A FLORISTICS STUDY OF BELL SMITH SPRINGS, POPE COUNTY, ILLINOIS

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ABSTRACT.—A detailed botanical study of Bell Smith Springs Recreation Area in extreme southeastern Illinois is presented. Ecological data are presented for the lowland woods, the slope woods, the bluff tops, and the open fields. An annotated checklist of 700 taxa completes the paper.

Bell Smith Springs Recreation Area is located in northwestern Pope County, Illinois, T 11 S, R 5 E, in extreme southeastern Illinois. The study area is approximately four miles west and slightly north of Eddyville. (See map). The area was named for Bell Smith, the son of the Smith family who settled near the springs (Allen, 1963, p. 325) and who later owned the area. The area is now part of the Shawnee National Forest and maintained by the U. S. Forest Service.

The study area, which comprises 870 acres, is in the Shawnee Hills Section of the Interior Lowland Plateaus Province (Leighton, et al., 1948). The Shawnee Hills are composed of Pounds and Battery Rock sandstone in the Caseyville Formation (Kosanke, et al., 1960). The escarpments of the Caseyville formation mostly face southward; however, the canyon-wall escarpments face in all directions at Bell Smith Springs. The gorge of Bay Creek has been eroded back from the Chester Escarpment. The forces of erosion working on the vertical joints have formed the picturesque features of the area. The joint blocks have fallen into the valley floor from the erosional action of the water. The water erosion has cut a natural bridge which spans 125 feet, 25 feet wide, 30 feet high, and is approximately 8 to 10 feet thick at the apex of the arch.

All of the uplands of southern Illinois are covered by brownish silt known as loess. This material has been deposited by winds from the flood-plains during glacial times. The soil covering the study area is of the Grantsburg-Zanesville soil association. The Grantsburg silt loam is moderately deep, slowly permeable with strong fragipans and covers 20 to 45 per cent of the study area. The Zanesville silt loam is a naturally well-drained acidic soil, low in plant nutrients. It occupies from 25 to 35 per cent of the area. The other soils of the area are shallow to bedrock and are composed of Wellston and Muskingum silt loam (Walter Parks, Jackson County Soil Conservation Service, Personal Communication).

FIGURE 1. — Map of Bell Smith Springs Recreation Area. (Map prepared by K. Weik).

The climate of the Shawnee Hills Section is considered a humid subtropical forest climate (Trewartha, 1943, p. 311). The rainfall distribution appears to be affected by the irregular relief. Warm moist air moving over the flat Coastal Plain Province of the south is forced to rise abruptly as it meets the hills and produces an increase in shower activity (Roberts, et al., 1957, p. 80). Precipitation at New Burnside (near Bell Smith Springs) averages 45.11 inches; an average of 24.62 inches (52 per cent) of rainfall occurs during the growing season, April to September (Page, 1949, p. 358). Even though this rainfall is more than that received in central and northern Illinois, it is less useful for the vegetation because of the tremendous runoff, slowly permeable soils, and the high rainfall-evaporation ratio. The annual temperature at New Burnside averages 57.2° F. with monthly summer norms for June, July, and August of 74.8°F., 78.1° F., and 77.4° respectively (U. S. Department of Commerce, Weather Bureau, Illinois, 1963). The average number of frost-free days for the area totals 187 (Page, 1949).

The study of Bell Smith Springs adds another area in the Shawnee Hills of Illinois to be studied floristically. Previous detailed works have been at Panther's Den (MacMahon, 1960), Giant City State Park (Mohlenbrock, 1954), Devil's Kitchen (Mohlenbrock, et al., 1962), and Ferne Clyffe State Park (Mohlenbrock, et al., 1966). Bell Smith lies further east than any of the other areas previously studied. Although it holds much in common with the other areas, Bell Smith Springs possesses more eastern elements in its flora. Plants such as stonecrop (*Sedum telephioides*), black cohosh (*Cimicifuga rubifolia*), beaked rush (*Rhynchospora capitellata*), rock moss (*Selaginella rupestris*), and others occur at Bell Smith Springs while not apparently at the more westerly stations.

Procedure

Collecting trips, particularly in the early spring, have been made into Bell Smith Springs since 1950. During the summer of 1966, a graduate class in Botany from Southern Illinois University, under the direction of Dr. Robert H. Mohlenbrock, made an intensive study of the area. The study included a search of the entire area for species content and quadratting of the major habitat types to determine vegetation percentages.

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Nomenclature used in this paper generally follows that in Mohlenbrock and Voigt (1959).

The quadratting was done by the random pairs technique developed by Cottam and Curtis (1949). This technique quickly permits the user to record a multitude of data. This method applies the use of a straight line through the study area. At each twenty paces along this straight line, meter quadrats were taken. Within each square-meter area, the total basal area of the herbaceous layer and the per cent composition of each species were determined.

After taking the meter quadrat, the nearest tree with a dbh of more than four inches was identified, measured, and recorded. A second tree, outside an exclusion angle of 180° when facing the first tree, was selected and likewise noted. The distance between the two trees was recorded. A line transect one meter wide between the first and second trees was used to record trees and shrubs with a dbh of one to four inches. With the use of this information, the following data were ascertained: the total basal area of each tree and shrub species, the relative basal area (or dominance) of each tree and shrub species, the density of all trees together, the density of each species of tree, and the relative density of each tree and shrub species. Detailed ecological data were obtained for the wooded slopes, the stream banks, the flood-plains, the dry bluffs, and the open fields.

THE WOODED SLOPES

The wooded slopes occupy that area below the bluff top and abandoned fields and the area above the exposed sandstone and bottomland. The soils of the slopes are primarily of two types. The Zanesville silt loam has approximately 20 to 40 inches of loess over bedrock and occurs on slopes of 7 to 18 per cent. The Wellston silt loam has less than 20 inches of loess over solid rock and is found on slopes of 12 to 30 per cent. The available water-supply capacity is low because the air and water move freely through the soil.

The slopes of Bell Smith Springs are of the oak-hickory association, except for an occasional planting of red pine (*Pinus resinosa*). The slopes are of variable composition, but primarily composed of the dominant white oak (*Quercus alba*), black oak (*Quercus velutina*), red oak (*Quercus rubra*), and, to a lesser extent, the shagbark hickory (*Carya ovata*). These species extend to the bluff top and exposed sandstone only to be replaced by the post oak (*Quercus stellata*) and black jack oak (*Quercus marilandica*).

The mid-layer is comprised primarily of white oak, shagbark hickory, sassafras (*Sassafras albidum*), slippery or red elm (*Ulmus rubra*), winged elm (*Ulmus alata*), and an occasional red cedar (*Juniperus virginiana*). However, the dominance of the understory changes with the location of the stations.

The herbaceous layer is variable in composition. The size of plants, variety of species, and amount of accumulated litter determine the frequency of the vegetation. The best represented herb of the slopes was *Panicum boscii*. This panicum had a 52.6 per cent frequency of occurrence in each quadrat and represented 8.2 per cent of the total composition. Other herbs which are conspicuous and generally characteristic of the slopes included poverty oat-grass (*Danthonia spicata*), goldenrods (*Solidago spp.*), Virginia creeper (*Parthenocisus quinquefolia*), pussy-toes (*Antennaria plantaginifolia*), and poison ivy (*Rhus radicans*).

Station one. This area was a north-facing slope which runs east and west. The slope is approximately 400 yards long and 200 yards wide. The soil is rather compact with a moderate covering of leaf litter. The dominant trees are white oak and black oak. The shrub layer consists primarily of shagbark hickory and flowering dogwood (*Cornus florida*) seedlings. The herbaceous layer had an average cover of 3.9 per cent, which consisted chiefly of Virginia creeper, poverty oat-grass, and *Panicum boscii*.

Station two. This area represented an east-facing slope which runs north and south. This station is approximately 300 yards long and 150 yards wide. The soil is rather dry and at the understory vegetation is very sparse with an average cover of 2.8 per cent in the quadrats. The canopy consists primarily of white and black oaks. The understory was chiefly represented by sassafras and shagbark hickory with a small per cent of winged elm, red oak, and black oak. Due to the dry soil, the herbaceous layer was represented by mountain mint (*Cunila origanoides*), *Lespedeza repens*, *Panicum boscii*, and poison ivy.

Station three. This area was a west-facing slope which followed a north-south ridge. The slope was about 800 yards long and varied from 100-200 yards wide. This area had a moderate leaf covering and was dry because of the westerly exposure, but the understory vegetation had a 2.7 per cent average cover in the quadrats. This slope had slightly more ground cover than area two because it received more rainfall during the growing season from the prevailing winds of the southwest. The dominant tree of this slope was white oak, with sugar maple (*Acer saccharum*) the subdominant. The most conspicuous ground cover consisted of seedling white oaks and slippery elms. Herbs which were present included *Panicum boscii*, *P. dichotomum*, Virginia creeper, and cat-brier (*Smilax glauca*).

Station four. Station four had a southern exposure. The area is about 250 yards long and 200 yards in width. This station is rather dry and is primarily composed of planted red pines

(*Pinus resinosa*) near the top of the slope, grasses on the mid-slope, and a small belt of a post oak-black jack oak community on the lower slope. The dominant trees of this station were red pine and post oak; subdominant trees consisted of black jack oak, white oak, and black oak. The shrub layer was represented by red cedar and sassafras. Poverty oat-grass, *Panicum boscii*, and goldenrods were the most prevalent herbaceous plants.

Station five. This station was of south-southeasterly exposure. The area varied from 100-200 yards in length to 200 yards in width. The soil was rather rocky with little available moisture near the surface. Little leaf litter was available to hold much moisture. Consequently, this station had the lowest average cover in the quadrats, 2.1 per cent. White oaks and shagbark hickories were the dominant trees. The shrub layer was comprised chiefly of small shagbark hickories and slippery elms. Examination of the herbaceous layer indicated a predominance of sunflower (*Helianthus decapetalus*), pussy-toes, and *Panicum boscii*.

THE STREAM BEDS AND BANKS

Four streams in the area were investigated. The area between the confluences of Bay Creek and Spring Branch, and Bay Creek and Hunting Branch, however, were much disturbed and have not been included in the ecological analysis of the stream banks. Many vascular plants were found to be common along all the streams studied. Such plants characteristic of this area included panic grasses (*Panicum polyanthes* and *P. microcarpon*), wild hydrangea (*Hydrangea arborescens*), sea oats (*Uniola latifolia*), river birch (*Betula nigra*), smooth alder (*Alnus serrulata*), sensitive plant (*Cassia nictitans*), sycamore (*Platanus occidentalis*), and buttonbush (*Cephalanthus occidentalis*).

Spring Branch was composed of smooth sandstone boulders ranging in diameter from four to twelve inches. The wooded slope generally extended to the stream bank. Very little vegetation was growing in the stream bed because of the rapidly flowing water between and under the rocks. The stream banks were dominated by *Panicum polyanthes* and sea oats. Found in lesser abundance were Christmas fern (*Polystichum acrostichoides*), orange-spotted touch-me-not (*Impatiens biflora*), and pokeweed (*Phytolacca americana*).

