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DEVELOPMENT OF NATURAL AND PLANTED VEGETATION AND WILDLIFE USE IN THE LAKE APOPKA MARSH FLOW-WAY DEMONSTRATION PROJECT: 1990 - 1994

Final Report 1997

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EXECUTIVE SUMMARY

This report describes the results of a study of the early successional characteristics of plant and wildlife communities developing on the Lake Apopka Marsh Flow-Way Demonstration Project. The study was conducted to gain an understanding of possible biological community development patterns that might be expected on former agriculture lands undergoing restoration to wetland by the St. Johns River Water Management District. The study was conducted during the time period September 1990 to March 1994.

The Lake Apopka Marsh Flow-Way Demonstration Project was located along the northwest shore of Lake Apopka (28°40'N Latitude/80°39'W Longitude), approximately 40 km northwest of Orlando, Florida. Prior to large-scale anthropogenic disturbance, the site probably had been a sawgrass and shrub wetland. A sawgrass and shrub wetland was inferred from observing aerial photographs taken during 1940. During the 1940s and 1950s conversion to agricultural use on the site, as well as, in the remaining Apopka Marsh was completed. The site was farmed until its purchase by the St. Johns River Water Management District in 1989. The flow-way project became operational and was flooded during November 1990. Flooding continued nearly uninterrupted through the end of the survey period (March 1994). Water level drawdowns occurred during June-August 1991 and spring 1993.

At the initiation of the flow-way project four distinct vegetation communities were present on the site. The eastern half of the southern flow-way cell (south marsh) contained a shallow emergent marsh with prominent species including, cattail (*Typha latifolia*), smartweed (*Polygonum punctatum*), pickerel weed (*Pontederia cordata*), arrowhead (*Sagittaria lancifolia*), water primrose (*Ludwigia* spp.), and southern water-hemp (*Amaranthus australis*). The western half of the southern cell (south marsh) was covered by an expanse of panic grass (*Panicum dichotomiflorum*) and water primrose (*Ludwigia* spp.) The northern cell (north marsh) contrasted sharply with that of the south. Most of the northern cell was covered by a continuous community of dogfennel (*Eupatorium capilifolium*). A narrow swath (~400m x 600m) adjacent to the western perimeter road was dominated by St. Augustine grass (*Stenatophrum secondatum*).

Soil on the site was predominantly histosol with varying thickness. Shallowest organic soil depths were observed in the northeastern corner of the southern cell. A soil consisting of silts and clays was observed below less than 10 cm of histosol. With time, and the continual action of Lake Apopka phytoplankton sedimentation, an unconsolidated flocculent layer with greatest depths of about 35 cm was observed in the eastern south cell.

The study was conducted using a multi-faceted approach. To test plant community successional patterns and the potential for manipulating these successional patterns sample plots and transects were established in the unmanipulated marsh (Natural

Succession Transects) and in three areas containing planted, seeded or mulched plots (Experimental Planting Sites).

Transects containing evenly spaced clusters (nodes) of plots (4 1-m^2 plots per cluster; 3 permanent, 1 temporary biomass clip plot) were regularly distributed across the marsh. Four transects (32 plots per transect) were placed perpendicular to the marsh water flow path in each of the north (600 m long) and south (450 m long) marshes (Number of plots=256). A ninth transect (610 m long) was placed parallel to the flow path at a point beginning near the south marsh lake water inlet and extending west. The ninth transect increased the total number of plots to 296.

Within the Experimental Planting Sites, sample plots were placed in each of the treatments. Within each of the small treatment plots (15 by 15 m for planted, seeded, and mulched; 18 by 18 m for control plots) a single 1m^2 was established. The larger Mixed Species plots (24 by 24 m) received two 1m^2 sample plots.

Three different types of data were gathered from the sample plots. Species composition and structure (percent cover, density, and height) data were taken from all of the 1m^2 plots (Experimental Planting Sites and Natural Succession Transects). Also, an overall estimate was made of species composition and cover percentage from each entire treatment plot in the Experimental Planting Sites.

Vegetative biomass was clipped and collected from one plot per cluster along the Natural Succession Transects. Live biomass (separated into species) and dead biomass (all species combined) were dried and weighed. Ground biomass subsamples were submitted to the Soil Science Department, University of Florida for tissue nutrient analysis.

Phenological patterns were measured in all treatments to determine if dynamics in flower and fruit production could be detected. These measurements were taken at the same time as structure and composition measurements. Measurements consisted of estimating the proportion of canopy in a sample plot containing flowers, immature fruit and/or mature fruit. A canopy index was developed in which estimates were based on the canopy in 1/3 canopy increments.

The effects of moisture on seed germination was tested in a growth chamber with seeds of wetland plant species placed under two moisture treatments (saturated and flooded).

A seed trapping study was conducted to determine if seed flow into and out of the Experimental Planting Sites was occurring. To accomplish this task seed traps were constructed from PVC pipe and 1x1 mm mesh fiberglass screen and placed along the upstream and downstream edges of two Experimental Planting Sites. Four traps per edge were placed. The traps were retrieved and replaced with clean traps monthly four times. In the greenhouse the water-borne traps were emptied into a germination pan and incubated under a twice daily automatically timed mist irrigation. Germination trials were run for two months per trap sample. Seedlings were identified to the species level and counted. Plants that could not be identified were grown to a size allowing identification. A collection of reference plants were maintained to allow identification of some species. The air-borne traps were surveyed and seeds were identified to species and counted.

The potential impact on succession by the soil seed bank was estimated by measuring seed germination from soils collected from the Natural Succession Transects, Experimental Planting Site-Control Plots and Experimental Planting Site-Mulch Plots in November 1991 and 1992. Soils were collected using 10cm diameter by 20cm long PVC corers, returned to greenhouse and placed under two soil moisture treatments (moist and 3-4 cm flooded). Seedlings were identified to species and counted.

Clonal recruitment was estimated by marking 8 individual rhizomes per species per planting site of arrowhead, cattail, bulrush, and pickerel weed in May 1992, then returning in May 1993 and measuring the distance grown and the distance to the nearest competitor. This experiment was conducted in the three Experimental Planting Sites.

Avian species were featured in a baseline study of wildlife utilization of the early successional marsh ecosystem. Birds were observed using two methods. First, a fixed width transect survey was conducted using the established vegetation transects. The transect width was approximated to be 35m wide on either side of the transect centerline. Birds observed or heard within this corridor were identified to species and counted. A second method used involved slowly driving around the marsh perimeters and observing birds. In addition to the flow-way marshes, observations were taken from the unmanaged marsh adjacent to and north of the south marsh, and the agricultural fields adjacent to and north of the north marsh. Again, birds were identified to species and counted. For comparison these observations were converted into bird numbers per hectare.

Evaluation of the Experimental Planting Sites revealed that the Mixed species planting treatment provided a diverse, cattail resistant vegetative community. In contrast, the mulched and seeded treatments provided a favorable environment for cattail invasion. The single species planted treatments varied in establishment and expansion success and resistance to cattail. Spikerush (*Eleocharis interstincta*), pickerel weed, arrowhead, and giant bulrush (*Scirpus californicus*) tended to establish quickly and resist cattail. Giant bulrush also was resistant to invasion by pennywort (*Hydrocotyle ranunculoides*, and *H. umbellata*). Pennywort was a dominant mat-forming species throughout the marsh, with the most dense coverages occurring in disturbed areas (e.g. Experimental Planting Site) and areas without dense overstory canopy. The canopy of giant bulrush was no more dense than other areas containing pennywort, yet was resistant to invasion by pennywort. Bulrush established quickly, covering the entire plot. Bulrush resisted cattail invasion during the study period. But its coverage of live biomass declined after two years, potentially increasing its invasibility by cattail. Maidencane (*Panicum hemitomon*) established slowly, did not cover the plot and was easily invaded by cattail.

Floating mats developed in the Experimental Planting Sites. The pickerel weed planted treatment floated completely, while the giant bulrush treatment and giant flag (*Thalia geniculata*) (Mixed Species Planted treatment) remained firmly rooted. The remaining treatment plots floated at different times during the duration of the study.

Successional patterns along the Natural Succession Transects tended to consist of the initial vegetative community senescing after flooding followed by a period of shallow open water with patches of vegetation developing, increasing in size and eventually coelescing into continuous hydrophytic plant community. Dominant plants in the hydrophytic plant community tended to be cattail (*Typha domingensis* and *T. latifolia*), pennywort, pickerel weed, arrowhead, alligator weed (*Alternanthera philoxeroides*), coastalplain willow (*Salix caroliniana*), and water primrose (*Ludwigia peruviana*). Less prominent species with potential for dominance included, *Polygonum densiflorum* and *Bidens laevis*. Structure and composition, and biomass measurements revealed shifts in dominance by the successional plant community during the study period.

Extensive floating mats developed along the Natural Succession Transects, as well as in the Experimental Planting Sites. Biomass measurements provided some evidence for one of the means of floating mat development. In the southeastern marsh, rhizomes were found growing up into the water column. Biomass measurements tracked this pattern over time. This strategy was found with cattail, arrowhead, and pickerel weed. These suspended roots and rhizomes seemed effective at trapping phytoplankton sediments from the inflowing lake water. The utilization of the water column by roots and rhizomes preferentially to the deeper sediments (See below-ground biomass measurements) led to a shift of bouyant biomass into the water column. Assuming that decomposing organic matter increased gas production, trapping of sediments and deposition of dead leaves contributed additional bouyant biomass. Finally, the coupling of the increase in bouyant biomass over time and the sediments' agricultural history led to floating mat formation. Floating mats affected the marsh in a number of ways. They increased the area of substrate available for seed germination and seedling establishment. Finally, floating mats moved around with the wind and scoured grounded or rooted vegetation patches leading to newly floating mats.

Results of the seed flooding experiment were often different from that of published reports. Germination rates tended to be lower than expected. This probably resulted from the absence of critical germination cues such as light and heat environment. An extensive literature review of seed germination by species found in the seed bank, seed dispersal, and vegetation studies was provided to reduce an information shortfall.

Water-borne seed dispersal differences between "inflows" and "outflows" to the Experimental Planting Areas were not detected. This pattern may have resulted because the dense cover of plant species such as pennywort may have limited the movement of seed in flowing water or stopped water altogether. A measurement of water flow in the north marsh planting site was less than the detection limit of the flow sensor (1.5 cm s^{-1}). Seed germination by pennywort from traps located in pennywort communities was commonly observed, suggesting that the plant species nearest the seed traps would provide the greatest measurable contribution. Air-borne seed traps captured a preponderance of cattail seeds (0-65.3 seeds trap-1). A single broomsedge (*Andropogon* spp.) seed was the only species other than cattail captured in air-borne seed traps. Seeds that we expected to capture, but did not, included: more *Andropogon* spp., *Baccharis* spp., *Eupatorium* spp., and *Mikania scandens.*

Seed bank measurements revealed a seed bank species community similar to other freshwater marshes. The seed bank consisted of a community containing annual or biennial species (47%), generalist species (84%), and graminoids and herbs (95%). The seed bank tended to contain a larger, generally unrelated, flora (24-52 species) than that of the established vegetation community (12-38 species).

The greenhouse soil moisture experiment revealed that shallow flooding (4 cm depth) reduced seed germination from the seed bank. Under moist soil conditions, seed germination from the Mulch treatment was greater than from the Natural Succession Transects and the Control Treatment, while the Natural Succession Transects and Control Treatment were somewhat similar. No differences among field treatments were found when soils were maintained under flooded soil conditions. Cattail tended to germinate at greater rates under flooded conditions than moist.

Clonal measurements provided insights into the competitive success of cattail in comparison with other rhizomatous species. Cattail grew at a greater rate (0.043-0.162 cm^{-d}) than bulrush (0.012-0.073 cm^{-d}), arrowhead (0.03-0.038 cm^{-d}), and pickerel weed (0.013-0.028 cm^{-d}). The competitive success of cattail can also be explained by its growth pattern in addition to its rapid growth. Cattail tended to grow three rhizomes from a culm. As each rhizome approached 1-2 m long it produced a leaf producing culm. Then, each culm grew an additional three rhizomes. In contrast, the competing species, pickerel weed and arrowhead tended to produce a single long dense rhizome.

As expected the marsh contained a wetland adapted avian community. No detectable differences in avian species similarity patterns were measured among the treatments. The south marsh tended to have fewer birds than the north marsh. Blackbirds tended to be the most common bird in the south marsh. The prevalence of blackbirds can be attributed to coverage by cattail. The north marsh had slightly greater densities among more taxa than the south marsh. We detected minimal temporal differences in total bird density in the south marsh while the north tended to be increasing during the sample period.

In summary, the Lake Apopka Marsh Flow-Way Demonstration Project was characterized as an early successional freshwater marsh ecosystem. Vegetation measurerments taken along Natural Succession Transects revealed an ecosystem rapidly filling open space as predicted by successional models of Eugene Odum. Insights into dominance by cattail in this succession may be found with a number of factors. High nutrient loading is related to cattail dominance. The disturbed soil environment brought on by agricultural practices reduced the density of plant species, in both the seed bank and established vegetation that could compete with cattail. Cattail was found to successfully germinate under shallow flooding conditions. Field observations revealed that cattail was capable of growing under completely inundated conditions. The clonal growth measurements revealed that rhizome growth rates of cattail were much greater than those of pickerel weed and arrowhead. In addition, large-scale cattail rhizome structural architecture, consisting of three rhizomes per culm growing and establishing a culm having three rhizomes each, was more competitive than the single rhizome plan of the various other species in the ecosystem. But assemblages of competitive species, if planted at a favorable density, were capable of competing and becoming established. The Experimental Planting Sites revealed that establishment of pickerel weed, arrowhead, giant bulrush, spikerush, or a mixture of the above species and giant flag, early in ecosystem succession could help establish invasion resistant vegetation communities. Unsuccessful planted species included: maidencane, bulrush, and sawgrass. Wildlife observations revealed that increasing numbers of wetland bird species were using the marsh over time.

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Acknowledgments

We thank the St. Johns River Water Management District for entrusting us with study of the Apopka Marsh as it developed from a recently abandoned agricultural field to an early succession freshwater marsh. We are especially grateful for their tolerance and patience as we worked towards the completion of this project. We have enjoyed the interest and appreciate the assistance in the field by Roxanne Conrow and Bob Cooper. Bob Cooper has provided considerably more than field assistance. He was always interested in evening chats about the natural history of the marsh, or anything else that mattered. We appreciate the help provided by the Operations staff. John Rutchow was there to help extract (once) our unstoppable Blazer 4X4, give us advice about road conditions, and to generally look after us as we slogged through the muck and mire from sunup to sundown. Charlie Register started near the end of our tenure at the marsh, but he too provided good cheer and a watchful eye as we spent our days knee deep in muck and mire. This project would not have been possible without the volunteer help of many graduate students and a visiting scientist. Dr. ShengFang Lan (Botanist, South China Agricultural University) provided assistance early in the project. He reminded us that the simplest solution to a problem is often the best solution. Chuck Graham, David Day and Tonya Howington proved significant field assistance during the early phase of the project. Chuck Graham and Tonya Howington lead the wildlife data collection field trips. Tonya Howington analyzed data and wrote the first draft of the wildlife section. John Wigginton helped with field work and wrote the second draft of the wildlife section. Rodney Pond provided assistance with repeated field trips early in the project. Mark Clark provided valuable field assistance and wonderful discussion about marsh ecology late in the project (to some extent every time I see him). Ken Clough must be singled out for accolades. He provided volunteer assistance during many field trips because he WANTED TO BE THERE. Each and everyone of the people assisting on this project was exposed to the elements including: coldest and hottest days of the year, rain, lightning (nobody got hurt, fortunately), mosquitoes, unbelievably disgusting muck (aka goop), extreme physical stress, and frequently much less than ideal living conditions. Sue Ellen Ritchie provided editorial assistance early in the generation of this report. Finally, Joe Prenger took on the daunting task of providing the final editing even though he has another full time job obligation.

I. INTRODUCTION

This research project provides information about vegetation and wildlife community development and control of vegetation community development in the Lake Apopka Marsh Flow-Way Demonstration Project. Information from this study will be used to help guide the design, construction and management of a full scale Lake Apopka Marsh Flow-Way.

VEGETATION COMPONENT

Until this project little information was available about "old-field" succession in wetland ecosystems. The successional process occurring in the study area is defined as secondary rather than primary because the site was not devoid of organisms (Glenn-Lewin and van der Maarel 1992). Previous site manipulation drastically changed the site, but not to the extent that it was beginning a successional process without propagules or on a newly formed substrate.

There exists a long history of studies on upland old-field succession in northern temperate areas within recovering agricultural lands (Bazzaz 1976, Odum 1960, Wiegert and Evans 1964, and Zedler and Zedler 1969). Much of the early theoretical work in ecology centered around observations of abandoned farmland in North

America. Many familiar paradigms in today's ecology originated from these studies. They include:

- Succession begins with the establishment of an annual plant community that rapidly shifts to a shrub community which then is replaced by a forest. The forest is stable and remains intact for a long period of time unless it is disturbed by some exogenous force such as wind or fire, and
- The successional pattern is predictable and generally driven by local climate. In other words, if the ecosystem is left alone it will return to a "normal" state (Peet 1992).

Contemporary successional paradigms don't accept a simplistic view of plant community succession. McCook (1994) provides a useful analysis of the various successional theories in use today. He suggests that there are generally accepted patterns of succession including: initial conditions are important, species replacements occur over time, and successional theories tend to be incomplete and somewhat fragmented. His statement, which is a condensation of past theory and a guide for the study and management of plant community succession, consists of three conditions:

- Life history strategies employed by various species will determine how they respond to the available environmental conditions;

- Competitive interactions determine the relative success of species within an ecosystem;
- Sorting of species along environmental gradients will result from the interplay of life history strategies and competitive interactions. This theoretical statement says that species with the ability to establish, survive and compete with other species along an environmental gradient will determine the character of successional patterns. Understanding these various components may lead to a moderately correct prediction of successional patterns.

This study was initiated before the publication of McCook's paper, but included many of its criteria for predicting successional patterns. Life history strategies may be inferred from long-term measurements of species presence/absence, cover, density, height, and phenology, and measurements of seed bank, and seed dispersal. Competitive interactions may be inferred from measurements of species performance under conditions of manipulated (e.g. planted) versus un-manipulated (e.g. unplanted) sites within the developing marsh. Sorting along environmental gradients may be addressed by the downstream placement of study plots. With this information we can generate a conceptual model of how ecosystem development may occur on this site.

WILDLIFE COMMUNITIES AND HIGH NUTRIENT ENVIRONMENTS

Constructed Wetlands and Habitat Quality

Many studies have been conducted on the most effective methods of designing and managing constructed wetlands to enhance habitat quality. Marble (1992) discussed methods that may enhance wetland dependent bird diversity. She suggested the use of complex/cluster wetlands to create a variety of habitats. Suggestions for vegetation class interspersion, richness, and canopy also were given that focus on enhancing bird populations.

Knight (1992) explained that significant losses of vegetation and animals may occur as a result of high loadings of pollutants. He suggested that water flow and depth control may affect primary productivity of the wetland and the ability of the wetland to effectively treat nonpoint source pollution. He suggested that greater flows in shallow water provide higher dissolved oxygen levels leading to higher secondary productivity. Deeper water can limit oxidation of organic matter and plant growth. The wetland design should include a flexible hydroperiod to allow for maximum growth of emergent vegetation over submerged vegetation and algae.

Hammer (1992a) predicted that high loading of nutrients into a system would allow *Typha spp.*, *Salix spp.*, or other woody shrubs to dominate and reduce the ecosystem's diversity. Hammer (1992b) also found that manipulation of the water level alone can sustain a diverse, complex, and productive marsh for many years. Furthermore, fluctuations of water levels may create more ecological niches.

Wildlife production is generally high for constructed wetlands receiving high concentrations of nutrients (Hammer 1992a, Hammer 1992b, McAllister 1993a, McAllister 1993b, Streever and Crisman 1993, Kale 1992, McAllister 1992, Knight 1992, Rader and Richardson 1992, Kerekes 1990, Maehr 1984). Edelson and Collopy (1990) conducted a study of wading bird utilization of a hypereutrophic lake, and concluded that the abundance of fish stimulated a large population of egrets and herons.

Van Horne (1983) correlated habitat diversity and wildlife species by the ratio of generalist to specialist species in managed areas. A positive correlation between habitat quality and species density cannot be assumed without supporting demographic data. Horne defined habitat quality as the relative importance of a certain habitat type in maintaining wildlife. He suggested that management plans should not be adopted on the basis of species surveys or censuses conducted for one year or less.

Factors Affecting Avian Community Structure

Based on studies of marshes in Iowa, Weller and Spatcher (1965) suggested that the majority of common marsh birds preferred a combination of dry and open areas, and areas of extreme coverage or extreme openness were not preferred by any one marsh bird species. "Edge" areas were attractive only when open pockets of water were present. Interspersion of open areas that could be connected by animal trails were determined to be more important than cover to open water ratios in determining habitat suitability for marsh birds.

Joyner (1980) found that pond selection by ducks in Ontario was partially determined by invertebrate density. Voigts (1976) determined that invertebrate abundance increased as submergent vegetation replaced emergent vegetation and that marshes with submerged vegetation (suggesting openness) interspersed with emergent vegetation (suggesting cover) maintained the greatest invertebrate abundance. Nesting birds preferred marshes with the highest numbers of invertebrates.

Murkin (1982) discovered that on experimental plots of various cover:water ratios, dabbling ducks preferred the 50:50 plots. This study supported the theory that maximum avian use and production occurs during the "hemi-marsh" phase of the marsh cycle. Invertebrate abundance also was positively correlated with marsh usage by waterfowl. However, invertebrate abundance was not affected by cover removal. Visual cues of openness may be the primary factor used by waterfowl to select areas of greatest invertebrate abundance.

Leschisin et al. (1992) suggested that vegetative factors such as cover, species diversity, and wetland age may affect waterfowl usage of wetlands. Their study revealed that breeding waterfowl may select a marsh based only on physical characteristics, with preference to submerged vegetation. This study did not include an analysis of water quality, or the macroinvertebrate and fish populations.

Wilcox and Meeker (1992) found that structural complexity and species diversity of the plant community was important to providing habitat for invertebrates, thus affecting the availability of a food source for fish and birds in marshes. Water depth fluctuation affected both plant structure and diversity. No, or infrequent, water fluctuation reduced the plant diversity and negatively affected invertebrate populations. However, large aquatic macrophytes tended to dominate their study sites. It was suggested that large fluctuations in water depth could lead to a lack of larger canopy plants resulting in reduced habitat for invertebrates and protective cover for fish and birds.

In a study of plant-macroinvertebrate associations with waterfowl, one gram of animal biomass was associated with every 100 grams of plant life (Krull 1970). Although there was no differentiation between overall percent cover types, it was noted that plants considered to be poor waterfowl food can harbor large quantities of macroinvertebrates, thereby increasing the area's utility for waterfowl.

OBJECTIVES

Assessment of Experimental Planting Areas and Natural Succession Transects.

This assessment introduces studies that were designed to provide information about the succession of agricultural land to freshwater marsh after flooding and to determine if the inclusion of preferred species will enhance the succession of this new marsh.

Assessment of Experimental Planting Treatments.

The objective of this subtask was to determine the nature of plant community development within three Experimental Planting areas. In 1991 a contractor selected by the SJRWMD completed planting in three five-acre experimental blocks located within the marsh flow-way. The successional development of these three areas containing a variety of experimental treatments was monitored. Each site contained planted, seeded, mulched, and control treatments. These treatments were chosen to test the survivability, competitiveness, and colonization potential of a suite of wetland species. The experimental planting sites provided information about the feasibility of enhancing plant community succession to a desirable species composition. These sites also provided insights into plant community development in the presence of cattail (*Typha latifolia*), an invasive, potentially site dominating plant species.

Assessment of Natural Succession - Structure and Composition

This subtask provided an assessment of successional development of the natural marsh and was compared to succession in the experimental planting areas. This assessment was undertaken to determine successional development without site manipulation or succession enhancement through planting.

Assessment of Natural Succession - Above- and Below-ground Biomass Dynamics

This assessment provided insights into the vegetation biomass dynamics in the natural succession area of the marsh. Above and below ground biomass data were collected in order to determine the partitioning of biomass in the ecosystem over time. The vegetation samples provided material for tissue nutrient analysis conducted by the University of Florida Department of Soil and Water Sciences.

Reproductive Potential from seed for plant communities in the Lake Apopka Marsh

The purpose of this task was to determine phenology of seed production (presence of flowers and fruits); assess the effect of water depth on seed germination; assess the role of air and water in seed dispersal in the marsh; determine the potential role of the seed bank in plant community dynamics; and determine seasonal patterns of flowering and fruiting in the marsh. Literature related to seed resources can be found in Leck, *et al.* (1989) and Fenner (1992). Regenerative capabilities of vegetative communities are dependent on two strategies: sexual reproduction from seed, and asexual reproduction (clonal) from rhizomes, stolons, or other means of vegetative growth. Wetland ecosystems tend to contain a preponderance of species that use clonal growth to increase and maintain population sizes. Seeds are an important part of the reproductive potential of a wetland community, but seeds make their greatest contribution to community regeneration or expansion during the periods when water levels recede to a low enough point to allow seed germination (van der Valk 1992). Understanding the regenerative potential of plant species found in the marsh will help managers devise management strategies for promoting or retarding these species.

Reproductive Phenology

Reproductive phenology was studied to provide information on flowering and fruiting phenology in the marsh in the natural succession areas and planting sites.

Seed Germination

This assessment was designed to provide information about the seed germination requirements of various plant species (preferred and nuisance) in the marsh, including the effects of shallow flooding on germination of target species within the marsh. Species of interest included: (1) dominant species found in the natural marsh, (2) planted species in the experimental planting site, and (3) obligate hydrophyte species (as defined by Reed 1989) found in the local area.

Seed Dispersal

The seed dispersal assessment was designed to provide information about seed dispersal to and from the Planted Sites. This information will provide insights into the understanding the seed flow patterns in the marsh.

Soil Seed Bank

Soil seed banks have been identified as sources of propagules for the regeneration of disturbed ecosystems. In some cases seeds have remained viable in the soil for long periods of time and have provided an opportunity to contribute to vegetation community restoration (van der Valk, A.G. and R.L. Pederson. 1989, van der Valk, A.G., and J.T.A. Verhoeven 1988, and van der Valk, A.G., R.L. Pederson, and C.B. Davis. 1992). In the case of the Lake Apopka Marsh, with anticipated management strategies including long hydroperiod and water depth greater than 50 cm, the seed bank may not contribute favorable wetland species to restoration of preferred species because farming activities have included intensive site management techniques to remove competing plant species and reduce water levels.

Clonal Growth

Clonal growth, an asexual reproductive strategy common to many wetland species, was studied to determine its contribution to the development of the marsh. Wetland species use this strategy to take advantage of environmental conditions that often are not acceptable for seed germination (e.g. deep flooding for long periods). This study was designed to compare the growth rates of rhizomes from a set of target species in the Planted area, including *Pontedaria cordata*, *Sagittaria lancifolia*, *Scirpus californicus*, and *Typha latifolia*.

Wildlife Component

This portion of the Apopka Demonstration Project Report identifies the population dynamics of the emerging wildlife communities utilizing the marsh from August 1991 through November 1993. Avian communities were used as the primary indicators of habitat quality for this study for the following reasons: 1) birds are easy to observe; 2) they engage in community dynamics; and 3) other studies have shown that birds are often sensitive to changes in wetland structure and function (Edelson and Collopy 1990, Cable et al. 1989, Frederick and Collopy 1988, Kroodsma 1978). In addition, Edelson and Collopy (1990) determined that constructed wetlands can provide suitable habitat for many avian species.

A limited fish survey is included in this report to supplement the avian surveys in the description of the wildlife communities using the project site. Only the south and unmanaged marshes of the demonstration project were sampled.

II. STUDY SITE

The study marsh is located on the northwest shore (28 40'N Latitude, 80 39'W Longitude) of Lake Apopka in Lake County, Florida (Figure 1). Lake Apopka is located in the headwaters of the Ocklawaha River basin, downstream and northeast of the Green Swamp. Before it was farmed, the site was a sawgrass/mixed shrub marsh (1940 USGS Aerial Photograph, 1842 Surveyers Map).

Landscape changes began in the 1880s with the digging of the Apopka-Beauclair Canal. The canal connected Lake Apopka to Lake Beauclair. Prior to the canal, Lake Apopka probably drained overland through a hardwood swamp forest to the northwest into Little Lake Harris. The canal seems to have reduced the water level in Lake Apopka based on observations of a present day difference in water level between Lake Apopka and downstream lakes (USGS hydrodata).

Conversion of marsh into agricultural land began during the late 1940s. Most of the marsh area was converted to farmland by the middle 1950s. Lake eutrophication progressed as a result of oxidized soil releasing nutrients into drainage water, fertilizer application in farming, discharge from a nearby citrus processing plant, and sewage effluent discharge from the community of Winter Garden.

Lake Apopka restoration plans began in the 1970s as water quality degraded and the lake's recreational fishery declined. Restoration efforts have continued with land acquisitions and the establishment of the Lake Apopka Marsh Demonstration Flow-Way Project.

APOPKA MARSH FLOW-WAY DEMONSTRATION PROJECT

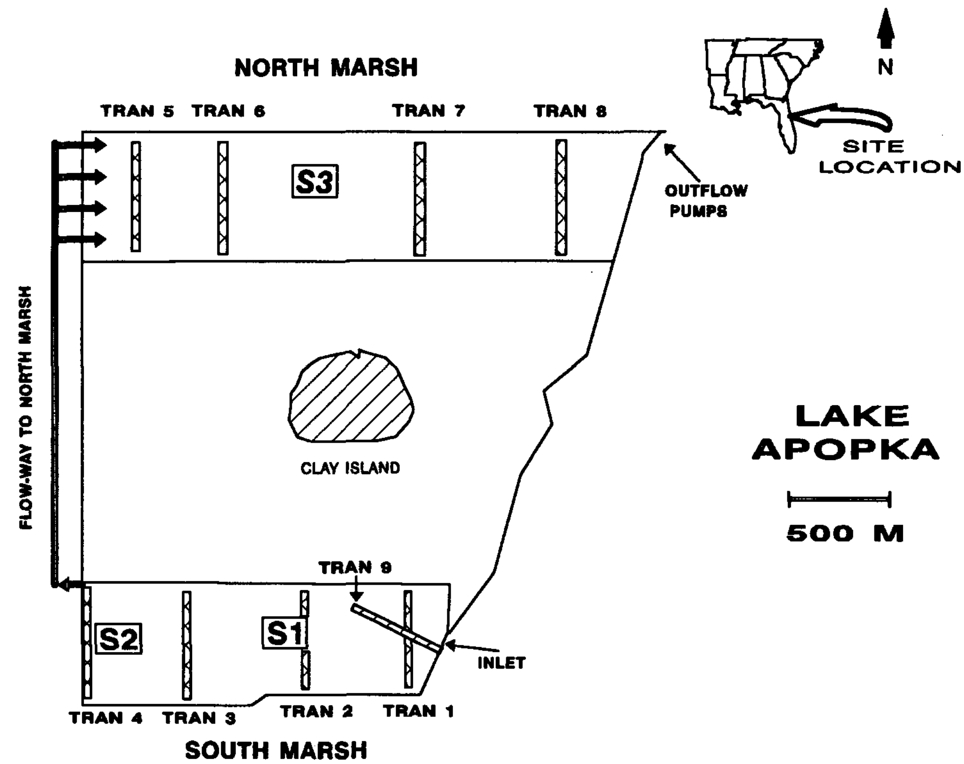

Figure 1. Plan view of Apopka Marsh Flow-Way Demonstration Project

PHYSICAL CHARACTERISTICS

Climate in this region is transitional between subtropical and temperate (Chen and Gerber 1991). This pattern is evident from the cool, slightly rainy winters, dry fall and spring seasons, and hot wet summers (Figures 2 and 3). Winter temperatures below freezing are infrequent, resulting in a nearly continuous growing season for vegetation.

Soil at the site is a 10 cm to 1 m thick veneer of histosol over clay and sand (Lake Co. Soil Survey; Pers. Obs.). Fifty years of farming has resulted in soil oxidation. The soil surface elevation reduction due to oxidation is approximately one meter (unpublished data, SJRWMD Soil Elevation Survey). Farming practices included plowing to an approximate depth of 50 cm, applying pesticides, and repeated planting of a seasonal rotation of primarily corn and carrots. These practices removed all wetland plants from the crop areas of the farm fields. The rapidly growing wetland plants, *Eichhornia crassipes*, *Hydrocotyle ranunculoides*, and *Typha* spp. maintained populations along drainage canals in spite of herbicide applications.

Lake Apopka water enters the marsh along the eastern levee of the south marsh. It flows westward through a water control weir, into a connecting flow-way, then into the north marsh through a series of culverts along its western levee. Water is pumped back into Lake Apopka at the northeastern corner of the north marsh (Figure 1).

Lake Apopka has been described as hypereutrophic with a mean total phosphorus of 0.22 mg l^{-1} and a mean soluble reactive phosphorus of 0.035 mg l^{-1} (Lowe, *et al.*, 1992). The lake water is high in suspended solids resulting in low water clarity. The lake surface level is usually above the marsh soil surface level due to soil oxidation.

Stage within the marsh remained above the sediment level during most of the sample period (Figure 4). Exceptions to this pattern occurred in August 1991 during

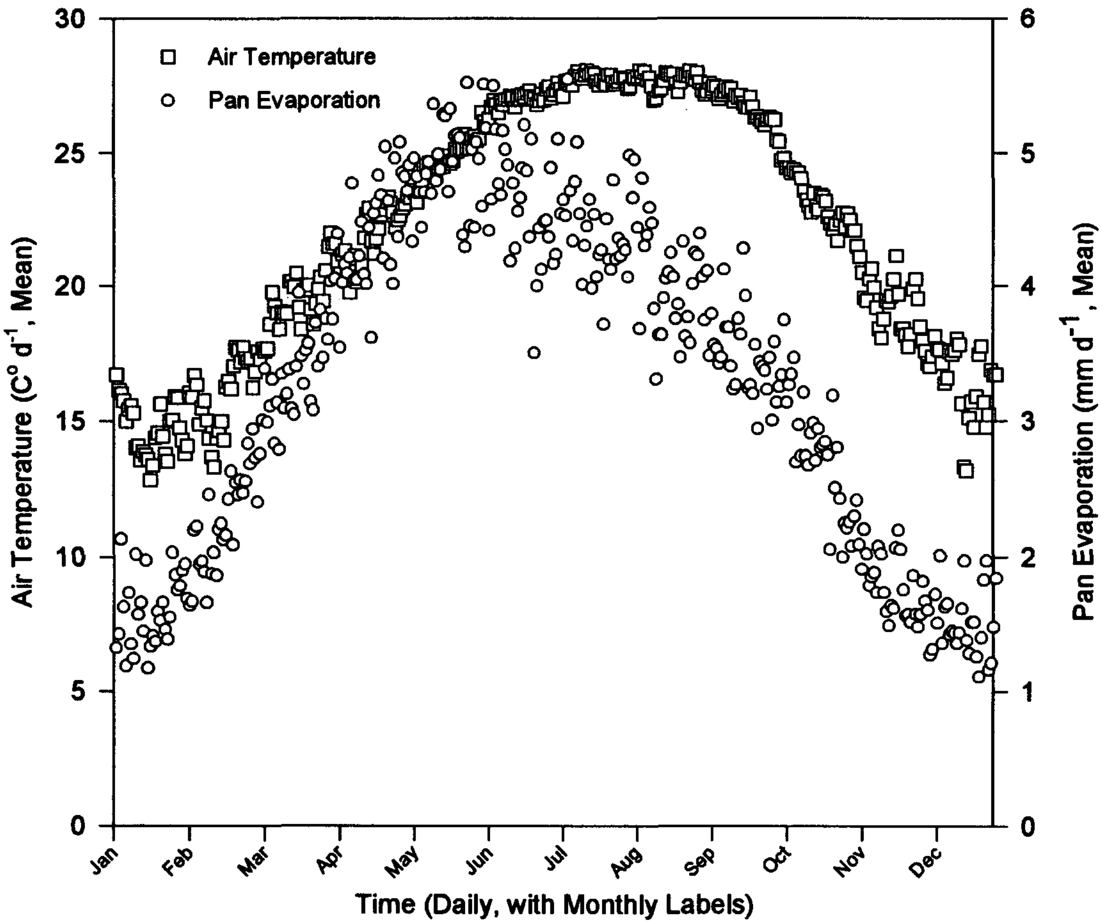

Figure 2. Mean daily air temperature (Clermont, Florida) and pan evaporation (Lisbon, Florida) from nearby the Apopka Marsh Flow-way Demonstration Project.

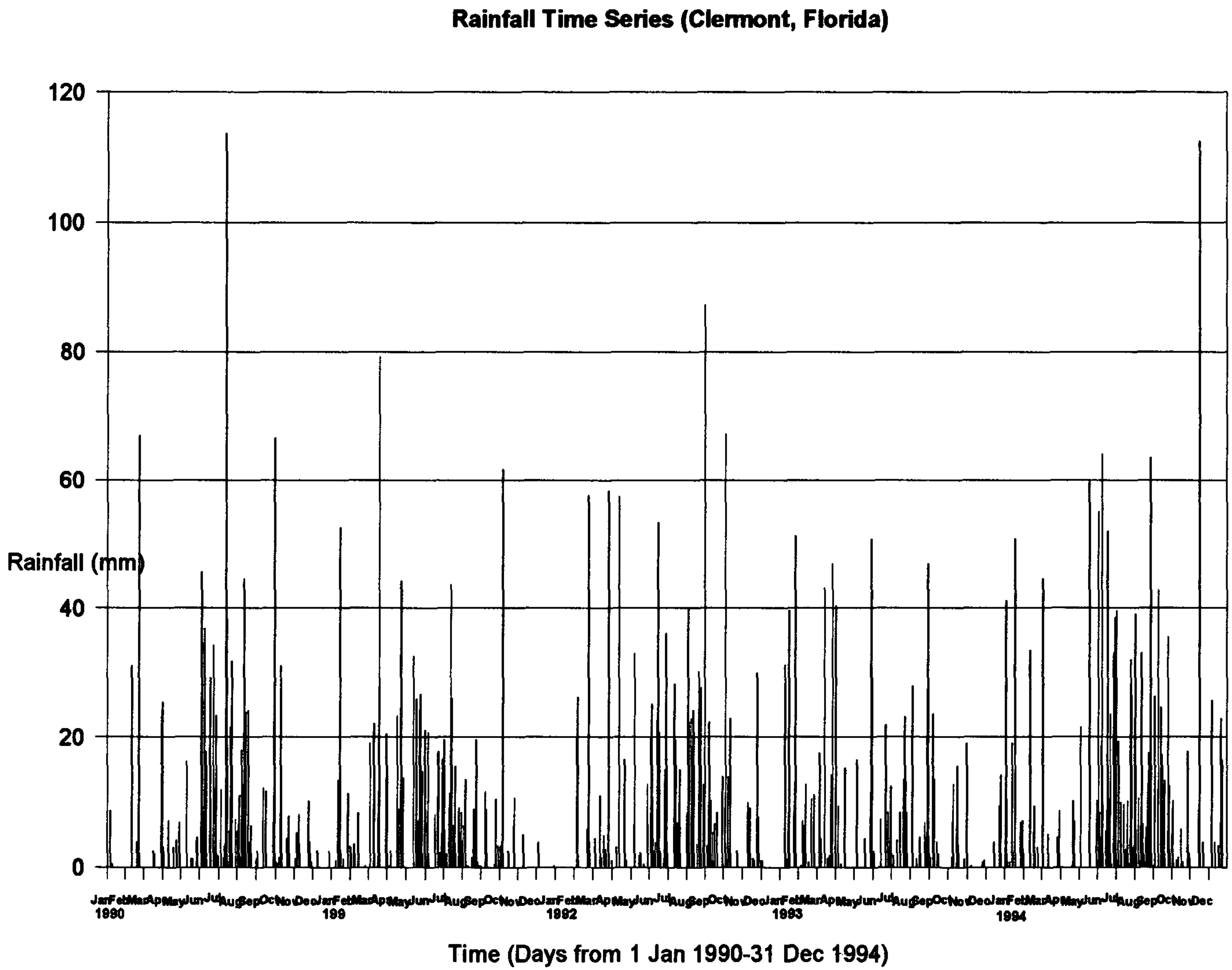

Figure 3. Rainfall time series from Clermont, Florida

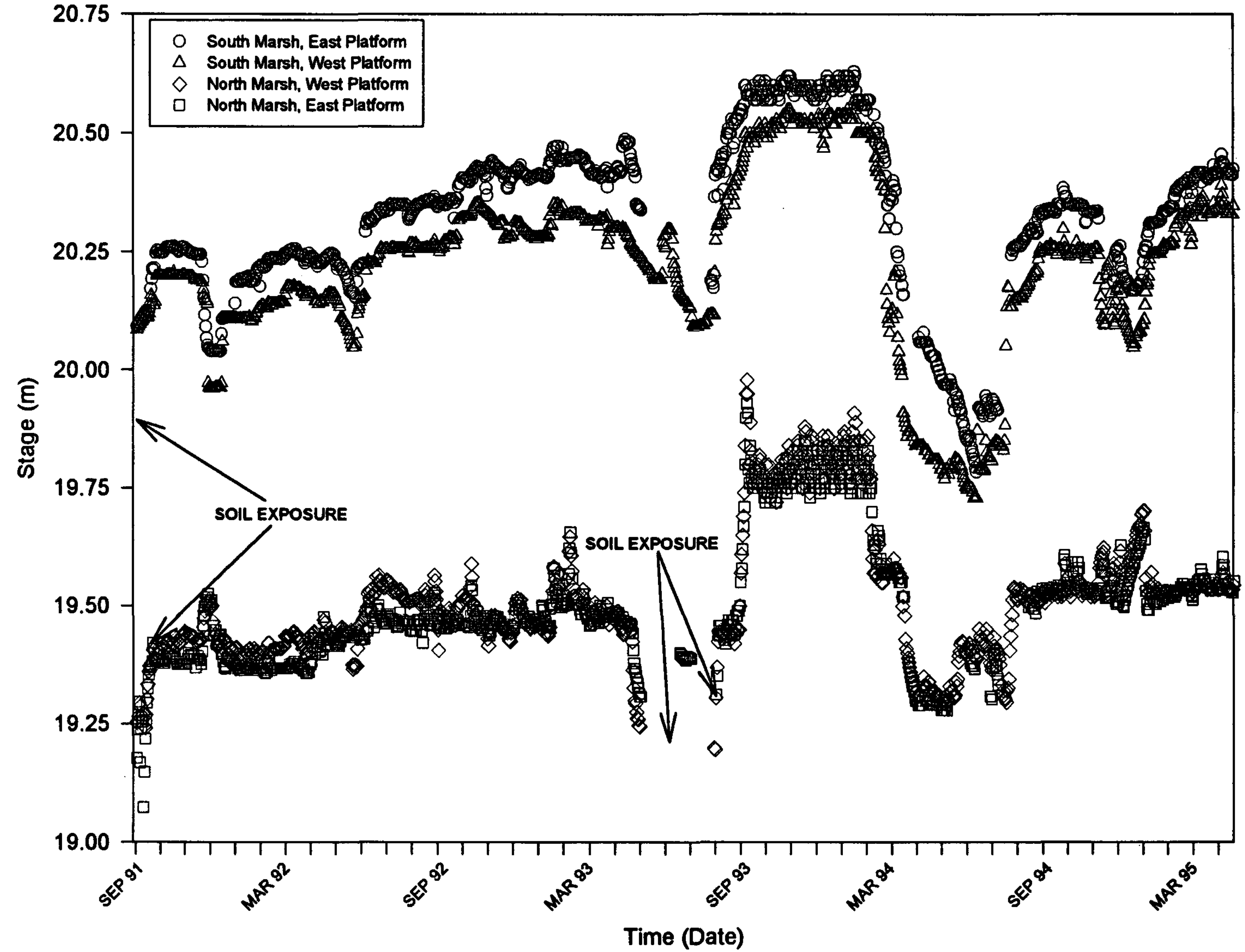

Figure 4. Apopka Marsh stage time series (m, NGVD), Apopka Marsh Flow-Way Demonstration Project.

planting of the Experimental Planting Sites and again in August 1993 during repair of the weir at the exit from the south marsh. These stage data also show the downstream elevation gradient from the marsh inlet to the easternmost stage recorder in the north marsh (Figure 4).

The physical environment may control vegetation dynamics of the Apopka Marsh in a number of ways. High nutrient levels in lake water and soils may promote the rapid growth of *Eichhornia crassipes* and *Typha* spp (DeBusk, *et al.*, 1995; Newman, *et al.*, 1996; Davis, 1984; Urban, *et al.*, 1993; Grace, 1988). Rapid growth of *Hydrocotyle ranunculoides* is probably promoted by increased nutrient loading. Growth measurement under varying nutrient loadings are not evident in the literature, but the absence of this species in low nutrient environments provides an inference about its habitat requirements (Loveless, 1959; Gunderson, 1989). High levels of suspended solids in the water limit the development of shade intolerant submersed plants and increase the burial rate of seeds in the soil seed bank as a result of increased sedimentation rates. Increased sedimentation rates may lead to isolation of the older seed bank while the recent seed bank becomes more likely to be exposed and activated when conditions are favorable for seed germination. If the recent seed bank is dominated by the most aggressive, high nutrient adapted plant species, a perpetuation of the dominant overstory may be expected.

BIOLOGICAL CHARACTERISTICS

Land use on the site has eliminated the perennial wetland plant community. Before the site was farmed it was dominated by a rhizomatous sedge, sawgrass (*Cladium jamaicense*) and mixed shrub (probably *Baccharis halimifolia* and *Myrica cerifera*) communities. Aerial photographs from 1941 reveal that the sawgrass marsh extended from the edge of the upland ridge system to the edge of Lake Apopka, a distance of about 5 km. At present sawgrass is only sporadically common along the Apopka-Beauclair Canal and around the lake fringe. Since 1941 a swamp forest dominated by *Acer rubrum* and *Fraxinus pennsylvanica* has become established on the lake fringe (1940 USGS aerial photography). The biological environment may be described as highly disturbed and devoid of historically dominant perennial vegetation.

III. METHODS

RESEARCH PROGRAM MANUAL

A research program manual was completed in October 1991. The manual, which described research methods, was used on a regular basis during field work at the Apopka Marsh.

VEGETATION COMPONENT

Development of Natural and Planted Vegetation and Mechanisms for Enhancing Marsh Establishment

Objectives of this study were to assess the development of plant communities within the Apopka Marsh Demonstration Project area (Figure 1). This part of the study was divided into three subsections: Experimental Planting Sites-Structure and Composition, Natural Succession Transects-Structure and Composition, and Natural Succession Transects-Above and Below Ground Biomass. This task deals with the fundamental measurements of succession within the marsh. See Figures 5 and 6 for overviews of Experimental Planting Sites (Figure 5) and Natural Succession Transects (Figure 6). Procedures for sampling community structure and biomass can be found in Bonham and Ahmed (1989) and Mueller-Dombois and Ellenberg (1974). A method for extracting roots using a sharpened PVC plastic corer inserted into the soil and sieving the extracted soil to separate roots was used. This method, along with other more complicated and time consuming methods are reported in Pearcy et al. (1991) and Boehm (1979).

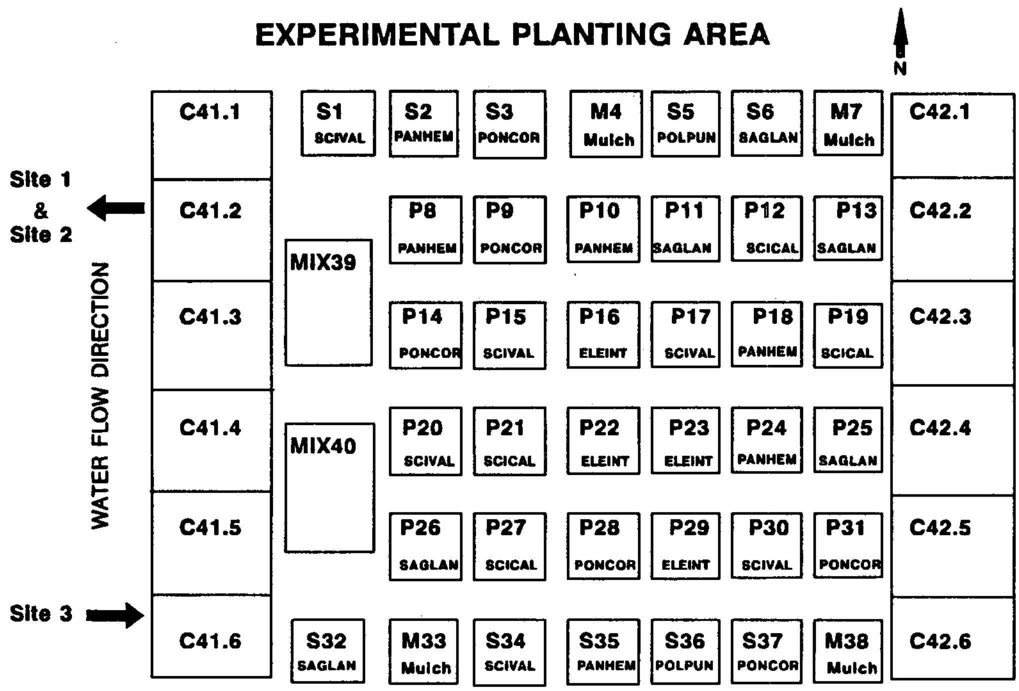

Figure 5. Plan view of Experimental Planting Site, Apopka Marsh Flow-Way Demonstration Project. Plot assignments were changed slightly at Site 2. S1 and S37 contained *Pontederia cordata* (PonCor) not *Scirpus validus* (SciVal). S3 and S37 contained *Scirpus validus* (SciVal) not *Pontederia cordata* (PonCor). See Tables 1-3 for plant code information.

NATURAL SUCCESSION TRANSECT

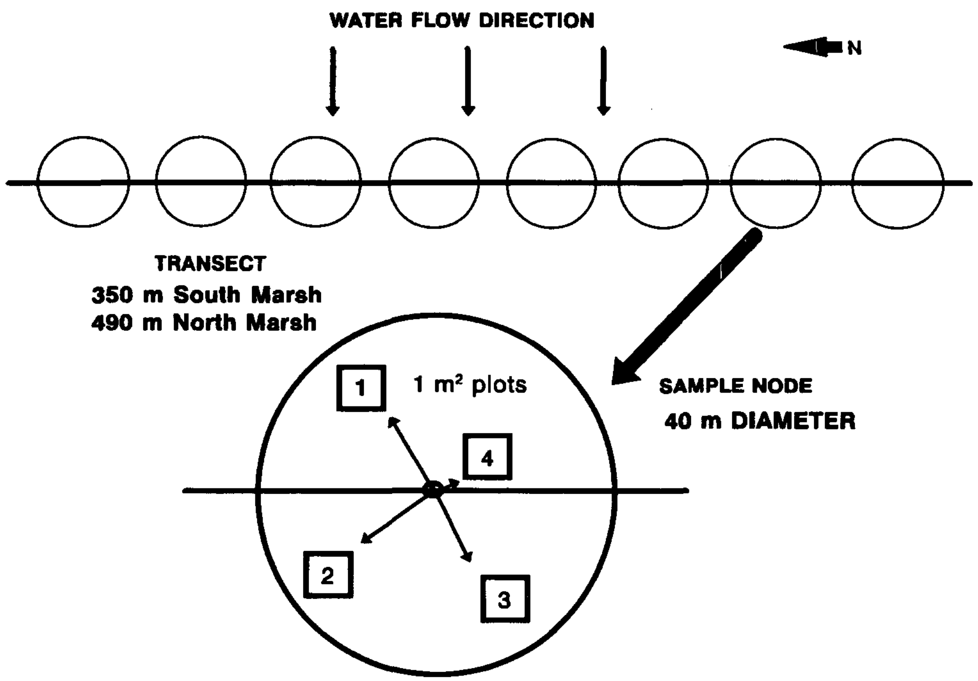

Figure 6. Plan view of Natural Succession Transect, Apopka Marsh Flow-Way Demonstration Project.

Within each planting treatment plot and natural succession transect plot a suite of qualitative and quantitative data were taken from each species encountered. These data included: vegetative cover (%), stem density (# m^{-2}), maximum height (cm), and phenology (canopy index). Cover was estimated in 5% increments, except for trace levels (<5%). Trace cover estimates were assigned a 1% cover value. A phenological index was generated by estimating the state of flowering and fruiting (immature and mature) using a canopy dominance index (1=1/3 of canopy, 2=2/3 of canopy, and 3=total canopy).

Within each subplot three water depth measurements estimated to the nearest 1 cm were made. To account for changes in water depth resulting from floating mat formation, additional vertical measurements were made through the mat surface to hard soil below. These measurements revealed mat formation in progress. As the mat floated to the surface over time it could be seen as a hard soil surface suspended in the water column. This resulted in a single vertical measurement while the soil was anchored, two vertical measurements after the mat had detached, and rarely, three vertical measurements if the mat had two layers. Stage measurements were made at the nearest continuous recording station.

Botanical nomenclature followed a number of sources. These included wetland species (Godfrey and Wooten 1981a, 1981b), upland (Radford et al. 1968), grasses (Hitchcock 1971), and ferns (Lakela and Long 1976).

Assessment of Experimental Planting Treatments. Two experimental planting sites were located in the south marsh and one site was located in the north marsh (Figure 1). Each site was prepared for planting by mowing, herbicide application (RODEO), and burning to remove the established plant community. Experimental treatments consisted of Control, Planted-Single Species, Planted-Mixed Species, Mulched and Seeded (Figure 5 and Table 1 and 2). Single species plots were planted at low (3' centers) and high (2' centers) densities. The mulch treatment consisted of applying an approximate 5 cm thick layer of wetland donor soil collected from a site near Sebring, Florida (Table 3). Treatment plots were delineated at each corner by 0.102 m diameter by 1.5 m tall, white PVC posts. Treatment plots were separated by 4.5 m wide paths. In all but the Mixed Species plots a single, permanent, randomly positioned $1m^{-2}$ subplot was established. In the Mixed Species plots, two subplots were established.

Vegetative cover (%) by species data were taken from the larger treatment plots and from the $1m^{-2}$ subplot(s). These data are reported as Overall Cover and Subplot Cover, respectively.

Assessment of Natural Marsh Development. Using nine established permanent transects (Stenberg et al., 1991) (Figure 1), we collected community structure and composition, and biomass data. An assessment of the influence of hydrology (depth and duration) and distance from the marsh inlet on community development was conducted.

Vegetation community structure data were collected from within each sample node at three permanent plots and one temporary plot. Data were collected according to the sample schedule in Table 4. These data consisted of species composition, percent cover, density (numbers of stems, culms, bunches), height (tallest leaf), phenology index (canopy dominance of flowers, immature fruit, and mature fruit in increments of 1=1/3 , 2=2/3 , 3=Full Canopy), and water depth (nearest cm).

Table 1. Experimental Treatment Plot Descriptions and Sample Collection Schedule.

Name	Treatment Description[a]	Dimensions (m)	Per Site
Mulch (M)	Wetland soil from sites near Sebring, Florida added to soil surface.	15.2x15.2	4
Mixed Spp. (X)	Planted sprigs of an assortment of species	24.4x24.4	2
Planted (P)	Planted sprigs of a single species.[b]	15.2x15.2	24
Seeded (S)	Seeded by a single species	15.2x15.2	10
Control (C)	Site preparation only	18.3x18.3	12
TOTAL/SITE			52
GRAND TOTAL (3 sites)			152

[a]. All treatment plots received site preparation to remove competing vegetation.

[b]. 12 plots planted at LOW DENSITY=1.2m (4') centers yielding 1.56 plants m^{-2} and 12 plots planted at HIGH DENSITY=0.6m (2') centers yielding 6.25 plants m^{-2}.

Sample Collection Schedule	
Initial Conditions (sprigged plots only)	Sep 1991
First Winter Season	Jan 1992
First Spring Season	May 1992
First Summer Season	Aug 1992
Second Winter Season	Feb 1993
Second Summer Season	Aug 1993
Third Spring Season	Mar 1994

Table 2. Planted plot treatment species and codes.

Plant Species List and Codes	Treatment Codes
1. *Sagittaria lancifolia* (SAGLAN)	(P,S,X)
2. *Pontedaria cordata* (PONCOR)	(P,S,X)
3. *Scirpus validus* (SCIVAL)	(P,S,X)
4. *S. californicus* (SCICAL)	(P,-,X)
5. *Panicum hemitomom* (PANHEM)	(P,S,X)
6. *Eleocharis interstincta* (ELEINT)	(P,-,X)
7. *Peltandra virginica* (PELVIR)	(-,-,X)
8. *Cladium jamaicense* (CLAJAM)	(-,-,X) *
9. *Kosteletzkya* spp. (KOSSPP)	(-,-,X)
10. *Thalia geniculata* (THAGEN)	(-,-,X)
11. *Polygonum punctatum* (POLPUN)	(-,<u>S</u>,-)

<u>Treatment Code Explanation</u>

(P,S) = SPRIGS AND SEEDS

(X) = MIXED SPECIES PLOTS

(P) = SPRIGS

(<u>S</u>) = SEEDS ONLY

(-) = SPECIES NOT INCLUDED IN TREATMENT

M = MULCHED PLOT

* *Cladium jamaicensis* replaced by *Juncus effusus* after initial planting.

Table 3. Vegetation species composition from donor soil sites for soils applied to mulch treatments in Experimental Planting Areas, Apopka Marsh Flow-Way Demonstration Project.

Soil A: Depressional wetland.

Species Name	Common Name
Andropogon virginicus	Bushy Beardgrass
Drosera brevifolia	Sundew
Erianthus strictus	Beard Grass
Eriocaulon spp.	Hat Pins
Hypericum fasciculatum	St. Johns Wort
Lacnanthes caroliniana	Redroot
Leersia spp.	Cutgrass
Panicum hemitomon	Maidencane
Xyris spp.	Yellow-Eyed Grass

Soil B: Bayhead

Species Name	Common Name
Gordonia lasianthus	Loblolly Bay
Hypericum fasciculatum	St. Johns Wort
Ilex glabra	Gallberry
Leersia spp.	Cutgrass
Lyonia lucida	Fetterbush
Magnolia virginiana	Sweetbay
Myrica cerifera	Waxmyrtle
Osmunda cinnamomea	Cinnamon Fern
Panicum abscissum	Cutthroat Grass
Persea palustris	Redbay
Pontederia cordata	Pickerel Weed
Rhexia cubensis	Meadow Beauty
Sagittaria lancifolia	Arrowhead
Woodwardia areolata	Chain Fern

Table 4. Sampling schedule for Natural Succession Transects. Table entries are nodes sampled, *= all nodes sampled, numbers=specific nodes, NS=no sample. Lower case a and b next to transect number represent type of data collected: a=Structure and Composition, and b=Biomass.

	SAMPLE DATES						
TRANSECT	NOV90	AUG91	JAN92	AUG92	FEB93	AUG93	MAR94
1 a	*	*	*	*	*	*	*
b	*	*	*	*	*	2, 4, 6, 8	1, 3, 5, 7
2 a	*	1-2, 6-8	1-2, 6-8	1-2, 6-8	1-2, 6-8	NS	1-2, 7
b	NS	NS	NS	NS	NS	NS	1-2, 7
3 a	*	*	*	*	*	*	*
b	*	*	*	*	*	2, 4, 6, 8	1, 3, 5, 7
4 a	*	*	*	*	*	NS	1.3.5.7
b	NS	NS	NS	NS	NS	NS	1,3,5,7
6 a	*	*	*	*	*	*	*
b	*	*	*	*	*	2, 4, 6, 8	1, 3, 5, 7
8 a	*	*	*	*	*	*	*
b	*	*	*	*	*	2, 4, 6, 8	1, 3, 5, 7

Vegetative biomass was collected along the Natural Succession Transects. Within each temporary (biomass) plot (plot #4 per sample node) we collected above-ground and below-ground biomass.

The above-ground component was collected as follows:

(1) From within the $1m^{-2}$ subplot #4 all plant material was clipped to soil surface level. Vegetation hanging into the plot was clipped through a vertical plane that intersected the plot boundaries.

(2) Clipped plant material was stored in large plastic bags with a numbered aluminum identification tag.

(3) Material was processed immediately or stored at $4^{o}C$ up to one week prior to processing.

(4) Plant material was separated into live (by species) and standing dead (all species combined) portions.

(5) Material was dried at $70^{o}C$ to constant mass, then weighed to nearest 0.1 g.Above-ground plant material was submitted to the Soil Science Wetland Soils Laboratory, University of Florida for nutrient analysis.

Preparation for above-ground nutrient analysis was conducted as follows:

(1) From the dried and weighed biomass sample we removed two replicates each of three dominant species and one composite from the above-ground biomass collected per transect (40 samples).

(2) Material was ground to a coarse particle size using a Wiley Mill.

(3) Ground plant material (at least 1 g) was stored in 12 ml vials and submitted to the Soil Science Department for nutrient analysis.

Below-ground biomass was collected from each biomass subplot (#4) in the following manner:

(1) Three soil cores (10 cm dia. X 20 cm long) were extracted using a section of sharpened PVC pipe. Soil and an aluminum identification tag were placed in a plastic sealable bag for transport.

(2) Soils were stored in cooler at 4°C for up to one month until processing.

(3) Biomass was separated from soil by washing through a 2 mm (No. 10, USA Standard Testing Sieve) sieve.

(4) Biomass was dried at 70°C to a constant mass, then weighed to nearest 0.001 g.

Below-ground biomass was prepared for nutrient analysis and submitted to the Soil Science Department, Wetland Soils Laboratory for nutrient analysis. Preparation was as follows:

(1) Root material from every two nodes per transect was combined (21 samples).

(2) The composite sample was ground to a coarse particle size using a Wiley Mill.

(3) Ground material was stored in 12 ml vials and submitted to the Soil Science Department for nutrient analysis.

REPRODUCTIVE COMPONENT

Determination of Potential Seed Production. We collected phenology data while we were conducting structure and composition, and biomass data collections. During "Phenology Only" sampling (see sample schedule below) all nodes were visited with phenological sampling from one randomly chosen plot per node. We estimated the percentage of each species' canopy that was in a state of flowering and fruiting (immature and/or mature). Data collected included (1) species composition and (2) phenology (estimate of canopy dominance of flowers, immature fruit, and mature fruit in increments of 1=1/3, 2=2/3, 3=Full Canopy). Sample scheduling was as follows:

Sample	Date	Description
First	May-Jun 1991	Phenology Only
Second	Aug-Sep 1991	Vegetation and Phenology
Third	Jan 1992	Vegetation and Phenology
Fourth	May 1992	Phenology Only
Fifth	Aug 1992	Vegetation and Phenology
Sixth	Feb 1993	Vegetation and Phenology

Phenology of vegetation within the Apopka Demonstration Marsh was observed along Natural Succession Transects; and within planted, seeded, mulched and control treatments. States of flowering, immature and mature fruit were identified in the natural succession plots from November 1990 to March 1994 and from August 1991 to March 1994 in the Experimental Planting Site treatments. Analysis of the data included identification of unique phenology characteristics of a species under different treatments as well as classification of the phenology into four general groups. These groups included seasonality, time lag of phenological developmental stages, reduction or increase in phenology activity and distance to inlet effects on phenology between the north and south cells. Seasonality of a species was determined qualitatively by identification of a sine wave pattern within the data for either flowering, immature fruiting or mature fruiting phenology regardless of the amplitude or timing within the year of the peaks. Time lag of developmental stages was classified as any species that showed a peak of one developmental stage followed by a peak of a later developmental stage in the next sampling period.

Distance to inlet effects, presumably of water quality parameters, were identified by comparing the phenology index activity in the four treatment sites or for natural succession in the eight transects perpendicular to the predominant flow path in the marsh. Detailed results for each treatment and target species as well as a summary table for each treatment type will follow. Phenology of *Typha latifolia* under natural succession as well as within the treatment plots will be addressed separately due to its predominant influence within most areas of the marsh.

Determination of the Effect of Hydrology on Seed Germination. In a growth chamber, seeds were placed in petri dishes on filter paper. Treatments consisted of moist soil and flooded (1 cm above filter paper). The growth chamber was used because it was easier to measure seed germination earlier in the process (Zheng, et al. 1994). Using this method allowed the opportunity to screen more species in a shorter period of time. The method has been used successfully (Morinaga 1926a, 1926b, 1926c, Sifton 1959, Zheng et al. 1994, Benvenuti and Macchia 1995). Methods consisted of:

(1) Seeds of target species were collected as they became available.

(2) Seeds were placed on filter paper in 3 petri dishes/trt, at least 30 seeds/dish, seeds and paper were moistened (MOIST TRT), or flooded to 1cm depth (FLOODED TRT).

(3) Seeds were maintained in a growth chamber for 12 hour light/dark cycle under a bank of four 40 watt fluorescent and four 60 watt incandescent bulbs.

(4) Each trial ran for about 60 days under ambient temperature conditions (27/32^{o}).

(5) Seeds exhibiting signs of germination (splitting of the seed coat and extension of the root tip beyond the seed) were periodically counted.

(6) Water was added as needed.

Assessment of Seed Dispersal Mechanisms. Seed traps (Figure 7) designed to trap water- and air-borne seeds were placed in positions upstream and downstream of each planting area. Seeds floating in the water or wind dispersed from surrounding vegetation were trapped, thus, providing an indication of propagule movement within the marsh.

The seed traps were built with 1.3 cm dia. PVC pipe. Fiberglass netting with a $1 mm^2$ mesh size was stretched loosely over the top (1 m x 0.5 m) for airborne seeds. To trap water-borne seeds a bag made from the same net material was attached to the leading edge of the trap (Figure 7). Four seed traps per upstream and downstream side were placed at Experimental Planting Sites 1 and 3. Traps were collected at one month intervals four times and replaced with clean netting during each visit. Nets were stored in a cooler at 4^{o} C for less than 7 days until processed. Nets from the water-borne position were washed into a germination tray filled to a depth of 2 cm with sterile Metro-Mix soil mix. The trays were then placed in the greenhouse under twice per day misting until seedlings could be identified. Germination trials were run for two months per trap sample. The traps captured large amounts of organic matter resulting in the need to use the seed germination method instead of a seed identification method.

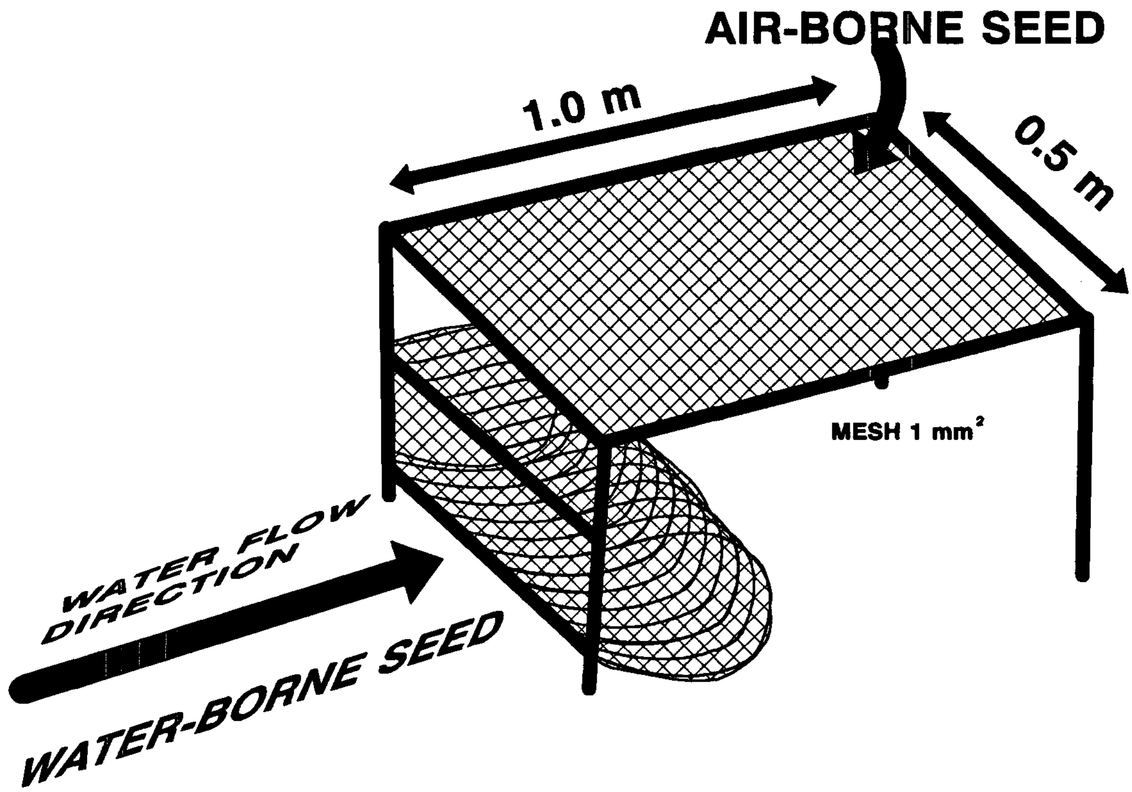

Figure 7. Seed trap design used for seed capture in Experimental Planting Sites, Apopka Marsh Flow-Way Demonstration Project.

Assessment of the Soil Seed Bank. The purpose of this subtask was to provide information about the contribution of the soil seed bank to plant community development. The factors influencing seed bank response were site treatment and, where possible, hydrology (e.g. depth and duration of inundation). This subtask was accomplished by the following procedure:

(1) Collected and composited 10 (10 cm dia. X 5 cm deep) soil cores from every other node along transects 1, 2, 6, and 7; Experimental Sites 1 and 3, "control" subplots 1, 3, 4, and 6, and the mulched plots. Soil was stored in sealable plastic bags until processed. Total number of plots = Natural (16) + "Control" (16) + Mulched (8) = 40 Plots (Fig. 2).

(2) Soil was stored at $4^{O}C$ up to two weeks prior to processing.

(3) Soil moisture treatments prepared by mixing soil together, removing rhizomes and roots, spreading soil into germination flats.

(4) A thin layer of soil was spread in germination flats (filled to 1 cm depth with METRO-MIX sterile soil mix) .

(5) At the same time as (4) flats with Metro-Mix only were established to provide a contamination indicator.

(6) Trays were misted twice daily.

(7) Treatments consisted of Moist Soil and Flooded Soil (3-4 cm depth).

(8) Seedlings were identified to species or genus, counted and removed.

(9) When seedlings were depleted, the soil was turned over and (8) was repeated. Soil was collected and the experiment run twice: (1) Nov 1991 and (2) Nov 1992. Each trial was conducted for 9 months in a forced-air ventilation greenhouse on the University of Florida campus. Therefore, light and temperature conditions were similar to that of Gainesville, Florida.

Statistical analysis consisted of a t-test for the moist (# seeds m^{-2}) versus flooded soil (# seeds m^{-2}) greenhouse treatment, an ANOVA with multiple ranges test for the site treatment effects (Natural Succession = Mulch = Control seeds m^{-2}) and a Cluster Analysis using normalized data (Vegetation % cover m^{-2} and Seed Bank seed number m^{-2}) to determine if a relationship existed between the seed bank species composition and that of the established vegetation.

Clonal Recruitment, Production and Dispersal

Growth rate was defined as a measure of the distance of a rhizome's growth over time. Plants were chosen in areas where the rhizome could be marked and it's growth followed. *Pontederia cordata*, *Sagittaria lancifolia*, and *Scirpus validus* planted plots were used. *Typha latifolia* was measured in seeded and mulched plots. The seeded and mulched plots were used because they contained sufficient *T. latifolia* to allow measurements. For each species a numbered PVC post was driven into the soil, marking the position of the rhizome at the initial time. Distance to the nearest competitor was measured at the initial time. Eight rhizomes per planting site per species were marked. The sites were revisited at the end of the sample period. For the final sample the distance grown from the PVC post and the distance to the nearest competition was measured. Water depth at the initial and final measurement was recorded. These measurements were made during the May 1992-1993 time period.

For each species, growth rates were estimated by calculating the distance between the initial and final measurements. Using a two-way ANOVA (species and distance from marsh inlet) the possible influence of high nutrient lake water on clonal growth was evaluated. An additional two-way ANOVA (Distance To Competition and Distance to Marsh Inlet) was used to help explain growth rates.

WILDLIFE COMPONENT

Wildlife community patterns were monitored every six weeks over the period August 1991 through June 1993. Avian surveys were conducted using two different surveying methods. In addition, general information was collected about other animals observed in the project area. The techniques used in the wildlife sampling are outlined in the research program manual for Phase II of the Demonstration Project (Best et al. 1991). Avian sampling was performed in the two marshes used for the flow-way demonstration project, and the unmanaged marsh (Figures 8 and 9). An agricultural field adjacent to the north marsh was also surveyed. The avifauna surveys were conducted using the Emlen strip technique (Emlen 1977), a timed drive-through survey (Best et al. 1991), a technique for counting congregating red-winged blackbirds, and a supplemental direct counting method. These are described below. Only minor changes were made from the program manual surveying methods including the rejection of use of radio transceivers, spotting scopes (binoculars were used), and documentation of flushes by photography. These procedures were intended to supplement other documentation and verification efforts, but were not needed.

Avifauna population sampling -- Emlen strip technique. Avian sampling along transects established for vegetation and wildlife studies began in August 1991. For wildlife studies each transect had an approximate fixed width of 35 meters on either side of the transect center line. Four transects were established in each of the north and south marshes (T1 through T8, Figure 8). All transects were oriented north-south. The south marsh transects were each 440 meters long, and the north marsh transects were each 600

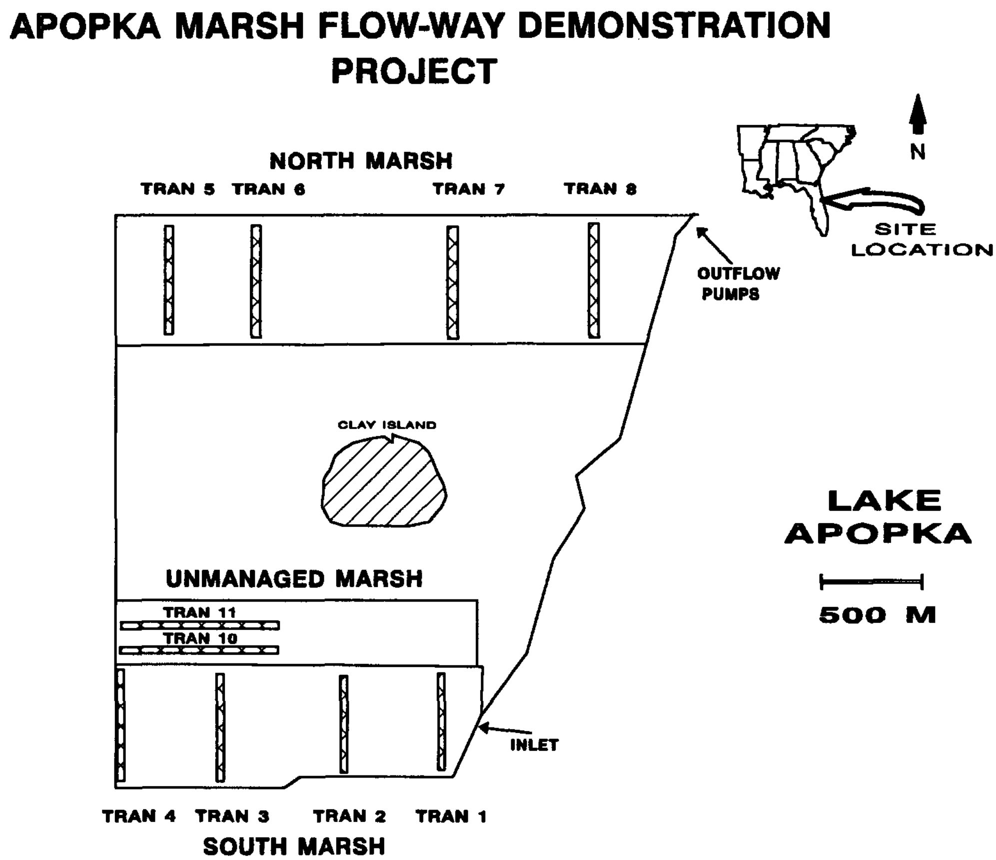

Figure 8. Wildlife survey transects (TRAN 1-8, 10, 11), Apopka Marsh Flow-way Demonstration Project.

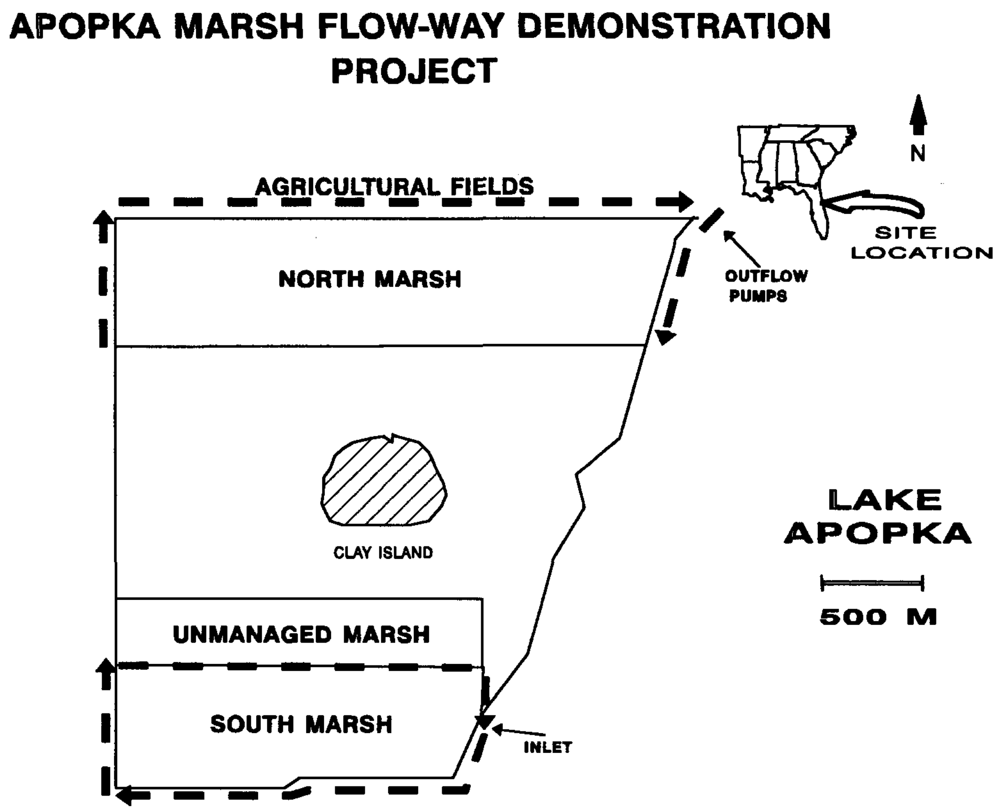

Figure 9. Paths (heavy dashed lines) used during drive-through wildlife surveys, Apopka Marsh Flow-way Demonstration Project.

meters long. Two transects were established in the unmanaged marsh, each 750 m long (T10 and T11, Figure 8). Surveying began on T10 and T11 in November 1992.

Two persons walked transects. One maintained trueness on the transect, watching for obstructions and assisting in data collection, while the other concentrated only on data collection. This method reduced the difficulty in passage through the marsh and improved the census quality. Binoculars were used on transect walks. Observations were recorded directly on a map of the transect complete with gridded distances from the center line. Vegetation, by species, was also included on the map. Up to three dominant vegetation species were included in every somewhat homogeneous locale. The parameters recorded were: (1) position of the birds from the center line; (2) dominant vegetation; (3) type of cue given (visual or auditory); and (4) time of observation.

Only birds observed within thirty-five meters from the transect center line were recorded. An additional observer was positioned at an elevated, fixed point on a levee. The purpose of this observer was to record birds flushed from dense vegetation stands that would have been missed from the transect center line. Flying birds such as raptors which were actively using the marsh and were within the vertical bounds of the transects were recorded in addition to the dominant vegetation of the area they used. Observers assigned to each transect compiled their collected data at the completion of the survey. By keeping accurate records on the time of observation, fixed observer and transect walker data redundancy was reduced.

Sampling order for the transects revolved from one sampling event to the next. The rotation decreased sampling bias by surveying each transect during different morning hours. Sampling was begun within thirty minutes of sunrise.

Avifauna population sampling -- drive-through method. Access roads upon the levees were used in a drive-through survey methodology in all three marshes (north, south, and unmanaged); and the adjacent agricultural field (Figure 9). Drive-through surveys occurred in the early afternoon after completion of the transect surveys. Observers with binoculars were positioned atop a slowly driven vehicle (van or full-sized four-wheel-drive). The vehicle was equipped with a platform on which the observers sat. The sitting observer's eyes reached a height of ~3m above the levee surface. Multiple observers (3-4) using binoculars were employed. This facilitated sighting, counting, and identification of birds. All birds sighted, as well as brief vegetation information, were recorded on a map of the area being surveyed.

Supplement direct counting. While performing Emlen strip and/or drive-through counts, observers recorded soaring species and species using areas near the marshes within the project site. These data completed the site species list.

Technique for red-winged blackbirds. Red-winged blackbirds congregating in high numbers within the dense vegetation stands were deliberately flushed before counting. This methodology was necessary only during the breeding seasons.

Avian species similarities (Sorensen's Similarity Index) were used to compare the north versus south marsh (transect 1 versus transect 4 within the south , and transect 5 versus transect 8 within the north; Sorensen 1948). Species similarity described the percentage of avian species each survey had in common as compared to the total number of species found in each marsh. The following equation was used to determine the similarity of species between the survey areas:

$$S = [2C / (A + B)] \times 100$$

where S = similarity %

A = number of species in sample 1

B = number of species in sample 2

C = number of species common to samples 1 and 2

Changes in density among taxonomic groups were compared for each survey area. Table 5 lists both the species identified during the surveys and their taxonomic group used for this study. The species in the category labeled "other" were grouped together due to the low number of species represented by the remaining taxonomic groups counted.

Avian density estimates for the transect survey method were calculated by dividing the total number of birds counted in each taxonomic group on one transect by the area of that transect:

$$D_i = N_{ij} / A_i$$

where D_i = density of transect i

N_{ij} = number of birds in taxonomic group j on transect i

A_i = area of transect i (ha)

Total area of transects 1 through 4 in the south marsh was 3.08 ha each (440 m x 70 m), and transects 5 through 8 in the north marsh each contained an area of 4.20 ha (600 m x 70 m). In the unmanaged marsh, transects 10 and 11 each were 5.25 ha (750 m x 70 m).

Table 5. Avian species found on Apopka Marsh Flow-way Demonstration Project, by taxonomic group.

Taxonomic Group	Scientific Name	Common Name
Gallinules		
	Fulica americana	American coot
	Gallinula cholorpus	Common moorhen
	Rallus elegans	King rail
	Porphyrula martinica	Purple gallinule
	Porzana carolina	Sora rail
Wading Birds		
	Botaurus lentiginosus	American bittern
	Nycticorax nycticorax	Black crown night heron
	Bubulcus ibis	Cattle egret
	Ardea herodias	Great blue heron
	Casmerodius albus	Great white egret
	Butorides striatus	Green back heron
	Ixobrychus exilis	Least bittern
	Egretta caerulea	Little blue heron
	Egretta thula	Snowy egret
	Egretta tricolor	Tri-color heron
	Nycticorax violaceus	Yellow crown night heron
Black Birds		
	Quiscalus major	Boat tail grackle
	Quiscalus quiscalus	Common grackle
	Agriaius phoeniceus	Red wing black bird
Passerines		
	Hirundo rustica	Barn swallow
	Polioptila caerulea	Blue-gray gnatcatcher
	Guiraca caerrulea	Blue grosbeak
	Cyanocitta cristata	Blue jay
	Thryothorus ludovicianus	Carolina wren
	Chaetura pelagica	Chimney swift
	Geothlypis trichas	Common yellow throat
	Tyrannus tyrannus	Eastern kingbird
Passerines		
	Sayornis phoebe	Eastern phoebe
	Sterna forsteri	Foresters tern
	Columbina passerina	Ground dove
	Passerrina cyanea	Indigo bunting
	Charadrius vociferus	Kill deer
	Cistothorus palustris	Marsh wren
	Zenaida macroura	Mouring dove
	Cardinalis cardinalis	Northern cardinal
	Mimus polyglottos	Northern mocking bird
	Dendroica palmarum	Palm warbler
	Cistohorus platensis	Sedge wren
	Melospiza melodia	Song sparrow
	Melospiza georgiana	Swamp sparrow
	Tachycineta biocolor	Tree swallow
	Dendrocia coronata	Yellow rumped warbler
	Dendroica petechia	Yellow warbler
Ducks		
	Ana americana	American widgeon
	Anas discors	Blue wing teal

Table 5. Avian species found on Apopka Marsh Flow-way Demonstration Project, by taxonomic group. (Cont.)

Taxonomic Group	Scientific Name	Common Name
	Dendrocygna bicolor	Fulvous whistling duck
	Anas strepera	Gadwall
	Lophodytes cucullatus	Hooded merganser
	Anas platyrhynchos	Mallard duck
	Anas fulvigula	Mottled duck
	Anas acuta	Northern pintail
	Anas clypeata	Northern shoveler
	Aix sponsa	Wood duck
Ibis		
	Plegadis falcinellus	Glossy ibis
	Eudocimus albus	White ibis
Other		
	Falco sparverius	American kestrel
	Anhinga anhinga	Anhinga
	Hialiaeetus leucocephalus	Bald eagle
	Ceryle alcyon	Belted kingfisher
	Himantopus mexicanus	Black neck stlit
	Coragyps atratus	Black vulture
	Gallinago gallinago	Common snipe
	Phalacrocorax pelagicus	Double-crested cormorant
	Tringa melanoleuca	Greater yellow legs
	Lanius ludovicianus	Logger headed shrike
	Circus cyaneus	Northern herrier
	Pandion haliaetus	Osprey
	Podilymbus podiceps	Pied billed grebe
	Buteo lineatus	Red shoulder hawk
	Cathartes aura	Turkey vulture
	Catoptrophorus semipalmatus	Willet

Estimates of overall avian density for each marsh were calculated by dividing the total number of birds in each taxonomic group by the total area of all surveyed transects in that marsh as follows:

$$D_m = N_{mj} / A_m$$

where D_m = density of marsh m

N_{mj} = number of birds in taxonomic group j in marsh m

A_m = area of marsh m (transects only)

The total combined area of the four transects in the south marsh was 12.32 ha, and the total area of four transects in the north marsh was 16.8 ha. The total area of the two transects in the unmanaged marsh was 10.50 ha. The survey results were averaged over three six month time periods to provide a more general representation of short-term temporal changes in density.

IV. RESULTS

General Overview:

This general overview has been included to introduce the species list, species codes, growth habits and life history types, hydrology, and some general observations. This study found a total of 109 plant species during the duration of the project. These species were not found simultaneously, but entered and departed the species sample as the project progressed. The assemblage is depicted in a cumulative list that reflects the history of the site varying from a moist, abandoned farm to a deeply flooded, early successional marsh (Table 6). Species richness from the Natural Succession treatment varied from a high of 65 early (August 1991) to a low of 36 late (March 1994) in the sample period. Species richness tended to decline with time. Species richness in the Planted treatments varied from 30 (May 1992) to 47 (August 1993). The change in species richness over time was not clearly defined. Both the Natural Succession and Planted treatments seemed to be approaching similar species richness late in the sample set. Both treatments seemed to be responding in a similar manner to the drawdown of Summer 1993 and the development of floating mats with an increase in species richness (Planting=47, Natural Succession=44) (Figure 4; Table 6). The relationship between water level and species responses will be explored in subsequent sections of this report.

Due to the sampling strategy species richness may be underestimated for the Natural Succession treatment versus the Planting Sites (Natural Succession= 296 m^2/visit

Table 6. Plant Species List with Codes and Presence Data For Apopka Marsh

Species Codes	Plant[b,c] Type	Sample Date[a] N90	A91	J92	M92	A92	F93	A93	M94
ACERUB= *Acer rubrum*	TRP	-/N	-/N	-/N	-/-	-/N	-/-	-/-	P/N
ALTPHI= *Alternanthera philoxeroides*	RH	-/N	P/N	P/N	P/-	P/N	P/N	P/N	P/N
AMAAUS= *Amaranthus australis*	RHA	-/N	P/N	P/N	-/-	P/N	P/N	P/N	P/N
ANDSPP= *Andropogon* spp.	GRA	-/-	-/-	-/N	-/-	-/-	-/N	-/N	-/-
AMBART= *Ambrosia artemissifolia*	RHA	-/-	-/N	-/-	-/-	-/-	-/-	-/-	P/-
AMMCOC= *Ammania coccinea*	RHA	-/-	-/N	P/-	-/-	-/-	-/-	P/-	-/-
APILEP= *Apium leptophyllum*	RHA	-/-	-/-	-/-	-/-	-/-	P/N	-/-	P/N
ASTELL= *Aster elliotii*	RHA	-/N	-/N	-/-	-/-	-/N	-/N	-/N	-/N
ASTSPP= *Aster* spp.	RHA	-/-	-/N	-/N	-/-	-/N	-/-	-/-	-/-
ASTSUB= *Aster subulata*	RHA	-/N	P/N	P/N	-/-	-/-	-/-	-/N	-/-
ASTTEN= *Aster tenuifolia*	RHA	-/-	-/N	-/N	-/-	-/-	-/-	-/-	-/-
AZOCAR= *Azolla caroliniana*	FF	-/-	-/N	P/N	P/-	P/N	P/N	-/-	-/-
BACCAR= *Bacopa caroliniana*	RHP	-/-	P/-	-/-	-/-	-/-	-/-	-/-	-/-
BACHAL= *Baccharis halimifolia*	SHP	-/N	-/N	-/N	-/-	-/N	-/N	-/N	-/N
BIDLAE= *Bidens laevis*	RH	-/-	-/N	-/N	-/-	-/N	-/N	-/N	-/N
BRAPUR= *Brachiara purpurascens*	GR	-/-	-/N	P/N	-/-	-/N	P/-	P/N	-/N
CALAME= *Callicarpa americana*	RHA	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
CARPEN= *Cardamine pensylvanica*	RHA	-/-	-/-	-/-	-/-	-/-	-/-	-/-	P/-
CARSPP= *Carex* spp.	SE	-/N	-/-	-/-	-/-	-/-	-/N	-/-	-/-
CASOBT= *Cassia obtusifolia*	RH	-/-	-/N	-/-	-/-	-/-	-/-	-/N	-/-
CICMEX= *Cicuta mexicana*	RH	-/-	-/-	-/-	-/-	-/-	-/-	-/N	-/-
CYNDAC= *Cynodon dactylon*	GRP	-/N	-/N	-/N	-/-	-/-	-/-	-/-	-/-
COMDIF= *Commelina diffusa*	RH	-/N	P/N	P/N	-/-	-/N	-/-	-/N	-/N
CYPCOM= *Cyperus compressus*	SE	-/N	-/-	-/-	-/-	-/-	-/-	P/-	-/-
CYPESC= *Cyperus esculentus*	SE	-/-	-/N	-/-	-/-	-/-	-/-	-/-	-/-
CYPHAS= *Cyperus haspans*	SE	-/N	-/N	P/N	P/-	-/N	-/-	-/-	-/-
CYPIRI= *Cyperus iria*	SE	-/-	P/N	-/-	-/-	-/-	-/-	P/N	-/-
CYPODO= *Cyperus odoratus*	SE	-/N	-/N	-/N	-/-	P/N	-/-	P/N	-/N
CYPSPP= *Cyperus* spp.	SE	-/N	P/N	P/-	P/-	P/N	P/N	P/N	P/N
CYPSUR= *Cyperus surinamensis*	SE	-/-	-/-	-/-	-/-	P/-	-/-	-/-	-/-
DIGSER= *Digitaria serotina*	GR	-/-	-/N	-/N	-/-	-/-	-/N	-/-	-/-
ECHCOL= *Echinochloa colonum*	GR	-/N	P/N	P/N	-/-	-/-	-/-	P/N	-/-

Table 6. Plant Species List (Cont.)

Species Codes	Plant[b,c] Type	Sample Date[a] N90	A91	J92	M92	A92	F93	A93	M94
ECHCRU= *Echinochloa crus-galli*	GR	-/-	-/-	-/-	-/-	-/-	-/-	P/-	P/-
ECHSPP1= *Echinochloa* spp1	GR	-/-	-/-	-/-	-/-	-/-	-/-	P/-	-/-
ECLALB= *Eclipta alba*	RH	-/N	P/N	P/-	P/-	P/N	-/N	P/N	P/N
EICCRA= *Eichhornia crassipes*	FH*	-/-	P/N	P/N	P/-	P/N	P/N	P/N	P/N
ELEIND= *Eleusine indica*	GR	-/N	-/N	-/-	-/-	-/N	-/-	P/-	P/-
ELEINT= *Eleocharis interstincta*	SE	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/-
ELEVIV= *Eleocharis vivipara*	SE	-/-	-/N	-/N	-/-	-/N	-/N	-/N	-/N
ERISPP= *Eriocaulon* spp.	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
EUPCAP= *Eupatorium capillifolium*	RH	-/N	-/N	-/N	-/-	-/N	P/N	P/-	P/N
EUPSER= *Eupatorium serotinum*	RH	-/N	-/N	P/-	-/-	-/-	-/-	-/-	P/-
EUPSPP= *Eupatorium* spp.	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
GALTIN= *Galium tinctorium*	RH	-/N	-/N	P/N	-/-	-/-	P/N	P/N	P/N
GERCAR= *Geranium caroliniana*	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
HYDRAN= Hydrocotyle ranunculoides	RH*	-/-	-/-	-/-	-/-	-/-	-/-	P/N	P/N
HYDSPP= *Hydrocotyle* spp.	RH*	-/N	P/N	P/N	P/-	P/N	P/N	P/-	-/-
HYDUMB= *Hydrocotyle umbellata*	RH*	-/-	-/-	-/-	-/-	-/-	-/-	-/N	P/-
HYGLAC= *Hygrophila lacustris*	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
IPOSPP= *Ipomoea* spp.	VI	-/N	-/N	-/-	-/-	-/-	-/-	-/-	-/-
JUNEFF= *Juncus effusus*	SE*	-/N	P/N	P/N	P/-	P/N	-/-	P/-	-/-
LEMSPP= *Lemna* spp.	FH	-/-	P/N	P/-	P/-	P/N	P/N	P/N	P/N
LEPFAS= *Leptocarpa fascicularis*	GR	-/-	-/-	-/-	-/-	-/-	-/-	P/-	-/-
LIMSPO= *Limnobium spongia*	RH*	-/-	-/N	P/N	P/-	P/N	P/N	-/-	-/-
LUDLEP= *Ludwigia leptocarpa*	SH	-/N	P/N	-/N	-/-	P/N	P/N	P/N	P/N
LUDOCT= *Ludwigia octovalvis*	SH	-/N	P/-	P/N	-/-	-/N	P/N	P/N	P/-
LUDPER= *Ludwigia peruviana*	SH	-/N	-/-	P/N	-/-	-/N	P/N	P/N	P/N
LUDPAL= *Ludwigia palustris*	RH	-/N	P/N	P/N	P/-	P/-	-/-	-/-	-/-
LUDSPP= *Ludwigia* spp.	SH	-/N	-/-	-/-	-/-	-/-	P/-	-/-	-/-
MELCOR= *Melochia corchorifolia*	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
MELPEN= *Melothria pendulosa*	RH	-/-	-/N	-/-	-/-	-/-	-/-	-/-	-/-
MIKSCA= *Mikania scandens*	VI	-/N	-/N	-/N	-/-	P/N	P/N	P/N	P/N
MOMCHA= *Momordica charantia*	VI	-/-	-/-	-/-	-/-	-/-	-/-	-/N	-/-
PANDIC= *Panicum dichotomiflorum*	GR	-/N	P/N	-/N	-/-	-/-	-/-	P/N	-/-
PANHEM= *Panicum hemitomon*	GR	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/-
PANSPP= *Panicum* spp.	GR	-/N	-/N	-/-	-/-	-/-	-/-	P/-	-/-
PASDIS= *Paspalum dissectum*	GR	-/-	-/-	-/-	-/-	-/-	-/-	P/N	-/N
PASSPP= *Paspalum* spp.	GR	-/-	-/N	-/N	-/-	-/N	-/-	-/-	-/-

Table 6. Plant Species List (Cont.)

Species Codes	Plant[b,c] Type	Sample Date[a] N90	A91	J92	M92	A92	F93	A93	M94
PASURV= *Paspalum urvillei*	GR	-/-	-/N	-/N	P/-	-/N	-/N	-/-	-/-
PELVIR= *Peltandra virginicus*	RH	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/-
PHYANG= *Physalis angulata*	RH	-/N	-/N	-/-	-/-	-/-	-/-	-/-	-/-
PLUROS= *Pluchea rosea*	RH	-/-	-/-	-/-	-/-	-/-	-/-	-/N	-/-
POLDEN= *Polygonum densiflorum*	RH	-/-	-/-	-/-	-/-	-/-	-/-	-/N	-/N
POLPUN= *Polygonum punctatum*	RH	-/N	P/N	P/N	P/-	P/N	P/N	P/N	P/N
PONCOR= *Pontederia cordata*	RH	-/N	P/N	P/N	P/-	P/N	P/N	P/N	P/N
POROLE= *Portulaca oleracea*	RH	-/-	-/N	-/-	-/-	-/-	-/-	-/-	-/-
RAPRAP= *Raphanus raphanistrum*	RH	-/-	-/-	P/N	-/-	-/-	-/-	-/-	-/-
ROTRAM= *Rotala ramosior*	RH	-/-	-/-	-/-	-/-	-/-	-/-	P/-	-/-
RUMCRI= *Rumex crispus*	RH	-/-	-/N	-/N	-/-	-/-	-/N	-/-	-/N
SAGLAN= *Sagittaria lancifolia*	RHP	-/N	P/N	P/N	P/-	P/N	P/N	P/N	P/N
SAGLAT= *Sagittaria latifolia*	RH	-/-	-/N	P/N	P/-	P/N	-/N	P/N	P/N
SALCAR= *Salix caroliniana*	TRP	-/N	P/N	P/N	P/-	-/N	-/N	-/N	-/N
SALROT= *Salvinia rotundifolia*	FF	-/-	P/N	P/N	P/-	P/N	P/N	P/N	P/N
SAMCAN= *Sambucus canadensis*	SH	-/N	-/N	-/N	-/-	P/-	-/N	-/-	-/N
SAMPAR= *Samolus parviflorus*	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	P/-
SCICAL= *Scirpus californicus*	SEP	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/-
SCISPP= *Scirpus* spp.	SEP	-/-	-/-	-/-	-/-	P/-	P/-	-/-	-/-
SCISPP4= *Scirpus* spp4.	SEP	-/-	-/-	-/-	-/-	-/-	P/-	P/-	-/-
SCIVAL= *Scirpus validus*	SEP	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/-
SESMAC= *Sesbania macrocarpa*	RHA	-/N	-/N	-/-	-/-	-/-	-/-	P/N	P/-
SETMAG= *Setaria magna*	GRA	-/-	-/N	-/-	-/-	-/-	-/-	-/-	-/-
SOLAME= *Solanum americanum*	RHA	-/N	-/N	-/-	P/-	-/-	-/-	-/-	-/N
SOLTOR= *Solidago tortifolia*	RHA	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
SPIPOL= *Spirodella polyrhiza*	FH	-/-	P/N	P/N	P/-	P/N	P/N	P/N	P/-
STAFLO= *Stachys floridana*	RH	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
THAGEN= *Thalia geniculata*	RHP	-/-	P/-	P/-	P/-	P/-	P/-	P/-	P/N
TYPDOM= *Typha domingensis*	SEP	-/-	-/-	-/-	-/-	-/-	-/-	-/N	-/N
TYPLAT= *Typha latifolia*	SEP	-/N	P/N	P/N	P/-	P/N	P/N	P/N	P/N
UTRBIF= *Utricularia biflora*	FH	-/-	-/-	-/-	P/-	P/N	P/-	-/-	-/-
UTRCOR= *Utricularia cornuta*	RH	-/-	-/N	-/-	-/-	-/-	-/-	-/-	-/-
UTRSPP= *Utricularia* spp.	RH	-/-	-/-	-/-	-/-	-/-	-/-	P/-	-/-
WOLFLO= *Wolffiella floridana*	FH	-/-	-/N	-/N	P/-	P/N	P/N	P/N	P/N
WOLSPP= *Wolffia* spp.	FH	-/-	P/N	P/-	-/-	-/N	-/N	P/N	-/-
WOOVIR= *Woodwardia virginiana*	RFP	-/N	P/N	-/N	-/-	-/-	-/-	-/-	-/-

Table 6. Plant Species List (Cont.)

Species Codes	Plant[b,c] Type	Sample Date[a] N90	A91	J92	M92	A92	F93	A93	M94
cyperac= Cyperaceae	SE	-/N	-/N	-/N	P/-	-/N	-/-	-/-	-/-
fern= Pteridophyte	RF	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
poaceae= Poaceae	GR	-/N	P/N	P/N	-/-	P/N	-/-	-/-	-/-
udicot= Unknown Dicot	??	-/N	P/N	-/N	-/-	-/-	-/N	-/N	-/-
uvine= Unknown Vine	VI	-/N	-/-	-/-	-/-	-/-	-/-	-/-	-/-
# SPECIES - PLANTING SITES (1215 m^2)		--	34	38	30	33	33	47	37
# SPECIES - NATURAL MARSH (296 m^2)		54	65	48	--	41	37	44	36
# SPECIES COMMON TO ALL SITES		--	26	26	--	23	22	28	22
SORENSEN'S SIMILARITY INDEX %									
PLANTED SPECIES INCLUDED		--	53	61	--	62	63	62	60
PLANTED SPECIES EXCLUDED		--	48	59	--	59	56	63	56

- = Not present. Bold Characters = Planted Species * = Plant may not fit category easily

[a]SAMPLE DATE CODES

CODE	PLANTED (P)	NATURAL SUCCESSION (N)
N90	--- ----	NOV 1990
A91	SEP 1991	AUG 1991
J92	JAN 1992	JAN 1992
M92	MAY 1992	--- ----
A92	AUG 1992	AUG 1992
F93	FEB 1993	FEB 1993
A93	AUG 1993	AUG 1993
M94	MAR 1994	MAR 1994

[b]PLANT TYPE CODES

CODE	DESCRIPTION
FF	FLOATING FERN
FH	FLOATING HERB
RF	ROOTED FERN
RH	ROOTED HERB
GR	GRASS
SE	SEDGE, RUSH, TYPHA
SH	SHRUB
ST	SMALL TREE
TR	TREE
VI	VINE

[c]PLANT LIFE TYPE= A/P ANNUAL or PERENNIAL

vs Planted= 40488 m^2/visit from overall plots and 164 m^2/visit from subplots). In spite of differences in total sample area these estimates seem reliable, because the samples were distributed over the study area, and we found few unrecorded species in our sample plots. For example, *Carex albotuscens* and *Hydrolea corymbosa* were very rare on the site and not found in any sample.

The site treatment method seems to have had a slight persistent effect on the comparative species assemblage over time. Site treatment species similarity based on Sorensen's Similarity Index (SI) tended to increase from a low value after planting site establishment to a set of values that didn't change much over time (Pielou 1984). Sorensen's SI was calculated with and without the planted species in the data set. This was done to determine how the addition of species through planting affected the "community" similarity. SI values varied from 53.1% (August 1991) to 62.9% (February 1993) with planted species included in the sample set. Similarity index values tended to be lower in the data set without planted species. With planted species removed from the SI calculation, values varied from 48.4% (August 1991) to 62.5% (August 1993) (Table 6). Results of the two calculation methods approached similar values during August 1993 (With Planted= 62.2% vs Without Planted= 62.5%). This suggests that the seed bank was activated by the Summer 1993 drawdown and had contributed a large species pool to the entire ecosystem, thus diluting the planting influence (Table 6). The seed bank linkage will be explored in the Seed bank section.

As mentioned above, some species, such as *Carex albotuscens, Habenaria repens,* and *Hydrolea corymbosa* were found in the marsh, but not in sample plots.

Carex albotuscens was found most frequently along canal banks in areas surrounding the marsh. The sedge may increase it's presence in the marsh over time. *Hydrolea corymbosa* was found only once in the South Marsh. It's environmental requirements include shallow water and access to light. The loss of these requirements (flooding >50 cm and overstory dominance by *Typha latifolia*) over time seem to have caused it's demise. A single plant of the orchid *Habenaria repens* was found along transect 6 (North Marsh). The plant was growing on a floating mat of *Eleocharis vivipara*. The increasing area of floating mats may lead to increased presence of species such as *Habenaria repens*. This species is commonly found in the nearby lake fringing swamp forest. In contrast, *Polygonum densiflorum* was found in small patches in the North Marsh during Summer 1991. Patch sizes increased until *P. densiflorum* was found in sample plots in August 1993 (Table 6).

Hydrology

Hydrology is an important driving force in any ecosystem. A number of conditions in the Apopka Marsh may cause unique hydrologic conditions in different parts of the marsh. Two conditions that may alter hydrology include the indirect connection between the North and South Marshes; soil surface elevation gradients that are perpendicular to the axis of the stage recording network; and the tendency to form floating mats.

The long-term stage record showed that water surface fluctuations across the marsh were well correlated (Fig. 4). The stage record also provided information about the timing and duration of soil surface exposure during August 1993 and March 1994.

The water depth record from measurements at plots provided information about soil surface elevation gradients and elevation changes brought on by floating mat formation over the duration of the project. The topographic survey conducted in August 1992 provided information about soil surface elevation for a short time and was not linked to this study, other than to provide inferences about soil oxidation. As mat formation progressed its presence was revealed as an increase in variation associated with water depth measurements.

Finally, developing an understanding of how vegetation succession has been driven requires an understanding of the relationship between the abiotic and biotic components. In this case relating water depth patterns measured at vegetation plots to long-term stage records should provide information about the hydrologic components: depth, duration, and timing. Unfortunately, floating mat development results in a loss in the information value of long-term stage records. A correlation analysis between daily stage and vegetation plot water depth revealed differences over time and between the natural succession and planting sites (Table 7). The relationship between stage and water depth tended to be closer in the planted sites than in the natural succession sites.

Table 7. Correlation analysis of Water Depth and Recorded Stage Data. * No correlation estimate due to insufficient numbers of stage measurements.

(A) NATURAL SUCCESSION TRANSECTS
SPEARMAN CORRELATION ANALYSIS

	SOUTH MARSH			NORTH MARSH		
DATE	COEF.	ρ	N	COEF.	ρ	N
NOV 90	-0.28	0.0003	168	-0.17	0.0527	128
AUG 91	0.60	0.0001	155	0.72	0.0001	124
JAN 92	0.52	0.0001	155	-0.15	0.0917	128
AUG 92	0.70	0.0001	156	-0.21	0.0189	128
FEB 93	0.52	0.0001	155	-0.30	0.0007	128
AUG 93	-0.35	0.0052	64	0.38	0.0022	62
MAR 94	-0.02	0.8140	92	-0.04	0.7512	63

(B) PLANTING SITE PLOTS
SPEARMAN CORRELATION ANALYSIS

	SOUTH MARSH			NORTH MARSH			COMBINED		
DATE	COEF.	ρ	N	COEF.	ρ	N	COEF.	ρ	N
SEP 91	0.85	0.0001	56	*	*	*	0.66	0.0001	84
JAN 92	0.71	0.0001	106	*	*	*	0.58	0.0001	159
MAY 92	0.60	0.0001	108	0.36	0.0077	54	0.41	0.0001	162
AUG 92	0.75	0.0001	108	*	*	*	0.67	0.0001	162
FEB 93	0.80	0.0001	108	*	*	*	0.53	0.0001	162
AUG 93	0.55	0.0001	107	0.05	0.7445	53	0.56	0.0001	160
MAR 94	0.51	0.0001	108	*	*	*	0.55	0.0001	162

In the south marsh natural succession sites the relationship tended to weaken or become negative during drawdowns or as mat formation reached maximum. In most cases north marsh natural succession sites tended to have positive or negative relationships with no discernable pattern. Drawdown did seem to result in breakdown in the relationship in the March 1994 sample (Table 7).

In the south marsh planting site, the relationship between stage and water depth seemed to decline late in the sample period. In contrast, the north marsh planting site analysis was mared by the lack of stage measurements because sites were measured in one day. A correlation analysis with the sites combined revealed little difference among sample dates. Combining sites lead to an overall reduction of correlation coefficients (Table 7).

Within vegetation plot water depth measurements were highly correlated. This result held for all sample dates in both north and south marsh planting sites (Table 8). Correlation analysis of natural succession plots also revealed similar within plot measures (Table 8).

ASSESSMENT OF EXPERIMENTAL PLANTING SITES

Hydrology

Hydrology will be reported first to lay the groundwork for understanding the vegetation dynamics of the site. The site remained flooded for most of the time since it was established (Figure 4). The first drawdown of the north marsh (Site 3) occurred

Table 8. Water depth measurement correlation analysis from within vegetation plots.

(A) NATURAL SUCCESSION TRANSECTS
SPEARMAN CORRELATION COEFFICIENTS

	SOUTH MARSH			NORTH MARSH		
DATE	WL1xWL2	WL1xWL3	WL2xWL3	WL1xWL2	WL1xWL3	WL2xWL3
NOV 90	0.95	0.96	0.96	0.87	0.88	0.92
AUG 91	0.95	0.91	0.95	0.94	0.86	0.90
JAN 92	0.95	0.92	0.95	0.90	0.78	0.84
AUG 92	0.93	0.92	0.94	0.86	0.84	0.86
FEB 93	0.91	0.92	0.94	0.77	0.74	0.76
AUG 93	0.90	0.87	0.91	0.82	0.84	0.83
MAR 94	0.99	0.94	0.94	0.87	0.84	0.95

(B) PLANTING SITE PLOTS
SPEARMAN CORRELATION COEFFICIENTS

	SOUTH MARSH			NORTH MARSH		
DATE	WL1xWL2	WL1xWL3	WL2xWL3	WL1xWL2	WL1xWL3	WL2xWL3
SEP 91	0.88	0.85	0.81	0.90	0.87	0.88
JAN 92	0.92	0.86	0.90	0.95	0.93	0.94
MAY 92	0.92	0.86	0.90	0.93	0.90	0.90
AUG 92	0.92	0.90	0.93	0.90	0.90	0.87
FEB 93	0.91	0.80	0.86	0.85	0.75	0.82
AUG 93	0.91	0.86	0.83	0.80	0.72	0.83
MAR 94	0.93	0.87	0.93	0.97	0.96	0.96

during spring 1993. The soil surface was exposed during the drawdown event. The south marsh remained flooded during this drawdown. During spring 1994 both the north and south marshes were drawn down leading to soil exposure.

Hydrology on the site was linked to vegetation dynamics and floating mat development. The *Pontederia cordata* planting treatment exhibited the greatest mat formation. A slowly declining water depth pattern over time reflects mat formation (Figure 10). The *Panicum hemitomon* planting treatment was vegetated (primarily by *Typha latifolia*) later than the other planted treatments. This later vegetation development resulted in the least mat formation and deeper water depths (Figure 10). The remaining treatments showed a linkage to surface water intermediate between *Pontederia* and *Panicum* (Figure 10, 11). A Scheffe' Multiple Ranges test (α=0.05) revealed that water depth in the *Pontederia cordata* planted treatment tended to be shallowest while the *Panicum hemitomon* treatment was deepest. Water depths in the remaining treatments did not differ (Table 9).

<u>Floating Mats</u>

Floating mats were as diverse in the Planting Sites as they were in the Natural Succession areas. Mats were formed by *Eleocharis interstincta*, *Pontederia cordata*, *Sagittaria lancifolia*, *Scirpus validus*, and *Typha latifolia* rhizomes; *Hydrocotyle* spp.

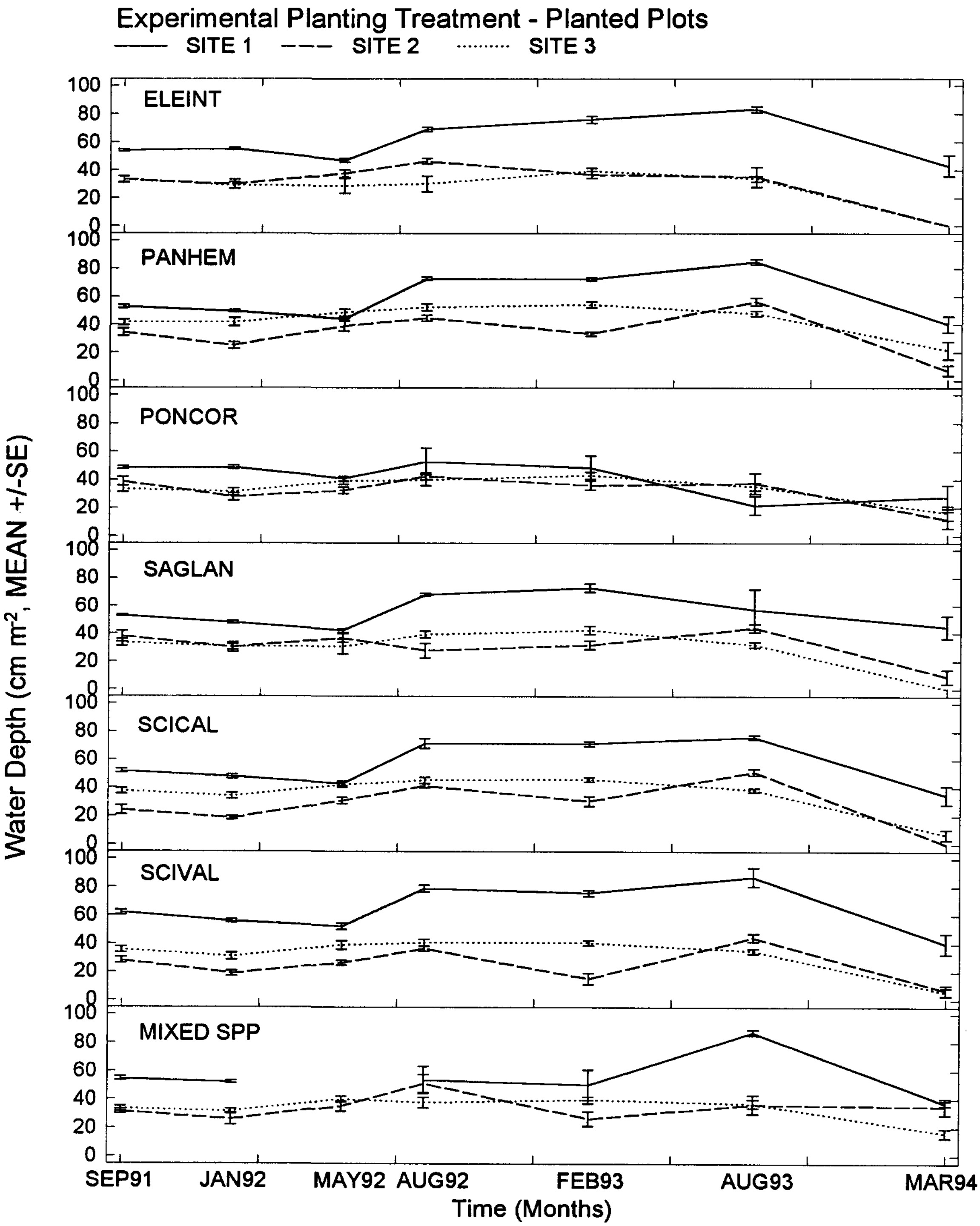

Figure 10. Water depth from Experimental Planting Treatment Sites, Planted Plots.

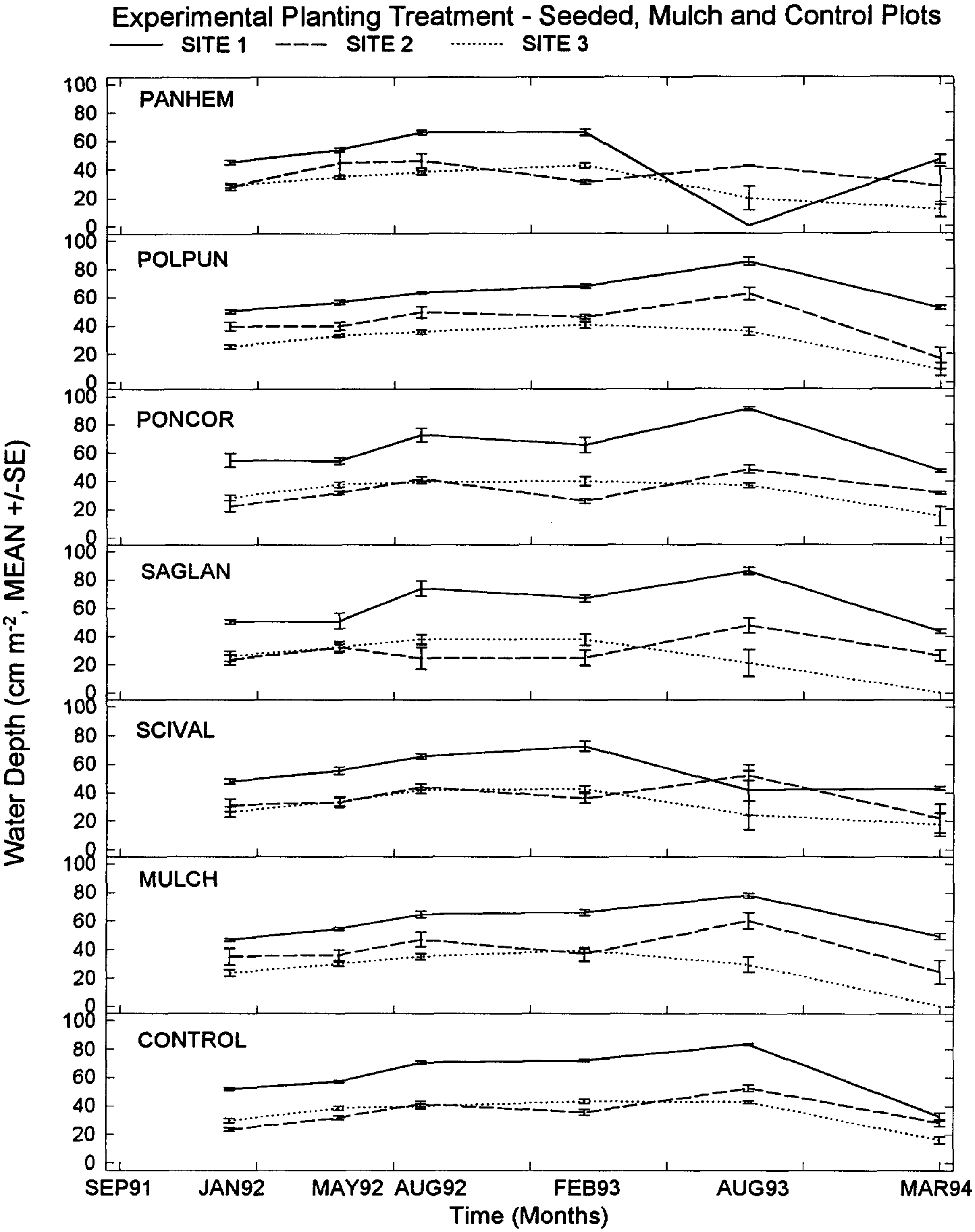

Figure 11. Water depth from Experimental Planting Treatment Sites, Seeded, Mulch, and Control Plots.

Table 9. Comparison of mean water depths (cm) among planted plot treatments, Experimental Planting Sites, Apopka Marsh Flow-way Demonstration Project. General Linear Model procedure with a Scheffe' Multiple Ranges test. [1]Similar letters denote no significant difference

Treatment Type	Water Depth	[1]Scheffe' Multiple Ranges Test	
Panicum hemitomon	45.7	a	
Scirpus validus	40.6	b	
Scirpus californicus	39.9	b	c
Eleocharis interstincta	39.9	b	c
Mixed Species	38.5	b	c
Pontederia cordata	35.7		c

stolons; dead vegetation; and *Eichhornia crassipes* colonies. We observed that most mat areas formed as vegetation grew into shallow soil (i.e. agricultural plow zone), followed by disconnection of the soil-root/rhizome matrix and flotation. *Hydrocotyle* spp. and *Eichhornia crassipes* tended to develop floating colonies which spread across canals and into established planted treatments.

Minimal invasion of planted *Scirpus californicus* plots by either *Hydrocotyle* spp. or *Eichhornia crassipes* was found. This is an unusual situation with colonization up to the edge of the *S. californicus* and little or no invasion inside the treatment plot. This pattern may represent a form of competitive exclusion. Other treatments exhibited similar patterns, but not to the extent of the *S. californicus* treatment.

Vegetation -- Treatment Plots

Flora-Overall. Fluctuations in species richness were similar among the various treatments over time (Table 10). An increase in species richness coinciding with the August 1993 drawdown in the south marsh was detected (Table 10).

Flora-Subplot. Fewer species were found in the subplots than in the overall plots. This results from the smaller sample area of the subplot. Common species found included the floating plants: *Azolla caroliniana*, *Lemna* spp., *Salvinia rotundifolia*, *Spirodella polyrhiza*, *Wolffia* spp. and *Wolffiella floridana*. Similarities in vegetation dynamics of dominant species between subplots and overall plots suggests that the subplots were representative of vegetation dynamics over time.

Table 10. Total plant species richness per treatment from Experimental Planting Sites. Values in parenthesis (X 0.001) are species richness values normalized to # spp. m^{-2} to allow comparisons among treatments.

TREATMENTS	SAMPLE DATES JAN92	MAY92	AUG92	FEB93	AUG93	MAR94
PLANTED (n=12)						
ELEINT	17 (6.13)	23 (8.30)	12 (4.33)	15 (5.41)	22 (7.94)	13 (4.69)
PANHEM	17 (6.13)	18 (6.49)	19 (6.85)	15 (5.41)	26 (9.38)	21 (7.57)
PONCOR	19 (6.85)	28 (10.10)	19 (6.85)	19 (6.85)	24 (8.66)	19 (6.85)
SAGLAN	18 (6.49)	23 (8.30)	17 (6.13)	16 (5.77)	24 (8.66)	18 (6.49)
SCICAL	15 (5.41)	18 (6.49)	19 (6.85)	13 (4.69)	21 (7.57)	12 (4.33)
SCIVAL	19 (6.85)	16 (5.77)	22 (7.94)	12 (4.33)	27 (9.74)	17 (6.13)
MIXED (n=6)	23 (6.55)	18 (5.12)	23 (6.55)	21 (5.98)	28 (7.97)	20 (5.69)
SEEDED (n=6)						
PANHEM	7 (5.05)	14 (10.10)	14 (10.10)	12 (8.66)	21 (15.15)	18 (12.98)
POLPUN	11 (7.94)	15 (10.82)	13 (9.38)	11 (7.94)	21 (15.15)	12 (8.66)
PONCOR	11 (7.94)	11 (7.94)	15 (10.82)	14 (10.10)	25 (18.03)	14 (10.10)
SAGLAN	12 (8.66)	14 (10.10)	14 (10.10)	11 (7.94)	19 (13.71)	16 (11.54)
SCIVAL	10 (7.21)	14 (10.10)	13 (9.38)	15 (10.82)	19 (13.71)	18 (12.98)
MULCH (n=12)	14 (5.05)	15 (5.41)	14 (5.05)	15 (5.41)	26 (9.38)	13 (4.69)
CONTROL (n=36)	22 (1.89)	26 (2.23)	25 (2.14)	24 (2.06)	40 (3.43)	28 (2.40)

Cover Percent. The first sampling (August 1991) of the planted sites was limited to a presence/absence species list for the overall estimates and detailed data collection from the subplots. The seeded, mulched, and control plots were visited but not intensively sampled during this sample period. The plots were nearly devoid of plants as a result of the site preparation (Table 11). Little evidence of planted sprigs were found during this visit. Apparently leaf die-back had occurred, leaving viable rhizomes in the soil. The dark brown stained water color restricted our view of living plants. As the plant community developed it became obvious that the planted treatment had achieved a high survival rate.

Each species behaved in a way that reflects its adaptation to its environment. Each species exhibited varying degrees of survival and colonization effectiveness in the face of inter- and intra-specific competition. *Hydrocotyle ranunculoides* and *Typha latifolia* were the most frequent invading species from the natural succession marsh. These species tended to provide competition in two ways. *Hydrocotyle ranunculoides*, a low growing, stoloniferous, perennial plant was found to grow into the understory of many other taller species. After cold weather reduced overstory cover it seemed as if *H. ranunculoides* increased its cover into the formerly shaded space. In contrast, *Typha latifolia* tended to establish from seed, then colonize nearby areas by growing multiple rhizomes into available spaces. It tended to increase shade and expand into a large fraction of the rhizosphere. It was outcompeted by planted species in many cases

Table 11. Overall vegetation cover measurements (% $plot^{-1}$ MEAN ±SE) from planted plots, Experimental Planting Sites, Apopka Marsh Flow-Way Demonstration Project. Species Codes: Upper case six character are abbreviated species codes. Lower case codes represent plant families or unknowns. Codes ending with D represent dead, while S represent seedlings. Overall cover measurements in August 1991 sample were presence/absence, therefore numeric entries are frequency of occurrence, not mean cover.

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
AUGUST 1991	SITE 1													
ALTPHI	0.25	.	0.25	.	.	.	0.25	.	.	.	.	.	.	.
AMMAUS	0.25	.	.	.	.	.	.	.	0.25	.	.	.	.	.
BACSPP	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
COMDIF	.	.	0.25	.	0.50	.	.	.	0.25	.	0.25	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
ECLALB	0.25	.	0.25	.	.	.	.	.	0.25	.	.	.	.	.
LEMSPP	1.00	.	1.00	.	1.00	.	1.00	.	1.00	.	1.00	.	0.50	.
PANHEM	.	.	0.25	.	.	.	0.25	.	.	.	.	.	.	.
POLPUN	0.50	.	0.75	.	0.50	.	0.50	.	0.50	.	.	.	0.50	.
PONCOR	.	.	.	.	0.25	.	.	.	.	.	0.25	.	.	.
SAGLAN	.	.	0.25	.	0.25	.	1.00	.	0.25	.	.	.	.	.
SALROT	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
SCICAL	0.25	.	.	.	0.25	.	.	.	0.25	.	0.25	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCIVAL	0.25	.	0.25	.	0.25	.	.	.	0.25	.	.	.	.	.
SPIPOL	1.00	.	1.00	.	1.00	.	1.00	.	1.00	.	0.75	.	0.50	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	.	.	.	.	.	.	0.25	.	.	.	.	.	.	.
WOLFLO	.	.	.	.	0.25	.	0.25	.	.	.	.	.	.	.
WOLSPP	0.25	.	0.75	.	0.25	.	0.25	.	0.25	.	0.75	.	0.50	.
AUGUST 1991	SITE 2													
ALTPHI	0.25	.	0.25	.	0.50	.	.	.	0.50	.	0.25	.	.	.
AMMAUS	1.00	.	0.75	.	0.75	.	0.25	.	1.00	.	0.75	.	0.50	.
ASTSUB	.	.	0.25	.	0.50	.	0.25	.	.	.	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	0.25	.	.	.	0.50	.
CYPIRI	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	0.25	.	.	.	0.25	.	.	.	.	.
ECHCOL	.	.	0.50	.	.	.	0.25	.	.	.	0.50	.	.	.
ECLALB	0.25	.	0.50	.	0.50	.	0.25	.	0.50	.	0.50	.	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
ELEIND	.	.	0.25	.	.	.	.	.	.	.	.	.	.	.
ELEINT	0.25	.	.	.	.	.	.	.	.	.	0.50	.	0.50	.
HYDUMB	.	.	0.25	.	.	.	.	.	.	.	0.25	.	.	.
KOSSPP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	.
LEMSPP	1.00	.	1.00	.	1.00	.	1.00	.	1.00	.	1.00	.	0.50	.
LUDLEP	.	.	.	.	.	.	.	.	0.25	.	0.25	.	.	.
LUDOCT	0.25	.	.	.	0.25	.	.	.	.	.	.	.	0.50	.
LUDPAL	.	.	0.25	.	0.25	.	0.25	.	.	.	.	.	.	.
PANDIC	0.25	.	0.25	.	0.50	.	0.25	.	0.25	.	0.25	.	.	.
PANHEM	.	.	0.50	.	.	.	0.25	.	0.25	.	.	.	0.50	.
POLPUN	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
PONCOR	0.25	.	.	.	.	.	.	.	.	.	0.25	.	0.50	.
SAGLAN	.	.	.	.	0.25	.	0.75	.	0.25	.	.	.	0.50	.
SCICAL	0.25	.	.	.	0.25	.	.	.	0.25	.	0.25	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	.
SCIVAL	0.25	.	0.25	.	0.25	.	.	.	0.25	.	.	.	.	.
SPIPOL	1.00	.	0.50	.	0.75	.	0.75	.	0.75	.	1.00	.	0.50	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	0.50	.
TYPLAT	.	.	0.25	.	.	.	.	.	.	.	.	.	.	.
UGRASS	.	.	.	.	.	.	0.25	.	.	.	.	.	.	.
WOLSPP	0.75	.	0.50	.	0.25	.	1.00	.	0.25	.	0.50	.	0.50	.
AUGUST 1991	SITE 3													
ALTPHI	.	.	.	.	0.25	.	0.75	.	0.25	.	0.25	.	.	.
AMMAUS	0.25	.	.	.	0.50	.	.	.	0.25	.	0.25	.	.	.
BACCAR	.	.	0.25	.	.	.	.	.	.	.	.	.	.	.
COMDIF	.	.	.	.	0.25	.	.	.	0.25	.	.	.	.	.
EICCRA	.	.	.	.	0.25	.	.	.	0.25	.	.	.	.	.
ELEINT	0.25	.	0.25	.	.	.	.	.	.	.	0.50	.	0.50	.
LEMSPP	0.25	.	.	.	0.75	.	0.25	.	0.75	.	.	.	.	.
LUDLEP	0.25	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDOCT	.	.	.	.	.	.	.	.	0.25	.	0.25	.	.	.
LUDPAL	0.75	.	0.50	.	0.25	.	.	.	0.25	.	0.25	.	.	.
PANHEM	.	.	0.25	.	.	.	0.25	.	0.25	.	.	.	0.50	.
POLPUN	.	.	.	.	.	.	.	.	.	.	0.25	.	.	.
PONCOR	0.25	.	.	.	0.50	.	.	.	0.25	.	0.25	.	0.50	.
SAGLAN	.	.	.	.	.	.	0.50	.	0.25	.	.	.	0.50	.
SALCAR	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
SCICAL	0.25	.	.	.	0.25	.	.	.	0.25	.	0.25	.	.	.
SCISPP	.	.	.	.	.	.	0.25	.	.	.	.	.	0.50	.
SCIVAL	0.25	.	0.25	.	0.25	.	.	.	0.25	.	.	.	.	.
SPIPOL	.	.	.	.	.	.	.	.	0.25	.	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	0.50	.
TYPLAT	.	.	0.25	.	.	.	.	.	.	.	.	.	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
JANUARY	1992		SITE 1											
ALTPHI	2.00	1.00	1.50	1.19	3.00	2.35	1.50	1.19	1.00	.	0.75	0.25	0.50	0.50
AMAAUS	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
AMMCOC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ECHCOL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	5.25	1.84	.	.	.	.	.	.	.	.	.	.	1.00	.
HYDRAN	0.25	0.25	0.25	0.25	.	.	0.50	0.29	0.50	0.29	1.25	1.25	.	.
LUDOCT	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
LUDPAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	1.00	.	.	.	.	.	.	.	.	.	1.00	.
POLPUN	0.50	0.29	2.75	1.31	1.50	1.19	1.75	1.11	0.75	0.25	0.50	0.29	1.00	.
PONCOR	.	.	.	.	28.75	10.87	.	.	.	.	0.50	0.29	7.50	7.50
SAGLAN	0.25	0.25	0.25	0.25	0.25	0.25	36.25	11.43	.	.	0.25	0.25	1.00	.
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	15.00	3.54	10.00	10.00	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	15.00	5.00
SCIVAL	.	.	.	.	.	.	.	.	.	.	37.50	14.36	5.00	5.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	35.00	5.00
TYPLAT	0.25	0.25	.	.	0.25	0.25	.	.	1.25	1.25	.	.	.	.
umono	.	.	.	.	.	.	.	.	.	.	.	.	.	.
unknon	.	.	.	.	.	.	.	.	.	.	.	.	.	.
JANUARY	1992		SITE 2											
ALTPHI	0.75	0.25	0.50	0.29	1.50	1.19	1.25	1.25	1.25	1.25	1.75	1.11	.	.
AMMCOC	.	.	.	.	3.75	3.75	.	.	.	.	.	.	.	.
ASTSUB	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
AZOCAR	0.75	0.25	0.25	0.25	7.75	4.19	18.75	7.18	.	.	43.75	15.33	0.50	0.50
COMDIF	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPODO	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
CYPSPP	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ECLALB	0.25	0.25	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEINT	16.25	3.15	0.25	0.25	.	.	.	.	.	.	0.25	0.25	5.00	5.00
ELESPP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	2.50	2.50
EUPSER	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
HYDRAN	7.75	7.42	1.25	1.25	1.50	1.19	0.25	0.25	.	.	0.25	0.25	1.00	.
LEMSPP	16.25	5.54	6.50	2.99	46.25	8.51	52.50	11.27	7.75	3.04	35.00	4.08	40.50	39.50
LIMSPO	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
LUDPAL	1.00	.	0.75	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	.	.
PANHEM	.	.	1.00	.	.	.	.	.	.	.	.	.	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
POLPUN	.	.	0.25	0.25	.	.	.	.	0.50	0.29	0.25	0.25	.	.
PONCOR	0.25	0.25	0.25	0.25	43.75	14.91	.	.	.	.	.	.	5.00	5.00
RHARHA	0.25	0.25	.	.	0.25	0.25	.	.	.	.	.	.	.	.
SAGLAN	0.25	0.25	.	.	.	.	60.00	9.13	0.25	0.25	.	.	5.00	.
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	0.75	0.25	0.50	0.29	.	.	0.25	0.25	0.50	0.29	0.25	0.25	0.50	0.50
SCICAL	.	.	.	.	.	.	.	.	21.25	8.51	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	10.00	10.00
SCIVAL	.	.	0.25	0.25	0.25	0.25	.	.	10.00	10.00	76.25	1.25	10.00	10.00
SPIPOL	1.75	1.11	0.75	0.25	2.00	1.00	1.00	.	1.00	.	4.25	3.59	1.00	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	27.50	7.50
TYPLAT	1.75	1.11	0.75	0.25	3.00	1.15	.	.	0.25	0.25	0.25	0.25	0.50	0.50
WOLFLO	4.25	2.14	2.00	1.00	5.25	1.84	4.25	2.14	3.00	1.15	6.50	2.18	5.50	4.50
WOLSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ugrass	0.25	0.25	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.
JANUARY	1992		SITE 3											
ALTPHI	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
AZOCAR	47.50	24.62	15.25	11.62	52.50	18.87	33.75	15.99	18.75	10.48	62.50	9.46	52.50	22.50
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CLAJAM	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
COMDIF	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	0.75	0.25	0.25	0.25	0.75	0.25	0.50	0.29	0.25	0.25	1.00	.	0.50	0.50
ELEINT	33.75	10.28	.	.	.	.	.	.	.	.	.	.	7.50	2.50
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LEMSPP	4.00	1.00	0.75	0.25	4.25	1.11	4.00	2.27	1.00	.	1.00	.	3.00	2.00
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDPAL	3.25	2.25	4.25	2.14	0.50	0.29	0.75	0.25	2.00	1.00	2.00	1.00	0.50	0.50
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLPUN	.	.	0.50	0.29	0.25	0.25	.	.	.	.	0.25	0.25	0.50	0.50
PONCOR	.	.	1.50	1.19	51.25	17.12	0.25	0.25	0.25	0.25	0.25	0.25	5.00	5.00
SAGMON	.	.	.	.	.	.	32.50	14.36	.	.	.	.	1.00	.
SALROT	0.50	0.29	0.50	0.29	.	.	0.25	0.25	0.50	0.29	0.75	0.25	1.00	.
SCICAL	.	.	.	.	.	.	.	.	10.00	10.00	.	.	35.00	10.00
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCIVAL	.	.	1.25	1.25	.	.	.	.	15.00	5.40	81.25	9.66	2.50	2.50
SPIPOL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THAGEN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	25.00	5.00
TYPLAT	1.75	1.11	2.00	1.00	0.50	0.29	2.75	2.43	1.25	1.25	0.50	0.29	.	.
WOLFLO	1.00	.	1.00	.	1.75	1.11	4.00	2.27	1.00	.	0.75	0.25	3.00	2.00

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
MAY 1992	SITE 1													
ALTPHI	10.25	3.30	10.00	6.77	6.25	2.39	3.00	2.35	9.25	4.87	6.50	2.99	.	.
ELEINT	41.25	9.66	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	0.50	0.29	0.25	0.25	.	.	0.25	0.25	0.50	0.29	0.50	0.29	.	.
LEMSPP	0.75	0.25	0.50	0.29	1.00	.	1.00	.	0.25	0.25	1.00	.	.	.
PANHEM	.	.	1.00	.	.	.	.	.	.	.	.	.	.	.
POLPUN	1.00	.	2.75	1.31	1.25	1.25	0.50	0.29	0.75	0.25	0.75	0.25	.	.
PONCOR	.	.	.	.	62.50	8.29	.	.	.	.	1.25	1.25	.	.
SAGLAN	5.25	3.42	2.75	2.43	.	.	72.50	5.20	0.50	0.29	1.25	1.25	.	.
SAGMON	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SALROT	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
SCICAL	.	.	.	.	.	.	.	.	51.25	5.15	16.25	16.25	.	.
SCIVAL	18.75	18.75	.	.	.	.	.	.	.	.	52.50	17.62	.	.
SPIPOL	0.75	0.25	0.75	0.25	1.00	.	1.00	.	0.25	0.25	2.00	1.00	.	.
TYPLAT	1.25	1.25	.	.	1.50	1.19	0.25	0.25	0.25	0.25	0.25	0.25	.	.
UTRBIF	5.00	2.89	2.50	1.44	0.25	0.25	2.50	2.50	0.25	0.25	.	.	.	.
UTRSPP	0.50	0.29	0.50	0.29	3.75	2.39	6.25	3.75	5.00	3.54	6.25	2.39	.	.
MAY 1992	SITE 2													
ALTPHI	7.75	3.04	0.25	0.25	5.25	4.92	5.25	4.92	1.25	1.25	0.75	0.25	0.50	0.50
AMAAUS	0.25	0.25	.	.	0.25	0.25	.	.	.	.	.	.	.	.
APILEP	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.	.	.
ASTELL	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
AZOCAR	1.50	1.19	0.25	0.25	3.75	2.39	7.50	7.50	12.75	7.36	2.75	2.43	.	.
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ECHCRU	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ECLALB	.	.	.	.	2.50	2.50	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	0.25	0.25	.	.	.	.	0.50	0.50
ELEINT	63.75	3.75	0.25	0.25	.	.	.	.	.	.	.	.	3.00	2.00
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EUPSER	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.	.	.
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
HYDRAN	7.50	7.50	2.50	2.50	1.25	1.25	6.50	6.17	.	.	5.00	3.54	5.50	4.50
HYDUMB	2.75	2.43	.	.	3.75	3.75	0.25	0.25	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	7.50	2.50
LEMSPP	3.25	2.25	9.00	5.02	47.50	7.50	30.00	8.16	30.50	17.03	37.75	12.91	35.00	15.00
LIMSPO	.	.	.	.	.	.	0.25	0.25	.	.	.	.	2.50	2.50
LUDPAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANDIC	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
PANHEM	.	.	4.00	1.00	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	1.00	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
POLPUN	.	.	1.25	1.25	.	.	0.25	0.25	3.75	2.39	.	.	.	.
PONCOR	.	.	0.50	0.29	52.50	17.97	.	.	.	.	.	.	2.50	2.50
RUMOBO	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
SAGLAN	1.25	1.25	.	.	.	.	75.00	11.73	.	.	0.25	0.25	8.00	7.00
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGSTA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	6.50	4.63	7.75	3.04	1.50	1.19	25.00	21.70	17.50	7.50	13.75	9.44	2.50	2.50
SAMCAN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCICAL	.	.	.	.	0.25	0.25	0.25	0.25	70.00	7.91	.	.	2.50	2.50
SCIVAL	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.	92.50	2.50	17.50	12.50
SENGLA	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
SOLSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SPIPOL	1.75	1.11	2.50	2.50	5.00	2.89	0.25	0.25	6.25	3.75	5.25	2.75	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	32.50	2.50
TYPLAT	17.50	6.61	26.25	12.48	15.00	8.90	.	.	0.25	0.25	1.50	1.19	40.00	30.00
WOLFLO	0.25	0.25	7.75	7.42	8.75	7.18	17.50	4.79	2.75	2.43	.	.	5.50	4.50
MAY 1992	SITE 3													
ALTPHI	0.75	0.25	0.25	0.25	.	.	1.25	1.25	0.50	0.29	.	.	.	.
AMAAUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AZOCAR	2.00	1.00	0.50	0.29	0.50	0.29	0.75	0.25	2.00	1.00	1.75	1.11	10.50	9.50
EICCRA	1.75	1.11	0.25	0.25	1.50	1.19	1.50	1.19	1.75	1.11	2.00	1.00	.	.
ELEINT	48.75	3.15	.	.	.	.	0.25	0.25	11.50	11.17	.	.	5.50	4.50
ELEVIV	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
JUNEFF	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.50	0.50
LEMSPP	1.00	.	0.50	0.29	5.75	4.75	0.75	0.25	2.00	1.00	15.75	14.75	15.50	14.50
LUDPAL	1.75	1.11	2.75	1.31	0.25	0.25	1.50	1.19	1.50	1.19	1.50	1.19	1.00	.
PANHEM	0.25	0.25	1.00	.	.	.	.	.	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCOR	0.25	0.25	2.50	1.44	56.25	18.86	2.50	2.50	0.50	0.29	2.50	1.44	15.00	15.00
SAGLAN	0.25	0.25	.	.	.	.	30.00	17.80	.	.	.	.	3.00	2.00
SAGMON	.	.	.	.	.	.	5.00	5.00	.	.	.	.	.	.
SAGSTA	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	1.00	.	0.25	0.25	2.00	1.00	0.50	0.29	2.00	1.00	4.25	2.14	10.50	9.50
SCICAL	.	.	.	.	0.50	0.29	.	.	37.50	13.15	15.00	15.00	5.00	5.00
SCIVAL	.	.	1.25	1.25	.	.	.	.	.	.	63.75	14.34	35.00	5.00
SPIPOL	0.25	0.25	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.
THAGEN	.	.	.	.	1.25	1.25	.	.	.	.	.	.	35.00	5.00
TYPLAT	10.00	2.04	4.00	2.27	0.50	0.29	1.25	1.25	0.25	0.25	0.50	0.29	.	.
WOLFLO	1.00	.	0.50	0.29	2.00	1.00	0.75	0.25	2.00	1.00	1.00	.	10.50	9.50

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE	
AUGUST 1992	SITE 1														
ALTPHI	4.00	2.27	2.50	1.44	0.50	0.29	3.00	1.15	4.00	1.00	3.75	2.39	5.00	5.00	
AMAAUS	.	.	0.25	0.25	.	.	0.25	0.25	.	.	.	.	.	.	
CYPODO	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.	
CYPSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
EICCRA	.	.	.	.	.	.	0.25	0.25	.	.	0.25	0.25	.	.	
ELEINT	78.75	10.68	.	.	.	.	.	.	.	.	.	.	7.50	7.50	
HYDRAN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
HYDUMB	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.	
LEMSPP	.	.	.	.	1.25	1.25	0.25	0.25	1.50	1.19	0.25	0.25	5.00	5.00	
LUDREP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
PANHEM	.	.	0.20	5.00	0.50	.	.	.	.	.	.	.	.	.	.
PASURV	.	.	2.50	.	1.40	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50	
POLPUN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.	
PONCOR	.	.	.	.	70.00	23.36	.	.	0.25	0.25	.	.	5.00	5.00	
SAGLAN	5.00	2.89	3.70	5.00	2.90	.	.	81.25	5.15	.	.	.	.	8.00	7.00
SAGMON	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.	
SALROT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
SCICAL	.	.	.	.	.	.	.	.	81.25	5.91	.	.	2.50	2.50	
SCISPP4	.	.	.	.	.	.	.	.	0.25	0.25	.	.	0.50	0.50	
SCIVAL	.	.	.	.	.	.	2.50	2.50	.	.	87.50	5.95	10.00	5.00	
SPIPOL	.	.	.	.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	5.00	5.00	
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	55.00	15.00	
TYPLAT	1.50	1.19	1.50	.	1.90	1.00	1.19	7.75	4.66	0.25	0.25	0.25	0.25	5.00	5.00
UTRBIF	3.75	2.39	0.20	5.00	0.50	1.00	1.19	1.25	1.25	2.75	2.43	22.50	16.52	7.50	2.50
AUGUST 1992	SITE 2														
ALTPHI	.	.	.	.	.	.	.	.	0.25	0.25	.	.	1.00	.	
AMAAUS	.	.	.	.	1.25	1.25	.	.	.	.	.	.	.	.	
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
CYPSUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
ECLALB	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
EICCRA	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.	
ELEINT	88.75	5.15	6.25	3.75	0.25	0.25	.	.	.	.	0.25	0.25	7.50	2.50	
EUPCAP	0.25	0.25	.	.	2.50	1.44	.	.	.	.	2.50	2.50	0.50	0.50	
HYDRAN	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.	
HYDUMB	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.	
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50	
LEMSPP	0.25	0.25	30.00	11.73	7.50	4.79	32.50	11.09	17.50	11.09	0.25	0.25	30.00	30.00	
LIMSPO	.	.	1.25	1.25	1.25	1.25	.	.	1.25	1.25	0.50	0.29	1.00	.	

