Floristic Composition and Species Richness of Subtropical Seasonally Wet *Muhlenbergia sericea* Prairies in Portions of Central and South Florida

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ABSTRACT

Fire-maintained, species-rich, seasonally wet subtropical grasslands dominated by muhly grass (*Muhlenbergia sericea*), here referred to as calcareous wet prairies, occur on mineral soils between pinelands (or Florida dry prairies) and herbaceous wetlands. Southern Florida calcareous prairies/pinelands are described based upon species composition, species richness, niche or habitat breadth, taxonomic uniqueness, and geographic area. This study differentiated three calcareous prairie/pineland regions, central, south-central, and south Florida. A south-central Florida community type occurs sporadically from Polk County south to Okeechobee, Hendry, and Sarasota counties, in an otherwise acidic prairie/pineland landscape. Quantitative sampling using nested and non-nested modules in Polk and Okeechobee counties was utilized to determine fine-scale species richness values. Results indicate that these prairies have among the highest fine-scale vascular plant species richness values recorded in North America, up to 27 species in 0.1 m^2, 49 species in 1 m^2, and 171 species in 1000 m^2. Floristic lists compiled from 43 sites in 14 southern Florida counties demonstrate that many sites have biodiversity significance with over 100 species. Several have 140-180 species recorded from single-event visits. The community species pool consists of 412 taxa from south-central Florida calcareous prairies alone with 548 taxa when south Florida calcareous pineland/prairies are included. Based on dominance and frequency values from quantitative sampling of the south-central Florida type the characteristic species are *Amphicarpum muhlenbergianum*, *Aristida beyrichiana, Dichanthelium aciculare, Eragrostis elliottii*, *Eriocaulon ravenelii*, *Ludwigia microcarpa*, *Muhlenbergia sericea*, *Myrica cerifera*, *Quercus minima*, *Rhynchospora divergens*, *R. colorata*, *Schizachyrium rhizomatum, Scleria reticularis*, *S. verticillata*, and *Pluchea rosea.* Over half of the south-central Florida calcareous taxa rarely occur in other central Florida community types (sandhills, coastal brackish marshes), while the majority of taxa are acidic wet prairie/pineland taxa, with herbaceous wetland generalist being the second highest rank. Other frequent species include *Centella asiatica*, *Helenium pinnatifidum*, *Hyptis alata*, *Lachnocaulon anceps*, *Liatris garberi*, *Piriqueta caroliniana*, and *Solidago stricta.* Rare and/or fidel endemic calciphytes include *Xyris calcicola*, *Vernonia blodgettii*, *Stillingia sylvatica* var. *tenuis*, *Dyschoriste angusta*, *Stenandrium dulce* var. *floridanum*, *Liatris garberi*, *Elionurus tripsacoides*, and *Eriochloa michauxii* var. *michauxii*. Many of the calcareous specialists also are found in marl prairies, shallow marsh edges, and hydric pinelands from Martin and Charlotte counties southward.

INTRODUCTION

Calcareous substrates are uncommon in the southeastern United States, particularly on the outer coastal plain (Hill 1992, LeBlond et al. 1994). Notable exceptions are the exposures of carbonate deposits and limestones of southern Florida (Bond 1986). In this region lithosols, calcitic muds, marls, and oolitic-limestones are common in parts of the Everglades, Big Cypress, and Miami Rock Ridge (Harper 1927, Davis 1943, Duever 1974, McPherson 1974, Duever et al. 1984, 1986, Snyder et al. 1990, Gleason and Stone 1994). Where calcareous substrates occur in the southeastern United States, unique plants or plant communities have often been documented (LeGrand 1988, Hill 1992, LeBlond et al. 1994, Webb et al. 1997, LeBlond 2001, Allison and Stevens 2001, Davis et al. 2002, Naczi et al. 2002, Shelingoski et al. 2005).

Although there are limited areas of surface calcareous outcrops in peninsular Florida (e.g., the Lime-sink region in Harper 1921), most of interior peninsular Florida lacks surfacial calcareous exposures or assemblages of calciphilic plants. For example, the pine savanna-flatwoods and Florida dry prairie landscape, which is prevalent within south-central Florida, occupies nearly level, interdrainage flatlands on acidic, nutrient-poor, poorly drained, seasonally wet sandy spodosols and sandy clay alfisols (Orzell and Bridges 2006b). There is little to no surface calcareous material within the Florida dry prairie/pinelands landscape, with the possible exception of the "Indian Prairie" region palm savannas described by Harper (1927). Where limited calcareous exposures occur in

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south-central Florida, there is often a calciphilic flora similar to the seasonally wet *Muhlenbergia sericea* dominated marl prairies found in southern Florida (Davis 1943, Porter 1967, Gunderson and Loope 1982, Caprio and Taylor 1984, Olmstead and Loope 1984, Gunderson 1994).

Prior to Bridges and Reese (1999) south-central Florida calcareous wet prairie had not been recognized as a community type, except for being briefly alluded to by Harper (1921, 1927). Vegetation sampling conducted by Bridges and Reese (1999) documented the distinct species composition and high species-richness values of a few sites. Our limited quantitative sampling of calcareous wet prairies from 1997-1999, coupled with frequent floristic discoveries (i.e., range extensions and county records) in these communities from 1999-2004, encouraged us to conduct additional floristic and vegetation sampling of these prairies.

The objectives of the paper are: (1) to document floristic composition and quantitative vegetation sampling results from south-central Florida calcareous wet prairies; (2) to describe calcareous wet prairies within a regional context by comparing them to other similar south Florida calcareous prairies; (3) to examine small-scale species richness of calcareous wet prairies; (4) to explore explanations for the high species richness values; and (5) to describe the biodiversity significance of Florida calcareous wet prairies.

Calcareous Prairies and Similar Communities in the Area of Study

Peninsular Florida Calcareous Prairies/Pinelands

We refer to muhly grass, *Muhlenbergia sericea* (Michx.) P. M. Peterson, (known as *Muhlenbergia filipes* in Davis 1943, Porter 1967, Gunderson and Loope 1982, Caprio and Taylor 1984, Olmsted and Loope 1984, Gunderson 1994, Main and Barry 2001, 2002) dominated areas of peninsular Florida as either calcareous wet prairies (herein shortened to calcareous prairies) or calcareous pinelands or savannas. In Wunderlin and Hansen (2003) *M. sericea* would key to *M. capillaris* var. *filipes*. There are many variations on the calcareous prairie/pineland theme in Florida and elsewhere on the southeastern coastal plain. We studied three geographic areas with calcareous prairies/pinelands, all from the southern Florida embayment as defined by Walker and Coleman (1987). Our three geographic areas are based upon physiography, landscape setting, soils, geology, vegetation, and floristics. Collectively these geographic regions are referred to as southern Florida (SNP), or individually as south Florida (SP), central Florida (CP), and south-central Florida (SCP) calcareous prairies/pinelands. The letter "P" stands for prairies/pinelands. Within southern Florida we limited our sampling to inland calcareous prairies/pinelands. We did not sample coastal-influenced sites, and excluded some other south Florida community types for reasons outlined below.

South Florida Calcareous Prairies/Pinelands (SP)

South Florida calcareous prairies and pinelands occur primarily in three physiographic regions - the Hydric Pine Flatwoods region, the Big Cypress, and the Everglades. Davis (1943) briefly describes various types of calcareous communities in south Florida—marl wet prairies from the Big Cypress, rockland wet prairies, and rockland/marl dry prairies from southern Florida. Davis (1943) also describes in more detail a southern Everglades rockland marsh-prairie.

Hydric Pine Flatwoods: The hydric pine flatwoods region is characterized by South Florida slash pine (*Pinus elliottii* var. *densa*) savanna-flatwoods with a species-rich groundcover dominated by herbaceous wetland plants. Saw palmetto (*Serenoa repens*) is less abundant here than in central Florida pine flatwoods, and many typical flatwoods shrubs are absent. Hydric pine savanna-flatwoods occur on poorly drained hydric soils in Charlotte, Collier, Lee, and Monroe counties in southwest Florida (Hilmon 1964, Beever and Dryden 1992, 1998). In southeastern Florida very similar species-rich hydric pine savanna-flatwoods occur on wet, calcareous-influenced soils in Palm Beach and Martin counties.

Big Cypress Marl Prairies: Big Cypress region marl prairies are dominated by *M. sericea* (=*M. capillaris* var. *filipes* in Porter, 1967) and *Cladium jamaicense* (=*Mariscus jamaicense*) with *Schizachyrium rhizomatum* (=*Andropogon rhizomatus*) being sub-dominant (Porter 1967). These marl prairies occur on Ochopee marl in the Big Cypress region, within a landscape of cypress strands and isolated higher elevation pinelands (Porter 1967). Porter (1967) found 39 species in seasonally wet marl prairies on Ochopee marl in the Deep Lake area in the eastern portion of the Big Cypress. Gunderson and Loope (1982) sampled a *Muhlenbergia* prairie with a mean hydroperiod of 73 days/year within the western portion of the Big Cypress National Preserve. They found 44 species, with 35 and 43 plants each from two 600-m^2 plots (Gunderson and Loope 1982).

Everglades Marl Prairies and Rockland (Glades) Prairies: In the eastern area of Everglades National Park, wet marl prairies occur between the Shark River and Taylor sloughs, where bedrock elevations are slightly higher and hydroperiods are shorter than in the slough sawgrass marshes (Caprio and Taylor 1984, Gunderson 1994). These wet marl prairies occur on shallow marl soils underlain with oolitic Miami limestone (Caprio and Taylor 1984, Gunderson 1994). Caprio and Taylor (1984) sampled a *Muhlenbergia* prairie with a short summer hydroperiod of 2-4 months, on the west edge of Taylor Slough in Everglades National Park. According to Davis (2004), under natural conditions there is a hydrologic gradient with hydroperiods ranging from 1-2 months in *Schizachyrium rhizomatum* dominated prairies, 3-5 months in *Muhlenbergia sericea* dominated prairies, and 6-8 months in *Cladium jamaicense* dominated prairies. In the Everglades marl prairies, periphyton mats are responsible for formation of the freshwater marls by precipitating calcite and accreting calcitic sediments in areas where the hydroperiod is too short for peat formation (Gleason 1972, Davis 2004).

Within the Everglades, on slightly higher elevations than the sloughs, rocky glades occur on exposures of oolitic limestone bedrock, pocketed with karstic solution holes (Bruno et al. 2002, Davis 2004). Also within Everglades National Park are low elevation short-hydroperiod marl prairies interspersed within the higher-elevation rockridge pine savannas on Long Pine Key (DeCoster et

al. 1999, Bruno et al. 2002, Schmitz et al. 2002). In south Florida, these calcareous communities are referred to variously as marl Everglades, marl prairies (Harper 1927, Gunderson and Loope 1982, Olmsted and Loope 1984), *Muhlenbergia* prairies (Olmsted et. al. 1980), wet prairies (marl) (Gunderson 1994), and southern marl marshes (Davis et. al. 1994). Although south Florida calcareous prairies/pinelands share floristic elements with southeast Florida rocklands (i.e., pine rocklands, rockland pine savannas, rocky glades, etc.), the hydric pineland and the marl prairie landscape of the Big Cypress region are distinct from the rockland landscapes of the Everglades and Florida Keys. Some of the differences between the regions in surface geology, soils, and vegetation are highlighted in Snyder et al. (1990), including a comparison of the distribution of woody species between rocklands and pinelands in south Florida.

The once extensive relatively well-drained pine rockland savannas of the Miami Rock Ridge, Everglades Keys (i.e., Long Pine Key), and the Florida Keys are not included within the communities compared in this study, as they are better-drained and not dominated or co-dominated by *Muhlenbergia sericea*.

Central Florida Calcareous Prairies/Pinelands (CP)

The northern extent of calcareous prairies in peninsular Florida occurs within low pine savannas of the upper Kissimmee River drainage basin and the outer terraces on the west side of the St. Johns River floodplain. We refer to these "northern" calcareous prairies/pinelands in Orange and Osceola counties as central Florida calcareous prairies/pinelands (CP). Interior central Florida calcareous prairies/pinelands are extremely rare. One notable example is the species-rich calcareous pine-palm savanna dominated by south Florida slash pine and cabbage palm at the William Beardall Tosahatchee State Reserve in Orange County. In this study, we did not include the coastal wet cabbage palm savannas described in Harper (1921, 1927) occurring on calcareous sands, with a ground cover of *Muhlenbergia sericea*, *Spartina bakeri*, or a mixture of brackish marsh and calcareous plant taxa, since they are not representative of interior peninsular Florida calcareous communities. Additional study within the Eastern Flatwoods region of central Florida, as defined by Harper (1921), will probably lead to the discovery of additional calcareous palm savannas, prairies, and pinelands.

South-central Florida Calcareous Prairies/Pinelands (SCP)

South-central Florida calcareous prairies/pinelands, here described as a new community type, occur sporadically from Polk County south to Okeechobee, Glades, Hendry, and Sarasota counties. Like the central Florida type (CP), the south-central Florida calcareous prairies/pinelands (SCP) typically occur between prairies or pinelands and the adjacent non-alluvial seasonal wetlands, which are usually herbaceous drainages or depression ponds/marshes.

South-central Florida calcareous wet prairies have similar hydropatterns to those described for marl prairies in the Everglades National Park (Acosta and Perry 2001, 2002, Bruno et al. 2002). Calcareous wet prairies are characterized as seasonal short-hydroperiod herbaceous communities. In general the hydroperiod of south-central Florida calcareous wet prairies is < 4 months. Annual shallow flooding usually occurs after the onset of the wet season (June-September, sometimes into October) with gradual drying conditions during the transition period from winter dry season to spring (March-April or May). During the summer wet season the soil may be saturated for extended periods. However, hydroperiod is variable since it is linked to ENSO climatic indices and to timing of the onset of the summer rainy season. Winter precipitation increases during the El Niño phase of ENSO and decreases during the La Niña phase, thereby directly affecting water levels in seasonal wetlands (Beckage and Platt 2003). Yearly variation in the onset of the summer rainy season also influences the hydroperiods of seasonal wet prairies in south-central Florida.

This community type differs from muhly prairies in south Florida in landscape position, occurring within an acidic prairie/pineland landscape. To the south, the south-central Florida calcareous prairies eventually grade into the more extensive hydric pinelands and marl prairies.

Soils of south-central Florida calcareous prairies/pinelands: While most of the south-central Florida calcareous prairies are on the Bradenton, Felda, Wabasso, or Winder soil series, the occurrence of calcareous prairies on these soils is not consistent (Table 1). This may be because most of the sites are too small to map as separate polygons at the county-level scale of mapping or because calcareous prairies often occur within large wetland complexes, where mapping is at a much coarser level. In general, calcareous prairie soils are mineral soils with little to no organic accumulation (Carter 1995). A generalized soil sequence of the landscape would be Wabasso/Felda/Felda, frequently flooded. Wabasso has a spodic layer and a calcareous, sandy-clay layer. Felda has only sand/silt above the calcareous sandy-clay layer (Carter 1995). Field examination of the soils at a calcareous prairie in Okeechobee County found Malabar soils (Grossarenic Ochraqualfs), with a surface pH of 6.4 and subsurface pH values from 6.6 to 7.2. Most commonly, calcareous prairie occurs within the driest portion of areas mapped as Felda soils (Arenic Ochraqualfs), often where alfic soils such as EauGallie or Oldsmar are immediately upslope. There is often an exposed hard whitish surface soil, perhaps indicating removal of the sandier A horizon by seasonally high water levels. This exposes the much harder subsoil, which is more calcareous or circumneutral. Algal periphyton occurs at many of the south-central Florida calcareous prairie/pineland sites, perhaps contributing to the "marly" surface or alkaline conditions. The algal periphyton mats do not develop to nearly the extent they do in south Florida marl prairies. Peat accumulation is neglible in calcareous prairies, in contrast to some other acidic wet prairies/marshes, since water levels fall below the ground surface each year in calcareous prairies. No underlying limestone is apparent at or near the soil surface, as is often the case in marl prairies in the Big Cypress and Everglades regions of south Florida.

Role of fire in calcareous prairies/pinelands: South-central Florida calcareous prairies occur within the pine savanna-flatwoods/dry prairie landscape, where lightning-ignited fire was historically recurrent (Harper 1921, 1927, Edmis-

Table 1. Classification of typical soil series of south-central Florida calcareous prairies. NRCS= Natural Resources Conservation Service.

Soil series	Soil order	Soil subgroup	NRCS drainage class
Bradenton	Alfisol	Typic Ochraqualfs	Poorly drained
Felda	Alfisol	Arenic Ochraqualfs	Poorly and very poorly drained
Malabar	Alfisol	Grossarenic Ochraqualfs	Poorly and very poorly drained
Wabasso	Spodosol	Alfic Haplaquods	Poorly and very poorly drained
Winder	Alfisol	Typic Glossaqualfs	Poorly drained

ten 1963, Huck 1987, Robbins and Myers 1990, Abrahamson and Abrahamson 1996, Goldman and Orzell 2000, Orzell and Bridges 2002, Slocum et al. 2003). Although the natural fire frequency is somewhat speculative for Florida dry prairie, some suggest that it was annual or biennial (Harper 1921, 1927), the highest natural fire frequency for any vegetation type in central Florida (Orzell and Bridges 1999). Historically, lightning fires burned from April to mid-June, the transition between the dry winter season, typically October through May, and the onset of the summer wet season typically beginning in May or June (Chen and Gerber 1990, Doren et al. 1993, Dye 1997, Platt 1999, Main and Barry 2002, Slocum et al. 2003, Platt et al. 2005). However, the southern Florida spring wildfire season is sensitive to the El Niño-Southern Oscillation (ENSO), since ENSO influences winter rainfall, thereby affecting wildfire frequency and intensity (Ropelewski and Halpert 1986, Beckage and Platt 2003, Beckage et al. 2003, Platt et al. 2005). In contrast, prescribed fires in south-central Florida have historically been non-lightning season burns. Lightning-season burning has become more prevalent in recent years, particularly at our study sites in Polk and Okeechobee counties.

METHODS

Floristic Methods and Analysis

Calcareous Prairie/Pineland Regional Floras of Southern Florida

The flora of calcareous prairies/pinelands was compiled from three regions—south-central Florida (SCP), south Florida (SP), and central Florida (CP). South-central Florida prairies/pinelands (SCP) include sites in Polk County south through Manatee to Sarasota, Desoto, Glades, Hendry, and Okeechobee counties (Fig. 1). Our central Florida calcareous prairies/pinelands (CP) sites were from wet calcareous south Florida slash pine flatwoods (*Pinus elliottii* var. *densa*) and cabbage palm (*Sabal palmetto*) wet savannas in northern Osceola and Orange counties.

We compiled floristic lists from 43 sites in 14 counties, primarily from Orange County south to Hendry County (Fig. 1). Survey sites were located in Collier, Desoto, Hendry, Highlands, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Polk, and Sarasota counties. Most of the sites were in southeastern Polk and western Okeechobee counties, where we located the greatest number of intact, burned examples of south-central Florida calcareous prairies.

Our study of south Florida calcareous prairies/pinelands was limited to a few hydric pine savanna-flatwoods and marl prairies in Collier, Lee, Martin, Monroe, and Palm Beach counties. We supplemented our compiled south Florida calcareous prairies/pinelands (SP) species list by including the 294 taxa listed by Main and Barry (2001) from pine and wet prairie habitats at the Florida Panther National Wildlife Refuge (FPNWR) in Collier County. Many of the 54 taxa listed by Main and Barry (2001) but absent from our species lists are from stands that we consider marginally calcareous. Although they fall within our definition of calcareous prairies, we did not include calcareous communities in the Everglades region (i.e., marl prairies, rocky glades) or south Florida rockland communities (i.e., pine rocklands, rockridge savannas, wet prairies) because comparable data were not available to us from the these areas.

Compilation of floristic lists began in 1990 and continued through 2004, with multiple site visits to assess seasonal differences. We constructed Microsoft Access databases and Microsoft Excel spreadsheets from site-specific species lists to compare the floras and to generate frequency values. Plant taxonomy and nomenclature follows Wunderlin (1998) with some exceptions. We refer the reader to Appendix B for a complete listing of the scientific names with authorities and common names.

Niche Breadth Analysis

We assessed the niche or habitat breadth of each taxon (based upon our field observations of the flora over the past 20 years) to determine the ecological amplitude (habitat specialists versus habitat generalists) of plants occurring in calcareous prairies and pinelands. Habitats of these species were classified into 7 types: 1) coastal brackish marsh; 2) calcareous wet prairies/pinelands including calcareous hammock edges; 3) disturbed areas and/or weedy calcareous habitats (i.e., calcareous roadsides); 4) marl prairies, muhly prairies, South Florida rockland communities, or hydric pine savanna-flatwoods); 5) acidic prairies/pinelands and associated depression marshes or wet prairies; 6) xeric sands (primarily sandhill woodlands); and 7) wetland generalist species (marshes, swamps, etc.). The listed habitat preferences represent the ecological amplitude of these taxa within southern and central Florida, but not necessarily outside of that region. In many cases, a species will have more than one habitat preference listed.

