

The Vascular Flora of the Cucumber Creek Nature Preserve, LeFlore County, Oklahoma

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ABSTRACT The Cucumber Creek Nature Preserve is located in the Ouachita Mountains of southeastern Oklahoma, a region of high plant diversity in the state. An inventory of the preserve yielded 341 taxa of vascular plants in 231 genera and 98 families. The largest families were the Asteraceae (46) and Poaceae (27). The flora consisted of 52 annuals, 1 biennial, 287 perennials, and 95 woody taxa. Sixteen exotic species were collected, representing 4.7% of the flora. Twenty-five species were present that are tracked by the Oklahoma Natural Heritage Inventory: *Actaea pachypoda*, *Carex cephalophora*, *C. latebracteata*, *C. ouachitana*, *C. striatula*, *Castanea pumila* var. *ozarkensis*, *Chionanthus virginicus*, *Dirca palustris*, *Fraxinus quadrangulata*, *Galium arkansanum*, *Halesia tetraptera*, *Hamamelis vernalis*, *H. virginiana*, *Hypericum gentianoides*, *Ilex opaca*, *Iris cristata*, *Magnolia tripetala*, *Mitchella repens*, *Panax quinquefolius*, *Piptochaetium avenaceum*, *Polygala polygama*, *Ribes cynosbati*, *Spigelia marilandica*, *Stachys eplingii*, and *Uvularia grandiflora*.

INTRODUCTION Botanists have been active in the Ouachita Mountains since Thomas Nuttall's visit to the region in 1819 (Nuttall 1821). Almost a century after Nuttall's visit, G.W. Stevens visited the Ouachita Mountains in April 1913 and collected 350 specimens that are deposited in the herbaria of Oklahoma State University (OKLA) and the Bebb Herbarium at the University of Oklahoma (OKL) (Hoagland et al. 2007). Subsequent work in the Ouachita Mountains of Oklahoma and Arkansas has documented the importance of this region to mid-continent plant diversity. Zollner et al. (2005) summarized these efforts and listed 31 species endemic to the Ouachita Mountains, 19 of which occur in Oklahoma. As might be expected, LeFlore County, one of six Oklahoma counties in the Ouachita Mountains, possesses many State rare species tracked by the Oklahoma Natural Heritage Inventory (2007).

Despite the unique nature of the Ouachita Mountain flora, few floristic inventories have been published. Smith et al. (1997) reported 359 species at the McCurtain County Wilderness Area, 50 km south of the Cucumber

Creek Nature Preserve (CCNP). Crandall and Tyrl (2006) documented 447 species at the Pushmataha Wildlife Management Area, 70 km to the west. Both sites are substantially greater than the CCNP in size at 5,701 ha and 7,690 ha, respectively. The objective of this study was to complete a floristic inventory of the CCNP as a management tool for Nature Conservancy personnel and contribute to a fuller understanding of the region.

STUDY AREA The Cucumber Creek Nature Preserve, 34.57°N–34.60°N latitude and 94.68°W–94.573°W longitude, is a 1,323 hectare tract established in 1989 to preserve habitat for neo-tropical migrant birds (Nature Conservancy 2007). The Ouachita National Forest flanks the CCNP to the north, south, and east, with several small privately owned land parcels down stream (Figure 1).

The CCNP is located in the Ridge and Valley Belt of the Ouachita Mountain physiographic province of southeastern Oklahoma (Curtis and Ham 1979), a region characterized by broadly folded Mississippian and Pennsylvanian sandstones (Branson and Johnson 1979). The CCNP is flanked by Lynn Mountain to the north and Blue Bouncer Mountain to the south and is bisected by the Lynn Mountain syncline (Briggs 1973). Lynn and