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDOCT	0.25	0.25	.	.	2.50	1.44	.	.	.	.	2.50	2.50	.	.
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANDIC	.	.	.	.	0.50	0.29	.	.	.	.	.	.	.	.
PANHEM	.	.	4.25	2.14	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
PONCOR	.	.	2.50	2.50	61.25	18.53	.	.	.	.	2.50	2.50	10.00	10.00
SAGLAN	0.25	0.25	0.25	0.25	0.25	0.25	66.25	3.75	.	.	0.50	0.29	22.50	17.50
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	2.75	2.43	3.75	3.75	8.75	3.15	0.25	0.25	.	.	5.00	5.00
SCICAL	.	.	.	.	0.25	0.25	0.25	0.25	56.25	20.14	.	.	2.50	2.50
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	10.00	4.08	.	.	.	.
SCIVAL	.	.	2.50	2.50	.	.	.	.	22.50	22.50	78.75	10.68	12.50	2.50
SPIPOL	0.25	0.25	5.25	3.42	2.50	2.50	7.75	4.66	2.50	2.50	0.25	0.25	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	0.25	0.25	35.00	25.00
TYPLAT	7.50	2.50	43.75	12.81	15.00	6.45	8.75	3.75	2.50	2.50	4.00	3.67	35.00	15.00
WOLFLO	.	.	3.75	2.39	.	.	3.75	2.39	.	.	.	.	5.00	5.00
AUGUST 1992	SITE 3													
ALTPHI	.	.	.	.	0.25	0.25	.	.	0.50	0.29	0.50	0.29	1.00	.
AZOCAR	0.25	0.25	0.25	0.25	.	.	.	.	2.50	2.50	.	.	5.00	5.00
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPSUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	2.00	1.00	12.50	4.79	.	.	8.75	5.15	19.00	9.50	7.75	2.25	5.00	.
ELEINT	87.50	4.33	.	.	.	.	.	.	.	.	.	.	35.00	5.00
HYDRAN	.	.	2.75	2.43	1.25	1.25	1.25	1.25	0.25	0.25	1.50	1.19	2.50	2.50
HYDUMB	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LEMSPP	15.25	8.52	40.00	7.07	10.00	3.54	25.00	6.45	37.50	8.54	32.50	9.46	25.00	5.00
LUDLEP	.	.	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.50	0.29	.	.	0.25	0.25	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	7.50	2.50
POLPUN	.	.	.	.	0.25	0.25	.	.	0.50	0.29	0.25	0.25	.	.
PONCOR	.	.	7.75	4.19	65.00	21.79	2.50	2.50	1.25	1.25	8.75	5.15	5.00	5.00
SAGLAN	.	.	0.25	0.25	0.50	0.29	72.50	4.33	.	.	.	.	10.00	.
SALROT	.	.	0.50	0.29	.	.	.	.	10.00	10.00	5.00	2.89	.	.
SCICAL	.	.	.	.	1.50	1.19	.	.	70.00	9.79	7.50	7.50	5.00	5.00
SCISPP4	.	.	.	.	.	.	.	.	3.00	1.15	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	33.75	9.44	15.00	5.00
SPIPOL	4.00	2.27	22.75	10.13	3.00	1.15	12.50	2.50	8.75	1.25	8.75	1.25	15.00	5.00

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
THAGEN	.	.	.	.	3.75	2.39	.	.	.	.	1.25	1.25	10.00	10.00
TYPLAT	6.50	2.99	16.25	6.25	5.25	2.75	3.00	2.35	2.50	2.50	6.25	3.75	2.50	2.50
WOLFLO	1.50	1.19	1.75	1.11	0.75	0.25	4.00	2.27	5.00	2.89	0.50	0.29	5.00	5.00
uaquatic	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
FEBRUARY 1993 SITE 1														
ALTPHI	.	.	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.50
AMAAUS	.	.	.	.	.	.	.	.	.	.	0.25	0.25	0.50	0.50
CYPSPP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
ELEINT	66.25	9.44	.	.	.	.	.	.	.	.	.	.	12.50	2.50
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	.	.	.	.	.	.	.	.	.	.	0.25	0.25	2.50	2.50
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.75	0.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	10.00	.
POLPUN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	0.50	0.50
PONCOR	.	.	0.25	0.25	28.75	16.63	.	.	1.50	1.19	2.50	1.44	2.50	2.50
SAGLAN	7.75	7.42	7.50	4.79	1.50	1.19	46.25	15.46	0.25	0.25	2.50	2.50	10.00	.
SAGMON	.	.	.	.	.	.	15.00	15.00	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.
SCICAL	.	.	.	.	.	.	0.25	0.25	55.00	2.89	.	.	5.50	4.50
SCIVAL	.	.	.	.	.	.	.	.	.	.	53.75	9.44	7.50	7.50
SPIPOL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	10.00	10.00
TYPLAT	0.50	0.29	3.00	2.35	4.00	3.67	1.00	.	0.25	0.25	0.25	0.25	2.50	2.50
UTRBIF	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEBRUARY 1993 SITE 2														
ALTPHI	2.75	1.31	0.25	0.25	1.25	1.25	1.50	1.19	1.25	1.25	0.25	0.25	0.50	0.50
APILEP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	0.50	0.50
EICCRA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	67.50	7.50	5.00	3.54	0.75	0.25	.	.	.	.	.	.	3.00	2.00
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
HYDRAN	3.75	2.39	.	.	5.00	5.00	.	.	.	.	.	.	0.50	0.50
HYDUMB	0.25	0.25	.	.	1.25	1.25	.	.	.	.	.	.	.	.
LEMSPP	23.75	18.75	18.75	13.90	16.75	14.45	21.50	9.47	33.75	15.73	4.00	2.27	10.00	.
LIMSPO	1.25	1.25	1.25	1.25	.	.	.	.	.	.	.	.	5.50	4.50
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.75	0.25	.	.	.	.	.	.	.	.	5.00	5.00
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	7.50	2.50
POLPUN	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.50	0.50
PONCOR	.	.	0.25	0.25	30.00	10.80	.	.	.	.	.	.	7.50	7.50
SAGLAN	0.25	0.25	0.25	0.25	.	.	63.75	3.75	.	.	1.25	1.25	17.50	7.50
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	2.50	2.50	0.50	0.29	12.75	12.42	3.25	2.25	5.25	2.75	4.00	2.27	10.00	10.00
SCICAL	.	.	0.25	0.25	0.25	0.25	1.50	1.19	48.75	4.27	.	.	5.50	4.50
SCIVAL	0.25	0.25	.	.	.	.	.	.	7.50	7.50	30.00	10.80	12.50	7.50
SPIPOL	0.25	0.25	0.50	0.29	0.25	0.25	.	.	0.25	0.25	.	.	1.00	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	27.50	2.50
TYPLAT	4.00	2.27	36.67	6.67	20.00	7.07	6.25	2.39	1.50	1.19	15.00	8.90	3.00	2.00
WOLFLO	0.25	0.25	0.50	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.00	.
FEBRUARY	1993		SITE 3											
ALTPHI	1.25	1.25	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.
AZOCAR	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.	.	.
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	0.50	0.29	11.25	8.26	.	.	5.25	3.42	22.50	7.22	1.50	1.19	.	.
ELEINT	80.00	5.40	.	.	0.50	0.29	0.25	0.25	.	.	.	.	12.50	2.50
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
HYDRAN	3.75	2.39	23.75	12.81	17.50	11.27	15.00	7.07	10.00	2.89	31.25	8.26	30.00	20.00
LEMSPP	11.25	3.15	29.00	12.12	24.00	11.26	50.00	16.20	26.25	8.98	23.75	8.98	5.00	.
LUDLEP	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	17.50	7.50
POLPUN	.	.	.	.	0.50	0.29	.	.	.	.	.	.	.	.
PONCOR	0.25	0.25	5.00	2.89	53.75	17.96	5.00	5.00	1.25	1.25	2.50	1.44	20.00	20.00
SAGLAN	0.25	0.25	0.25	0.25	0.75	0.25	63.75	4.73	.	.	1.50	1.19	25.00	15.00
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	0.25	0.25	0.25	0.25	11.50	9.56	16.25	9.44	1.25	1.25	7.50	7.50
SCICAL	.	.	.	.	1.50	1.19	0.25	0.25	40.00	4.56	3.75	3.75	10.00	.
SCIVAL	.	.	0.25	0.25	0.25	0.25	1.25	1.25	.	.	33.75	10.28	12.50	2.50
SPIPOL	0.50	0.29	0.25	0.25	1.50	1.19	0.50	0.29	.	.	.	.	1.00	.
THAGEN	.	.	.	.	1.50	1.19	.	.	.	.	.	.	25.00	5.00
TYPLAT	3.75	1.25	12.50	4.79	6.25	1.25	2.50	1.44	2.75	1.31	15.00	7.36	.	.
WOLFLO	0.25	0.25	0.25	0.25	.	.	.	.	.	.	.	.	0.50	0.50
AUGUST 1993			SITE 1											

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
ALTPHI	0.50	0.29	0.25	0.25	1.00	.	5.00	.	2.00	1.00	2.00	1.00	0.50	0.50
AMAAUS	0.50	0.29	0.25	0.25	1.75	1.11	1.50	1.19	0.25	0.25	4.00	1.00	.	.
CYPIRI	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPODO	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.	.	.
CYPSPP	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ECLALB	.	.	.	.	0.25	0.25	.	.	.	.	0.50	0.29	.	.
EICCRA	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEINT	91.25	3.75	.	.	.	.	.	.	.	.	.	.	12.50	12.50
EUPCAP	.	.	.	.	.	.	0.25	0.25	0.25	0.25	0.50	0.29	.	.
HYDRAN	.	.	.	.	.	.	2.50	1.44	0.25	0.25	.	.	0.50	0.50
HYDUMB	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LEMSPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LUDLEP	2.75	2.43	.	.	2.75	2.43	3.75	2.39	1.75	1.11	3.25	2.25	.	.
PANHEM	.	.	2.50	1.44	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	5.00	5.00
POLPUN	0.25	0.25	.	.	.	.	.	.	0.50	0.29	0.50	0.29	.	.
PONCOR	0.25	0.25	0.25	0.25	73.75	24.61	.	.	0.25	0.25	1.50	1.19	10.00	10.00
SAGLAN	1.25	1.25	6.25	3.75	.	.	60.00	7.36	0.50	0.29	0.25	0.25	8.00	7.00
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	.	.	0.25	0.25	.	.	0.50	0.50
SCICAL	.	.	.	.	0.25	0.25	.	.	36.25	9.44	.	.	5.00	5.00
SCISPP4	.	.	.	.	.	.	.	.	0.25	0.25	.	.	0.50	0.50
SCIVAL	.	.	.	.	2.50	2.50	.	.	.	.	30.00	14.14	5.00	5.00
SPIPOL	.	.	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	25.00	25.00
TYPLAT	4.00	3.67	9.00	5.79	4.00	2.27	5.00	.	0.25	0.25	2.75	2.43	5.00	5.00

AUGUST 1993 SITE 2

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ALTPHI	0.75	0.25	0.25	0.25	.	.	0.50	0.29	0.25	0.25	0.25	0.25	.	.
AMAAUS	0.25	0.25	.	.	.	.	0.50	0.29	.	.	0.25	0.25	.	.
CYPODO	4.25	2.14	0.50	0.29	0.25	0.25	1.75	1.11	.	.	3.00	2.35	0.50	0.50
ECHCOL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
ECLALB	0.50	0.29	.	.	.	.	0.50	0.29	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	50.00	12.25	4.00	2.27	2.75	2.43	.	.	.	.	.	.	7.50	7.50
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.
GALTIN	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	4.25	3.59	.	.	2.50	2.50	3.75	2.39	.	.	4.00	2.27	1.00	.
HYDUMB	2.75	2.43	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	7.50	7.50
LEMSPP	1.00	.	15.25	6.26	0.75	0.25	10.00	3.54	9.25	6.98	1.75	1.11	3.00	2.00
LEPFAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LIMSPO	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
LUDLEP	31.25	6.25	2.00	1.00	10.00	10.00	7.50	1.44	1.25	1.25	21.25	7.18	2.50	2.50
LUDOCT	.	.	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANDIC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.75	0.25	.	.	.	.	.	.	.	.	.	.
PANSPP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
POLPUN	.	.	.	.	.	.	.	.	0.25	0.25	1.25	1.25	.	.
PONCOR	.	.	1.50	1.19	45.00	13.23	.	.	.	.	2.50	2.50	20.00	20.00
SAGLAN	0.25	0.25	0.25	0.25	.	.	60.00	.	1.50	1.19	1.25	1.25	15.00	15.00
SAGMON	.	.	.	.	.	.	.	.	.	.	1.25	1.25	.	.
SALROT	0.50	0.29	35.00	6.45	2.75	2.43	37.50	4.79	22.50	7.50	17.50	10.31	3.00	2.00
SCICAL	.	.	1.50	1.19	1.25	1.25	0.25	0.25	27.50	8.54	.	.	2.50	2.50
SCISPP4	.	.	.	.	.	.	.	.	0.50	0.29	.	.	.	.
SCIVAL	0.25	0.25	0.25	0.25	2.50	2.50	.	.	.	.	20.00	4.56	2.50	2.50
SPIPOL	0.75	0.25	.	.	0.25	0.25	0.50	0.29	.	.	0.50	0.29	1.00	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	20.00	20.00
TYPLAT	8.75	5.15	52.50	6.29	28.75	4.27	18.75	7.18	10.25	4.39	30.00	9.35	45.00	25.00
WOLFLO	.	.	0.50	0.29	.	.	0.50	0.29	0.50	0.29	.	.	0.50	0.50
AUGUST 1993	SITE 3													
ALTPHI	0.50	0.29	4.00	2.27	1.75	1.11	2.75	1.31	1.50	1.19	3.00	1.15	15.50	14.50
AMAAUS	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
AMMCOC	.	.	0.75	0.25	0.25	0.25	0.25	0.25	.	.	0.50	0.29	.	.
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
CYPCOM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
CYPIRI	0.25	0.25	0.75	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.50	0.29	.	.
CYPODO	.	.	0.75	0.25	0.25	0.25	.	.	0.25	0.25	0.25	0.25	1.00	.
CYPSPP	0.25	0.25	0.50	0.29	.	.	.	.	0.25	0.25	.	.	.	.
ECHCOL	.	.	0.25	0.26	.	.	.	.	.	.	.	.	0.50	0.50
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ECLALB	0.25	0.25	0.25	0.25	.	.	0.25	0.25	0.25	0.25	1.25	1.25	0.50	0.50
EICCRA	0.25	0.25	27.50	10.51	0.25	0.25	2.75	1.31	12.50	3.23	11.50	6.44	10.00	10.00
ELEIND	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	83.75	5.91	0.25	0.25	2.75	2.43	1.25	1.25	.	.	0.25	0.25	7.50	7.50
HYDRAN	1.75	1.11	2.50	2.50	1.50	1.19	2.50	1.44	4.25	3.59	8.75	1.25	5.00	.
HYDUMB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	7.50	7.50
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LEMSPP	1.75	1.11	31.25	10.08	15.25	11.80	33.75	10.68	12.75	5.01	27.75	9.22	3.00	2.00
LEPFAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDLEP	1.25	1.25	1.50	1.19	1.00	.	0.25	0.25	3.00	2.35	2.00	1.00	30.50	29.50
LUDOCT	0.25	0.25	0.50	0.29	0.50	0.29	.	.	.	.	0.25	0.25	5.00	5.00
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PANDIC	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
PANSPP	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
PASDIC	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
POLPUN	0.25	0.25	.	.	1.25	1.25	0.25	0.25	4.00	3.67	0.25	0.25	0.50	0.50
PONCOR	.	.	13.75	8.00	40.00	14.14	2.50	2.50	.	.	6.25	3.75	2.50	2.50
ROTRAM	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGLAN	0.25	0.25	.	.	0.50	0.29	72.50	4.33	.	.	.	.	10.00	10.00
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	10.25	9.92	.	.	0.50	0.29	10.00	5.77	10.00	5.77	10.00	10.00
SCICAL	.	.	.	.	2.50	1.44	0.25	0.25	63.75	2.39	.	.	7.50	7.50
SCISPP4	.	.	.	.	.	.	.	.	1.25	1.25	11.25	11.25	.	.
SCIVAL	.	.	0.25	0.25	17.75	17.42	0.25	0.25	.	.	40.00	10.80	5.00	5.00
SESMAC	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
SPIPOL	0.50	0.29	3.00	2.35	3.25	2.25	1.00	.	3.00	2.35	0.75	0.25	1.00	.
THAGEN	.	.	1.25	1.25	2.50	1.44	0.25	0.25	.	.	3.75	2.39	20.00	20.00
TYPLAT	11.50	5.38	17.50	6.29	30.00	7.36	13.75	2.39	5.00	3.54	28.75	12.31	12.50	2.50
UTRSPP	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
WOLFLO	.	.	0.75	0.25	0.25	0.25	0.25	0.25	0.50	0.29	0.50	0.29	0.50	0.50
WOLSPP	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.

MARCH 1994 SITE 1

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ACERUB	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALTPHI	0.50	0.29	0.75	0.25	0.75	0.25	5.75	4.75	.	.	0.75	0.25	7.50	2.50
AMAAUS	0.25	0.25	0.25	0.25	0.25	0.25	1.25	1.25	.	.	.	.	0.50	0.50
APILEP	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CARPEN	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
EICCRA	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
ELEINT	51.25	11.61	.	.	.	.	.	.	.	.	.	.	2.50	2.50
EUPCAP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	5.25	1.84	2.75	2.43	0.50	0.29	21.25	11.61	.	.	1.75	1.11	5.00	5.00
LEMSPP	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
LUDLEP	0.50	0.29	.	.	.	.	0.50	0.29	.	.	0.25	0.25	1.00	.
LUDPER	.	.	2.50	2.50	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	0.25	0.25	.	.	.	.	22.50	7.50
POLPUN	.	.	0.50	0.29	.	.	.	.	.	.	0.25	0.25	1.00	.
PONCOR	.	.	.	.	56.50	18.95	.	.	1.25	1.25	4.00	2.27	15.00	15.00
SAGLAN	8.75	7.18	6.50	3.62	0.50	0.29	53.75	3.75	0.50	0.29	1.25	1.25	10.50	9.50
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SAMPAR	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	0.25	0.25	83.75	5.15	17.50	17.50	5.00	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	52.50	17.85	5.00	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
SPIPOL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	15.00	.
TYPLAT	2.75	2.43	9.00	4.10	4.00	2.27	8.00	5.74	3.00	2.35	3.75	3.75	1.00	.
MARCH 1994	SITE 2													
ACERUB	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
ALTPHI	0.75	0.25	.	.	0.50	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.50	0.50
APILEP	0.25	0.25	0.25	0.25	0.75	0.25	.	.	0.25	0.25	.	.	0.50	0.50
CYPSPP	.	.	0.25	0.25	.	.	.	.	.	.	0.25	0.25	0.50	0.50
ECLALB	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.	0.50	0.50
EICCRA	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
ELEINT	63.75	3.75	3.00	2.35	3.75	3.75	.	.	.	.	0.25	0.25	10.00	.
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
GALTIN	0.75	0.25	.	.	0.75	0.25	.	.	.	.	0.25	0.25	1.00	.
HYDRAN	6.50	2.99	0.50	0.29	1.50	1.19	1.75	1.11	1.25	1.25	4.00	2.27	3.00	2.00
LEMSPP	.	.	0.50	0.29	0.50	0.29	.	.	0.25	0.25	0.25	0.25	.	.
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LUDPER	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	8.00	7.00
POLPUN	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	0.75	0.25	32.50	14.93	.	.	.	.	.	.	5.00	5.00
SAGLAN	0.25	0.25	.	.	.	.	47.50	12.99	0.50	0.29	0.50	0.29	10.00	5.00
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	1.25	1.25	0.25	0.25	1.00	.	1.00	.	0.50	0.29	2.50	2.50
SCICAL	.	.	1.50	1.19	1.25	1.25	1.75	1.11	60.00	7.07	2.50	2.50	0.50	0.50
SCIVAL	0.25	0.25	0.75	0.25	.	.	0.25	0.25	.	.	17.50	14.22	3.00	2.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	5.00	.
TYPLAT	10.25	4.39	76.25	5.91	38.75	13.75	36.25	12.14	18.75	5.15	47.50	10.31	35.00	30.00
MARCH 1994	SITE 3													
ACERUB	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALTPHI	0.25	0.25	6.50	3.62	0.75	0.25	1.50	1.19	1.00	.	0.75	0.25	0.50	0.50
AMAAUS	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
AMBART	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	.	.	0.25	0.25	0.50	0.50
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	.	.	14.00	6.72	.	.	2.75	2.43	9.00	3.56	5.25	2.75	.	.
ELEINT	51.25	8.26	.	.	2.75	2.43	1.25	1.25	.	.	.	.	17.50	2.50
EUPCAP	.	.	0.25	0.25	0.50	0.29	.	.	.	.	.	.	.	.
GALTIN	0.50	0.29	.	.	3.00	2.35	.	.	.	.	.	.	0.50	0.50
HYDRAN	37.50	4.33	17.50	1.44	1.50	1.19	26.25	7.47	11.25	3.15	10.00	3.54	1.00	.

Table 11. Overall vegetation cover measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
HYDUMB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
LEMSPP	1.75	1.11	0.50	0.29	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.
LUDLEP	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	12.50	2.50
POLPUN	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.
PONCOR	.	.	11.50	4.05	42.50	14.36	1.25	1.25	0.25	0.25	2.50	2.50	7.50	2.50
SAGLAN	0.25	0.25	0.25	0.25	.	.	76.25	5.15	0.25	0.25	.	.	5.00	.
SAGMON	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALROT	.	.	0.50	0.29	0.25	0.25	13.25	12.25	2.50	1.19	1.75	1.11	0.50	0.50
SCICAL	.	.	.	.	5.00	2.89	1.25	1.25	67.50	5.95	5.25	4.92	7.50	7.50
SCIVAL	.	.	0.50	0.29	0.25	0.25	0.25	0.25	.	.	27.75	14.92	0.50	0.50
SPIPOL	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.	.	.
THAGEN	.	.	1.25	1.25	0.25	0.25	.	.	.	.	1.50	1.19	17.50	7.50
TYPLAT	8.00	4.04	13.75	5.15	13.75	5.54	8.75	3.75	0.75	0.25	23.75	13.75	15.00	15.00
WOLFLO	.	.	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.

(e.g. *Eleocharis interstincta*, *Pontederia cordata*, *Sagittaria lancifolia*, and *Scirpus californicus*) (Tables 11,12).

Planted Treatments -- Overall and Subplot Cover Percent

Eleocharis interstincta. This species was successful in terms of colonizing the treatment plot and resisting invasion by other species (Figure 12) . It also was a successful invader of pathways and adjacent treatment plots. Colonization at all three sites followed a similar pattern (Figure 12). Coverage in the treatment plots reached maximum (75%-90%) by the August 1992 sample collection. With time the cover values varied, but remained near 75%. Cover at Sites 1 and 3 began to decline between August 1993 and March 1994 (Figure 12). Declines in live leaf cover were matched by increased coverage of dead vegetation. Vegetation dynamics at Site 2 were slightly different. Cover peaked at the August 1992 sample date, declined slightly until August 1993, then increased by the March 1994 sample. Dead vegetation cover followed this pattern as well between February 1993 until March 1994. This treatment experienced a dramatic die-off of *Eleocharis interstincta* during the winter of 1994/1995 (Stenberg Pers. Obs., March 1995).

The competitor species, *Typha latifolia*, was limited by its competition with *Eleocharis interstincta* (Figures 12, 13, 14). At Site 1 *Typha latifolia* was suppressed (<5% cover) while at Sites 2 and 3 it slowly increased cover (0.33% $month^{-1}$ and 0.5% $month^{-1}$, Sites 2 and 3, respectively).

Table 12. Vegetation cover measurements (% m^{-2} MEAN ±SE) from subplots in planted plots, Experimental Planting Sites. Species Codes: Upper case six character are abbreviated species codes. Lower case codes represent plant families or unknowns. Codes ending with D represent dead, while S represent seedlings.

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
AUGUST 1991	SITE 1													
ALTPHI	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.25	0.25
COMDIF	.	.	1.25	1.25	6.25	3.75	.	.	0.25	0.25	.	.	1.25	1.25
ECLALB	0.50	0.29	.	.	.	.	.	.	.	.	.	.	.	.
LEMSPP	4.25	2.14	3.25	2.25	1.00	.	3.00	2.35	2.00	1.00	1.00	.	3.25	2.25
POLPUN	2.50	2.50	10.00	7.07	1.25	1.25	.	.	.	.	0.25	0.25	1.25	1.25
PONCOR	.	.	.	.	0.50	0.29	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	1.75	1.11	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	1.50	1.19	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	1.75	1.11	.	.
SPIPOL	5.00	2.04	4.25	2.14	2.00	1.00	7.50	3.23	3.00	1.15	1.00	.	3.00	1.15
WOLSPP	0.25	0.25	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.29	0.50	0.29
AUGUST 1991	SITE 2													
ALTPHI	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
AMMAUS	.	.	.	.	0.25	0.25	2.50	2.50	0.50	0.29	2.50	2.50	.	.
ASTSUB	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
CYPIRI	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	0.50	0.29	.	.	.	.
ECHCOL	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.
LEMSPP	13.67	6.33	13.25	12.25	10.50	5.85	33.75	6.88	17.75	14.11	8.00	5.74	13.00	8.04
PANDIC	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
Poaceae	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
PONCOR	.	.	.	.	5.00	2.89	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	2.50	1.44	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
SCIVAL	.	.	.	.	.	.	.	.	.	.	1.00	.	.	.
SPIPOL	22.00	12.74	0.75	0.25	9.00	5.02	6.75	6.09	1.50	1.19	0.75	0.25	21.75	16.42
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	2.50	1.44
WOLSPP	10.00	5.77	12.75	12.42	0.25	0.25	17.50	11.27	9.00	8.67	5.25	4.92	9.00	5.02
AUGUST 1991	SITE 3													
AMMAUS	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.
ELEINT	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.50	0.29

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
LEMSPP	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
PONCOR	.	.	.	.	3.75	3.75	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	0.50	0.29	.	.	.	.	.	.
SALCAR	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
JANUARY 1992	SITE 1													
ALTPHI	1.25	1.25	.	.	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25
ELEINT	1.00	.	.	.	.	.	.	.	.	.	.	.	1.50	1.19
HYDRAN	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
PANHEM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
POLPUN	0.25	0.25	1.75	1.11	0.25	0.25	.	.	0.25	0.25	0.25	0.25	.	.
PONCOR	.	.	.	.	8.00	5.74	.	.	.	.	.	.	0.25	0.25
SAGLAN	.	.	.	.	.	.	10.25	4.39	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	1.50	1.19	.	.	0.50	0.29
SCIVAL	.	.	.	.	.	.	.	.	.	.	8.75	5.91	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
TYPLAT	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
JANUARY 1992	SITE 2													
ALTPHI	1.25	1.25	.	.	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25
AZOCAR	0.25	0.25	1.25	1.25	0.50	0.29	18.75	14.20	0.25	0.25	21.25	8.26	0.25	0.25
ELEINT	1.00	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	3.75	3.75	2.50	2.50	.	.	.	.	.	.	.	.	.	.
LEMSPP	5.25	1.84	6.75	4.52	26.25	12.48	27.50	19.20	4.00	1.00	30.00	10.80	19.00	8.57
LUDPAL	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
POLPUN	.	.	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.
PONCOR	.	.	.	.	22.50	12.99	.	.	.	.	.	.	0.25	0.25
SAGLAN	.	.	.	.	.	.	6.75	3.47	.	.	.	.	.	.
SALROT	0.25	0.25	.	.	.	.	.	.	.	.	0.25	0.25	.	.
SCICAL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
SCIVAL	.	.	.	.	.	.	.	.	0.25	0.25	38.75	7.74	5.00	3.54
SPIPOL	0.50	0.29	0.75	0.25	0.75	0.25	1.00	.	0.50	0.29	4.00	2.27	0.75	0.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	16.25	9.87
TYPLAT	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.	.	.
WOLFLO	2.00	1.00	2.00	1.00	6.50	2.18	2.00	1.00	1.00	.	5.25	1.84	2.00	1.00
JANUARY 1992	SITE 3													
ALTPHI	0.50	0.29	0.25	0.25	.	.	0.50	0.50	0.25	0.25	.	.	.	.

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
AZOCAR	73.75	19.72	30.25	20.29	27.50	11.09	61.25	11.61	6.75	4.52	47.75	22.69	42.75	19.13
EICCRA	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	21.50	13.16	3.75	3.75	.	.	.	.	.	.	0.25	0.25	3.75	2.39
LEMSPP	2.00	1.00	0.75	0.25	3.00	1.15	11.50	9.56	1.75	1.11	1.00	.	3.00	1.15
LUDPAL	2.00	1.00	1.25	1.25	1.25	1.25	1.25	1.25	0.75	0.25	0.50	0.29	1.50	1.19
POLPUN	.	.	0.50	0.29	0.25	0.25	.	.	.	.	0.25	0.25	.	.
PONCOR	.	.	.	.	16.25	14.63	0.75	0.75	.	.	.	.	0.50	0.29
SAGLAN	.	.	.	.	.	.	11.25	5.54	.	.	.	.	.	.
SALROT	0.75	0.25	0.50	0.29	.	.	0.50	0.29	.	.	.	.	0.75	0.25
SCICAL	.	.	.	.	.	.	.	.	12.50	12.50	.	.	.	.
SCIVAL	.	.	.	.	.	.	0.25	0.25	.	.	60.00	16.83	1.25	1.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	17.50	11.81
TYPLAT	0.50	0.29	.	.	.	.	.	.	.	.	.	.	.	.
WOLFLO	1.00	.	2.00	1.00	1.75	1.11	1.75	1.11	0.75	0.25	1.00	.	2.00	1.00
MAY 1992	SITE 1													
ALTPHI	5.25	4.92	.	.	.	.	0.50	0.29	0.25	0.25	0.50	0.29	.	.
ELEINT	13.75	5.54	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	0.25	0.25	0.25	0.25	.	.	.	.	.	.	.	.	.	.
LEMSPP	0.25	0.25	.	.	0.25	0.25	1.00	.	.	.	0.50	0.29	.	.
PANHEM	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
POLPUN	0.50	0.29	2.75	1.31	0.25	0.25	.	.	0.25	0.25	.	.	.	.
PONCOR	.	.	.	.	67.50	17.97	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	60.00	11.73	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
SCICAL	.	.	.	.	.	.	.	.	41.25	18.41	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	53.75	16.38	.	.
SPIPOL	0.25	0.25	1.25	1.25	0.25	0.25	2.00	1.00	0.25	0.25	1.00	.	.	.
TYPLAT	.	.	.	.	.	.	2.50	2.50	.	.	.	.	.	.
URTBIF	15.00	15.00	3.75	2.39	1.25	1.25	1.25	1.25	1.25	1.25	.	.	.	.
UTRSPP	.	.	.	.	0.25	0.25	5.00	5.00	.	.	.	.	.	.
MAY 1992	SITE 2													
ALTPHI	1.25	1.25	.	.	2.50	2.50	0.25	0.25	0.25	0.25	1.50	1.19	.	.
AZOCAR	.	.	1.25	1.25	3.75	3.75	0.25	0.25	2.50	2.50	2.50	2.50	.	.
ELEINT	38.75	9.66	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	7.50	7.50	6.25	6.25	.	.	.	.	.	.	2.50	2.50	.	.
HYDUMB	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.25
LEMSPP	8.00	4.53	3.00	2.35	67.50	11.09	22.50	17.62	11.75	9.46	50.25	20.62	25.25	11.73
PANHEM	.	.	1.25	1.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
POLPUN	.	.	.	.	.	.	.	.	2.50	2.50	.	.	.	.

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
PONCOR	.	.	.	.	87.50	5.95	.	.	.	.	.	.	12.50	9.46
SAGLAN	.	.	.	.	.	.	41.25	11.25	.	.	.	.	7.50	7.50
SALROT	6.50	3.62	4.00	2.27	1.50	1.19	31.50	20.12	14.00	10.58	5.00	5.00	8.75	7.18
SCICAL	.	.	.	.	0.25	0.25	.	.	48.75	15.33	.	.	18.75	18.75
SCIVAL	1.25	1.25	.	.	.	.	.	.	.	.	85.00	8.90	.	.
SPIPOL	3.00	2.35	1.25	1.25	0.50	0.29	0.25	0.25	1.50	1.19	6.50	3.62	0.25	0.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	58.75	19.83
TYPLAT	1.50	1.19	2.50	2.50	5.25	4.92	.	.	.	.	.	.	.	.
WOLFLO	2.50	2.50	15.25	14.92	18.75	14.20	7.50	2.50	1.25	1.25	.	.	5.50	4.84
MAY 1992	SITE 3													
ALTPHI	0.25	0.25	.	.	.	.	1.25	1.25	0.25	0.25	.	.	.	.
AZOCAR	1.50	1.19	.	.	0.50	0.29	0.50	0.29	1.50	1.19	0.25	0.25	8.00	7.34
EICCRA	2.50	1.44	.	.	.	.	.	.	3.75	2.39	.	.	2.50	1.44
ELEINT	30.00	15.55	.	.	.	.	.	.	10.00	10.00	.	.	17.50	10.31
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	7.50	7.50
LEMSPP	2.00	1.00	.	.	3.00	2.35	0.75	0.25	0.75	0.25	16.75	14.45	14.25	11.95
LUDPAL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LUDREP	2.50	2.50	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	47.50	17.97	6.25	6.25	.	.	.	.	18.75	17.12
SAGLAN	.	.	.	.	.	.	7.50	7.50	.	.	.	.	1.25	1.25
SAGLAT	.	.	.	.	.	.	7.50	4.33	.	.	.	.	.	.
SALROT	0.75	0.25	.	.	1.75	1.11	0.25	0.25	1.75	1.11	5.00	2.04	5.00	.
SCICAL	.	.	.	.	.	.	.	.	7.75	7.42	10.00	10.00	.	.
SCIVAL	.	.	.	.	.	.	.	.	17.50	17.50	67.50	12.50	17.50	17.50
SPIPOL	0.50	0.29	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	12.50	12.50
TYPLAT	5.00	3.54	.	.	.	.	6.25	6.25	.	.	1.25	1.25	.	.
WOLFLO	1.00	.	.	.	1.00	.	0.50	0.29	1.00	.	1.50	1.19	15.25	11.62
AUGUST 1992	SITE 1													
ALTPHI	2.75	2.43	0.25	0.25	.	.	0.50	0.29	3.75	2.39	.	.	0.25	0.25
ELEINT	71.25	19.08	.	.	.	.	.	.	.	.	.	.	40.00	23.09
HYDRAN	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LEMSPP	.	.	.	.	1.25	1.25	0.25	0.25	0.25	0.25	.	.	0.25	0.25
PONCOR	.	.	.	.	93.75	1.25	.	.	.	.	.	.	2.50	1.44
SAGLAN	.	.	.	.	.	.	76.25	10.28	.	.	.	.	1.25	1.25
SCICAL	.	.	.	.	.	.	.	.	58.75	22.11	.	.	.	.
SCIVAL	.	.	.	.	.	.	1.25	1.25	.	.	81.25	8.51	2.50	2.50
SPIPOL	.	.	.	.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.50	1.19
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	45.00	25.98
TYPLAT	.	.	.	.	.	.	5.00	5.00	.	.	.	.	2.50	2.50

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
UTRBIF	1.25	1.25	.	.	0.50	0.29	0.25	0.25	0.25	0.25	20.00	12.25	5.25	1.84
SCIVALD	.	.	.	.	.	.	.	.	.	.	3.75	3.75	.	.
AUGUST 1992	SITE 2													
ALTPHI	.	.	.	.	1.25	1.25	.	.	.	.	1.25	1.25	10.25	9.92
ELEINT	86.25	12.14	0.25	0.25	.	.	.	.	.	.	.	.	1.25	1.25
HYDSPP	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
LEMSPP	3.25	2.25	25.50	14.72	21.25	8.26	48.75	17.12	14.00	8.86	8.75	1.25	35.00	11.90
LIMSPO	.	.	3.75	3.75	.	.	.	.	0.25	0.25	.	.	.	.
LUDLEP	.	.	.	.	.	.	5.00	5.00	.	.	.	.	.	.
PANHEM	.	.	1.25	1.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
POLPUN	.	.	.	.	.	.	.	.	.	.	2.50	2.50	.	.
PONCOR	.	.	.	.	95.00	3.54	.	.	.	.	.	.	18.75	18.75
SAGLAN	.	.	.	.	.	.	67.50	17.38	.	.	.	.	.	.
SALROT	8.75	7.18	1.50	1.19	0.25	0.25	11.25	4.27	15.00	11.90	1.25	1.25	3.00	2.35
SCICAL	.	.	.	.	2.50	2.50	.	.	65.00	23.63	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	0.75	0.25	.	.	.	.
SCIVAL	0.25	0.25	.	.	.	.	.	.	25.00	25.00	98.75	1.25	4.00	2.27
SPIPOL	3.67	1.33	5.25	3.42	20.00	10.80	16.50	14.54	21.25	16.63	47.50	6.29	22.50	13.15
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	43.75	23.57
TYPLAT	40.00	16.83	35.00	21.11	7.50	4.79	1.25	1.25	.	.	.	.	.	.
WOLFLO	0.25	0.25	2.75	1.31	0.25	0.25	12.50	6.61	10.25	9.92	3.75	3.75	6.25	2.39
WOLSPP	.	.	.	.	0.50	0.29	.	.	1.25	1.25	1.25	1.25	0.25	0.25
AUGUST 1992	SITE 3													
ALTPHI	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	1.25	1.25	.	.	.	.	.	.	25.00	21.79	1.25	1.25	.	.
ELEINT	100.00	.	.	.	.	.	.	.	.	.	.	.	27.50	24.28
HYDSPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LEMSPP	14.25	11.95	40.00	9.13	6.50	2.18	36.25	15.99	60.00	15.81	50.00	17.32	37.50	16.52
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
POLPUN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	100.00	.	23.75	23.75	.	.	.	.	6.00	4.71
SAGLAN	.	.	.	.	.	.	56.25	13.44	.	.	.	.	.	.
SALROT	.	.	1.50	1.19	.	.	10.00	10.00	1.25	1.25	2.50	2.50	12.50	12.50
SCICAL	.	.	.	.	.	.	.	.	32.50	23.58	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	20.00	20.00	62.50	16.52	20.00	20.00
SPIPOL	1.50	1.19	25.25	8.42	2.75	1.31	36.25	19.93	31.25	16.75	32.50	14.36	20.00	13.54
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	25.00	9.57
TYPLAT	31.25	18.53	.	.	.	.	15.00	15.00	.	.	15.00	15.00	.	.
uaquatic	.	.	2.50	2.50	.	.	.	.	.	.	.	.	.	.
WOLFLO	.	.	0.25	0.25	.	.	2.50	2.50	20.00	12.25	30.00	21.21	.	.

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
SCIVALD	.	.	.	.	.	.	.	.	.	.	25.00	15.00	.	.

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SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ALTPHI	.	.	.	.	0.25	0.25	.	.	0.50	0.29	.	.	0.25	0.25
ELEINT	65.00	17.56	.	.	.	.	.	.	.	.	.	.	21.25	19.62
LEMSPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
POLPUN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	58.75	11.97	.	.	.	.	.	.	21.25	19.62
SAGLAN	.	.	.	.	.	.	43.75	16.25	.	.	.	.	1.25	1.25
SAGLAT	.	.	.	.	.	.	6.25	6.25	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	0.25	0.25	0.50	0.29	.	.	0.25	0.25
SCICAL	.	.	.	.	.	.	.	.	37.50	12.99	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	62.50	15.07	.	.
SPIPOL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	31.25	18.75
TYPLAT	0.25	0.25	3.75	3.75	.	.	0.25	0.25	.	.	.	.	.	.
ELEINTD	30.00	15.81	.	.	.	.	.	.	.	.	.	.	.	.
PONCORD	.	.	.	.	13.75	5.54	.	.	.	.	.	.	.	.
SAGLAND	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	34.00	12.25	.	.	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	23.75	8.98	.	.
THAGEND	.	.	.	.	.	.	.	.	.	.	.	.	11.25	6.57
TYPSPPD	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.

FEBRUARY 1993 SITE 2

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ALTPHI	.	.	.	.	1.25	1.25	.	.	1.25	1.25	0.25	0.25	0.25	0.25
APILEP	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.25
ELEINT	37.50	10.31	2.75	2.43	.	.	.	.	.	.	.	.	0.25	0.25
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
HYDRAN	1.25	1.25	.	.	5.00	5.00	.	.	.	.	.	.	1.25	1.25
HYDSPP	.	.	.	.	1.25	1.25	.	.	.	.	.	.	.	.
HYDUMB	1.25	1.25	.	.	.	.	.	.	.	.	.	.	.	.
LEMSPP	2.50	2.50	16.50	11.32	6.75	4.52	21.50	8.55	37.50	19.20	0.75	0.25	4.50	3.50
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.25
PANHEM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	5.00	5.00
PONCOR	.	.	.	.	58.75	13.60	.	.	.	.	.	.	3.75	3.75
SAGLAN	.	.	.	.	.	.	37.50	4.79	.	.	.	.	.	.
SALROT	.	.	0.25	0.25	10.25	9.92	0.50	0.29	3.00	2.35	0.50	0.29	1.25	1.25
SCICAL	.	.	.	.	2.50	2.50	1.25	1.25	31.25	12.97	.	.	1.25	1.25
SCIVAL	1.25	1.25	.	.	.	.	.	.	.	.	25.00	12.08	1.50	1.19
SPIPOL	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	15.00	5.40
TYPLAT	1.50	1.19	28.75	10.87	7.75	7.42	3.75	3.75	0.25	0.25	2.50	1.44	7.75	4.66
WOLFLO	0.25	0.25	.	.	.	.	.	.	0.25	0.25	.	.	0.50	0.29
ELEINTD	50.00	19.15	.	.	.	.	.	.	.	.	.	.	.	.
PONCORD	.	.	.	.	3.75	2.39	.	.	.	.	.	.	.	.
SAGLAND	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	18.75	10.87	.	.	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	48.75	14.77	.	.
THAGEND	.	.	.	.	.	.	.	.	.	.	.	.	20.00	9.13
TYPSPPD	1.25	1.25	7.75	4.19	1.50	1.19	2.50	2.50	.	.	.	.	.	.
FEBRUARY	1993		SITE 3											
ALTPHI	0.25	0.25	.	.	0.25	0.25	.	.	.	.	.	.	.	.
AZOCAR	.	.	.	.	.	.	0.50	0.29	0.25	0.25	.	.	.	.
EICCRA	.	.	10.25	9.92	.	.	1.25	1.25	25.25	18.82	.	.	0.50	0.29
ELEINT	72.50	17.85	.	.	.	.	.	.	.	.	.	.	21.25	18.07
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
HYDRAN	4.00	3.67	20.25	12.11	12.50	8.29	17.75	14.11	12.75	4.57	41.25	15.99	1.50	1.19
LEMSPP	4.00	3.67	48.00	27.14	15.25	11.80	68.75	18.19	46.25	5.54	18.75	10.87	23.75	8.98
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	3.75	3.75
PONCOR	.	.	.	.	43.75	13.13	2.50	2.50	.	.	.	.	7.50	4.79
SAGLAN	.	.	.	.	.	.	21.25	3.75	.	.	.	.	.	.
SALROT	.	.	.	.	0.25	0.25	16.50	11.68	1.25	1.25	0.25	0.25	10.25	9.92
SCICAL	.	.	.	.	.	.	.	.	20.25	10.65	0.25	0.25	4.00	3.67
SCIVAL	.	.	.	.	.	.	.	.	.	.	19.00	9.50	0.75	0.25
SPIPOL	.	.	0.75	0.25	0.25	0.25	0.50	0.29	.	.	.	.	0.75	0.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	22.50	7.22
TYPLAT	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.	2.50	2.50	.	.
WOLFLO	.	.	1.25	1.25	.	.	.	.	.	.	.	.	.	.
ELEINTD	20.00	13.54	.	.	.	.	.	.	.	.	.	.	0.25	0.25
PONCORD	.	.	.	.	13.75	3.75	.	.	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	22.50	8.54	.	.	.	.
THAGEND	.	.	.	.	.	.	.	.	.	.	.	.	6.25	4.73
TYPSPPD	.	.	.	.	.	.	.	.	.	.	5.00	5.00	.	.
AUGUST 1993		SITE 1												
ALTPHI	.	.	.	.	0.50	0.29	5.00	.	0.25	0.25	1.75	1.11	0.25	0.25
AMAAUS	0.25	0.25	.	.	.	.	1.25	1.25	.	.	2.50	1.44	.	.
ECLALB	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
ELEINT	75.00	23.36	.	.	.	.	.	.	.	.	.	.	48.75	28.16
HYDRAN	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
LEMSPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	1.25	1.25	0.25	0.25

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
PANHEM	.	.	3.75	3.75	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	98.75	1.25	.	.	.	.	2.50	2.50	10.00	7.07
SAGLAN	.	.	.	.	.	.	46.25	10.87	.	.	.	.	0.25	0.25
SALROT	.	.	.	.	.	.	.	.	0.25	0.25	12.50	12.50	.	.
SCICAL	.	.	.	.	.	.	.	.	23.75	8.98	.	.	5.00	5.00
SCIVAL	.	.	.	.	.	.	.	.	.	.	7.75	2.25	.	.
SPIPOL	.	.	.	.	.	.	0.25	0.25	.	.	0.25	0.25	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	31.25	23.31
TYPLAT	0.25	0.25	2.50	2.50	.	.	3.75	2.39	.	.	2.50	2.50	.	.
ELEINTD	24.00	23.67	.	.	.	.	.	.	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	43.75	13.13	.	.	15.00	15.00
SCIVALD	.	.	.	.	.	.	.	.	.	.	61.25	13.29	.	.
TYPLATD	.	.	3.75	3.75	.	.	.	.	.	.	.	.	.	.
AUGUST 1993	SITE 2													
ALTPHI	3.75	2.39	.	.	.	.	1.50	1.19	.	.	0.25	0.25	0.25	0.25
CYPODO	1.75	1.11	.	.	.	.	0.50	0.29	.	.	1.25	1.25	.	.
ECLALB	0.25	0.25	.	.	.	.	1.50	1.19	.	.	.	.	.	.
ELEINT	42.75	15.25	6.50	6.17	2.50	2.50	.	.	.	.	.	.	26.50	24.52
GALTIN	0.25	0.25	.	.	.	.	.	.	.	.	.	.	0.50	0.29
HYDRAN	11.25	8.26	.	.	.	.	1.25	1.25	.	.	2.50	2.50	0.25	0.25
HYDUMB	6.25	3.75	.	.	.	.	.	.	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
LEMSPP	2.00	1.00	23.75	7.47	0.75	0.25	7.75	3.04	13.00	12.34	1.75	1.11	8.75	7.18
LUDLEP	22.50	7.77	.	.	.	.	7.50	3.23	.	.	8.75	5.15	.	.
PONCOR	.	.	.	.	90.00	3.54	.	.	.	.	.	.	18.75	17.12
SAGLAN	.	.	.	.	.	.	41.25	7.18	.	.	.	.	.	.
SALROT	1.50	1.19	38.75	10.48	0.25	0.25	32.50	2.50	11.50	9.56	11.25	7.18	2.75	2.43
SCICAL	.	.	.	.	2.50	2.50	0.25	0.25	8.75	1.25	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCIVAL	0.25	0.25	.	.	.	.	.	.	.	.	7.75	3.04	0.25	0.25
SPIPOL	0.50	0.29	.	.	0.25	0.25	0.50	0.29	.	.	0.25	0.25	0.25	0.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	67.50	22.87
TYPLAT	4.00	3.67	21.25	8.26	4.00	2.27	2.75	2.43	7.50	5.95	10.25	5.99	1.25	1.25
WOLFLO	.	.	0.50	0.29	.	.	0.50	0.29	0.50	0.29	.	.	0.25	0.25
ELEINTD	25.00	15.00	.	.	.	.	.	.	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	43.75	13.75	.	.	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	7.75	5.85	.	.
TYPLATD	2.50	2.50	17.50	5.95	1.25	1.25	4.00	3.67	.	.	2.75	2.43	.	.
AUGUST 1993	SITE 3													
ALTPHI	1.25	1.25	6.50	4.63	1.25	1.25	0.25	0.25	1.50	1.19	.	.	.	.
CYPODO	.	.	0.25	0.25	.	.	.	.	.	.	0.25	0.25	.	.
CYPSPP	0.25	0.25	.	.	.	.	.	.	0.25	0.25	.	.	.	.

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
EICCRA	.	.	12.50	9.46	.	.	.	.	20.00	10.80	7.50	4.79	.	.
ELEINT	72.50	21.07	.	.	.	.	.	.	.	.	.	.	31.25	23.66
HYDRAN	6.25	3.75	.	.	.	.	1.50	1.19	6.25	3.75	18.75	13.90	1.25	1.25
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	12.50	12.50
LEMSPP	1.50	1.19	42.50	6.29	15.25	9.45	31.50	11.75	9.00	4.10	17.75	7.02	15.75	14.75
LUDLEP	5.00	5.00	.	.	.	.	.	.	0.50	0.29	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	10.00	8.42
PONCOR	.	.	.	.	65.00	16.83	18.75	18.75	.	.	.	.	10.00	6.12
SAGLAN	.	.	.	.	.	.	25.00	7.91	.	.	.	.	3.75	3.75
SALROT	.	.	15.00	15.00	.	.	0.25	0.25	10.00	10.00	11.25	7.18	7.50	7.50
SCICAL	.	.	.	.	.	.	.	.	36.25	10.87	3.75	3.75	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	6.50	2.99	0.25	0.25
SPIPOL	0.25	0.25	1.75	1.11	4.25	2.14	1.00	.	3.00	2.35	0.50	0.29	1.00	.
THAGEN	.	.	2.50	2.50	.	.	.	.	.	.	.	.	60.00	13.39
TYPLAT	5.00	2.89	6.25	6.25	7.50	7.50	5.00	3.54	.	.	8.75	5.15	.	.
WOLFLO	.	.	0.75	0.25	0.25	0.25	0.25	0.25	0.50	0.29	0.25	0.25	0.25	0.25
WOLSPP	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
SCICALD	.	.	.	.	.	.	.	.	15.00	15.00	.	.	.	.
TYPLATD	.	.	2.50	2.50	2.50	2.50	.	.	.	.	.	.	.	.
MARCH 1994	SITE 1													
ALTPHI	0.25	0.25	.	.	0.25	0.25	3.00	1.15	.	.	0.50	0.29	0.50	0.29
AMAAUS	.	.	.	.	0.25	0.25	1.25	1.25	.	.	.	.	0.25	0.25
CARPEN	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEINT	35.00	10.41	.	.	.	.	.	.	.	.	.	.	6.50	6.17
HYDRAN	.	.	7.50	7.50	.	.	7.50	4.33	.	.	0.25	0.25	5.25	3.42
LUDLEP	.	.	.	.	.	.	1.50	1.19	.	.	.	.	.	.
PANHEM	.	.	1.25	1.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	5.00	5.00	.	.	.	.	22.50	19.31
POLPUN	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	37.50	16.01	.	.	.	.	.	.	25.00	17.68
SAGLAN	.	.	.	.	.	.	12.50	2.50	.	.	.	.	.	.
SALROT	.	.	.	.	.	.	0.25	0.25	1.25	1.25	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	73.75	20.14	.	.	22.50	22.50
SCIVAL	.	.	.	.	.	.	.	.	.	.	26.25	3.75	0.50	0.29
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.25
TYPLAT	.	.	7.50	5.95	1.25	1.25	3.75	3.75	.	.	11.25	11.25	1.25	1.25
UTRSPP	.	.	.	.	2.50	2.50	.	.	.	.	.	.	.	.
ELEINTD	57.50	7.50	.	.	.	.	.	.	.	.	.	.	.	.
PONCORD	.	.	.	.	22.50	7.50	.	.	.	.	.	.	5.00	5.00
SAGLAND	.	.	.	.	.	.	2.50	1.44	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	6.75	3.47	.	.	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	1.50	1.19	.	.
TYPLATD	.	.	5.00	5.00	7.50	7.50	8.75	8.75	.	.	.	.	2.50	2.50

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
udicotS	.	.	.	.	.	.	.	.	.	.	0.25	0.25	0.50	0.29
MARCH 1994	SITE 2													
ALTPHI	1.25	1.25	.	.	.	.	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ECLALB	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	53.75	19.51	21.25	21.25	0.25	0.25	.	.	.	.	.	.	5.25	4.92
GALTIN	0.50	0.29	.	.	1.25	1.25	.	.	.	.	.	.	.	.
HYDRAN	7.50	4.33	.	.	1.25	1.25	1.25	1.25	1.50	1.19	1.25	1.25	0.25	0.25
LEMSPP	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	6.25	6.25
PONCOR	.	.	.	.	40.00	11.73	.	.	.	.	.	.	3.75	2.39
SAGLAN	.	.	.	.	.	.	25.00	5.40	.	.	.	.	1.25	1.25
SALROT	.	.	1.25	1.25	.	.	0.75	0.25	0.50	0.29	0.25	0.25	0.25	0.25
SCICAL	.	.	.	.	1.25	1.25	.	.	17.75	8.37	1.25	1.25	.	.
SCIVAL	0.25	0.25	.	.	.	.	0.25	0.25	.	.	16.50	14.54	0.75	0.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	11.25	3.75
TYPLAT	2.75	1.31	32.50	17.62	7.75	4.66	22.50	8.54	12.50	7.50	28.75	10.87	.	.
ELEINTD	27.50	22.59	.	.	.	.	.	.	.	.	.	.	.	.
PONCORD	.	.	.	.	15.00	6.12	.	.	.	.	.	.	.	.
SCICALD	.	.	.	.	1.25	1.25	.	.	26.25	19.62	.	.	.	.
THAGEND	.	.	.	.	.	.	.	.	.	.	.	.	36.25	14.91
TYPLATD	.	.	7.50	3.23	25.00	16.58	7.50	3.23	10.00	5.77	11.25	4.27	7.50	7.50
GALTINS	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
TYPSPPS	0.25	0.25	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25	0.25	0.25
udicotS	0.50	0.29	0.25	0.25	.	.	.	.	.	.	.	.	.	.
MARCH 1994	SITE 3													
ALTPHI	1.25	1.25	3.00	2.35	.	.	0.25	0.25	0.25	0.25	.	.	.	.
AMBART	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	.	.	16.25	14.63	.	.	6.25	6.25	7.50	4.33	10.00	7.07	.	.
ELEINT	28.75	20.45	.	.	.	.	.	.	.	.	.	.	12.50	6.61
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
GALTIN	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	51.25	22.49	1.75	1.11	7.50	7.50	30.00	18.82	6.25	1.25	7.75	2.25	2.50	2.50
LEMSPP	5.00	2.04	0.50	0.29	0.25	0.25	0.25	0.25	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	12.50	12.50
PONCOR	.	.	.	.	58.75	13.60	10.00	10.00	.	.	.	.	2.50	1.44
SAGLAN	.	.	.	.	.	.	14.00	4.49	.	.	.	.	2.50	2.50
SALROT	.	.	0.25	0.25	.	.	10.50	9.84	18.75	17.12	3.00	2.35	1.50	1.19
SCICAL	.	.	.	.	.	.	.	.	51.25	16.75	7.50	7.50	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	4.00	2.27	0.25	0.25
SPIPOL	.	.	0.25	0.25	0.25	0.25	0.25	0.25	.	.	0.25	0.25	.	.

Table 12. Vegetation cover measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
THAGEN	.	.	21.25	21.25	.	.	.	.	.	.	.	.	16.25	2.39
TYPLAT	2.50	2.50	7.50	7.50	8.75	5.91	5.00	5.00	.	.	18.75	10.87	.	.
EICCRAD	.	.	5.00	5.00	.	.	.	.	.	.	2.50	2.50	.	.
ELEINTD	22.75	16.41	.	.	.	.	.	.	.	.	.	.	5.00	3.54
PONCORD	.	.	.	.	8.75	4.27	5.00	5.00	.	.	.	.	.	.
SCICALD	.	.	.	.	.	.	.	.	12.75	4.09	.	.	.	.
THAGEND	.	.	2.50	2.50	.	.	.	.	.	.	.	.	20.00	7.36
TYPLATD	2.50	2.50	2.50	2.50	4.00	3.67	2.50	2.50	.	.	4.00	3.67	.	.
TYPSPPS	0.25	0.25	0.25	0.25	.	.	0.25	0.25	.	.	0.50	0.29	.	.
udicotS	0.25	0.25	0.50	0.29	.	.	0.50	0.29	0.25	0.25	0.75	0.25	0.50	0.29

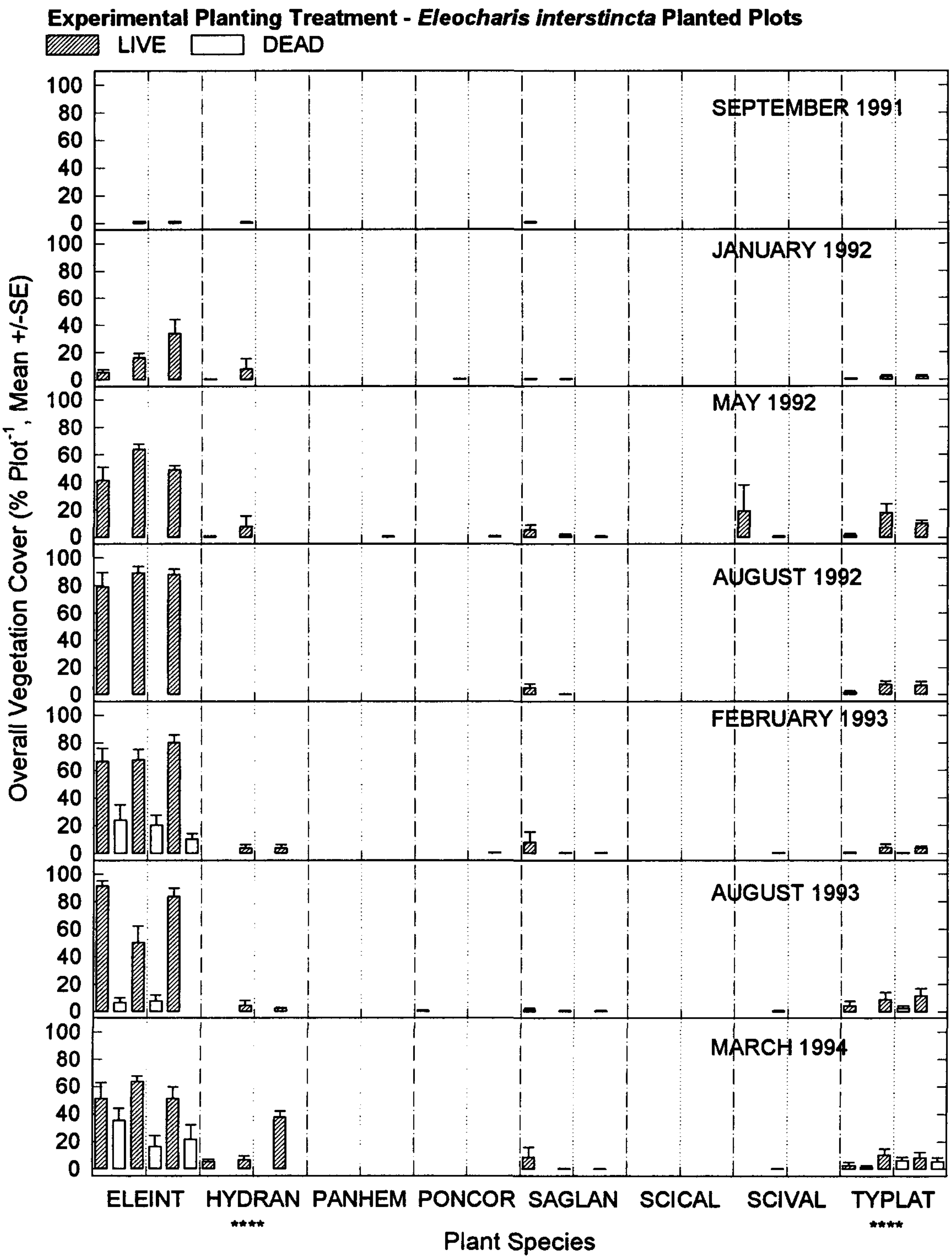


Figure 12. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Eleocharis interstincta* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2

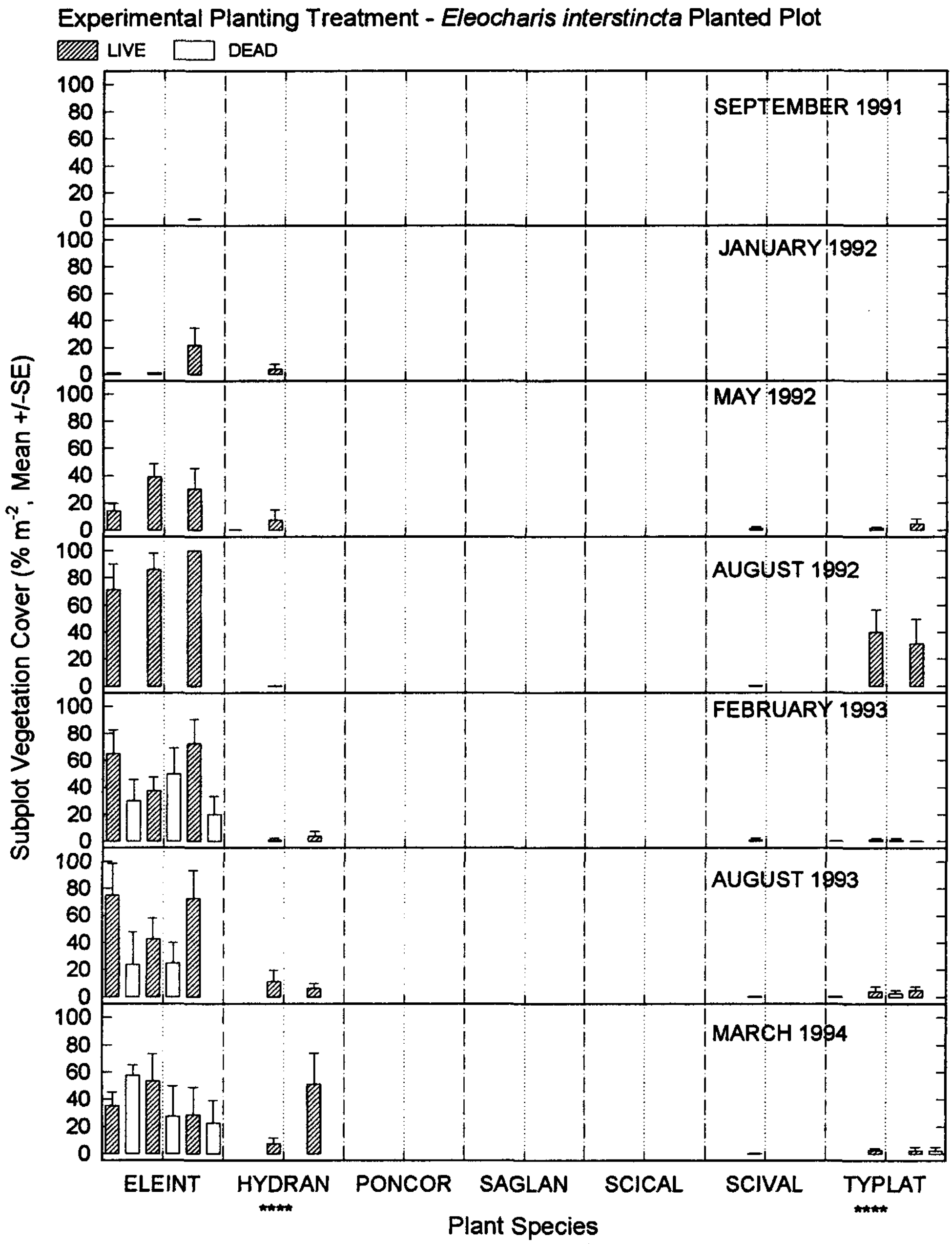


Figure 13. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Eleocharis interstincta* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. **=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.**

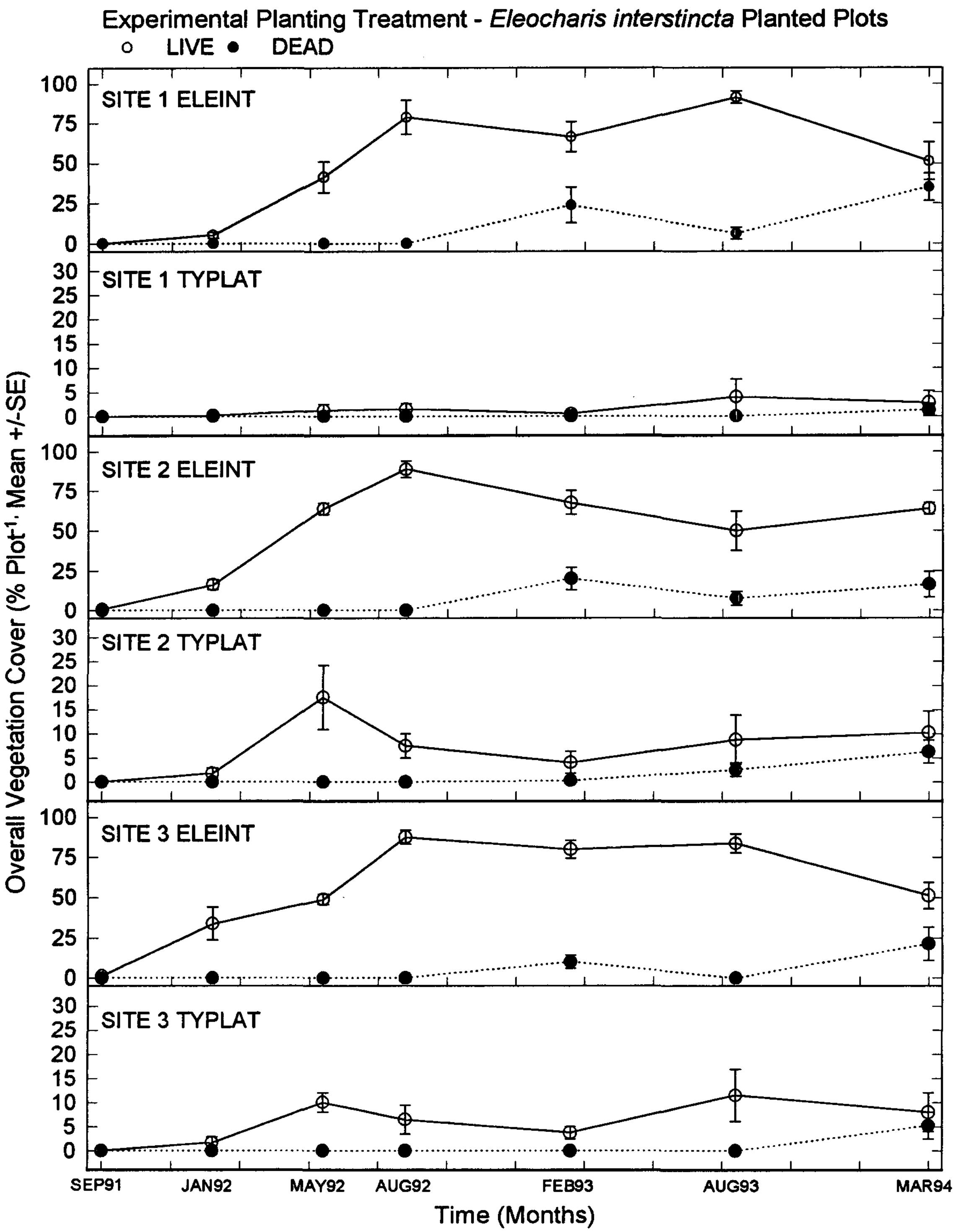


Figure 14. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Eleocharis interstincta* and *Typha latifolia* from *Eleocharis interstincta* Planted Plots, Experimental Planting Sites

Panicum hemitomon. This species was largely unsuccessful at site colonization and resistance to invasion by other species. This species did not completely die out in spite of its inability to compete. It was found at low levels in at least a few of the plots during each sample (Figure 15). Early in the vegetative development of these plots they tended to be dominated by open water.

Eventually the plots were colonized by *Typha latifolia*. Colonization rates varied among the sites (Figure 16). Sites 1 and 3 were similar with low cover values. (<20%). Site 2 was substantially different with a rapid rate of increase (2.5% $month^{-1}$) following invasion in January 1992 (Figure 17).

Pontederia cordata. This species was highly successful at colonization and resisting invasion by other species. The *P. cordata* vegetation community formed dense floating mats consisting of rhizomes and attached soil. The species was sensitive to cold and showed leaf die-back after severe freezes. Live vegetation reached maximum cover at approximately the same time for all sites (August 1992) (Figures 18, 19). This pattern was followed by cover oscillation around 75% at Site 1 and a slow decline in cover at Sites 2 and 3.

Typha latifolia was suppressed at Site 1 (cover <10%). *Typha latifolia* cover at Sites 2 and 3 increased over time (1.07% $month^{-1}$ and 0.65% $month^{-1}$, respectively (Figures 18-20).

Sagittaria lancifolia. This treatment tended to be successful at surviving during

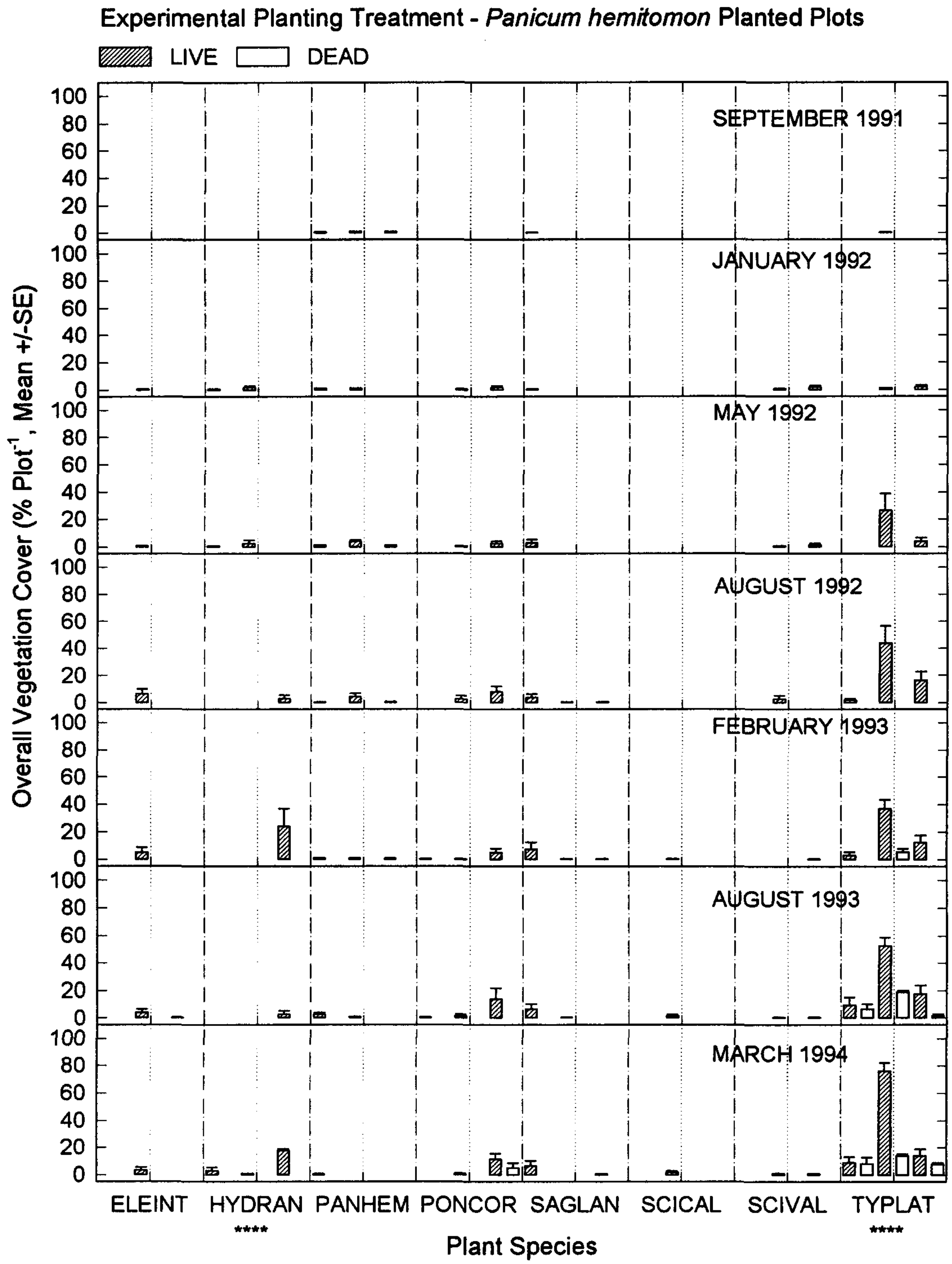


Figure 15. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Panicum hemitomon* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

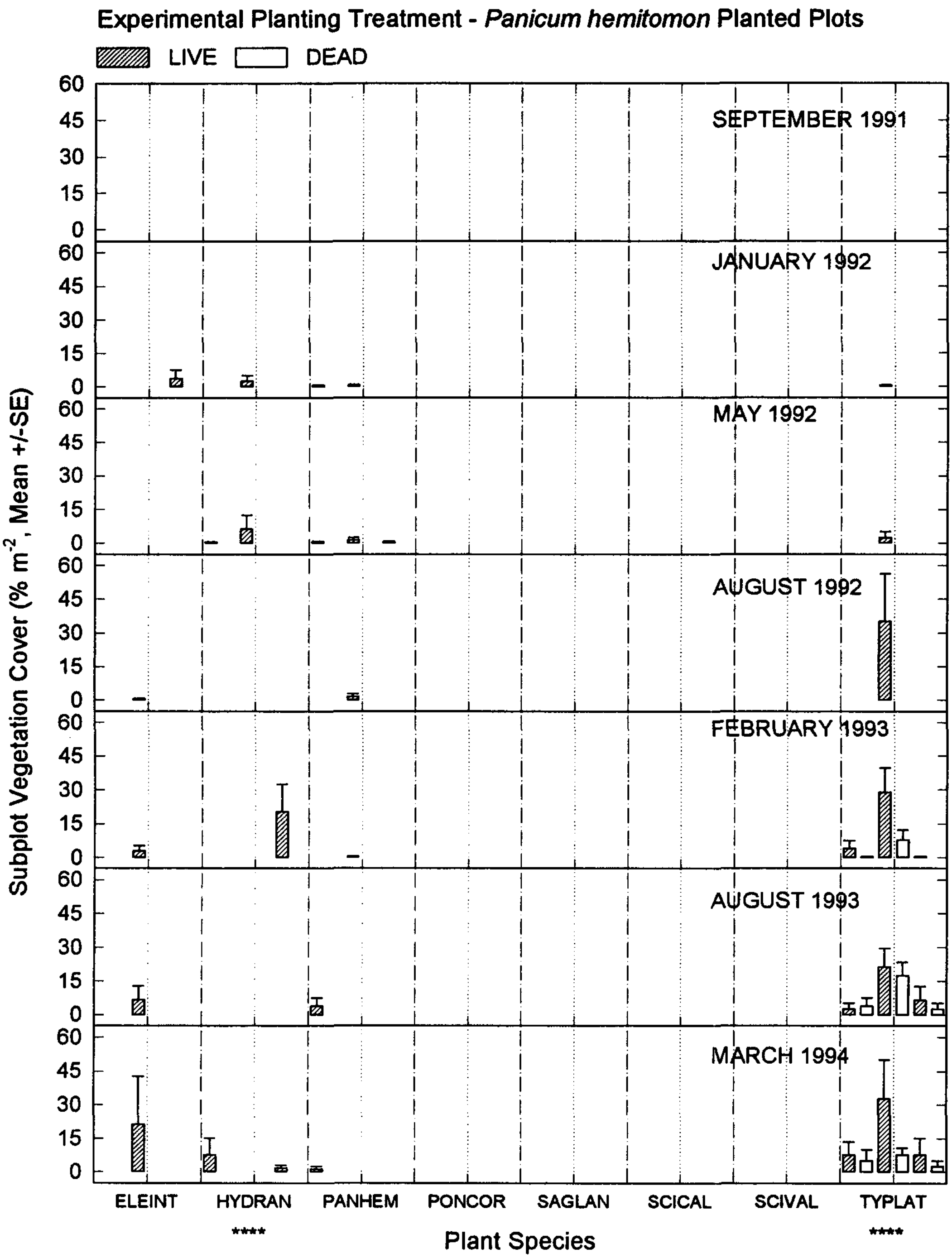


Figure 16. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Panicum hemitomon* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. **=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.**

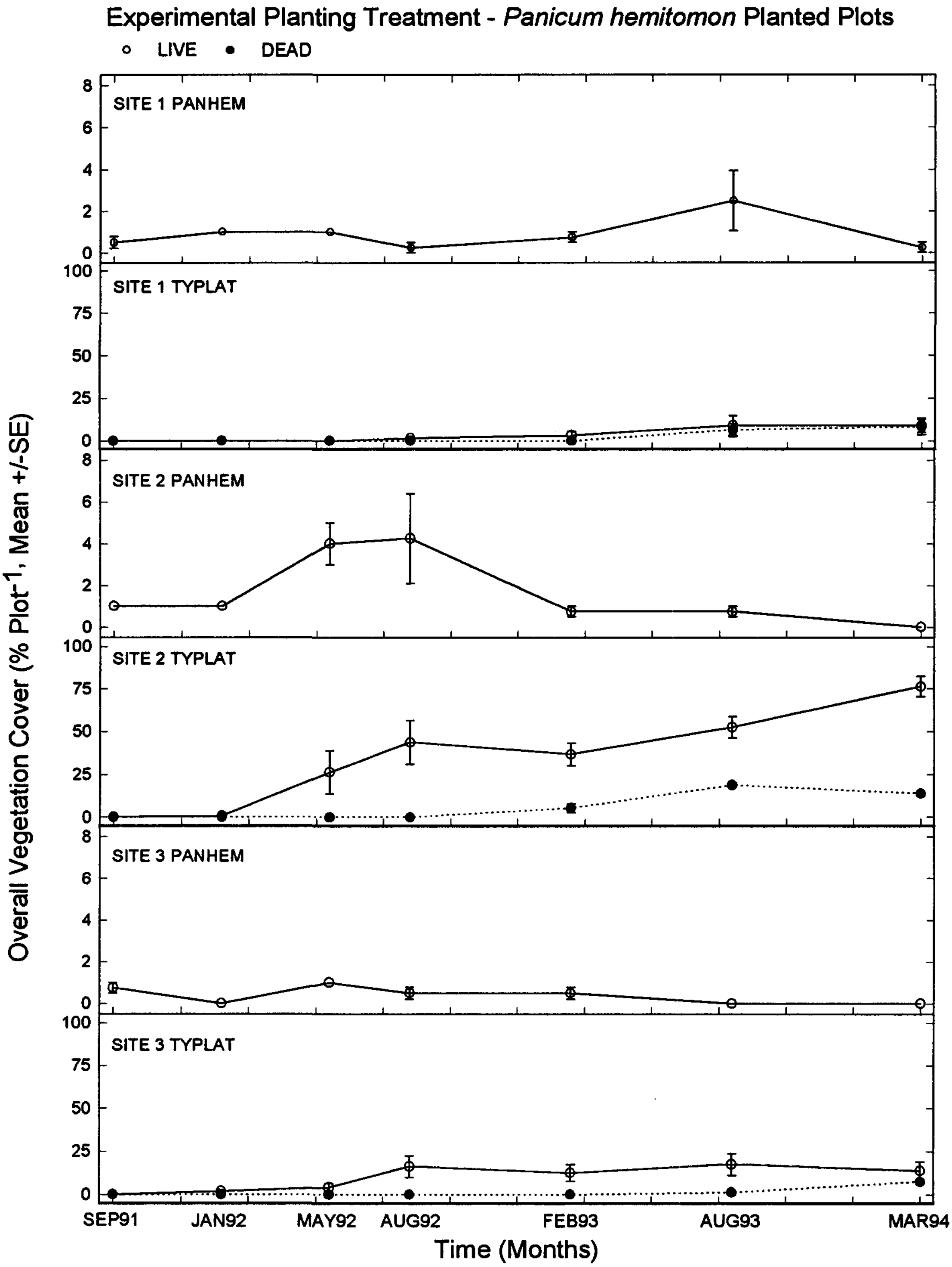


Figure 17. Time series of overall vegetation cover (% $Plot^{-1}$, Mean ±SE) of *Panicum hemitomon* and *Typha latifolia* from *Panicum hemitomon* Planted Plots, Experimental Planting Sites

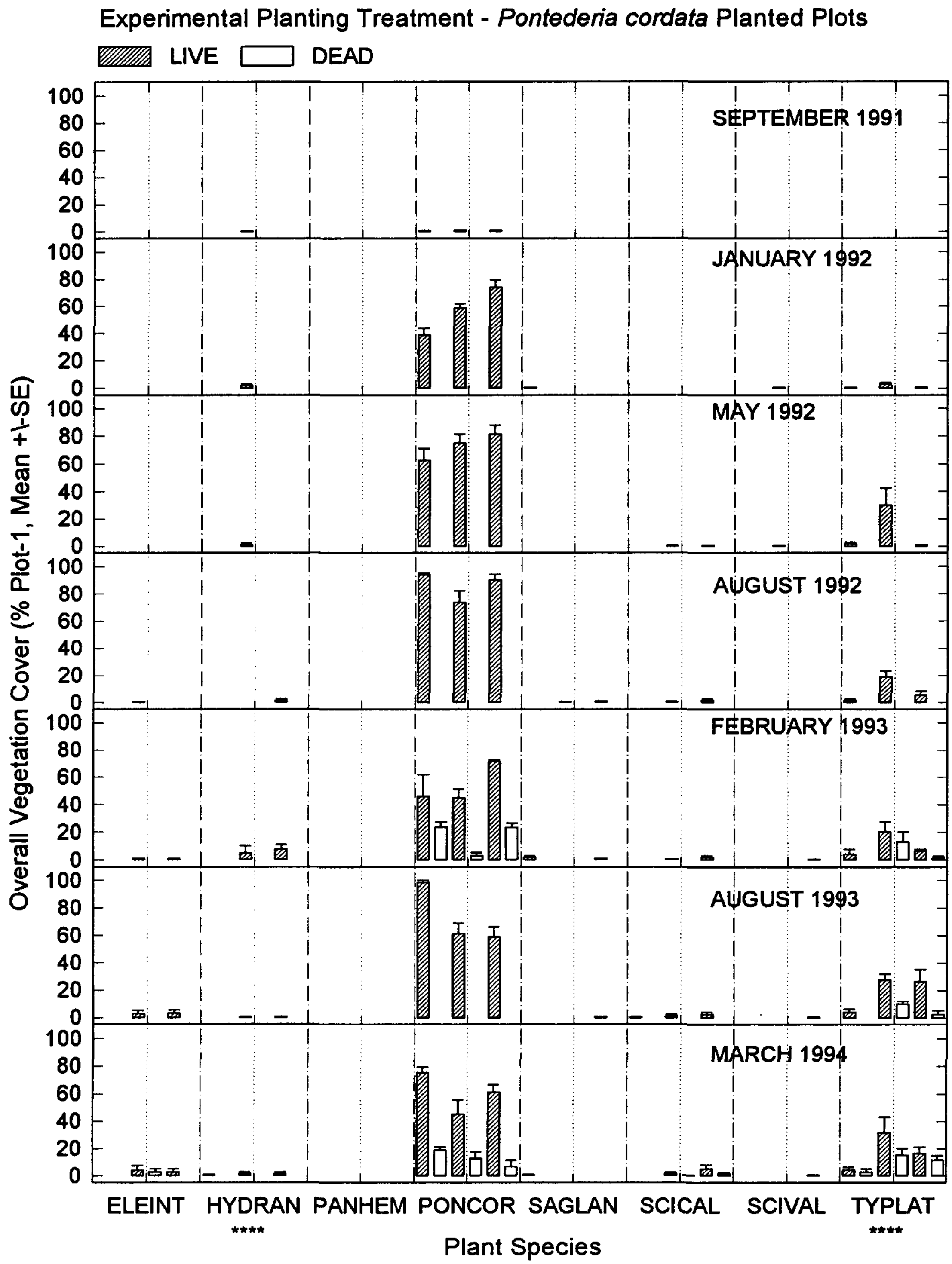


Figure 18. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Pontederia cordata* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

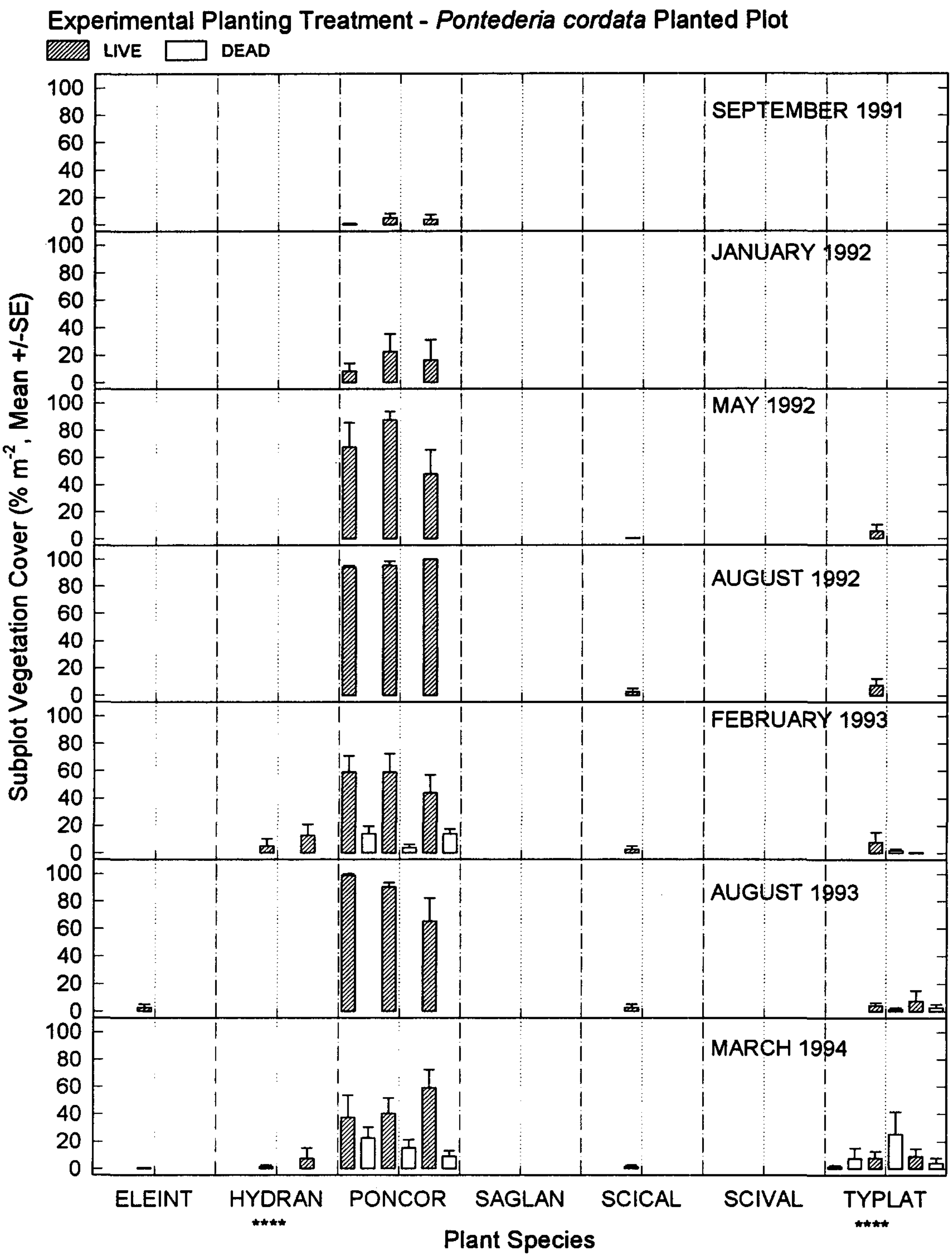


Figure 19. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Pontederia cordata* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. **=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.**

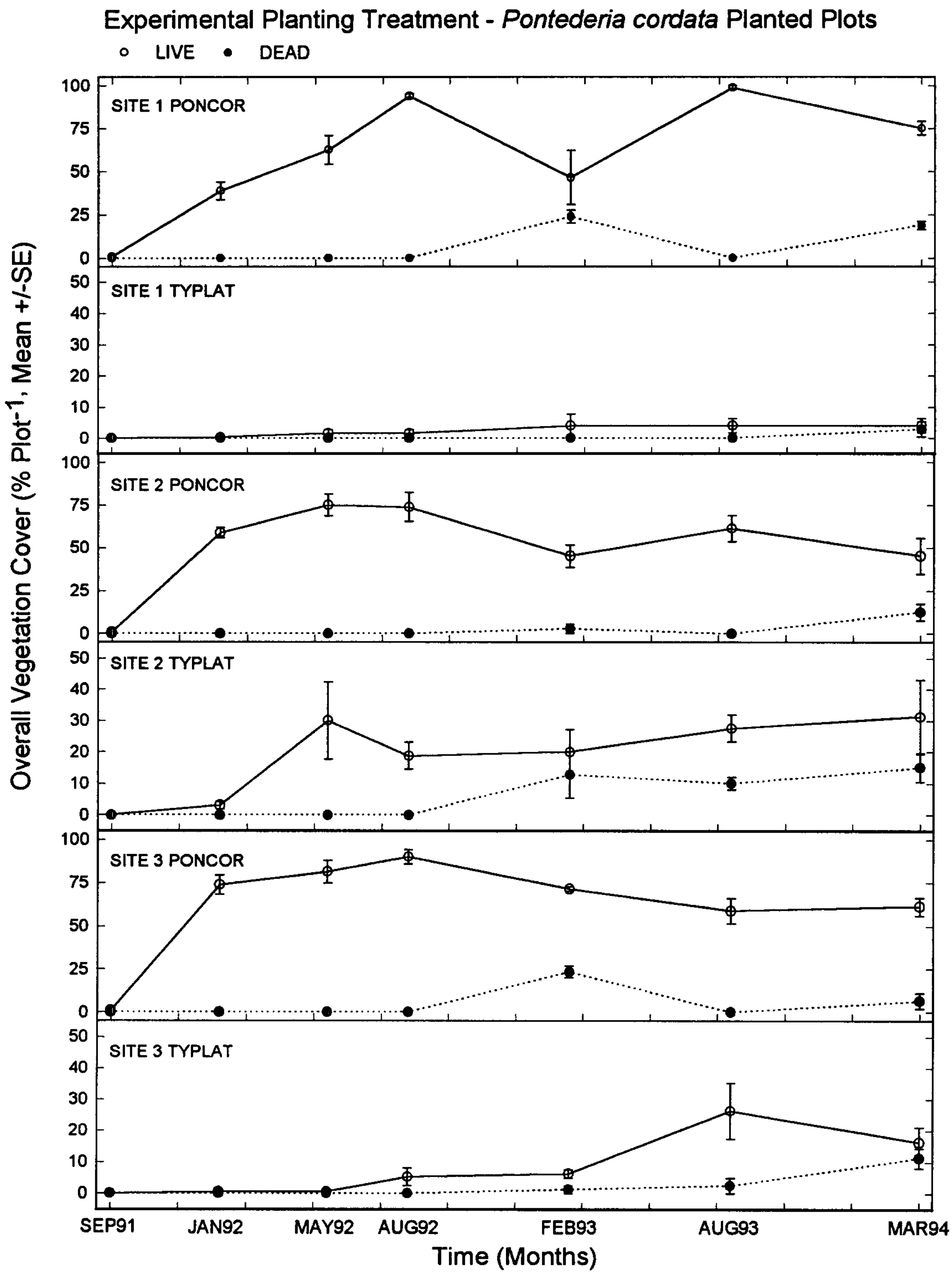


Figure 20. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Pontederia cordata* and *Typha latifolia* from *Pontederia cordata* Planted Plots, Experimental Planting Sites.

the term of study. It didn't expand into all available space as did species such as *P. cordata*, but it did resist invasion by other species (Figure 21, 22). Maximum cover (~75%)was reached by May 1992 for Site 2 and August 1992 for Sites 1 and 3 (~80% and 75%, respectively) (Figure 21, 22). Live vegetation cover remained relatively stable at between 50% to 75% through the study period, while dead was a minor component.

In contrast, *T. latifolia* displayed two distinct growth patterns. In Sites 1 and 3 it remained at low levels (<15%). In Site 2 its cover increased rapidly during the February 1993 to March 1994 sample period (2.1%/month). This increase seems to be associated with a slight decline in *S. lancifolia* cover (Figure 23).

Scirpus californicus. This treatment species performed well under any standard of measure. It had high survival, rapid complete site colonization, resisted invasion by other species, and did not form floating mats (Figures 24, 25, 26). It seems to have some means of excluding most other plant species. Its understory tended to be open through the study period. This species colonized pathways and adjacent plots (Stenberg, Pers. Obs.).

Scirpus validus. Early in the study period this treatment species colonized the site and resisted invasion by other species. After about 2 years the entire cohort went through a large scale senescence. After the senescence event, floating mats formed of dead vegetation and the few remaining live plants (Figures 27, 28, 29).

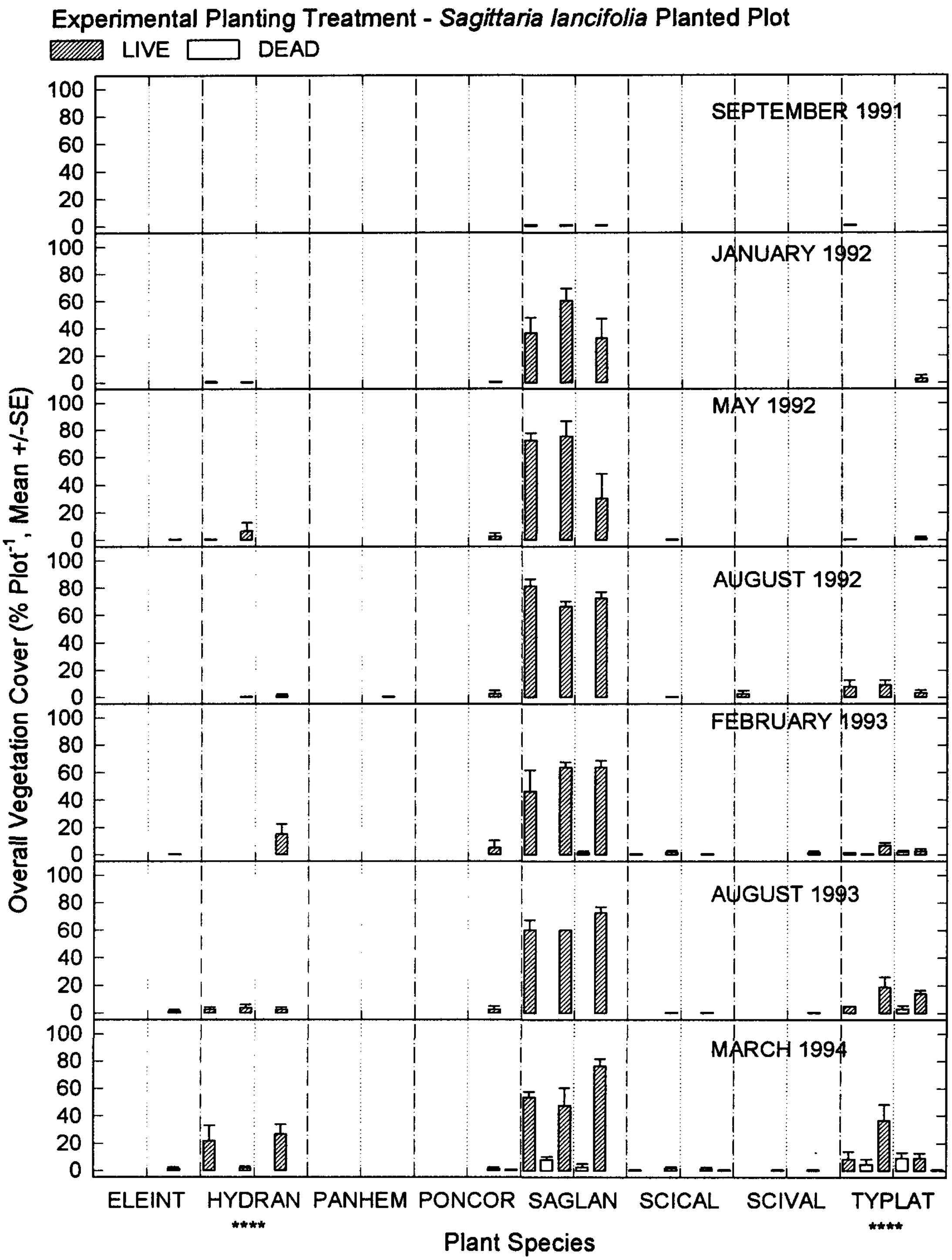


Figure 21. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

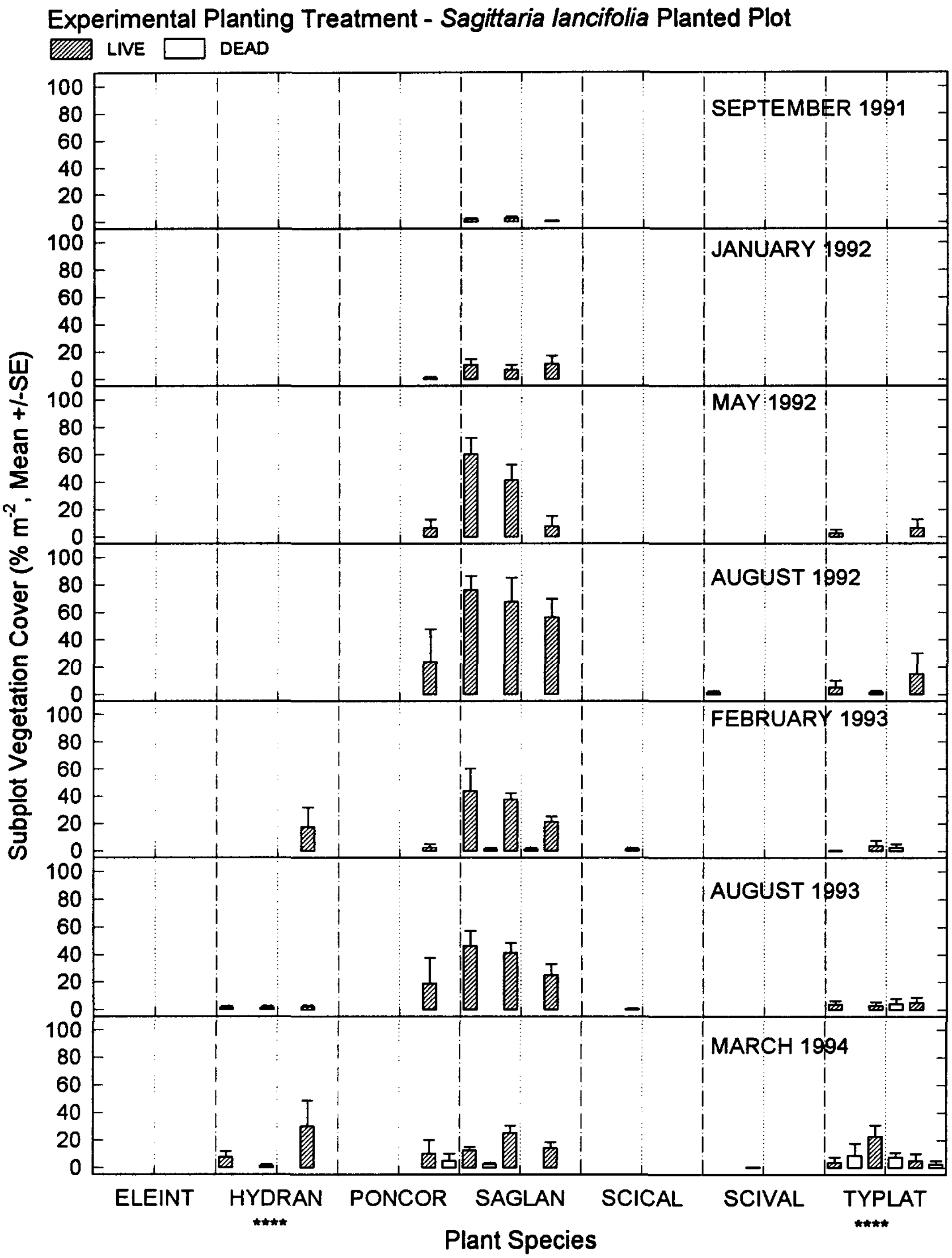


Figure 22. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. ****=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.

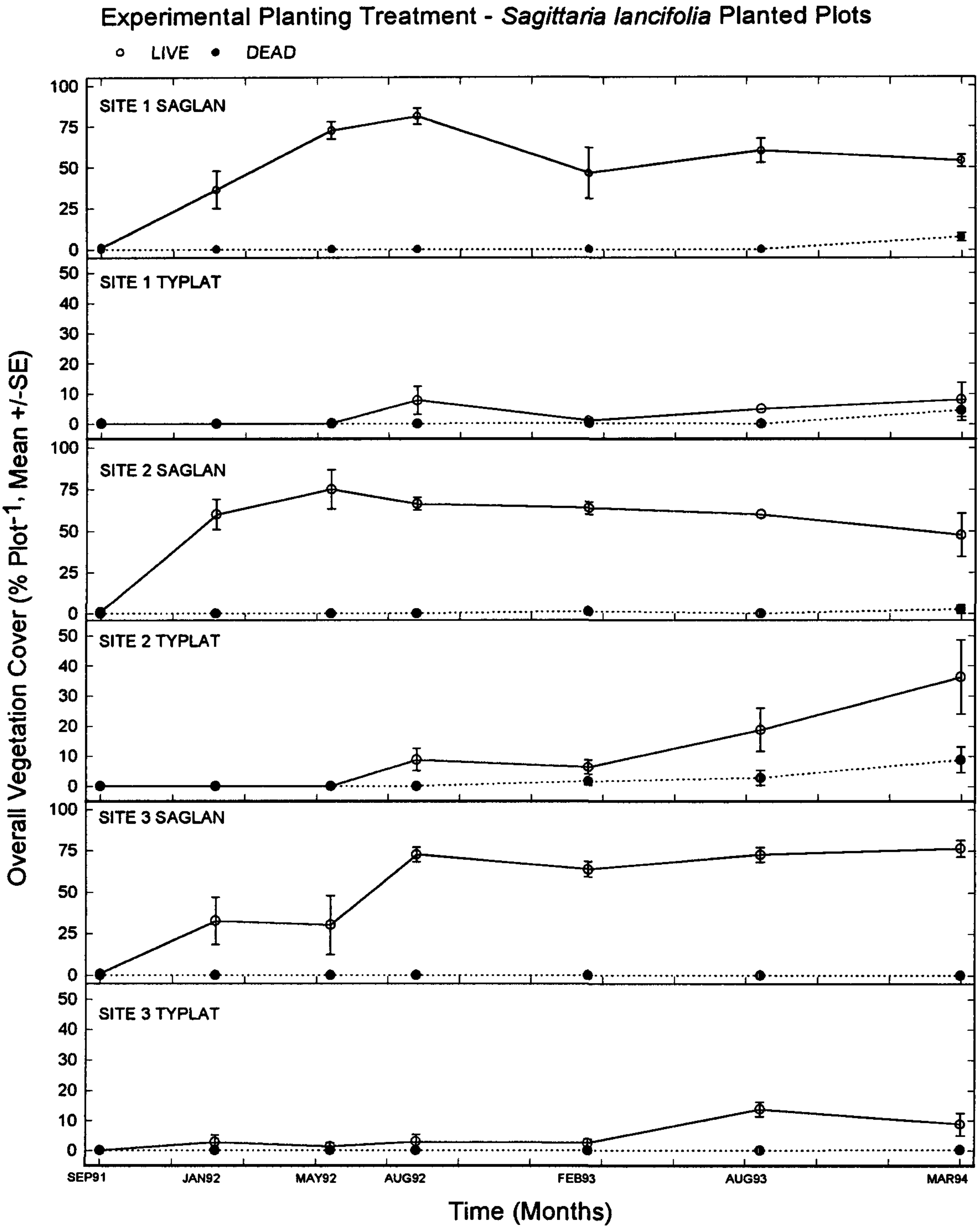


Figure 23. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Sagittaria lancifolia* and *Typha latifolia* from *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites.

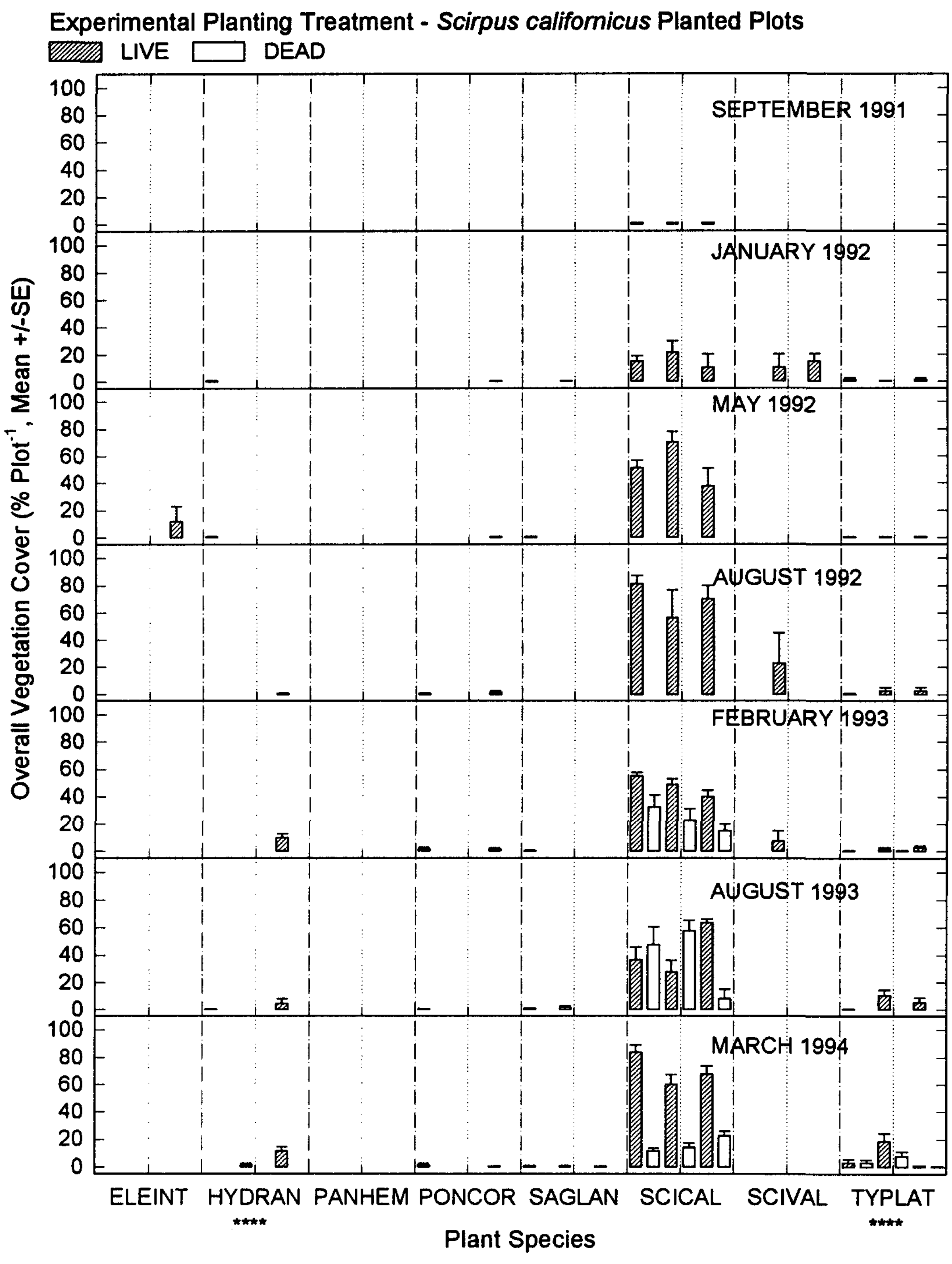


Figure 24. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Scirpus californicus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

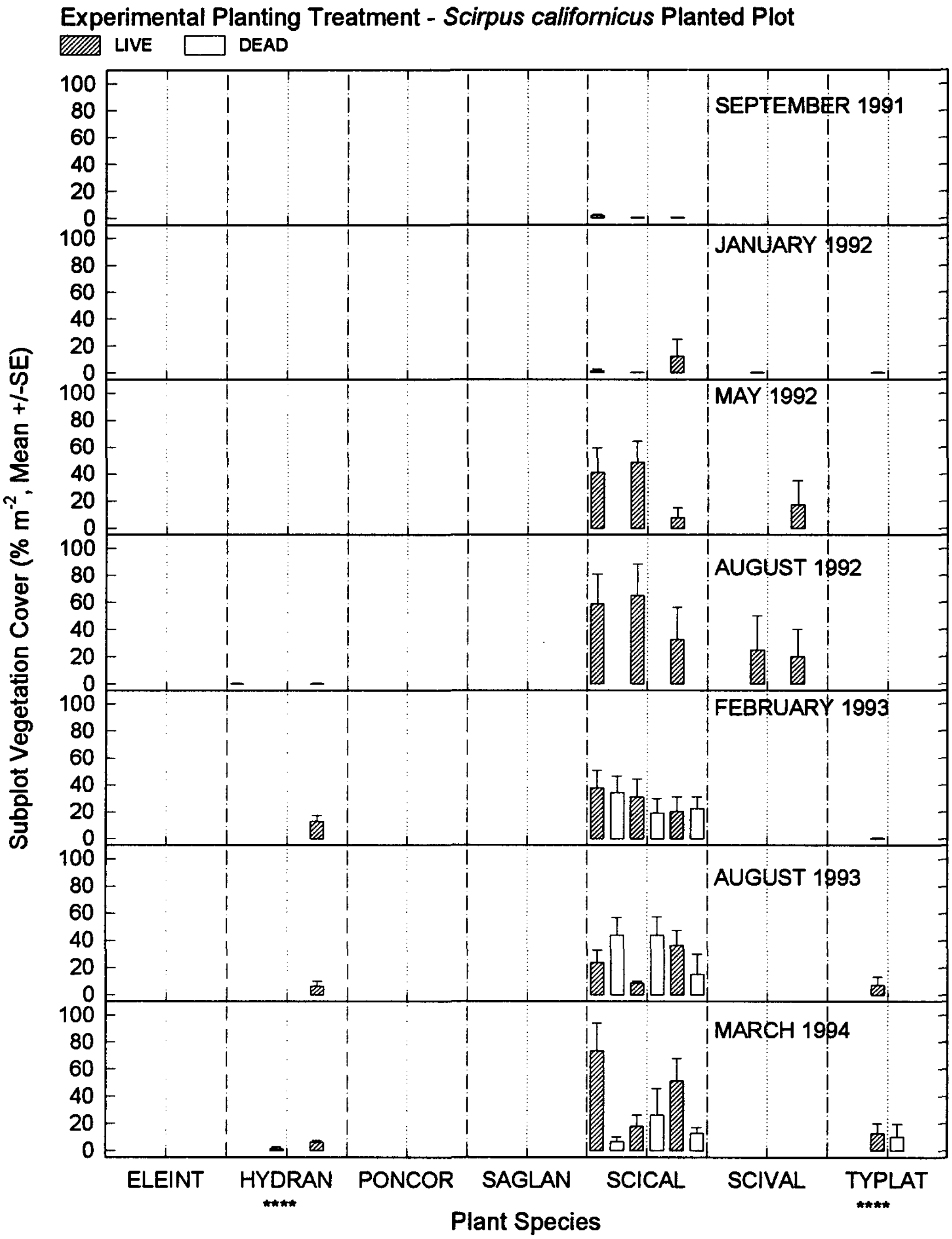


Figure 25. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Scirpus californicus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. **=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.**

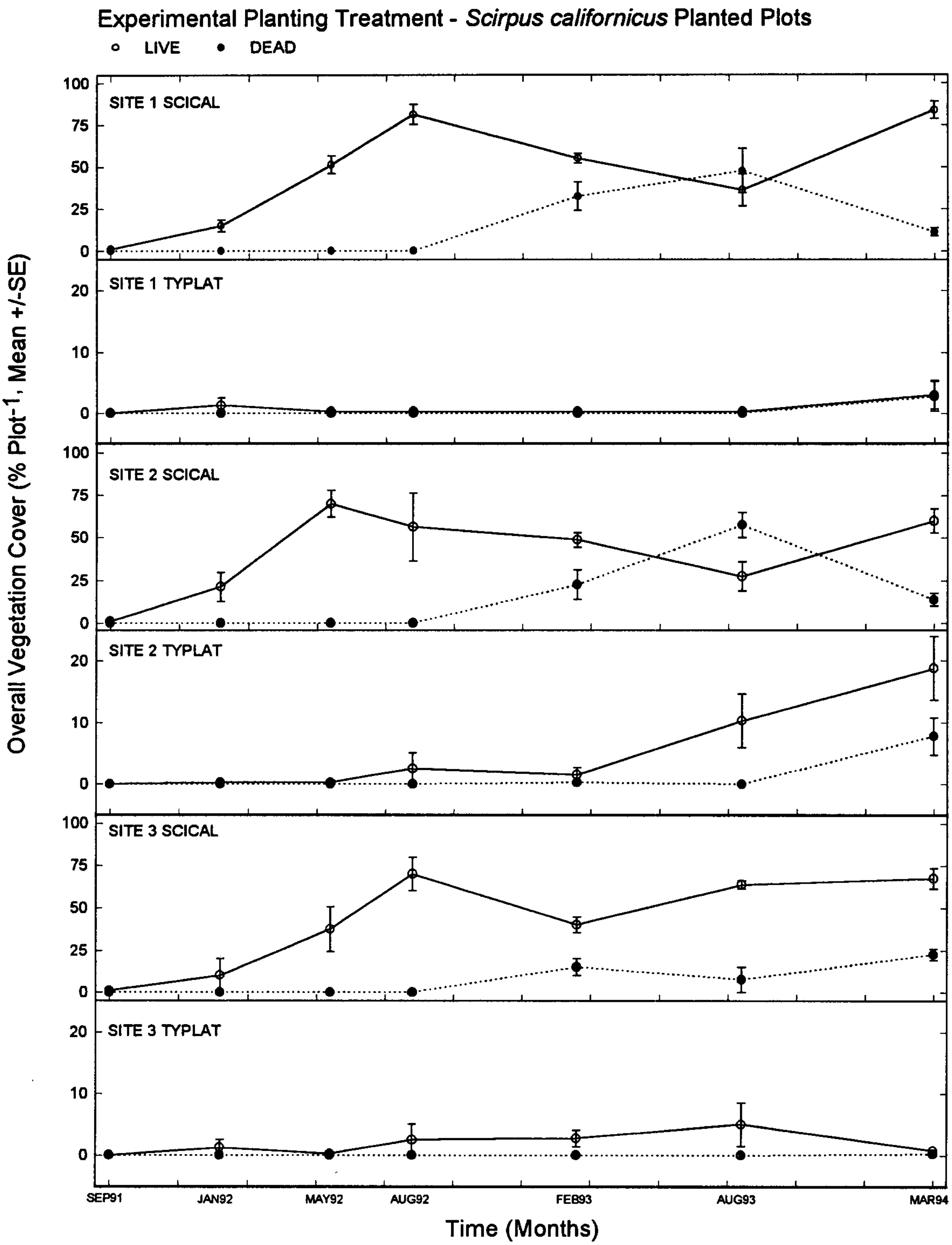


Figure 26. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Scirpus californicus* and *Typha latifolia* from *Scirpus californicus* Planted Plots, Experimental Planting Sites.

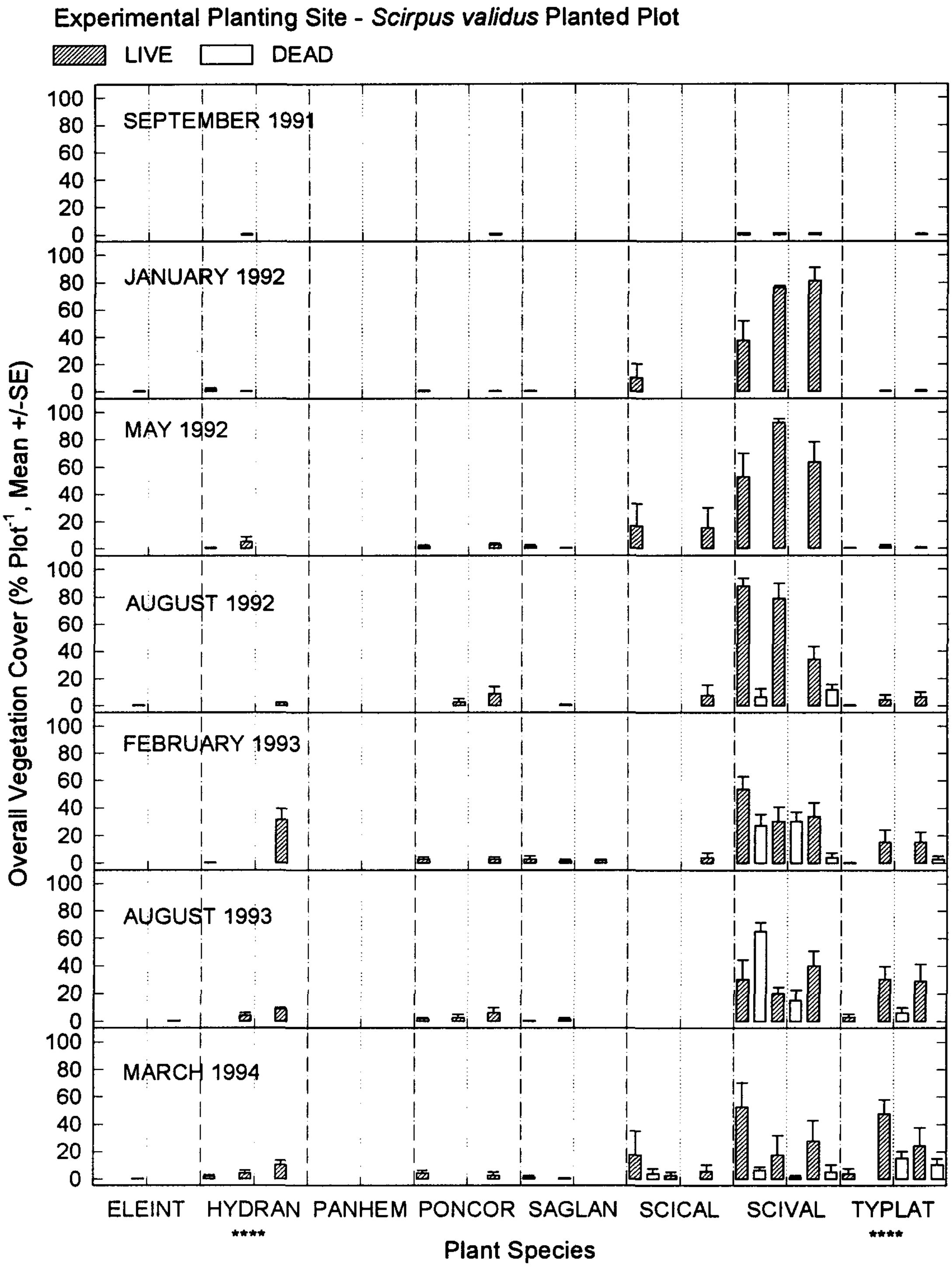


Figure 27. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from *Scirpus validus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

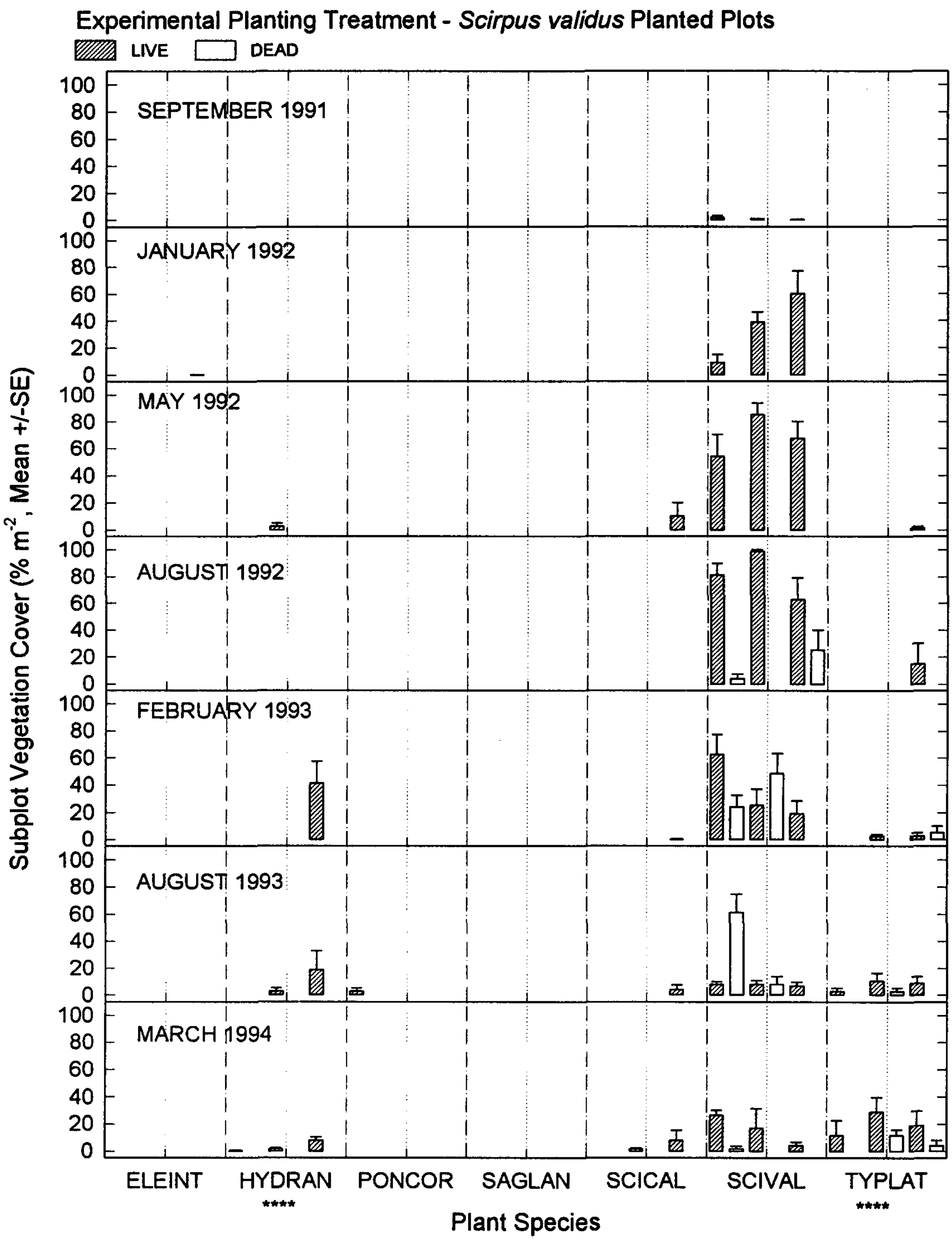


Figure 28. Subplot vegetation cover (% m^{-2}, Mean ±SE) from *Scirpus validus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. ****=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.

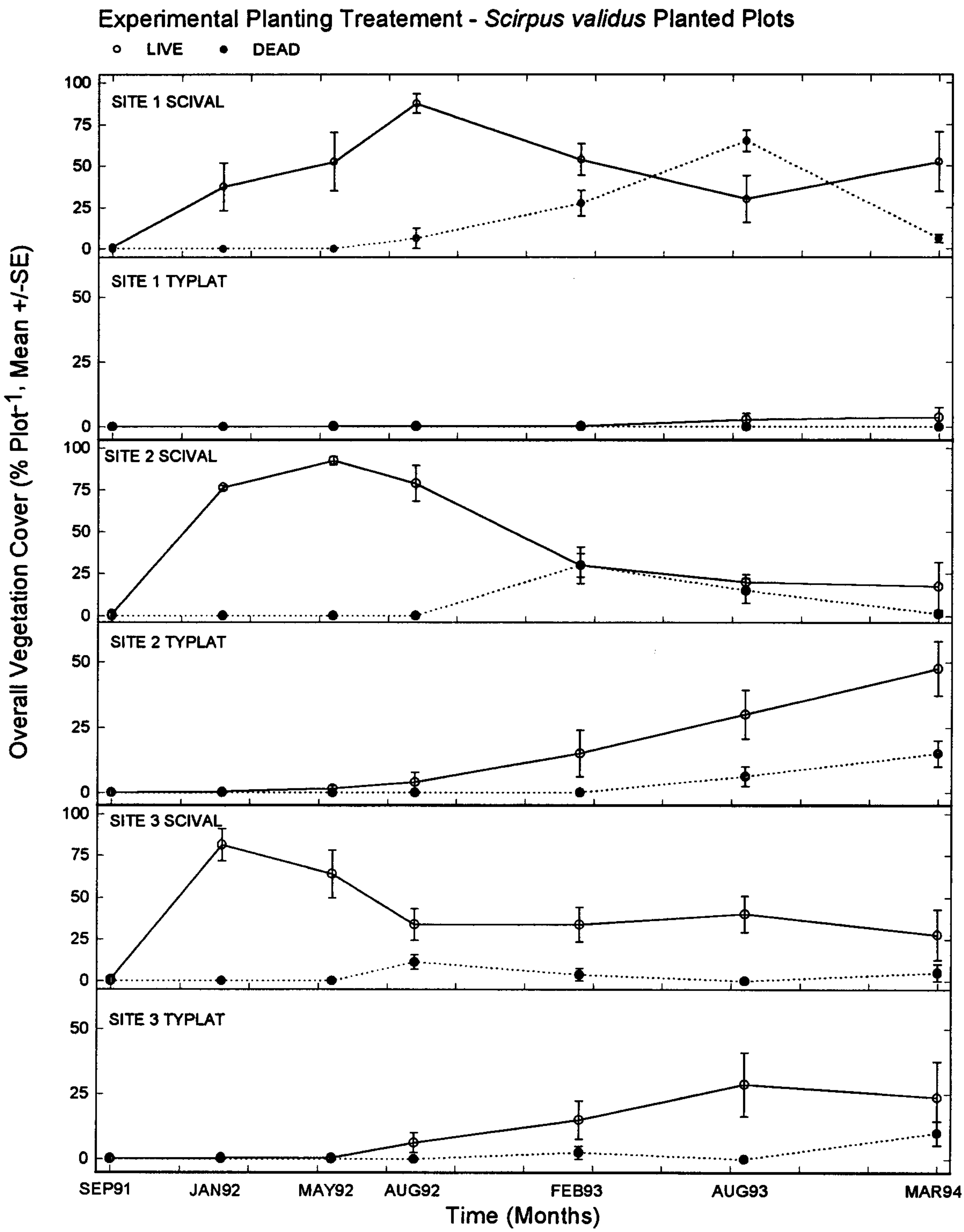


Figure 29. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Scirpus validus* and *Typha latifolia* from *Scirpus validus* Planted Plots, Experimental Planting Sites.

Mixed Planting. The mixed planting treatment provided information about the adaptive and competitive abilities of the various planted species in an interspecific mix. Survivors included: *Eleocharis interstincta*, *Peltandra virginica*, *Pontederia cordata*, *Sagittaria lancifolia*, *Scirpus validus*, *Scirpus californicus*, and *Thalia geniculata*. *Kosteletzkya virginia*, and *Cladium jamaicense* did not survive. The surviving species had partitioned the available space among themselves. This vegetation pattern suggests that they are somewhat equally competitive in an interspecific interaction (Figures 30, 31, 32a,b,c).

Invasion by *Typha latifolia* and *Hydrocotyle ranunculoides* was minimal. Both of these species were found in the plots, but at low levels. They showed no sign at the time of the final sampling of increasing their rate of invasion.

Seasonal live:dead cover dynamics were most pronounced with *Thalia geniculata*. This species cycled between live, tall (4m) vegetation during summer to large scale senescence during winter. This phenomenon resulted in little or no exposed living cover during winter (Figures 30, 31, 32a,b,c).

Thalia geniculata dispersed beyond the plot boundaries more effectively than any other planted species in the planted plots. It has become established in some treatment plots, in pathways, and most densely in control plots and the area surrounding the planting area. Dispersal of this species seems related to movement of unanchored clumps and seed germination during drawdown events (Stenberg, Pers. Obs).

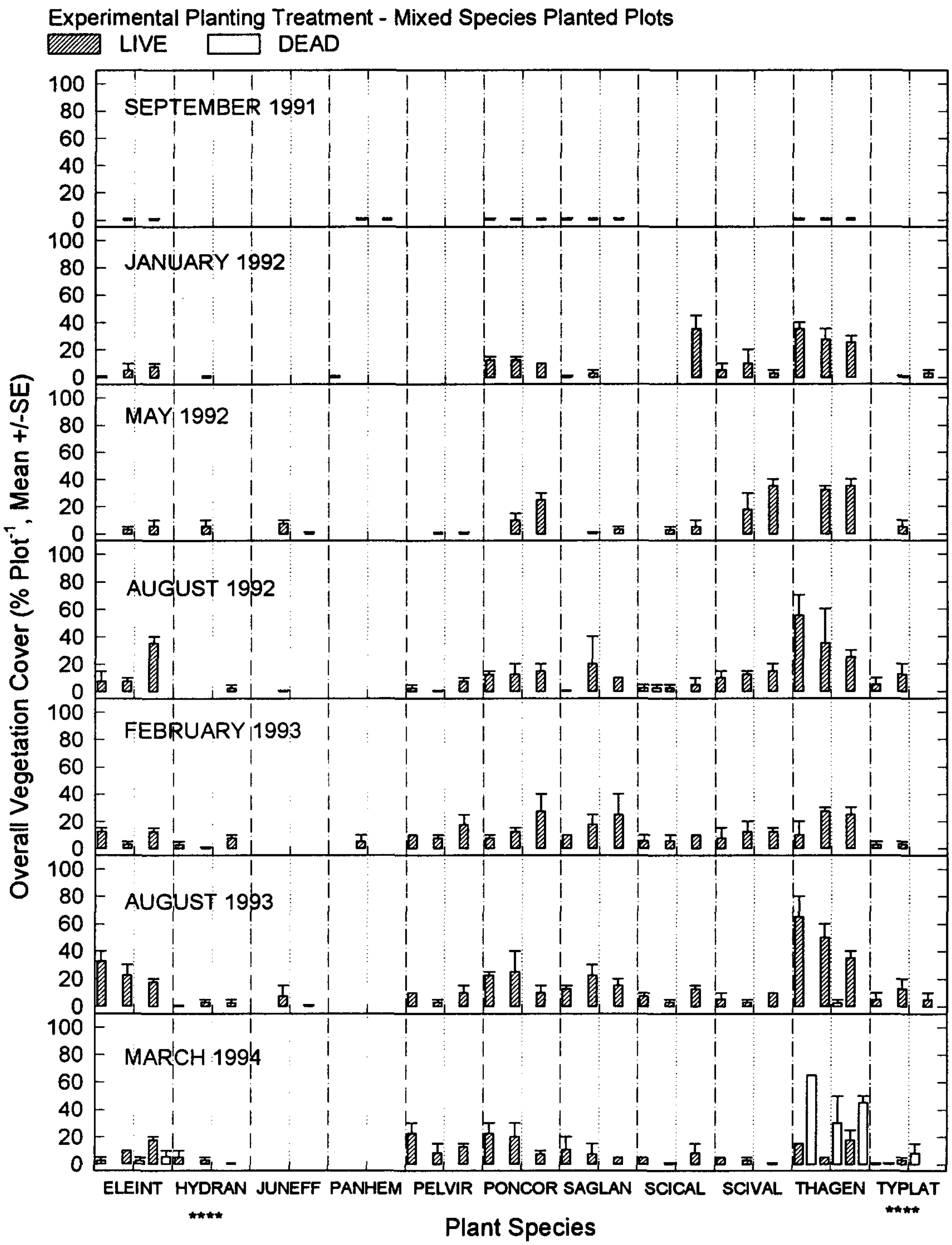


Figure 30. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from Mixed Species Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

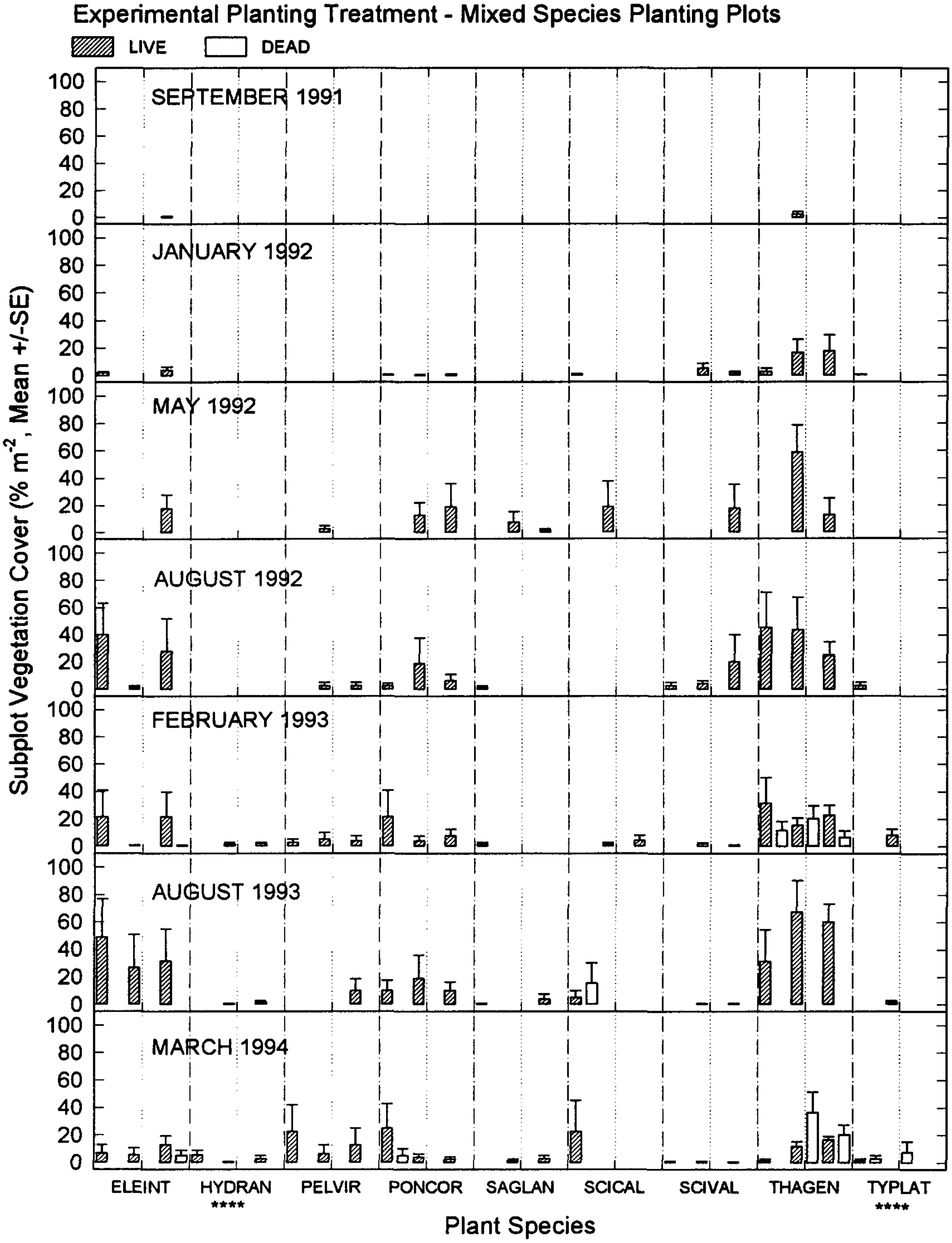


Figure 31. Subplot vegetation cover (% m^{-2}, Mean ±SE) from Mixed Species Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars. ****=*Hydrocotyle ranunculoides* (HYDRAN) and *Typha latifolia* (TYPLAT) not planted, other species planted near treatment plot.

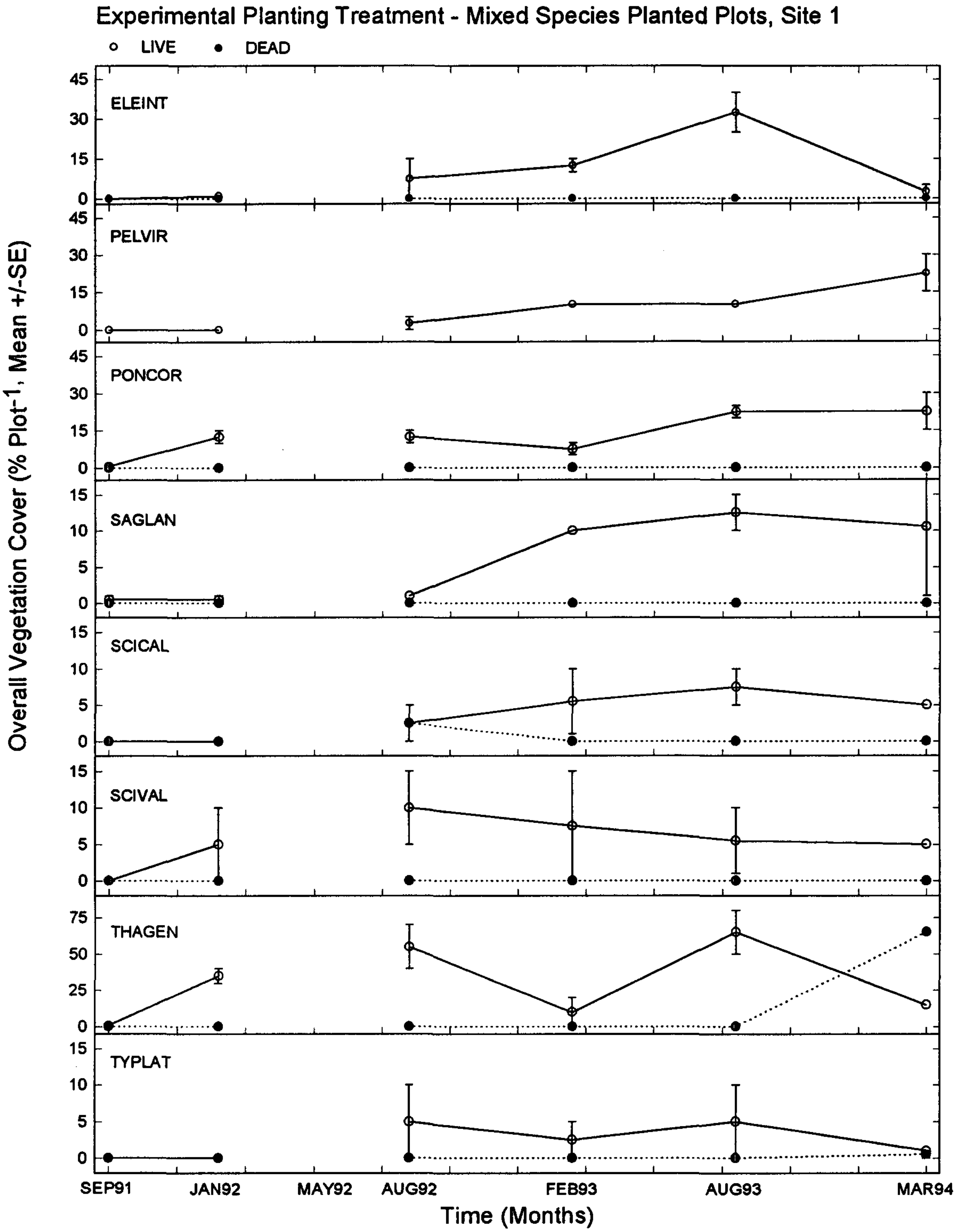


Figure 32a. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Mixed Species Planted Plots, Site 1, Experimental Planting Sites.

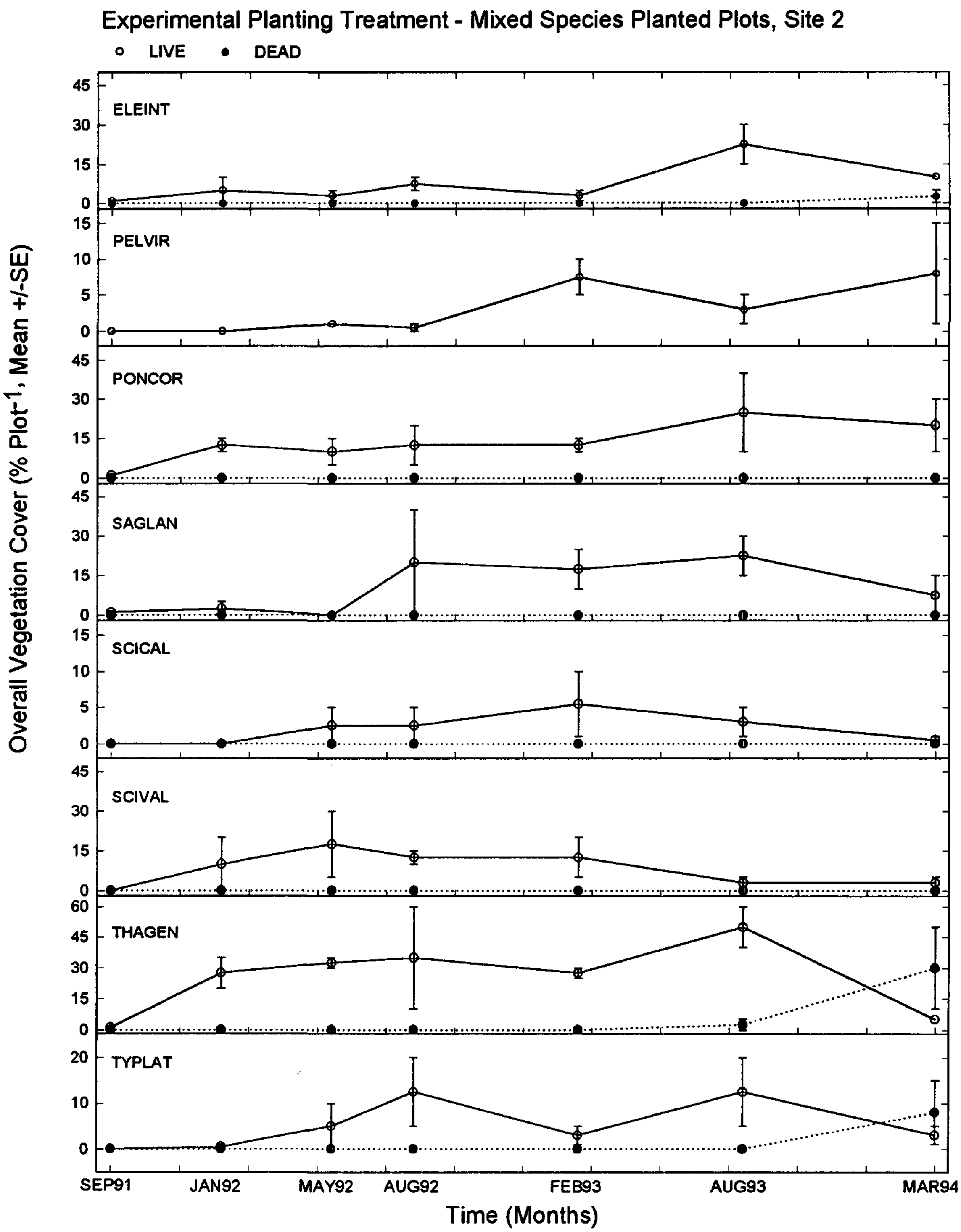


Figure 32b. Time series of overall vegetation cover (% $Plot^{-1}$, Mean ±SE) of common species from Mixed Species Planted Plots, Site 2, Experimental Planting Sites.

Experimental Planting Treatment - Mixed Species Plots, Site 3

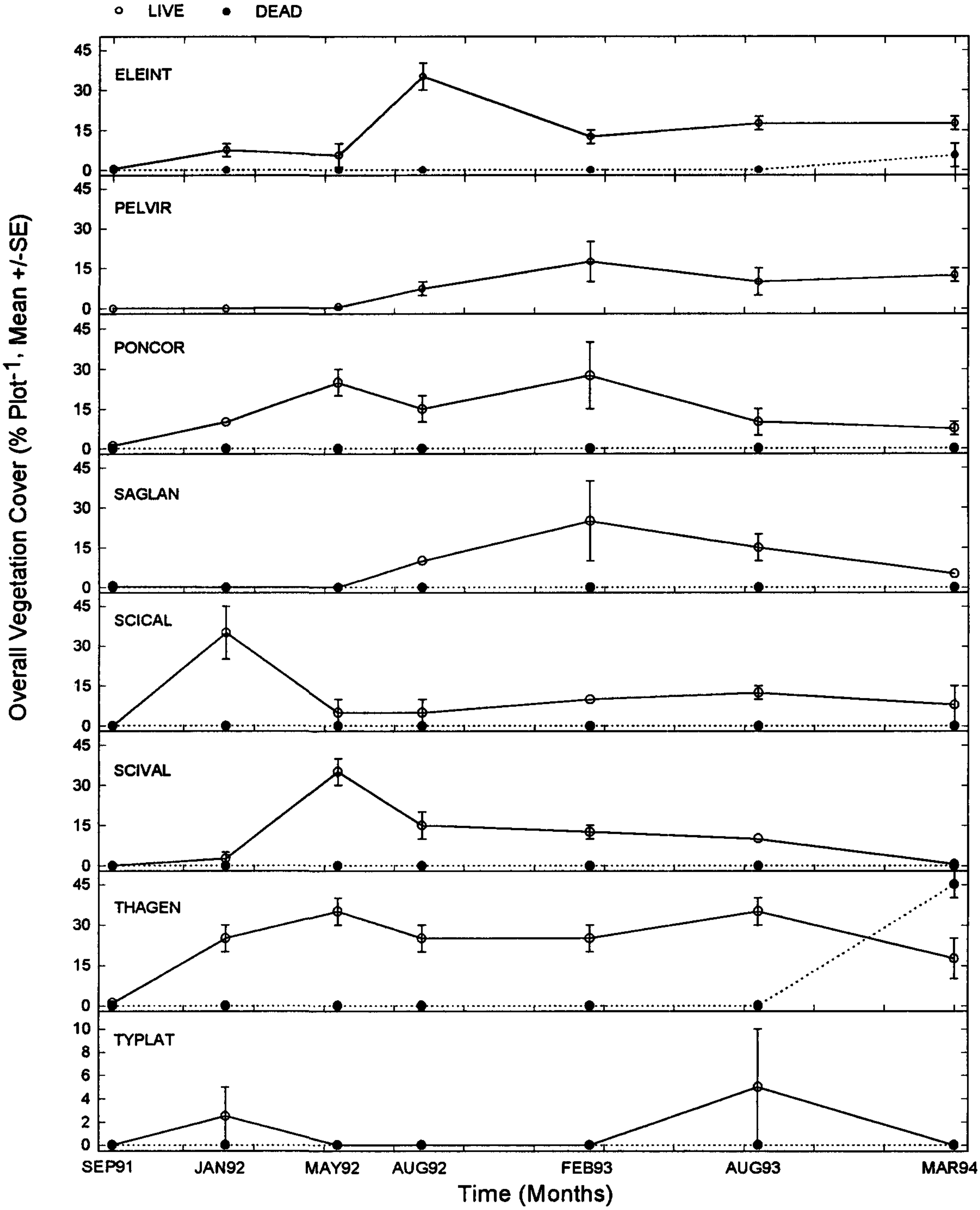


Figure 32c. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Mixed Species Planted Plots, Site 3, Experimental Planting Sites.