Entering each major stream bed was a dry creek which carries water in periods of excessive rainfall. Smooth sandstone boulders to over twelve inches in diameter were also found here. The bank vegetation was similar to Spring Branch except vegetation was found growing among the boulders. Plants common among the boulders were *Panicum polyanthes*, alumroot (*Heuchera parviflora*), cream violet (*Viola striata*), wild bergamot (*Monarda fistulosa*), sensitive plant, and Virginia creeper (*Parthenocissus quinquefolia*). Although the dry stream bed can be found in all the four streams, it is most characteristic of Hunting Branch.

The Bay Creek stream bed and flood-plain were larger than the other streams. Bay Creek from the confluence of Hunting Branch downstream and much of Bay Creek above the confluence of Spring Branch consisted of pools varying in length up to 40 yards. These pools were characterized by banks of soil or rock which rose abruptly two to five feet to the level flood-plain. Neither the pool nor the bank supported much vegetation. The only plants associated directly with these pools were *Carex virescens*, *Carex vulpinoidea*, and water willow (*Dianthera americana*), which grew along the margins of the tail waters.

Large bolders, logs, and debris from high water periods created small islands in between the pools. These areas, although within the stream bank, sometimes rose almost to the level of the flood-plain. The species of trees which dominated these islands were river birch, smooth alder, and sycamore. These seedling trees were growing very densely up to ten feet in height in some areas. In other locations, however, they were scattered and the sycamores grew to heights of 30 feet or more. Commonly associated with these trees were such plants as buttonbush, poison ivy, Virginia creeper, common ragweed (*Ambrosia artemisiifolia*), flowering spurge (*Euphorbia corollata*), pokeweed, Joe-pye-weed (*Eupatorium purpureum*), common evening primrose (*Oenothera biennis*), and *Panicum polyanthes*.

Occasionally the stream banks were interrupted by abrupt ledges as high as 30 feet or more. These ledges were conspicuously inhabited by wild hydrangea and alumroot.

THE LOWLAND WOODS

The lowland woods are considered to extend from the stream bank to the base of the cliffs or to the beginning of the wooded slopes. In the areas of Hunting Branch and Spring Branch, the lowland woods scarcely existed except at the lower end of the stream near Bay Creek. All areas had the same general profile, a dense canopy of mature trees, little or no understory except seedling trees, a sparse herbaceous layer, and an exposed forest floor.

Station one. (Tables 1 and 2). This station was located along lower Bay Creek and possessed the densest layer with a total basal area of approximately 12 per cent. The dominant herbs of the area were goosegrass (*Galium aparine*), Virginia creeper, cream violet, and butterfly violet (*Viola papilionacea*). Two trees dominated the area, the tulip tree (*Liriodendron tulipifera*) and slippery elm. The shrub layer was well represented by spicebush and sugar maple seedlings.

The other four stations (2-5) were floristically fairly similar. The dominant trees of these stations were the beech and sugar maple, having a frequency of occurrence of 50 to 71 per cent and 14 to 50 per cent, respectively. White oaks and several species of hickories were also common.

Seedling sugar maples dominated the shrub layer in all but lower Bay Creek. Other characteristic vegetation of the shrub layer included young flowering dogwood (*Cornus florida*), beech, and tulip tree seedlings. The herbaceous vegetation had an average cover of 3 to 4 per cent at stations 2-5. Virginia creeper and poison ivy were well represented in each area. Other common herbs included *Desmodium nudiflorum*, bedstraw (*Galium concinnum*), woolly blue violet (*Viola sororia*), cat-brier, wild hydrangea, and *Panicum microcarpon*.

THE DRY BLUFFS

One of the outstanding features of the Shawnee Hills is the dry bluff tops and their canyon wall escarpments. Along these dry bluff tops and rock ledges many habitats and micro-habitats may be found. Bell Smith Springs presents a large array of dry bluff tops and rock ledges.

Many of the cliffs face southward, giving a somewhat more xeric exposure and a better development of nearly bare ledges than would be likely with any other direction of dip except northeastward (Winterringer and Vestal, 1956). The major vegetation is very shrubby due to the sparsity of water and the thinness of the soil. The soil is Muskingum stony silt loam which is a grayish-brown stony silt loam, 0-10" in depth. It often contains rocks on the surface and mixed through the soil. The substrata are sandstone bedrock, usually more or less broken on the upper portion.

The exposed rock ledges in the area vary from approximately one foot to more than 100 feet in width. In the smaller areas lichens are the predominant members of the flora; however, in the larger areas, small islands of black jack oak and red cedar may be found. Often these small islands of shrubby trees are connected by a thin line of soil and vegetation running along a rock ledge. In many places the height of the bluff is dramatized by the fact that it is too low to overtop the trees rooted in the talus just below the base of the cliff. However, the trees do not reduce the exposure of the ledge to the sun and the wind in most cases

In a number of places large blocks of sandstone have broken away from the main cliff. The blocks often become completely dissociated from the main cliff, often becoming covered with vegetation.

The vegetation on the summit of the sandstone escarpment in the aboriginal zone consists mainly of mats of lichens (*Parmelia spp., Cladonia spp.*) and mosses (*Grimmia spp.*). Such forms occur on exposed ledges and rock slopes. These species help prepare the habitat for other plants which will eventually crowd out their predecessors.

Where thin soil areas occur, such plants as rock moss (*Sedum pulchellum*), pineweed (*Hypericum gentianoides*), flower-of-an-hour (*Talinum parviflorum*), and pencil flower (*Stylosanthes biflora*) are prevalent, as well as the more succulent flowering plants such as cactus (*Opuntia rafinesquii*) and American aloe (*Agave virginica*). The rare small club moss (*Selaginella rupestris*) was found associated with *Cladonia* spp. and the cactus.

As the soil deepens, other plants become conspicuous. Among these are poverty oat-grass, broomsedge (*Andropogon virginicus*), *Crotonopsis elliptica*, stone mint (*Cunila origanoides*), cat-brier, pussy-toes, and *Panicum* spp. This deep layer usually forms a distinct line of demarcation along the bluff top. This line may be broken by islands of deeper soil especially in shallow crevices and depressions.

Adjacent to the true slopes, the scrubby xerophytic forest abounds. This area consists of such dominant species as red cedar, post oak, black jack oak, and white oak. The trees in this zone are relatively sparse, numbering approximately 100 per acre (Tables 3 and 4).

The shrub layer contains mainly seedlings of the dominant trees as well as sparkleberry (*Vaccinium arboreum*) and hickories (*Carya* spp.).

THE OPEN FIELDS

The open fields are characterized by their lack of fertility and their tendency to erode rapidly. The fields are generally of the Grantsburg silt loam type having 6 to 8 feet over sandstone, shale bedrock, or residium. The surface is of brown silt loam 6-10″ thick. The yellowish-brown silt loam of the subsurface is 4-8″ thick. The yellowish-brown silty clay loam of the subsoil is 12-18″ thick. The silt pan or fragipan is comprised of brown silt loam with gray mottles 12-36″ thick and is very hard when dry. The substrata are brown and yellowish-brown mottled with gray silt loam 0-36″ thick over bedrock residium (Walter Parks, personal communication).

The fields in the Bell Smith Springs area are small and not under cultivation. Many of the abandoned fields have been reforested by the United States Forest Service. The fields are better suited for wildlife food-plots than for cropland or pasture.

Broomsedge is the dominant plant of the fields, with sassafras and dwarf sumac (*Rhus copallina*) the dominant shrubs. Fields that have been reforested have been planted predominantly with white pine. Trees that invade the open fields rarely reach a diameter of more than 4″ due to the dryness of the fields and competition from other species.

The field vegetation in general consists mainly of broomsedge, giving the fields the appearance of a prairie. Other common plants include sassafras, dwarf sumac, cat-brier, partridge pea (*Cassia fasciculata*), and species of *Desmodium*.

Due to a greater disturbance in the roadside fields, there was a marked difference in the vegetation found here in contrast to the open fields. The roadside fields (Table 5) frequently have horsetail milkweed (*Asclepias verticillata*), purple milkweed (*Asclepias purpurascens*), field bindweed (*Convolvulus sepium*), rose gentian (*Sabatia angularis*), and St. John's-wort (*Hypericum perforatum*). Near the edge of the fields, flowering dogwood (*Cornus florida*), redbud (*Cercis canadensis*), and species of oak can be found. Other characteristic plants of this area are dodder (*Cuscuta gronovii*), growing coiled around such plants as the flowering spurge (*Euphorbia corollata*).

The open fields had a vegetation similar to the general field vegetation as described above (Table 5). In addition, there were large quantities of panic grasses (*Panicum* spp.), rough-leaved american feverfew (*Parthenium integrifolium*), common cinquefoil (*Potentilla simplex*), and bush clover (*Lespedeza* spp.). In the more moist areas of the field, the common field rush (*Juncus tenuis*) is often encountered. Near the area where the quadrats were taken, a rare white-flowered rose gentian (*Sabatia angularis f. albiflora*) was found.

Annotated Checklist of Vascular Plants

The total number of taxa of vascular plants thus far recorded from Bell Smith Springs is 700. In similar floristics studies completed in similar topographic regions of the Shawnee Hills, the numbers of vascular plants have been 535 for Panther's Den (Union County), 701 for Ferne Clyffe State Park (Johnson County), and 820 for Giant City State Park (Jackson and Union Counties). While the number for Bell Smith Springs is less than that for Ferne Clyffe and Giant City, the percentage of plants considered rare for southern Illinois is greater at Bell Smith Springs.

Uncommon plants for southern Illinois and found at Bell Smith Springs include *Lycopodium lucidulum, L. porophilum, Selaginella rupestris, Sphenopholis nitida, Carex aggregata, C. annectens, C. careyana, C. digitalis, C. torta, Rhynchospora capitellata, R. glomerata, Goodyera pubescens, Tipularia discolor, Talinum parviflorum, Cimicifuga rubifolia, Dicentra canadensis, Sedum telephioides, Itea virginica, Geum virginianum, Desmodium nuttallii, Angelica venenosa, Heracleum lanatum, Triosteum angustifolium, Pen-*

stemon deamii, *Lonicera flavescens*, and *Valeriana pauciflora*.

Twenty-eight taxa are ferns or fern allies while three are gymnosperms (including two introductions). Of the flowering plants, 163 are monocots and 506 are dicots. The largest family is the Compositae with 79 taxa, followed by the Gramineae with 73, the Leguminosae with 48, and the Cyperaceae with 38.

Sixty-six species (about 10%) are considered introduced and naturalized.

Lycopodiaceae

Lycopodium lucidulum Michx. Damp shaded bluff, along Bay Creek. One station found.

Lycopodium porophilum Lloyd & Underw. On shaded sandstone ledge. One station found.

Selaginellaceae

Selaginella apoda (L.) Fern. Wet soil near stream. One colonly found.

Selaginella rupestris (L.) Spring. Exposed sandstone cliff. One colony found.

Isoetaceae

Isoetes butleri Engelm. In moist pockets on sandstone bluff tops; not common, but easily overlooked

Equisetaceae

Equisetum hyemale L. Along Hunting Branch. One colony found.