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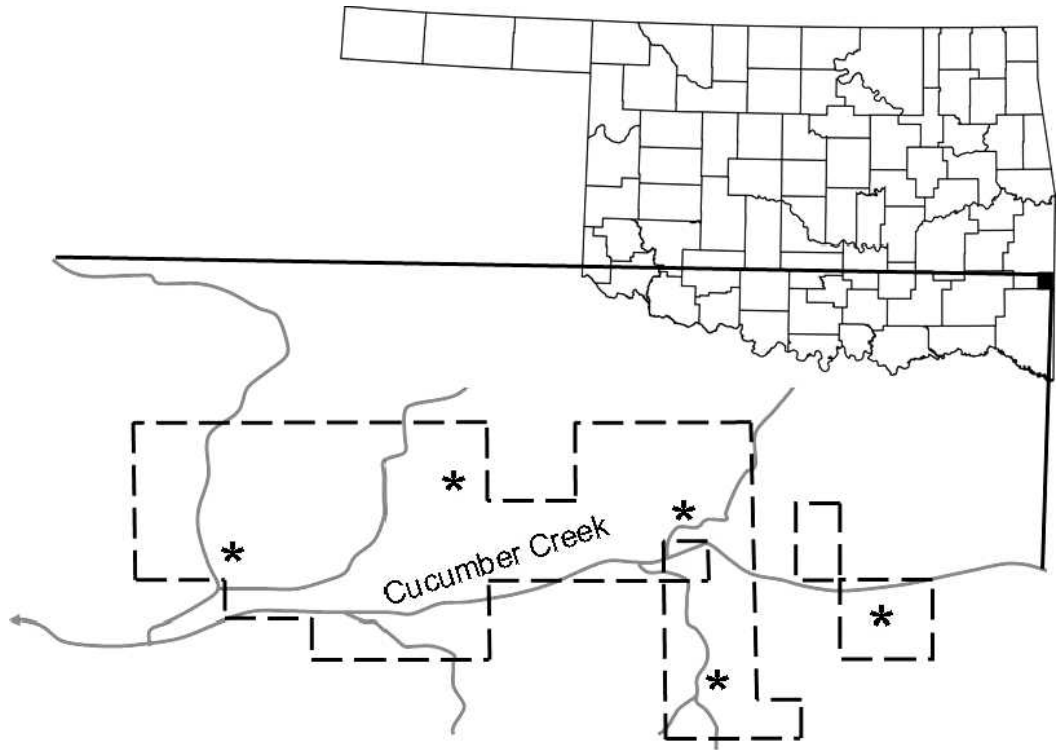


Figure 1. Location of The Nature Conservancy's Cucumber Creek Preserve, southeastern LeFlore County, Oklahoma. The preserve boundary is dashed lines, stars are collecting sites.

Blue Bouncer Mountains are capped by the Pennsylvanian age Game Refuge Formation consisting of interbedded white to brown sandstones and gray shale (Briggs 1973). The lower slopes of both are composed of Pennsylvanian sandstones of the undifferentiated Wesley-Markham Mill-Prairie Mountain formation, which intergrades with the quaternary alluvium along Cucumber Creek. The siliceous shale portion of the Wesley formation occurs in the CCNP. Peak elevation ranges from 670 m on Lynn Mountain to 611 m on Blue Bouncer Mountain. Elevations at CCNP range from a low of 335 m along Cucumber Creek to 488 m on Blue Bouncer Mountain.

Soils on the floodplain of Cucumber Creek belong to the frequently flooded Ceda-Rubble Land Complex (Abernathy et al. 1983). The Pirum-Carnasaw-Caston Complex occurs low on the north-face of Blue Bouncer Mountain. Slopes range from 35 to 60 percent slopes within the CCNP. The surface layer is a dark grayish brown stony loam that is 10 cm deep, and the subsurface is 13 cm deep and a yellowish brown gravelly loam. The Carna-

saw-Pirum Complex occurs from upper-mid slopes to the tops of Lynn and Blue Bouncer Mountains. The Carnasaw-Pirum Complex is divided into two slope classes, 4–15 percent and 15–35 percent. The surface layer is a dark brown stony loam that is 10 cm deep, and the subsurface is 8 cm deep and a brown gravelly loam (Abernathy et al. 1983).

The CCNP is located in the subtropical humid (Cf) climate zone (Trewartha 1968). Summers are warm and humid (mean July temperature = 26.9°C) and winters are relatively short and mild (mean January temperature = 2.7°C). Mean annual precipitation is 122 cm, the highest monthly precipitation occurring in April (13 cm) and May (15 cm) (Oklahoma Climatological Survey 2007).