Seeded Treatments -- Cover Percent

Panicum hemitomon. This treatment was unsuccessful. The plot was colonized by *Typha latifolia*. *Panicum hemitomon* was not found in the plot (Figures 33,34 & Appendix A1, A2).

Polygonum punctatum. This treatment was generally unsuccessful. Late in the sample period a small amount of *Polygonum punctatum* was found. It may have come from the surrounding landscape and not the seeded treatment. *Polygonum punctatum* was common in the natural succession marsh early in the vegetation sequence. It also made an appearance after the August 1993 drawdown. *Typha latifolia* colonized and dominated the site (Figures 35, 36, Appendix A1, A2).

Pontederia cordata. This treatment was the most successful. Large patches of *Pontederia cordata* were found. *Typha latifolia* colonized and was a co-dominant on sites 2 and 3 (Figures 37, 38, Appendix A1, A2).

Sagittaria lancifolia. This treatment was moderately successful. The seed used in this treatment may have been contaminated with *Sagittaria montevidensis*. *S. montevidensis* was found at high cover values in this treatment (Appendix A1, A2). *Pontederia cordata* was also an important component of this plot. It is not known if it invaded after seeding or if seed drifted in immediately after seeding from nearby plots. *Typha latifolia* colonized and was a co-dominant on the site (Figures 39, 40).

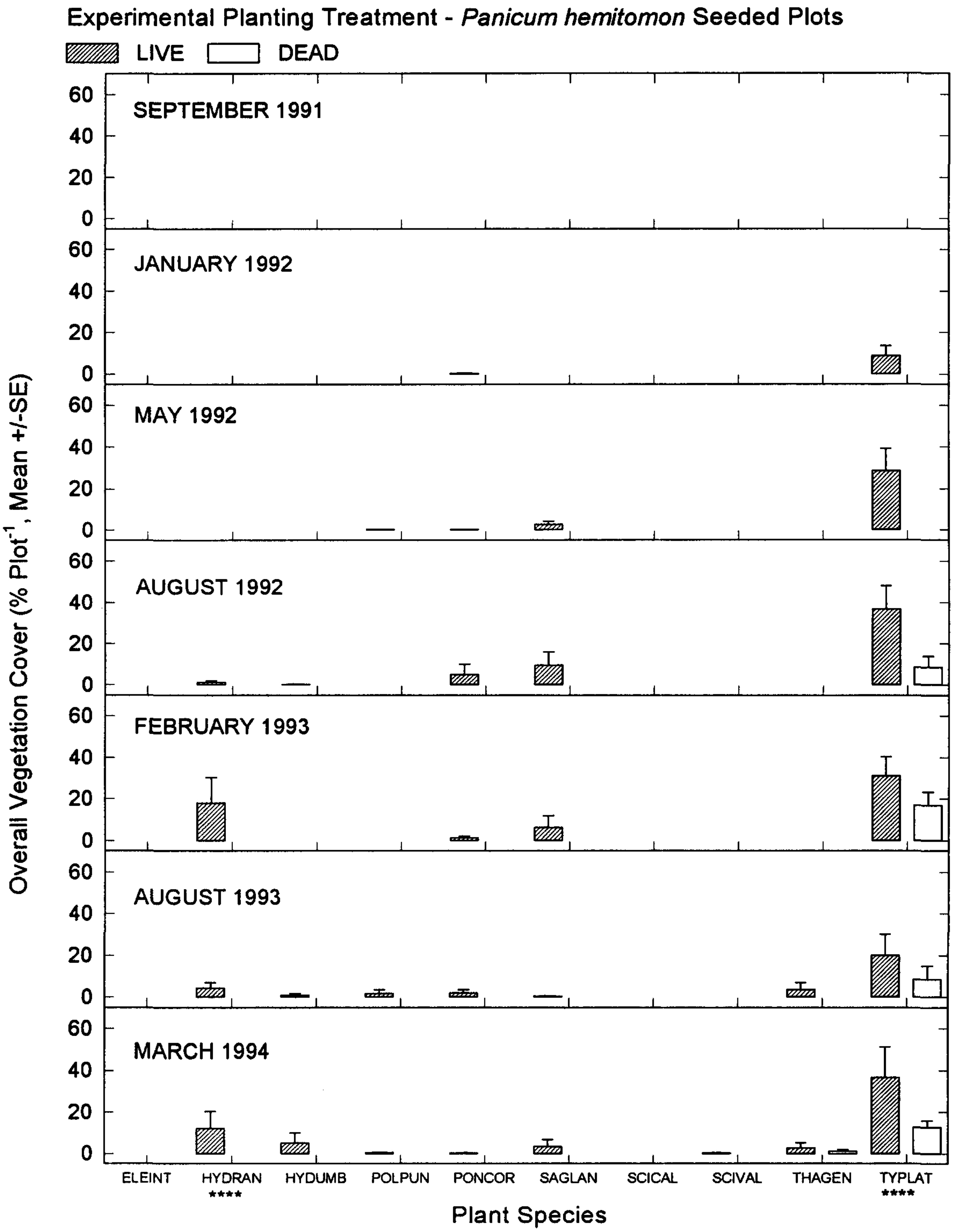


Figure 33. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from all (n=6) *Panicum hemitomon* Seeded Plots, Experimental Planting Sites.

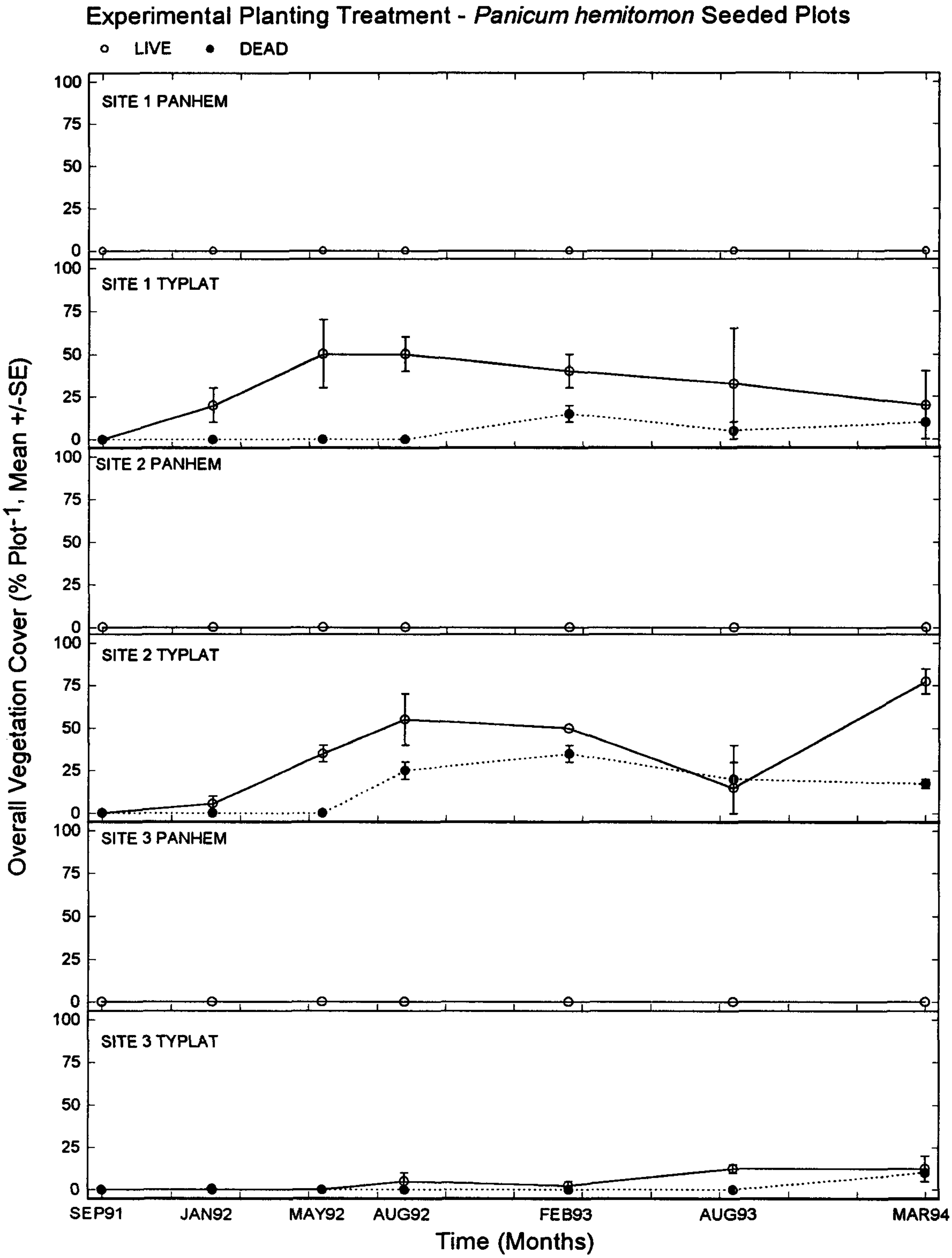


Figure 34. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Panicum hemitomon* and *Typha latifolia* from *Panicum hemitomon* Seeded Plots, Experimental Planting Sites.

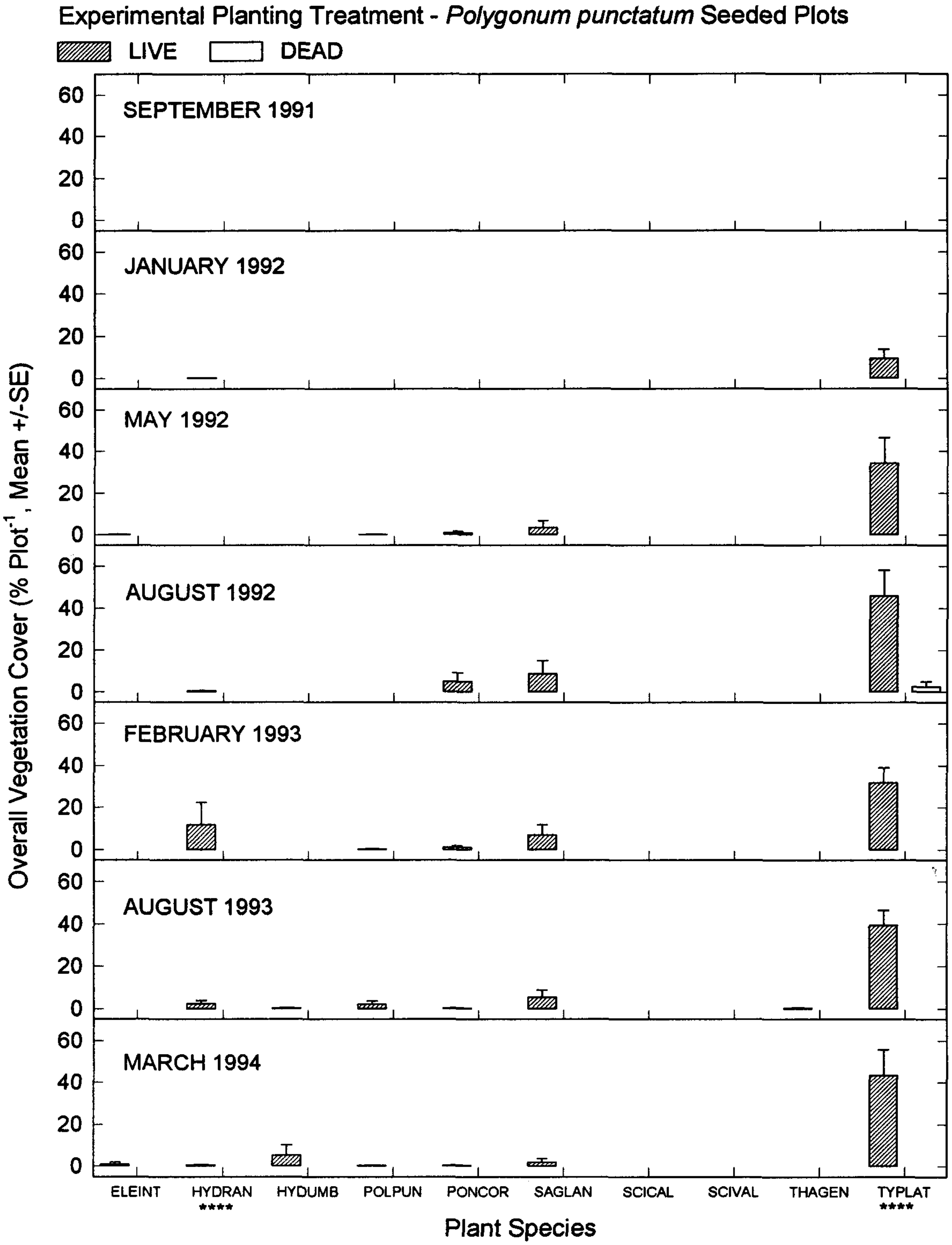


Figure 35. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from all (n=6) *Polygonum punctatum* Seeded Plots, Experimental Planting Sites.

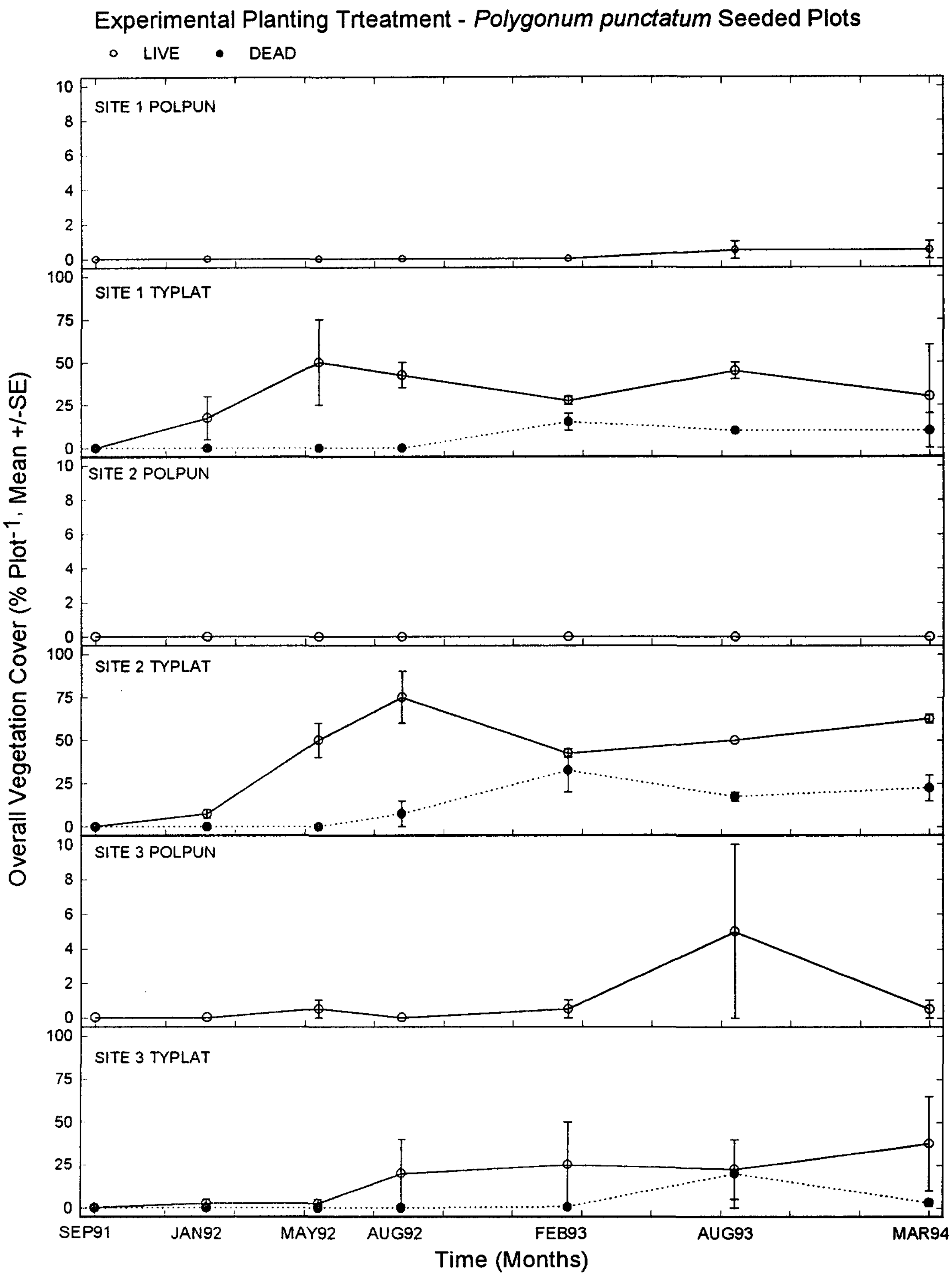


Figure 36. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Polygonum punctatum* and *Typha latifolia* from *Polygonum punctatum* Seeded Plots, Experimental Planting Sites.

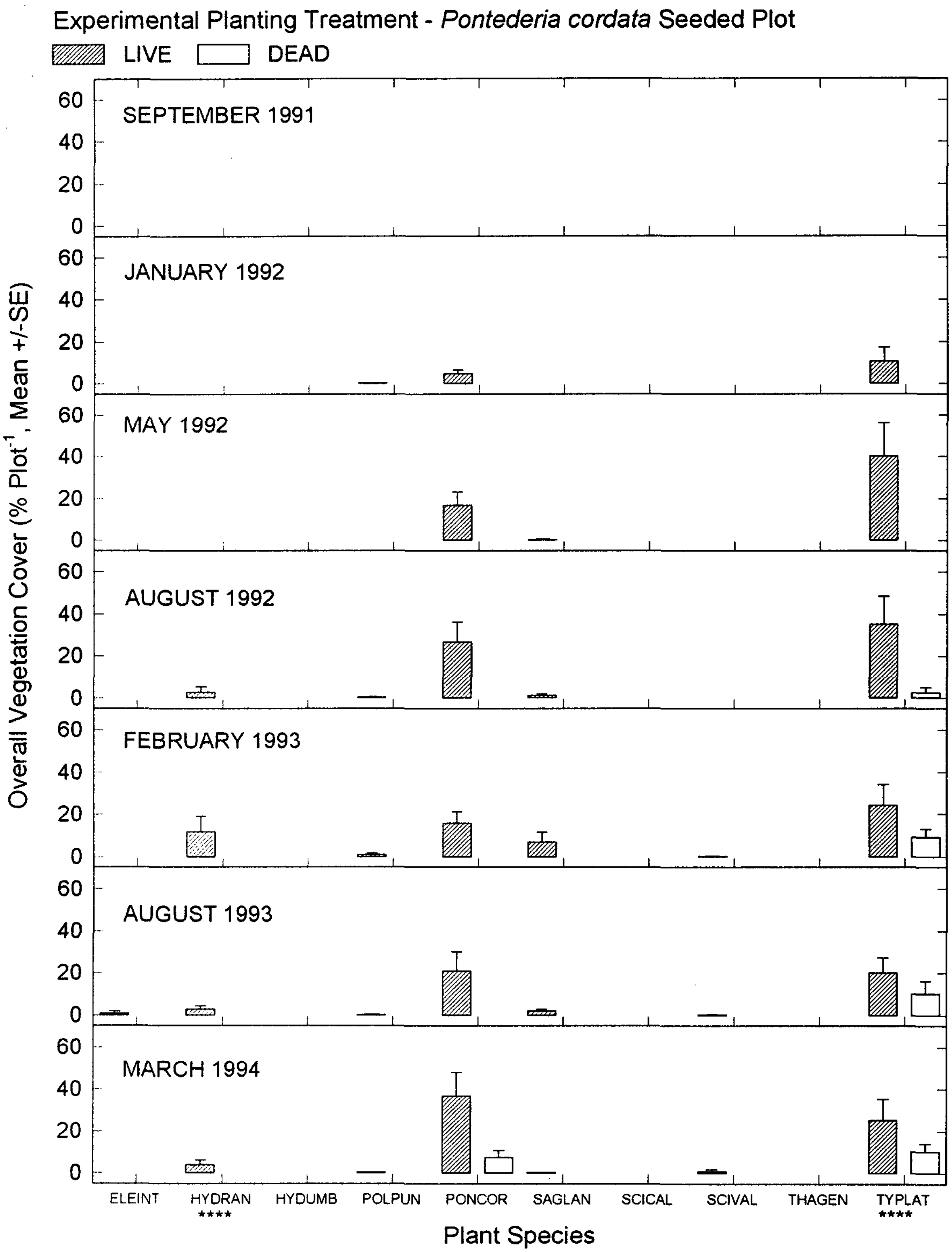


Figure 37. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from all (n=6) *Pontederia cordata* Seeded Plots, Experimental Planting Sites.

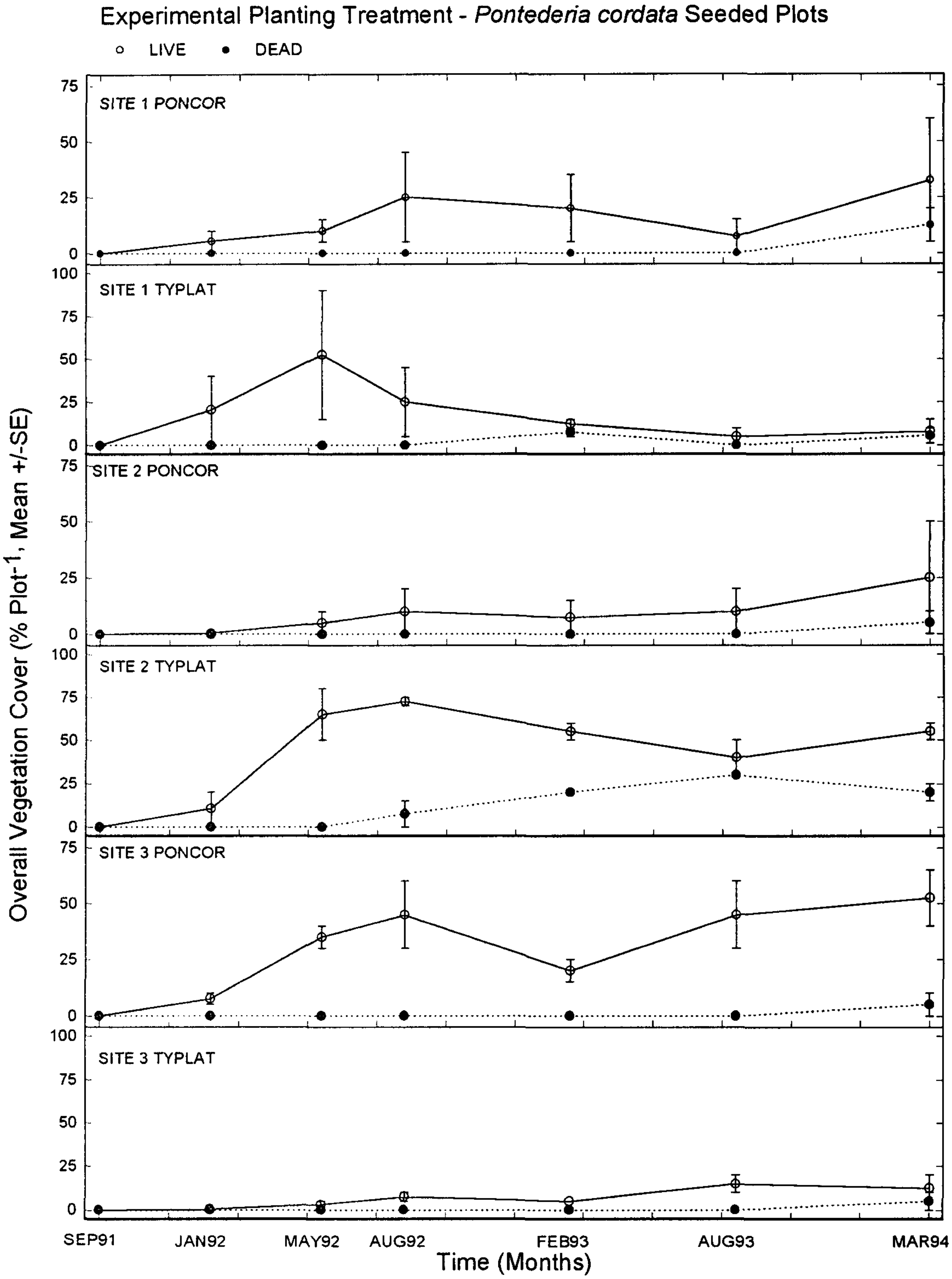


Figure 38. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Pontederia cordata* and *Typha latifolia* from *Pontederia cordata* Seeded Plots, Experimental Planting Sites.

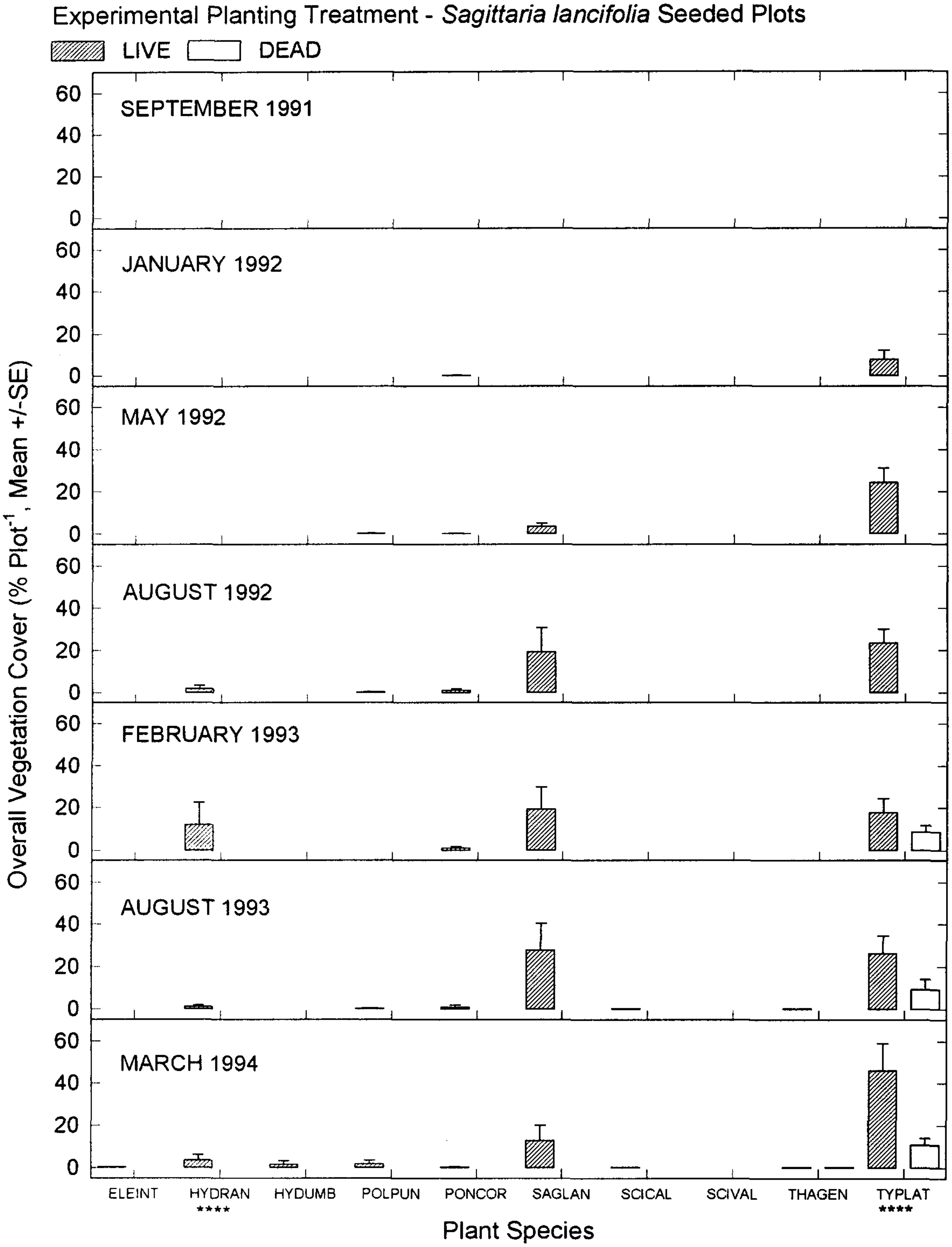


Figure 39. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from all (n=6) *Sagittaria lancifolia* Seeded Plots, Experimental Planting Sites.

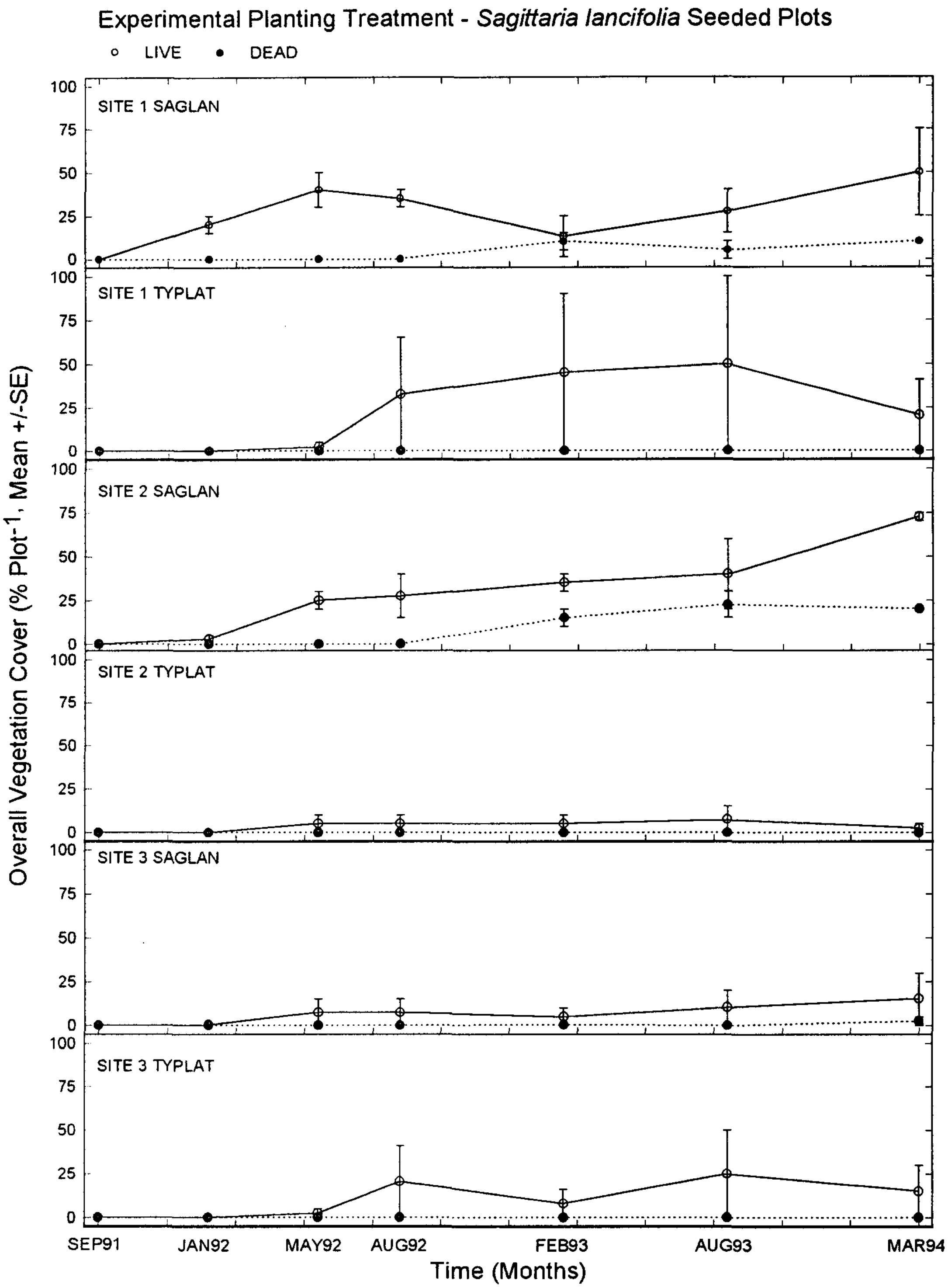


Figure 40. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Sagittaria lancifolia* and *Typha latifolia* from *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites.

Scirpus validus. *Scirpus validus* was found at low cover values and was largely unsuccessful. Other species including, *Hydrocotyle ranunculoides* invaded the plot. *Typha latifolia* colonized and dominated the site (Figures 41, 42, Appendix A1, A2).

Mulch Treatment -- Cover Percent

There was no evidence that the mulch treatment contributed additional plant species to the site. The treatment plots remained minimally vegetated during the early sampling events. Eventually, *Typha latifolia* became established and took over the plots. The seed bank measurements of 1991 and 1992 revealed that few if any seeds of species representing the donor wetland sites were found. In the 1991 seed bank sample, three individuals of *Xyris jupicai* and in the 1992 sample only one individual of *Rhexia nashii* were found. These species were never found on the site. The seed bank tests showed that *Typha latifolia* seemed to be preferentially favored by the mulch treatment. The magnitude of this contribution is unknown given the seemingly slow invasion of *Typha latifolia* under long-term flooded conditions (Figures 43, 44a, b, c).

Control Treatment -- Cover Percent

Vegetation dynamics within the control plots were different than the planted, seeded, or mulched treatment plots. The control plots remained minimally vegetated for most of the sample period. Early in the sample period floating plants were the most frequently found species (Figures 45, 46a, b, c). Slowly the sites were colonized by *Hydrocotyle ranunculoides* and *Typha latifolia* (Figures 45, 46a, b, c). Small patches of

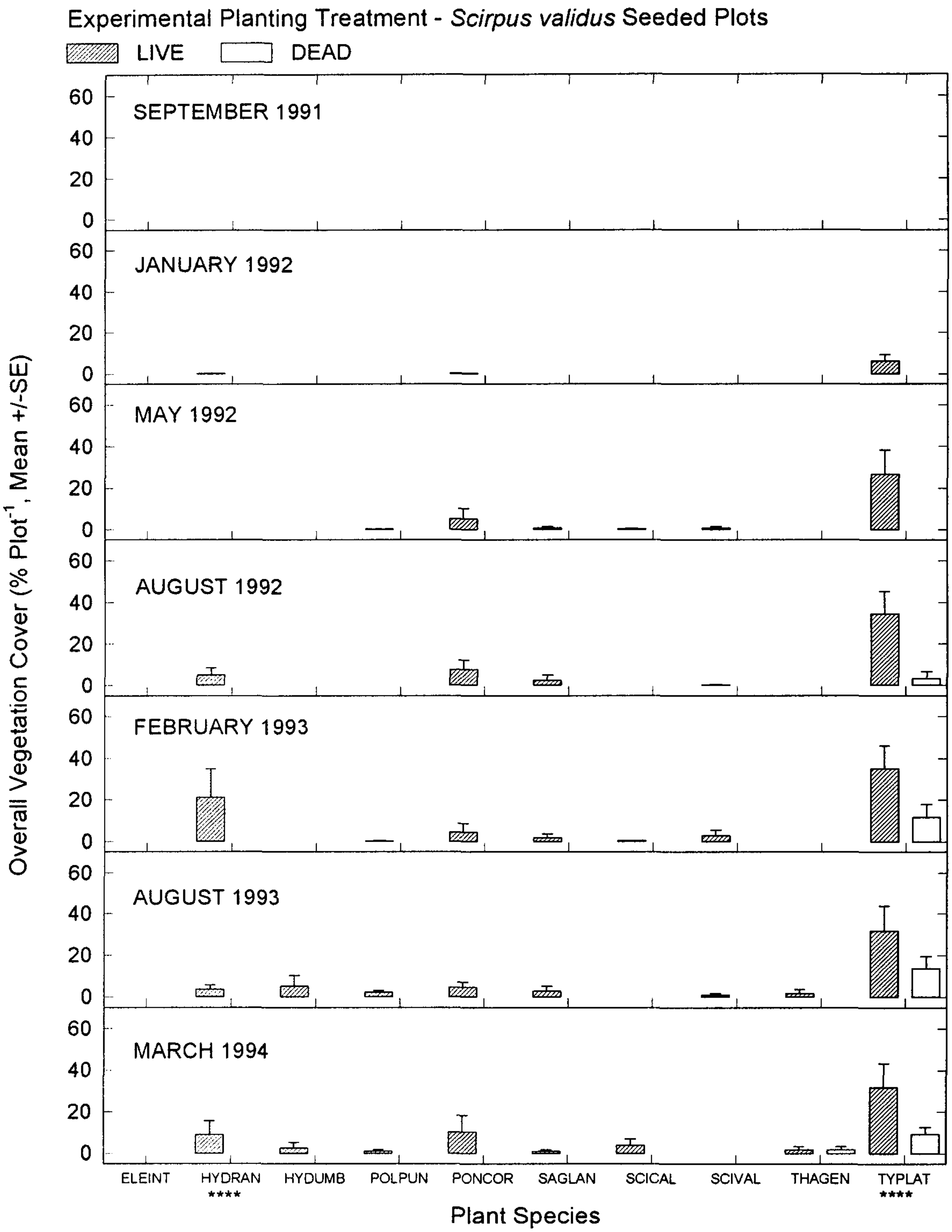


Figure 41. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from all (n=6) *Scirpus validus* Seeded Plots, Experimental Planting Sites.

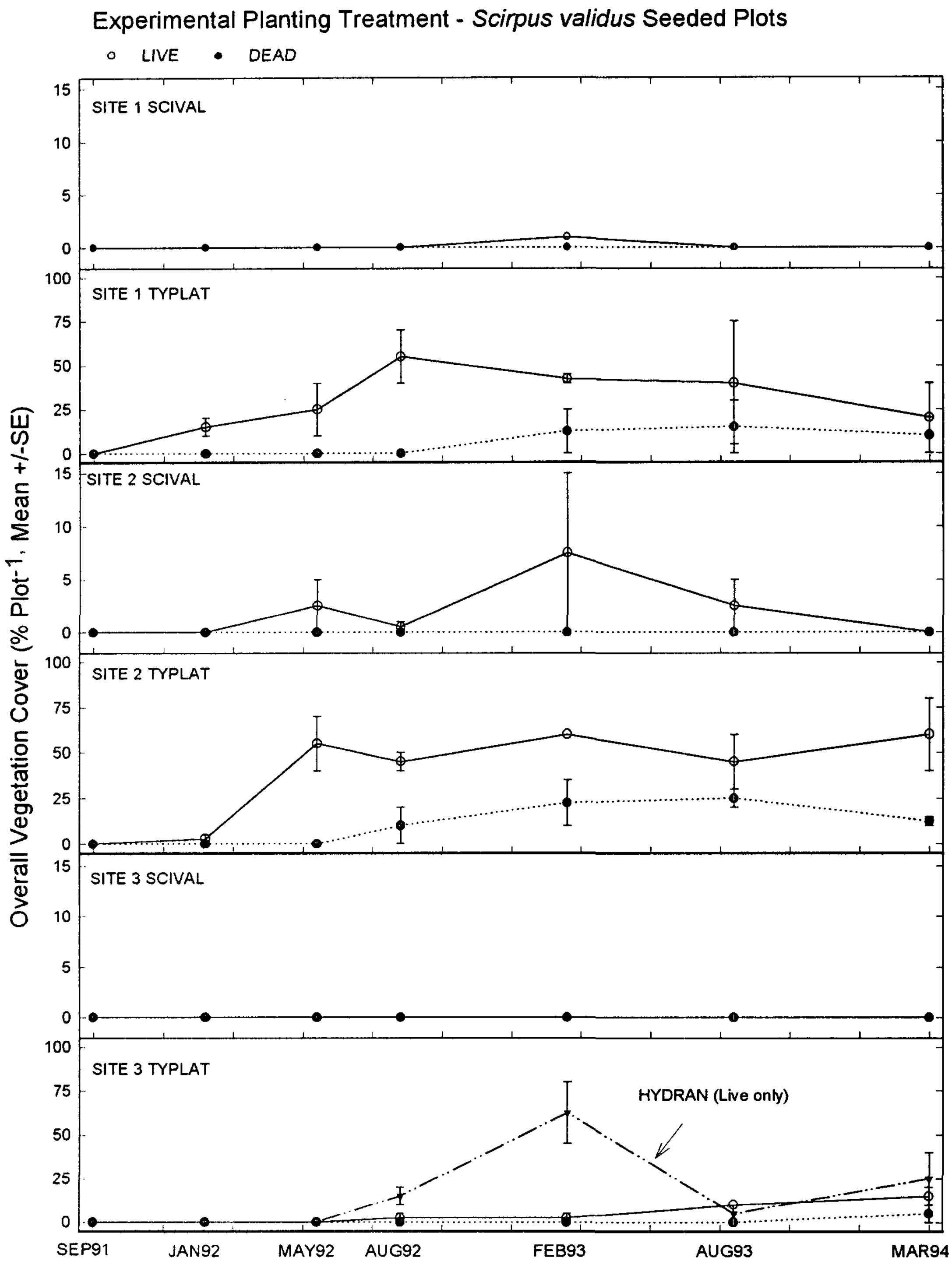


Figure 42. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of *Hydrocotyle ranuculoides* (Site 3 only), *Scirpus validus* and *Typha latifolia* from *Scirpus validus* Seeded Plots, Experimental Planting Sites.

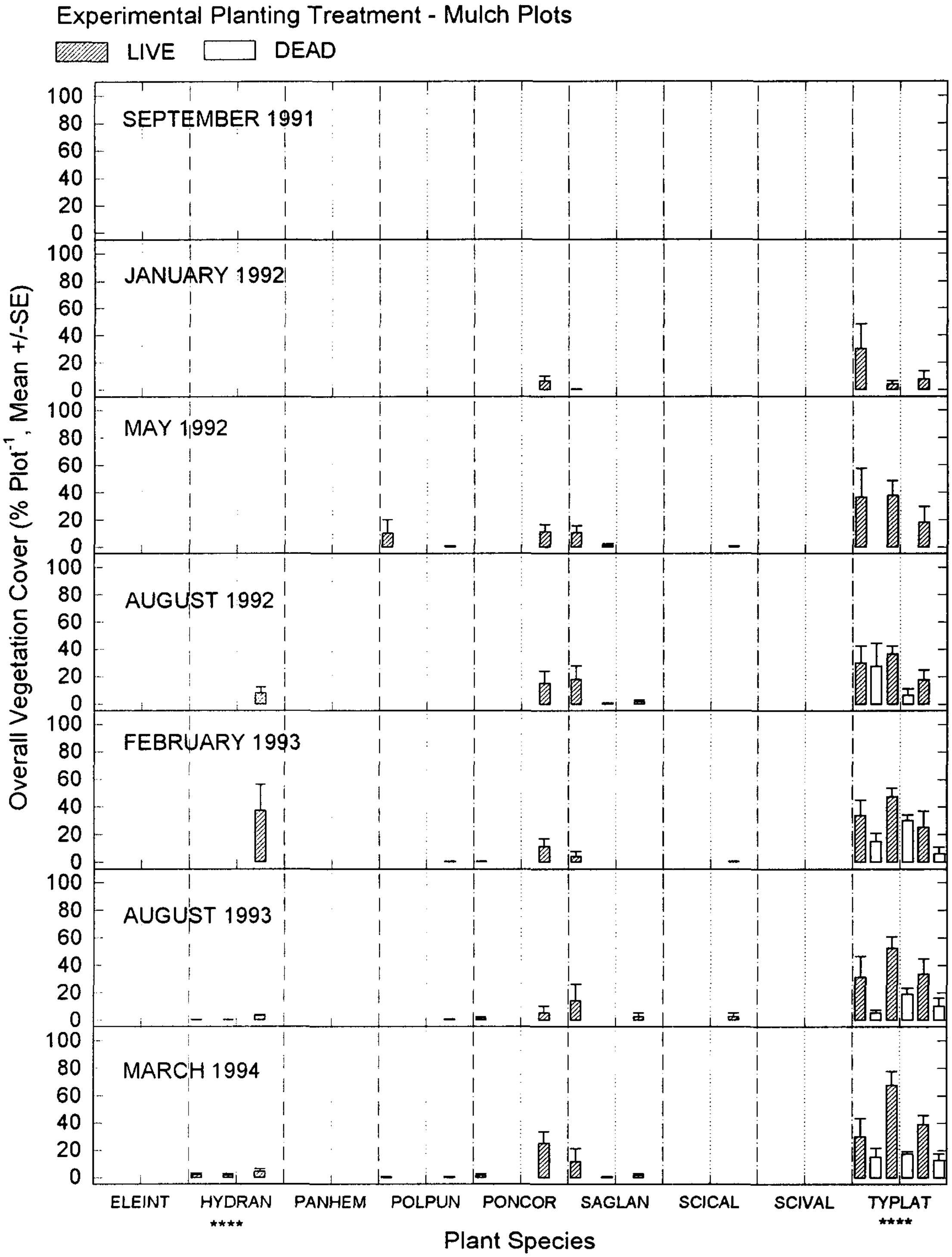


Figure 43. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from Mulch Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

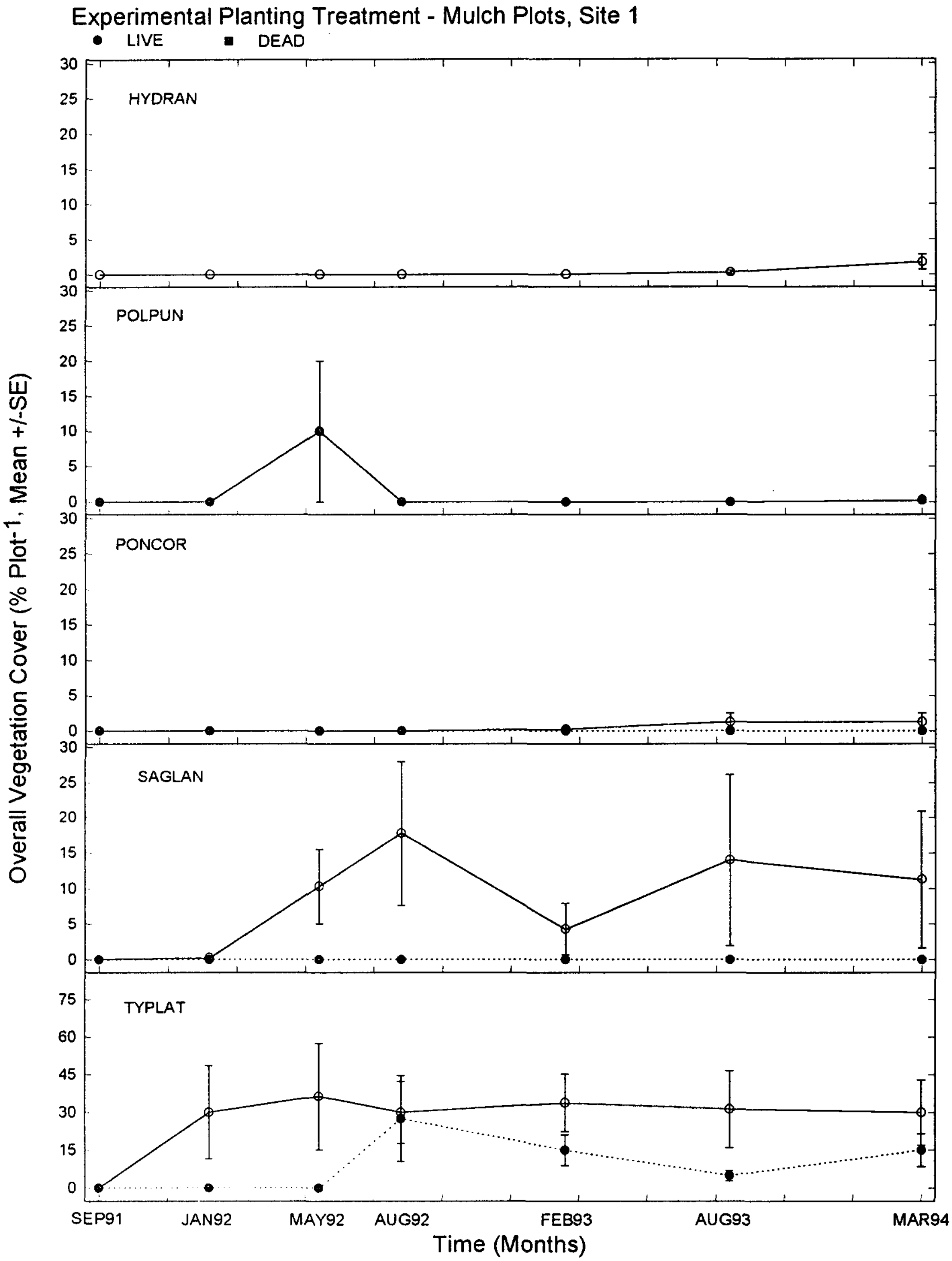


Figure 44a. Time series of overall vegetation cover (% $Plot^{-1}$, Mean ±SE) of common species from Mulch Plots, Site 1, Experimental Planting Sites.

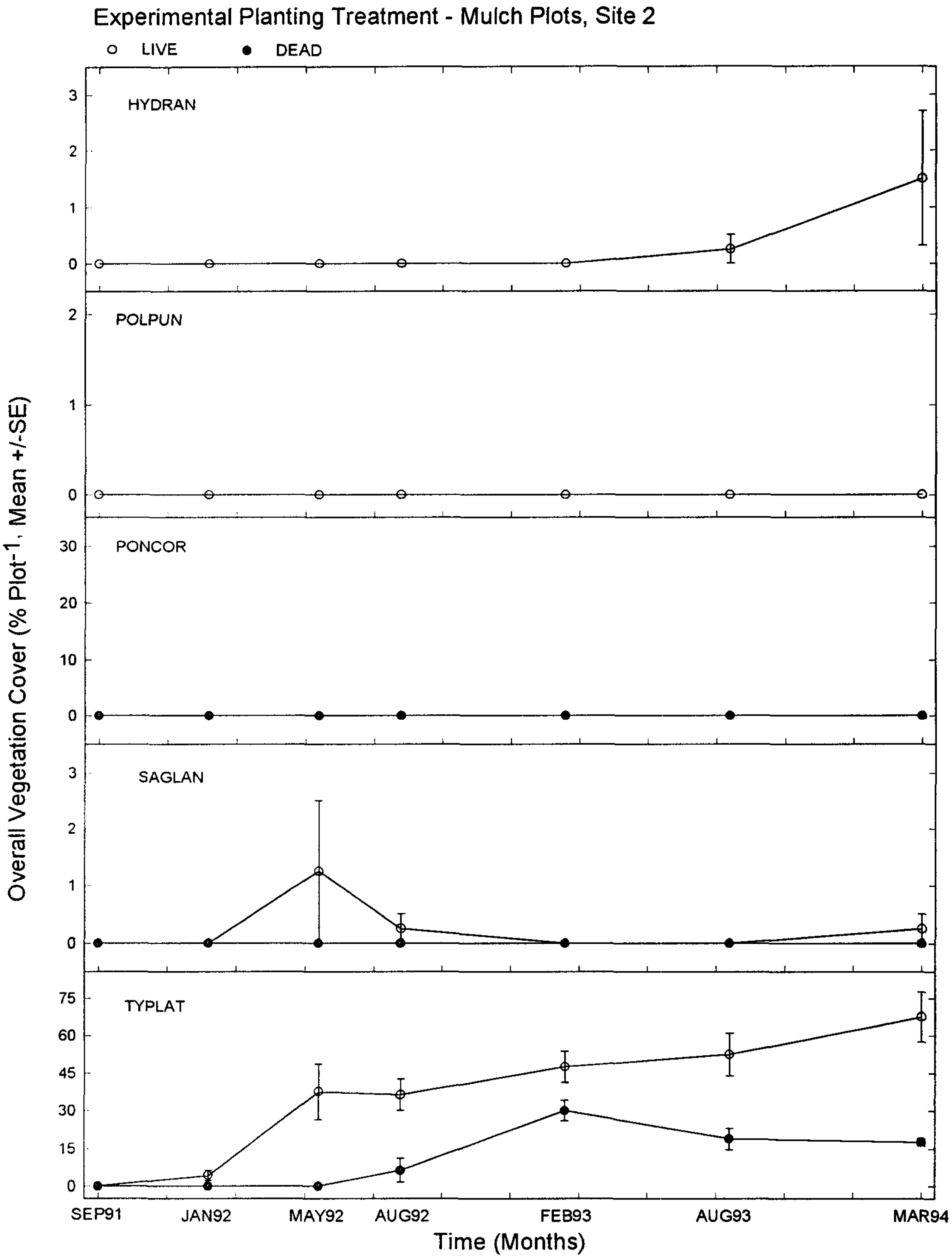


Figure 44b. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Mulch Plots, Site 2, Experimental Planting Sites.

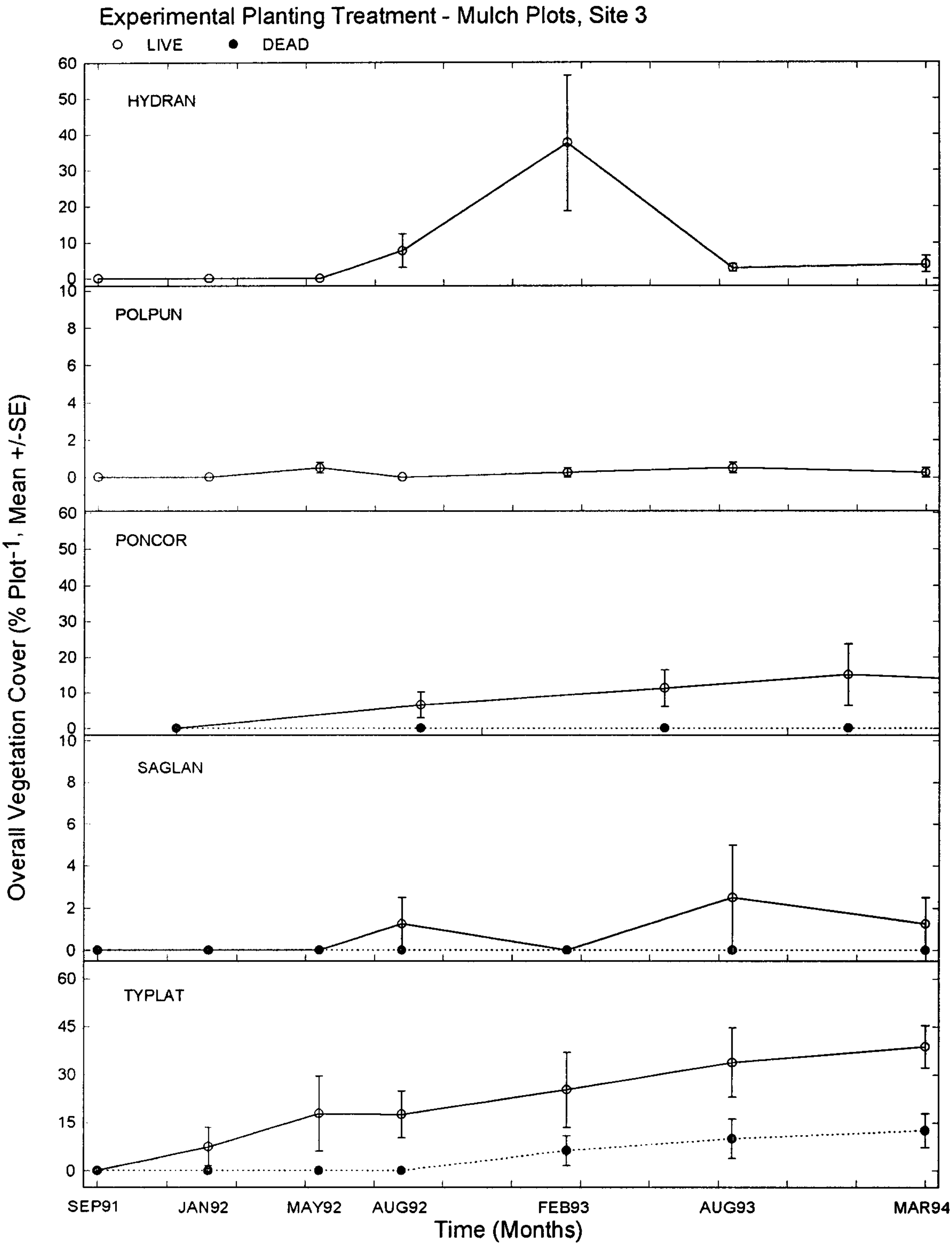


Figure 44c. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Mulch Plots, Site 3, Experimental Planting Sites.

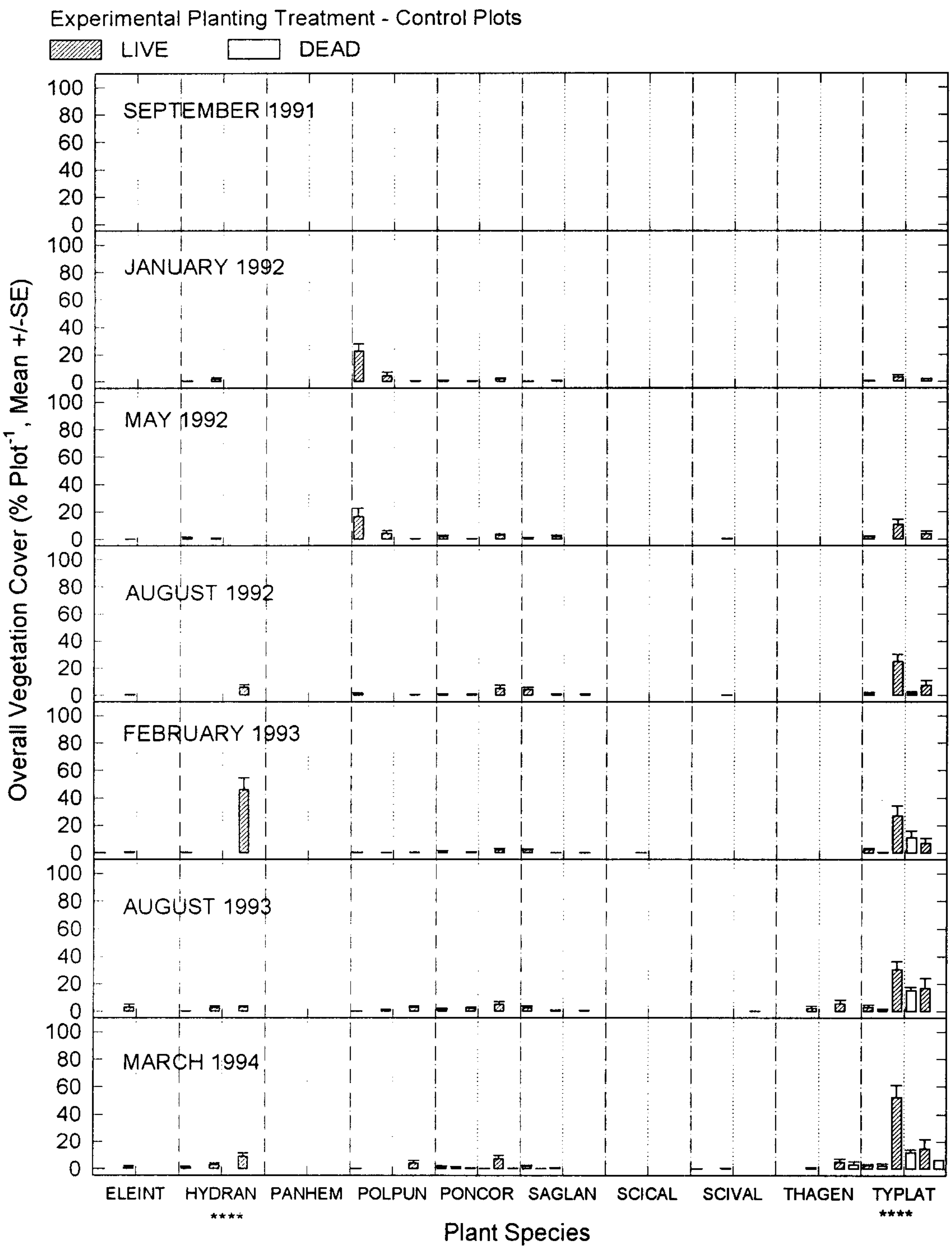


Figure 45. Overall vegetation cover (% Plot^{-1}, Mean ±SE) from Control Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines, a dotted vertical line bisects site 2 bars.

Experimental Planting Treatment - Control Plots, Site 1

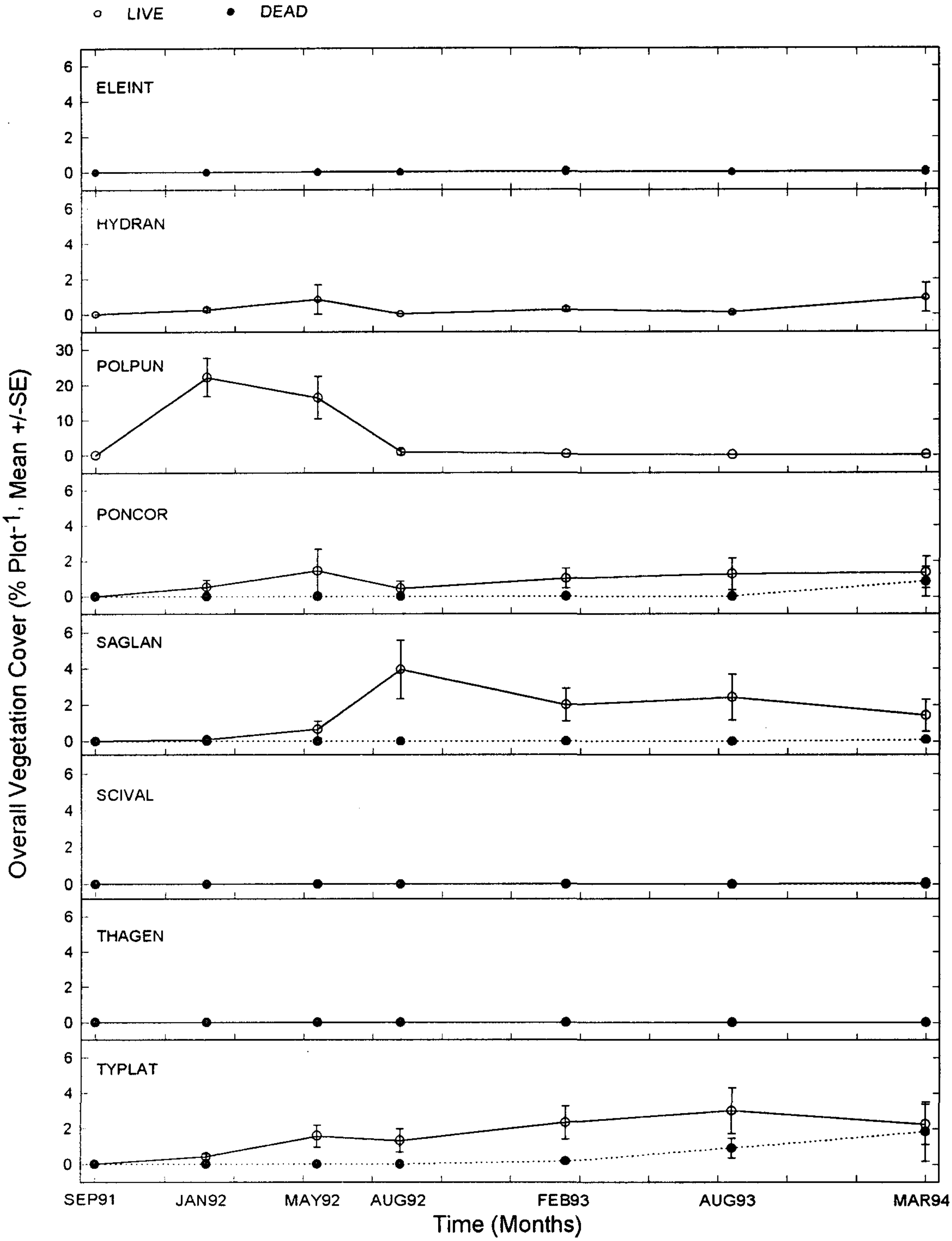


Figure 46a. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Control Plots, Site 1, Experimental Planting Sites.

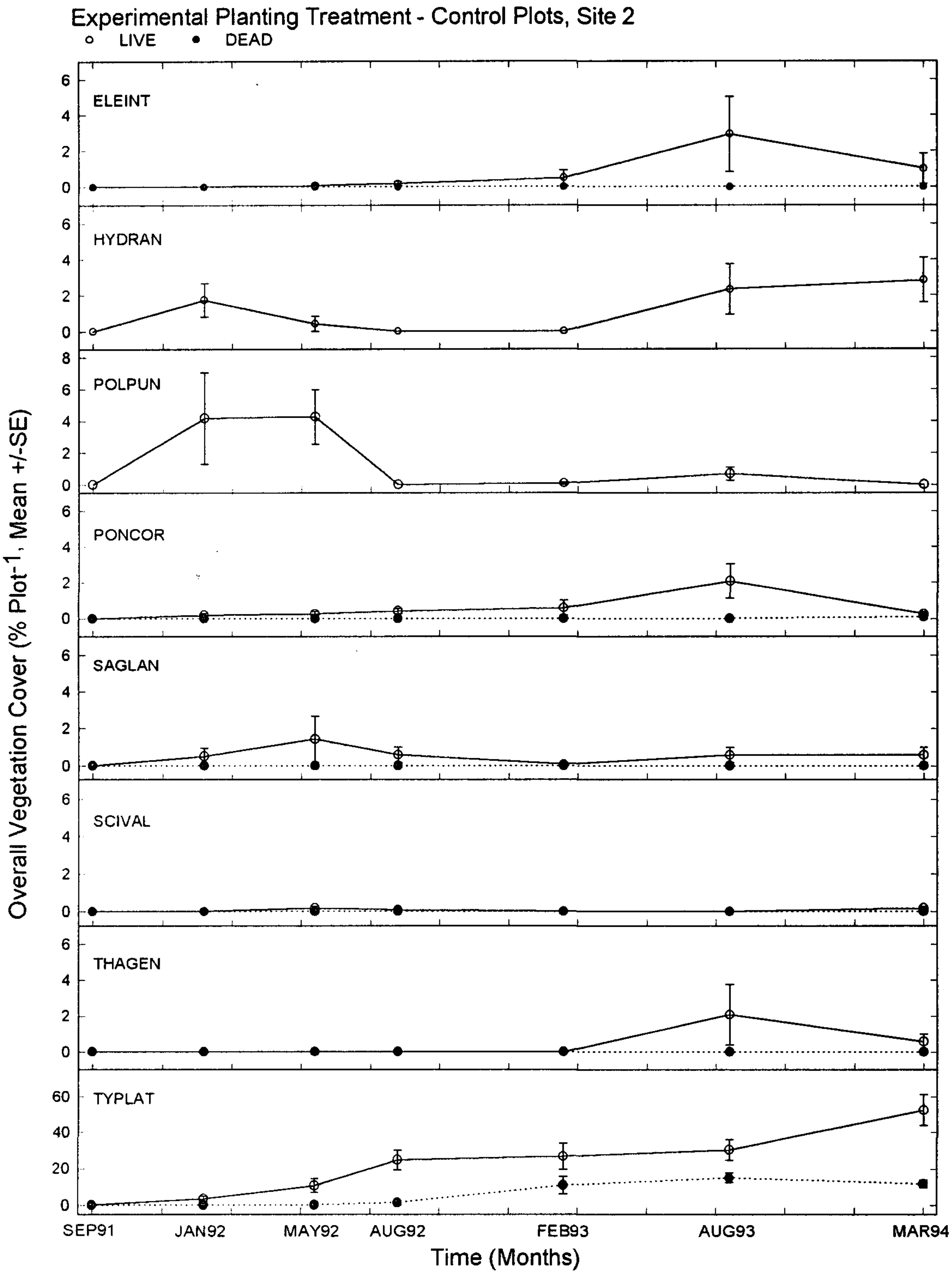


Figure 46b. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Control Plots, Site 2, Experimental Planting Sites.

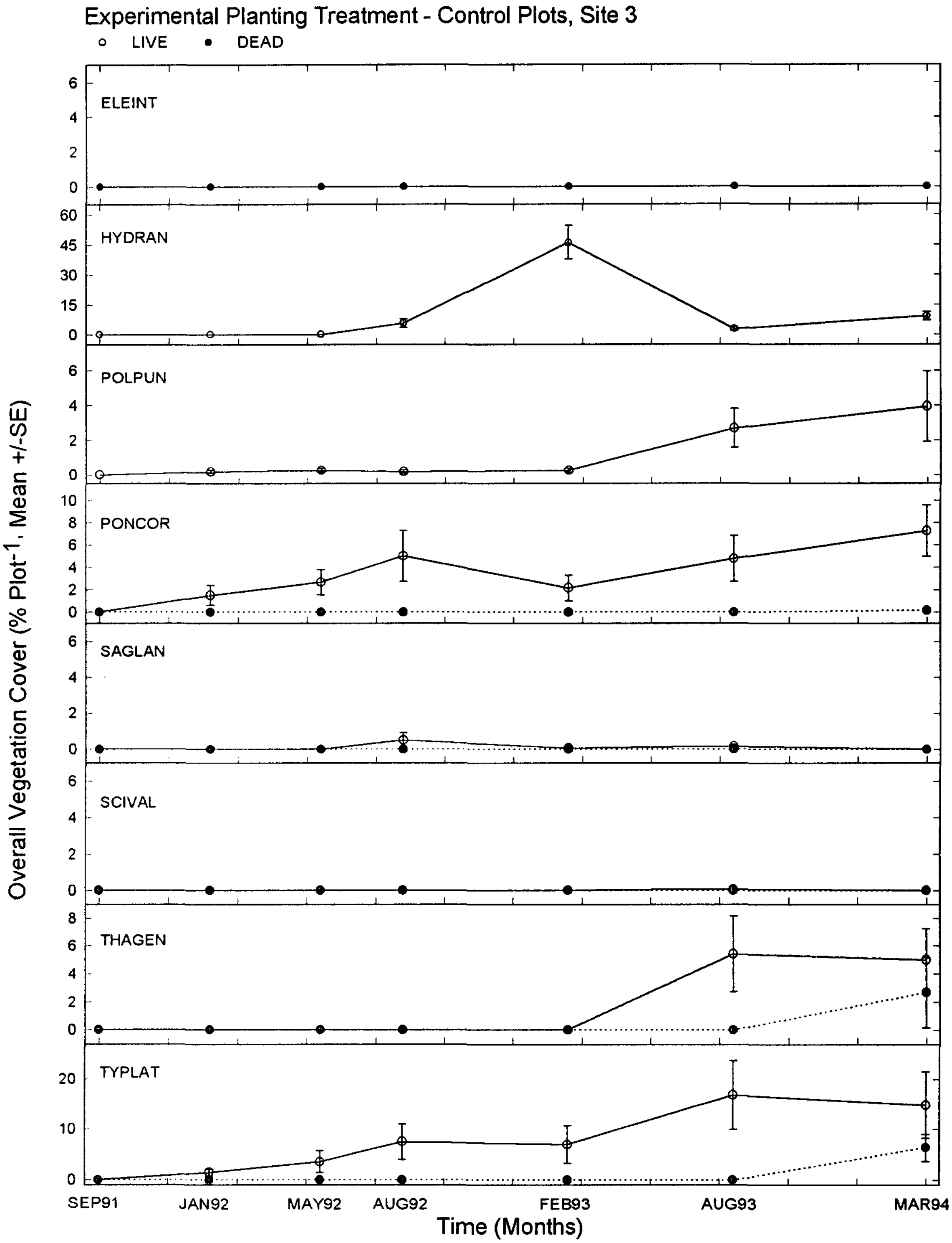


Figure 46c. Time series of overall vegetation cover (% Plot^{-1}, Mean ±SE) of common species from Control Plots, Site 3, Experimental Planting Sites.

Pontederia cordata and *Sagittaria lancifolia* were also found. After the drawdowns of August 1993 and March 1994, species richness increased and included a short-term colonization by species that had been found during earlier samples, including *Cyperus iria*, *Echinochloa colonum*, and *Panicum dichotomiflorum*. Eventually, these species declined or were found only on floating mats.

Subplot Cover and Water Depth

Time series plots of vegetation cover and water depth for each planted treatment revealed that cover seemed to change independently of water depth (Figures 47 -52). A pattern of cover dominance oscillating between live and dead developed as the community matured (Figures 47-52). A decline in live cover is probably coincident with normal winter biomass dynamics.

Planting Site -- Density

Stem densities within planted plots were similar to cover with dominant species yielding the largest density estimates (Table 13 and Figures 53-59). The control, mulch and seeded plots were eventually dominated by *Typha latifolia* (Appendix A3).

The *Eleocharis interstincta* planting treatment had a pattern of low densities of observable plants early in the sampling followed by increases over time. During January 1992, stem density at Site 3 jumped to nearly 100 stems m^{-2} while densities at Sites 1 and 2 remained low near 10 stems m^{-2}. Stem densities became somewhat more similar among sites as time progressed, with peak densities reaching 150 stems m^{-2} (Site 2) to

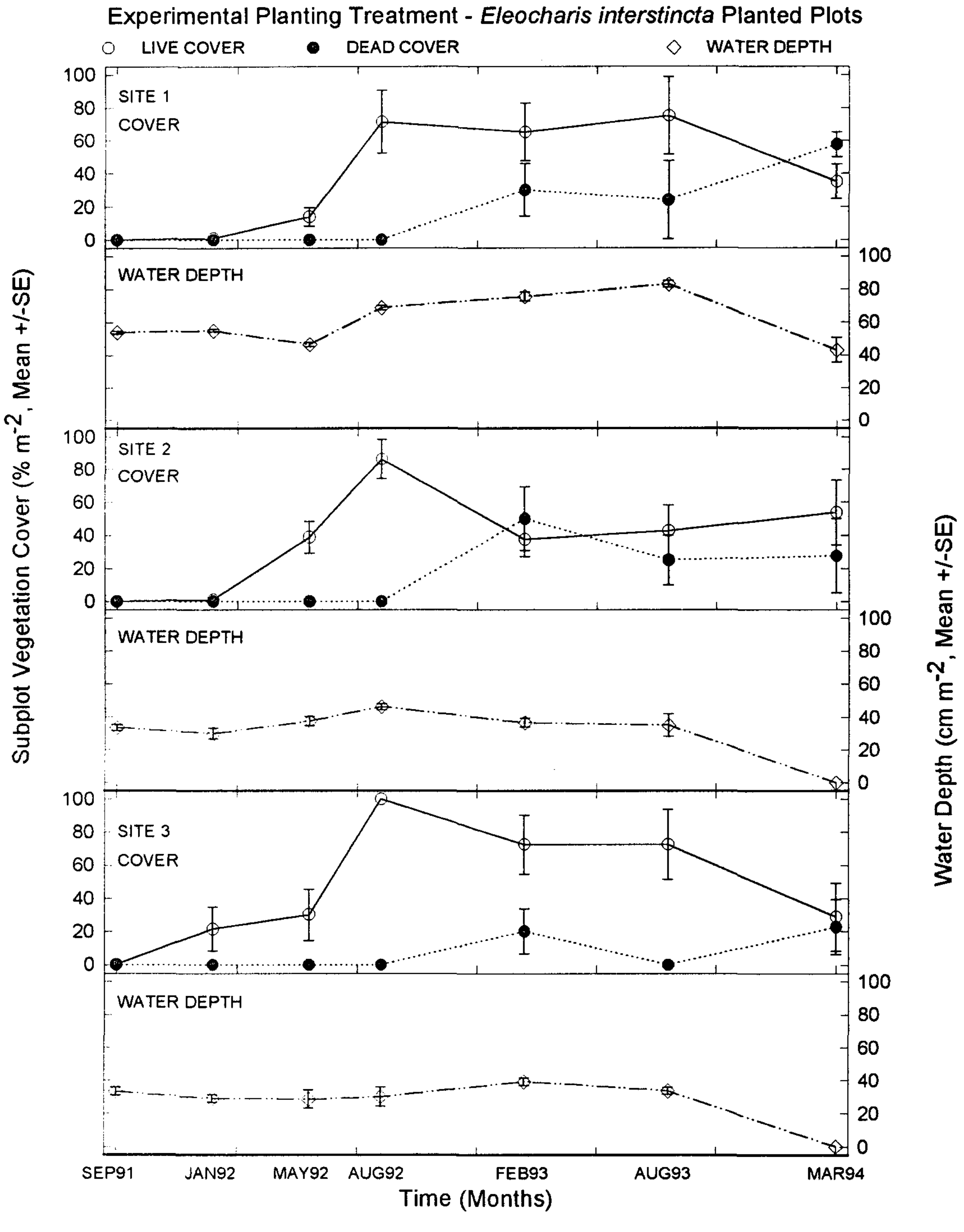


Figure 47. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from subplots in *Eleocharis interstincta* single species planted plots, Experimental Planting Sites.

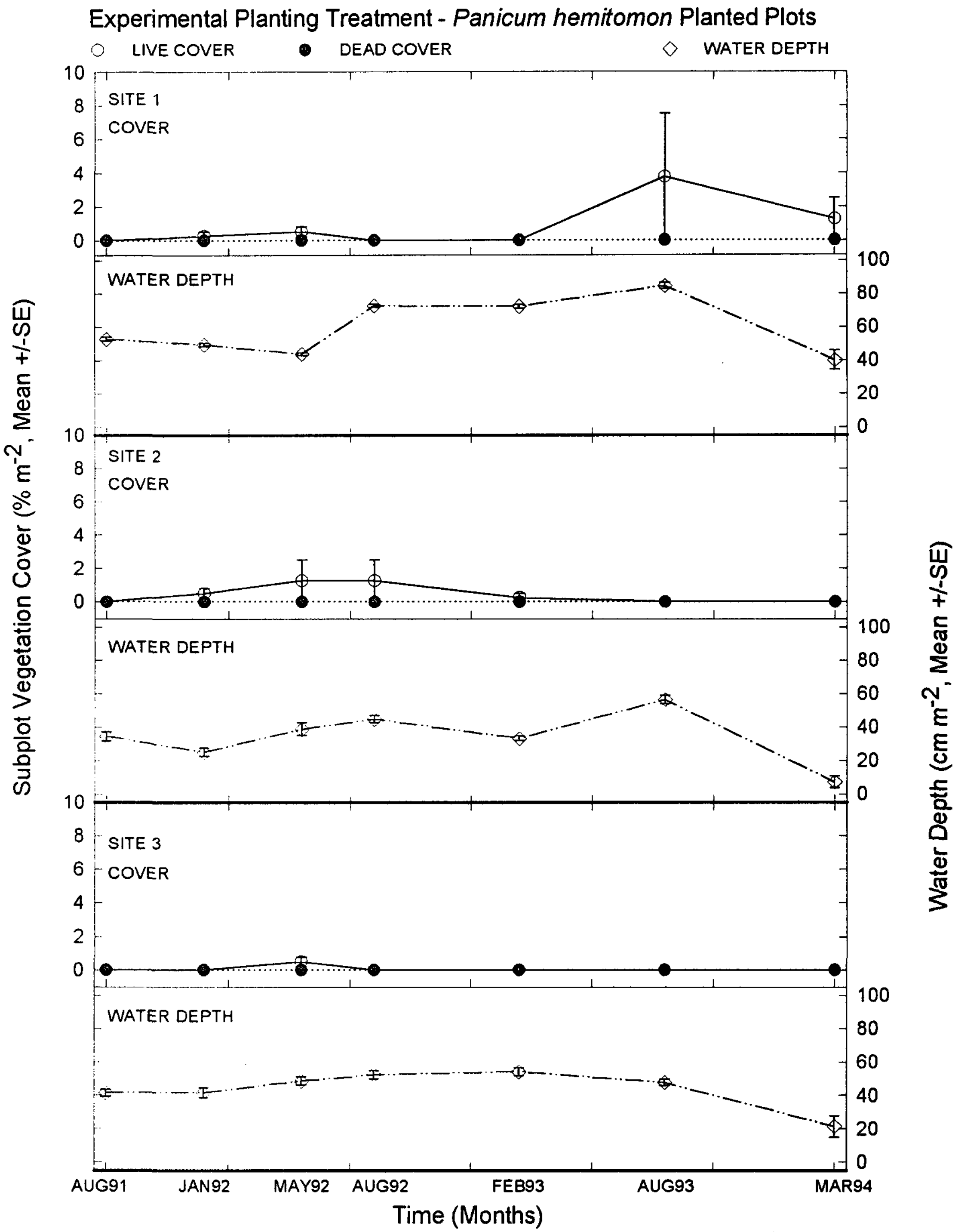


Figure 48. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from subplots in *Panicum hemitomon* single species planted plots, Experimental Planting Sites.

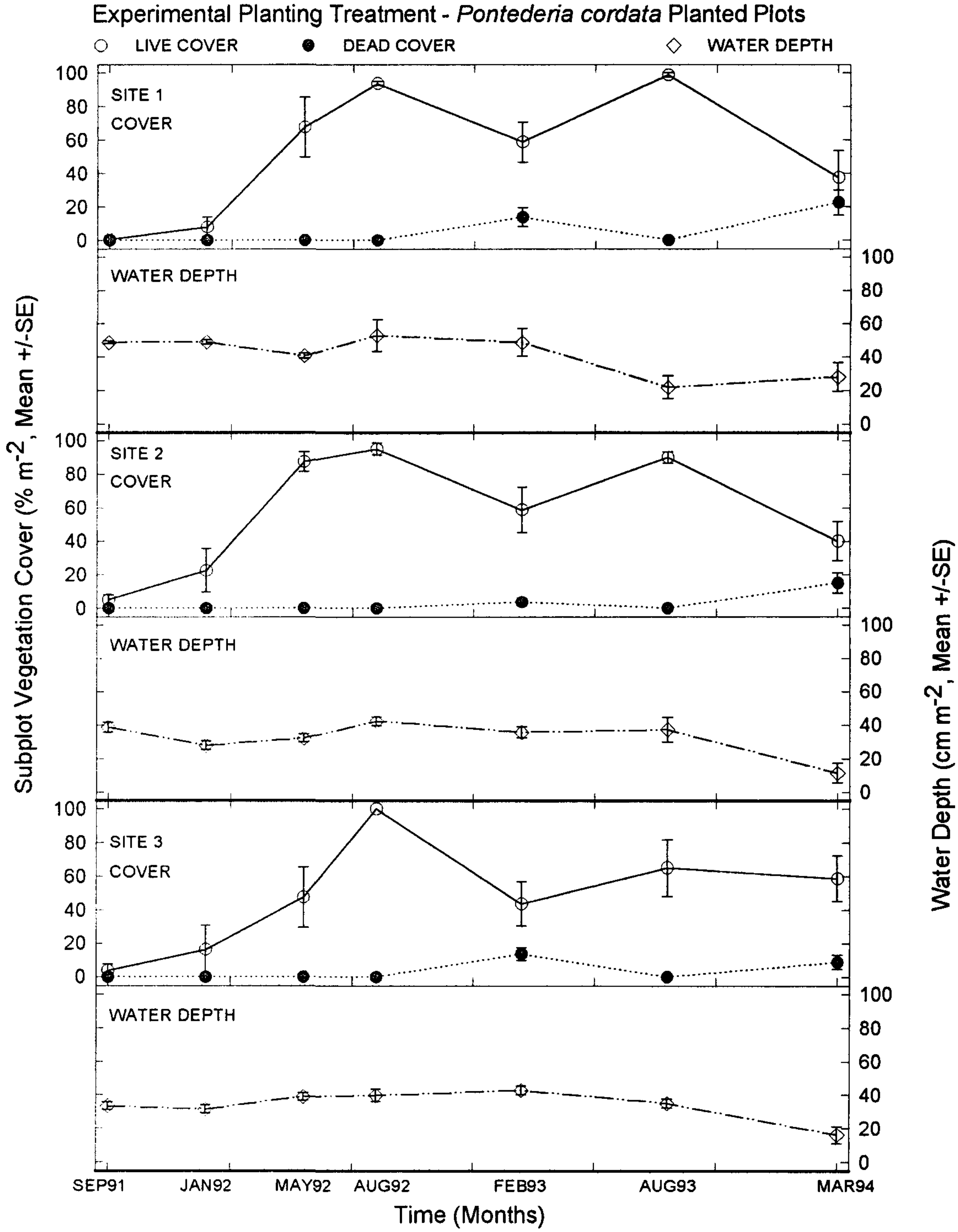


Figure 49. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from *Pontederia cordata* single species planted plots, Experimental Planting Sites.

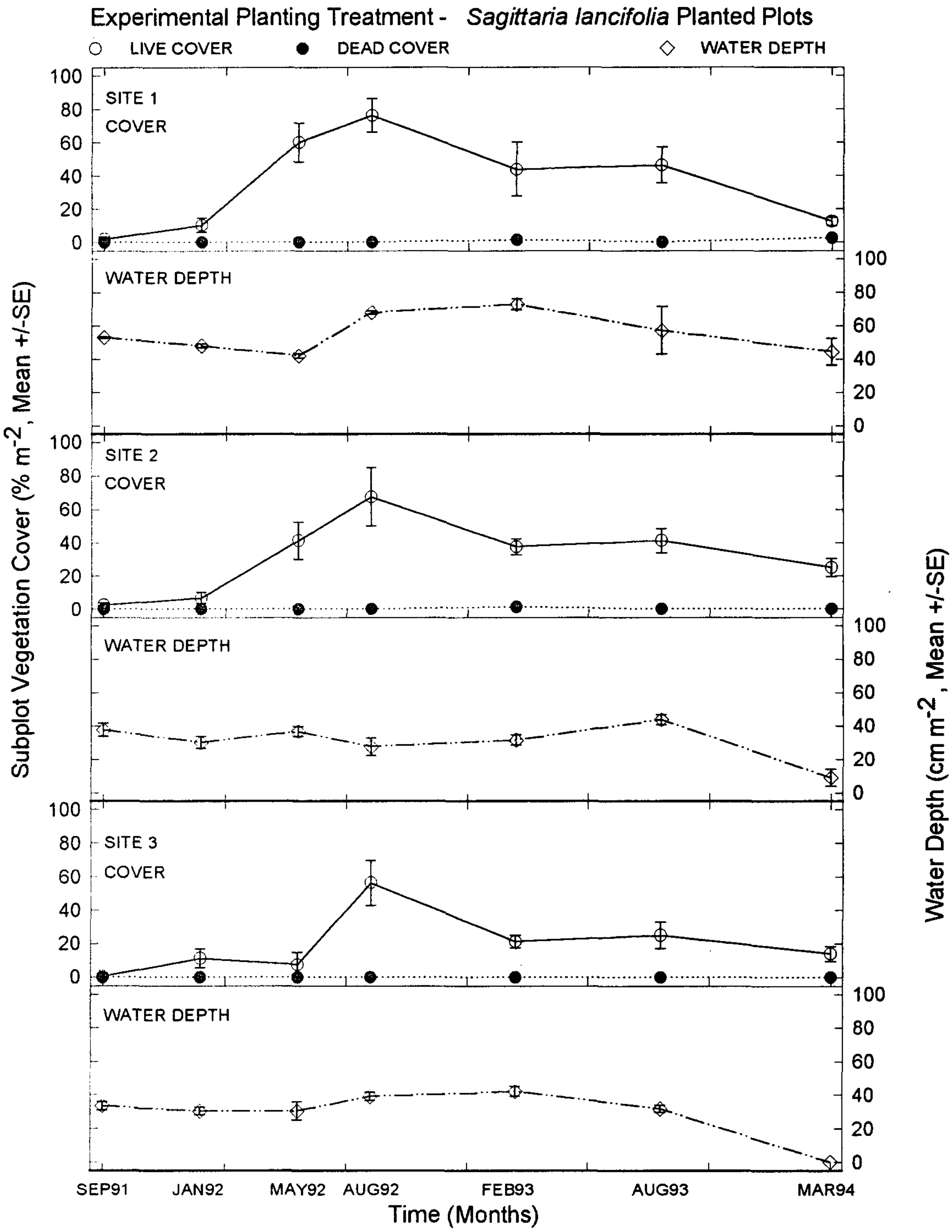


Figure 50. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from *Sagittaria lancifolia* single species planted plots, Experimental Planting Sites.

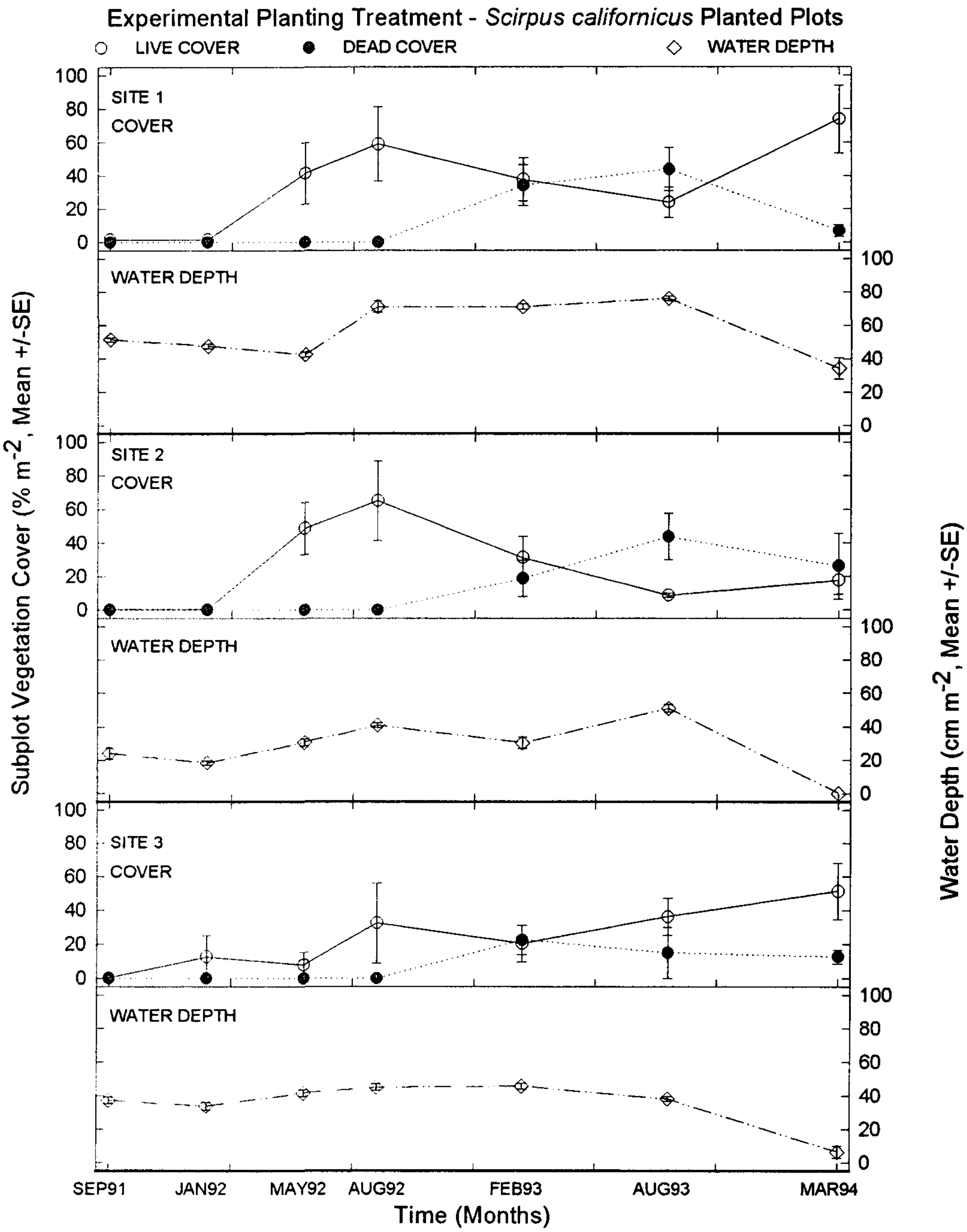


Figure 51. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from *Scirpus californicus* single species planted plots, Experimental Planting Sites.

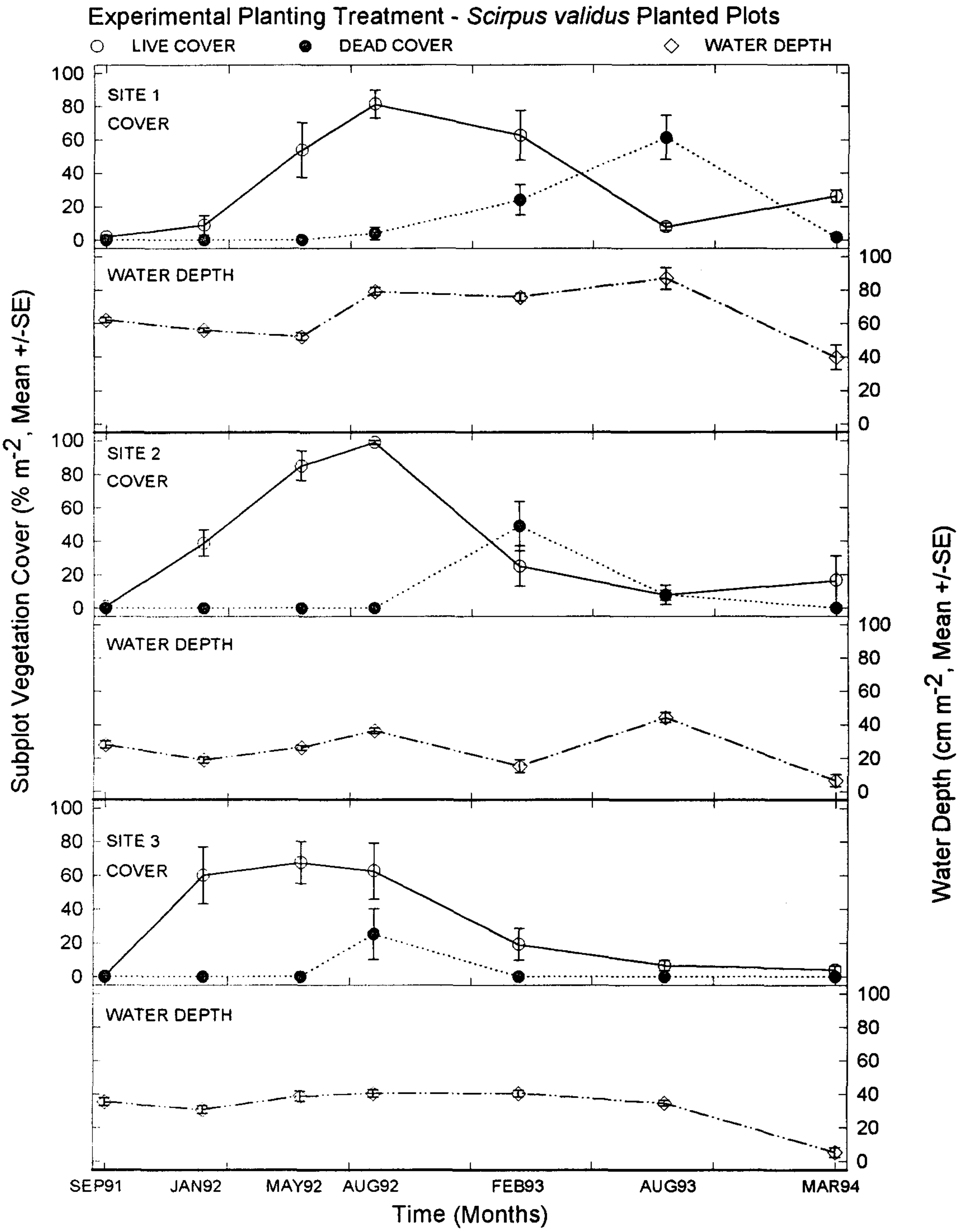


Figure 52. Time series of vegetation cover (% m^{-2}) and water depth (cm m^{-2}) from *Scirpus validus* single species planted plots, Experimental Planting Sites.

375 stems m^{-2} (Site 1). Through most of the sample set, Sites 1 and 3 had similar density patterns, while Site 2 remained at a lower level until March 1994 when the densities were reduced at Sites 1 and 3. Invading species did not root successfully in the plots (Figure 53, Table 13).

Stem densities in the *Panicum hemitomon* planting treatment remained low for most of the sample period. Except for Site 2 this species had little vegetative growth through most of the sample period. *Panicum hemitomon* was present at low density until it peaked at 4.5 stems m^{-2} at Site 2 in August 1993. The density of invading *Eleocharis interstincta* and *Typha latifolia* increased, primarily at Site 2 beginning in February 1993 (Figure 54, Table 13).

Pontederia cordata culms were found at low densities in the *Pontederia cordata* treatments during the first sample period. Culm densities approached a maximum (20-32 stems m^{-2}) by the August 1993 sample period. During the sample periods densities varied from 10-30 stems m^{-2}. Invading species entered at different times for two of the sites (Figure 55, Table 13). Site 2 was invaded by *Scirpus californicus* and *Typha latifolia* in May 1992 and by *Eleocharis interstincta* in August 1993. Site 3 was invaded by *T. latifolia* in February 1993.

In the *Sagittaria latifolia* plots, density peaked at Sites 1 (45 m^{-2}; May 1992), Site 2 (15 m^{-2}; August 1993), and 3 (12 m^{-2}; February 1993). The density levels changed from sample to sample suggesting a high turnover of culms by this target species (Figure 56). The competitor species *Typha latifolia* gradually increased its density over time with a peak at the March 1994 Site 2 sample (8 m^{-2}). It wasn't until March 1994 that *T.*

Table 13. Vegetation density measurements (# m^{-2} MEAN ±SE) from subplots in planted plots, Experimental Planting Sites. Species Codes: Upper case six character are abbreviated species codes. Lower case codes represent plant families or unknowns. Codes ending with D represent dead, while S represent seedlings.

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
AUGUST 1991 SITE 1														
PONCOR	.	.	.	.	0.50	0.29	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	2.25	1.03	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	1.25	0.95	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	1.00	0.71	.	.
AUGUST 1991 SITE 2														
ALTPHI	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
AMMAUS	.	.	.	.	0.25	0.25	0.50	0.50	0.50	0.29	1.50	1.50	.	.
ASTSUB	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
CYPIRI	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
ECHCOL	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	.	.	.	.	0.25	0.25	0.25	0.25	.	.
Poaceae	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
PONCOR	.	.	.	.	1.75	1.03	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	0.75	0.48	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
SCIVAL	.	.	.	.	.	.	.	.	.	.	1.25	0.25	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
AUGUST 1991 SITE 3														
AMMAUS	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
ELEINT	0.75	0.48	.	.	.	.	.	.	.	.	.	.	0.50	0.29
PONCOR	.	.	.	.	1.50	1.50	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	1.25	0.95	.	.	.	.	.	.
SALCAR	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	0.50	0.50	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	1.50	0.65	.	.
JANUARY 1992 SITE 1														
ALTPHI	.	.	.	.	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ELEINT	3.50	2.18	.	.	.	.	.	.	.	.	.	.	1.25	0.95
PANHEM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
POLPUN	0.25	0.25	.	.	.	.	.	.	0.75	0.75	0.25	0.25	.	.
PONCOR	.	.	.	.	1.75	0.25	.	.	.	.	.	.	0.25	0.25
SAGLAN	.	.	.	.	.	.	2.75	0.25	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	5.00	5.00	.	.	0.25	0.25
SCIVAL	.	.	.	.	.	.	.	.	0.50	0.50	3.25	2.93	.	.
TYPLAT	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
JANUARY 1992	SITE 2													
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	5.50	1.94	.	.	.	.	.	.	.	.	.	.	.	.
LUDPAL	0.50	0.50	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.50	0.29	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	11.75	10.44	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	10.25	5.45	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	5.75	5.11	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
SCIVAL	.	.	.	.	.	.	.	.	0.25	0.25	43.00	4.14	10.00	5.83
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	4.25	3.92
TYPLAT	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.	.	.
JANUARY 1992	SITE 3													
ALTPHI	0.50	0.29	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	91.25	54.84	.	.	.	.	.	.	.	.	1.50	1.50	17.00	9.82
LUDPAL	1.75	1.11	.	.	0.50	0.50	.	.	0.75	0.48	0.50	0.29	0.50	0.50
POLPUN	.	.	1.00	0.71	0.25	0.25	.	.	.	.	0.25	0.25	.	.
PONCOR	.	.	.	.	3.00	2.38	0.25	0.25	.	.	.	.	0.50	0.29
SAGMON	.	.	.	.	.	.	2.00	0.91	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	11.25	11.25	.	.	.	.
SCIVAL	.	.	.	.	.	.	1.00	1.00	.	.	77.25	24.67	6.75	6.75
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.29
TYPLAT	0.75	0.48	.	.	.	.	.	.	.	.	.	.	.	.
MAY 1992	SITE 1													
ALTPHI	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEINT	67.00	22.66	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
POLPUN	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	14.25	2.95	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	45.25	16.86	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	33.00	15.15	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	44.50	13.05	.	.

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
TYPLAT	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
MAY 1992	SITE 2													
ALTPHI	0.25	0.25	.	.	.	.	0.25	0.25	.	.	0.50	0.29	.	.
ELEINT	43.50	25.67	.	.	.	.	.	.	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.75	0.75
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
POLPUN	.	.	.	.	.	.	.	.	.	.	0.25	0.25	.	.
PONCOR	.	.	.	.	12.50	3.69	.	.	.	.	.	.	0.75	0.48
SAGLAN	.	.	.	.	.	.	15.00	9.87	.	.	.	.	0.50	0.50
SCICAL	.	.	.	.	1.00	1.00	.	.	42.50	13.62	.	.	17.25	17.25
SCIVAL	0.75	0.75	.	.	.	.	.	.	.	.	97.50	45.48	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	1.00	0.41
TYPLAT	0.50	0.29	0.50	0.50	1.25	0.95	.	.	.	.	.	.	.	.
MAY 1992	SITE 3													
ALTPHI	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	2.00	2.00	.	.	.	.
ELEINT	74.75	9.53	.	.	.	.	.	.	.	.	.	.	42.50	25.29
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	16.00	16.00
PANHEM	.	.	1.00	0.71	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	23.50	5.78	6.25	6.25	.	.	.	.	1.75	1.03
SAGLAN	.	.	.	.	.	.	7.00	7.00	.	.	.	.	1.00	1.00
SAGMON	.	.	.	.	.	.	2.75	2.75	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	23.00	14.11	10.00	10.00	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	67.75	12.91	8.50	8.50
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	1.75	1.75
TYPLAT	2.00	1.41	.	.	.	.	.	.	.	.	.	.	.	.
AUGUST 1992	SITE 1													
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	341.75	121.40	.	.	.	.	.	.	.	.	.	.	87.50	51.54
PONCOR	.	.	.	.	8.75	3.09	.	.	.	.	.	.	1.25	0.95
SAGLAN	.	.	.	.	.	.	7.75	2.10	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	64.50	27.38	.	.	.	.
SCIVAL	.	.	.	.	.	.	1.00	1.00	.	.	215.00	46.99	1.25	1.25
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	1.25	0.75
TYPLAT	.	.	.	.	.	.	1.25	1.25	.	.	.	.	1.50	1.50
SCIVALD	.	.	.	.	.	.	.	.	.	.	6.50	6.50	.	.
AUGUST 1992	SITE 2													

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	25.75	7.26	0.50	0.50	.	.	.	.	.	.	.	.	1.25	1.25
LUDLEP	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
PANHEM	.	.	1.50	1.50	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.75	0.75
PONCOR	.	.	.	.	21.75	2.90	.	.	.	.	.	.	2.25	2.25
SAGLAN	.	.	.	.	.	.	8.25	1.31	.	.	.	.	.	.
SCICAL	.	.	.	.	0.50	0.50	.	.	33.00	17.22	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	1.25	0.63	.	.	.	.
SCIVAL	0.25	0.25	.	.	.	.	.	.	46.75	46.75	26.75	3.01	4.75	2.50
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	3.50	2.02
TYPLAT	7.50	2.99	11.00	6.36	2.75	1.70	0.75	0.75	.	.	.	.	.	.
AUGUST 1992	SITE 3													
EICCRA	.	.	.	.	.	.	.	.	.	.	0.50	0.50	.	.
ELEINT	215.00	128.16	.	.	.	.	.	.	.	.	.	.	106.25	98.09
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
PONCOR	.	.	.	.	16.00	4.38	3.25	3.25	.	.	.	.	1.50	0.65
SAGLAN	.	.	.	.	.	.	4.50	0.87	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	24.00	10.26	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	5.00	5.00	74.00	45.30	24.00	24.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	1.00	0.41
TYPLAT	4.25	2.53	.	.	.	.	2.75	2.75	.	.	1.75	1.75	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	5.50	3.20	.	.
FEBRUARY 1993	SITE 1													
ELEINT	300.00	122.47	.	.	.	.	.	.	.	.	.	.	65.50	61.57
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.75	0.48
PONCOR	.	.	.	.	18.00	2.12	.	.	.	.	.	.	5.00	5.00
SAGLAN	.	.	.	.	.	.	11.75	1.25	.	.	.	.	0.25	0.25
SCICAL	.	.	.	.	.	.	.	.	50.00	28.87	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	19.00	12.01	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	5.00	2.89
TYPLAT	.	.	2.00	2.00	.	.	0.50	0.50	.	.	.	.	.	.
FEBRUARY 1993	SITE 2													
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	72.50	22.87	7.00	6.04	.	.	.	.	.	.	.	.	0.25	0.25
PANHEM	.	.	1.00	1.00	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
PONCOR	.	.	.	.	12.75	3.09	.	.	.	.	.	.	1.50	1.50
SAGLAN	.	.	.	.	.	.	7.50	2.90	.	.	.	.	.	.
SCICAL	.	.	.	.	3.25	3.25	0.75	0.75	56.00	15.03	.	.	2.75	2.75
SCIVAL	1.25	1.25	.	.	.	.	.	.	.	.	20.50	8.42	4.00	3.37
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	3.25	1.65
TYPLAT	0.75	0.75	16.25	5.95	3.50	3.50	2.00	2.00	0.25	0.25	1.50	1.50	3.25	1.60
FEBRUARY 1993 SITE 3														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
EICCRA	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	360.75	108.51	.	.	.	.	.	.	.	.	.	.	0.75	0.75
GALTIN	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
PONCOR	.	.	.	.	21.25	1.25	3.75	3.75	.	.	.	.	3.00	2.12
SAGLAN	.	.	.	.	.	.	13.00	4.20	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	17.25	9.68	7.75	7.75	7.75	7.42
SCIVAL	.	.	.	.	.	.	.	.	.	.	14.00	13.67	1.25	0.63
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	7.75	6.09
TYPLAT	0.25	0.25	0.25	0.25	0.25	0.25	.	.	.	.	.	.	.	.
AUGUST 1993 SITE 1														
ALTPHI	.	.	.	.	0.25	0.25	.	.	0.25	0.25	0.25	0.25	0.25	0.25
AMAAUS	0.25	0.25	.	.	.	.	1.00	1.00	.	.	0.50	0.29	.	.
ELEINT	385.25	114.75	.	.	.	.	.	.	.	.	.	.	250.00	144.34
LUDLEP	.	.	.	.	.	.	.	.	.	.	0.25	0.25	0.25	0.25
PANHEM	.	.	4.50	4.50	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	31.00	3.34	.	.	.	.	.	.	2.25	1.44
SAGLAN	.	.	.	.	.	.	8.50	1.19	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	25.75	9.72	.	.	12.50	12.50
SCIVAL	.	.	.	.	.	.	.	.	12.50	12.50	26.75	8.63	.	.
TYPLAT	0.25	0.25	2.75	2.75	.	.	2.50	2.50	.	.	1.75	1.75	.	.
AUGUST 1993 SITE 2														
ALTPHI	.	.	.	.	.	.	0.50	0.29	.	.	0.25	0.25	.	.
CYPODO	2.25	1.31	.	.	.	.	0.75	0.48	.	.	16.00	16.00	.	.
ECLALB	0.25	0.25	.	.	.	.	0.75	0.48	.	.	.	.	.	.
ELEINT	176.75	57.80	20.00	17.44	3.00	3.00	.	.	.	.	.	.	134.50	122.16
GALTIN	0.50	0.50	.	.	.	.	.	.	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	15.00	15.00
LUDLEP	4.50	0.65	.	.	.	.	1.25	0.63	.	.	2.25	1.31	.	.
PONCOR	.	.	.	.	27.25	2.29	.	.	.	.	.	.	4.00	3.67
SAGLAN	.	.	.	.	.	.	16.00	3.11	.	.	.	.	.	.

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
SCICAL	.	.	.	.	3.75	3.75	.	.	15.50	3.57	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	0.75	0.75	.	.	.	.
SCIVAL	0.25	0.25	.	.	.	.	.	.	.	.	30.25	8.26	1.00	1.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	8.75	4.70
TYPLAT	1.75	1.44	13.75	4.73	2.50	1.32	3.00	2.68	2.75	2.14	5.50	3.28	0.75	0.75
AUGUST 1993	SITE 3													
CYPODO	.	.	0.50	0.50	.	.	.	.	.	.	0.25	0.25	.	.
CYPSPP	17.50	17.50	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	0.50	0.50	.	.
ELEINT	305.75	117.83	.	.	.	.	.	.	.	.	.	.	162.50	117.92
HYDRAN	.	.	.	.	.	.	.	.	.	.	2.25	2.25	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	50.00	50.00
LUDLEP	1.25	1.25	.	.	.	.	.	.	0.25	0.25	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	1.00	0.71
PONCOR	.	.	.	.	19.25	4.77	4.25	4.25	.	.	.	.	2.50	1.44
SAGLAN	.	.	.	.	.	.	5.00	1.96	.	.	.	.	0.25	0.25
SCICAL	.	.	.	.	.	.	.	.	49.50	13.62	9.50	9.50	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	14.25	7.09	0.75	0.75
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	3.75	2.25
TYPLAT	1.75	1.44	2.00	2.00	2.50	2.50	1.50	0.87	.	.	3.25	1.97	.	.
MARCH 1994	SITE 1													
ALTPHI	.	.	.	.	0.25	0.25	.	.	.	.	0.25	0.25	.	.
AMAAUS	.	.	.	.	0.25	0.25	37.50	37.50	.	.	.	.	1.00	1.00
CARPEN	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEINT	53.25	5.82	.	.	.	.	.	.	.	.	.	.	10.75	7.78
HYDRAN	.	.	.	.	.	.	.	.	.	.	0.50	0.50	0.50	0.50
LUDLEP	.	.	.	.	.	.	1.00	0.58	.	.	.	.	.	.
PANHEM	.	.	2.00	2.00	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	0.25	0.25	.	.	.	.	3.00	2.38
POLPUN	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	31.50	5.84	.	.	.	.	.	.	15.25	9.20
SAGLAN	.	.	.	.	.	.	13.25	4.31	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	84.00	43.32	.	.	13.75	13.75
SCIVAL	.	.	.	.	.	.	.	.	.	.	37.25	6.76	.	.
TYPLAT	.	.	4.50	3.57	0.50	0.50	3.00	3.00	.	.	2.00	2.00	0.75	0.75
udicotS	.	.	.	.	.	.	.	.	.	.	2.50	2.50	20.25	18.30
MARCH 1994	SITE 2													
CYPSPP	.	.	.	.	.	.	.	.	.	.	.	.	3.50	3.50
ECLALB	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50

Table 13. Vegetation density measurements (Cont.)

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
ELEINT	159.00	41.00	125.00	125.00	2.00	2.00	.	.	.	.	.	.	11.25	9.66
GALTIN	0.50	0.29	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	0.50	0.50
PONCOR	.	.	.	.	16.50	2.72	.	.	.	.	.	.	1.50	1.19
SAGLAN	.	.	.	.	.	.	9.25	1.70	.	.	.	.	.	.
SCICAL	.	.	.	.	2.75	2.75	.	.	23.75	10.13	2.25	2.25	.	.
SCIVAL	.	.	.	.	.	.	0.25	0.25	.	.	13.75	9.31	2.75	1.11
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	4.00	2.04
TYPLAT	0.50	0.50	10.75	2.78	3.00	1.58	7.75	2.78	6.00	3.83	9.00	3.03	.	.
GALTINS	.	.	.	.	.	.	.	.	.	.	1.00	1.00	.	.
TYPSPPS	2.50	2.50	6.25	6.25	.	.	2.50	2.50	.	.	0.50	0.50	5.00	5.00
udicotS	8.75	8.75	0.25	0.25	.	.	.	.	.	.	.	.	.	.
MARCH 1994	SITE 3													
AMBART	.	.	.	.	0.75	0.75	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	3.75	3.75	1.00	1.00	2.25	2.25	.	.
ELEINT	104.75	53.40	.	.	.	.	.	.	.	.	.	.	4.50	3.30
EUPCAP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	1.75	1.75
PONCOR	.	.	.	.	30.00	12.62	5.00	5.00	.	.	.	.	0.75	0.48
SAGLAN	.	.	.	.	.	.	5.25	1.89	.	.	.	.	0.75	0.75
SCICAL	.	.	.	.	.	.	.	.	30.00	4.32	3.25	3.25	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	9.50	7.01	3.25	3.25
THAGEN	.	.	1.50	1.50	.	.	.	.	.	.	.	.	2.25	1.31
TYPLAT	0.75	0.75	5.00	5.00	2.50	1.89	2.00	1.41	.	.	3.75	2.17	.	.
TYPSPPS	.	.	2.50	2.50	.	.	2.50	2.50	.	.	.	.	.	.
udicotS	.	.	0.25	0.25	.	.	0.50	0.50	.	.	.	.	.	.

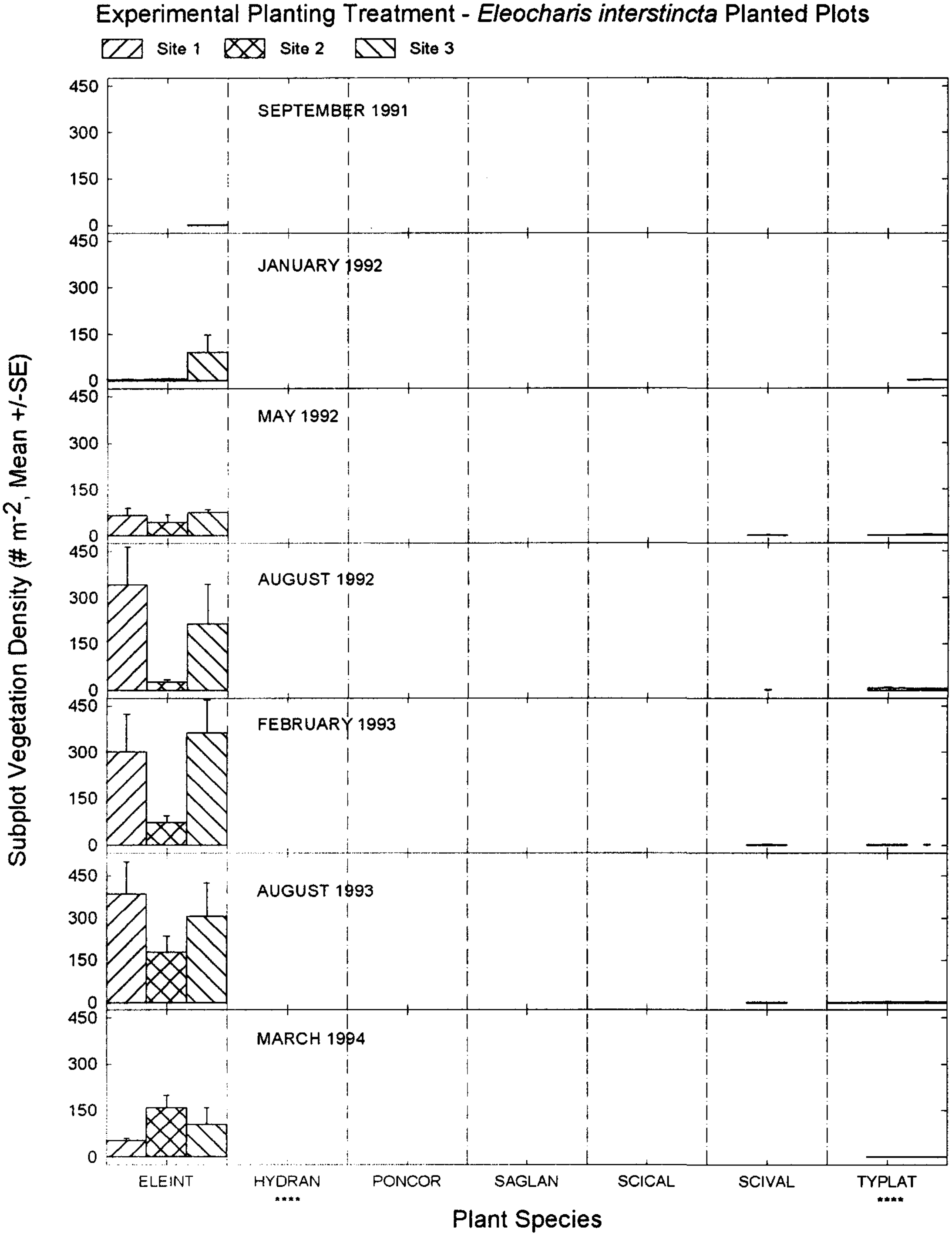


Figure 53. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Eleocharis interstincta* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.**

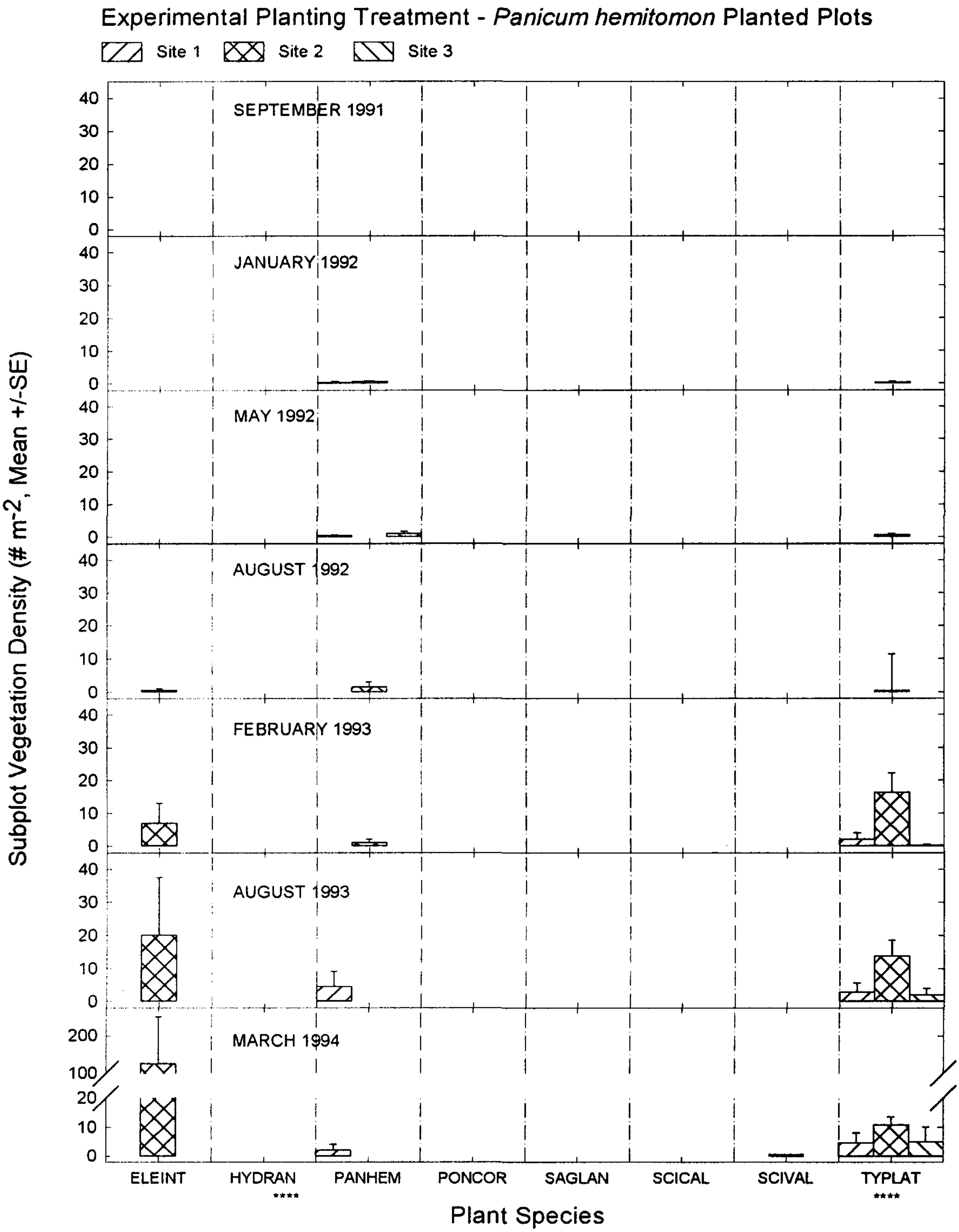


Figure 54. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Panicum hemitomon* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. ****= Invading species not planted.

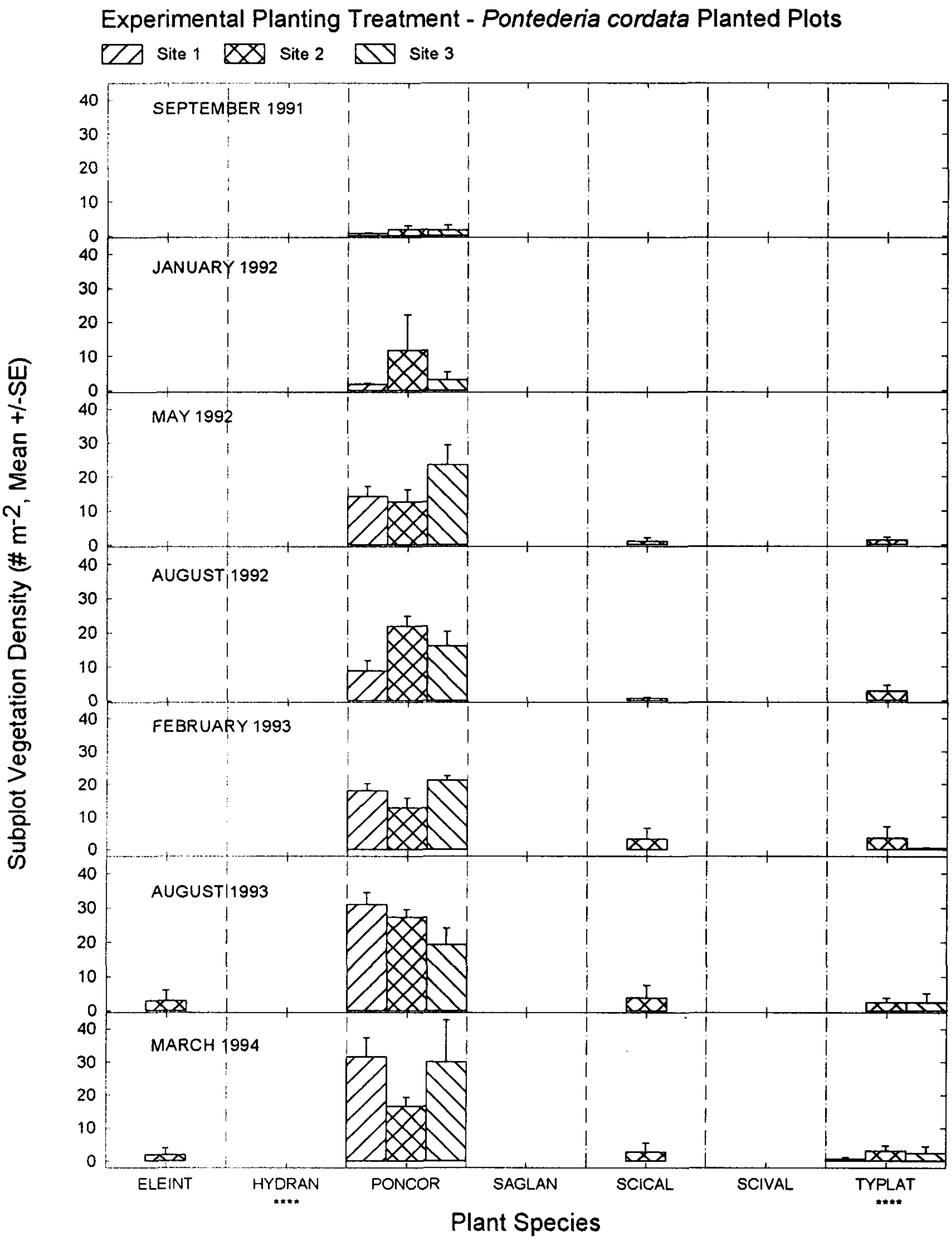


Figure 55. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Pontederia cordata* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.**

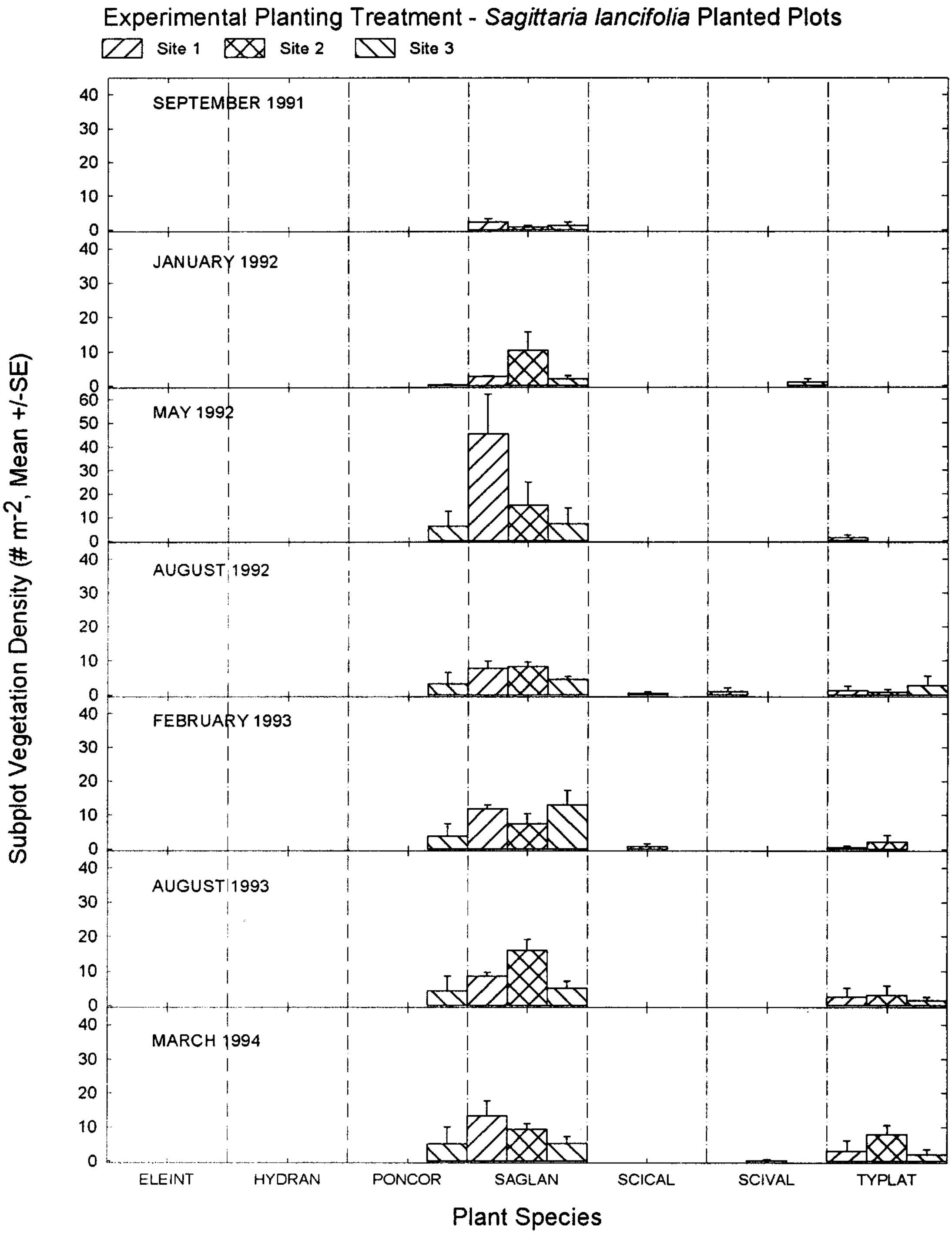


Figure 56. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.**

latifolia approached similar densities as *S. lancifolia*, at Site 2 (Figure 56, Table 13).

Culm density varied among samples and sites with time in the *Scirpus californicus* plots. Peak values were observed in February 1993 at Site 2 (60 m^{-2}), August 1993 at Site 3 (50 m^{-2}), and March 1994 at Site 1 (75 m^{-2}). Density values in the March 1994 sample were reduced at Sites 2 and 3, to levels comparable to the August 1992 samples (Figure 57, Table 13). *Scirpus validus* appeared at Sites 2 and 3 in August 1992, and Site 1 in August 1993. The competitor species *Typha latifolia* slowly increased density at Site 2 to a maximum of 5 m^{-2} (Figure 57, Table13).

Scirpus validus attained peak density during May 1992 at Site 2 (100 m^{-2}) and August 1992 at Site 1 (200 m^{-2}) and Site 3 (75 m^{-2}). During subsequent sampling events, *Scirpus validus* occurred at much lower densities than previously measured (<<50 m^{-2}). The competitor species *Typha latifolia* first appeared in August 1992 and reached a maximum density of 5.5 culms m^{-2} at Site 2 in March 1994 (Figure 58, Table 13).

In the Mixed Species plots, measurements of *Eleocharis interstincta* and *Thalia geniculata* dominated as a result of random plot placement. Vegetation density dynamics included growth to a maximum followed by a decline with time (Figure 59, Table 13).

Density measurements in the seeded, mulch, and control plots featured an early period with little or no measurable vegetation followed by a later dominance by *Typha latifolia* (Appendix A3). The best representation of species performance can be found in the cover measurements (Appendix A1).

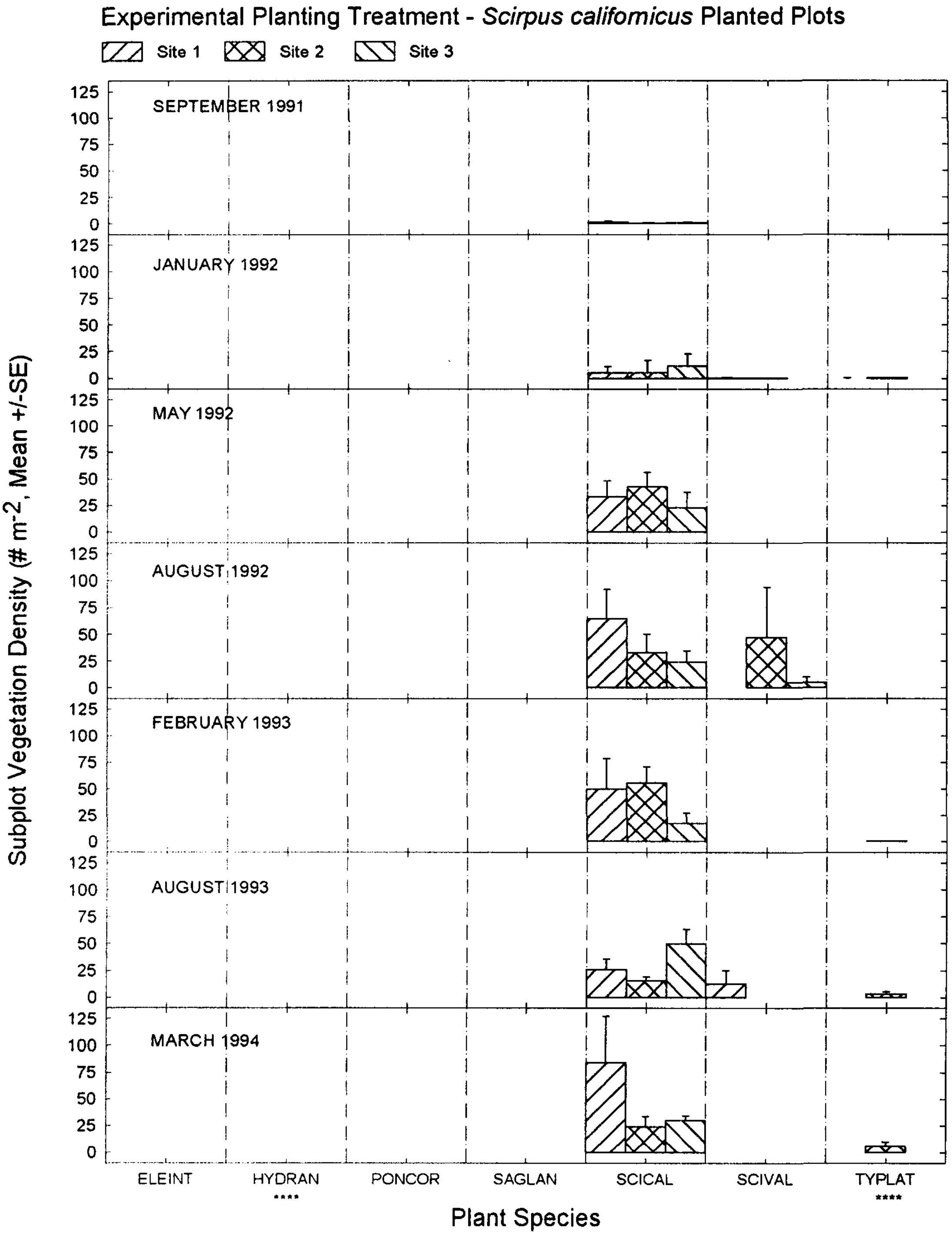


Figure 57. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Scirpus californicus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.**

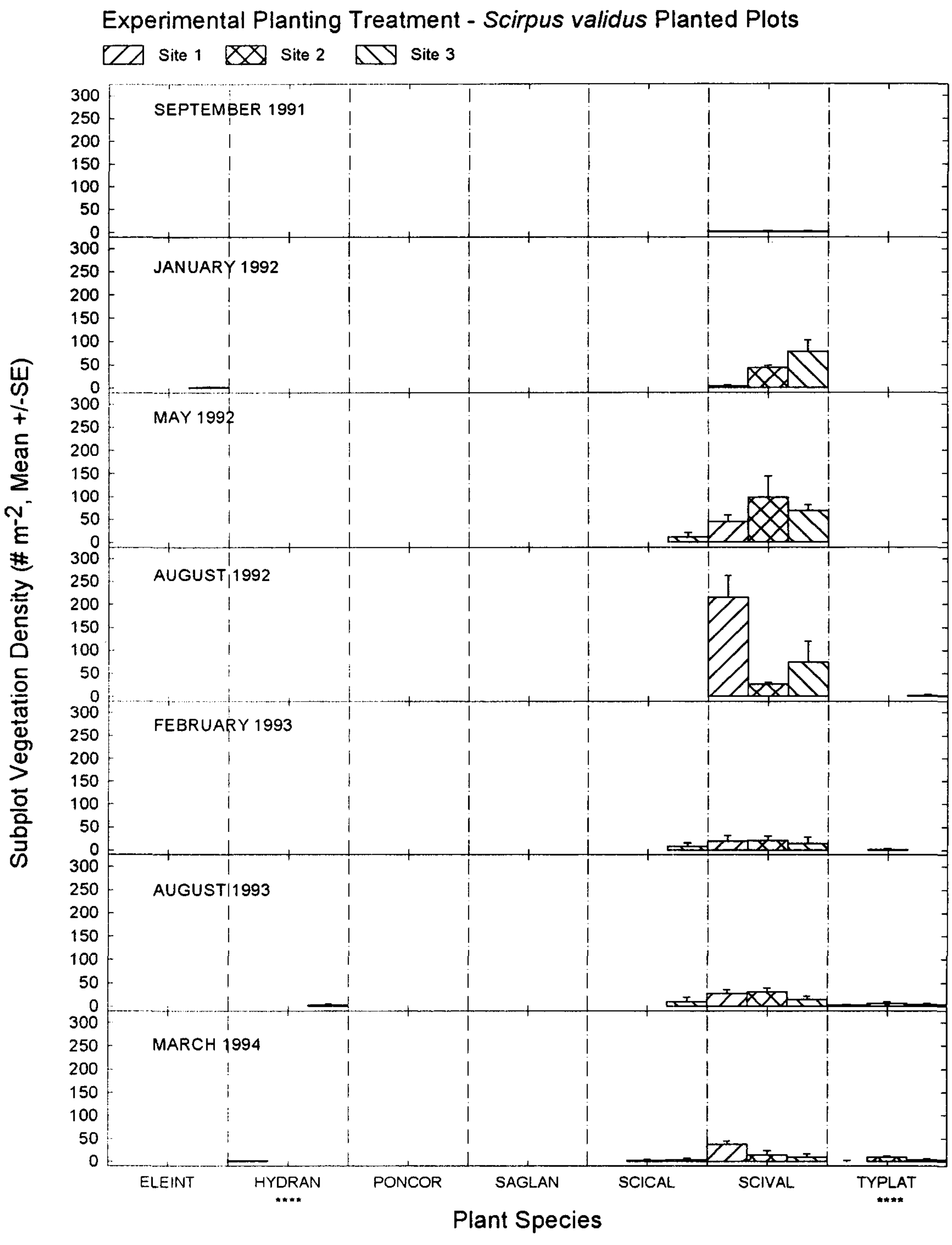


Figure 58. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *Scirpus validus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. ****= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.

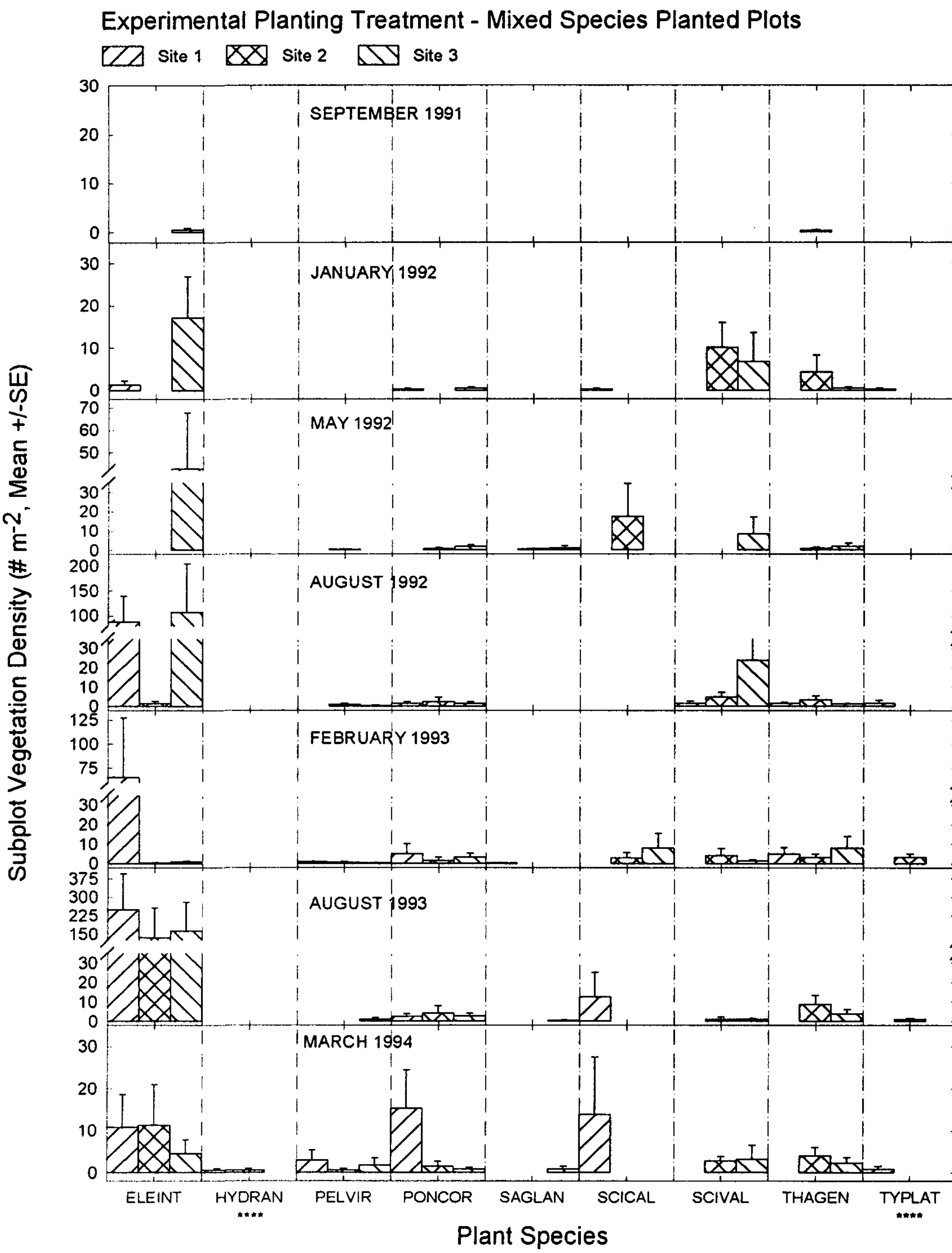


Figure 59. Vegetation density (# m^{-2}, Mean ±SE) from subplots in *the* Mixed Species Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species not planted. *Panicum hemitomon* (PANHEM) not found in any plots other than it's own target plot.**

Planting Site -- Height

Within the planting site plots, height measurements followed a similar temporal dynamic pattern as cover and density (Figures 60-65; Table 14). Fewer species were measured than for the cover parameter because the floating plant taxa such as Salviniaceae (*Azolla, Salvinia*) and Lemnaceae (e.g. *Lemna, Spirodella, Wolffia, Wolffiella*) were excluded due to a thin growth form and non-rooting habit. Occasionally, *Alternanthera philoxeroides* was excluded if it was found floating (a frequent occurrence) or its rooting habit was indeterminate. Species such as *Eichhornia crassipes, Hydrocotyle ranunculoides, H. umbellata,* and *Limnobium spongia* were measured from the top of the dense, floating root matrix. A greater number of species were measured for height than were counted for the density parameter. Height measurements were taken from plants that overhung the plot and from species that were defined as mat forming without an easily definable root to sediment location. Mat forming species included: *Hydrocotyle ranunculoides, H. umbellata, Polygonum punctatum*, and *Utricularia biflora*. As was discussed in the density results, height measurements from planted plots will be treated in more detail than those from control, mulch, and seeded plots. Again the best measure of species performance in the latter plots may be derived from the cover estimates.

Within the single species planted plots, target species height reached a peak up to two years after planting. The species reaching peak height earliest was *Scirpus validus* at 200-250 cm in May 1992. In August 1992, *Eleocharis interstincta* (150 cm), *Pontederia cordata* (125 cm), and *Sagittaria lancifolia* (175 cm) were found to have peaked. *Scirpus*

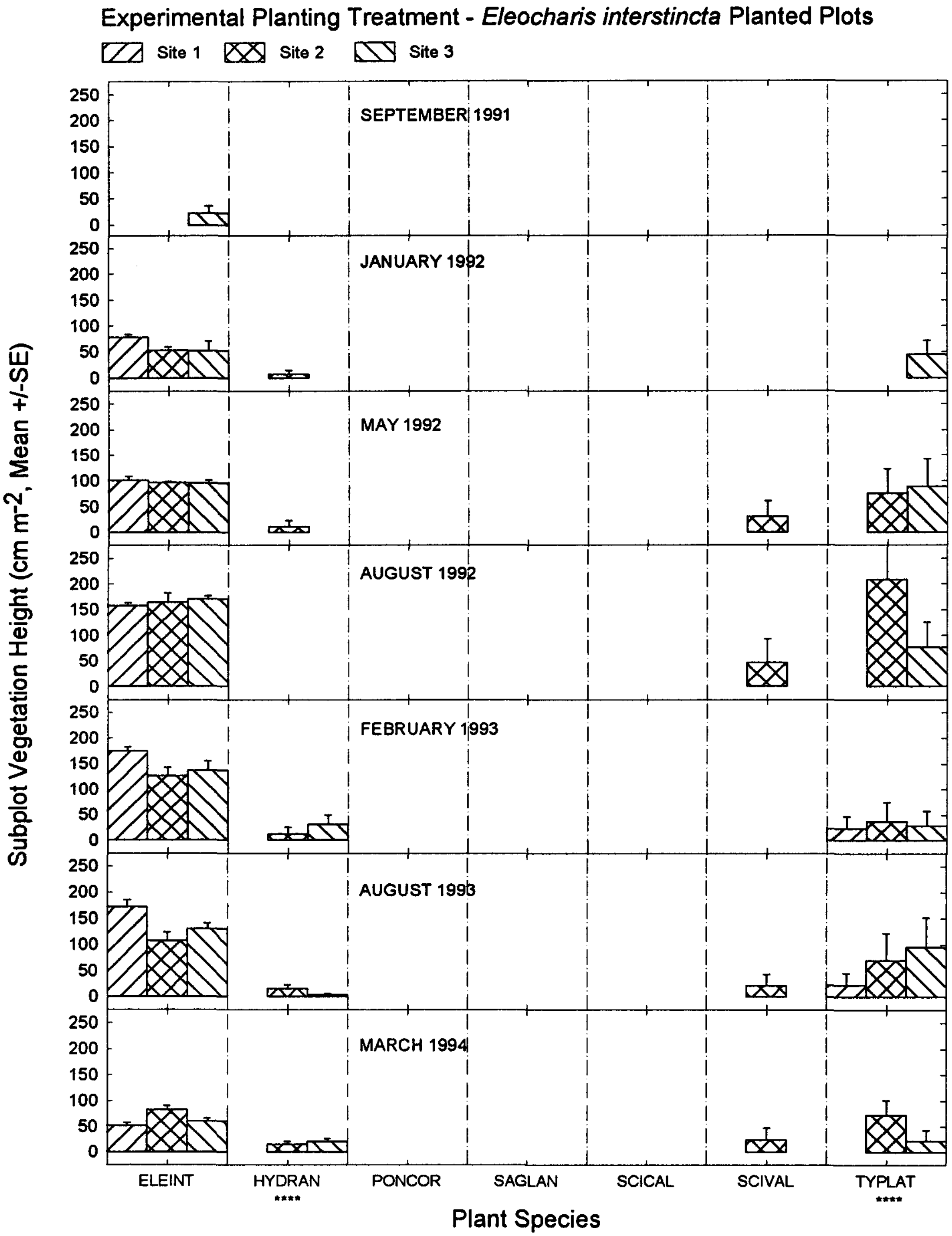


Figure 60. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Eleocharis interstincta* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. ****= Invading species, not planted target species. *Panicum hemitomon* (PANHEM) because it did not colonize any other plots.

