Title: VEGETATION COMPOSITION AND STRUCTURE OF EVERSGERD POST OAK FLATWOODS, CLINTON COUNTY, ILLINOIS

Author: John E. Ebinger, Emeritus Professor of Botany, Eastern Illinois University, Charleston, Illinois 61920

Grant: FY01 Wildlife Preservation Fund -- $1000.00

Abstract: -- A woody vegetation survey of Eversgerd Post Oak Flatwoods was undertaken in 2001. This small 16 ha woodlot is part of an extensive band of timber associated with the broad Kaskaskia River valley in the Southern Till Plain Division of Illinois. Tree density averaged 266 trees/ha with a basal area of 24.793 m^2/ha. Quercus stellata Wang. (post oak) dominated the overstory and woody understory with an importance value of 171 (200 possible). Quercus bicolor Willd. (swamp white oak) and Q. palustris Muenchh. (pin oak) were common species in a shallow depression, accounting for their being second and third in importance. The forest had an open, park-like appearance, small woody saplings averaging 820 stems/ha with large saplings averaging 221 stems/ha. The herbaceous understory was dominated by a few grasses and sedges, Danthonia spicata (L.) Roem. & Schultes and Carex cephalophora Willd. being the dominant taxa. The large number of post oaks with low branches and branch scars indicate that this woods was more open in the past.

INTRODUCTION

At the time of European settlement Quercus stellata (post oak) dominated forests were common throughout much of the Midwest from Ohio to Missouri, being especially common on the Illinoian glacial till plain (Telford 1926, Braun 1950). Post oak forests occurred on barrens with thin soil and exposed bedrock (Ebinger et al. 1994), as well as on flats with heavy clay soils having a claypan at or near the surface (Coates et al. 1992, Taft et al. 1995). On these flats, were standing water was common throughout parts of the growing season, a Quercus palustris-Quercus bicolor Seasonally Flooded Forest Alliance persisted and was surrounded by the post oak flatwoods (Drake and Faber-Langendoen 1997, Tecic et al. 2001). In areas with improved drainage, due to topographic relief, post oak was usually associated with Q. velutina (black oak) and various species of hickory (Carya spp.).

Studies indicate that post oak upland forests were relatively open (Anderson and Anderson 1975, Ebinger and McClain 1991). At the time of European settlement these open canopy forests were maintained by periodic fires (Williams 1989, Davies 1994, Dolan 1994, McClain and Elzinga 1994). With the cessation of landscape fires, woody plant encroachment resulted in canopy closure (Ebinger 1986, Ebinger and McClain 1991).

The study area is a small section of an extensive block of timber located along Shoal Creek near where it enters the Kaskaskia River. Here the Kankakee River valley is extremely broad, heavy clay soils are common, and many of the soils have a

dense claypan. The woodlot was the best remaining example of the post oak forest that once was common in this part of southern Clinton County. Protected by the owner Franklin Eversgerd, no cutting, recent grazing, or other disturbances have taken place. This woodlot was considered a grade B Southern Flatwoods by the Natural Areas Inventory (White and Madany 1978). The study was undertaken to determine the forest structure and floristic composition of this flatwoods.

DESCRIPTION OF THE STUDY AREA

Eversgerd Post Oak Flatwoods is located in Germantown Township about 5 kms south of Germantown, Clinton County, Illinois in the Effingham Plain Section of the Southern Till Plain Natural Division (Schwegman 1973). Though mostly composed of forest and savanna in presettlement times, extensive prairies were present partcularly on the flat uplands away from the major river systems.

The woodlot studied is a mesic to wet-mesic post oak woods about 16 ha in size (SW1/4 NW1/4 S28 T1N R4W). The overall relief does not exceed 1 m. The soils are Wynoose and Bluford silt loams which are poorly drained soils that occur on broad, loess-covered till plains. The climate is continental, with humid, hot summers and cold winters. Average annual precipitation is 105 cm, with a record high of 157.5 cm in 1945 and a record low of 68.3 cm in 1936. The highest temperature on record is 114 degrees F for July 14, 1936. During an average

year there are 51 days with temperatures greater than 90 degrees F, 104 days less than 32 degrees F, and only four days less than zero. The frost-free growing period averages 184 days (Bryan and Wendland 1995).