METHODS Plant collections were made at five regularly visited sites (Figure 1) and opportunistically throughout the study area. In the winter of 2005, United States Geological Survey 1:24,000 topographic maps were studied to locate features such as wetlands, rock crops, and talus slopes that might harbor unique assemblages of species. A total of 7

Table 1. Summary of floristic collections at the Cucumber Creek Nature Preserve, LeFlore County, Oklahoma. Format follows Palmer et al. (1995)

Taxonomic Group	Species	Native	Exotic
Pteridophyta	8	8	0
Coniferophyta	2	2	0
Magnoliophyta	331	315	16
Magnoliopsida	263	251	12
Liliopsida	68	64	4
Total	341	325	16

candidate collect sites were located in this manner. Two of these sites were not revisited after the first field trip. For each plant specimen, the predominant vegetation association at the site was recorded using the classification of Hoagland (2000). Collecting began in March 2005 and continued monthly through October 2005. A total of 22 days were spent collecting plants at the CCNP. Vouchers for exotic species were made from naturalized populations only, thus excluding cultivated and ornamental plants. Specimens were processed at the Robert Bebb Herbarium at the University of Oklahoma following standard procedures. Manuals used for specimen identification included Waterfall (1973), Smith (1994), and Yatskiyevych (1999). Origin, either native or introduced to North America, was determined using the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) (2007). Nomenclature also follows the USDA-NRCS (2007). Voucher specimens were deposited at the Robert Bebb Herbarium at the University of Oklahoma.

RESULTS AND DISCUSSION A total of 341 vascular plant taxa in 231 genera and 98 families were collected at the CCNP, representing eight ferns (2.3%), two gymnosperms (0.6%), 68 monocots (19.9%), and 261 dicots (76.5%) (Table 1, Appendix). The Asteraceae and Poaceae had the greatest number of taxa, with 46 and 27 taxa, respectively. The largest genus was *Carex* with 16 species (4.7%). Of the taxa collected, fifty-two were annuals (15.2%), one was a biennial, and 288 were perennials (84.4%). Ninety-four taxa (27.6%) were trees (49 species), shrubs (31), or woody vines (14). Thirty taxa in this study have not been previously reported from LeFlore County. Sixteen taxa, or 4.7% of the flora, were non-native to Oklahoma. More species were

Table 2. Species tracked by the Oklahoma Natural Heritage Inventory that occurred at The Nature Conservancy's Cucumber Creek Nature Preserve. G Rank = global conservation rank, S Rank = state conservation rank. Species are ranked in this Table according to level of imperilment at the state (S) and global (G) levels on a scale of 1–5; 1 representing a species that is imperiled and 5 one that is secure (Groves et al. 1995)

Taxon	G Rank	S Rank
<i>Actaea pachypoda</i>	G5	S1
<i>Carex cephalophora</i>	G5	S2
<i>Carex latebracteata</i>	G3	S2
<i>Carex ouachitana</i>	G4	S2S3
<i>Carex striatula</i>	G4G5	S1
<i>Castanea pumila</i> var. <i>ozarkensis</i>	G5T3	S2
<i>Chionanthus virginicus</i>	G5	S2
<i>Dirca palustris</i>	G4	S1S2
<i>Fraxinus quadrangulata</i>	G5	S2S3
<i>Galium arkansanum</i>	G5	S1S2
<i>Halesia tetraptera</i>	G4G5	S2
<i>Hamamelis vernalis</i>	G4?	S2
<i>Hamamelis virginiana</i>	G5	S2
<i>Hypericum gentianoides</i>	G5	S1S2
<i>Ilex opaca</i>	G5	S2S3
<i>Iris cristata</i>	G5	S2
<i>Magnolia tripetala</i>	G5	S1
<i>Mitchella repens</i>	G5	S2S3
<i>Panax quinquefolius</i>	G4	S1
<i>Piptochaetium avenaceum</i>	G5	S2
<i>Polygala polygama</i>	G5	S2
<i>Ribes cynosbati</i>	G5	S1S2
<i>Spigelia marilandica</i>	G5	S?
<i>Stachys eplingii</i>	G5	S1S2
<i>Uvularia grandiflora</i>	G5	S2S3

present at the Pushmataha Wildlife Management Area (Crandall and Tyrl 2006) and the McCurtain County Wilderness Area (Smith et al. 1997), as would be expected given their greater size. Interestingly, there were only 18 more taxa at the McCurtain County Wilderness Area than the CCNP, although it is 4,378 ha larger.