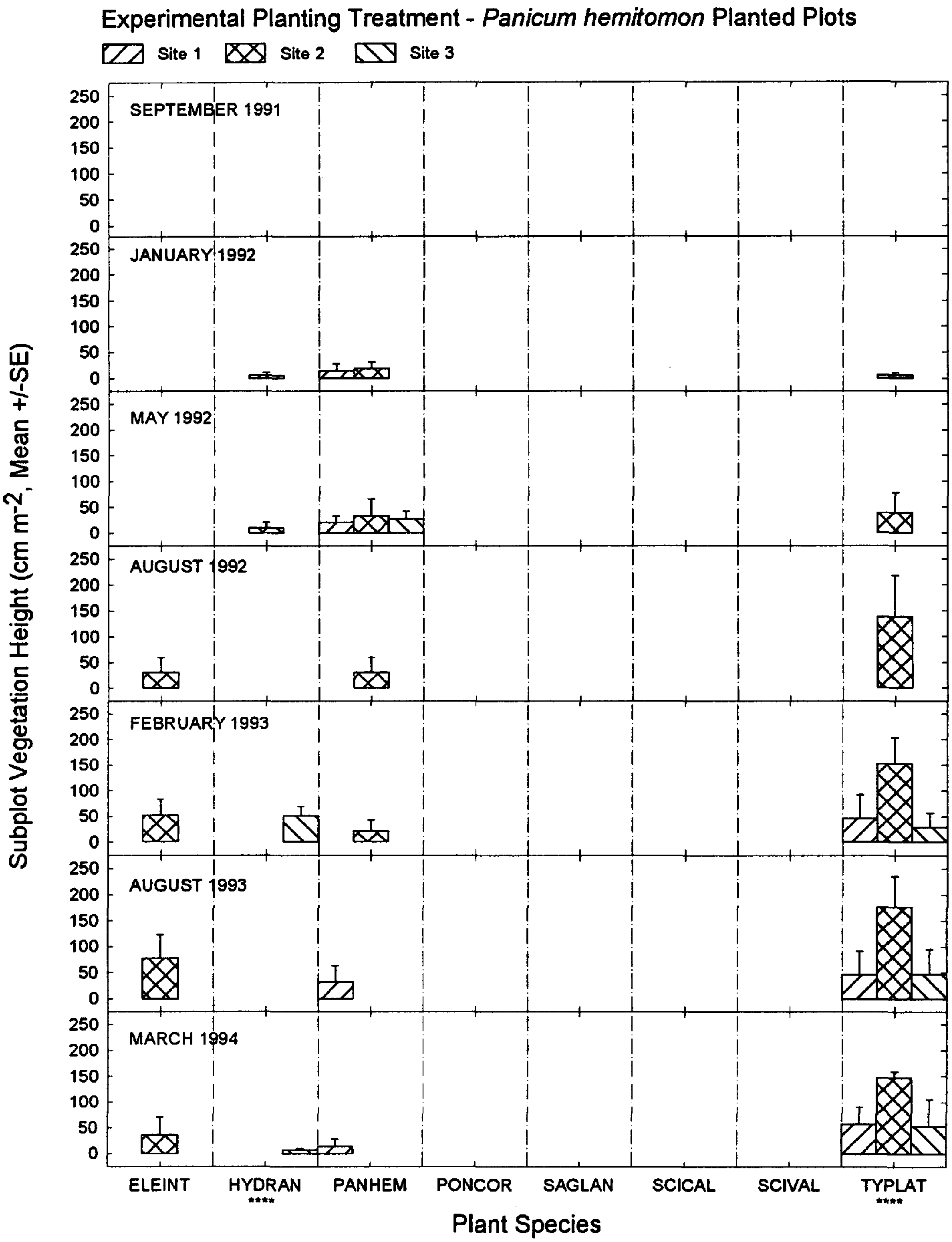


Figure 61. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Panicum hemitomon* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. ****= Invading species, not planted target species.

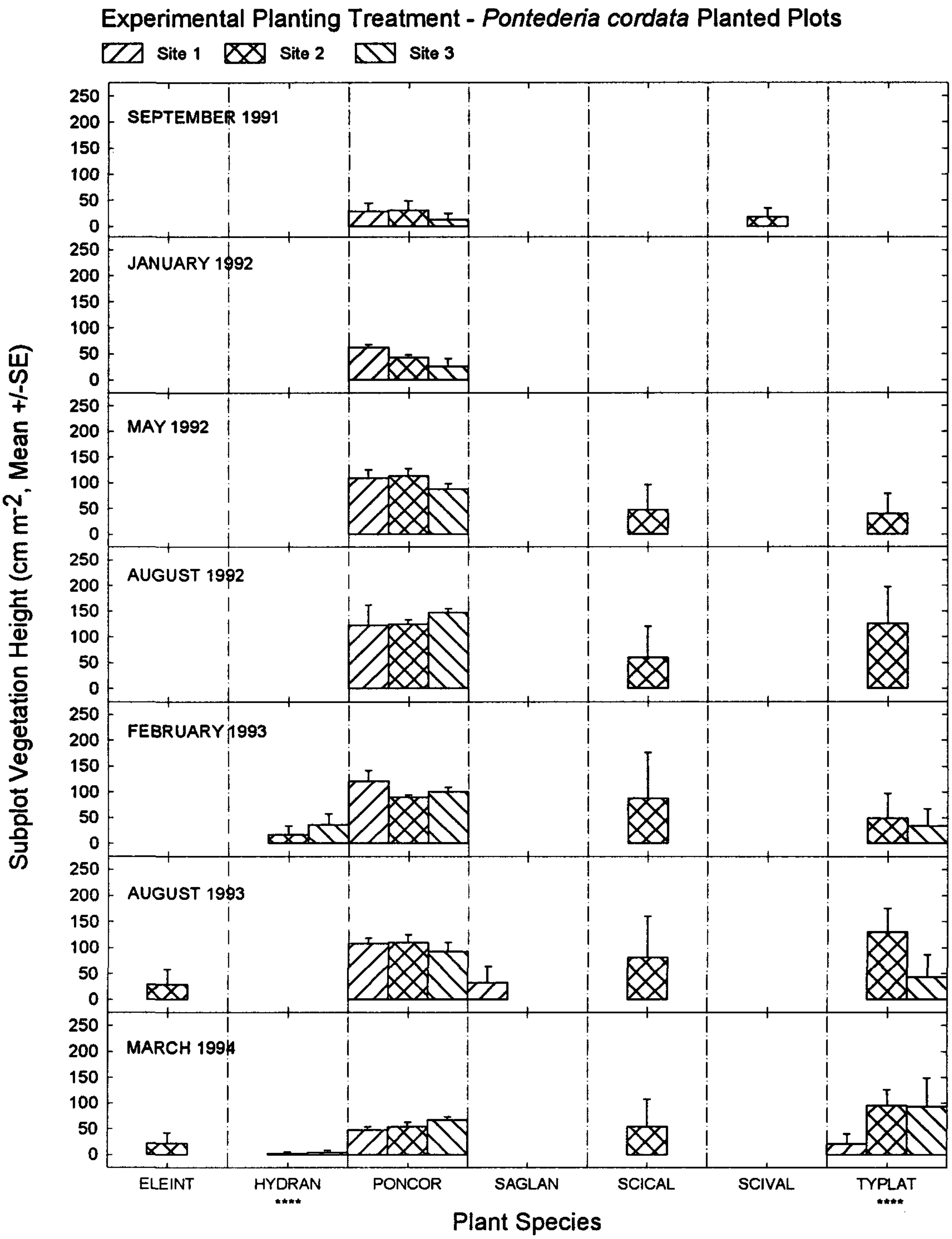


Figure 62. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Pontederia cordata* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species, not planted target species. *Panicum hemitomon* (PANHEM) because it did not colonize any other plots.**

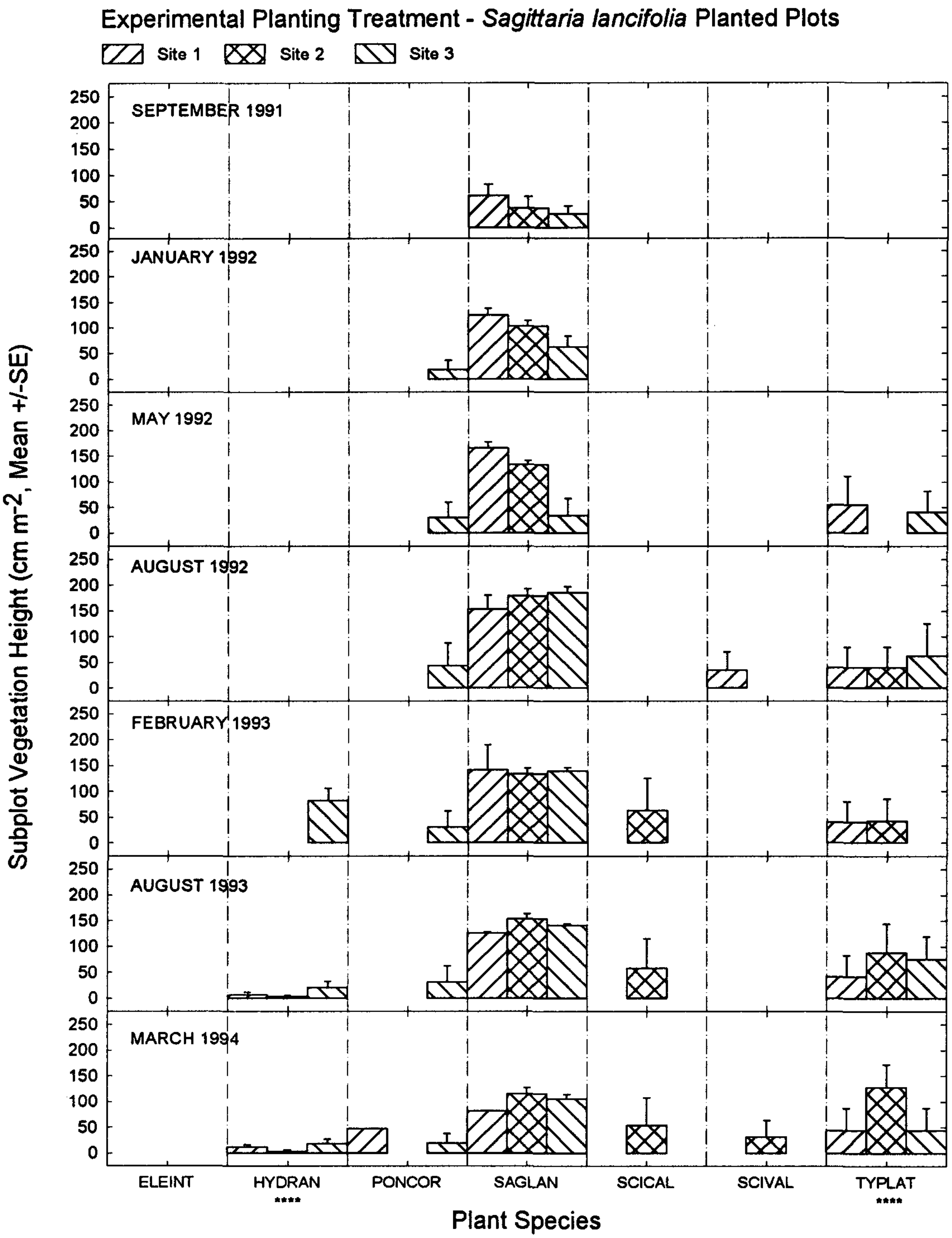


Figure 63. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Sagittaria lancifolia* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. ****= Invading species, not planted target species. *Panicum hemitomon* (PANHEM) because it did not colonize any other plots.

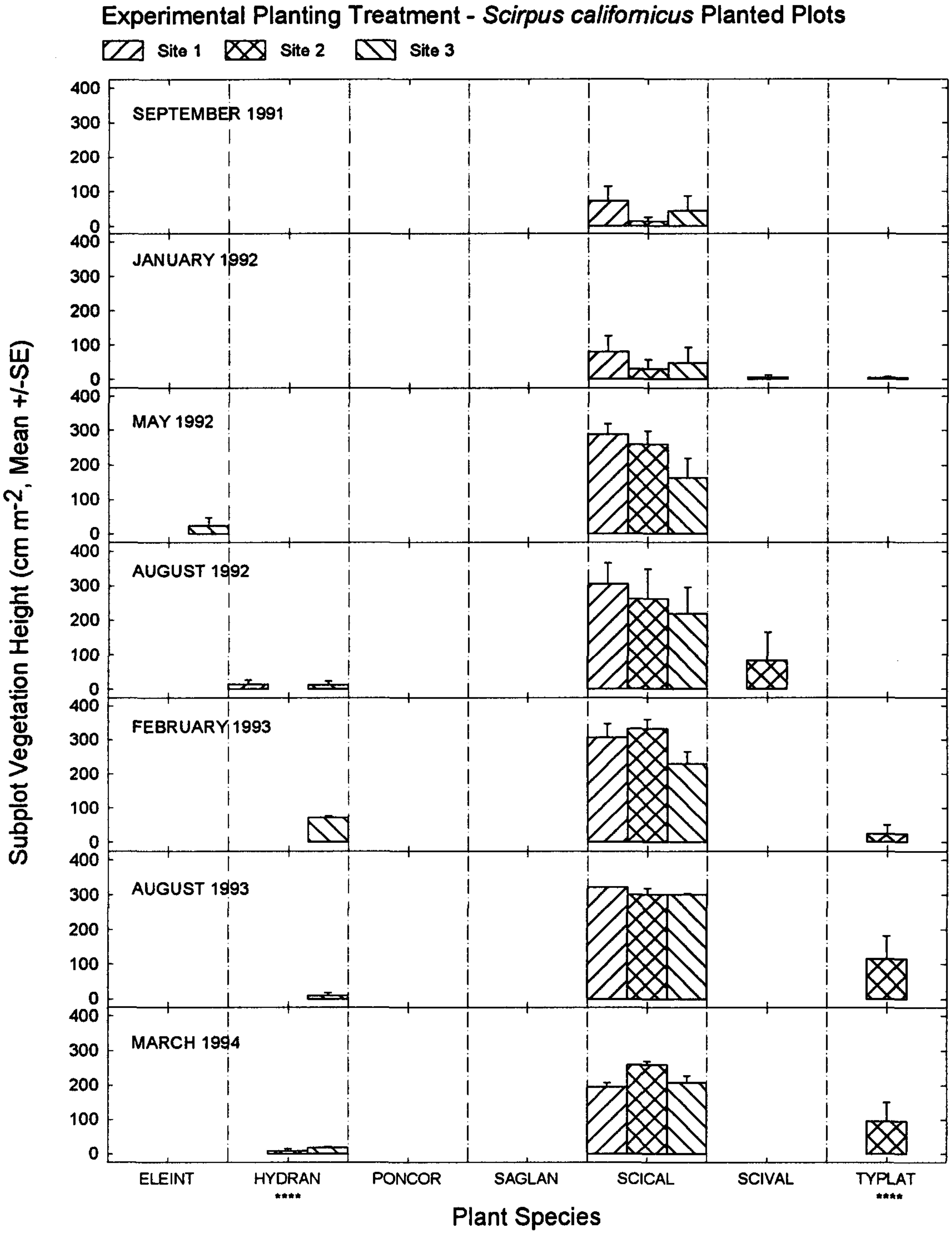


Figure 64. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Scirpus californicus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species, not planted target species. *Panicum hemitomon* (PANHEM) because it did not colonize any other plots.**

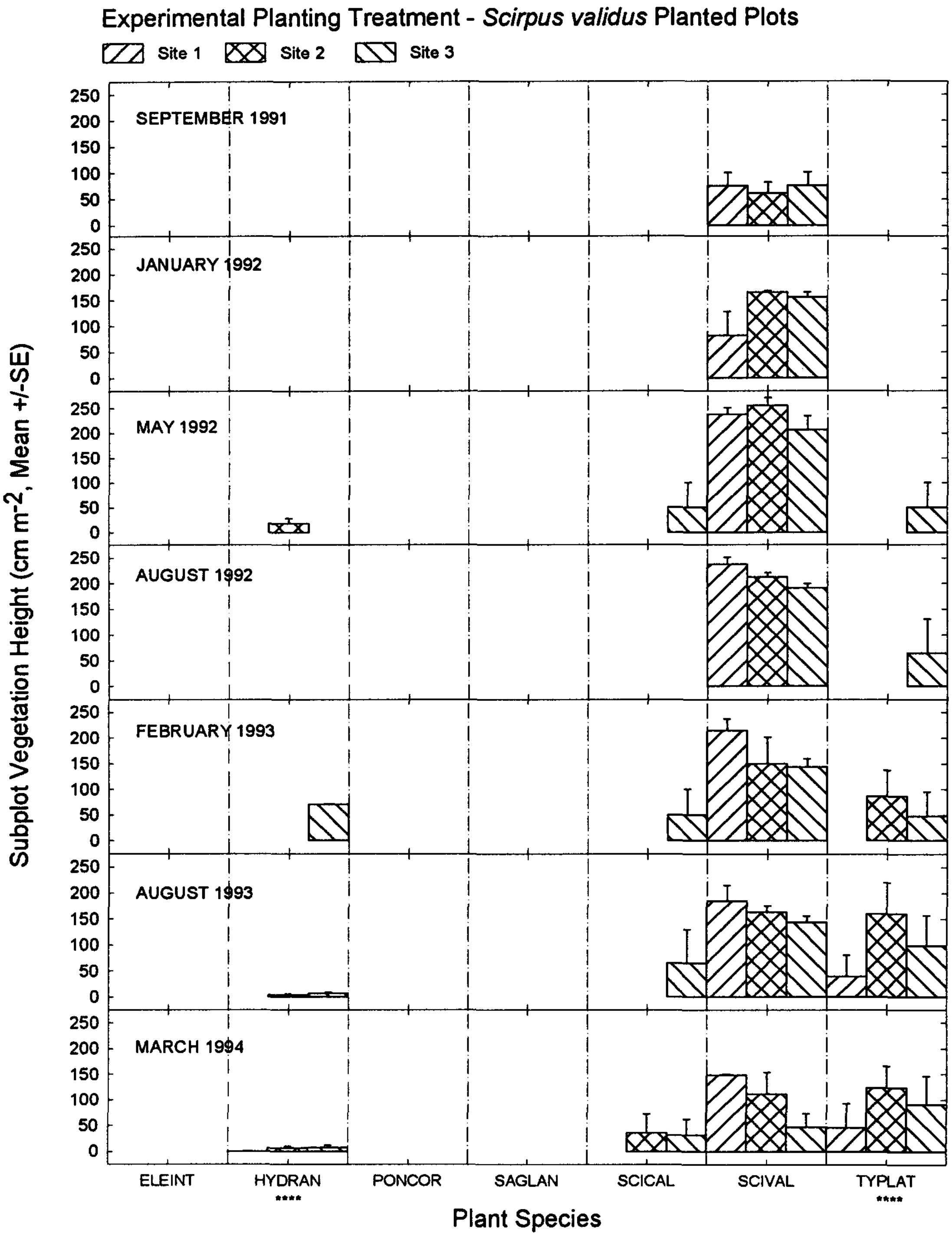


Figure 65. Vegetation height (cm m^{-2}, Mean ±SE) from subplots in *Scirpus validus* Planted Plots, Experimental Planting Sites. For each species, bars representing the three sites are bound by vertical dot-dash lines. **= Invading species, not planted target species. *Panicum hemitomon* (PANHEM) because it did not colonize any other plots.**

Table 14. Vegetation height measurements (cm m^{-2} MEAN ±SE) from planted plots in Experimental Planting Sites. Species Codes: Upper case six character are abbreviated species codes. Lower case codes represent plant families or unknowns. Codes ending with D represent dead, while S represent seedlings.

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
AUGUST 1991		SITE 1												
ALTPHI	15.75	15.75	.	.	.	.	.	.	.	.	.	.	16.50	16.50
COMDIF	.	.	18.00	18.00	31.25	18.04	.	.	16.25	16.25	.	.	13.00	13.00
ECLALB	14.00	14.00	.	.	.	.	.	.	.	.	.	.	.	.
POLPUN	15.50	15.50	39.00	22.70	20.25	20.25	.	.	.	.	14.25	14.25	13.00	13.00
PONCOR	.	.	.	.	28.25	16.32	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	61.50	20.75	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	71.25	41.82	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	74.25	25.51	.	.
AUGUST 1991	SITE 2													
ALTPHI	.	.	.	.	.	.	.	.	.	.	8.25	8.25	.	.
AMMAUS	.	.	.	.	16.00	10.46	10.00	10.00	13.25	8.40	.	.	.	.
ASTSUB	.	.	.	.	.	.	.	.	4.75	4.75	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	.	.	.	.	11.25	11.25
CYPIRI	.	.	.	.	.	.	9.00	9.00	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	9.50	6.18	.	.	.	.
ECHCOL	12.75	12.75	.	.	.	.	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	6.75	6.75	5.00	5.00	4.50	4.50	.	.	.	.
PANDIC	.	.	.	.	.	.	6.00	6.00	.	.	.	.	.	.
PONCOR	.	.	.	.	30.50	17.84	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	37.00	21.50	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	13.00	13.00	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	20.00	20.00
SCIVAL	.	.	.	.	17.50	17.50	.	.	.	.	61.25	20.44	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	36.75	21.27
UGRASS	.	.	.	.	.	.	4.25	4.25	.	.	.	.	.	.
AUGUST 1991	SITE 3													
AMMAUS	.	.	.	.	.	.	.	.	9.00	9.00	.	.	.	.
ELEINT	22.25	13.12	.	.	.	.	.	.	.	.	.	.	28.75	16.81
PONCOR	.	.	.	.	12.00	12.00	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	25.75	15.27	.	.	.	.	.	.
SALCAR	.	.	.	.	8.75	8.75	.	.	.	.	.	.	.	.

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT		PANHEM		PONCOR		SAGLAN		SCICAL		SCIVAL		MIXED SPP.	
	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
SCICAL	.	.	.	.	.	.	.	.	43.25	43.25	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	75.75	25.35	.	.
JANUARY 1992	SITE 1													
ALTPHI	14.25	14.25	.	.	13.50	13.50	.	.	11.50	11.50	.	.	12.75	12.75
ELEINT	77.75	5.96	.	.	.	.	.	.	.	.	.	.	37.50	21.75
HYDRAN	.	.	.	.	.	.	10.00	10.00	.	.	.	.	.	.
PANHEM	.	.	13.50	13.50	.	.	.	.	.	.	.	.	.	.
POLPUN	13.75	13.75	36.00	12.03	13.00	13.00	.	.	11.00	11.00	12.00	12.00	.	.
PONCOR	.	.	.	.	62.50	4.66	.	.	.	.	.	.	14.75	14.75
SAGLAN	.	.	.	.	.	.	124.25	13.39	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	80.00	46.19	.	.	66.50	38.76
SCIVAL	.	.	.	.	.	.	.	.	.	.	81.00	46.77	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	35.75	35.75
TYPLAT	.	.	.	.	.	.	.	.	.	.	.	.	23.50	23.50
JANUARY 1992	SITE 2													
ALTPHI	7.25	7.25	.	.	9.25	9.25	.	.	4.00	4.00	.	.	4.50	4.50
ELEINT	53.75	6.49	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	7.50	7.50	5.00	5.00	.	.	.	.	.	.	.	.	.	.
LUDPAL	3.25	3.25	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	18.25	12.09	.	.	.	.	.	.	.	.	.	.
POLPUN	.	.	.	.	.	.	.	.	5.25	5.25	2.25	2.25	.	.
PONCOR	.	.	.	.	43.00	4.78	.	.	.	.	.	.	12.00	12.00
SAGLAN	.	.	.	.	.	.	103.00	10.51	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	28.75	28.75	.	.	.	.
SCISPP	.	.	.	.	.	.	.	.	.	.	.	.	10.25	10.25
SCIVAL	.	.	.	.	.	.	.	.	6.00	6.00	165.00	2.89	76.75	44.42
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	74.25	42.87
TYPLAT	.	.	4.50	4.50	.	.	.	.	3.75	3.75	.	.	.	.
JANUARY 1992	SITE 3													
EICCRA	13.75	13.75	.	.	.	.	.	.	.	.	.	.	.	.
ELEINT	52.25	18.58	.	.	.	.	.	.	.	.	.	.	35.00	20.89
LUDPAL	6.00	6.00	6.25	6.25	10.00	10.00	6.75	6.75	8.75	8.75	7.50	7.50	.	.
POLPUN	.	.	26.75	15.67	8.00	8.00	.	.	.	.	8.50	8.50	.	.
PONCOR	.	.	.	.	25.50	15.17	18.25	18.25	.	.	.	.	20.75	12.06
SAGLAT	.	.	.	.	.	.	62.00	21.00	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	46.50	46.50	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	155.75	9.17	21.75	21.75

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	53.50	30.96
TYPLAT	45.00	26.06	.	.	.	.	.	.	.	.	.	.	.	.
MAY 1992	SITE 1													
ALTPHI	15.75	15.75	.	.	.	.	.	.	.	.	14.00	14.00	.	.
ELEINT	100.75	7.17	.	.	.	.	.	.	.	.	.	.	.	.
PANHEM	.	.	20.00	12.25	.	.	.	.	.	.	.	.	.	.
POLPUN	13.75	13.75	33.50	11.82	10.50	10.50	.	.	12.25	12.25	.	.	.	.
PONCOR	.	.	.	.	108.50	16.47	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	165.50	11.41	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	287.50	31.46	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	237.50	12.50	.	.
TYPLAT	.	.	.	.	.	.	55.00	55.00	.	.	.	.	.	.
MAY 1992	SITE 2													
ALTPHI	10.25	10.25	10.25	10.25	23.75	23.75	10.25	10.25	15.75	15.75	40.50	27.84	.	.
ELEINT	96.75	2.29	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	11.00	11.00	10.00	10.00	.	.	.	.	.	.	16.75	10.27	.	.
PANHEM	.	.	32.50	32.50	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	11.00	11.00
POLPUN	.	.	.	.	.	.	.	.	14.25	14.25	.	.	.	.
PONCOR	.	.	.	.	112.75	13.55	.	.	.	.	.	.	55.50	35.08
SAGLAN	.	.	.	.	.	.	133.00	7.29	.	.	.	.	37.50	37.50
SCICAL	.	.	.	.	47.50	47.50	.	.	258.50	38.43	.	.	50.00	50.00
SCIVAL	30.00	30.00	.	.	.	.	.	.	.	.	255.50	15.39	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	210.00	7.07
TYPLAT	75.50	46.69	38.75	38.75	39.25	39.25	.	.	.	.	.	.	.	.
MAY 1992	SITE 3													
ALTPHI	10.50	10.50	.	.	.	.	.	.	10.50	10.50	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	9.50	9.50	.	.	.	.
ELEINT	95.25	5.79	.	.	.	.	.	.	23.00	23.00	.	.	54.75	31.61
PANHEM	.	.	26.50	15.35	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	87.00	11.15	30.00	30.00	.	.	.	.	38.25	23.34
SAGLAN	.	.	.	.	.	.	33.75	33.75	.	.	.	.	25.00	25.00
SAGLAT	.	.	.	.	.	.	76.75	45.81	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	162.50	56.03	50.00	50.00	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	206.00	28.04	53.00	53.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	50.00	50.00
TYPLAT	87.75	53.82	.	.	.	.	40.75	40.75	.	.	50.00	50.00	.	.

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
AUGUST 1992	SITE 1													
ALTPHI	28.75	27.11	1.25	1.25	.	.	16.25	16.25	13.25	13.25	.	.	.	.
ELEINT	157.50	5.20	.	.	.	.	.	.	.	.	.	.	77.25	44.64
HYDRAN	.	.	.	.	.	.	.	.	13.25	13.25	.	.	.	.
PONCOR	.	.	.	.	121.50	40.60	.	.	.	.	.	.	36.67	36.67
SAGLAN	.	.	.	.	.	.	153.00	26.69	.	.	.	.	32.50	32.50
SCICAL	.	.	.	.	.	.	.	.	305.50	61.02	.	.	.	.
SCIVAL	.	.	.	.	.	.	35.00	35.00	.	.	237.00	14.02	37.50	37.50
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	180.00	105.20
TYPLAT	.	.	.	.	.	.	40.00	40.00	.	.	.	.	75.00	75.00
AUGUST 1992	SITE 2													
ALTPHI	.	.	.	.	27.25	27.25	.	.	.	.	35.75	35.75	60.00	34.88
ELEINT	164.50	17.63	30.00	30.00	.	.	.	.	.	.	.	.	26.25	26.25
HYDUMB	19.00	19.00	.	.	.	.	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	48.75	48.75	.	.	.	.	.	.
PANHEM	.	.	30.00	30.00	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	31.25	31.25
POLPUN	.	.	.	.	.	.	.	.	.	.	30.00	30.00	.	.
PONCOR	.	.	.	.	124.25	7.85	.	.	.	.	.	.	33.75	33.75
SAGLAN	.	.	.	.	.	.	179.25	13.76	.	.	.	.	.	.
SCICAL	.	.	.	.	60.00	60.00	.	.	261.25	87.57	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	157.50	58.08	.	.	.	.
SCIVAL	46.25	46.25	.	.	.	.	.	.	82.50	82.50	212.50	8.54	143.75	51.29
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	220.00	92.01
TYPLAT	207.50	69.81	137.50	80.04	125.00	72.17	40.00	40.00	.	.	.	.	.	.
AUGUST 1992	SITE 3													
ALTPHI	.	.	.	.	27.50	27.50	.	.	.	.	.	.	21.25	21.25
EICCRA	23.00	23.00	.	.	.	.	.	.	40.25	24.43	20.50	20.50	.	.
ELEINT	170.00	6.72	.	.	.	.	.	.	.	.	.	.	55.50	33.17
HYDRAN	.	.	.	.	.	.	.	.	11.75	11.75	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	27.25	27.25
POLPUN	.	.	.	.	25.00	25.00	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	146.00	8.34	43.75	43.75	.	.	.	.	72.25	24.22
SAGLAN	.	.	.	.	.	.	185.00	11.70	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	218.50	76.04	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	48.00	48.00	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	190.50	8.96	40.50	40.50
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	168.00	62.22

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
TYPLAT	77.00	47.50	.	.	.	.	62.50	62.50	.	.	65.00	65.00	.	.
SCIVALD	.	.	.	.	.	.	.	.	.	.	91.25	52.77	.	.
FEBRUARY	1993		SITE 1											
ALTPHI	.	.	.	.	2.50	2.50	.	.	.	.	.	.	8.25	8.25
ELEINT	174.00	7.99	.	.	.	.	.	.	.	.	.	.	77.75	45.18
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	32.50	32.50
POLPUN	.	.	.	.	11.50	11.50	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	120.75	20.62	.	.	.	.	.	.	36.25	28.53
SAGLAN	.	.	.	.	.	.	141.75	47.64	.	.	.	.	45.00	45.00
SAGLAT	.	.	.	.	.	.	52.50	52.50	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	305.75	41.58	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	213.75	23.22	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	93.25	54.12
TYPLAT	23.25	23.25	45.75	45.75	.	.	40.00	40.00	.	.	.	.	.	.
FEBRUARY	1993		SITE 2											
ALTPHI	.	.	.	.	19.00	19.00	.	.	11.25	11.25	.	.	.	.
ELEINT	126.25	16.50	52.00	31.58	.	.	.	.	.	.	.	.	10.75	10.75
GALTIN	.	.	.	.	14.75	14.75	.	.	.	.	.	.	.	.
HYDRAN	12.50	12.50	.	.	17.00	17.00	.	.	.	.	.	.	.	.
HYDSPP	19.00	19.00	.	.	18.75	18.75	.	.	.	.	.	.	.	.
PANHEM	.	.	21.25	21.25	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	23.00	23.00
PONCOR	.	.	.	.	89.25	4.31	.	.	.	.	.	.	25.00	25.00
SAGLAN	.	.	.	.	.	.	134.00	10.75	.	.	.	.	.	.
SCICAL	.	.	.	.	87.50	87.50	62.50	62.50	332.50	26.89	.	.	50.00	50.00
SCIVAL	.	.	.	.	.	.	.	.	.	.	150.25	50.67	75.00	47.87
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	100.50	9.46
TYPLAT	37.50	37.50	152.25	51.49	48.75	48.75	42.50	42.50	25.00	25.00	86.25	51.05	96.75	45.06
FEBRUARY	1993		SITE 3											
ALTPHI	.	.	.	.	13.75	13.75	.	.	.	.	.	.	.	.
EICCRA	.	.	36.50	21.83	.	.	18.25	18.25	67.50	23.59	.	.	16.00	16.00
ELEINT	137.00	11.01	.	.	.	.	.	.	.	.	.	.	79.75	46.24
GALTIN	.	.	.	.	16.25	16.25	.	.	.	.	.	.	.	.
HYDRAN	31.00	18.12	51.25	17.73	35.50	22.22	81.75	24.45	71.25	5.62	70.00	1.73	32.25	20.95
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	19.75	19.75
PONCOR	.	.	.	.	100.00	9.13	30.75	30.75	.	.	.	.	39.25	22.66
SAGLAN	.	.	.	.	.	.	138.75	6.68	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	229.50	34.31	50.00	50.00	67.00	40.70

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
SCIVAL	.	.	.	.	.	.	.	.	.	.	143.50	16.17	103.75	38.26
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	146.50	4.05
TYPLAT	28.75	28.75	28.00	28.00	33.50	33.50	.	.	.	.	47.50	47.50	.	.
AUGUST 1993	SITE 1													
ALTPHI	.	.	.	.	34.25	23.59	60.75	25.14	6.25	6.25	20.25	11.91	32.25	32.25
AMAAUS	21.25	21.25	.	.	.	.	10.00	10.00	.	.	18.75	11.97	.	.
ECLALB	.	.	.	.	.	.	.	.	.	.	15.75	15.75	.	.
ELEINT	171.25	13.19	.	.	.	.	.	.	.	.	.	.	97.00	58.22
HYDRAN	.	.	.	.	.	.	5.75	5.75	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	15.75	15.75	30.00	30.00
PANHEM	.	.	31.50	31.50	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	107.50	9.95	.	.	.	.	.	.	37.25	21.72
SAGLAN	.	.	.	.	31.50	31.50	125.75	1.65	.	.	.	.	38.50	38.50
SCICAL	.	.	.	.	.	.	.	.	321.25	10.87	.	.	10.00	10.00
SCIVAL	.	.	.	.	.	.	.	.	.	.	184.25	30.38	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	225.25	85.37
TYPLAT	22.50	22.50	45.50	45.50	.	.	41.25	41.25	.	.	40.00	40.00	.	.
AUGUST 1993	SITE 2													
ALTPHI	21.50	13.07	.	.	.	.	33.00	20.57	.	.	6.75	6.75	.	.
CYPODO	45.25	17.45	.	.	.	.	30.00	18.37	.	.	1.00	1.00	.	.
ECLALB	13.25	13.25	.	.	.	.	32.75	19.30	.	.	.	.	.	.
ELEINT	107.25	16.04	77.25	44.99	29.00	29.00	.	.	.	.	.	.	67.75	35.68
GALTIN	8.75	8.75	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	14.25	8.25	.	.	.	.	2.50	2.50	.	.	2.50	2.50	2.50	2.50
HYDUMB	21.00	13.58	.	.	.	.	.	.	.	.	.	.	.	.
LUDLEP	102.00	6.87	.	.	.	.	73.25	29.81	.	.	34.00	21.42	.	.
PONCOR	.	.	.	.	109.00	14.94	.	.	.	.	.	.	50.75	30.83
SAGLAN	.	.	.	.	.	.	153.50	9.54	.	.	.	.	.	.
SCICAL	.	.	.	.	80.00	80.00	57.50	57.50	301.25	17.12	.	.	.	.
SCISPP4	.	.	.	.	.	.	.	.	57.50	57.50	.	.	.	.
SCIVAL	21.25	21.25	.	.	.	.	.	.	.	.	162.75	12.15	35.00	35.00
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	212.25	83.23
TYPLAT	70.00	50.70	176.25	59.31	130.00	44.38	88.25	55.44	114.50	66.95	159.75	60.20	50.00	50.00
AUGUST 1993	SITE 3													
ALTPHI	4.75	4.75	23.75	20.55	13.25	13.25	14.00	14.00	33.50	22.68	.	.	.	.
CYPODO	.	.	16.75	16.75	.	.	.	.	.	.	14.00	14.00	.	.
CYPSPP	2.50	2.50	.	.	.	.	.	.	1.25	1.25	.	.	.	.

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	ELEINT SE	PANHEM MEAN	PANHEM SE	PONCOR MEAN	PONCOR SE	SAGLAN MEAN	SAGLAN SE	SCICAL MEAN	SCICAL SE	SCIVAL MEAN	SCIVAL SE	MIXED SPP. MEAN	MIXED SPP. SE
EICCRA	.	.	12.25	7.42	.	.	.	.	27.25	15.80	13.25	7.87	.	.
ELEINT	129.25	11.74	.	.	.	.	.	.	.	.	.	.	70.00	40.42
HYDRAN	2.50	2.50	.	.	.	.	20.25	11.71	9.75	7.08	6.25	2.43	6.00	6.00
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	41.25	41.25
LUDLEP	15.75	15.75	.	.	.	.	.	.	11.75	7.03	.	.	.	.
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	39.75	24.57
PONCOR	.	.	.	.	92.00	17.64	31.25	31.25	.	.	.	.	27.75	16.02
SAGLAN	.	.	.	.	.	.	140.75	2.66	.	.	.	.	24.75	24.75
SCICAL	.	.	.	.	.	.	.	.	301.25	3.15	65.00	65.00	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	143.25	12.58	33.00	33.00
THAGEN	.	.	40.75	40.75	.	.	.	.	.	.	.	.	367.50	19.74
TYPLAT	95.75	55.56	47.25	47.25	43.00	43.00	75.00	43.49	.	.	99.00	57.17	.	.
MARCH 1994	SITE 1													
ALTPHI	4.75	4.75	.	.	5.75	4.25	17.00	4.64	.	.	6.50	6.17	4.50	4.17
AMAAUS	.	.	.	.	0.25	0.25	0.25	0.25	.	.	.	.	3.25	3.25
CARPEN	.	.	.	.	.	.	5.50	5.50	.	.	.	.	.	.
ELEINT	51.25	5.84	.	.	.	.	.	.	.	.	.	.	17.25	12.75
HYDRAN	.	.	.	.	.	.	11.75	4.63	.	.	0.50	0.50	8.75	3.17
LUDLEP	.	.	.	.	.	.	13.25	7.67	.	.	.	.	.	.
PANHEM	.	.	14.00	14.00	.	.	.	.	.	.	.	.	.	.
PELVIR	.	.	.	.	.	.	15.00	15.00	.	.	.	.	40.75	25.11
POLPUN	.	.	3.00	3.00	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	47.25	6.30	.	.	.	.	.	.	24.25	14.25
SAGLAN	.	.	.	.	.	.	82.00	1.29	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	194.75	13.10	.	.	43.75	43.75
SCIVAL	.	.	.	.	.	.	.	.	.	.	148.75	1.25	26.75	15.83
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	7.00	7.00
TYPLAT	.	.	57.25	33.28	20.00	20.00	43.75	43.75	.	.	46.25	46.25	29.50	29.50
UTRSPP	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
UDICOTS	.	.	.	.	.	.	.	.	.	.	0.25	0.25	0.50	0.29
MARCH 1994	SITE 2													
ALTPHI	16.50	16.50	.	.	.	.	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.25
ECLALB	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.25
ELEINT	83.00	6.68	35.00	35.00	21.00	21.00	.	.	.	.	.	.	66.25	38.37
GALTIN	7.75	7.42	.	.	6.25	6.25	.	.	.	.	0.50	0.50	.	.
HYDRAN	15.50	5.19	.	.	2.50	2.50	3.00	3.00	7.25	7.25	6.00	3.67	0.75	0.75
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	25.75	25.75
PONCOR	.	.	.	.	53.75	8.67	.	.	.	.	.	.	19.00	11.34
SAGLAN	.	.	.	.	.	.	114.50	11.98	.	.	.	.	20.00	20.00

Table 14. Vegetation height measurements (Cont.).

SPP	ELEINT MEAN	SE	PANHEM MEAN	SE	PONCOR MEAN	SE	SAGLAN MEAN	SE	SCICAL MEAN	SE	SCIVAL MEAN	SE	MIXED SPP. MEAN	SE
SCICAL	.	.	.	.	53.75	53.75	.	.	258.25	9.82	35.75	35.75	.	.
SCIVAL	23.75	23.75	.	.	.	.	31.75	31.75	.	.	112.00	41.74	94.25	42.67
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	76.75	15.42
TYPLAT	71.50	29.24	147.00	12.17	94.50	31.58	127.75	44.50	94.50	55.23	123.75	42.20	.	.
TYPSPPS	0.25	0.25	0.25	0.25	.	.	0.25	0.25	.	.	0.25	0.25	0.25	0.25
UDICOTS	0.50	0.29	0.25	0.25	.	.	.	.	.	.	.	.	.	.
MARCH 1994	SITE 3													
ALTPHI	9.75	9.75	24.75	11.12	.	.	9.25	9.25	9.00	9.00	.	.	.	.
AMBART	.	.	.	.	1.25	1.25	.	.	.	.	.	.	.	.
ECLALB	.	.	.	.	0.25	0.25	.	.	.	.	.	.	.	.
EICCRA	.	.	7.50	4.50	.	.	5.00	5.00	20.25	8.17	7.00	4.12	.	.
ELEINT	60.00	5.43	.	.	.	.	.	.	.	.	.	.	64.75	21.88
EUPCAP	.	.	.	.	2.00	2.00	.	.	.	.	.	.	.	.
GALTIN	2.00	2.00	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	20.00	5.52	7.50	2.60	4.50	4.50	18.75	7.56	17.75	2.90	7.25	4.42	3.00	3.00
PELVIR	.	.	.	.	.	.	.	.	.	.	.	.	25.75	25.75
PONCOR	.	.	.	.	67.00	5.73	19.00	19.00	.	.	.	.	12.00	7.35
SAGLAN	.	.	.	.	.	.	105.75	8.73	.	.	.	.	25.50	25.50
SCICAL	.	.	.	.	.	.	.	.	207.75	18.55	31.00	31.00	.	.
SCIVAL	.	.	.	.	.	.	.	.	.	.	47.75	25.12	7.00	7.00
THAGEN	.	.	25.75	25.75	.	.	.	.	.	.	.	.	80.00	27.31
TYPLAT	21.25	21.25	52.50	52.50	92.50	55.28	43.75	43.75	.	.	90.00	56.61	.	.
THAGEND	.	.	.	.	.	.	.	.	.	.	.	.	12.75	12.75
TYPLATD	.	.	2.50	2.50	.	.	.	.	.	.	.	.	.	.
TYPSPPS	.	.	0.25	0.25	0.25	0.25	.	.	.	.	.	.	.	.
UDICOTS	.	.	0.50	0.29	.	.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

californicus (300 cm) peaked around February 1993. Finally, *Panicum hemitomon* (25 cm) peaked around the August 1993 sample period. The potential competitor species *Typha latifolia* tended to reach a lower height than the target species (Figures 60-65). The exception to the pattern of lower *T. latifolia* heights occurred in the *P. hemitomon* plot. *P. hemitomon* tended to survive and colonize poorly. Its height measurements partly reflect a lack of presence in the vegetation community.

The mixed species planted plots presented a special case with respect to measuring species performance. In contrast to the single species plots, species position in the mixed plot was more randomly arranged. Therefore, a height measurement would reflect the presence of the species initially or its subsequent invasion of the plot with time. With this in mind it is not possible to directly compare the results of measurements in single species plots to mixed species plots. Similar patterns over time that include growth to a peak followed by a height decline are comparable and do reflect the nature of vegetation community development on the site (Table 14). The tall "flag" species *Thalia geniculata* provided the most temporally dynamic height pattern with growth to 200-400 cm during the summer followed by a winter decline to 10-80 cm (Table 14). The competitor species *T. latifolia* reached a peak height of about 100 cm at Site 2 in February 1993. Its height declined in subsequent samples. *Typha* height was not measured at Sites 1 and 3 during most of the study period because of its inability to compete in the mixed species planted plots.

NATURAL SUCCESSION -- STRUCTURE AND COMPOSITION

Hydrology

In spite of the uncertainty in determining hydroperiod associated with floating mat formation some useful water depth patterns were measured. The water depth plots showed a general pattern of mean water depth increase to an approximate plateau of about 50 cm in the south marsh and a little over 25 cm in the north marsh (Figures 66-74). Water depths dropped to near zero at most plots in March 1994 as a result of drawdown. Observations in the field during the drawdown and from the standard error of the mean provided evidence of the extensive area of floating vegetation mat (Figures 66-74). Large standard error estimates resulted from measurements on dry mat surface interspersed with measurements in open water. Finally, plots of water depth over time along each transect provide a higher resolution view of transect level hydrologic conditions (Figures 66-74). These graphics clearly show increased standard errors in the sample prior to mat flotation and decreased water depth after flotation at times when the marsh is flooded (Figures 66-74).

Water depth measurements along the transects revealed that depth was not always distributed evenly (Figures 66-74). Transects 1 (Figure 66) and 2 (Figure 67) tended to deepen from the middle to the southern end, and transect 9 (Figure 70) deepened toward its western end. Water depths along transects 3 (Figure 68) and 4 (Figure 69) were somewhat evenly distributed. Transects 5 (Figure 71) and 7 (Figure 73) gradually declined in depth from north to south. Transects 6 (Figure 72) and 8 (Figure 74) had nearly constant water levels until a rapid water depth decrease from 400 m to the end of

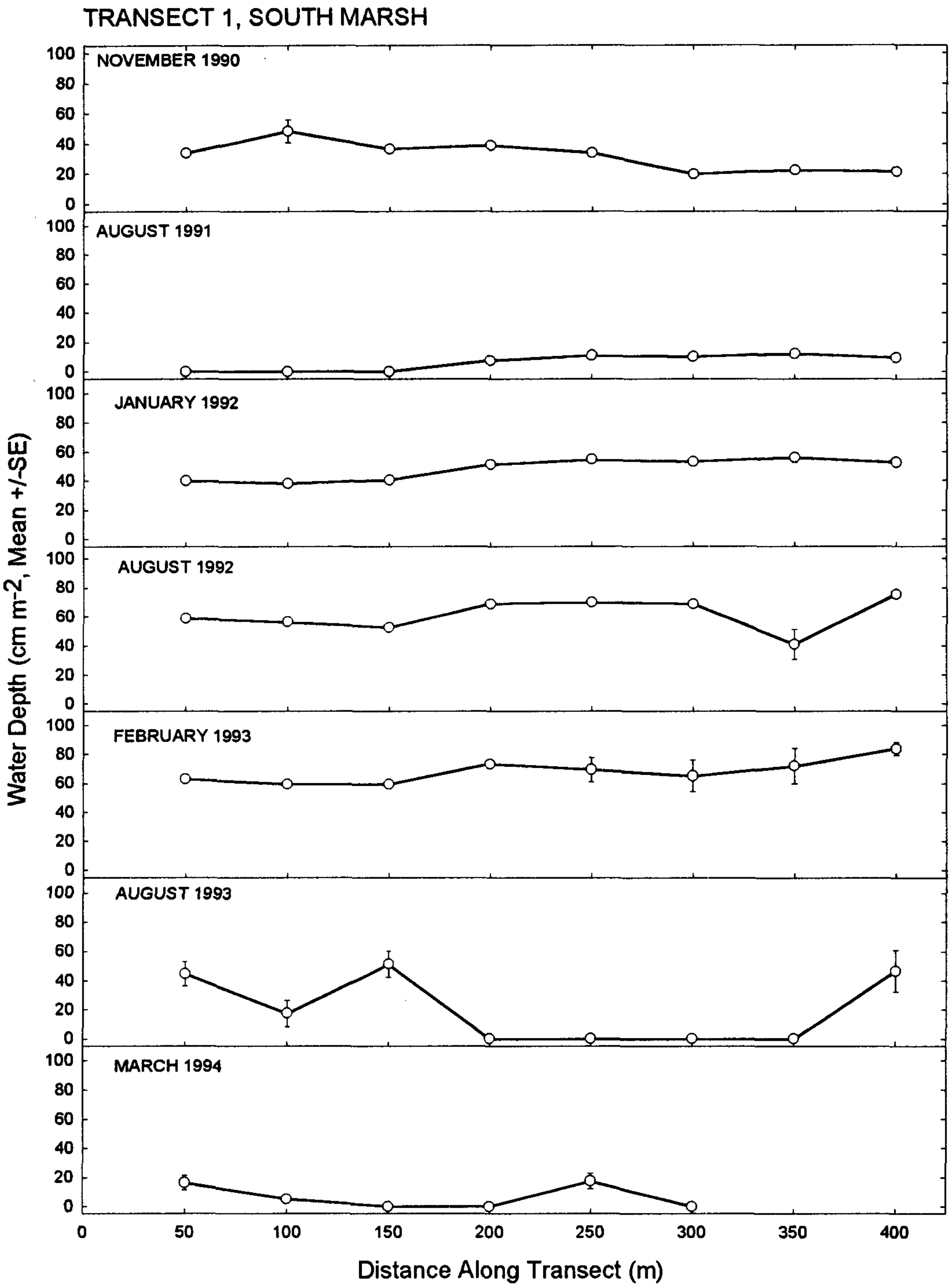


Figure 66. Water depth time series from Transect 1, Natural Succession transects.

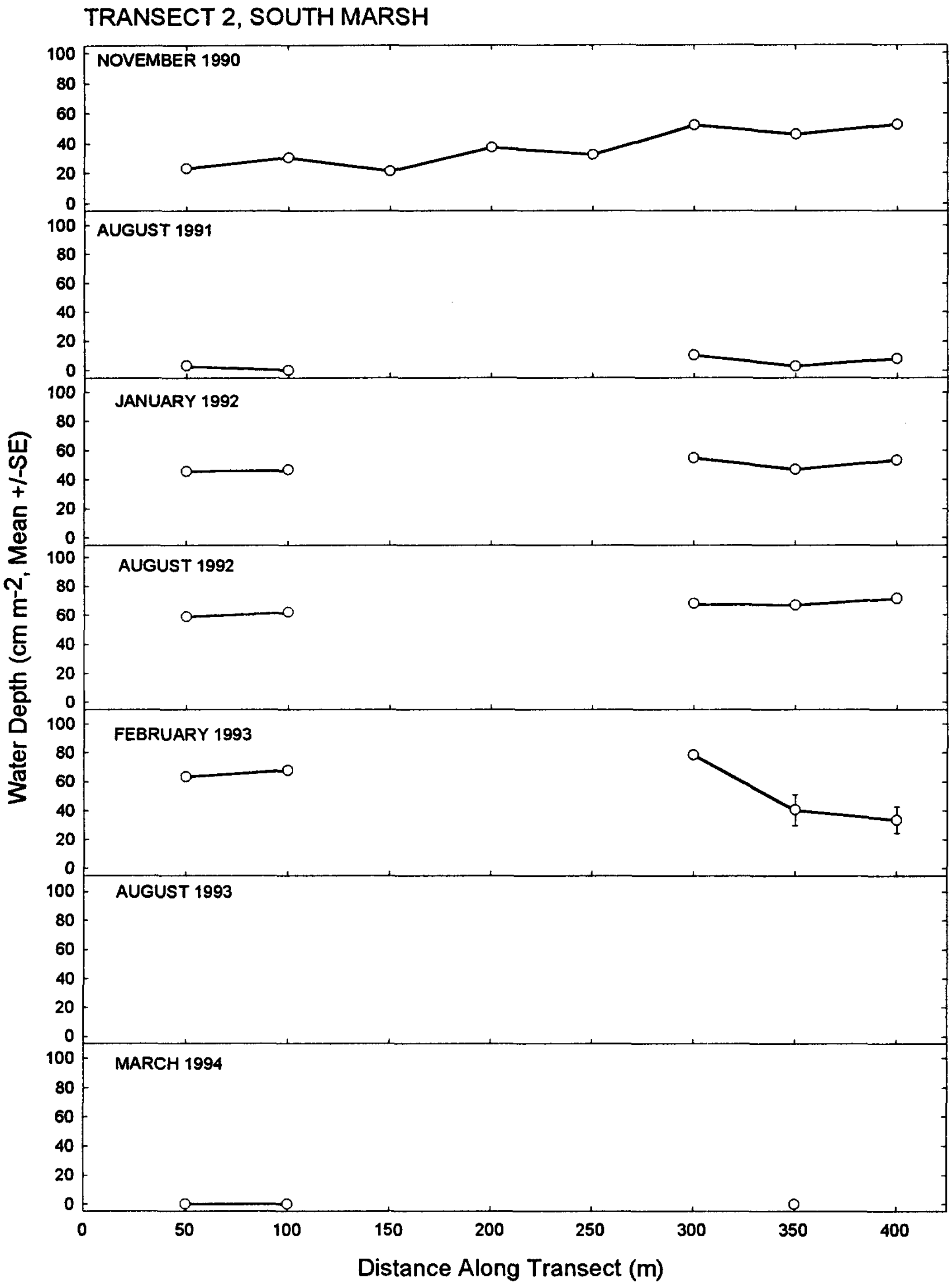


Figure 67. Water depth time series from Transect 2, Natural Succession transects.

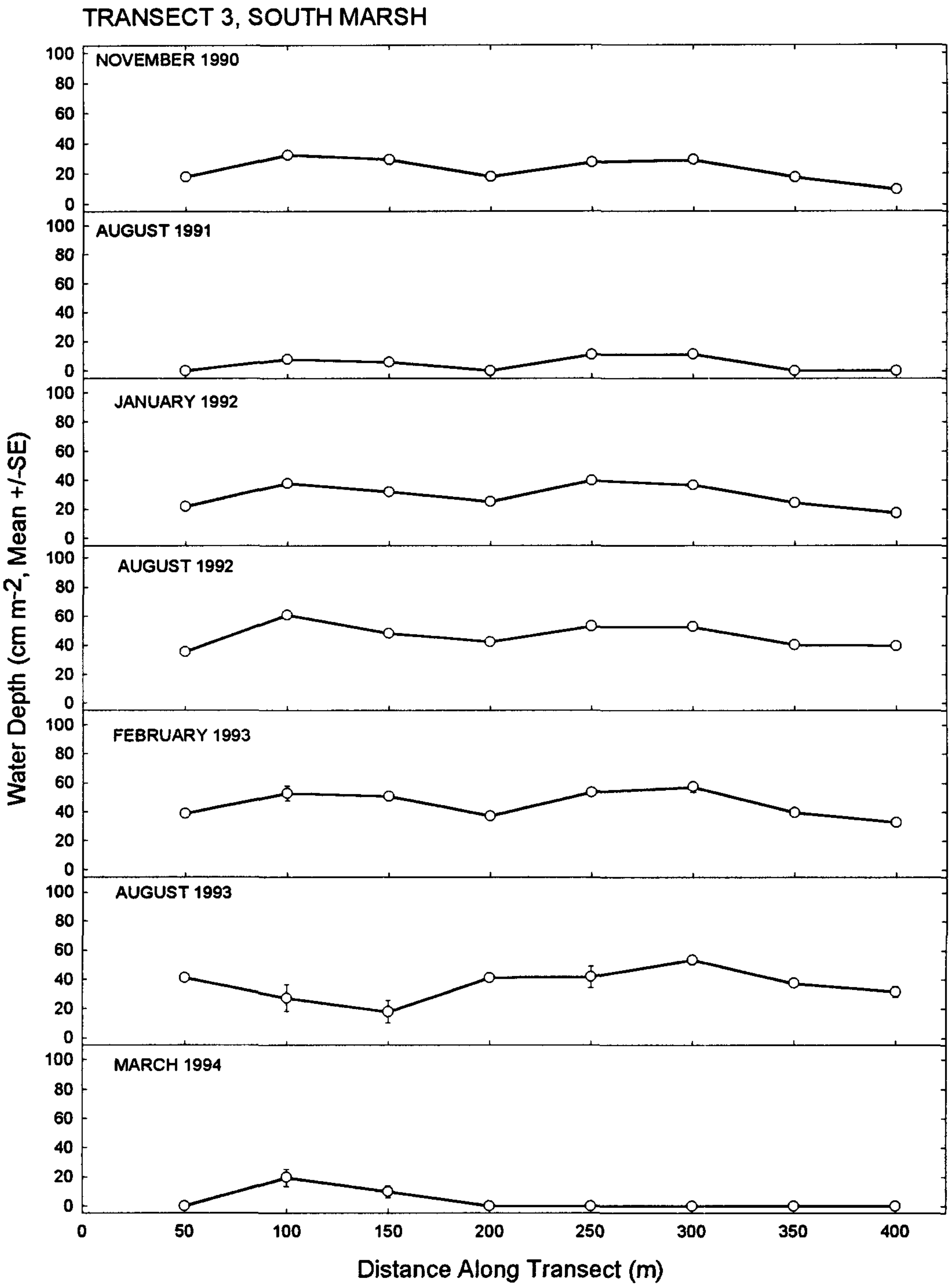


Figure 68. Water depth time series from Transect 3, Natural Succession transects.

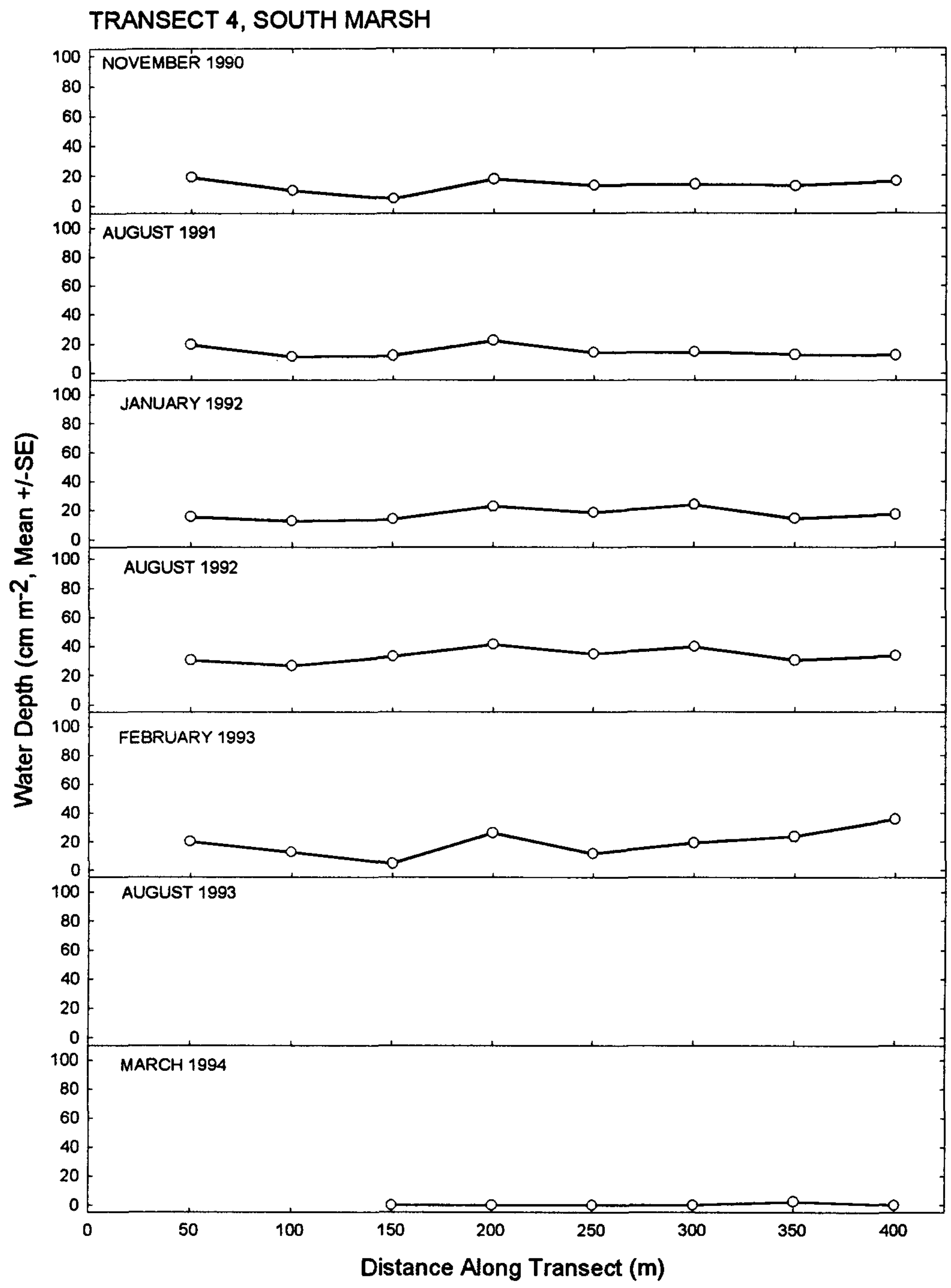


Figure 69. Water depth time series from Transect 4, Natural Succession transects.

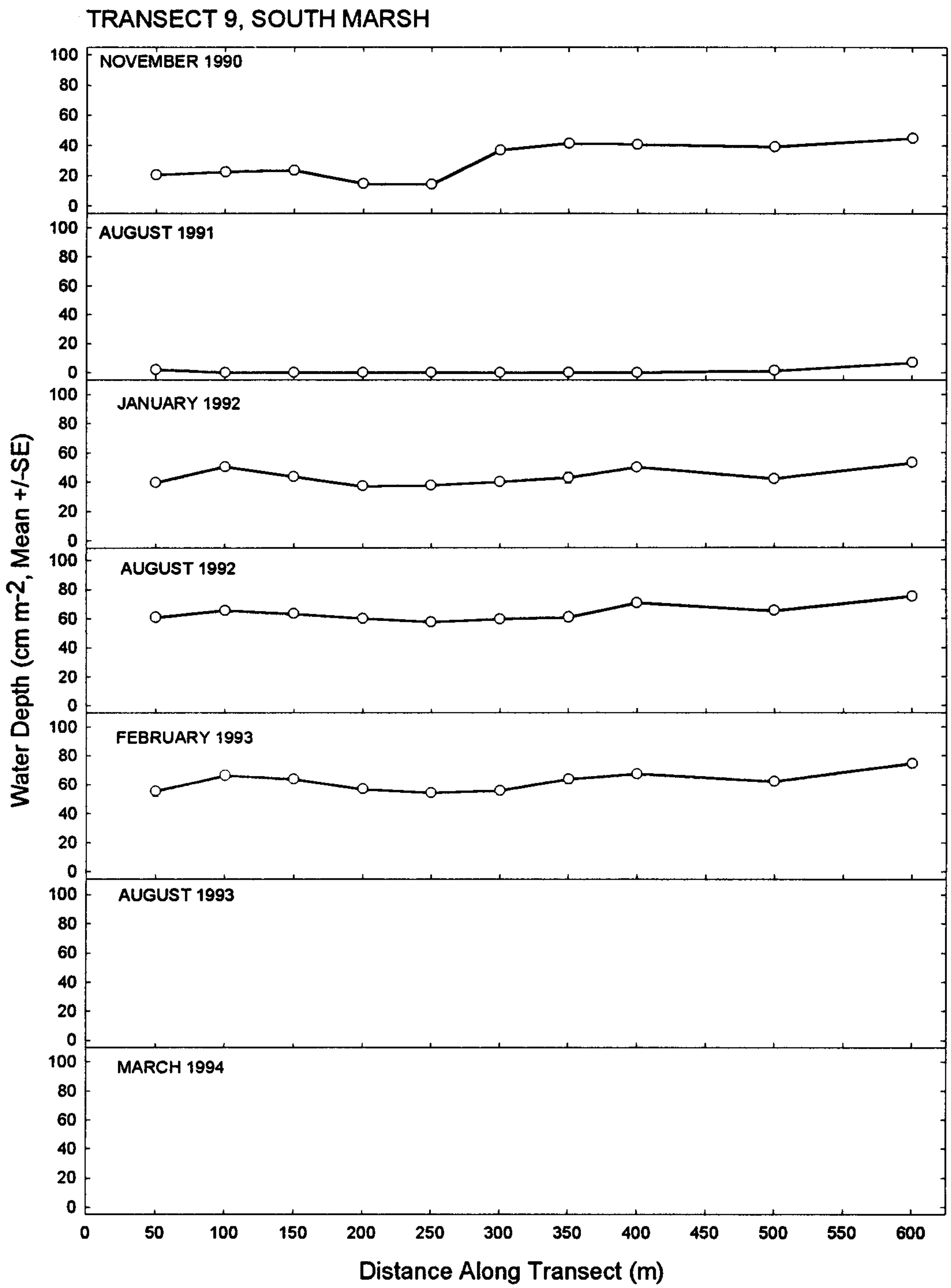


Figure 70. Water depth time series from Transect 9, Natural Succession transects.

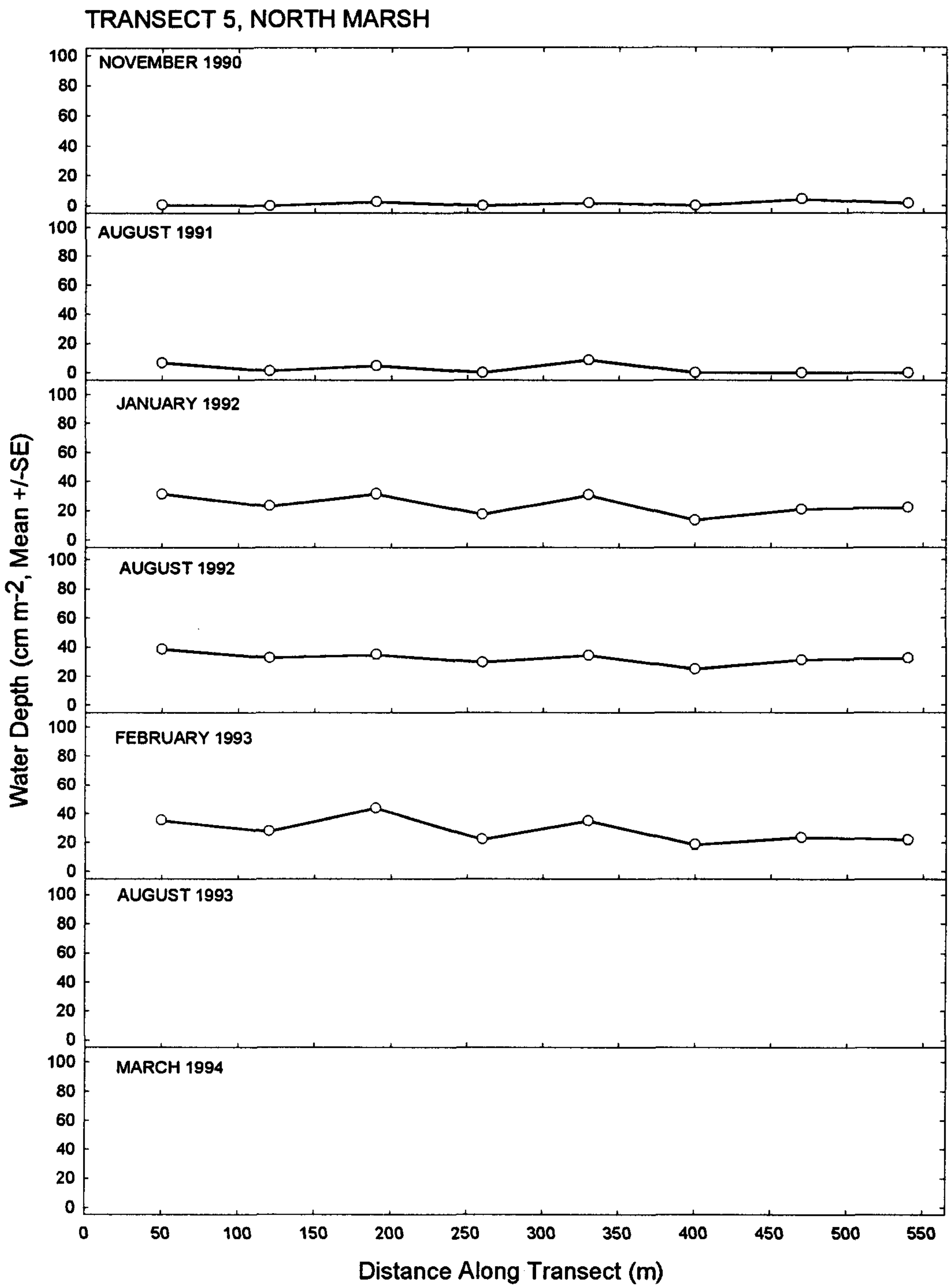


Figure 71. Water depth time series from Transect 5, Natural Succession transects.

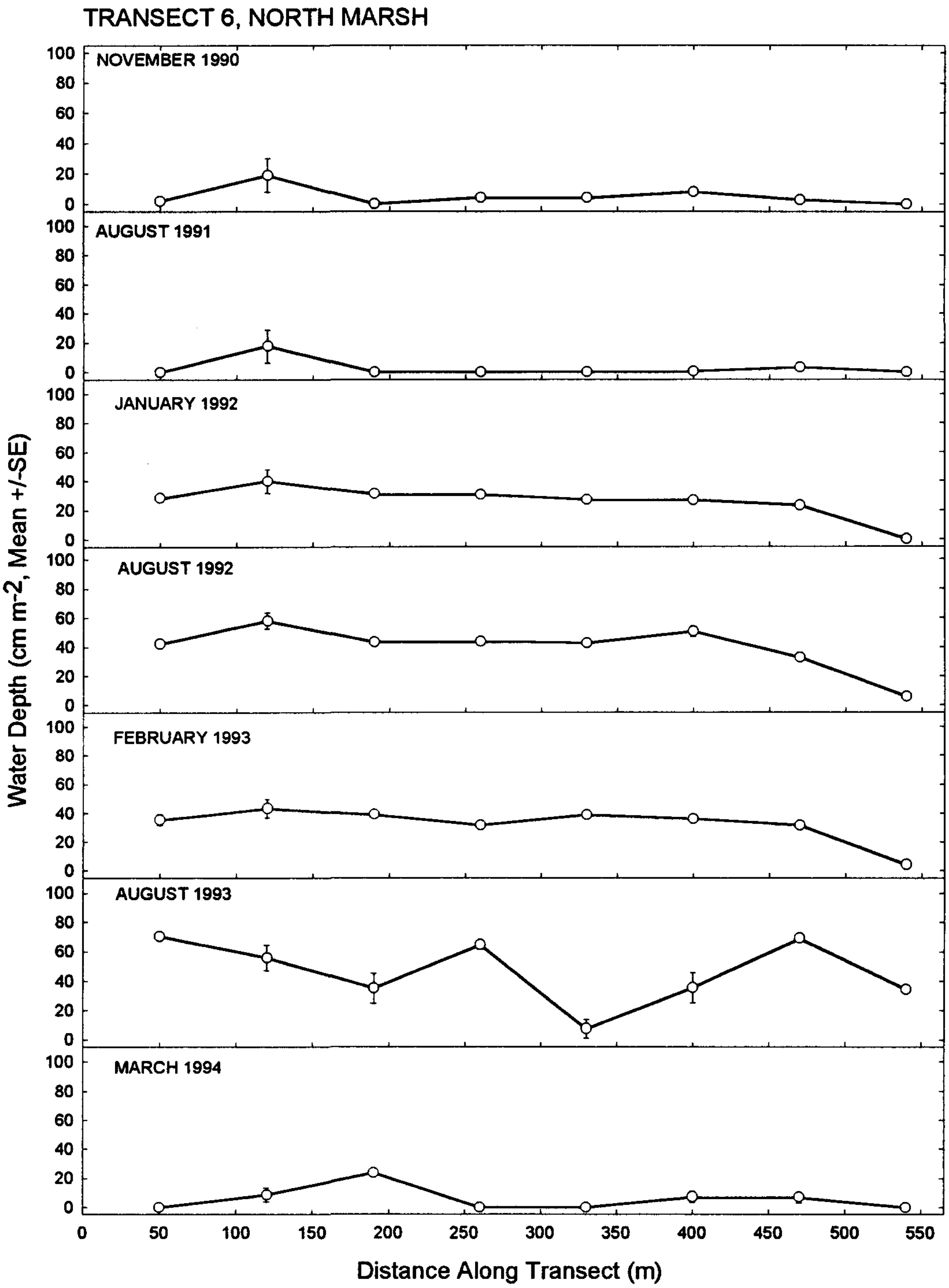


Figure 72. Water depth time series from Transect 6, Natural Succession transects.

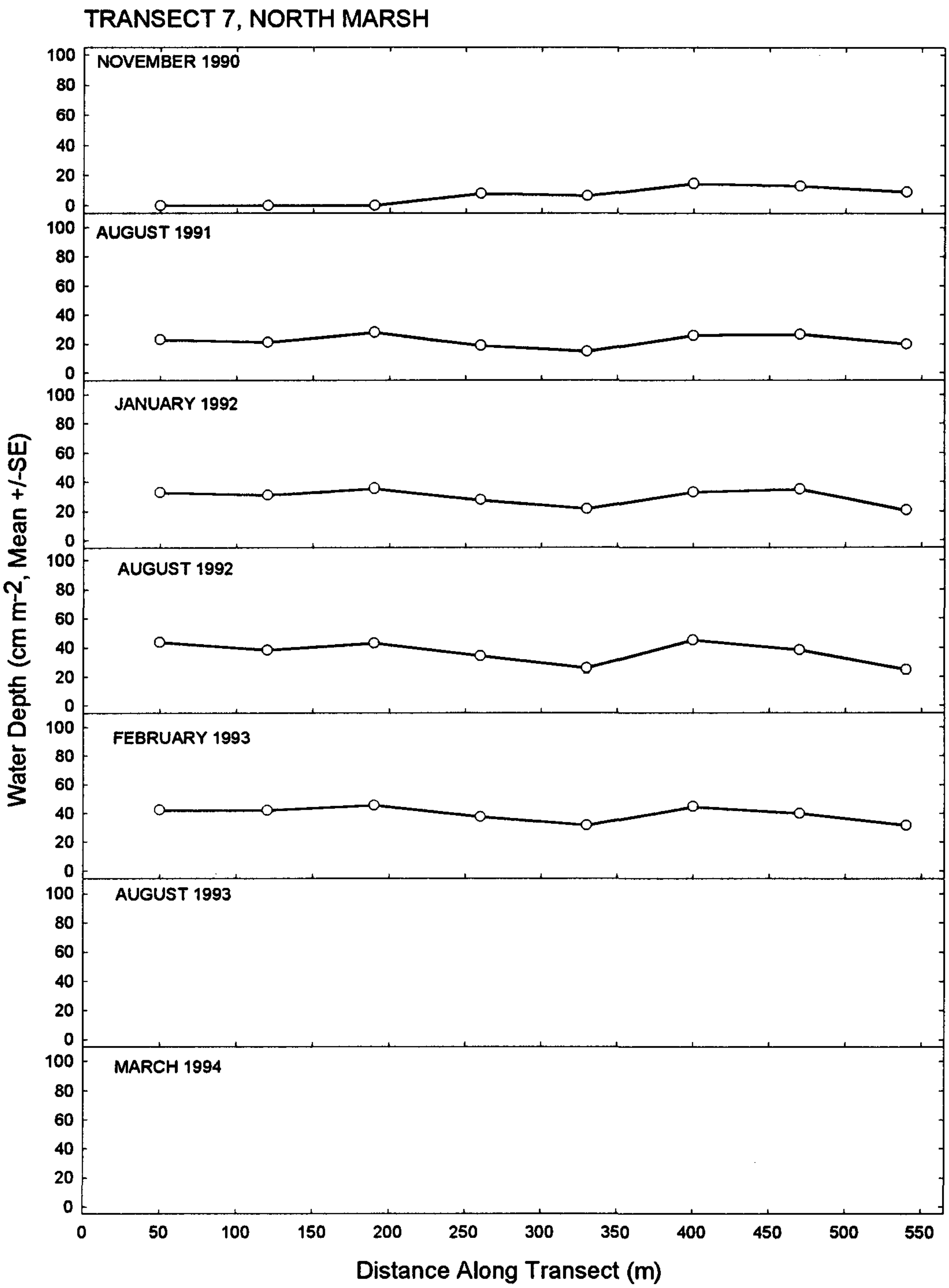


Figure 73. Water depth time series from Transect 7, Natural Succession transects.

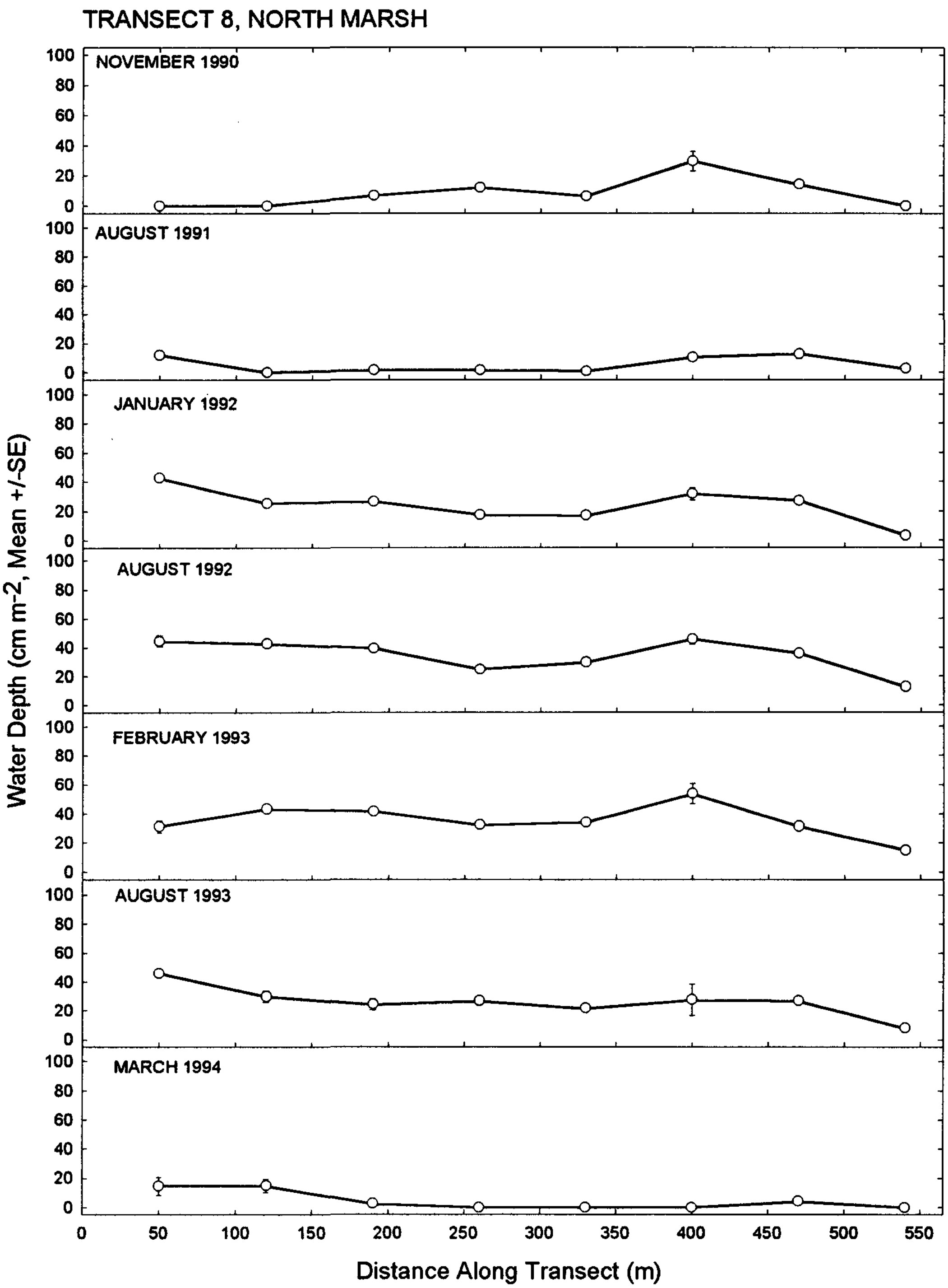


Figure 74. Water depth time series from Transect 8, Natural Succession transects.

the transect.

Vegetation Plots

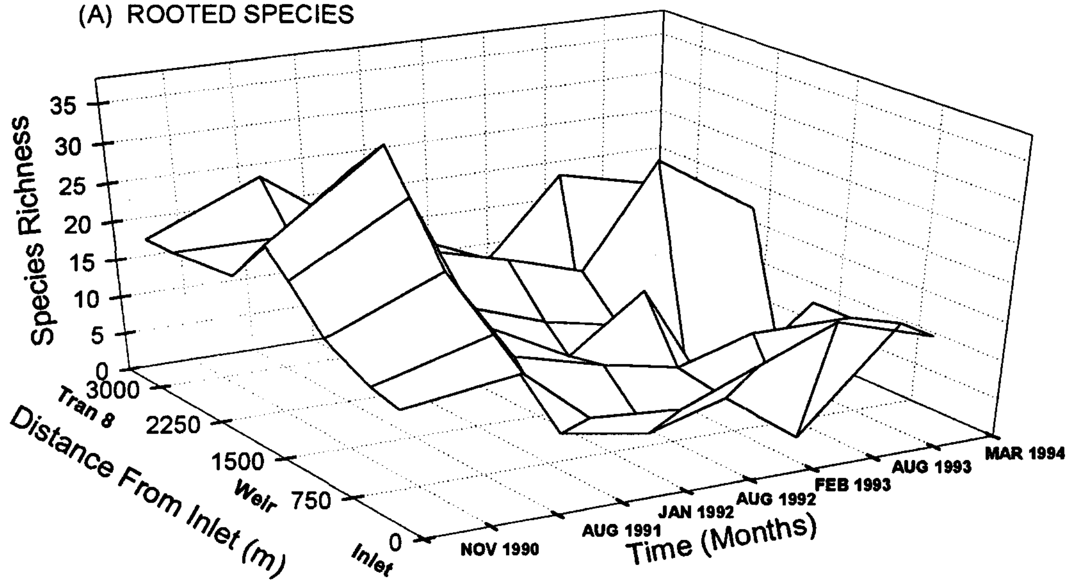
Flora. Distinctive spatial and temporal trends for rooted and floating plant species were detected (Figure 75). Species richness estimates for each plant type were related to water depth history. As we have seen, water depth history can be a function of management driven water level manipulation (e.g. drawdown for structure maintenance or vegetation management) or natural floating mat formation.

Rooted species richness was at a maximum (37 spp.) on Transect 5 during (August 1991) when water levels were lowered to accommodate the establishment of the Experimental Planting Sites (Figure 75). As time since the last drawdown increased, species richness declined to 4 spp. on Transect 2 at month 9 (August 1992). Species richness increased late in the sample period as water levels were dropped or floating mats formed. Simultaneously, *Typha* spp. dominance increased leading to exclusion of other flood tolerant species. A trend of increasing species richness with distance from the marsh inlet was found (Figure 75).

Floating plant species richness was zero at all sites at month 0 (November 1990) when water levels were low (Figure 75). Species richness reached a maximum 7 spp. on Transects 5 and 7 at month 9 (August 1992). The temporal pattern of species richness was opposite that of the rooted plant species. Early in vegetation community development, floating plant species richness was low because of the lack of standing water and a dense overstory cover. After the site was flooded, intolerant species were killed,

Natural Succession Transects

(A) ROOTED SPECIES



(B) FLOATING SPECIES

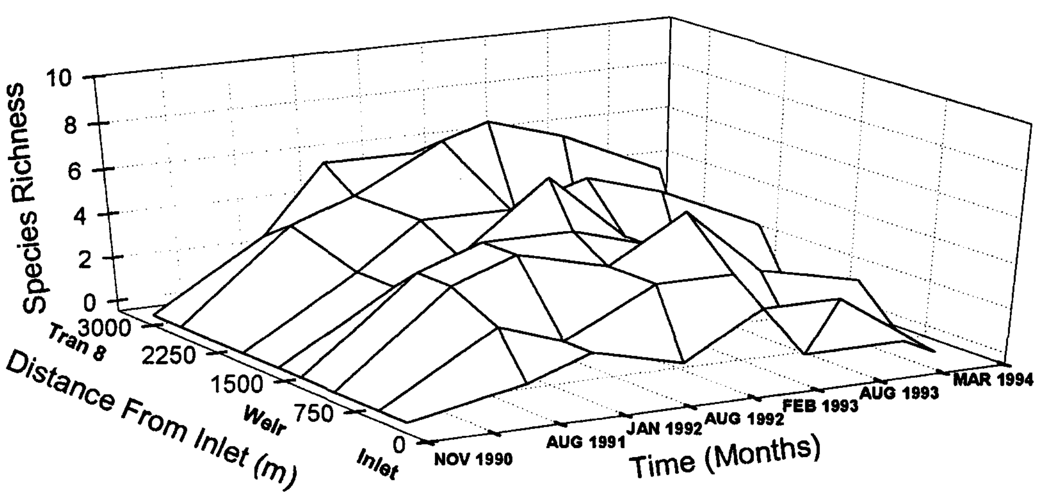


Figure 75. Time series response surface plot of rooted (Top graph) and floating (Bottom graph) plant species richness, Natural Succession Transects.

exposing the water surface to full sunlight. With time, vegetation community development, floating mat development, and drawdown for maintenance leading to increased vegetation overstory development reduced the area favorable for floating species. The responses as measured by cover percent for the 15 most dominant species are presented in Figures 76-90.

Effects of Flooding. Two flooding effects were observed. First, with time flooding killed or reduced the coverage of plants that were flood intolerant or annually reproducing. These species included: *Eupatorium capillifolium* and *Ludwigia octovalvis* (Figures 78, 82). Second, the hydrophytic species *Typha domingensis* and *T. latifolia* increased areal coverage under flooded conditions (Figures 89, 90) With the loss of flood intolerant species, *Typha domingensis* and *T. latifolia* gained a competitive advantage and expanded their ranges. Additional flood tolerant species, including: *Alternanthera philoxeroides* (Figure 76), *Hydrocotyle ranunculoides* (Figure 79) and *Hydrocotyle* spp. (probably includes both *Hydrocotyle ranunculoides* and *H. umbellata*) (Figure 80) have become more widespread over time. At the drier ends of transects the prolific *Ludwigia peruviana* became dominant (Figure 83). *Salix caroliniana* increased its cover primarily in an area of initial establishment along the north levee of the north marsh (Figure 88).

The flood tolerant species *Pontederia cordata* (Figure 86) and *Sagittaria lancifolia* (Figure 87) were found at low levels (<5% cover) early in the project. Coincident with drawdown in the south marsh, *Pontederia cordata* cover increased to

Natural Succession Transects

Alternanthera philoxeroides

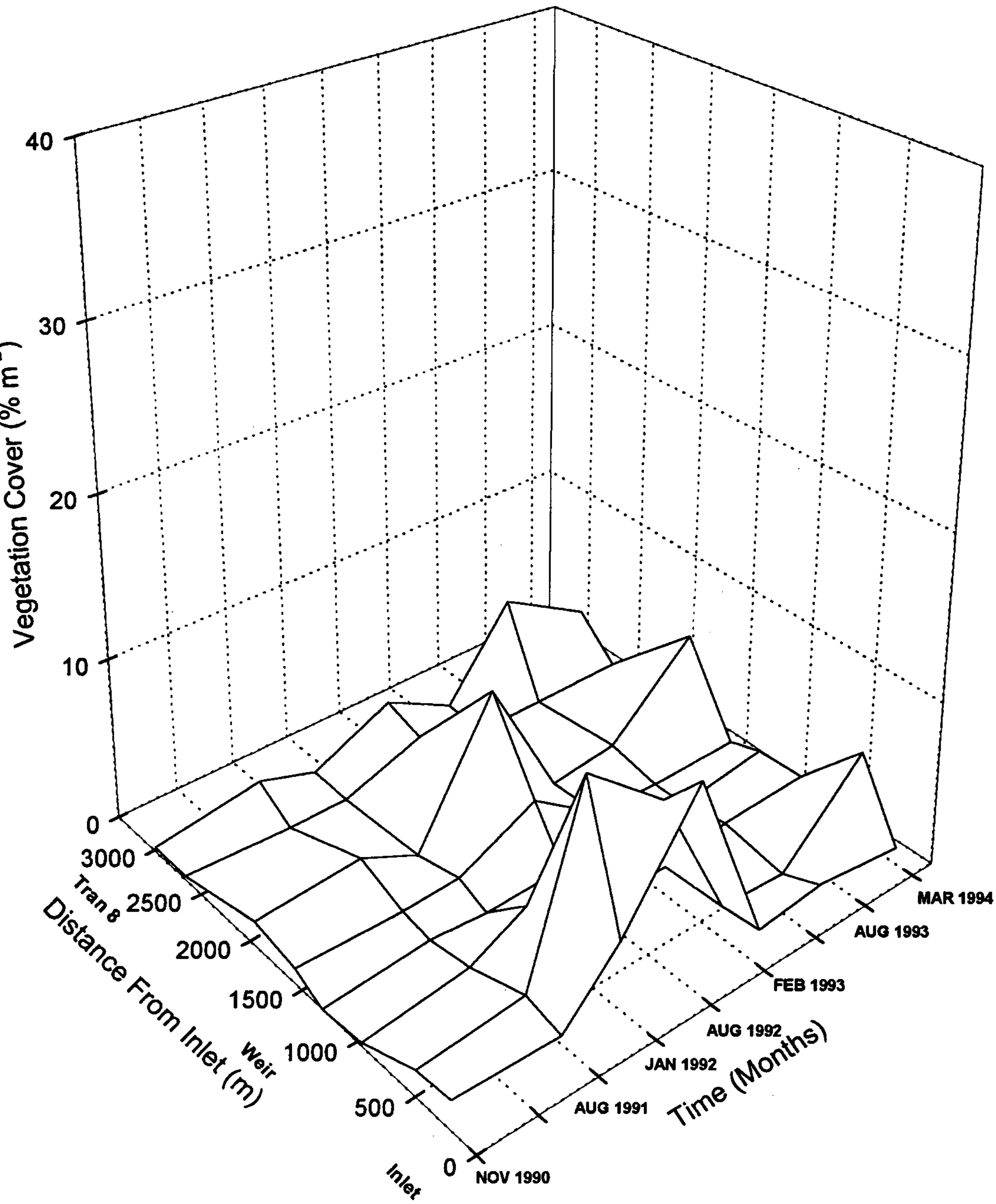


Figure 76. Time series response surface plot of *Alternanthera philoxeroides* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Amaranthus australis

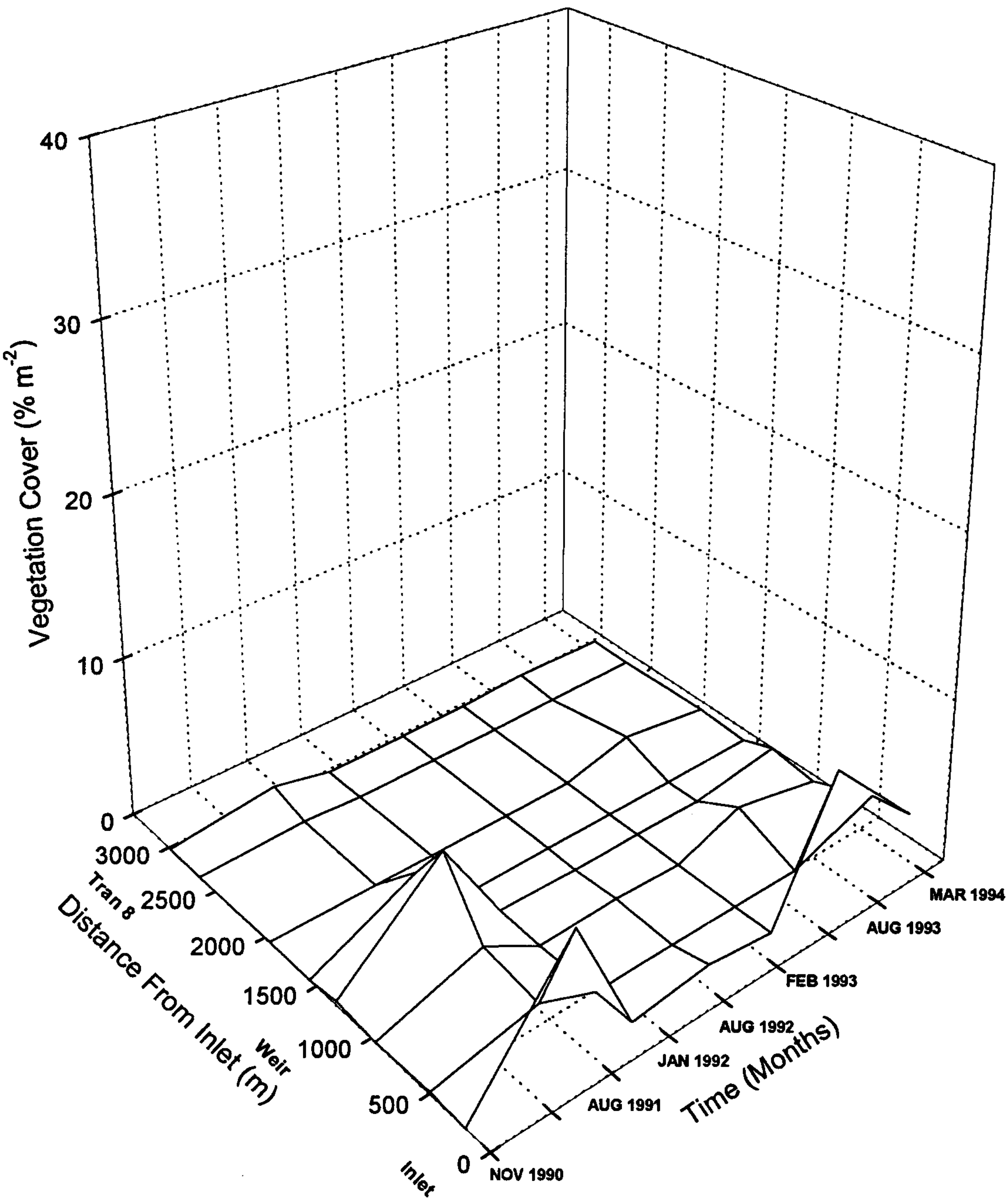


Figure 77. Time series response surface plot of *Amaranthus australis* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Eupatorium capillifolium

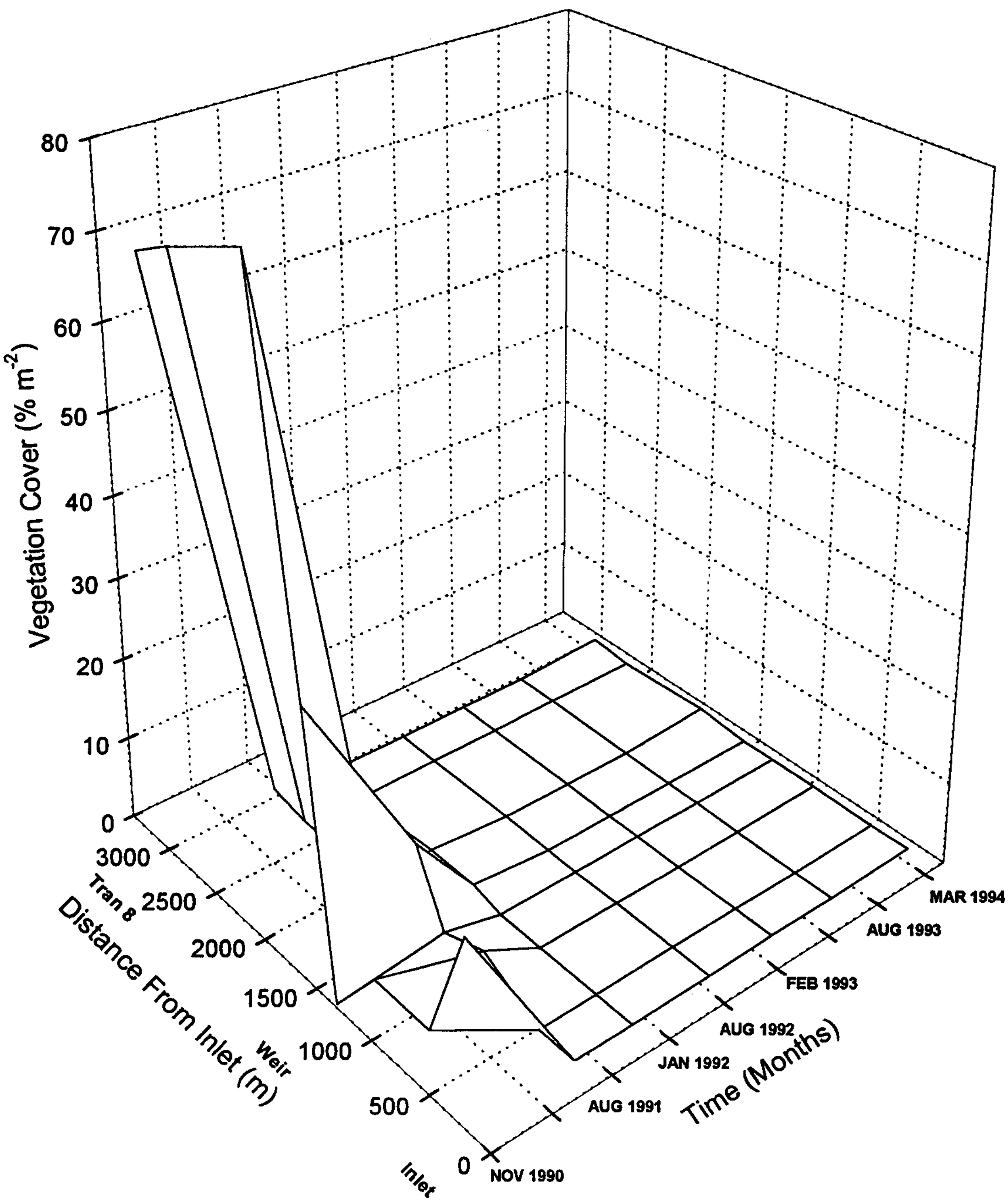


Figure 78. Time series response surface plot of *Eupatorium capillifolium* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Hydrocotyle ranunculoides

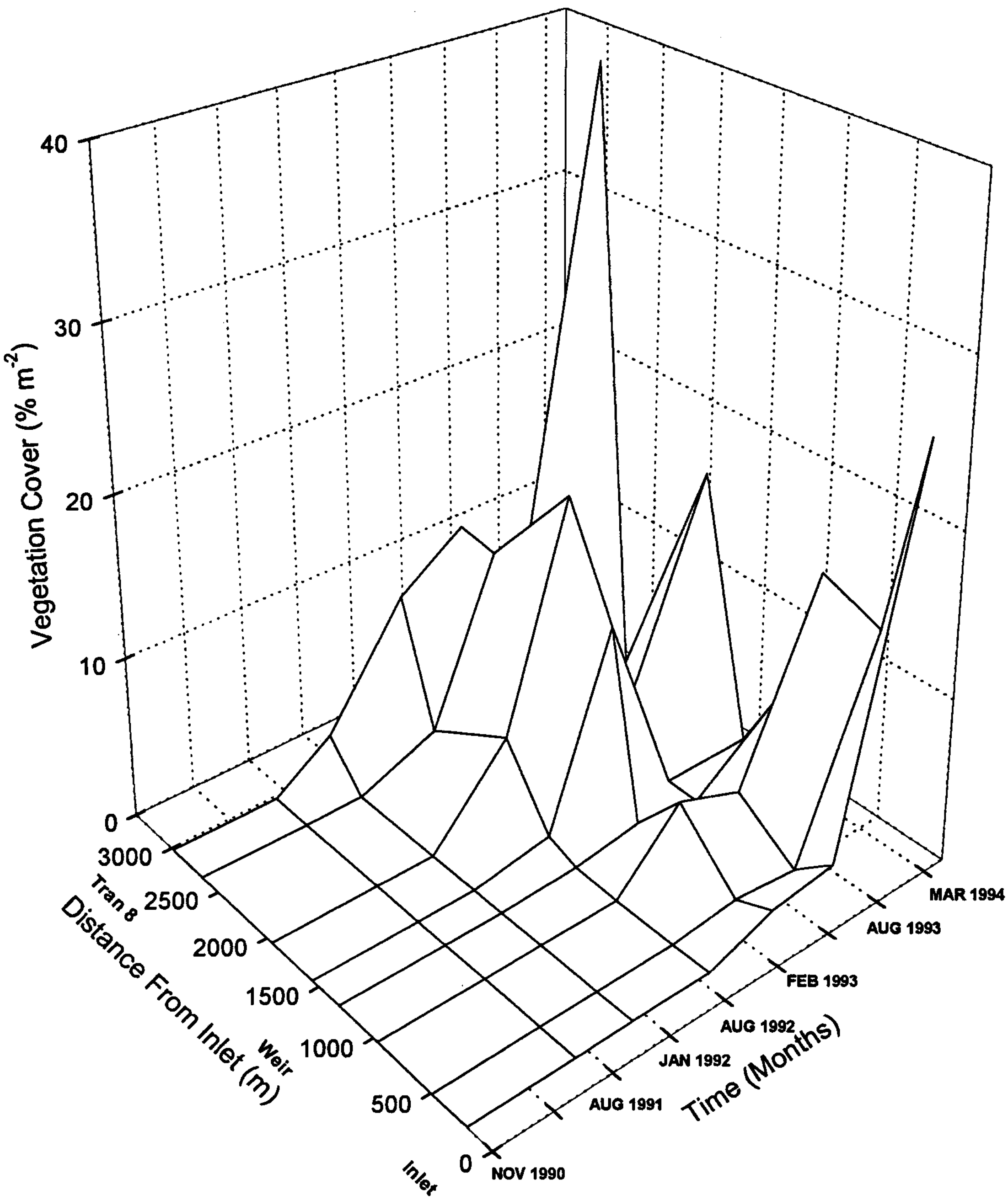


Figure 79. Time series response surface plot of *Hydrocotyle ranunculoides* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Hydrocotyle spp.

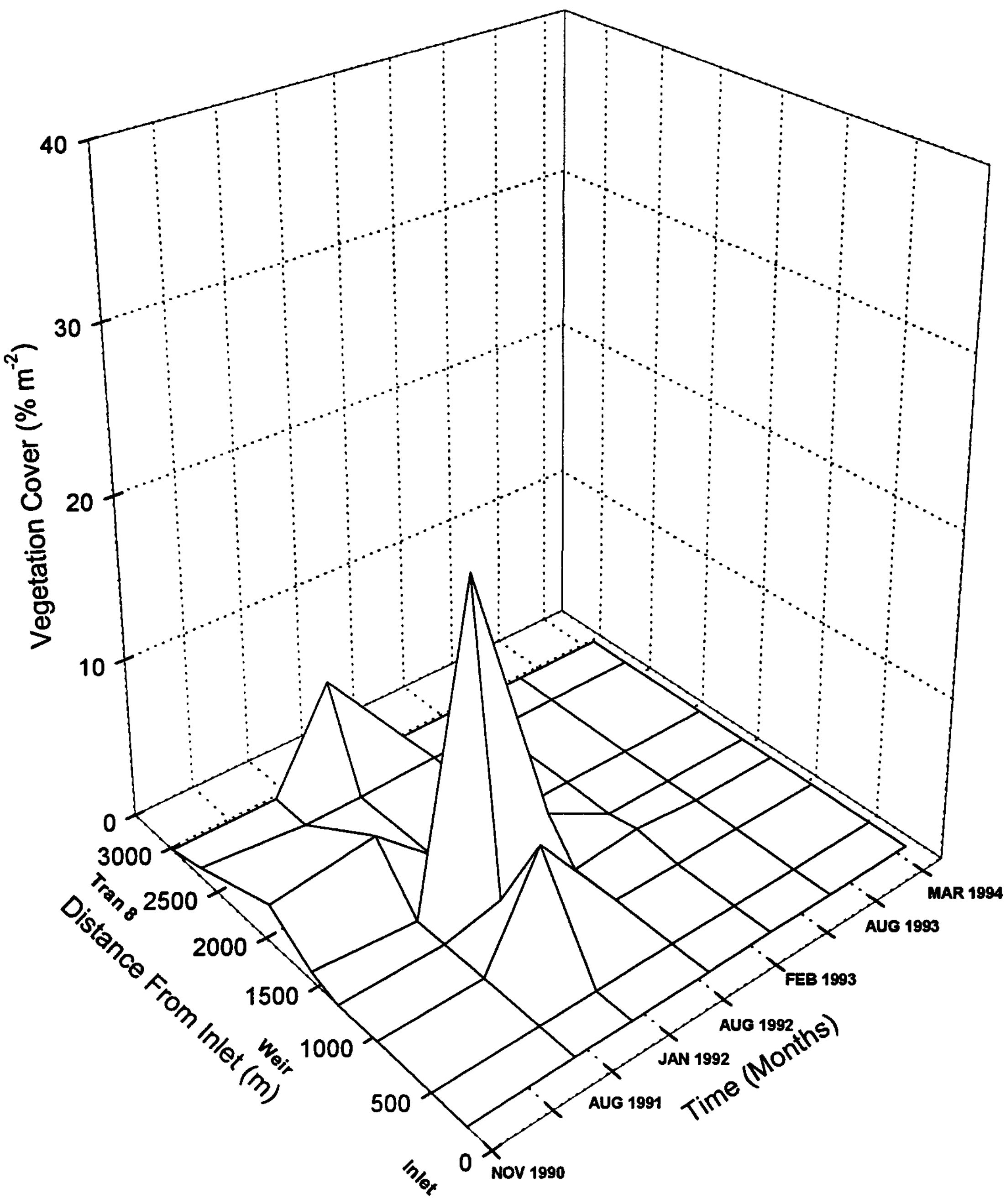


Figure 80. Time series response surface plot of *Hydrocotyle* spp. cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Ludwigia leptocarpa

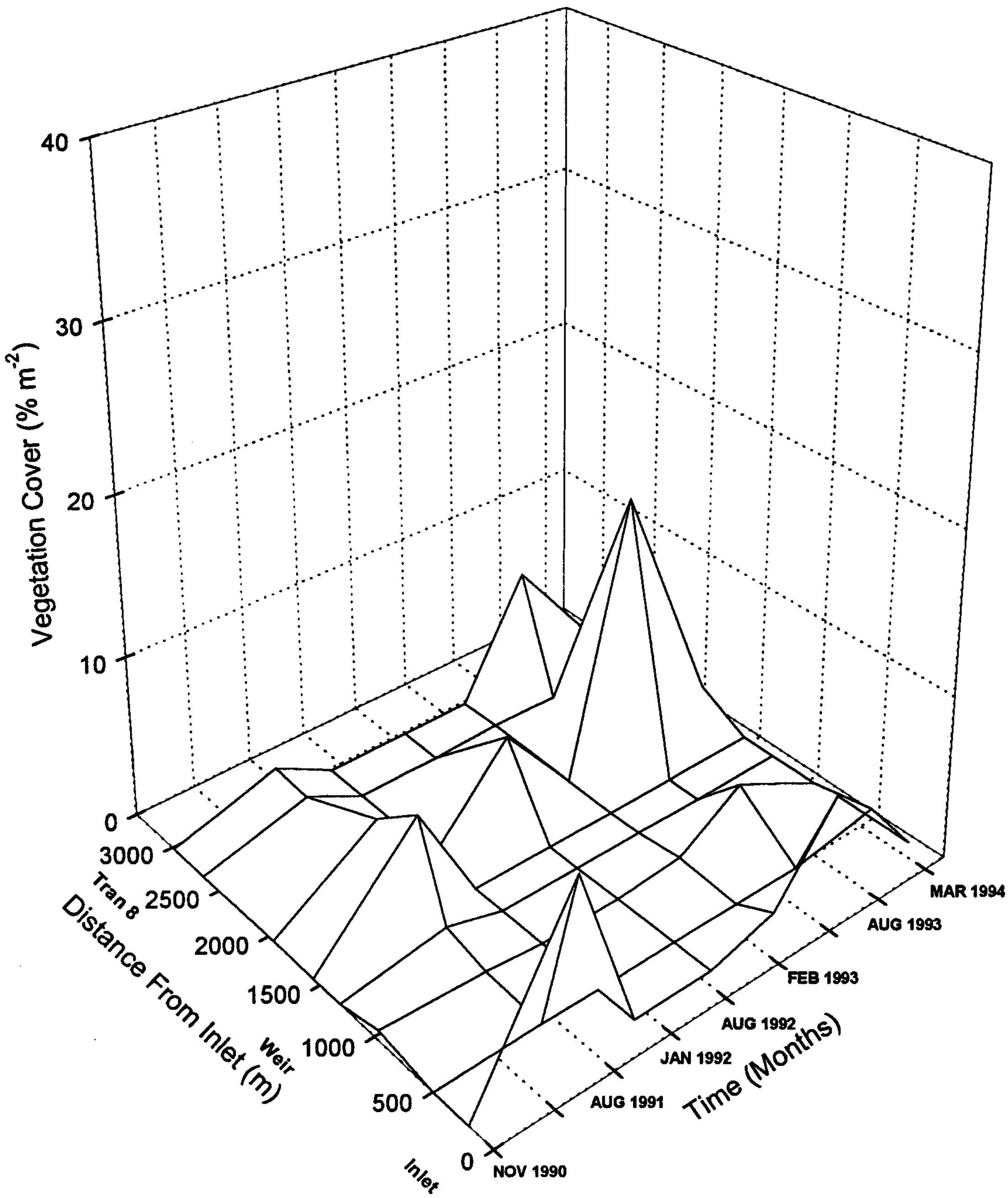


Figure 81. Time series response surface plot of *Ludwigia leptocarpa* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Ludwigia octovalvis

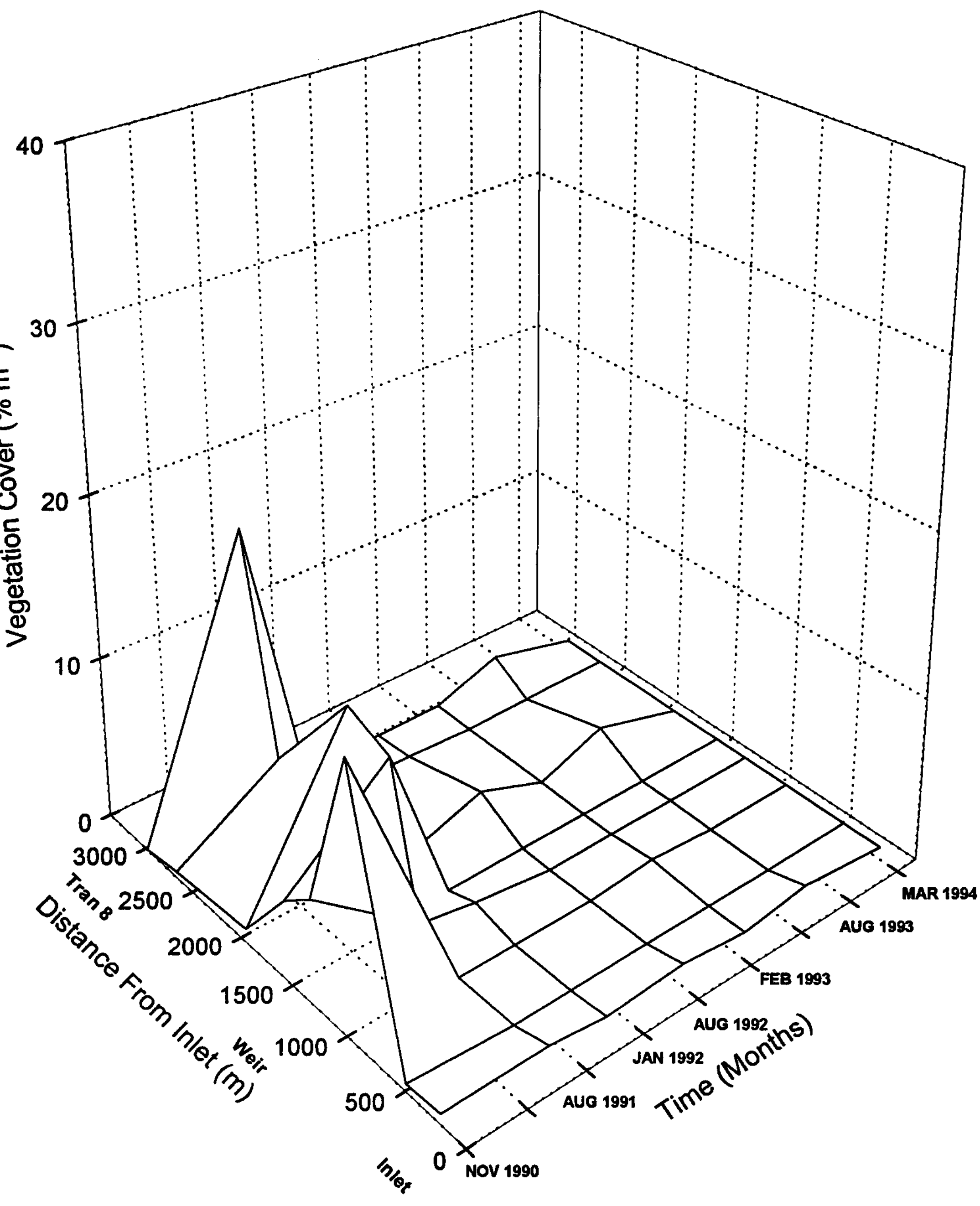


Figure 82. Time series response surface plot of *Ludwigia octovalvis* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Ludwigia peruviana

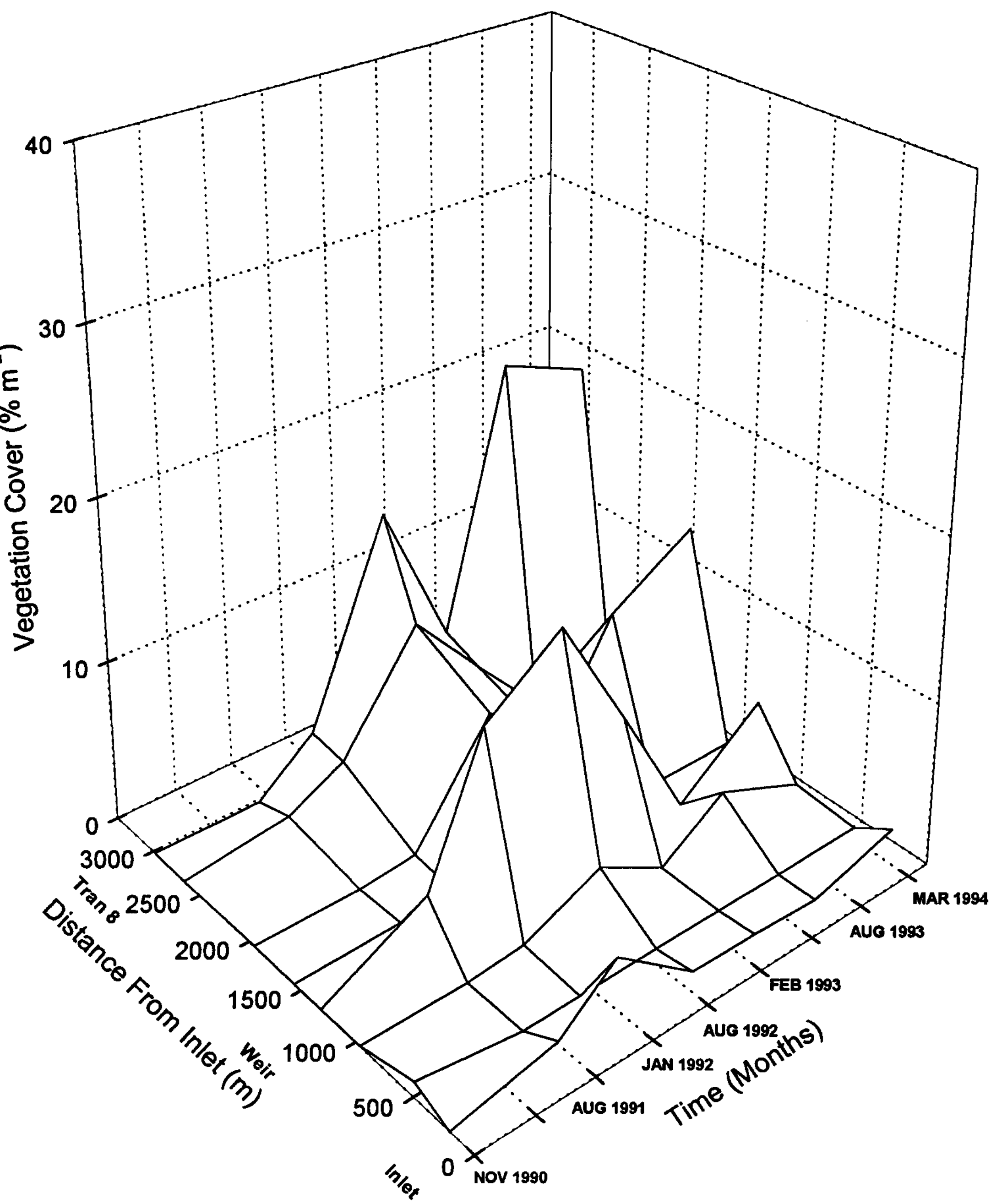


Figure 83. Time series response surface plot of *Ludwigia peruviana* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Panicum dichotomiflorum

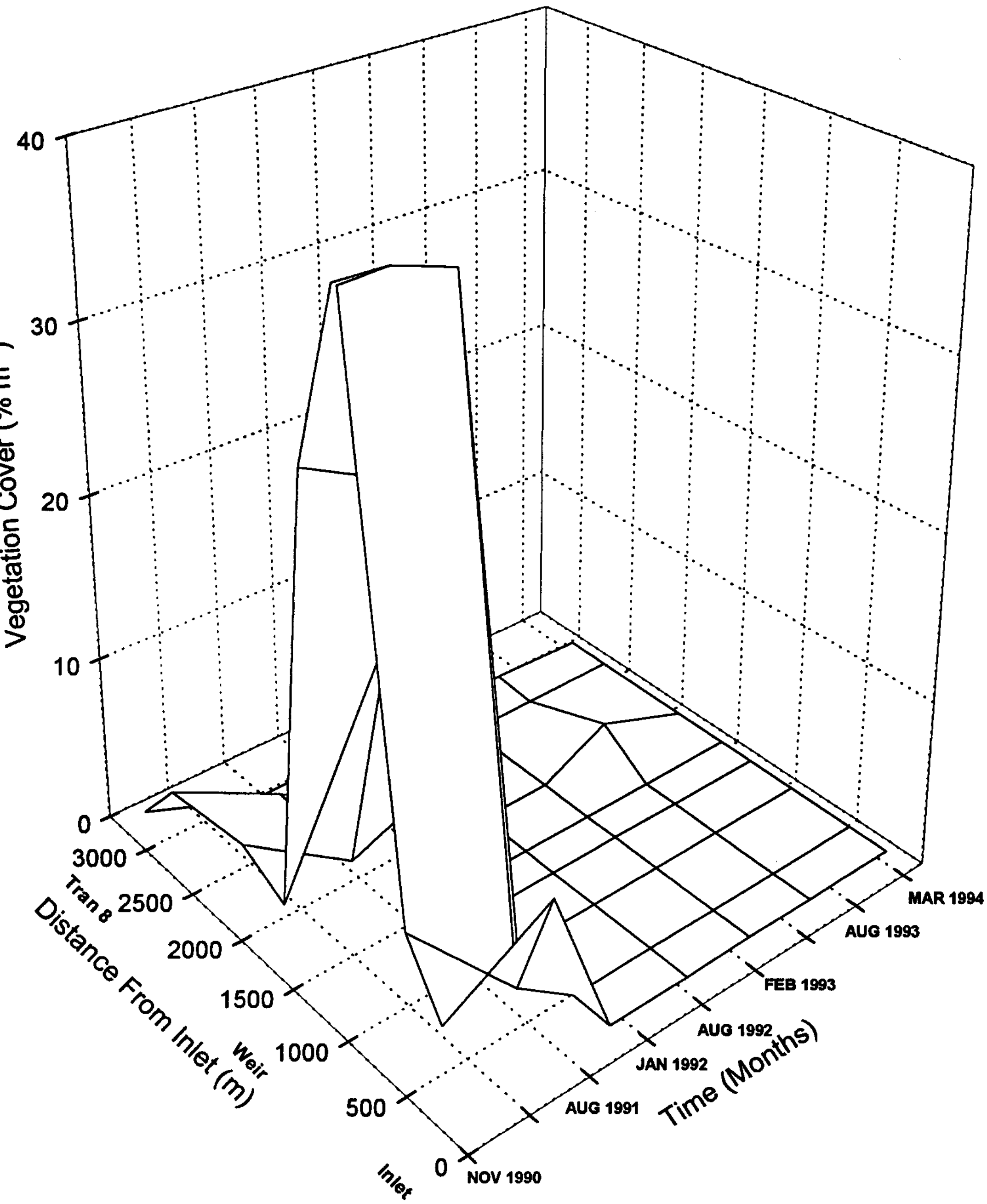


Figure 84. Time series response surface plot of *Panicum dichotomiflorum* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Polygonum punctatum

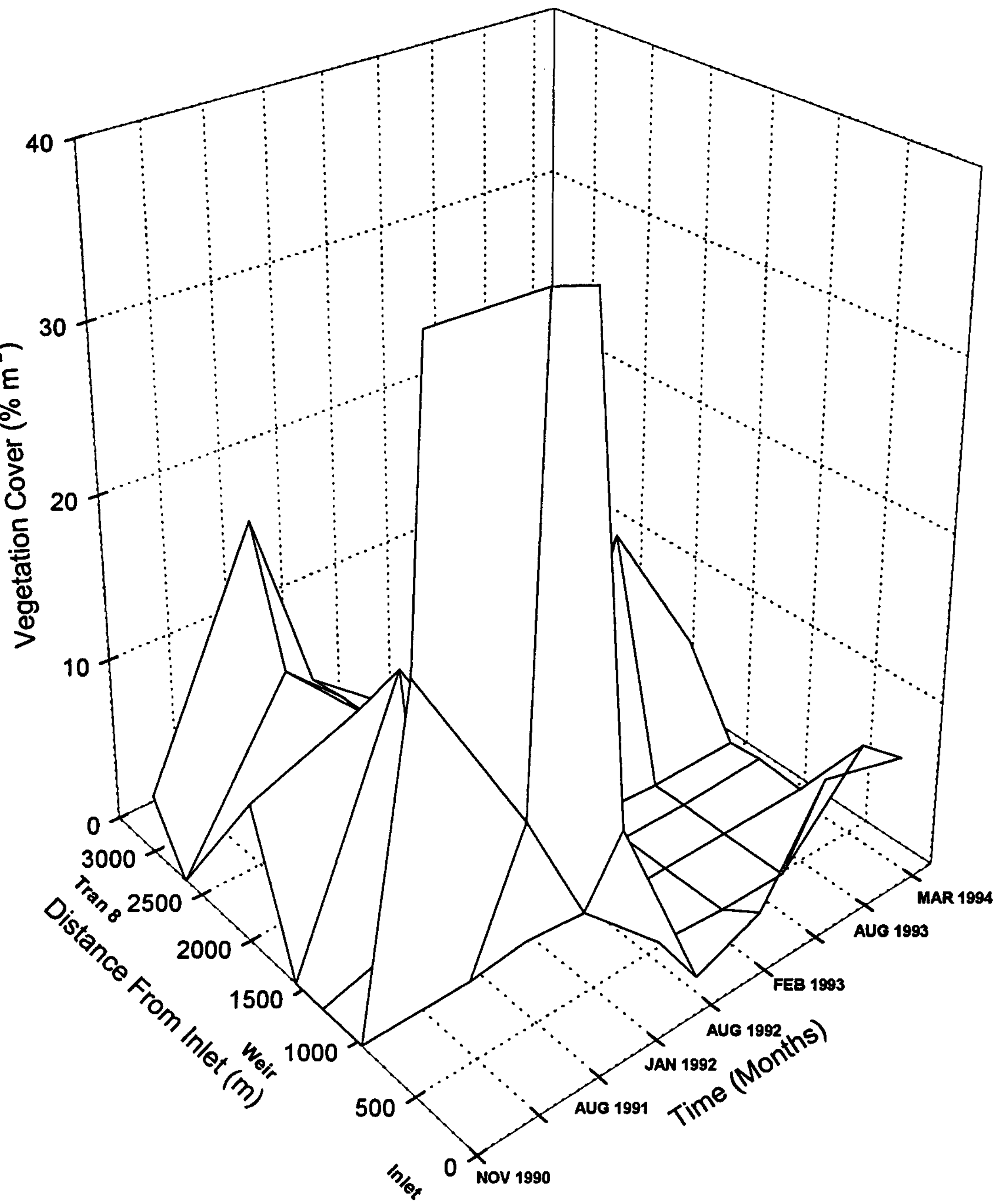


Figure 85. Time series response surface plot of *Polygonum punctatum* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Pontederia cordata

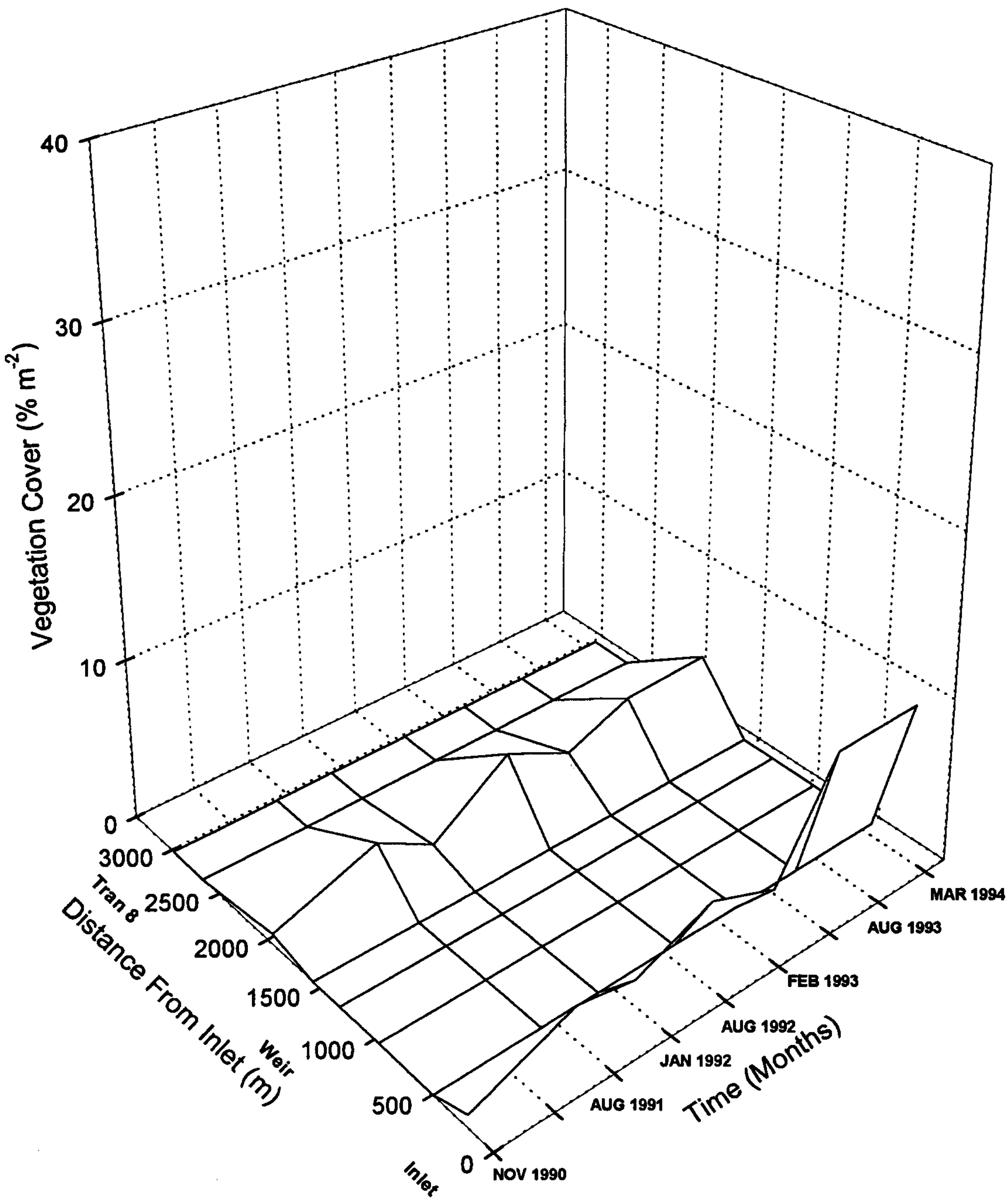


Figure 86. Time series response surface plot of *Pontederia cordata* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Sagittaria lancifolia

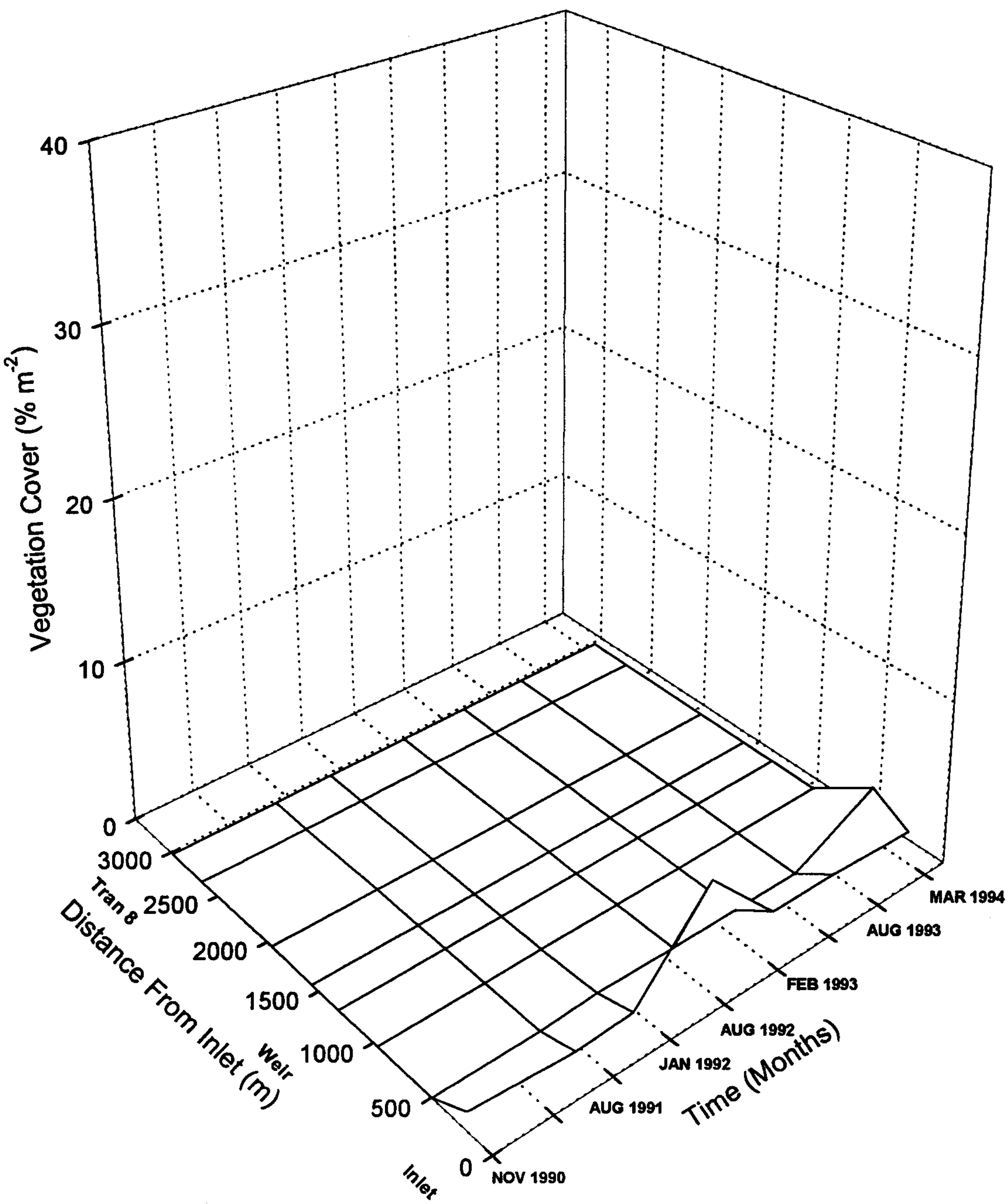


Figure 87. Time series response surface plot of *Sagittaria lancifolia* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Salix caroliniana

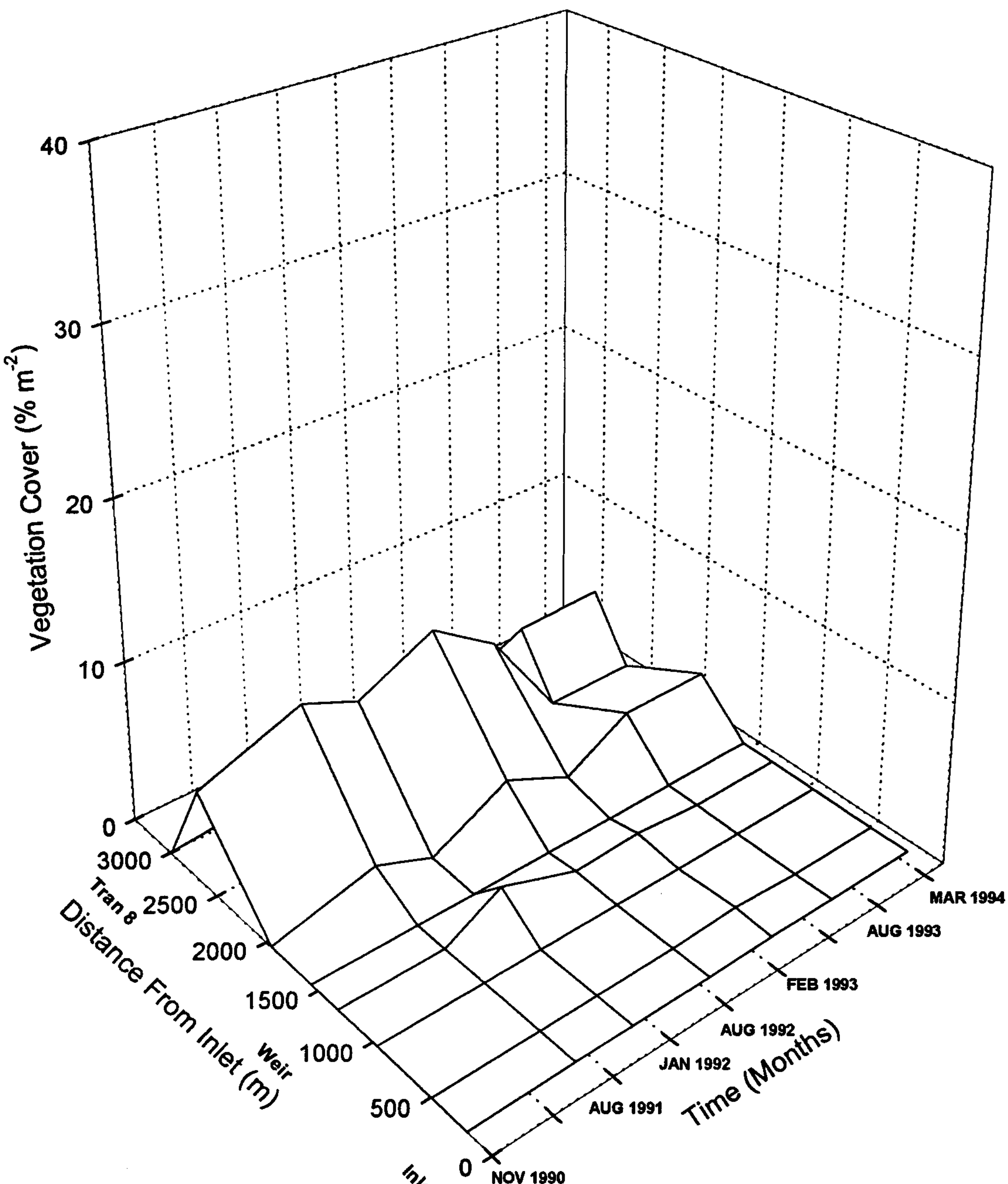


Figure 88. Time series response surface plot of *Salix caroliniana* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Typha domingensis

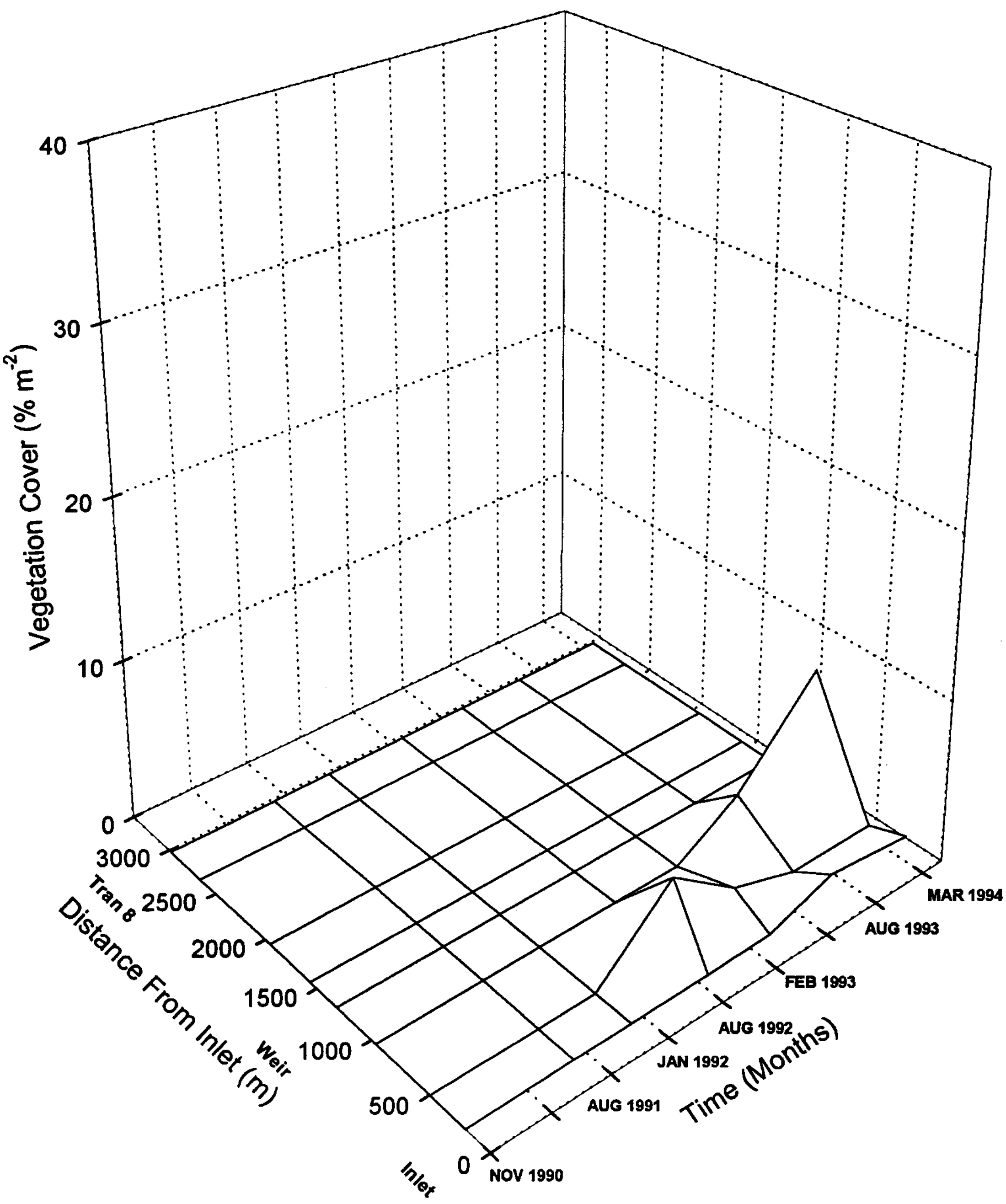


Figure 89. Time series response surface plot of *Typha domingensis* cover (% m^{-2}, Mean), Natural Succession Transects.

Natural Succession Transects

Typha latifolia

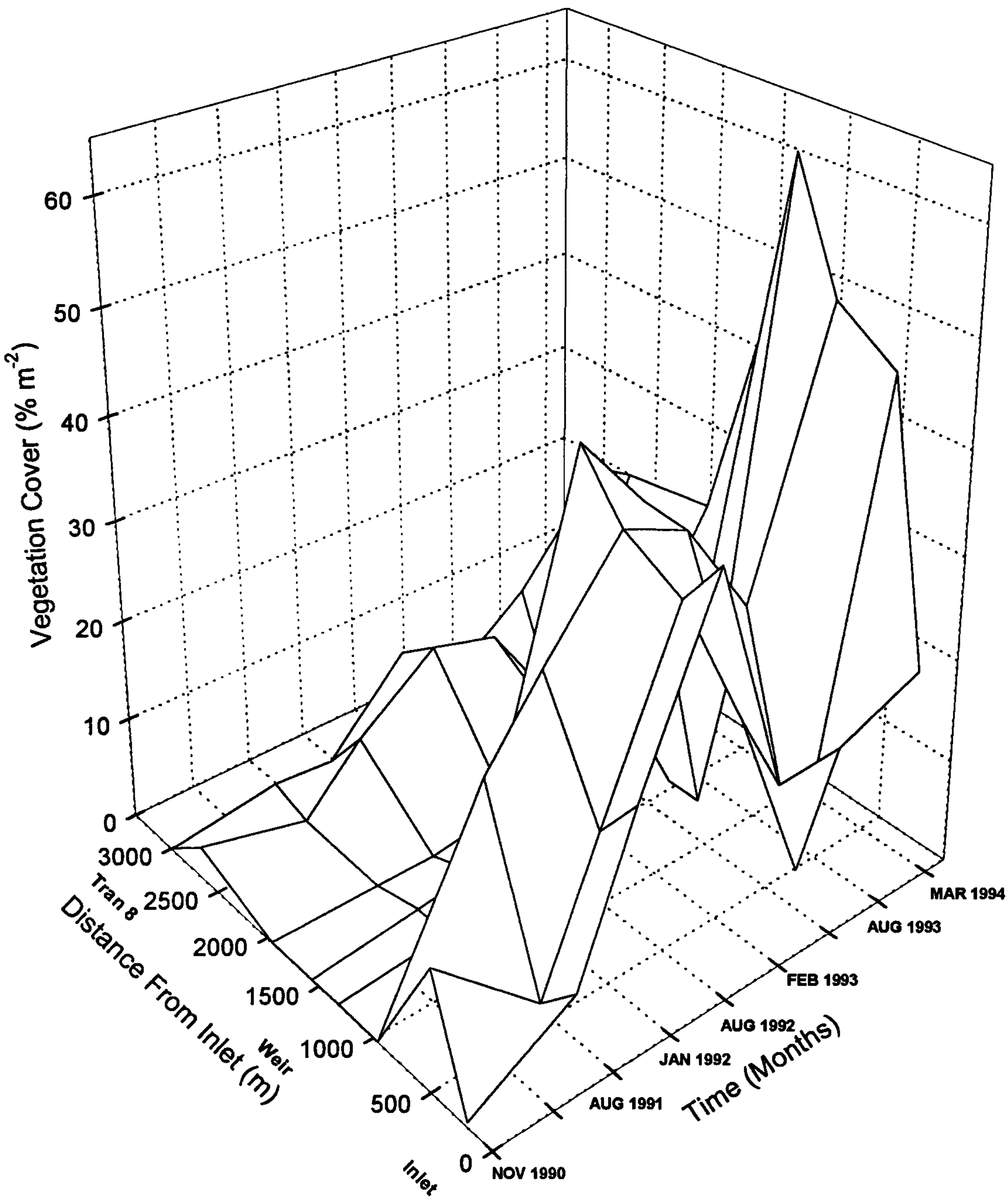


Figure 90. Time series response surface plot of *Typha latifolia* cover (% m^{-2}, Mean), Natural Succession Transects.

about 9% (Figure 86). In contrast, *Sagittaria lancifolia* cover peaked at nearly 5% prior to drawdown (Figure 87).

Drawdown and Mat Formation. During summer 1993 a management related drawdown and floating mat formation led to reductions in water depth long enough to allow activation of the soil seed bank. These hydrologic changes led to increases in cover by species that had been found at much lower levels prior to drawdown. These effects can be seen in the surface plots of cover for various species. Note the increased cover in the later sample sets. Species responding in this manner included: *Amaranthus australis* (Figure 76), *Ludwigia leptocarpa* (Figure 81), *Panicum dichotomiflorum* (Figure 84), and *Polygonum punctatum* (Figure 85).

Cover Percent -- Initial Conditions and Early Development. Vegetation coverage reflected site history, water depth distribution (spatially and temporally) and nutrient loading. The responses to environmental conditions are a direct result of the adaptive capacities of the various species inhabiting the site. Early in the project history the eastern half of the south marsh (T1, T2, T9) was dominated by *Commelina diffusa*, *Eupatorium capillifolium*, and *Polygonum punctatum*. *Typha latifolia* was present at low levels. The western half of the south marsh (T3, T4) was dominated by the grass *Panicum dichotomiflorum* and the shrub *Ludwigia octovalvis*. *Aster subulatus*, *Baccharis halimifolia*, and *Eupatorium capillifolium* were present at low levels. *Typha latifolia* was present, but at very low levels (Table 15). These patterns resulted because water levels tended to be deeper in the eastern half than the west (Figures 66-70). At the same time,

Table 15. Vegetation cover measurements (% m^{-2} MEAN ±SE) from Natural Succession Transects. Periods (.) represent species absent from the transect or transects not sampled.