Quantitative Vegetation Sampling and Analysis

We conducted quantitative vegetation sampling mostly in October and November, corresponding with autumnal-flowering of graminoids and forbs. We measured species richness and composition at multiple spatial

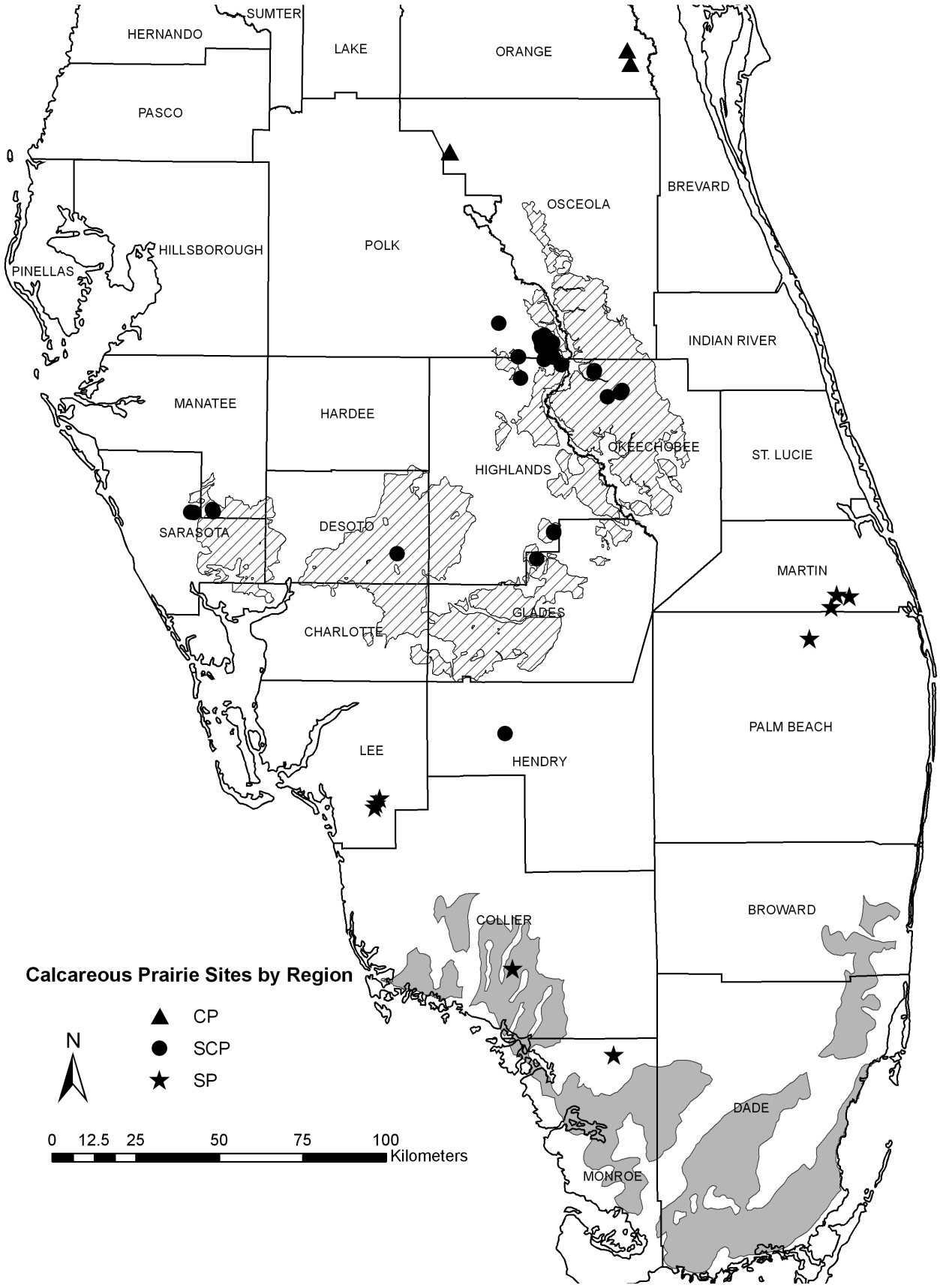

Figure 1: Location of calcareous prairie sites inventoried by region. Cross-hatched area is the presettlement extent of the Florida dry prairie landscape. Shaded area is the presettlement extent of "Wet to Dry Prairie Marshes on Marl and Rockland" from Davis (1967), which roughly correlates to the maximum extent of South Florida calcareous prairies, as well as including sawgrass marshes and some marl sawgrass/mangrove transitions. Some individual sites are not discernible at this scale due to close proximity to each other.

scales using both nested and non-nested sampling designs. Non-nested sampling utilized 1-m^2 plots spaced 5 m apart along linear transects, whereas the nested design utilized 0.1-ha (20 x 50 m) modules. Both sampling designs were stratified in prairie vegetation that had been burned within less than a year prior to our sampling. We chose sites lacking obvious signs of disturbance to the ground cover based upon presence of native plant species, absence of plants indicative of disturbance, and an overall diverse native ground cover. We sampled a total of 130 1-m^2 plots along 13 transects in Polk (Avon Park Air Force Range = APAFR) and Okeechobee (Kissimmee Prairie Preserve State Park) counties. Specific plot and transect locations are available from the authors as an ARC GIS shapefile from the APAFR GIS program. Plots were located along 50-m long transects placed within homogeneous prairie sites. We established 0.1- ha modules using the North Carolina Vegetation Survey protocols (Peet et al. 1998). Each 0.1-ha (20 x 50 m) module contains ten 10 x 10m (100 m^2 modules). Four of these inner modules each contain two sets of smaller (10 m^2, 1 m^2, 0.1 m^2, 0.01 m^2) nested sub-modules. Within each plot or module we identified all species rooted in the plot to species or varietal level and visually estimated cover for each species. The corners of the 0.1-ha modules and the transect endpoints were permanently marked with angled aluminum stakes.

We used Microsoft relational databases and spreadsheets to record cover and frequency values from sites sampled within south-central Florida. Percent mean cover values in wet prairies, pinelands, and both data sets combined from Main and Barry (2001) were also entered into spreadsheets. We used these spreadsheets to generate various statistics comparing and contrasting quantitative differences between the calcareous sites sampled in south-central Florida and those sampled by Main and Barry (2001) in south Florida. Since Main and Barry (2001) used plots of a different size (0.5 m^2) than ours, it was not possible to compare frequency values.

RESULTS AND DISCUSSION

Floristic Composition and Species Pools

Comparison with Floras of Florida Dry Prairie Landscape and Prairie Subset Flora

Partel and Zobel (1999) define a community species pool as the set of species present within a community type. The community species pool for calcareous prairies/pinelands for all of central and southern Florida combined consists of 548 taxa. Some 412 of these occur in south-central Florida prairies/pinelands (SCP), 422 taxa in south Florida calcareous prairies/pinelands (SP), and 168 taxa in central Florida calcareous prairies/pinelands (CP). The complete species list by region is in Appendix A.

Approximately 82.5% of the entire calcareous community species pool is shared with the Florida dry prairie landscape flora, and 94.4% of the SCP flora is shared with this flora (Orzell and Bridges 2006a). The species of the SCP flora, which are not shared with the Florida dry prairie landscape flora, are found in calcareous sites outside the Florida dry prairie region proper, including within calcareous pinelands. Some 96 of the 548 taxa within the total calcareous prairie/pineland flora are not part of the Florida dry prairie landscape flora, including the 54 species added to the south Florida calcareous prairie/pineland flora (SP) from Main and Barry (2001).

Comparison of the calcareous flora (SCP, CP, SP, and total calcareous flora) to the Florida dry prairie landscape flora and the dry prairie subset (Orzell and Bridges 2006a) reveals more similarity than dissimilarity. A comparison of diversity within taxonomic groupings (families, genera, pteridophytes, monocots, dicots), nativity status (native versus adventive = non-native), life forms (grasses, sedges, herbs, trees, ferns, vines, shrubs), and between the various floras and flora subsets reveals few differences. Overall, the calcareous flora (in particular SCP and SP) had a slightly lower percentage (4.6%) of adventive taxa compared to the Florida dry prairie landscape flora (6.4%), but a higher percentage than in the dry prairie subset flora (2.0%).

The genera *Ludwigia* (12) and *Utricularia* (8) were the only genera having substantially more taxa than in the Florida dry prairie subset flora (5 and 2 respectively). The family Lentibulariaceae, which includes *Utricularia,* is more diverse in the SP flora than in either of the Florida dry prairie data sets. One of these, *Utricularia simulans*, a terrestrial bladderwort with a pantropical distribution, is restricted in the United States to peninsular Florida (Schnell 1980, 2002, Taylor 1989). It is both frequently encountered and locally abundant in south-central Florida calcareous prairies/pinelands. It is not uncommon to encounter five or more carnivorous taxa, including *Pinguicula pumila*, *Drosera brevifolia*, and three species of *Utricularia* (*subulata*, *juncea*, and *simulans*) in south-central Florida calcareous prairies/pinelands. In total, 13 carnivorous taxa (8 species of *Utricularia,* 2 species of *Pinguicula,* 2 species of *Drosera*, and 1 species of *Sarracenia*) are known to occur in calcareous prairies/pinelands in southern Florida.

The plant families Apiaceae, Eriocaulaceae, and Liliaceae were also relatively more diverse as compared to the Florida dry prairie floras. There are more ferns and fern allies in the Florida dry prairie landscape flora (24) as compared to the calcareous flora (8), the SCP flora (3) or SP flora (5), but slightly more in the calcareous flora than in the Florida dry prairie flora subset (6).

Floristic Comparisons Between Regions

Other than Main and Barry (2001, 2002), there are several ecological studies that provide floristic information on marl prairies or *Muhlenbergia* prairies from the Big Cypress and Everglades regions (Porter 1967, Loope 1980, Olmsted et al. 1980, Gunderson and Loope 1982, Gunderson et al. 1982, Olmsted et al. 1983, Caprio and Taylor 1984, DeCoster et al. 1999, Schmitz et al. 2002). Most of these studies document a diverse vascular flora, with the majority of plant species being forbs, but with grasses and sedges dominant in cover and biomass (Olmsted et al. 1980, Olmsted et al. 1983, Olmsted and Loope 1984, Gunderson 1994).

The plants listed in Table 2 with floristic-based relative frequency (RF) values (greater than 88%) can be considered prevalent species of the calcareous prairie/pineland flora in southern Florida (SNP: i.e., SCP and SP combined). Of these, several are restricted within southern Florida to calcareous community types—*Muhlenbergia sericea*, *Schizachyrium rhizomatum*, and species of *Rhynchospora* (*R. colorata*, *R. microcarpa*, and *R. divergens*). Others with RF values >88%, such as *Amphicarpum muhlenbergianum*, *Eragrostis elliottii*, *Fuirena breviseta*, *Hyptis alata*, *Myrica cerifera*, and *Pluchea rosea* also frequently occur in acidic wetlands in southern Florida and the southeastern United States. Several other species with high RF values, such as *Eriocaulon ravenelii*, *Lachnocaulon anceps* (the form *L. glabrum*), *Ludwigia microcarpa*, *Juncus megacephalus*, and *Scleria verticillata* are also calcareous taxa in southern Florida.

While the SP and SCP flora are similar, there are some compositional differences. *Pinus elliottii* var. *densa*, *Schoenus nigricans*, and *Serenoa repens* all have high RF values in SP sites, but are absent or with low RF in SCP sites.

Table 2. Species with highest frequency values based upon floristic inventory of sites in south-central Florida calcareous prairies/pinelands (SCP), south Florida calcareous prairies/pinelands (SP), and central Florida calcareous prairies/pinelands (CP).

Scientific name	Total n = 43	SCP n = 31	SP n = 11	CP n = 4
Hyptis alata	43	31	8	4
Muhlenbergia sericea	42	30	9	3
Myrica cerifera	42	30	9	3
Pluchea rosea	42	30	8	4
Rhynchospora colorata	41	27	11	3
Fuirena breviseta	40	26	10	4
Rhynchospora microcarpa	40	25	11	4
Eragrostis elliottii	39	28	8	3
Amphicarpum muhlenbergianum	38	29	6	3
Rhynchospora divergens	38	28	9	1
Schizachyrium rhizomatum	38	27	8	3
Centella asiatica	37	27	8	2
Ludwigia microcarpa	37	27	9	1
Scleria reticularis	37	27	7	3
Lachnocaulon anceps	35	29	3	3
Piriqueta caroliniana var. *caroliniana*	35	30	3	2
Eriocaulon ravenelii	34	26	6	2
Juncus megacephalus	34	24	8	2
Scleria verticillata	34	24	9	1
Cyperus haspan	33	25	6	2
Mecardonia acuminata subsp. *peninsularis*	33	26	5	2
Panicum hians	33	26	5	2
Setaria parviflora	33	26	6	1
Cirsium nuttallii	32	25	5	2
Solidago stricta	32	25	6	1
Aristida beyrichiana	31	26	3	2
Bigelowia nudata subsp. *australis*	31	21	6	4
Panicum tenerum	31	21	8	2
Polygala grandiflora var. *angustifolia*	31	24	7	0
Aster dumosus	30	21	6	3
Axonopus furcatus	30	25	3	2
Xyris jupicai	30	21	8	1
Cyperus polystachyos	29	23	5	1
Euthamia tenuifolia	29	24	3	2
Helenium pinnatifidum	29	20	7	2
Sabal palmetto	29	21	4	4
Serenoa repens	29	17	9	3
Dichanthelium strigosum var. *glabrescens*	28	21	5	2
Diodia virginiana	28	24	2	2
Eryngium yuccifolium var. *yuccifolium*	28	21	5	2
Mitreola sessilifolia	28	21	6	1
Quercus minima	28	25	1	2
Stillingia sylvatica subsp. *tenuis*	28	25	3	0
Andropogon virginicus var. *virginicus*	27	21	3	3
Dichanthelium aciculare subsp. *neuranthum*	27	25	2	0
Chaptalia tomentosa	26	20	5	1
Juncus marginatus var. *biflorus*	25	18	6	1
Oxypolis filiformis	25	16	6	3
Panicum rigidulum	25	19	4	2
Rhynchospora inundata	25	17	5	3

The lower frequency of pine trees in our sampling of the SCP flora is primarily because most of the SCP sites are in a Florida dry prairie landscape context, whereas there are more hydric pine flatwoods with calcareous affinity among the SP sites. Although rarely found north of this region, *Schoenus nigricans*, a calciphilic cyperoid in south Florida, is not known from any of the SCP sites. It is a perennial cespitose sedge that is often dominant or co-dominant in south Florida marl prairies (Olmsted et al. 1980, Gunderson and Loope 1982, Gunderson 1994). It also occurs in coastal west-central Florida counties and is dominant on chalky limestone glades (Bridges et al. 1989) in Gadsden County and sporadically elsewhere in the Florida panhandle. *Rhynchospora eximia*, a subtropical beak-rush known from Florida, Mexico, West Indies, Central America, and South America, was found at two SCP sites. *Rhynchospora eximia* is extremely rare in the United States, only known from southern Florida, with the other occurrences from the outer zones of coastal brackish marshes.

The lower number of CP sites make frequency comparisons tenuous. In general, CP sites have fewer calciphilic taxa than SCP sites. All of the taxa found at all four sites (*Hyptis alata*, *Pluchea rosea, Fuirena breviseta, Rhynchospora microcarpa, Bigelowia nudata* subsp. *australis*, *Eriocaulon decangulare*, *Gratiola ramosa*, *Saccharum giganteum*, and *Sabal palmetto*), commonly occur in other acidic community types in central Florida, with the possible exception of *R. microcarpa. Aristida beyrichiana*, *Quercus minima*, and *Andropgon virginicus* var. *virginicus* (only the "smooth variant" of Campbell 1983) have substantially higher RF values in the combined CP and SCP sites than at SP sites. Central Florida sites tend to be open herb-dominated drainages within circumneutral pinelands, with a canopy of south Florida slash pines or cabbage palms.

Diversity of the Species Pool

The diversity of the species pool is evidenced by the high number of taxa recorded during single-event visits to many calcareous prairies. At 15 of 27 sites floristically surveyed at a single date, we recorded over 100 species. Of these, 11 had over 110 taxa and 6 had between 140 and 185 species. Most of these surveys occurred within a 1,000-m^2 area, all in a single community type. We suspect that some south-central Florida calcareous prairie/pineland complexes may potentially have even higher species numbers at scales greater than 1,000 m^2. Multiple site visits to calcareous sites have the potential to produce some of the highest numbers of species within a community type ever recorded during field surveys of single community types throughout the southeastern coastal plain. Based upon some 4,000 floristic lists compiled by the authors from over 50 natural community types at a scale of 1,000 m^2 on the southeastern coastal plain, there are several species rich communities (Table 3). The next highest species-rich communities in Florida are seepage slopes, calcareous hydric hammocks in central Florida, calcareous floodplain forest along the Peace River in Polk County, and a few Lake Wales Ridge sandhills (ex. 126 species recorded at a Polk County site). Of these, seepage slopes have considerable hydrologic variation, and sandhill communities have greater micro-topography than calcareous prairie/pinelands. Very few of our floristic lists from pine savannas supported over 100 species from a single-event visit at a 1,000-m^2 scale. One such floristic list compiled from fire-maintained, central Florida wet-mesic pine savanna

Table 3: Examples of highest species richness recorded by the authors during field surveys from within a single natural community type. The site codes are abbreviations: first two letters = state, next four letters = first four letters of county or parish name. The number following the county code is a unique site number assigned by the authors as part of a floristic data set being assembled for various natural communities on the southeastern coastal plain.

Site Code	Species	Natural community type
FLLIBE02899	197	Lower slope strong seepage slope with transition zones
ALBALD018	180	Strong seepage slope with intact transition zones
LAVERN1321	171	Extensive seepage slope in broad shallow swale
FLFRAN11018	171	Lower slope strong seepage slope
FLOKAL030	165	High hillside seepage slopes with sapric drainageways
FLFRAN10221	163	Extensive lower slope seepage slope
FLNASS027	163	Hillside seepage slope with intact transition zones
TXJASP164B	157	Low seepage-savanna at Miocene/Recent contact
FLWALT004	155	Low hillside seepage slope
FLFRAN11104	154	Extensive lower slope seepage slope
TXJASP006A	153	Extensive low hillside seepage-savanna
FLLIBE07007	153	Strongly seepy mid-slope seepage slope with ecotones
FLLIBE07924	151	Strongly seepy multiple-zone lower seepage slope
FLLIBE07009	149	Strongly seepy mid-slope seepage slope with ecotones
FLPOLK225G	148	Extensive cutthroat grass seepage slope
FLOKAL146	147	High hillside seepage slopes with sapric drainageways
FLWALT092	145	Extensive lower slope seepage slope
FLPOLK302C	143	Extensive very rich calcareous hydric hammock
FLWALT095	141	Strongly seepy lower slope seepage slope
FLHIGH222G	138	Extensive cutthroat grass seepage slope
TXLEON088A	137	Large high hillside seepage slope
FLHIGH222E	136	Extensive cutthroat grass seepage slope
FLLIBE09527	135	Strongly seepy lower slope seepage slope

peaked at 126 species. This was from a wet-mesic longleaf pine savanna on alfisol soils in Polk County where there was considerable hydrologic variation.

Niche Breadth and Endemism

Niche Breadth

Approximately 41% of the 548 taxa from calcareous prairies/pinelands in southern Florida are also found in acidic prairies/pinelands and 41% are also found in other wetland habitats (Table 4). In both the SCP and CP floras most taxa are acidic prairie/pineland taxa, with generalist wetland taxa second in rank. Peninsular Florida acidic prairie/pineland taxa that frequent calcareous prairies/pinelands include (but are not limited to) *Myrica cerifera*, *Pluchea rosea*, *Fuirena breviseta*, *Eragrostis elliottii*, *Amphicarpum muhlenbergianum*, *Centella asiatica*, *Scleria reticularis*, and *Piriqueta caroliniana*.

While herbaceous wetland generalist taxa rank second in the SCP flora, wetland taxa rank the highest in the SP flora (Table 4). Our finding that herbaceous wetland generalists are prevalent in the SP flora is not surprising and is consistent with the findings of others (Porter 1967, Caprio and Taylor 1984, Gunderson 1994) that report the prevalence of wetland species in seasonally wet marl prairies. Based upon the National Wetland Status rankings (Wunderlin and Hansen 2006), 61-64% of the species in each of the calcareous prairie species pools are facultative wetland species or facultative species (FACW+ through FACU+ rankings), 24-29% are obligate wetland species (OBL ranking), and 13-14% are upland species (FACU through UPL rankings). Within the total calcareous flora species pool and each subset, 66-90% of the top indicator species are classified as facultative wetland species. Many of the facultative wetland species are wet prairie species that are subject to the seasonally alternating wet/dry conditions of the southern third of Florida and therefore are not obligate wetland species.