Twenty-five species tracked by the Oklahoma Natural Heritage Inventory (ONHI) (2007) were encountered (Table 2). Species are ranked according to level of imperilment at the state (S) and global (G) levels on a scale of 1–5, where 1 represents a species that is critically imperiled and 5 one that it is secure (Groves et al. 1995). With one exception, *Carex latebracteata* ranked G3, the species in Table 1 were considered secure at the global level (G4 or G5). *Carex latebracteata* and *Galium arkansanum* are endemic to the Ouachita Mountains.

As mentioned previously the Ouachita Mountains are known for the high number

of rare plant species tracked by the ONHI. Crandall and Tyrl (2006) reported 13 species tracked by ONHI from the western Ouachita Mountains, 12 fewer than reported from the CCNP. The rare species encountered by Crandall and Tyrl (2006) are listed here, but note that seven species (designated with an asterisk) were not present at CCNP: **Brachyelytrum erectum* (Schreb. ex Spreng.) P. Beauv. (G5S1), **Calamovilfa arcuata* K.E. Rogers (G2S2), **Carex oklahomensis* Mack. (G4S?), **Carex oxylepis* Torr. & Hook. (G5?S2), **Dulichium arundinaceum* (L.) Britton (G5S1), *Ilex opaca* (G5S2S3), **Justicia ovata* (Walter) Landau var. *lanceolata* R.W. Long (G5S1), *Mitchella repens* (G5S2S3), *Piptochaetium avenaceum* (G5S2), *Polygala polygama* (G5S2), *Ribes cynosbati* (G5S1S2), **Smilax smallii* Morong (G5S), and *Tilia americana* L. var. *caroliniana* (Mill.) Castigl. (G5S1S2G5).

Smith et al. (1997) reported 14 species tracked by the ONHI from the McCurtain County Wilderness Area, a site located south of CCNP. Like Crandall and Tyrl (2006), this is fewer tracked species than reported from CCNP, but in the following list of rare species reported by Smith et al. (1997), eight species (designated with an asterisk) were not found at CCNP: **Amorpha ouachitensis* Wilbur (G3QS2, Ouachita endemic), **Baptisia nuttalliana* Small (G5S2), **Brachyelytrum erectum* (G5S1), *Carex latebracteata* (G3S2, Ouachita endemic), **Carex oxylepis* (G5?S2), *Chionanthus virginicus* (G5S2), *Hamamelis virginiana* (G5S2), *Ilex opaca* (S2S3), *Iris cristata* (G5S2), *Mitchella repens* (G5S2S3), **Panicum brachyanthum* Steud. (S2S3), **Phaseolus polystachios* (L.) Britton, Sterns & Poggenb. (G5S1), **Ribes curvatum* Small (G4S1), and **Streptanthus squamiformis* Goodman (G2S1, Ouachita endemic).

Collection sites at CCNP occurred within four vegetation associations. The site was predominantly forested with few disturbed areas. Only two forest associations were recognized, because the CCNP is primarily restricted to mesic and low slopes flanking Cucumber Creek. Nonetheless, dry forest vegetation did occur but was limited in area and thus subsumed into a mesic forest association. Descriptions of all vegetation categories follow.

1. *Quercus alba-Ulmus americana/Carpinus caroliniana* Forest Association [QAUA]

This Association was described by Hoagland et al. (1996) as the predominant forest

association on the Cucumber Creek floodplain. Like similar high gradient streams in the Ouachita Mountains, the Cucumber Creek floodplain consists of large cobble and boulders overlain with a thin layer of clay-loam soil. Associated species included *Amsonia tabernaemontana*, *Boehmeria cylindrica*, *Bromus pubescens*, *Carex cherokeensis*, *Crataegus marshallii*, *Cynoglossum virginianum*, *Desmodium glutinosum*, *Elephantopus carolinianus*, *Enemion biternatum*, *Erythronium rostratum*, *Galium aparine*, *Iris cristata*, *Mitchella repens*, *Pedicularis canadensis*, and *Sanguinaria canadensis*.