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
NOVEMBER 1990 SAMPLE SET																
ACERUB	.	.	.	.	0.06	0.04	.	.	.	.	0.03	0.03	.	.	.	.
ALTPHI	1.78	0.62	1.59	0.79	0.16	0.16	.	.	0.94	0.65	1.44	0.88	0.22	0.16	0.31	0.31
AMAAUS	.	.	0.16	0.16	.	.	0.25	0.16	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	0.94	0.94	.	.	.	.	.	.
ASTSUB	.	.	0.19	0.16	6.72	2.85	4.59	1.81	5.25	2.67	1.56	0.79	1.09	0.43	3.13	1.09
BACHAL	0.78	0.64	0.16	0.16	0.94	0.47	0.31	0.31	0.13	0.06	2.75	0.62	8.56	2.68	1.84	0.57
CALAME	.	.	.	.	.	.	.	.	0.31	0.16	4.53	2.30	.	.	0.03	0.03
CARSPP	.	.	0.63	0.63	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	1.44	0.88	14.69	4.97	.	.	0.47	0.26	12.97	4.17	12.03	4.14	3.75	2.94	.	.
CYNDAC	.	.	.	.	.	.	3.19	2.97	.	.	.	.	.	.	.	.
Cyperac.	.	.	.	0.03	0.03	0.16	0.16	.	.	.	.	0.03	0.03	.	.	
CYPHAS	.	.	.	.	.	.	1.09	0.80	.	.	.	.	0.06	0.04	.	.
CYPODO	.	.	0.97	0.65	1.16	0.43	.	.	.	.	0.16	0.16	0.38	0.31	0.22	0.16
CYPSPP	.	.	.	.	.	.	0.13	0.06	2.06	1.88	1.72	1.57	0.06	0.04	.	.
ECHCOL	0.53	0.47	3.28	1.63	5.63	1.76	.	.	.	.	1.09	0.83	5.44	2.24	0.53	0.26
ECLALB	0.06	0.04	.	.	0.94	0.52	1.09	1.09	2.06	1.62	1.78	0.65	.	.	0.03	0.03
ELEIND	0.03	0.03	.	.	0.78	0.78	0.19	0.16	.	.	.	.	.	.	.	.
ELESPP	.	.	.	.	.	.	.	.	.	.	1.56	1.26	0.03	0.03	.	.
ERISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.
EUPCAP	21.56	6.54	7.66	3.35	7.66	3.75	0.41	0.31	32.26	6.72	77.34	5.78	72.97	6.20	70.47	6.57
EUPSER	.	.	.	.	0.16	0.16	.	.	.	.	0.16	0.16	.	.	.	.
EUPSPP	.	.	.	.	.	.	.	.	.	.	0.81	0.51	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	0.03	0.03	.	.	3.34	1.42	.	.
HYDSPP	.	.	.	.	.	.	.	.	0.50	0.47	2.34	1.38	0.63	0.26	.	.
HYGLAC	.	.	.	.	.	.	0.25	0.16	.	.	.	.	.	.	.	.
IPOSPP	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.
LUDLEP	.	.	.	.	0.63	0.63	.	.	.	.	.	.	.	.	.	.
LUDOCT	0.66	0.49	0.47	0.47	16.25	4.15	6.28	1.28	4.78	1.36	0.78	0.78	0.38	0.22	0.06	0.04
LUDPAL	.	.	.	.	.	.	.	.	0.09	0.05	.	.	.	.	0.50	0.47
LUDPER	.	.	0.94	0.94	.	.	.	.	.	.	.	.	.	.	.	.
LUDSPP	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
MELCOR	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	0.78	0.46	.	.	.	.	.	.	.	.	.	.
PANDIC	5.94	3.69	9.38	3.90	40.94	6.31	29.88	6.38	4.75	2.76	6.09	3.16	5.50	3.26	2.53	2.50
PANHEM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.50	2.50
PANSPP	.	.	0.31	0.31	0.03	0.03	0.06	0.04	.	.	.	.	.	.	1.88	1.88
PASSPP	.	.	.	.	.	.	2.22	1.87	2.56	1.58	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	0.31	0.31	.	.	.	.	.	.	.	.

Table 15. Vegetation cover measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
PHYANG	.	.	.	.	.	.	0.78	0.62	0.16	0.16	.	.	.	.	.	.
Poaceae	.	.	0.03	0.03	.	.	0.78	0.51	.	.	.	.	.	.	0.34	0.31
POLPUN	60.47	6.92	22.81	6.14	.	.	.	.	.	.	8.59	3.47	.	.	3.59	2.42
PONCOR	0.78	0.78	.	.	.	.	.	.	.	.	0.63	0.63	.	.	.	.
Pterido.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
GERCAR	.	.	.	.	.	.	.	.	0.03	0.03	.	.	1.03	0.79	.	.
SAGLAN	1.13	1.09	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	.	.	5.66	3.23	0.16	0.16
SAMCAN	.	.	.	.	0.16	0.16	0.16	0.16	1.56	1.56	.	.	.	.	.	.
SAMPAR	.	.	.	.	.	.	0.63	0.43	.	.	.	.	.	.	.	.
SESMAC	0.94	0.69	.	.	.	.	.	.	0.94	0.94	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
SOLTOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.47	0.34
STAFLO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.34	0.31
TYPLAT	0.47	0.34	11.72	3.61	.	.	0.09	0.05	0.03	0.03	.	.	3.13	3.13	0.16	0.16
unknown	.	.	.	.	.	.	.	.	0.06	0.04	.	.	.	.	.	.
udicot	.	.	.	.	0.16	0.16	.	.	0.53	0.47	0.16	0.16	0.03	0.03	0.34	0.31
uvine	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
WOOVIR	.	.	.	.	0.47	0.26	.	.	.	.	.	.	.	.	.	.
AUGUST 1991 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	1.56	1.26	2.13	1.38	0.94	0.57	0.50	0.47	0.81	0.43	1.91	1.28	.	.	1.28	0.95
AMAAUS	7.59	3.00	1.41	1.03	1.97	0.62	5.75	1.69	3.00	1.63	.	.	0.22	0.16	0.81	0.45
AMBART	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
AMMCOC	.	.	.	.	.	.	.	.	0.16	0.16	.	.	0.03	0.03	.	.
ASTELL	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	1.00	0.79	.	.	.	.	.	.
ASTSUB	.	.	.	.	.	.	0.38	0.17	.	.	.	.	.	.	.	.
ASTTEN	.	.	.	.	0.09	0.05	0.16	0.07	.	.	.	.	.	.	.	.
AZOCAR	.	.	0.09	0.05	.	.	0.09	0.05	.	.	.	.	.	.	.	.
BACHAL	.	.	.	.	0.47	0.47	3.00	2.09	.	.	0.66	0.34	0.66	0.47	0.19	0.16
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.34	0.22
BRAPUR	.	.	.	.	.	.	.	.	0.63	0.49	5.47	2.56	.	.	6.88	3.90
CASOBT	.	.	.	.	.	.	.	.	.	.	2.06	1.62	.	.	0.31	0.31
COMDIF	0.31	0.31	1.56	1.28	.	.	0.19	0.16	2.03	0.91	6.69	3.46	.	.	0.03	0.03
CYNDAC	.	.	.	.	.	.	2.44	1.60	.	.	.	.	.	.	.	.
Cyperac.	.	.	0.03	0.03	0.06	0.04	.	.	2.25	2.19	.	.	0.03	0.03	0.03	0.03
CYPESC	.	.	0.03	0.03	.	.	.	.	0.47	0.47	.	.	.	.	.	.
CYPHAS	.	.	0.06	0.04	0.34	0.31	.	.	.	.	0.34	0.31	0.03	0.03	0.06	0.04
CYPIRI	.	.	.	.	0.03	0.03	0.56	0.47	0.16	0.16	0.03	0.03	.	.	.	.
CYPODO	0.03	0.03	0.22	0.16	0.56	0.34	0.19	0.07	0.81	0.29	0.13	0.06	0.19	0.16	1.31	0.67
CYPSPP	.	.	.	.	.	.	.	.	0.47	0.22	.	.	.	.	0.03	0.03
CYPSUR	.	.	.	.	.	.	0.69	0.49	0.03	0.03	.	.	.	.	.	.

Table 15. Vegetation cover measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
DIGSER	.	.	1.88	1.88	1.44	0.96	1.16	0.49	3.47	1.27	4.55	2.06	2.38	1.03	12.97	4.36
ECHCOL	.	.	0.81	0.51	1.63	0.69	0.13	0.06	3.71	1.89	9.91	3.29	2.72	1.38	15.13	4.53
ECLALB	0.03	0.03	0.97	0.94	6.81	3.04	3.72	1.62	17.69	4.62	29.72	5.20	6.56	2.70	13.03	3.37
EICCRA	.	.	.	.	.	.	.	.	0.03	0.03	0.31	0.31	.	.	3.28	3.12
ELEIND	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.
ELESPP	.	.	.	.	.	.	.	.	0.47	0.47	.	.	.	.	.	.
ELEVIV	.	.	.	.	.	.	.	.	.	.	4.47	2.09	.	.	.	.
EUPCAP	.	.	.	.	3.59	2.28	1.75	0.97	9.75	4.07	0.53	0.34	0.63	0.63	1.41	0.72
EUPSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.31
EUPSPP	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
GALTIN	0.03	0.03	0.03	0.03	0.22	0.16	0.22	0.07	0.50	0.23	1.19	0.53	0.06	0.04	1.31	0.42
HYDSPP	.	.	.	.	.	.	.	.	.	.	3.13	2.23	.	.	.	.
IPOSPP	.	.	.	.	.	.	0.03	0.03	0.19	0.16	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.
LEMSPP	0.03	0.03	0.50	0.31	16.28	4.74	1.19	0.44	1.25	0.98	2.88	1.48	28.44	7.29	14.71	5.54
LIMSPO	.	.	.	.	1.88	1.88	.	.	.	.	.	.	.	.	.	.
LUDLEP	10.50	4.68	0.06	0.04	0.31	0.31	0.97	0.94	6.47	2.09	4.13	3.08	1.75	1.28	1.91	0.77
LUDOCT	0.63	0.49	.	.	.	.	1.25	0.59	10.03	2.54	11.13	2.94	4.25	1.27	17.19	4.03
LUDPAL	.	.	0.03	0.03	.	.	0.16	0.16	0.03	0.03	0.03	0.03	.	.	.	.
LUDPER	1.25	1.25	.	.	.	.	3.28	1.67	0.16	0.16	.	.	0.78	0.78	.	.
LUDSPP	0.16	0.16	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
MELPEN	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.
MIKSCA	.	.	0.03	0.03	6.41	3.55	.	.	.	.	.	.	1.75	1.56	0.03	0.03
PANDIC	9.38	4.10	2.50	1.74	38.81	7.83	26.72	6.08	17.44	5.63	1.72	1.57	2.13	1.05	.	.
PANSPP	.	.	.	.	.	.	.	.	.	.	0.63	0.63	.	.	.	.
PASDIS	.	.	.	.	.	.	.	.	0.63	0.63	.	.	.	.	.	.
PASSPP	.	.	.	.	0.47	0.47	.	.	0.97	0.94	0.06	0.04	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	0.50	0.47	1.91	1.72	.	.	.	.
PHYANG	.	.	2.41	1.60	.	.	.	.	.	.	0.03	0.03	.	.	.	.
PHYSPP	.	.	.	.	.	.	0.03	0.03	0.34	0.31	.	.	.	.	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	0.31	0.22	.	.	.	.
POLPUN	63.16	7.25	12.09	5.12	0.03	0.03	1.81	1.32	15.25	4.11	10.97	4.31	9.88	3.70	17.69	5.13
PONCOR	3.16	2.97	.	.	.	.	.	.	.	.	2.81	2.07	.	.	.	.
POROLE	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	1.88	0.95	0.06	0.04	5.97	3.01	.	.	.	.
SAGLAN	0.63	0.49	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	0.94	0.94	0.31	0.31	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	1.56	1.56	7.97	4.35	0.78	0.55
SALROT	.	.	.	.	3.28	1.52	.	.	3.75	2.61	6.91	2.90	7.09	3.06	15.50	5.61
SAMCAN	.	.	.	.	.	.	1.25	1.25	0.47	0.47	.	.	.	.	.	.
SESMAC	2.03	1.74	0.63	0.63	.	.	.	.	17.69	5.34	11.41	5.32	.	.	.	.
SETMAG	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	0.38	0.31	.	.	4.38	2.79	.	.	0.38	0.31
SPIPOL	.	.	0.47	0.31	.	.	0.78	0.34	.	.	.	.	0.63	0.30	.	.
TYPLAT	6.06	2.53	2.22	1.02	19.31	5.70	0.97	0.39	1.25	0.98	.	.	0.47	0.47	1.56	1.56
UTRCOR	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.

Table 15. Vegetation cover measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
udicot	.	.	0.03	0.03	0.22	0.16	0.06	0.04	1.78	1.56	0.06	0.04	.	.	2.50	1.68
WOLFLO	.	.	.	.	5.84	2.14	0.19	0.16	.	.	.	.	.	.	.	.
WOLSPP	.	.	.	.	2.34	1.33	.	.	.	.	.	.	1.31	0.55	3.59	1.87
WOOVIR	.	.	.	.	0.63	0.43	.	.	.	.	.	.	.	.	.	.
JANUARY 1992 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	5.00	2.09	12.97	5.33	2.63	2.50	0.19	0.16	0.94	0.40	0.22	0.16	.	.	0.13	0.06
AMAAUS	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.
ANDSPP	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
ASTSUB	.	.	.	.	0.03	0.03	.	.	.	.	0.03	0.03	.	.	.	.
ASTTEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
AZOCAR	.	.	.	.	0.19	0.16	0.06	0.04	.	.	.	.	4.53	2.61	10.47	4.06
BACHAL	.	.	.	.	0.31	0.31	0.31	0.31	0.31	0.22	1.66	0.75	0.78	0.29	0.09	0.05
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.41	1.25
BRAPUR	.	.	.	.	.	.	.	.	0.31	0.31	0.63	0.63	.	.	7.66	4.51
COMDIF	.	.	.	.	.	.	.	.	0.06	0.04	0.56	0.34	0.03	0.03	.	.
CYNDAC	.	.	.	.	.	.	0.63	0.49	.	.	.	.	.	.	.	.
Cyperac.	.	.	.	.	.	.	.	.	0.68	0.35	0.13	0.07	0.06	0.04	.	.
CYPHAS	.	.	.	.	.	.	1.16	0.83	0.06	0.04	.	.	0.03	0.03	0.19	0.16
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.04
EICCRA	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.	2.50	1.96
ELEVIV	.	.	.	.	.	.	.	.	.	.	2.97	1.58	.	.	.	.
EUPCAP	.	.	.	.	.	.	.	.	0.94	0.65	0.97	0.97	.	.	0.16	0.16
GALTIN	.	.	.	.	0.03	0.03	.	.	0.03	0.03	2.50	0.99	0.13	0.06	3.38	0.91
HYDRAN	.	.	.	.	.	.	.	.	.	.	15.00	5.82	.	.	2.38	2.34
HYDSPP	.	.	.	.	6.09	3.52	0.78	0.78	19.19	5.82	.	.	.	.	5.97	3.38
HYDUMB	.	.	.	.	.	.	.	.	.	.	.	.	18.63	6.15	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.
LEMSPP	0.03	0.03	.	.	36.53	5.98	38.44	6.56	5.41	1.65	5.09	1.35	11.53	3.77	5.28	2.42
LIMSPO	.	.	.	.	4.22	3.19	0.03	0.03	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.04	.	.
LUDOCT	0.19	0.16	.	.	.	.	0.66	0.49	.	.	0.03	0.03	0.31	0.31	0.16	0.16
LUDPAL	0.03	0.03	.	.	0.03	0.03	0.09	0.05	.	.	.	.	.	.	.	.
LUDPER	4.06	2.83	.	.	0.31	0.31	11.59	3.97	.	.	0.31	0.31	2.53	1.19	2.81	1.63
MIKSCA	.	.	0.03	0.03	2.81	1.57	.	.	.	.	.	.	2.06	1.32	0.34	0.31
PANDIC	.	.	.	.	.	.	.	.	.	.	3.13	3.13	.	.	.	.
PASSPP	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	1.31	0.59	.	.	.	.	0.03	0.03
Poaceae	.	.	.	.	.	.	0.06	0.04	.	.	0.22	0.16	0.03	0.03	.	.
POLPUN	11.38	3.62	4.94	2.28	0.47	0.34	6.09	3.38	9.30	1.45	6.22	2.78	6.59	2.59	6.19	2.75
PONCOR	2.50	2.50	.	.	.	.	.	.	.	.	0.78	0.51	.	.	.	.
RAPRAP	.	.	.	.	.	.	.	.	.	.	2.34	1.54	.	.	.	.

Table 15. Vegetation cover measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
RUMCRI	.	.	.	.	.	.	1.28	1.25	.	.	1.56	1.04	.	.	.	.
SAGLAN	0.78	0.55	0.16	0.16	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	0.31	0.31	.	.	.	.	.	.	0.94	0.69	.	.	.	.	1.56	0.73
SALCAR	.	.	.	.	.	.	1.88	1.88	.	.	0.16	0.16	6.47	3.40	0.47	0.47
SALROT	0.75	0.49	0.03	0.03	12.41	4.34	1.72	1.57	26.29	5.37	53.19	6.59	23.97	6.18	25.09	5.72
SAMCAN	0.03	0.03	.	.	.	.	.	.	0.63	0.63	.	.	.	.	.	.
SPIPOL	.	.	.	.	0.22	0.16	4.50	2.26	0.19	0.07	0.03	0.03	0.13	0.06	0.16	0.16
TYPLAT	20.34	4.77	15.47	3.91	26.56	4.81	13.91	3.34	1.88	0.95	.	.	6.09	2.28	1.09	0.77
udicot	.	.	.	.	.	.	.	.	.	.	1.41	1.25	.	.	.	.
WOLFLO	.	.	0.94	0.64	9.59	3.80	17.22	3.52	15.29	4.02	7.72	2.71	2.50	0.56	2.91	0.70
WOOVIR	.	.	.	.	0.47	0.34	.	.	.	.	.	.	.	.	.	.
AUGUST 1992 SAMPLE SET																
ALTPHI	11.56	4.92	8.94	3.84	0.03	0.03	0.31	0.22	3.25	2.19	8.16	3.00	1.63	1.56	2.38	1.89
AMAAUS	0.50	0.47	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	0.16	0.16	.	.	0.47	0.34	.	.	.	.
AZOCAR	.	.	0.03	0.03	.	.	.	.	.	.	.	.	0.03	0.03	0.16	0.16
BACHAL	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.	0.47	0.34
BIDLAE	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	5.00	2.79
BRAPUR	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.	6.41	4.34
COMDIF	.	.	.	.	.	.	.	.	.	.	0.47	0.47	.	.	.	.
Cyperac.	0.03	0.03	.	.	0.66	0.62	.	.	.	.	.	.	.	.	.	.
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	0.16	0.16	0.16	0.16
CYPODO	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	0.03	0.03
CYPSPP	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
CYPSUR	.	.	.	.	.	.	.	.	0.50	0.47	.	.	.	.	.	.
DIGSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.04
ECLALB	.	.	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.
EICCRA	.	.	.	.	.	.	0.16	0.16	0.03	0.03	5.00	2.97	4.53	2.92	3.16	2.56
ELEVIV	.	.	.	.	.	.	.	.	.	.	2.94	2.19	0.03	0.03	.	.
EUPCAP	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.
HYDRAN	.	.	.	.	0.03	0.03	0.16	0.16	0.78	0.40	5.03	2.85	1.88	1.05	9.22	4.37
HYDSPP	.	.	.	.	0.06	0.04	.	.	2.22	1.88	.	.	0.16	0.16	.	.
HYDUMB	.	.	.	.	.	.	.	.	0.31	0.31	.	.	0.16	0.16	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.
LEMSPP	.	.	0.19	0.16	13.91	5.10	44.91	7.28	29.38	6.12	27.41	4.99	49.44	5.98	20.72	4.39
LIMSPO	.	.	.	.	11.09	5.08	0.63	0.49	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	5.00	3.54	.	.	0.03	0.03
LUDOCT	0.47	0.47	.	.	.	.	.	.	.	.	1.56	1.56	0.19	0.16	.	.
LUDPER	0.31	0.31	.	.	2.34	2.34	15.16	5.60	0.78	0.51	6.88	4.08	9.22	4.81	14.84	5.52
MIKSCA	.	.	.	.	0.16	0.16	.	.	0.16	0.16	.	.	5.16	3.18	1.09	0.62
PASDIS	.	.	.	.	.	.	.	.	0.63	0.49	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
Poaceae	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Table 15. Vegetation cover measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
POLPUN	.	.	0.34	0.22	.	.	0.03	0.03	6.13	1.86	2.88	0.70	0.69	0.37	2.28	1.14
PONCOR	4.38	2.75	.	.	.	.	.	.	.	.	4.06	2.83	.	.	.	.
SAGLAN	5.81	3.35	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	11.25	4.62	4.69	3.33	6.72	3.86	18.44	6.20
SALCAR	.	.	.	.	.	.	0.19	0.16	.	.	2.53	2.50	8.78	4.09	2.66	1.80
SALROT	.	.	1.28	1.25	0.56	0.22	0.16	0.16	0.16	0.16	.	.	3.63	1.83	3.97	1.72
SPIPOL	0.06	0.04	0.41	0.22	0.09	0.05	1.00	0.32	10.66	4.10	1.78	0.99	5.69	2.13	3.78	1.71
SPIPUN	.	.	.	.	.	.	.	.	0.09	0.05	.	.	.	.	.	.
SPISPP	.	.	.	.	.	.	0.09	0.05	.	.	.	.	.	.	.	.
TYPDOM	.	.	4.22	3.18	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	37.97	6.31	32.81	6.02	35.94	5.94	41.56	6.45	16.88	4.68	0.94	0.57	12.03	3.90	9.06	3.68
TYPSPPD	4.84	2.09	11.59	3.94	6.00	2.14	2.26	2.26	4.69	3.05	.	.	6.25	3.92	1.88	1.58
WOLFLO	.	.	.	.	0.94	0.45	.	.	7.16	2.35	8.81	1.58	9.63	2.63	6.25	1.89
WOLSPP	.	.	.	.	.	.	.	.	3.03	1.80	1.19	0.48	0.91	0.39	.	.
FEBRUARY 1993 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	0.47	0.17	0.25	0.16	0.06	0.04	.	.	0.28	0.16	0.13	0.06	0.03	0.03	0.16	0.07
AMAAUS	0.06	0.04	.	.	.	.	.	.	.	.	.	.	.	.	.	.
APILEP	.	.	.	.	.	.	0.91	0.50	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	1.41	0.88	.	.	.	.
AZOCAR	.	.	.	.	0.03	0.03	.	.	.	.	0.03	0.03	.	.	1.47	1.25
BACHAL	.	.	.	.	.	.	0.09	0.05	.	.	0.63	0.43	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.16	1.30
CARSPP	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	0.16	0.16	.	.	0.03	0.03	.	.
dead	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.97	1.55
ECLALB	0.03	0.03	.	.	.	.	0.06	0.04	.	.	0.03	0.03	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	0.16	0.16	1.75	1.28	3.94	2.83
ELEVIV	.	.	.	.	.	.	.	.	.	.	2.66	2.34	.	.	.	.
ELEVIVD	.	.	.	.	.	.	.	.	.	.	2.19	1.54	.	.	.	.
EUPCAP	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EUPCAPD	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.	.	.
GALTIN	.	.	.	.	.	.	0.91	0.64	.	.	.	.	.	.	0.09	0.05
HYDRAN	1.41	0.88	0.47	0.47	4.00	2.66	0.72	0.37	11.94	4.42	18.28	5.99	11.66	5.17	12.03	3.33
HYDSPP	.	.	.	.	.	.	0.34	0.31	.	.	0.03	0.03	.	.	.	.
HYDUMB	.	.	.	.	.	.	0.03	0.03	0.34	0.31	.	.	.	.	.	.
LEMSPP	0.13	0.06	0.19	0.07	4.53	2.33	2.06	0.43	24.00	6.23	29.31	5.87	30.78	6.67	16.16	4.70
LIMSPO	.	.	.	.	5.78	2.25	0.38	0.31	.	.	.	.	.	.	.	.
LUDLEP	1.13	0.94	.	.	0.31	0.22	.	.	.	.	.	.	0.16	0.16	0.03	0.03
LUDLEPD	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.	.	.
LUDOCT	.	.	.	.	0.31	0.31	.	.	.	.	.	.	.	.	.	.
LUDOCTD	.	.	.	.	.	.	.	.	.	.	0.47	0.34	.	.	.	.
LUDPER	0.19	0.16	.	.	0.06	0.04	7.72	3.47	0.16	0.16	2.97	1.49	4.50	2.20	5.34	2.21

Table 15. Vegetation cover measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
LUDPERD	.	.	.	.	.	.	0.31	0.31	.	.	.	.	.	.	.	.
LUDSPPD	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	.	.	.	.	0.47	0.47	.	.	2.97	1.68	0.59	0.34
PASURV	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
POLPUN	1.50	0.96	0.03	0.03	.	.	.	.	0.22	0.16	2.09	0.83	0.19	0.16	0.56	0.34
PONCOR	2.75	1.43	.	.	.	.	.	.	.	.	2.03	1.42	.	.	.	.
PONCORD	0.31	0.31	.	.	.	.	.	.	.	.	.	.	.	.	.	.
RHARHA	.	.	.	.	.	.	0.09	0.05	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	0.06	0.04	.	.	1.56	1.11	.	.	.	.
SAGLAN	1.56	1.04	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.
SAGLAND	0.16	0.16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	0.16	0.16	.	.	0.31	0.31	0.03	0.03
SAGSPP	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	0.19	0.16	.	.	0.38	0.31	.	.	0.63	0.43	5.97	2.96	1.88	1.12
SALROT	0.16	0.16	0.03	0.03	1.16	0.31	0.06	0.04	0.22	0.16	1.50	1.24	6.66	3.73	5.66	2.42
SALROTD	.	.	.	.	.	.	.	.	.	.	0.78	0.55	.	.	.	.
SAMCAN	.	.	.	.	.	.	1.28	1.25	0.63	0.63	.	.	.	.	.	.
SPIPOL	0.06	0.04	0.09	0.05	0.25	0.08	0.03	0.03	0.31	0.16	0.63	0.30	.	.	0.38	0.17
TYPDOM	.	.	1.25	1.25	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	14.55	2.01	18.28	3.76	33.00	3.92	33.47	4.14	13.66	3.00	4.84	2.06	10.03	3.11	4.78	1.46
TYPLATD	18.28	2.85	19.69	4.22	13.75	1.85	15.88	3.26	9.25	2.62	1.09	0.70	3.94	1.87	3.94	1.45
UTRSPP	.	.	.	.	0.06	0.04	.	.	.	.	.	.	.	.	.	.
udicot	0.19	0.07	.	.	.	.	0.09	0.05	.	.	.	.	.	.	.	.
WOLFLO	.	.	0.09	0.05	0.25	0.08	0.06	0.04	1.97	0.85	0.25	0.16	3.66	1.44	2.56	0.70
WOLSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.34	0.17
AUGUST 1993 SAMPLE SET																
ALTPHI	0.91	0.29	.	.	0.66	0.43	.	.	.	.	0.59	0.22	.	.	5.34	2.81
AMAAUS	7.81	2.16	.	.	1.47	0.75	.	.	.	.	1.00	0.65	.	.	0.16	0.16
ANDSPP	.	.	.	.	.	.	.	.	.	.	0.78	0.78	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	2.81	1.75	.	.	.	.
ASTSUB	.	.	.	.	.	.	.	.	.	.	2.97	1.99	.	.	.	.
BACHAL	.	.	.	.	.	.	.	.	.	.	0.47	0.34	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8.75	4.53
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.63	0.63
CASOBT	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
CICMEX	0.16	0.16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	.	.	1.28	1.25	.	.	.	.
CYPIRI	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.22
CYPODO	0.53	0.34	.	.	0.84	0.51	.	.	.	.	1.31	0.50	.	.	1.59	0.96
CYPSPP	0.09	0.05	.	.	0.06	0.04	.	.	.	.	0.03	0.03	.	.	.	.
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.19	0.16
ECHCRUD	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.47	0.47

Table 15. Vegetation cover measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
ECHSPP1	.	.	.	.	.	.	.	.	.	.	3.00	2.37	.	.	.	.
ECHSPP2	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
ECLALB	0.03	0.03	.	.	0.16	0.16	.	.	.	.	0.25	0.16	.	.	1.00	0.94
EICCRA	.	.	.	.	.	.	.	.	.	.	2.34	1.63	.	.	4.56	2.44
ELEVIV	.	.	.	.	.	.	.	.	.	.	0.81	0.64	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
HYDRAN	1.94	0.99	.	.	2.41	1.27	.	.	.	.	2.81	0.98	.	.	6.19	3.25
HYDUMB	0.47	0.47	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.
LEMSPP	0.31	0.16	.	.	1.47	0.95	.	.	.	.	19.13	4.53	.	.	14.75	3.06
LIMSPO	.	.	.	.	3.59	2.01	.	.	.	.	.	.	.	.	.	.
LUDLEP	6.13	1.53	.	.	2.81	1.31	.	.	.	.	16.38	4.81	.	.	7.03	2.57
LUDOCT	0.63	0.63	.	.	.	.	.	.	.	.	1.56	0.76	.	.	1.41	0.82
LUDPER	.	.	.	.	2.66	2.66	.	.	.	.	9.38	4.45	.	.	21.09	6.31
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.53	0.34
MOMCHA	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.
PANDIC	.	.	.	.	.	.	.	.	.	.	2.00	0.73	.	.	0.16	0.16
PASDIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.34	0.31
PASURV	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
PLUROS	0.16	0.16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLDEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.34	1.66
POLPUN	7.44	3.89	.	.	.	.	.	.	.	.	14.22	5.04	.	.	0.97	0.57
PONCOR	8.91	3.12	.	.	.	.	.	.	.	.	3.59	2.52	.	.	.	.
SAGLAN	1.56	0.99	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	.	.	2.66	1.37	.	.	2.34	1.23
SALCAR	.	.	.	.	.	.	.	.	.	.	2.81	1.97	.	.	3.59	2.35
SALROT	0.63	0.63	.	.	8.03	3.17	.	.	.	.	8.09	3.57	.	.	8.34	3.02
SESMAC	.	.	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.
SPIPOL	0.03	0.03	.	.	0.03	0.03	.	.	.	.	5.19	1.69	.	.	9.72	3.25
TYPDOM	1.41	0.82	.	.	2.38	1.33	.	.	.	.	.	.	.	.	.	.
TYPLAT	14.72	2.13	.	.	22.81	3.11	.	.	.	.	8.31	2.89	.	.	9.75	2.89
TYPLATD	19.38	3.50	.	.	33.78	4.32	.	.	.	.	3.13	2.10	.	.	5.47	3.18
WOLFLO	.	.	.	.	.	.	.	.	.	.	2.78	1.38	.	.	0.81	0.33
WOLSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
ALTPHIS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AMAAUSS	0.06	0.04	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRANS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.47	0.47
LUDPERS	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	0.31	0.22
POLPUNS	0.19	0.16	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCORS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGLANS	0.50	0.47	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGLATS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	0.16	0.16
TYPLATS	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
udicotS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.

MARCH 1994 SAMPLE SET

Table 15. Vegetation cover measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
ALTPHI	0.25	0.08	4.75	3.06	0.78	0.44	0.66	0.61	.	.	5.25	1.22	.	.	2.18	0.75
AMAAUS	2.20	0.70	1.83	0.88	0.31	0.21	0.70	0.33	.	.	0.15	0.15	.	.	.	.
APILEP	.	.	.	.	.	.	0.12	0.06	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	0.46	0.33	.	.	.	.
BACHAL	.	.	.	.	0.03	0.03	.	.	.	.	0.46	0.33	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.46	0.33
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
COMDIF	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
CYPODO	.	.	0.41	0.39	0.15	0.15	.	.	.	.	.	.	.	.	.	.
CYPSPP	0.04	0.04	0.50	0.39	0.03	0.03	0.04	0.04	.	.	0.09	0.05	.	.	0.09	0.05
ECLALB	.	.	0.41	0.39	.	.	.	.	.	.	0.06	0.04	.	.	0.03	0.03
EICCRA	.	.	.	.	.	.	.	.	.	.	2.34	1.16	.	.	10.70	4.77
ELEVIV	.	.	.	.	.	.	.	.	.	.	2.12	1.05	.	.	.	.
EUPCAP	0.20	0.20	0.08	0.07	0.15	0.15	0.08	0.05	.	.	0.56	0.25	.	.	0.40	0.21
GALTIN	0.04	0.04	.	.	.	.	0.04	0.04	.	.	0.06	0.04	.	.	0.21	0.15
HYDRAN	24.80	7.47	12.20	6.25	13.60	4.90	3.70	1.50	.	.	15.80	4.78	.	.	38.00	6.35
LEMSPP	0.31	0.16	.	.	0.06	0.04	.	.	.	.	0.06	0.04	.	.	1.34	0.64
LUDLEP	0.20	0.20	0.83	0.79	0.03	0.03	.	.	.	.	1.56	1.15	.	.	.	.
LUDPER	1.45	1.08	.	.	0.31	0.30	4.00	2.86	.	.	12.50	5.20	.	.	18.90	5.51
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.15	0.15
PASDIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.31	0.30
POLDEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.12	0.92
POLPUN	5.95	1.90	5.25	2.91	.	.	0.20	0.20	.	.	4.93	1.88	.	.	0.34	0.21
PONCOR	8.95	4.22	.	.	.	.	.	.	.	.	3.75	2.88	.	.	.	.
RUMCRI	.	.	.	.	.	.	.	.	.	.	0.31	0.21	.	.	.	.
SAGLAN	1.25	0.84	2.50	2.39	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	0.08	0.07	.	.	.	.	.	.	0.31	0.21	.	.	0.31	0.30
SALCAR	.	.	.	.	.	.	.	.	.	.	2.81	1.93	.	.	3.75	2.04
SALROT	.	.	.	.	0.62	0.36	.	.	.	.	0.71	0.36	.	.	12.30	4.03
SAMCAN	.	.	.	.	.	.	.	.	.	.	0.20	0.20	.	.	.	.
SOLAME	.	.	0.41	0.39	.	.	.	.	.	.	.	.	.	.	.	.
SPIPOL	.	.	.	.	.	.	.	.	.	.	0.15	0.06	.	.	0.15	0.06
TYPDOM	0.83	0.81	.	.	7.65	3.23	.	.	.	.	.	.	.	.	.	.
TYPLAT	17.90	4.16	44.50	7.91	48.50	6.92	60.40	5.22	.	.	22.30	5.30	.	.	19.70	5.16
WOLFLO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
POLDEND	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.25	1.23
PONCORD	1.04	1.01	.	.	.	.	.	.	.	.	0.78	0.62	.	.	.	.
TYPLATD	3.95	1.50	13.30	1.80	23.10	4.73	32.00	5.21	.	.	11.10	3.32	.	.	4.43	1.15

the north marsh (T5-T8) was dominated by a community of *Eupatorium capillifolium*. The *E. capillifolium* covered most of the north marsh with a nearly continuous, dense overstory. The *Eupatorium capillifolium* dominated area had been farmed most recently (summer 1990). Evidence in the form of undecomposed corn (*Zea mays*) was found throughout the area. A small stand of *Sesbania macrocarpa* (0.94±0.94%) was found near the end of T5 in the southwestern corner. Between the western levee and transect 5, a St. Augustine grass (*Stenotaphorum secundatum*) section (about 5 ha) remaining from sod farming was left intact. *Aster subulatus, Baccharis halimifolia, Commelina diffusa, Ludwigia octovalvis, Panicum dichotomiflorum, Polygonum punctatum, Salix caroliniana* and *Typha latifolia* were present, but at low levels (Table 15).

Cover Percent Successional Patterns Over Time. Changes in species dominance patterns over time reflect the integration of environmental controlling factors with initial conditions and the adaptive abilities of the available species pool. Water level dynamics were related to vegetation

species cover dynamics (Figures 76-90). Two prominent species-level responses were observed. These included species that (1) declined after flooding, but maintained a presence in the seed bank allowing germination and growth response after water level drawdown or floating mat initiation (*Amaranthus australis, Eupatorium capillifolium, Ludwigia octovalvis, Panicum dichotomiflorum*, and *Polygonum punctatum*), and (2) increased vegetation dominance with flooding (*Alternanthera philoxeroides, Hydrocotlye ranunculoides* and *Typha spp.*).

<u>Responses By Species With Minimum Flood Tolerance.</u> The most prominent species in this ecosystem showed varying responses to environmental conditions. *Amaranthus australis* revealed a pattern of prominence in the eastern portion of the south marsh early and late in the sample period (Figure 77). This pattern is related to the initial dry conditions the south marsh experienced and to drawdown and mat formation that occured later in the sample period. *Amaranthus australis* was nearly absent in the north marsh, due to dominance by *Eupatorium capillifolium*.

Eupatorium capillifolium was rapidly nearly extirpated from the site following flooding (Figure 78). The plants remained for a short time following flooding, exhibiting signs of adaptation (e.g. adventitious roots) but could not survive under continuous flooding (Stenberg, Pers. Obs). It was found occasionally at low levels in subsequent samples, especially after drawdown and mat formation (Figure 78).

Ludwigia leptocarpa was found occasionally throughout the marsh early in the sample period. It increased in cover after drawdown and mat formation (Figure 81). It occured less frequently in the south than the north marsh.

Ludwigia octovalvis cover was reduced quickly after flooding, but was found occasionally in subsequent samples (Figure 82). It responded to water level drawdown by increasing its cover. It was most prominent along transects 3-6, and 8. Its minimal flood tolerance was revealed by its propensity to inhabit the plow ridges in areas that had been farmed recently (Stenberg, Pers. Obs.).

Ludwigia peruviana increased in dominance since the inception of the project (Figure 83). It was most common in the driest regions of the sample areas, especially at the southern ends of the north marsh transects. Its most robust growth was in areas with water levels averaging less than 10 cm.

Panicum dichotomiflorum reached its maximum cover along transects 3 and 4 early in the sample period (Figure 84). It persisted in the seed bank and became slightly more obvious after a drawdown and mat flotation.

Polygonum punctatum was an important member of the eastern portion of the south marsh plant community during the earliest days of the project (Figure 85, Table 15). It declined slowly to near obscurity after the 15th month of flooding (February 1992). It rebounded with an increase in cover after drawdown and mat formation (Figure 85).

<u>Responses By Species With Maximum Flood Tolerance.</u> *Hydrocotyle ranunculoides*, an obligate hydrophyte (Reed 1989) was present at low levels early in the study period. By the 15th month of flooding it had increased its dominance (Figure 79). The coverage pattern for *Hydrocotyle ranunculoides* early in the project is slightly misleading because of an early mis-identification problem. The misidentification was corrected after the January 1992 sample. It had previously been lumped with *Hydrocotyle* spp., which included *H. umbellata* (Figure 80). After the 15th month it rapidly increased its dominance, especially in the north marsh. By the end of the sample period it had colonized most unshaded empty space in the marsh, including canals and under marginally open *Typha latifolia* canopy (Stenberg, Pers. Obs.). This colonization pattern has led to the establishment of mixed communities including *Hydrocotyle ranunculoides* and *Bidens laevis* or *Eichhornia crassipes*. In some areas, often in canals, floating *Hydrocotyle ranunculoides* mats have provided the substrate for regeneration of *Amaranthus australis*, *Pontederia cordata*, and *Sagittaria lancifolia* (Stenberg, Pers. Obs.).

Pontederia cordata revealed a pattern of "preference" for transects 1 (200 m from water inlet) and 6 (middle of north marsh) (Figure 86). It was found early in the sample period and maintained a nearly constant cover level over time (4%). During the drawdown and mat formation it increased its cover along transect 1 to 8.5%.

Sagittaria lancifolia cover increased with time primarily along transect 1. It was found at low levels early in the sample period. Late in the period it went through a rapid increase in community average (Figure 87).

Salix caroliniana was relatively uncommon early in marsh development, occupying only north marsh transects. It became more prominent with time, appearing along transect 4 (south marsh) in January 1992. In the south marsh, the largest continuous stand of *S. caroliniana* was found about 200m southeast of the marsh's northwest corner. Its triangular shape suggests a response to the surface scraping conducted during site construction (Stenberg, Pers. Obs.). The most likely seed source for marsh colonization came from a well established *Salix caroliniana* stand (400m long by 50m wide) located along the north marsh levee (Stenberg, Pers. Obs.).

Cattails *Typha domingensis* and *T. latifolia* increased in dominance from the southeastern section of the south marsh to the remainder of the demonstration marsh (Figures 89, 90). During the year prior to flooding, *T. latifolia* dominated vegetative cover of the southeastern south marsh (Bob Cooper, Pers. Comm.). This was possible because the area had a lower soil elevation and water was not pumped out during site construction. The pattern of vegetative cover change over time suggests that the southeastern south marsh provided a *T. latifolia* seed source to the remainder of the marsh . Within the *T. latifolia* community matrix, *T. domingensis*, a cattail species more common in southern Florida, became established and increased its coverage in the south marsh (Figure 89). The presence of *T. domingensis* in the marsh was noted simultaneously in the sample plots and in general observations.

Density. Density measurements were taken on species with definable bunches, culms, or stems rooted in the sample plot. This measurement strategy resulted in mat or vine forming species being excluded. These excluded species were: *Alternanthera philoxeroides, Bidens laevis, Brachiara purpurascens, Commelina diffusa, Cynadon dactylon, Digitaria serotina, Eclipta alba, Eicchornia crassipes, Eleocharis vivipara, Galium tinctorium, Hydrocotyle ranunculoides, H. umbellata, Limnobium spongia, Ludwigia palustris, Mikania scandens, Panicum dichotomiflorum*, and *Polygonum punctatum*. If the rooting point for these sprawling, mat forming species could be located it was measured. Frequently, mat forming species exhibit rooting at nodes, leading to difficulty in determining the original rooting point.

Vegetation patterns as described by density and cover data were similar (Tables 16 and 15). As the marsh matured and hydroperiod increased, the percent of species with mat forming or sprawling tendencies increased proportionally from 27% at T1 in November 1990 to 39% at T6 in March 1994. Concomitantly, as species with definable

Table 16. Vegetation density measurements (# m^{-2} MEAN ±SE) from Natural Succession Transects. Periods (.) represent species absent from the transect or transects not sampled.

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
NOVEMBER 1990 SAMPLE SET																
ACERUB	.	.	.	.	0.06	0.04	.	.	.	.	0.03	0.03	.	.	.	.
ALTPHI	1.90	0.86	2.06	1.09	0.13	0.13	.	.	.	.	0.10	0.07	0.16	0.10	.	.
AMAAUS	.	.	0.03	0.03	.	.	0.20	0.17	.	.	.	.	.	.	.	.
ASTSUB	.	.	0.06	0.04	3.09	1.46	1.00	0.35	0.50	0.22	0.22	0.12	0.22	0.09	0.66	0.25
BACHAL	0.03	0.03	0.03	0.03	0.40	0.29	0.06	0.06	0.19	0.08	1.78	0.38	4.63	0.95	0.77	0.22
CALAME	.	.	.	.	.	.	.	.	1.97	1.77	1.25	0.77	.	.	0.19	0.19
COMDIF	0.84	0.62	.	.	.	.	.	.	.	.	0.09	0.09	.	.	.	.
Cyperac.	.	.	.	.	.	.	0.09	0.09	.	.	.	.	.	.	.	.
CYPHAS	.	.	.	.	.	.	1.13	0.79	.	.	.	.	0.16	0.13	.	.
CYPODO	.	.	0.37	0.26	0.40	0.18	.	.	.	.	.	.	0.07	0.07	0.09	0.05
CYPSPP	.	.	.	.	.	.	0.25	0.13	.	.	.	.	0.06	0.06	.	.
ECHCOL	0.09	0.05	.	.	0.05	0.05	.	.	.	.	.	.	1.95	1.10	0.04	0.04
ECLALB	0.06	0.04	.	.	0.71	0.51	.	.	.	.	0.31	0.12	.	.	0.03	0.03
ELEIND	0.19	0.19	.	.	.	.	0.32	0.32	.	.	.	.	.	.	.	.
ERISPP	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
EUPCAP	2.21	0.93	1.14	0.55	8.94	5.30	0.25	0.13	12.00	3.06	53.91	10.36	44.62	8.00	77.74	15.41
EUPSER	.	.	.	.	0.16	0.16	.	.	.	.	0.03	0.03	.	.	.	.
EUPSPP	.	.	.	.	.	.	.	.	.	.	0.25	0.14	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	0.06	0.06	.	.	39.50	19.74	.	.
GERCAR	.	.	.	.	.	.	.	.	.	.	.	.	1.52	1.29	.	.
HYDSPP	.	.	.	.	.	.	.	.	.	.	0.73	0.54	0.77	0.39	.	.
HYGLAC	.	.	.	.	.	.	0.55	0.42	.	.	.	.	.	.	.	.
IPOSPP	.	.	.	.	.	.	.	.	0.31	0.31	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
LUDLEP	.	.	.	.	0.41	0.41	.	.	.	.	.	.	.	.	.	.
LUDOCT	0.61	0.55	0.06	0.06	3.90	1.15	2.55	0.58	2.71	0.73	0.03	0.03	0.28	0.16	0.06	0.04
LUDPAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.06
LUDPER	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.
LUDSPP	.	.	.	.	.	.	0.09	0.09	.	.	.	.	.	.	.	.
MELCOR	0.03	0.03	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	0.13	0.09	.	.	.	.	.	.	.	.	.	.
PANDIC	2.31	1.25	.	.	0.22	0.15	.	.	.	.	.	.	.	.	0.03	0.03
PANSPP	.	.	.	.	.	.	0.06	0.04	1.09	1.09	.	.	.	.	.	.
PASSPP	.	.	.	.	.	.	0.30	0.13	0.42	0.17	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
PHYANG	.	.	.	.	.	.	0.31	0.14	0.06	0.06	.	.	.	.	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.26	0.26
PONCOR	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
Pterido.	.	.	.	.	.	.	.	.	.	.	0.06	0.06	.	.	.	.

Table 16. Vegetation density measurements (Cont.).

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
SAGLAN	0.10	0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	.	.	0.55	0.29	0.06	0.06
SAMCAN	.	.	.	.	0.03	0.03	0.03	0.03	0.06	0.06	.	.	.	.	.	.
SAMPAR	.	.	.	.	.	.	0.10	0.10	.	.	.	.	.	.	.	.
SESMAC	0.19	0.13	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
SOLTOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.66	0.62
STAFLO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.22
TYPLAT	0.06	0.06	2.06	0.73	.	.	0.13	0.10	0.06	0.06	.	.	0.84	0.84	0.03	0.03
unknown	.	.	.	.	.	.	.	.	0.06	0.04	.	.	.	.	.	.
udicot	.	.	.	.	2.69	2.69	.	.	0.83	0.83	0.63	0.63	0.31	0.31	0.31	0.28
uvine	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
WOOVIR	.	.	.	.	0.22	0.16	.	.	.	.	.	.	.	.	.	.
AUGUST 1991 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	.	.	0.07	0.07	.	.	0.06	0.06	0.04	0.04	0.21	0.17	.	.	.	.
AMAAUS	1.13	0.46	0.34	0.25	0.55	0.17	12.00	4.76	0.53	0.20	.	.	0.19	0.16	0.38	0.19
AMBART	.	.	.	.	.	.	.	.	0.09	0.09	.	.	.	.	.	.
AMMCOC	.	.	.	.	.	.	.	.	0.06	0.06	.	.	0.03	0.03	.	.
ASTELL	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	0.59	0.47	.	.	.	.	.	.
ASTSUB	.	.	.	.	.	.	0.50	0.20	.	.	.	.	.	.	.	.
ASTTEN	.	.	.	.	0.09	0.05	0.25	0.11	.	.	.	.	.	.	.	.
BACHAL	.	.	.	.	0.06	0.06	0.25	0.17	.	.	0.20	0.07	0.44	0.17	0.09	0.07
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.16	0.13
BRAPUR	.	.	.	.	.	.	.	.	.	.	0.55	0.37	.	.	.	.
CASOBT	.	.	.	.	.	.	.	.	.	.	0.13	0.07	.	.	0.03	0.03
COMDIF	.	.	.	.	.	.	.	.	0.16	0.11	0.14	0.14	.	.	.	.
CYNDAC	.	.	.	.	.	.	0.15	0.15	.	.	.	.	.	.	.	.
Cyperac.	.	.	.	.	0.06	0.04	.	.	0.03	0.03	.	.	0.03	0.03	0.03	0.03
CYPESC	.	.	0.03	0.03	.	.	.	.	0.75	0.75	.	.	.	.	.	.
CYPHAS	.	.	0.09	0.07	0.03	0.03	.	.	.	.	0.16	0.13	0.03	0.03	0.09	0.07
CYPIRI	.	.	.	.	.	.	3.45	3.22	0.03	0.03	.	.	.	.	.	.
CYPODO	0.06	0.06	0.16	0.10	0.42	0.21	0.66	0.36	0.71	0.29	0.10	0.05	0.06	0.04	0.45	0.29
CYPSPP	.	.	.	.	.	.	.	.	0.33	0.21	.	.	.	.	0.03	0.03
CYPSUR	.	.	.	.	.	.	0.94	0.76	0.03	0.03	.	.	.	.	.	.
DIGSER	.	.	.	.	0.34	0.24	.	.	0.25	0.18	.	.	.	.	0.23	0.23
ECHCOL	.	.	0.07	0.07	.	.	0.17	0.17	2.35	1.91	0.05	0.05	.	.	0.53	0.31
ECLALB	.	.	.	.	0.26	0.18	1.09	0.41	0.18	0.12	0.25	0.16	0.05	0.05	0.06	0.06
EICCRA	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	0.06	0.06
ELEIND	.	.	.	.	.	.	0.72	0.72	.	.	.	.	.	.	.	.
EUPCAP	.	.	.	.	2.09	1.25	0.41	0.15	11.61	5.36	0.16	0.08	0.16	0.16	0.63	0.38
EUPSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.06

Table 16. Vegetation density measurements (Cont.).

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
EUPSPP	.	.	.	.	0.06	0.06	.	.	.	.	.	.	.	.	.	.
GALTIN	0.06	0.06	0.38	0.38	0.22	0.16	0.29	0.12	0.88	0.41	0.73	0.39	0.03	0.03	1.29	0.70
HYDSPP	.	.	.	.	.	.	.	.	.	.	1.30	1.20	.	.	.	.
IPOSPP	.	.	.	.	.	.	0.03	0.03	0.03	0.03	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
LUDLEP	1.63	0.74	0.06	0.04	0.03	0.03	0.06	0.04	0.97	0.29	0.47	0.23	0.19	0.09	0.26	0.09
LUDOCT	0.09	0.07	.	.	.	.	0.25	0.13	2.77	0.68	4.74	2.30	1.52	0.50	4.00	1.23
LUDPAL	.	.	0.06	0.06	.	.	.	.	0.06	0.06	0.03	0.03	.	.	.	.
LUDPER	0.03	0.03	.	.	.	.	0.63	0.37	0.03	0.03	.	.	0.03	0.03	.	.
LUDSPP	.	.	.	.	.	.	.	.	0.06	0.06	.	.	.	.	.	.
MELPEN	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	0.03	0.03
PANDIC	.	.	.	.	9.44	6.79	1.81	1.43	0.20	0.20	0.03	0.03	0.12	0.12	.	.
PASSPP	.	.	.	.	.	.	.	.	0.22	0.19	0.03	0.03	.	.	.	.
PHYANG	.	.	0.50	0.21	.	.	.	.	.	.	0.03	0.03	.	.	.	.
PHYSPP	.	.	.	.	.	.	0.03	0.03	0.09	0.07	.	.	.	.	.	.
POLPUN	0.50	0.50	0.16	0.12	0.03	0.03	0.11	0.11	0.14	0.10	0.04	0.04	0.17	0.17	.	.
PONCOR	0.78	0.72	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POROLE	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	0.97	0.43	0.06	0.04	1.34	0.84	.	.	.	.
SAGLAN	0.09	0.07	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	0.13	0.13	0.09	0.09	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	0.03	0.03	0.45	0.28	0.13	0.10
SAMCAN	.	.	.	.	.	.	0.03	0.03	0.03	0.03	.	.	.	.	.	.
SESMAC	0.13	0.10	0.03	0.03	.	.	.	.	1.76	0.60	0.50	0.27	.	.	.	.
SETMAG	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	0.19	0.11	.	.	0.10	0.07	.	.	0.13	0.07
TYPLAT	1.88	0.68	1.19	0.37	6.00	1.67	0.81	0.27	0.10	0.10	.	.	0.25	0.25	0.34	0.34
UTRCOR	.	.	.	.	0.09	0.09	.	.	.	.	.	.	.	.	.	.
udicot	.	.	0.03	0.03	0.23	0.20	0.06	0.04	1.79	1.72	0.66	0.62	.	.	0.52	0.37
WOOVIR	.	.	.	.	0.38	0.26	.	.	.	.	.	.	.	.	.	.
JANUARY 1992 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	.	.	.	.	0.04	0.04	0.10	0.10	0.04	0.04	0.06	0.04	.	.	.	.
AMAAUS	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
ANDSPP	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
ASTSUB	.	.	.	.	0.03	0.03	.	.	.	.	0.03	0.03	.	.	.	.
ASTTEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
BACHAL	.	.	.	.	0.03	0.03	0.03	0.03	0.03	0.03	0.44	0.22	0.32	0.11	0.09	0.05
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.72	0.63
COMDIF	.	.	.	.	.	.	.	.	0.03	0.03	0.13	0.08	.	.	.	.
Cyperac.	.	.	.	.	.	.	.	.	0.19	0.09	0.16	0.10	0.03	0.03	.	.

Table 16. Vegetation density measurements (Cont.).

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
CYPHAS	.	.	.	.	.	.	0.13	0.10	0.03	0.03	.	.	0.03	0.03	0.13	0.09
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.09	0.07
ELEVIV	.	.	.	.	.	.	.	.	.	.	0.08	0.06	.	.	.	.
EUPCAP	.	.	.	.	.	.	.	.	0.23	0.23	0.45	0.45	.	.	0.03	0.03
GALTIN	.	.	.	.	.	.	.	.	.	.	0.05	0.05	0.03	0.03	0.05	0.05
HYDSPP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
LIMSPO	.	.	.	.	0.03	0.03	0.03	0.03	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
LUDOCT	0.16	0.13	.	.	.	.	0.38	0.26	.	.	0.03	0.03	.	.	0.22	0.19
LUDPAL	0.03	0.03	.	.	0.03	0.03	0.16	0.10	.	.	.	.	.	.	.	.
LUDPER	0.09	0.07	.	.	0.03	0.03	0.78	0.29	.	.	.	.	0.17	0.08	0.13	0.07
PASURV	.	.	.	.	.	.	.	.	0.34	0.13	.	.	.	.	.	.
Poaceae	.	.	.	.	.	.	0.03	0.03	.	.	0.19	0.11	.	.	.	.
POLPUN	0.09	0.09	.	.	.	.	.	.	2.20	2.20	0.40	0.14	.	.	0.35	0.21
PONCOR	0.16	0.16	.	.	.	.	.	.	.	.	0.23	0.20	.	.	.	.
RAPRAP	.	.	.	.	.	.	.	.	.	.	0.58	0.41	.	.	.	.
RUMCRI	.	.	.	.	.	.	0.41	0.32	.	.	0.53	0.36	.	.	.	.
SAGLAN	0.13	0.09	0.06	0.06	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	0.22	0.22	.	.	.	.	.	.	0.47	0.33	.	.	.	.	1.03	0.45
SALCAR	.	.	.	.	.	.	0.28	0.28	.	.	0.03	0.03	0.33	0.18	0.13	0.13
SAMCAN	0.03	0.03	.	.	.	.	.	.	0.19	0.19	.	.	.	.	.	.
TYPLAT	6.03	1.25	5.50	1.23	10.44	1.58	4.44	1.00	0.55	0.32	.	.	2.59	0.96	1.34	1.11
udicot	.	.	.	.	.	.	.	.	.	.	6.25	4.35	.	.	.	.
WOOVIR	.	.	.	.	0.22	0.17	.	.	.	.	.	.	.	.	.	.
AUGUST 1992 SAMPLE SET																
ALTPHI	0.19	0.19	0.15	0.12	.	.	0.13	0.10	0.20	0.12	.	.	.	.	.	.
AMAAUS	0.68	0.68	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	0.06	0.06	.	.	0.06	0.04	.	.	.	.
BACHAL	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.	0.09	0.07
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.37	0.37
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	0.03	0.03
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
CYPSPP	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
CYPSUR	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.
DIGSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.04
EICCRA	.	.	.	.	.	.	0.06	0.06	0.03	0.03	0.10	0.10	0.17	0.17	1.77	1.62
ELEVIV	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
EUPCAP	.	.	.	.	.	.	.	.	.	.	0.09	0.09	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	0.25	0.18	.	.	0.03	0.03
LUDOCT	0.13	0.13	.	.	.	.	.	.	.	.	0.22	0.22	0.09	0.07	.	.
LUDPER	0.03	0.03	.	.	0.09	0.09	1.10	0.55	0.09	0.05	0.06	0.04	0.28	0.15	0.58	0.20
MIKSCA	.	.	.	.	0.06	0.06	.	.	.	.	.	.	0.04	0.04	0.03	0.03

Table 16. Vegetation density measurements (Cont.).

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
PASURV	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
POLPUN	.	.	.	.	.	.	.	.	0.05	0.05	0.06	0.06	0.21	0.17	0.04	0.04
PONCOR	0.45	0.33	.	.	.	.	.	.	.	.	0.22	0.15	.	.	.	.
SAGLAN	0.34	0.18	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	1.59	0.62	0.31	0.22	1.19	0.75	1.69	0.50
SALCAR	.	.	.	.	.	.	0.03	0.03	.	.	0.03	0.03	1.13	0.43	0.13	0.10
TYPDOM	.	.	0.97	0.84	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	8.31	1.22	7.28	1.27	10.19	1.09	10.38	1.77	4.78	1.30	0.41	0.25	3.75	1.05	2.38	0.80
TYPSPPD	0.69	0.25	1.55	0.55	1.17	0.34	1.34	0.96	0.17	0.12	.	.	1.72	1.05	0.22	0.15
FEBRUARY 1993 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	0.35	0.16	.	.	.	.	.	.	0.07	0.05	.	.	.	.	.	.
AMAAUS	0.44	0.31	.	.	.	.	.	.	.	.	.	.	.	.	.	.
APILEP	.	.	.	.	.	.	4.46	2.59	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	1.38	1.00	.	.	.	.
BACHAL	.	.	.	.	.	.	0.07	0.07	.	.	0.53	0.38	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.15	0.12
CYPSPP	.	.	.	.	.	.	.	.	0.03	0.03	.	.	0.03	0.03	.	.
ECLALB	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	.	.	0.17	0.14	.	.
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.22	0.16
HYDRAN	.	.	.	.	.	.	0.15	0.15	0.05	0.05	0.06	0.06	.	.	.	.
LIMSPO	.	.	.	.	.	.	0.07	0.07	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	0.10	0.10	.	.	.	.	.	.	0.06	0.06	.	.
LUDOCTD	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
LUDPER	.	.	.	.	0.03	0.03	0.37	0.19	0.03	0.03	0.29	0.19	0.29	0.16	0.81	0.32
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
POLPUN	3.84	3.38	.	.	.	.	.	.	0.03	0.03	0.04	0.04	0.03	0.03	0.14	0.11
PONCOR	0.55	0.30	.	.	.	.	.	.	.	.	1.34	0.93	.	.	.	.
RHARHA	.	.	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	0.03	0.03	.	.	5.31	3.76	.	.	.	.
SAGLAN	0.52	0.36	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	0.03	0.03	.	.	0.16	0.16	0.03	0.03
SAGSPP	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	0.03	0.03	.	.	.	.	.	.	0.13	0.13	0.41	0.28	0.63	0.46
SAMCAN	.	.	.	.	.	.	0.06	0.04	.	.	.	.	.	.	.	.
TYPDOM	.	.	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	11.73	1.54	7.00	1.35	16.97	1.31	12.60	1.64	6.87	1.42	2.09	1.02	4.34	1.19	3.10	0.90
udicot	0.26	0.11	.	.	.	.	0.13	0.10	.	.	.	.	.	.	.	.

Table 16. Vegetation density measurements (Cont.).

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
AUGUST 1993 SAMPLE SET																
ALTPHI	0.21	0.08	.	.	0.03	0.03	.	.	.	.	0.39	0.17	.	.	0.04	0.04
AMAAUS	1.97	0.59	.	.	0.37	0.24	.	.	.	.	0.37	0.28	.	.	.	.
ANDSPP	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	1.03	0.63	.	.	.	.	.	.	.	.	.	.
ASTSUB	.	.	.	.	0.59	0.36	.	.	.	.	.	.	.	.	.	.
BACHAL	.	.	.	.	0.10	0.10	.	.	.	.	.	.	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.11	0.11
CASOBT	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
CICMEX	0.31	0.31	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	.	.
CYPIRI	0.31	0.31	.	.	.	.	.	.	.	.	.	.	.	.	0.25	0.18
CYPODO	0.28	0.17	.	.	1.09	0.65	.	.	.	.	0.74	0.36	.	.	1.44	1.10
CYPSPP	0.16	0.10	.	.	0.10	0.10	.	.	.	.	0.03	0.03	.	.	.	.
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.06	0.06
ECHSPP1	.	.	.	.	.	.	.	.	.	.	0.13	0.09	.	.	.	.
ECHSPP2	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
ECLALB	0.09	0.09	.	.	0.03	0.03	.	.	.	.	0.17	0.12	.	.	0.31	0.25
EICCRA	.	.	.	.	.	.	.	.	.	.	0.13	0.13	.	.	0.21	0.13
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
HYDRAN	.	.	.	.	0.18	0.15	.	.	.	.	.	.	.	.	0.05	0.05
LUDLEP	2.27	0.64	.	.	1.69	0.84	.	.	.	.	2.93	0.92	.	.	2.13	0.79
LUDOCT	0.63	0.63	.	.	.	.	.	.	.	.	1.00	0.51	.	.	0.53	0.31
LUDPER	.	.	.	.	1.41	0.63	.	.	.	.	.	.	.	.	0.80	0.26
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.10	0.05
MOMCHA	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
PANDIC	.	.	.	.	.	.	.	.	.	.	0.57	0.30	.	.	0.03	0.03
PASDIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
PLUROS	0.06	0.06	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLPUN	0.71	0.29	.	.	.	.	.	.	.	.	0.11	0.11	.	.	.	.
PONCOR	1.28	0.45.	.	.	.	.	.	.	.	.	2.19	1.52	.	.	.	.
SAGLAN	0.29	0.23	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	.	.	0.45	0.23	.	.	0.81	0.49
SALCAR	.	.	.	.	.	.	.	.	.	.	0.31	0.22	.	.	0.23	0.14
SESMAC	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
TYPDOM	0.31	0.18	.	.	0.97	0.69	.	.	.	.	.	.	.	.	.	.
TYPLAT	6.75	1.05	.	.	10.78	1.24	.	.	.	.	4.90	1.63	.	.	4.16	1.21
ALTPHIS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AMAAUSS	0.06	0.04	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRANS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.13	3.13
LUDPERS	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	0.28	0.20
POLPUNS	0.22	0.17	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCORS	0.09	0.09	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGLANS	1.41	1.28	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMONS	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	0.09	0.09

Table 16. Vegetation density measurements (Cont.).

SPECIES CODE	TRAN #1 MEAN	SE	TRAN #2 MEAN	SE	TRAN #3 MEAN	SE	TRAN #4 MEAN	SE	TRAN #5 MEAN	SE	TRAN #6 MEAN	SE	TRAN #7 MEAN	SE	TRAN #8 MEAN	SE
TYPLATS	.	.	.	.	1.25	1.16	.	.	.	.	.	.	.	.	.	.
udicots	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MARCH 1994 SAMPLE SET																
ACERUB	.	.	.	.	0.03	0.03	.	.	.	.	.	.	.	.	0.03	0.03
ALTPHI	0.04	0.04	0.25	0.18	.	.	.	.	.	.	0.06	0.04	.	.	.	.
AMAAUS	10.58	5.59	2.25	1.55	0.06	0.04	0.75	0.34	.	.	0.16	0.16	.	.	.	.
APILEP	.	.	.	.	.	.	0.33	0.22	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	0.28	0.25	.	.	.	.
BACHAL	.	.	.	.	0.03	0.03	.	.	.	.	0.03	0.03	.	.	.	.
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
COMDIF	.	.	.	.	.	.	.	.	.	.	0.03	0.03	.	.	.	.
CYPODO	.	.	0.17	0.17	0.03	0.03	.	.	.	.	.	.	.	.	.	.
CYPSPP	0.04	0.04	19.58	13.80	0.03	0.03	0.04	0.04	.	.	1.13	0.66	.	.	0.22	0.19
ECLALB	.	.	0.08	0.08	.	.	.	.	.	.	0.03	0.03	.	.	.	.
ELEVIV	.	.	.	.	.	.	.	.	.	.	0.22	0.17	.	.	.	.
EUPCAP	0.08	0.08	.	.	0.03	0.03	0.08	0.06	.	.	0.66	0.40	.	.	0.22	0.12
GALTIN	.	.	.	.	.	.	0.21	0.21	.	.	0.06	0.06	.	.	0.03	0.03
HYDRAN	0.05	0.05	.	.	0.03	0.03	0.38	0.19	.	.	.	.	.	.	1.09	1.09
LUDLEP	0.04	0.04	0.83	0.83	0.03	0.03	.	.	.	.	0.38	0.26	.	.	.	.
LUDPER	0.29	0.20	.	.	0.13	0.13	0.25	0.18	.	.	1.53	0.99	.	.	2.13	0.81
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
Poacea	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.84	0.78
POLPUN	0.38	0.24	2.00	1.44	.	.	.	.	.	.	0.22	0.12	.	.	.	.
PONCOR	2.00	0.99	.	.	.	.	.	.	.	.	1.31	0.95	.	.	.	.
RUMCRI	.	.	.	.	.	.	.	.	.	.	0.09	0.07	.	.	.	.
SAGLAN	0.13	0.13	0.25	0.25	.	.	.	.	.	.	0.06	0.06	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	.	.	0.06	0.04	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	0.06	0.06	.	.	0.06	0.06
SOLAME	.	.	0.08	0.08	.	.	.	.	.	.	.	.	.	.	.	.
TYPDOM	0.13	0.13	.	.	1.59	0.58	.	.	.	.	.	.	.	.	.	.
TYPLAT	8.17	1.58	13.42	2.58	13.31	1.83	15.29	1.36	.	.	6.84	1.43	.	.	5.09	1.28

point rooting habits declined (Table 16).

As the marsh matured, density of *Typha latifolia* tended to increase with time. Early in marsh development *T. latifolia* was found at low levels. For example, a minimum density of 0 m^{-2} (0%) was found at T3 and T6, and a maximum density of 2 m^{-2} (35%) found at T2 (Table 16). At the final measurement, *T. latifolia* had attained the greatest density relative to most other species measured. A minimum density of 5 m^{-2} (52%) was found at T8 and a maximum density of 15 m^{-2} (88%) was found at T4. In the north marsh, the second most dense perennial, non-mat forming species *Ludwigia peruviana* increased to maximum densities at the final sampling of 1.5m^{-2} at T6 and 2.3m^{-2} at T8. This species contributed most to the shallow, south ends of transects 6 and 8.

Height. Vegetation height patterns were similar to vegetation cover patterns (Table 17). Height measurements were taken on a larger number of species than density measurements and on a fewer number of species than cover measurements. This measurement difference resulted because species, such as *Azolla caroliniana, Lemna* spp., *Salvinia rotundifolia, Spirodella polyrhiza, Wolffia* spp. and *Wolffiella floridana* are very thin floating species. Species such as *Alternanthera philoxeroides* often tended to float at the water surface without a definable rooting zone. Under these conditions the height measurement was omitted.

Height patterns were similar to cover in showing successional state of the marshes. These patterns included height declines by species not adapted to long-term flooding (e.g. *Aster subulata, Commelina diffusa, Eupatorium capillifolium, Ludwigia*

Table 17. Vegetation height measurements (cm m^{-2} MEAN ±SE) from Natural Succession Transects. Periods (.) represent species absent from the transect.

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
NOVEMBER 1990 SAMPLE SET																
ACERUB	.	.	.	.	0.81	0.81	.	.	.	.	0.63	0.63	.	.	.	.
ALTPHI	15.03	4.60	11.22	4.33	0.78	0.78	.	.	2.06	1.16	4.03	2.25	0.78	0.46	0.53	0.53
AMAAUS	.	.	12.50	12.50	.	.	14.28	9.87	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	7.50	7.50	.	.	.	.	.	.
ASTSUB	.	.	2.13	1.48	36.72	14.37	40.25	10.57	30.28	11.23	24.06	12.06	12.57	6.66	46.41	15.33
BACHAL	8.44	5.93	1.88	1.88	4.48	4.48	2.63	2.63	6.19	2.64	31.19	5.79	45.28	7.10	19.87	5.42
CALAME	.	.	.	.	.	.	.	.	15.36	7.55	15.31	7.36	.	.	0.31	0.31
CARSPP	.	.	1.75	1.75	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	4.69	2.26	20.13	5.20	.	.	2.66	1.57	13.50	3.16	15.16	4.45	1.34	0.94	.	.
CYNDAC	.	.	.	.	.	.	6.13	3.12	.	.	.	.	.	.	.	.
Cyperac..	.	.	.	.	0.00	0.00	1.25	1.25	.	.	.	.	1.69	1.69	.	.
CYPHAS	.	.	.	.	.	.	3.84	2.25	.	.	.	.	3.59	2.92	.	.
CYPODO	.	.	5.97	3.34	7.90	3.16	.	.	.	.	1.69	1.69	2.91	1.86	4.56	2.68
CYPSPP	.	.	.	.	.	.	4.69	2.43	2.53	1.42	2.81	2.51	1.41	1.18	.	.
ECHCOL	4.34	2.43	9.77	4.15	20.32	5.01	.	.	.	.	5.63	4.31	14.40	3.44	4.00	2.27
ECLALB	2.00	1.39	.	.	5.00	2.57	4.75	4.75	1.19	0.83	12.53	4.19	.	.	0.66	0.66
ELEIND	1.03	1.03	.	.	1.88	1.88	2.13	1.52	.	.	.	.	.	.	.	.
ELESPP	.	.	.	.	.	.	.	.	.	.	0.30	0.30	0.13	0.13	.	.
ERISPP	.	.	.	.	.	.	.	.	.	.	.	.	1.75	1.75	.	.
EUPCAP	72.26	22.13	51.32	17.97	29.53	13.79	14.91	9.32	110.13	16.93	258.91	12.57	181.58	18.04	200.16	18.99
EUPSER	.	.	.	.	1.56	1.56	.	.	.	.	2.81	2.81	.	.	.	.
EUPSPP	.	.	.	.	.	.	.	.	.	.	21.88	12.26	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	0.28	0.28	.	.	3.81	1.07	.	.
GERCAR	.	.	.	.	.	.	.	.	0.38	0.38	.	.	3.41	3.12	.	.
HYDSPP	.	.	.	.	.	.	.	.	0.48	0.48	3.31	1.69	1.06	0.46	.	.
HYGLAC	.	.	.	.	.	.	3.34	1.61	.	.	.	.	.	.	.	.
IPOSPP	.	.	.	.	.	.	.	.	0.16	0.16	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	2.63	2.63	.	.	.	.	.	.
LUDLEP	.	.	.	.	3.13	3.13	.	.	.	.	.	.	.	.	.	.
LUDOCT	4.90	3.76	5.94	5.94	65.94	12.93	82.84	15.12	51.03	13.03	3.31	3.31	1.84	0.98	0.97	0.97
LUDPAL	.	.	.	.	.	.	.	.	0.72	0.48	.	.	.	.	0.90	0.90
LUDPER	.	.	6.56	6.56	.	.	.	.	.	.	.	.	.	.	.	.
LUDSPP	.	.	.	.	.	.	0.31	0.31	.	.	.	.	.	.	.	.
MELCOR	1.56	1.56	.	.	.	.	1.16	1.16	.	.	.	.	.	.	.	.
MIKSCA	.	.	.	.	9.52	6.70	.	.	.	.	.	.	.	.	.	.
PANDIC	18.72	9.51	17.48	6.55	67.10	8.10	63.16	9.35	7.00	3.11	7.48	4.87	11.00	5.02	5.19	4.70
PANHEM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.44	3.44
PANSPP	.	.	3.13	3.13	0.63	0.63	1.78	1.24	0.00	0.00	.	.	.	.	1.75	1.75
PASSPP	.	.	.	.	.	.	9.81	3.75	14.63	5.80	.	.	.	.	.	.

Table 17. Vegetation Height measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
PASURV	.	.	.	.	.	.	3.75	3.75	.	.	.	.	.	.	.	.
PHYANG	.	.	.	.	.	.	4.00	1.75	1.25	1.25	.	.	.	.	.	.
Poaceae	.	.	1.97	1.97	.	.	3.72	2.22	.	.	.	.	.	.	0.36	0.35
POLPUN	82.00	7.95	36.69	8.00	.	.	.	.	.	.	15.06	6.03	.	.	7.16	3.52
PONCOR	3.06	3.06	.	.	.	.	.	.	.	.	2.97	2.97	.	.	.	.
Pterido.	.	.	.	.	.	.	.	.	.	.	0.31	0.31	.	.	.	.
SAGLAN	3.74	3.74	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	.	.	24.53	12.05	3.44	3.44
SAMCAN	.	.	.	.	1.09	1.09	2.53	2.53	8.44	8.44	.	.	.	.	.	.
SAMPAR	.	.	.	.	.	.	1.44	1.08	.	.	.	.	.	.	.	.
SESMAC	17.34	12.25	.	.	.	.	.	.	8.44	8.44	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.	.	.
SOLTOR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.72	2.03
STAFLO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4.06	3.23
TYPLAT	8.91	6.24	62.16	14.87	.	.	6.03	4.20	3.28	3.28	.	.	7.81	7.81	3.91	3.91
unknown	.	.	.	.	.	.	.	.	0.22	0.17	.	.	.	.	.	.
udicot	.	.	.	.	0.00	0.00	.	.	0.13	0.13	0.16	0.16	0.06	0.06	1.06	0.74
WOOVIR	.	.	.	.	3.39	2.38	.	.	.	.	.	.	.	.	.	.
AUGUST 1991 SAMPLE SET																
ACERUB	.	.	.	.	0.94	0.94	.	.	.	.	.	.	.	.	.	.
ALTPHI	3.34	2.03	6.72	2.90	3.38	2.20	3.81	2.81	9.94	3.29	8.53	3.74	.	.	6.56	3.62
AMAAUS	81.94	24.37	8.19	5.77	45.28	12.53	65.94	20.43	41.00	16.00	.	.	11.41	6.59	8.22	4.16
AMBART	.	.	.	.	.	.	.	.	3.38	3.38	.	.	.	.	.	.
AMMCOC	.	.	.	.	.	.	.	.	2.50	2.50	.	.	2.50	2.50	.	.
ASTELL	.	.	.	.	.	.	1.22	1.22	.	.	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	9.59	5.29	.	.	.	.	.	.
ASTSUB	.	.	.	.	.	.	12.06	4.75	.	.	.	.	.	.	.	.
ASTTEN	.	.	.	.	7.78	4.61	8.56	4.00	.	.	.	.	.	.	.	.
BACHAL	.	.	.	.	4.06	4.06	16.22	11.09	.	.	26.03	8.45	20.75	7.48	6.41	4.46
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.44	3.09
BRAPUR	.	.	.	.	.	.	.	.	7.09	4.93	26.50	9.40	.	.	11.69	6.56
CASOBT	.	.	.	.	.	.	.	.	.	.	6.25	3.84	.	.	3.66	3.66
COMDIF	1.66	1.66	4.06	2.83	.	.	2.25	1.69	11.09	3.31	23.34	6.06	.	.	2.44	2.44
CYNDAC	.	.	.	.	.	.	5.53	2.35	.	.	.	.	.	.	.	.
Cyperac.	.	.	0.41	0.41	4.06	3.15	.	.	2.63	1.83	.	.	1.72	1.72	2.31	2.31
CYPESC	.	.	0.88	0.88	.	.	.	.	2.75	2.75	.	.	.	.	.	.
CYPHAS	.	.	1.97	1.38	1.69	1.40	.	.	.	.	3.44	2.42	3.13	3.13	5.78	4.10
CYPIRI	.	.	.	.	2.13	2.13	4.50	2.22	1.59	1.59	0.31	0.31	.	.	.	.
CYPODO	0.78	0.78	7.97	5.79	7.34	3.19	5.63	2.23	16.25	4.61	9.63	4.66	4.97	3.46	15.28	5.38
CYPSPP	.	.	.	.	.	.	.	.	10.13	3.73	.	.	.	.	1.63	1.63
CYPSUR	.	.	.	.	.	.	4.97	2.51	1.38	1.38	.	.	.	.	.	.
DIGSER	.	.	1.59	1.59	10.91	4.78	8.41	2.63	32.31	7.66	18.59	6.92	16.81	6.29	27.81	7.47
ECHCOL	.	.	4.88	2.48	16.38	4.79	4.66	2.35	21.81	5.36	30.78	8.00	19.03	6.98	49.50	9.42

Table 17. Vegetation Height measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	TRAN #1 SE	TRAN #2 MEAN	TRAN #2 SE	TRAN #3 MEAN	TRAN #3 SE	TRAN #4 MEAN	TRAN #4 SE	TRAN #5 MEAN	TRAN #5 SE	TRAN #6 MEAN	TRAN #6 SE	TRAN #7 MEAN	TRAN #7 SE	TRAN #8 MEAN	TRAN #8 SE
ECLALB	1.78	1.78	1.59	1.11	30.31	6.51	22.72	4.64	51.22	8.16	75.13	9.09	36.38	9.15	42.59	7.77
EICCRA	.	.	.	.	.	.	.	.	0.59	0.59	1.41	1.41	.	.	3.25	2.30
ELEIND	.	.	.	.	.	.	1.31	1.31	.	.	.	.	.	.	.	.
ELESPP	.	.	.	.	.	.	.	.	0.25	0.25	.	.	.	.	.	.
ELEVIV	.	.	.	.	.	.	.	.	.	.	8.63	2.77	.	.	.	.
EUPCAP	.	.	.	.	17.31	8.28	31.16	13.04	20.69	6.97	12.03	7.04	5.63	5.63	14.38	6.91
EUPSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.28	1.28
EUPSPP	.	.	.	.	4.78	4.78	.	.	.	.	.	.	.	.	.	.
GALTIN	0.09	0.09	0.47	0.47	3.47	2.15	4.00	2.05	4.63	2.01	6.06	2.30	2.66	2.30	11.06	2.92
HYDSPP	.	.	.	.	.	.	.	.	.	.	3.66	2.06	.	.	.	.
IPOSPP	.	.	.	.	.	.	0.66	0.66	4.13	3.67	.	.	.	.	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	3.13	3.13	.	.
LIMSPO	.	.	.	.	0.94	0.94	.	.	.	.	.	.	.	.	.	.
LUDLEP	35.34	13.17	1.25	0.87	4.66	4.66	5.47	5.01	48.97	11.75	20.78	9.10	17.38	8.65	25.31	8.50
LUDOCT	9.91	7.42	.	.	.	.	11.97	7.13	69.75	14.32	99.00	17.03	68.34	16.72	97.66	18.20
LUDPAL	.	.	0.38	0.38	.	.	0.31	0.31	0.34	0.34	1.13	1.13	.	.	.	.
LUDPER	6.06	6.06	.	.	.	.	8.22	3.97	5.16	5.16	.	.	5.03	5.03	.	.
LUDSPP	1.19	1.19	.	.	.	.	.	.	1.66	1.66	.	.	.	.	.	.
MELPEN	.	.	.	.	.	.	1.38	1.38	.	.	.	.	.	.	.	.
MIKSCA	.	.	0.16	0.16	15.28	7.38	.	.	.	.	.	.	14.25	8.18	2.97	2.97
PANDIC	24.25	8.37	6.44	4.51	66.13	10.67	52.00	8.32	52.00	12.25	5.84	4.24	28.94	10.54	.	.
PANSPP	.	.	.	.	.	.	.	.	.	.	1.88	1.88	.	.	.	.
PASDIS	.	.	.	.	.	.	.	.	2.50	2.50	.	.	.	.	.	.
PASSPP	.	.	.	.	3.28	3.28	.	.	4.72	3.32	6.13	4.37	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	7.31	5.29	10.66	6.02	.	.	.	.
PHYANG	.	.	14.44	6.19	.	.	.	.	.	.	1.09	1.09	.	.	.	.
PHYSPP	.	.	.	.	.	.	0.53	0.53	4.06	2.84	.	.	.	.	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	0.97	0.97	.	.	.	.
POLPUN	93.47	7.32	16.22	5.44	0.09	0.09	14.97	6.95	50.91	8.07	23.81	7.62	25.38	7.73	44.53	8.04
PONCOR	6.03	3.72	.	.	.	.	.	.	.	.	6.56	4.57	.	.	.	.
POROLE	.	.	.	.	.	.	0.31	0.31	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	3.94	1.74	0.50	0.39	4.31	1.84	.	.	.	.
SAGLAN	6.13	4.56	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	2.81	2.81	3.13	3.13	.	.	.	.
SALCAR	.	.	.	.	.	.	.	.	.	.	10.94	10.94	46.56	23.82	12.50	8.70
SAMCAN	.	.	.	.	.	.	6.56	6.56	9.38	9.38	.	.	.	.	.	.
SESMAC	15.03	10.61	0.00	0.00	.	.	.	.	109.94	24.86	50.63	21.42	.	.	.	.
SETMAG	5.78	5.78	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SOLAME	.	.	.	.	.	.	4.13	2.42	.	.	9.38	4.68	.	.	4.75	2.70
TYPLAT	76.56	17.58	48.84	12.94	97.19	15.45	34.16	10.16	9.25	6.48	.	.	5.06	5.06	6.25	6.25
UTRCOR	.	.	.	.	0.56	0.56	.	.	.	.	.	.	.	.	.	.
udicot	.	.	0.03	0.03	0.88	0.70	1.34	0.94	2.34	1.35	0.03	0.03	.	.	9.03	6.69
WOOVIR	.	.	.	.	6.03	4.21	.	.	.	.	.	.	.	.	.	.

JANUARY 1992 SAMPLE SET

Table 17. Vegetation Height measurements (Cont.)

SPECIES CODE	TRAN #1 MEAN	SE	TRAN #2 MEAN	SE	TRAN #3 MEAN	SE	TRAN #4 MEAN	SE	TRAN #5 MEAN	SE	TRAN #6 MEAN	SE	TRAN #7 MEAN	SE	TRAN #8 MEAN	SE
ACERUB	.	.	.	.	1.03	1.03	.	.	.	.	.	.	.	.	.	.
ALTPHI	20.47	4.58	20.26	5.11	6.19	2.63	2.41	1.75	7.39	2.42	4.03	2.45	.	.	4.84	2.57
AMAAUS	.	.	.	.	.	.	2.19	2.19	.	.	.	.	.	.	.	.
ANDSPP	.	.	.	.	.	.	.	.	2.31	2.31	.	.	.	.	.	.
ASTSPP	.	.	.	.	.	.	.	.	.	.	0.94	0.94	.	.	.	.
ASTSUB	.	.	.	.	0.84	0.84	.	.	.	.	2.94	2.94	.	.	.	.
BACHAL	.	.	.	.	5.66	5.66	6.25	6.25	7.25	5.20	27.47	10.14	27.66	8.53	6.59	4.13
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6.38	4.44
BRAPUR	.	.	.	.	.	.	.	.	2.13	2.13	8.22	8.22	.	.	13.28	7.42
COMDIF	.	.	.	.	.	.	.	.	2.03	1.41	6.28	2.65	1.63	1.63	.	.
CYNDAC	.	.	.	.	.	.	2.22	1.54	.	.	.	.	.	.	.	.
Cyperac.	.	.	.	.	.	.	.	.	12.47	3.90	4.41	2.66	2.22	1.55	.	.
CYPHAS	.	.	.	.	.	.	6.34	3.03	3.63	2.62	.	.	1.94	1.94	3.22	2.25
CYPODO	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.72	1.91
ELEVIV	.	.	.	.	.	.	.	.	.	.	9.63	2.83	.	.	.	.
EUPCAP	.	.	.	.	.	.	.	.	2.91	1.67	1.48	1.48	.	.	0.34	0.34
GALTIN	.	.	.	.	0.38	0.38	.	.	0.16	0.16	9.47	2.82	4.97	2.39	16.68	4.14
HYDRAN	.	.	.	.	.	.	.	.	.	.	8.43	3.23	.	.	1.78	1.25
HYDSPP	.	.	.	.	4.94	2.78	1.63	1.63	12.56	3.46	.	.	.	.	5.34	2.59
HYDUMB	.	.	.	.	.	.	.	.	.	.	.	.	13.34	3.89	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	3.72	3.72	.	.
LIMSPO	.	.	.	.	5.53	2.74	0.00	0.00	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	3.66	2.83	.	.
LUDOCT	4.94	3.98	.	.	.	.	5.06	4.20	.	.	1.97	1.97	4.75	4.75	8.50	6.13
LUDPAL	1.31	1.31	.	.	1.22	1.22	0.27	0.27	.	.	.	.	.	.	.	.
LUDPER	7.09	5.23	.	.	1.81	1.81	35.25	11.03	.	.	1.25	1.25	15.44	6.22	11.50	6.61
MIKSCA	.	.	2.22	2.22	8.00	4.53	.	.	.	.	.	.	13.94	7.07	5.41	4.30
PASSPP	.	.	.	.	.	.	.	.	1.72	1.72	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	11.88	4.18	.	.	.	.	2.25	2.25
Poaceae	.	.	.	.	.	.	1.34	1.03	.	.	2.56	1.62	1.34	1.34	0.00	0.00
POLPUN	40.84	5.75	16.75	4.91	3.00	2.29	9.81	3.42	35.84	3.62	19.25	4.46	17.59	4.61	21.61	6.04
PONCOR	3.13	3.13	.	.	.	.	.	.	.	.	5.44	3.08	.	.	.	.
RAPRAP	.	.	.	.	.	.	.	.	.	.	1.47	0.92	.	.	.	.
RUMCRI	.	.	.	.	.	.	2.28	1.60	.	.	0.94	0.61	.	.	.	.
SAGLAN	7.84	5.48	2.28	2.28	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	2.38	2.38	.	.	.	.	.	.	3.59	2.50	.	.	.	.	11.00	4.61
SALCAR	.	.	.	.	.	.	6.00	6.00	.	.	0.00	0.00	48.72	21.29	9.38	9.38
SAMCAN	2.06	2.06	.	.	.	.	.	.	9.38	9.38	.	.	.	.	.	.
TYPLAT	112.03	16.56	80.00	16.57	122.06	16.90	97.28	14.30	20.66	9.94	.	.	47.22	13.02	9.28	6.46
WOOVIR	.	.	.	.	4.03	2.82	.	.	.	.	.	.	.	.	.	.
AUGUST 1992 SAMPLE SET																
ALTPHI	11.71	4.68	19.45	6.63	0.44	0.44	10.47	7.43	16.41	5.10	19.91	4.73	5.53	3.09	8.66	4.34

Table 17. Vegetation Height measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
AMAAUS	2.34	1.92	.	.	4.59	4.59	.	.	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	3.28	3.28	.	.	7.34	5.11	.	.	.	.
BACHAL	.	.	.	.	7.81	7.81	.	.	.	.	.	.	.	.	7.53	5.24
BIDLAE	.	.	.	.	.	.	.	.	.	.	0.00	0.00	.	.	17.00	6.64
BRAPUR	.	.	.	.	.	.	.	.	1.28	1.28	.	.	.	.	7.19	4.11
COMDIF	.	.	.	.	.	.	.	.	.	.	2.03	2.03	.	.	.	.
Cyperac.	1.97	1.97	.	.	2.88	2.39	.	.	.	.	.	.	.	.	.	.
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	3.13	3.13	2.19	2.19
CYPODO	.	.	.	.	.	.	.	.	.	.	0.00	0.00	.	.	3.13	3.13
CYPSPP	.	.	.	.	.	.	1.78	1.78	.	.	.	.	.	.	.	.
CYPSUR	.	.	.	.	.	.	.	.	4.25	3.18	.	.	.	.	.	.
DIGSER	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6.88	4.80
ECLALB	.	.	.	.	.	.	.	.	.	.	4.16	4.16	.	.	.	.
EICCRA	.	.	.	.	.	.	1.22	1.22	0.97	0.97	5.78	2.94	5.72	3.28	7.69	4.37
ELEVIV	.	.	.	.	.	.	.	.	.	.	10.58	3.87	0.97	0.97	.	.
EUPCAP	.	.	.	.	.	.	.	.	.	.	1.25	1.25	.	.	.	.
HYDRAN	.	.	.	.	0.00	0.00	1.34	1.34	5.28	2.53	15.32	4.82	7.63	3.20	12.03	4.30
HYDSPP	.	.	.	.	2.19	1.95	.	.	5.69	2.97	.	.	1.25	1.25	.	.
HYDUMB	.	.	.	.	.	.	.	.	1.31	1.31	.	.	1.22	1.22	.	.
JUNEFF	.	.	.	.	.	.	.	.	.	.	.	.	4.06	4.06	.	.
LIMSPO	.	.	.	.	12.42	5.27	2.22	1.54	.	.	.	.	.	.	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	12.81	8.94	.	.	2.97	2.97
LUDOCT	6.56	6.56	.	.	.	.	.	.	.	.	5.09	5.09	4.53	3.16	.	.
LUDPER	4.22	4.22	.	.	7.81	7.81	42.94	15.06	9.00	5.04	17.91	10.07	21.50	10.88	52.19	16.13
MIKSCA	.	.	.	.	2.66	2.66	.	.	1.50	1.50	.	.	21.31	9.18	10.91	6.30
PASDIS	.	.	.	.	.	.	.	.	4.25	2.96	.	.	.	.	.	.
PASURV	.	.	.	.	.	.	.	.	.	.	2.75	2.75	.	.	.	.
Poaceae	1.94	1.94	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLPUN	.	.	9.28	5.21	.	.	1.16	1.16	24.13	5.64	34.31	7.24	10.25	4.36	22.16	7.11
PONCOR	23.06	9.75	.	.	.	.	.	.	.	.	8.75	6.09	.	.	.	.
SAGLAN	21.28	10.89	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	29.50	9.58	9.56	6.65	12.88	7.21	39.59	10.65
SALCAR	.	.	.	.	.	.	9.28	6.89	.	.	15.00	10.78	52.91	23.62	12.28	7.02
TYPDOM	.	.	26.06	14.87	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	182.34	16.56	146.41	22.24	210.88	15.85	171.78	18.79	76.84	19.76	16.09	9.07	72.39	18.53	57.66	16.86
TYPSPPD	38.44	13.31	24.40	13.55	61.67	16.24	7.13	7.13	16.45	9.36	.	.	22.26	12.73	13.44	9.37

FEBRUARY 1993 SAMPLE SET

ACERUB	.	.	.	.	4.00	4.00	.	.	.	.	.	.	.	.	.	.
ALTPHI	11.48	5.48	2.31	2.31	0.94	0.69	.	.	2.76	2.11	5.81	2.77	0.00	0.00	7.45	3.64
APILEP	.	.	.	.	.	.	2.24	1.23	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	4.47	2.57	.	.	.	.
BACHAL	.	.	.	.	.	.	0.94	0.81	.	.	3.16	2.21	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13.13	4.32

Table 17. Vegetation Height measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
CARSPP	.	.	.	.	.	.	0.78	0.78	.	.	.	.	.	.	.	.
CYPSPP	.	.	.	.	.	.	.	.	2.06	2.06	.	.	2.16	2.16	.	.
ECLALB	0.00	0.00	.	.	.	.	1.69	1.18	.	.	0.00	0.00	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	0.00	0.00	6.57	4.98	4.39	3.05
ELEVIV	.	.	.	.	.	.	.	.	.	.	0.80	0.80	.	.	.	.
EUPCAP	0.31	0.31	.	.	.	.	.	.	.	.	.	.	.	.	.	.
GALTIN	.	.	.	.	.	.	2.38	2.07	.	.	.	.	.	.	5.47	3.05
HYDRAN	6.41	4.18	0.16	0.16	3.79	2.59	3.43	1.75	11.82	3.79	22.97	5.10	11.04	4.61	28.10	4.90
HYDSPP	.	.	.	.	.	.	0.26	0.26	.	.	1.13	1.13	.	.	.	.
HYDUMB	.	.	.	.	.	.	0.00	0.00	1.00	1.00	.	.	.	.	.	.
LIMSPO	.	.	.	.	5.53	2.96	0.80	0.80	.	.	.	.	.	.	.	.
LUDLEP	10.84	7.43	.	.	8.56	6.56	.	.	.	.	.	.	1.75	1.75	1.09	1.09
LUDPER	6.63	4.69	.	.	5.28	3.85	33.50	13.62	6.56	6.56	17.53	8.95	26.31	12.76	47.69	16.63
MIKSCA	.	.	.	.	.	.	.	.	0.00	0.00	.	.	6.90	6.90	6.52	3.71
PASURV	.	.	.	.	.	.	.	.	.	.	1.41	1.41	.	.	.	.
Poaceae	.	.	.	.	.	.	.	.	.	.	1.41	1.41	.	.	.	.
POLPUN	16.70	7.84	0.00	0.00	.	.	.	.	1.13	1.13	11.84	4.54	1.55	1.55	7.75	3.51
PONCOR	26.45	10.03	.	.	.	.	.	.	.	.	4.69	3.26	.	.	.	.
RHARHA	.	.	.	.	.	.	1.00	1.00	.	.	.	.	.	.	.	.
RUMCRI	.	.	.	.	.	.	0.84	0.66	.	.	0.94	0.72	.	.	.	.
SAGLAN	17.34	9.71	6.25	6.25	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	1.28	1.28	.	.	5.94	5.94	0.78	0.78
SALCAR	.	.	5.78	4.02	.	.	0.00	0.00	.	.	12.81	8.92	62.10	27.14	12.97	7.11
SAMCAN	.	.	.	.	.	.	10.44	7.41	3.13	3.13	.	.	.	.	.	.
TYPDOM	.	.	6.88	6.88	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	147.90	13.09	113.75	17.86	196.00	9.94	142.94	11.79	96.38	14.99	30.88	11.75	72.13	16.29	57.72	13.51
udicot	0.11	0.11	.	.	.	.	0.10	0.07	.	.	.	.	.	.	.	.
AUGUST 1993 SAMPLE SET																
ALTPHI	9.56	2.54	.	.	5.25	3.03	.	.	.	.	17.69	5.40	.	.	13.44	4.04
AMAAUS	50.03	13.19	.	.	17.66	10.21	.	.	.	.	10.25	5.88	.	.	2.97	2.97
ANDSPP	.	.	.	.	.	.	.	.	.	.	6.72	6.72	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	14.09	8.21	.	.	.	.
ASTSUB	.	.	.	.	.	.	.	.	.	.	14.38	8.03	.	.	.	.
BACHAL	.	.	.	.	.	.	.	.	.	.	7.16	5.05	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13.00	5.16
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.47	2.47
CASOBT	.	.	.	.	.	.	.	.	.	.	2.09	2.09	.	.	.	.
CICMEX	1.25	1.25	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	.	.	.	.	.	.	.	.	.	.	2.63	2.32	.	.	.	.
CYPIRI	0.78	0.78	.	.	.	.	.	.	.	.	.	.	.	.	2.75	1.99
CYPODO	8.28	3.97	.	.	10.22	4.45	.	.	.	.	15.81	5.36	.	.	11.88	4.72
CYPSPP	1.81	1.11	.	.	3.22	2.70	.	.	.	.	0.31	0.31	.	.	.	.
ECHCRU	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.81	4.07

Table 17. Vegetation Height measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
ECHSPP1	.	.	.	.	.	.	.	.	.	.	9.63	5.02	.	.	.	.
ECHSPP2	.	.	.	.	.	.	.	.	.	.	2.66	2.66	.	.	.	.
ECLALB	0.56	0.56	.	.	0.28	0.28	.	.	.	.	3.41	1.83	.	.	5.41	3.41
EICCRA	.	.	.	.	.	.	.	.	.	.	4.19	2.48	.	.	6.22	2.93
ELEVIV	.	.	.	.	.	.	.	.	.	.	1.68	1.27	.	.	.	.
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.47	0.47
HYDRAN	3.88	1.46	.	.	2.75	1.18	.	.	.	.	4.34	1.21	.	.	10.39	3.47
HYDUMB	0.88	0.88	.	.	.	.	.	.	.	.	0.94	0.94	.	.	.	.
LIMSPO	.	.	.	.	2.07	1.07	.	.	.	.	.	.	.	.	.	.
LUDLEP	32.59	7.55	.	.	13.44	6.54	.	.	.	.	59.63	14.05	.	.	28.50	9.57
LUDOCT	2.50	2.50	.	.	.	.	.	.	.	.	26.72	12.05	.	.	14.53	8.52
LUDPER	.	.	.	.	8.28	8.28	.	.	.	.	40.25	15.76	.	.	71.50	19.51
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11.00	5.33
MOMCHA	.	.	.	.	.	.	.	.	.	.	3.59	3.59	.	.	.	.
PANDIC	.	.	.	.	.	.	.	.	.	.	39.22	11.15	.	.	2.63	2.63
PASDIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.56	1.82
PASURV	.	.	.	.	.	.	.	.	.	.	3.25	3.25	.	.	.	.
PLUROS	0.47	0.47	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLDEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.16	3.62
POLPUN	32.78	8.15	.	.	.	.	.	.	.	.	43.81	9.96	.	.	8.63	4.35
PONCOR	29.84	10.00	.	.	.	.	.	.	.	.	8.53	5.94	.	.	.	.
SAGLAN	15.34	8.65	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	.	.	16.71	7.87	.	.	12.03	5.51
SALCAR	.	.	.	.	.	.	.	.	.	.	16.25	11.31	.	.	24.19	10.54
SESMAC	.	.	.	.	.	.	.	.	.	.	6.25	6.25	.	.	.	.
TYPDOM	28.91	16.16	.	.	31.19	15.49	.	.	.	.	.	.	.	.	.	.
TYPLAT	145.00	17.30	.	.	192.66	16.85	.	.	.	.	80.19	16.81	.	.	95.06	17.12
ALTPHIS	0.25	0.25	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AMAAUSS	0.34	0.26	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRANS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.03	0.03
LUDPERS	.	.	.	.	0.09	0.09	.	.	.	.	.	.	.	.	1.06	0.74
POLPUNS	2.88	2.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCORS	0.06	0.06	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGLANS	0.66	0.52	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAGMONS	0.16	0.16	.	.	.	.	.	.	.	.	.	.	.	.	1.31	1.31
TYPLATS	.	.	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
udicots	0.50	0.50	.	.	.	.	.	.	.	.	.	.	.	.	.	.

MARCH 1994 SAMPLE SET

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
ACERUB	.	.	.	.	0.41	0.41	.	.	.	.	.	.	.	.	0.38	0.38
ALTPHI	2.71	1.92	4.08	2.18	4.25	2.47	5.29	4.24	.	.	21.09	4.00	.	.	10.03	3.14
AMAAUS	5.88	1.83	2.17	1.48	3.03	2.11	2.63	1.17	.	.	0.47	0.47	.	.	.	.
APILEP	.	.	.	.	.	.	1.92	1.13	.	.	.	.	.	.	.	.
ASTELL	.	.	.	.	.	.	.	.	.	.	5.28	4.00	.	.	.	.

Table 17. Vegetation Height measurements (Cont.)

SPECIES	TRAN #1		TRAN #2		TRAN #3		TRAN #4		TRAN #5		TRAN #6		TRAN #7		TRAN #8	
CODE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE	MEAN	SE
BACHAL	.	.	.	.	0.31	0.31	.	.	.	.	6.22	4.55	.	.	.	.
BIDLAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.75	1.33
BRAPUR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.09	1.09
COMDIF	.	.	.	.	.	.	.	.	.	.	0.47	0.47	.	.	.	.
CYPODO	.	.	5.83	5.83	1.97	1.97	.	.	.	.	.	.	.	.	.	.
CYPSPP	0.42	0.42	2.33	1.37	0.72	0.52	0.21	0.21	.	.	2.31	0.96	.	.	1.19	0.67
ECLALB	.	.	4.75	4.75	.	.	.	.	.	.	1.72	1.41	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	1.03	0.66	.	.	6.28	2.70
ELEVIV	.	.	.	.	.	.	.	.	.	.	9.19	3.36.	.		.	.
EUPCAP	0.21	0.21	3.67	3.67	0.47	0.47	0.79	0.55	.	.	1.91	1.31.	.		1.42	0.85
GALTIN	1.25	1.25	.	.	.	.	0.92	0.92.	.		0.31	0.31.	.		2.44	1.61
HYDRAN	9.63	2.49	13.25	4.65	7.78	2.13	8.29	2.49	.	.	12.41	2.96	.	.	25.00	3.60
LUDLEP	2.00	2.00	2.33	2.33	1.09	1.09	.	.	.	.	4.25	2.96	.	.	.	.
LUDPER	6.96	5.15	.	.	3.59	3.59	10.50	7.27	.	.	25.75	9.84	.	.	71.22	20.19
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.50	3.50
PASDIC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.94	0.94
Poaceae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.50	1.96
POLDEN	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4.63	2.72
POLPUN	13.71	3.02	12.75	6.49	.	.	3.17	3.17	.	.	19.38	5.38	.	.	4.19	2.42
PONCOR	11.79	5.62	.	.	.	.	.	.	.	.	3.72	3.72	.	.	.	.
RUMCRI	.	.	.	.	.	.	.	.	.	.	1.25	0.87	.	.	.	.
SAGLAN	7.79	5.39	11.75	11.75	.	.	.	.	.	.	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	.	.	.	.	2.00	1.40	.	.	1.19	1.19
SALCAR	.	.	.	.	.	.	.	.	.	.	16.25	11.31	.	.	16.22	9.33
SAMCAN	.	.	.	.	.	.	6.33	6.33	.	.	.	.	.	.	.	.
SOLAME	.	.	2.33	2.33	.	.	.	.	.	.	.	.	.	.	.	.
TYPDOM	11.25	11.25	.	.	67.59	22.48	.	.	.	.	.	.	.	.	.	.
TYPLAT	103.38	15.21	179.08	7.09	151.63	15.15	245.21	6.79	.	.	94.32	17.67	.	.	97.81	18.30

octovalvis, and *Panicum dichotomiflorum*), and increases or height maintenance by flood adapted species (e.g. *Hydrocotyle ranunculoides*, *Ludwigia peruviana*, *Pontederia cordata*, *Sagittaria lancifolia*, *Salix caroliniana*, and *Typha latifolia*). Opportunistic species, present in the seedbank, and responding to drawdown and mat flotation included: *Amaranthus australis*, *Commelina diffusa*, *Eupatorium capillifolium*, *Ludwigia leptocarpa*, and *Polygonum punctatum*.

Height measurements provided another view of the competitive environment in the marsh ecosystem. The most prolific invader species, *Typha latifolia*, was also the tallest species durng the study period. Potential competing species (e.g. *Pontederia cordata*, *Ludwigia peruviana*, and *Sagittaria lancifolia*) tended to attain a maximum average height <30 cm while *Typha latifolia* had attained heights approaching 250 cm.

NATURAL SUCCESSION TRANSECTS -- BIOMASS

Biomass within the Apopka Marsh showed noticeable changes from November 1990 to March 1994. Species composition, allocation of above- and below-ground biomass, and amount of dead biomass all contributed to these changes. In an attempt to better define some of these changes within the marsh, biomass was partitioned into "above-ground" (alive and dead), "below-ground" and "floating mat" components. Above-ground biomass was defined as any tissue (leaves, roots, rhizomes) found above the consolidated substrate. Living tissue within the substrate was considered below-ground biomass. If the biomass partition had a loosely consolidated matrix of soil and recently deposited sediment (aka "goop"), shoot bases, rhizomes, and roots floating in the water column, it was defined as floating mat biomass. Live and dead biomass was differentiated by tissue color with green biomass considered alive and brown dead.

Above-ground and General Biomass Patterns

In November 1990, above-ground live biomass values ranged from 270 g m^{-2} along transect 5 to 1753 g m^{-2} on transect 8 (Table 18). The dominant species as determined by total biomass were *Eupatorium capillifolium, Panicum dichotomiflorum, Panicum* spp., and *Polygonum punctatum* (Table 19). Additional species were found within the sample plots. With the exception of *Aster subulatus* in transect 4 and *Ludwigia octovalvis* in transect 3, these species accounted for less than 10% of the biomass collected along each transect. The amount of above-ground live biomass on the site relative to dead biomass ranged from a ratio of 1.28 on transect 2 to 38.48 on transect 7. Below-ground biomass for those transects ranged from 28 (T2) to 46 g m^{-2} (T1) (Table 18).

Above- and below-ground live biomass for the August 1991 samples ranged from 268 g m^{-2} (T2) to 928 g m^{-2} (T9) (Table 18). Live above-ground biomass ranged from 136 g m^{-2} (T2) to 812 g m^{-2} (T9), with ratios of above- to below-ground live biomass ranging from 1.03 (T2) to 10.87 (T6). Dead above-ground biomass ranged from 162 g m^{-2} (T9) to 545 g m^{-2} (T6). A ratio of live to dead above-ground biomass ranged from 0.26 (T2) to 5.01 (T9) (Table 18). This indicates a change from the November 1990 sampling where, at all transects, live biomass was greater than dead biomass. There was

Table 18. Total biomass summary (g m^{-2}, MEAN ±SE), by transect and sampling date. "." No sample taken or information not available for calculation. A:B=Above-ground:Below-ground Biomass Ratio

	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
November 1990																		
Above-ground																		
Dead	198.21	71.62	568.66	139.27	141.46	55.99	81.85	68.66	39.85	17.56	55.30	51.39	29.74	29.74	54.11	26.75	96.61	25.83
Live	799.66	233.68	727.52	286.17	686.49	161.77	579.19	124.47	270.45	110.42	1386.00	205.74	1144.35	171.55	1753.14	284.77	633.32	104.30
Total	997.86	305.30	1296.18	425.44	827.95	217.76	661.04	193.13	310.30	127.98	1441.30	257.12	1174.09	201.29	1807.25	311.52	729.93	130.13
Live:Dead	4.03		1.28		4.85		7.08		6.79		25.06		38.48		32.40		6.56	
Below-ground																		
Total	82.768	23.95	27.975	5.316	.	.	.	.	.	.	.	.	.	.	.	.	66.042	19.093
Overall																		
Live	882.43		755.49		686.49		579.19		270.45		1386.00		1144.35		1753.14		699.37	
A:B	9.66		26.01														9.59	
August 1991																		
Above-ground																		
Dead	535.30	206.54	524.47	271.06	146.92	53.20	.	.	.	.	545.11	106.59	.	.	472.83	114.55	162.20	68.84
Live	658.69	82.78	135.86	65.11	483.82	105.75	.	.	.	.	552.30	141.30	.	.	328.79	64.39	811.91	140.83
Total	1193.99	289.32	660.33	336.17	630.74	158.95					1097.41	247.89			801.62	178.94	974.11	209.67
Live:Dead	1.23		0.26		3.29						1.01				0.70		5.01	
Below-ground																		
Total	223.557	48.504	132.478	60.286	289.647	100.492	.	.	.	.	50.831	12.749	.	.	62.842	12.683	116.743	19.918
Overall																		
Live	882.24		268.34		773.47						603.13				391.63		928.65	
A:B	2.95		1.03		1.67						10.87				5.23		6.95	
January 1992																		
Above-ground																		
Dead	595.55	76.99	237.96	52.16	685.67	145.45	.	.	.	.	621.61	196.86	.	.	428.91	87.95	507.54	76.10
Live	294.23	66.57	212.44	68.73	63.35	26.58	.	.	.	.	256.84	111.40	.	.	455.54	294.58	306.40	42.90
Total	889.79	143.56	450.41	120.89	749.02	172.04					878.45	308.26			884.45	382.52	813.94	119.00
Live:Dead	0.49		0.89		0.09						0.41				1.06		0.60	
Below-ground																		
Total	225.34	59.486	246.462	5.349	392.233	86.342	.	.	.	.	37.899	10.524	.	.	99.235	53.67	201.46	51.185
Overall																		
Live	519.57		458.90		455.58						294.74				554.78		507.86	
A:B	1.31		0.86		0.16						6.78				4.59		1.52	
August 1992																		
Above-ground																		
Dead	524.12	207.87	.	.	748.71	294.94	.	.	.	.	50.74	23.29	.	.	296.43	57.15	365.80	141.88

Table 18. Total biomass summary (Cont.)

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Live	666.77	207.58	.	.	705.88	147.15	.	.	.	.	328.60	155.98	.	.	476.83	86.85	310.12	85.46
Total	1190.89	415.46			1454.59	442.09					379.34	179.27			773.26	144.01	675.92	227.34
Live:Dead	1.27				0.94						6.48				1.61		0.85	
Below-ground																		
Total	173.939	39.209	.	.	223.66	59.746	.	.	.	.	42.006	9.192	.	.	108.923	43.154	227.758	48.407
Overall																		
Live	840.71				929.54						370.61				585.75		537.88	
A:B	3.83				3.16						7.82				4.38		1.36	
February 1993																		
Above-ground																		
Dead	565.16	174.58	.	.	617.55	84.05	.	.	.	.	220.79	109.88	.	.	64.61	46.59	246.20	86.37
Live	410.16	94.46	.	.	506.19	83.83	.	.	.	.	177.32	61.45	.	.	604.27	268.29	678.39	232.85
Total	975.32	269.04			1123.74	167.88	.	.	.	.	398.11	171.33			668.88	314.89	924.59	319.22
Live:Dead	0.73				0.82						0.80				9.35		2.76	
Below-ground																		
Total	450.08	36.70	.	.	288.57	54.50					81.06	29.80	.	.	145.84	38.59	201.38	37.68
Overall																		
Live	860.24				794.76						258.38				750.11		879.77	
A:B	0.91				1.75						2.19				4.14		3.37	
August 1993																		
Above-ground																		
Dead	302.52	195.38	.	.	1135.20	207.40	.	.	.	.	61.79	53.22	.	.	175.69	77.30	.	.
Live	654.78	238.59	.	.	274.52	60.86	.	.	.	.	550.19	223.50	.	.	1142.01	77.77	.	.
Total	957.29	433.97			1409.72	268.26					611.98	276.72			1317.70	155.07		
Live:Dead	2.16				0.24						8.90				6.50			
Below-ground																		
Total	96.62	27.88	.	.	821.34	201.33	.	.	.	.	36.05	16.45	.	.	182.24	66.42	.	.
Overall																		
Live	751.40				1095.86						586.24				1324.25			
A:B	6.78				0.33						15.26				6.27			
March 1994																		
Above-ground																		
Dead	144.23	69.57	185.08	8.84	507.43	76.59	813.88	174.19	.	.	431.42	187.25	.	.	278.23	41.58	.	.
Live	190.80	78.52	414.77	169.76	533.47	73.86	617.39	88.41	.	.	370.08	220.60	.	.	1171.79	290.10	.	.
Total	335.03	148.10	599.85	178.60	1040.90	150.44	1431.28	262.60			801.50	407.85			1450.02	331.68		
Live:Dead	1.32		2.24		1.05		0.76				0.86				4.21			
Below-ground																		
Total	294.60	14.70	265.22	50.53	549.43	108.35	580.78	68.63	.	.	537.56	147.22	.	.	241.76	96.77	.	.
Overall																		
Live	485.40		679.99		1082.90		1198.17				907.64				1413.55			
A:B	0.65		1.56		0.97		1.06			.	0.69			.	4.85		.	.

Table 19. Above-ground Biomass Summary (Mean ±SE) by Transect and Species. Species codes ending with -L represent leaves and -R roots and rhizomes.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
November 1990																		
ACERUB																		
ALTPHI	8.32	8.31	0.11	0.11					8.76	8.76							40.73	23.11
AMAAUS							1.23	1.23										
AMMCOC																		
ASTSUB	3.60	3.60			111.13	106.57	141.32	97.90	41.85	27.34	21.82	21.82	1.11	1.11	17.61	12.82		
ASTTEN	1.51	1.51			0.21	0.22												
BACHAL									0.77	0.62	0.97	0.62	4.23	2.08	0.43	0.37		
BIDLAE																		
BRAPUR																		
CALAME									1.87	1.87								
COMDIF	3.77	3.77	46.29	31.65			3.79	3.60	3.83	1.91	62.78	44.18					190.12	74.91
CYNDAC							6.47	6.47										
CYPHAS							3.93	3.93										
CYPIRI																		
CYPODO					0.05	0.05			0.74	0.74			0.18	0.18				
CYPSPP			0.09	0.09	0.22	0.21					0.05	0.05					0.28	0.28
DIGSER																	0.02	0.02
ECHCOL					9.62	9.62	7.79	7.79			50.61	50.61	0.34	0.34				
ECLALB	0.02	0.02							5.85	3.12	3.29	2.16	0.03	0.04			10.87	10.63
EICCRA																		
ELEIND	1.01	1.01			3.01	2.92											0.06	0.06
ELEVIV																		
EUPCAP	276.40	255.77	314.70	305.79	74.68	74.68			153.69	89.49	1152.01	257.41	927.37	233.95	1628.00	317.17	57.79	57.79
EUPSER					1.82	1.82			2.23	2.23	0.29	0.29						
GALTIN						0.01							2.27	1.26				
HYDRAN																		
HYDSPP											0.59	0.59						
HYDUMB																		
LIMSPO																		
LUDLEP																		
LUDOCT	6.35	6.35	15.68	15.68	75.50	36.20	24.18	16.95	3.22	1.67	0.56	0.57					11.9	8.93
LUDPAL									0.40	0.40								
LUDPER																		
MELCOR	0.25	0.25																
MIKSCA															0.04	0.04		
PANDIC	23.85	23.85	50.38	50.38	317.07	163.65	166.15	100.59	14.02	11.43			142.02	72.05			103.17	70.86
PANSPP			17.09	16.91	93.00	49.77	125.55	84.43	28.63	28.63	56.58	56.58			103.00	100.09	40.04	40.04

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
PASDIC																		
PASSPP			2.53	2.53	0.14	0.11	34.30	34.30	0.11	0.11								
PASURV									3.13	2.06							3.10	3.10
PHYANG							0.12	0.12							0.01	0.02		
PHYSPP																		
POACEAE							61.76	61.76										
POLPUN	462.60	151.47	195.04	129.22							36.44	24.33			4.03	4.03	168.64	110.96
PONCOR-L																		
PONCOR-R																		
RHYINU																	2.35	2.35
RUMCRI																		
SAGLAN-L	10.89	10.89	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.0. A
SAGLAN-R																		
SAGMON-L																		
SAGMON-R																		
SALCAR-L													66.55	66.55				
SALCAR-R																		
SALROT																		
SAMSPP									0.25	0.20			0.21	0.21				
SESMAC																	4.23	4.23
SOLAME																		
TYPLAT-L	1.11	1.11	85.62	66.50			2.62	2.62	1.11	1.11								
TYPLAT-R																		
UDICOT																		
UNKNOWN					0.01	0.01							0.02	0.02	0.01	0.01		
WOOVIR					0.01	0.01												
DEAD	198.21	71.62	568.66	139.27	141.46	55.99	81.85	68.66	39.85	17.56	55.30	51.39	29.74	29.74	54.11	26.75	96.61	25.83
DEAD-EIC																		
DEAD-EUP																		
DEAD-LIM																		
DEAD-LUD																		
DEAD-PON																		
DEAD-SAG																		
DEAD-TYP																		

August 1991

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
ACERUB					0.17	0.18												
ALTPHI	28.57	28.56	26.32	26.32	27.23	27.23					27.02	27.03					42.16	17.42
AMAAUS	103.92	70.08			5.93	4.44					0.05	0.05			1.16	1.16	88.30	79.20
AMMCOC																	0.04	0.04
ASTTEN					0.14	0.14												
BACHAL					20.78	20.79					0.34	0.30			0.12	0.12		
BIDLAE															3.99	2.30		
BRAPUR											21.99	21.99						

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	SE	Transect 2 Mean	SE	Transect 3 Mean	SE	Transect 4 Mean	SE	Transect 5 Mean	SE	Transect 6 Mean	SE	Transect 7 Mean	SE	Transect 8 Mean	SE	Transect 9 Mean	SE
COMDIF											21.35	15.96			0.08	0.08		
CYPHAS																		
CYPIRI					0.29	0.30												
CYPODO	0.57	0.52	0.54	0.54	0.98	0.98					0.58	0.48			4.27	4.12	0.10	0.10
CYPSPP					2.76	2.75											0.14	0.14
DIGSER					0.01	0.01					15.90	14.51			66.14	40.19	1.72	1.64
ECHCOL			1.32	1.32	23.73	23.09					76.39	67.34			90.53	41.64	0.09	0.08
ECLALB	0.12	0.12			46.72	34.46					115.02	32.19			36.50	18.72	0.72	0.61
EICCRA-L																		
ELEVIV											21.51	21.41						
EUPCAP					6.02	6.02					8.37	8.37						
EUPSER					0.19	0.19									0.23	0.24		
GALTIN					0.01	0.01					0.26	0.17			0.44	0.44		
HYDRAN																		
HYDUMB																		
LIMSPO																		
LUDLEP	81.18	81.18									0.12	0.12			0.46	0.46	0.08	0.08
LUDOCT											74.69	39.83			86.12	42.37		
LUDPAL											0.03	0.04						
LUDPER																		
MIKSCA					15.74	15.74												
PANDIC	22.36	22.36			174.98	89.19					2.46	2.47					60.95	41.73
PANSPP											0.30	0.30						
PASDIC											0.13	0.13						
PHYANG			0.50	0.50											2.37	2.38		
PHYSPP											0.02	0.02						
POACEAE											0.06	0.06					0.04	0.03
POLPUN	398.39	130.64	53.56	52.85	0.13	0.13					1.18	0.77			35.46	34.34	478.38	171.13
PONCOR-L	0.02	0.02															0.04	0.04
PONCOR-R																		
RUMCRI											0.28	0.28					0.66	0.66
SAGLAN-L																		
SAGLAN-R																		
SAGMON-L	0.12	0.12																
SAGMON-R																		
SALCAR-L											128.64	128.64			0.32	0.32	1.24	1.24
SALCAR-R																		
SALROT																		
SAMCAN																		
SESMAC											11.32	11.32					121.25	66.92
SOLAME											24.26	24.26			0.57	0.57		
TYPLAT-L	23.43	14.54	53.62	24.93	157.99	97.57											16.00	11.94
TYPLAT-R																		
UDICOT											0.07	0.07			0.86	0.86		
DEAD	535.30	206.54	524.47	271.06	146.92	53.20					545.11	106.59			472.83	114.55	162.20	68.84
DEAD-EIC																		

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	SE	Transect 2 Mean	SE	Transect 3 Mean	SE	Transect 4 Mean	SE	Transect 5 Mean	SE	Transect 6 Mean	SE	Transect 7 Mean	SE	Transect 8 Mean	SE	Transect 9 Mean	SE
DEAD-EUP																		
DEAD-LIM																		
DEAD-LUD																		
DEAD-PON																		
DEAD-SAG																		
DEAD-TYP																		
January 1992																		
ACERUB					0.30	0.30												
ALTPHI	46.63	36.90	17.13	14.95	7.86	7.75					1.06	0.97					46.79	26.02
ASTSPP					0.37	0.37					1.34	1.34						
ASTTEN															0.51	0.51		
BACHAL											135.13	118.43			0.21	0.21		
BIDLAE															23.88	23.88		
BRAPUR											45.29	33.51			312.67	312.68	9.52	9.52
COMDIF											3.19	2.89						
CYPERAC											0.06	0.06						
CYPSPP											0.54	0.54			0.50	0.50		
ECHCOL															0.24	0.24		
ECLALB											0.02	0.02						
EICCRA-L																		
ELEVIV											2.37	2.24						
EUPCAP											40.82	40.82			2.00	2.00		
GALTIN					0.01	0.01					2.90	2.75			5.20	4.81		
HYDRAN															11.58	11.58		
HYDSPP															0.07	0.07		
LIMSPO																		
LUDLEP																		
LUDOCT											0.34	0.34						
LUDPAL					0.65	0.65												
LUDPER	10.16	10.16													50.94	33.46		
LUDSPP											0.01	0.01						
MIKSCA																		
PASDIC																		
POLPUN	37.01	19.07	13.56	7.78	0.14	0.14					21.00	14.37			10.62	7.11	104.82	40.01
PONCOR-L																		
PONCOR-R																		
RHARHA											2.76	2.77						
SAGLAN-L																	6.09	6.09
SAGLAN-R																		
SAGMON-L															1.73	1.73		
SALCAR-L																		
SALROT															0.14	0.14		
SAMCAN	1.11	1.11																

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
TYPLAT-L	199.33	72.07	181.75	83.22	54.01	28.06									18.82	18.82	139.18	57.94
TYPLAT-R																		
floating															16.42	16.42		
DEAD	595.55	76.99	237.96	52.16	685.67	145.45					621.61	196.86			428.91	87.95	507.54	76.10
DEAD-EIC																		
DEAD-EUP																		
DEAD-LIM																		
DEAD-LUD																		
DEAD-PON																		
DEAD-SAG																		
DEAD-TYP																		
August 1992																		
ALTPHI	9.41	9.38									36.06	11.51			50.41	48.96	75.40	43.20
BIDLAE																	0.16	0.16
CYPHAS															0.69	0.69		
EICCRA-L											0.49	0.49						
ELEVIV											0.06	0.05						
HYDRAN											0.65	0.46			46.91	46.62		
HYDUMB															4.09	4.09		
LIMSPO					34.32	34.32					72.83	72.84						
LUDOCT	18.09	18.09													0.06	0.06	24.10	23.85
LUDPER											10.69	10.69			49.24	49.25		
MIKSCA															7.06	6.95		
PASDIC															1.97	1.97		
POLPUN											4.86	4.68			27.10	18.32	1.53	1.53
SAGLAN-L	83.26	83.26																
SAGLAN-R	48.47	48.47																
SAGMON-L											25.62	25.62			88.21	44.79		
SAGMON-R															3.37	3.38		
SALCAR-L											147.06	147.06			67.10	67.10		
SALCAR-R															15.80	15.80		
TYPLAT-L	466.53	149.84			589.17	151.75					17.35	17.36			114.81	65.77	208.94	60.72
TYPLAT-R	41.01	27.03			82.39	44.40					10.30	10.30						
UDICOT											2.62	2.62						
DEAD	329.34	150.51			50.75	37.03					50.74	23.29			156.88	61.67	163.18	120.31
DEAD-LIM					34.50	34.50												
DEAD-LUD															12.58	12.58		
DEAD-SAG															8.83	8.83		
DEAD-TYP	194.78	83.36			663.46	313.10									118.15	77.35	202.62	110.65

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
February 1993																		
ALTPHI	5.56	5.29			0.07	0.08					0.12	0.12			1.12	0.69	54.74	42.11
BIDLAE															0.02	0.02		
EICCRA-L															119.47	119.47	0.22	0.22
ELEVIV											21.16	21.16						
EUPCAP																		
GALTIN															0.04	0.04		
HYDRAN	0.25	0.25									36.45	36.20			137.10	134.58		
LIMSPO					30.35	30.35												
LUDLEP	0.13	0.13																
LUDPER	0.23	0.23									40.36	40.36			59.96	51.12	7.68	7.68
MIKSCA															25.11	23.59		
POLPUN	9.68	8.09																
PONCOR-L																	96.02	96.02
PONCOR-R																	118.56	118.56
SAGLAN-L	58.91	58.91																
SAGLAN-R	26.86	26.86																
SAGMON-L															0.01	0.01		
SALCAR-L															156.56	156.56	35.81	31.29
SALROT															14.82	11.42		
TYPLAT-L	157.70	54.19			421.53	84.85					79.24	59.05			86.97	30.39	212.75	90.06
TYPLAT-R	150.86	56.52			54.23	16.05									3.08	3.08	152.62	73.43
DEAD					134.51	94.75					48.89	48.89					14.97	11.10
DEAD-EIC															4.59	4.59		
DEAD-EUP											3.58	3.58						
DEAD-LUD											46.48	46.49						
DEAD-PON																	28.64	28.64
DEAD-SAG	11.75	11.75																
DEAD-TYP	553.41	179.43			483.05	62.54					121.84	83.62			60.03	47.21	202.58	79.87
August 1993																		
ALTPHI	3.17	1.71									0.10	0.06			0.02	0.02		
AMAAUS	103.38	102.12									6.09	6.09						
CYPODO	1.71	1.71									15.97	15.98						
CYPSPP	0.03	0.03																
ECHSPP1											36.59	36.60						
ECLALB	0.01	0.01													0.41	0.42		
ELEVIV											0.03	0.04						
HYDRAN	0.61	0.61									0.67	0.67						
LUDLEP	26.80	15.03									58.67	58.68			35.50	35.50		
LUDOCT															20.23	20.23		
LUDPER											288.19	288.19			259.26	259.26		
MIKSCA															12.54	12.54		

Table 19. Above-ground Biomass Summary (Cont.)

Species	Transect 1 Mean	SE	Transect 2 Mean	SE	Transect 3 Mean	SE	Transect 4 Mean	SE	Transect 5 Mean	SE	Transect 6 Mean	SE	Transect 7 Mean	SE	Transect 8 Mean	SE	Transect 9 Mean	SE
PANDIC											3.78	2.32						
POLDEN															255.25	255.25		
POLPUN	0.93	0.93									70.06	70.07			4.30	4.30		
PONCOR-L	121.44	121.44																
PONCOR-R	95.23	95.23																
SAGLAN-L	54.01	54.01																
SAGLAN-R	7.00	7.00																
SALCAR-L															187.76	181.87		
SAMCAN	0.08	0.08																
TYPDOM	106.59	106.59																
TYPLAT-L	133.80	83.40			274.52	60.86					70.01	70.02			332.15	207.91		
TYPLAT-R															34.57	34.57		
DEAD	32.81	32.81									61.79	53.22			175.69	77.30		
DEAD-TYP	269.71	207.35			1135.20	207.40												

March 1994

Species	Transect 1 Mean	SE	Transect 2 Mean	SE	Transect 3 Mean	SE	Transect 4 Mean	SE	Transect 5 Mean	SE	Transect 6 Mean	SE	Transect 7 Mean	SE	Transect 8 Mean	SE	Transect 9 Mean	SE
ALTPHI	0.01	0.01					0.67	0.67			0.63	0.62			4.84	4.84		
AMAAUS	0.12	0.12																
CYPSPP					0.01	0.01												
EICCRA-L															689.93	402.73		
EICCRA-R															40.84	40.85		
HYDRAN	47.90	47.39			45.53	30.81	0.19	0.19			0.12	0.12			48.44	21.06		
LUDLEP					0.05	0.05												
LUDPER			0.02	0.02											132.18	132.18		
PASDIC															71.88	71.88		
POLDEN			1.39	1.39														
POLPUN	6.98	5.50	0.18	0.18							0.04	0.04						
PONCOR-L	17.59	17.59																
PONCOR-R	20.18	20.18																
SAGLAN-L	12.64	9.80																
SALCAR-L															26.81	26.82		
TYPDOM					84.32	50.11												
TYPLAT-L	85.40	42.31	413.18	168.17	403.57	106.18	616.54	88.86			459.43	258.89			156.86	141.07		
TYPLAT-R											2.38	2.38						
TYPSPP-S																		
UDICOT																		
DEAD	144.23	69.57	185.08	8.84	333.66	70.95	723.30	215.33			539.27	197.61			278.23	41.58		
DEAD-TYP	.	.	.	.	173.77	87.73	90.58	90.58	.	.	.	.	.	.	.	.	.	.

a considerable increase in dead biomass at the site, in some cases up to four times that of living biomass. Also the dominant species began to shift, with *Alternanthera philoxeroides, Amaranthus australis, Digitaria serotina, Echinochloa colonum, Eclipta alba, Ludwigia octovalvis, Panicum dichotomiflorum, Polygonum punctatum, Sambucus canadensis* and *Typha latifolia* providing approximately 90% of the live biomass along the transects (Table 19).

Dominant species accounting for more than 90% of the biomass in the January 1992 sampling included *Alternanthera philoxeroides, Baccharis halimifolia, Brachiaria purpurascens, Eupatorium capillifolium, Ludwigia peruviana, Polygonum punctatum* and *Typha latifolia* (Table 19). Above- and below-ground live biomass ranged from 295 g m^{-2} (T6) to 555 g m^{-2} (T5) (Table 18). Above-ground live biomass ranged from 63 g m^{-2} (T3) to 456 g m^{-2} (T8). Below-ground biomass ranged from 38 g m^{-2} (T6) to 392 g m^{-2} (T3). The ratio of total above to below-ground biomass ranged from 0.16 (T3) to 6.78 (T6). The lowest ratios of above-ground live to dead biomass were recorded during this sampling period and ranged from 0.09 (T3) to 1.06 (T8). Dead biomass values ranged from 238 g m^{-2} (T2) to 686 g m^{-2} (T3) (Table 18).

Live to dead above-ground biomass ratios for the August 1992 sampling were higher than that of the previous sampling and ranged from 0.85 (T9) to 6.48 (T6). The dead biomass values ranged from 51 g m^{-2} (T6) to 749 g m^{-2} (T3). Above-ground live biomass values ranged from 310 g m^{-2} (T9) to 705 g m^{-2} (T3). Below-ground biomass values ranged from 42 g m^{-2} (T6) to 228 g m^{-2} (T9) (Table 17). Ratios of above-ground biomass to below-ground biomass ranged from 1.36 (T9) to 7.82 (T6). Dominant species for this sampling period consisted of *Alternanthera philoxeroides*, *Baccharis halimifolia*, *Brachiaria purpurascens*, *Eupatorium capillifolium*, *Ludwigia peruviana*, *Polygonum punctatum* and *Typha latifolia* (Table 19).

In February 1993 above- and below-ground live biomass ranged from 258 g m^{-2} (T6) to 880 g m^{-2} (T9) with above- to below-ground biomass ratios ranging from 0.91 (T1) to 4.14 (T8). Live biomass above-ground ranged from 177 g m^{-2} (T6) to 678 g m^{-2} (T9) and live below-ground biomass ranged from 81 (T6) g m^{-2} to 450 (T1) g m^{-2} (Table 18). The dominant vegetation consisted of *Alternanthera philoxeroides*, *Eichhornia crassipes*, *Hydrocotyle ranunculoides*, *Ludwigia peruviana*, *Pontederia cordata*, *Salix caroliniana* and *Typha latifolia*. *T. latifolia* provided more than 50% of the combined live biomass in all but two transects measured (Table 19). Dead above-ground biomass ranged from 65 g m^{-2} (T8) to 618 g m^{-2} (T3), with a range of above-ground live to dead ratios of 0.73 (T1) to 9.35 (T8) (Table 18).

Dead biomass from August 1993 ranged from 62 g m^{-2} (T6) to 1135 g m^{-2} (T3), with live above-ground biomass values ranging from 275 g m^{-2} (T3) to 1142 g m^{-2} (T8). The ratio of live to dead above-ground biomass ranged from 0.24 (T3) to 8.90 (T6) (Table 18). Below-ground live biomass ranged from 36 g m^{-2} (T6) to 821 g m^{-2} (T3). The above- to below-ground live biomass ratio ranged from 0.33 (T3) to 15.26 (T6) (Table 18). Dominant species found along the transects were *Alternanthera philoxeroides*, *Amaranthus australis*, *Ludwigia leptocarpa*, *Ludwigia peruviana*, *Polygonum densiflorum*, *Polygonum punctatum*, *Pontederia cordata*, *Sagittaria lancifolia*, *Salix caroliniana*, *Typha domingensis*, and *Typha latifolia* (Table 19).

In March 1994 there were six dominant species throughout the system: *Eichhornia crassipes*, *Hydrocotyle ranunculoides*, *Ludwigia peruviana*, *Paspalum distichum*, *Typha domingensis*, and *Typha latifolia* (Table 19). Above-ground live biomass ranged from 191 g m^{-2} (T1) to 1172 g m^{-2} (T8). Dead biomass ranged from 144 g m^{-2} (T1) to 814 g m^{-2} (T4), with a ratio of live to dead above-ground biomass from 0.76 (T4) to 4.21 (T8) (Table 18). Below-ground biomass ranged from 242 g m^{-2} (T8) to 581 g m^{-2} (T4) with a ratio between above and below-ground biomass ranging from 0.65 (T1) to 4.85 (T8) (Table 18). Total above- and below-ground live biomass for this sampling date ranged from 485 g m^{-2} (T1) to 1414 g m^{-2} (T9) (Table 18).

Contribution to Biomass by Common Species

Species composition changes resulting from initial inundation and subsequent flooding influenced the standing crop biomass within the system. Nine species that dominated the system at some point during the study period have been addressed in more detail. A discussion of each of these species and changes in the dead biomass within the system follows.

Alternanthera philoxeroides was a relatively small component of the biomass during the first sampling, <10 g m^{-2} on most transects, with transect 9 having the largest amount with 41 g m^{-2}. During the next 21 months, over the course of three sampling periods, biomass of *A. philoxeroides* appeared to follow a bell-shaped pattern, with transects in the south marsh reaching maximum biomass levels earlier than those in the north. Biomass of *A. philoxeroides* increased until August 1992 (Table 19, Figure 91).

Alternanthera philoxeroides

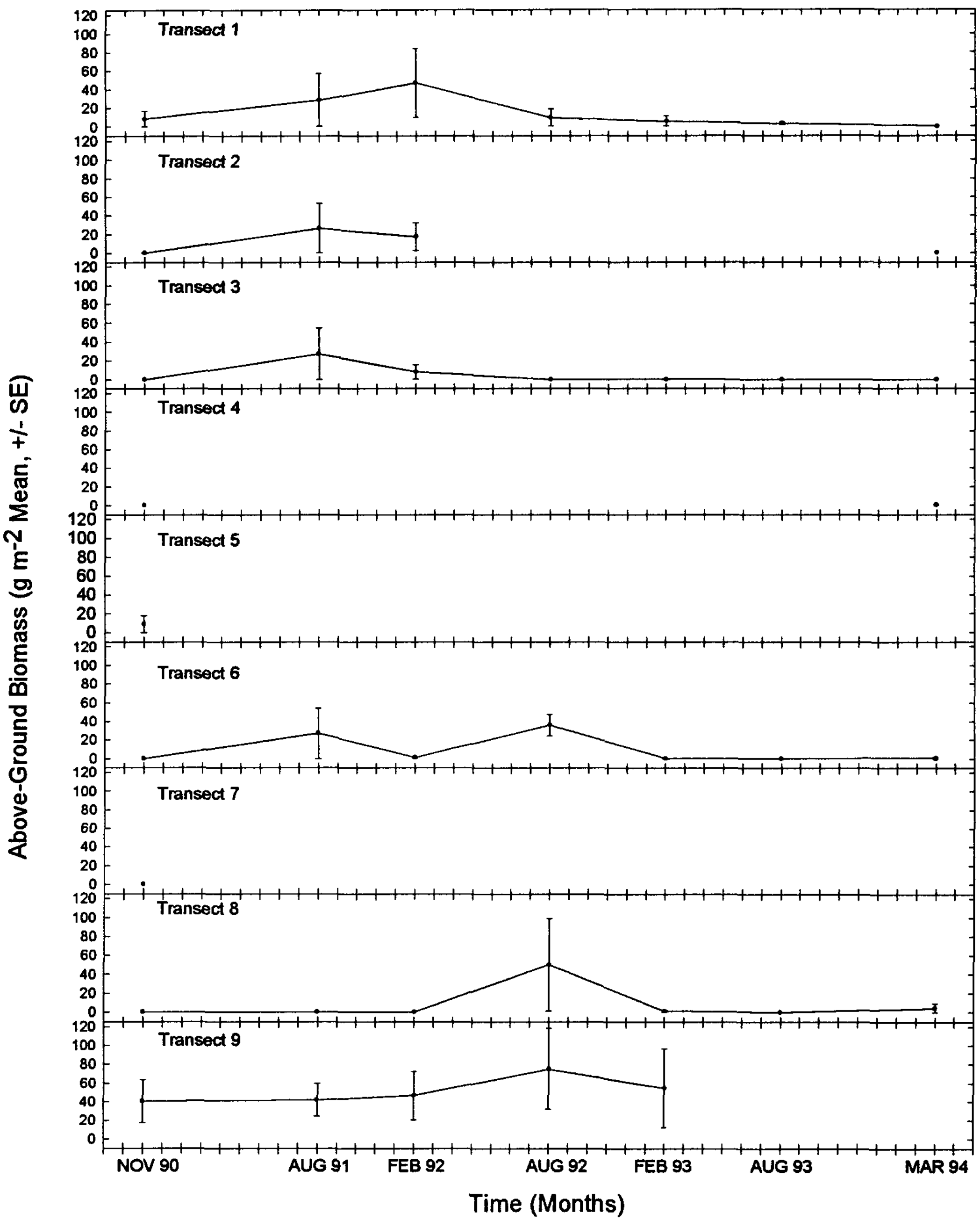


Figure 91. Time series of *Alternanthera philoxeroides* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

Biomass distribution of *A. philoxeroides* was very patchy, indicated by a high ~90% average coefficient of variation along all transects except for transect 9. Transect 9 showed a more even distribution during the study period, with a coefficient of variation averaging 57%.

Biomass contribution from *Eupatorium capillifolium* was the greatest during the first sampling period in November 1990 with average values on transect 8 as high as 1628 g m^{-2} (Table 19). By the next sampling period in August 1991, *E. capillifolium* was absent on several transects. On transects where *E. capillifolium* was found, biomass levels were <10 g m^{-2} (Figure 92). In the February 1992 sampling, *E. capillifolium* biomass at transect 6 increased to 41 g m^{-2} but disappeared by August 1992. Biomass of *E. capillifolium* was always higher in the north cell of the marsh than in the south cell (Table 20).

High biomass levels of *Hydrocotyle ranunculoides* were not measured until the February 1993 through March 1994 sampling periods (Figure 93). Except for transect 8, *H. ranunculoides* biomass never averaged more than 48 g m^{-2}. This level was attained at T6 in February 1993 and at T1 and T2 in March 1994. At transect 8, biomass increased gradually between February 1992 and February 1993 and was followed by a sudden decline six months later. *H. ranunculoides* biomass, like *E. capillifolium*, was generally higher in the north cell of the marsh than in the south cell. However, there was one exception in March 1994 when the south cell had a greater average biomass (Table 20). The coefficient of variation between nodes in all but transects 3 and 6 in March 1994 was greater than 95%, suggesting a very patchy biomass distribution of *H. ranunculoides*

Eupatorium capillifolium

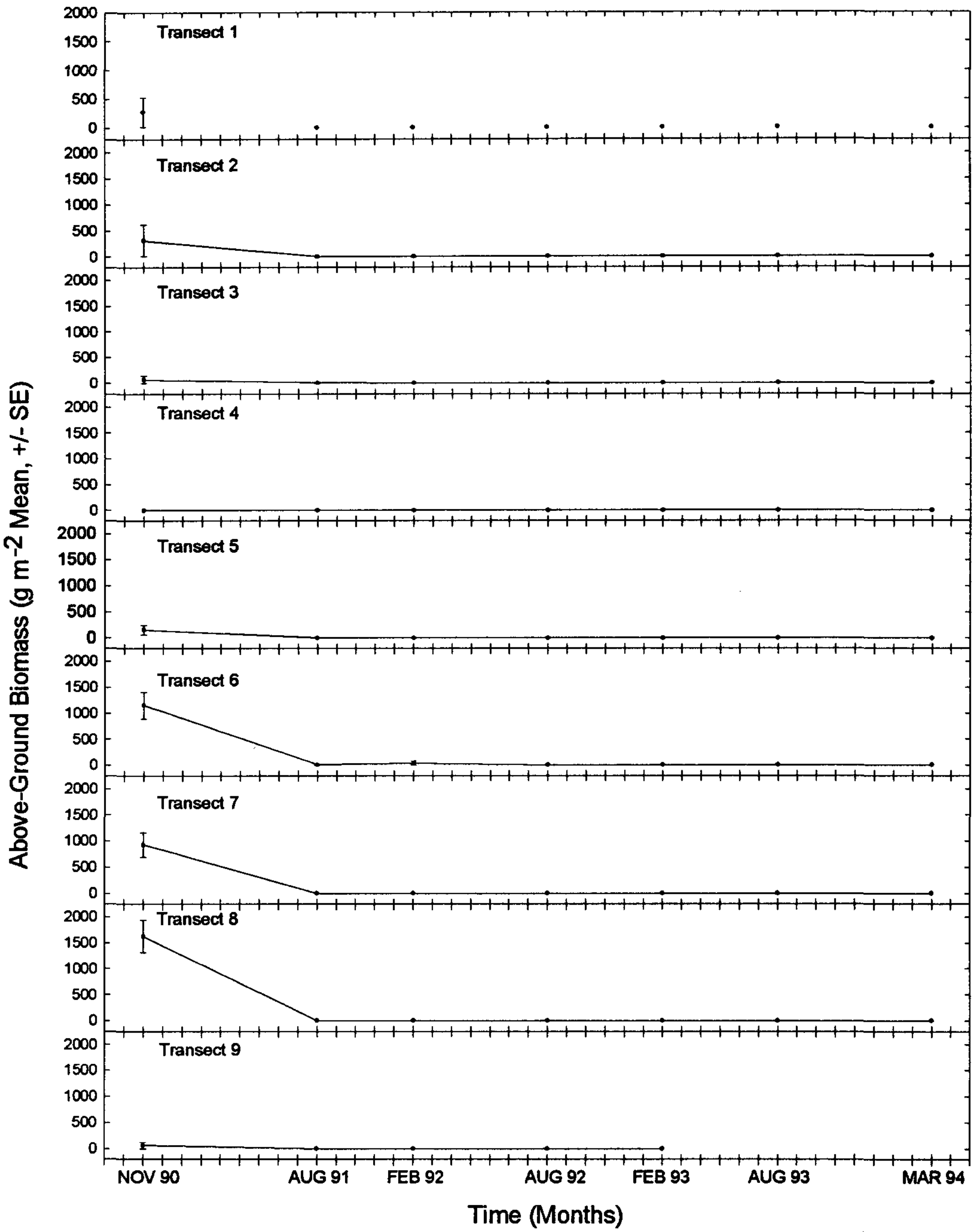


Figure 92. Time series of *Eupatorium capillifolium* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

Table 20. Live biomass summary (g m^{-2}, Mean ±SE), North (N) and South (S) Cells. All entries are leaf or culm biomass.

Species	Cell	Nov 1990 Mean	Nov 1990 SE	Aug 1991 Mean	Aug 1991 SE	Feb 1992 Mean	Feb 1992 SE	Aug 1992 Mean	Aug 1992 SE	Feb 1993 Mean	Feb 1993 SE	Aug 1993 Mean	Aug 1993 SE	Mar 1994 Mean	Mar 1994 SE
ACERUB	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	0.03	0.03	0.06	0.06	.	.	.	.	.	.	.	.
ALTPHI	N	2.19	2.19	6.76	6.76	0.27	0.25	21.62	12.60	0.31	0.19	0.02	0.01	0.68	0.61
	S	11.30	6.23	23.80	9.16	23.56	9.94	19.75	11.34	14.11	10.56	0.30	0.10	0.08	0.08
AMAAUS	N	.	.	0.30	0.29	.	.	.	.	.	.	0.76	0.76	.	.
	S	0.23	0.24	41.95	23.80	.	.	.	.	.	.	9.85	9.99	0.02	0.02
AMMCOC	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	0.01	0.01	.	.	.	.	.	.	.	.	.	.
ASTSPP	N	.	.	.	.	0.33	0.33	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ASTSUB	N	20.60	9.23	.	.	.	.	.	.	.	.	.	.	.	.
	S	48.77	28.48	.	.	0.07	0.07	.	.	.	.	.	.	.	.
ASTTEN	N	.	.	.	.	0.13	0.13	.	.	.	.	.	.	.	.
	S	0.33	0.30	0.03	0.03	.	.	.	.	.	.	.	.	.	.
BACHAL	N	1.60	0.61	0.11	0.08	33.84	30.04	.	.	.	.	.	.	.	.
	S	.	.	3.96	4.06	.	.	.	.	.	.	.	.	.	.
BIDLAE	N	.	.	1.00	0.63	5.97	5.97	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	0.04	0.04	.	.	.	.	.	.
BRAPUR	N	.	.	5.50	5.50	89.49	78.29	.	.	.	.	.	.	.	.
	S	.	.	.	.	2.27	0.00	.	.	.	.	.	.	.	.
CALAME	N	0.47	0.47	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
COMDIF	N	16.65	11.55	5.36	4.14	0.80	0.73	.	.	.	.	.	.	.	.
	S	55.52	22.21	.	.	.	.	.	.	.	.	.	.	.	.
CYNDAC	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	1.23	1.26	.	.	.	.	.	.	.	.	.	.	.	.
CYPHAS	N	.	.	.	.	.	.	0.17	0.17	.	.	.	.	.	.
	S	0.75	0.77	.	.	.	.	.	.	.	.	.	.	.	.
CYPIRI	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	0.06	0.06	.	.	.	.	.	.	.	.	.	.
CYPODO	N	0.23	0.19	1.21	1.04	.	.	.	.	.	.	2.00	2.00	.	.
	S	0.01	0.01	0.38	0.22	.	.	.	.	.	.	0.16	0.17	.	.
CYPRAC	N	.	.	.	.	0.01	0.01	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CYPSPP	N	0.01	0.01	.	.	0.26	0.18	.	.	.	.	.	.	.	.
	S	0.12	0.08	0.56	0.56	.	.	.	.	.	.	.	.	.	.
DIGSER	N	.	.	20.51	11.26	.	.	.	.	.	.	.	.	.	.
	S	0.01	0.01	0.41	0.40	.	.	.	.	.	.	.	.	.	.
ECHCOL	N	12.74	12.65	41.73	20.27	0.06	0.06	.	.	.	.	.	.	.	.
	S	3.32	2.39	4.70	4.52	.	.	.	.	.	.	.	.	.	.
ECHSPP1	N	.	.	.	.	.	.	.	.	.	.	4.57	4.57	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.

throughout the site.

Panicum dichotomiflora biomass was as high as 317 g m^{-2} along transect 3 and ranged between 0 and 166 g m^{-2} along other transects in November 1990. August 1991 biomass levels were half of previous measurements. Apparent extirpation of *Panicum dichotomiflorum* occurred by February of 1992 when, after sharp declines in biomass, no individuals of this species were collected (Figure 94). Comparison of the north and south cells indicated the south marsh generally had higher average biomass of of *P. dichotomiflorum* than did the north marsh.

Polygonum punctatum exhibited a similar biomass pattern as that of *P. dichotomiflorum*. A maximum biomass of 463 g m^{-2} (T1) and 478 g m^{-2} (T9) was recorded during the first two sampling events, followed by substantial declines in February 1992 (Figure 95). Low biomass levels persisted throughout the remaining study period with a maximum of 70.06 g m^{-2} (T6) found in August 1993. Also the biomass distribution between the north and south cells showed higher levels in the south marsh except for the August 1992 and 1993 sampling events when biomass for this species was greater in the north cell (Table 20).

Occurrence of *Pontederia cordata* in the nine transects sampled was very low (Figure 96). *P. cordata* was found on transects 1 and 9 during the August 1993 and February 1993 samples respectively. Biomass of leaf and root material was 121 g m^{-2} and 95 g m^{-2} for transect 1, and 96 g m^{-2} and 119 g m^{-2}, respectively, for transect 9. *P. cordata* was also found in transect 1 during the March 1994 sampling, with shoot and root biomass levels of 18 g m^{-2} and 20 g m^{-2}, respectively.