METHODS

During the spring of 2001, a 10.5 ha section of the woodlot was divided into quadrats 25 m on a side (168 quadrats). In each quadrat all living and dead-standing woody individuals 10.0 cm dbh and above were identified to species and their diameters recorded. Living-stem density (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value (IV), and average diameter (cm) were calculated for each species. Dead-standing stem density (stems/ha), basal area (m^2/ha), and average diameter were also determined for each species.

Woody understory composition and density (stems/ha) were determined using 0.0001, 0.001, and 0.01 ha nested circular plots randomly located at 20 meter intervals along line transects within the study area, four additional 0.0001 ha plots were located 7 m north, east, south and west of each center. In the 0.0001 ha plot, seedlings ($\leq$40 cm tall) and all shrubs were counted; in the 0.001 ha circular plots small saplings (>40 cm tall and $\leq$2.5 dbh) were recorded; and in the 0.01 ha circular plots large saplings (2.6-9.9 cm dbh) were tallied.

The flatwoods was visited at various times during the growing season in 2000 and 2001. During each trip, voucher specimens were

collected from in and around the flatwoods, including disturbed and open areas along the woodland edge. The specimens were identified and deposited in the Stover-Ebinger Herbarium (EIU) of Eastern Illinois University, Charleston, Illinois. All vascular plant species observed are listed in Appendix I, while nomenclature follows Mohlenbrock (1986).

RESULTS AND DISCUSSION

Tree density in the woodlot averaged 265.8 stems/ha with a basal area of 24.793 m^2/ha (Table 1). Of the 15 arborescent species encountered, post oak ranked first with an IV of 171.1, averaged 209.5 stems/ha, and accounted for more than 90% of the total basal area (22.859 m^2/ha). Most of the large post oaks had an open-grown appearance with low branches or branch scars and broad open crowns. Even-aged and uniform-sized post oaks are common with most individuals in the 20 to 50 cm diameter classes (Table 1). The largest tree found was a 102 cm dbh post oak.

Swamp white oak and pin oak were common species in a shallow depressions, accounting for their being second and third in importance (Table 1). This Quercus palustris-Quercus bicolor Seasonally Flooded Forest Alliance (Drake and Faber-Langendoen 1997) is occasionally found along the Kaskaskia River drainage in southern Illinois (Tecic et al. 2001). One shallow depression of about 0.9 ha occurs in the study area. A relatively mature pin oak/swamp white oak community occurs in this depression.

The remaining woody species were not common, none had an IV

greater than 4.0, or a density greater than 8 stems/ha (Table 1). Of these, four were oaks, with Quercus marilandica (blackjack oak) and Q. velutina (black oak) occurring on drier sites. In contrast, Q. imbricaria (shingle oak) was scattered throughout the woodlot. Also, two hickory species were encountered, Carya ovata (shagbark hickory) being forth in IV, while C. tomentosa (mockernut hickory) was rare.

The open appearance of the understory is suggested by the relatively few woody seedling and saplings encountered during the survey (Table 2). Woody seedlings averaged only 2,520 stems/ha, with small saplings averaging 820 stems/ha, and large saplings 221 stems/ha. Post oak dominated all categories, while Sassafras albidum (sassafras) and pin oak were also common (Table 2).

Tree mortality averaged 31.9 stems/ha with a basal area of 2.062 m^2/ha (Table 3). Post oak had the highest mortality followed by blackjack oak. The average diameter of the dead-standing individuals of post oak was 26.8 cm with the largest individual being nearly 100 cm dbh.

Species diversity in the flatwoods was not high, only 169 taxa in 55 families were encountered (Appendix I). Of these, two were ferns, 40 were monocots in six families, and 127 were dicots in 47 families. Woody taxa accounted for 39 of these, while 14 exotic taxa were found. Of the exotic taxa, none were common on the site except for Lonicera japonica which occurred in a few open area.

The majority of the herbaceous species were rare, being

confined to disturbed sites in and at the edge of the woods, open areas were edaphic factors limited tree growth, or the taxa were infrequent and widely scattered throughout the woods. The majority of the herbaceous understory was composed of various species of grasses and sedges. Danthonia spicata and Panicum lanuginosa were the dominant grasses, while Carex cephalophora was the dominant sedge. In wetter areas Carex meadii, C. annectens, and Eleocharis verrucossa dominated.