Comparing the 36 taxa that do not substantially differ in average cover values between our quantitative sampling in the SCP region and sampling in the SP region by Main and Barry (2001), there is a preference for calcareous or marl prairies (Table 5). Of the 36 taxa listed in Table 5, 13 are calcareous habitat specialists, occurring in only a small subset of habitats within a given geographic area (i.e., habitat specialist as defined by Maliakal-Witt et al. 2005). Other typical calciphilic specialists in southern Florida include *Asclepias longifolia*, *Elionurus tripsacoides*, *Eriocaulon ravenelii*, *Heliotropium polyphyllum*, *Polygala balduinii*, *Rhynchospora colorata*, *Sideroxylon reclinatum*, and *Xyris calcicola*. Within south-central Florida, many of the characteristic species of calcareous prairies are also calcareous specialists, otherwise occurring in south Florida counties (i.e., Broward, Collier, Miami-Dade, and Monroe). *Schizachyrium rhizomatum*, *Stenandrium dulce* var. *floridanum*, and *Vernonia blodgettii* are examples of calcareous specialists that occur in south Florida marl prairies and in south-central Florida calcareous prairies/pinelands. Yarlett (1965) considered *S. rhizomatum* as primarily adapted to sites with marl or limestone, and Porter (1967) noted that it occurred equally on dry and seasonally wet marl prairies. South-central Florida calcareous prairies/pinelands represent the northern extension of the marl prairie flora into central Florida, where these communities are found in close proximity to typical acidic wet prairies. Although we refer to calcareous habitat specialists as calciphytes, physiological evidence of calcium dependency is not available, and in fact so-called calciphytes may be more adapted to circumneutral soil conditions.

Table 4. Calcareous community species pool habitat preferences.

Habitat Breadth [a]	Total Calcareous flora n = 548 [b]	SCP flora n = 412 [c]	CP flora n =168 [d]	SP flora n = 422 [e]
Brackish marshes [f]	23 (4.2%)	17 (4.1%)	6 (3.6%)	18 (4.3%)
Calcareous [g]	122 (22.3%)	110 (26.7%)	40 (23.8%)	95 (22.5%)
Disturbed [h]	154 (28.1%)	114 (27.7%)	43 (25.6%)	126 (29.9%)
Marl and rocklands [i]	106 (19.3%)	77 (18.7%)	37 (22.0%)	99 (23.5%)
Prairies/pinelands [j]	225 (41.1%)	189 (45.9%)	89 (53.0%)	166 (39.3%)
Sandhills [k]	67 (12.2%)	51 (12.4%)	16 (9.5%)	49 (11.6%)
Wetlands [l]	228 (41.6%)	155 (37.6%)	77 (45.8%)	183 (43.5%)

a = Habitat breadth or niche breadth considers the habitat preferences of the taxa. Species can have narrow or broad ecological amplitudes. Habitat generalists, those taxa with little specificity for a particular habitat, can occupy more than one habitat.

b = Community species pool for south-central, south and central Florida calcareous prairies/pinelands.

c = Community species pool from south-central Florida prairies/pinelands.

d = Community species pool for central Florida calcareous prairies/pinelands.

e = Community species pool for south Florida calcareous prairies/pinelands.

f = Coastal brackish marsh taxa, some are halophytes.

g = Calcareous wet prairie/pineland and calcareous prairie hammock edge taxa, includes all calcareous habitat specialists.

h = Disturbance adapted and/or weedy calcareous habitat taxa (i.e., calcareous roadsides).

i = Marl prairie, muhly prairie, or south Florida rockland community taxa (rockridge pinelands, pine rocklands, rockridge pine savannas, etc.), and hydric pineland taxa (hydric pine flatwoods, hydric pine savanna-flatwoods),

j = Acidic prairie/pineland taxa, including acidic wet prairies embedded in the prairie/pineland landscape. Most of these are acid-tolerant species characteristic of the Florida dry prairie/pineland landscape.

k = Xeric sand taxa, most of which occur in sandhills (occasionally scrubby flatwoods).

l = Wetland generalist taxa (several types of marshes, swamps, etc.).

Table 5. Characteristic taxa of calcareous prairies/pinelands in southern Florida (south-central and south Florida calcareous prairies/pinelands combined). Listed taxa are those without major differences in average cover values between south-central Florida calcareous prairies/pinelands and values recorded at the Florida Panther National Wildlife Refuge by Main and Barry (2001). FPNWR = Florida Panther National Wildlife Refuge, Collier County, Florida. Taxa arranged in descending order based upon average cover values.

Species	FPNWR Pine	FPNWR WP	FPNWR Both	SCP	Avg
*Muhlenbergia sericea**	1.04	8.41	4.725	5.48	5.103
Myrica cerifera	4.51	3.94	4.225	2.86	3.543
*Schizachyrium rhizomatum**	0.67	7.43	4.050	2.22	3.133
*Rhynchospora divergens**	0.88	5.85	3.365	2.32	2.844
*Ludwigia microcarpa**	1.05	2.65	1.850	1.56	1.705
Eragrostis elliottii	0.22	1.66	0.940	1.48	1.210
Dichanthelium aciculare	0.80	1.91	1.355	0.98	1.168
*Rhynchospora microcarpa**	0.23	2.34	1.285	0.65	0.969
Phyla nodiflora	0.26	1.17	0.715	0.62	0.668
Panicum rigidulum	0.09	1.60	0.845	0.44	0.643
Eryngium baldwinii	0.69	0.65	0.670	0.37	0.520
Stillingia sylvatica subsp. *tenuis**	0.63	0.30	0.465	0.47	0.468
*Flaveria linearis**	0.10	0.75	0.425	0.41	0.418
Panicum tenerum	0.05	0.67	0.360	0.44	0.400
Fuirena breviseta	0.10	0.70	0.400	0.37	0.385
Setaria parviflora	0.23	0.73	0.480	0.28	0.380
Polygala grandiflora var. *angustifolia**	0.30	0.33	0.315	0.29	0.303
Fuirena scirpoidea	0.01	0.70	0.355	0.21	0.283
Diodia virginiana	0.32	0.31	0.315	0.19	0.253
*Rudbeckia hirta**	0.25	0.07	0.160	0.26	0.211
Juncus megacephalus	0.06	0.24	0.150	0.25	0.200
Eryngium yuccifolium var. *yuccifolium*	0.37	0.02	0.195	0.11	0.151
*Rhynchospora globularis**	0.23	0.01	0.120	0.08	0.102
*Hypericum hypericoides**	0.20	0.05	0.125	0.07	0.098
Stenandrium dulce var. *floridanum**	0.01	0.13	0.070	0.12	0.095
Evolvulus sericeus var. *sericeus**	0.13	0.04	0.085	0.10	0.093
Rhynchospora tracyi	—	0.23	0.115	0.06	0.088
Cyperus haspan	0.07	0.09	0.080	0.05	0.065
Quercus pumila	0.16	—	0.080	0.05	0.065
Leersia hexandra	0.08	0.02	0.050	0.04	0.045
Buchnera americana	—	0.07	0.035	0.05	0.043
Pityopsis graminifolia	0.10	—	0.050	0.03	0.040
Scleria georgiana	0.04	0.01	0.025	0.04	0.032
Cyperus polystachyos	0.03	0.01	0.020	0.02	0.020
Physostegia purpurea	0.01	0.01	0.010	0.02	0.015
Aristida spiciformis	0.01	—	0.005	0.01	0.008

* = taxa recognized as calcareous habitat specialists within southern Florida.

FPNWR = Florida Panther National Wildlife Refuge, Collier County, Florida.

SCP = South-central Florida calcareous prairies/pinelands.

FPNWR Pine = Sites sampled by Main and Barry (2001) in pinelands.

FPNWR WP = Sites sampled by Main and Barry (2001) in wet prairies.

FPNWR both = Average of pinelands and wet prairie cover means at FPNWR (Main and Barry 2001).

Some species are bimodal in habitat preference, i.e., occurring in both calcareous prairie/pinelands and xeric sandy habitats. These include *Asclepias verticillata*, *Centrosema virginianum*, *Commelina erecta*, *Dichanthelium aciculare* (*sensu lato*), *Dyschoriste oblongifolia*, *Evolvulus sericeus*, *Polygala incarnata*, and *Sporobolus junceus*. This group of species is often found in longleaf pine-turkey oak-wiregrass sandhills. Others, including *Fimbristylis spadicea*, *Kosteletzkya virginica*, and *Sarcostema clausum* occur in both calcareous prairies/pinelands and in coastal brackish marshes. Many species of calcareous prairies/pinelands are otherwise found in south-central Florida mostly in disturbed calcareous habitats (i.e., clay, shell, and limerock-amended roadsides, ditches, and roadbanks). Some of these include *Aristida patula*, *Coreopsis leavenworthii*, *Eulophia alta*, *Eustachys petraea*, *Lindernia crustacea*, *Lobelia feayana*, *Ludwigia microcarpa*, *Phyla nodiflora*, *Polygala grandiflora* var. *angustifolia*, *Rhynchospora colorata*, *Rudbeckia hirta*, and *Xyris jupicai*. Some of these are not necessarily calciphiles in other portions of their ranges. In Florida, calcareous prairies/pinelands are the natural habitat for these indigenous, some even nearly endemic, disturbance-adapted calciphiles, which are otherwise "uncharacteristic species" of other community types (Greenberg et al. 1997).

Vascular Plant Endemism

In addition to calciphilic specialists, the flora of these communities is rich with endemic vascular plant taxa at

the species or varietal level (Avery and Loope 1980). Even if one excludes south Florida rockland endemics or discounts debates over the taxonomic status of some taxa (i.e., *Stillingia sylvatica* subsp. *tenuis* and *Stenandrium dulce* var. *floridanum*), there are many other endemics in these habitats. Although none of the south Florida endemics are restricted to calcareous prairies, many are habitat specialists primarily found in calcareous habitats (Long 1974, Loope et al. 1979, Avery and Loope 1980, Daniels 1984, Snyder et al. 1990). Some of these reach their northern limit in Florida calcareous prairies, including *Stillingia sylvatica* subsp. *tenuis*, *Schizachyrium rhizomatum*, and *Vernonia blodgettii*. Other south Florida endemic taxa in calcareous prairies include *Schizachyrium rhizomatum*, *Piptochaetium avenacioides*, *Stenandrium dulce* var. *floridanum*, *Xyris calcicola*, *Elytraria carolinensis* var. *angustifolia*, *Euphorbia inundata* var. *garrettii*, *Dyschoriste angusta*, *Justicia angusta*, and *Stillingia sylvatica* subsp. *tenuis*. *Euphorbia inundata* var. *garrettii* occurs in southwest and south-central Florida wet pinelands (Bridges and Orzell 2002), with occurrences from south-central Florida calcareous prairies/pinelands and south Florida hydric pinelands. *Xyris calcicola* occurs almost exclusively in calcareous habitats, primarily in southern and south-central Florida and very rarely in northern Florida (Bridges and Orzell 2003). There are other south Florida endemics (Avery and Loope 1980) that one might expect to occur within our study area, but were not encountered during this study (i.e., *Jacquemonita curtissii*, *J. reclinata*, *Ruellia succulenta* = *R. carolinensis* var. *succulenta* in Wasshausen 1998) and *Sida rubromarginata*, a peninsular Florida endemic (Siedo 1999). Other calcareous prairie specialists that are mostly restricted to peninsular Florida, occurring sporadically elsewhere in the southeastern United States include *Muhlenbergia sericea*, *Eriocaulon ravenelii*, *Paspalum monostachyum*, and *Eriochloa michauxii*. Other species occur in Florida and the Bahama Archipelago, such as *Galactia parvifolia*, *Liatris garberi*, *Vernonia blodgettii*, *Andropogon longiberbis*, and *Polygala grandiflora* var. *angustifolia* (also in Cuba and the Dominican Republic; Nauman 1981). *Eriocaulon ravenelii*, although occurring in isolated localities north of peninsular Florida, seems to reach great abundance in Florida calcareous prairies.

Vegetation Sampling

Community Composition

Within south-central Florida calcareous prairie (SCP), 192 taxa were sampled in the 130 m^2 plots. In terms of average percent cover over all the plots, the dominant species of the SCP quantitative data set were (average percent cover in parentheses) *Aristida beyrichiana* (6.0), *Muhlenbergia sericea* (5.5), *Quercus minima* (2.9), *Myrica cerifera* (2.9), *Rhynchospora divergens* (2.3), *Schizachyrium rhizomatum* (2.2), *Scleria reticularis* (1.9), *Ludwigia microcarpa* (1.6), *Eragrostis elliottii* (1.5), and *Scleria verticillata* (1.4) (Tables 5, 6 and 7). Based upon combined dominance (cover values) and frequency values from our quantitative sampling of SCP, characteristic species of this community type are *Amphicarpum muhlenbergianum*, *Aristida beyrichiana*, *Dichanthelium aciculare*,

Table 6. Mean cover of restricted species, based on vegetation sampling of south-central Florida calcareous prairies/pinelands (SCP) and sampling of south Florida calcareous prairies/pinelands (SP) at the Florida Panther National Wildlife Refuge (FPNWR) by Main and Barry (2001). Included are the ten highest cover (of 67 total) taxa present only in south-central Florida calcareous prairies/pinelands (SCP), and the ten highest average cover (of 173 total) taxa present only at FPNWR.

Species	FPNWR Pine	FPNWR WP	FPNWR Both	SCP
Aristida beyrichiana	—	—	—	5.96
Quercus minima	—	—	—	2.92
Elionurus tripsacoides	—	—	—	1.33
Carphephorus carnosus	—	—	—	0.72
Cirsium nuttallii	—	—	—	0.50
Dichanthelium strigosum var. *glabrescens*	—	—	—	0.49
Andropogon longiberbis	—	—	—	0.48
Dyschoriste humistrata	—	—	—	0.45
Mitreola sessilifolia	—	—	—	0.41
Sporobolus junceus	—	—	—	0.40
Paspalum monostachyum	5.88	21.95	13.915	—
Cladium jamaicense	2.79	11.74	7.265	—
Melochia spicata	5.02	1.22	3.120	—
Ruellia caroliniensis	1.75	1.74	1.745	—
Mikania scandens	0.57	1.96	1.265	—
Baccharis glomeruliflora	1.88	0.63	1.255	—
Lyonia fruticosa	2.35	—	1.175	—
Elytraria caroliniensis var. *angustifolia*	0.71	1.60	1.155	—
Rhynchospora odorata	0.14	2.14	1.140	—
Spermacoce assurgens	0.51	1.57	1.040	—

FPNWR = Florida Panther National Wildlife Refuge, Collier County, Florida.

SCP = South-central Florida calcareous prairies/pinelands.

FPNWR Pine = Sites sampled by Main and Barry (2001) in pinelands.

FPNWR WP = Sites sampled by Main and Barry (2001) in wet prairies.

FPNWR both = Average mean cover from both pinelands and wet prairies FPNWR (Main and Barry 2001).

Table 7. Differential taxa (> 2x difference in average cover values) between south-central Florida calcareous prairies/pinelands (SCP) and south Florida calcareous prairies/pinelands (SP) based upon vegetation sampling of SCP, and SP at the Florida Panther National Wildlife Refuge (FPNWR) by Main and Barry (2001). The first ten species listed are positively differential for SCP, and the remainder are positively differential for SP.

Species	FPNWR Pine	FPNWR WP	FPNWR Both	SCP	Diff
Scleria reticularis	0.26	0.17	0.215	1.95	1.731
Scleria verticillata	0.05	0.04	0.045	1.45	1.401
Axonopus furcatus	0.01	0.12	0.065	1.42	1.355
Helenium pinnatifidum	0.01	0.06	0.035	1.26	1.225
Mecardonia acuminata subsp. *peninsularis*	0.07	0.22	0.145	1.35	1.205
Eriocaulon ravenelii	0.03	0.05	0.040	1.20	1.160
Liatris garberi	0.04	0.001	0.021	0.73	0.710
Andropogon virginicus var. *virginicus*	0.11	0.06	0.085	0.67	0.585
Bigelowia nudata subsp. *australis*	0.02	—	0.010	0.56	0.550
Solidago stricta	0.04	0.06	0.050	0.58	0.530
Sabal palmetto	27.04	2.59	14.815	0.07	14.745
Serenoa repens	21.61	0.22	10.915	0.43	10.485
Pluchea rosea	2.99	4.04	3.515	1.43	2.085
Centella asiatica	1.50	3.49	2.495	0.78	1.715
Amphicarpum muhlenbergianum	2.80	2.01	2.405	0.78	1.625
Hyptis alata	1.04	3.37	2.205	0.66	1.545
Dichanthelium dichotomum	1.59	1.54	1.565	0.56	1.005
Rhynchospora colorata	0.91	3.00	1.955	0.96	0.993
Chamaecrista nictitans var. *aspera*	1.92	0.02	0.970	0.02	0.950
Ipomoea sagittata	0.50	1.30	0.900	0.11	0.790

FPNWR = Florida Panther National Wildlife Refuge, Collier County, Florida.

SCP = South-central Florida calcareous prairies/pinelands.

FPNWR Pine = Sites sampled by Main and Barry (2001) in pinelands.

FPNWR WP = Sites sampled by Main and Barry (2001) in wet prairies.

FPNWR both = Average cover value for pinelands and wet prairies at FPNWR (Main and Barry 2001).

Diff = SCP minus FPNWR both

E. elliottii, *Eriocaulon ravenelii*, *L. microcarpa*, *M. sericea*, *M. cerifera*, *Q. minima*, *R. divergens*, *R. colorata*, *S. rhizomatum*, *Scleria reticularis*, *S. verticillata*, and *Pluchea rosea*. Other frequent species include *Centella asiatica*, *Helenium pinnatifidum*, *Hyptis alata*, *Lachnocaulon anceps*, *Liatris garberi*, *Piriqueta caroliniana*, and *Solidago stricta*. In contrast, south Florida calcareous prairies sampled by Main et al. (2000) identified *M. capillaris* (= *M. sericea*), *Paspalum monostachyum*, and *Schizachyrium rhizomatum* as the dominant grasses with greater than 25% total graminoid cover in wet prairies at the Florida Panther National Wildlife Refuge (FPNWR) in Collier County.

The most comparable study of marl prairies in South Florida to our study is that of Main and Barry (2001). They recorded 294 taxa from 360 0.5-m² plots located along transects, with 185 taxa from wet prairies and 135 taxa from pinelands. Sixty-seven taxa recorded from the SCP sites were absent from sampling data collected by Main and Barry (2001) from the FPNWR in Collier County. Main and Barry (2001) sampled 173 taxa that we did not sample in SCP sites, with 106 of these from wet prairie and 161 from pinelands. Of these 173 taxa not sampled in SCP sites, 119 were present on at least some SCP floristic lists, while 54 taxa were not recorded from SCP sites in either quantitative sampling plots or floristic lists.

Some of these differences reflect intrinsic site differences (i.e., past land use practices and history, hydrologic differences, and differing fire regimes), while others may reflect floristic differences between central and south Florida. Much of the floristic difference is because adjacent "upland" pine habitats were not included in our SCP sampling. The pinelands at FPNWR are on calcareous substrates; therefore, they do not differ as much in composition from the adjacent marl prairies as the SCP calcareous prairies do from the adjacent acidic pine savannas or acidic dry prairies. For example, there are higher mean percent cover values for the shrubs recorded at the FPNWR (67% in pinelands, 9% in wet prairie) in comparison to the 6% cover value in the SCP. While higher shrub cover values in FPNWR pinelands may be due to site differences (i.e., less frequent burning), they may also be attributed to a richer shrub stratum that seems to characterize south Florida pinelands. Main and Barry (2001) sampled 34 shrub species in the FPNWR pinelands as compared to 18 shrub species in wet prairie. Snyder et al. (1990) and Olmsted et al. (1983) also noted the rich shrub stratum of south Florida pinelands. Snyder et al. (1990) noted 15 species of shrubs, both temperate and West Indian-Antillean tropical species, in south Florida pinelands, with only seven of these representing species also occurring in acidic pine flatwoods. Olmsted et al. (1983) found 61 shrubby taxa (75% with West Indian origin) in the shrub layer at Long Pine Key in Everglades National Park, with as many as 29 species being recorded in a single 0.025-ha plot.

Of the 67 taxa sampled in SCP sites but not sampled by Main and Barry (2001) at the FPNWR, 10 taxa have average cover values greater than or equal to 0.40 (Table 6). These are SCP-restricted species. Six of these (*Aristida beyrichiana*, *Quercus minima*, *Dichanthelium stigosum* var. *glabre-*

scens, *Sporobolus junceus*, *Dyschoriste humistrata*, and *Carphephorus carnosus*) are common floristic elements of the acidic south-central Florida dry prairie/pineland landscape. Both dwarf live oak (*Q. minima*) and wiregrass (*A. beyrichiana*) are often dominant in the dry-mesic to wet-mesic prairie types in south central Florida, as well as in the ground cover of pine savannas (Orzell and Bridges 2006a, 2006b). Although present in south Florida, *Q. minima*, a rhizomatous clonal ground dwelling oak, is more characteristic of the south-central Florida dry prairie/pineland region than of south Florida landscapes. *Aristida beyrichiana*, a warm-season, C^4, cespitose graminoid, characteristic of southeastern coastal plain pinelands, savannas, and prairies (Peet 1993, Platt 1999), is more characteristic of SCP sites when compared to SP sites. *Carphephorus carnosus*, a south-central Florida endemic with a distribution centered primarily within the Florida dry prairie/pineland region, is mostly absent from SP sites. *Dyschoriste humistrata*, with its range centered in peninsular Florida but extending into the southern coastal plain of South Carolina (Wasshausen 1998, Sorrie and Weakley 2001) is a Floridian near-endemic that occurs in SCP sites. *Dyschoriste humistrata* is largely replaced by *Dyschoriste angusta* in south Florida calcareous prairies/pinelands.