Ophioglossaceae

Botrychium dissectum Spreng. var. *obliquum* (Muhl.) Clute. Occurs sparingly in both flood-plain woods and slope woods.

Botrychium virginianum (L.) Sw. Lowland and slope woods throughout the area.

Ophioglossum vulgatum L. Flood-plain woods. Found only in one area.

Hymenophyllaceae

Trichomanes boschianum Sturm ex Bosch. Not in study area but found less than a half mile southwest of area beneath overhanging sandstone cliff along Bay Creek.

Polypodiaceae

Adiantum pedatum L. Lowland woods throughout the area.

Asplenium pinnatifidum Nutt. Crevices of dry sandstone walls. Highly variable. A crested specimen was also found.

Asplenium platyneuron (L.) Oaks ex D.C. Eaton. Flood-plain, slope, and upland woods; sparingly found on bluff tops in shade of scrub oaks.

Asplenium rhizophyllum L. On boulders in shaded woods; occasional.

Asplenium trichomanes L. Crevices of moist sandstone cliffs; locally abundant.

Athyrium filix-femina (L.) Bernh. Occasionally in woods near or on sandstone cliffs.

Athyrium pycnocarpon (Spreng.) Tidestrom. Flood-plain woods. One nice colony found.

Athyrium thelypterioides (Michx.) Desv. Flood-plain woods along Bay Creek; junction of lowland woods and slope woods along Spring Branch.

Cheilanthes lanosa (Michx.) DC. Eaton in Torr. Occasional atop dry sandstone bluffs.

Cystopteris fragilis (L.) Bernh. var. *protrusa* Weatherby. Found in nearly all moist, shaded situations.

Dryopteris carthusiana (Fuchs) Villars. On shaded sandstone cliffs; sparingly found.

Dryopteris marginalis (L.) Gray. In shaded woods or on shaded sandstone throughout the area.

Onoclea sensibilis L. Low ground along Bay Creek. One colony found.

Polypodium polypodioides (L.) Watt. On exposed or shaded sandstone; occasional.

Polypodium virginianum L. On sandstone boulders and cliffs, usually in the shade; occasional.

Polystichum acrostichoides (Michx.) Schott. Lowland or slope woods throughout the area.

Thelypteris hexagonoptera (Michx.) Slosson. Lowland woods throughout the area, but not particularly common.

Woodsia obtusa (Spreng.) Torr. Lowland and slope woods or even on exposed sandstone bluff tops; occasional.

Pinaceae

**Pinus resinosa* Ait. Occurs in several forest plantings and showing evidence to re-seed itself.

**Pinus strobus* L. Sparingly planted; there is no evidence that this species is spreading.

Curpressaceae

Juniperus virginiana L. On sandstone bluffs, in slope woods, and along edges of fields; common.

Typhaceae

Typha latifolia L. Around small pond; only one colony found.

Gramineae

Agrostis alba L. Waste ground, roadsides, and fields; common.

Agrostis elliottiana Schult. Dry bluff tops throughout the area, but not common.

Agrostis hyemalis (Walt.) BSP. Common along all streams.

Alopecurus carolinianus Walt. Open field, in moist areas.

Andropogon elliottii Chapm. Along edge of woods; found in three or four locations.

Andropogon virginicus L. Common in fields; also on exposed bluff tops.

Aristida dichotoma Michx. Along edge of woods; only one station recorded.

Aristida oligantha Michx. On exposed sandstone cliffs; not common.

Arundinaria gigantea (Walt.) Chapm. Common in flood-plain along Bay Creek.

Brachyelytrum erectum (Schreb.) Beauv. Near base of slope, in woods, along Spring Branch.

Bromus ciliatus L. In slope woods throughout the area.

**Bromus commutatus* Schrad. Common as a roadside weed.

Bromus purgans L. Occasional in flood-plain woods.

**Bromus racemosus* L. Along a road; one plant found.

**Bromus secalinus* L. In open fields and along roads throughout the area.

**Bromus tectorum* L. In open fields and along roads throughout the area.

Cinna arundinacea L. In flood-plain woods throughout the area.

**Dactylis gromerata* L. Only one station found, that along the edge of a woods on a sandstone bluff.

Danthonia spicata (L.) Beauv. ex Roem. & Schultes. The common grass on the dry, exposed sandstone bluff tops.

Diarrhena americana Beauv. Rich woods, sometimes on shaded boulders.

**Digitaria ischaemum* (Schreb.) Muhl. Along roadside; found occasionally.

**Digitaria sanguinalis* (L.) Scop. Found in most weedy situations.

**Echinochloa pungens* (Poir.) Rydb. Occasionally found in moist weedy areas.

**Eleusine indica* (L.) Gaertn. In a grassy field.

Elymus canadensis L. Edge of woods; roadsides; edge of fields.

Elymus villosus Muhl. ex. Willd. Edge of woods; roadsides.

Elymus virginicus L. Lowland woods; roadsides; open fields; common.

**Eragrostis cilianensis* (All.) Link ex Lutati. In an open field.

Eragrostis frankii C.A. Mey. in Steud. Edge of woods on sandstone bluff.

Eragrostis pectinacea (Michx.) Nees. Found in most weedy areas.

Eragrostis spectabilis (Pursh) Steud. On sandstone bluffs; roadsides.

**Festuca elatior* L. Along a road; only found once.

Festuca obtusa Bieler. Low woods along Spring Branch; also in slope woods.

Festuca octoflora Walt. var. *tenella* (Willd.) Fern. Common on exposed bluff tops.

Glyceria striata (Lam.) Hitchc. Along streams and in low woods.

**Hordeum jubatum* L. Waste areas.

Hordeum pusillum Nutt. Open fields and along roads; common.

Hystrix patula Moench. Lowland and slope woods; occasional.

Leersia virginica Willd. Woods along Bay Creek.

Melica mutica Walt. Edge of woods on sandstone bluff.

Melica nitens (Scribn.) Nutt. ex Piper. Exposed sandstone bluff top.

Muhlenbergia sobolifera (Muhl.) Trin. Slope woods; one of the more common woodland grasses.

Panicum anceps Michx. Woods at edge of sandstone bluff; growing in a moist depression.

Panicum barbulatum Mich. Woods at edge of sandstone bluff.

Panicum boscii Poir. in Lam. Flood-plain woods; along all streams.

Panicum clandestinum L. Along Bay Creek in several places.

Panicum depauperatum Muhl. Edge of woods of sandstone bluff.

Panicum dichotomiflorum Michx. Along all streams.

Panicum dichotomum L. Slope woods; woods on sandstone bluffs.

Panicum huachucae Ashe. Common in fields; occasional along the edge of woods.

Panicum latifolium L. Slope woods; occasional.

Panicum linearifolium Scribn. ex Britt. & Brown. Woods on sandstone bluff top.

Panicum microcarpon Muhl. ex Ell. Flood-plain woods; common.

Panicum polyanthes Schult. Along most of the streams.
Panicum praecocius Hitchc. & Chase. Dry ground on sandstone bluff top.
Panicum sphaerocarpon Ell. Woods of sandstone bluff.
Panicum tennesseense Ashe. Along Bay Creek; not common.
Panicum sphaerocarpon Ell. Woods of sandstone bluff tops; common.
Paspalum laeve Michx. Along roads; occasional.
**Phleum pratense* L. Fields and along roads; common.
**Poa annua* L. Moist waste ground; occasional.
Poa chapmaniana Scribn. Dry areas in fields; not common.
**Poa compressa* L. Waste ground and occasionally in woods.
**Poa pratensis* L. Common in nearly all habitat types.
Poa sylvestris A. Gray. Lowland woods; not common.
**Setaria faberi* Herrm. Roadsides and fields; common.
**Setaria lutescens* (Weigel) F.T. Hubb. Roadsides and fields; common.
**Setaria viridis* (L.) Beauv. Fields; common.
**Sorghum halepense* (L.) Pers. Roadsides; occasional.
Sphenopholis nitida (Bieler) Scribn. Woods on sandstone bluff tops.
Sphenopholis obtusata (Michx.) Scribn. Woods along roads.
Triodia flava (L.) Smyth. Fields and roadsides; common.
Uniola latifolia Michx. Lowland and slope woods; common.

Cyperaceae

Bulbostylis capillaris (L.) C.B. Clarke in Hook. f. Moist depressions on dry sandstone bluffs.
Carex aggregata Mack. Dry woods; only one colony found. This species is known in Illinois also from Adams and Madison Counties.
Carex albursina Sheldon. Lowland woods; occasional. This species has the widest leaves of any species of *Carex* in Illinois.
.*Carex annectens* Bickn. Moist area along a road; only one plant found. This Pope County collection marks only the fifth county in Illinois for this species.
Carex artitecta Mack. Mostly dry woods; common. One of the earliest species of *Carex* to bloom.
Carex blanda Dewey. Moist or dry woods; common.
Carex bushii Mack. Dry woods; fields; common.
Carex careyana Torr. ex Dewey. Deep lowland woods; not common.
Carex cephalophora Muhl. ex Willd. Along roads; in fields; common.
Carex convoluta Mack. One colony found half-way up a wooded slope beneath pignut hickory and white oak.
.*Carex digitalis* Willd. Lowland woods beneath beech and sugar maple; rare. Only a station in Hardin County is known besides this one.
Carex frankii Kunth. One station along Bay Creek.
Carex glaucodea Tuckerm. ex Olney. Dry woodlands, frequently on sandstone bluffs; occasional.
Carex granularis Muhl. ex Willd. Wooded slopes; occasional.
Carex grisea Wahl. Woods near streams; occasional.
Carex hirsutella Mack. Dry woods, especially on sandstone bluffs; common.
Carex jamesii Schw. Woods on sandstone bluffs.
Carex lupulina Muhl. ex Willd. Low area along a road; only one colony found.
Carex lurida Wahl. Low area along a road, growing with *C. lupulina*.
Carex muhlenbergii Schk. Dry woodlands; occasional.
Carex retroflexa Muhl. ex Willd. Dry woods; occasional.
Carex rosea Schk. ex Willd. Lowland woods; occasional.
Carex squarrosa L. In stream bed of Spring Branch.
Carex torta Boot ex Carey in Gray. In rapid-flowing waters of Bay Creek.
Carex tribuloides Wahl. Moist ditch along a road; only a single colony found.
Carex umbellata Schk. in Willd. On open sandstone boulders; not common. This is one of the earliest flowering species of *Carex* in Illinois.
Carex virescens Muhl. ex Willd. Lowland woods near Bay Creek; not common.
Carex vulpinoidea Michx. Along all the streams; common.
Cyperus aristatus Rottb. Moist depressions on sandstone bluff tops.
Cyperus esculentus L. Waste areas; along streams; common.
Cyperus ovularis (Michx.) Torr. Bluff tops; open fields; roadsides; common.

Cyperus strigosus L. Fields; along streams; common.
Eleocharis acicularis (L.) Roem. & Schultes. In moist depressions on sandstone bluff top.
Eleocharis obtusa (Willd.) Schultes. Along most of the streams.
Rhynchospora capitellata (Michx.) Vahl. Along Bay Creek; rare.
Rhynchospora glomerata (L.) Vahl. Along sandy creek; rare.
Scirpus atrovirens Willd. In moist, open areas; common.
Scirpus lineatus Michx. Wet areas along roads; occasional.