Presently post oak dominates the woodlot, and its importance will continued in the near future. However, the small number of post oaks in the lower diameter classes suggests that conditions are not favorable the long term dominance of this taxon. This decrease in oak regeneration is occurring throughout the Midwest, probably due to fire suppression (Ebinger and McClain 1991, McClain et al. 2001). The resulting canopy closure favors the growth of shade-tolerant, fire-sensitive species that take advantage of canopy openings as veteran trees die.

ACKNOWLEDGMENTS

The author would like to thank Bill McClain and Bob Gillespie, Illinois Department of Natural Resources, and Bob R. Edgin, Illinois Nature Preserves Commission, for their help and encouragement during the study. Thanks are also due the Illinois Department of Natural Resources for the grant to complete the study.

LITERATURE CITED

Anderson, R.C. and M.R. Anderson. 1975. The presettlement vegetation of Williamson County, Illinois. Castanea 40:345-363.

Braun, E.L. 1950. Deciduous forests of eastern North America. Hafner Publishing Company, New York.

Bryan, A.A. and W. Wendland. 1995. Local climatological data summary, Mt. Vernon, 1895-1994. SWS Miscellaneous Publication 98-20. Illinois State Water Survey, Illinois Department of Natural Resources. Champaign, Illinois. 18 pages.

Coates, D.T., K.J. Lyman and J.E. Ebinger. 1992. Woody vegetation structure of a post oak flatwoods in Illinois. Castanea 57:196-201.

Davies, K.M., Jr. 1994. Some ecological aspects of northeastern American Indian agroforestry practices. Northern Nut Growers' Association Annual Report 85:25-37.

Dolan, R. W. 1994. Effects of a prescribed burn on the tree-and herb-layer vegetation in a post oak (Quercus stellata) dominated flatwoods. Proceedings of the Indiana Academy of Science 103:25-32.

Drake, J. and D. Faber-Langendoen. 1997. An alliance level classification of the vegetation of the midwestern United States, The Nature Conservancy, Minneapolis, Minnesota. 397 pages.

Ebinger, J.E. 1986. Sugar Maple, a management problem in

Illinois forests? Transactions of the Illinois State Academy of Science 79:25-30.

Ebinger, J.E. and W.E. McClain. 1991. Forest succession in the prairie peninsula of Illinois. Illinois Natural History Survey Bulletin 34:375-381.

Ebinger, J.E., R. Buhrmester and W.E. McClain 1994. Vegetation of some post oak barrens in Saline County, Illinois. Pages 335-339 in J.S.Fralish, R.C.Anderson, J.E. Ebinger and R. Szafoni (eds), Proceedings of the North American Conference on Savannas and Barrens: living in the edge. Normal, Illinois.

McClain, W.E. and S.L. Elzinga. 1994. The occurrence of prairie and forest fires in Illinois and other midwestern states, 1679-1854. Erigenia 13:79-90.

McClain, W.E., T.L. Esker, B.R. Edgin and J.E.Ebinger. 2001. Fire history of a post oak (Quercus stellata Wang.) woodland in Hamilton County, Illinois. (in preparation)

Mohlenbrock, R.H. 1986. Guide to the vascular flora of Illinois. Southern Illinois University Press, Carbondale and Edwardsville, Illinois.

Schwegman, J.E. 1973. Comprehensive plan for the Illinois Nature Preserves System. Part 2. The natural divisions of Illinois. Illinois Nature Preserves Commission, Rockford, Illinois.

Taft, J.B., M.W. Schwartz and L.R. Phillippe. 1995. Vegetation ecology of flatwoods on the Illinoian till plain. Journal

of Vegetation Science 6:647-666.

Tecic, D., W. E. McClain, and J. E. Ebinger 2001. Structure and composition of pin oak/swamp white oak flatwood forests in Illinois. Transactions of the Illinois State Academy of Science (in press).

Telford, C.J. 1926. Third report on a forest survey of Illinois. Illinois Natural History Survey Bulletin 16:1-102.

White, J. and M.H.Madany. 1978. Classification of natural communities in Illinois. Pages 310-505. In: J.White (editor), Illinois Natural Areas Inventory, Technical Report. Illinois Natural Areas Inventory, Urbana, Illinois.

Williams, M. 1989. Americans and their forests: a historical geography. Cambridge University Press, New York.