Table 6 lists the top ten (of 173) taxa absent from SCP sampling, but with high cover values from FPNWR (Main and Barry 2001). Many species present in the FPNWR sampling, but absent from the SCP sampling, are not habitat-specific or restricted to south Florida; one example is *Cladium jamaicense*. Although it was not sampled at any of our SCP sites, it is a frequent cyperoid (floristic RF values of 42 at SCP, 54 at SP, 25 at CP) that does not typically form monocultural stands in SCP or CP sites, unlike elsewhere in Florida where it can form dense stands at sites with longer hydroperiod wetlands. In contrast, other taxa with high mean cover values at the FPNWR are confined in Florida to southern Florida including *Paspalum monostachyum* and *Elytraria carolinensis* var. *angustifolia*. *Paspalum monostachyum* is a locally abundant rhizomatous grass in south Florida that is disjunct from coastal Texas, coastal southwestern Louisiana and eastern Mexico. *Elytraria carolinensis* var. *angustifolia* is endemic to southern peninsular Florida (Wasshausen 1998, Wunderlin and Hansen 2003).

Differential species between the SCP calcareous prairies and the FPNWR are those with average cover values that are double or more in SCP as compared to FPNWR. The top ten (of 49) are mostly calcareous prairie (60%) or calciphilic taxa (Table 7). These include *Scleria verticillata, Eriocaulon ravenelii*, *Liatris garberi*, and *Mecardonia acuminata* subsp. p*eninsularis* (weakly calciphilic). *Mecardonia acuminata* subsp. *peninsularis* is endemic to peninsular Florida, while *Liatris garberi* is a near peninsular Florida endemic, with reports from the Bahama Islands (Correll and Correll 1982, Nesom 2005). Wetland generalist species among these include *Scleria reticularis* and *Helenium pinnatifidum*. Disturbance-adapted taxa include *Andropogon virginicus* var. *virginicus* ("smooth variant") and *Axonopus furcatus*, a "weedy" southeastern United States endemic (Barkworth 2003). *Axonopus furcatus* is a disturbance-adapted species that displaces other native groundcover species in calcareous prairies and other Florida habitats. Of the 39 differential species with average cover values in the FPNWR greater than twice those in the SCP, the top ten are equally split between marl prairie and wetland generalist taxa. When all 39 taxa are included, the habitat preferences are equally split between acidic prairies/pinelands and wetland generalist taxa.

There are 36 taxa without major percent cover differences between SCP and the south Florida calcareous prairie/pinelands at the FPNWR. These 36 taxa are characteristic plants of calcareous prairie/pinelands in the southern third of Florida (Table 5), but are not necessarily restricted to these communities. For example, *Aristida spiciformis*, *Myrica cerifera*, *Panicum tenerum*, *Quercus pumila*, *Rhynchospora tracyi*, and *Scleria georgiana* are common in other habitats in Florida. However, the presence of those plants with average cover values greater than 0.9, along with several of the other 28 taxa, at a site would indicate a calcareous prairie in the southern third of Florida. Of the 36 taxa 13 are calcareous habitat specialists in southern Florida (Table 5). The remaining 23 are primarily acidic prairie/pineland taxa or generalist wetland taxa with temperate affinities.

There are shifts in species composition within genera between the typical acidic pineland/prairie landscape and the calcareous prairie/pineland community type. Some of the calcareous specialists and their habitat-generalist congeners are listed in Table 8.

Small-scale Species Richness Values

Prior to this study our maximum species-diversity values for calcareous prairie at Avon Park Air Force Range (APAFR) had been 41 species per m^2, 75 per 100 m^2, and 109 per 1000 m^2 (Bridges and Reese 1999). Subsequent sampling has documented higher species richness values (Table 9). The highest recorded diversity values for the 0.1-ha nested modules were supported by independent samples of 1-m^2 non-nested plots in transects. One transect of 10 1-m^2 plots averaged 40.5 species per 1-m^2 plot, with 120 species recorded from the 10 plots combined. There was an overall mean of 27 species per 1.0 m^2 for the entire 130 plots sampled for SCP. The mean was skewed slightly lower because of the inclusion of relatively barren "slick spots" and seasonally inundated transitions in the adjacent depression marshes within transects. Sampling at five APAFR sites also included plots with over 40 species per 1 m^2. A 1-m^2 plot sampled in November 2001 had 47 species, at a different site the 49 species plot listed in Table 9.

Calcareous wet prairies are remarkable for their high species richness (Fig. 2). This fact is even more significant considering that nearly all the species are herbaceous and there is an extremely uniform hydrology and fine-scale elevation within the community. In the SCP sites sampled, 91% of the total cover is herbaceous, and only 10 shrub species were present. High species-richness values have been reported from subtropical rockridge pine savannas and short-hydroperiod prairies at Long Pine Key in Everglades National Park (DeCoster et al. 1999, Schmitz et al. 2002). There are more species in the Long Pine Key short-hydroperiod prairies than the pine savanna at scales less than 1 m^2, but are reverse at scales greater than 10 m^2 (Schmitz et al. 2002). South-central Florida calcareous prairies lack the fine-scale topographic varia-

Table 8. Calcareous specialists and their sympatric habitat-generalist congener pairs in south-central Florida calcareous prairies/pinelands.

Calcareous prairie/pineland taxa	Acidic prairie/pineland taxa
Andropogon longiberbis	*Andropogon virginicus* var. *decipiens*
Dichanthelium aciculare	*Dichanthelium ensifolium (sensu lato)*
Dichanthelium dichotomum	*Dichanthelium portoricense*
Eleocharis geniculata	*Eleocharis baldwinii*
Erigeron quercifolius	*Erigeron vernus*
Eriocaulon ravenelii	*Eriocaulon decangulare*
Fimbristylis caroliniana	*Fimbristylis puberula*
Hypericum cf. *limosum*	*Hypericum fasciculatum*
Juncus megacephalus	*Juncus scirpoides*
Liatris garberi	*Liatris gracilis*, *L. spicata*, *L. laevigata*
Pinus elliottii var. *densa*	*Pinus palustris*
Polygala balduinii	*Polygala ramosa*
Rhynchospora colorata	*Rhynchospora latifolia*
Rhynchospora divergens	*Rhynchospora pusilla*
Rhynchospora microcarpa	*Rhnchospora fascicularis*
Sabatia stellaris	*Sabatia grandiflora*
Schizachyrium rhizomatum	*Schizachyrium stoloniferum*
Scleria verticillata	*Scleria pauciflora*, *S. hirtella*
Stillingia sylvatica subsp. *tenuis*	*Stillingia sylvatica* subsp. *sylvatica*
Xyris calcicola	*Xyris floridana*

tion of rockridge pine savannas, where solution holes and pinnacle rock result in substrate and microhabitat heterogeneity (Schmitz et al. 2002). Although Schmitz et al. (2002) found fine-scale elevational variation to be positively associated with species diversity at scales of 1 m^2 and 10 m^2 in pine savannas, there was not a significant relationship between elevational variation and species diversity in short-hydroperiod prairies. Therefore, environmental heterogeneity may at least be partially responsible, at coarser spatial scales, for the high species diversity of Long Pine Key pinelands. There are many species of shrubs with tropical affinities in rockridge pine savannas as compared to the short-hydroperiod prairie, where up to 90 woody taxa (mostly with West Indies tropical affinity) are known to occur in rockridge pine savannas (Snyder et al. 1990). However, the large numbers of species at fine scales in calcareous prairies and the short-hydroperiod prairies of Long Pine Key is unlikely to be due to substrate heterogeneity (Schmitz et al. 2002). In another study, species richness was correlated with micro-elevation, some soil parameters, and light penetration in southwestern Louisiana coastal tallgrass prairies (Grace et al. 2000). Coastal tallgrass prairies in southwestern Louisiana have more micro-elevation variation (i.e., mima mounds) than calcareous prairies in either the SCP or SP regions.

In sampling of North American tall-grass prairies, species richness averaged 18/m^2 and never exceeded 28/m^2 (Peet et al. 1983, Walker and Peet 1983). At the 0.1-m^2 to 10-m^2 scale, the species diversity values of 27-69 species rank calcareous prairies among some of the most species-rich communities in North America, north of Mexico (Table 9). At the 1-m^2 and 1000-m^2 scales, south-central Florida calcareous prairies appear to surpass all other North American plant communities. At the 1000-m^2 scale, the number of species recorded (171) is an order

Table 9: Maximum species-richness values from nested modules and plots.

Area (m^2)	Calcareous wet prairie[a]	Pine savanna wet-mesic (alfisol)[b]	Upland loess plain pine savanna[c]	Pine rockridge savanna[d]	Rockridge short hydroperiod calcareous prairie[e]	Pine flatwoods/ savanna (ultisol)[f]	Mesic pine flatwoods (spodosol)[g]
0.01	8	8	11	11	14	9	8
0.1	27	16	21	21	27	27	10
1	49	29	41	39	39	46	21
10	69	45	72	61	57	70	31
100	99	69	118	86	84	91	46
1000	171	109	166	132	104	128	68

a. Orzell and Bridges (2006b), Avon Park Air Force Range, Florida.
b. Bridges (1997), Avon Park Air Force Range, Florida.
c. Platt et al. (2006) and W. J. Platt (unpublished data), Camp Whispering Pines, Louisiana.
d. DeCoster et al (1999), Schmitz et al. (2002) and W. J. Platt (unpublished data) from Long Pine Key, Everglades National Park, Florida.
e. DeCoster et al (1999), Schmitz et al. (2002) and W. J. Platt (unpublished data) from Long Pine Key, Everglades National Park, Florida.
f. Glitzenstein et al. (2003) Tiger Corner, Francis Marion National Forest, South Carolina.
g. Glitzenstein et al. (2003) Osceola National Forest, Florida.

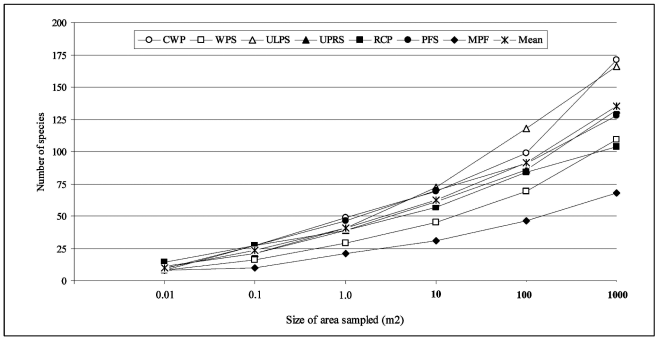

Figure 2. Species area curves from the following sites: CWP: Calcareous wet prairie (Orzell and Bridges 2006b, Avon Park Air Force Range, Florida); WPS: Wet-mesic pine savanna (Bridges 1997, Avon Park Air Force Range, Florida); ULPS: Upland loess plain pine savanna (Platt et al. 2006 and W. J. Platt, unpublished data, Camp Whispering Pines, Louisiana); UPRS: Upland pine rockridge savanna (DeCoster et al. 1999, Schmitz et al. 2002, and W. J. Platt, unpublished data, from Long Pine Key, Everglades National Park, Florida); RCP: Rockridge calcareous short-hydroperiod prairie (DeCoster et al. 1999, Schmitz et al. 2002, and W. J. Platt, unpublished data, from Long Pine Key, Everglades National Park, Florida); PFS: Pine flatwoods/savanna (Glitzenstein et al. 2003, Tiger Corner, Francis Marion National Forest, South Carolina); MPF: Mesic pine flatwoods (Glitzenstein et al. 2003, Osceola National Forest, Florida); Mean: excludes mesic pine flatwoods site.

of magnitude greater than the numbers at the finer scales, with our values representing the highest known to us at the time of this publication. The 171 taxa recorded at the 1000-m^2 scale is conservative, since it is based upon a single-sampling event, rather than multiple visits at different dates, and the plant nomenclature is based upon a conservative taxonomic treatment (Wunderlin 1998). For example, Carr (2001) delineated 193 taxa during our joint sampling of the 1000-m^2 plot. The 22 species difference is partially attributable to recognition of taxa using Weakley (2005) that are either not referenced or are placed under synonymy in Wunderlin (1998).

DeCoster et al. (1999) report species-richness values from burned rockridge pine savannas on Long Pine Key in Everglades National Park equal to or exceeding values reported by Peet and Allard (1993) for longleaf pine (*Pinus palustris*) communities on the Atlantic and Gulf coastal plains. Walker and Peet (1983) report species-richness values up to 42 species at the 0.25-m^2 scale from fire-maintained mesic pine savannas in the Green Swamp of North Carolina. Most of the highest species-richness values reported in North America are frequently burned sites (Walker and Peet 1983, DeCoster et al. 1999, Schmitz et al. 2002, Glitzenstein et al. 2003). Although our sample sites have never been fire-suppressed, they have not been subject to annual burning as reported in other studies with high species diversity (Walker and Peet 1983, Glitzenstein et al. 2003). They have only recently been subject to lightning-season prescribed burning (twice within the past ten years), following decades of winter burning. The study sites at APAFR have been subject to intervals of low-intensity livestock grazing management since the 1940s, not unlike some other species-rich sites that have also been subject to grazing or mowing (Willems et al. 1993, Bastow et al. 1995, Partel and Zobel 1999, Kahmen et al. 2002).

Outside of the United States, species richness on a 1-m^2 or 0.25-m^2 scale similar to our results have been reported (Willems et al. 1993, Bastow et al. 1995, Partel and Zobel 1999, Duckworth et al. 2000, Kahmen et al. 2002). These communities include alvar limestone grasslands in Sweden (Bastow et al. 1995), chalk grasslands in The Netherlands (Willems et al. 1993), calcareous grasslands in Europe (Duckworth et al. 2000, Kahmen et al. 2002), and calcareous alvar grasslands in Estonia (Partel and Zobel 1999). However, at scales of 100 m^2 to 1000 m^2, we believe that none of the managed European grasslands are equivalent in species diversity to the fire-maintained savannas of the southeastern United States. These communities may be unparalleled in temperate regions for the range of spatial scales of high species diversity. It is possible that equivalent intensive sampling will reveal similar patterns of diversity in tropical wet savannas of Cuba and northern South America.

Potential Mechanisms for Maintenance of High Species Richness

Explanations for high species richness at fine spatial scales, especially in herbaceous communities, has recently been the subject of considerable debate (Walker and Peet 1983, Auerbach and Shmida 1987, Willems et al. 1993, Bastow et al. 1995, Kirkman et al. 1998, DeCoster et al. 1999, Partel and Zobel 1999, Duckworth et al. 2000, Grace et al. 2000, Kirkman et al. 2001, Kahmen et al. 2002, Schmitz et al. 2002, Glitzenstein et al. 2003, Wentworth et al. 2003, Fridley et al. 2005). Although our study does not address why there are large numbers of species at small scales in Florida calcareous prairies/pinelands, we can examine how our results relate to some theories, which may prove useful to future researchers.

In general, we concur with Grace et al. (2000) that species richness in herbaceous plant communities is controlled by multiple interacting factors such as environmental conditions, species pools, plant abundance, disturbance, and spatial heterogeneity. Both non-equilibrium and equilibrium processes, as described in Walker and Peet (1983), provide insight to the mechanisms related to high species richness. These factors in conjunction with stochastic processes are thought to vary with spatial scales and interact to govern species richness (Auerbach and Shmida 1987).

The shallow, nutrient-poor soils and fluctuating extractable water suggest that calcareous prairies are stressful environments with conditions that affect the vegetation differentially during the winter dry and summer wet seasons. Calcareous prairies/pinelands are subject to major episodic disturbances—frequent fire (perhaps annual or biennial under natural presettlement conditions), seasonal short-hydroperiods (i.e., inundation for < 4 months), and drought during the dry season. These natural disturbances are integral ecological processes in the south-central Florida prairie/pineland landscape. Although not unique to these prairies, short fire-return intervals (annual or biennial burns) have been implicated elsewhere in the maintenance of species-rich ground cover (Lewis and Harshbarger 1976, Keddy and Reznicek 1982, Peet et al. 1983, Walker and Peet 1983, Waldrop et al. 1992, Glitzenstein et al. 2003). Species

richness may be indirectly related to fluctuations in the water levels (Keedy and Reznicek 1985, Hill and Keddy 1992) that interact with other disturbances (frequent fire, seasonal drought, etc.) to reduce competitive interactions (Grime 1979, Hill and Keddy 1992) and create micro-habitat heterogeneity (i.e., by substrate exposure; Keddy 1983). Perhaps hydro-edaphic conditions in calcareous prairies interact with frequent fire to produce conditions more favorable to small and short-stature herbaceous taxa, but less than optimal or adverse to growth of competitive larger perennial or woody plants. For example, saw palmetto (*Serenoa repens*) and other shrubs are nearly absent from calcareous wet prairies, but present in the surrounding prairie/pineland landscape.

The fine-textured soils of calcareous prairies/pinelands are of limited extent in the acidic prairie/pineland landscape within south-central Florida. Microsites where fine-textured circumneutral soil lenses and coarser acidic sandy lenses occur in close proximity create conditions where *Aristida beyrichiana* and *Muhlenbergia sericea* are co-dominant. Other calcareous flora species-rich genera (*Andropogon*, *Aster*, *Cyperus*, *Dichanthelium*, *Hypericum*, *Ludwigia*, *Panicum*, *Rhynchospora*, *Polygala*, and *Xyris*) include calcareous specialists as well as species more adapted to acidic mesic savannas, wet savannas, or acidic wet prairies. These microsites seem to have high species richness, perhaps due to the juxtaposition of calcareous specialists, acidic prairie/pineland taxa, xeric taxa, and generalist wetland taxa. The calcareous prairie flora is seemingly an enriched species pool, with a number of south and/or south-central Florida endemic or near-endemic taxa, ecotypes, wide variation in life-forms, and disjunct or peripheral species. Many of the plants are infrequent in the region, have sporadic distributions, are restricted calcareous specialists, or preferentially occur in these prairies. The pool of species capable of colonizing any given set of environmental conditions (the so-called "species pool," *sensu* Zobel et al. 1998) has been implicated as dictating small-scale species richness (Grace et al. 2000).

Attributes distinguishing calcareous prairies from the surrounding vegetation include sparse cover with areas of exposed substrate (i.e., gaps), dwarfing, and xerophytism, all indirect factors that contribute to differences in growth forms (i.e., size and density). At fine scales, differences in sizes of species may have an influence on species diversity (Schmitz et al. 2002). The wide array of species morphologies, including a large number of diminutive herbs (isoetids, filiform sedges, tussock and rosette plants, insectivorous plant species, etc.) perhaps allows for greater species diversity at a fine-scale. *Eriocaulon ravenelii*, one or more diminutive *Ludwigia*, *Eleocharis*, *Xyris* and *Rhynchospora* species, along with several basal rosette-forming species are almost always present. Also present are several loosely rhizomatous or small anastomosing clumps of grasses and sedges, none of which is usually a dominant species. Herbs, in particular *Iva microcephala*, *Evolvulus sericeus, Polygala grandiflora* var. *angustifolia*, and *Heliotropium polyphyllum,* with low aboveground biomass (i.e., "thin" plants) are frequent but sparse, with low cover values. Only 18 (9.3%) of the 192 plants sampled in SCP have average cover values above 1.0% (only two have values greater than 4%), but 111 (57.8%) have average cover values of 0.1% or less. Perhaps edaphic conditions (Tyler 1994, Tyler and Strom 1995) are preventing certain competitive plants from attaining maximum size and vigor, as in Grime's non-equilibrium model (Grime 1973, 1979, Walker and Peet 1983, Peet et al. 1990).

The above provides a brief overview of some potential mechanisms for high species richness in southern Florida calcareous prairies/pinelands. Walker and Peet (1983) discuss other non-equilibrium and equilibrium mechanisms. Peet et al. (1990) proposes a new model based upon the relative importance of above- and below-ground competition. All of these offer plausible explanations and topics for discussion and debate. However, none adequately address the question as to why the neighbors of any given species are not likely to be the same species, a question that may require experimental studies to resolve.

Species-rich calcareous prairies/pinelands seem to share the following characteristics—a historically high fire-return interval (annual or biennial), a wet-mesic to wet hydrologic gradient, and distinct edaphic conditions. The most species-rich sites are those with either a short fire-return interval (i.e., very frequent fire) or a long uninterrupted history of burning (i.e., lack of fire suppression). The portion of the hydro-edaphic gradient that is most directly affected by seasonal change between wet and dry conditions is the most species-rich part of the prairie/pineland landscape. In addition, some unknown edaphic aspect of the soil (nutrient deficits, texture differences, pH, soil moisture, etc.), may play an important role, especially since none of the other above attributes is unique to calcareous prairies. There is a tendency for greater species richness in the wetter acidic prairie community types (wet-mesic and acidic wet prairies) within the region (Bridges and Reese 1999), however none of these approaches the species-richness values found in the calcareous prairies. Where localized edaphic conditions, such as those in the calcareous prairies, are of rare occurrence or atypical within a given landscape, species groupings can vary with the soil and soil-moisture conditions. This results in juxtaposition of habitat specialists and generalists not found in surrounding communities. Perhaps the high species-richness values both at the fine-scale (0.01 m^2 and 1 m^2) and at the coarser level (10 m^2, 1000 m^2) will stimulate ecologists to investigate mechanisms responsible for the species richness in calcareous prairies in south-central Florida.