Araceae

Arisaema dracontium (L.) Schott. Lowland woods; occasional.
Arisaema triphyllum (L.) Schott in Schott & Endl. Lowland woods; common.

Commelinaceae

Commelina communis L. Along Bay Creek; occasional.
**Commelina diffusa* Burm. f. Along several of the streams; occasional.
Tradescantia ohiensis Raf. Along a road; only one colony found.
Tradescantia subaspera Ker-Gawler. Lowland or slope woods; occasional.
Tradescantia virginiana L. Open woods; fields; common.

Juncaceae

Juncus acuminatus Michx. Along Bay Creek; occasional.
Juncus biflorus Ell. Eroded gulley in field.
Juncus dudleyi Wieg. In an open field; found only once.
Juncus interior Wieg. On sandstone bluff; rare.
Juncus marginatus Rostk. Along a creek; rare.
Juncus tenuis Willd. Along streams; on sandstone bluffs; in open fields; common.
Luzula echinata (Small) Hermann. Dry woods, associated with sandstone outcroppings; occasional.
Luzula multiflora (Retz.) Lejeune. Woods on sandstone bluffs; occasional.

Liliaceae

Allium canadense L. Waste ground; along roads; on sandstone bluff tops.
**Allium vineale* L. Waste ground; common.
**Asparagus officinalis* L. Along roads; occasional.
Erythronium albidum Nutt. Moist shaded woods; occasional.
Erythronium americana Ker. Moist shaded sandstone ledges.
Nothoscordum bivalve (L.) Britt. in Britt. & Brown. Fields; on dry sandstone bluff tops.
Polygonatum biflorum (Walt.) Ell. Mossy slope near creek; on sandstone bluff tops; occasional.
Polygonatum commutatum (J. H. Schultes) Dietr. ex Otto & Dietr. Woods; common.
Smilacina racemosa (L.) Desf. Woods; common.
Smilax bona-nox L. In woods and climbing on trees on sandstone bluff tops; occasional.
Smilax glauca Walt. Woods; often on bluff tops; common.
Smilax hispida Muhl. ex Torr. Woods; common.
.*Smilax lasioneuron* Hook. Lowland and slope woods; occasional.
Smilax pulverulenta Michx. Lowland woods; occasional.
Smilax rotundifolia L. Woods, particularly along Spring Branch; occasional.
Trillium gleasonii Fern. Deep, shaded woods; not common.
Trillium recurvatum Beck. Woods; common.
Uvularia grandiflora Sm. Deep, shaded woods; occasional.
Uvularia sessilifolia L. Moist woods; rare.

Dioscoreaceae

Dioscorea quaternata [Walt.] J.F. Gmel. Along most streams; lowland woods; common.
Dioscorea villosa L. Slope woods; occasional.

Amaryllidaceae

Agave virginica L. On exposed sandstone bluff tops; occasional.
Hypoxis hirsuta (L.) Coville. Slope woods; bluff top woods; occasional.

Iridaceae

Sisyrinchium albidum Raf. Open areas near streams; occasional.
Sisyrinchium angustifolium Mill. Fields; bluff tops; occasional.

Orchidaceae

Aplectrum hyemale (Muhl.) Torr. Lowland woods; occasional.
Corallorhiza odontorhiza (Willd.) Nutt. Lowland woods; rare.
Corallorhiza wisteriana Conrad. Lowland and slope woods; rare.

Goodyera pubescens (Willd.) R.Br. ex Ait. Lowland woods; rare.
Habenaria peramoena Gray. Along Bay Creek; only one plant found.
Liparis lilifolia (L.) Rich. ex Lindl. Colony under *Juniperus virginiana* near edge of woods on sandstone bluff.
Orchis spectabilis L. Lowland woods; rare.
Spiranthes cernua (L.) Rich. Edge of field; one colony found.
Spiranthes gracilis (Bigel.) Beck. Mossy wooded slopes; rare.
Spiranthes grayi Ames. In thin soil on sandstone bluff tops; occasional.
Tipularia discolor (Pursh) Nutt. Moist, shaded woods; rare.

Salicaceae

Populus alba L. One specimen persistent from cultivation was found.
Populus deltoides Marsh. Along all streams; common.
Salix amygdaloides Anders. Along Hunting Branch; rare.
Salix interior Rowlee. Along a few of the streams; occasional.
Salix nigra Marsh. Along all streams; common.
Salix sericea Marsh. Along small tributary to Bay Creek; rare.

Juglandaceae

Carya cordiformis (Wang.) K. Koch. Primarily in slope woods; occasional.
Carya glabra (Mill.) Sweet. In slope and bluff top woods; common.
Carya ovalis (Wang.) Sarg. Slope woods; occasional.
Carya ovata (Mill.) K. Koch. Lowland and slope woods; common.
Carya texana Buckl. On sandstone bluff tops; rare.
Carya tomentosa (Poir.) Nutt. Lowland and slope woods; rare.
Juglans cinerea L. Rich, mesic woods; rare.
Juglans nigra L. Lowland and slope woods; occasional.

Betulaceae

Alnus serrulata (Ait.) Willd. Along most of the streams; common.
Betula nigra L. Along most of the streams; occasional.
Carpinus caroliniana Walt. Lowland and slope woods; common.
Corylus americana Walt. Lowland and slope woods, particularly near streams; common.
Ostrya virginiana (Mill.) K. Koch. Lowland and slope woods; common.

Fagaceae

Fagus grandifolia Ehrh. Low, mesic woods; common.
Quercus alba L. Most woodland types; common.
Quercus bicolor Willd. ex Muhl. Along a stream; only one tree found.
Quercus coccinea Muench. Edge of woods at upper parking lot; only one tree found.
Quercus falcata Michx. Slope woods; rare.
Quercus imbricaria Michx. Slope and bluff top woods; occasional.
Quercus marilandica Muench. Bluff top woods; common.
Quercus michauxii Nutt. Along Bay Creek; rare.
Quercus muhlenbergii Engelm. Slope woods; occasional.
Quercus palustris Muench. Along a few of the streams; occasional.
Quercus rubra L. Most woodland types; common.
Quercus stellata Wang. Bluff top woods; common.
Quercus velutina Lam. Most woodland types; common.

Ulmaceae

Celtis occidentalis L. Lowland woods; occasional.
Celtis pumila Pursh. Woods on sandstone bluffs; common.
Ulmus alata Michx. Woods on sandstone bluffs; common.
Ulmus americana L. Most woodland types; common.
Ulmus rubra Muhl. Primarily in floodplain woods; common.

Moraceae

Morus rubra L. Lowland woods; occasional.

Urticaceae

Boehmeria cylindrica (L.) Sw. Floodplain woods; common.
Laportea canadensis (L.) Gaudich. Flood-plain woods; occasional.
Parietaria pennsylvanica Muhl. ex Willd. In dry, powdery soil beneath sandstone cliffs; occasional.
Pilea pumila (L.) Gray. Flood-plain woods; along streams; common.

Aristolochiaceae

Aristolochia serpentaria L. Deep, moist woods; occasional, but often overlooked.
Asarum reflexum Bickn. Deep, moist woods; common.

Polygonaceae

Polygonum aviculare L. Edge of fields; occasional.

Polygonum convolvulus L. In fields; occasional.

Polygonum hydropiperoides Michx. Along streams; common.

Polygonum lapathifolium L. Along streams; common.

Polygonum pennsylvanicum L. Along streams; in fields; common.

Polygonum persicaria L. Along roads; edges of fields; common.

Polygonum punctatum Ell. Along streams; along roads in moist areas; common.

Polygonum scandens L. In woods on slopes and bluff tops; occasional.

Polygonum tenue Michx. Dry, exposed sandstone bluff top; occasional.

Polygonum virginianum L. Lowland woods; common.

**Rumex acetosella* L. In fields; along roads; common.

**Rumex crispus* L. Along roads; occasional.

Chenopodiaceae

Chenopodium album L. Field; along roads; common.

Chenopodium standleyanum Aellen. Slope woods; occasional.

Chenopodium hybridum L. Lowland woods; occasional.

Phytolaccaceae

Phytolacca americana L. Edge of woods; common.

Illecebraceae

Paronychia canadensis (L.) Wood. In shade on sandstone bluff tops; rare.

Paronychia fastigiata (Raf.) Fern. In sandy soil at base of cliffs; on sandstone bluffs; occasional.

Aizoaceae

**Mollugo verticillata* L. Moist waste areas; occasional.

Portulacaceae

Claytonia virginica L. Lowland and slope woods; common.

Talinum parviflorum Nutt. ex Torr. & Gray. Exposed sandstone bluff top; rare.

Caryophyllaceae

Cerastium nutans Raf. Along Bay Creek; occasional.

**Cerastium viscosum* L. Found in two areas along streams.

**Cerastium vulgatum* L. Along roads; edges of fields; occasional.

**Dianthus armeria* L. In stream bed of Bay Creek.

Silene antirrhina L. Along a road; rare.

Silene stellata (L.) Ait f. Slope woods; occasional.

**Stellaria media* (L.) Vill. In waste ground; occasional.

Magnoliaceae

Liriodendron tulipifera L. Rich, moist woods; common.

Annonaceae

Asimina triloba (L.) Dunal. Flood-plain and slope woods; common.

Ranunculaceae

Actaea alba (L.) Mill. Lowland woods; common.

Anemone virginiana L. Lowland and slope woods; occasional.

Anemonella thalictroides (L.) Spach. Flood-plain woods; common.

.*Aquilegia canadensis* L. On shaded sandstone; common.

Cimicifuga rubifolia Kearney. Deep, moist woodland; rare.

Delphinium tricorne Michx. Flood-plain and slope woods; occasional.

Hepatica acutiloba DC. Shaded, rocky woods; occasional; one of the first species to flower.

Hydrastis canadensis L. Lowland woods; occasional.

Isopyrum biternatum (Raf.) Torr. & Gray. Lowland and slope woods; common.

Myosurus minimus L. Along streams; occasional.

Ranunculus abortivus L. Along Bay Creek; occasional.

Ranunculus fascicularis Muhl. Slope and bluff top woods; occasional.

Ranunculus hispidus Michx. Slope and bluff top woods; occasional.

Ranunculus micranthus Nutt. ex Torr. & Gray. Slope woods; occasional.

Ranunculus recurvatus Poir. in Lam. Flood-plain woods; occasional.

Ranunculus septentrionalis Poir. in Lam. Flood-plain along Bay Creek; occasional.

Thalictrum dioicum L. Lowland woods; rare.

Berberidaceae

Caulophyllum thalictroides (L.) Michx. Lowland and slope woods; occasional.

Podophyllum peltatum L. In all woodland types; common.

Menispermaceae

Menispermum canadense L. Wooded slopes; occasional.

Papaveraceae

Sanguinaria canadensis L. Lowland woods; common.

Stylophorum diphyllum (Michx.) Nutt. Rich woodlands; occasional.

Fumariaceae

Corydalis flavula (Raf.) DC. Moist, shaded woods; common.