Table 1. Density by diameter class (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value and average diameter of the woody species at Eversgerd Post Oak Flatwoods, Clinton County, Illinois.

Species	Diameter Classes (cm) 10-19	20-29	30-39	40-49	50-59	60-69	70+	Total #/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)
Quercus stellata	23.8	43.7	71.7	47.7	17.7	3.4	1.5	209.5	22.859	78.9	92.2	171.1	35.2
Quercus bicolor	7.2	3.5	1.2	1.0	0.6	--	--	13.5	0.697	5.1	2.8	7.9	22.6
Quercus palustris	10.9	1.5	0.5	0.6	0.7	0.2	0.1	14.5	0.660	5.4	2.7	8.1	19.8
Carya ovata	5.2	2.0	0.1	--	--	--	--	7.3	0.188	2.8	0.8	3.6	17.4
Quercus marilandica	4.2	0.7	0.4	--	--	--	--	5.3	0.122	2.0	0.5	2.5	16.0
Ulmus americana	5.5	0.1	--	--	--	--	--	5.6	0.067	2.1	0.3	2.4	11.3
Quercus imbricaria	4.5	0.3	--	--	--	--	--	4.8	0.068	1.8	0.3	2.1	13.3
Quercus velutina	2.5	0.1	0.1	0.1	0.1	--	--	2.9	0.082	1.1	0.3	1.4	16.1
Others	2.1	0.2	0.1	--	--	--	--	2.4	0.050	0.8	0.1	0.9	--
Total	65.9	52.1	74.1	49.4	19.1	3.6	1.6	265.8	24.793	100.0	100.0	200.0	

Table 2. Frequency (%) and density (stems/ha) of woody seedlings (<40 cm tall), small saplings (>40 cm tall <2.5 cm dbh), and large saplings (2.5-9.9 cm dbh) at the Eversgerd Post Oak Flatwoods, Clinton County, Illinois.

Species	Seedlings		Small Saplings		Large Saplings	
	Freq.	Den.	Freq.	Den.	Freq.	Den.
Quercus stellata	9.0	1160	15.0	270	20.0	35
Sassafras albidum	3.6	420	8.0	80	18.0	31
Quercus palustris	2.4	260	19.0	220	25.0	36
Fraxinus pennsylvanica	1.4	140	2.0	20	1.0	1
Diospyros virginiana	1.2	120	--	--	18.0	20
Carya ovata	1.0	100	3.0	30	20.0	23
Prunus serotina	0.8	80	4.0	60	3.0	3
Quercus marilandica	0.2	60	5.0	60	12.0	19
Quercus bicolor	0.4	40	1.0	10	5.0	6
Acer saccharinum	0.4	40	1.0	10	--	--
Quercus velutina	0.2	40	1.0	20	2.0	2
Ulmus americana	0.2	20	1.0	10	15.0	18
Quercus imbricaria	0.2	20	3.0	30	7.0	7
Carya tomentosa	0.2	20	--	--	1.0	1
Ulmus rubra	--	--	--	--	9.0	9
Celtis occidentalis	--	--	--	--	7.0	8
Acer negundo	--	--	--	--	2.0	2
Totals	--	2520	--	820	--	221

Table 3. Density (stems/ha), basal area (m^2/ha), and average diameter (cm) of dead-standing individuals recorded for Eversgerd Post Oak Faltwoods, Clinton County, Illinois.

Species	Density (stems/ha)	Basal Area (m^2/ha)	Average Diameter (cm)
Quercus stellata	27.5	1.936	26.8
Quercus marilandica	2.4	0.062	17.4
Others	2.0	0.064	--
Totals	31.9	2.062	--

APPENDIX I. The vascular plant species found at Eversgerd Post Oak Flatwoods are listed below. All species are listed in their appropriate division, and arranged alphabetically within each taxonomic group. Exotic species are indicated by an asterisk (*). After the binomial and author the collecting number, preceded by the initial of the collectors' last name, is given.