2. *Quercus muehlenbergii - Acer saccharum* Forest Association [QMAS]

This Association occurred on the slopes above the creek. Associated species from QAUA intermingled with the QMAS downslope, and dry forest species (i.e., *Pinus echinata*, *Quercus falcata*, *Q. stellata*, *Vaccinium pallidum*) were increasingly prevalent upslope, although extensive areas of xeric Ouachita oak-pine forest were absent. Associated species included *Adiantum pedatum*, *Asclepias quadrifolia*, *Dichantheium boscii*, *D. linearifolium*, *Hypericum hypericoides*, *Myosotis verna*, *Nyssa sylvatica*, *Ostrya virginiana*, *Polystichum acrostichoides*, *Sanicula canadensis*, *Silene virginica*, *Smallanthus uvedalius*, *Symphotrichum patens*, *Viburnum rufidulum*, and *Woodsia obtusa*.

3. *Hamamelis vernalis/virginiana - Cornus obliqua* Shrubland Association [HVCO]

This Association occurred on the margins of Cucumber Creek. The creek channel and the plants growing within are included in this category as well. Where the channel is widest, there is substantial exposure to sunlight. In addition to cobbles and boulders in the stream, spacious outcrops of sandstone occur at intervals. Associated species included *Alnus serrulata*, *Amorpha nitens*, *Andrachne phyllanthoides*, *Cephalanthus occidentalis*, *Hypericum prolificum*, *Justicia americana*, *Penthorum sedoides*, *Platanus occidentalis*, *Proserpinaca palustris*, and *Salix caroliniana*.

4. Disturbed areas (DA)

This category refers only to sites perceptibly disturbed by anthropogenic activity and does not include natural disturbance factors such as fire, insect outbreak, windthrow, and ice storms. Anthropogenic disturbances at CCNP consisted of a Civilian Conservation Corps firebreak-road that bisects the site north to

south, a road paralleling Cucumber Creek, and the site of an abandoned three room cabin. Of the two roads, there was more traffic on the CCC road, but this was limited to total of 4 vehicles seen during the course of the inventory. The manager of the CCNP had allowed fallen trees to block the Cucumber Creek road so as to limit access by all-terrain vehicles. Both roads were well-shaded with occasional breaks in the canopy. The cabin was once surrounded by a yard which was occupied by early successional species at the time of this inventory. Common plants in disturbed areas included *Bromus secalinus*, *Geranium carolinianum*, *Ligustrum sinense*, *Nothoscordum bivalve*, *Phytolacca americana*, *Poa annua*, *Trifolium repens*, and *Veronica arvensis*.

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APPENDIX Annotated species list for The Nature Conservancy's Cucumber Creek Nature Preserve, LeFlore County, Oklahoma. Each entry includes life history (A=annual, B=biennial, or P=perennial), vegetation association (*Quercus alba-Ulmus americana*/*Carpinus caroliniana* Forest Association = QUAU, *Quercus muehlenbergii* - *Acer saccharum* Forest Association = QMAS, *Hamamelis vernalis*/*virginiana* - *Cornus obliqua* Shrubland Association = HVCO, and disturbed areas = DA), and collection number. Introduced species are denoted by an asterisk (*) and taxa tracked by the Oklahoma Natural Heritage Inventory denoted with a double-dagger (‡).