Dicentra canadensis (Goldie) Walp. One colony found on a wooded slope.

Dicentra cucullaria (L.) Bernh. Lowland and slope woods; occasional.

Cruciferae

**Arabidopsis thaliana* (L.) Heynh. Edge of roads; occasional.

Arabis canadensis L. Slope woods; occasional.

Arabis laevigata (Muhl.) Poir. in Lam. All woodland types; common.

Arabis virginica (L.) Poir. in Lam. Along edge of fields; occasional.

**Barbarea vulgaris* R.Br. in Ait. Waste areas; common.

**Capsella bursa-pastoris* (L.) Medic. Along roads; in fields; common.

Cardamine parviflora L. var. *arenicola* (Britt.) O.E. Schulz. Along streams; occasional.

Cardamine pennsylvanica Muhl. ex Willd. Flood-plain woods; occasional.

Dentaria laciniata Muhl. Lowland and slope woods; common.

Draba brachycarpa Nutt. ex Torr. & Gray. In fields; common.

Lepidium virginicum L. All waste areas; in fields; common.

Rorippa islandica (Oeder) Borbas. Along Hunting Branch; several plants found.

Rorippa sessiliflora (Nutt.) Hitchc. Along most streams; occasional.

Crassulaceae

Penthorum sedoides L. Along streams; occasional.

Sedum pulchellum Michx. On sandstone cliffs and boulders; occasional.

Sedum telephioides Michx. On sand stone cliffs and boulders, usually in the shade; occasional.

Sedum ternatum Michx. Very common in a flood-plain slippery elm woods, otherwise rare.

Saxifragaceae

Heuchera americana L. var. *hirsuticaulis* (Wheelock) Rosend., Butters, & Lak. Along Bay Creek near bases of oak-hickory slopes; occasional.

Heuchera parviflora Bartl. var. *rugelii* (Shuttlw.) Rosend., Butters, & Lak. Shaded sandstone cliffs; common. The flower period extends later into autumn than that of any other species.

Escalloniceae

Itea virginica L. Along Bay Creek; rare.

Hydrangeaceae

Hydrangea arborescens L. Woods and on shaded sandstone; common. This species is extremely variable in leaf pubescence and degree of sterile flowers present.

Hamamelidaceae

Liquidambar styraciflua L. Flood-plain woods; occasional.

Platanaceae

Platanus occidentalis L. Flood-plain woods and along streams; common.

Rosaceae

Agrimonia parviflora Ait. Along several streams; occasional.

Agrimonia pubescens Wallr. Lowland and slope woods; occasional.

Agrimonia rostellata Wallr. Lowland and slope woods; occasional.

Amelanchier arborea (Michx. f.) Fern. On sandstone cliffs; occasional. This species flowers as early as mid-March.

Aruncus dioicus (Walt.) Fern. Rocky, shaded woods; occasional.

Crataegus crus-galli L. Open woods; occasional.

Fragaria virginiana Duch. Along a road; occasional.

Geum canadense Jacq. Lowland and slope woods; along a road; common.

Geum vernum (Raf.) Torr. & Gray. Lowland and slope woods; occasional.

Geum virginianum L. Open woods near upper slope; only one plant found.

Gillenia stipulata (Muhl.) Trel. ex Branner & Coville. Wooded slopes and bluff tops; occasional.

Potentilla simplex Michx. Woods; fields; along streams; common.

Prunus americana Marsh. Open woods; occasional.

Prunus hortulana Bailey. Along roads; occasional.

Prunus serotina Ehrh. Woods; common.

Rosa carolina L. Along roads; wooded slopes; occasional.

Rosa setigera Michx. Wooded slopes; occasional.
Rubus allegheniensis Porter. Wooded slopes; fields; common.
Rubus flagellaris Willd. Wooded slopes; bluff tops; occasional.
Rubus occidentalis L. Fields; occasional.
Rubus ostryifolius Rydb. in Britt. Fields; common.
Rubus pennsylvanicus Poir. Fields; occasional.

Leguminosae

Amphicarpa bracteata (L.) Fern. Wooded slopes; occasional.
Apios americana Medic. Wooded slopes; occasional.
Baptisia leucantha Torr. & Gray. Floodplain along Bay Creek; rare.
Cassia fasciculata Michx. Woods; fields; along streams; roadsides; common.
Cassia marilandica L. Along a road; rare.
Cassia nictitans L. Fields; along streams; occasional.
Cercis canadensis L. Lowland and slope woods; common.
Clitoria mariana L. Woods on sandstone bluff top; occasional.
Crotalaria sagittalis L. Fields; occasional.
Desmodium canescens (L.) DC. Wooded slopes; occasional.
Desmodium ciliare (Muhl.) DC. Wooded slopes; rare.
Desmodium cuspidatum (Muhl.) Loud. Wooded slopes; occasional.
Desmodium glutinosum (Muhl.) Wood. Lowlands woods; occasional.
Desmodium illinoense Gray. Field; rare.
Desmodium marilandicum (L.) DC. Edge of woods near Natural Bridge.
Desmodium nudiflorum (L.) DC. Lowland and slope woods; common.
Desmodium nuttallii (Schindl.) Schubert. Bluff top woods; rare.
Desmodium paniculatum (L.) DC. Wooded slopes; common.
Desmodium pauciflorum (Nutt.) DC. Wooded slopes; occasional.
Desmodium rotundifolium DC. Slope and bluff top woods; occasional.
Desmodium sessilifolium (Torr.) Torr. & Gray. Wooded slopes; occasional.
Galactia volubilis (L.) Britton. Slope and bluff top woods; occasional.
Gleditsia triacanthos L. Along streams; occasional.
Lespedeza capitata Michx. Bluff top woods; occasional.
**Lespedeza cuneata* (Dom.-Cours.) G. Don. Along roads; common.
Lespedeza hirta (L.) Hornem. Bluff top woods; occasional.
Lespedeza intermedia S. Wats. in Britt. Wooded slopes; occasional.
Lespedeza procumbens Michx. Slope and bluff top woods; common.
Lespedeza repens (L.) Bart. Wooded slopes; occasional.
**Lespedeza stipulacea* Maxim. Planted and escaped along roads.
**Lespedeza striata* (Thunb.) Hook. & Arnott. Along roads; fields; common.
Lespedeza stuvei Nutt. Wooded slopes; occasional.
Lespedeza violacea (L.) Pers. Wooded slopes; occasional.
Lespedeza virginica (L.) Britt. Bluff top woods; occasional.
**Medicago sativa* L. Along roads; in fields; occasional.
**Melilotus alba* Desr. Fields; along roads; common.
**Melilotus officinalis* (L.) Lam. Fields; roadsides; common.
Psoralea psoralioides (Walt). Cory. Slope and bluff top woods; occasional.
Strophostyles helvola (L.) Britt. in Britt. & Brown. Along roads; occasional.
Strophostyles leiosperma (Torr. & Gray) Piper. Along Spring Branch; rare.
Strophostyles umbellata (Muhl.) Britt. in Britt. & Brown. Along roads; fields; occasional.
Stylosanthes biflora (L.) BSP. Slope and bluff top woods; occasional.
Tephrosia virginiana (L.) Pers. var. *holosericea* (Nutt.) Torr. & Gray. Slope and bluff top woods; occasional.
**Trifolium hybridum* L. Roadsides; fields; occasional.
**Trifolium pratense* L. Roadsides; fields; common.
**Trifolium procumbens* L. Roadsides; occasional.
**Trifolium repens* L. Fields; roadsides; common.
**Vicia villosa* Roth. Roadsides; occasional.

Geraniaceae

Geranium carolinianum L. Roadsides; fields; common.
Geranium maculatum L. Lowland and slope woods; common.

Oxalidaceae

Oxalis cymosa Small. Roadsides; slope

and bluff top woods; fields; common. Much variation exists in this species.

.*Oxalis stricta* L. Fields; roadsides; wooded slopes; common.

Oxalis violacea L. Slope and bluff top woods; common.

Linaceae

Linum medium (Planch.) Britt. in Britt. & Brown. Exposed sandstone bluff top; occasional.

Linum striatum Walt. Rock barrens along Hill Branch, October 4, 1952, *H.E. Ahles 6931.*

Linum virginianum L. Wooded slopes; occasional.

Balsaminaceae

Impatiens biflora Walt. Flood-plain woods; along streams; common.

Impatiens pallida Nutt. Flood-plain woods; occasional.

Polygalaceae

Polygala ambigua Nutt. Woods on sandstone bluff top; rare.

Polygala sanguinea L. Fields; occasional.

Euphorbiaceae

Acalypha gracilens Gray. Bluff top woods; rare.

Acalypha rhomboidea Raf. Roadsides; fields; occasional.

Acalypha virginica L. Roadsides; fields; open woods; occasional.

Chamaesyce maculata (L.) Small. Roadsides; fields; common.

Chamaesyce supina (Raf.) Moldenke. Fields; roadsides; occasional.

Croton monanthogynus Michx. Exposed sandstone bluff tops; rare.

Crotonopsis elliptica Willd. Exposed sandstone bluff tops; occasional.

Euphorbia corollata L. Slope and bluff top woods; fields; roadsides; common.

Euphorbia obtusata Pursh. Lowland woods; rare.

Celastraceae

Celastrus scandens L. Woods; occasional.

Euonymus atropurpureus Jacq. Lowland woods; occasional.

Euonymus obovatus Nutt. Rich woods; occasional.

Aquifoliaceae

Ilex decidua Walt. Flood-plain woods; occasional.

Anacardiaceae

Rhus aromatica Ait. Slope and bluff top woods; occasional. One of the first shrubs to flower.

Rhus copallina L. Flood-plain woods; roadsides; common.

Rhus glabra L. Wooded slopes; common.

Rhus radicans L. In all habitats; common.

Staphyleaceae

Staphylea trifolia L. Along several streams; common.

Aceraceae

Acer negundo L. Flood-plain woods; occasional.

Acer rubrum L. Flood-plain woods and wooded bluff tops; common.

Acer saccharinum L. Flood-plain woods; common.

Acer saccharum Marsh. Lowland and slope woods; common.

Hippocastanaceae

Aesculus glabra Willd. Woods; occasional.

Rhamnaceae

Ceanothus americanus L. Slope and bluff top woods; common.

Rhamnus caroliniana Walt. Lowland woods; occasional.

Vitaceae

Parthenocissus quinquefolia (L.) Planch. In all habitats; common.

Vitis aestivalis Michx. Flood-plain woods; common.

Vitis cinerea Engelm. ex Millardet. Wooded slopes; old fields; wooded bluff tops; common.

Vitis vulpina L. Along Spring Branch.

Tiliaceae

Tilia americana L. Flood-plain woods along Bay Creek; occasional.

Malvaceae

Sida spinosa L. Fields; occasional.

Hypericaceae

Ascyrum multicaule Michx. Wooded slopes and bluff tops; occasional.

Hypericum drummondii (Grev. & Hook.) Torr. & Gray. Exposed bluff tops; occasional.

Hypericum gentianoides (L.) BSP. Exposed bluff tops; occasional.

Hypericum mutilum L. Along Bay Creek and Spring Branch; occasional.