FERN AND FERN-ALLIES

ASPLENIACEAE
Asplenium platyneuron (L.) Oakes E28483

OPHIOGLOSSACEAE
Botrychium dissectum Spreng. var. obliquum (Muhl.) Clute E29085

MONOCOTS

ALISMACEAE
Alisma plantago-aquatica L. E29086

CYPERACEAE
Carex annectens Bickn. E28510
Carex caroliniana Schwein E28508
Carex cephalophora Willd. E28511
Carex meadii Dewey E29552
Carex muhlenbergii Willd. E28512
Carex squarrosa L. E28509
Carex stipata Muhl. E28513
Cyperus ovularis (Michx.) Torr. E29087
Eleocharis verrucosa (Svens.) Harms. E28507
Scirpus atrovirens Willd. E28738
Scirpus georgianus Harper E28796

JUNCACEAE
Juncus biflorus Ell. E28741
Juncus brachycarpus Engelm. E28740
Juncus interior Wieg. E28506
Juncus tenuis Willd. E28742

LILIACEAE
Allium canadense L. E28489
Erythronium albidum Nutt. E28279
Hypoxis hirsuta (L.) Coville E28478
Nothoscordum bivalve (L.) Britt. E28285

POACEAE
Agrostis perennans (Walt.) Tuckerm. E29088
Cinna arundinacea L. E29089
Danthonia spicata (L.) Roem. & Schultes E28500
*Echinochloa crus-galli (L.) Beauv. E29090
Elymus virginicus L. E28736

Eragrostis spectabilis (Pursh) Steud. E29091
Glyceria striata (L.) Hitchcock E28502
Leersia lenticularis Michx. E29093
Leersia virginica Willd. E29092
Muhlenbergia bushii Pohl E29275
Muhlenbergia glabrifloris Scribn. E29276
Panicum depauperatum Muhl. E28504
Panicum lanuginosum Ell. E28505
Panicum polyanthes Schult. E29277
Panicum rigidulum Bosc E29094
Paspalum laeve Michx. var. circulare (Nash) Fern. E28797
*Poa compressa L. E28501
*Poa pratensis L. E28503
*Setaria glauca (L.) Beauv. E29095

SMILACACEAE
Smilax hispida Muhl. E29096

DICOTS
ACANTHACEAE
Ruellia humilis Nutt. E29097
Ruellia strepens L. E29259

ACERACEAE
Acer negundo L. E29550
Acer rubrum L. E29098
Acer saccharinum L. E29260

ANACARDIACEAE
Toxicodendron radicans (L.) Kuntze E28480

APIACEAE
Cryptotaenia canadensis (L.) DC. E29099
Sanicula canadensis L. E28735
Sium suave Walt. E29261

APOCYNACEAE
Apocynum cannabinum L. E28485

AQUIFOLIACEAE
Ilex decidua Walt. E28743

ASTERACEAE
Ambrosia artemisiifolia L. E29100
Aster ontarionis Wieg. E29263
Aster simplex Willd. E29264
Aster vimineus Lam. E29262
Bidensa tripartia L. E29267
Boltonia diffusa Ell. E28798
Eclipta prostrata (L.) L. E29101
Erechtites hieracifolia (L.) Raf. E29266

Erigeron annuus (L.) Pers. E28732
Erigeron philadelphicus L. E28473
Eupatorium serotinum Michx. E29265
Helianthus divaricatus L. E28799
Krigia dandelion (L.) Nutt. E28491
Lactuca canadensis L. E29102
Senecio glabellus Poir. E29549
Solidago canadensis L. E29268
Solidago missouriensis Nutt. E28800
*Taraxacum officinale Weber. E28284
Vernonia gigantea (Walt.) Trel. E29103

BALSAMINACEAE
Impatiens capensis Meerb. E28488

BERBERIDACEAE
Podophyllum peltatum L. E28484

BIGNONIACEAE
Campsis radicans (L.) Seem. E29104

BORAGINACEAE
Myosotis verna Nutt. E28474

BRASSICACEAE
Cardamine parviflora L. E28281

CAESALPINIACEAE
Cercis canadensis L. E29105
Gleditsia triacanthos L. E28486

CALLITRICHACEAE
Callitriche terrestris Raf. E28492

CAPRIFOLIACEAE
*Lonicera japonica Thunb. E29106

CARYOPHYLLACEAE
Paronychia fastigiata (Raf.) Fern. E29107

CISTACEAE
Lechea tenuifolia Michx. E28801

EBENACEAE
Diospyros virginiana L. E28752

EUPHORBIACEAE
Acalypha virginica L. E29269, E28802
Croton capitatus Michx. E29108
Crotonopsis elliptica Willd. E28803
Phyllanthus caroliniensis Walt. E29109