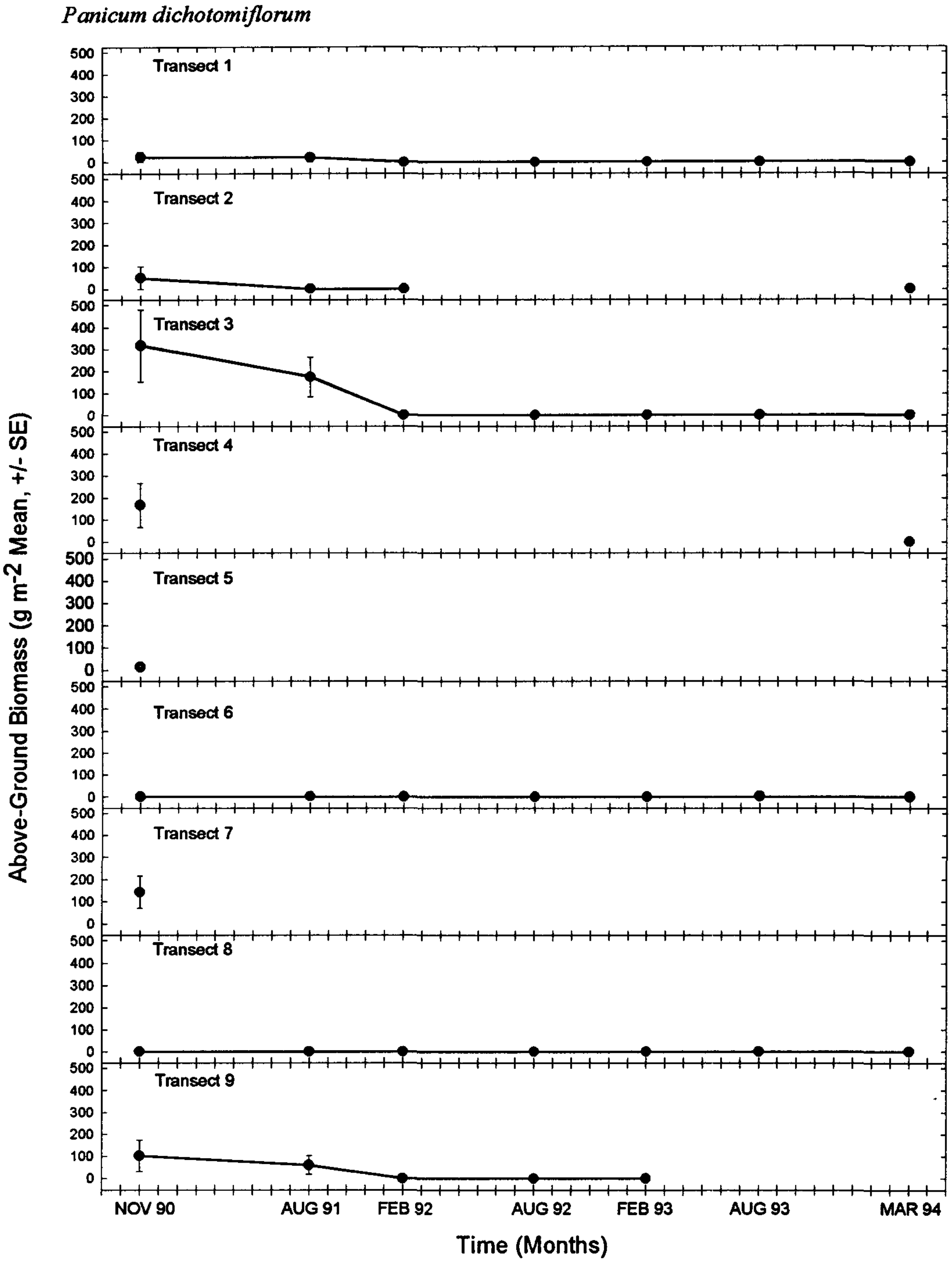


Figure 94. Time series of *Panicum dichotomiflorum* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

Polygonum punctatum

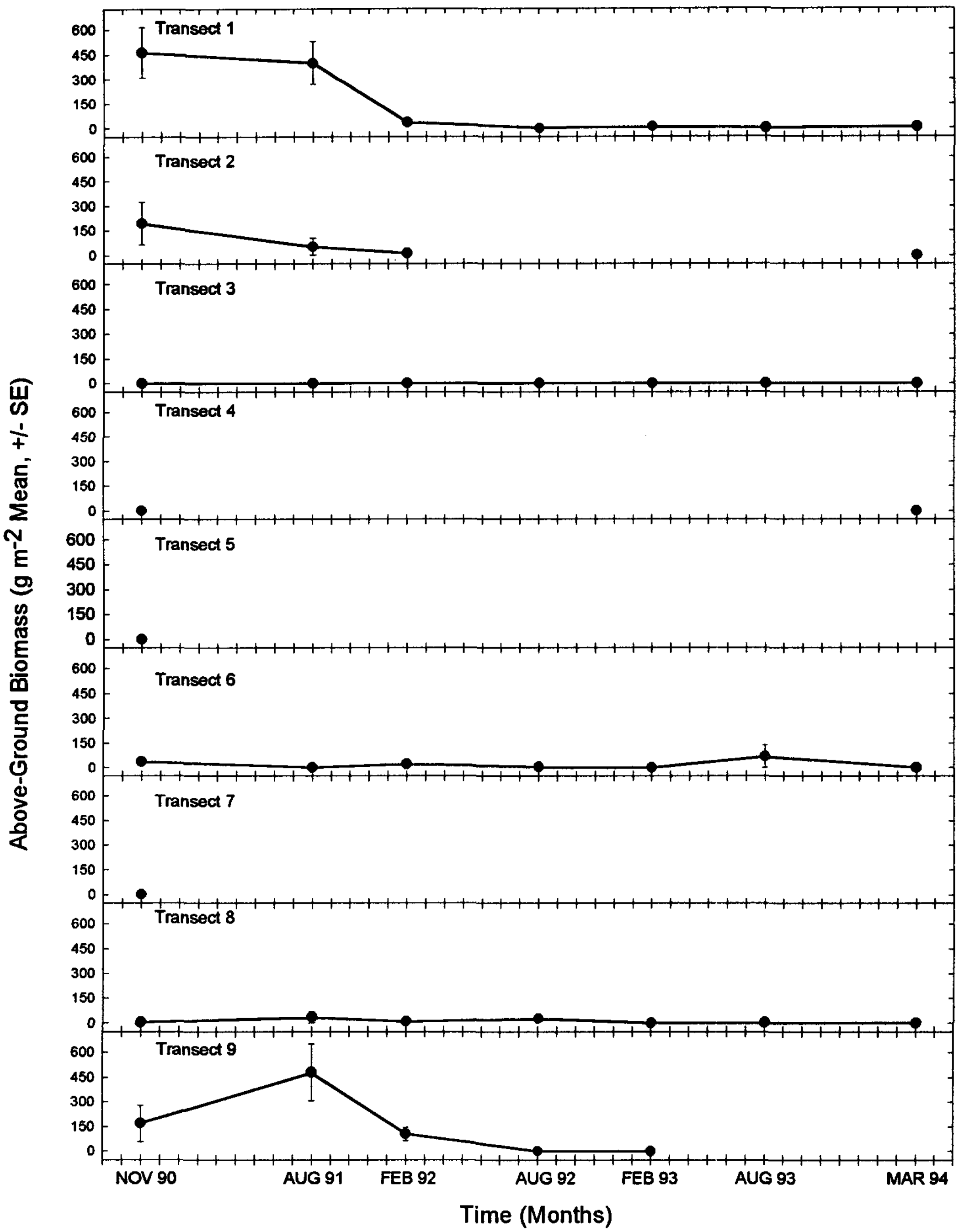


Figure 95. Time series of *Polygonum punctatum* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

Table 20. Live biomass summary (g m^{-2}, Mean ±SE), North (N) and South (S) Cells (continued)

Species	Cell	Nov 1990		Aug 1991		Feb 1992		Aug 1992		Feb 1993		Aug 1993		Mar 1994	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
ECLALB	N	2.29	1.00	37.88	12.22	0.01	0.01	.	.	.	.	0.05	0.05	.	.
	S	2.59	2.62	9.09	7.01	.	.	.	.	.	.	.	.	.	.
EICCRA	N	.	.	.	.	.	.	0.12	0.12	29.87	29.87	.	.	86.24	60.34
	S	.	.	.	.	.	.	.	.	0.05	0.05	.	.	.	.
ELEIND	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	0.78	0.60	.	.	.	.	.	.	.	.	.	.	.	.
ELEVIV	N	.	.	5.38	5.35	0.59	0.56	0.01	0.01	5.29	5.29	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EUPCAP	N	965.27	148.69	2.09	2.09	10.71	10.20	.	.	.	.	.	.	.	.
	S	140.57	78.72	1.15	1.18	.	.	.	.	.	.	.	.	.	.
EUPSER	N	0.63	0.56	0.06	0.06	.	.	.	.	.	.	.	.	.	.
	S	0.35	0.35	0.04	0.04	.	.	.	.	.	.	.	.	.	.
GALTIN	N	0.57	0.35	0.18	0.12	2.03	1.37	.	.	0.01	0.01	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDRAN	N	.	.	.	.	2.90	2.90	11.89	11.66	43.39	34.61	0.08	0.08	6.07	3.69
	S	.	.	.	.	.	.	.	.	0.05	0.05	0.06	0.06	15.54	9.26
HYDSPP	N	0.15	0.15	.	.	0.02	0.02	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
HYDUMB	N	.	.	.	.	.	.	1.02	1.02	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LIMSPO	N	.	.	.	.	.	.	18.21	18.21	.	.	.	.	.	.
	S	.	.	.	.	.	.	6.54	6.70	5.78	5.92	.	.	.	.
LUDLEP	N	.	.	0.14	0.12	.	.	.	.	.	.	11.77	8.45	.	.
	S	.	.	15.48	0.02	.	.	.	.	0.03	0.03	2.55	1.80	0.01	0.01
LUDOCT	N	0.95	0.48	40.20	15.61	0.09	0.09	0.02	0.02	.	.	2.53	2.53	.	.
	S	26.02	9.05	.	.	.	.	9.18	3.53	.	.	.	.	.	.
LUDPAL	N	0.10	0.10	0.01	0.01	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	0.12	0.13	.	.	.	.	.	.	.	.
LUDPER	N	.	.	.	.	12.74	8.88	14.98	12.51	25.08	16.16	68.43	47.67	16.52	16.52
	S	.	.	.	.	1.93	1.98	.	.	1.87	0.04	.	.	.	.
MELCOR	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	0.05	0.05	.	.	.	.	.	.	.	.	.	.	.	.
MIKSCA	N	0.01	0.01	.	.	.	.	1.76	1.74	6.28	5.94	1.57	1.57	.	.
	S	.	.	3.00	3.07	.	.	.	.	.	.	.	.	.	.
PANDIC	N	39.01	20.39	0.62	0.62	.	.	0.49	0.49	.	.	0.47	0.34	.	.
	S	130.74	43.61	52.10	20.39	.	.	.	.	.	.	.	.	.	.
PANSPP	N	47.05	28.97	0.07	0.07	.	.	.	.	.	.	.	.	.	.
	S	54.42	21.87	.	.	.	.	.	.	.	.	.	.	.	.
PASDIC	N	.	.	0.03	0.03	.	.	.	.	.	.	.	.	8.99	8.99
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PASSPP	N	0.03	0.03	.	.	.	.	.	.	.	.	.	.	.	.
	S	7.04	6.70	.	.	.	.	.	.	.	.	.	.	.	.
PASURV	N	0.78	0.55	.	.	.	.	.	.	.	.	.	.	.	.
	S	0.74	0.82	.	.	.	.	.	.	.	.	.	.	.	.
PHYANG	N	.	.	0.59	0.59	.	.	.	.	.	.	.	.	.	.
	S	0.02	0.02	0.06	0.06	.	.	.	.	.	.	.	.	.	.

Table 20. Live biomass summary (g m^{-2}, Mean ±SE), North (N) and South (S) Cells (continued)

Species	Cell	Nov 1990 Mean	SE	Aug 1991 Mean	SE	Feb 1992 Mean	SE	Aug 1992 Mean	SE	Feb 1993 Mean	SE	Aug 1993 Mean	SE	Mar 1994 Mean	SE
PHYSPP	N	.	.	0.01	0.01	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Poaceae	N	.	.	0.02	0.02	.	.	.	.	.	.	.	.	.	.
	S	11.76	12.05	0.01	0.00	.	.	.	.	.	.	.	.	.	.
POLDEN	N	.	.	.	.	.	.	.	.	.	.	31.91	31.91	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	0.07	0.07
POLPUN	N	10.12	6.47	9.16	8.61	7.91	4.12	7.99	4.92	.	.	9.30	8.76	0.01	0.01
	S	165.42	51.86	196.18	58.25	33.65	12.06	0.36	0.37	1.84	1.61	0.09	0.09	1.01	0.84
PONCOR	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	0.01	0.00	.	.	.	.	22.86	0.00	11.57	0.00	2.51	0.00
RHARHA	N	.	.	.	.	0.69	0.69	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
RHYINU	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	0.56	0.00	.	.	.	.	.	.	.	.	.	.	.	.
RUMCRI	N	.	.	0.07	0.07	.	.	.	.	.	.	.	.	.	.
	S	.	.	0.16	0.16	.	.	.	.	.	.	.	.	.	.
SAGLAN	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	2.07	2.12	.	.	1.45	0.00	15.86	16.25	11.22	11.49	5.14	0.00	1.81	1.46
SAGMON	N	.	.	.	.	0.43	0.43	28.46	13.86	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	N	16.64	16.64	32.24	32.16	.	.	53.54	39.92	39.14	39.14	23.47	22.90	3.35	3.35
	S	.	.	0.30	0.30	.	.	.	.	8.53	7.72	.	.	.	.
SALROT	N	.	.	.	.	0.03	0.03	.	.	3.70	2.95	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SAMCAN	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	0.21	0.22	.	.	.	.	0.01	0.01	.	.
SAMSPP	N	0.12	0.07	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SESMAC	N	.	.	2.83	2.83	.	.	.	.	.	.	.	.	.	.
	S	1.01	0.00	28.87	17.71	.	.	.	.	.	.	.	.	.	.
SOLAME	N	.	.	6.21	6.06	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TYPDOM	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	10.15	10.40	16.06	10.66
TYPLAT	N	0.28	0.28	.	.	4.70	4.70	33.04	18.30	41.55	17.46	50.27	31.07	77.04	42.55
	S	17.02	13.40	44.75	20.69	103.03	24.79	250.83	56.24	160.98	37.36	38.89	16.30	182.14	43.20
u-dicot	N	.	.	0.23	0.22	.	.	0.66	0.66	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
unknown	N	0.01	0.01	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL	N	1138.48	137.60	220.27	55.93	178.10	82.35	201.36	56.53	195.40	79.01	29.69	14.76	102.19	40.51
	S	682.76	83.24	427.11	66.34	194.68	32.75	335.30	70.28	336.06	55.58	136.93	58.99	222.96	52.42

Hydrocotyle ranunculoides

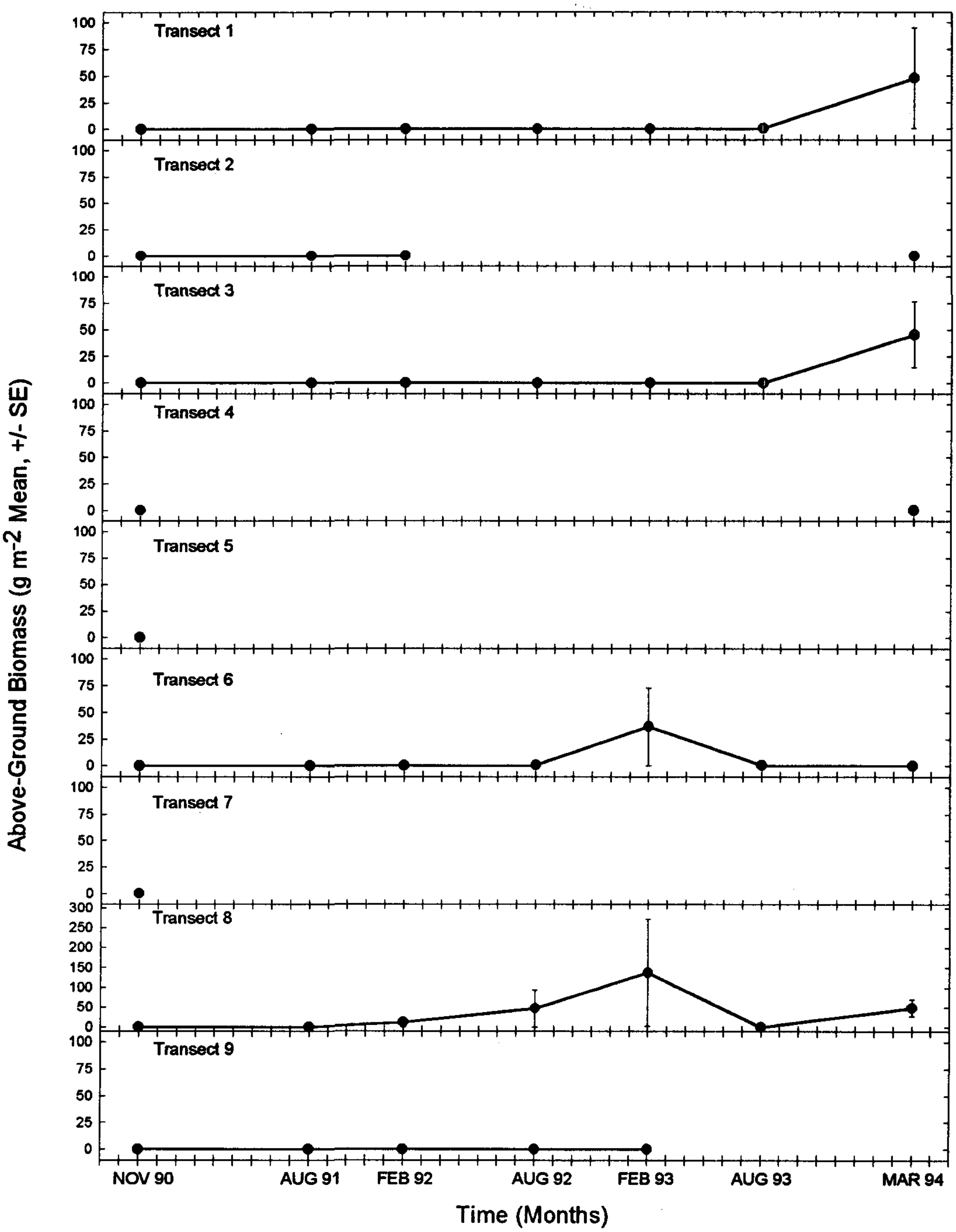


Figure 93. Time series of *Hydrocotyle ranunculoides* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

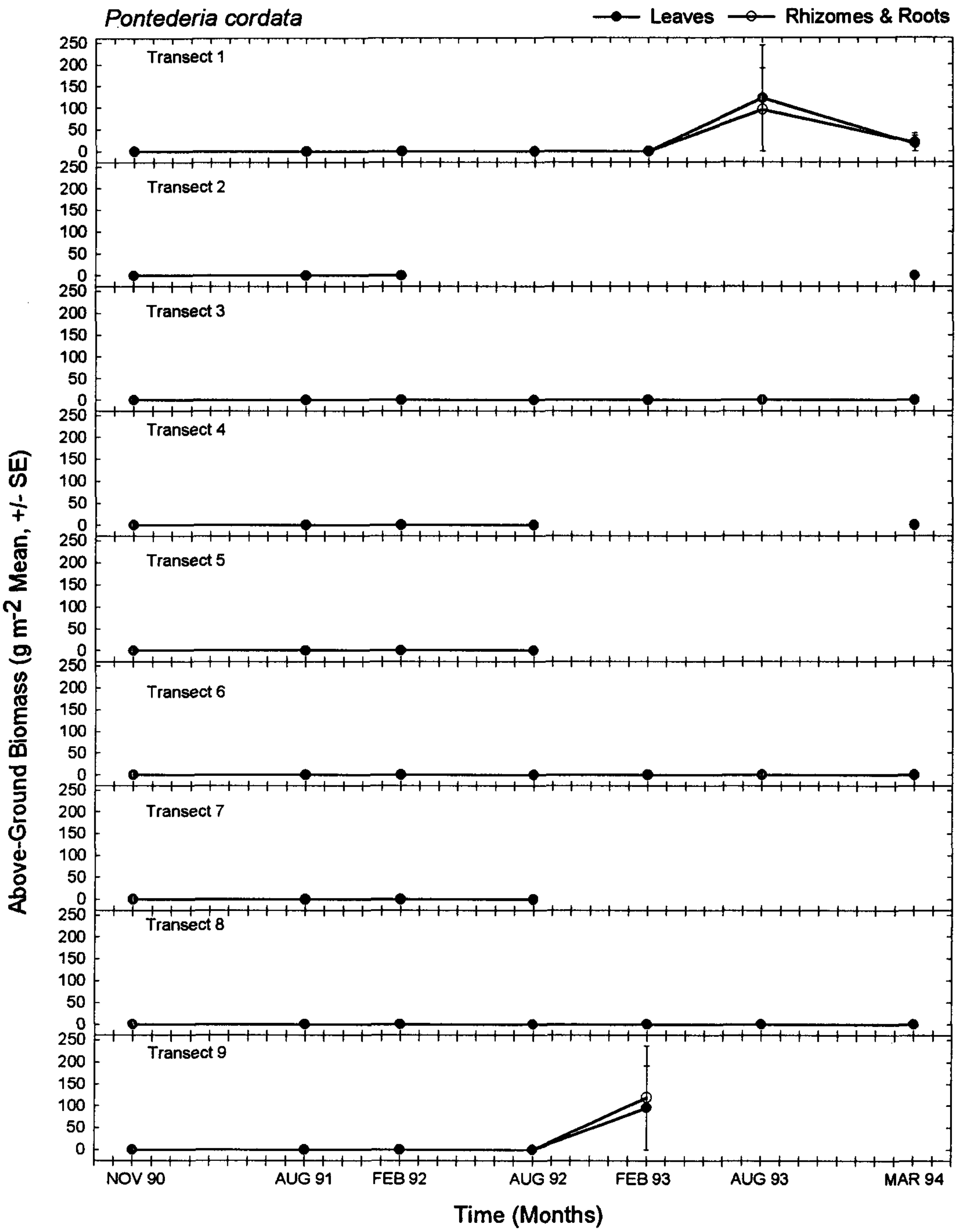


Figure 96. Time series of *Pontederia cordata* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

Sagittaria lancifolia also had a narrow biomass distribution within the marsh with notable biomass only occurring in transects 1 and 9, which are located in the south cell of the marsh (Figure 97). Transect 9 had 6 g m^{-2} of leaf biomass in February 1992 with no root material found. Along transect 1, 11 g m^{-2} of leaf biomass was collected in November 1990. No biomass was found during the August 1991 and February 1992 sampling dates. A sharp increase in biomass, up to 83 g m^{-2} for leaf and 48 g m^{-2} for roots, occurred in August 1992, followed by a gradual decline in both above- and below-ground biomass down to 13 g m^{-2} and 7 g m^{-2} for leaves and roots, respectively.

Two species of Ludwigia, *Ludwigia octovalvis* and *Ludwigia peruviana*, attained significant biomass within the marsh (Figure 98). *Ludwigia octovalvis* biomass was highest at the beginning of the four-year sampling regime with upper level averages of 76 g m^{-2} along transect 3 in November 1990 and 86 g m^{-2} in August 1991 on transect 8. There was no clear biomass dominance of this species between the north and south cells of the marsh (Table 20). By August 1992 biomass was below 10 g m^{-2}, with *Ludwigia peruviana* as the dominant contributor. In February 1992 on transect 8, biomass of *L. peruviana* was 51 g m^{-2}. Biomass peaks along transect 1 (10 g m^{-2}), 6 (288 g m^{-2}) and 8 (259 g m^{-2}) occurred during February 1992, August 1993 and August 1993 respectively. Biomass declined by the next sampling period to 0.0 g m^{-2} at transects 1 and 6 and 132 g m^{-2} at transect 8. Biomass of *L. Peruviana* was always greater in the north cell compared to average biomass of the south cell (Table 20).

Typha latifolia provided the greatest overall contribution of biomass in the marsh, with peak live biomass occurring in August 1992 (Figure 99). During the first sampling

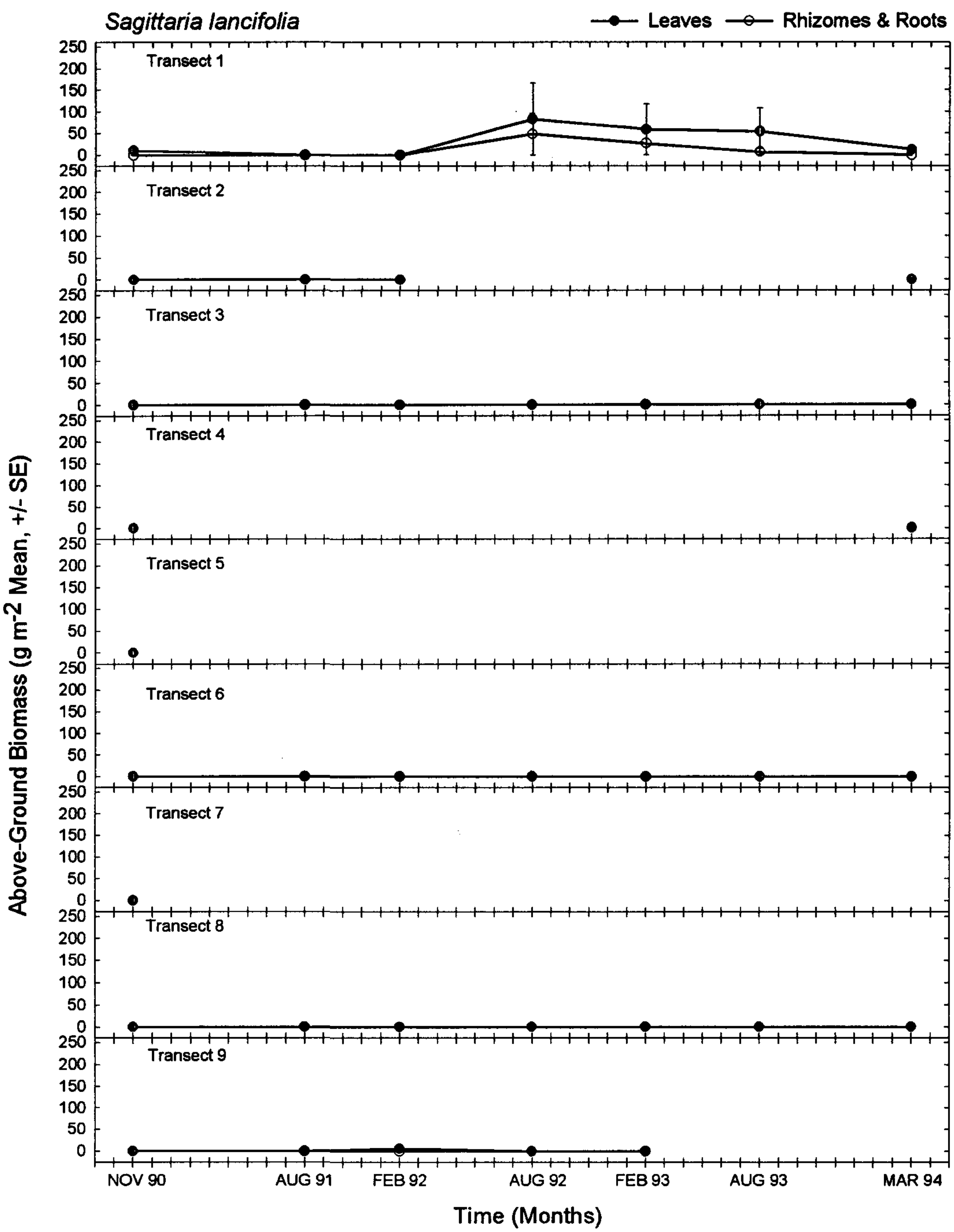


Figure 97. Time series of *Sagittaria lancifolia* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

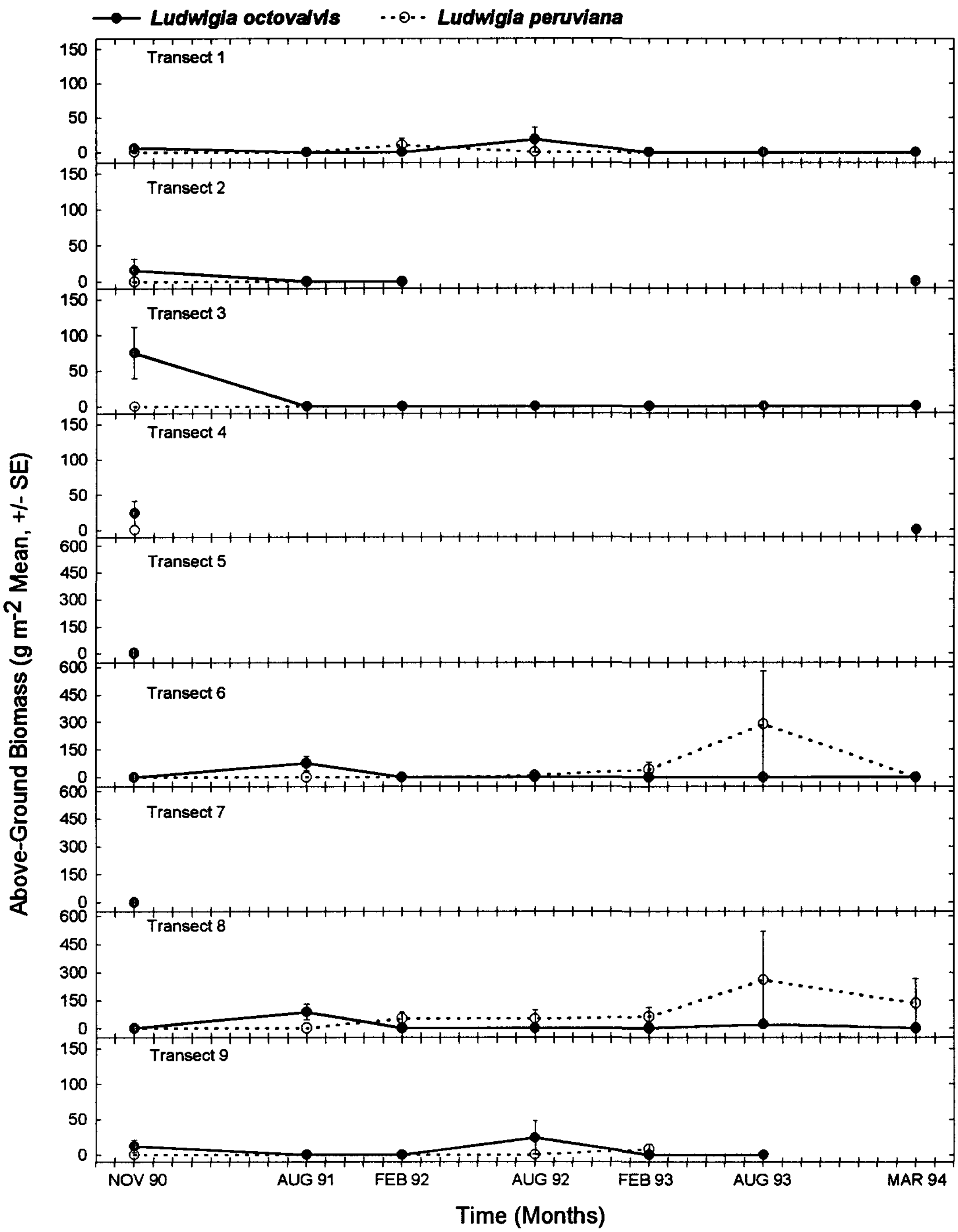


Figure 98 . Time series of *Ludwigia octovalvis* and *Ludwigia peruviana* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

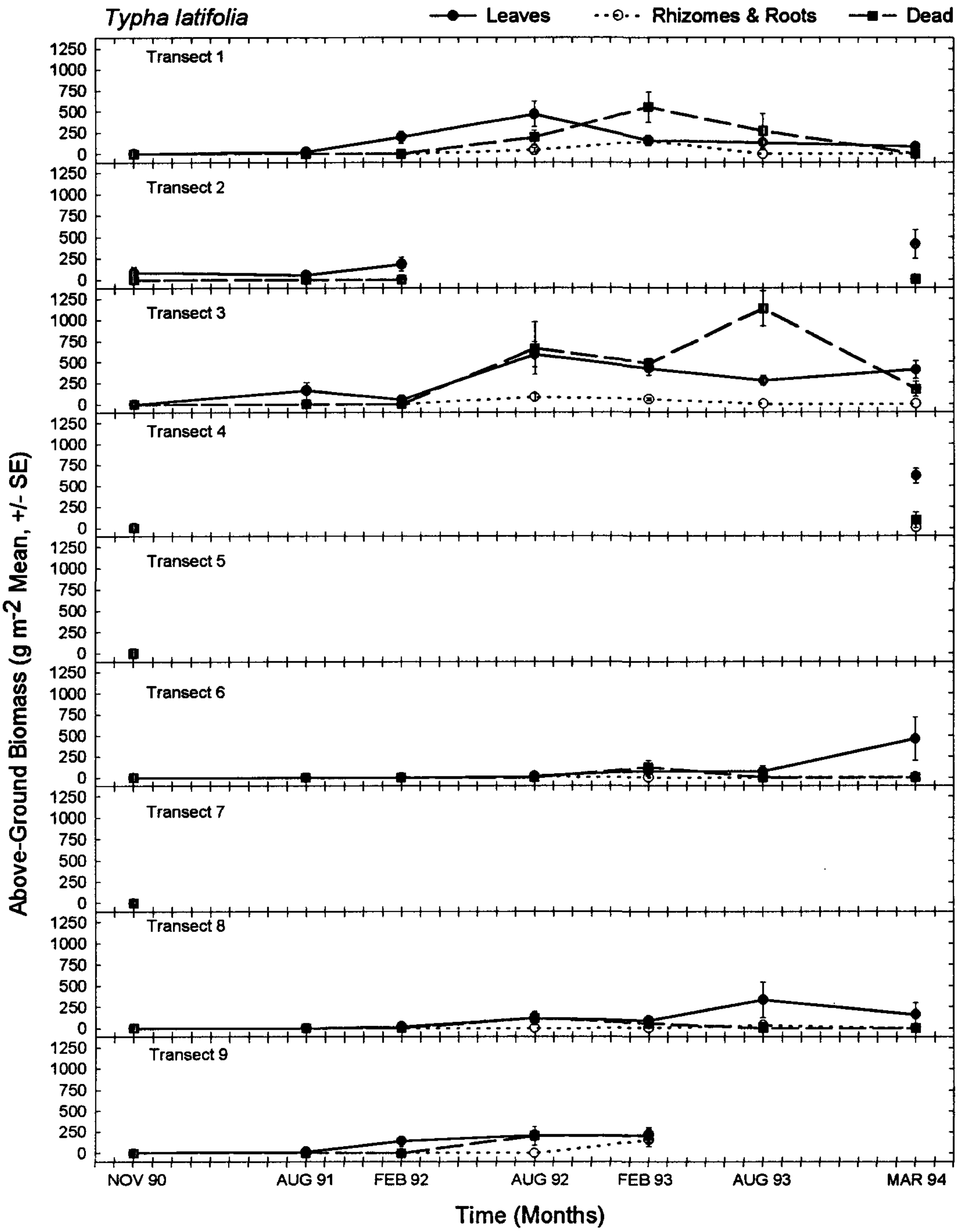


Figure 99. Time series of *Typha latifolia* biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

event in November 1990 only transect 2 had a significant biomass contribution from *Typha latifolia* averaging 86 g m^{-2}. Between November 1990 and August 1992, transects 1, 2, 3 and 9 (south marsh, (Table 20), experienced a gradual increase in leaf biomass along with a lesser, but comparable, root biomass increase. In August 1992 *T. latifolia* biomass in these transects ranged from 209 g m^{-2} and 0 g m^{-2} to 589 g m^{-2} and 82 g m^{-2} for leaf and root biomass, respectively. After this date biomass along these transects declined and appeared to level off. Dead *T. latifolia* biomass showed a similar pattern to that of live leaf biomass with the exception of a six-month lag between peak values. This pattern is likely due to the contribution of summer *T. latifolia* leaf biomass to the winter leaf litter and overall dead biomass. In the north marsh along transects 6 and 8, a gradual increase in *T. latifolia* biomass began in February 1992, peaked in August 1993 at a level of 332 g m^{-2} (leaf) and 32 g m^{-2} (root) for transect 8, and rose to 459 g m^{-2} (leaf) and 2 g m^{-2} (root) for transect 6.

Total dead biomass varied considerably among transects and throughout the duration of the study (Figure 100). The range in average dead biomass was 30 g m^{-2} to 814 g m^{-2}, occurring in November 1990 on transect 7 and March 1994 on transect 4, respectively. Dead biomass peaked at T8 in August and at T6 and T9 in February 1992. Transect 3 peaked in August 1993 after a gradual increase in dead biomass since August 1991. Transect 1 had no distinguishable peak in dead biomass with approximately equal levels collected throughout the August 1991 to February 1993 samples. Transect 2 was the only transect that had more dead biomass during the first sampling event than any successive sampling. Spatial and temporal representation of dead biomass at transect 9 is

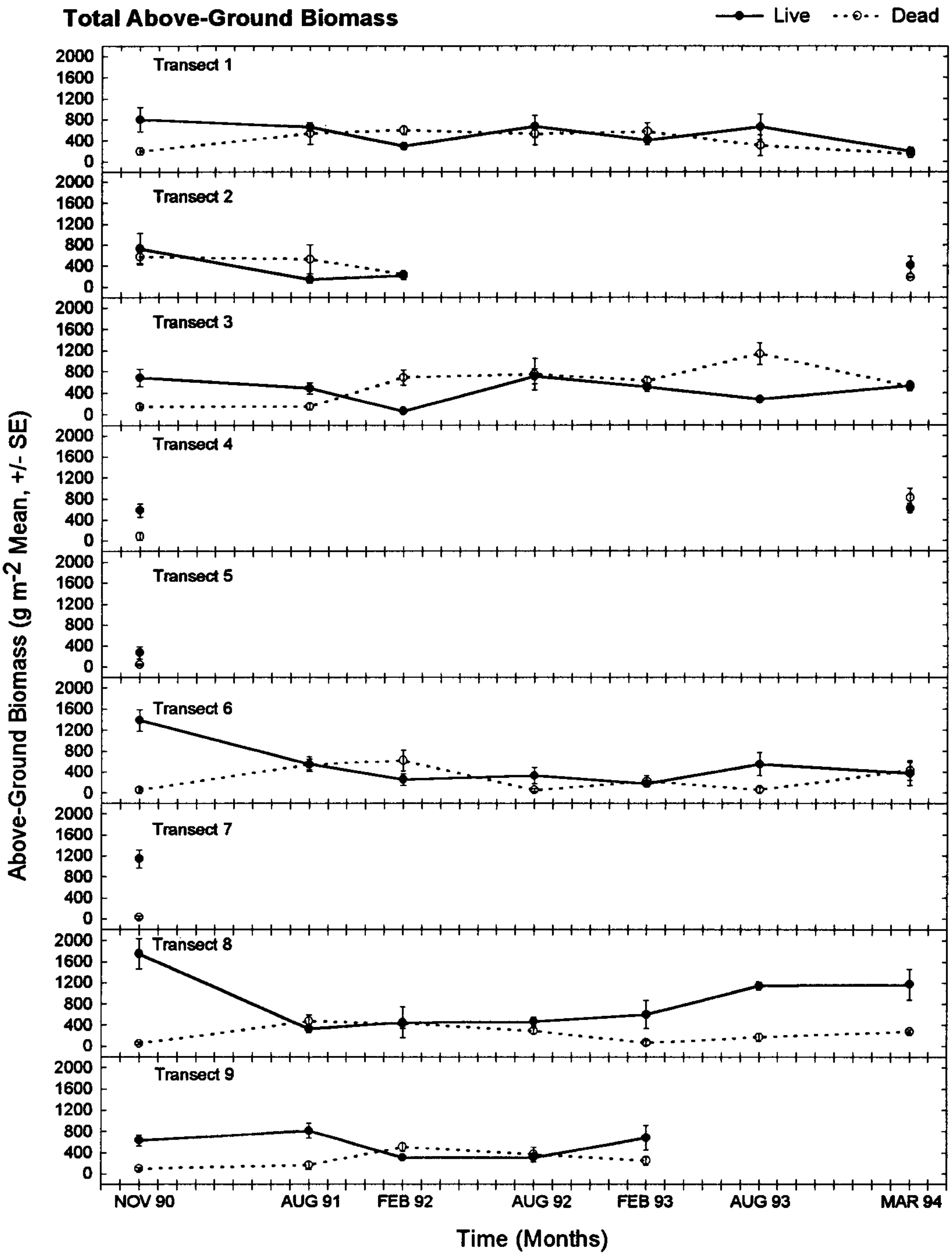


Figure 100. Time series of total above-ground biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects.

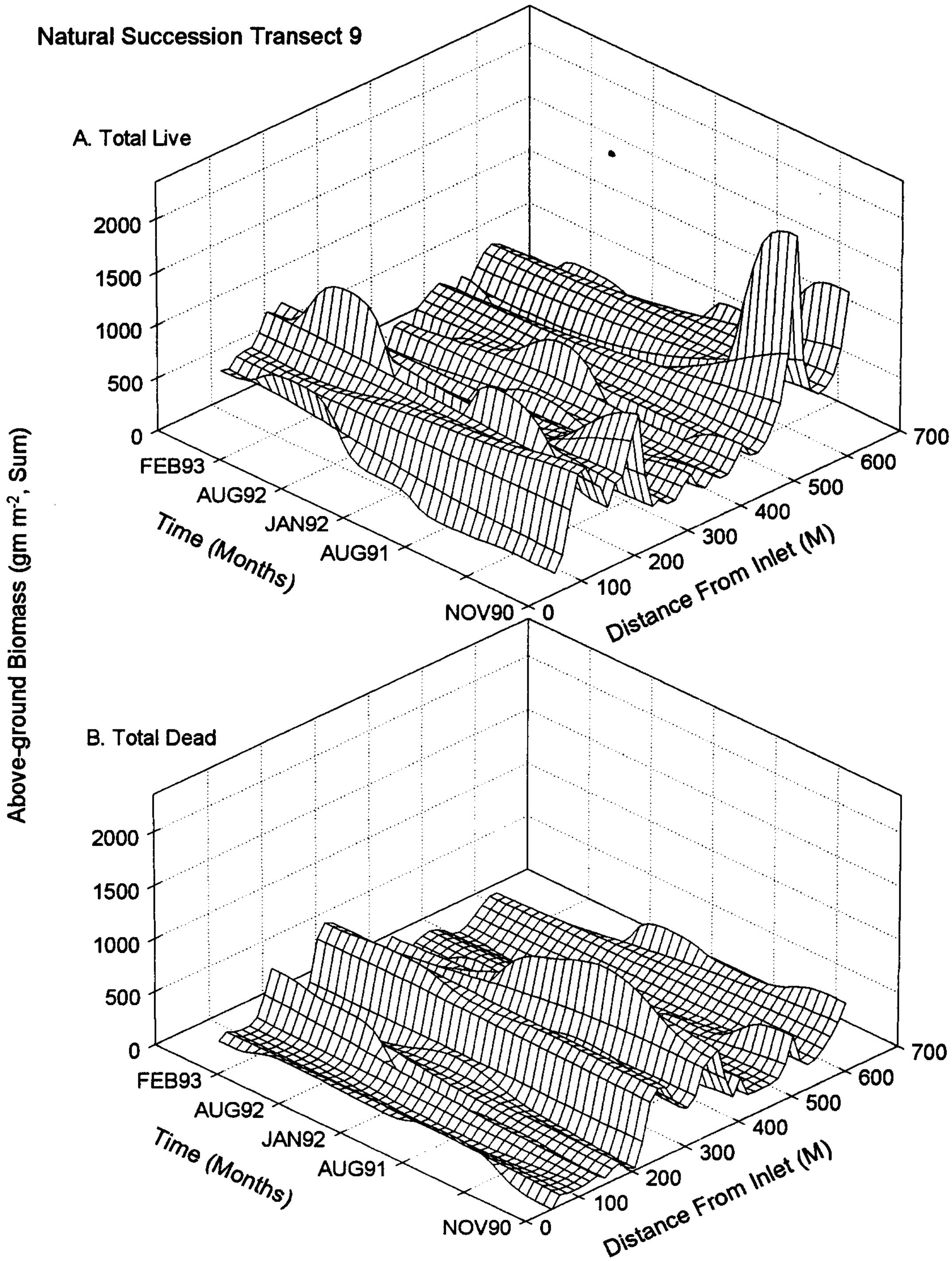


Figure 101. Time series of total above-ground biomass (g m^{-2}, Mean ±SE) from Natural Succession Transect 9.

representative of the variation found in dead biomass throughout the marsh during this study (Figure 101). Comparison of the total dead biomass within the north and south cells of the marsh showed highest levels in the south cell except in August 1991 and 1993. In August 1991, biomass in the north was slightly greater than the south (254 g m^{-2} > 231 g m^{-2}). In contrast, in August 1993 there was a large biomass difference between north and south (212 g m^{-2} > 89 g m^{-2}) (Table 21). This discrepancy resulted from the presence of open water patches in the south cell.

Below-Ground Biomass Trends

Transects in the south marsh showed an increase in biomass from the initial sampling in November 1990, with levels oscillating slightly between sampling periods (Figure 102). Maximum average biomass levels measured along these transects were 450 g m^{-2} (T1, Feb. 93), 265 g m^{-2} (T2, Mar. 94), 821 g m^{-2} (T3, Aug. 93) and 581 g m^{-2} (T4, Mar. 94). Below-ground biomass concentrations in the north marsh along transects 6 and 8 also showed an increase over time with the greatest levels, 538 g m^{-2} (T6) and 242 g m^{-2} (T8), measured in March 1994. Below-ground biomass measurements from transect 9 also showed a gradual increase in biomass over time but indicated heterogeneity along the transect (Figure 103). Average below-ground biomass levels along the transect ranged from 66 g m^{-2} in November 1990 to 201 g m^{-2} in February 1993.

A group of species— *Pontederia cordata, Sagittaria lancifolia, S. montevidensis, Salix caroliniana* and *Typha* spp.—exhibited a morphological feature in which roots

Table 21. Dead biomass summary (g m^{-2}, Mean ±SE), North (N) and South (S) Cells. All entries are leaf and/or culm biomass.

Species	Cell	Nov 1990 Mean	Nov 1990 SE	Aug 1991 Mean	Aug 1991 SE	Feb 1992 Mean	Feb 1992 SE	Aug 1992 Mean	Aug 1992 SE	Feb 1993 Mean	Feb 1993 SE	Aug 1993 Mean	Aug 1993 SE	Mar 1994 Mean	Mar 1994 SE
EICCRA	N	.	.	.	.	.	.	.	.	1.15	1.15	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
EUPCAP	N	.	.	.	.	.	.	.	.	0.89	0.89	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LIMSPO	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	6.57	6.73	.	.	.	.	.	.
LUDSPP	N	.	.	.	.	.	.	3.14	3.14	11.62	11.62	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCOR	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	6.82	0.00	.	.	.	.
SAGSPP	N	.	.	.	.	.	.	2.21	2.21	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	2.24	2.29	.	.	.	.
TYPSPP	N	.	.	.	.	.	.	29.54	20.55	45.47	24.55	.	.	.	.
	S	.	.	.	.	.	.	211.72	74.62	245.65	54.09	133.80	58.99	43.88	22.01
unknown	N	44.75	16.14	254.48	59.10	262.63	70.70	51.91	19.43	12.22	12.22	29.69	14.76	102.19	40.51
	S	211.61	43.95	231.00	62.10	393.21	55.21	111.25	44.28	29.18	19.42	3.13	0.00	179.08	47.34
TOTAL	N	44.75	16.14	254.48	59.10	262.63	70.70	86.79	26.48	71.35	32.66	211.52	75.59	204.30	82.94
	S	211.61	43.95	231.00	62.10	364.89	57.93	329.54	87.36	283.90	58.23	88.51	28.38	222.12	45.38

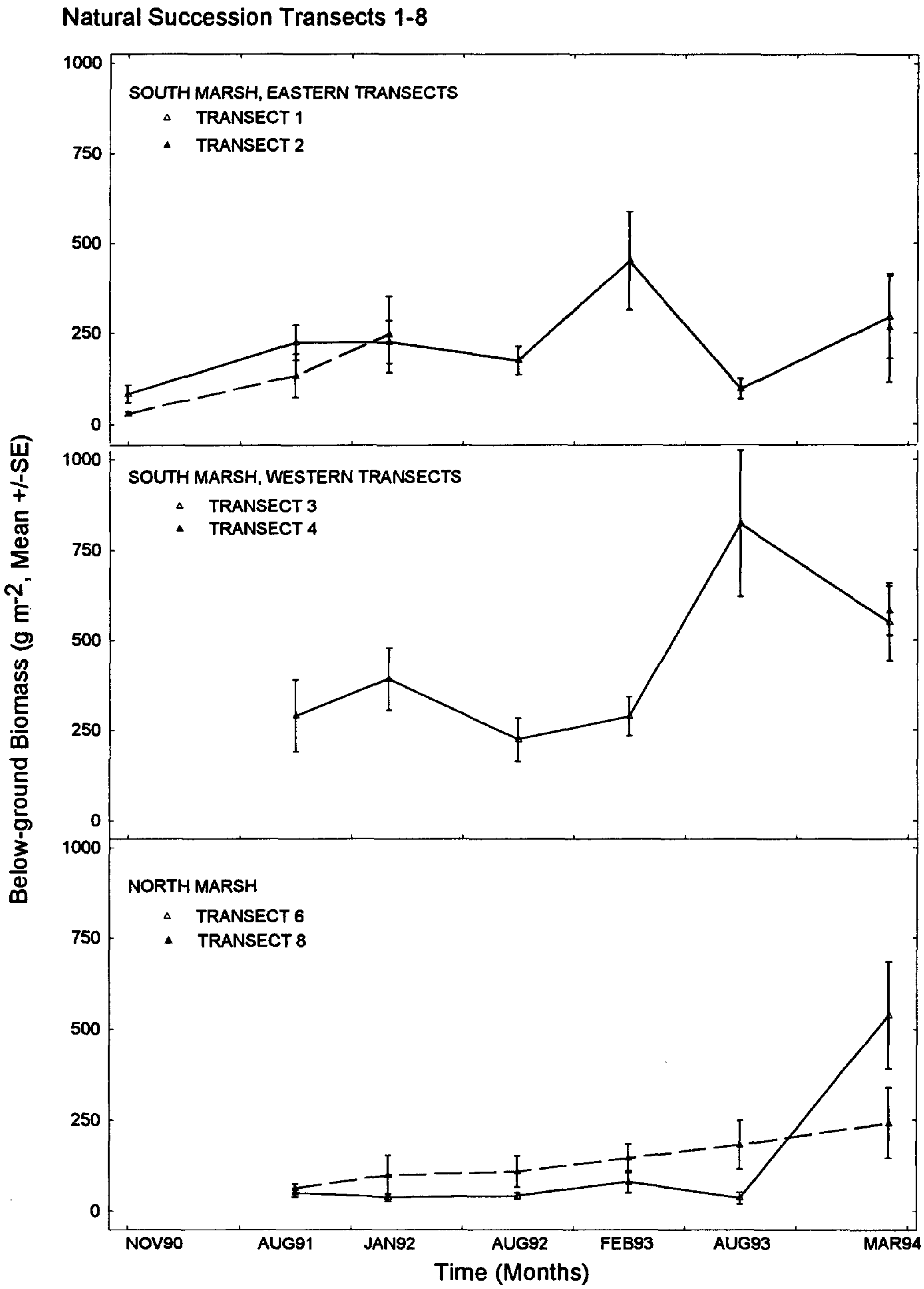
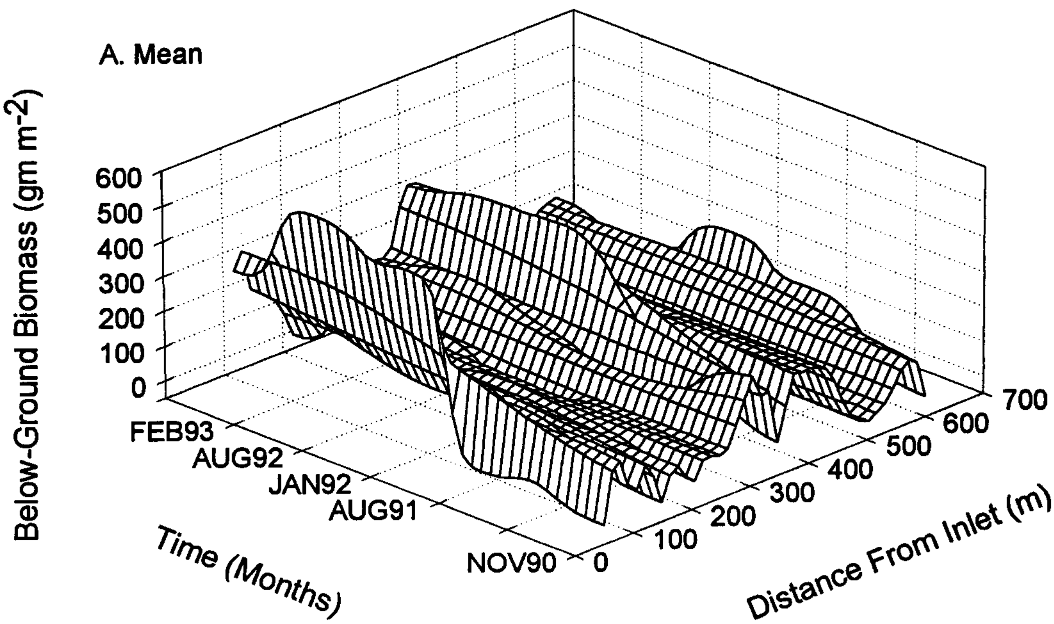


Figure 102. Time series of below-ground biomass (g m^{-2}, Mean ±SE) from Natural Succession Transects 1-4, 6, 8.

Natural Succession Transect 9



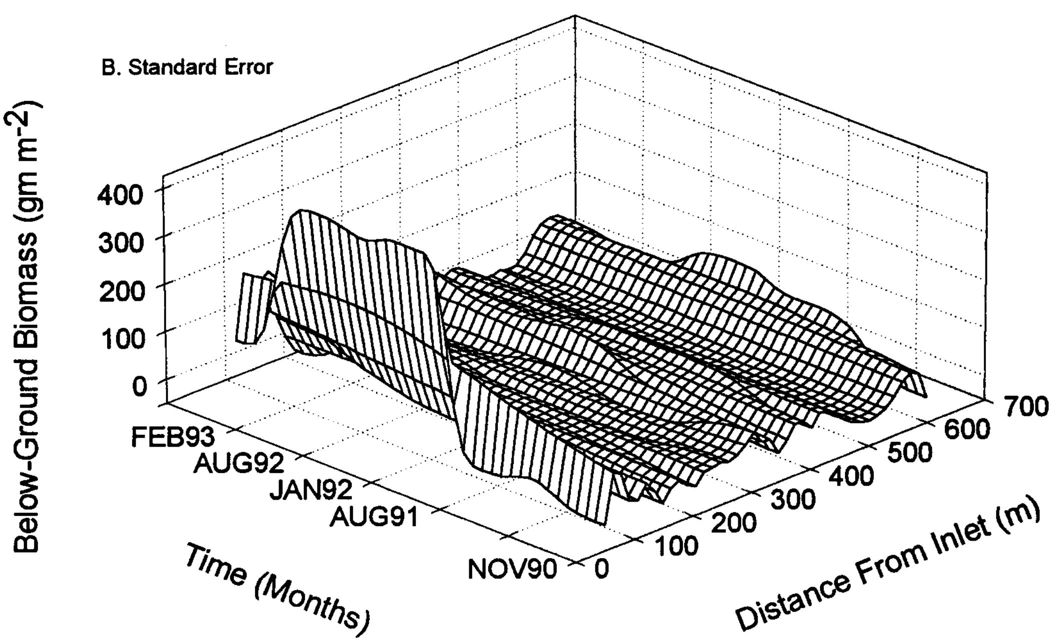


Figure 103. Time series of below-ground biomass (g m^{-2}, Mean ±SE) from Natural Succession Transect 9.

and/or rhizomes grew into the water column without support from soil. This seemed to be an intermediate stage prior to floating mat development. As floating mats developed, observations were made that these water suspended roots and rhizomes were trapping overstory leaf litter and organic matter from inflowing lake water (Clark and Stenberg, Personal Observations). *Typha spp.* showed higher average water suspended rhizome/root biomass in the south marsh during the August 1992 and February 1993 sampling periods, but a change to higher biomass levels in the north cell of the marsh in August 1993 and March 1994. *S. lancifolia* and *P. cordata* showed consistently higher water suspended rhizome/root biomass in the south marsh while *Sagittaria montevidensis* and *Salix caroliniana* showed highest water suspended rhizome/root biomass in the north cell (Table 22).

Floating Mat Formation and Biomass

Although not well understood, the formation of floating mats within the Apopka Marsh may have some effect on species composition and standing crop biomass. Formation of mats was first noted in August 1992 (Figure 104) along transects 1 and 3. A simple index of mat formation using the percentage of plots with evidence of mat development revealed a pattern of increasing areal floating mat coverage with time. This pattern consisted of 2%, 5%, and 41% for sample dates, August 1992, March 1993, and August 1993, respectively. Mat formation began in the south marsh along transects 1 and 3 (August 1992) and progressed to the remainder of the marsh by August 1993 (Figure 104 and 105).

Table 22. Water suspended Rhizome and root biomass summary (g m^{-2}, Mean ±SE), North (N) and South (S) Cells. All entries are leaf or culm biomass.

Species	Cell	Nov 1990 Mean	Nov 1990 SE	Aug 1991 Mean	Aug 1991 SE	Feb 1992 Mean	Feb 1992 SE	Aug 1992 Mean	Aug 1992 SE	Feb 1993 Mean	Feb 1993 SE	Aug 1993 Mean	Aug 1993 SE	Mar 1994 Mean	Mar 1994 SE
EICCRA	N	.	.	.	.	.	.	.	.	.	.	.	.	5.11	5.11
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PONCOR	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	28.23	0.00	9.07	0.00	2.88	0.00
SAGLAN	N	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	S	.	.	.	.	.	.	9.23	9.46	5.12	5.24	0.67	0.00	.	.
SAGMON	N	.	.	.	.	.	.	0.84	0.84	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SALCAR	N	.	.	.	.	.	.	3.95	3.95	.	.	.	.	.	.
	S	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TYPLAT	N	.	.	.	.	.	.	2.57	2.57	0.77	0.77	4.32	4.32	0.30	0.30
	S	.	.	.	.	.	.	23.50	10.91	75.40	22.97	.	.	.	.

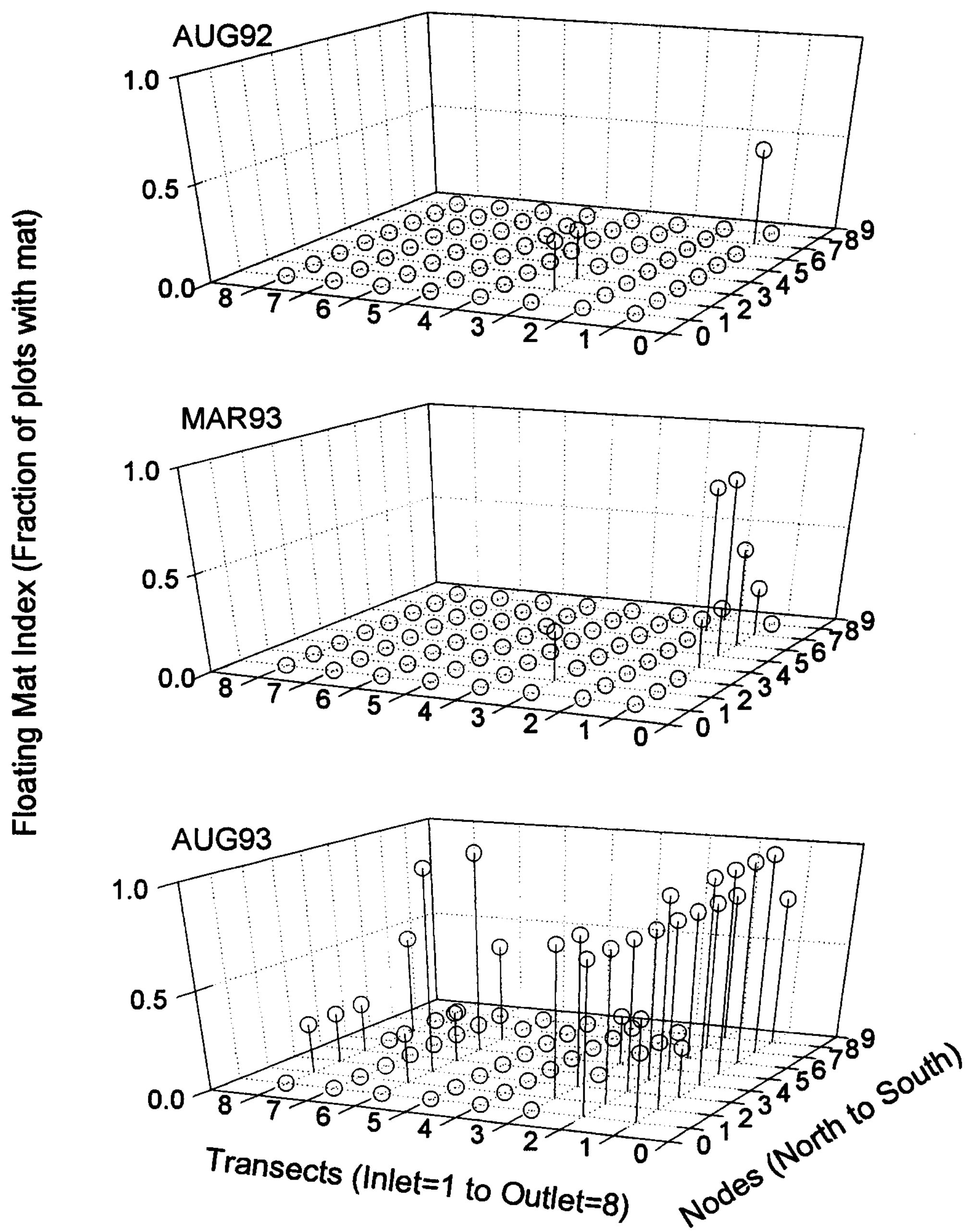


Figure 104. Floating mats along Natural Succession Transects. Floating mat index is the percent of plots with floating mat.

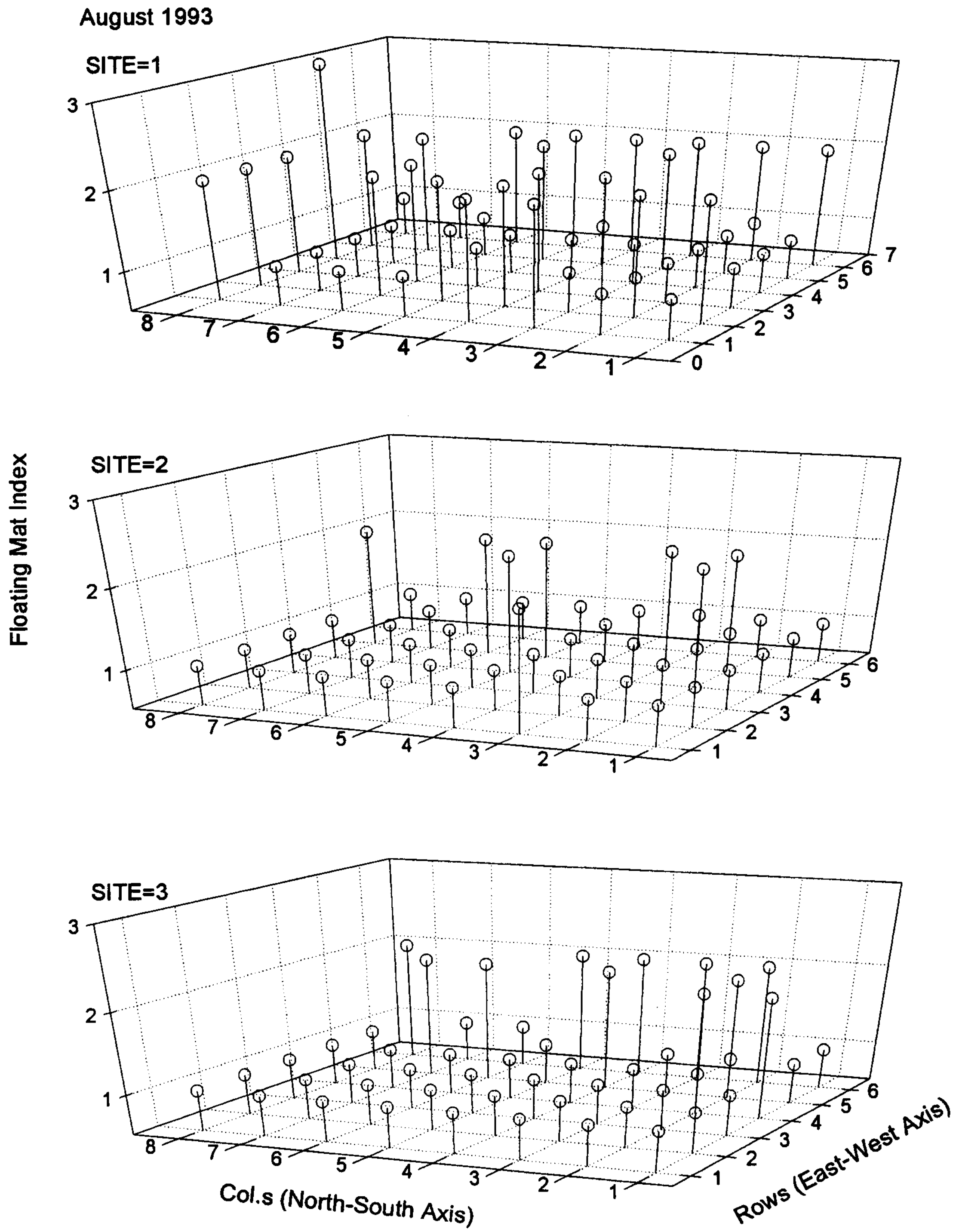


Figure 105. Floating mats in Experimental Planting Areas. Floating mat index based on mat layers observed during water depth measurements (1=Minimal mat, 2=Two layer mat, 3=Three layer mat).

Floating mat biomass in August 1992 for transects 1 and 6 averaged 827±419 g m^{-2} and 647±381 g m^{-2}, respectively. In March 1994, biomass had increased to 926±381 g m^{-2} along transect 2. Preliminary information from August 1994 suggested a substantial increase in aerial coverage by floating mats primarily within the south marsh (Clark and Stenberg, Personal Observations).

Repeated Measures Analysis

Total Live Biomass. Temporal and spatial differences in total live biomass were analyzed for the Apopka Marsh using a general linear model procedure for the analysis of variance and two mean separation techniques, Least Significant Differences (LSD) and Scheffe's comparisons tests. Highly significant differences ($p = 0.0001$) were found among sampling dates, among transects sampled, and as an interaction of sampling dates and sampling transects. No differences ($p = 0.8865$) were found within the sampling transects. Temporal comparison of all sampling events using the LSD comparison method showed only the January 1992 sampling event as having significantly different (α=0.05) total live biomass when compared to all other sampling dates (Tables 23, 24). This same temporal comparison using Scheffe's comparison technique showed significant differences (a = 0.05) between sampling events in January 1992 and the sampling periods in November 1990, August 1991, August 1992, and August 1993. The comparison did not show differences between the January 1992, February 1993 or March 1994 sampling dates, which were significant with the LSD method (Tables 23, 24).

Spatial analysis comparing differences among transects over the course of the study were variable among transects and between the north and south marsh with no apparent pattern (Tables 23, 24). Comparisons using the LSD analysis techniques showed significant differences at the 95% confidence level among transects 2, 4, 5, and 7, and transects 1, 3, 6, 8 and 9. The results of the spatial analysis using the Scheffe's comparison method were identical to that found with the LSD technique (Tables 23, 24).

Total dead biomass. Overall temporal and spatial comparisons of the data set for total above-ground dead biomass were similar to that of total live biomass. Highly significant differences (p=0.0001) were found among sampling dates, transects sampled, and as an interaction of the sampling date and transect sampled. Again, no significant difference (p=.3032) was found within the transects. Comparison of sampling dates using the LSD analysis technique showed significant differences between November 1990 and all other sampling dates, between January 1992 and all other sampling dates, and the August 1992 and the March 1994 sampling dates (Tables 25, 26). Repeated measures analysis using Scheffe's comparison of sampling dates showed differences between the November 1990 sampling and all other dates. Two significant differences were found between January 1992, August 1991 and March 1994 (Tables 25, 26). No other significant differences were found among sampling dates.

Use of the LSD or Scheffe's analysis technique in the repeated measures analysis of total dead above-ground biomass between transects showed identical results (Table 25 and Table 26 respectively). Significant differences (a=0.05) using these two tests were found among transects 1, 3, 6, 8 and 9 and transects 2, 4, 5, and 7.

Table 23. Repeated Measure Analysis of Total Live Biomass using Least Significant Differences (LSD) comparison technique

Comparisons by Sample Date

Date	Nov-90	Aug-91	Jan-92	Aug-92	Feb-93	Aug-93	Mar-94
Nov-90			***				
Aug-91			***				
Jan-92	***	***		***	***	***	***
Aug-92			***				
Feb-93			***				
Aug-93			***				
Mar-94			***				

*** Denotes significants comparison at the 0.05 level

Comparisons by Transect

Transect #	T1	T2	T3	T4	T5	T6	T7	T8	T9
T1		***		***	***		***		
T2	***		***			***		***	***
T3		***		***			***		
T4	***		***		***	***		***	***
T5	***		***			***		***	***
T6		***		***	***		***		
T7	***		***			***		***	***
T8		***		***	***		***		
T9		***		***	***		***		

*** Denotes significants comparison at the 0.05 level

Table 24. Repeated Measure Analysis of Total Live Biomass using Scheffe's comparison technique

Comparisons by Sample Date

Date	Nov-90	Aug-91	Jan-92	Aug-92	Feb-93	Aug-93	Mar-94
Nov-90			***				
Aug-91			***				
Jan-92	***	***		***		***	
Aug-92			***				
Feb-93							
Aug-93			***				
Mar-94							

*** Denotes significants comparison at the 0.05 level

Comparisons by Transect

Transect	T1	T2	T3	T4	T5	T6	T7	T8	T9
T1		***		***	***		***		
T2	***		***			***		***	***
T3		***		***	***		***		
T4	***		***			***		***	***
T5	***		***			***		***	***
T6		***		***	***		***		
T7	***		***			***		***	***
T8		***		***	***		***		
T9		***		***			***		

*** Denotes significants comparison at the 0.05 level

Table 25. Repeated Measure Analysis of Total Dead Biomass using Least Significant Differences (LSD) comparison technique

Temporal Comparisons by Sample Date

Date	Nov-90	Aug-91	Jan-92	Aug-92	Feb-93	Aug-93	Mar-94
Nov-90		***	***	***	***	***	***
Aug-91	***		***				
Jan-92	***	***		***	***	***	***
Aug-92	***		***				***
Feb-93	***		***				
Aug-93	***		***				
Mar-94	***		***	***			

*** Denotes significants comparison at the 0.05 level

Spatial Comparisons by Transect

Transect #	T1	T2	T3	T4	T5	T6	T7	T8	T9
T1		***		***	***		***		
T2	***		***			***		***	***
T3		***		***	***		***		
T4	***		***			***		***	***
T5	***		***			***		***	***
T6		***		***	***		***		
T7	***		***			***		***	***
T8		***		***	***		***		
T9		***		***	***		***		

*** Denotes significants comparison at the 0.05 level

Table 26. Repeated Measure Analysis of Total Dead Biomass using Scheffe's comparison technique

Temporal Comparisons by Sample Date

Date	Nov-90	Aug-91	Jan-92	Aug-92	Feb-93	Aug-93	Mar-94
Nov-90		***	***	***	***	***	***
Aug-91	***		***				
Jan-92	***						
Aug-92	***						
Feb-93	***						
Aug-93	***						
Mar-94	***		***				

*** Denotes significants comparison at the 0.05 level

Spatial Comparisons by Transect

Transect #	T1	T2	T3	T4	T5	T6	T7	T8	T9
T1		***		***	***		***		
T2	***		***			***		***	***
T3		***		***	***		***		
T4	***		***			***		***	***
T5	***		***			***		***	***
T6		***		***	***		***		
T7	***		***			***		***	***
T8		***		***	***		***		
T9		***		***	***		***		

*** Denotes significants comparison at the 0.05 level

REPRODUCTIVE PHENOLOGY

Planted Plots

Phenology characteristics in the planted treatments were similar when classification groupings could be identified for the five target species (Tables 27, 28). Seasonal trends in *Eleocharis interstincta*, *Pontederia cordata* and *Sagittaria lancifolia* showed peaks in flowering during the summer season while *Scirpus californicus* and *Scirpus validus* both peaked in the winter. Evidence of a time lag between early and later developmental stages of phenology (i.e. from flowering to mature fruit) could be identified in all target species except *E. interstincta* where no clear time lag was apparent. Phenology index activity showed either no evidence of change throughout the study period or a decrease in activity over the course of the study. The phenology of target species did not appear to be affected by the water quality gradient among the planted treatment plots.

Eleocharis interstincta showed a strong seasonal pattern with greatest levels of flowering, immature and mature fruit present during the summer months (Figure 106). This pattern was initiated in May 1992 with no change in activity apparent through March 1994. It was difficult to define a distinct time lag of phenology within this species partly due to the high index level of immature fruit during the summer samplings. This high level, often above the flowering index, indicated that flowering actually occurred earlier in the year, possibly in mid or late spring. Distance from the inlet did not appear to affect timing or intensity of the phenology index of this species for all three phenology

Table 27. Summary of phenological patterns for single species planted treatments. Table entries: Seasonality= "Summer" or "Winter" denotes peak periods of flowering detectable under this sampling frequency. Time Lag= "Yes" or "No" denotes presence or absence of detectable time lags. Activity= "Positive", "No", or "Negative" denotes trend with time. Gradient= "Positive", "No", or "Negative" denotes trend with distance from the lake water inlet. "?" indicates pattern difficult to determine.

Classification	*Eleocharis interstincta*	*Pontederia cordata*	*Sagittaria lancifolia*	*Scirpus californicus*	*Scirpus validus*
Seasonality	Summer	Summer	Summer	Winter	Winter
Time Lag	No	Yes (Site 1)	Yes	Yes	Yes
Activity	No	Negative	Negative	?	Negative
Gradient	?	No	No	No	No

Table 28. Summary of phenological patterns for mixed species planted treatments. Table entries: Seasonality= "Summer" or "Winter" denotes peak periods of flowering detectable under this sampling frequency. Time Lag= "Yes" or "No" denotes presence or absence of detectable time lags. Activity= "Positive", "No", or "Negative" denotes trend with time. Gradient= "Positive", "No", or "Negative" denotes trend with distance from the lake water inlet. "?" indicates pattern difficult to determine.

Classification	*Eleocharis interstincta*	*Pontederia cordata*	*Scirpus californicus*	*Scirpus validus*	*Thalia geniculata*
Seasonality	?	Summer	?	?	Summer
Time Lag	No	Yes	No	Yes	No
Activity	?	?	?	Negaative	Positive
Gradient	Positive	Positive	Negative	?	?

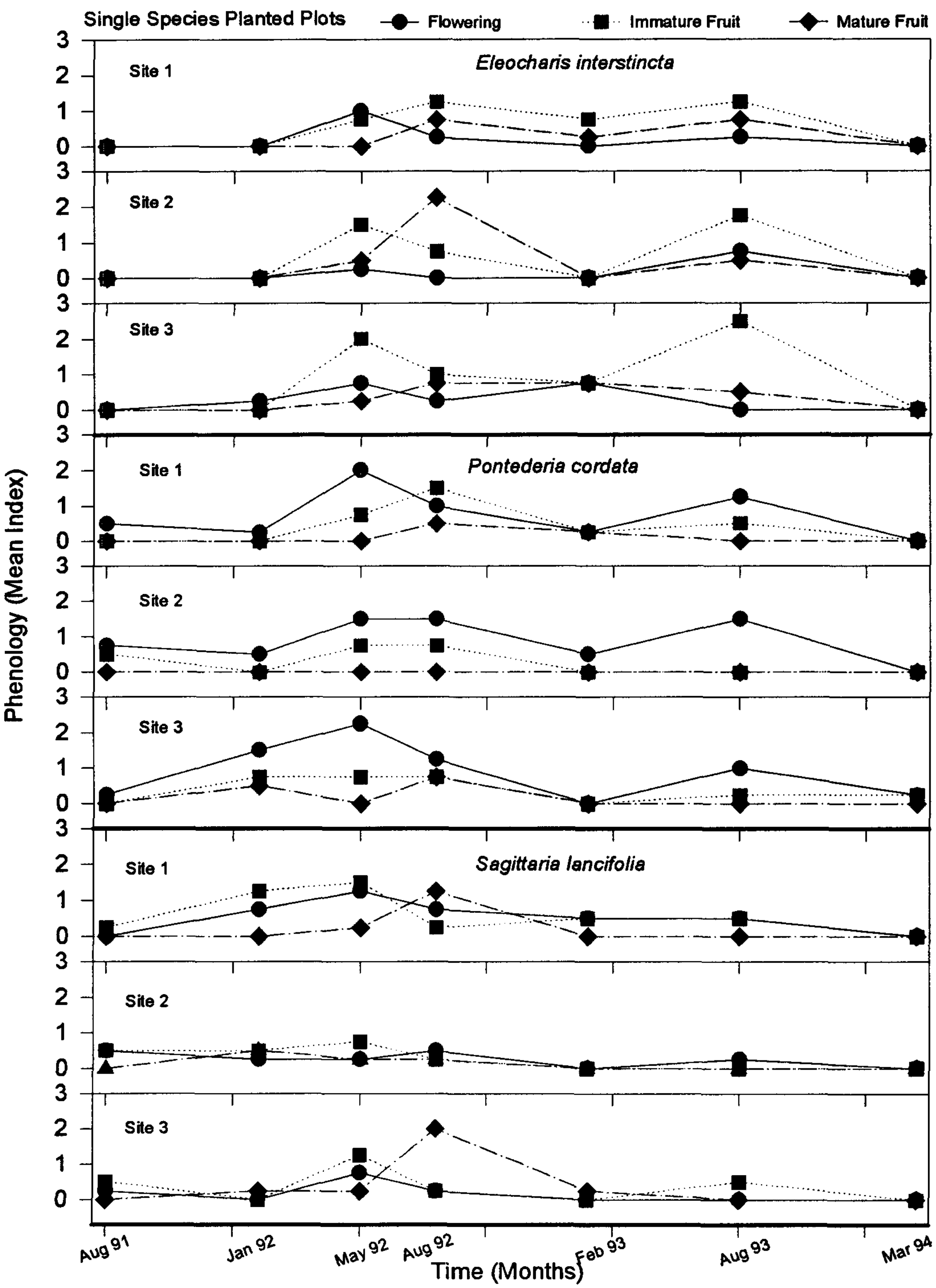


Figure 106. Phenology of *Eleocharis interstincta* (Top three graphs), *Pontederia cordata* (Middle three graphs) and *Sagittaria lancifolia* (Bottom three graphs) from Single Species Planted Plots, Experimental Planting Sites.

stages. Phenology data of *Pontederia cordata* in the planted plots indicated peak flowering occurred in late spring and was closely followed by immature fruit production at a slightly lower percentage of the total potential coverage (Figure 106). Mature fruit production at all three sites was low compared to the overall coverage of the species with mean phenology indices ranging from 0 to less than 0.75. The overall trends of activity showed a slight increase in activity during the summer of 1992 over that of the previous year. However, a decrease in flowering and immature fruit phenology occurred the next summer. Effects of distance are not apparent in the data with Sites 1 and 3 having similar phenological indices during the summers of 1992 and 1993.

Activity levels of *Sagittaria lancifolia* showed a marked decline between the summer of 1992 and that of 1993 especially in mature fruit development (Figure 106). The seasonal pattern, peaking in the summer, was still evident especially in the immature fruiting stage of development. Time lag of immature and mature fruiting phenology was clearly evident during the two summer sampling events in 1992. Time lag for flowering and immature fruit development was not as apparent during any time of the year indicating the peak flowering period probably occurred between May and August. Site 2 had an overall lower mean phenological index than Sites 1 or 3. However, there was no apparent difference between Sites 1 and 2 during the study period.

Scirpus californicus showed a clearly different peak flowering phenology than that of the three species mentioned above. This species flowered closer to the winter sampling events, with phenological index values between 0.5-1.5. For the August 1992 and 1993 sampling events no flowering was detected (Figure 107). Peak mature fruit

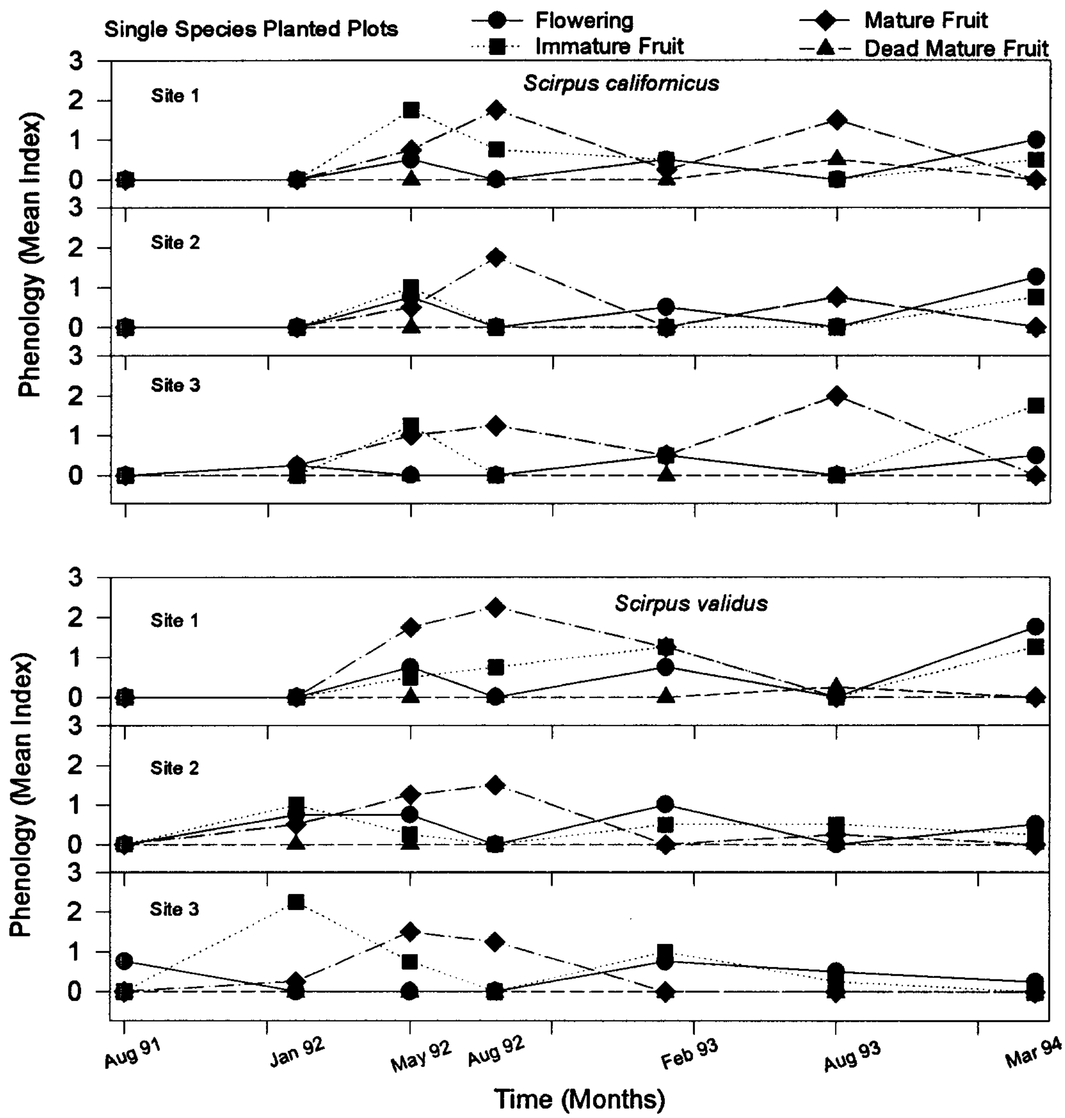


Figure 107. Phenology of *Scirpus californicus* (Top three graphs), *Scirpus validus* (Bottom three graphs) from Single Species Planted Plots, Experimental Planting Sites.

phenology however, had its highest index values during the summer months. No apparent trends in the phenology activity were apparent over time at any of the sites and differences between sites were also not apparent.

Peak flowering phenology for *Scirpus validus* was similar to that of *S. californicus* and closer to the winter sampling event (Figure 107). These winter flowering peaks were often below the immature fruiting phenological indices indicating flowering may be taking place in early or mid winter followed by immature fruit in late winter and into spring and peak values of mature fruit occurring during the summer sampling period. It is difficult to identify any activity trends due to time or gradient because of a large fluctuation in phenological indices within sites and over the course of the study.

Mixed Planted Plots

A clear classification of phenology of the six target species in the mixed planted plots was difficult due to the low mean phenological indices calculated during the study period. Five of the six planted species had phenological values less then 1.0 for either flowering, immature or mature fruiting stages (Appendix B1) . Only *Thalia geniculata* had index values greater then one, ranging up to 2.5 for flowering in August 1993 (Figure 108). Summer peak flowering periods were evident for *Pontederia cordata* and *Thalia geniculata*. There was no clear evidence for flowering seasonality in the other four species (Table 28). Temporal changes in activity were also difficult to distinguish with mixed results in the two species in which trends were identified. Distance also showed

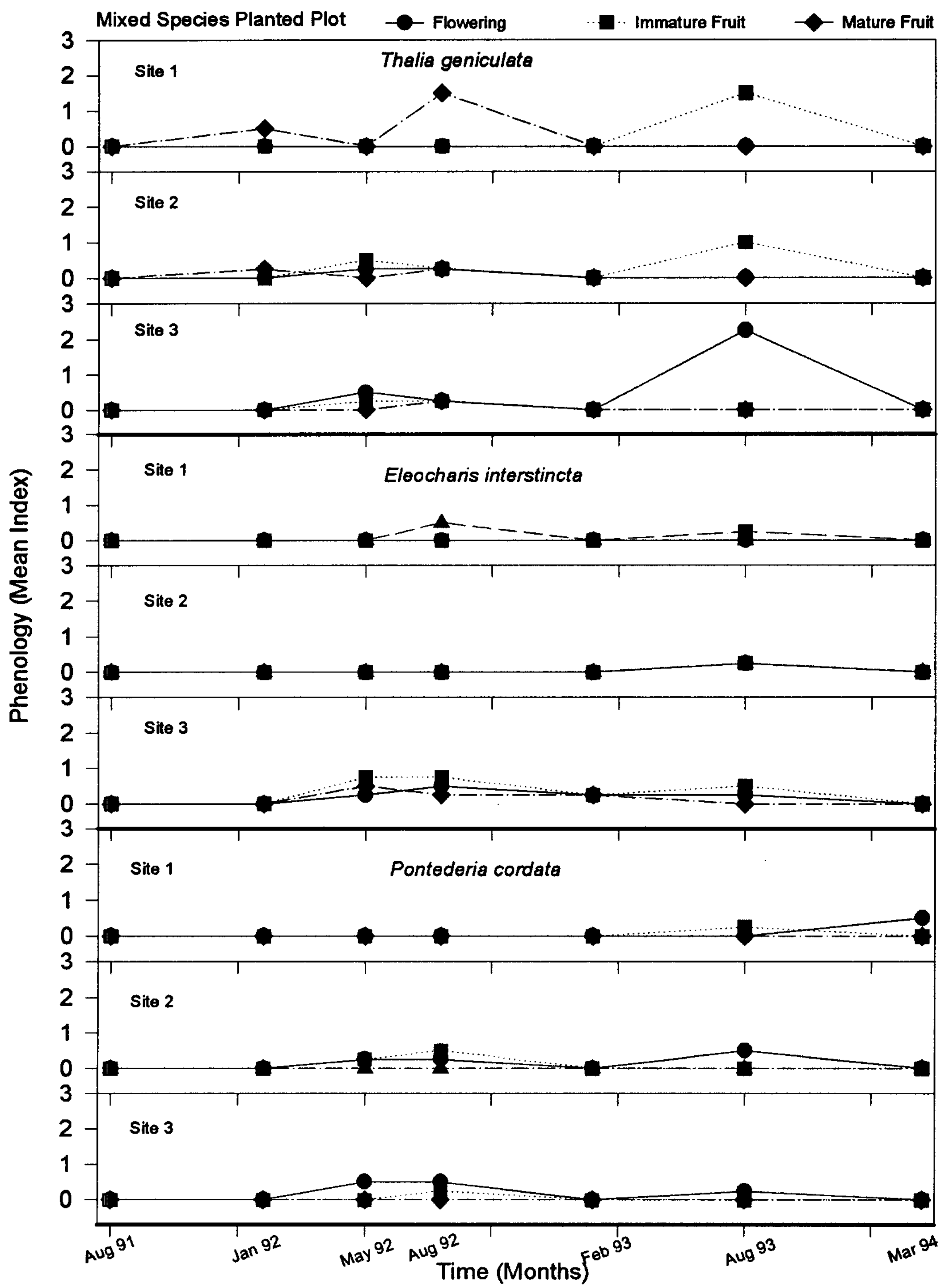


Figure 108. Phenology of *Thalia geniculata* (Top three graphs), *Eleocharis interstincta* (Middle three graphs) and *Pontederia cordata* (Bottom three graphs) from Mixed Species Planted Plots, Experimental Planting Sites.

variable effects on *Eleocharis interstincta*, *Pontederia cordata* and *Scirpus californicus* with no trends evident for *Scirpus validus* or *Thalia geniculata*.

Thalia geniculata had the highest flowering index values, when present, during the summer sampling events, with no time lag in reproductive stages evident within the sampling frequency of the data (Figure 108). Peak values for immature fruit and mature fruit varied slightly between the summer sampling events of 1992 and 1993 with mature values greater or equal to index values of immature fruit in 1992 and only immature fruit present during the sampling event in August of 1993. There appeared to be an increase in mean phenological index values over time especially for immature fruit, with values increasing from less then 0.5 in May and August 1992 to greater than 1.0 during August 1993. Gradient effects on phenology of *T. geniculata* were evident at Site 3 of the north cell where the highest phenological index was the flowering reproductive stage while peak values found at Sites 1 and 2 in the south marsh were mature or immature fruit stages.

Phenological indices for *Eleocharis interstincta* in mixed planted plots were low making determination of trends difficult. All values were less than 1.0 with no activity occurring at Site 2 until August 1993 (Figure 108). Flowering, immature and mature fruit phenology appeared to occur during the summer while little activity and index values less than 0.25 occurred in the winter. Mean phenological indices were greater in the north marsh at Site 3 than in either of the south marsh sampling locations, indicating a positive relationship between phenology index and distance from the marsh inlet.

Pontederia cordata mean phenological indices show increased in activity at Site 1 in the north marsh and increased with distance away from the marsh inlet during the August 1992 sampling (Figure 108). Summer sampling events had the greatest abundance of *P. cordata* flowers with phenology indices ranging from 0.25 to 0.5. Time lag of reproductive stage was clearly evident between May and August 1992. However, in the summer of 1993, only flowering plants were present at Sites 2 and 3 and only immature fruiting plants were detected at Site 1.

Winter flowering of *Scirpus californicus* was evident in the mixed planted plots, indicating a seasonal trend in phenology for this species. Most of the activity for *S. californicus* occurred at Site 1 in the south marsh. Only one mean phenological index value of 0.5 was recorded for immature fruit at Site 2 and no activity was recorded at Site 3 (Figure 109). There appeared to be no major changes in activity in phenology at Site 1 and no clear evidence of time lags for successive reproductive stages.

Scirpus validus in mixed planted plots showed peak activity in August 1992 with little activity before or after this date (Figure 109). Mean phenological indices for all three sites was 0.75 showing no gradient effect due to distance from the marsh inlet on percentage of plants with mature fruit production. Time lag of reproductive stages was not evident. Absence of any phenological activity in August 1993 may indicate a decreasing trend in flowering and fruit production over the course of the study period.

Seeded Plots

Seeded plot treatments within the marsh generally showed low reproductive activity throughout the study period. Three of the species, *Panicum hemitomon*,

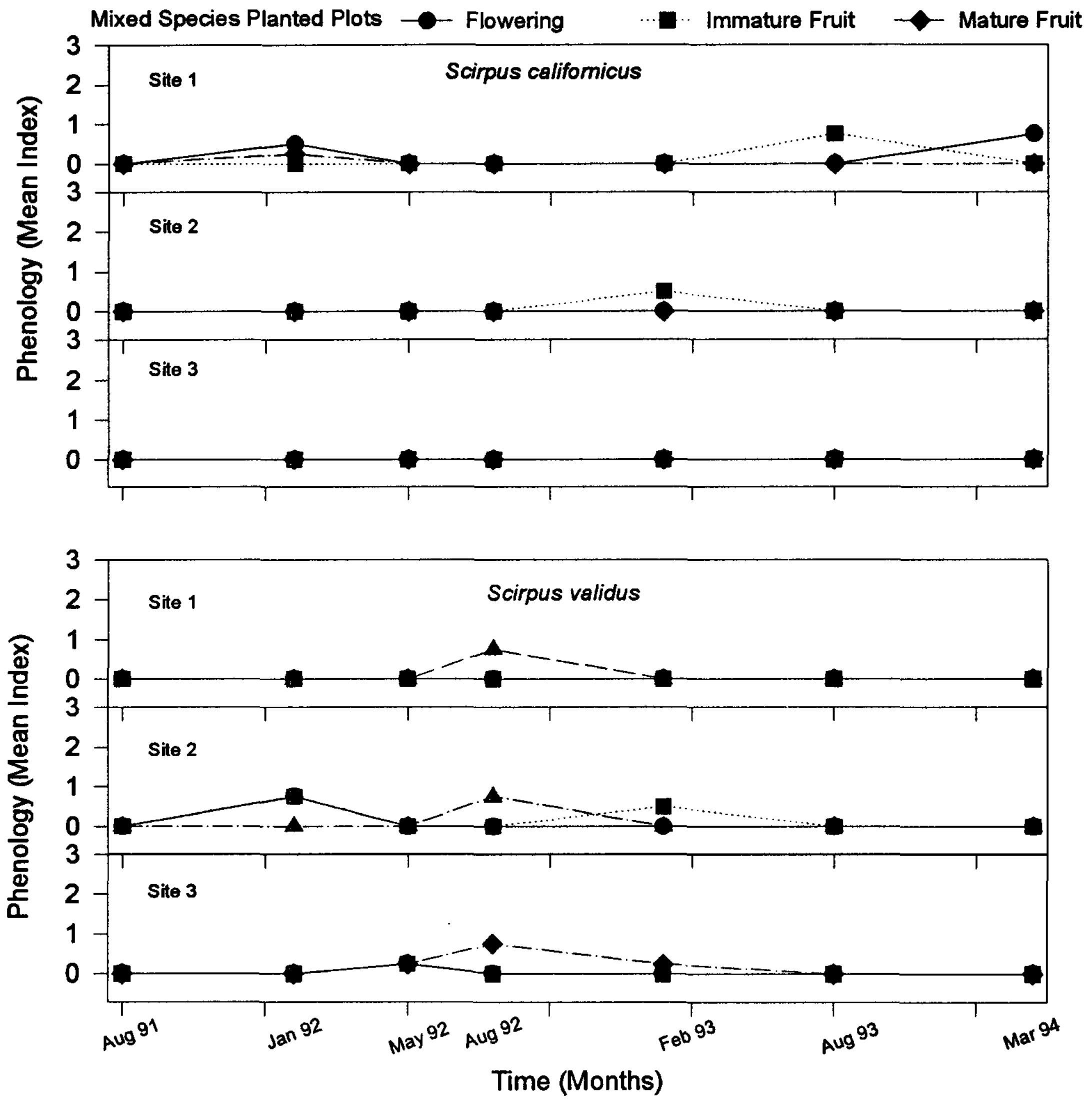


Figure 109. Phenology of *Scirpus californicus* (Top three graphs), *Scirpus validus* (Bottom three graphs) from Mixed Species Planted Plots, Experimental Planting Sites.

Polygonum punctatum and *Scirpus validus*, showed no activity. Two species, *Pontederia cordata* and *Sagittaria lancifolia*, had mean flowering (<1.75), immature fruit (<1.75) and mature fruit (<0.5) phenological values in Sites 1 and 3 (Appendix B2).

Pontederia cordata had flowering peaks during the early summer followed by immature fruit development in August 1992 (Figure 110). Activity of *P. cordata* was apparent during the summer of 1992 and 1993 at Site 1 but only during May of 1992 at Site 3. *Sagittaria lancifolia* showed a similar pattern with flowering and fruiting occurring during the summer of 1992 and 1993 at Site 1 but restricted in 1992 to Site 3 (Figure 110). There was no reproductive activity for either of these two species at Site 2 in the western portion of the south cell of the marsh.

Control Plots

Three species were noted as having some reproductive activity in the control treatment plots (Appendix B3). *Typha latifolia*, which was the most active, will be discussed later in a section designated to this species. *Hydrocotyle ranunculoides* showed no activity in any of the control plots until August 1993 when flowering and immature fruit phenology indices reached 0.17 and 0.08, respectively (Figure 111). In March 1994 the mean flowering phenological index for this species was 0.25 at all three sites. Seasonality, lag time or distance trends could not be identified due to limited data for this species. *Polygonum punctatum*, the third species with some activity within the control treatment plots, flowered in January 1992 at Site 2 and was both flowering and bearing immature fruit in August 1993 at Site 3 (Figure 111). No other instances of

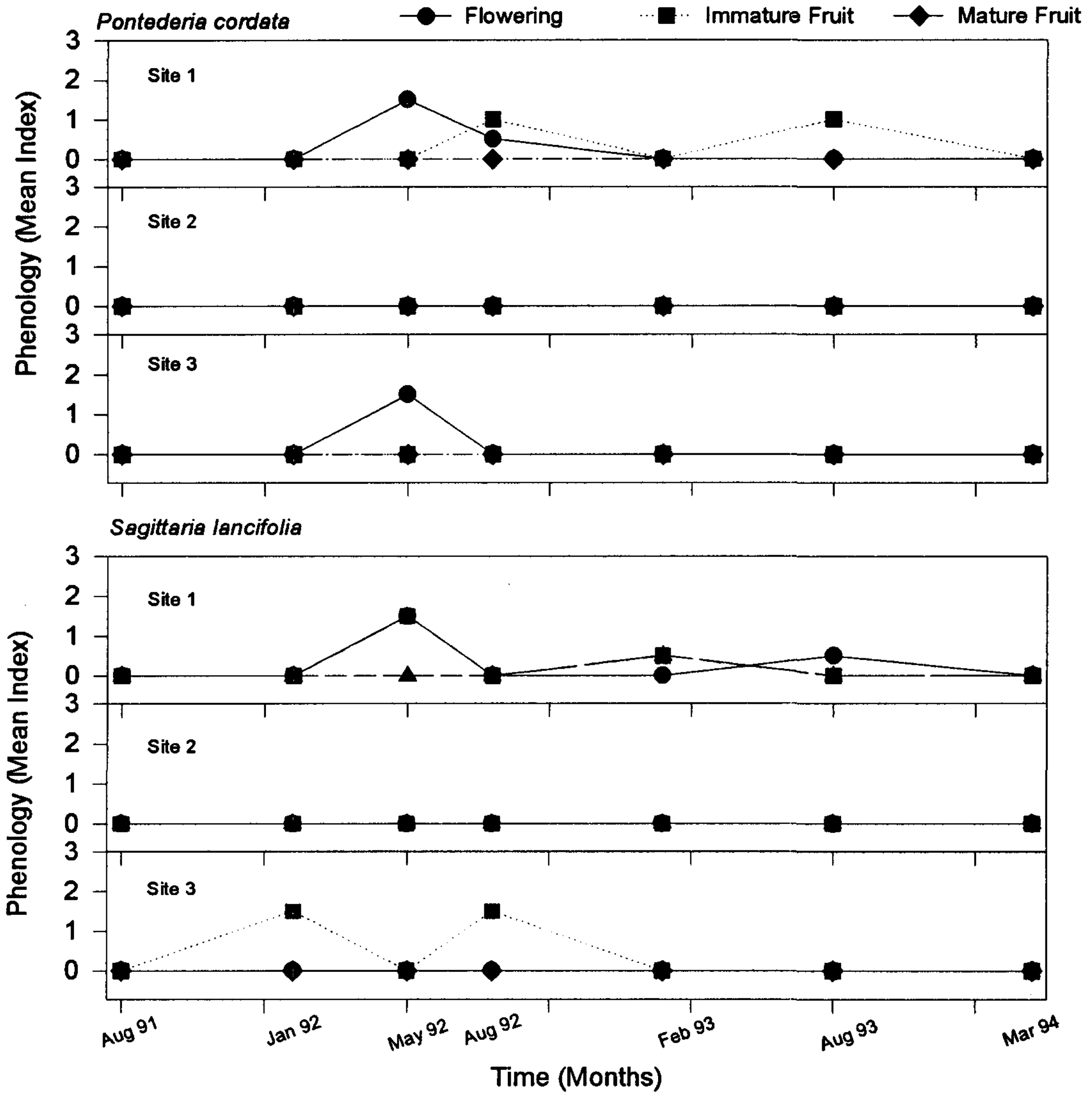


Figure 110. Phenology of *Pontederia cordata* (Top graph) and *Sagittaria lancifolia* (Bottom graph) from Seed Plots, Experimental Planting Sites.

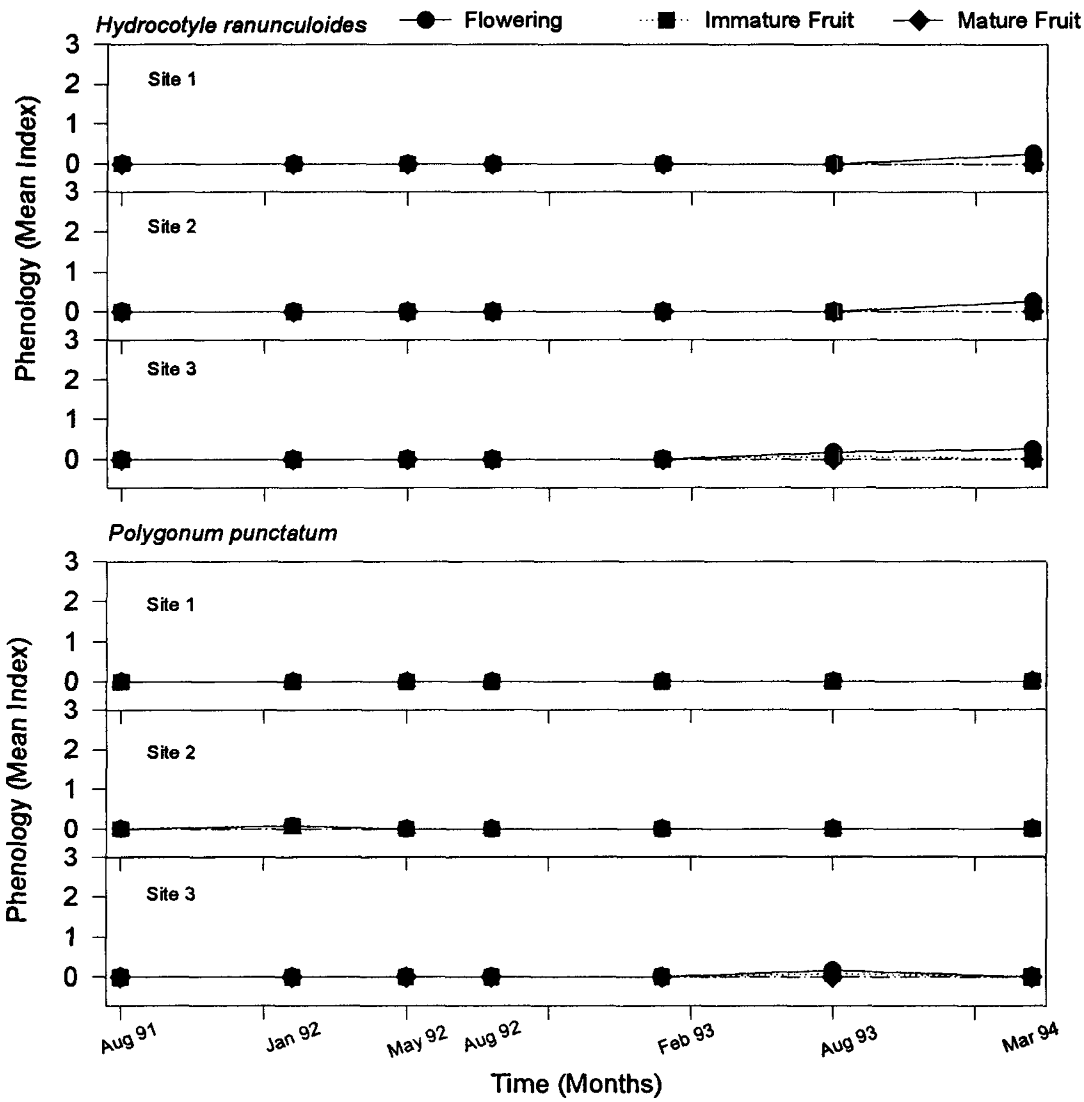


Figure 111. Phenology of *Hydrocotyle ranunculoides* (Top graph) and *Polygonum punctatum* (Bottom graph) from Control Plots, Experimental Planting Sites.

phenological activity were noted for this species.

Mulched Plots

Flowering phenology was the only reproductive phase noted for this treatment type and was identified in four species at all sites on three different sampling events (Appendix B3). *Sagittaria lancifolia* had an average flowering phenological index of 0.25 in August 1992 at Site 1. *Cyperus odoratus* was found at Sites 2 and 3 during the August 1993 sampling with mean flowering phenologic indices of 0.75 and 0.75 respectively. *Alternanthera philoxeroides* was identified in March 1994 at Site 3 with a flowering phenologic index of 0.75 along with *Hydrocotyle umbellata* at the same location and time with a phenologic index of 0.25. The only other species identified in this treatment with phenologic characteristics was *Typha latifolia*, which will be discussed in more detail later.

Natural Succession

Measurements of phenology on natural succession transects revealed that thirty-six species were found either flowering or with immature or mature fruit between November 1990 and March 1994. Most of these species were highly variable in their occurrence or phenology and resulted in mean phenological indices less then 0.01. For this reason these species will not be dealt with in more detail and the reader is referred to Appendix B4 for further information. *Pontederia cordata*, *Hydrocotyle ranunculoides* and *Typha latifolia* showed a more regular pattern of phenology. *Pontederia cordata* and *Hydrocotyle ranunculoides* will be discussed in this section. *Typha latifolia* will be discussed within its own section.

Pontederia cordata was found flowering on transects 1, 9 and 6 and with immature fruit on transects 1 and 6. In the south marsh mean phenologic indices for flowering and immature fruit were less then 0.065 (Figure 112). Flowering on transect 6 in the north marsh had phenologic indices up to 2.0 in June 1991 and 1.75 in March of 1994 (Figure 112). Seasonal trends and time lag information for reproductive stages were not identified for *Pontederia cordata* under natural succession due to its limited occurrence in the marsh.

Hydrocotyle ranunculoides showed a greater distribution of phenological activity than *P. cordata* and was found in all transects except transect 9 (Figure 113). Mean index values for all stages of phenology were less then 0.25 until March 1994, except for flowering on transect 4 in May 1992 and immature seed production in August 1992 which were both 1.0. Flowering phenological indices in March 1994 increased to 1.0 or greater for transects 1, 3, 6 and 8 and more than 0.5 for transects 2 and 4. Immature fruit phenology in March 1994 was measured at 0.5 on transect 4 and 8 and 0.25 on transect 2 and 6. Flowering activity appeared to be greatest during the summer months with no clear time lag of immature or mature fruiting being detected during the sampling period.

Typha latifolia

Typha latifolia in Natural Succession. The dominant species, as determined by biomass and cover, within the marsh after the first year of flooding was *Typha latifolia*. The phenology of this species therefore was well documented primarily in areas under

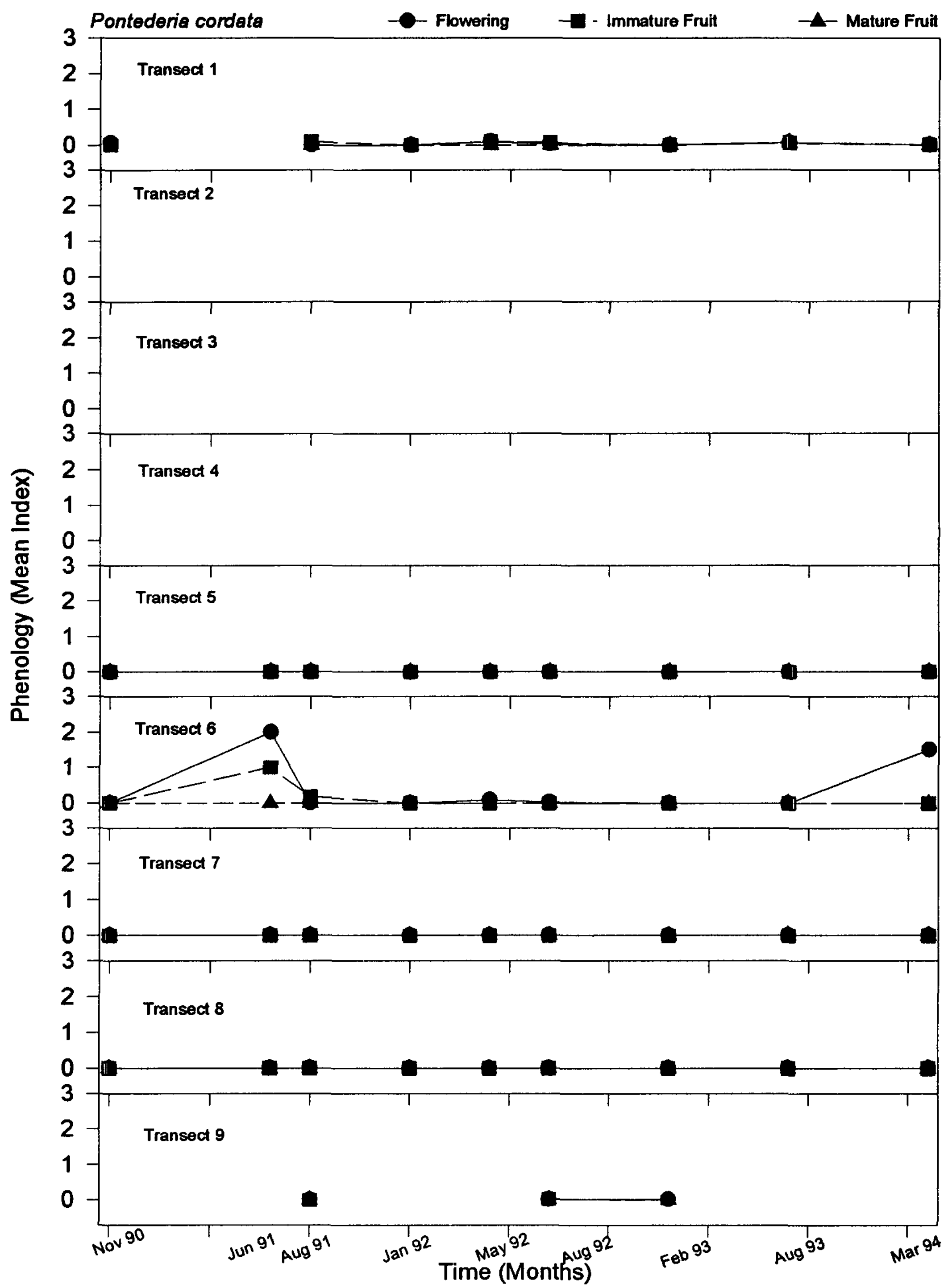


Figure 112. Phenology of *Pontederia cordata* from Natural Succession Transects.

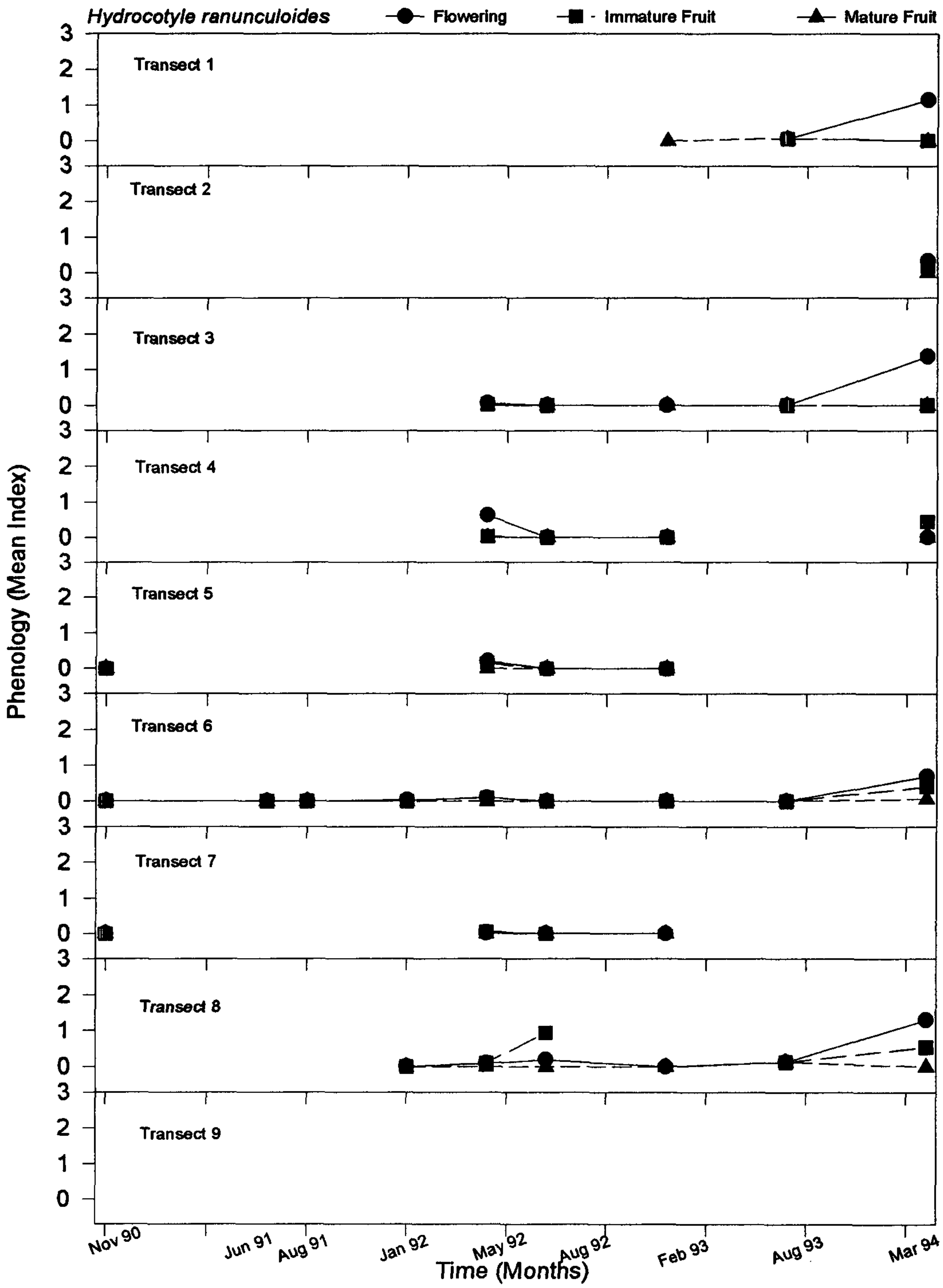


Figure 113. Phenology of *Hydrocotyle ranunculoides* from Natural Succession Transects.

natural succession, but also in areas which were initially planted or seeded with other species. In winter or early spring and had immature and mature fruit phenology during the summer sampling events (Figure 114). Time lags of mature fruit following immature fruit were evident especially in May and August 1992 samplings in the south marsh.

Although temporal changes in phenology of *T. latifolia* during the study period were not clear and were masked to some extent by spatial influences, it appeared that in the south marsh phenological indices stayed relatively constant. In the north marsh flowering and fruiting phenology increased during the second year after flooding. Spatially there is a trend in the eastern portion of the south marsh closest to the inflow where immature and mature fruit were greatest in June 1991 and decreased to only half of that level in May and August of the following year. In the west end of the south marsh all stages of phenology measured in August 1992 and February 1993 were equal or greater than those measured in August 1991 and January 1992. In the north marsh, transects 5, 7 and 8 showed increases in phenological activity in August 1992 and February 1993 from that of August 1991 and January 1992. Variability of *T. latifolia* phenology between nodes along the same transect and during a specific sampling event were high but tended to be lower then other species sampled in the natural succession areas of the marsh (Appendix B4).

Typha latifolia in Planted Treatments. The first observation of phenological activity of *T. latifolia* in the planted treatments was in May 1992. Three treatments planted with *Eleocharis interstincta* (Figure 115), *Pontederia cordata* (Figure 115) and *Sagittaria lancifolia* (Figure 115) showed signs of immature fruit, mature fruit and flowering

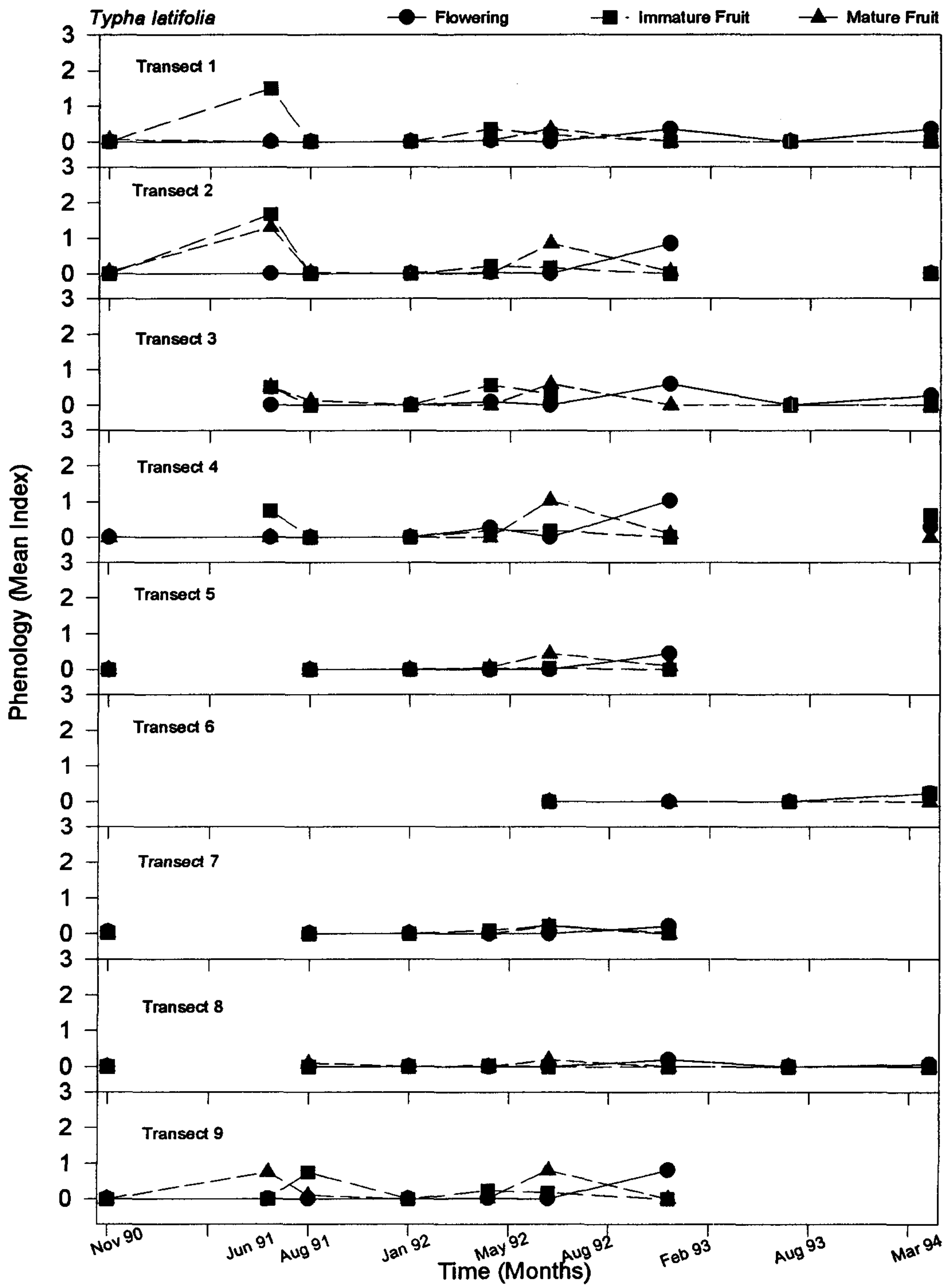


Figure 114. Phenology of *Typha latifolia* from Natural Succession Transects.

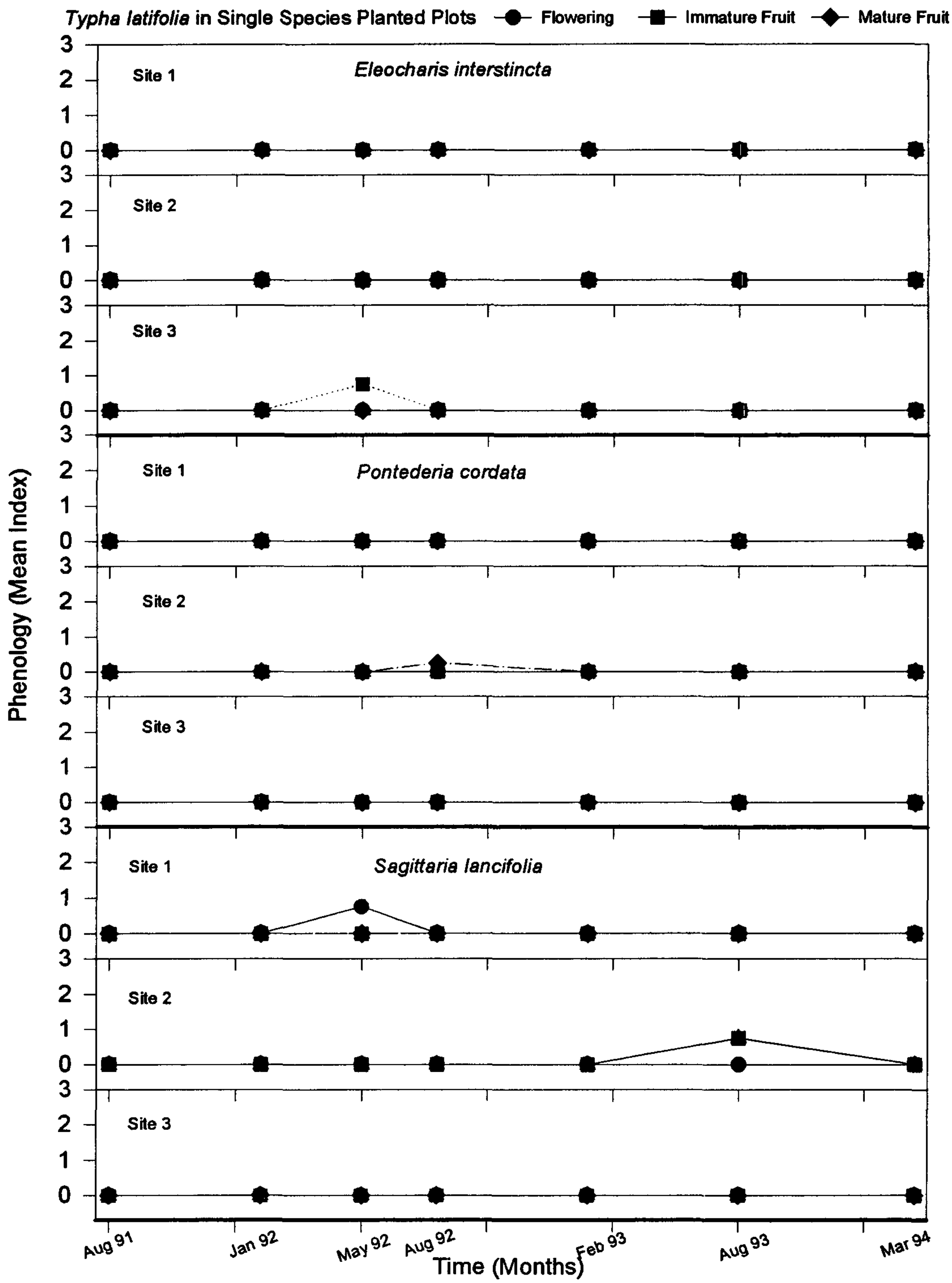


Figure 115. Phenology of *Typha latifolia* in *Eleocharis interstincta* (Top three graphs), *Pontederia cordata* (Middle three graphs), and *Sagittaria lancifolia* (Bottom three graphs) Planted Plots, Experimental Planting Sites.

phenology of *Typha latifolia*. No other phenology stage was noted in the *E. interstincta* planted treatments after this sampling date, but both *P. cordata* and *S. lancifolia* planted treatments had mature fruit and dead fruit phenology in the August 1993 at Sites 3 and 2, respectively. One additional flowering event of *T. latifolia* occurred in the *P. cordata* planted treatment in March 1994. Two other planted treatments had dead mature fruit phenology stages of *T. latifolia* in August 1993 at Sites 1, 2 and 3 for *P. hemitomon* (Figure 116) and Sites 2 and 3 for *S. validus* (Figure 116). *S. validus* also showed flowering phenology of *T. latifolia* in March 1994 at Site 3.

Typha latifolia in Seeded Treatments. Seeded treatments had the first occurrence of *T. latifolia* phenology in May 1992, and overall had a much greater level of cattail reproductive activity than did the planted treatments. Site 2 had the greatest phenology activity of cattail in all five of the seeded treatments. *Pontederia cordata* (Figure 117) and *Panicum hemitomon* (Figure 117) treatments showing some activity until March 1994 at Site 2 and only one other occurrence each of flowering and mature fruit phenology respectively at Site 1. The other three seeded species treatments, *Polygonum punctatum* (Figure 117), *Sagittaria lancifolia* (Figure 118) and *Scirpus validus* (Figure 118) showed lesser *Typha* activity at Site 2 than *P. cordata* and *P. hemitomon* treatments did and more activity at Site 1 (*S. lancifolia*) and Site 3 (*P. punctatum*). *Typha latifolia* flowering and immature fruit phenology in all five seeded treatments was only noted in May 1992 and all later sampling dates had mature or dead mature phenology.

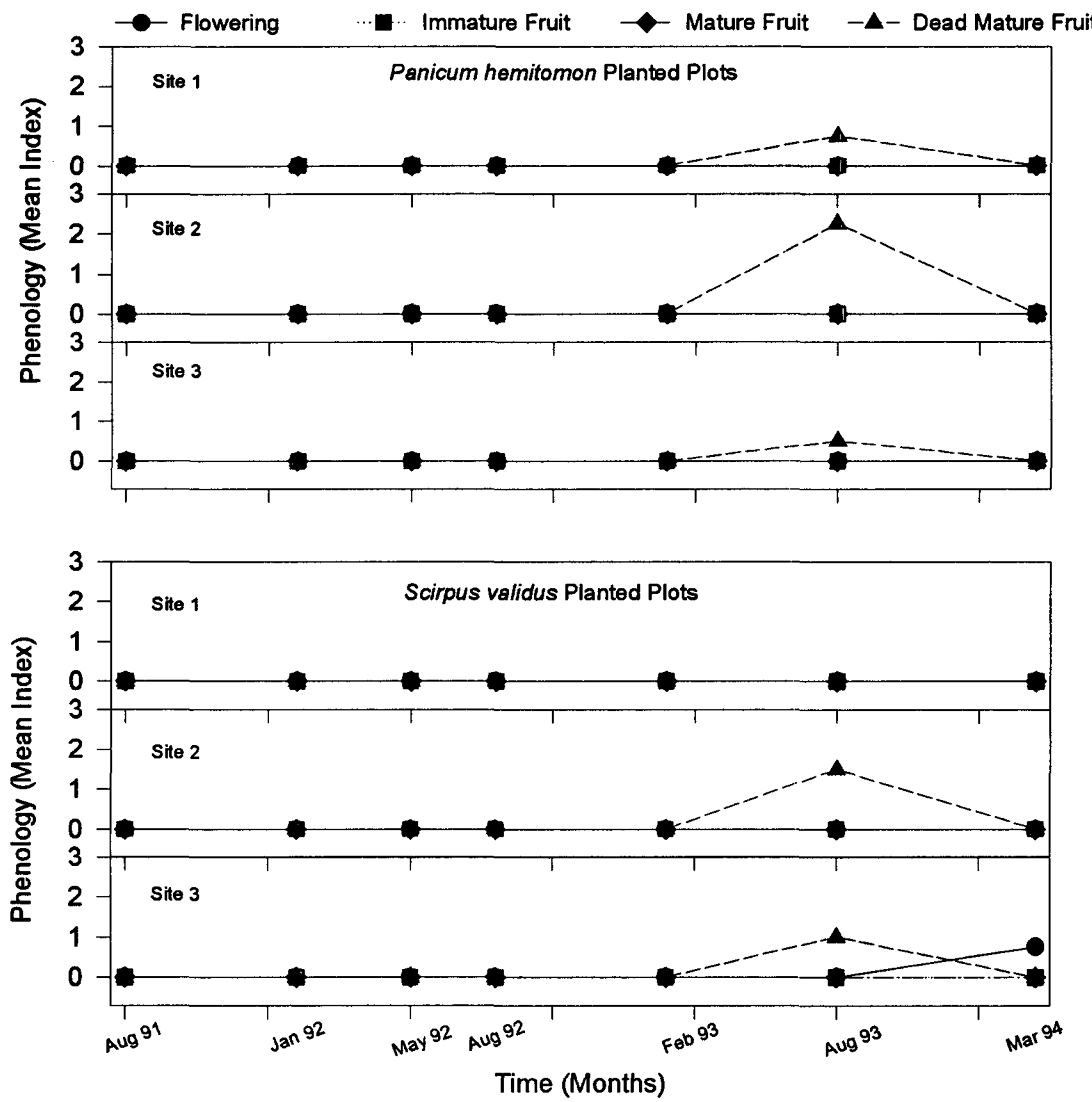


Figure 116. Phenology of *Typha latifolia* in *Panicum hemitomon* (Top three graphs) and *Scirpus validus* (Bottom three graphs) Planted Plots, Experimental Planting Sites.

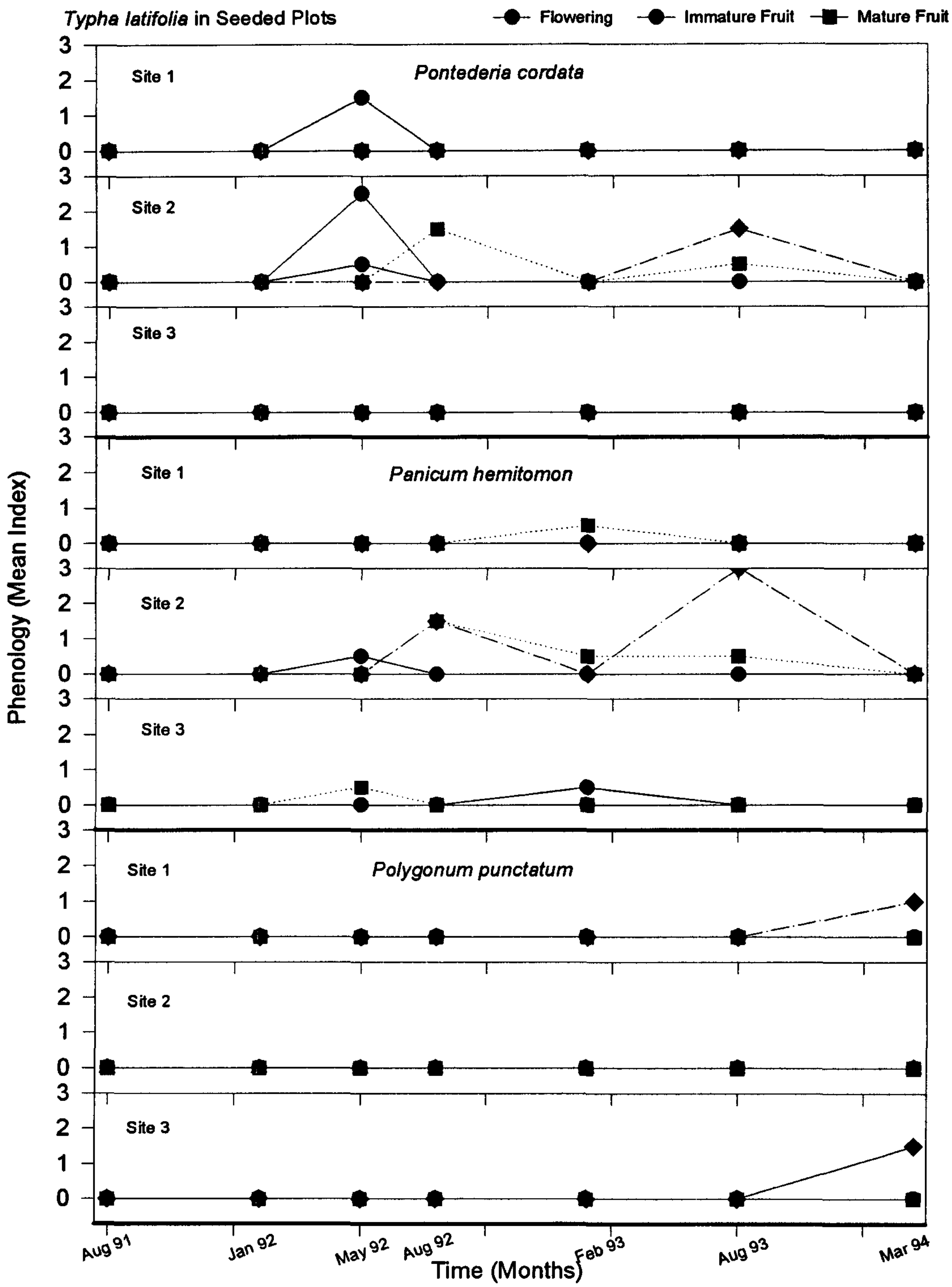


Figure 117. Phenology of *Typha latifolia* in *Pontederia cordata* (Top three graphs), *Panicum hemitomon* (Middle three graphs), and *Polygonum punctatum* (Bottom three graphs) Seeded Plots, Experimental Planting Sites.

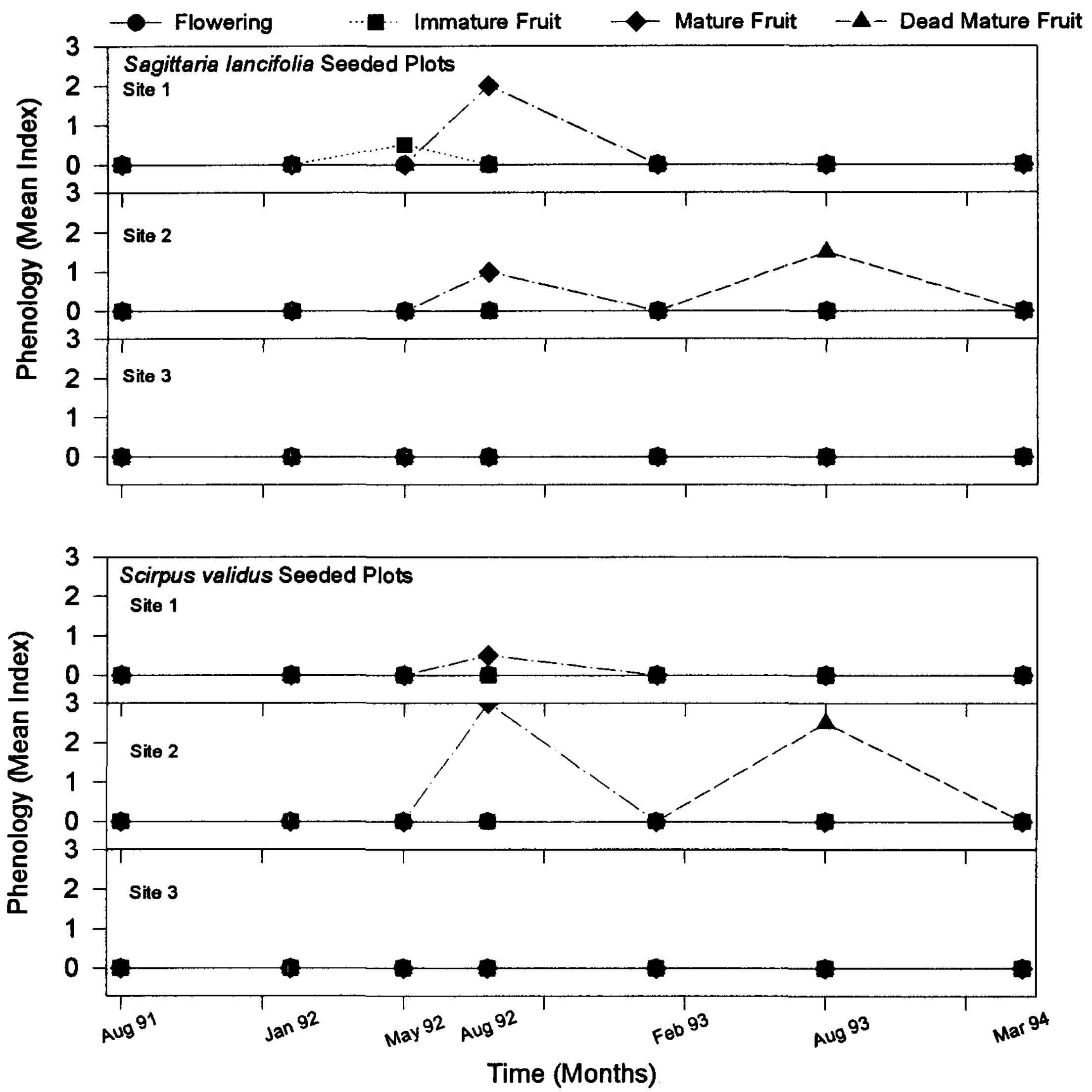


Figure 118. Phenology of *Typha latifolia* in *Sagittaria lancifolia* (Top three graphs) and *Scirpus validus* (Bottom three graphs) Seeded Plots, Experimental Planting Sites.

Typha latifolia in Mulched Treatment. The mulched treatment plots also showed this trend of flowering and immature fruit only May 1992 but this occurred at Site 1 and 3 and was followed by higher phenological index values of mature and dead mature fruit than those found in the control plots (Figure 119). Mulched treatments also had mature fruit of *T. latifolia* as early as January 1992 with equal index values in August 1992 and 1993.

Typha latifolia in Control Treatment. *Typha latifolia* phenology in the control treatment showed no activity at Site 1, but increasing activity after May 1992 at Sites 2 and 3 (Figure 119). Again only mature and dead mature phenology was noted after the August 1992 sampling event with both flowering and immature fruit occurring in May 1992.

CLONAL GROWTH

Clonal growth studies within the Apopka Marsh Flow-Way provided additional information toward understanding the early succession and colonization of species. Four target species, *Pontederia cordata*, *Sagittaria lancifolia*, *Scirpus validus* and *Typha latifolia*, were monitored between May 1992 and May 1993. All of these species have rhizomatous morphology and vegetative reproductive potential under inundated conditions. Experimental design and data collected in this study were organized under two criteria. The first featured the change in rhizome growth distance between the two sample times. The data were normalized to average daily growth rate of the four species

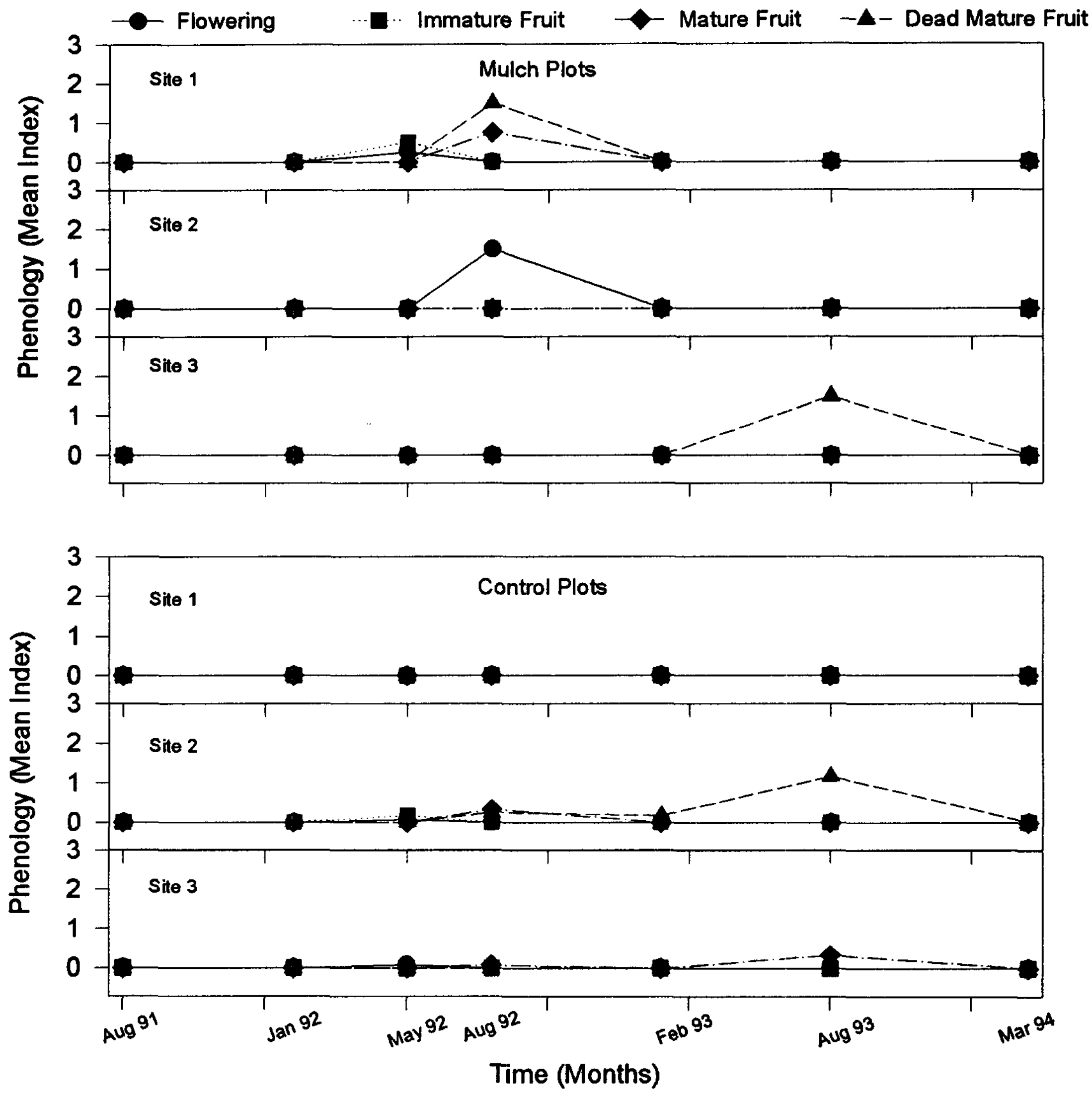


Figure 119. Phenology of *Typha latifolia* in Mulch (Top three graphs) and Control (Bottom three graphs) Plots, Experimental Planting Sites.

in an effort to estimate the vegetative growth potential of these species. The second criteria looked at the average distance to the nearest competitor to approximate competitive effects on the target species. In addition, possible effects of distance from the inlet on clonal growth rate and competitive interactions were analyzed.

Clonal Daily Growth

Average clonal growth rates ranged from 0.013 cm d^{-1} for *P. cordata* at 2800 meters from inlet (MFI), to 0.162 cm d^{-1} for *T. latifolia* at 490 MFI (Table 29). Growth rates were generally less then 0.1 cm d^{-1} with the exception of *T. latifolia*, which had growth rates of 0.162 cm d^{-1} and 0.149 cm d^{-1} measured at 490 and 1200 MFI, respectively. Of the four species studied, two species *T. latifolia* and *P. cordata*, showed decreased rates of growth with increasing distance from the inlet. The other two species, *S. lancifolia* and *S. validus*, showed highest growth rates at the 1200 meter distance (Figure 120).

Statistically significant differences ($p=0.0001$) were found between the four species when averaged over the whole marsh. Using Scheffe's multiple ranges test to isolate significant differences in growth rate means, *T. latifolia* had significantly ($\alpha=0.05$) greater daily growth rates than all three other species studied. *P. cordata*, *S. validus* and *S. lancifolia* showed no significant difference with other species except for *T. latifolia*.

Effects of distance from inlet as well as distance from nearest competitor were analyzed using Pearsons coefficient correlation test. Daily growth of *Pontederia cordata* was negatively correlated with distance from the inlet ($r=-0.420$). The relationship was

Table 29. Daily clonal growth rates (cm day^{-1}) of four species from Experimental Planting Sites.