Hypericum perforatum L. Field; rare.

Hypericum prolificum L. Wooded bluffs; occasional.

Hypericum punctatum Lam. Roadsides; occasional.
Hypericum sphaerocarpon Michx. Roadsides; wooded slopes; occasional.

Cistaceae

Lechea tenuifolia Michx. Bluff top woods; occasional.

Violaceae

Hybanthus concolor (Forst.) Spreng. Lowland woods; common.
Viola eriocarpa Schw. Lowland woods; common.
Viola falcata Greene. Wooded slopes; occasional.
Viola missouriensis Greene. Flood-plain woods; occasional.
Viola papilionacea Pursh. Woods; common.
Viola rafinesquii Greene. Woods; fields; roadsides; common.
Viola sagittata Ait. Wooded slopes; rare.
Viola sororia Willd. Woods; common.
Viola striata Ait. Flood-plain woods; occasional.

Lauraceae

Lindera benzoin (L.) Blume. Lowland and slope woods; common.
Sassafras albidum (Nutt.) Nees. All woodland types; roadsides; edges of fields; common.

Lythraceae

Cuphea petiolata (L.) Koehne. Along a road; rare.
Rotala ramosior (L.) Koehne. Along Hunting Branch; rare.

Passifloraceae

Passiflora lutea L. Lowland and slope woods; occasional.

Cactaceae

Opuntia rafinesquii Engelm. Exposed sandstone bluff tops; occasional.

Cucurbitaceae

Melothria pendula L. Along Bay Creek; rare.

Onagraceae

Circaea latifolia Hill. Flood-plain woods; common.
Ludwigia alternifolia L. Moist woods; occasional.
Ludwigia polycarpa Short & Peter. Roadside; rare.
Oenothera biennis L. Along roads; common.
Oenothera linifolia Nutt. Exposed sandstone bluff tops; rare.
Oenthera pilosella Raf. Along a road; rare.
Oenothera tetragona Roth. Wooded slopes; rare.

Callitrichaceae

Callitriche terrestris Raf. Moist, shaded soil; occasional.

Cornaceae

Cornus alternifolia L. f. Lowland woods; rare.
Cornus drummondii C.A. Mey. Along several streams; common.
Cornus florida L. Woods; common.
Nyssa sylvatica Marsh. Lowland woods; occasional.

Araliaceae

Aralia racemosa L. Shaded sandstone boulders; rare.
Panax quinquefolius L. Lowland woods; occasional.

Umbelliferae

Angelica venenosa (Greenway) Fern. In dried-up stream bed; rare.
Chaerophyllum procumbens (L.) Crantz. Fields; roadsides; common.
Chaerophyllum tainturieri Hook. Fields; roadsides; common.
Cicuta maculata L. Along Bay Creek; rare.
Cryptotaenia canadensis (L.) DC. Flood-plain woods; common.
**Daucus carota* L. Waste ground; common.
Erigenia bulbosa (Michx.) Nutt. Lowland woods; occasional.
Eryngium yuccifolium Michx. Slope and bluff top woods; occasional.
Heracleum lanatum Michx. Flood-plain woods; rare.
Osmorhiza claytonii (Michx.) Clarke in Hook. f. Lowland woods; occasional.
Osmorhiza longistylis (Torr.) DC. Lowland and slope woods; occasional.
Sanicula canadensis L. All woodland types; occasional.
Sanicula gregaria Bickn. Flood-plain and slope woods; occasional
Thaspium trifoliatum (L.) Gray. All woodland types; common. Both the purple- and yellow-flowered forms have been found.

Ericaceae

Monotropa uniflora L. Lowland woods; rare.
Vaccinium arboreum Marsh. Bluff top woods; common.

Vaccinium vacillans Torr. Bluff top woods; occasional.

Ebenaceae

Diospyros virginiana L. Wooded slopes; edge of fields; common.

Primulaceae

Dodecatheon frenchii (Vasey) Rydb. Beneath overhanging sandstone cliffs; locally abundant.

Dodecatheon meadia L. Wooded slopes; common.

Lysimachia ciliata L. Flood-plain woods; common.

Lysimachia lanceolata Walt. Flood-plain woods; common.

Samolus parviflorus Raf. Moist, shaded soil; occasional.

Oleaceae

Forestiera acuminata (Michx.) Poir. in Lam. Along Bay Creek; rare.

Fraxinus americana L. All woodland types; common.

Fraxinus lanceolata Borkh. Lowland woods; occasional.

Fraxinus pennsylvanica Marsh. Lowland woods; rare.

Loganiaceae

Spigelia marilandica L. Bluff top woods; rare.

Gentianaceae

Frasera caroliniensis Walt. Wooded slopes; occasional.

Gentiana saponaria L. Lowland woods; rare.

Obolaria virginica L. Rich lowland woods; rare.

Sabatia angularis (L.) Pursh. Wooded slopes; fields; occasional. The white-flowered form was found mixed with typical specimens.

Apocynaceae

Amsonia tabernaemontana Walt. Along Bay Creek; occasional.

Apocynum cannabinum L. Waste ground; common.

Apocynum sibiricum Jacq. Exposed sandstone bluff; fields; roadsides; common.

Asclepiadaceae

Ampelamus albidus (Nutt.) Britt. Along several streams; common.

Asclepias exaltata L. Lowland woods; rare.

Asclepias incarnata L. Along some streams; occasional.

Asclepias purpurascens L. Fields; occasional.

Asclepias syriaca L. Roadsides; occasional.

Asclepias tuberosa L. Wooded slopes; fields; roadsides; common.

Asclepias variegata L. Wooded slopes; rare.

Asclepias verticillata L. Bluff top woods; field; occasional.

Convolvulaceae

Convolvulus americanus (Sims) Greene. Fields; roadsides; common.

Convolvulus arvensis L. Roadsides; occasional.

Cuscuta cuspidata Engelm. Roadside near field; one station found.

Cuscuta gronovii Willd. ex Roem. & Schultes. Roadside; growing on *Euphorbia corollata*.

**Ipomoea hederacea* Jacq. Slope woods; fields; common.

Ipomoea lacunosa L. Along Bay Creek; occasional.

Ipomoea pandurata (L.) Meyer. Fields, roadsides; occasional.

Polemoniaceae

Phlox bifida Beck. Bluff top woods; occasional.

Phlox divaricata L. Lowland and slope woods; common.

Phlox glaberrima L. Lowland woods at base of slope; rare.

Phlox paniculata L. Flood-plain woods; along streams; occasional.

Pholox pilosa L. Wooded slopes; occasional.

Polemonium reptans L. Lowland and slope woods; common.

Hydrophyllaceae

Hydrophyllum appendiculatum Michx. Lowland woods; occasional.

Hydrophyllum canadense L. Lowland woods; rare.

Phacelia bipinnatifida Michx. Lowland woods; common.

Phacelia purshii Buckley. Lowland woods; occasional.

Boraginaceae

Cynoglossum virginianum L. Wooded slopes; occasional.

Hackelia virginiana (L.) I.M. Johnst. Wooded slopes; occasional.

**Lithospermum arvense* L. Roadsides; fields; common.

Lithospermum latifolium Michx. Wooded slopes; rare.

Mertensia virginica (L.) Pers. ex Link. Lowland woods; occasional.

Myosotis macrosperma Engelm. Lowland woods; occasional.

Myosotis verna Nutt. Fields; roadsides; wooded slopes; common.

Phrymaceae

Phryma leptostachya L. Lowland woods; occasional.

Verbenaceae

Phyla lanceolata (Michx.) Greene. Along streams; common.

Verbena bracteata Lag. & Rodr. Roadsides; occasional.

Verbena hastata L. Roadsides; occasional.

Verbena simplex Lehm. Roadsides; fields; occasional.

Verbena stricta Vent. Roadsides; fields; common.

Verbena urticifolia L. Roadsides; fields; edge of woods; common.

Labiatae

Blephilia ciliata (L.) Benth. Wooded slopes; occasional.

Blephilia hirsuta (Pursh) Benth. Wooded slopes; occasional.

Cunila origanoides (L.) Britt. All woodland types; particularly abundant in bluff top woods.

Hedeoma pulegioides (L.) Pers. Wooded slopes; occasional.

**Lamium amplexicaule* L. Waste ground; common.

**Lamium purpureum* L. Fields; roadsides; occasional.

Lycopus virginicus L. Along Bay Creek; occasional.

Monarda bradburiana Beck. Slope and bluff top woods; common.

Monarda fistulosa L. Slope and bluff top woods; common.

**Prunella vulgaris* L. Waste ground, particularly disturbed areas along streams; common. This species is highly variable in our area.

Pycnanthemum flexuosum (Walt.) BSP. All woodland types; common.

Pycnanthemum incanum (L.) Michx. Wooded slopes; rare.

Pycnanthemum pycnanthemoides (Leavenw.) Fern. Wooded slopes; occasional.

Salvia lyrata L. Flood-plain woods; occasional.

Scutellaria elliptica Muhl. Slope and bluff top woods; occasional.

Scutellaria incana Biehler. Wooded slopes; occasional.

Scutellaria leonardii Epling. Bluff top woods; occasional.

Scutellaria ovata Hill. Slope and bluff top woods; occasional.

Stachys tenuifolia Willd. Along streams; occasional.

Teucrium canadense L. Along streams; occasional.

Solanaceae

**Datura stramonium* L. Fields; occasional.

Physalis pubescens L. Roadsides; rare.

Physalis subglabrata Mack. & Bush. Roadsides; fields; occasional.

Physalis virginiana Mill. Roadsides; fields; occasional.

Solanum carolinense L. Waste ground; occasional.

**Solanum nigrum* L. Moist soil in woods, fields, and along roads; occasional.

Scrophulariaceae

Aureolaria flava (L.) Farwell. Slope and bluff top woods; occasional.

Gerardia tenuifolia Vahl. Edge of fields; along streams; occasional.

Mimulus alatus Ait. Along several streams; common.

Pedicularis canadensis L. Lowland and slope woods; occasional.

Penstemon calycosus Small. Wooded slopes; occasional.

Penstemon deamii Pennell. Bluff top woods; rare.

Penstemon digitalis Nutt. ex Sims. Lowland woods; occasional.

Penstemon pallidus Small. Slope and bluff top woods; common.

Scrophularia marilandica L. Lowland and slope woods; occasional.

**Verbascum thapsus* L. Fields; roadsides; occasional.

**Veronica arvensis* L. Fields; roadsides; common.

Veronica peregrina L. Fields; roadsides; common.

Veronicastrum virginicum (L.) Farwell. All woodland types; occasional.

Acanthaceae

Dianthera americana L. In and along all streams; common.

Ruellia humilis Nutt. Slope and bluff top woods; common.

Ruellia pedunculata Torr. ex Gray. Roadside; only one plant found.

Ruellai strepens L. Edge of woods; occasional.

Orobanchaceae

Epifagus virginiana (L.) Bart. Lowland woods; occasional.

Bignoniaceae

Bignonia capreolata L. Lowland woods; bluff tops; occasional.

Campsis radicans (L.) Seem. Floodplain woods; occasional.

Plantaginaceae

Plantago aristata Michx. Waste ground; common.