Implications for Biodiversity Conservation

South-central Florida calcareous prairies/pinelands are biodiversity hotspots due to their remarkable species-richness values, high single-event floristic diversity, and the presence of many calcareous habitat specialists and endemic plant taxa. These prairies/pinelands have among the highest vascular plant species richness recorded in North America at a fine scale. Many sites have over 100 species, with several having 140-180 species recorded from single-event visits. Although decreases in ground-cover species richness can be associated with less frequent burning at small spatial scales (Glitzenstein et al. 2003), calcareous prairies with high small-scale species richness are ideal for monitoring changes in species richness at a community level. Declines in species diversity in commu-

nities of such limited extent could translate into landscape-level biodiversity declines. South-central Florida calcareous prairies serve as refugia for populations of calciphiles within an otherwise acidic prairie/pineland landscape, and harbor species from south Florida marl prairies that are at or near their northernmost range limits. High species-richness values characterized by calcareous habitat specialists and herbaceous southern Florida endemic or near-endemic taxa support the regional biodiversity value of calcareous prairies. Destruction or habitat degradation of even a small extent of calcareous prairies/pinelands would result in a disproportionate loss of species biodiversity from the otherwise acidic prairie/pineland landscape of south-central and central Florida.

Calcareous prairies are sensitive to changes in hydrology, including alteration of annual hydroperiod, dry season water levels, and timing of drying patterns. Local or regional hydrologic alterations could cause changes in periphyton mats, alteration of the fire regime, increased woody plant invasion, spread of exotics, or other changes that should be reflected in the plant community. Consequently, calcareous prairies are ideal plant communities in which to conduct vegetation and hydrologic monitoring in order to assess ecological health and integrity. Calcareous prairies might be classified by some as "infertile wetlands" (as per Moore et al. 1989), characterized by nutrient-poor conditions, low productivity, and "stress tolerators" with low growth rates and poor competitive abilities, which are highly sensitive to human disturbances (Keddy and Wisheu 1989). Baseline information on these plant communities can provide general guidelines for wetland restoration and management efforts aimed at maintaining ecosystem health.

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Appendix A. Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Acalypha gracilens	9.3	9.7	9.1	—
Acer rubrum var. *trilobum*	7.0	—	18.2	25.0
Acmella oppositifolia var. *repens*	9.3	—	27.3	25.0
Aeschynomene americana	2.3	—	9.1	—
*Agalinis fasciculata**	2.3	—	9.1	—
Agalinis harperi	2.3	—	9.1	—
Agalinis linifolia	25.6	22.6	18.2	50.0
Agalinis obtusifolia	4.7	6.5	—	—
Agalinis pinetorum	4.7	6.5	—	—
Ageratina jucunda	4.7	6.5	—	—
Aletris lutea	48.8	35.5	81.8	25.0
Ambrosia artemisiifolia	14.0	12.9	18.2	—
Ammannia coccinea	11.6	12.9	9.1	—
Ammannia latifolia	7.0	—	27.3	—
Ampelopsis arborea	18.6	22.6	9.1	—
Amphicarpum muhlenbergianum	88.4	93.5	54.5	75.0
Andropogon brachystachyus	2.3	—	—	25.0
Andropogon glomeratus var. *glaucopsis*	27.9	16.1	36.4	75.0
Andropogon glomeratus var. *hirsutior*	9.3	9.7	—	25.0
Andropogon glomeratus var. *pumilus*	41.9	35.5	54.5	25.0
Andropogon gyrans var. *gyrans*	2.3	3.2	—	—
Andropogon gyrans var. *stenophyllus*	11.6	12.9	9.1	—
Andropogon longiberbis	39.5	54.8	—	—
Andropogon ternarius var. *cabanisii*	39.5	41.9	27.3	25.0
Andropogon virginicus var. *decipiens*	4.7	3.2	9.1	—
Andropogon virginicus var. *glaucus*	46.5	48.4	36.4	25.0
Andropogon virginicus var. *virginicus*	62.8	67.7	27.3	75.0
Aristida beyrichiana	72.1	83.9	27.3	50.0
Aristida palustris	18.6	16.1	27.3	—
Aristida patula	27.9	16.1	36.4	75.0
Aristida purpurascens var. *purpurascens*	4.7	3.2	—	25.0
Aristida purpurascens var. *tenuispica*	48.8	51.6	45.5	—
Aristida rhizomophora	2.3	—	9.1	—
Aristida spiciformis	11.6	6.5	27.3	—
Arnoglossum ovatum	11.6	9.7	18.2	—
Asclepias connivens	4.7	6.5	—	—
Asclepias lanceolata	18.6	16.1	27.3	—
Asclepias longifolia subsp. *longifolia*	9.3	12.9	—	—
Asclepias pedicellata	4.7	—	9.1	25.0
*Asclepias perennis**	2.3	—	9.1	—
Asclepias verticillata	20.9	22.6	18.2	—
Asimina reticulata	9.3	9.7	—	25.0
Aster adnatus	4.7	3.2	9.1	—
Aster concolor	2.3	3.2	—	—
Aster dumosus	69.8	67.7	54.5	75.0
*Aster elliottii**	2.3	—	9.1	—
Aster simmondsii	18.6	22.6	9.1	—
Aster subulatus	11.6	9.7	9.1	25.0
*Aster tenuifolius**	2.3	—	9.1	—
Aster tortifolius	2.3	3.2	—	—
Axonopus compressus	2.3	3.2	—	—
Axonopus fissifolius	25.6	25.8	18.2	25.0
Axonopus furcatus	69.8	80.6	27.3	50.0
Baccharis glomeruliflora	16.3	12.9	27.3	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Baccharis halimifolia	16.3	12.9	18.2	25.0
Bacopa caroliniana	30.2	25.8	18.2	75.0
Bacopa innominata	2.3	3.2	—	—
Bacopa monnieri	20.9	25.8	9.1	—
Bartonia virginica	2.3	—	9.1	—
*Berchemia scandens**	2.3	—	9.1	—
Bidens alba var. *radiata*	4.7	6.5	—	—
Bigelowia nudata subsp. *australis*	72.1	67.7	54.5	100.0
Blechnum serrulatum	9.3	—	36.4	—
Bletia purpurea	4.7	—	18.2	—
Boehmeria cylindrica	9.3	3.2	27.3	—
Boltonia diffusa	23.3	25.8	18.2	—
Buchnera americana	25.6	25.8	27.3	—
Burmannia biflora	2.3	—	9.1	—
Burmannia capitata	14.0	9.7	27.3	—
Callicarpa americana	9.3	9.7	9.1	—
Calopogon pallidus	7.0	3.2	18.2	—
Calopogon tuberosus	4.7	—	18.2	—
Campanula floridana	4.7	3.2	9.1	—
Caperonia castaneifolia	2.3	3.2	—	—
*Caperonia palustris**	2.3	—	9.1	—
Carex longii	2.3	3.2	—	—
Carex verrucosa	16.3	16.1	—	50.0
Carex vexans	7.0	3.2	18.2	—
Carphephorus carnosus	25.6	25.8	18.2	25.0
Carphephorus odoratissimus var. *subtropicanus*	4.7	—	18.2	—
Carphephorus paniculatus	7.0	3.2	18.2	—
Cassytha filiformis	18.6	3.2	63.6	—
Centella asiatica	86.0	87.1	72.7	50.0
Centrosema virginianum	9.3	9.7	9.1	—
Cephalanthus occidentalis	2.3	—	—	25.0
Chamaecrista fasciculata	16.3	12.9	27.3	—
Chamaecrista nictitans var. *aspera*	14.0	12.9	18.2	—
*Chamaesyce bombensis**	2.3	—	9.1	—
*Chamaesyce hyssopifolia**	2.3	—	9.1	—
Chaptalia tomentosa	60.5	64.5	45.5	25.0
Chiococca alba	2.3	—	9.1	—
Chiococca pinetorum	2.3	—	9.1	—
*Chrysopogon pauciflorus**	2.3	—	9.1	—
Chrysopsis mariana	4.7	6.5	—	—
Cirsium horridulum	9.3	9.7	9.1	—
Cirsium nuttallii	74.4	80.6	45.5	50.0
Cladium jamaicense	46.5	41.9	54.5	25.0
Clematis baldwinii	16.3	16.1	18.2	—
*Cnidoscolus stimulosus**	2.3	—	9.1	—
Coelorachis rugosa	30.2	25.8	27.3	50.0
Commelina diffusa var. *diffusa**	2.3	—	9.1	—
Commelina erecta	2.3	3.2	—	—
Conoclinium coelestinum	44.2	51.6	27.3	—
Coreopsis floridana	51.2	61.3	—	75.0
Coreopsis leavenworthii	53.5	54.8	54.5	—
Cornus foemina	2.3	3.2	—	—
Crinum americanum	2.3	—	9.1	—
Crotalaria rotundifolia	16.3	12.9	27.3	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
*Croton linearis**	2.3	—	9.1	—
Ctenium aromaticum	30.2	35.5	9.1	25.0
Cuphea carthagenensis	11.6	6.5	27.3	—
Cynanchum angustifolium	2.3	3.2	—	—
Cyperus compressus	2.3	3.2	—	—
Cyperus distinctus	2.3	—	9.1	—
Cyperus flavescens	7.0	6.5	9.1	—
Cyperus haspan	76.7	80.6	54.5	50.0
Cyperus ligularis	4.7	—	18.2	—
Cyperus odoratus	2.3	—	9.1	—
Cyperus ovatus	2.3	3.2	—	—
Cyperus polystachyos	67.4	74.2	45.5	25.0
Cyperus pumilus	2.3	3.2	—	—
Cyperus retrorsus	7.0	6.5	9.1	—
Cyperus surinamensis	9.3	6.5	18.2	—
Dalea carnea var. *albida*	20.9	22.6	18.2	—
Dalea carnea var. *carnea*	2.3	3.2	—	—
Desmodium incanum	14.0	6.5	36.4	—
*Desmodium marilandicum**	2.3	—	9.1	—
*Desmodium paniculatum**	2.3	—	9.1	—
*Desmodium triflorum**	2.3	—	9.1	—
Dichanthelium aciculare subsp. *neuranthum*	62.8	80.6	18.2	—
*Dichanthelium commutatum**	2.3	—	9.1	—
Dichanthelium dichotomum subsp. *nitidum*	34.9	41.9	18.2	—
Dichanthelium dichotomum subsp. *roanokense*	7.0	9.7	—	—
Dichanthelium dichotomum subsp. *yadkinense*	2.3	3.2	—	—
Dichanthelium ensifolium var. *ensifolium*	4.7	—	9.1	25.0
Dichanthelium ensifolium var. *unciphyllum*	4.7	6.5	—	—
Dichanthelium erectifolium	27.9	29.0	18.2	25.0
Dichanthelium laxiflorum	2.3	3.2	—	—
Dichanthelium leucothrix	20.9	25.8	9.1	—
*Dichanthelium ovale**	2.3	—	9.1	—
Dichanthelium portoricense	20.9	22.6	9.1	25.0
Dichanthelium scabriusculum	2.3	—	—	25.0
Dichanthelium strigosum var. *glabrescens*	65.1	67.7	45.5	50.0
Dichanthelium strigosum var. *strigosum*	2.3	3.2	—	—
Dichanthelium tenue	4.7	3.2	—	25.0
Digitaria filiformis	14.0	16.1	9.1	—
Digitaria texana	2.3	3.2	—	—
Digitaria villosa	4.7	6.5	—	—
Diodia teres	2.3	3.2	—	—
Diodia virginiana	65.1	77.4	18.2	50.0
Diospyros virginiana	11.6	12.9	9.1	—
Drosera brevifolia	18.6	16.1	18.2	25.0
Drosera capillaris	20.9	19.4	27.3	—
*Drymaria cordata**	2.3	—	9.1	—
Dyschoriste angusta	11.6	12.9	9.1	—
Dyschoriste humistrata	32.6	45.2	—	—
Dyschoriste oblongifolia	9.3	6.5	9.1	25.0
Eclipta prostrata	2.3	—	9.1	—
Eleocharis atropurpurea	11.6	12.9	9.1	—
Eleocharis baldwinii	4.7	3.2	—	25.0
*Eleocharis cellulosa**	2.3	—	9.1	—
Eleocharis flavescens	32.6	35.5	18.2	25.0

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Eleocharis geniculata	44.2	48.4	36.4	—
Eleocharis nigrescens	14.0	19.4	—	—
Eleocharis tuberculosa	2.3	—	—	25.0
Eleocharis vivipara	2.3	3.2	—	—
Elephantopus elatus	14.0	12.9	18.2	—
Elionurus tripsacoides	51.2	58.1	36.4	—
Elytraria caroliniensis var. *angustifolia*	14.0	—	54.5	—
Eragrostis atrovirens	32.6	38.7	18.2	—
Eragrostis elliottii	90.7	90.3	72.7	75.0
Erechtites hieracifolia	14.0	6.5	27.3	25.0
Erigeron quercifolius	34.9	41.9	18.2	—
Erigeron vernus	44.2	48.4	27.3	25.0
Eriocaulon compressum	7.0	3.2	18.2	—
Eriocaulon decangulare	48.8	41.9	36.4	100.0
Eriocaulon ravenelii	79.1	83.9	54.5	50.0
Eriochloa michauxii var. *michauxii*	30.2	22.6	36.4	50.0
Eryngium baldwinii	53.5	64.5	18.2	25.0
Eryngium yuccifolium var. *yuccifolium*	65.1	67.7	45.5	50.0
Eulophia alta	4.7	3.2	9.1	—
Eupatorium capillifolium	14.0	12.9	18.2	—
Eupatorium leptophyllum	14.0	3.2	45.5	—
Eupatorium mikanioides	16.3	6.5	36.4	25.0
Eupatorium mohrii	2.3	3.2	—	—
Eupatorium recurvans	18.6	12.9	27.3	25.0
Eupatorium rotundifolium	9.3	9.7	—	25.0
Euphorbia inundata var. *garrettii*	4.7	6.5	—	—
*Euphorbia polyphylla**	2.3	—	9.1	—
Eustachys glauca	23.3	19.4	18.2	50.0
Eustachys petraea	16.3	19.4	9.1	—
Euthamia graminifolia var. *hirtipes*	2.3	3.2	—	—
Euthamia tenuifolia	67.4	77.4	27.3	50.0
Evolvulus sericeus var. *sericeus*	20.9	19.4	27.3	—
Fimbristylis autumnalis	55.8	64.5	27.3	25.0
Fimbristylis caroliniana	44.2	58.1	—	25.0
Fimbristylis cymosa	4.7	6.5	—	—
Fimbristylis dichotoma	4.7	3.2	9.1	—
Fimbristylis puberula	2.3	3.2	—	—
Fimbristylis schoenoides	11.6	12.9	9.1	—
Fimbristylis spadicea	41.9	54.8	—	25.0
Flaveria floridana	2.3	—	9.1	—
Flaveria linearis	23.3	6.5	72.7	—
Fuirena breviseta	93.0	83.9	90.9	100.0
Fuirena longa	7.0	3.2	18.2	—
Fuirena scirpoidea	53.5	58.1	36.4	25.0
Galactia elliottii	34.9	32.3	18.2	75.0
Galactia parvifolia	2.3	3.2	—	—
*Galactia regularis**	2.3	—	9.1	—
*Galactia volubilis**	2.3	—	9.1	—
*Galium tinctorium**	2.3	—	9.1	—
Gaylussacia dumosa	2.3	3.2	—	—
Gaylussacia nana	2.3	3.2	—	—
*Gnaphalium falcatum**	2.3	—	9.1	—
Gratiola pilosa	18.6	22.6	—	25.0
Gratiola ramosa	37.2	35.5	9.1	100.0