FABACEAE
Lespedeza virginica (L.) Britt. E29270

FAGACEAE
Quercus bicolor Willd. E28762
Quercus x bushii Sarg. E28805
Quercus imbricaria Michx. E28758
Quercus lyrata Walt. E29271
Quercus marilandica Muenchh. E28759
Quercus palustris Muenchh. E28760
Quercus stellata Wangh. E28761
Quercus velutina Lam. E28804

HYPERICACEAE
Hypericum gentianoides (L.) BSP. E28808
Hypericum gymnanthum Engelm. & Gray E28807
Hypericum mutilum L. E29110
Hypericum punctatum Lam. E28806

JUGLANDACEAE
Carya cordiformis (Wang.) K. Koch E28756
Carya ovata (Mill.) K. Koch E28755
Carya tomentosa (Poir.) Nutt. E28757

LAMIACEAE
Hedeoma pulegioides (L.) Pers. E29111
Lycopus virginicus L. E29112
*Prunella vulgaris L. E29113
Pycnanthemum tenuifolium Schrad. E28733
Scutellaria australis (Fassett) Epling E28490
Scutellaria lateriflora L. E29114
Stachys tenuifolia Willd. E29115

LAURACEAE
Sassafras albidum (Nutt.) Nees E28754

LINACEAE
Linum medium (Planch.) Britt. E28809

LYTHRACEAE
Rotala ramosior (L.) Koehne E29116

MALVACEAE
Hibiscus lasiocarpus Cav. E29117
*Sida spinosa L. E29118

OLEACEAE
Fraxinus pennsylvanica Marsh. E28747

ONAGRACEAE
Ludwigia alternifolia L. E28810
Ludwigia palustris (L.) Ell. E29119, E29273

OXALIDACEAE
Oxalis dillenii Jacq. E28472
Oxalis stricta L. E29120
Oxalis violacea L. E28475

PHYTOLACCACEAE
Phytolacca americana L. E29121

POLEMONIACEAE
Phlox divaricata L. E28731

POLYGALACEAE
Polygala sanguinea L. E29122

POLYGONACEAE
*Polygonum cespitosum Blum E28477
*Polygonum hydropiper L. E28739
Polygonum hydropiperoides Michx. E28811
Polygala ramosissimum Michx. E29123
*Rumex crispus L. E28482

PORTULACACEAE
Claytonia virginica L. E28286

PRIMULACEAE
*Lysimachia nummularia L. E28476

RANUNCULACEAE
Clematis pitcheri Torr. & Gray E29274
Ranunculus abortivus L. E28282
Ranunculus micranthus Nutt. E28493
Ranumculus septentrionalis Poir. E28280

RHAMNACEAE
*Rhamnus frangula L. E29849

ROSACEAE
Agrimonia rostellata Wallr. E29124
Crataegus calpodendron (Ehrh.) Medic. E29551
Geum canadense Jacq. E28734
Geum vernum (Raf.) Torr. & Gray E28283
Malus ioensis (Wood) Britt. E28278
Potentilla simplex Michx. E28497
Prunus munsoniana Wright & Hedrick E28748
Prunus serotina Ehrh. E28749
*Rosa multiflora Thunb. E28499
Rosa setigera Michx. E28744
Rubus flagellaris Willd. E28496
Rubus pensylvanicus Poir. E28498

RUBIACEAE
Diodia teres Walt. E28812
Galium aparine L. E28494
Galium obtusum Bigel E28495

SAXIFRAGACEAE
Penthorum sedoides L. E29125

SCROPHULARIACEAE
Gratiola neglecta Torr. E28487
Gratiola virginiana L. E28737
Lindernia dubia (L.) Pennell E28813
Penstemon digitalis Nutt. E28479
Penstemon pallidus Small E28730

ULMACEAE
Celtis laevigata Willd. E28751
Celtis occidentalis L. E28750
Ulmus americana L. E29272
Ulmus rubra Muhl. E28753

URTICACEAE
Boehmeria cylindrica (L.) Sw. E29126
Pilea pumila (L.) Gray E29127

VIOLACEAE
Viola pratincola Greene E28277
Viola sagittata Ait. E28481

VITACEAE
Parthenocissus quinquifolia (L.) Planch. E28745
Vitis aestivalis Michx. E29128
Vitis vulpina L. E28746