**Plantago lanceolata* L. Waste ground; common.

Plantago pusilla Nutt. Exposed sandstone bluff tops; occasional.

Plantago rugelii Decne. in DC. Waste ground; common.

Plantago virginica L. Waste ground; common.

Rubiaceae

Cephalanthus occidentalis L. Along some of the streams; occasional.

Diodia teres Walt. Fields; roadsides; bluff tops; common.

Galium aparine L. Woods; roadsides; common.

Galium circaezans Michx. Moist soil; occasional.

Galium concinnum Torr. & Gray. Along streams; wooded slopes; occasional.

Galium obtusum Bigel. Along streams; occasional.

Galium pilosum Ait. Slope and bluff top woods; occasional.

Houstonia lanceolata (Poir.) Britt. Wooded slopes; occasional.

Houstonia longifolia Gaertn. Exposed sandstone bluff top; rare.

Houstonia pusilla Schoepf. Exposed bluff tops; common.

Mitchella repens L. Moist, shaded soil and boulders; occasional.

Caprifoliaceae

Lonicera flavescens Small. Lowland woods; rare.

**Lonicera japonica* Thunb. Waste ground; common.

Sambucus canadensis L. All woodland types; fields; common.

Symphoricarpos orbiculatus Moench. All woodland types; common.

Triosteum angustifolium L. Bluff top woods; rare.

Viburnum dentatum L. Along Hunting Branch; rare.

Viburnum prunifolium L. Wooded slopes; occasional.

Viburnum rufidulum Raf. Lowland and slope woods; occasional.

Campanulaceae

Campanula americana L. Lowland and slope woods; common.

Triodanis perfoliata (L.) Nieuwl. Slope and bluff top woods; fields; roadsides; common.

Lobeliaceae

Lobelia cardinalis L. Along some streams; occasional.

Lobelia inflata L. Edge of woods; along streams; fields; roadsides; common.

Lobelia leptostachys A. DC. Wooded slopes; rare.

Lobelia spicata Lam. Slope and bluff top woods; occasional.

Valerianaceae

Valeriana pauciflora Michx. Lowland woods; occasional.

Valerianella radiata (L.) Dufr. Along streams; occasional.

Compositae

**Achillea lanulosa* Nutt. Bluff top woods; one station found.

**Achillea millefolium* L. Fields; roadsides; common.

**Ambrosia artemisiifolia* L. Waste ground; common.

**Ambrosia bidentata* Michx. Exposed bluff tops; occasional.

**Ambrosia trifida* L. Waste ground; occasional.

Antennaria plantaginifolia (L.) Hook. All woodland types; common.

Aster anomalus Engelm. Wooded slopes; rare.

Aster ericoides L. Fields; common.

Aster exiguus (Fern.) Rydb. Fields; occasional.

Aster laevis L. Along a few of the streams; occasional.

Aster laterifolius (L.) Britt. Along Spring Branch; one station found.

Aster novae-angliae L. Wooded slopes; occasional.

Aster ontarionis Wieg. Fields; occasional.

Aster patens Ait. Wooded slopes; occasional.

Aster pilosus Willd. Fields; common.

Aster praealtus Poir. Fields; occasional.

Aster sagittifolius Wedem. Wooded slopes; occasional.

Aster shortii Lindl. Wooded slopes; occasional.

Aster simplex Willd. Fields; occasional.

Aster vimineus Lam. Fields; occasional.

Bidens aristosa (Michx.) Britt. Along some of the streams; occasional.

Bidens bipinnata L. Lowland woods; along streams; common.

Cacalia atriplicifolia L. Wooded slopes; occasional.

Cacalia muhlenbergii (Sch.-Bip.) Fern. Lowland woods; rare.

Chrysanthemum leucanthemum L. Slope and bluff top woods; roadsides; fields; common.

Cirsium altissimum (L.) Spreng. Roadsides; occasional.

Cirsium discolor (Muhl.) Spreng. Bluff top woods; occasional.

**Cirsium vulgare* (Savi) Airy-Shaw. Roadsides; fields; occasional.

Coreopsis tripteris L. Lowland and slope woods; occasional.

Eclipta alba (L.) Hassk. Along streams; occasional.

Elephantopus carolinianus Willd. Lowland woods; occasional.

Erechtites hieracifolia (L.) Raf. Wooded slopes; occasional.

Erigeron annuus (L.) Pers. Edge of woods; fields; roadsides; common.

Erigeron canadensis L. Fields; roadsides; common.

Erigeron philadelphicus L. Wooded slopes and bluff tops; fields; occasional.

Erigeron pulchellus Michx. Wooded slopes; occasional.

Erigeron strigosus Muhl. Roadsides; fields; woodlands; common.

Eupatorium coelestinum L. Lowland woods; along streams; common.

Eupatorium purpureum L. Lowland woods; occasional.

Eupatorium rugosum Houtt. Lowland woods; common.

Eupatorium serotinum Michx. Fields; common.

Gnaphalium obtusifolium L. Wooded slopes; occasional.

Gnaphalium purpureum L. Bluff top woods; occasional.

Helianthus decapetalus L. Wooded slopes; common.

Helianthus divaricatus L. Wooded slopes; common.

Helianthus grosseserratus Martens. Wooded slopes; occasional.

Helianthus hirsutus Raf. var. *trachyphyllus* Torr. Field; one plant found.

Helianthus strumosus L. Wooded slopes; occasional.

Hieracium gronovii L. Slope and bluff top woods; occasional.

Krigia biflora (Walt.) Blake. Wooded slopes; occasional.

Krigia dandelion (L.) Nutt. Bluff top woods; occasional.

Krigia oppositifolia Raf. Moist areas in fields; occasional.

Krigia virginica (L.) Willd. Wooded slopes; occasional.

Lactuca canadensis L. var. *latifolia* Kuntze. Fields; roadsides; occasional.

Liatris pycnostachya Michx. Bluff top woods; occasional.

Liatris scabra (Greene) K. Schum. Exposed sandstone bluff tops and in the woods; occasional.

Parthenium integrifolium L. Bluff top woods; occasional.

Polymnia canadensis L. Lowland woods; occasional.

Polymnia uvedalia L. Lowland woods, often among the boulders; rare.

Prenanthes altissima L. Moist, shaded sandstone cliffs; occasional.

Pyrrhopappus carolinianus (Walt.) DC. Roadsides; occasional.

Rudbeckia hirta L. Bluff top woods; fields; roadsides; common.

Rudbeckia subtomentosa Pursh. Wooded slopes; occasional.

Senecio aureus L. Along and in stream beds; common.

Senecio glabellus Poir. Lowland woods; occasional.

Silphium integrifolium Michx. Roadside; one plant found.

Silphium perfoliatum L. Along Bay Creek; one colony found.

Solidago altissima L. Fields; occasional.

Solidago canadensis L. Fields; occasional.

Solidago caesia L. Lowland and slope woods; common.

Solidago juncea Ait. Roadsides; occasional.

Solidago missouriensis Nutt. Bluff top woods; rare.

Solidago nemoralis Ait. Fields; wooded slopes; common.

Solidago ulmifolia Muhl. Slope and bluff top woods; common.

**Taraxacum officinale* Weber. Waste ground; common.

Verbesina alternifolia (L.) Britt. Lowland and slope woods; occasional.

Verbesina helianthoides Michx. Floodplain woods along Bay Creek; bluff top woods; occasional.

Vernonia fasciculata Michx. Bluff top woods; occasional.

Vernonia missurica Raf. Fields; occasional.

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Table 1.—Quadrat data from 5 lowland woods stations (10 random pairs for each. Station 1, 43.0 trees per acre; Station 2, 88.1 trees per acre; Station 3, 186.8 trees per acre; Station 4, 124.9 trees per acre; Station 5, 37.1 trees per acre).

Species	% Dominance					Relative Density					% Frequency				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Acer saccharum	4.9	13.5	13.1	29.4	5.7	10	10	20	30	7	20	20	40	50	14
Betula nigra	8.9	...	...	5.7	...	5	...	...	10	...	10	...	...	20	...
Carpinus caroliniana	1.5	0.8	...	...	...	5	5	...	...	...	10	10	...	...	...
Carya glabra	...	1.6	...	...	...	...	5	...	...	...	...	10	...	...	...
Carya ovata	...	1.1	...	1.4	...	...	5	...	5	...	...	10	...	10	...
Carya sp.	...	...	4.6	...	5.8	...	...	15	...	14	...	...	20	...	28
Cornus florida	...	...	...	...	0.7	...	...	...	...	7	...	...	...	...	14
Fagus grandifolia	...	60.4	58.4	41.1	70.5	...	50	35	30	50	...	60	60	50	71
Fraxinus spp.	...	...	1.2	1.0	...	...	...	5	5	...	...	...	10	10	...
Liriodendron tulipifera	45.6	...	21.1	15.4	...	15	...	20	5	...	20	...	30	10	...
Nyssa sylvatica	...	9.2	...	...	9.4	...	5	...	...	8	...	10	...	...	14
Quercus alba	...	12.6	1.2	1.1	...	...	15	5	5	...	...	30	10	10	...
Quercus rubra	39.1	0.8	...	4.5	7.9	65	5	...	10	14	70	10	...	20	14

TABLE 2.—Quadrat data from 5 lowland woods stations (10 random pairs each).