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Gymnopogon brevifolius	14.0	16.1	—	25.0
Habenaria floribunda	4.7	—	18.2	—
Hedyotis corymbosa	2.3	3.2	—	—
Hedyotis procumbens	4.7	6.5	—	—
Hedyotis uniflora	32.6	41.9	9.1	—
Helenium pinnatifidum	67.4	64.5	63.6	50.0
Helianthus angustifolius	51.2	71.0	—	—
Helianthus radula	27.9	35.5	9.1	—
Heliotropium polyphyllum	46.5	51.6	36.4	—
Heteropogon contortus	2.3	—	9.1	—
*Hieracium megacephalon**	2.3	—	9.1	—
Hydrocotyle umbellata	9.3	3.2	27.3	—
Hydrolea corymbosa	18.6	9.7	18.2	75.0
Hymenocallis palmeri	18.6	12.9	36.4	—
Hypericum cf. limosum	7.0	—	9.1	50.0
Hypericum cistifolium	48.8	38.7	63.6	50.0
Hypericum crux-andreae	7.0	6.5	9.1	—
Hypericum edisonianum	4.7	6.5	—	—
Hypericum fasciculatum	37.2	38.7	36.4	—
Hypericum hypericoides	55.8	58.1	36.4	50.0
Hypericum mutilum	4.7	3.2	—	25.0
Hypericum myrtifolium	30.2	41.9	—	—
Hypericum tetrapetalum	30.2	25.8	36.4	25.0
Hypoxis juncea	30.2	22.6	45.5	25.0
Hypoxis wrightii	4.7	6.5	—	—
Hyptis alata	100.0	100.0	72.7	100.0
Hyptis mutabilis	2.3	3.2	—	—
Ilex cassine var. *cassine*	9.3	6.5	18.2	—
Ilex glabra	30.2	29.0	36.4	—
*Imperata brasiliensis**	2.3	—	9.1	—
Imperata cylindrica	4.7	3.2	9.1	—
*Ipomoea indica**	2.3	—	9.1	—
Ipomoea pandurata	2.3	3.2	—	—
Ipomoea sagittata	48.8	35.5	63.6	75.0
Iresine diffusa	2.3	—	9.1	—
Isoetes flaccida	2.3	3.2	—	—
Iva microcephala	53.5	58.1	27.3	50.0
Juncus dichotomus	2.3	3.2	—	—
Juncus effusus subsp. *solutus*	4.7	6.5	—	—
Juncus elliottii	2.3	3.2	—	—
Juncus marginatus var. *biflorus*	58.1	58.1	54.5	25.0
Juncus megacephalus	79.1	77.4	72.7	50.0
Juncus repens	2.3	3.2	—	—
Juncus scirpoides	14.0	12.9	18.2	—
Juncus sp. nov.*	2.3	—	9.1	—
Justicia angusta	18.6	19.4	18.2	—
Kosteletzkya virginica	9.3	6.5	18.2	—
Kyllinga brevifolia	7.0	—	27.3	—
Lachnanthes caroliniana	18.6	9.7	27.3	50.0
Lachnocaulon anceps	81.4	93.5	27.3	75.0
*Lantana depressa**	2.3	—	9.1	—
Lechea torreyi	4.7	6.5	—	—
Leersia hexandra	23.3	22.6	9.1	50.0
Liatris garberi	48.8	64.5	9.1	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Liatris gracilis	9.3	3.2	27.3	—
Liatris spicata var. *resinosa*	34.9	32.3	36.4	25.0
Lilium catesbaei	9.3	—	27.3	25.0
Lindernia anagallidea	4.7	6.5	—	—
Lindernia crustacea	11.6	6.5	27.3	—
Lindernia grandiflora	9.3	9.7	9.1	—
*Linum carteri**	2.3	—	9.1	—
Linum floridanum	2.3	—	9.1	—
Linum medium var. *texanum*	37.2	41.9	27.3	—
*Lipocarpha aristulata**	2.3	—	9.1	—
Lipocarpha maculata	11.6	16.1	—	—
Lipocarpha micrantha	2.3	3.2	—	—
Lobelia feayana	4.7	3.2	9.1	—
Lobelia glandulosa	55.8	45.2	72.7	50.0
Lobelia paludosa	18.6	16.1	27.3	—
Ludwigia alata	4.7	—	18.2	—
Ludwigia curtissii	48.8	64.5	—	25.0
Ludwigia leptocarpa	4.7	3.2	9.1	—
Ludwigia linearis	14.0	16.1	—	25.0
Ludwigia linifolia	4.7	3.2	9.1	—
Ludwigia maritima	44.2	51.6	18.2	25.0
Ludwigia microcarpa	86.0	87.1	81.8	25.0
Ludwigia octovalvis	4.7	—	18.2	—
Ludwigia peruviana	2.3	—	9.1	—
Ludwigia repens	7.0	3.2	18.2	—
Ludwigia suffruticosa	4.7	6.5	—	—
*Ludwigia virgata**	2.3	—	9.1	—
Lycopodiella alopecuroides	2.3	3.2	—	—
Lycopodiella appressa	4.7	—	18.2	—
Lycopus rubellus	2.3	—	—	25.0
Lyonia fruticosa	18.6	9.7	45.5	—
Lyonia lucida	4.7	—	18.2	—
Lythrum alatum var. *lanceolatum*	7.0	6.5	9.1	—
Magnolia virginiana	4.7	6.5	—	—
Marshallia tenuifolia	7.0	6.5	9.1	—
Mecardonia acuminata subsp. *peninsularis*	76.7	83.9	45.5	50.0
Melaleuca quinquenervia	11.6	—	45.5	—
Melanthera angustifolia	2.3	—	9.1	—
Melanthera nivea	18.6	16.1	27.3	—
Melochia spicata	11.6	—	45.5	—
Melothria pendula	4.7	—	18.2	—
Micranthemum glomeratum	2.3	—	9.1	—
*Mikania cordifolia**	2.3	—	9.1	—
Mikania scandens	18.6	6.5	36.4	50.0
Mimosa quadrivalvis var. *floridana*	4.7	6.5	—	—
Mitreola petiolata	20.9	12.9	45.5	—
Mitreola sessilifolia	65.1	67.7	54.5	25.0
Muhlenbergia sericea	97.7	96.8	81.8	75.0
Murdannia nudiflora	9.3	6.5	18.2	—
Myrica cerifera	97.7	96.8	81.8	75.0
Myrsine floridana	11.6	3.2	36.4	—
Nemastylis floridana	4.7	—	—	50.0
Nothoscordum bivalve	2.3	—	9.1	—
*Oplismenus hirtellus**	2.3	—	9.1	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Osmunda cinnamomea	2.3	—	—	25.0
Oxalis corniculata	11.6	12.9	9.1	—
Oxypolis filiformis	58.1	51.6	54.5	75.0
Panicum anceps	37.2	45.2	9.1	25.0
Panicum dichotomiflorum var. *bartowense*	7.0	—	27.3	—
Panicum dichotomiflorum var. *dichotomiflorum*	4.7	3.2	9.1	—
Panicum hemitomon	7.0	3.2	18.2	—
Panicum hians	76.7	83.9	45.5	50.0
Panicum longifolium	14.0	16.1	—	25.0
Panicum repens	11.6	12.9	9.1	—
Panicum rigidulum	58.1	61.3	36.4	50.0
Panicum tenerum	72.1	67.7	72.7	50.0
Panicum verrucosum	20.9	22.6	—	50.0
Panicum virgatum	23.3	9.7	36.4	75.0
*Parietaria praetermissa**	2.3	—	9.1	—
Parthenocissus quinquefolia	7.0	3.2	18.2	—
Paspalidium geminatum	4.7	6.5	—	—
*Paspalum blodgettii**	2.3	—	9.1	—
*Paspalum caespitosum**	2.3	—	9.1	—
Paspalum conjugatum	4.7	—	18.2	—
Paspalum floridanum	9.3	3.2	9.1	50.0
Paspalum laeve	9.3	9.7	—	25.0
Paspalum monostachyum	18.6	3.2	63.6	—
Paspalum notatum var. *saurae*	9.3	9.7	9.1	—
Paspalum praecox	41.9	45.2	9.1	75.0
Paspalum setaceum	27.9	32.3	9.1	25.0
Paspalum urvillei	2.3	3.2	—	—
Persea palustris	11.6	9.7	18.2	—
Phyla nodiflora	46.5	54.8	27.3	—
Phyllanthus caroliniensis subsp. *saxicola*	7.0	—	27.3	—
Phyllanthus urinaria	2.3	3.2	—	—
*Physalis angulata**	2.3	—	9.1	—
*Physalis pubescens**	2.3	—	9.1	—
Physalis walteri	11.6	12.9	9.1	—
Physostegia purpurea	25.6	16.1	54.5	—
Piloblephis rigida	9.3	3.2	27.3	—
Pinguicula caerulea	4.7	3.2	9.1	—
Pinguicula pumila	18.6	16.1	27.3	—
Pinus elliottii var. *densa*	46.5	25.8	81.8	75.0
Pinus elliottii var. *elliottii*	2.3	3.2	—	—
Pinus palustris	7.0	9.7	—	—
Piptochaetium avenacioides	23.3	29.0	—	25.0
Piriqueta caroliniana var. *caroliniana*	81.4	96.8	27.3	50.0
Pityopsis graminifolia	20.9	16.1	27.3	25.0
Platanthera nivea	2.3	—	9.1	—
Pluchea foetida	7.0	6.5	9.1	—
Pluchea odorata	7.0	6.5	9.1	—
Pluchea rosea	97.7	96.8	72.7	100.0
Pogonia ophioglossoides	2.3	—	9.1	—
Polygala balduinii	20.9	16.1	36.4	—
Polygala cruciata	11.6	9.7	18.2	—
Polygala cymosa	2.3	—	9.1	—
Polygala grandiflora var. *angustifolia*	72.1	77.4	63.6	—
Polygala incarnata	14.0	19.4	—	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Polygala lutea	9.3	3.2	27.3	—
Polygala ramosa	11.6	12.9	9.1	—
Polygala rugelii	4.7	3.2	9.1	—
Polygala setacea	7.0	3.2	18.2	—
*Polygonum hydropiperoides**	2.3	—	9.1	—
Polygonum punctatum	4.7	—	9.1	25.0
Polypremum procumbens	16.3	22.6	—	—
Pontederia cordata	4.7	3.2	—	25.0
Proserpinaca palustris	9.3	3.2	27.3	—
Proserpinaca pectinata	30.2	25.8	27.3	50.0
Prunus umbellata	2.3	3.2	—	—
*Psychotria nervosa**	2.3	—	9.1	—
Pteridium aquilinum var. *pseudocaudatum*	7.0	—	27.3	—
Pterocaulon pycnostachyum	27.9	22.6	36.4	25.0
Quercus laurifolia	14.0	16.1	9.1	—
Quercus minima	65.1	80.6	9.1	50.0
Quercus nigra	2.3	3.2	—	—
Quercus pumila	20.9	25.8	9.1	—
Quercus virginiana	20.9	22.6	9.1	25.0
Rhexia cubensis	9.3	9.7	9.1	—
Rhexia mariana	37.2	45.2	18.2	—
Rhexia nashii	2.3	3.2	—	—
Rhexia nuttallii	11.6	9.7	9.1	25.0
Rhexia petiolata	2.3	—	9.1	—
Rhus copallinum	27.9	29.0	27.3	—
*Rhynchosia minima**	2.3	—	9.1	—
*Rhynchosia reniformis**	2.3	—	9.1	—
Rhynchospora baldwinii	9.3	9.7	9.1	—
Rhynchospora breviseta	7.0	—	27.3	—
Rhynchospora chapmanii	4.7	3.2	9.1	—
Rhynchospora ciliaris	2.3	—	9.1	—
Rhynchospora colorata	95.3	87.1	100.0	75.0
*Rhynchospora corniculata**	2.3	—	9.1	—
Rhynchospora divergens	88.4	90.3	81.8	25.0
Rhynchospora eximia	4.7	6.5	—	—
Rhynchospora fascicularis var. *distans*	2.3	3.2	—	—
Rhynchospora fascicularis var. *fascicularis*	37.2	35.5	27.3	50.0
Rhynchospora filifolia	14.0	12.9	18.2	—
Rhynchospora globularis var. *recognita*	48.8	51.6	45.5	—
Rhynchospora harperi	2.3	—	9.1	—
Rhynchospora inundata	58.1	54.8	45.5	75.0
Rhynchospora latifolia	16.3	16.1	18.2	—
Rhynchospora microcarpa	93.0	80.6	100.0	100.0
Rhynchospora microcephala	4.7	6.5	—	—
Rhynchospora nitens	25.6	25.8	18.2	25.0
Rhynchospora odorata	30.2	12.9	63.6	50.0
Rhynchospora plumosa	2.3	3.2	—	—
Rhynchospora pusilla	7.0	6.5	9.1	—
Rhynchospora rariflora	7.0	3.2	18.2	—
Rhynchospora sulcata	2.3	3.2	—	—
Rhynchospora tracyi	32.6	22.6	63.6	—
Rhynchospora wrightiana	2.3	—	9.1	—
Rotala ramosior	9.3	3.2	18.2	25.0
Rubus cuneifolius	4.7	—	9.1	25.0

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Rubus trivialis	25.6	29.0	18.2	—
Rudbeckia hirta	51.2	51.6	54.5	—
Ruellia caroliniensis	9.3	—	36.4	—
Sabal palmetto	67.4	67.7	36.4	100.0
Sabatia bartramii	2.3	3.2	—	—
Sabatia brevifolia	4.7	3.2	9.1	—
Sabatia grandiflora	20.9	22.6	18.2	—
Sabatia stellaris	39.5	38.7	45.5	—
Saccharum giganteum	32.6	22.6	27.3	100.0
Sacciolepis indica	51.2	54.8	27.3	50.0
Sacciolepis striata	20.9	16.1	18.2	50.0
Sacoila lanceolata var. *lanceolata*	2.3	3.2	—	—
Sagittaria graminea var. *chapmanii*	16.3	16.1	9.1	25.0
Sagittaria lancifolia	4.7	3.2	9.1	—
Salvia lyrata	7.0	6.5	—	25.0
Samolus ebracteatus	16.3	3.2	54.5	—
Sarcostemma clausum	7.0	—	27.3	—
Sarracenia minor	4.7	6.5	—	—
Schinus terebinthifolius	4.7	—	18.2	—
Schizachyrium rhizomatum	88.4	87.1	72.7	75.0
*Schizachyrium sanguineum**	2.3	—	9.1	—
Schizachyrium stoloniferum	25.6	25.8	9.1	50.0
Schoenolirion albiflorum	11.6	3.2	36.4	—
Schoenus nigricans	20.9	—	81.8	—
Scleria baldwinii	20.9	12.9	45.5	—
Scleria ciliata	7.0	6.5	9.1	—
Scleria georgiana	37.2	38.7	36.4	—
Scleria hirtella	9.3	9.7	9.1	—
Scleria pauciflora	30.2	32.3	27.3	—
Scleria reticularis	86.0	87.1	63.6	75.0
Scleria triglomerata	2.3	—	—	25.0
Scleria verticillata	79.1	77.4	81.8	25.0
Scoparia dulcis	14.0	6.5	27.3	25.0
Scutellaria integrifolia	18.6	22.6	—	25.0
Serenoa repens	67.4	54.8	81.8	75.0
*Setaria corrugata**	2.3	—	9.1	—
Setaria parviflora	76.7	83.9	54.5	25.0
Sida acuta	2.3	—	9.1	—
Sida elliottii	2.3	—	9.1	—
Sideroxylon celastrinum	7.0	—	27.3	—
Sideroxylon reclinatum subsp. *reclinatum*	34.9	41.9	9.1	25.0
Sisyrinchium angustifolium	39.5	45.2	27.3	—
Smilax auriculata	11.6	9.7	18.2	—
Smilax bona-nox	7.0	6.5	9.1	—
*Smilax laurifolia**	2.3	—	9.1	—
Smilax walteri	2.3	3.2	—	—
Solidago fistulosa	18.6	16.1	27.3	—
*Solidago latissimifolia**	2.3	—	9.1	—
Solidago odora var. *chapmanii*	7.0	3.2	18.2	—
Solidago sempervirens	4.7	—	18.2	—
Solidago stricta	74.4	80.6	54.5	25.0
Solidago tortifolia	14.0	16.1	9.1	—
*Sonchus oleraceus**	2.3	—	9.1	—
Sorghastrum secundum	14.0	9.7	27.3	—

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
Scientific name	Total n = 43	SCP n = 31	SP n =11	CP n = 4
Spartina bakeri	51.2	51.6	27.3	75.0
Spermacoce assurgens	11.6	3.2	36.4	—
*Spermacoce prostrata**	2.3	—	9.1	—
Spermacoce verticillata	4.7	—	18.2	—
Spiranthes brevilabris var. *floridana*	2.3	3.2	—	—
Spiranthes laciniata	2.3	3.2	—	—
Spiranthes longilabris	2.3	—	9.1	—
Spiranthes odorata	2.3	3.2	—	—
Spiranthes praecox	2.3	3.2	—	—
Spiranthes vernalis	4.7	3.2	9.1	—
Sporobolus indicus var. *indicus*	4.7	3.2	9.1	—
Sporobolus jacquemontii	2.3	3.2	—	—
Sporobolus junceus	30.2	41.9	—	—
Stenandrium dulce var. *floridanum*	18.6	16.1	27.3	—
Stillingia aquatica	7.0	3.2	18.2	—
Stillingia sylvatica subsp. *sylvatica*	16.3	16.1	—	50.0
Stillingia sylvatica subsp. *tenuis*	65.1	80.6	27.3	—
Syngonanthus flavidulus	14.0	9.7	18.2	25.0
Taxodium ascendens	4.7	—	18.2	—
Tephrosia hispidula	2.3	—	—	25.0
Tephrosia rugelii	2.3	3.2	—	—
*Tephrosia spicata**	2.3	—	9.1	—
Teucrium canadense	11.6	6.5	9.1	50.0
Thelypteris kunthii	4.7	—	18.2	—
Thelypteris palustris var. *pubescens*	2.3	3.2	—	—
Toxicodendron radicans	14.0	9.7	27.3	—
*Triadenum virginicum**	2.3	—	9.1	—
Tridens flavus var. *flavus*	2.3	—	9.1	—
Tripsacum dactyloides	11.6	9.7	9.1	25.0
Urena lobata	11.6	6.5	27.3	—
Utricularia biflora	2.3	—	9.1	—
Utricularia cornuta	16.3	—	63.6	—
Utricularia gibba	2.3	—	9.1	—
Utricularia juncea	11.6	9.7	18.2	—
Utricularia purpurea	2.3	—	9.1	—
*Utricularia resupinata**	2.3	—	9.1	—
Utricularia simulans	25.6	25.8	27.3	—
Utricularia subulata	44.2	38.7	63.6	—
Vaccinium myrsinites	9.3	6.5	18.2	—
Verbesina virginica var. *laciniata*	7.0	6.5	9.1	—
Vernonia blodgettii	16.3	9.7	27.3	25.0
Viburnum obovatum	7.0	6.5	—	25.0
*Vicia acutifolia**	2.3	—	9.1	—
Vigna luteola	2.3	—	9.1	—
Viola lanceolata	32.6	38.7	18.2	—
Viola septemloba	18.6	25.8	—	—
Vitis aestivalis	7.0	6.5	9.1	—
Vitis rotundifolia var. *rotundifolia*	18.6	16.1	27.3	—
Vitis shuttleworthii	4.7	3.2	9.1	—
Woodwardia virginica	9.3	3.2	18.2	25.0
Xyris ambigua	46.5	41.9	36.4	75.0
Xyris brevifolia	7.0	3.2	9.1	25.0
Xyris calcicola	11.6	3.2	36.4	—
Xyris caroliniana	7.0	3.2	9.1	25.0

Appendix A. (Continued) Complete listing of calcareous flora (548 taxa). SCP = south-central Florida calcareous prairies/pinelands, (SP) = south Florida calcareous prairies/pinelands, (CP) = central calcareous prairies/pinelands. Asterisk (*) indicates the 54 taxa listed by Main and Barry (2001) that were absent from our lists.

	Relative frequency			
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Xyris elliottii	53.5	54.8	45.5	25.0
Xyris fimbriata	2.3	3.2	—	—
Xyris flabelliformis	34.9	32.3	27.3	50.0
Xyris floridana	53.5	51.6	36.4	75.0
Xyris jupicai	69.8	67.7	72.7	25.0
Xyris platylepis	16.3	12.9	—	75.0
Xyris serotina	2.3	3.2	—	—
Xyris smalliana	7.0	3.2	18.2	—
Total Taxa	548	412	422	168

Appendix B. Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Acalypha gracilens A. Gray	Three-seeded Mercury
Acer rubrum Linnaeus var. *trilobum* Torrey & A. Gray ex K. Koch	Southern Red Maple
Acmella oppositifolia (Lamarck) R. Jansen var. *repens* (Walter) R. Jansen	Button of Gold; Creeping Spotflower
Aeschynomene americana Linnaeus	American Joint-vetch; Shyleaf
Agalinis fasciculata (Elliott) Rafinesque	Beach False-foxglove
Agalinis harperi Pennell	St. Marks False-foxglove
Agalinis linifolia (Nuttall) Britton	Flax-leaf False-foxglove
Agalinis obtusifolia Rafinesque	Ten-lobe False-foxglove
Agalinis pinetorum Pennell	False-foxglove
Ageratina jucunda (E. Greene) Clewell & Wooten	Hammock Thoroughwort
Aletris lutea Small	Yellow Colic-root
Ambrosia artemisiifolia Linnaeus	Common or Annual Ragweed
Ammannia coccinea Rottboell	Scarlet or Purple Ammannia; Valley Redstem
Ammannia latifolia Linnaeus	Toothcups; Pink Ammannia; Pink Redstem
Ampelopsis arborea (Linnaeus) Koehne	Pepper-vine
Amphicarpum muhlenbergianum (Schultes) A. Hitchcock	Little Blue Maidencane
Andropogon brachystachyus Chapman	Short-spike Bluestem
Andropogon glomeratus (Walter) Britton et al. var. *glaucopsis* (Elliott) C. Mohr	Big Chalky Bluestem
Andropogon glomeratus (Walter) Britton et al. var. *hirsutior* (Hackel) C. Mohr	Hairy Bushy Bluestem
Andropogon glomeratus (Walter) Britton et al. var. *pumilus* (Vasey) Vasey ex L. Dewey	Big Bushy Bluestem
Andropogon gyrans Ashe var. *gyrans*	Elliott's Bluestem
Andropogon gyrans Ashe var. *stenophyllus* (Hackel) C. Campbell	Slim Bluestem
Andropogon longiberbis Hackel	Long-beard Bluestem
Andropogon ternarius Michaux var. *cabanisii* (Hackel) Fern. & Griscom	Silver Bluestem
Andropogon virginicus Linnaeus var. *decipiens* C. Campbell	Broomsedge
Andropogon virginicus Linnaeus var. *glaucus* Hackel	Little Chalky Bluestem
Andropogon virginicus Linnaeus var. *virginicus*	Broomsedge
Aristida beyrichiana Trinius & Ruprecht	Wiregrass; Pineland Three-awn Grass
Aristida palustris (Chapman) Vasey	Long-leaf Three-awn Grass
Aristida patula Chapman ex Nash	Tall Threeawn; Tall Wiregrass
Aristida purpurascens Poiret var. *purpurascens*	Slim-spike Three-awn Grass
Aristida purpurascens Poiret var. *tenuispica* (A. Hitchcock) Allred	Hillsboro Three-awn Grass
Aristida rhizomophora Swallen	Rhizomatous or Florida Three-awn Grass
Aristida spiciformis Elliott	Bottlebrush or Pinebarren Threeawn
Arnoglossum ovatum (Walter) H. Robinson	Egg-leaf Indian-plantain
Asclepias connivens Baldwin	Large-flower Milkweed
*Asclepias lanceolat*a Walter	Few-flower Milkweed
Asclepias longifolia Michaux subsp. *longifolia*	Long-leaf Milkweed
Asclepias pedicellata Walter	Savannah Milkweed