	Sample Site Distance From Inlet					
	490 Meters		1200 Meters		2800 Meters	
	Mean	SE	Mean	SE	Mean	SE
Pontederia cordata	0.028	0.005	0.026	0.004	0.013	0.004
Sagittaria lancifolia	0.030	0.007	0.038	0.006	0.035	0.006
Scirpus validus	0.068	0.007	0.073	0.012	0.044	0.010
Typha latifolia	0.162	0.047	0.149	0.027	0.043	0.016

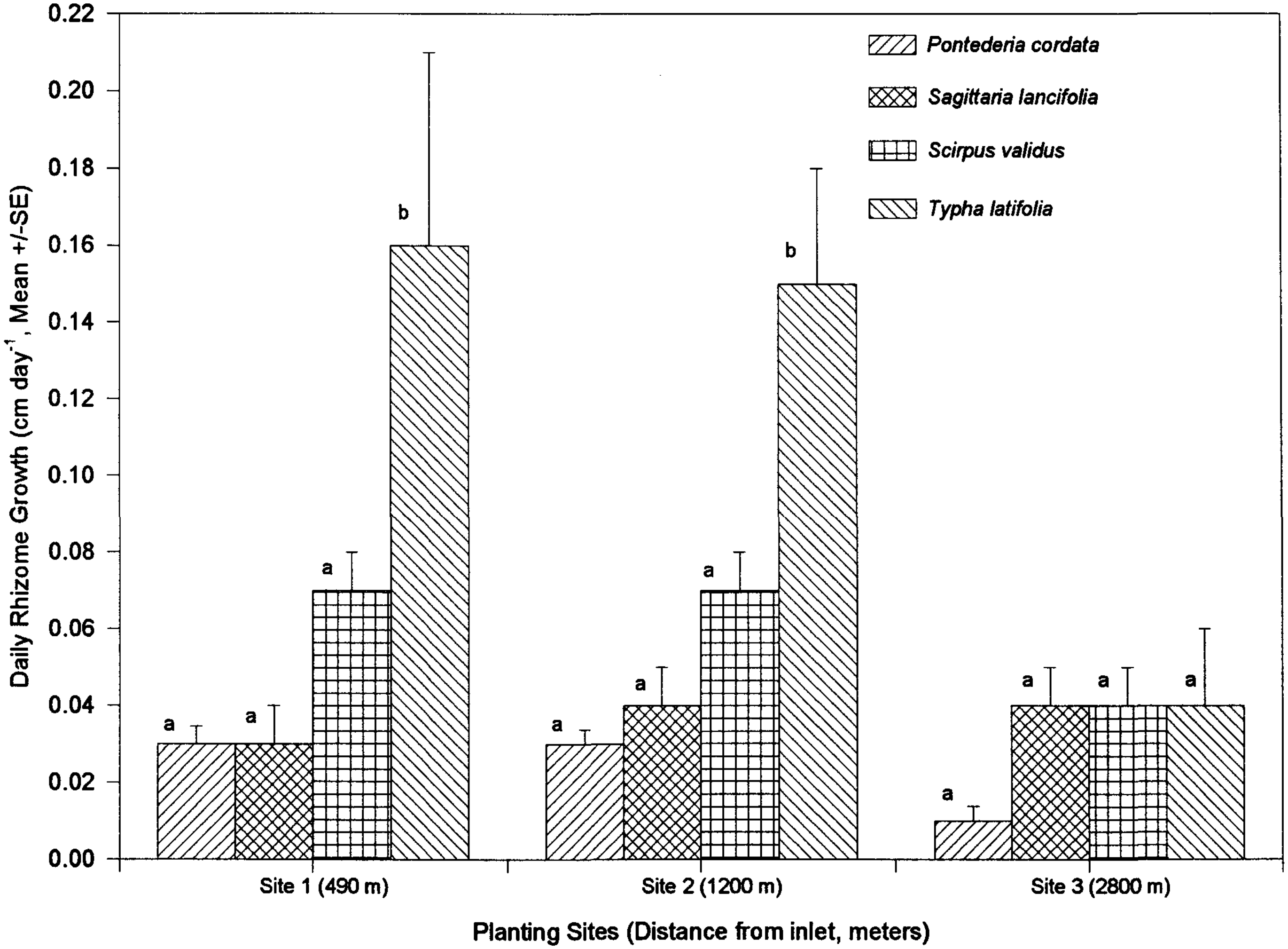


Figure 120. Daily rhizome growth rates (cm day^{-1}, Mean ±SE), Experimental Planting Site

also negative, but less certain with *Scirpus validus* (r=-0.26. p=0.18), and virtually non-existent for *Sagittaria lancifolia* and *Typha latifolia* (Table 30). Distance from nearest competitor showed statistically significant effects on daily growth of *P. cordata* (p=0.034) and *T. latifolia* (p=0.018). Correlations in the two other species were noted. (Table 31).

Competitor Effect on Daily Growth

A positive correlation was found between daily growth and change in distance to competitors for *P. cordata* (r=0.35, p=0.03). In contrast, negative correlations were found between daily growth and delta distance to competitor for *S. lancifolia* (r=-0.24, p=0.10), and *T. latifolia* (r=-0.49, p=0.018). Little or no relationship was found for *S. validus* (r=-0.12, p=0.53) (Table 30).

The values given for this sampling parameter represent the distance filled in by the clonal and competitor species during the one-year period between sampling dates. The greater the positive value the greater the filling in rate of combined clonal and competitor species. Negative values suggested death of the nearest competitor or growth away from the target species. The change in distance ranged from 7.38 cm to 45.31 cm occurring in *P. cordata* at 2800 MFI and 490 MFI, respectively (Table 31). Values for *S. lancifolia* and *S. validus* were typically between 10 and 20 cm. *T. latifolia* had values of 34.72 cm and 34.58 cm for sites 490 MFI and 1200 MFI respectively. High mortality of *T. latifolia* at site 2800 MFI confounded this analysis.

With data pooled by species, the change in distance to competition measure

Table 30. Pearson correlation analysis of daily clonal growth patterns of four species from Experimental Planting Sites. Table entries consist of correlation coefficient and ρ value in parentheses.

	Pontederia cordata		*Sagittaria lancifolia*		*Scirpus validus*		*Typha latifolia*	
	Daily Growth	Delta Distance	Daily Growth	Delta Distance	Daily Growth	Delta Distance	Daily Growth	Delta Distance
Site	-0.420 (0.010)	-0.776 (0.0001)	0.064 (0.669)	0.056 (0.709)	-0.257 (0.178)	-0.233 (0.220)	-0.055 (0.801)	-0.103 (0.988)
Daily Growth		0.349 (0.034)		-0.243 (0.100)		-0.120 (0.535)		-0.488 (0.018)

Table 31. Change in distance between Target species and nearest competitor (cm) of four species from Experimental Planting Sites. "." one surviving individual.

	Sample Site Distance From Inlet					
	490 Meters		1200 Meters		2800 Meters	
	Mean	SE	Mean	SE	Mean	SE
Pontederia cordata	45.31	5.264	18.33	4.844	7.38	2.130
Sagittaria lancifolia	11.31	5.105	21.44	6.660	16.73	7.989
Scirpus validus	18.08	1.834	10.45	3.015	11.23	5.020
Typha latifolia	34.73	6.294	34.58	7.041	.	.

differed for *T. latifolia*, *S. lancifolia* and *S. validus* (Scheffe's, a=0.05). No differences were found for *P. cordata* versus the other species. This same analysis when tested individually at each site indicated highest differences between species at the nearest site to the inflow, 490 meters, and no statistically significant differences at the farthest site measured, 2800 meters (Figure 121). With data pooled by site, sites 490 and 1200 were similar to each other yet both differed from site 2800 (Scheff's a=0.05).

Effects of distance from inflow on change in competitor distance were variable when analyzed using a Pearsons correlation test. *P. cordata* was the only species highly correlated with distance from inflow (p = 0.0001). All other species showed little or no statistically significant correlation (Table 30).

SEEDS

Waterborne Seed Trapping

Measurements of seed dispersal by water did not reveal differences in seed density (as represented by numbers of seed germinated) betweeen the upstream and downstream sides of the planted areas for any sample date (Table 32). No differences in seed density between sites were detected for the first three sample periods. Site 3 was greater than Site 1 in the fourth sample (Table 32). This difference may be attributed to four species, *Cyperus iria* (104.5 seedlings per upstream trap, 53.5 per downstream trap), *Ludwigia octovalvis* (32.3 seedlings per upstream trap, 7.8 seedlings per downstream trap), *Eupatorium capillifolium* (21 seedlings per upstream trap, 15 seedlings per

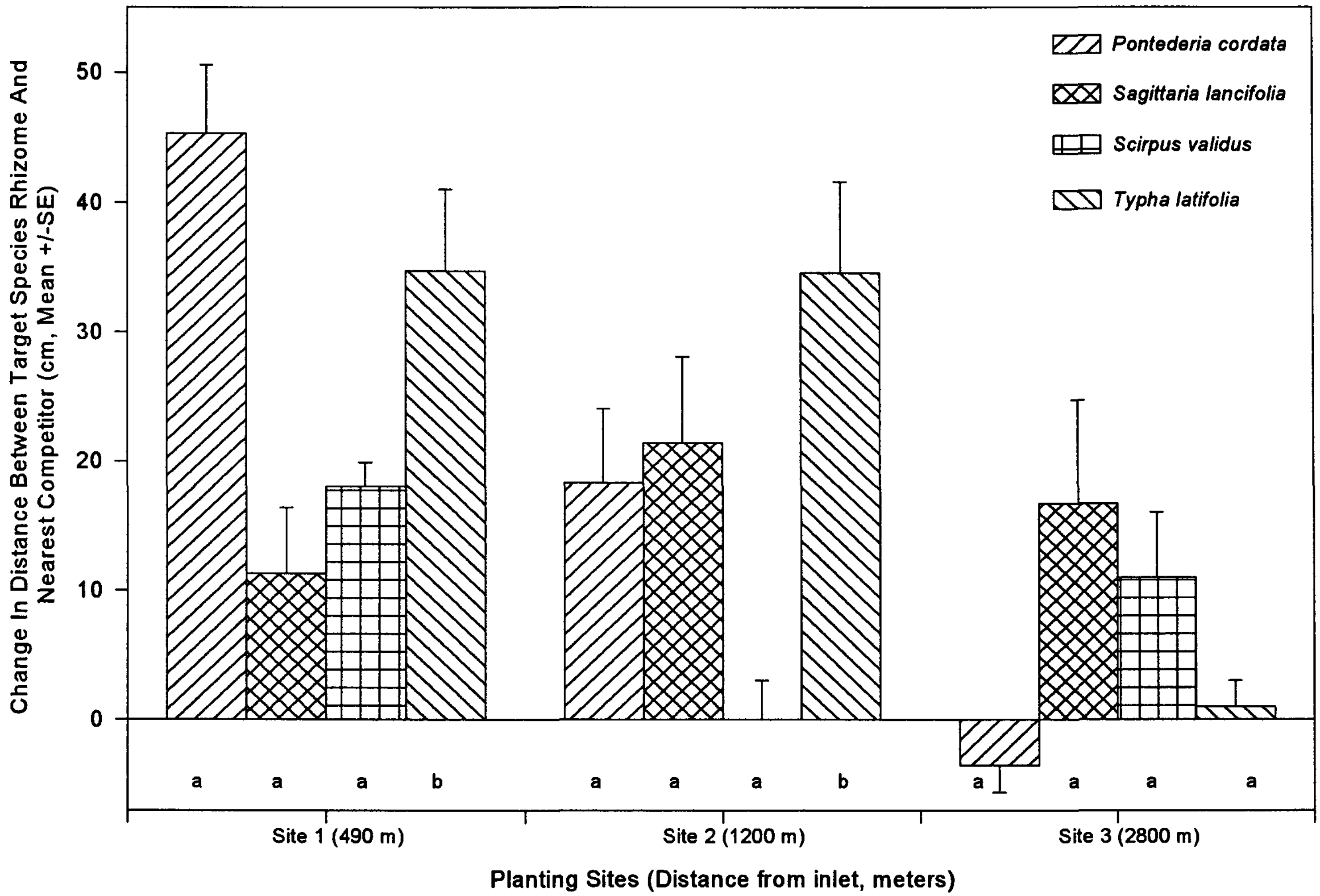


Figure 121. Change in distance between target species rhizome and nearest competitor (cm, Mean ±SE) by Species.

Table 32. Differences between waterborne seed traps by date from Experimental Planting Sites. Values reported as # $trap^{-1}$, Mean(Standard Error). Differences determined using T-Test.

Differences between Sites

Date	Site 1		Site 3		T-Value	p>|T|
S92-N92	46.7	(12.2)	56.6	(23.4)	-0.516	0.649
N92-D92	47.9	(11.9)	98.0	(31.7)	-1.482	0.182
D92-J93	41.6	(10.0)	58.6	(23.6)	-0.665	0.528
J93-M93	22.3	(4.8)	149.8	(31.7)	-3.979	0.005

Differences between Trap Positions

Date	Upstream		Downstream		T-Value	p>|T|
S92-N92	53.4	(16.5)	51.8	(18.6)	0.062	0.952
N92-D92	101.4	(30.7)	44.5	(12.1)	1.720	0.129
D92-J93	64.5	(21.6)	34.9	(13.0)	1.133	0.278
J93-M93	114.4	(40.1)	57.6	(18.7)	1.283	0.221

downstream trap), and *Ludwigia palustris* (10.8 seedlings per upstream trap, 4.3 seedlings per downstream trap) (Table 33).

Velocity of water flow through the seed traps is an important factor in determining the composition and density of seeds moving into the trap. Because we were unable to obtain reliable measurement of flow velocity, it was not possible to conduct a time series analysis. A flow measurement test conducted at Site 3 while water level was at 35 cm revealed that water flow was less than the detection limit of the flow-meter (1.5 cm s^{-1}). This low flow could be attributed to establishment of a dense mat of *Eichhornia crassipes* and *Hydrocotyle ranunculoides* in the northern planted area (Site 3). The development of flow-restricting vegetation and the system shutdown of spring 1993 (weir repair) made a time series analysis unreliable.

The species composition identified with seed traps was similar to that of the seed bank study. Species tended to be annual and ruderal in life history type (Table 33). Spearmans Rank Correlation analysis revealed that species composition was related between the upstream and downstream traps for samples 1, 2, and 4 (Table 34). The relationships tended to be weak, but statistically significant ($p<0.10$). The seed traps provided no evidence for movement of seeds from planted species out of the planted area. In contrast to the results of trap measurements, *Scirpus validus* was observed growing near the upstream edge of the southeastern planted area (Stenberg, Pers. Obs.). It could only have come from the planted area because it was not present on the site before planting. Also, *Thalia geniculata* expanded its range from the original planted sites. Dissimilarities in species richness were small for both sites and all dates (Table 35).

Table 33. Summary of seedling densities from waterborne seed traps by date and site. Densities reported as # $trap^{-1}$,(Mean ±Standard Error).

	Site 1				Site 3			
	Upstream		Downstream		Upstream		Downstream	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Sep92-Nov92								
AMAAUS	10.33	2.96	5.33	3.18	.	.	.	.
AMMCOC	.	.	.	.	.	.	0.33	0.33
BACHAL	.	.	0.33	0.33	.	.	.	.
CARPEN	.	.	.	.	.	.	2.00	1.00
CARSPP	.	.	.	.	.	.	1.00	1.00
CYPBRE	.	.	.	.	1.00	1.00	1.00	0.58
CYPIRI	1.00	1.00	9.67	9.17	.	.	1.33	1.33
CYPODO	12.33	7.54	3.67	1.86	1.00	1.00	1.33	1.33
CYPSPP	.	.	.	.	.	.	0.33	0.33
CYPSPP1	.	.	.	.	.	.	1.00	1.00
CYPSPP2	.	.	.	.	.	.	2.33	2.33
ECHCRU	.	.	0.33	0.33	.	.	.	.
ECLALB	2.00	2.00	0.33	0.33	3.00	3.00	7.33	3.28
EUPCAP	3.33	1.76	1.33	0.88	7.00	7.00	37.33	21.09
GALTIN	.	.	.	.	2.00	2.00	1.33	0.67
HYDRAN	.	.	.	.	6.00	6.00	2.33	1.45
JUNMAR	0.33	0.33	.	.	0.50	0.50	0.67	0.33
LINANA	3.33	2.85	0.33	0.33	.	.	0.67	0.67
LUDDEC	0.33	0.33	.	.	.	.	.	.
LUDLEP	.	.	1.33	1.33	.	.	.	.
LUDOCT	1.33	0.88	.	.	2.50	2.50	0.33	0.33
LUDPAL	.	.	0.33	0.33	1.50	0.50	4.67	2.40
LUDPER	.	.	0.33	0.33	2.00	2.00	0.33	0.33
LUDSPP	0.67	0.67	.	.	.	.	.	.
OXACOR	0.67	0.33	.	.	.	.	.	.
PANDIC	0.67	0.33	.	.	.	.	.	.
POLPUN	7.33	5.36	1.00	1.00	0.50	0.50	3.00	3.00
TYPSPP	16.67	0.67	7.00	7.00	13.50	13.50	3.00	1.15
udicot	1.67	0.88	.	.	.	.	0.67	0.67
Nov92-Dec92								
ALTPHI	.	.	.	.	0.25	0.25	.	.
AMAAUS	3.00	1.58	1.00	0.71	1.25	0.63	0.75	0.25
AMMCOC	.	.	0.25	0.25	0.25	0.25	0.25	0.25
BACHAL	0.25	0.25	.	.	0.75	0.48	0.50	0.50
CARALB	.	.	.	.	0.75	0.25	0.25	0.25
CARPEN	.	.	0.50	0.50	0.75	0.25	0.25	0.25
CYPBRE	.	.	.	.	.	.	0.50	0.29
CYPHAS	.	.	1.00	0.58	1.25	0.95	0.25	0.25
CYPIRI	0.75	0.48	6.50	3.75	13.25	8.93	0.50	0.50
CYPODO	5.75	3.01	5.50	3.23	7.50	3.97	3.25	1.65
CYPSPP	1.00	1.00	0.75	0.75	3.00	3.00	3.00	3.00
DIGSER	.	.	.	.	0.50	0.29	.	.
ECLALB	1.00	0.41	12.00	10.37	23.00	8.34	7.00	4.76
ELEVIV	.	.	.	.	0.50	0.50	.	.
EUPCAP	0.25	0.25	6.00	3.24	60.00	24.69	2.25	1.93
EUPSPP	.	.	.	.	0.25	0.25	.	.
GALTIN	.	.	0.50	0.50	2.50	0.65	0.25	0.25
HYDRAN	.	.	0.25	0.25	4.25	2.98	.	.

Table 33. Summary of seedling densities (Cont.)

Species	Site 1 Upstream Mean	SE	Downstream Mean	SE	Site 3 Upstream Mean	SE	Downstream Mean	SE
HYDSPP	.	.	.	.	0.25	0.25	.	.
JUNEFF	.	.	.	.	0.25	0.25	.	.
JUNMAR	.	.	.	.	0.25	0.25	.	.
LINANA	10.50	4.94	0.25	0.25	0.75	0.48	0.25	0.25
LUDDEC	1.00	1.00	.	.	.	.	.	.
LUDOCT	.	.	.	.	5.00	3.54	0.25	0.25
LUDPAL	0.25	0.25	0.25	0.25	10.75	7.11	.	.
LUDPER	4.50	2.06	1.00	0.58	2.25	2.25	0.25	0.25
LUDSPP	.	.	0.75	0.75	.	.	0.75	0.75
MIKSCA	.	.	.	.	0.25	0.25	.	.
OXACOR	0.25	0.25	0.75	0.75	.	.	0.75	0.75
PANDIC	0.25	0.25	0.25	0.25	2.75	1.60	.	.
POLPUN	4.25	2.66	0.75	0.75	2.00	1.35	0.50	0.29
TYPSPP	7.25	1.89	17.25	8.26	18.00	4.12	11.50	4.57
udicot	.	.	.	.	.	.	0.25	0.25
Dec92-Jan93								
ALTPHI	0.75	0.48	.	.	.	.	.	.
AMAAUS	5.75	2.78	1.33	0.88	1.00	1.00	.	.
AMMCOC	.	.	.	.	.	.	0.25	0.25
CARALB	0.25	0.25	.	.	.	.	.	.
CYPHAS	0.25	0.25	.	.	.	.	.	.
CYPIRI	1.25	1.25	0.33	0.33	.	.	.	.
CYPODO	6.75	2.87	6.33	4.37	4.25	2.66	4.75	2.50
CYPSPP	.	.	.	.	4.50	3.86	0.75	0.75
DIGSER	.	.	.	.	1.00	0.58	.	.
ECLALB	.	.	1.67	1.20	11.00	4.02	4.75	3.09
ELEIND	.	.	.	.	0.25	0.25	0.25	0.25
EUPCAP	0.25	0.25	.	.	20.50	14.67	15.25	9.08
HYDRAN	.	.	1.00	0.58	4.50	3.20	0.50	0.29
JUNMAR	.	.	.	.	0.25	0.25	.	.
LINANA	2.25	1.93	0.33	0.33	.	.	.	.
LUDOCT	0.50	0.50	0.33	0.33	.	.	.	.
LUDPAL	.	.	.	.	0.50	0.50	1.50	1.50
LUDPER	9.00	2.48	13.33	9.06	6.50	3.77	2.00	0.71
LUDSPP	.	.	.	.	1.75	1.75	.	.
MIKSCA	.	.	.	.	0.50	0.50	0.50	0.50
PANDIC	0.25	0.25	.	.	.	.	1.25	0.48
POLPUN	3.25	2.93	.	.	.	.	.	.
TYPSPP	20.00	6.10	5.00	3.61	21.75	15.46	7.00	3.19
udicot	.	.	.	.	0.25	0.25	.	.
Jan93-May93								
AMAAUS	9.25	3.94	4.25	1.44	0.75	0.48	0.25	0.25
AMMCOC	.	.	.	.	5.75	3.52	2.75	1.70
CARPEN	.	.	.	.	0.25	0.25	0.50	0.50
CYPBRE	.	.	0.25	0.25	2.00	1.22	3.00	2.12
CYPIRI	0.50	0.29	0.75	0.48	104.50	45.55	53.50	13.54
CYPODO	7.25	0.95	2.50	1.32	1.50	0.87	2.50	1.04
CYPSPP	.	.	0.50	0.50	.	.	.	.
CYPSUR	.	.	.	.	.	.	0.50	0.29
DIGSER	0.25	0.25	.	.	1.00	0.41	.	.

Table 33. Summary of seedling densities (Cont.)

Species	Site 1 Upstream Mean	SE	Downstream Mean	SE	Site 3 Upstream Mean	SE	Downstream Mean	SE
Diodia?	0.25	0.25	.	.	0.25	0.25	0.25	0.25
ECHCOL	.	.	.	.	.	.	0.75	0.48
ECLALB	0.50	0.29	0.25	0.25	5.75	2.50	2.75	1.11
ELEIND	.	.	.	.	2.25	0.75	0.75	0.25
EUPCAP	0.50	0.50	.	.	21.00	10.90	15.00	4.51
FIMAUT	.	.	.	.	.	.	0.25	0.25
GALTIN	.	.	.	.	0.25	0.25	.	.
HYDRAN	.	.	.	.	0.25	0.25	.	.
LINANA	0.50	0.50	.	.	.	.	0.50	0.50
LUDLEP	4.50	1.85	0.75	0.48	3.25	0.85	4.50	2.90
LUDOCT	4.00	3.67	0.75	0.75	32.25	6.66	7.75	4.87
LUDPAL	.	.	.	.	10.75	8.09	4.25	1.60
LUDPER	.	.	0.50	0.50	0.25	0.25	0.25	0.25
MIKSCA	.	.	.	.	.	.	0.25	0.25
PANDIC	.	.	0.25	0.25	0.75	0.48	0.25	0.25
PASDIC	.	.	.	.	1.25	0.75	0.25	0.25
POLPUN	0.50	0.50	.	.	0.25	0.25	.	.
ROTRAM	.	.	0.50	0.50	0.25	0.25	0.25	0.25
TYPSPP	5.00	4.67	0.25	0.25	1.25	0.95	2.75	2.75

Table 34. Spearman Rank Correlation analysis comparing species composition of Upstream vs Downstream seed traps by date.

Date	Corr. Coef.	p>|R|
S92-N92	-0.473	0.0005
N92-D92	-0.191	0.0334
D92-J93	0.044	0.7169
J93-M93	0.224	0.0232

Table 35. Species richness from water borne seed traps.

Date	Site 1		Site 3	
	Upstream	Downstream	Upstream	Downstream
S92-N92	15	13	12	20
N92-D92	15	19	28	21
D92-J93	13	9	15	12
J93-M93	11	12	22	23

Airborne Seed Trapping

Differences in trapped seed densities between sites were detected from the second and third samples (Table 36). No statistical differences in trapped seed densities were detected for the upstream versus downstream position (Table 36). Species composition of trapped seeds was almost exclusively made up of *Typha* spp. It was not possible to determine the relative proportion of *T. domingensis* and *T. latifolia* seeds, so they were lumped under *Typha* spp. The lone exception to sample dominance by *Typha* spp. seeds was the trapping of a single seed of *Andropogon* spp. in the N92-D92 sample at Site 1 in the downstream trap (Table 36).

Seed Germination

Seed germination rates were lower than expected (Table 37). Results are reported as minimum and maximum values to provide information about the range of values observed in this experiment. The experiment was conducted in a growth chamber at the Center For Wetlands. The growth chamber was chosen because it provided an environment with lower daily maximum temperatures and allowed for a consistent daily light/dark cycle. As will be seen by comparison with published data these experiments seem to have underestimated seed germination rates. The flooded treatment (1 cm depth) provided the best germination conditions, with more germination events and greater germination rates. These results will be compared with similar published studies in the Discussion section.

Table 36. Differences between airborne seed traps by date. Values reported as # 0.5 m^{-2} Mean(Standard Error). Differences determined using T-Test. Except for one seed of *Andropogon* spp. found in the Date=N92-D92, Site=1, Downstream trap, only *Typha* spp. seeds were found in traps.

Differences between Sites

Date	Site 1		Site 3		T-Value	p>|T|
S92-N92	29.0	(21.7)	23.0	(15.2)	0.211	0.837
N92-D92	65.3	(16.0)	24.8	(4.2)	2.447	0.045
D92-J93	0.2	(0.5)	4.3	(2.0)	-2.026	0.082
J93-M93	0.6	(0.6)	0.1	(0.1)	0.775	0.479

Differences between Trap Positions

Date	Upstream		Downstream		T-Value	p>|T|
S92-N92	33.1	(24.6)	19.7	(13.3)	0.480	0.640
N92-D92	44.1	(15.8)	43.3	(14.0)	0.047	0.964
D92-J93	3.3	(2.4)	2.1	(1.5)	0.433	0.673
J93-M93	0.6	(0.4)	0.0	(0.0)	1.227	0.246

Table 37. Results of seed germination experiment. Reported as percent germination.

SPECIES	TREATMENTS	
	MOIST	FLOOD
Cyperus haspan	0	52
Cyperus odoratus	3	3
Echinochloa crusgalli	0	13
Eleocharis interstincta	0	0
Juncus effusus	0	0
Juncus marginatus	0	0
Pontederia cordata	0- 3	0- 2
Rumex crispus	0-33	0-37
Sagittaria lancifolia	0-17	0-25
Scirpus validus	0	0
Typha latifolia	0	0

Seed Bank

Overview. Seed bank species richness varied from 24 to 52 for all sites and samples (Table 38). The flora may be characterized as annual or biennial (47%), generalist (84%), species common to disturbed sites (56%) with dominance by grasses, graminoids, and herbs (95%). See Table 39 for a summary of seed bank species composition and seedling densities. Most species found in the seed bank have been reported to be <1.5 m tall at maturity (Godfrey and Wooten 1981a, b).

Comparison of Seed Bank Treatments. Mean seedling densities differed between field-greenhouse treatment combinations ($F=9.65$, $p=0.0001$, $n=12$). Seedling count data were $\log_{10}$ transformed prior to analysis to correct a lack of independence of the mean and variance (Sokal and Rohlf 1981). The untransformed mean seedling densities are reported. Three seedling density patterns were detected (Figure 122). These seedling density patterns were related to dates of soil collection, greenhouse treatments (moist vs. flooded) and field treatments.

Seedling densities measured from the November 1991 soil sample seemed to decline according to the following pattern: Natural Succession Transects > Mulch > Control (Figure 122). This pattern was not statistically significant (SNK Multiple Ranges Test, =0.1). In contrast, under moist soil conditions seedlings from the November 1992 sample seemed to follow a pattern of Natural Succession ≅ Mulch > Control. This pattern was statistically significant (SNK Multiple Ranges Test, $\alpha=0.1$).

Table 38. Number of species from seed bank and above-ground vegetation measurements. Data consolidated for simplicity.Field Treatment (FLD) Codes: NS=Natural Succession, MUL=Mulch Site, and CON=Control Site. Greenhouse Treatment Codes (GRNHS): FL=Flooded Soil, MO=Moist Soil.

	SEED BANK GRNHS					ABOVE-GROUND VEGETATION SAMPLE DATES						
FLD	1991		1992									
	FL	MO	FL	MO	%CHG	NOV90	AUG91	JAN92	MAY92	AUG92	FEB93	AUG93
NS	50	51	32	51	+59	32	38	30	--	27	20	25
MUL	45	41	24	39	+63	--	--	14	15	12	15	25
CON	46	52	29	37	+28	--	--	18	15	14	16	32

Table 39. Summary of seed bank density by species (# sample^{-1}). First column codes represent species abbreviations. Full species names with abbreviations can be found in Table 6. Column header codes use the following convention: sample sites (first two characters), dates (second two characters) and data type (last character). Site characters are: C1-C3=Control Sites 1 and 3; M1-M3=Mulch Sites 1 and 3; and T1-T8=Transects 1-8. Date characters are: N91=November 1991 and N92=November 1992. Data type characters are: F=Flooded greenhouse treatment; M=Moist greenhouse treatment; and V=Vegetation cover.

SEEDBANK									SEEDBANK							
	NOV1991								NOV1991							
	TRANSECT - MOIST				MULCH -	MOIST	CONTROL-MOIST		TRANSECT-FLOOD				MULCH-FLOOD		CONTROL-FLOOD	
SPP	T1N91MO	T3N91MO	T6N91MO	T7N91MO	M1N91MO	M3N91MO	C1N91MO	C3N91MO	T1N91FL	T3N91FL	T6N91FL	T7N91FL	M1N91FL	M3N91FL	C1N91FL	C3N91FL
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
AMAAUS	3.50	12.50	0.00	1.00	42.00	1.00	8.67	1.00	2.50	16.00	1.00	1.00	54.00	0.00	4.88	1.00
AMASPP	0.00	0.00	0.00	0.00	244.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMMCOC	1.00	0.00	1.00	30.00	0.00	5.67	4.00	14.86	4.67	0.00	3.00	15.00	0.00	24.25	9.33	53.38
ANDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
APILEP	19.00	1.00	0.00	0.00	1.00	0.00	18.80	0.00	0.00	2.00	0.00	0.00	0.00	0.00	6.00	0.00
ASTELL	2.00	4.00	2.00	0.00	0.00	45.00	1.00	1.00	1.00	3.00	0.00	0.00	0.00	0.00	1.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AZOCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACINN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARALB	1.00	0.00	0.00	4.00	0.00	0.00	0.00	3.67	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.33
CARPEN	3.00	3.00	7.67	4.00	6.00	0.00	4.50	3.88	6.00	0.00	1.00	0.00	2.00	3.00	5.20	5.20
CARSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
CASOBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CICMEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
CYPBRE	0.00	0.00	2.00	2.00	1.00	4.00	0.00	4.00	0.00	0.00	0.00	1.00	1.00	5.50	0.00	0.00
CYPCOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
CYPERAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPESC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00
CYPHAS	0.00	0.00	9.00	0.00	0.00	7.00	1.33	4.00	1.50	12.00	7.00	0.00	16.50	2.00	7.33	6.67
CYPIRI	38.00	7.00	48.50	14.00	10.75	23.00	14.17	22.00	48.33	17.50	45.75	17.25	22.25	19.25	37.43	18.63
CYPODO	24.67	17.50	5.50	12.33	63.25	4.67	37.63	12.33	1.50	15.50	5.50	9.00	12.00	3.75	25.75	10.00
CYPSPP	15.00	16.33	1.00	14.50	60.00	38.00	36.14	7.25	18.67	10.00	14.00	4.00	40.50	10.25	47.40	3.40
CYPSUR	0.00	0.00	0.00	0.00	1.00	1.00	1.67	1.00	0.00	0.00	0.00	1.00	0.00	2.00	3.67	4.33
DIGSER	8.00	23.25	16.25	22.33	2.67	4.00	2.50	3.50	8.00	2.33	3.00	10.00	2.00	6.00	7.00	1.33
ECHCOL	4.00	2.00	1.00	8.00	0.00	0.00	1.00	0.00	8.00	25.50	1.00	0.00	1.00	3.00	1.50	2.00
ECHCRU	0.00	0.00	0.00	0.00	4.00	0.00	1.00	1.00	0.00	0.00	18.00	0.00	0.00	0.00	0.00	1.00
ECHSPP1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 39. Summary of seed bank density by species (continued).

SPP	SEEDBANK NOV1991 TRANSECT - MOIST T1N91MO	T3N91MO	T6N91MO	T7N91MO	MULCH - MOIST M1N91MO	M3N91MO	CONTROL-MOIST C1N91MO	C3N91MO	SEEDBANK NOV1991 TRANSECT-FLOOD T1N91FL	T3N91FL	T6N91FL	T7N91FL	MULCH-FLOOD M1N91FL	M3N91FL	CONTROL-FLOOD C1N91FL	C3N91FL
ECHSPP2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	63.50	41.50	25.75	16.25	62.00	15.25	52.00	8.14	33.50	28.25	20.25	13.33	43.00	13.00	36.38	4.20
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEFLA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
ELEIND	25.67	18.25	8.75	4.00	10.50	9.00	10.88	6.25	45.50	14.67	1.00	1.00	11.33	9.67	4.67	3.80
ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	2.00	0.00	15.00	0.00	3.00	5.75	0.00	0.00	0.00	0.00	39.00	0.00	8.33	3.00	4.00	10.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	106.50	16.50	209.00	166.75	72.75	118.25	80.38	82.00	101.00	8.50	88.00	23.25	40.00	93.50	40.63	55.14
EUPSER	3.00	1.00	0.00	0.00	11.50	0.00	6.80	2.00	0.00	0.00	2.00	1.00	7.00	0.00	11.50	1.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIMAUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	113.00	3.50	18.00	1.50	1.00	5.50	8.00	6.83	27.00	4.00	1.50	0.00	0.00	9.00	2.00	2.00
HEDUNI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00
HYDRAN	0.00	0.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	1.00	0.00	0.00	4.00	0.00	2.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	3.00
JUNMAR	14.00	0.00	1.00	0.00	4.00	3.00	0.00	6.33	5.00	13.00	3.00	3.50	1.33	4.50	1.00	6.25
LEMSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00
LEPFAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINANA	1.00	0.00	2.50	8.00	74.00	0.00	26.67	2.50	8.00	1.00	0.00	14.50	226.00	2.00	113.38	9.00
LINCAN	3.00	2.00	16.00	0.00	6.67	3.75	11.17	0.00	0.00	0.00	1.00	0.00	7.67	0.00	11.67	0.00
LUDALA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDDEC	0.00	55.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	93.00	0.00	0.00	0.00	0.00	7.00	1.00
LUDLEP	12.00	3.50	1.00	0.00	1.00	0.00	0.00	1.00	0.00	17.00	1.00	0.00	1.00	0.00	5.00	10.00
LUDOCT	2.50	36.25	133.75	50.75	41.67	18.25	25.00	20.14	59.33	185.00	187.50	42.25	64.50	68.50	56.00	40.50
LUDPAL	21.00	10.00	4.50	39.00	17.50	16.25	3.75	21.25	20.50	12.00	6.50	28.67	9.00	18.50	3.75	23.13
LUDPER	0.00	0.00	2.00	0.00	3.00	0.00	0.00	2.00	1.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	10.00	352.00	0.00	0.00	16.00	7.00	2.00	0.00	0.00	6.00	0.00	0.00	1.00	0.00	0.00	0.00
MELCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITPET	120.00	0.00	0.00	41.00	3.00	0.00	2.00	0.00	2.00	0.00	0.00	65.00	2.00	0.00	1.50	0.00
MOMCHA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	4.50	52.50	20.25	13.50	1.33	3.00	14.83	5.00	2.67	26.75	9.50	4.00	6.00	2.00	3.40	3.00

Table 39. Summary of seed bank density by species (continued).

SPP	SEEDBANK NOV1991 TRANSECT - MOIST T1N91MO	T3N91MO	T6N91MO	T7N91MO	MULCH - MOIST M1N91MO	M3N91MO	CONTROL-MOIST C1N91MO	C3N91MO	SEEDBANK NOV1991 TRANSECT-FLOOD T1N91FL	T3N91FL	T6N91FL	T7N91FL	MULCH-FLOOD M1N91FL	M3N91FL	CONTROL-FLOOD C1N91FL	C3N91FL
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	2.00	0.00	0.00	0.00	1.00	0.00	2.67	1.00	0.00	1.00	1.50	1.00	0.00	1.00	11.00	1.00
PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
PENPEN	0.00	0.00	0.00	1.00	3.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	10.00	0.00	0.00	0.00	1.00	1.00	2.33	2.00	5.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
PLUROS	0.00	0.00	84.00	0.00	6.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	2.50	0.00	1.50	0.00
POACEAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	290.75	0.00	72.33	75.00	27.67	0.00	89.75	0.00	152.33	1.00	7.00	40.00	5.75	1.00	38.25	0.00
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POROLE	0.00	1.00	0.00	8.00	0.00	4.50	0.00	3.00	0.00	4.00	0.00	0.00	0.00	2.50	0.00	1.50
PTERIDO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAPRAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHENAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYBAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
ROTRAM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.75	0.00	0.00	0.00	6.00	0.00	0.00	2.00	12.50
RUMCRI	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
SAGLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGSPP	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	1.00	0.00	0.00	0.00	1.00	0.00	2.50	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALROT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	13.67	0.00	0.00	0.00	5.00	0.00	0.00	0.00	9.67	0.00	0.00	1.00	0.00	0.00	0.00	0.00
SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SENGLA	1.00	1.00	0.00	0.00	3.50	0.00	7.50	1.75	1.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
SESMAC	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 39. Summary of seed bank density by species (continued).

SPP	SEEDBANK NOV1991 TRANSECT - MOIST				MULCH - MOIST		CONTROL-MOIST		SEEDBANK NOV1991 TRANSECT-FLOOD				MULCH-FLOOD		CONTROL-FLOOD	
	T1N91MO	T3N91MO	T6N91MO	T7N91MO	M1N91MO	M3N91MO	C1N91MO	C3N91MO	T1N91FL	T3N91FL	T6N91FL	T7N91FL	M1N91FL	M3N91FL	C1N91FL	C3N91FL
SPIPOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPSPP	4.33	4.00	0.00	1.00	7.50	0.00	3.00	0.00	25.50	9.67	1.67	1.00	5.75	1.00	8.88	1.00
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	24.00	0.00	0.00
VERPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERSCA	1.00	0.00	0.00	0.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00
VERSCR	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
WOLFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOLSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
XYRJUP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cyperac	4.00	0.00	0.00	27.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00
poaceae	14.00	0.00	9.00	7.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	3.00	2.00	0.00	0.00	0.00
scispp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
udicot	1.50	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00

Table 39. Seed bank density (# sample^{-1}). (Continued)

	SEEDBANK NOV1992 TRANSECT - MOIST				MULCH - MOIST		CONTROL-MOIST		SEEDBANK NOV1992 TRANSECT-FLOOD				MULCH-FLOOD		CONTROL-FLOOD	
SPP	T1N92MO	T3N92MO	T6N92MO	T7N92MO	M1N92MO	M3N92MO	C1N92MO	C3N92MO	T1N92FL	T3N92FL	T6N92FL	T7N92FL	M1N92FL	M3N92FL	C1N92FL	C3N92FL
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	5.33	2.50	0.00	17.00	38.00	0.00	6.25	0.00	23.00	3.50	2.00	0.00	18.33	2.00	4.67	0.00
AMASPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMMCOC	1.50	0.00	3.67	7.67	3.00	25.75	1.00	69.25	2.00	0.00	3.50	22.00	2.00	47.25	0.00	44.25
ANDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
APILEP	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AZOCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACINN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARALB	0.00	0.00	0.00	3.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
CARPEN	7.25	0.00	5.00	3.33	5.00	1.50	1.33	4.57	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.33
CARSPP	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CASOBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CICMEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPBRE	0.00	0.00	1.00	0.00	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPCOM	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPERAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPESC	1.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	3.33	3.00	13.00	10.00	3.00	2.00	2.00	0.00	4.33	3.00	7.00	11.00	2.00	4.50
CYPIRI	42.00	69.00	102.75	53.25	89.75	79.25	112.50	54.75	8.00	4.50	36.50	31.50	20.50	9.50	27.13	24.00
CYPODO	6.50	7.00	5.00	26.50	13.25	1.33	15.20	3.33	3.00	3.00	2.50	10.00	1.67	2.00	4.50	2.50
CYPSPP	2.50	8.75	0.00	0.00	2.00	13.00	48.80	10.00	2.00	5.00	0.00	2.00	2.00	9.00	5.20	0.00
CYPSUR	10.50	0.00	0.00	3.50	25.33	17.33	8.00	4.00	19.00	0.00	1.00	8.50	15.33	8.50	13.83	3.25
DIGSER	6.00	6.50	1.50	2.00	2.00	3.00	0.00	0.00	4.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
ECHCOL	2.00	14.00	1.00	4.50	2.00	2.00	2.60	1.50	2.00	3.00	1.00	4.00	1.00	1.00	0.00	0.00
ECHCRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

Table 39. Seed bank density (# sample^{-1}). (Continued)

	SEEDBANK NOV1992 TRANSECT - MOIST				MULCH - MOIST		CONTROL-MOIST		SEEDBANK NOV1992 TRANSECT-FLOOD				MULCH-FLOOD		CONTROL-FLOOD	
SPP	T1N92MO	T3N92MO	T6N92MO	T7N92MO	M1N92MO	M3N92MO	C1N92MO	C3N92MO	T1N92FL	T3N92FL	T6N92FL	T7N92FL	M1N92FL	M3N92FL	C1N92FL	C3N92FL
ECHSPP1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECHSPP2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	6.50	5.50	21.75	3.33	3.67	5.33	6.57	7.67	2.00	6.00	13.33	1.50	2.00	5.00	3.50	9.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEFLA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEIND	5.67	12.00	1.33	6.00	4.00	7.50	7.86	2.00	1.00	0.00	0.00	0.00	0.00	0.00	1.50	1.00
ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	11.00	0.00	7.00	2.75	0.00	0.00	0.00	0.00	12.75	0.00	2.00	3.50	0.00	0.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	88.75	8.25	194.50	74.50	48.25	143.00	55.13	24.13	9.00	1.00	34.75	8.33	5.67	6.00	13.43	3.50
EUPSER	0.00	0.00	1.00	1.00	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIMAUT	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	5.00	0.00	3.00	3.00	0.00	2.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
HEDUNI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	3.50	0.00	4.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNMAR	9.50	0.00	0.00	13.00	0.00	4.00	0.00	1.00	6.00	4.00	1.00	4.00	0.00	1.00	0.00	4.00
LEMSPP	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LEPFAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINANA	37.00	3.00	0.00	0.00	151.00	2.33	23.00	11.40	16.00	0.00	0.00	1.00	132.50	4.00	20.50	8.29
LINCAN	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDALA	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDDEC	10.33	9.33	0.00	3.00	4.00	1.00	4.00	0.00	1.00	5.50	0.00	2.67	12.00	0.00	3.00	0.00
LUDLEP	10.50	11.50	4.00	2.33	0.00	0.00	3.50	1.00	6.33	3.00	4.00	1.00	0.00	0.00	2.00	1.00
LUDOCT	34.50	129.00	127.25	48.75	45.75	28.00	18.63	23.00	8.00	11.33	60.50	16.50	13.50	11.00	5.50	20.57
LUDPAL	20.33	0.00	6.25	12.75	2.00	20.75	9.00	14.50	18.67	0.00	12.33	8.75	1.00	4.25	2.75	6.00
LUDPER	2.00	0.00	46.00	13.50	1.00	1.00	0.00	0.00	1.00	0.00	21.00	11.50	0.00	0.00	1.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITPET	1.50	0.00	0.00	2.00	4.67	0.00	3.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00

Table 39. Seed bank density (# sample^{-1}). (Continued)

SPP	SEEDBANK NOV1992 TRANSECT - MOIST T1N92MO	T3N92MO	T6N92MO	T7N92MO	MULCH - MOIST M1N92MO	M3N92MO	CONTROL-MOIST C1N92MO	C3N92MO	SEEDBANK NOV1992 TRANSECT-FLOOD T1N92FL	T3N92FL	T6N92FL	T7N92FL	MULCH-FLOOD M1N92FL	M3N92FL	CONTROL-FLOOD C1N92FL	C3N92FL
MOMCHA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	44.00	54.00	5.33	5.00	7.50	1.75	10.00	3.00	7.50	27.33	8.00	3.50	0.00	1.00	4.00	1.67
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIC	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENPEN	0.00	0.00	2.00	0.00	0.00	1.00	0.00	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PLUROS	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
POACEAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	102.33	1.00	1.00	11.50	14.00	0.00	41.00	0.00	88.33	6.00	1.00	8.50	13.00	0.00	31.38	0.00
PONCOR	2.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	3.00	1.00	1.00
POROLE	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PTERIDO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAPRAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHENAS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYBAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROTRAM	3.00	1.00	0.00	0.00	4.00	0.00	1.00	0.00	3.00	0.00	0.00	0.00	4.00	0.00	1.50	1.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	1.00	0.00	1.00	0.00	1.40	0.00
SAGLAT	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	1.00	0.00	5.00	2.00	0.00	0.00	1.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
SALROT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	2.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SENGLA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

Table 39. Seed bank density (# sample^{-1}). (Continued)

SPP	SEEDBANK NOV1992 TRANSECT - MOIST				MULCH - MOIST		CONTROL-MOIST		SEEDBANK NOV1992 TRANSECT-FLOOD				MULCH-FLOOD		CONTROL-FLOOD	
	T1N92MO	T3N92MO	T6N92MO	T7N92MO	M1N92MO	M3N92MO	C1N92MO	C3N92MO	T1N92FL	T3N92FL	T6N92FL	T7N92FL	M1N92FL	M3N92FL	C1N92FL	C3N92FL
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPIPOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPSPP	1.33	19.50	1.00	17.00	8.75	22.67	12.50	1.75	12.75	67.75	2.25	31.00	18.25	43.25	15.38	2.83
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERSCR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOLFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOLSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
XYRJUP	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cyperac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
poaceae	0.00	0.00	6.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
scispp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
udicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

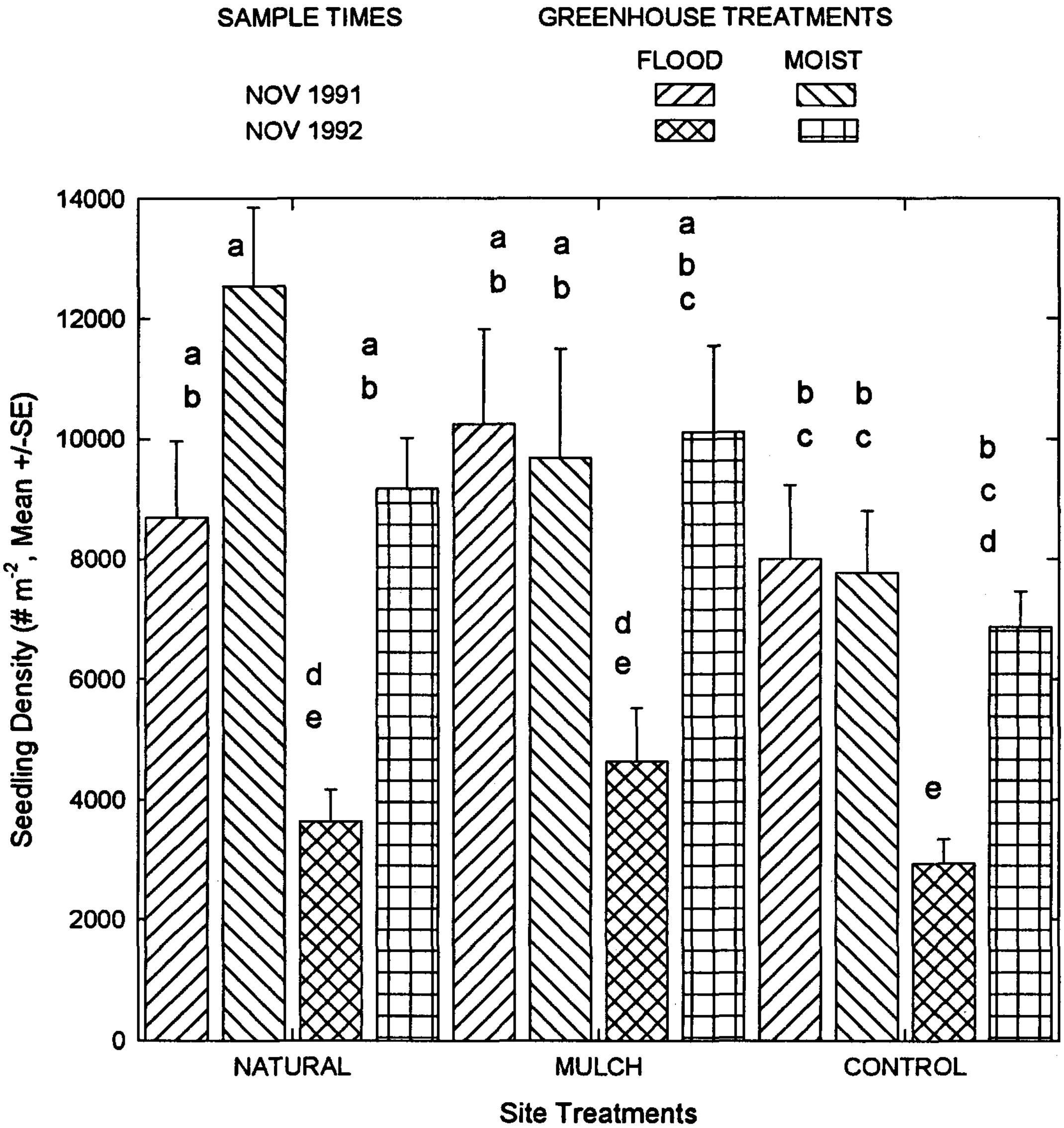


Figure 122. Comparisons among seedbank treatments. Detected using SNK Multiple Rantes Test (α=0.10). Similar letters represent similar means.

Seedling densities for the two greenhouse soil moisture treatments were similar (Moist ≅Flood) for November 1991 and differed for the November 1992 soil samples. This pattern resulted because during the assay of November 1991, soil water levels were not well controlled. This problem was corrected before the start of the November 1992 assay. Therefore, results of the November 1992 flooded soil treatment are reliable, while the November 1991 flooded soil treatment results are less so.

Seed bank species responded to field and greenhouse treatments. Species richness was higher under moist soil conditions regardless of the field treatment (Table 38). Species richness was higher in the seed bank than the existing vegetation at any time in the study period (Table 38). The most common and abundant species in the seed bank flora tended to germinate more readily under moist soil conditions (Table 40). In contrast to the majority, *Typha* spp. germinated more favorably under flooded conditions (Table 40). Species germination patterns were less distinct when comparing among field treatments. Under flooded conditions, only *Lindernia anagallidea, Panicum dichotomiflorum* and *Typha* spp. had statistically significant differences (Table 41). The seedling density pattern detected for *Typha* spp. reflects the overall seedling density pattern (Fig.122, Table 40,41). Under moist soil conditions a larger collection of species was found to have statistically significant differences between field treatments (Table 42). These species included, *Ammania coccinea, Cyperus surinamensis, Eclipta alba, Lindernia anagallidea, Ludwigia decurrens*, and *Ludwigia octovalvis*. Species seedling density patterns were not clearly defined, with the natural succession sites or control sites

Table 40. Effects of soil flooding on seed bank germination densities (# m^{-2}, Mean ±SE) for species common to all greenhouse and field treatment combinations. November 1992 sample only. Differences among treatment distributions tested with Wilcoxon Two-Sample Test (n=40, p<0.15 considered to be a significant difference).

	GREENHOUSE TREATMENTS						
	FLOOD (FL)			MOIST (MO)			
SPECIES	MEAN	(SE)		MEAN	(SE)	Z	p
Amaranthus australis	72	(33)	≅	109	(53)	0.040	0.9681
Ammania coccinea	376	(116)	≅	433	(141)	-0.306	0.7599
Cyperus haspan	37	(12)	≅	27	(11)	1.085	0.2780
Cyperus iria	**505**	**(66)**	<	**1860**	**(187)**	**-5.429**	**0.0001**
Cyperus odoratus	**28**	**(8)**	<	**140**	**(39)**	**-2.378**	**0.0174**
Cyperus spp.	46	(14)	≅	191	(96)	-0.367	0.7134
Cyperus surinamensis	131	(35)	≅	136	(46)	0.224	0.8224
Eclipta alba	**54**	**(20)**	<	**149**	**(36)**	**-3.573**	**0.0004**
Eupatorium capillifolium	**204**	**(70)**	<	**1767**	**(338)**	**-5.634**	**0.0001**
Juncus marginatus	15	(6)	≅	23	(13)	0.277	0.7816
Lindernia anagallidea	447	(201)	≅	583	(249)	-0.777	0.437
Ludwigia decurrens	**25**	**(9)**	<	**60**	**(17)**	**1.623**	**0.1045**
Ludwigia octovalvis	**393**	**(113)**	<	**1226**	**(254)**	**-3.671**	**0.0002**
Ludwigia palustris	**123**	**(38)**	<	**221**	**(50)**	**-1.509**	**0.1313**
Panicum dichotomiflorum	**83**	**(37)**	<	**301**	**(104)**	**-3.071**	**0.0021**
Polygonum punctatum	349	(109)	≅	434	(128)	-0.453	0.6503
Rotala ramosoir	7	(3)	≅	8	(4)	-0.017	0.9866
***Typha* spp.**	**519**	**(128)**	>	**222**	**(63)**	**2.521**	**0.0117**
TOTAL SEEDLING DENSITY	3554	(329)	<	8447	(530)		

Table 41. Effects of field treatment on seed bank germination densities (# m^{-2}, Mean ±SE) for common species. November 1992 sample only. Differences among treatments tested with Kruskal-Wallis Multiple Comparison Test (Natural Succession Transects and Control Treatments n=16, Mulch treatment n=8; p<0.15 considered to be significantly different).

FLOODED SOIL GREENHOUSE TREATMENT

A. Seed bank germination densities (# m^{-2})

	FIELD TREATMENTS					
	Natural Succession (NS)		Mulch (MUL)		Control (CON)	
SPECIES	Mean	(SE)	Mean	(SE)	Mean	(SE)
Amaranthus australis	49	(36)	176	(138)	43	(32)
Ammania coccinea	99	(64)	590	(298)	546	(231)
Cyperus haspan	31	(13)	77	(48)	23	(13)
Cyperus iria	483	(130)	370	(85)	594	(91)
Cyperus odoratus	37	(17)	22	(9)	22	(12)
Cyperus spp.	29	(16)	90	(56)	40	(17)
Cyperus surinamensis	83	(46)	194	(97)	148	(59)
Eclipta alba	97	(45)	28	(16)	25	(15)
Eupatorium capillifolium	269	(150)	127	(47)	177	(89)
Juncus marginatus	23	(12)	3	(3)	12	(9)
Lindernia anagallidea	**77**	**(69)**	**1648**	**(899)**	**216**	**(91)**
Ludwigia decurrens	31	(13)	37	(37)	14	(8)
Ludwigia octovalvis	540	(258)	302	(81)	290	(113)
Ludwigia palustris	198	(89)	56	(20)	82	(26)
Panicum dichotomiflorum	**173**	**(87)**	**3**	**(3)**	**32**	**(12)**
Polygonum punctatum	446	(225)	80	(56)	387	(150)
Rotala ramosior	5	(5)	12	(12)	6	(4)
***Typha* spp.**	**702**	**(218)**	**759**	**(435)**	**216**	**(71)**
TOTAL SEEDLING DENSITY	3634	(533)	4638	(884)	2925	(412)

B. Kruskal-Wallis Distribution Test

SPECIES	FIELD TREATMENTS	CHI^2	P-value
Amaranthus australis	NS ≅ CON ≅ MUL	2.0239	0.3625
Ammania coccinea	NS ≅ CON ≅ MUL	1.6408	0.4403
Cyperus haspan	CON ≅ NS ≅ MUL	0.4310	0.8062
Cyperus iria	MUL ≅ NS ≅ CON	2.5329	0.2818
Cyperus odoratus	CON ≅ NS ≅ MUL	0.9008	0.6374
Cyperus spp.	NS ≅ CON ≅ MUL	0.9470	0.6227
Cyperus surinamensis	NS ≅ CON ≅ MUL	2.6377	0.2674
Eclipta alba	CON ≅ MUL ≅ NS	3.7075	0.1566
Eupatorium capillifolium	NS ≅ CON ≅ MUL	0.5664	0.7534
Lindernia anagallidea	**NS<CON<MUL**	**8.1540**	**0.0170**
Ludwigia decurrens	MUL ≅ CON ≅ NS	1.8300	0.4006
Ludwigia octovalvis	CON ≅ NS ≅ MUL	1.1069	0.5750
Ludwigia palustris	MUL ≅ NS ≅ CON	0.0871	0.9574
Panicum dichotomiflorum	**MUL<CON<NS**	**4.5497**	**0.1028**
Polygonum punctatum	MUL ≅ NS ≅ CON	1.4814	0.4768
Rotala ramosoir	NS ≅ CON ≅ MUL	0.9120	0.6340
***Typha* spp.**	**CON<NS<MUL**	**4.5557**	**0.1025**

Table 42. Effects of field treatment on seed bank germination densities (g m^{-2}, Mean ±SE) for common species. November 1992 sample only. Differences in distributions among treatments tested with Kruskal-Wallis Multiple Comparison Test (Natural Succession and Control n=16, Mulch n=8; p <0.15 considered to be significantly difference).

MOIST SOIL GREENHOUSE TREATMENT
A. Seed bank germination densities (# m^{-2})

	FIELD TREATMENT					
	Natural Succession (NS)		Mulch (MUL)		Control (CON)	
SPECIES	Mean	(SE)	Mean	(SE)	Mean	(SE)
Amaranthus australis	59	(32)	352	(249)	39	(20)
Ammania coccinea	57	(28)	336	(192)	858	(314)
Cyperus haspan	20	(11)	71	(47)	11	(6)
Cyperus iria	1542	(295)	2086	(325)	2065	(321)
Cyperus odoratus	128	(78)	176	(72)	133	(48)
Cyperus spp.	62	(34)	46	(40)	392	(233)
Cyperus surinamensis	**43**	**(31)**	**395**	**(191)**	**99**	**(34)**
Eclipta alba	**224**	**(78)**	**83**	**(34)**	**106**	**(38)**
Eupatorium capillifolium	2259	(639)	2361	(912)	978	(266)
Juncus marginatus	49	(32)	12	(12)	3	(2)
Lindernia anagallidea	**179**	**(161)**	**1886**	**(1112)**	**336**	**(130)**
Ludwigia decurrens	**105**	**(36)**	**52**	**(32)**	**19**	**(13)**
Ludwigia octovalvis	**2096**	**(545)**	**910**	**(280)**	**514**	**(128)**
Ludwigia palustris	211	(90)	269	(141)	207	(60)
Panicum dichotomiflorum	577	(240)	68	(28)	142	(58)
Polygonum punctatum	514	(261)	130	(80)	506	(183)
Rotala ramosior	6	(5)	25	(17)	2	(2)
Typha spp.	233	(80)	318	(175)	165	(107)
TOTAL SEEDLING DENSITY	9178	(840)	10108	(1437)	6866	(585)

B. Kruskal-Wallis Distribution Test

SPECIES	FIELD TREATMENTS	CHI^2	P-value
Amaranthus australis	CON ≅ NS ≅ MUL	0.7569	0.6849
Ammania coccinea	**NS<MUL<CON**	**4.2327**	**0.1205**
Cyperus haspan	MUL ≅ NS ≅ CON	0.4670	0.7919
Cyperus iria	NS ≅ CON ≅ MUL	2.2855	0.3189
Cyperus odoratus	NS ≅ CON ≅ MUL	2.8252	0.2435
Cyperus spp.	MUL ≅ NS ≅ CON	0.6690	0.7157
Cyperus surinamensis	**NS<CON<MUL**	**7.4578**	**0.0240**
Eclipta alba	**`CON<MUL<NS**	**4.4276**	**0.1093**
Eupatorium capillifolium	CON ≅ NS ≅ MUL	1.3945	0.4980
Juncus marginatus	MUL ≅ CON ≅ NS	0.4840	0.7849
Lindernia anagallidea	**NS<CON<MUL**	**9.5470**	**0.0085**
Ludwigia decurrens	**CON<MUL<NS**	**5.8486**	**0.0537**
Ludwigia octovalvis	**CON<MUL<NS**	**6.8139**	**0.0331**
Ludwigia palustris	NS ≅ CON ≅ MUL	0.2444	0.8850
Panicum dichotomiflorum	MUL ≅ CON ≅ NS	2.6679	0.2634
Polygonum punctatum	MUL ≅ NS ≅ CON	0.7596	0.6840
Rotala ramosoir	NS ≅ CON ≅ MUL	2.0450	0.3597
Typha spp.	CON ≅ NS ≅ MUL	1.8115	0.4042

often having the smallest seedling counts. Mulch sites tended to have middle range seedling density.

Comparison of Seed Bank and Vegetation Species Composition. The species composition of the seed bank tended to differ from that of the extant vegetation. Based on a normalized dataset containing seed bank and vegetation species a Principal Components Analysis (PCA) and a cluster analysis revealed distinct groups (Figure 123, Table 43).

The PCA revealed two distinct groups representing seed bank and vegetation species (Figure 123). The PCA Axis I was most closely correlated with treatments (Seed Bank Flooded and Moist, and Vegetation; Pearson Correlation, r=-0.831), and the PCA Axis II was most closely correlated with the date of sample collection (Pearson Correlation; r=-0.563).

A cluster analysis revealed a similar pattern, but with more definitive groupings (Table 43). The cluster analysis revealed three species composition groups dominated by the seed bank and three dominated by the vegetation (Table 43). Within the seed bank and vegetation groups three additional subgroups each were found. Each group defined a separate site identity.

Within the seed bank group, the first subgroup contained south marsh sites from November 1991. The second subgroup contained sites from both the November 1991 and 1992 samples, primarily from the north marsh. The third subgroup contained a mixture of sites from the north and south Marshes combined, all of which were sampled.

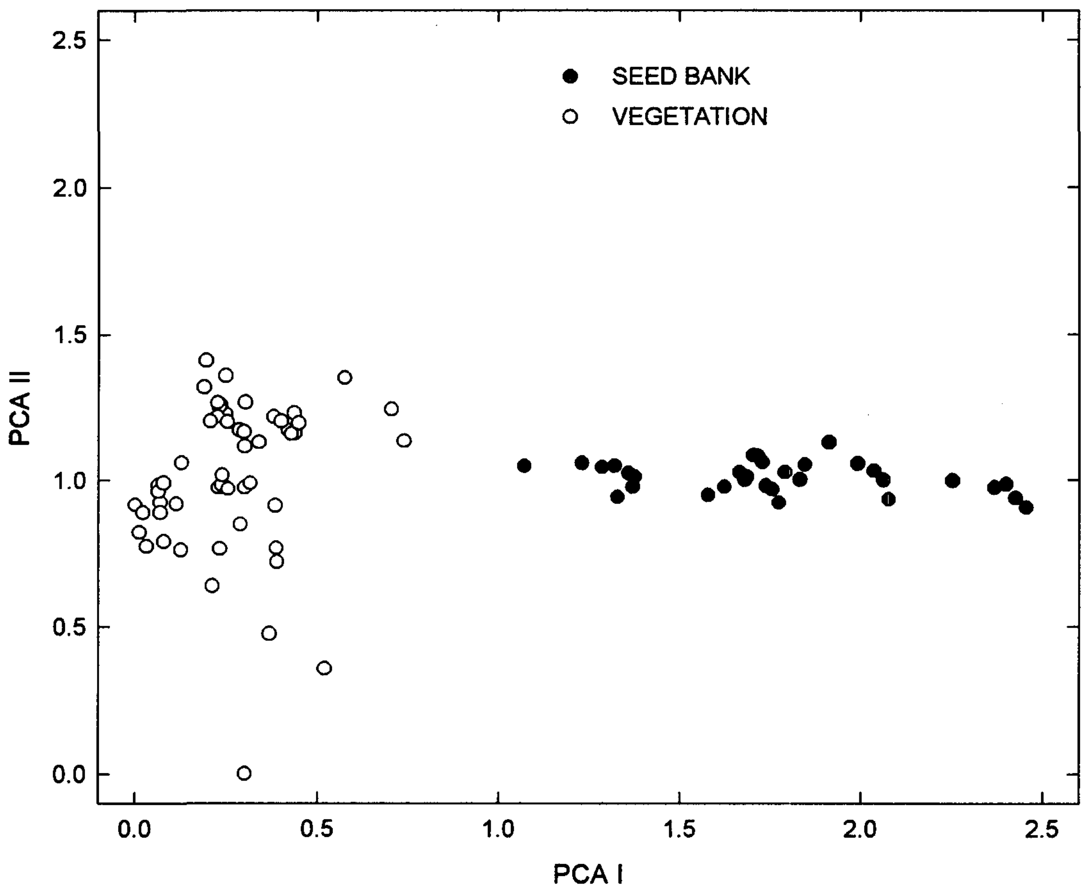


Figure 123. Principal components analysis of normalized seed bank seedling densities (# m^{-2}) and vegetation cover (% m^{-2}).

Table 43. Cluster analysis of normalized seed bank density and vegetation cover datasets from Natural Succession Transects and Experimental Planting Site Mulch and Control Sites. Left hand column codes represent specific sites (first two characters), dates (second two characters) and data type (last character). Site characters are: C1-C3=Control Sites 1 and 3; M1-M3=Mulch Sites 1 and 3; and T1-T8=Transects 1-8. Date characters are: N91=November 1991 and N92=November 1992. Data type characters are: F=Flooded greenhouse treatment; M=Moist greenhouse treatment; and V=Vegetation cover.

```
        D I S T A N C E
        .500        254.151          507.803         761.454        1015.106
        |-------+-------+-------+-------+-------+-------+-------+-------+
T1N91M  ----------------|--------|
M1N91M  ----------------|        |---|
C1N91M  ---------|---------------|   |----|                               (1)
C1N91F  ---------|                   |    |
T3N91M  --------|--------------------|    |
T3N91F  --------|                         |
-----------------------------------------------------------------------------
T6N91M  -------------|----|               |
T6N92M  -------------|    |---|           |
M1N91F  ------------------|   |----|      |----|
T6N91F  --------|---------|   |    |      |    |
C3N91F  --------|         |---|    |      |    |
T7N92M  ------------------|        |---|  |    |
T7N91M  -----------|----|          |   |  |    |                          (2)
T7N91F  -----------|    |-----|    |   |  |    |
T1N91F  ----------------|     |----|   |--|    |
T1N92M  ----------------------|        |       |
M3N91M  -----------------|------|      |       |-----------------------|
M3N91F  -----------|-----|      |------|       |                       |
M3N92M  -----------|            |              |                       |
C3N91M  -----------------------||              |                       |
C3N92M  ------|----------------|               |                       |
C3N92F  ------|                                |                       |
-----------------------------------------------------------------------------
T3N92M  --|----------------|                   |                       |
T3N92F  --|                |                   |                       |
M1N92M  --------|-----|    |                   |                       |
M1N92F  --------|     |----|-------------------|                       |
C1N92M  --------------|    |                                           |  (3)
T1N92F  --|----------|     |                                           |
C1N92F  --|          |-----|                                           |
T6N92F  ------|------|                                                 |
T7N92F  ----|-|                                                        |
M3N92F  ----|                                                          |
```

Table 43. Cluster analysis of normalized seed bank density and vegetation cover datasets from Natural Succession Transects and Experimental Planting Site Mulch and Control Sites. (Cont.)

```
        D I S T A N C E
        .500         254.151         507.803         761.454        1015.106
        |-------+-------+-------+-------+-------+-------+-------+-------+

T1N90V  |-|                                                            |
T8A92V  | |--|                                                         |
T7J92V  | |  |                                                         |
T1A92V  |-|  |-|                                                       |
T3A92V  |    | |-|                                                     |
T6J92V  -----| | |-----|                                               |
T1A91V  -------| |     |                                               |
T8A91V  ---------|     |                                               |
T3N90V  |---|          |                                               |
T1J92V  |   |-|        |----------|                                    |
T6N90V  ----| |--------|          |                                    | (4)
T7N90V  ---|| |        |          |                                    |
T3J92V  ---||-|        |          |                                    |
T8N90V  ----|          |          |                                    |
T8J92V  |--|           |          |                                    |
T6F93V  |  |           |          |-----------------|                  |
T8F93V  |  |           |          |                 |                  |
T6A92V  |--|------|    |          |                 |                  |
T1F93V  |  |      |----|          |                 |                  |
T3F93V  ---|      |               |                 |                  |
T7A92V  ----------|               |                 |                  |
T3A91V  -------|--|               |                 |                  |
T6A91V  -------|  |---------------|                 |                  |
T7A91V  ----------|                                 |                  |

M1M92V  |----|                                      |                  |
M1A93V  |    |--------|                             |                  |
M1A92V  |-|  |        |                             |                  |
M1F93V  | |--|        |-------|                     |------------------|
C1F93V  --|           |       |                     |
C1M92V  ||            |       |                     |
T1M94V  ||------------|       |------|              |
C1A93V  -|                    |      |              |                    (5)
C1A92V  ||                    |      |              |
M3F93V  ||--|                 |      |              |
C3F93V  ||  |-----------------|      |-------|      |
C3A93V  -|  |                        |       |      |
M3A93V  ----|                        |       |      |
M3M92V  -|                           |       |      |
M3A92V  ||---------------------------|       |      |
C3A92V  ||                                   |------|
C3M92V  -|                                   |
```

Table 43. Cluster analysis of normalized seed bank density and vegetation cover datasets from Natural Succession Transects and Experimental Planting Site Mulch and Control Sites. (Cont.)

```
          D I S T A N C E
          .500         254.151        507.803        761.454        1015.106
          |-------+-------+-------+-------+-------+-------+-------+-------+

T7F93V    -----|--------------------|       |
T6M94V    ---|-|                    |---|   |
T8M94V    ---|                      |   |--|  |
T6A93V    --------------------------|   |  |  |
T8A93V    ------------|----------------|  |--|
C3M94V    ------------|                   |                          (6)
T1A93V    ---------|----------|           |
M3M94V    ---------|          |-----------|
T3A93V    |-----------|       |
T3M94V    |           |-------|
M1M94V    |-----------|
C1M94V    |
```

in November 1992.

Within the vegetation group, the first subgroup contained all transect sites from the November 1990 through February 1993 samples. With the exception of transect 1 in March 1994, the second subgroup was dominated by mulch and control sites from May 1992 through August 1993. The third subgroup contained a mixture of transect, mulch, and control sites from August 1993 and March 1994. The third subgroup was also primarily made up of north marsh sites (Table 43).

The patterns detected by Principal Components Analysis and cluster analysis result from the species contained within the seed bank not becoming established in the above-ground vegetation. The seed bank was dominated by a large collection of small, and often ephemeral species, such as, *Cyperus iria, Eleusine indica, Lindernia anagallidea* and *Utricularia subulata*. The prostrate, submersed species *Ludwigia palustris* was commonly found in the seed bank, but seldom found in the vegetation. The seed bank also contained species that had been important members of the vegetation community, such as, *Eupatorium capillifolium, Ludwigia octovalvis, Panicum dichotomiflorum*, and *Polygonum punctatum*. The dominant plant, cattail (*Typha* spp.) was found at low levels in the November 1991 sample, and at much higher levels in the November 1992 sample (Table 39). Although the donor mulch used in the plots came from a bayhead site, little evidence was found for the presence of bayhead species from the mulch treatment (Table 3). The most likely contenders were *Rhexia nashii* (1 seedling, north marsh, November 1992), *Utricularia subulata* (24 seedlings, north marsh, November 1991) and *Xyris jupicai* (1 seedling, south marsh, November 1992).

Utricularia subulata (7 seedlings, November 1991) was also found in the north marsh control site.

WILDLIFE UTILIZATION

BIRD OBSERVATIONS

Avian Species Similarity. Avian species composition similarity, based on Simpsons Similarity Index, varied between 50% and 70%. These index values were observed for the duration of the study within and between marshes (Figure 124). No temporal trends or major differences between or within the marshes in similarity were observed.

Avian Density Based on Transects. Avian density measurements from transects revealed some differences between the north and south marshes and consistent patterns within transects in each marsh (Figures 125, 126). The avian communities of the south and north marshes tended to be dominated by blackbirds (10-20 birds ha^{-1}) (Figure 125, 126). In addition to blackbirds, ducks were important in the north marsh (10-40 birds ha^{-1}) (Figure 126). The observation of 40 birds ha^{-1} occurred while sampling along transect 6 during the November 1992 sample period. Duck densities declined in subsequent samples. Avian densities tended to be lower in the unmanaged marsh than the north or south marshes (Figures 125-127). Density distribution of taxonomic types in the unmanaged marsh seemed more similar to the north marsh than the south.

Avian Density Based on Drive-Through. Observations made using the Drive-Through

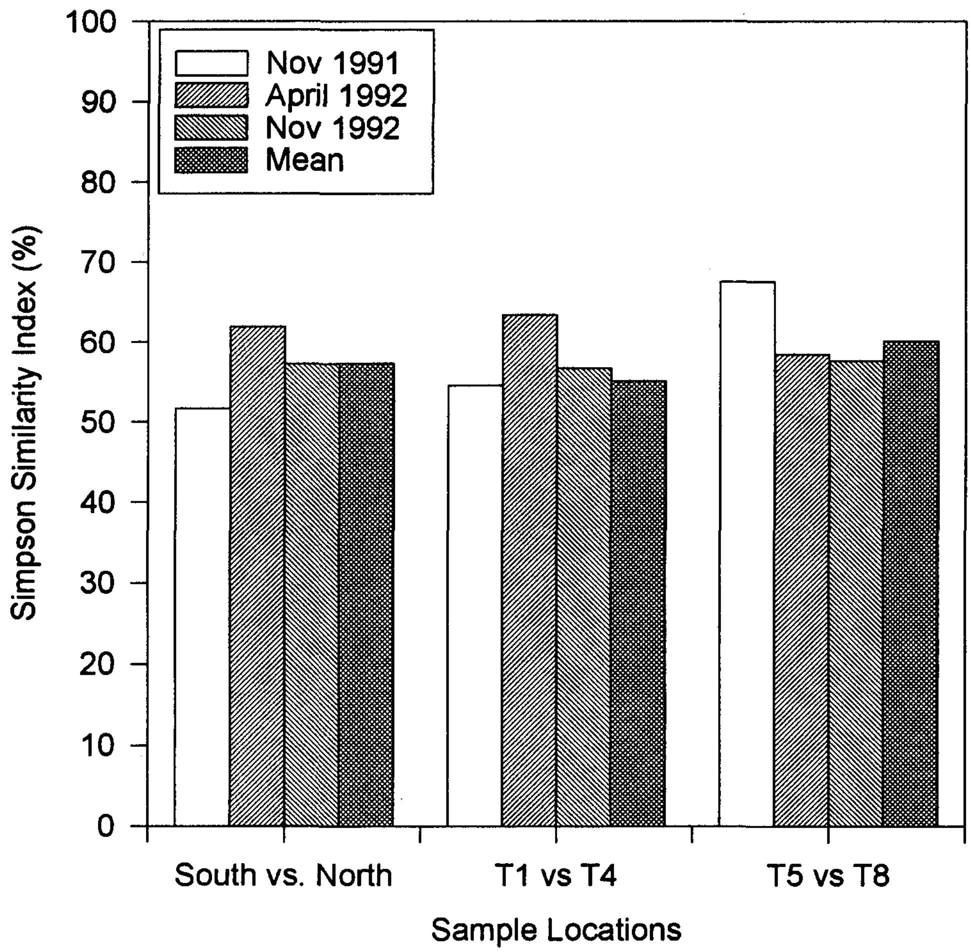


Figure 124. Avian species similarity index (Simpson Similarity Index %).

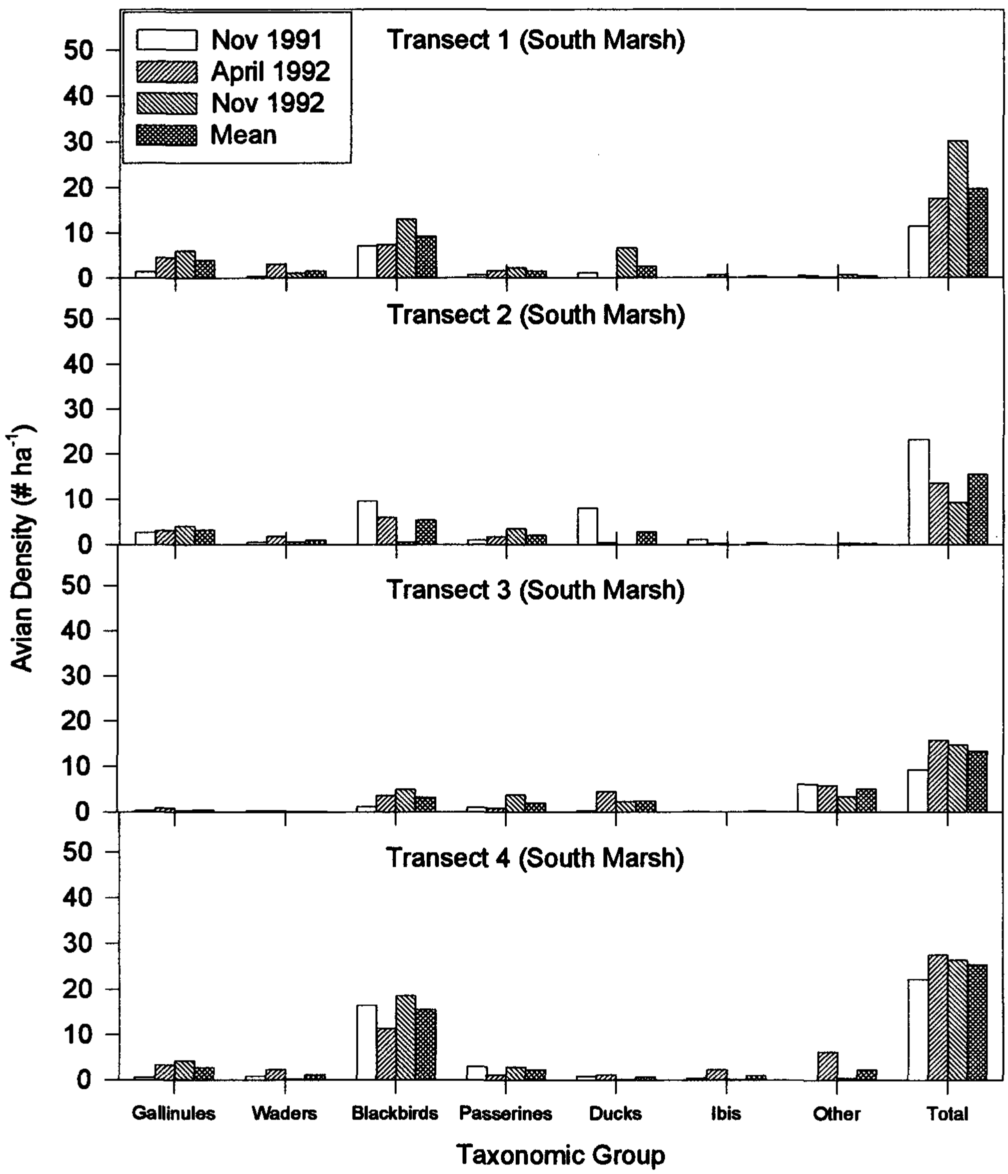


Figure 125. Avian density (# ha^{-1}) estimates from transects in South Marsh.

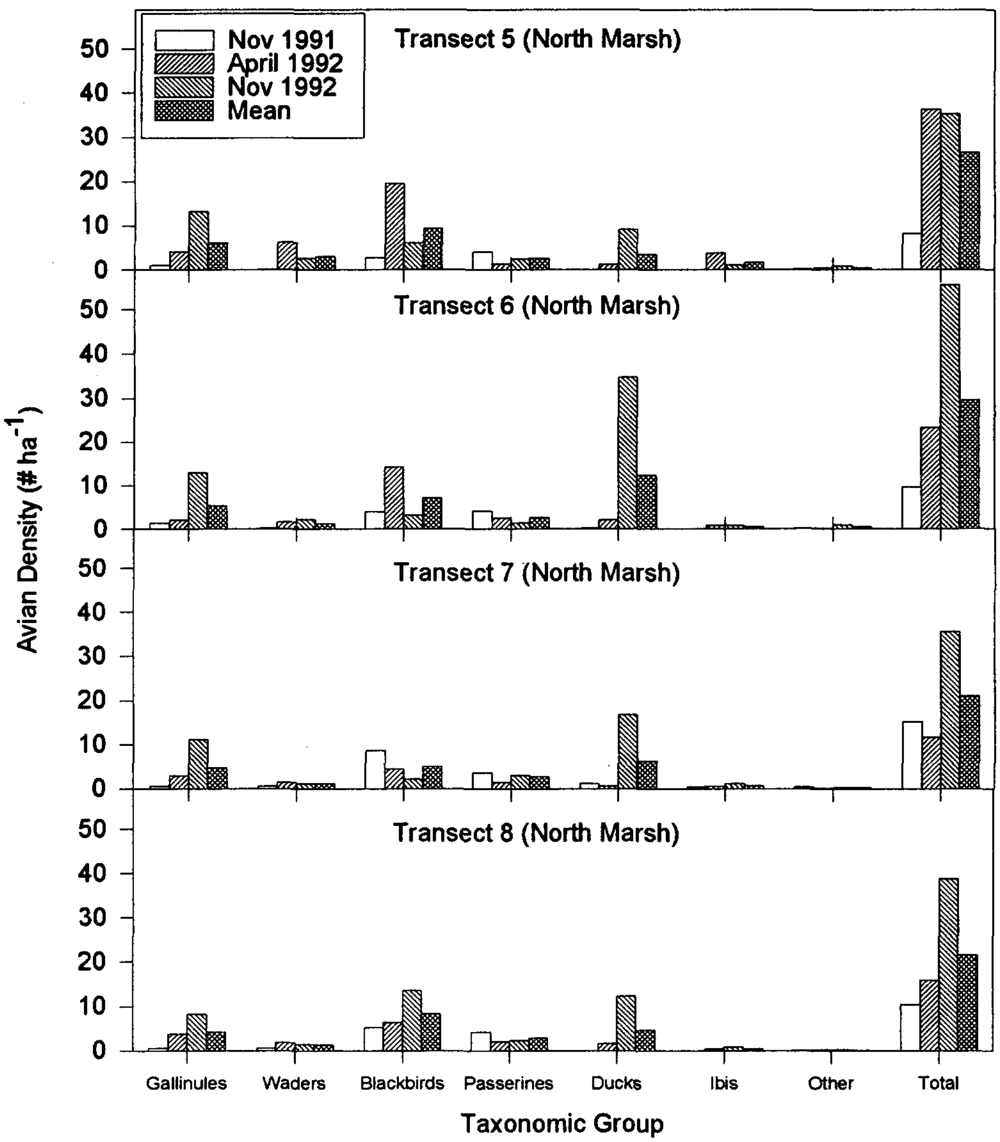


Figure 126. Avian density (# ha^{-1}) estimates from transects in North Marsh.

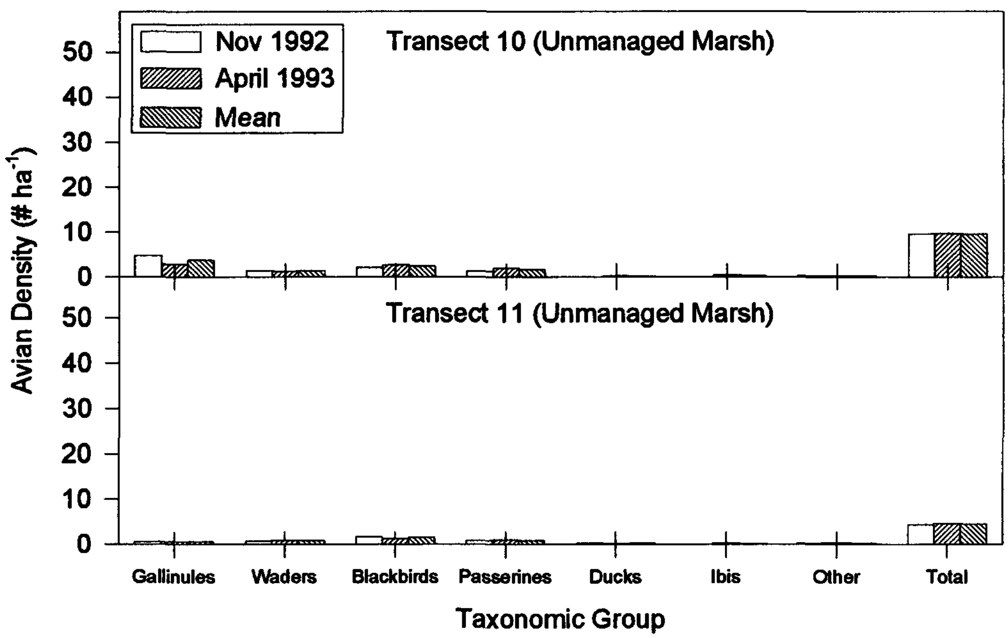


Figure 127. Avian density (# ha^{-1}) estimates from transects in Unmanaged Marsh.

Method revealed a slightly different pattern than that provided by transects (Figure 128). Blackbirds were important in the south marsh, as was observed along transects (Figure 128). In the south marsh, gallinules were not as important in the transect sample as in the drive-through sample. In the north marsh, in contrast to the transects, a more evenly distributed taxon density was observed (Figure 128). Gallinules, Waders, Blackbirds, and Passerines shared dominance over the time period represented (Figure 128). The agricultural field contained the lowest avian density at any time during any sample periods (Figure 128).

Additional Bird Observations. Additional birds sighted during visits, but not during survey periods were documented. Avian species which were sighted on or near Clay Island included barn, barred, and great horned owls, bald eagles, and sharp-shinned hawks. Passerines were often seen along the edges of Clay Island and the marshes. These passerines included blue grosbeak, grasshopper sparrow, common nighthawk, and chuck-will's-widow. Birds sighted near the agricultural field included yellow-billed cuckoo, lesser yellowlegs, sanderlings, least sandpiper, and a cooper's hawk. Immature wood storks were sighted twice in the north marsh near transect 5. White pelicans were sighted near the study area. During the winter months sandhill cranes also flew directly over the marshes.

Nesting birds observed during the spring of 1992 and 1993 included common moorhens, purple gallinules, glossy ibis, little blue herons, and green-back herons. All three planting sites were used extensively for nesting by red-wing blackbirds, boat-tailed

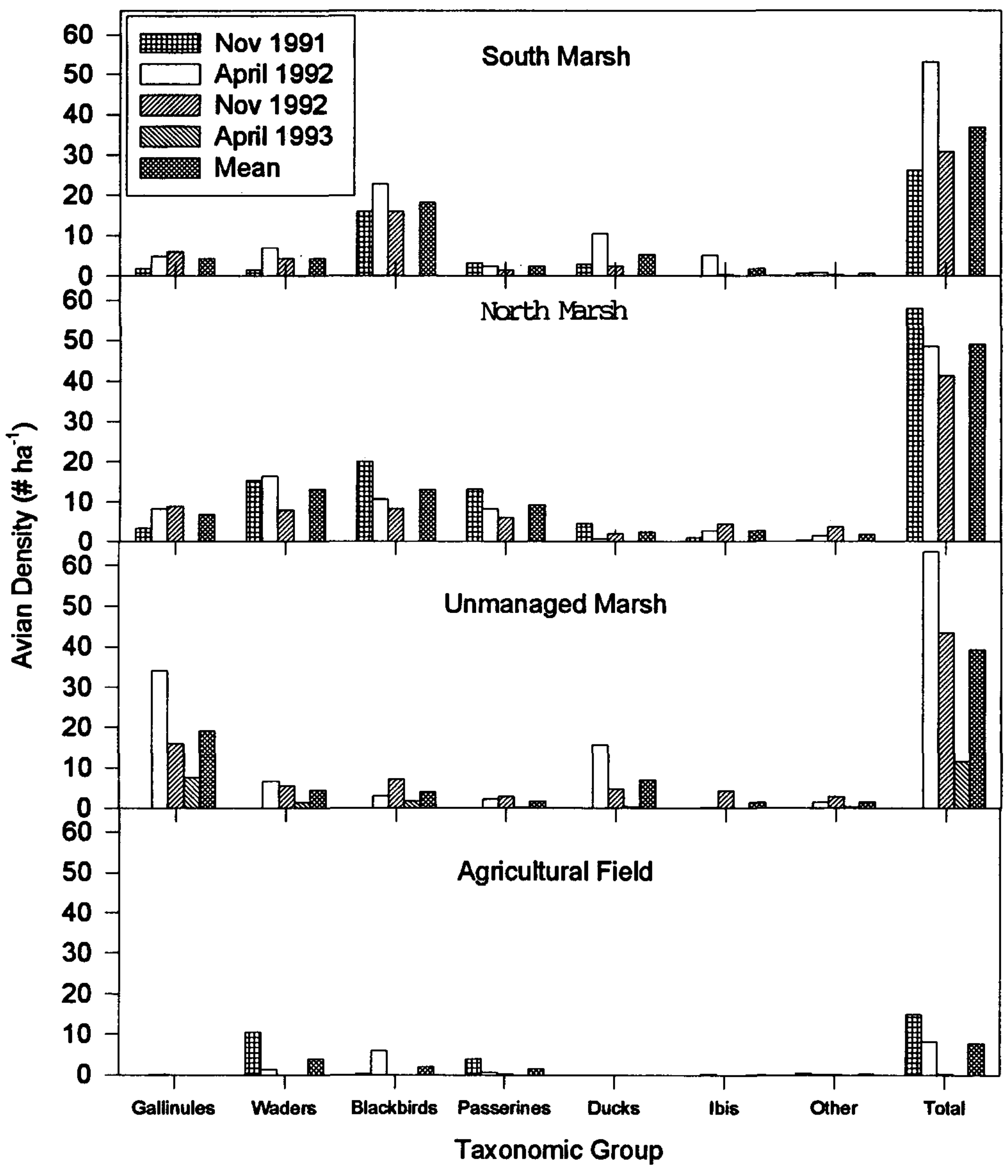


Figure 128. Avian density (# ha^{-1}) estimates using Drive-Through method.

grackles, and least bitterns. American bitterns, cattle egrets, and great blue herons were observed performing mating rituals, but nests of these birds were not found in the marshes.

Yellow-crowned night herons and black-crowned night herons were observed with young in the south and north marshes during the 1992 breeding season. In addition, eggs identified as belonging to yellow-crowned night herons were found near the south marsh inlet. Black-necked stilts were observed nesting in the south and unmanaged marshes during the 1991, 1992, and 1993 breeding seasons. It was interesting to note that sightings of the night herons and black-necked stilts were rare during late summer through winter months. A fulvous whistling duck was found in south marsh sitting on a nest with eggs in May 1993.

Ospreys have been observed in nests in the trees along the lake shoreline near the marshes. These birds were observed feeding their young in these nests. White ibis also built nests in the same forest, but it was difficult to ascertain whether young were being produced.

MAMMAL OBSERVATIONS

Raccoons, opossums, and armadillos were commonly observed on the project site. In May 1993 during a survey of the unmanaged marsh, two infant raccoons were found in a nest made of cattails. Bobcats or evidence (e.g. feces, foot prints, prey remains) were observed frequently around the marsh. Otters were sighted swimming and feeding in all three of the marshes. Most often two or more otters were seen together. Occasionally, up to five otters were observed feeding in the open areas of the north and unmanaged marshes. A marsh rabbit and its nest were found near the end of transect 8. Rabbit feces have been found in other project areas. Rats and mice were also commonly seen in the marshes at various times.

FISH OBSERVATIONS

Fish have been observed during bird surveys and vegetation field work. A limited throw-trap survey in the south and unmanaged marshes revealed four species with dominance by mosquitofish (*Gambusia_holbrooki*) (Table 44). Numerous *Tilapia* spp. nests were found in the unmanaged and south marshes. Large schools of gar have been seen in the canals and in the pool downstream of the south marsh outlet weir.

Table 44. Small scale fish sample of South and Unmanaged Marshes.

	Density (# m^{-2})	
Species	South_Marsh	Unmanaged_Marsh
Gambusia_holbrooki	183.5	130
Heterandria_formosa	38	31
*Tilapia_*spp.	0	8
Ictalurus_nebulosus	1	0
Total	222.5	169

V. DISCUSSION

GENERAL OVERVIEW: FLORA

The flora of the Apopka Marsh during the duration of sampling was dominated by ruderal species. These species are common to ephemeral habitats, disturbed sites and newly regenerating vegetation communities. The flora is common to, at least partially, with other ecosystems in Florida including components of anthropogenically disturbed sites on Little Talbot Island (Easley and Judd 1993), and Paynes Prairie (Patton and Judd 1986, Easley and Judd 1990); abandoned farmland on marl in south Florida (Loope and Dunevitz 1981), rice fields in coastal South Carolina (Stalter and Baden 1994), corn and oat fields in the Inland Pampa, Argentina (D'Angelo et al. 1988). The flora can be found on sites that are in a state of restoration, such as, wetland forest (Weller 1995) and Everglades marsh (Dalrymple et al. 1993) in south Florida; phosphate mine reclamation sites in central Florida (Erwin and Best 1985, Patrick 1992); and a limestone quarry in Illinois (Anderson and Brown 1991). Finally, a similar flora is common on sites that undergo periodic geological or hydrologic variation, such as, delta formation along the Atchafalaya (Shaffer et al. 1992) and Mississippi rivers (White 1993), or water level manipulation in a northern freshwater marsh in the United States (Harris and Marshall 1963).

With time many of these species will disappear as a longer lived, rhizomatous community dominates. This pattern emerged with the expansion of two species of cattails (*Typha domingensis* and *T. latifolia*). The potential successional pathways in the Apopka Marsh are difficult to predict, but may lead to a more diverse vegetation community with time. Fraga and Kvet (1993) after a seven year study of succession in a *Typha* *domingensis* community in Cuba, found the development of more diverse flora, including: *Cyperus odoratus, Eleocharis interstincta, Mikania micrantha, Panicum maximum*, and *Sagittaria lancifolia*. The maturing community contained some species similar to that of the Apopka Marsh. Fraga and Kvet (1993) determined that changes to the *T. domingensis* were a result of accumulating litter providing a substrate favorable for seed germination and seedling establishment. They reported formation of "organic mats" within the community and attributed mat accumulation to primary production being greater than decomposition. Apparently similar patterns of organic deposition and mat formation have occurred in the Apopka Marsh (Figures 104 & 105) and may become sites for development of a more diverse vegetation community. The nearby red maple-green ash swamp forest may provide seeds to colonize the marsh, leading to grounding of floating mats and development of a more heterogenous topography and vegetation community.

VEGETATION COMMUNITY DEVELOPMENT - PLANTED & NATURAL SUCCESSION: STRUCTURE AND COMPOSITION

The results of the vegetation community development measurements have revealed an ecosystem undergoing a number of early successional processes. These include rapid coverage by the opportunistic species *Hydrocotyle ranunculoides* and *Typha latifolia*; rapid shifts from dominance by one suite of species (*Eupatorium capillifolium, Panicum dichotomum*) to *Ludwigia octovalvis* and to *Ludwigia peruviana* and *Typha latifolia* as environmental conditions changed with increasing hydroperiod.

Cover data from the planted sites and natural succession transects revealed that site preparation and planting of favorable species, *Eleocharis interstincta, Pontedaria* *cordata, Sagittaria lancifolia, Scirpus californicus*, and *S. validus* established initial site conditions favorable to the formation of a *Typha latifolia* resistant plant community.

FLOATING MAT FORMATION

The areal development of vegetated floating mats increased with time in both the planted sites and along natural succession transects. The development of floating mats may be attributed to a number of factors occurring simultaneously. These include, maintenance of a long hydroperiod (Mitchell and Niering 1993), coupled with deep water (>50cm) (Milleson et al. 1980, Pomogyi 1989), deposition of organic particles from the inflowing Lake Apopka water, nutrient loading (Kadlec and Bevis 1990), deposition of dead leaves (Fraga and Kvet 1993), reduction in soil matrix integrity due to farming, and the growth of a robust rhizomatous plant community. A probable successional process leading to the formation of floating mats is as follows. As the plant community grew, roots colonized the disturbed soil layer. With no need to grow into the deeper soil for nutrients, and restrictions on growth from anaerobic soil conditions and a buried (at 50 cm+ depth) dense soil matrix, rhizomes and roots grew into the water column. The expanding matrix of water suspended rhizomes and roots trapped organic particles from the lake water flowing through the marsh and increased the depth of the unconsolidated sediment layer. Biomass measurements have shown an increasing presence of suspended rhizomes over time. Simultaneously, slowly decomposing dead leaves were deposited onto the rhizome-unconsolidated sediment layer. Measurements of leaf decomposition have provided information suggesting that 20% of *Typha latifolia* leaf tissue remains after 130 days (Fisher et al. 1994). Finally, trapped gas produced in the sediment resulting from anaerobic decomposition and gasses stored in the rhizomes of plants (Michaud and

Richardson 1989) increased mat buoyancy until the soil and vegetation matrix floated to the water surface. Floating mats exposed the sediment surface to air and light, thus promoting seed germination of plant species that would otherwise remain dormant until drawdown improved seed germination conditions. The floating mat condition may result in a succession away from domination by *Typha* spp. See discussion of Fraga and Kvet (1993) in "General Overview - Flora."

MARSH VEGETATION COMMUNITY DEVELOPMENT - INITIAL CONDITIONS

The establishment of planted sites within the naturally developing marsh vegetation community provided the means to observe the effects of initial vegetation conditions on marsh development. Site treatment that included removal of the *Typha latifolia* dominated vegetation reset the successional state on the site to an earlier more accessible phase. This treatment method consisting of mowing followed by flooding has been reported to effectively remove *Typha domingensis* in a tropical, Costa Rican marsh (McCoy and Rodríguez 1994). A suite of planted species (i.e. *Eleocharis interstincta, Pontedaria cordata, Sagittaria lancifolia, Scirpus californicus,* and *Scirpus validus*) were successful at establishing plant communities in an environment that was conducive to the establishment and expansion of the invasive species *Typha latifolia*. Within the mixed species planting plots these same species, plus *Peltandra virginiana* and *Thalia geniculata* established a competitive vegetation community. Within the mixed plots the nearly even division of space among the most successful species suggests they are somewhat similarly competitively adapted. Invasion of the control plots by *Typha latifolia* provides an indicator of its potential ability to invade the planted plots (mixed and single species).

Typha latifolia coverage in the walkways between planted plots was not measured, but was similar to coverages within the control plots. Also, seed from *Typha latifolia* in the landscape flowed into the planted areas providing opportunity for regeneration from seed as vegetated mats began to float.

In spite of the high level of opportunity for invasion by *Typha latifolia* the successful planted plots remained competitive with a high level of coverage dominance by target species. Initial condition played a role in the establishment of a *Pontedaria cordata* dominated marsh on reclaimed phosphate mined land in south central Florida. A donor wetland soil containing *Pontedaria cordata* seeds established quickly and excluded *Typha latifolia* more effectively than occured in a similar site without soil added (Erwin and Best 1985). Erwin et al. (1994) reported that initial condition and proximity to an undisturbed wetland were the most important factors explaining the rapid development of a species-rich, nearly *Typha latifolia*-free freshwater marsh in southwest Florida. Unlike in the Apopka marsh, nutrient levels in the southwest Florida marsh were low, explaining the competitive edge of the newly established plant community relative to *Typha latifolia*.

MARSH VEGETATION COMMUNITY DEVELOPMENT - DYNAMICS

In the planted plots containing single species, cover estimates revealed that *Eleocharis interstincta, Pontedaria cordata, Sagittaria lancifolia,* and *Scirpus californicus* were successful at resisting invasion by cattail (*Typha latifolia*). *Scirpus validus* successfully colonized early, then after two years experienced a large scale senescence. This life cycle has been reported in a northern cattail/bulrush marsh (Harris and Marshall 1963). The least successful species, *Panicum hemitomon* was overwhelmed by the invading cattail. The success of *Panicum hemitomon* may be related to its habitat requirements. It has been reported from the oligotrophic Everglades marsh (Loveless 1959). It has also been reported to occur in a long hydroperiod site in the Everglades marsh at which water level fluctuated near the surface and seldom was greater than 50 cm deep (Gunderson 1986). The range of adaptation for *Panicum hemitomon* includes a moderate degree of drought tolerance and it s preference for fluctuating water level (Kirkman 1992). When well established in high nutrient environments, *Panicum hemitomon* seems to resist invasion by nutrient adapted species (e.g. Typha spp.). An example of this pattern may be found in the upper St. Johns River marsh. Extensive *Panicum hemitomon* areas have been reported from this marsh (Kim Ponzio, Personal Communication, Lowe 1983, Turner 1996). The likelihood that this marsh community formed under oligotrophic (low nutrient) conditions is supported by measurements of nutrient deposition in the Blue Cypress Marsh Conservation Area (Brenner and Schelske 1995). Brenner and Schelske (1995) reported that nutrient deposition was much greater since the 1970 s than during the time period around 1920. The results of this study suggest that establishment of *Panicum hemitomon* may be difficult.

Within the seeded plots *Pontedaria cordata* was the most successful. It was successful colonizing the *Sagittaria lancifolia* seeded plot as well. This colonization pattern suggests that seeds floated from the target plots into adjacent plots or *Pontedaria cordata* seeds are widely distributed in the marsh. Within the *Polygonum punctatum* seeded plot an increased presence after drawdown suggests that seeds remained in the seed bank and were activated when environmental conditions were favorable for germination. The predominant pattern in all seeded plots was dominant coverage by *Hydrocotyle ranunculoides* and *Typha latifolia*. This suggests that initial conditions were important in determining the successional patterns for these plots. The predominance of invader species in the seeded and mulched plots relative to the control plots suggests that seeds may have been introduced during plot preparation.

The mulched plots were quickly invaded by *Typha latifolia*. This pattern is suggestive of seed introductions in the mulch material. The vegetative community developing on these sites was in no way similar to that from the donor site (Table 3). The seed bank assay revealed only a few individuals of *Rhexia nashii* and *Xyris jupicai*, common bayhead species. A lack of response by bayhead species resulted because the donor soil (mulch) was under deeper water (>30 cm) than the species are adapted to withstand .

Except for a slow invasion by *Typha latifolia* and an increase in cover after drawdown, the control plots remained open during most of the study period. The slow invasion by *Typha latifolia* suggests that intense site preparation followed by flooding provided a means for limiting the invasion of undesirable species. The planted plots revealed the positive effect of establishing a competitive species early in community succession.

The target species seemed to compete successfully with *Typha latifolia*. The time series graphics of *Typha latifolia* growing in the planted plots suggest that *Typha latifolia* has not reached a coverage plateau. It is likely that the planted vegetation communities are approaching some form of a stable state in which a mixture of *Typha latifolia*, a target species, and a species such as *Hydrocotyle ranunculoides* coexist. This species mixture is probably unstable over the long-term because of the rapid growth potential of *Typha latifolia* (See "Clonal Growth") and the capability of *Hydrocotyle ranunculoides* to colonize available space including partially shaded areas. Therefore, circumstances in which productivity of the target species declines could lead to a rapid increase in dominance of both *Typha latifolia* and *Hydrocotyle ranunculoides*. This scenario differs from that reported by Fraga and Kvet (1993) in which dominance by *Typha domingensis* declines over time as organic matter builds on the soil surface. A likely scenario for the Apopka Marsh is a rapid increase in competitive species in the short-term as a function of initial conditions, followed by an apparent stable state as the ecosystem comes to a competitively driven "equilibrium." With time, as litter is deposited, substrate conditions become more amenable to germination and establishment of seeds flowing in from outside the marsh. In addition, if the floating mats persist, substrate conditions will rapidly change to a favorable condition for establishment of invading species and activation of the seed bank. If the floating mats degrade, open water will form between the mats providing a favorable habitat for growth of suspended *Typha* spp. rhizomes, and floating *Hydrocotyle ranunculoides* and *Eichhornia crassipes* mats. This scenario may be slightly modified within the planted plots. In the planted plots, if a decline in productivity, a senescence event (e.g. *Scirpus validus* after two years), or a slow invasion into available space as target species rhizomes turnover occurs, the planted species may become more susceptible to a rapid shift to dominance by *Typha latifolia*. The catalyst for this rapid shift might be a biotic factor such as invasion by an herbivore or virus, or an abiotic factor such as a severe freeze.

Vegetation community development along the natural succession transects may be characterized by a rapid expansion and colonization by the cattails, *Typha domingensis* and *T. latifolia*. The rapid colonization of *Typha latifolia* in a similar ecosystem has been reported by Pomogyi (1989). Pomogyi (1989) measured a 54% increase in areal coverage per year from 1985-1987 in the Balaton Reservior, Hungary. Under increased nutrient loading and hydroperiod, cattails have been shown to rapidly increase coverage and exclude other associated species (Urban et al., 1993).

VEGETATION COMMUNITY DEVELOPMENT

Natural Succession Transects -- Biomass

Biomass patterns and partitioning in the Apopka Marsh appeared to be primarily regulated by four factors: site history, species composition, time, and distance from inlet. During the four year survey of this site, considerable changes in standing biomass occurred. Initially, the predominant biomass consisted of flood intolerant species, primarily *Eupatorium capillifolium* (eastern portion of the south marsh and north marsh), and *Aster subulata* and grasses *Panicum dichotomiflorum*, *Panicum* spp. (western portion of the south marsh). During this initial period standing crop biomass at transect 8 averaged the highest surveyed in the marsh, over the four year study, 1753 g m^{-2}. *E. capillifolium* contributed 1628 g m^{-2} to this total. After flooding, these previously dominant and almost monospecific stands were extirpated by the following summer. Under the new hydrologic regime, average standing crop biomass declined by almost half over the next two years. By the summer of the third year standing crop had increased to 65% of the pre-flooded condition, and by March 1994, at the beginning of the growing season, standing crop was at 70% and seemed likely to equal the highest pre-flooding standing crop biomass by the end of the growing season. During the period of lower standing crop the marsh was in a transitional phase under the new hydrologic regime with selection for species that could survive and compete under these conditions. *Typha latifolia was* the most competitive species under these conditions and dominated the biomass of the south marsh by the summer of 1992 and areas of the north marsh by the summer of 1993.

The literature documents that under conditions of continuous inundation and elevated nutrients *Typha* spp. will most likely become the dominant biomass species present (e.g. Boyt *et al.* 1977; Fetter *et al.* 1978; Pomogyi 1989; Kadlec and Bevis 1990). Dominance of a species within a site has been found to follow two general selection processes: preemption or "founder controlled" communities (Sutherland 1974), or "dominance-controlled" communities (Yodzis 1978). Preemption defines the process under which a species that first colonizes a site will become the dominant species and exclude other invading species. Dominance-controlled communities, on the other hand, are dominated by that species which has the most competitive edge regardless of the pioneer species at the site. Dominance by *Typha latifolia* within the marsh after four years of inundation attests to the ability of this species to utilize both of these community controlling strategies. Initial colonization of a site by *T. latifolia* is through wind dispersed seeds primarily on areas of exposed wet mud (van der Valk and Davis 1976; Grace and Wetzel 1981) after which vegetative colonization of an area as great as 60 m^2 per individual plant within two years have been reported (Dykyjova and Kvet 1978). This evidence suggests that under continuously flooded conditions and elevated nutrient conditions *Typha latifolia* will continue to dominate the biomass within the marsh complex.

Below-ground biomass levels within the marsh may be related to dominant species, duration of species presence and seasonal translocation of biomass (Hogg and Wein

1987). Below-ground structural morphology of species may affect the amount of biomass found below the substrate surface. The presence of *Typha latifolia* as compared to *Eleocharis* spp., for instance, would have significantly different below-ground components due to the fact that *T. latifolia* has a more robust rhizomatous root system and *Eleocharis* spp. a more filamentous, less robust, morphology. Below-ground biomass of perennial species often survives for several years. An equilibrium state of new root production to old root senescence is not reached for up to five years in the case of *T. latifolia* (Hogg and Wein 1987). Therefore, increases in living below-ground biomass can occur even after maximum above-ground biomass crop has been reached. Seasonal translocation of non-structural carbohydrates may also influence the below-ground biomass levels, with the end of the growing season having the highest concentrations and mid growing season having the lowest levels. This can account for up to 50% of the dry weight biomass in species such as *T. latifolia* (Hogg and Wein 1978). Live below-ground biomass in the Apopka Marsh steadily increased, indicating a shift to rhizomatous species and a system not yet having attained a state of below-ground biomass equilibrium.

The establishment of floating mats within the marsh did not appear to have a significant effect on biomass with total biomass levels comparable to other parts of the marsh. Mat development in wastewater treatment marsh systems (Kadlec and Bevis 1990) was not considered detrimental to the treatment train and biomass was not affected. However, formation of mats in the Apopka Marsh was relatively recent and long-term effects of the mats on standing crop species composition or other parameters (e.g. nutrients, flow volume and velocity) of the marsh is unclear.

Temporal changes in above-ground live biomass over the course of the survey indicated only one period of time that had significantly lower biomass levels than any of the other sampling events. This relates to the species transition period and establishment discussed above. The differences in significance between the LSD and Scheffe's comparison technique relate to the Type I error where LSD techniques are more of a pair-wise comparison with a cumulative and greater potential for a Type I error, and Scheffe's comparison method is more conservative and develops a Type I error on an overall comparison. The differences in significance between the LSD and the Scheffe's test results were seen during the winter sampling events when live standing crop biomass would be lowest and therefore more similar to the low biomass levels found during the January 1992 sampling. In summary these results indicate a convex curve of above ground total live biomass levels over the four sampling years. After a period of reduced total standing crop biomass, resulting from changes in the hydrologic regime, the overall biomass in the marsh increased and by the summer of 1994 was approaching initial, pre-flooding levels.

Dead biomass was significantly influenced by changes in the hydrologic regime and live biomass levels. Dead biomass increased considerably during the August 1991 sampling and reached a peak in January 1992. These high levels were most likely the result of flood intolerant species die-off as well as annual winter die-back of new species colonizing the site. Trends in dead biomass levels also appeared to follow live biomass levels with about a six-month lag between the summer and winter sampling events. Over the course of the four year sampling, dead biomass increased and some seasonal oscillation was observed primarly due to senescence and dieback in the fall and winter months. Due to the duration of sampling, it is not known whether a longer frequency oscillation for dead biomass may exist related to changes in standing crop biomass.

There were many statistically significant spatial biomass differences within the marsh (Scheffe's comparison test). However, these differences are only apparent at the transect level scale of the marsh. Transects showing significant differences in biomass were not transects that could be grouped into the north or south marsh or by distance from the inlet. This would imply a more random factor that influences overall biomass within the marsh than a more predictable nutrient gradient, which has been found to influence biomass gradients in other treatment marsh systems (Zoltek and Bayley, 1979; Bayley *et al.* 1985). The random distribution of biomass in the Apopka Marsh may be a result of different aged stands of vegetation, patchy species distribution, a non-linear nutrient gradient throughout the marsh possibly related to hydrologic short-circuiting or many other variables. One relationship which could be seen from both the *Typha latifolia* and *Alternanthera philoxeroides* biomass data was that total live biomass crops peaked in the south marsh one year earlier than in the north marsh. Early stands of both of these species found in the eastern portion of the south marsh may have provided an earlier establishment in this marsh. More recent sampling events that have not been incorporated in this report may provide some insight into these longer-term trends. As yet, however, these observations are not conclusive.

Overall, the biomass information collected over the past four years indicates a re-establishment of high biomass levels within the marsh after a period of low standing crop biomass related to changes in the hydrologic regime and subsequent transition of dominant species. These levels are still lower then other freshwater marshes (Table 45) with similar dominant species and may be a result of open spaces which are not yet filled in. At this time *Typha latifolia* is the dominant competitor in the marsh. With no change in the hydrologic regime *T. latifolia* may dominate the entire marsh and should attain biomass levels similar to other mature *Typha* spp. dominated marshes. Long-term oscillation of *Typha* on an approximate two-year cycle may be evident. However, this is still preliminary and requires additional information. Spatial heterogeneity in biomass within the marsh was evident, although correlations with nutrient concentrations, flow regime, soil characteristics, and other gradients in the marsh are unclear. Temporal and spatial biomass relationships within the marsh at this time were most likely related to species composition and duration of species recruitment on the site. Future information may clarify the importance of species specific oscillations in biomass, long-term species succession trends, and other factors affecting the marsh biomass such as management techniques and development of floating mats.

REPRODUCTIVE PHENOLOGY

Phenology of selected plant species within the Apopka Demonstration Marsh was surveyed under five treatments: natural succession, single species planted treatments, mixed species planted treatments, mulched treatments and control conditions. Over the 40-month sampling period reproductive activity and trends were characterized within the marsh. However, resolution and definitive timing of various phenologic stages were often difficult to determine due to the low sampling frequency.

Table 45. Biomass and Primary Productivity Comparison between Apopka Marsh Demonstration Project and other freshwater marshes. Subscript explanation: 1=Standing Crop g m^{-2}, 2= Primary Productivity g m^{-2} yr^{-1} (Except see This Study, g m^{-2} d^{-1}); a=Above-ground, b=Below-ground, c=Above- and Below-ground combined.

Site	Dominant Species	Standing Crop$_1$	Primary Prod.$_2$	References
Apopka Marsh, FL	Sagittaria lancifolia	132a		This Study (August 1992)
Barataria Basin, LA	Sagittaria lancifolia	61a control		Howard & Mendelssohn 1995
Barataria Basin, LA	*Sagittaria lancifolia*	54a Disturbed control		Howard & Mendelssohn 1995
Barataria Basin, LA	*Sagittaria lancifolia*	44a 7.5 cm water depth		Howard & Mendelssohn 1995
Barataria Basin, LA	*Sagittaria lancifolia*	54a 15 cm water depth		Howard & Mendelssohn 1995
Apopka Marsh, FL	*Typha latifolia*	617a	1.5 - 3.4 gm^{-2} d^{-1}	This Study (March 1994)
Apopka Marsh, FL	*Typha latifolia*	580b		This Study (March 1994)
Apopka Marsh, FL	*Typha latifolia*	1197c		This Study (March 1994)
Tropical Marsh, Kenya	*Typha domingensis*	1350		Jones 1988
San Juan Reserv., Cuba	*Typha domingensis*	328-420a	1324-1514	Fraga and Kvet 1993
San Juan Reserv., Cuba	*Typha domingensis*	323-429b		Fraga and Kvet 1993
Prairie pothole, IA	*Typha glauca*	1156c	2297a	van der Valk and Davis 1978
Prairie pothole, IA	*Typha glauca*	2000a		Davis and van der Valk 1983
Prairie pothole, IA	*Typha glauca*	791-1431b		Davis and van der Valk 1983
Prairie pothole, IA	*Typha glauca*	1281-2000a		Currier et al. 1978
Prairie pothole, IA	*Typha glauca*	1150b		Currier et al. 1978
Lake marsh, WI	*Typha* spp.		3450c	Klopatek 1974
Czechoslovakia	*Typha latifolia*	1400-1600a		Kvet 1978
Britain	*Typha latifolia*	1070a		Pearsall and Gorham 1956
Central Alberta	*Typha latifolia*	322a		van der Valk and Bliss 1971
Athabasca R. Alberta	*Typha latifolia*	456-846a		Lieffers 1983
Oregon	*Typha latifolia*		2040-2210c	McNaughton 1966
Floating marsh Can.	*Typha x glauca*	450a		Hogg and Wein 1987
Floating marsh Can.	*Typha x glauca*	249b		Hogg and Wein 1987
Floating marsh Can.	*Typha x glauca*	704c		Hogg and Wein 1987
South Carolina	*Juncus effusus*		1860c	Boyd 1971
Floating Marsh, LA	*Panicum hemitomon*		1700a	Anderson 1976

Although thirty-six species were sampled at least once in flowering, immature or mature fruiting phenology, only the ten most dominant and reproductively active species were analyzed in more detail. In general when reproductive activity was noted in a species there was little temporal difference in occurrence of a phenological stage between different treatment types. There were, however, some differences in timing of reproduction between different species. Differences in intensity of various phenological stages were observed occurring temporally over the duration of the survey and between treatment sites or transects.

Pontederia cordata was found to produce flowering, immature and mature fruiting phenology during the late spring and summer sampling events, primarily as documented in May 1992 and August 1992 and 1993. This timing of phenology corresponds well with another survey conducted in Paynes Prairie, Florida, where *P. cordata* flowering occurred principally between May and September, immature or ripening fruit between late May and mid-September and mature or dispersing fruit between early July and mid September (Patton and Judd, 1988). Between the different treatment types applied to *P. cordata*, single species planted plots had the highest levels of phenology activity followed by seeded plots and mixed species plots. Lowest activity was found along the natural succession transects. In the planted treatments, intensity of phenology appeared to decrease over the course of the survey as indicated by amount of immature fruit present in August 1993 relative to that of August 1992. However flowering activity during these two sampling events was approximately equal. In the mixed species plots the results were similar with a reduction in immature fruit production but similar or greater flowering activity occurred in 1993. Spatial differences in phenology intensity, not evident in the single species plots, were reversed in the mixed and seeded plots with increasing and decreasing activity from inlet to outlet, respectively. Differences occurred at transects 1 and 6 along the natural succession transects with greater intensity at transect 6.

Eleocharis interstincta found in both the planted and mixed treatments showed relatively constant phenology activity throughout the sampling survey. In the planted plots no differences were found between sites over the duration of the study. The period of most active flowering appeared to be in the spring and summer. Fruit production was most active during the summer and early fall. This corresponded well with another study of vegetation in Everglades National Park where fruiting activity was greatest in the months of July and August (Loope 1980). Differences between the single species and mixed species treatment were great with single species plots showing at least twice the reproductive intensity as that of the mixed plots.

A decline over time in intensity of phenology of *Sagittaria lancifolia* was evident in both planted and seeded treatments. Phenology indices were highest in the summer of August 1992 and declined considerably in August 1993. Spatial differences in phenology of this species were not evident. Similar to other species there was greater intensity of reproduction in the planted treatments as compared to seeded treatments. The timing of reproductive stages appeared to be greatest in late spring for flowering and immature fruit production and summer for mature fruit phenology.

Thalia geniculata, a species planted in the mixed species plots, showed some increase in reproductive activity during the duration of the study with the greatest increases found in Site 3 of the north marsh. Timing of flowering is most likely in the late spring or summer months with fruit production primarily in the summer as evidenced by intermediate flowering activity and higher immature and mature fruiting phenology in August of 1992 and 1993. This increase in reproductive activity may indicate an increase in reproductive potential with age of the *T. geniculata* stand.

Scirpus validus and *Scirpus californicus* exhibited reproductive activity in both the mixed species and single species plots. The planted treatments by far had a greater intensity of phenology throughout the study with levels overall showing little or only a slight decline over the 40 months of sampling. Flowering of these species appears to occur in the late winter and early spring followed by fruit production in the summer. Activity in the mixed plots peaked in the summer of 1992 for *S. validus* with no activity found in August 1993 or March 1994. During this time fruiting and flowering activity should have occurred in the mixed species plots based on activity in the single species plots. In the mixed plots of *S. californicus*, activity was only found at Sites 1 and 2 with some reproductive activity in Site 1 apparent throughout the study.

Hydrocotyle ranunculoides, although not planted in either of the treatment plots, was common throughout the marsh as a sub-canopy and open water invading species. This species showed highest flowering activity in late winter and early spring with some activity occurring in the summer months. Similar activity has been reported for the Everglades National Park (Loope 1980). Immature fruit production was greatest in August but was also higher in the spring than during winter sampling events. Reproductive activity of this species increased throughout the study, especially in March 1994 in both the natural succession transects and in the control plots. No difference in phenologic intensity was evident between transects throughout the marsh or between control sites in the south and north marsh indicating little, if any, influence of variables effected by the distance from the inflow of the marsh.

Typha latifolia, the dominant biomass species within the overall marsh system, showed several trends in phenology during the study. Intensity of phenology in the natural succession transects appeared to be constant in the south marsh after an initially high fruit production in June 1991 but increased slightly over time in the north marsh.

Phenological index values were greater for all stages of phenology in the south marsh than in the north marsh indicating an overall greater reproductive potential. In the planted plots, *Typha* showed considerably less phenology activity than in the seeded, mulched or control plots, most likely due to the initial need for establishment and greater competition occurring in the planted plots than in the other three treatments. By August 1993, no planted treatments were without some *T. latifolia* phenology present. Spatial differences in *T. latifolia* between Sites 1, 2 and 3 did not appear to be present in the planted plots most likely due to the lower overall activity. In the seeded treatment, however, Site 2 had a great deal more activity than Site 1, with Site 3 only showing dead mature fruit phenology in March 1994 in the seeded plots of *Polygonum punctatum*. Mulched and control treatments showed highest activity in Sites 1 and 3, and 2 and 3, respectively, with overall intensity of phenology stages greater in the mulched treatments than in the control. Timing of flowering, immature fruit production and mature fruit dispersal agreed with a similar study in Paynes Prairie, Fla. (Patton and Judd 1988). The time span of reproductive activity in the Apopka Marsh appeared to be much longer than the Paynes Prairie survey, which indicated flowering, fruiting and dispersal stages of only one month, two and a half months and three months respectively. The *Typha* seed dispersal period may be extended by persistent, viable seed remaining on standing dead reproductive stalks.

The Apopka Marsh Demonstration Flow-Way Project showed phenological activity similar to other marsh systems (Loope 1980; Patton and Judd 1988). In these marshes the dominant number of species flowering and fruiting occurs in late spring and early summer with some species staggered throughout the year. Because of the dominance of *T. latifolia*, the overall phenology activity of the Apopka Marsh tends to be influenced by this species and immature and mature fruiting phenology will be extended later into the summer. The timing of phenology and other activities in the marsh such as water level fluctuation, burning or other disturbances which may increase or decrease the establishment of seeds or the reproductive potential should be considered. This coordination will help to minimize recruitment of undesirable species and enhance the recruitment of desirable species within the marsh.

CLONAL GROWTH

Vegetative reproduction is responsible for most of the expansion and species selection in a continuously inundated marsh (Fennessy et al. 1994; Gosselink and Turner 1978; van der Valk 1981). The type of species and resource availability are factors in the rate and extent of clonal expansion within a wetland. In the Apopka Marsh Demonstration Project these two factors were evident to varying degrees and can be used to interpret some of the present status of the marsh.

In this investigation all of the species studied showed some degree of clonal growth during the one year study period. *T. latifolia* showed clonal growth rates up to six times higher than the other three species measured. These rapid growth rates are supported in the literature by other investigations (Grace 1987; Dykyjova and Kvet 1978; McNaughton 1975) and provide some evidence for the rapid colonization of the marsh by *Typha* spp. In addition to the high linear growth rate indicated in this and other studies of *Typha* spp., it is important to note that the morphological characteristics of *Typha* spp. rhizomes indicate that up to three times the rates reported in this study are possible when extrapolating the expansion of *Typha* spp. to an areal coverage. Grace and Harrison (1986) showed that *T. latifolia* rhizomes have multiple branching from each culm, with each branch becoming a new rhizome. Other species studied do not have multiple branching along the rhizome. In this study only the growth of one rhizome was measured, resulting in the underestimation of the potential areal expansion rate of *Typha* spp. in the marsh.

Effects on productivity and rates of clonal expansion, presumably from nutrient limitation, were evident in the study by significant decreases in growth rate associated with distance from the marsh inlet. This decline was not surprising assuming the highest nutrient levels originated at the inlet and that the primary limitation to growth was nutrient availability. Two species however, *S. lancifolia* and *S. validus*, showed higher growth rates at the middle site sampled 1200 meters from the marsh inlet. This would indicate that some other factor regulates the growth of these species. Soil at the middle site appeared less compact and probably more easily exploited (Stenberg, personal observation). Differences in growth rate between species also became statistically significantly less at farther distances from the inlet. *Scirpus validus* outgrew *T. latifolia* at the farthest site. These differences in growth rate relative to other species, increased the understanding of the dominance by *Typha* spp. in many locations of the marsh.

Competition among species also plays a role in the development of vegetation communities in a marsh. In this study, measurements to the nearest competitor were taken on the first and second sampling events. Differences between the two were used to estimate the effect of competition on the gap closure rate. Although this method cannot measure an absolute effect of one "competitor" individual on the "target" individual, it does provide a good estimate of the rate at which open areas may be filled in by different species and how the proximity of other individuals may affect this rate. From this investigation, results suggest *P. cordata* was benefitted by "competition", *S. lancifolia* and *T. latifolia* hindered, and *S. validus* was not affected by competition. In the literature, theories on competitive effects on macrophyte growth are varied and often are dependent on standing crop and resource availability. In submerged macrophytes (McCreary et al. 1983) and emergent macrophytes in deep water (Wilson and Keddy 1991) it was found that competition did not have any effect on growth. However, at shallow water sites competition appeared to affect survival and growth of new transplants (Wilson and Keddy 1991). Newman (1973) indicated that available resources may provide a better indicator of competitive interaction. For example, competition for nutrients may be more important under low nutrient conditions, and for light under high nutrient conditions. Resource limitation may not become a factor until standing crop increases and available open space is reduced. In the Apopka Demonstration Marsh, filling in of available open space has been observed during the entire study period (November 1990 - March 1994) and the effect of competitive interaction is most likely increasing. This study indicates the potentials, of these species to vegetatively colonize the marsh as a result of linear growth rates and gap closure rates and provides insights into the role of *T. latifolia* as a dominant species. The high growth rate and multiple branching rhizome morphology of *T. latifolia* may explain its rapid spread through the marsh.

SEEDS

Waterborne Seed Trapping

The lack of an effect of trap position relative to the planted area on seed density may result from a number of factors. These may include: (1) seeds were not transported by water in this marsh; (2) vegetation acts as a trap that didn't allow the movement of seeds; (3) the seed traps were effective only at sampling seeds at or near the soil surface (thus sampling the soil seed bank); (4) the marsh had not matured to the point where measurable differences in seed flow (other than that from the seed bank) had occurred; (5) the traps were not effective indicators of seed movement in the marsh.

The detection of a seed density difference (Table 32, Jan93-Mar93) due to site seems related to drawdown of the north marsh (Site 3) during the spring of 1993. Because the sample was taken before most plant species had completed life cycles and provided additional fresh seed to the trap, increased seed germination must be attributed to seeds already in the trap. The increased rate of germination may be related to removal of a dormancy state by the spring drawdown (e.g. increased light, heat, and daily temperature fluctuations). Species contributing most to the increased seed density were annuals (e.g. *Ammania coccinea*, *Cyperus iria*, *Eclipta alba*, *Eupatorium capillifolium*) or flood intolerant (e.g. *Ludwigia leptocarpa*, *Ludwigia octovalvis*) species. An exception to this pattern was the increased presence of *Ludwigia palustris*, which tends to be a persistent submersed plant species in clear water. Most of the species found in all samples are commonly associated with disturbed sites (Godfrey and Wooten 1981a, 1981b). Statistically significant correlations between species composition of upstream and downstream traps for samples 1 (Sep92-Nov92), 2 (Nov92-Dec92), and 4 (Jan93-Mar93) suggests that on these dates similar species were found with similar seed densities. The finding of no relationship for sample 3 (Dec92-Jan93) results from the dominating influence of *Eclipta alba*, *Eupatorium capillifolium* and *Typha* spp. In this sample (Dec92-Jan93) these species were found in greater quantities in upstream sites than downstream sites. This correlation analysis provides further evidence for the lack of waterborne seed flow through the ecosystem. If seeds were flowing from the planted sites into traps, then fewer significant relationships should have been found. The finding of similar species richness provides more evidence for the lack of seed flow in this ecosystem. The seed bank section will provide a more complete view of seeds in the soil and their potential contribution to vegetation community development.

Airborne Seed Trapping

The predominance of *Typha* spp. in the airborne seed traps was unexpected. Other wind borne seeds that should have been found in the traps included: *Acer rubrum*, *Baccharis halimifolia*, *Eupatorium capillifolium*, *Pluchea* spp., and a greater density of *Andropogon* spp. The detection of a difference in seed densities between sites in the November 1992-December 1992 sample may be related to a peak in seed dissemination during this period. This pattern could result if cattails in the south marsh matured before those in the north marsh.

This experiment has provided more information to help explain the rapid invasion and dominance by cattails (*Typha domingensis* and *T. latifolia*) in the Apopka Marsh. The waterborne sampling revealed the presence and relative importance of cattails in the water column and surface soil. The airborne sampling has shown a maximumof 130 seeds m^{-2} during what appears to be a peak dissemination near the most mature cattails. During this same sample period seed density dropped to 49.6 seeds m^{-2} at the site farthest from the mature cattail. Using these data it is possible to suggest that during the peak dissemination period 37-98 seeds m^{-2} (assuming 75% seed viability) are available for establishment of new plants each year.

Seed Germination

The seed germination experiments resulted in lower than expected germination events and rates for most trial species (Table 37). The probable causes for these results are: (1) seed was collected prior to or after peak viability in the field; (2) conditions in the growth chamber did not meet the physiological requirements of target species; (3) seed was stored incorrectly leading to a loss of viability. To supplement information from the seed germination experiment a compilation of published seed germination experiments is presented in Table 44. The species in this list have been found in, or were important members of the Apopka Marsh ecosystem.

The most prominent component of the Apopka Marsh, cattails (*Typha domingensis* and *T. latifolia*), are well represented in the ecological literature. As might be expected from the rapid invasion and subsequent dominance of the Apopka Marsh, cattails are well adapted to early establishment in a marsh ecosystem. The most favorable conditions seem to be: shallow water (50-100% germination; Grace 1983, 1985), water low in oxygen (Morinaga 1926a), the absence of a previous cattail community or presence of ash from a recent fire (70-90% germination; Rivard and Woodard 1989), and the presence of light as might be found under recent disturbance conditions (4% vs 24-89% germination; Sifton 1959). *Typha angustifolia* and *T. subulata* were included in this collection to show that within the genus similar seed germination patterns have been found. Results of our experiment were not successful at duplicating the results of previous experiments (Table 46).

Pontedaria cordata and *Sagittaria lancifolia*, two potentially important species in the Apopka Marsh were found to have low seed germination rates when compared to the the literature values for cattails. *Pontedaria cordata* has been reported to germinate at 25% while *Sagittaria lancifolia* approaches 30% (Sutton 1990). Our study produced

Table 46. Seed germination characteristics of plant species found in the Apopka Marsh Demonstration Project.

SPECIES	# DAYS	%GERMINATION LIGHT	DARK	NOTES	REFERENCES
Bidens laevis	--	64	--	15C /6C ; stratified in dark	Leck et al. 1994
	--	93	--	35C /20C ; stratified in dark	
	--	--	2	15C /6C ; stratified in light	
	--	--	27	35C /20C ; stratified in light	
Cladium jamaicense	--	20	--	1^{st} 30 days	Alexander 1971
Cladium jamaicense	--	16	--	1^{st} 30 days (0.53% d^{-1})	Ponzio 1995
	--	17	--	Remaing 8.3 months (0.054% d^{-1})	
Cyperus esculentus	6	27	--		Shipley and Parent
1991					
Cyperus haspans	**--**	**52**	**--**	**Flooded treatment**	**This Study**
	--	**0**	**--**	**Moist treatment**	
Cyperus odoratus	**--**	**3**	**--**	**Flooded treatment**	**This Study**
	--	**3**	**--**	**Moist treatment**	
Cyperus spp.	3-4	81-91	--		Shipley and Parent
1991					
Digitaria spp.	3	7	--		Shipley and Parent
1991					
Echinochloa crusgalli	3	66	--		Shipley and Parent
1991					
Echinochloa crusgalli	**--**	**13**	**--**	**Flooded treatment**	**This Study**
	--	**0**	**--**	**Moist treatment**	
Eleocharis cellulosa	21	16	--	14 weeks trial	Sutton 1990
Eleocharis interstincta	**--**	**0**	**--**	**Flooded treatment**	**This Study**
	--	**0**	**--**	**Moist treatment**	
Eleocharis spp.	13-16	0-16	--		Shipley et al. 1989
Eleocharis spp.	4-8	7-87	--		Shipley and Parent
1991					
Eupatorium perfoliatum	--	50	--	-5-+10 cm water depth	Keddy and Ellis 1985
Eupatorium perfoliatum	4	70	--		Shipley and Parent
1991					
Eupatorium spp.	3	40	--		Shipley and Parent
1991					

Table 46. Seed germination characteristics of plant species found in the Apopka Marsh Demonstration Project (Cont.).

SPECIES	# DAYS	%GERMINATION LIGHT	DARK	NOTES	REFERENCES
Eupatorium spp.	6	58	--	30 day trial	Stockey and Hunt 1994
Juncus effusus	4	61	--		Shipley and Parent 1991
Juncus effusus	**--**	**0**	**--**	**Flooded and Moist treatments**	**This Study**
Juncus marginatus	**--**	**0**	**--**	**Flooded and Moist treatments**	**This Study**
Juncus spp.	5	0-93	--		Shipley et al. 1989
Juncus spp.	3-5	20-80	--		Shipley and Parent 1991
Juncus spp.	20	29	--		Stockey and Hunt 1994
Panicum spp.	4-5	65-87	--		Shipley and Parent 1991
Polygonum punctatum	--	85	--	-5 cm water depth	Keddy and Ellis 1985
	--	75	--	0 cm water depth	
	--	60	--	+5 cm water depth	
	--	30	--	+10 cm water depth	
Polygonum spp.	4-7	1-11	--		Shipley and Parent 1991
Pontederia cordata	21	25	--	12 weeks trial	Sutton 1990
Pontederia cordata	**--**	**0-2**	**--**	**Flooded treatment**	**This Study**
	--	**0-3**	**--**	**Moist treatment**	
Rumex crispus	7 max	48	--	small seeds	Cideciyan and Mallock 1982
	7 max	60	--	medium seeds	
	7 max	60	--	large seeds	
Rumex crispus	**--**	**0-37**	**--**	**Flooded treatment**	**This Study**
	--	**0-33**	**--**	**Moist treatment**	
Rumex spp.	8 max	65	--	small seeds	Cideciyan and Mallock 1982
	9 max	75	--	medium seeds	
	10 max	73	--	large seeds	
Rumex spp.	16	0-18	--		Shipley et al. 1989
Rumex spp.	4	77	--	a	Shipley and Parent 1991
Sagittaria lancifolia	28	29	--	6 weeks trial	Sutton 1990
Sagittaria lancifolia	**--**	**0-25**	**--**	**Flooded treatment**	**This Study**
	--	**0-17**	**--**	**Moist treatment**	

Table 46. Seed germination characteristics of plant species found in the Apopka Marsh Demonstration Project (Cont.).

SPECIES	# DAYS	%GERMINATION LIGHT	DARK	NOTES	REFERENCES
Sagittaria montevidensis	--	40	--	-5 cm water depth	Keddy and Ellis 1985
	--	50	--	0 cm water depth	
	--	50	--	+5 cm water depth	
	--	45	--	+10 cm water depth	
Sagittaria montevidensis	10	3-20	--		Shipley et al. 1989
Sagittaria montevidensis	2	70	--	6 weeks trial	Sutton 1990
Sagittaria montevidensis	9	58-100	--		Delesalle and Blom
1994					
Scirpus cyperinus	6	0-2	--		Shipley et al. 1989
Scirpus cyperinus	6	4	--	a	Shipley and Parent
1991					
Scirpus spp.	11-13	1-48	--		Shipley et al. 1989
Scirpus spp.	4-12	3-95	--	a	Shipley and Parent
1991					
Scirpus validus	--	25	--	-5, 0, +5 cm water depth	Keddy and Ellis 1985
	--	30	--	+10 cm water depth	
Scirpus validus	6	47	--	a	Shipley and Parent
1991					
Scirpus validus	**--**	**0**	**--**	**Flooded and Moist treatments**	**This Study**
Typha angustifolia	3	0-85	--		Shipley et al. 1989
Typha domingensis	--	10	--	-15 cm water depth	Grace 1985
	--	90	--	-7 cm water depth	
	--	90	--	-4 cm water depth	
	--	90-100	--	-4-+20 cm water depth	
Typha latifolia	--	70	--	b	Morinaga 1926b
	--	95	--	c	
	--	--	89		
	--	76	--	d	
	--	--	59	e	
	--	--	65		
Typha latifolia	--	--	95	20%H:80%air; 4 days	Morinaga 1926b
	--	--	97	80%H:20%air; 4 days	
	--	--	42	sealed jar; 4 days	
	--	--	86	sealed jar; 10 days	
	--	--	94	20%N_2:80%air; 4 days	
	--	--	98	90%N_2:10%air; 4 days	
	--	--	43	sealed jar; 4 days	

Table 46. Seed germination characteristics of plant species found in the Apopka Marsh Demonstration Project (Cont.).

SPECIES	# DAYS	%GERMINATION LIGHT	DARK	NOTES	REFERENCES
	--	--	85	sealed jar; 10 days	
Typha latifolia	--	24-89	4	f	Sifton 1959
	--	20-64	--	g	
	--	96	--	h	
Typha latifolia	--	50	--	i	Bedish 1967
Typha latifolia	--	90-100	--		Grace 1983
Typha latifolia	--	20	--	-15 cm water depth	Grace 1985
	--	50	--	-7 cm water depth	
	--	60	--	-4 cm water depth	
	--	30-60	--	-4-+20 cm water depth	
Typha latifolia	--	70-90	15		Rivard and Woodard
1989					
	--	--	75	l	
Typha latifolia	--	**0**	--	**Flooded and Moist treatment**	**This Study**
Typha subulata	--	88-95	<1	10 hr light/14 dark	Sobrero et al. 1993

Footnotes:
#DAYS = #Days to first evidence of germination. Max refers to days to mazimum germination.
#GERMINATION will have modifiers dscribing seed germination conditions.

Light = Germination trial in light.
Dark = Germination trial in dark.

NOTES
a. 30 days trial; 20C min/30C max; 15 hr light.
b. Temperature range 10/32 C , seeds on blotter paper (i.e. filter paper).
c. Temperature range 10/38, 15/38 C ; seeds in water.
d. Alternating temperature.
e. Ambient temperature.
f. Seeds submerged in water.
g. Seeds placed on moist filter paper in petri dish.
h. Seeds placed in environment with 2% O_2.
i. Optimum seed burial depth = 3 cm. Seed stored for one year.
j. Seed stored for one year.
k. With green leaf extract.
l. With ash extract.

low germination for *P. cordata* (2-3%) and germination approaching that reported by Sutton (1990) for *S. latifolia* at 17% (moist treatment) and 25% (flooded treatment). These low germination rates may provide some insight into why *Pontedaria cordata* and *Sagittaria lancifolia* are localized in the southeastern Apopka Marsh. With low seed germination rates these species would have to disperse large numbers of seeds great distances to cause a shift in species dominance patterns. In competition with *Typha* spp. and in the presence of floating mats this may not be possible. Sutton (1990) reported the time to first evidence of germination as 21 days for *Pontedaria cordata* and 28 days for *Sagittaria lancifolia*. In a marsh containing plant species that germinate more quickly, such as, *Cyperus esculentus* (6 days; Shipley and Parent 1991), *Cyperus* spp. (3-4 days; Shipley and Parent 1991), *Echinochloa crusgalli* (3 days; Shipley and Parent 1991), and *Polygonum* spp. (4-7 days; Shipley and Parent 1991) a competitive limit may be placed on the establishment of *Pontedaria cordata* and *Sagittaria lancifolia*.

Sagittaria latifolia, a species closely related to the Apopka Marsh inhabitant *Sagittaria montevidensis*, was reported to germinate in the range of 40-50% under conditions of -5 to +10 cm water depth (Keddy and Ellis 1985). Lower germination of 3-20% was reported by Shipley and Parent (1991). A high value of 70% was reported by Sutton (1990), and up to 100% by Delesalle and Blum (1994). At the Apopka Marsh, flowering and fruiting specimens of *Sagittaria montevidensis* were found infrequently. Therefore, we did not test this species. The prevalence of *Sagittaria montevidensis* seedlings after drawdown and its widely dispersed distribution suggests that it may have high germination percentages (Stenberg, Pers. Obs).

A pattern of low germination among a suite of rhizomatous species has been reported. The sedge, *Cladium jamaicense* has been reported to produce an early germination peak of only 16% in the first 30 days of a germination trial. During the next 8.3 months its germination percentage was only 17% (Ponzio et al., 1995). Alexander (1971) found a similar germination percentage after the first 30 days (20%), thus suggesting that the species may not compete well from seed. Another rhizomatous species, *Eleocharis interstincta*, a planted species in the Apopka Marsh did not germinate in our experiment. Its close relative *Eleocharis cellulosa* was reported to germinate at 16% with the first germination evident after 21 days (Sutton 1990). *Scirpus validus*, another rhizomatous species planted in the Apopka Marsh, did not germinate in our experiment. Keddy and Ellis (1985) reported germination percentages of 25% for water depths of -5 to +5 cm and 30% for a water depth of +10 cm. The greatest germination percentage of 47% was reported by Shipley and Parent (1991).

In a marsh containing large numbers of viable *Typha* spp. seeds, germinating at high rates, competition from other species will be limited at best. For successful colonization by the species covered in this section, competition from *Typha* spp. must be reduced and soil moisture must remain high (See Sutton 1990 for conditions needed to promote successful seed germination). These conditions must be maintained for at least a month because of the germination requirements of favorable species. Finally, the timing for establishing conditions for seed germination must coincide with seed fall from the target species. The target species mentioned in this section were not well represented in the soil seed bank and no evidence was found for stringent dormancy requirements for these species. Plant species in temperate locations have dormancy requirements which preserve the seed through winter and allow germination during spring when conditions are more favorable for establishment (Fenner 1992). These conditions may not apply in central Florida, with its infrequent severe freeze history.

Seed Bank Overview

This seed bank contained a flora that was similar to seed banks found in other early successional freshwater marsh ecosystems (Ewel and Conde 1979; Ewel et al. 1982; Dunn and Best 1983; Dalrymple et al. 1993; Erwin et al. 1994; Collins and Wein 1995). Species compositions of the marshes studied by Dunn and Best (1983) were similar to this study, but with a much lower species richness, 3-16 species versus 37-52 species from Apopka Marsh. Comparison with studies reported by Dalrymple et al. (1993) and Ewel and Conde (1979) suggests that despite geographical (southern, subtropical Florida) and habitat differences (disturbed, calcareous substrate) a common suite of species are responsible for early recolonization of disturbed sites in Florida. Erwin et al. (1994) did not sample the seed bank, but used mulch from a nearby donor wetland as a source of propagules and wetland soil matrix. The created wetland was established on an improved pasture. During the early successional period the species composition of the created wetland was dependent on the seed bank. Species that might be considered desirable for marsh restoration, including *Pontedaria cordata* and *Sagittaria lancifolia*, were found at low densities. Additional desirable restoration species such as, *Cladium jamiacense* and *Scirpus* spp. were not found.

Comparison of Seed Bank Treatments

Field and greenhouse treatments had mixed results over the reported two years of seed bank collection. The seedling density differences attributed to soil moisture in greenhouse trials are linked to physiological responses by the respective seed bank species. These responses are species-specific and have been reported in other studies (Morinaga 1926c; DuBarry 1963; van der Valk and Davis 1978; van der Valk 1981; Gerritsen and Greening 1989; Leck 1989; van der Valk 1992; Wilson, et al. 1993). A suite of species common to the Apopka Marsh have been categorized as mudflat species (van der Valk and Davis 1978). Mudflat species often are recruited into recently exposed habitats that have lost a vegetated community or are in the process of forming a new one on recently deposited sediment. Without the competitive exclusion caused by roots and/or a vegetated overstory these species respond by germinating and establishing. Mudflat species are also identified with disturbed sites such as agricultural fields that are maintained in a state of early succession. The maintenance of this early successional environment favors annual, rapidly reproducing species at the expense of perennial, slowly reproducing species.

While most species responded favorably to moist soil conditions, *Typha* spp. germinated best under flooded soil conditions. *Typha* spp. germination under flooded or low oxygen conditions has been reported in other studies (Morinaga 1926c, van der Valk and Davis 1978). This germination strategy may provide a competitive advantage under a wider range of soil moisture conditions.

In contrast to the results of soil flooding, field treatments provided a less clear picture of seed bank activities in the Apopka Marsh. Differences in germination rates may be attributed to the type of field treatment, but with low reliability. For example, it was not possible to reject the hypothesis that field treatments differed for the November 1991 sample. From these data there seems to be a downward trend in seedling density that might be related to field treatment. In contrast, the seedling densities measured in the November 1992 sample set provide some evidence that the control treatment had a detrimental effect, while the natural succession and mulch treatments had similar seedling densities.

Seedling density patterns resulting from field treatments may be explained by a number of factors. The field treatments may have had little or no effect on the seed bank. This may have occurred if the sites had been left unflooded for long enough to allow seedlings to complete their life cycles and replenish the seed bank. Sample intensity may have been too low to provide an adequate representation of the seed bank content and quantity. Under-sampling may occur if the seed bank is spatially heterogenous (Bigwood and Inouye 1988). We attempted to compensate for this problem by taking a large number of randomly chosen samples across each sample area. Determining the actual soil seed density distribution without an intensive study is not possible.

The similarity of the natural succession and mulch sites may be attributed to the apparent promotion of *Typha* spp. germination and establishment by the application of mulch. This conclusion may be drawn from the much lower germination rate of *Typha* spp. from the control sites. A possible explanation for this pattern may be that the bayhead donor soils had an extant *Typha* spp. vegetation community or the site was near a cattail seed source. It seems less likely that the soil acted as a trap or provided a more favorable germination environment for *Typha* spp. Alternatively, an argument for the mulch site donor soil providing a favorable environment for local seed germination may be supported by the presence of species common to all three treatment areas.

Few species representing a bayhead seed bank flora were found in the mulch treatment samples. The best candidates were, *Rhexia nashii*, *Utricularia subulata*, and *Xyris jupicai*. The remaining species at the mulch site are just as likely to be from the Apopka Marsh (Poiani and Dixon 1995). This pattern may be related to a number of factors, including, treatment of the mulch before and after application. With the mulch being collected and stored during the early summer prior to application it may have overheated causing seed death or been exposed to air, heat, and light, thus triggering germination. After application, seeds may have germinated prior to flooding. Water level may have been raised too rapidly and to an unacceptable depth, leading to seedling death. Either or both of these scenarios may have reduced the seed bank species composition and density and limited the potential for members of the seed bank to be detected in a seed bank assay or vegetation survey.

Comparison of Seed Bank and Vegetation Species

Differences in species composition between seed bank and vegetation communities were detected using Principal Components Analysis (PCA) and cluster analysis. Differences were found because species responded differently to treatment conditions and succession was occurring on the site. This successional pattern includes a shift away from flood intolerant and annual species towards a dominance by flood tolerant species, such as, *Eicchornia crassipes*, *Hydrocotyle ranunculoides*, *Ludwigia peruviana*, *Salix caroliniana*, and *Typha* spp. As the vegetation community continues to develop, without soil disturbance, its species composition may continue to diverge from the seed bank if the density of buried viable seed remains high. If seed that was buried early in site succession (e.g. at the end of agricultural activities) has a short period of viability and dominant species, such as *Eicchornia crassipes*, *Hydrocotyle ranunculoides*, *Ludwigia peruviana*, *Salix caroliniana*, and *Typha* spp., contribute seed, the seed bank species community may converge on the vegetation community.

The PCA grouped seed bank samples separately, primarily along the first axis. PCA Axis I was correlated most highly with treatment. This was because differences between the seed bank and vegetation species compositions dominated variation in the sample set. The correlation of PCA Axis II with sample date is most prominent for vegetation because of the multiple sample dates and the change in vegetation species composition with time.