PTERIDOPHYTA
ASPLENIACEAE

Asplenium platyneuron (L.) B. S. P. - P; QUAU, QMAS; CC013

DRYOPTERIDACEAE

Athyrium filix-femina (L.) Roth - P; QMAS; CC250
Dryopteris marginalis (L.) Gray - P; QUAU, QMAS; CC032
Polystichum acrostichoides (Michx.) Schott - P; QMAS; CC091
Woodsia obtusa (Spreng.) Torr. - P; QMAS; CC037

OPHIOGLOSSACEAE

Botrychium virginianum (L.) Sw. - P; QUAU, QMAS; CC044

POLYPODIACEAE

Pleopeltis polypodioides (L.) Andrews & Windham - P;
QUAU, QMAS; CC015

PTERIDACEAE

Adiantum pedatum L. - P; QMAS; CC113

CONIFEROPHYTA
CUPRESSACEAE

Juniperus virginiana L. - P; DA; CC165

PINACEAE

Pinus echinata P. Mill. - P; QMAS; CC302

MAGNOLIOPHYTA
MAGNOLIOPSIDA
ACANTHACEAE

Justicia americana (L.) Vahl - P; HVCO; CC301

ACERACEAE

Acer rubrum L. - P; QUAU, QMAS; CC130

Acer saccharum Marsh. - P; QMAS; CC115

ANACARDIACEAE

Rhus copallinum L. - P; DA; CC303

Rhus glabra L. - P; DA; CC155

Toxicodendron radicans (L.) Kuntze - P; DA, QUAU, QMAS;
CC109

ANNONACEAE

Asimina triloba (L.) Dunal - P; QMAS; CC174

APIACEAE

Chaerophyllum tainturieri Hook. - A; DA, QMAS; CC017

Sanicula canadensis L. - P; QUAU, QMAS; CC186

Sanicula odorata (Raf.) K. M. Pryer & L. R. Phillippe - P;
QUAU, QMAS; CC104

Taenidia integerrima (L.) Drude - P; QUAU, QMAS; CC098

**Torilis arvensis* (Huds.) Link - A; DA; CC179

Zizia aurea (L.) W. D. J. Koch - P; QUAU; CC331

APOCYNACEAE

Amsonia tabernaemontana Walt. - P; QUAU, QMAS; CC058

AQUIFOLIACEAE

Ilex decidua Walt. - P; QUAU; CC190

‡*Ilex opaca* Ait. - P; QUAU, QMAS; CC220

ARALIACEAE

‡*Panax quinquefolius* L. - P; QMAS; CC266

ARISTOLOCHIACEAE

Aristolochia serpentaria L. - P; QMAS; CC170

ASCLEPIADACEAE

Asclepias quadrifolia Jacq. - P; QMAS; CC095

Asclepias variegata L. - P; QUAU, QMAS; CC325

Matelea baldwyniana (Sweet) Woods. - P; QMAS; CC284

ASTERACEAE

Ageratina altissima (L.) King & H. E. Robins. - P; HVCO;
CC277

Ambrosia tremisiifolia L. - A; DA; CC355

Antennaria parlinii Fern. - P; QMAS; CC027

Bidens frondosa L. - A; HVCO; CC375

Boltonia diffusa Ell. - A; HVCO; CC335

**Cirsium vulgare* (Savi) Ten. - A; DA; CC271

Conyza canadensis (L.) Cronq. - A; DA; CC297

Coreopsis grandiflora Hogg ex Sweet - P; DA; CC352

Coreopsis tripteris L. - P; DA; CC341

Echinacea purpurea (L.) Moench - P; QMAS; CC218

Elephantopus carolinianus Raeusch. - P; QUAU; CC322

Erigeron pulchellus Michx. - P; DA; CC063

Erigeron strigosus Muhl. ex Willd. - A; QAU; CC192
Erigeron tenuis Torr. & Gray - P; HVCO, QAU; CC126
Eupatorium perfoliatum L. - P; QAU; CC308
Eupatorium purpureum L. - P; QAU; CC207
Eupatorium serotinum Michx. - P; HVCO, QAU; CC376
Facelis retusa (Lam.) Schultz-Bip. - A; DA; CC381
Gamochaeta purpurea (L.) Cabrera - P; DA; CC068
Helenium amarum (Raf.) H. Rock - A; DA; CC310
Helenium flexuosum Raf. - P; HVCO; CC263
Helianthus hirsutus Raf. - P; QMAS; CC281
Heliopsis helianthoides (L.) Sweet - P; QAU; CC193
Hieracium gronovii L. - P; QMAS; CC187