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Asclepias perennis Walter	Aquatic Milkweed
Asclepias verticillata Linnaeus	Whorled Milkweed
Asimina reticulata Shuttleworth ex Chapman	Reticulate or Netted Pawpaw
Aster adnatus Nuttall	Scale-leaf Aster
Aster concolor Linnaeus	Eastern Silver Aster
Aster dumosus Linnaeus	Bush Aster
Aster elliottii Torrey & A. Gray	Elliott's Aster
Aster simmondsii Small	Simmons' aster
Aster subulatus Michaux	Annual Saltmarsh Aster
Aster tenuifolius Linnaeus	Perennial Saltmarsh Aster
Aster tortifolius Michaux	White-topped Aster
Axonopus compressus (Swartz) Palisot de Beauvois	Tropical or Flat-joint Carpetgrass
Axonopus fissifolius (Raddi) Kuhlmann	Common or Southern Carpetgrass
Axonopus furcatus (Flugge) A. Hitchcock	Big Carpetgrass
Baccharis glomeruliflora Persoon	Groundsel Tree; Silverling
Baccharis halimifolia Linnaeus	Groundsel Tree
Bacopa caroliniana (Walter) Robinson	Carolina or Blue Water-hyssop
Bacopa innominata (Gomez de la Maza y Jimenez) Alain	Tropical Water-hyssop
Bacopa monnieri (Linnaeus) Pennell	Coastal Water-hyssop
Bartonia virginica (Linnaeus) Britton et al.	Yellow Screwstem
Berchemia scandens (Hill) K. Koch	Rattan Vine; Alabama Supple-jack
Bidens alba (Linnaeus) de Candolle var. *radiata* (Schultz Bipontinus) Ballard ex Melchert	Common Begger-ticks
Bigelowia nudata (Michaux) de Candolle subsp. *australis* L. C. Anderson	South Florida Rayless-goldenrod
Blechnum serrulatum L. Richard	Toothed Mid-sorus Fern
Bletia purpurea (Lamarck) de Candolle	Pine-pink
Boehmeria cylindrica (Linnaeus) Swartz	Small-spike False-nettle; Bog Hemp
Boltonia diffusa Elliott	FalseAster; Small-head Doll's Daisy; Saltmarsh Boltonia
Buchnera americana Linnaeus	American Blueheart(s)
Burmannia biflora Linnaeus	Northern Burmannia; Northern Bluethreads
Burmannia capitata (J. F. Gmelin) Martius	Southern Bluethreads
Callicarpa americana Linnaeus	Beautybush; American Beauty-berry
Calopogon pallidus Chapman	Pale grass-pink
Calopogon tuberosus (Linnaeus) Britton et al.	Tuberous Grass-pink
Campanula floridana S. Watson ex A. Gray	Florida Bellflower
Caperonia castaneifolia (Linnaeus) A. Saint-Hilaire	Tropical Caperonia
Caperonia palustris (Linnaeus) A. Saint-Hilaire	Marsh Caperonia; Sacatrapo
Carex longii Mackenzie	Greenish-white Sedge
Carex verrucosa Muhlenberg	Warty Sedge
Carex vexans F. J. Hermann	Confusing or Florida Hammock Sedge
Carphephorus carnosus (Small) James	Pineland Chaffhead
Carphephorus odoratissimus (J.F. Gmelin) Herbert var. *subtropicanus* (DeLaney et al.) Wunderlin & B.F.Hansen	Pineland Purple
Carphephorus paniculatus (J. F. Gmelin) Herbert	Hairy Chaffhead
Cassytha filiformis Linnaeus	Fine-stem Love Vine; Devil's-gut
Centella asiatica (Linnaeus) Urban	Coinwort; Asian Coinleaf; Spade-leaf
Centrosema virginianum (Linnaeus) Bentham	Spurred Butterfly-pea
Cephalanthus occidentalis Linnaeus	Common Buttonbush
Chamaecrista fasciculata (Michaux) E. Greene	Partridge Pea
Chamaecrista nictitans (Linnaeus) Moench var. *aspera* (Muhlenberg ex Elliott) Irwin & Barneby	Wild Sensitive Plant
Chamaesyce bombensis (Jacquin) Dugand	Sand-dune Spurge
Chamaesyce hyssopifolia (Linnaeus) Small	Hyssop-leaf Broomspurge; Eyebane; H.-l. Sandmat
Chaptalia tomentosa Ventenat	Pineland Daisy; Woolly Sunbonnets
Chiococca alba (Linnaeus) A. Hitchcock	Snowberry; West Indies Milkberry
Chiococca pinetorum Britton	Snowberry
Chrysopogon pauciflorus (Chapman) Bentham ex Vasey	Florida Raphis
Chrysopsis mariana (Linnaeus) Elliott	Maryland Golden-aster
Cirsium horridulum Michaux	Yellow or Horrid Thistle
Cirsium nuttallii de Candolle	Nuttall's Thistle
Cladium jamaicense Crantz	Jamaica Sawgrass
Clematis baldwinii Torrey & A. Gray	Pine-hyacinth
Cnidoscolus stimulosus (Michaux) Engelmann & A. Gray	Tread Softly; Stinging or Spurge Nettle; Finger-rot
Coelorachis rugosa (Nuttall) Nash	Wrinkled Jointgrass; Wrinkled Jointtail
Commelina diffusa Burman f. var. *diffusa*	Speading Day-flower

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Commelina erecta Linnaeus	Day-flower
Conoclinium coelestinum (Linnaeus) de Candolle	Blue Mistflower
Coreopsis floridana E. B. Smith	Florida Tickseed
Coreopsis leavenworthii Torrey & A. Gray	Leavenworth's Tickseed
Cornus foemina Miller	Swamp Dogwood
Crinum americanum Linnaeus	String-lily; Southern Swamplily; Seven Sisters
Crotalaria rotundifolia J. F. Gmelin	Rabbit-bells; Prostrate Rattle-box
Croton linearis Jacquin	Pineland Croton
Ctenium aromaticum (Walter) Alph. Wood	Toothachegrass
Cuphea carthagenensis (Jacquin) Macbride	Columbia Waxweed
Cynanchum angustifolium Persoon	Gulf coast Swallow-wort
Cyperus compressus Linnaeus	Poorland Flatsedge
Cyperus distinctus Steudel	Marshland Flatsedge
Cyperus flavescens Linnaeus	Yellow Flatsedge
Cyperus haspan Linnaeus	Sheathed Flatsedge
Cyperus ligularis Linnaeus	Alabama Swamp Flatsedge
Cyperus odoratus Linnaeus	Rusty Flatsedge
Cyperus ovatus Baldwin	Flatsedge
Cyperus polystachyos Rottboell	Texas Sedge; Many-spike Flatsedge
Cyperus pumilus Linnaeus	Low Flatsedge
Cyperus retrorsus Chapman	Retorse or Pine-barren Flatsedge; Galingale
Cyperus surinamensis Rottboell	Tropical Flatsedge
Dalea carnea (Michaux) Poiret var. *albida* (Torrey & A. Gray) Barneby	White Prairie-clover
Dalea carnea (Michaux) Poiret var. *carnea*	Hammock Prairie-clover; Whitetassels
Desmodium incanum de Candolle	Beggar's Lice; Creeping Beggerweed; Zarzabacoa Comun
Desmodium marilandicum (Linnaeus) de Candolle	Beggar's Lice; Small Smooth-leaf Tick-trefoil
Desmodium paniculatum (Linnaeus) de Candolle	Narrow-leaf or Panicled Tick-trefoil
Desmodium triflorum (Linnaeus) de Candolle	Three-flower Tick-trefoil
Dichanthelium aciculare (Desvaux ex Poiret) Gould & C.A.Clark subsp. *neuranthum* (Griseb.) Freckmann & Lelong	Panic Grass
Dichanthelium commutatum (Schultes) Gould	Variable Witchgrass; Panic Grass
Dichanthelium dichotomum (Linnaeus) Gould subsp. *nitidum* (Lamarck) LeBlond	Cypress Witchgrass; Panic Grass
Dichanthelium dichotomum (Linnaeus) Gould subsp. *roanokense* (Ashe) Freckmann & Lelong	Cypress Witchgrass; Panic Grass
Dichanthelium dichotomum (Linnaeus) Gould subsp. *yadkinense* (Ashe) Freckmann & Lelong	Cypress Witchgrass; Panic Grass
Dichanthelium ensifolium (Baldwin ex Elliott) Gould var. *ensifolium*	Panic Grass
Dichanthelium ensifolium (Baldwin ex Elliott) Gould var. *unciphyllum* (Trinius) B. F. Hansen & Wunderlin	Panic Grass
Dichanthelium erectifolium (Nash) Gould & C. A. Clark	Erect-leaf Witchgrass
Dichanthelium laxiflorum (Lamarck) Gould	Lax-flower Witchgrass; Panic Grass
Dichanthelium leucothrix (Nash) Freckmann	Panic Grass
Dichanthelium ovale (Elliott) Gould & C. A. Clark	Panic Grass; Egg-leaf Witchgrass
Dichanthelium portoricense (Desvaux ex Hamilton) B. F. Hansen & Wunderlin	Hemlock Witchgrass
Dichanthelium scabriusculum (Elliott) Gould & C. A. Clark	Woolly Panic Grass
Dichanthelium strigosum (Muhlenberg ex Elliott) Freckmann var. *glabrescens* (Grisebach) Freckmann	Panic Grass
Dichanthelium strigosum (Muhlenberg ex Elliott) Freckmann var. *strigosum*	Rough-hair Witchgrass
Dichanthelium tenue (Muhlenberg) Freckmann & Lelong	Panic Grass
Digitaria filiformis (Linnaeus) Koeler	Slender Crabgrass
Digitaria texana A. Hitchcock	Texas Crabgrass
Diodia teres Walter	Poor Joe; Rough Button-weed
Diodia virginiana Linnaeus	Viginia Buttonweed
Diospyros virginiana Linnaeus	Common Persimmon
Drosera brevifolia Pursh	Dwarf Sundew
Drosera capillaris Poiret	Pink Sundew
Drymaria cordata (Linnaeus) Willdenow ex Schultes	West Indian Chickweed; West Indian Drymary
Dyschoriste angusta (A. Gray) Small	Pineland Dyschoriste
Dyschoriste humistrata (Michaux) Kuntze	Twinflower; Swamp Dyschoriste; Swamp Snakeherb
Dyschoriste oblongifolia (Michaux) Kuntze	Twinflower; Oblong-leaf Snakeherb
Eclipta prostrata (Linnaeus) Linnaeus	Yerba de Tajo; False Daisy
Eleocharis atropurpurea (Retzius) J. Presl & C. Presl	Purple Spikerush
Eleocharis baldwinii (Torrey) Chapman	Roadgrass; Baldwin's Spikerush
Eleocharis cellulosa Torrey	Gulf Coast Spikerush

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Eleocharis flavescens (Poiret) Urban	Pale Spikerush
Eleocharis geniculata (Linnaeus) Roemer & Schultes	Capitate or Clustered Spikerush
Eleocharis nigrescens (C. Nees von Esenbeck) Steudel	Small-flower Spikerush
Eleocharis tuberculosa (Michaux) Roemer & Schultes	Long-tubercle Spikerush
Eleocharis vivipara Link	Viviparous Spikerush
Elephantopus elatus Bertoloni	Florida ot Tall Elephant's-foot
Elionurus tripsacoides Humboldt & Bonpland ex Willdenow	Pan-american Balsamscale
Elytraria caroliniensis (J. F. Gmelin) Persoon var. *angustifolia* (Fernald) Blake	Narrow-leaved Scaly-stem
Eragrostis atrovirens (Desfontaines) Trinius ex Steudel	Thalia Lovegrass
Eragrostis elliottii S. Watson	Elliott('s) Lovegrass
Erechtites hieracifolia (Linnaeus) Rafinesque ex de Candolle	Fireweed; American Burn
Erigeron quercifolius Lamarck	Southern or Oakleaf Fleabane
Erigeron vernus (Linnaeus) Torrey & A. Gray	Daisy or Early White-top Fleabane
Eriocaulon compressum Lamarck	Flattened Pipewort
Eriocaulon decangulare Linnaeus	Ten-angle Pipewort
Eriocaulon ravenelii Chapman	Ravenel's Pipewort
Eriochloa michauxii (Poiret) A. Hitchcock var. *michauxii*	Longleaf Cupgrass
Eryngium baldwinii Sprengel	Baldwin's Coyote Thistle
Eryngium yuccifolium Michaux var. *yuccifolium*	Rattlesnake-master; Button Snakeroot
Eulophia alta (Linnaeus) Fawcett & Rendle	Wild Coco
Eupatorium capillifolium (Lamarck) Small	Small Dog-fennel Thorough-wort; Dog Fennel
Eupatorium leptophyllum de Candolle	Marsh Fennel
Eupatorium mikanioides Chapman	Semaphore Eupatorium; Semaphore Thoroughwort
Eupatorium mohrii E. Greene	Dog-fennel; Pale Boneset; Mohr's Thoroughwort
Eupatorium recurvans Small	Coastal Plain Thoroughwort
Eupatorium rotundifolium Linnaeus	False Horehound; Round-leaf Thorough-wort
Euphorbia inundata Torrey ex Chapman var. *garrettii* E. Bridges & Orzell	South Florida Pine Spurge
Euphorbia polyphylla Engelmann ex Chapman	Lesser Florida Spurge
Eustachys glauca Chapman	Saltmarsh Fingergrass
Eustachys petraea (Swartz) Desvaux	Pinewoods Fingergrass
Euthamia graminifolia (Linnaeus) Nuttall var. *hirtipes* (Femald) C. Taylor & R. J. Taylor	Bushy Fragrant or Bushy Grassleaf Goldenrod
Euthamia tenuifolia (Pursh) E. Greene	Slender Fragrant or Flat-topped Goldenrod
Evolvulus sericeus Swartz var. *sericeus*	Creeping Morning-glories; Silky False-moring-glory
Fimbristylis autumnalis (Linnaeus) Roemer & Schultes	Slender Fimbry
Fimbristylis caroliniana (Lamarck) Fernald	Carolina Fimbry; Fringe-rush
Fimbristylis cymosa R. Brown	Hurricane-grass
Fimbristylis dichotoma (Linnaeus) Vahl	Tall or Annual or Woolly Fimbry
Fimbristylis puberula (Michaux) Vahl	Vahl's Hairy Fimbry
Fimbristylis schoenoides (Retzius) Vahl	Ditch Fimbry
Fimbristylis spadicea (Linnaeus) Vahl	Marsh Fimbry
Flaveria floridana J. Johnston	Florida Flaveria; Florida Yellowtops
Flaveria linearis Lagasca	Florida Flaveria; Narrow-leaf Yellowtops
Fuirena breviseta (Coville) Coville	Saltmarsh Umbrella-sedge
Fuirena longa Chapman	Coastal Plain Umbrella-sedge
Fuirena scirpoidea Michaux	Southern Umbrella-sedge
Galactia elliottii Nuttall	Elliott's Milk-pea
Galactia parvifolia A. Richard	Milk-pea
Galactia regularis (Linnaeus) Britton et al.	Eastern or Florida Milk-pea
Galactia volubilis (Linnaeus) Britton	Downy Milk-pea
Galium tinctorium Linnaeus	Stiff Marsh Bedstraw
Gaylussacia dumosa (Andrews) Torrey & A. Gray	Dwarf Huckleberry
Gaylussacia nana (A. Gray) Small	Dangleberry; Creeping Huckleberry
Gnaphalium falcatum Lamarck	Cudweed; Narrow-leaf Purple Everlasting
Gratiola pilosa Michaux	Shaggy Hedge-hyssop
Gratiola ramosa Walter	Branching Hedge-hyssop
Gymnopogon brevifolius Trinius	Slim or Shortleaf Skeletongrass
Habenaria floribunda Lindley	Toothed Habenaria
Hedyotis corymbosa (Linnaeus) Lamarck	Flat-top Bluet
Hedyotis procumbens (J. F. Gmelin) Fosberg	Innocence; Round-leaf Bluet
Hedyotis uniflora (Linnaeus) Lamarck	Flat-top Bluet; Clustered Bluet
Helenium pinnatifidum (Nuttall) Rydberg	Southeastern Sneezeweed
Helianthus angustifolius Linnaeus	Swamp Sunflower
Helianthus radula (Pursh) Torrey & A. Gray	Rayless or Pineland Sunflower
Heliotropium polyphyllum Lehmann	Pineland or Seaside Heliotrope

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Heteropogon contortus (Linnaeus) Palisot de Beauvois ex Roemer & Schultes	Twisted Tanglehead
Hieracium megacephalon Nash	Hawk's Beard; Coastal-plain Hawkweed
Hydrocotyle umbellata Linnaeus	Marsh or Many-flower Pennywort
Hydrolea corymbosa Macbride ex Elliott	Sky-flower; Corymb False-fiddleleaf
Hymenocallis palmeri S. Watson	Alligator-lily
Hypericum cf. *limosum* Grisebach	Cuban St. John's-wort
Hypericum cistifolium Lamarck	Round-pod St. John's-wort
Hypericum crux-andreae (Linnaeus) Crantz	St.Peter's-wort; Saint Andrew's-cross;St.John's Wort
Hypericum edisonianum (Small) W. Adams & Robson	Edison's St. John's-wort; Edison's Ascyrum
Hypericum fasciculatum Lamarck	Sandweed or Swampy or Peel-bark St. John's-wort
Hypericum hypericoides (Linnaeus) Crantz	St. Andrew's Cross; Edison's St. John's-wort
Hypericum mutilum Linnaeus	Dwarf or Slender St. John's-wort
Hypericum myrtifolium Lamarck	Myrtle-leaf St. John's-wort
Hypericum tetrapetalum Lamarck	Four-petal St. John's-wort; St. Andrew's Cross
Hypoxis juncea J. E. Smith	Fringed Yellow or Common Stargrass
Hypoxis wrightii (Baker) Brackett	Stargrass
Hyptis alata (Rafinesque) Shinners	Musky Mint; Cluster Bushmint
Hyptis mutabilis (A. Richard) Briquet	Tropical Bushmint
Ilex cassine Linnaeus var. *cassine*	Dahoon Holly; Dahoon
Ilex glabra (Linnaeus) A. Gray	Inkberry; Gallberry
Imperata brasiliensis Trinius	Cogongrass; Brazilian Satintail
Imperata cylindrica (Linnaeus) Palisot de Beauvois	Cogongrass
Ipomoea indica (Burman f.) Merrill	Ocean-blue Morning-glory
Ipomoea pandurata (Linnaeus) G. Meyer	Wild Potato Vine; Morning-glory; Man-of-the-earth
Ipomoea sagittata Poiret	Saltmarsh or Glade Morning-glory
Iresine diffusa Humboldt & Bonpland ex Willdenow	Bloodleaf; Juba's Bush
Isoetes flaccida Shuttleworth ex A. Braun	Florida or Southern Quillwort
Iva microcephala Nuttall	Piedmont Sumpweed; Piedmont Marsh-elder
Juncus dichotomus Elliott	Two-parted or Forked Rush
Juncus effusus Linnaeus subsp. *solutus* (Fernald & Wiegand) Hamet-Ahti	Soft or Lamp Rush
Juncus elliottii Chapman	Bog Rush
Juncus marginatus Rostkov var. *biflorus* Wood	Shore or Grass-leaf Rush
Juncus megacephalus M. Curtis	Large-headed or Big-headed Rush
Juncus repens Michaux	Lesser Creeping Rush
Juncus scirpoides Lamarck	Needle-pod Rush
Juncus sp. nov, Bridges and Orzell, ined.	Florida Septate Rush
Justicia angusta (Chapman) Small	Everglades or Pineland Water-willow
Kosteletzkya virginica (Linnaeus) C. Presl ex A. Gray	Virginia Saltmarsh Mallow; Virginia Fen-rose
Kyllinga brevifolia Rottboell	Short-leaf Flatsedge
Lachnanthes caroliniana (Lamarck) Dandy	Bloodroot; Carolina Redroot
Lachnocaulon anceps (Walter) Morong	White-head Bog-buttons
Lantana depressa Small	Florida Lantana
Lechea torreyi Leggett ex Britton	Piedmont Pinweed
Leersia hexandra Swartz	Southern or Clubhead Cutgrass
Liatris garberi A. Gray	Garber's Gayfeather
Liatris gracilis Pursh	Blazing-star; Slender Gayfeather
Liatris spicata (Linnaeus) Willdenow var. *resinosa* (Nuttall) Voss	Spiked Gayfeather
Lilium catesbaei Walter	Catesby's or Pine or Southern Red Lily
Lindernia anagallidea (Michaux) Pennell	False-pimpernel
Lindernia crustacea (Linnaeus) F. Mueller	Malayan False-pimpernel
Lindernia grandiflora Nuttall	Savannah False-pimpernel
Linum carteri Small	Carter's Flax
Linum floridanum (Planchon) Trelease	Florida Yellow Flax
Linum medium (Planchon) Britton var. *texanum* (Planchon) Fernald	Stiff Yellow Flax
Lipocarpha aristulata (Coville) G. Tucker	Awned or Small-headed Hemicarpha; S.-h. Lipocarpa
Lipocarpha maculata (Michaux) Torrey	American Lipocarpha
Lipocarpha micrantha (Vahl) G. Tucker	Dwarf-bullrush; Small-flower Halfchaffseed
Lobelia feayana A. Gray	Bay Lobelia
Lobelia glandulosa Walter	Glandular or Glade Lobelia
Lobelia paludosa Nuttall	White Lobelia
Ludwigia alata Elliott	Winged Seedbox; Winged Primrose-willow
Ludwigia curtissii Chapman	Curtiss' Seedbox; Curtiss' Primrose-willow
Ludwigia leptocarpa (Nuttall) Hara	River Seedbox; River Primrose-willow
Ludwigia linearis Walter	Narrow-leaf Seedbox
Ludwigia linifolia Poiret	Southeastern Seedbox; Southeastern Primrose-willow