Species	% Composition					% Frequency				
	1	2	3	4	5	1	2	3	4	5
Acer rubrum	....	....	....	....	1.4	....	....	....	....	10
Acer saccharum	1.0	5.4	5.3	0.5	4.3	10	80	60	10	10
Allium canadense	0.4	....	....	....	....	20	....	....	....	....
Ambrosia trifida	7.0	....	0.4	....	....	30	....	10	....	....
Arisaema triphyllum	1.0	6.7	....	....	....	10	50	....	....	....
Arundinaria gigantea	0.5	....	....	11.4	6.5	10	....	....	30	30
Asarum reflexum	6.3	....	....	....	....	20	....	....	....	....
Asimina triloba	....	0.4	....	1.5	0.3	....	10	....	10	10
Botrychium virginianum	....	0.5	0.5	....	....	....	10	10	....	....
Brachyelytrum erectum	....	15.0	....	....	....	....	30	....	....	....
Bromus ciliatus	0.6	....	....	0.4	....	20	....	....	10	....
Carex spp.	0.5	4.5	2.0	0.5	1.4	10	20	10	10	10
Carpinus caroliniana	....	0.3	....	1.0	3.6	....	10	....	10	30
Carya cordinformis	3.0	....	....	....	....	10	....	....	....	....
Carya ovalis	....	3.5	1.5	....	....	....	10	10	....	....
Carya ovata	....	0.5	....	....	....	....	10	....	....	....
Cireaea latifolia	2.5	....	....	....	....	20	....	....	....	....
Cornus florida	....	0.8	....	....	....	....	10	....	....	....
Corylus americana	....	....	....	....	2.9	....	....	....	....	10
Cryptotaenia canadensis	....	3.3	....	....	....	....	10	....	....	....
Danthonia spicata	....	....	9.5	2.0	10.0	....	....	20	20	30
Desmodium nudiflorum	....	2.5	....	1.0	0.7	....	30	....	10	10
Desmodium spp.	....	....	3.0	....	....	....	....	10	....	....
Dioscorea quaternata	0.1	....	....	....	3.6	10	....	....	....	20
Dryopteris hexagonoptera	....	....	....	....	4.3	....	....	....	....	10
Dryopteris marginalis	....	0.5	....	....	....	....	10	....	....	....
Elephantopus carolinianus	8.0	....	....	....	....	70	....	....	....	....
Epifagus virginiana	....	0.5	....	....	0.7	....	10	....	....	10
Euonymus atropurpureus	....	....	29.4	0.5	....	....	....	40	10	....
Eupatorium spp.	4.8	....	....	2.0	....	80	....	....	10	....
Euphorbia corollata	....	0.5	....	....	....	....	10	....	....	....
Fagus grandifolia	....	2.8	....	....	....	....	40	....	....	....
Festuca spp.	0.8	....	....	....	....	20	....	....	....	....
Fraxinus spp.	....	2.0	0.1	0.9	....	....	30	10	20	....
Galium aparine	1.9	0.5	....	....	....	60	10	....	....	....
Galium circaezans	0.7	....	0.1	....	....	20	....	10	....	....
Galium concinnum	1.1	9.4	....	3.0	....	30	60	....	30	....
Geum canadense	1.2	....	....	....	....	30	....	....	....	....
Hybanthus concolor	0.6	....	....	....	....	20	....	....	....	....
Hydrangea arborescens	....	....	2.5	2.5	10.0	....	....	10	10	30
Hydrophyllum spp.	1.2	....	....	....	....	30	....	....	....	....
Impatiens biflora	2.2	0.3	....	2.0	....	40	10	....	10	....
Juniperus virginiana	....	0.7	....	....	....	....	20	....	....	....
Lindera benzoin	14.0	....	1.1	0.5	....	70	....	20	10	....
Luzula multiflora	0.1	....	....	....	....	10	....	....	....	....
Nyssa sylvatica	....	0.2	1.5	2.5	8.6	....	10	10	20	30
Ostrya virginiana	....	1.0	2.0	8.0	....	....	20	10	20	....
Oxalis stricta	0.5	....	....	0.5	....	10	....	....	10	....
Panicum boscii	0.7	....	....	....	....	10	....	....	....	....
Panicum latifolium	0.3	1.0	....	....	....	20	10	....	....	....
Panicum microcarpon	0.5	0.5	18.0	....	0.8	10	10	40	....	10
Panicum polyanthes	....	....	....	2.0	....	....	....	....	20	....

TABLE 2—(Continued)

Species	% Composition					% Frequency				
	1	2	3	4	5	1	2	3	4	5
Panicum spp.	0.3	...	...	0.5	...	10	...	...	10	...
Parthenocissus quinquefolia	10.5	9.7	4.6	2.0	9.3	50	50	40	20	70
Passiflora lutea	...	...	0.1	...	0.2	...	...	10	...	10
Phlox divaricata	0.1	...	...	...	...	10	...	...	...	...
Poa sylvestris	0.3	...	...	...	...	10	...	...	...	...
Podophyllum peltatum	...	...	0.3	...	...	...	...	10	...	...
Potentilla simplex	0.3	...	0.5	...	...	20	...	10	...	...
Prunus serotina	...	0.5	1.5	...	...	...	10	10	...	...
Quercus alba	...	...	...	1.4	2.9	...	...	...	20	10
Quercus rubra	...	...	0.5	0.5	0.9	...	...	10	10	30
Ranuuculus recurvatus	0.1	...	...	...	...	10	...	...	...	...
Rhus radicans	2.7	4.7	20.5	15.5	15.0	20	30	40	40	50
Rudbeckia hirta	0.1	...	...	...	...	10	...	...	...	...
Salvia lyrata	0.4	...	...	...	...	10	...	...	...	...
Sanguinaria canadensis	0.5	...	...	...	...	10	...	...	...	...
Sanicula spp.	0.4	...	...	...	...	20	...	...	...	...
Sassafras albidum	...	1.0	2.0	2.0	0.8	...	20	20	10	10
Sedum ternatum	0.4	...	...	...	...	10	...	...	...	...
Smilacina racemosa	...	...	0.5	...	2.9	...	...	10	...	10
Smilax bona-nox	...	0.2	...	...	...	...	10	...	...	...
Smilax glauca	...	...	0.9	3.7	...	...	...	30	30	...
Smilax hispida	1.4	...	...	...	...	40	...	...	...	...
Smilax rotundifolia	...	5.5	...	...	...	...	10	...	...	...
Solidago caesia	1.0	...	0.5	...	...	10	...	10	...	...
Staphylea trifolia	...	...	...	...	3.0	...	...	...	...	10
Symphoricarpos orbiculatus	0.5	...	...	0.4	...	10	...	...	10	...
Ulmus rubra	0.1	0.7	0.5	0.5	...	10	20	10	10	...
Uniola latifolia	0.6	0.5	2.0	...	...	20	10	10	...	...
Valeriana pauciflora	2.0	...	...	...	...	10	...	...	...	...
Viola eriocarpa	0.3	...	...	...	...	10	...	...	...	...
Viola papilionacea	1.6	...	...	...	...	50	...	...	...	...
Viola sororia	2.0	0.8	0.5	5.0	...	60	20	10	30	...
Viola striata	12.8	...	...	...	...	80	...	...	...	...
Vitis spp.	...	...	5.0	0.3	4.5	...	...	10	10	20
Woodsia obtusa	...	...	0.1	...	...	...	...	10	...	...

TABLE 3. — Quadrat data from 3 blufftop woodland stations. Station 1 (10 random pairs), 119 trees per acre, with 23.1 feet average distance between trees; Station 2 (6 random pairs), 110 trees per acre, with 24 feet average distance between trees; Station 3 (10 random pairs), 99 trees per acre, with 26.1 feet average distance between trees.

Species	% Dominance			Relative Density			% Frequency			Basal Area		
	1	2	3	1	2	3	1	2	3	1	2	3
Acer rubrum	...	...	2	...	...	5	...	...	10	...	...	28.3
Fraxinus americana	...	5	...	...	8	...	...	17	...	...	28.3	...
Juniperus virginiana	29	8	7	35	17	15	50	17	30	230.0	40.8	82.4
Quercus alba	32	49	11	15	8	15	20	17	20	251.9	254.3	126.3
Quercus marilandica	23	14	...	25	17	...	40	33	...	179.7	66.7	...
Quercus stellata	13	19	78	20	42	60	30	67	80	103.6	101.3	934.2
Quercus velutina	3	...	...	5	...	...	10	...	...	28.2	...	...
Ulmus alata	...	5	...	...	8	...	...	17	...	...	28.3	...
Ulmus americana	...	...	2	...	...	5	...	...	10	...	...	28.3

TABLE 4.—Quadrat data from 3 blufftop woodland stations. Station 1, 10 random pairs; Station 2, 6 random pairs; Station 3, 10 random pairs.

Species	% Composition			% Frequency		
	1	2	3	1	2	3
Acalypha virginica	....	0.1	....	....	17	....
Agave virginica	....	....	0.3	....	....	10
Andropogon virginicus	0.5	15.5	24.0	10	33	50
Antennaria plantaginifolia	16.4	0.9	16.5	30	33	70
Carex spp.	....	....	0.2	....	....	10
Carya spp.	0.2	....	0.1	10	....	10
Cheilanthes lanosa	....	....	0.2	....	....	10
Crotonopsis elliptica	0.3	2.1	0.6	20	67	30
Cunila origanoides	3.2	....	1.0	40	....	40
Danthonia spicata	40.2	19.1	18.2	80	83	70
Desmodium spp.	....	....	1.5	....	....	20
Diodia teres	....	1.7	....	....	17	....
Elymus virginicus	....	0.2	....	....	17	....
Euphorbia corollata	0.1	....	0.5	10	....	20
Festuca octoflora	2.5	3.3	....	10	17	....
Galium circaezans	....	....	0.1	....	....	10
Helianthus divaricatus	0.4	....	2.8	20	....	70
Hieracium gronovii	5.3	....	0.2	30	....	10
Houstonia longifolia	0.1	....	....	10	....	....
Hypericum drummondii	....	0.3	....	....	17	....
Juncus tenuis	....	8.7	....	....	17	....
Juniperus virginiana	....	0.1	0.1	....	17	20
Lechae tenuifolia	0.1	....	....	10	....	....
Lespedeza spp.	11.3	0.1	5.3	50	17	70
Opuntia rafinesquii	4.9	....	....	10	....	....
Panicum linearifolium	2.5	....	....	10	....	....
Panicum polyanthes	....	....	0.1	....	....	10
Panicum praecocius	5.0	....	....	10	....	....
Panicum xalapensis	....	1.7	....	....	17	....
Panicum spp.	0.4	2.5	3.1	10	50	80
Polygonatum biflorum	0.2	....	....	10	....	....
Pycranthemum flexuosum	....	1.7	....	....	17	....
Quercus marilandica	0.9	0.5	0.1	20	17	10
Quercus stellata	....	1.5	....	....	17	....
Rhus radicans	....	....	0.6	....	....	20
Rosa spp.	....	....	0.8	....	....	10
Rudbeckia hirta	....	....	0.1	....	....	10
Smilax glavca	4.1	....	0.2	20	....	20
Stylosanthes biflora	0.3	....	5.8	20	....	30
Tephrosia virginiana	....	....	1.5	....	....	10
Ulmus alata	....	....	0.2	....	....	20
Vaccinium arboreum	....	....	16.5	....	....	70
Vitis spp.	....	....	0.2	....	....	10

TABLE 5.—Quadrat data from 10 quadrats in a roadside field (4A) and 10 quadrats in an open field (4B). Average basal area for the roadside field was 13.0%, for the open field 11.5%.

Species	% Composition		% Dominance	
	4 A	4 B	4 A	4 B
Allium vineale	0.1	10	0.2	20
Andropogon virginicum	89.8	100	91.2	100
Carex hirsutella	0.2	10	0.7	20
Cassia fasciculata	0.4	40	1.3	90
Cercis canadensis	0.1	10	......	......
Crotonopsis elliptica	0.2	20	0.2	20
Desmodium spp.	1.3	60	0.9	50
Diodia teres	0.2	10	......	......
Diospyros virginiana	0.2	10	......	......
Galium spp.	0.2	10	0.2	10
Juncus tenuis	......	......	0.1	10
Juniperus virginiana	......	......	0.2	10
Lespedeza spp.	0.8	50	0.3	30
Panicum spp.	0.4	30	0.4	30
Parthenium integrifolium	0.6	30	0.6	40
Parthenocissus quinquefolia	0.5	20	0.2	10
Potentilla simplex	......	......	0.6	30
Rhus copallina	0.4	30	0.3	20
Rubus spp.	1.5	50	......	......
Sassafras albidum	0.3	20	1.1	60
Smilax glauca	0.6	50	1.2	80
Solidago spp.	1.1	50	0.1	10
Ulmus alata	0.3	20	......	......
Unidentified grasses	0.7	50	......	......
Unidentified herb	......	......	0.2	20