Krigia biflora (Walt.) Blake - P; DA, QMAS; CC101
Krigia dandelion (L.) Nutt. - P; HVCO; CC053
Liatris aspera Michx. - P; DA, QMAS; CC294
Packeria obovata (Muhl. ex Willd.) W. A. Weber & A. Love - P; QMAS; CC029
Polymnia canadensis L. - P; QAU; CC217
Pseudognaphalium obtusifolium (L.) Hilliard & Burt - A; DA; CC324
Rudbeckia hirta L. - P; DA, QMAS; CC160
Silphium asteriscus L. - P; QAU; CC212
Smallanthus weddalius (L.) Mackenzie ex Small - P; QAU; AB2900
Solidago caesia L. - P; QMAS; CC387
Solidago ludoviciana (Gray) Small - P; QMAS; CC256
Solidago petiolaris Ait. - P; DA, QMAS; CC363
Solidago rugosa P. Mill. - P; QMAS; CC393
Symphotrichum anomalum (Engelm.) Nesom - P; QMAS; CC370
Symphotrichum drummondii (Lindl.) Nesom - P; QMAS; CC369
Symphotrichum dumosum (L.) Nesom - P; QMAS; CC390
Symphotrichum lateriflorum (L.) A. & D. Love - P; QMAS; CC388
Symphotrichum oolentangiense (Riddell) Nesom - P; QAU, QMAS; CC359
Symphotrichum patens (Ait.) Nesom - P; QMAS; CC362
Verbesina helianthoides Michx. - P; DA, QAU; CC197
Verbesina virginica L. - P; DA; CC337
Vernonia baldwinii Torr. - P; DA; CC258

BERBERIDACEAE

Podophyllum peltatum L. - P; QAU; CC033

BETULACEAE

Alnus serrulata (Ait.) Willd. - P; HVCO; CC148
Carpinus caroliniana Walt. - P; QAU, QMAS; CC233
Ostrya virginiana (P. Mill.) K. Koch - P; QMAS; CC195

BIGNONIACEAE

Campsis radicans (L.) Seem. ex Bureau - P; DA, HVCO; CC169

BORAGINACEAE

Cynoglossum virginianum L. - P; QMAS; CC060
Myosotis verna Nutt. - A; QAU, QMAS; CC151

BRASSICACEAE

Arabis laevigata (Muhl. ex Willd.) Poir. B; DA, QMAS; CC020
Arabis missouriensis Greene - A; QMAS; CC070
Cardamine concatenata (Michx.) Sw. - P; QAU, QMAS; CC026
Cardamine hirsuta L. - A; DA; CC024
Draba brachycarpa Nutt. ex Torr. & Gray - A; DA; CC023

CALLITRICHACEAE

Callitriche heterophylla Pursh - A; HVCO; CC103

CAMPANULACEAE

Campanulastrum americanum (L.) Small - P; QAU, QMAS; CC272
Lobelia appendiculata A. DC. - P; QMAS; CC211
Lobelia cardinalis L. - P; HVCO; CC353
Triodanis lamprosperma McVaugh - A; DA; CC153
Triodanis perfoliata (L.) Nieuwl. - A; DA; CC120

CAPRIFOLIACEAE

Lonicera sempervirens L. - P; DA; CC041
Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli - P; HVCO; CC182
Symphoricarpos orbiculatus Moench - P; QMAS; CC180
Viburnum rufidulum Raf. - P; QMAS; CC080

CARYOPHYLLACEAE

**Cerastium fontanum* Baumg. - A; DA; CC142
 **Cerastium glomeratum* Thuill. - A; DA; CC049
Paronychia fastigiata (Raf.) Fern. - A; DA; CC351
Silene stellata (L.) Ait. F. - P; QMAS; CC267
Silene virginica L. - P; QMAS; CC002
 **Stellaria media* (L.) Vill. - A; DA; CC051

CELASTRACEAE

Euonymus americana L. - P; QAU, QMAS; CC132

CLUSIACEAE

‡*Hypericum gentianoides* (L.) B. S. P. - A; HVCO; CC326
Hypericum gymnanthum Engelm. & Gray - P; HVCO; CC327
Hypericum hypericoides (L.) Crantz - P; QMAS; CC254
Hypericum mutilum L. - P; HVCO; CC255
Hypericum prolificum L. - P; HVCO, QAU; CC288