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Ludwigia maritima F. Harper	Seaside Primrose-willow; Seaside Seedbox
Ludwigia microcarpa Michaux	Small-fruit Seedbox; Small-fruit Primrose-willow
Ludwigia octovalvis (Jacquin) Raven	Mexican Seedbox; Mexican Primrose-willow
Ludwigia peruviana (Linnaeus) Hara	Peruvian Primrose-willow
Ludwigia repens Forster	Water Primrose; Creeping Seedbox
Ludwigia suffruticosa Walter	Shrubby Seedbox; Shrubby Primrose-willow
Ludwigia virgata Michaux	Savanna Seedbox; Savannah Primrose-willow
Lycopodiella alopecuroides (Linnaeus) Cranfill	Foxtail Clubmoss
Lycopodiella appressa (Chapman) Cranfill	Southern Clubmoss
Lycopus rubellus Moench	Taper-leaf Water Hoarhound
Lyonia fruticosa (Michaux) G. Torrey	Coastal-plain Staggerbush
Lyonia lucida (Lamarck) K. Koch	Fetterbush; Shinyleaf
Lythrum alatum Pursh var. *lanceolatum* (Elliott) Torrey & A. Gray ex Rothrock	Wing(ed)(-angle) Loosestrife
Magnolia virginiana Linnaeus	Sweet Bay; Sweetbay Magnolia
Marshallia tenuifolia Rafinesque	Slim-leaf Barbara's Buttons
Mecardonia acuminata (Walter) Small subsp. *peninsularis* (Pennell) Rossow	Axilflower
Melaleuca quinquenervia (Cavanilles) Blake	Punk Tree; Cajeput; Melaleuca
Melanthera angustifolia A. Richard	Snow Squarestem
Melanthera nivea (Linnaeus) Small	Snow Squarestem; Cat-tongue
Melochia spicata (Linnaeus) Fryxell	Hairy Chocolate-weed
Melothria pendula Linnaeus	Creeping Cucumber; Guadeloupe-cucumber
Micranthemum glomeratum (Chapman) Shinners	Manatee Mudflower
Mikania cordifolia (Linnaeus f.) Willdenow	Florida Keys Hempweed; Florida Key Hempvine
Mikania scandens (Linnaeus) Willdenow	Climbing Hempweed; Climbing Hempvine
Mimosa quadrivalvis Linnaeus var. *floridana* (Chapm.) Barneby	Florida Sensitive Brier
Mitreola petiolata (J. F. Gmelin) Torrey & A. Gray	Miterwort; Lax Hornpod
Mitreola sessilifolia (J. F. Gmelin) G. Don	Miterwort; Swamp Hornpod
Muhlenbergia sericea (Michaux) P.M.Peterson	Muhly Grass
Murdannia nudiflora (Linnaeus) Brenan	Naked-stem Dewflower
Myrica cerifera Linnaeus	Wax Myrtle; Southern Bayberry
Myrsine floridana A. DC.	Florida Myrsine
Nemastylis floridana Small	Fall-flowering Ixia; F-flw.Pleatleaf
Nothoscordum bivalve (Linnaeus) Britton	False Garlic; Crowpoison
Oplismenus hirtellus (Linnaeus) Beauv.	Wood(s)grass; Short-leaf Basketgrass
Osmunda cinnamomea Linnaeus	Cinnamon Fern
Oxalis corniculata Linnaeus	Yellow Wood Sorrel
Oxypolis filiformis (Walter) Britton	Water Dropwort; Water Cowbane
Panicum anceps Michaux	Beaked Panicum; Beaked Panic Grass
Panicum dichotomiflorum Michaux var. *bartowense* (Lamson-Scribner & Merrill) Fernald	Bartrow Panicum; Bartow's Panic Grass
Panicum dichotomiflorum Michaux var. *dichotomiflorum*	Fall Panic Grass; Fall Panicum
Panicum hemitomon Schultes	Maidencane
Panicum hians Elliott	Gaping Panic Grass
Panicum longifolium Torrey	Panic Grass
Panicum repens Linnaeus	Torpedo Grass
Panicum rigidulum Bosc ex C. Nees von Esenbeck	Redtop Panicum; Redtop Panic Grass
Panicum tenerum Beyrich ex Trinius	Bluejoint or Southeastern Panicum
Panicum verrucosum Muhlenberg	Warty Panicum; Warty Panic Grass
Panicum virgatum Linnaeus	Switchgrass; Wand-shape Panicum
Parietaria praetermissa Hinton	Pellitory; Clustered Pellitory-of-the-wall
Parthenocissus quinquefolia (Linnaeus) Planchon	Virginia Creeper; Woodbine
Paspalidium geminatum (Forsskal) Stapf	Egyptian Paspalidium; Egyptian Watercrowngrass
Paspalum blodgettii Chapman	Coral or Blodgett's Paspalum
Paspalum caespitosum Flugge	Blue Paspalum; Blue Crowngrass
Paspalum conjugatum Bergius	Sour Paspalum; Sour Crowngrass
Paspalum floridanum Michaux	Florida or Giant Paspalum; Florida Crowngrass
Paspalum laeve Michaux	Field Paspalum; Field Crowngrass
Paspalum monostachyum Vasey	Gulfdune Paspalum
Paspalum notatum Flugge var. *saurae* Parodi	Bahiagrass
Paspalum praecox Walter	Early Paspalum; Early Crowngrass
Paspalum setaceum Michaux	Thin Paspalum; Slender Crowngrass
Paspalum urvillei Steudel	Vaseygrass
Persea palustris (Rafinesque) Sargent	Swamp Bay: Swamp Red-bay
Phyla nodiflora (Linnaeus) E. Greene	Common Frog-fruit; Carpetweed; Turkey-tange
Phyllanthus caroliniensis Walter subsp. *saxicola* (Small) Webster	Southern Carolina Leaf-flower

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Phyllanthus urinaria Linnaeus	Peewater Leaf-flower; Chamber-bitter
Physalis angulata Linnaeus	Cut-leaf Ground-cherry
Physalis pubescens Linnaeus	Low Hairy Ground-cherry
Physalis walteri Nuttall	Starry-hair Ground-cherry
Physostegia purpurea (Walter) Blake	Purple Dragon-head;Eastern Purple False Dragonhead
Piloblephis rigida (Bartram ex Bentham) Rafinesque	Wild Pennyroyal
Pinguicula caerulea Walter	Blue(-flower) Butterwort
Pinguicula pumila Michaux	Small Butterwort
Pinus elliottii Engelmann var. *densa* Little & Dorman	South Florida Slash Pine
Pinus elliottii Engelmann var. *elliottii*	Slash Pine
Pinus palustris Miller	Longleaf Pine
Piptochaetium avenacioides (Nash) Valencias & Costas	Florida Needle Grass
Piriqueta caroliniana (Walter) Urban var. *caroliniana*	Piriqueta; Carolina Stripeseed
Pityopsis graminifolia (Michaux) Nuttall	Golden Aster; Coastal-plain Silkgrass
Platanthera nivea (Nuttall) Luer	Snowy or Snow Orchid; Bog Torch
Pluchea foetida (Linnaeus) de Candolle	White or Marsh Fleabane; Stinking Camphor-weed
Pluchea odorata (Linnaeus) Cassini	Saltmarsh Fleabane; Shrubby Camphorweed
Pluchea rosea Godfrey	Godfrey's Fleabane; Rosy Camphor-weed
Pogonia ophioglossoides (Linnaeus) Ker-Gawler	Rose Pogonia; Snake-mouth Orchid
Polygala balduinii Nuttall	Batchelor's Button; Baldwin's Milkwort
Polygala cruciata Linnaeus	Cross-leaf Milkwort; Drumheads
Polygala cymosa Walter	Tall Pine-barren Milkwort
Polygala grandiflora Walter var. *angustifolia* T. & G.	Showy Milkwort; Candyroot; Dense-flower Smartweed
Polygala incarnata Linnaeus	Procession Flower; Pink Milkwort
Polygala lutea Linnaeus	Wild Batchelor's Button; Orange Milkwort
Polygala ramosa Elliott	Low Pine-barren Milkwort
Polygala rugelii Shuttleworth ex Chapman	Yellow Batchelor's Button; Yellow Milkwort
Polygala setacea Michaux	Coastal-plain Milkwort
Polygonum hydropiperoides Michaux	Mild or Swamp Water-pepper; Swamp Smartweed
Polygonum punctatum Elliott	Dotted Smartweed
Polypremum procumbens Linnaeus	Rustweed; Juniper-leaf
Pontederia cordata Linnaeus	Pickerelweed
Proserpinaca palustris Linnaeus	Marsh Mermaid-weed
Proserpinaca pectinata Lamarck	Comb-leaf Mermaid-weed
Prunus umbellata Elliott	Flatwoods or Hog Plum
Psychotria nervosa Swartz	Wild Coffee: Seminole Balsamo
Pteridium aquilinum (Linnaeus) Kuhn var. *pseudocaudatum* (Clute) A. A. Heller	Bracken Fern
Pterocaulon pycnostachyum (Michaux) Elliott	Wand or Coastal Blackroot; Rabbit Tobacco
Quercus laurifolia Michaux	Laurel Oak; Diamond (-leaf) Oak
Quercus minima (Sargent) Small	Dwarf Live Oak
Quercus nigra Linnaeus	Water Oak
Quercus pumila Walter	Runn(ing)(er) Oak
Quercus virginiana Miller	Virginia Live Oak
Rhexia cubensis Grisebach	West Indi(an)(es) Meadow-beauty
Rhexia mariana Linnaeus	Pale or Maryland Meadow-beauty
Rhexia nashii Small	Nash's Meadow-beauty
Rhexia nuttallii C. James	Nuttall's Meadow-beauty
Rhexia petiolata Walter	Ciliate Meadow-beauty
Rhus copallinum Linnaeus	Winged or Shining or Dwarf Sumac
Rhynchosia minima (Linnaeus) de Candolle	Least Snout-bean
Rhynchosia reniformis de Candolle	Dollarleaf
Rhynchospora baldwinii A. Gray	Baldwin's Beakrush; Baldwin's Beaksedge
Rhynchospora breviseta (Gale) Channell	Piedmont Beakrush; Short-bristle Beaksedge
Rhynchospora chapmanii M. Curtis	Chapman's Beakrush; Chapman's Beaksedge
Rhynchospora ciliaris (Michaux) C. Mohr	Ciliate or Fringed Beakrush
Rhynchospora colorata (Linnaeus) H. Pfeiffer	Starbrush White-topped Sedge; Star Rush
Rhynchospora corniculata (Lamarck) A. Gray	Horned-rush; Short-bristle Horned Beak(rush)(sedge)
Rhynchospora divergens Chapman ex M. Curtis	Spreading Beakrush; Spreading Beaksedge
Rhynchospora eximia (C. Nees von Esenbeck) Boeckeler	Tropical Baldrush
Rhynchospora fascicularis (Michaux) Vahl var. *distans* (Chapm.) Small	Brown Beakrush
Rhynchospora fascicularis (Michaux) Vahl var. *fascicularis*	Fascicled Beakrush
Rhynchospora filifolia A. Gray	Thread-leaf Beakrush; Thread-leaf Beaksedge
Rhynchospora globularis (Chapman) Small var. *recognita* Gale	Large Globe Beakrush
Rhynchospora harperi Small	Harper's Beakrush; Harper's Beaksedge
Rhynchospora inundata (Oakes) Fernald	Narrow-fruited Horned Beak(rush)(sedge)

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Rhynchospora latifolia (Baldwin ex Elliott) W. Thomas	Giant or Sand-Swamp White-top Sedge; Star Rush
Rhynchospora microcarpa Baldwin ex A. Gray	Southern Beakrush; Southern Beaksedge
Rhynchospora microcephala (Britton) Britton ex Small	Capitate Beakrush
Rhynchospora nitens (Vahl) A. Gray	Short-beak Baldrush
Rhynchospora odorata C. Wright ex Grisebach	Fragrant Beakrush; Fragrant Beaksedge
Rhynchospora plumosa Elliott	Plumed Beakrush; Plumed Beaksedge
Rhynchospora pusilla Chapman ex M. Curtis	Humble Beakrush
Rhynchospora rariflora (Michaux) Elliott	Few-flower Beakrush; Few-flower Beakrush
Rhynchospora sulcata Gale	Dixie Beakrush
Rhynchospora tracyi Britton	Tracy's Beakrush; Tracy's Beaksedge
Rhynchospora wrightiana Boeckeler	Wright's Beakrush; Wright's Beaksedge
Rotala ramosior (Linnaeus) Koehne	Lowland Toothcup
Rubus cuneifolius Pursh	Sand Blackberry
Rubus trivialis Michaux	Southern Dewberry
Rudbeckia hirta Linnaeus	Blackeyed Susan
Ruellia caroliniensis (J. F. Gmelin) Steudel	Carolina Wild-petunia
Sabal palmetto (Walter) Loddiges ex Schultes & Schultes f.	Cabbage Palm
Sabatia bartramii Wllbur	Bartram's Rose-gentian
Sabatia brevifolia Rafinesque	Short-leaf Rose-gentian
Sabatia grandiflora (A. Gray) Small	Large-flower Rose-gentian
Sabatia stellaris Pursh	Saltmarsh Rose-gentian; Rose-of-plymouth
Saccharum giganteum (Walter) Persoon	Sugarcane Plumegrass
Sacciolepis indica (Linnaeus) Chase	India Cupscale; Glenwood Grass
Sacciolepis striata (Linnaeus) Nash	American Cupscale
Sacoila lanceolata (Aublet) Garay var. *lanceolata*	Leafless beaked Ladies-tresses
Sagittaria graminea Michaux var. *chapmanii* J. G. Smith	Grass-leaf Arrowhead
Sagittaria lancifolia Linnaeus	Bull-tongue Arrow-head
Salvia lyrata Linnaeus	Lyre-leaved Sage
Samolus ebracteatus Kunth	Coast Water Pimpernel; Limewater Brookweed
Sarcostemma clausum (Jacquin) Roemer & Schultes	White-vine
Sarracenia minor Walter	Hooded Pitcher-plant
Schinus terebinthifolius Raddi	Brazilian Pepper; Brazilian Holly
Schizachyrium rhizomatum (Swallen) Gould	Florida Bluestem
Schizachyrium sanguineum (Retzius) Alston	Crimson False Bluestem
Schizachyrium stoloniferum Nash	Creeping Bluestem
Schoenolirion albiflorum (Rafinesque) Gates	Sunnybell(s)
Schoenus nigricans Linnaeus	Black Sedge
Scleria baldwinii (Torrey) Steudel	Baldwin's Nutrush
Scleria ciliata Michaux	Fringed Nutrush
Scleria georgiana Core	Georgia or Slender-fruit Nutrush
Scleria hirtella Swartz	River-swamp Nutrush
Scleria pauciflora Muhlenberg ex Willdenow	Few-flower Nutrush
Scleria reticularis Michaux	Netted or Torrey's Nutrush
Scleria triglomerata Michaux	Tall Nutgrass; Whip Nutrush
Scleria verticillata Muhlenberg ex Willdenow	Low Nutrush
Scoparia dulcis Linnaeus	Sweet Broom; Licorice Weed
Scutellaria integrifolia Linnaeus	Hyssop or Rough Skullcap; Helmet-flower
Serenoa repens (Bartram) Small	Saw Palmetto
Setaria corrugata (Elliott) Schultes	Coastal Foxtail; Coastal Bristle Grass
Setaria parviflora (Poiret) Kerguélen	Knotroot Foxtail; Knotroot Bristle Grass
Sida acuta Burman f.	Broomweed; Common Wireweed
Sida elliottii Torrey & A. Gray	Elliott's Fanpetal
Sideroxylon celastrinum (Kunth) T. D. Pennington	Saffron Plum
Sideroxylon reclinatum Michaux subsp. *reclinatum*	Florida bully
Sisyrinchium angustifolium Miller	Pointed or Sandplain or Michaux's Blue-eyed-grass
Smilax auriculata Walter	Ear-leaf Greenbrier; Catbrier
Smilax bona-nox Linnaeus	Saw Greenbrier; Catbrier
Smilax laurifolia Linnaeus	Catbrier; Bamboo-vine; Laurel(-leaf) Greenbrier
Smilax walteri Pursh	Coral or Red-berry Greenbrier
Solidago fistulosa Miller	Pinebarren Goldenrod
Solidago latissimifolia Miller	Goldenrod
Solidago odora Aiton var. *chapmanii* (Torrey & A. Gray) Cronquist	Sweet Golden-rod
Solidago sempervirens Linnaeus	Seaside Goldenrod
Solidago stricta Aiton	Willow-leaf or Wand Goldenrod
Solidago tortifolia Elliott	Twist-leaf Goldenrod

Appendix B. (Continued) Scientific names with authority and common names for calcareous flora.

Scientific name	Common name
Sonchus oleraceus Linnaeus	Common Sow Thistle
Sorghastrum secundum (Elliott) Nash	Lopsided Indiangrass
Spartina bakeri Merrill	Sand or Bunch Cordgrass
Spermacoce assurgens Ruiz Lopez & Pavon	Woodland False Buttonweed
Spermacoce prostrata Aublet	Prostrate False Buttonweed
Spermacoce verticillata Linnaeus	Whorled Buttonweed
Spiranthes brevilabris Lindley var. *floridana* (Wherry) Luer	Florida Ladies'-tresses
Spiranthes laciniata (Small) Ames	Lacelip Ladies'-tresses
Spiranthes longilabris Lindley	Giant Spiral Ladies'-tresses
Spiranthes odorata (Nuttall) Lindley	Fragrant Ladies'-tresses
Spiranthes praecox (Walter) S. Watson	Grass-leaf or Green-vein Ladies'-tresses
Spiranthes vernalis Engelmann & A. Gray	Spring Ladies'-tresses
Sporobolus indicus (Linnaeus) R. Brown var. *indicus*	Smutgrass; West Indian Dropseed
Sporobolus jacquemontii Kunth	West Indian Rush-grass; West Indian Dropseed
Sporobolus junceus (Palisot de Beauvois) Kunth	Pineywoods or Pinewoods Dropseed
Stenandrium dulce (Cavanilles) C. Nees von Esenbeck var. *floridanum* A. Gray	Stenandrium; Sweet Shaggytuft
Stillingia aquatica Chapman	Corkwood; Water Toothleaf
Stillingia sylvatica Linnaeus subsp. *sylvatica*	Upland Queen's Delight
Stillingia sylvatica Linnaeus subsp. *tenuis* (Small) D. J. Rogers	Marsh Queen's-delight
Syngonanthus flavidulus (Michaux) Ruhland	Bantam-buttons; Yellow Hatpins
Taxodium ascendens Brongniart	Pond Cypress
Tephrosia hispidula (Michaux) Persoon	Spreading Hoary-pea
Tephrosia rugelii Shuttleworth ex B. Robinson	Rugel's Hoary-pea
Tephrosia spicata (Walter) Torrey & A. Gray	Spiked Hoary-pea
Teucrium canadense Linnaeus	American Germander; Wood-sage
Thelypteris kunthii (Desvaux) C. Morton	Widespread Maiden Fern
Thelypteris palustris Schott var. *pubescens* (Lawson) Fernald	Eastern Marsh Fern
Toxicodendron radicans (Linnaeus) Kuntze	Poison Ivy
Triadenum virginicum (Linnaeus) Rafinesque	Virginia Marsh St. John's-wort
Tridens flavus (Linnaeus) A. Hitchcock var. *flavus*	Tall Redtop; Purpletop; Purpletop Triends
Tripsacum dactyloides (Linnaeus) Linnaeus	Eastern Gamagrass; Eastern Mock Grama
Urena lobata Linnaeus	Caesar-weed
Utricularia biflora Roxburgh	Humped Bladderwort
Utricularia cornuta Michaux	Horned Bladderwort
Utricularia gibba Linnaeus	Cone-spur or Humped Bladderwort
Utricularia juncea Vahl	Rush or Southern Bladderwort
Utricularia purpurea Walter	Eastern Purple Bladderwort
Utricularia resupinata B. Greene	Lavendar or Small Purple Bladderwort
Utricularia simulans Pilger	Fringed Bladderwort
Utricularia subulata Linnaeus	Zigzag Bladderwort
Vaccinium myrsinites Lamarck	Shiny Blueberry
Verbesina virginica Linnaeus var. *laciniata* (Poiret) A.Gray	Frostweed; White Crownbeard
Vernonia blodgettii Small	Florida or Blodgett's Ironweed
Viburnum obovatum Walter	Small or Walter Viburnum; Black Haw
Vicia acutifolia Elliott	Four-leaf Vetch
Vigna luteola (Jacquin) Bentham	Hairy-pod or Piedmont Cowpea
Viola lanceolata Linnaeus	Bog White or Long-leaf or Lance-leaf Violet
Viola septemloba LeConte	Southern Coast Violet
Vitis aestivalis Michaux	Summer Grape
Vitis rotundifolia Michaux var. *rotundifolia*	Muscadine Grape; Scuppernong
Vitis shuttleworthii House	Calusa Grape
Woodwardia virginica (Linnaeus) J. E. Smith	Virginia Chain Fern
Xyris ambigua Beyrich ex Kunth	Coastal-plain Yellow-eyed Grass
Xyris brevifolia Michaux	Short-leaf Yellow-eyed Grass
Xyris calcicola E. Bridges & Orzell	Calciphilic Yellow-eyed Grass
Xyris caroliniana Walter	Carolina Yellow-eyed Grass
Xyris elliottii Chapman	Elliott's Yellow-eyed Grass
Xyris fimbriata Elliott	Fringed Yellow-eyed Grass
Xyris flabelliformis Chapman	Savannah Yellow-eyed Grass
Xyris floridana (Kral) E.Bridges & Orzell	Florida Yellow-eyed Grass
Xyris jupicai L. Richard	Common or Richard's Yellow-eyed Grass
Xyris platylepis Chapman	Tall Yellow-eyed Grass
Xyris serotina Chapman	Acid-swamp Yellow-eyed Grass
Xyris smalliana Nash	Small's Yellow-eyed Grass