The cluster analysis further illustrated the separation of seed bank and vegetation species compositions, and succession within the vegetation community. This analysis placed the most distant temporal samples at opposite ends (1 versus 6) of the cluster diagram because of species composition shift from dominance by annual, flood-intolerant species to perennial, flood-tolerant species (Table 43). The clustering of similar treatments (2 and 3) early in the project reflects the limiting effects of site treatment upon the development of a species mix comparable to that of the natural succession transects. The clusters (5) and (6) show species composition convergence with time. This species composition convergence is a function of dominance by *Typha* spp.

Conclusions

This study suggests that the seed bank may inhibit more than promote establishment of a perennial vegetation community. The seed bank contained a large suite of species that may inhibit establishment of a perennial community, but once water returned to the site these species dropped out and didnot contribute to maintenance of diversity. The increase in *Typha* spp from November 1991 to November 1992 is evidence for the persistence (at least short-term) of its seed in the seed bank. *Typha* spp. presence in the seed bank coupled with its ability to germinate under shallow water shows its wide tolerance to environmental conditions. This tolerance coupled with its rapid clonal growth (Chapter IV-E in this report) suggests that *Typha* spp. will prove to be a formidable imped-iment to the development of a diverse plant community on the site. In contrast, Fraga and Kvet (1993) presents observations of *Typha domingensis* dominated communities in Cuba that show an increase in species diversity and a decline in the dominance of *Typha domingensis* over a seven year period. These successional changes were attributed to the net accumulation of dead organic matter in the community. Rapid organic matter accumulation would likely isolate an older seed bank and cause a lower seed concentration in the recently accumulated litter and sediment. Under these condi-tions, colonization of the site from the seed bank might be as dependent on access to buried seed under the litter (van der Valk 1986) as to the lower concentration of buried seed.

WILDLIFE UTILIZATION

Transect Surveys

Species Similarity. Comparisons of species similarity indicated that the north and south marshes do not support corresponding avian communities. This may be a reasonable inference as many species of insectivorous passerines and ducks sighted in the north marsh were not found in the south marsh. Furthermore, Night-Herons were more common in the north marsh, but Tri-colored Herons and Black-necked Stilts were sighted more often in the south marsh.

The percent similarity of avian species between T1 to T4 and T5 to T8 indicate a different community structure for each transect. Species of insectivorous passerines were the primary differences. Black-necked Stilts, Pied-billed Grebes, Anhingas, hawks and some heron species were not frequently sighted during the transect surveys. The presence or absence of these species could significantly affect similarity estimates for the community. This index does not take into account the relative abundances of the various species and could give a distorted view of the actual similarity of the communities (Brower et al. 1990).

Density -- South Marsh. Average avian density by individuals in the south marsh was indicative of a highly productive system. Densities of aquatic birds tend to increase with the trophic state of a water body according to Kerekes (1990). Krull (1970) and Voigts (1976) found that aquatic macrophytes were important to waterfowl production because they harbor large quantities of macroinvertebrates. The plants were determined to be poor in nutrient quality for the diet of many waterfowl.

The changes in avian density in the south marsh may signify that the number of birds which can be supported by this marsh was either decreasing or stabilizing. Wilcox and Meeker (1992) also determined that a combination of water depth and macrophyte structure of a marsh can affect macroinvertebrate populations. Deep marshes that were not dewatered or have small fluctuations tend to provide poor habitat for macroinvertebrates and small fish. Other factors involved may make high densities not sustainable. Closure of the open areas by vegetation, a decline in small fish or macroinvertebrate densities, competition, and regional changes in the landscape could contribute to the establishment of the carrying capacity of the marsh. If the carrying capacity was reached in this marsh, then it was likely between 14 and 22 individuals per hectare.

Gallinules and insectivorous passerines appeared to be increasing in density. A group of greater than 200 Fulvous Whistling-Ducks account for the increase in density for ducks in the last two surveys. Fulvous Whistling-Ducks tend to prefer moderately sized open areas surrounded with thick cover, a feature common in the south marsh. The decrease of herons and ibis in the south marsh is probably attributable to the increase in vegetative cover, thereby creating more difficult foraging. Wading birds have been known, however, to continue foraging in dense *Typha* spp. when more open habitat was not available (Edelson and Collopy 1990).

Of the transects in the south marsh, only T1 appeared to be increasing in avian density. After the inlet pumps were installed, more open areas were created which probably allowed more fish production and easy access to these resources by birds. The Fulvous Whistling-Ducks were most frequently observed using this transect in the south marsh. Low avian density on T2 and T3 was probably due to the thick vegetative cover of the transects. T4 was also nearest to the spring fed marsh, and was probably most affected by the conditions in that marsh. From field observations T4 has an uneven distribution of hydrologic conditions. This may have allowed pockets of fish concentrations or patches of high plant diversity. Both conditions could contribute to the high densities of ducks and blackbirds using this transect over the other transects.

Density -- North Marsh. The high avian density of the north marsh was probably due to similar factors involved in the south marsh. The north marsh receives nutrient enriched water from the south marsh, and probably has circulation of nutrients formerly bound in the soil when the marsh was used for agricultural production. The large surface area of the north marsh obviously has an effect on the number of birds using it (Leschisin et al. 1992). Densities in the north marsh appeared to be leveling, which may indicate that the carrying capacity of the avian communities had been reached. To determine the level of the carrying capacity more data would need to be collected. A preliminary estimate is a density of 17 to 34 individuals per hectare.

Ducks, blackbirds, and gallinules appeared to be dominating the north marsh by the end of the survey period. Herons, ibis, insectivorous passerines, and species which irregularly use the marsh all seem to have reached equilibrium. The increase of ducks species including Fulvous Whistling-Ducks, Mallards, Mottled Ducks, and Wood Ducks is probably a result of the large open areas.

High average avian density for T5 and T6 was probably due to the mosaic of openness and cover habitats. Herons, egrets and ibis particularly preferred the foraging opportunities on T5, and the highest average density of ducks occurred on T6. Transects 7 and 8 were more similar in the average avian density of taxonomic groups. T7 was more open than T8, possibly accounting for the greater densities of blackbirds on T8.

Density -- Unmanaged Marsh. The density in the unmanaged marsh was consistent throughout the survey period for this marsh. Comparisons with the south and north marshes were difficult as this marsh was surveyed during different periods. However, the average density of this marsh was significantly lower than that of the north and south marshes, possibly a result of lower productivity levels in the unmanaged marsh. The vegetative diversity of this marsh was probably high, but this should affect only the types of birds using the marsh and not the density. The avian density of the unmanaged marsh would be expected to increase if more nutrients were made available in the system. The vegetative diversity, however, should decrease which may lead to a decrease in avian diversity as in the north and south marshes.

For all taxonomic groups except ibis and ducks, density was greater in T10 than T11 in the unmanaged marsh. Transect 10 was similar in the vegetation structure to T4. There were pockets of open areas, but also patches of mixed vegetation. If the primary productivity of T10 was similar to T4, then the avian communities might be more similar. T11 has a large open in which Ospreys and Anhingas were frequently observed feeding as well as ducks and ibis. Large fish were apparently easier to catch in this area because the water contained less flocculent and was free of duckweed.

Drive Through Survey

It was difficult to assess the reliability of the density estimates in the surveyed areas due to the potential visibility bias of the drive-through method. A successional response appears to be occurring in the south and north marshes. Density increased until approximately the eighth or ninth survey and decreased through the remainder of the survey period. It may be possible that the carrying capacity of the avian community was reached and the population began to stabilize.

South Marsh. Given the problems associated with the drive-through method, the vegetative cover may have increased in the south marsh to the point that the results of the survey were skewed. This may explain the low numbers of black-birds and insectivorous passerines. Densities of Red-winged Blackbirds, Marsh Wrens and Common Yellowthroats may increase as they often prefer *Typha* spp. dominated habitats. Gallinules would also be expected in higher numbers as they tend to prefer thick cover with pockets of open water similar to that provided by the south marsh.

North Marsh. Total density of the north marsh increased and appeared to reach carrying capacity. The trend in the development of this marsh determined by the results of the drive-through method was probably unreliable due to the stand of *Salix caroliniana* bordering the north levee. Although a prediction could be postulated as to the changes occurring in the avian community, none were made since the density estimates may have been distorted due to the problems of visually surveying the marsh.

It should be noted that the area closest to the inlet of this marsh frequently had high densities of Little Blue Herons, Great Egrets, Snowy Egrets, White Ibis, Glossy Ibis, and Great Blue Herons. This aggregation of birds often would be present during the transect surveys and would remain until late in the afternoon during the drive-through survey. It is possible that small fish concentrated in this area because of the nearly even ratio of cover and open water. The water quality of this site may also have a higher productivity potential than the rest of the marsh and therefore produce a higher diversity of plant types.

Unmanaged Marsh. Avian density of the unmanaged marsh may also reflect early successional organization of the marsh. The effects of increasing productivity in the north and south marshes on the unmanaged marsh were not apparent. It would appear that density in the unmanaged marsh would significantly increase because the density of birds supported in the north and south marshes increased. The dramatic decrease in density of ducks in the unmanaged marsh may be due to regional changes in the landscape including the existence of other flooded agricultural fields including Sunny Hill Farm and areas near Emeralda Marsh. Another explanation for the patterns discovered in this marsh may be that as cover increased, birds were more difficult to observe.

It was expected that the unmanaged marsh would have significantly lower densities than the north and south marshes due to lower rates of productivity. This was evident in the transect surveys. Early successional processes in the north and south marshes would likely manifest in high productivities as the various biological components compete for the high quality nutrients being pumped into these marshes. Species would begin to diversify after the nutrients again became limiting, then species would need to occupy more narrow niches to compete within the community. It was not clear why the results of the drive-through were different except for the aforementioned problems of visibility which occurred in surveying all three marshes.

Agricultural Field. Avian density of the agricultural field, as indicated by the drive-through method, was likely the most indicative of the actual trends in community structure. The avian community of this area was probably responding to the planting cycles of the farming operation. Cattle Egrets and Red-winged Black-birds were the dominant species using the agricultural field. The insectivorous passerines included Indigo Buntings, shore birds, and various warblers. These birds, however, were observed primarily in the *Sambucus canadensis* bordering the canal and parallel to the levee just outside of the field.

Early in the surveys, northern Harriers (Marsh Hawks) were frequently observed using both the agricultural field and the north marsh. A Bald Eagle was also periodically sighted during the drive-through survey. These two species were not sighted during either the drive-through or the transect surveys for the last year of the study. It was unclear why these species were not found to be using the project area as intensively as in the first year of the bird surveys. Many factors could be involved including the lack of desirable nesting sites near the marshes, or more preferable foraging sites elsewhere. Because they are migratory, northern Harriers also were subject to environmental changes at a large regional scale. These species and other Buteos could provide beneficial population control of such taxa as rats, mice and rabbits. Managed properly, the project area could be important habitat for raptors in general, thereby decreasing the chances of the birds becoming increasingly threatened in Florida.

Conclusions

Colonization of the project areas appears to have been rapid, noticeable especially in the north marsh. The time over which different populations became established in the project was uncertain because the area was not surveyed before the former muck fields were flooded. The marshes were flooded approximately six months apart. Moreover, the north marsh was flooded immediately after the last crop had been harvested, but the south marsh had been fallow for nearly a year before flooding. Each marsh may provide different functions preferred by the avian species at different times. These functions may include cover during the breeding season or ease of foraging during winter months.

The sources of the colonists for the project site were probably the nearby spring fed marsh and woodlands, areas fringing Lake Apopka, and regional migrants. After the first breeding season, the marshes also became sources for colonizing species in the project area. The composition and structure of the avian communities at the project area is dependent on the types of birds which successfully establish populations in the marshes. As it was difficult to determine in which marsh the populations were established, colonization of the avian species should be discussed for the project site as a whole.

Many species may have used the project area during a critical period of their life cycle, but may not have established a population. For example, Black-crowned Night-Herons, Yellow-crowned Night-Herons, and Black-necked Stilts were known to breed in the project area. These species were not present, however, outside the six to twelve week breeding season. Double-breasted Cormorants have been frequently sighted feeding in the marshes, but have not been known to breed there.

American Coots, King Rails and Sora Rails appeared to have established wintering populations in the project area. Common Moorhens were common year-round. Purple Gallinules were not commonly sighted, but they appeared to have established a small breeding population.

All of the heron species appeared to have small populations of permanent residents. Many herons used the marsh, but their numbers fluctuated seasonally. However, only the Green-backed Heron was observed to have built nests and raised young. Mating Great Blue Herons have been observed which may also indicate a breeding population exists for this species. Great Egrets and Snowy Egrets may have wintering populations in the marshes. Their populations were decreasing during the survey period, so it was difficult to predict whether the populations will be sustained.

Cattle Egrets have been observed performing mating rituals, but no signs of nesting within the project area were observed. As this species prefers more shallow wetlands, it was uncertain if many will remain after the agricultural field is converted into a deep water marsh. Breeding populations of both the American Bittern and the Least Bittern were present. The American Bittern also appeared to have a wintering population, while the Least Bittern was most abundant during the spring and summer.

Red-winged Blackbirds and Boat-tailed Grackles were abundant year-round, and each has a breeding population. These species probably have the most stable populations of the avian community.

Insectivorous passerines which may have established populations in the marshes include Common Yellowthroats, Marsh Wrens, and Palm Warblers. Although no signs of breeding were observed, these species were common year-round. Other small bird species may have populations near the marsh in the upland areas including Indigo Buntings, Yellow Warblers, and Eastern Kingbirds.

Fulvous Whistling-Ducks, Mottled Ducks, Wood Ducks, and Mallards were possibly the only species of ducks to establish populations in the project area. Nests of Fulvous Whistling-Ducks have been identified, and the other ducks seem to have small populations of permanent residents. Blue-winged Teals were also common, but their population appeared to be rapidly diminishing as the marshes tend to support more omnivorous appetites.

Neither White or Glossy Ibis appeared to have established resident or breeding populations in the project area. Glossy Ibis may have a small wintering population. A pair of White Ibis were observed building a nest in a tree near the south marsh, but it was not determined if young were produced.

Ospreys established a breeding population in the lake fringe woods near the south marsh. Anhingas were common in the project area, but it was not certain if they were breeding there. Belted Kingfishers and Red-shouldered Hawks may have established populations in the forested wetland near the south marsh as they were common year-round.

To determine the long term avian communities and their respective ability to persist in the constructed marshes a longer study would be necessary. However, it is obvious that many species utilized the project area during the survey periods. It is apparent that many resources were available for their use including food, shelter, and nesting habitat.

The rapid changes in both the avian communities and the vegetative communities suggests that the changes in avian similarity and density were a response to the changing vegetative structure in each marsh. Changing vegetative structure may represent changes in available resources. Without comparative studies, it is difficult to assess the status of the fish communities except that the south marsh may provide more resources than the unmanaged marsh allowing higher densities to be established. The south marsh could provide more resources due to its high nutrient enrichment from Lake Apopka (Howington 1994) which could also affect the other community parameters such as the avian and vegetative communities.

The nutrient enrichment appeared to have increased the self-organizational processes in the subsidized marsh increasing the rate of vegetative coverage of the marsh. The prevalence of large-bodied birds in the unsubsidized marsh was likely due to the larger percentage of open water. More open water may have also allowed greater diversity in the avian community given a greater variety of feeding habitats.

Concurrent with the nutrient enrichment, community parameters such as density and overall biomass also increased in the subsidized marsh, but at a cost of lowered species richness. Complexity of community structures did not appear to be affected.

VI. SYNTHESIS

This research project has been designed to create a picture of the early successional state of the Apopka Marsh Demonstration Project. The ecosystem diagram in (Figure 189) summarizes the marsh ecosystem structure at its most simplistic level. This model excludes more complex feedback and multiplier interactions to maintain simplicity.

As can be seen in the diagram there are many interacting ecosystem components. This project focused on the state of the marsh as it developed with time. To complete the picture, measurements of energy flow and nutrient cycling are required and are difficult to attain. We will focus on the patterns of ecosystem succession and possible methods for affecting that state change. Measurements will provide useful insights into how the marsh ecosystem has functioned over time.

The shift from a post-agricultural annual plant community through an intermediate open water habitat to a cattail dominated marsh were the most dramatic changes observed. These changes were reported in the "Natural Succession Transects" and "Landscape Dynamics" section. The patterns we observed were a result of declines by flood intolerant annual species after the cessation of farming activities, followed by a short period of dominance by more flood tolerant shrubs. Site dominance by cattail seems to have resulted from long-term, moderately deep flooding coupled with high nutrient loading from Lake Apopka water.

The potential for manipulating ecosystem succession was reported in the "Assessment of Experimental Plantings." The three planted sites were embedded in the marsh in such a way that a range of environmental conditions down gradient from the lake water inlet would be experienced by the various treatment conditions. The experimental planting revealed a range of responses and adaptive qualities of the vegetation communites in the Apopka Marsh. The most obvious response was the invasion by cattail (*Typha domingensis* and *T. latifolia*). We found that establishment of plant species adapted to long hydroperiod in most cases resulted in invasion resistant plant communities. The most successful communities were dominated by *Eleocharis interstincta, Pontedaria cordata, Sagittaria lancifolia*, and *Scirpus californicus* (Figures 12,17,20,23,26). *Scirpus validus* was successful early in the study period. Later in the study it experienced a dramatic die-off (Figure 27). It seems as if the rhizome system of a cohort of this species lives for about two years. This community was beginning to recover after the last data collection (Stenberg, Pers. Obs.), but it remains to be seen how well *S. validus* will recover with cattail as a close companion in the marsh. The *Panicum hemitomon* planted treatment was not successful. It was not rapidly colonized by *Typha* spp., but even without high levels of competition it languished and was eventually overtaken by *Typha* spp. (Figure 15). This behavior may be related to genotypic variation. The species *Panicum hemitomon* is found naturally in deep water along lake shores and in shallow, moderate-to-long hydroperiod marshes (Loveless 1959, Lowe 1986).

The mixed planting treatment provided an opportunity to observe the rapid development of a diverse plant community in spite of the presence of the invasive species *Typha* spp. Almost all of the original plants placed in the mixed planting treatment survived. Most were successful at filling space and increasing resistance to invasion by *Typha* spp. (Figure 30). The exceptions to this pattern tended not to be well adapted to the environmental conditions provided to them. *Cladium jamaicense* probably did not survive because it may be sensitive to transplanting and is not competitive in high nutrient environments (Davis and van der Valk, 1983). Excision of the live rhizome from an established colony may have detrimental effects. Survival of *Kosteletskya virginica* is probably related to flood intolerance; it tends to prefer shallower water than was present in the Apopka Marsh (Godfrey and Wooten, 1981). This planting strategy may provide the best opportunity to generate a diverse, invasion resistant plant community.

The seeded treatments were rapidly colonized by *Typha* spp., with varying degrees of dominance (Figures 33-42). The *Pontedaria cordata* and *Sagittaria lancifolia* treatments were most successful at competing with *Typha* spp. *Pontedaria cordata* also colonized the *Sagittaria lancifolia* treatment plot. This suggests that *Pontedaria cordata* seed was transported out of its treatment plot and, with *Sagittaria lancifolia,* was capable of developing an invasion resistant community. However, *Pontedaria cordata* seems to lose more leaf area than *Typha* spp. during freeze events. Reduced leaf area may lead to reduced productivity and diminished competitive ability with respect to *Typha* spp. over time.

Panicum hemitomon, Polygonum punctatum, and *Scirpus validus* were unsuccessful at colonizing the seeded plots. This pattern suggests that *Panicum hemitomon* and *Scirpus validus* may have special establishment requirements (Figures 33,41). *Polygonum punctatum*, was probably successful during the germination and early establishment phase of the project but could not withstand subsequent flooding applied to preserve the planted sprigs. This species was a prominent member of the seed bank assays, thus suggesting that if the seed applied during the treatment was viable a community may have developed. This study revealed that the flood intolerant *Polygonum punctatum* had played a minor role as a member of the above-ground plant community (Figures 85,95). It remained in the seed bank during the duration of this project. It was found frequently on floating mats with exposed soil surfaces and extensively during draw down periods.

The mulch plots did not enhance the establishment of a diverse plant community. No evidence was found for the establishment of species that may have been transferred in the soil. The seed bank assays found a few species (*Rhexia nashii, Utricularia subulata, Xyris jupicai*) (Table 39) that may represent the bayhead mulch source. The lack of development of a bayhead analog community may be linked to a lack of representative species in the seed bank and water depths that are greater than the tallest species, other than trees and shrubs, in the established community. This treatment seemed to promote the invasion of *Typha* spp. We observed that the greatest seed bank seedling densities were found under moist soil conditions from mulch site soil (Figure 122). *Typha* spp. and other "weedy" species were prominent members of the seed bank community. This suggests that soil handling or amelioration of site conditions by the mulch may have increased the opportunity associated with site colonization by species other than bayhead species. It is impossible, without a test of the seed bank before and after handling and a more in-depth vegetation analysis of the mulch source site, to show that the seed bank species composition and seed density were changed by soil handling techniques or site conditions.

The control sites provided the opportunity to observe the results of removing the above-ground vegetation. Colonization by invasive species was slow to occur. A colonization pattern related to water depth was observed. The control plots in site 1 remained vegetation free longer than the other sites. Water depths in site 1 tended to be about 80 cm deep, while sites 2 and 3 had water depths of 30-40 cm and were colonized more rapidly. Site 2 was colonized primarily by *Typha* spp., while site 3 was colonized by a mat consisting of *Eichhornia crassipes* and *Hydrocotyle ranunculoides*.

The vegetation removal treatment (control plots), with no added soil or plant sprigs, affected the seed bank as well. Under moist soil conditions, seed bank germination tended to be lower from the control treatment than from the mulch treatment or natural succession treatment (Figure 122). This may have resulted from activation of the seed bank in the control plots brought on by vegetation removal and soil disturbance, followed by deep flooding. Flooding may have eliminated the opportunity for species in the seed bank community to germinate, complete life cycles, and re-establish a seed population in the soil.

The Natural Succession Transects were included to provide a better understandingof plant community development surrounding the Experimental Planting Areas (Figures 76-90). Areas outside the planted area were rapidly dominated by *Typha domingensis* and *T. latifolia*. Rapid clonal growth rates by *Typha latifolia* relative to other species in the Apopka Marsh (Figure 120), tolerance of long-term flooding, and the ability to take advantage of elevated nutrients may explain site dominance by this species (Toth 1988). Without the resistance to invasion provided by the planting of *Eleocharis interstincta*, *Pontedaria cordata*, *Sagittaria lancifolia*, *Scirpus californicus* and the mixture of these species (Mixed Plot) the planting sites would also have been invaded by *Typha* spp. The timing of cattail invasion and the potential to increase cover may have played an important role in the development of this marsh.

The mat forming plants *Eichhornia crassipes* and *Hydrocotyle ranunculoides* colonized open areas (e.g. Control plots and walkways between plots) in the Experimental Planting Site. This may have resulted because *Typha* spp. was excluded from becoming established by seed over large areas by the establishment of planted species. Without widely distributed foci (e.g. genet origin from seed) *Typha* spp. seems to have been limited in its ability to colonize using clonal growth. The pattern of *Typha* spp. exclusion by enhanced plant community establishment (e.g. planting) has been successful early in the development of the marsh ecosystem (Figures 14,17,20, 23, 26, 29, 32a,b,c).

Maintenance of a relatively species diverse marsh, with planted target species, over the long term is difficult to predict at this time.

While large scale cover estimates of *Typha* spp. reveal a pattern of continuing expansion, finer scale estimates using biomass reveal a live:dead cyclical pattern (Figure 99). During periods of *Typha* spp. die-off, opportunities may exist for invasion by other marsh species. This die-off pattern may be enhanced by coupling herbicide treatment, fire, and water level draw down. Fraga and Kvet (1993) have shown the potential for diversification within a *Typha* spp. community over a seven-year period. In contrast, the Apopka Marsh seed bank assay revealed an increase in *Typha* spp. between 1991 and 1992. The increase in seed bank density may be expected from the presence of flowering and fruiting mature plants (Figures 114-119). Unfortunately, our estimates of *Typha* spp. seed germination potential underestimate the likelihood of establishment of new plants from seed. Published seed germination reports are a better source of information in this regard (Table 45). The seed bank assay is probably the best estimator for potential establishment of new plants from seed because it mimics natural conditions more directly than seed germination trials. Because the seed bank assay is a measure of maximum potential seed germination it must be used with caution. Van der Valk (1986) has shown that the presence of litter or other plants can have a significant effect on seed bank germination.

Wildlife studies revealed that early in its history the marsh was used by a suite of avian taxonomic groups (Figures 125-128), with the presence of groups closely identified with wetland ecosystems (e.g. blackbirds, ducks, gallinules, ibis, and waders). The species composition was weakly to moderately similar among and within the north and south marshes (Figure 124). This suggests that the marshes, even with slightly different histories and different successional patterns (e.g. more rapid *Typha* spp. coverage in the south marsh) were used in a somewhat similar way by birds. With the exception of a brief dominance by ducks (north marsh, November 1992) the marshes were used predominantly by blackbirds during the course of study (Figures125-128). Dominance by ducks during the Nov 1992 sample seems unrelated to changes in vegetative cover or the availability of open water. In contrast, the use of the marsh by blackbirds is suggestive of their opportunistic nature and adaptation to a *Typha* spp. marsh.

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Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots, Experimental Planting Sites. Species codes and full species names can be found in Table 6.

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Site 1 August 1991														
ALTPHI	0.5	0.5	0.5	0.5							0.8	0.3	11.3	3.3
AMAAUS													0.1	0.1
AMMCOC											0.3	0.3		
ECHCOL													0.4	0.4
HYDRAN			0.5	0.5					0.5	0.5			0.3	0.1
LUDOCT													0.1	0.1
LUDPAL					0.5	0.5					0.3	0.3		
POLPUN													22.2	5.4
PONCOR					5.5	4.5							0.5	0.4
SAGLAN											0.3	0.3	0.1	0.1
SAGMON							0.5	0.5					0.1	0.1
TYPLAT	20.0	10.0	17.5	12.5	20.5	19.5	20.0	5.0	15.0	5.0	30.0	18.4	0.4	0.2
Unknown monocot					0.5	0.5								
Unknown							2.5	2.5						
Site 2 August 1991														
ALTPHI													1.4	0.9
COMDIF													0.1	0.1
CYPHAS													0.1	0.1
HYDRAN													1.8	0.9
LEMSPP	13.0	12.0	8.0	7.0	10.5	9.5	22.5	17.5	3.0	2.0	5.3	2.8	14.9	5.7
LIMSPO													0.7	0.4
LUDOCT			0.5	0.5	0.5	0.5					5.0	2.9	3.7	1.4
LUDPAL	20.0	20.0	10.0	10.0	2.5	2.5	10.0	10.0	2.5	2.5	8.8	7.2	0.7	0.4
POLPUN													4.2	2.9
PONCOR					0.5	0.5			0.5	0.5			0.2	0.1
SAGLAN													0.5	0.4
SAGMON							0.5	0.5						
SCISPP													0.1	0.1
SPIPOL													0.3	0.1
TYPLAT	5.5	4.5	7.5	2.5	10.5	9.5	3.0	2.0	3.0	2.0	4.3	2.1	3.3	1.5
WOLFLO	7.5	7.5	2.5	2.5	13.0	12.0	10.0	10.0	2.5	2.5	2.8	2.4	5.6	2.5
WOLSPP			0.5	0.5			0.5	0.5	0.5	0.5				

Appendix A1. Overall vegetation cover (% $plot^{-1}$, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

Species Codes	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	Sagittaria lancifolia Mean	SE	Scirpus validus Mean	SE	Mulch Mean	SE	Control Mean	SE
Site 3 August 1991														
ALTPHI			2.5	2.5							10.3	9.9	0.5	0.2
AZOCAR	3.0	2.0	27.5	22.5	5.0	0.0	52.5	27.5	13.0	12.0	27.5	15.3	17.6	8.6
BRAPUR											0.3	0.3		
COMDIF							0.5	0.5	0.5	0.5			0.2	0.1
EICCRA			0.5	0.5							1.8	1.1	0.3	0.1
GALTIN											0.3	0.3		
Lemna spp.	1.0	0.0	1.0	0.0	1.0	0.0	2.5	2.5	1.0	0.0	1.8	1.1	0.7	0.1
LUDOCT	0.5	0.5	2.5	2.5										
LUDPAL	3.0	2.0					7.5	7.5	0.5	0.5	5.5	4.8	0.8	0.4
LUDPER													0.2	0.1
POLPUN					0.5	0.5							0.2	0.1
PONCOR	0.5	0.5			7.5	2.5	0.5	0.5	0.5	0.5	6.5	3.6	1.5	0.9
SAGMON													0.5	0.4
SALROT			0.5	0.5	0.5	0.5					0.3	0.3	0.2	0.1
SCISPP											0.3	0.3		
SPIPOL													0.1	0.1
TYPLAT	0.5	0.5	2.5	2.5	0.5	0.5	0.5	0.5			7.5	6.0	1.4	0.6
WOLFLO			2.5	2.5	1.0	0.0	3.0	2.0	0.5	0.5	1.3	1.3	0.3	0.1
Site 1 January 1991														
ALTPHI	0.5	0.5			0.5	0.5	0.5	0.5	15.0	15.0	4.0	3.7	22.6	4.9
HYDRAN													0.8	0.8
Lemna spp.	1.0	0.0	1.0	0.0	0.5	0.5	1.0	0.0	0.5	0.5	0.8	0.3	0.3	0.1
POLPUN									0.5	0.5	10.0	10.0	16.3	6.1
PONCOR					10.0	5.0							1.4	1.2
SAGLAN	7.5	2.5	10.0	10.0	1.0	0.0	2.5	2.5	2.5	2.5	10.3	5.3	0.6	0.5
SAGMON	0.5	0.5	2.5	2.5			0.5	0.5						
SALROT											0.3	0.3		
SCICAL									1.0	0.0				
SPIPOL	1.0	0.0	0.5	0.5			0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.1
TYPLAT	50.0	20.0	50.0	25.0	52.5	37.5	40.0	10.0	25.0	15.0	36.3	21.2	1.6	0.6
UTRBIF	17.5	12.5	10.5	9.5	0.5	0.5	20.0	20.0	15.5	14.5	25.0	11.9	31.7	4.2
Site 2 January 1992														
ALTPHI	5.0	5.0	5.0	5.0	0.5	0.5			0.5	0.5	2.8	2.4	3.8	2.2
AMAAUS													0.1	0.1
AZOCAR	10.0	0.0	5.5	4.5	1.0	0.0	0.5	0.5	10.0	0.0	4.0	3.7	0.7	0.4
CYPHAS													0.1	0.1

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYPODO													0.1	0.1
Cyperus spp.													0.1	0.1
ECLALB													0.1	0.1
EICCRA											0.3	0.3	0.2	0.1
ELEINT													0.1	0.1
HYDRAN													0.4	0.4
HYDUMB													1.4	0.9
Lemna spp.	5.0	0.0	15.0	15.0	17.5	2.5	5.5	4.5	20.5	19.5	17.8	11.7	7.6	4.2
LIMSPO													3.0	1.8
LUDPAL	15.0	15.0			0.5	0.5	2.5	2.5	0.5	0.5	2.8	2.4		
POLPUN													4.3	1.7
PONCOR					5.0	5.0			15.0	15.0			0.3	0.1
SAGLAN							5.0	5.0			1.3	1.3	1.4	1.2
SAGMON							1.0	0.0						
SAGSTA	5.0	5.0												
SALROT	20.0	20.0	7.5	7.5	30.0	30.0	12.5	12.5	7.5	7.5	10.0	7.1	1.4	0.9
SAMCAN													0.1	0.1
SCIVAL									2.5	2.5			0.2	0.1
SOLSPP													0.1	0.1
SPIPOL	25.0	25.0	12.5	12.5	20.0	20.0	12.5	12.5	7.5	7.5	6.3	3.8	3.6	1.7
TYPLAT	35.0	5.0	50.0	10.0	65.0	15.0	25.0	5.0	55.0	15.0	37.5	11.1	10.6	3.8
WOLFLO	5.0	5.0	5.0	5.0	5.0	5.0	0.5	0.5	7.5	2.5	1.8	1.1	3.3	1.7
Site 3 January 1992														
ALTPHI	3.0	2.0	0.5	0.5	0.5	0.5			1.0	0.0	0.3	0.3	1.7	0.6
AMAAUS							2.5	2.5					0.1	0.1
AZOCAR			0.5	0.5	0.5	0.5	3.0	2.0	0.5	0.5	0.8	0.3	0.5	0.2
EICCRA			1.0	0.0							0.5	0.3	0.1	0.1
ELEINT			0.5	0.5										
Lemna spp.	1.0	0.0	0.5	0.5	1.0	0.0	1.0	0.0	0.5	0.5	0.8	0.3	0.5	0.2
LUDPAL	5.5	4.5	12.5	7.5	5.0	0.0	3.0	2.0	0.5	0.5	2.8	2.4	0.7	0.1
PASURV											0.3	0.3		
POLPUN	0.5	0.5	0.5	0.5			0.5	0.5			0.5	0.3	0.3	0.1
PONCOR	0.5	0.5	2.5	2.5	35.0	5.0	0.5	0.5	0.5	0.5	11.3	5.2	2.7	1.1
SAGLAN							2.5	2.5						
SALCAR													0.1	0.1
SALROT			1.0	0.0	1.0	0.0	0.5	0.5	1.0	0.0	0.8	0.3	0.6	0.2
SCICAL											0.3	0.3		
TYPLAT			2.5	2.5	3.0	2.0	7.5	7.5			17.8	11.7	3.5	2.1

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
WOLFLO	1.0	0.0	0.5	0.5	0.5	0.5	2.5	2.5	0.5	0.5	2.5	1.4	0.7	0.1
Site 1 May 1992														
ALTPHI	10.0	0.0	7.5	2.5	5.0	5.0	2.5	2.5	5.0	0.0	4.0	1.0	8.5	2.4
AMAAUS							0.5	0.5			0.3	0.3	0.1	0.1
Cyperus spp.													0.1	0.1
ECHCRU			0.5	0.5										
EICCRA	0.5	0.5	0.5	0.5									0.1	0.1
HYDRAN			0.5	0.5										
HYDUMB	0.5	0.5												
Lemna spp.	0.5	0.5	0.5	0.5							0.3	0.3	0.1	0.1
LUDPAL													0.1	0.1
POLPUN													0.9	0.8
PONCOR			2.5	2.5	25.0	20.0							0.4	0.4
SAGLAN	27.5	12.5	25.0	15.0	2.5	2.5	32.5	32.5	7.5	7.5	17.8	10.2	3.9	1.6
SAGMON							5.0	5.0						
SALROT									0.5	0.5	1.3	1.3		
SPIPOL	1.0	0.0	0.5	0.5	5.0	5.0			0.5	0.5	0.5	0.3		
TYPLAT	50.0	10.0	42.5	7.5	25.0	20.0	35.0	5.0	55.0	15.0	30.0	12.3	1.3	0.6
UTRBIF	17.5	12.5	20.0	20.0	10.0	10.0			12.5	7.5	21.3	14.2	0.2	0.1
TYPLAT dead											27.5	17.0		
Site 2 May 1992														
ALTPHI			0.5	0.5	0.5	0.5					0.3	0.3	1.3	0.6
AMAAUS													0.1	0.1
CYPODO											0.3	0.3	0.1	0.1
CYPSUR													0.4	0.4
ECLALB													0.1	0.1
EICCRA													0.1	0.1
ELEINT													0.2	0.1
Lemna spp.	40.0	10.0	50.0	0.0	70.0	10.0	15.0	15.0	55.0	5.0	56.3	10.7	24.9	9.1
LIMSPO	5.0	5.0			2.5	2.5							5.4	2.4
LUDLEP											0.3	0.3	1.3	1.3
LUDOCT													0.8	0.8
LUDPER													0.5	0.4
PONCOR					10.0	10.0			10.0	10.0			0.4	0.2
SAGLAN	0.5	0.5			0.5	0.5	5.0	5.0			0.3	0.3	0.6	0.4
SAGMON	0.5	0.5			0.5	0.5	2.5	2.5						
SALROT	0.5	0.5	0.5	0.5	5.0	5.0			5.0	5.0	1.5	1.2	1.3	0.8

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SCISPP									0.5	0.5				
SCIVAL									0.5	0.5			0.1	0.1
SPIPOL	0.5	0.5	0.5	0.5			0.5	0.5			0.3	0.3	2.7	1.3
TYPLAT	55.0	15.0	75.0	15.0	72.5	2.5	27.5	12.5	45.0	5.0	36.3	6.3	24.7	5.5
WOLFLO	2.5	2.5	5.0	5.0			2.5	2.5			1.3	1.3	2.0	1.1
TYPLAT dead	25.0	5.0	7.5	7.5	7.5	7.5			10.0	10.0	6.3	4.7	1.3	1.3
Site 3 May 1992														
ALTPHI					1.0	0.0	0.5	0.5	0.5	0.5	0.8	0.3	0.8	0.4
BRAPUR							0.5	0.5						
CYPSUR			0.5	0.5										
EICCRA	32.5	17.5	5.5	4.5	30.0	0.0	40.0	30.0	45.0	5.0	45.0	15.4	31.0	9.1
HYDRAN	3.0	2.0	0.5	0.5	8.0	7.0	5.0	5.0	15.0	5.0	7.8	4.7	5.6	2.1
Lemna spp.	25.0	5.0	15.5	14.5	20.0	0.0	20.0	0.0	25.0	5.0	31.3	7.2	14.5	4.1
LUDLEP							0.5	0.5						
MIKSCA					0.5	0.5								
POLPUN					1.0	0.0	0.5	0.5					0.2	0.1
PONCOR	15.0	15.0	12.5	12.5	45.0	15.0	2.5	2.5	12.5	12.5	15.0	8.7	5.0	2.3
SAGLAN			0.5	0.5			20.5	19.5			1.3	1.3	0.5	0.4
SPIPOL	15.0	5.0	10.5	9.5	10.0	0.0	20.0	10.0	15.0	5.0	23.8	5.5	8.6	2.6
TYPLAT	5.0	5.0	20.0	20.0	7.5	2.5	7.5	7.5	2.5	2.5	17.5	7.2	7.5	3.5
WOLFLO	1.0	0.0	5.5	4.5	5.5	4.5	5.0	5.0	7.5	2.5	7.8	4.7	4.8	1.3
Site 1 August 1992														
ALTPHI	0.5	0.5			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	2.0	1.6
EICCRA	0.5	0.5					0.5	0.5						
ELEINT													0.1	0.1
EUPCAP									0.5	0.5				
GALTIN													0.1	0.1
HYDRAN	0.5	0.5					0.5	0.5	0.5	0.5			0.3	0.1
LUDLEP									0.5	0.5				
LUDOCT	0.5	0.5											0.1	0.1
LUDSPP													0.1	0.1
POLPUN													0.3	0.1
PONCOR	0.5	0.5			20.0	15.0	0.5	0.5			0.3	0.3	1.0	0.6
SAGLAN	17.5	17.5	20.0	10.0	17.5	12.5	45.0	25.0	5.5	4.5	4.3	3.6	2.0	0.9
SAGMON	0.5	0.5					1.0	0.0	0.5	0.5				
SALROT							0.5	0.5	0.5	0.5	0.3	0.3		
SCICAL									1.0	0.0				

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SCIVAL									1.0	0.0				
TYPLAT	40.0	10.0	27.5	2.5	12.5	2.5	13.0	12.0	42.5	2.5	33.8	11.4	2.3	0.9
UTRBIF													0.1	0.1
EUPCAP dead													0.1	0.1
Ludwigia spp. dead	0.5	0.5											0.2	0.1
Typha spp. seedling	15.0	5.0	15.0	5.0	7.5	2.5	10.0	5.0	12.5	12.5	15.0	6.1	0.2	0.1
Site 2 August 1992														
ALTPHI	0.5	0.5									0.3	0.3	0.8	0.6
APILEP													0.8	0.6
EICCRA													0.1	0.1
ELEINT													0.5	0.4
Lemna spp.	25.0	5.0	10.5	9.5	37.5	12.5	12.5	7.5	32.5	2.5	12.5	2.5	5.6	2.4
LIMSPO													3.3	1.9
LUDLEP													0.1	0.1
LUDPER													0.5	0.4
POLPUN													0.1	0.1
PONCOR	0.5	0.5			7.5	7.5			12.5	12.5			0.6	0.4
SAGLAN	0.5	0.5			2.5	2.5	5.0	0.0					0.1	0.1
SAGMON	2.5	2.5			2.5	2.5	7.5	2.5			0.3	0.3		
SALROT	0.5	0.5	0.5	0.5	2.5	2.5	0.5	0.5	2.5	2.5	1.5	1.2	1.1	0.8
SCICAL													0.1	0.1
SCIVAL					0.5	0.5			7.5	7.5				
SPIPOL	0.5	0.5			0.5	0.5					0.3	0.3	0.1	0.1
TYPLAT	50.0	0.0	42.5	2.5	55.0	5.0	35.0	5.0	60.0	0.0	47.5	6.3	26.8	7.4
WOLFLO	0.5	0.5			0.5	0.5					0.3	0.3	0.3	0.1
Typha spp. seedling	35.0	5.0	32.5	12.5	20.0	0.0	15.0	5.0		12.5	30.0	4.1	10.9	4.8
Site 3 August 1992														
ALTPHI			0.5	0.5	1.0	0.0	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.1
AZOCAR													0.1	0.1
BRAPUR													0.4	0.4
EICCRA	12.5	7.5	8.0	7.0	25.0	5.0	22.5	22.5	17.5	2.5	15.0	5.4	19.3	4.4
GALTIN											0.3	0.3		
HYDRAN	52.5	22.5	35.0	30.0	35.0	5.0	35.0	30.0	62.5	17.5	37.5	18.8	46.0	8.3
Lemna spp.	15.5	14.5	22.5	17.5	17.5	12.5	5.5	4.5	15.0	15.0	25.0	7.9	10.3	3.0
LUDLEP													0.1	0.1
LUDOCT											0.3	0.3	0.1	0.1
MIKSCA					0.5	0.5							0.1	0.1

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
POLPUN			0.5	0.5	3.0	2.0			0.5	0.5	0.3	0.3	0.3	0.1
PONCOR	2.5	2.5	2.5	2.5	20.0	5.0	2.5	2.5	0.5	0.5	11.3	5.5	2.2	1.1
SAGLAN							8.0	7.0					0.1	0.1
SAGMON											0.3	0.3		
SALROT			0.5	0.5			0.5	0.5			1.3	1.3	0.1	0.1
SCICAL											0.3	0.3		
SPIPOL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.5	1.2	0.5	0.2
TYPLAT	2.5	2.5	25.0	25.0	5.0	0.0	5.0	5.0	2.5	2.5	25.3	11.7	6.9	3.7
WOLFLO			2.5	2.5			0.5	0.5			1.3	1.3	0.2	0.1
Typha spp. seedling			0.5	0.5			0.5	0.5			6.3	4.7		
Site 1 February 1993														
ALTPHI	1.0	0.0	1.0	0.0	0.5	0.5	1.0	0.0	0.5	0.5	0.5	0.3	0.3	0.1
AMAAUS	0.5	0.5			0.5	0.5	0.5	0.5			0.5	0.3	0.2	0.1
CYPIRI											0.3	0.3		
CYPODO	0.5	0.5									0.5	0.3	0.1	0.1
Cyperus spp.			0.5	0.5							0.3	0.3	0.2	0.1
EICCRA					0.5	0.5			2.5	2.5	0.3	0.3	0.1	0.1
EUPCAP	0.5	0.5					0.5	0.5			0.3	0.3		
HYDRAN			1.0	0.0	0.5	0.5	0.5	0.5	5.0	5.0	0.3	0.3	0.1	0.1
HYDUMB			0.5	0.5							0.3	0.3	0.2	0.1
Lemna spp.			0.5	0.5					0.5	0.5				
LUDLEP	5.0	5.0					2.5	2.5	2.5	2.5	0.8	0.3	0.2	0.1
POLPUN			0.5	0.5					2.5	2.5			0.1	0.1
PONCOR	0.5	0.5			7.5	7.5			2.5	2.5	1.3	1.3	1.3	0.9
SAGLAN	0.5	0.5	15.0	5.0	5.0	0.0	50.0	30.0	7.5	7.5	14.0	12.1	2.4	1.3
SAGMON							12.5	7.5	2.5	2.5				
SALROT							2.5	2.5						
SPIPOL			0.5	0.5					0.5	0.5			0.1	0.1
TYPLAT	32.5	32.5	45.0	5.0	5.0	5.0	27.5	12.5	40.0	35.0	31.3	15.3	3.0	1.3
TYPLAT dead	5.0	5.0	10.0	0.0			5.0	5.0	15.0	15.0	5.0	2.0	0.9	0.6
Site 2 Febraury 1993														
ALTPHI							2.5	2.5			0.3	0.3	1.1	0.8
AMAAUS			0.5	0.5									0.2	0.1
CYPODO			1.0	0.0			0.5	0.5			0.3	0.3	0.2	0.1
ECHCOL							2.5	2.5					0.9	0.6
ECHCRU							0.5	0.5					0.1	0.1
ECLALB			0.5	0.5										

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
EICCRA													0.2	0.1
ELEINT													2.9	2.1
HYDRAN			0.5	0.5							0.3	0.3	2.3	1.4
Lemna spp.	7.5	2.5	22.5	17.5	7.5	2.5	15.5	14.5	25.5	24.5	25.5	14.2	18.0	9.2
LEPFAS													0.1	0.1
LIMSPO					0.5	0.5					0.3	0.3	1.4	0.9
LUDLEP			2.5	2.5					2.5	2.5	1.3	1.3	1.6	0.9
LUDOCT													0.3	0.1
LUDPER													0.8	0.6
PANDIC													7.1	4.0
POLPUN							0.5	0.5	0.5	0.5			0.7	0.4
PONCOR					10.0	10.0			7.5	7.5			2.1	1.0
SAGLAN	0.5	0.5			0.5	0.5	7.5	2.5					0.6	0.4
SAGMON	2.5	2.5					10.0						0.9	0.8
SALROT			15.5	14.5	5.0	5.0	17.5	12.5	1.0	0.0	7.8	4.2	12.5	5.4
SCICAL							0.5	0.5						
SCIVAL					0.5	0.5			2.5	2.5				
SPIPOL	0.5	0.5			1.0	0.0	0.5	0.5	3.0	2.0	0.3	0.3	0.5	0.2
THAGEN													2.1	1.7
TYPLAT	15.0	15.0	50.0	0.0	40.0	10.0	40.0	20.0	45.0	15.0	52.5	8.5	30.4	5.8
WOLFLO			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.4	0.2
TYPLAT dead	20.0	20.0	17.5	2.5	30.0	0.0	22.5	7.5	25.0	5.0	18.8	4.3	15.0	2.7
GALTIN seedling											0.3	0.3	0.4	0.4
Panicum spp #1													0.1	0.1
Site 3 Febraury 1993														
ALTPHI	7.5	2.5	10.0	10.0	5.5	4.5	7.5	7.5	20.5	19.5	23.0	14.1	6.7	3.4
AMAAUS	0.5	0.5					0.5	0.5	0.5	0.5			0.3	0.1
AMMCOC	0.5	0.5			0.5	0.5	0.5	0.5	0.5	0.5			0.2	0.1
BRAPUR											0.3	0.3	0.8	0.8
CYPIRI	0.5	0.5			0.5	0.5			0.5	0.5	0.3	0.3	0.4	0.2
CYPODO	3.0	2.0			1.0	0.0	2.5	2.5			1.8	1.1	0.9	0.1
ECHCOL			2.5	2.5							0.3	0.3	2.8	2.5
ECHCRU			0.5	0.5					0.5	0.5			0.2	0.1
ECLALB	2.5	2.5	0.5	0.5	0.5	0.5					0.3	0.3	0.5	0.2
EICCRA	40.0	35.0	0.5	0.5	28.0	27.0	15.0	5.0	33.0	32.0	4.0	2.3	16.3	3.4
ELEIND					0.5	0.5								
ELEINT					2.5	2.5								
HYDRAN	12.5	2.5	5.0	5.0	7.5	2.5	2.5	2.5	5.0	5.0	3.0	1.2	2.8	0.9

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
HYDUMB	2.5	2.5							15.0	15.0	3.8	3.8		
Lemna spp.	15.5	14.5	10.5	9.5	1.0	0.0	5.5	4.5	1.0	0.0	15.5	11.7	12.8	5.3
LEPFAS													0.1	0.1
LUDLEP	32.5	27.5	30.0	30.0	2.5	2.5	40.0	40.0	1.0 .		22.5	14.4	20.9	5.7
LUDOCT	1.0	0.0	2.5	2.5	1.0	0.0	0.5	0.5	0.5	0.5	3.8	2.4	6.7	5.0
LUDPAL													0.1	0.1
MIKSCA													0.8	0.8
PANDIC	0.5	0.5							0.5	0.5			3.2	2.0
PASDIS													2.9	2.2
POLPUN	5.0	5.0	5.0	5.0	0.5	0.5	0.5	0.5	3.0	2.0	0.5	0.3	2.7	1.1
PONCOR	5.0	5.0	0.5	0.5	45.0	15.0	2.5	2.5	3.0	2.0	5.3	4.9	4.8	2.1
ROTRAM					0.5	0.5								
SAGLAN			0.5	0.5			25.0	25.0			2.5	2.5	0.2	0.1
SAGMON													0.3	0.1
SALROT	0.5	0.5	12.5	12.5			25.0	25.0			11.3	6.6	1.3	0.9
SCICAL											2.5	2.5		
SCIVAL													0.1	0.1
SESMAC							0.5	0.5	0.5	0.5	0.3	0.3	1.7	1.3
SPIPOL	8.0	7.0	0.5	0.5	3.0	2.0	0.5	0.5	13.0	12.0	1.8	1.1	6.6	2.1
THAGEN	10.0	10.0	0.5	0.5			0.5	0.5	5.0	5.0			5.4	2.7
TYPLAT	12.5	2.5	22.5	17.5	15.0	5.0	10.5	9.5	10.0	0.0	33.8	10.9	16.8	6.9
WOLFLO			0.5	0.5			0.5	0.5			1.5	1.2	0.7	0.4
WOLSPP											0.3	0.3		
TYPLAT dead			20.0	20.0							10.0	6.1		
Site 1 August 1993														
ACERUB					0.5	0.5								
ALTPHI			0.5	0.5	0.5	0.5	3.0	2.0	0.5	0.5	0.5	0.3	0.5	0.4
AMAAUS	0.5	0.5							0.5	0.5				
APILEP													0.1	0.1
EICCRA									0.5	0.5				
ELEINT													0.1	0.1
GALTIN	0.5	0.5											0.1	0.1
HYDRAN	10.0	10.0	0.5	0.5	1.0	0.0	3.0	2.0	1.0	0.0	1.8	1.1	0.9	0.8
LUDLEP			0.5	0.5	0.5	0.5	0.5	0.5						
POLPUN	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5			0.3	0.3	0.1	0.1
PONCOR			0.5	0.5	32.5	27.5			0.5	0.5	1.3	1.3	1.3	0.9
SAGLAN	10.0	10.0	5.0	5.0	0.5	0.5	20.5	19.5	3.0	2.0	11.3	9.7	1.4	0.9
SAGMON							15.0	15.0						

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SAMPAR	0.5	0.5												
SCICAL							0.5	0.5	10.5	9.5				
SCIVAL													0.1	0.1
SPIPOL	0.5	0.5												
TYPLAT	20.0	20.0	30.0	30.0	8.0	7.0	50.0	25.0	20.0	20.0	30.0	12.9	2.3	1.1
PONCOR dead					12.5	7.5							0.8	0.8
SAGLAN dead													0.1	0.1
TYPLAT dead	10.0	10.0	10.0	10.0	5.5	4.5	10.0	0.0	10.0	10.0	15.0	6.5	1.8	1.7
Typha spp seedling	0.5	0.5					0.5	0.5			0.3	0.3		
Unknown dicot seedling	0.5	0.5					0.5	0.5					0.1	0.1
Site 2 August 1993														
ACERUB													0.1	0.1
ALTPHI			0.5	0.5	0.5	0.5	0.5	0.5			0.3	0.3	0.8	0.4
APILEP									0.5	0.5			0.1	0.1
Cyperus spp.													0.8	0.8
ECLALB	0.5	0.5			0.5	0.5								
EICCRA													0.1	0.1
ELEINT													1.0	0.8
EUPCAP									0.5	0.5			0.1	0.1
GALTIN									0.5	0.5			0.1	0.1
HYDRAN	0.5	0.5	1.0	0.0	0.5	0.5			1.0	0.0	1.5	1.2	2.8	1.3
Lemna spp.							0.5	0.5	0.5	0.5			0.8	0.4
LUDOCT													0.1	0.1
LUDPER													0.2	0.1
PONCOR					25.0	25.0			25.0	25.0			0.3	0.1
SAGLAN							2.5	2.5			0.3	0.3	0.6	0.4
SAGMON					0.5	0.5	3.0	2.0					0.3	0.1
SALROT	0.5	0.5	1.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.8	0.1
SCICAL									0.5	0.5				
SCIVAL					2.5	2.5							0.2	0.1
THAGEN													0.6	0.4
TYPLAT	77.5	7.5	62.5	2.5	55.0	5.0	72.5	2.5	60.0	20.0	67.5	10.1	52.5	8.6
PONCOR dead					5.0	5.0							0.1	0.1
TYPLAT dead	17.5	2.5	22.5	7.5	20.0	5.0	20.0	0.0	12.5	2.5	17.5	1.4	11.7	2.1
Typha spp seedling	0.5	0.5	0.5	0.5	0.5	0.5	1.0	0.0	1.0	0.0	0.5	0.3	3.1	2.5
Unknown dicot seedling			0.5	0.5							0.3	0.3	0.1	0.1
Unknown grass seedling	0.5	0.5												

Appendix A1. Overall vegetation cover (% plot^{-1}, Mean SE) from Seeded, Mulch, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		Sagittaria lancifolia		Scirpus validus		Mulch		Control	
Species Codes	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Site 3 August 1993														
ACERUB													0.1	0.1
ALTPHI	25.0	25.0	25.0	25.0	8.0	7.0	40.0	40.0	17.5	12.5	19.0	11.8	2.6	1.1
AMAAUS													0.1	0.1
Cyperus spp.	0.5	0.5					0.5	0.5					0.2	0.1
ECHCRU													0.2	0.1
EICCRA	15.5	14.5	1.0	0.0	15.0	5.0	3.0	2.0	15.0	15.0	1.8	1.1	5.6	1.6
ELEINT			2.5	2.5			0.5	0.5						
EUPCAP													0.2	0.1
GALTIN													0.3	0.1
HYDRAN	25.5	24.5			10.0	5.0	8.0	7.0	25.0	15.0	4.0	2.3	9.0	2.1
HYDUMB	15.0	15.0	15.0	15.0			5.0	5.0	7.5	7.5	8.8	7.2	0.8	0.8
Lemna spp.	2.5	2.5					0.5	0.5			0.3	0.3	0.3	0.1
LUDLEP									2.5	2.5	0.3	0.3	0.3	0.1
MIKSCA					0.5	0.5							2.1	2.1
POLPUN	0.5	0.5	0.5	0.5			5.0	5.0	2.5	2.5	0.3	0.3	3.9	2.0
PONCOR	0.5	0.5	0.5	0.5	52.5	12.5	1.0	0.0	5.0	0.0	25.0	8.7	7.3	2.3
SAGLAN			0.5	0.5			15.0	15.0			1.3	1.3		
SAGMON			0.5	0.5			0.5	0.5			0.3	0.3		
SALROT							0.5	0.5			0.3	0.3	0.4	0.4
SCIVAL	0.5	0.5												
SPIPOL	0.5	0.5							2.5	2.5			0.5	0.2
THAGEN	7.5	7.5					0.5	0.5	5.0	5.0	0.3	0.3	5.0	2.2
TYPLAT	12.5	7.5	37.5	27.5	12.5	7.5	15.5	14.5	15.0	5.0	38.8	6.6	14.8	6.7
WOLFLO													0.1	0.1
EICCRA dead	10.0	10.0			10.0	10.0			5.0	5.0			0.1	0.1
LUDLEP dead							1.3	1.3	2.5	2.5				
Ludwigia spp. dead			2.5	2.5										
PONCOR dead					5.0	5.0							0.2	0.1
THAGEN dead	2.5	2.5					0.5	0.5	5.0	5.0			2.7	2.5
TYPLAT dead	10.0	0.0	3.0	2.0	5.0	5.0	2.5	2.5	5.0	5.0	12.5	5.2	6.3	2.7
HYDRAN seedling			0.5	0.5										
POLPUN seedling			0.5	0.5										
Typha spp seedling			0.5	0.5							0.5	0.3	0.3	0.1
Unknown dicot seedling	1.0	0.0	0.5	0.5			1.0	0.0	1.0	0.0	1.0	0.0	2.3	1.6
Unknown grass seedling													0.2	0.1

Appendix A2. Vegetation cover (% m^{-2}, Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots, Experimental Planting Area. Full names of species codes can be found in Table 6.

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Site 1, August 1991														
ALTPHI			0.5	0.5							0.3	0.3	1.6	1.2
AMMCOC											0.3	0.3		
LUDPAL					0.5	0.5					0.3	0.3		
POLPUN													6.4	4.3
TYPLAT	5.0	0.0	0.5	0.5	2.5	2.5	5.5	4.5			16.3	11.8		
Unknown monocot					0.5	0.5								
Site 2, August 1991														
ALTPHI													0.1	0.1
HYDRAN													3.3	3.3
Lemna spp.	1.0	0.0	0.5	0.5	8.0	7.0	3.0	2.0	3.0	2.0	1.0	0.0	15.8	7.6
LIMSPO													0.4	0.4
LUDOCT													1.7	0.9
LUDPAL	10.0	10.0	7.5	7.5			0.5	0.5	2.5	2.5			1.8	1.7
POLPUN													1.3	1.3
SAGMON							0.5	0.5						
SPIPOL													0.3	0.1
TYPLAT	5.0	5.0					2.5	2.5	5.5	4.5			3.4	3.3
WOLFLO	0.5	0.5	0.5	0.5	10.5	9.5	5.0	5.0	1.0	0.0	1.5	1.2	8.1	3.1
Wolffia spp			0.5	0.5			0.5	0.5						
Site 3, August 1991														
ALTPHI											0.3	0.3	0.2	0.1
AMMCOC													0.1	0.1
AZOCAR			30.0	30.0	2.5	2.5	0.5	0.5			41.3	23.8	11.9	7.8
Lemna spp.			0.5	0.5	0.5	0.5	0.5	0.5			6.3	3.8	0.5	0.2
LUDPAL			20.0	20.0							1.5	1.2	1.5	0.9
SALCAR			0.5	0.5							1.3	1.3		
SALROT													0.2	0.1
SPIROT					0.5	0.5								
TYPLAT											0.3	0.3	0.5	0.4
WOLFLO			2.5	2.5	0.5	0.5					2.8	1.3	0.5	0.2
Site 1, January 1992														

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
ALTPHI													6.0	3.0
Lemna spp.	0.5	0.5	1.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	1.8	1.1	0.3	0.1
POLPUN									0.5	0.5	17.5	17.5	6.0	5.8
PONCOR					7.5	7.5								
SAGLAN	2.5	2.5	12.5	2.5			25.0	15.0						
SAGMON			7.5	7.5										
SPIPOL	0.5	0.5	0.5	0.5			0.5	0.5	0.5	0.5	0.3	0.3	0.6	0.4
TYPLAT	7.5	2.5	15.0	5.0	12.5	12.5	7.5	7.5	5.0	5.0	13.8	12.1		
UTRBIF	10.0	10.0	0.5	0.5	2.5	2.5			47.5	47.5	15.0	7.4	14.2	6.3
Site 2, January 1992														
ALTPHI	0.5	0.5									0.3	0.3	1.3	1.3
AZOCAR			0.5	0.5					3.0	2.0	2.5	2.5	0.6	0.4
CYPSPP													1.3	1.3
EICCRA											0.3	0.3	0.1	0.1
HYDUMB													0.2	0.1
Lemna spp.	10.5	9.5	0.5	0.5	5.5	4.5	5.0	5.0	45.0	45.0	2.8	2.4	10.7	5.4
LIMSPO	2.5	2.5											2.5	1.8
LUDPAL							5.0	5.0						
LUDPER	2.5	2.5												
POLPUN													1.3	1.3
PONCOR													0.1	0.1
SAGLAN							2.5	2.5					0.1	0.1
SAGMON							7.5	7.5						
SAGSTA											0.3	0.3		
SALROT	2.5	2.5	15.0	15.0	30.0	30.0	12.5	12.5	2.5	2.5			1.3	0.9
SPIPOL	7.5	7.5	5.0	5.0	20.0	20.0	15.0	15.0	5.0	5.0			1.4	1.2
TYPLAT	52.5	47.5	8.0	7.0	30.0	30.0	20.0	20.0	65.0	35.0			8.0	5.8
WOLFLO	0.5	0.5	2.5	2.5	5.0	5.0	0.5	0.5	0.5	0.5	0.3	0.3	3.2	2.5
Site 3, January 1992														
ALTPHI	0.5	0.5	0.5	0.5										
AZOCAR							0.5	0.5	0.5	0.5	0.3	0.3	1.3	0.9
EICCRA			0.5	0.5							0.3	0.3		
Lemna spp.											0.5	0.3	0.2	0.1
LUDPAL	1.0	0.0	30.0	30.0							0.3	0.3	0.9	0.8
PONCOR					0.5	0.5							0.4	0.4
SALROT			0.5	0.5							1.3	1.3	0.5	0.4

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
TYPLAT											17.8	17.4	1.7	1.7
WOLFLO			3.0	2.0			0.5	0.5			1.5	1.2	0.3	0.1
Site 1, May 1992														
ALTPHI	0.5	0.5	2.5	2.5	0.5	0.5			1.0	0.0	0.3	0.3	10.1	5.5
ECHCOL			0.5	0.5										
Lemna spp.			0.5	0.5							0.3	0.3	0.1	0.1
POLPUN													0.1	0.1
PONCOR					10.0	10.0								
SAGLAN	10.0	10.0	10.0	5.0			52.5	22.5			7.5	7.5	0.4	0.4
SALROT									0.5	0.5	0.3	0.3		
SPIPOL	0.5	0.5	0.5	0.5	0.5	0.5					0.3	0.3		
TYPLAT	37.5	32.5	32.5	7.5	1.0	1.0	35.0	15.0	27.5	22.5	20.0	15.4		
UTRBIF	25.5	24.5	22.5	22.5	25.0	25.0			2.5	2.5	15.0	15.0		
Typha spp. dead											3.8	2.4		
Site 2, May 1992														
ALTPHI											0.3	0.3	1.7	1.3
CYPSUR													0.1	0.1
Lemna spp.	55.0	5.0	40.0	10.0	57.5	2.5	52.5	32.5	55.0	5.0	44.0	16.0	29.8	8.8
LIMSPO	10.0	10.0			0.5	0.5							16.7	7.7
PONCOR					20.0	20.0								
SAGLAN							5.0	5.0						
SAGMON							10.0	10.0						
SALROT	2.5	2.5	0.5	0.5	0.5	0.5			5.0	5.0	0.3	0.3	3.4	2.3
SCISPP									0.5	0.5				
SPIPOL	5.0	5.0					0.5	0.5			1.3	1.3	3.1	1.8
TYPLAT	72.5	12.5	62.5	32.5	42.5	17.5	35.0	5.0	15.0	15.0	25.0	14.4	13.8	8.2
WOLFLO			2.5	2.5			2.5	2.5			0.3	0.3	2.5	1.3
Typha spp. dead	10.0	10.0			0.5	0.5			2.5	2.5			0.8	0.8
Site 3, May 1992														
ALTPHI													1.4	0.9
EICCRA	2.5	2.5			45.0	30.0	45.0	45.0	45.0	45.0	43.8	25.4	13.4	5.9
HYDRAN					10.0	10.0	5.0	5.0	20.0	20.0	1.3	1.3	2.6	1.4
Hydrocotyle spp.					5.0	5.0								
Lemna spp.	15.5	14.5	15.5	14.5	47.5	32.5	17.5	12.5	20.5	19.5	42.5	6.3	26.1	8.1
PONCOR					35.0	35.0							3.8	3.3
SAGLAN			2.5	2.5			2.5	2.5					0.1	0.1

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SALROT											2.5	2.5		
SPIPOL	10.5	9.5	5.5	4.5	12.5	7.5	37.5	32.5	25.0	25.0	50.0	4.1	13.8	5.7
TYPLAT					45.0	45.0					25.0	15.0	10.8	7.1
WOLFLO	1.0	0.0	0.5	0.5					15.0	15.0	17.5	10.3	6.7	2.9
Site 1, August 1992														
ALTPHI			0.5	0.5					2.5	2.5				
EICCRA			0.5	0.5										
PONCOR					17.5	17.5								
SAGLAN	0.5	0.5	7.5	2.5			35.0	10.0						
SALROT							0.5	0.5	0.5	0.5	0.3	0.3		
TYPLAT	22.5	7.5	22.5	2.5			2.5	2.5	17.5	12.5	23.8	8.3	0.1	0.1
Typha spp. dead	25.0	15.0	20.0	10.0	5.0	5.0	5.5	4.5	12.5	12.5	12.5	6.0	0.1	0.1
Site 2, August 1992														
ALTPHI													0.4	0.4
APILEP													0.1	0.1
Lemna spp.	22.5	7.5	8.0	7.0	22.5	7.5	15.5	14.5	40.0	10.0	10.0	4.6	9.0	6.5
LIMSPO													7.9	7.5
PONCOR					10.0	10.0			5.0	5.0				
SAGMON							12.5	12.5						
SALROT	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.8	0.6
SCIVAL					0.5	0.5			15.0	15.0				
SPIPOL											0.3	0.3	0.1	0.1
TYPLAT	35.0	5.0	25.0	5.0	12.5	2.5	27.5	12.5	40.0	10.0	20.0	8.2	10.0	3.6
WOLFLO											0.3	0.3	0.1	0.1
Typha spp. dead	27.5	2.5	7.5	2.5	10.0	0.0	30.0	0.0	25.0	5.0	10.3	7.0	6.3	2.4
Site 3, August 1992														
ALTPHI					3.0	2.0			0.5	0.5	0.5	0.3	0.3	0.1
EICCRA	2.5	2.5	2.5	2.5	25.0	15.0	17.5	17.5	17.5	2.5	15.3	9.5	17.2	4.1
GALTIN											0.3	0.3		
HYDRAN	42.5	42.5			40.0	5.0	22.5	22.5	82.5	7.5	26.5	15.9	45.3	10.8
Lemna spp.	5.0	5.0	20.0	20.0	7.5	2.5	1.0	0.0	25.5	24.5	47.5	23.1	18.6	8.0
MIKSCA													0.1	0.1
PONCOR					12.5	12.5							1.7	1.7
SAGLAN							0.5	0.5						
SALROT			0.5	0.5			0.5	0.5			0.5	0.3		
SPIPOL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.8	1.3	0.8	0.4

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
TYPLAT			25.0	25.0							5.0	2.9	3.8	2.3
WOLFLO			0.5	0.5			0.5	0.5					0.4	0.4
Typha spp. dead			0.5	0.5							1.5	1.2	0.2	0.1
Site 1, February 1993														
ALTPHI			0.5	0.5			0.5	0.5	13.0	12.0	0.3	0.3		
CYPODO	0.5	0.5							0.5	0.5				
HYDRAN									2.5	2.5				
Lemna spp.			0.5	0.5					0.5	0.5				
LUDLEP	10.0	10.0							10.0	0.0	0.3	0.3		
POLPUN									0.5	0.5				
PONCOR					47.5	47.5								
SAGLAN	0.5	0.5	10.0	5.0			32.5	17.5						
SAGMON							37.5	27.5						
SALROT							2.5	2.5						
SPIPOL									0.5	0.5				
TYPLAT	55.0	30.0	65.0	5.0	0.5	0.5	3.0	2.0	40.0	30.0	28.8	14.8		
TYPLAT dead	37.5	22.5	17.5	2.5					10.5	9.5	4.0	2.3		
Site 2, February 1993														
ALTPHI											0.3	0.3	5.5	5.0
CYPODO											0.3	0.3	0.1	0.1
ECHCOL													0.4	0.4
HYDRAN											0.3	0.3	3.5	3.3
Lemna spp.	35.5	34.5	12.5	7.5	7.5	2.5	5.5	4.5	30.5	29.5	41.5	23.7	23.7	10.5
LEPFAS													0.1	0.1
LIMSPO					0.5	0.5					0.3	0.3	1.8	0.9
LUDLEP													3.3	3.3
LUDPER													5.0	5.0
PANDIC													2.9	2.5
PONCOR					7.5	7.5			7.5	7.5			0.4	0.4
SAGLAN							0.5	0.5						
SAGMON							47.5	22.5					1.3	1.3
SALROT	7.5	7.5	15.0	15.0	5.0	5.0	25.0	25.0	1.0	0.0	1.8	1.1	17.8	7.5
SCIVAL					0.5	0.5			2.5	2.5				
SPIPOL	0.5	0.5			1.0	0.0	0.5	0.5	3.0	2.0			0.3	0.1
THAGEN													1.7	1.7
TYPLAT	17.5	2.5	37.5	2.5	27.5	2.5	10.0	0.0	12.5	7.5	22.5	12.7	12.2	3.8

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
WOLFLO	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.1
TYPLAT dead	12.5	7.5	20.0	5.0	12.5	2.5	10.0	10.0	30.0	10.0	15.0	6.5	11.3	4.6
Site 2, February 1993														
ALTPHI	5.0	5.0	0.5	0.5	25.0	25.0	15.0	15.0	2.5	2.5	18.8	15.6	4.0	2.5
AMAAUS													0.8	0.8
CYPIRI	2.5	2.5											0.4	0.4
CYPODO	12.5	12.5			0.5	0.5	0.5	0.5	10.0	10.0	1.3	1.3	0.3	0.1
ECHCOL			7.5	7.5							0.3	0.3	0.1	0.1
ECHCRU			0.5	0.5										
ECLALB	5.0	5.0	2.5	2.5	0.5	0.5							0.7	0.4
EICCRA	32.5	32.5			20.0	20.0	32.5	32.5	7.5	7.5	1.3	1.3	17.9	7.9
HYDRAN	15.0	5.0	0.5	0.5	0.5	0.5	5.0	5.0			1.5	1.2	2.8	2.1
HYDUMB	10.0	10.0							25.0	25.0				
Lemna spp.	13.0	12.0	10.5	9.5	1.0	0.0	3.0	2.0	1.0	0.0	15.5	9.3	17.4	7.5
LUDLEP	20.0	20.0					5.0	5.0	20.0	20.0	16.3	14.6	12.9	5.1
LUDOCT	2.5	2.5	2.5	2.5									3.3	2.5
LUDPAL													0.1	0.1
PANDIC													2.5	1.8
PASDIC													4.2	2.9
POLPUN			0.5	0.5			2.5	2.5	20.0	20.0			2.9	2.5
PONCOR					30.0	30.0							0.8	0.8
SAGLAN			2.5	2.5			2.5	2.5						
SALROT			15.0	15.0			45.0	45.0			7.5	4.8		
SPIPOL	5.5	4.5	0.5	0.5	3.0	2.0	5.0	5.0	3.0	2.0	1.8	1.1	7.0	3.3
THAGEN													0.4	0.4
TYPLAT			12.5	12.5	7.5	7.5	1.0	0.0			20.0	8.4	16.8	7.8
WOLFLO			0.5	0.5			0.5	0.5			0.5	0.3	0.7	0.4
Wolffia spp											0.3	0.3		
TYPLAT dead			20.0	20.0							7.5	6.0		
Site 1, August 1993														
ALTPHI									0.5	0.5	0.3	0.3	0.5	0.4
APILEP													0.1	0.1
ELEINT													0.1	0.1
GALTIN													0.1	0.1
HYDRAN			0.5	0.5			2.5	2.5	5.0	5.0			0.9	0.8
POLPUN													0.1	0.1

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PONCOR					20.0	20.0							2.2	1.7
SAGLAN	5.0	5.0	0.5	0.5			7.5	2.5					1.3	0.9
SAGMON							30.0	30.0						
SCICAL									5.0	5.0				
SCIVAL									5.0	5.0			0.1	0.1
SPIPOL	0.5	0.5												
TYPLAT	5.0	5.0	10.0	10.0			10.0	5.0	7.5	7.5	10.0	7.1	2.2	1.1
PONCOR dead					20.0	20.0							3.3	3.3
TYPLAT dead			40.0	40.0			32.5	32.5	2.5	2.5	6.3	4.7	1.8	1.7
Typha spp. seedling											1.3	1.3		
Unknown dicot seedling							0.5	0.5					0.1	0.1
Site 2, August 1993														
ALTPHI					0.5	0.5							2.2	1.7
HYDRAN	0.5	0.5									0.3	0.3	8.7	7.4
Lemna spp.							0.5	0.5					0.3	0.1
LUDPER													2.5	2.5
PONCOR					40.0	40.0			7.5	7.5			2.5	1.8
SAGLAN							0.5	0.5						
SAGMON							12.5	7.5					1.3	1.3
SALROT			1.0	0.0	0.5	0.5	0.5	0.5			0.3	0.3	0.6	0.4
SCICAL									0.5	0.5				
SCIVAL					0.5	0.5								
TYPLAT	17.5	7.5	25.0	5.0	13.0	12.0	15.0	10.0	32.5	17.5	27.8	14.9	26.7	8.6
TYPLAT dead	30.0	20.0	25.0	5.0	7.5	7.5	5.0	0.0	30.0	20.0	13.8	4.3	10.5	3.9
Typha spp. seedling	0.5	0.5	0.5	0.5			1.0	0.0			0.3	0.3	2.4	2.1
Unknown dicot seedling			0.5	0.5							0.3	0.3	0.1	0.1
Site 3, August 1993														
ALTPHI	10.0	10.0	0.5	0.5	13.0	12.0	37.5	37.5	20.0	20.0	33.8	22.5	3.4	2.5
CYPSPP													0.1	0.1
EICCRA	20.0	20.0			20.0	20.0	10.0	5.0	20.0	20.0	2.5	2.5	8.4	5.7
GALTIN													0.1	0.1
HYDRAN	20.0	20.0			5.0	5.0	7.5	2.5	30.0	20.0	0.3	0.3	13.4	7.8
HYDUMB	40.0	40.0							10.0	10.0	1.5	1.2		
Lemna spp.	0.5	0.5									0.3	0.3	0.2	0.1
LUDLEP													0.1	0.1
POLPUN			2.5	2.5					0.5	0.5	1.3	1.3	2.5	2.1

Appendix A2. Vegetation cover (Mean ±Standard error) from subplots in Seeded, Mulched, and Control plots (Cont.)

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		Mulch		Control	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PONCOR			7.5	7.5	7.5	7.5			0.5	0.5	2.5	2.5	2.9	1.6
SAGLAN			2.5	2.5			5.0	5.0						
SALROT							0.5	0.5			0.3	0.3	0.4	0.4
SPIPOL									2.5	2.5			0.7	0.4
THAGEN													0.8	0.6
TYPLAT			27.5	12.5	7.5	7.5	12.5	12.5			10.3	5.3	8.3	5.1
WOLFLO													0.1	0.1
EICCRA dead	10.0	10.0			5.0	5.0			2.5	2.5			0.4	0.4
LUDLEPdead									5.0	5.0				
PONCOR dead													0.4	0.4
TYPLAT dead			10.0	0.0	7.5	7.5					7.5	3.2	3.3	2.2
Poaceae seedling													0.3	0.1
AMAAUS seedling													0.1	0.1
HYDRAN seedling			0.5	0.5										
Typha spp. seedling			0.5	0.5							0.5	0.3	0.2	0.1
Unknown dicot seedling	0.5	0.5	0.5	0.5			1.0	0.0	0.5	0.5	0.8	0.3	1.3	0.8

Appendix A3. Density of vegetation (# m^{-2}, Mean SE) from Seeded, Mulch, and Control treatment plots, Experimental Planting Areas. Full names of species codes can be found in Table 6.

Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE	Mulch Mean	SE	Control Mean	SE
Site 1, August 1991														
ALTPHI	.	.	0.5	0.5	.	.	.	.	.	.	0.5	0.5	0.3	0.1
AMMCOC	.	.	.	.	.	.	.	.	.	.	0.3	0.3	.	.
LUDPAL	.	.	.	.	0.5	0.5	.	.	.	.	0.5	0.5	.	.
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.4
TYPLAT	3.5	1.5	2.5	2.5	1.0	1.0	3.5	2.5	2.0	2.0	8.8	6.1	.	.
Site 2, August 1991														
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	1.6	1.6
LUDOCT	.	.	.	.	1.0	1.0	.	.	.	.	.	.	0.3	0.2
LUDPAL	1.0	1.0	2.5	2.5	.	.	0.5	0.5	1.5	1.5	.	.	0.6	0.4
SAGMON	.	.	.	.	.	.	1.5	1.5	.	.	.	.	.	.
TYPLAT	1.5	1.5	.	.	.	.	1.5	1.5	3.0	2.0	.	.	0.5	0.4
Site 3, August 1991														
LUDPAL	.	.	.	.	.	.	.	.	.	.	0.3	0.3	.	.
TYPLAT	.	.	.	.	.	.	.	.	.	.	0.5	0.5	0.2	0.1
Site 1, January 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.3	0.1
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
PONCOR	.	.	.	.	1.0	1.0	.	.	.	.	.	.	.	.
SAGLAN	0.5	0.5	2.0	1.0	.	.	2.0	1.0	.	.	.	.	.	.
SAGMON	.	.	1.5	1.5	.	.	.	.	.	.	.	.	.	.
TYPLAT	3.0	1.0	5.0	4.0	5.5	5.5	7.0	7.0	4.0	4.0	6.5	5.6	.	.
Site 2, January 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	0.3	0.3	.	.
LUDPAL	3.0	3.0	.	.	.	.	3.0	3.0	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	1.5	1.5	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	1.0	1.0	.	.	.	.	.	.

Appendix A3. Density of vegetation (# m^{-2}, Mean SE) from Seeded, Mulch, and Control treatment plots, Experimental Planting Areas (Cont.)

Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE	Mulch Mean	SE	Control Mean	SE
TYPLAT	11.0	10.0	4.0	3.0	13.5	13.5	6.0	6.0	18.5	9.5	.	.	2.2	1.5
Site 3, January 1992														
ALTPHI	.	.	0.5	0.5	.	.	.	.	.	.	.	.	.	.
EICCRA	.	.	1.0	1.0	.	.	.	.	.	.	0.3	0.3	.	.
LUDPAL	0.5	0.5	.	.	.	.	.	.	.	.	0.3	0.3	.	.
PONCOR	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
TYPLAT	.	.	.	.	.	.	.	.	.	.	3.3	2.6	0.3	0.3
Site 1, May 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.8	0.8
PONCOR	.	.	.	.	3.5	3.5	.	.	.	.	.	.	.	.
SAGLAN	1.5	1.5	1.5	0.5	.	.	10.0	0.0	.	.	0.3	0.3	.	.
TYPLAT	15.5	9.5	23.5	3.5	5.0	5.0	10.5	0.5	10.0	7.0	11.0	6.7	.	.
Typha spp seedling	.	.	.	.	.	.	.	.	.	.	2.3	1.7	.	.
Site 2, May 1992														
PONCOR	.	.	.	.	0.5	0.5	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	0.5	0.5	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	1.5	1.5	.	.	.	.	.	.
Scirpus spp.	.	.	.	.	.	.	.	.	0.5	0.5	.	.	.	.
TYPLAT	23.0	10.0	25.5	5.5	14.5	0.5	18.5	1.5	12.0	2.0	12.3	7.6	5.0	2.6
Typha spp seedling	3.0	3.0	.	.	1.0	1.0	.	.	1.5	1.5	.	.	0.3	0.3
Site 3, May 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
EICCRA	1.0	1.0	.	.	1.5	1.5	.	.	13.5	13.5	13.5	8.2	0.9	0.7
PONCOR	.	.	.	.	8.5	8.5	.	.	.	.	.	.	0.5	0.4
SAGLAN	.	.	1.0	1.0	.	.	0.5	0.5	.	.	.	.	.	.
TYPLAT	.	.	.	.	4.0	4.0	.	.	.	.	7.3	4.2	2.8	1.9
Site 1, August 1992														
PONCOR	.	.	.	.	3.0	3.0	.	.	.	.	.	.	.	.
SAGLAN	.	.	0.5	0.5	.	.	8.5	0.5	.	.	.	.	.	.
TYPLAT	12.0	3.0	12.5	5.5	.	.	1.5	1.5	6.0	4.0	7.5	2.9	0.1	0.1

Appendix A3. Density of vegetation (# m^{-2}, Mean SE) from Seeded, Mulch, and Control treatment plots, Experimental Planting Areas (Cont.)

Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE	Mulch Mean	SE	Control Mean	SE
Site 2, August 1992														
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	0.4	0.4
PONCOR	.	.	.	.	.	.	.	.	1.0	1.0	.	.	.	.
SAGMON	.	.	.	.	.	.	2.0	2.0	.	.	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	7.0	7.0	.	.	.	.
TYPLAT	14.5	2.5	15.5	6.5	6.5	0.5	12.0	11.0	12.5	2.5	9.0	3.5	3.8	1.7
Site 3, August 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
PONCOR	.	.	.	.	5.0	5.0	.	.	.	.	.	.	0.3	0.3
SAGLAN	.	.	.	.	.	.	0.5	0.5	.	.	.	.	.	.
TYPLAT	.	.	10.0	10.0	.	.	.	.	.	.	5.0	2.9	1.8	1.2
Site 1, February 1993														
ALTPHI	.	.	.	.	.	.	0.5	0.5	.	.	0.5	0.5	.	.
CYPODO	0.5	0.5	.	.	.	.	.	.	.	.	.	.	.	.
LUDLEP	6.0	6.0	.	.	.	.	.	.	5.0	2.0	.	.	.	.
PONCOR	.	.	.	.	7.5	7.5	.	.	.	.	.	.	.	.
SAGLAN	0.5	0.5	1.5	1.5	.	.	6.0	3.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	3.5	2.5	.	.	.	.	.	.
TYPLAT	22.0	3.0	15.5	6.5	1.0	1.0	0.5	0.5	22.0	10.0	10.0	4.1	.	.
Site 2, February 1993														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	0.3	0.2
CYPODO	.	.	.	.	.	.	.	.	.	.	0.5	0.5	0.1	0.1
HYDRAN	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	0.6	0.6
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	0.2	0.2
PONCOR	.	.	.	.	2.0	2.0	.	.	2.0	2.0	.	.	0.1	0.1
SAGMON	.	.	.	.	.	.	4.5	1.5	.	.	.	.	0.3	0.3
SCIVAL	.	.	.	.	1.5	1.5	.	.	3.0	3.0	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	0.2	0.2
TYPLAT	13.0	3.0	19.5	4.5	17.0	2.0	3.5	0.5	12.0	6.0	16.8	9.2	7.5	2.6

Appendix A3. Density of vegetation (# m^{-2}, Mean SE) from Seeded, Mulch, and Control treatment plots, Experimental Planting Areas (Cont.)

Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE	Mulch Mean	SE	Control Mean	SE
Site 3, February 1993														
AMAAUS	0.5	0.5	.	.	.	.	.	.	.	.	.	.	0.3	0.3
CYPIRI	0.5	0.5	.	.	.	.	.	.	.	.	.	.	.	.
CYPODO	1.5	1.5	.	.	0.5	0.5	0.5	0.5	1.5	1.5	0.8	0.8	0.3	0.3
ECHCOL	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
ECLALB	0.5	0.5	.	.	1.5	1.5	.	.	.	.	.	.	0.3	0.2
EICCRA	.	.	.	.	.	.	.	.	.	.	0.3	0.3	.	.
HYDRAN	.	.	.	.	.	.	.	.	.	.	0.8	0.8	1.8	1.8
LUDLEP	3.0	3.0	.	.	.	.	2.0	2.0	3.0	3.0	3.0	2.4	4.4	1.9
LUDOCT	0.5	0.5	1.0	1.0	.	.	.	.	.	.	.	.	0.8	0.8
PANDIC	.	.	.	.	.	.	.	.	.	.	.	.	0.8	0.6
PASDIS	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
POLPUN	.	.	0.5	0.5	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	6.5	6.5	.	.	.	.	.	.	.	.
SAGLAN	.	.	0.5	0.5	.	.	0.5	0.5	.	.	.	.	.	.
TYPLAT	.	.	4.0	4.0	1.5	1.5	0.5	0.5	.	.	9.8	3.4	7.1	3.1
Site 1, August 1993														
ALTPHI	.	.	.	.	.	.	.	.	.	.	0.8	0.8	.	.
APILEP	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
PONCOR	.	.	.	.	7.0	7.0	.	.	.	.	.	.	1.8	1.8
SAGLAN	0.5	0.5	.	.	.	.	2.0	1.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	5.0	5.0	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	8.0	8.0	.	.	.	.
TYPLAT	5.0	5.0	6.5	6.5	.	.	8.0	4.0	3.5	3.5	6.5	5.0	0.3	0.3
Site 2, August 1993														
ALTPHI	.	.	.	.	1.0	1.0	.	.	.	.	.	.	.	.
HYDRAN	0.5	0.5	.	.	.	.	.	.	.	.	0.5	0.5	0.3	0.3
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
PONCOR	.	.	.	.	15.0	15.0	.	.	2.5	2.5	.	.	0.5	0.5
SAGLAN	.	.	.	.	.	.	1.0	1.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	3.5	2.5	.	.	.	.	0.2	0.2

Appendix A3. Density of vegetation (# m^{-2}, Mean SE) from Seeded, Mulch, and Control treatment plots, Experimental Planting Areas (Cont.)

Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE	Mulch Mean	SE	Control Mean	SE
SCIVAL	.	.	.	.	2.5	2.5	.	.	.	.	.	.	.	.
TYPLAT	9.0	1.0	12.0	0.0	6.5	5.5	6.0	1.0	10.0	2.0	9.5	3.3	8.3	1.9
Site 3, August 1993														
EICCRA	.	.	.	.	.	.	5.0	5.0	.	.	1.3	1.3	1.2	0.6
PONCOR	.	.	2.0	2.0	6.0	6.0	.	.	0.5	0.5	0.3	0.3	1.7	1.2
SAGLAN	.	.	0.5	0.5	.	.	1.0	1.0	.	.	.	.	.	.
TYPLAT	.	.	8.0	2.0	1.5	1.5	2.5	2.5	.	.	3.8	2.4	2.0	1.1

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. Full names of species codes can be found in Table 6. .

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Site 1, August 1991														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	9.1	6.1
AMMCOC	.	.	.	.	.	.	.	.	.	.	10.8	10.8	.	.
LUDPAL	.	.	.	.	.	.	.	.	.	.	0.3	0.3	.	.
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	21.3	7.8
TYPLAT	109.0	.	31.0	31.0	56.0	56.0	86.5	8.5	47.0	47.0	60.5	36.0	.	.
Site 2, August 1991														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	1.8	1.8
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	1.6	1.6
LUDOCT	.	.	.	.	.	.	.	.	.	.	.	.	12.7	9.7
LUDPAL	.	.	17.5	17.5	.	.	9.0	9.0	9.5	9.5	.	.	2.1	1.5
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	3.4	3.4
SAGMON	.	.	.	.	.	.	19.0	19.0	.	.	.	.	.	.
TYPLAT	31.0	31.0	.	.	.	.	46.5	46.5	47.5	18.5	.	.	8.5	8.5
Site 3, August 1991														
ALTPHI	.	.	.	.	.	.	.	.	.	.	7.3	7.3	6.0	4.1
AMMAUS	.	.	.	.	.	.	.	.	.	.	.	.	2.8	2.8
LUDPAL	.	.	10.5	10.5	.	.	.	.	.	.	1.8	1.8	12.0	5.2
TYPLAT	.	.	.	.	.	.	.	.	.	.	11.0	11.0	12.5	9.4
Site 1, January 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	33.4	10.1
POLPUN	.	.	.	.	.	.	.	.	.	.	18.3	18.3	14.4	7.7
PONCOR	.	.	.	.	68.5	68.5	.	.	.	.	.	.	.	.
SAGLAN	69.0	69.0	151.0	36.0	.	.	146.0	8.0	.	.	.	.	.	.
SAGMON	.	.	61.5	61.5	.	.	.	.	.	.	.	.	.	.
TYPLAT	171.5	18.5	199.0	44.0	128.0	128.0	100.0	100.0	117.5	117.5	92.8	59.7	.	.
Site 2, January 1992														
ALTPHI	20.0	20.0	.	.	.	.	.	.	.	.	7.3	7.3	3.0	3.0

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. (Cont.).

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYPHAS	.	.	.	.	.	.	.	.	.	.	.	.	8.3	8.3
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	4.9	3.3
LUDPAL	13.0	13.0	.	.	.	.	13.5	13.5	.	.	.	.	.	.
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	3.8	3.8
SAGLAN	.	.	.	.	.	.	46.0	46.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	30.0	30.0	.	.	.	.	.	.
SAGSTA	.	.	.	.	.	.	.	.	.	.	13.8	13.8	.	.
TYPLAT	106.5	16.5	140.0	40.0	110.0	110.0	80.0	80.0	167.0	33.0	.	.	42.9	23.7
Site 3, January 1992														
ALTPHI	.	.	15.0	15.0	.	.	.	.	.	.	.	.	.	.
EICCRA	.	.	.	.	.	.	.	.	.	.	8.8	8.8	.	.
LUDPAL	19.0	19.0	17.5	17.5	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	.	.	.	.	.	.	.	.	7.2	7.2
TYPLAT	.	.	.	.	.	.	.	.	.	.	65.8	49.7	16.2	16.2
Site 1, May 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	8.1	6.6
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	5.3	5.3
PONCOR	.	.	.	.	78.0	78.0	.	.	.	.	.	.	.	.
SAGLAN	80.0	80.0	150.0	.	.	.	187.5	2.5	.	.	42.5	42.5	.	.
TYPLAT	205.0	45.0	260.0	8.0	105.0	105.0	254.5	24.5	191.0	39.0	115.0	66.9	.	.
Site 2, May 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	1.8	1.8	5.6	4.0
CYPSUR	.	.	.	.	.	.	.	.	.	.	.	.	12.9	12.9
LIMSPO	.	.	.	.	.	.	.	.	.	.	.	.	7.9	4.4
PONCOR	.	.	.	.	67.0	67.0	.	.	.	.	.	.	.	.
SAGLAN	.	.	.	.	.	.	62.5	62.5	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	74.5	74.5	.	.	.	.	.	.
Scirpus spp.	.	.	.	.	.	.	.	.	17.5	17.5	.	.	.	.
TYPLAT	290.0	60.0	255.0	45.0	265.0	35.0	242.5	37.5	225.0	15.0	73.3	73.3	78.1	30.5
Site 3, May 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	19.8	8.8

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. (Cont.).

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
EICCRA	28.0	28.0	.	.	69.5	4.5	41.0	41.0	41.0	41.0	39.5	23.2	33.9	12.3
HYDRAN	.	.	.	.	64.0	4.0	30.5	30.5	28.5	28.5	11.3	11.3	18.3	8.0
PONCOR	.	.	.	.	60.0	60.0	.	.	.	.	.	.	21.9	15.1
SAGLAN	.	.	37.0	37.0	.	.	73.0	73.0	.	.	.	.	.	.
TYPLAT	115.0	115.0	.	.	5.0	5.0	.	.	.	.	94.0	54.3	37.6	25.7
Site 1, August 1992														
ALTPHI	.	.	35.5	35.5	.	.	.	.	41.5	41.5	.	.	.	.
EICCRA	.	.	36.0	36.0	.	.	.	.	.	.	.	.	.	.
PONCOR	.	.	.	.	84.0	84.0	.	.	.	.	.	.	.	.
SAGLAN	67.5	67.5	149.0	6.0	.	.	162.5	5.5	.	.	.	.	.	.
TYPLAT	197.5	17.5	202.5	7.5	.	.	73.0	73.0	182.5	2.5	140.5	50.2	.	.
Site 2, August 1992														
ALTPHI	.	.	.	.	.	.	.	.	.	.	.	.	1.1	1.1
PONCOR	.	.	.	.	75.0	75.0	.	.	50.0	50.0	.	.	.	.
SAGMON	.	.	.	.	.	.	91.5	91.5	.	.	.	.	.	.
SCIVAL	.	.	.	.	.	.	.	.	115.0	115.0	.	.	.	.
TYPLAT	138.5	61.5	123.5	98.5	169.5	40.5	196.0	4.0	157.5	42.5	120.8	41.3	65.3	29.1
Site 3, August 1992														
ALTPHI	.	.	.	.	73.5	3.5	.	.	35.5	35.5	27.5	16.9	24.6	10.5
EICCRA	26.5	26.5	.	.	80.0	4.0	38.5	38.5	77.5	6.5	38.3	22.4	53.1	9.7
GALTIN	.	.	.	.	.	.	.	.	.	.	9.5	9.5	.	.
HYDRAN	35.5	35.5	.	.	78.0	3.0	32.5	32.5	85.0	3.0	35.5	20.6	66.6	9.5
MIKSCA	.	.	.	.	.	.	.	.	.	.	.	.	7.1	7.1
PONCOR	.	.	.	.	57.5	57.5	.	.	.	.	.	.	13.1	13.1
SAGLAN	.	.	.	.	.	.	55.0	55.0	.	.	.	.	.	.
TYPLAT	.	.	95.0	95.0	.	.	.	.	.	.	66.8	38.6	36.3	19.1
Site 1, February 1993														
ALTPHI	.	.	.	.	.	.	12.5	12.5	25.0	5.0	9.8	9.8	.	.
CYPODO	20.0	20.0	.	.	.	.	.	.	10.0	10.0	.	.	.	.
HYDRAN	.	.	.	.	.	.	.	.	9.0	9.0	.	.	.	.
LUDLEP	75.0	75.0	.	.	.	.	.	.	81.5	38.5	12.5	12.5	.	.

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. (Cont.).

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
POLPUN	.	.	.	.	.	.	.	.	15.5	15.5	.	.	.	.
PONCOR	.	.	.	.	81.0	81.0	.	.	.	.	.	.	.	.
SAGLAN	5.0	5.0	147.5	13.5	45.5	45.5	143.0	48.0	.	.	20.3	20.3	.	.
SAGMON	.	.	.	.	.	.	137.5	27.5	.	.	.	.	.	.
TYPLAT	127.5	37.5	162.0	28.0	81.0	81.0	45.5	45.5	202.5	27.5	161.5	58.0	.	.
Site 2, February 1993														
ALTPHI	.	.	.	.	.	.	.	.	.	.	11.8	11.8	21.3	11.1
CYPODO	.	.	.	.	.	.	.	.	.	.	22.5	22.5	2.9	2.9
ECHCOL	.	.	.	.	.	.	.	.	.	.	.	.	7.7	7.7
HYDRAN	.	.	.	.	.	.	.	.	.	.	.	.	5.8	3.8
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	12.5	12.5
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	22.5	22.5
PANDIC	.	.	.	.	.	.	.	.	.	.	.	.	24.1	16.4
PONCOR	.	.	.	.	75.0	75.0	.	.	75.0	75.0	.	.	8.0	8.0
SAGLAN	.	.	.	.	.	.	65.0	65.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	150.5	4.5	.	.	.	.	10.8	10.8
SCIVAL	.	.	.	.	72.5	72.5	.	.	66.5	66.5	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	15.0	15.0
TYPLAT	218.5	53.5	233.5	24.5	254.0	24.0	252.0	4.0	199.5	34.5	207.0	24.3	141.5	31.3
Site 3, February 1993														
ALTPHI	13.0	13.0	9.0	9.0	15.5	15.5	22.5	22.5	12.5	12.5	16.3	9.6	19.6	6.8
AMAAUS	10.0	10.0	.	.	.	.	.	.	.	.	.	.	7.7	7.7
CYPIRI	4.5	4.5	.	.	.	.	.	.	.	.	.	.	3.8	3.8
CYPODO	27.5	27.5	.	.	20.5	20.5	17.0	17.0	41.5	41.5	17.0	17.0	14.3	8.3
ECHCOL	.	.	42.0	42.0	.	.	.	.	.	.	17.0	17.0	6.0	6.0
ECHCRU	.	.	28.5	28.5	.	.	.	.	.	.	.	.	.	.
ECLALB	24.5	24.5	8.5	8.5	2.5	2.5	.	.	.	.	.	.	12.4	6.7
EICCRA	.	.	.	.	23.5	23.5	24.0	24.0	.	.	3.8	3.8	15.7	5.8
HYDRAN	17.5	7.5	5.0	5.0	2.5	2.5	4.5	4.5	.	.	5.3	3.8	5.4	2.6
HYDUMB	15.0	15.0	.	.	.	.	.	.	19.0	19.0	.	.	.	.
LUDLEP	43.0	43.0	.	.	.	.	24.0	24.0	47.0	47.0	30.3	27.0	33.2	13.0

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. (Cont.).

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
LUDOCT	38.5	38.5	40.5	40.5	.	.	.	.	.	.	.	.	30.7	16.6
PANDIC	.	.	.	.	.	.	.	.	.	.	.	.	23.3	15.7
PASDIC	.	.	.	.	.	.	.	.	.	.	.	.	4.5	4.5
POLPUN	.	.	31.0	31.0	.	.	33.5	33.5	47.0	47.0	.	.	14.9	10.3
PONCOR	.	.	.	.	64.0	64.0	.	.	.	.	.	.	8.6	8.6
SAGLAN	.	.	58.0	58.0	.	.	69.5	69.5	.	.	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	11.7	11.7
TYPLAT	.	.	90.0	90.0	101.5	101.5	101.5	48.5	.	.	131.3	44.9	81.2	31.1
Site 1, August 1993														
ALTPHI	.	.	.	.	.	.	.	.	10.0	10.0	1.3	1.3	1.7	1.7
APILEP	.	.	.	.	.	.	.	.	.	.	.	.	1.1	1.1
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	1.3	1.3
HYDRAN	.	.	4.0	4.0	.	.	7.5	7.5	5.0	5.0	.	.	1.1	1.1
POLPUN	.	.	.	.	.	.	.	.	.	.	.	.	1.6	1.6
PONCOR	.	.	.	.	37.5	37.5	.	.	.	.	.	.	2.7	2.7
SAGLAN	36.5	36.5	26.0	26.0	.	.	77.0	12.0	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	37.5	37.5	.	.	.	.	.	.
SCICAL	.	.	.	.	.	.	.	.	92.0	92.0	.	.	.	.
TYPLAT	67.5	67.5	90.0	90.0	.	.	134.5	5.5	62.5	62.5	67.0	40.7	2.4	2.4
Unknown dicot seedling	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
Site 2, August 1993														
ALTPHI	.	.	.	.	24.0	24.0	.	.	.	.	.	.	7.5	5.3
HYDRAN	1.5	1.5	.	.	.	.	.	.	.	.	0.3	0.3	7.4	2.8
LUDPER	.	.	.	.	.	.	.	.	.	.	.	.	20.0	20.0
PONCOR	.	.	.	.	48.0	48.0	.	.	39.0	39.0	.	.	9.5	6.4
SAGLAN	.	.	.	.	.	.	35.5	35.5	.	.	.	.	.	.
SAGMON	.	.	.	.	.	.	72.5	7.5	.	.	.	.	5.3	5.3
SCICAL	.	.	.	.	.	.	.	.	107.5	107.5	.	.	.	.
SCIVAL	.	.	.	.	101.5	101.5	.	.	.	.	.	.	.	.
TYPLAT	158.5	41.5	190.0	30.0	173.0	23.0	198.5	26.5	160.0	10.0	163.3	33.2	126.4	24.5
Typha spp. seedlings	0.5	0.5	.	.	.	.	0.5	0.5	.	.	.	.	0.3	0.1

Appendix A4. Height (cm m^{-2}, Mean ±SE) of vegetation from Seeded, Mulch, and Control plots in Experimental Planted Treatments. (Cont.).

	Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*		*Mulch*		*Control*	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Unknown dicot seedling	.	.	.	.	.	.	.	.	.	.	0.3	0.3	0.1	0.1
Site 3, August 1993														
ALTPHI	29.5	29.5	1.0	1.0	20.5	8.5	13.0	13.0	19.5	19.5	16.5	9.6	8.8	4.2
AMAAUS	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
Cyperus spp.	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.1
EICCRA	9.0	9.0	.	.	11.5	11.5	11.5	3.5	10.5	10.5	3.5	3.5	6.1	2.5
GALTIN	.	.	.	.	.	.	.	.	.	.	.	.	0.6	0.6
HYDRAN	11.5	11.5	.	.	11.0	11.0	12.5	4.5	21.5	6.5	4.8	4.8	6.4	3.3
HYDUMB	21.0	21.0	.	.	.	.	.	.	.	.	14.3	8.3	.	.
LUDLEP	.	.	.	.	.	.	.	.	.	.	.	.	1.3	1.3
POLPUN	.	.	10.5	10.5	.	.	.	.	17.5	17.5	9.8	9.8	5.3	3.6
PONCOR	.	.	19.0	19.0	80.0	80.0	.	.	20.0	20.0	24.5	24.5	14.7	9.0
SAGLAN	.	.	48.0	48.0	.	.	43.5	43.5	.	.	.	.	.	.
THAGEN	.	.	.	.	.	.	.	.	.	.	.	.	9.1	7.8
TYPLAT	.	.	142.5	4.5	105.0	105.0	47.5	47.5	.	.	117.0	12.4	46.9	20.5
Typha spp. seedlings	.	.	.	.	.	.	.	.	.	.	0.3	0.3	0.1	0.1
Unknown dicot seedling	0.5	0.5	.	.	.	.	0.5	0.5	.	.	0.5	0.3	2.9	2.6
Poaceae seedling	.	.	.	.	.	.	.	.	.	.	.	.	0.2	0.1

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites. Species name column headings are planting treatments. Full species names are found in Table 6. Species codes ending with "D" represent dead.

FLOWERING PHENOLOGY

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-91	1	COMDIF	0.00	0.00	0.50	0.58	1.25	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.25	0.29	1.00	0.67	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	PONCOR	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	CYPIRI	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.75	0.87	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87
Aug-91	3	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00
Jan-92	1	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.50	0.58
Jan-92	2	LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Jan-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	PONCOR	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.75	0.55
Jan-92	3	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	1.50	0.33	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
May-92	1	ALTPHI	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	ELEINT	1.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00
May-92	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	HYDRAN	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
May-92	2	PONCOR	0.00	0.00	0.00	0.00	1.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	2	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	ELEINT	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
May-92	3	PANHEM	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	PONCOR	0.00	0.00	0.00	0.00	2.25	0.29	0.75	0.87	0.00	0.00	0.00	0.00	0.50	0.58
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00	0.75	0.87
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
May-92	3	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.25	0.29
Aug-92	2	LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.50	0.58	1.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.82	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	3	EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	1.25	0.29	0.25	0.29	0.00	0.00	0.00	0.00	0.50	0.58
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00
Feb-93	2	ELEINT	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Feb-93	2	PONCOR	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.67	0.00	0.00
Feb-93	3	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.25	0.29
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Aug-93	1	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	1.25	0.29	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.75	0.87	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	2	GALTIN	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	HYDUMB	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	PONCOR	0.00	0.00	0.00	0.00	1.50	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Aug-93	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	3	HYDRAN	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	3	LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00	1.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00
Aug-93	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.25	0.87
Mar-94	1	HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87
Mar-94	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.67	0.00	0.00	0.75	0.87

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.87	0.00	0.00
Mar-94	2	HYDRAN	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Mar-94	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.29	0.25	0.29	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00
Mar-94	3	ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	HYDRAN	1.50	1.00	0.00	0.00	0.50	0.58	1.00	0.82	0.00	0.00	0.25	0.29	0.00	0.00
Mar-94	3	HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.25	0.29	0.00	0.00
Mar-94	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Mar-94	3	TYPLAT	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00
IMMATURE FRUIT PHENOLOGY																
Aug-91	1	ECLALB	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.50	0.58	0.50	0.33	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.55	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.67	0.00	0.00
Jan-92	2	LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.47	0.75	0.55
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	2.25	0.29	0.00	0.00
May-92	1	ELEINT	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.29	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00
May-92	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	ELEINT	1.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	1.00	0.47	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
May-92	2	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	ELEINT	2.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55
May-92	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	3	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.87	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.55	0.25	0.29	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.25	0.29
May-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
May-92	3	TYPLAT	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	ELEINT	1.25	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	1.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.75	0.29	0.00	0.00
Aug-92	2	CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	ELEINT	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.25	0.29	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	3	ELEINT	1.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Feb-93	1	ELEINT	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.55	0.00	0.00
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.50	0.58
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.50	0.58
Feb-93	3	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.67	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00
Aug-93	1	ELEINT	1.25	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	1	PANHEM	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87
Aug-93	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.00
Aug-93	2	CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00
Aug-93	2	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	1.75	0.29	0.50	0.58	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00
Aug-93	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.82
Aug-93	3	CYPIRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	2.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Aug-93	3	HYDRAN	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Aug-93	3	PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.87	0.00	0.00
Mar-94	2	ELEINT	0.50	0.33	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Mar-94	3	ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.55	0.50	0.58	0.00	0.00
MATURE FRUIT PHENOLOGY																
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Jan-92	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Jan-92	2	LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00
Jan-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Jan-92	3	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.29	0.00	0.00
May-92	2	ELEINT	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.75	0.55	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.55	0.00	0.00
May-92	3	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.47	0.50	0.58	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.58	0.25	0.29
Aug-92	1	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.55	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.55	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	2.25	0.29	0.75	0.87
Aug-92	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.00
Aug-92	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	ELEINT	2.25	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Aug-92	2	SCICAL	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	1.75	0.73	0.00	0.00	0.00	0.00
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	1.50	0.75	0.75	0.87
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	2	TYPLAT	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.75	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.73	0.00	0.00	0.00	0.00
Aug-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.87	0.75	0.87
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-92	3	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	ELEINT	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Feb-93	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Feb-93	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	1	ELEINT	0.75	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PANHEM	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B1. Phenology of vegetation found in single and mixed species planted plots, Experimental Planting Sites (Cont.).

			Eleocharis interstincta		*Panicum hemitomon*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus californicus*		*Scirpus validus*		Mixed Species Plots	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.75	0.00	0.00	0.00	0.00
Aug-93	1	SCICALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.00	0.00
Aug-93	1	SCIVALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Aug-93	1	TYPLATD	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	0.50	0.58	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29
Aug-93	2	LEPFAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCISPP#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00
Aug-93	2	SCICAL	0.00	0.00	0.00	0.00	0.50	0.58	0.00	0.00	0.75	0.29	0.00	0.00	0.00	0.00
Aug-93	2	SCICALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00
Aug-93	2	SCIVALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.29	0.00	0.00	0.00	0.00
Aug-93	2	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	0.00	0.00	2.25	0.87	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.00	0.00	0.00
Aug-93	3	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.50	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.47	0.00	0.00	0.00	0.00
Aug-93	3	TYPLAT	0.00	0.00	0.50	0.58	0.75	0.87	0.00	0.00	0.00	0.00	1.00	0.82	0.00	0.00
Aug-93	3	TYPLATD	0.00	0.00	0.00	0.00	0.75	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	ELEINT	1.00	0.47	0.25	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index.

FLOWERING

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-91	1	COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	CYPIRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.50	0.71	0.00	0.00	1.50	0.71	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	TYPLAT	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00	0.00	0.00
May-92	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	TYPLAT	0.50	0.71	0.00	0.00	2.50	0.71	0.00	0.00	0.00	0.00
May-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
May-92	3	PONCOR	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCI#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.41
Aug-93	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	CYPODO	1.50	2.12	0.00	0.00	0.00	0.00	0.00	0.00	1.50	2.12
Aug-93	3	ECLALB	0.50	0.71	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Aug-93	3	EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	HYDUMB	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	1.50	2.12
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

Date	Site	Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE
Aug-93	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.41	1.00	1.41
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71
Mar-94	1	PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Mar-94	3	ALTPHI	1.50	2.12	0.00	0.00	0.50	0.71	0.50	0.71	0.00	0.00
Mar-94	3	HYDRAN	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.41
Mar-94	3	HYDUMB	1.50	2.12	0.00	0.00	0.00	0.00	0.00	0.00	1.50	2.12
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IMMATURE FRUIT

Date	Site	Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE
Aug-91	1	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00
Jan-92	3	SAGLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.50	0.71	0.00	0.00	1.50	0.71	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
May-92	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	TYPLAT	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
May-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	1.00	1.41	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCI#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	1.50	2.12	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	1.00	1.41	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECHCOL	0.00	0.00	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	1.00	1.41	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.50	0.71
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	ALTPHI	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MATURE FRUIT

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

			Panicum hemitomon		*Polygonum punctatum*		*Pontederia cordata*		*Sagittaria lancifolia*		*Scirpus validus*	
Date	Site	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
May-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	1	TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.41	0.50	0.71
Aug-92	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCI#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	2	TYPLAT	1.50	2.12	0.00	0.00	2.00	0.00	1.00	1.41	3.00	0.00
Aug-92	2	TYPLATD	1.50	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	1	TYPLAT	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Feb-93	2	TYPLAT	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SCICALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	SCIVALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	1	TYPLATD	0.00	0.00	1.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B2. Phenology of vegetation found in seeded treatments. Column headings are treatment species. Table entries are mean and standard errors of phenology canopy index. (Cont.)

Date	Site	Species	*Panicum hemitomon* Mean	SE	*Polygonum punctatum* Mean	SE	*Pontederia cordata* Mean	SE	*Sagittaria lancifolia* Mean	SE	*Scirpus validus* Mean	SE
Aug-93	2	SCI#4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCICALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	SCIVALD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	2	TYPLAT	0.50	0.71	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	3.00	0.00	3.00	0.00	1.50	0.71	1.50	2.12	2.50	0.71
Aug-93	3	ECHCOL	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.50	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	SCICAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-93	3	TYPLATD	0.00	0.00	1.50	2.12	0.00	0.00	0.00	0.00	0.00	0.00
Mar-94	2	ELEINT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B3. Phenology of vegetation found in mulch and control treatments. Column headings are treatments. Table entries are mean and standard errors of phenology canopy index.

FLOWERING

	Planting		Mulched Plots		Control Plots	
Date	Site	Species	Mean	SE	Mean	SE
Aug-91	1	COMDIF	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.00	0.00	0.00	0.00
Aug-91	1	PONCOR	0.00	0.00	0.00	0.00
Aug-91	2	CYPIRI	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-91	2	SCISPP	0.00	0.00	0.00	0.00
Aug-91	3	PONCOR	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00
Aug-91	3	SCIVAL	0.00	0.00	0.00	0.00
Jan-92	1	PONCOR	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00
Jan-92	2	LUDOCT	0.00	0.00	0.00	0.00
Jan-92	2	POLPUN	0.00	0.00	0.08	0.09
Jan-92	2	PONCOR	0.00	0.00	0.00	0.00
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00
Jan-92	3	ELEINT	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAT	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00
May-92	1	ALTPHI	0.00	0.00	0.25	0.19
May-92	1	ELEINT	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00
May-92	1	TYPLAT	0.25	0.29	0.00	0.00
May-92	2	ELEINT	0.00	0.00	0.00	0.00
May-92	2	HYDRAN	0.00	0.00	0.00	0.00
May-92	2	PONCOR	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00
May-92	2	TYPLAT	0.00	0.00	0.08	0.09
May-92	3	ELEINT	0.00	0.00	0.00	0.00
May-92	3	JUNEFF	0.00	0.00	0.00	0.00
May-92	3	PANHEM	0.00	0.00	0.00	0.00
May-92	3	PONCOR	0.00	0.00	0.17	0.17
May-92	3	SAGLAN	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00
May-92	3	THAGEN	0.00	0.00	0.00	0.00
May-92	3	TYPLAT	0.25	0.29	0.08	0.09

Appendix B3. Phenology of vegetation found in mulch and control treatments (Cont.).

Date	Planting Site	Species	Mulched Plots Mean	Mulched Plots SE	Control Plots Mean	Control Plots SE
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	2	ALTPHI	0.00	0.00	0.00	0.00
Aug-92	2	LIMSPO	0.00	0.00	0.50	0.35
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP4	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00
Aug-92	3	EICCRA	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00
Feb-93	2	ELEINT	0.00	0.00	0.00	0.00
Feb-93	2	PONCOR	0.00	0.00	0.00	0.00
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.75	0.87	0.00	0.00
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00
Aug-93	2	GALTIN	0.00	0.00	0.00	0.00
Aug-93	2	HYDUMB	0.00	0.00	0.00	0.00
Aug-93	2	PONCOR	0.00	0.00	0.00	0.00
Aug-93	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	0.00	0.00	0.00	0.00
Aug-93	3	AMAAUS	0.00	0.00	0.25	0.26
Aug-93	3	CYPODO	0.75	0.87	0.50	0.35
Aug-93	3	ECLALB	0.00	0.00	0.25	0.26
Aug-93	3	EICCRA	0.00	0.00	0.25	0.19
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00
Aug-93	3	HYDRAN	0.00	0.00	0.17	0.17
Aug-93	3	HYDUMB	0.00	0.00	0.00	0.00
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00
Aug-93	3	LUDOCT	0.00	0.00	0.33	0.27
Aug-93	3	PASDIC	0.00	0.00	0.17	0.17
Aug-93	3	POLPUN	0.00	0.00	0.17	0.17
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	3	THAGEN	0.00	0.00	0.00	0.00

Appendix B3. Phenology of vegetation found in mulch and control treatments (Cont.).

Date	Planting Site	Species	Mulched Plots Mean	SE	Control Plots Mean	SE
Mar-94	1	HYDRAN	0.00	0.00	0.25	0.26
Mar-94	1	PELVIR	0.00	0.00	0.00	0.00
Mar-94	1	PONCOR	0.00	0.00	0.00	0.00
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	2	HYDRAN	0.00	0.00	0.25	0.26
Mar-94	2	PELVIR	0.00	0.00	0.00	0.00
Mar-94	2	PONCOR	0.00	0.00	0.00	0.00
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	3	ALTPHI	0.75	0.55	0.08	0.09
Mar-94	3	HYDRAN	0.00	0.00	0.25	0.26
Mar-94	3	HYDUMB	0.25	0.29	0.00	0.00
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00
Mar-94	3	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	3	TYPLAT	0.00	0.00	0.00	0.00

IMMATURE FRUIT

Date	Site	Species	Mean	SE	Mean	SE
Aug-91	1	ECLALB	0.00	0.00	0.00	0.00
Aug-91	1	POLPUN	0.00	0.00	0.00	0.00
Aug-91	1	SAGLAN	0.00	0.00	0.00	0.00
Aug-91	2	ECHCOL	0.00	0.00	0.00	0.00
Aug-91	2	PONCOR	0.00	0.00	0.00	0.00
Aug-91	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-91	3	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	1	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00
Jan-92	2	LUDOCT	0.00	0.00	0.33	0.27
Jan-92	2	POLPUN	0.00	0.00	0.08	0.09
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAT	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00
May-92	1	ELEINT	0.00	0.00	0.00	0.00
May-92	1	PONCOR	0.00	0.00	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00
May-92	1	TYPLAT	0.50	0.58	0.00	0.00
May-92	2	ELEINT	0.00	0.00	0.00	0.00
May-92	2	PONCOR	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00
May-92	2	THAGEN	0.00	0.00	0.00	0.00
May-92	2	TYPLAT	0.00	0.00	0.17	0.17
May-92	3	ELEINT	0.00	0.00	0.00	0.00

Appendix B3. Phenology of vegetation found in mulch and control treatments (Cont.).

Date	Planting Site	Species	Mulched Plots Mean	Mulched Plots SE	Control Plots Mean	Control Plots SE
May-92	3	JUNEFF	0.00	0.00	0.00	0.00
May-92	3	PONCOR	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00
May-92	3	THAGEN	0.00	0.00	0.00	0.00
May-92	3	TYPLAT	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.25	0.29	0.00	0.00
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	2	CYPSUR	0.00	0.00	0.25	0.26
Aug-92	2	ELEINT	0.00	0.00	0.00	0.00
Aug-92	2	POLPUN	0.00	0.00	0.00	0.00
Aug-92	2	PONCOR	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP4	0.00	0.00	0.00	0.00
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00
Feb-93	1	ELEINT	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00
Feb-93	1	SCIVAL	0.00	0.00	0.00	0.00
Feb-93	2	SCICAL	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	1	ECLALB	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00
Aug-93	1	PANHEM	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00
Aug-93	1	SAGLAN	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00
Aug-93	1	THAGEN	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.00	0.00	0.00	0.00
Aug-93	2	ECHCOL	0.00	0.00	0.25	0.26
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	2	THAGEN	0.00	0.00	0.00	0.00
Aug-93	3	CYPIRI	0.00	0.00	0.25	0.26
Aug-93	3	ECHCOL	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00
Aug-93	3	HYDRAN	0.00	0.00	0.08	0.09

Appendix B3. Phenology of vegetation found in mulch and control treatments (Cont.).

Date	Planting Site	Species	Mulched Plots Mean	SE	Control Plots Mean	SE
Aug-93	3	JUNEFF	0.00	0.00	0.00	0.00
Aug-93	3	PASDIC	0.00	0.00	0.17	0.17
Aug-93	3	POLPUN	0.00	0.00	0.08	0.09
Aug-93	3	PONCOR	0.00	0.00	0.00	0.00
Aug-93	3	SAGLAN	0.00	0.00	0.00	0.00
Aug-93	3	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	1	SCICAL	0.00	0.00	0.00	0.00
Mar-94	1	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	2	ELEINT	0.00	0.00	0.00	0.00
Mar-94	2	SCICAL	0.00	0.00	0.00	0.00
Mar-94	2	SCIVAL	0.00	0.00	0.00	0.00
Mar-94	3	ALTPHI	0.00	0.00	0.00	0.00
Mar-94	3	PONCOR	0.00	0.00	0.00	0.00
Mar-94	3	SCICAL	0.00	0.00	0.00	0.00

MATURE FRUIT

Date	Site	Species	Mean	SE	Mean	SE
Jan-92	1	SCICAL	0.00	0.00	0.00	0.00
Jan-92	1	THAGEN	0.00	0.00	0.00	0.00
Jan-92	2	LUDOCT	0.00	0.00	0.42	0.30
Jan-92	2	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	2	SCIVAL	0.00	0.00	0.00	0.00
Jan-92	2	THAGEN	0.00	0.00	0.00	0.00
Jan-92	3	PONCOR	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAN	0.00	0.00	0.00	0.00
Jan-92	3	SAGLAT	0.00	0.00	0.00	0.00
Jan-92	3	SCICAL	0.00	0.00	0.00	0.00
Jan-92	3	SCIVAL	0.00	0.00	0.00	0.00
Jan-92	3	TYPLAT	0.75	0.87	0.00	0.00
May-92	1	SAGLAN	0.00	0.00	0.00	0.00
May-92	1	SCICAL	0.00	0.00	0.00	0.00
May-92	1	SCIVAL	0.00	0.00	0.00	0.00
May-92	2	ELEINT	0.00	0.00	0.00	0.00
May-92	2	SAGLAN	0.00	0.00	0.00	0.00
May-92	2	SCICAL	0.00	0.00	0.00	0.00
May-92	2	SCIVAL	0.00	0.00	0.00	0.00
May-92	3	ELEINT	0.00	0.00	0.00	0.00
May-92	3	SAGLAN	0.00	0.00	0.00	0.00
May-92	3	SCICAL	0.00	0.00	0.00	0.00
May-92	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	1	ELEINT	0.00	0.00	0.00	0.00
Aug-92	1	PONCOR	0.00	0.00	0.00	0.00
Aug-92	1	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	1	SCICAL	0.00	0.00	0.00	0.00
Aug-92	1	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	1	THAGEN	0.00	0.00	0.00	0.00
Aug-92	1	TYPLAT	0.75	0.87	0.00	0.00
Aug-92	1	TYPLATD	1.50	1.00	0.00	0.00
Aug-92	2	ELEINT	0.00	0.00	0.00	0.00
Aug-92	2	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	2	SCISPP4	0.00	0.00	0.00	0.00
Aug-92	2	SCICAL	0.00	0.00	0.00	0.00

Appendix B3. Phenology of vegetation found in mulch and control treatments (Cont.).

Date	Planting Site	Species	Mulched Plots Mean	Mulched Plots SE	Control Plots Mean	Control Plots SE
Aug-92	2	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	2	THAGEN	0.00	0.00	0.00	0.00
Aug-92	2	TYPLAT	0.00	0.00	0.33	0.23
Aug-92	2	TYPLATD	0.00	0.00	0.25	0.26
Aug-92	3	ELEINT	0.00	0.00	0.00	0.00
Aug-92	3	POLPUN	0.00	0.00	0.00	0.00
Aug-92	3	PONCOR	0.00	0.00	0.00	0.00
Aug-92	3	SAGLAN	0.00	0.00	0.00	0.00
Aug-92	3	SCICAL	0.00	0.00	0.00	0.00
Aug-92	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-92	3	THAGEN	0.00	0.00	0.00	0.00
Aug-92	3	TYPLAT	0.75	0.87	0.08	0.09
Feb-93	1	ELEINT	0.00	0.00	0.00	0.00
Feb-93	1	PONCOR	0.00	0.00	0.00	0.00
Feb-93	1	SAGLAN	0.00	0.00	0.00	0.00
Feb-93	1	SCICAL	0.00	0.00	0.00	0.00
Feb-93	1	TYPLAT	0.00	0.00	0.00	0.00
Feb-93	2	SCIVAL	0.00	0.00	0.00	0.00
Feb-93	2	TYPLAT	0.00	0.00	0.00	0.00
Feb-93	2	TYPLATD	0.00	0.00	0.17	0.17
Feb-93	3	ELEINT	0.00	0.00	0.00	0.00
Feb-93	3	SAGLAN	0.00	0.00	0.00	0.00
Feb-93	3	SCICAL	0.00	0.00	0.00	0.00
Feb-93	3	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	1	ELEINT	0.00	0.00	0.00	0.00
Aug-93	1	PANHEM	0.00	0.00	0.00	0.00
Aug-93	1	PONCOR	0.00	0.00	0.00	0.00
Aug-93	1	SCICAL	0.00	0.00	0.00	0.00
Aug-93	1	SCICALD	0.00	0.00	0.00	0.00
Aug-93	1	SCIVALD	0.00	0.00	0.00	0.00
Aug-93	1	TYPLATD	0.00	0.00	0.00	0.00
Aug-93	2	CYPODO	0.00	0.00	0.00	0.00
Aug-93	2	ELEINT	0.00	0.00	0.00	0.00
Aug-93	2	LEPFAS	0.00	0.00	0.17	0.17
Aug-93	2	SCISPP4	0.00	0.00	0.00	0.00
Aug-93	2	SCICAL	0.00	0.00	0.00	0.00
Aug-93	2	SCICALD	0.00	0.00	0.00	0.00
Aug-93	2	SCIVAL	0.00	0.00	0.00	0.00
Aug-93	2	SCIVALD	0.00	0.00	0.00	0.00
Aug-93	2	TYPLAT	0.00	0.00	0.00	0.00
Aug-93	2	TYPLATD	1.50	1.00	1.17	0.44
Aug-93	3	ECHCOL	0.00	0.00	0.00	0.00
Aug-93	3	ECLALB	0.00	0.00	0.00	0.00
Aug-93	3	ELEINT	0.00	0.00	0.00	0.00
Aug-93	3	PASDIC	0.00	0.00	0.08	0.09
Aug-93	3	SCICAL	0.00	0.00	0.00	0.00
Aug-93	3	TYPLAT	0.50	0.58	0.33	0.20
Aug-93	3	TYPLATD	0.00	0.00	0.00	0.00
Mar-94	2	ELEINT	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
FLOWERING																		
Nov-90																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.06	0.04	0.06	0.04	0.41	0.13	0.22	0.12	0.09	0.07	0.00	0.00	0.00	0.00	0.03	0.03
BACHAL	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.06	0.04	0.22	0.07	0.00	0.00	0.13	0.07	0.31	0.10	0.09	0.05	0.06	0.04	0.00	0.00	0.45	0.11
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.08	0.08
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECHCOL	0.00	0.00	0.06	0.06	0.13	0.06	0.00	0.00	0.00	0.00	0.06	0.04	0.06	0.04	0.00	0.00	0.00	0.00
ECLALB	0.09	0.07	0.00	0.00	0.09	0.07	0.00	0.00	0.06	0.06	0.09	0.07	0.00	0.00	0.00	0.00	0.13	0.07
ELEIND	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.72	0.21	0.06	0.04	0.09	0.05	0.09	0.09	0.25	0.11	0.94	0.13	0.81	0.11	0.84	0.13	0.08	0.08
EUPSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYGLAC	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.06	0.06	0.03	0.03	0.28	0.09	0.22	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.06
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.07
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PANDIC	0.13	0.06	0.06	0.06	0.03	0.03	0.72	0.12	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.15	0.08
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	1.47	0.17	0.25	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.08	0.00	0.00	0.00	0.00	0.44	0.12
PONCOR	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pteridophyte	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GERCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00
TYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_vine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		
Jun-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
CROSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPIRI	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	1.50	0.50	0.33	0.33	2.33	0.67	0.50	0.50	0.75	0.48	0.00	0.00	1.00	1.00	0.50	0.50
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	3.00	0.00	0.50	0.50	0.00	0.00
DIGSER	0.00	0.00	3.00	0.00	3.00	0.00	2.50	0.50	1.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	3.00	0.00
ECHCOL	1.00	0.00	0.50	0.50	1.67	0.88	3.00	0.00	0.25	0.25	2.00	0.00	0.25	0.25	1.33	0.33	0.00	0.00
ECHCRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	1.50	0.50	0.75	0.25	2.00	0.00	0.88	0.23	1.29	0.18	1.50	0.29	1.00	0.00	1.33	0.33
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIMAUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.50	0.50	1.33	0.67	1.33	0.33	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.25	1.50	0.22	1.75	0.25	1.25	0.48	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITPET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OXACOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.50	0.29	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.88	0.23	1.00	0.00	0.00	0.00	3.00	0.00	0.33	0.33	0.00	0.00	1.00	0.00	1.00	0.00	0.71	0.18
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Pteridophyte	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.06	0.04	0.06	0.04	0.31	0.09	0.72	0.18	0.31	0.12	0.00	0.00	0.25	0.13	0.00	0.00	0.08	0.04
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.09	0.07	0.19	0.13	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.10	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.28	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.75	0.13	0.13	0.06	0.00	0.00	0.19	0.10	0.31	0.11	0.09	0.05	0.38	0.13	0.38	0.11	0.55	0.10
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POROLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.09	0.31	0.16	0.00	0.00	0.00	0.00	0.45	0.14
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.22	0.12	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRCOR	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		
Aug-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.59	0.20	0.06	0.04	0.09	0.07	0.44	0.18	0.09	0.09	0.00	0.00	0.00	0.00	0.06	0.06	0.40	0.16
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMMCOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.16	0.00	0.00	0.06	0.06	0.00	0.00
CASOBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.03	0.03	0.00	0.00	0.06	0.06	0.03	0.03	0.56	0.19	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPERAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00
CYPESC	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.10
CYPHAS	0.00	0.00	0.19	0.13	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPIRI	0.00	0.00	0.00	0.00	0.09	0.09	0.34	0.17	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
CYPODO	0.09	0.09	0.19	0.13	0.00	0.00	0.38	0.17	0.34	0.15	0.22	0.12	0.09	0.09	0.25	0.12	0.10	0.06
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.05	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.16	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00	0.63	0.19	0.34	0.15	0.31	0.12	0.56	0.18	0.13	0.08
ECHCOL	0.00	0.00	0.03	0.03	0.25	0.10	0.13	0.10	0.16	0.07	0.50	0.16	0.09	0.07	0.53	0.13	0.05	0.05
ECLALB	0.03	0.03	0.06	0.06	0.59	0.16	0.56	0.13	0.63	0.13	0.84	0.11	0.31	0.09	0.63	0.15	0.15	0.08
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.03	0.03	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.13	0.10	0.00	0.00	0.00	0.00	0.09	0.09	0.31	0.12	0.22	0.13	0.06	0.04	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.12	0.47	0.15	0.25	0.08	0.28	0.09	0.03	0.03
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
MELPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.06	0.04	0.06	0.04	0.31	0.09	0.72	0.18	0.31	0.12	0.00	0.00	0.25	0.13	0.00	0.00	0.08	0.04
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.09	0.07	0.19	0.13	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.10	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.28	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.75	0.13	0.13	0.06	0.00	0.00	0.19	0.10	0.31	0.11	0.09	0.05	0.38	0.13	0.38	0.11	0.55	0.10
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POROLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.09	0.31	0.16	0.00	0.00	0.00	0.00	0.45	0.14
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.22	0.12	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRCOR	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		
Jan-92																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.12	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.03	0.03	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.03	0.03	0.03	0.03	0.13	0.06	0.19	0.09	0.09	0.05	0.22	0.11	0.06	0.06	0.25	0.08
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAPRAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.05	0.05
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
FLOWERING																		
May-92																		
ALTPHI	0.06	0.04	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.06	0.06	0.00	0.00	0.09	0.09	0.15	0.09
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.16	0.11	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.22	0.11	0.09	0.07	0.03	0.03	0.09	0.07	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.13	0.10	0.00	0.00
POLUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PONCOR	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
TYPLAT	0.03	0.03	0.03	0.03	0.09	0.05	0.28	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Aug-92																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.11	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.09	0.00	0.00	0.00	0.00	0.05	0.05
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.06	0.04	0.41	0.13	0.03	0.03	0.13	0.10	0.03	0.03
PONCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

Species	Transect 1 Mean	SE	Transect 2 Mean	SE	Transect 3 Mean	SE	Transect 4 Mean	SE	Transect 5 Mean	SE	Transect 6 Mean	SE	Transect 7 Mean	SE	Transect 8 Mean	SE	Transect 9 Mean	SE
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPSPPD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		
Feb-93																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.13	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.34	0.13	0.84	0.19	0.59	0.16	1.03	0.22	0.44	0.17	0.00	0.00	0.22	0.11	0.19	0.11	0.80	0.19
TYPLATD	0.03	0.03	0.09	0.09	0.31	0.15	0.09	0.09	0.00	0.00	0.00	0.00	0.16	0.09	0.19	0.13	0.00	0.00
TYPSPPD	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLOWERING																		
Aug-93																		
ALTPHI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUS	0.53	0.20	.	.	0.03	0.03	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUSS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ANDSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTSUB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BACHAL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CASOBT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CICMEX	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPIRI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPODO	0.19	0.13	.	.	0.28	0.16	.	.	.	.	0.03	0.03	.	.	0.19	0.13	.	.
CYPSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHCRU	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHCRUD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHSPP1	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHSPP2	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.25	0.14	.	.
EICCRA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.03	0.03	.	.	0.06	0.06	.	.
ELEVIV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
GALTIN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDRAN	0.03	0.03	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.16	0.09	.	.
HYDRANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDUMB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LIMSPO	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDLEP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.22	0.11	.	.	0.00	0.00	.	.
LUDOCT	0.06	0.06	.	.	0.00	0.00	.	.	.	.	0.06	0.06	.	.	0.03	0.03	.	.
LUDPER	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.09	0.09	.	.	0.00	0.00	.	.
LUDPERS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MOMCHA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PANDIC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.19	0.13	.	.	0.00	0.00	.	.
PASDIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASURV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PLUROS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.19	0.10	.	.	0.00	0.00	.	.	.	.	0.63	0.17	.	.	0.06	0.06	.	.
POLPUNS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCOR	0.03	0.03	.	.	0.00	0.00	.	.	.	.	0.03	0.03	.	.	0.00	0.00	.	.
PONCORS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	0.09	0.09	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMONS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SESMAC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.03	0.03	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicots	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
FLOWERING																		
Mar-94																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.47	0.21	.	.	0.33	0.14	.	.
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
AMAAUSS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
APILEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPURS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.50	0.50	.	.	0.00	0.00	.	.
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	1.25	0.53	.	.	0.00	0.00	.	.
ELEVIVS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.67	0.67	.	.
HYDRAN	1.15	0.42	0.33	0.33	1.36	0.47	0.00	0.00	.	.	0.71	0.22	.	.	1.29	0.19	.	.
HYDRANS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	1.00	0.00	.	.	0.00	0.00	.	.
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.43	0.20	.	.	0.64	0.24	.	.
LUDPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	.	.	0.09	0.09	.	.	0.00	0.00	.	.
POLPUNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	1.50	1.50	.	.	0.00	0.00	.	.
PONCORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	0.00	0.00	0.11	0.11	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.35	0.24	0.00	0.00	0.27	0.12	0.29	0.13	.	.	0.24	0.14	.	.	0.06	0.06	.	.
TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicotS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
IMMATURE FRUIT Nov-90																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.03	0.03	0.13	0.06	0.25	0.11	0.13	0.06	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.03	0.03	0.44	0.15	0.00	0.00	0.16	0.09	0.19	0.07	0.09	0.05	0.06	0.04	0.00	0.00	0.18	0.08
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECHCOL	0.03	0.03	0.06	0.04	0.31	0.08	0.00	0.00	0.00	0.00	0.06	0.04	0.06	0.04	0.00	0.00	0.00	0.00
ECLALB	0.03	0.03	0.00	0.00	0.06	0.04	0.03	0.03	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.10	0.07
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.06	0.04	0.19	0.10	0.13	0.06	0.00	0.00	0.47	0.11	0.84	0.07	0.78	0.07	0.66	0.09	0.03	0.03
EUPSER	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
HYGLAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.03	0.03	0.41	0.09	0.66	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
MIKSCA	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.13	0.06	0.16	0.07	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.10	0.06
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.34	0.09	0.53	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.00	0.00	0.10	0.07
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PTERIDO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GERCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.13
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.11
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
TYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
u_vine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Jun-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.67
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	3.00	0.00	1.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CROSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPIRI	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00
CYPODO	1.00	0.00	1.50	0.50	0.67	0.33	0.67	0.67	2.50	0.50	1.50	0.29	3.00	0.00	1.50	0.50	2.00	1.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.50	1.67	0.33	2.00	1.00	1.00	0.00	0.00	0.00
ECHCOL	2.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	2.00	0.00	1.00	0.00	2.50	0.29	1.33	0.33	0.00	0.00
ECHCRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	1.50	0.50	1.75	0.25	0.75	0.25	1.50	0.33	1.00	0.00	1.50	0.29	1.60	0.24	1.33	0.33
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIMAUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00	1.00	0.71	0.67	0.33	1.67	0.33	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.48	1.33	0.21	1.25	0.25	1.00	0.41	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITPET	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OXACOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.50	0.29	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.48	1.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	1.25	0.31	2.00	0.00	0.00	0.00	0.00	0.00	1.33	0.67	0.00	0.00	2.00	0.00	2.00	0.00	1.43	0.30
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	1.50	1.50	1.67	0.88	0.50	0.50	0.75	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pteridophyte	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Aug-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.06	0.04	0.06	0.04	0.09	0.07	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.05	0.03
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMMCOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00
CASOBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPESC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.16	0.11	0.06	0.06	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYPIRI	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.19	0.11	0.03	0.03	0.25	0.13	0.09	0.05	0.00	0.00	0.22	0.11	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.06	0.06	0.16	0.09	0.00	0.00	0.22	0.11	0.16	0.08	0.19	0.08	0.22	0.09	0.05	0.03
ECHCOL	0.00	0.00	0.06	0.06	0.25	0.09	0.03	0.03	0.25	0.10	0.25	0.09	0.28	0.12	0.53	0.13	0.00	0.00
ECLALB	0.03	0.03	0.03	0.03	0.56	0.16	0.47	0.11	0.97	0.15	0.78	0.11	0.69	0.17	0.56	0.13	0.18	0.08
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.06	0.06	0.03	0.03	0.09	0.07	0.00	0.00	0.00	0.00	0.16	0.08	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.05	0.03	0.03	0.16	0.11	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.00	0.00	0.00	0.00	0.09	0.09	0.63	0.13	0.50	0.12	0.44	0.12	0.56	0.14	0.03	0.03
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.09	0.05	0.00	0.00	0.72	0.16	0.06	0.04	0.25	0.10	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.19	0.11	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.91	0.13	0.19	0.09	0.00	0.00	0.06	0.04	0.88	0.19	0.25	0.10	0.28	0.11	0.94	0.20	0.93	0.15
PONCOR	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.13	0.00	0.00	0.00	0.00	0.00	0.00
POROLE	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.19	0.06	0.06	0.00	0.00	0.00	0.00	0.15	0.08
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
UTRCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Jan-92																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.03	0.03	0.00	0.00	0.00	0.00	0.34	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.03	0.03	0.00	0.00	0.22	0.09	0.00	0.00	0.16	0.07	0.00	0.00	0.06	0.04	0.23	0.08
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAPRAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT May-92																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.06	0.06	0.03	0.03	0.00	0.00	0.03	0.03	0.03	0.03
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.16	0.08	0.09	0.07	0.06	0.06	0.09	0.07	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
POLPUN	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00
POLUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PONCOR	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.34	0.14	0.22	0.12	0.56	0.20	0.19	0.13	0.03	0.03	0.00	0.00	0.09	0.09	0.03	0.03	0.23	0.11
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Aug-92																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.03	0.03
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.08	0.08
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.25	0.11	0.22	0.07	0.00	0.00	0.06	0.06	0.03	0.03
PONCOR	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.19	0.08	0.16	0.09	0.31	0.14	0.19	0.13	0.09	0.07	0.00	0.00	0.22	0.12	0.00	0.00	0.18	0.08
TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPSPPD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Feb-93																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.03	0.03	0.13	0.06	0.25	0.11	0.13	0.06	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.03	0.03	0.44	0.15	0.00	0.00	0.16	0.09	0.19	0.07	0.09	0.05	0.06	0.04	0.00	0.00	0.18	0.08
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECHCOL	0.03	0.03	0.06	0.04	0.31	0.08	0.00	0.00	0.00	0.00	0.06	0.04	0.06	0.04	0.00	0.00	0.00	0.00
ECLALB	0.03	0.03	0.00	0.00	0.06	0.04	0.03	0.03	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.10	0.07
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.06	0.04	0.19	0.09	0.13	0.06	0.00	0.00	0.47	0.11	0.84	0.07	0.78	0.07	0.66	0.09	0.03	0.03
EUPSER	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYGLAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.03	0.03	0.41	0.09	0.66	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
MIKSCA	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.13	0.06	0.16	0.07	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.10	0.06
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.34	0.09	0.53	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.00	0.00	0.10	0.07
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PTERIDO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GERCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.13
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.11
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
TYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_vine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IMMATURE FRUIT Aug-93																		
ALTPHI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.09	0.09	.	.	0.00	0.00	.	.
AMAAUSS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ANDSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTSUB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
BACHAL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CASOBT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CICMEX	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPIRI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.16	0.11	.	.
CYPODO	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.50	0.19	.	.	0.16	0.11	.	.
CYPSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHCRU	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.09	0.09	.	.
ECHCRUD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHSPP1	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.16	0.11	.	.	0.00	0.00	.	.
ECHSPP2	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.03	0.03	.	.
EICCRA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
GALTIN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDRAN	0.06	0.06	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.13	0.07	.	.
HYDRANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDUMB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LIMSPO	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDLEP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.06	0.06	.	.	0.00	0.00	.	.
LUDOCT	0.03	0.03	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPER	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPERS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MOMCHA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PANDIC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASDIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASURV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PLUROS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.09	0.05	.	.	0.00	0.00	.	.	.	.	0.41	0.13	.	.	0.03	0.03	.	.
POLPUNS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCOR	0.06	0.06	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCORS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
SAGLANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMONS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SESMAC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.06	0.06	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicots	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
IMMATURE FRUIT Mar-94																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUSS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
APILEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPURS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	1.00	1.00	.	.	0.00	0.00	.	.
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.25	0.25	.	.	0.00	0.00	.	.
ELEVIVS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDRAN	0.00	0.00	0.17	0.17	0.00	0.00	0.44	0.29	.	.	0.41	0.17	.	.	0.54	0.10	.	.
HYDRANS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	2.00	0.00	.	.	0.00	0.00	.	.
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.14	0.14	.	.	0.91	0.28	.	.
LUDPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.20	.	.	0.24	0.16	.	.	0.00	0.00	.	.
TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicotS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MATURE FRUIT																		
Nov-90																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.09	0.07	0.19	0.10	0.28	0.10	0.28	0.14	0.03	0.03	0.00	0.00	0.00	0.00	0.08	0.08
BACHAL	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.03	0.03	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARSPP	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.09	0.07	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07	0.06	0.04	0.00	0.00	0.05	0.04

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04
ECHCOL	0.25	0.14	0.25	0.14	0.50	0.14	0.00	0.00	0.00	0.00	0.09	0.07	0.16	0.09	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.03	0.03	0.06	0.06	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.09	0.05	0.22	0.12	0.16	0.08	0.00	0.00	0.78	0.19	1.41	0.16	1.53	0.17	0.66	0.09	0.00	0.00
EUPSER	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYGLAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.88	0.18	0.31	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.09	0.05	0.25	0.12	0.13	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.13	0.06
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PELVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.59	0.09	0.44	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.08	0.00	0.00	0.00	0.00	0.74	0.16
PONCOR	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PTERIDO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
GERCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYIND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.06
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMPAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCISPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.08
SESMAC	0.19	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.13
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STAFLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
TYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
unknown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_vine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MATURE FRUIT																		
Jun-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CALAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CROSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPIRI	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	2.00	0.00	0.00	0.00	1.00	0.58	0.00	0.00	0.00	0.00	0.75	0.48	0.00	0.00	0.50	0.50	0.50	0.50
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	0.50	0.00	0.00	0.50	0.50	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00
ECHCOL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.25	0.25	0.33	0.33	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
ECHCRU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.16	0.71	0.18	0.00	0.00	0.40	0.24	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIMAUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MITPET	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OXACOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.00
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	1.33	0.88	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75
Pteridophyte	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MATURE FRUIT																		
Aug-91																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMBART	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
AMMCOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00
CASOBT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPESC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00
CYPIRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.03	0.03
CYPODO	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00	0.16	0.09	0.06	0.06	0.09	0.09	0.13	0.10	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.12	0.16	0.10	0.03	0.03	0.16	0.10	0.03	0.03
ECHCOL	0.00	0.00	0.00	0.00	0.19	0.07	0.09	0.09	0.56	0.17	0.25	0.11	0.19	0.08	0.22	0.07	0.13	0.09
ECLALB	0.03	0.03	0.00	0.00	0.06	0.04	0.09	0.05	0.28	0.09	0.38	0.09	0.13	0.06	0.22	0.11	0.03	0.03
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEIND	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELESPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IPOSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.12	0.50	0.13	0.34	0.11	0.25	0.12	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
LUDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MELPEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.13	0.06	0.03	0.03	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.07	0.00	0.00	0.00	0.00	0.05	0.03
PANSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00
PHYANG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.22	0.07	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03	0.19	0.09	0.00	0.00	0.09	0.07	0.00	0.00
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POROLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHYSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.03	0.03	0.13	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.10	0.08
UTRCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MATURE FRUIT																		
Jan-92																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTSUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTTEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYNDAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00
LUDPAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.03	0.03	0.00	0.00	0.00	0.00	0.16	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.13	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.18	0.06
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAPRAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.10	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
MATURE FRUIT																		
May-92																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00
POLUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SESMAC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SETMAG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

Species	Transect 1 Mean	Transect 1 SE	Transect 2 Mean	Transect 2 SE	Transect 3 Mean	Transect 3 SE	Transect 4 Mean	Transect 4 SE	Transect 5 Mean	Transect 5 SE	Transect 6 Mean	Transect 6 SE	Transect 7 Mean	Transect 7 SE	Transect 8 Mean	Transect 8 SE	Transect 9 Mean	Transect 9 SE
MATURE FRUIT																		
Aug-92																		
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyperaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPHAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIGSER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JUNEFF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANHEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASDIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.13	0.03	0.03	0.00	0.00	0.00	0.00	0.03	0.03
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
TYPDOM	0.00	0.00	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.34	0.13	0.84	0.19	0.59	0.16	1.03	0.22	0.44	0.17	0.00	0.00	0.22	0.11	0.19	0.11	0.80	0.19
TYPLATD	0.03	0.03	0.09	0.09	0.31	0.15	0.09	0.09	0.00	0.00	0.00	0.00	0.16	0.09	0.19	0.13	0.00	0.00
TYPSPPD	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRBIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WOOVIR	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MATURE FRUIT																		
Feb-93																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	.	0.00	0.00	0.00	0.00	0.00	0.00
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
APILEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
dead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELEVIVD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EUPCAPD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYDUMB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LIMSPO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDLEPD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDOCTD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00
LUDPERD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LUDSPPD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PASURV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POLPUN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PONCORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RHARHA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGLAND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SAGSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.03	0.00	0.00
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLAT	0.00	0.00	0.06	0.04	0.00	0.00	0.09	0.05	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TYPLATD	0.00	0.00	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTRSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
u_dicot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MATURE FRUIT																		
Aug-93																		
ALTPHI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.09	0.09	.	.	0.00	0.00	.	.
AMAAUSS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ANDSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTSUB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BACHAL	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CASOBT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CICMEX	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPIRI	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.16	0.11	.	.
CYPODO	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.50	0.19	.	.	0.16	0.11	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
CYPSPP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHCRU	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.09	0.09	.	.
ECHCRUD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECHSPP1	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.16	0.11	.	.	0.00	0.00	.	.
ECHSPP2	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.03	0.03	.	.
EICCRA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
GALTIN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDRAN	0.06	0.06	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.13	0.07	.	.
HYDRANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDUMB	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LIMSPO	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDLEP	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.06	0.06	.	.	0.00	0.00	.	.
LUDOCT	0.03	0.03	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPER	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPERS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MOMCHA	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PANDIC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASDIS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASURV	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PLUROS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.09	0.05	.	.	0.00	0.00	.	.	.	.	0.41	0.13	.	.	0.03	0.03	.	.
POLPUNS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCOR	0.06	0.06	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCORS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLANS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMONS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SESMAC	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.06	0.06	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATD	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
TYPLATS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicotS	0.00	0.00	.	.	0.00	0.00	.	.	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MATURE FRUIT																		
Mar-94																		
ACERUB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ALTPHI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
AMAAUSS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
APILEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ASTELL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BACHAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BIDLAE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
BRAPURS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
COMDIF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPODO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
CYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ECLALB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EICCRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
ELEVIVS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
EUPCAPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
GALTIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
HYDRAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.06	0.06	.	.	0.00	0.00	.	.
HYDRANS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDLEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
LUDPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
MIKSCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PASDIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLDEND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUN	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
POLPUNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.

Appendix B4. Phenology of vegetation found along natural succession transects. Species codes ending with "D" represent dead, "S" represents seedlings.

	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5		Transect 6		Transect 7		Transect 8		Transect 9	
Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
PONCOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
PONCORD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
RUMCRI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGLAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGMON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SAGSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SALCAR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.50	0.50	.	.
SAMCAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
SOLAME	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPDOMD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLAT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPLATD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
TYPSPPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
Poaceae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.
u_dicotS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	.	0.00	0.00	.	.	0.00	0.00	.	.