CONVOLVULACEAE

Ipomoea pandurata (L.) G. F. W. Mey. - P; DA; CC317

CORNACEAE

Cornus florida L. - P; QMAS; CC038
Cornus obliqua Raf. - P; HVCO; CC224

CRASSULACEAE

Penthorum sedoides L. - P; HVCO; CC265

CUSCUTACEAE

Cuscuta glomerata Choisy - A; DA; CC316

EBENACEAE

Diospyros virginiana L. - P; DA, QAU, QMAS; CC0955

ELAEAGNACEAE

**Elaeagnus umbellata* - P; HVCO; CC066

ERICACEAE

Rhododendron canescens (Michx.) Sweet - P; QMAS; CC194
Vaccinium arboreum Marsh. - P; QMAS; CC276
Vaccinium pallidum Ait. - P; QMAS; CC087

EUPHORBACEAE

Acalypha virginica L. - A; DA; CC338
Croton glandulosus L. - A; DA; CC312
Euphorbia corollata L. - P; DA; CC290

Euphorbia cyathophora Murray - A; DA; CC314
Euphorbia longicuris Scheele - A; DA; CC055

FABACEAE

**Albizia julibrissin* Durazz. - P; HVCO; CC177
Amorpha nitens Boynt. - P; HVCO; CC127
Astragalus canadensis L. - P; QMAS; CC209
Baptisia bracteata Muhl. ex Ell. - P; QMAS; CC140
Cercis canadensis L. - P; QMAS; CC001
Chamaecrista nictitans (L.) Moench - A; DA; CC309
Desmodium glutinosum (Muhl. ex Willd.) Wood - P; QUAU; CC206
Desmodium nudiflorum (L.) DC. - P; QUAU; CC270
Galactia volubilis (L.) Britt. - P; QMAS; CC260
Lathyrus venosus Muhl. ex Willd. - A; QMAS; CC133
**Lespedeza cuneata* (Dum.-Cours.) G. Don - P; DA; CC304
Lespedeza procumbens Michx. - P; QMAS; CC364
Robinia pseudoacacia L. - P; DA; CC097
Senna marilandica (L.) Link - P; HVSO; CC259
**Trifolium repens* L. - P; DA; CC143
Vicia caroliniana Walt. - P; QUAU, QMAS; CC025
V. ludoviciana Nutt. - A; QUAU, QMAS; CC056

FAGACEAE

‡*Castanea pumila* (L.) P. Mill. var. *ozarkensis* (Ashe) Tucker - P; QMAS; CC291
Fagus grandifolia Ehrh. - P; QMAS; CC121
Quercus alba L. - P; QUAU, QMAS; CC175
Quercus falcata Michx. - P; QMAS; CC386
Quercus marilandica Muenchh. - P; QMAS; CC158
Quercus muehlenbergii Engelm. - P; QUAU, QMAS; CC172
Quercus rubra L. - P; QUAU, QMAS; CC116
Quercus stellata Wangenh. - P; QMAS; CC293
Quercus velutina Lam - P; QMAS; CC305

FUMARIACEAE

Corydalis micrantha (Engelm. ex Gray) Gray - A; QMAS; CC028

GERANIACEAE

Geranium carolinianum L. - A; DA; CC084

GROSSULARIACEAE

‡*Ribes cynosbati* L. - P; QMAS; CC099

HALORAGACEAE

Proserpinaca palustris L. - P; HVCO; CC348

HAMAMELIDACEAE

‡*Hamamelis vernalis* Sarg. - P; HVCO; CC011
‡*Hamamelis virginiana* L. - P; HVCO; CC383
Liquidambar styraciflua L. - P; QUAU; CC173

HIPPOCASTANACEAE

Aesculus glabra Willd. - P; QUAU; CC035

HYDRANGEACEAE

Hydrangea arborescens L. - P; QMAS; CC166

JUGLANDACEAE

Carya alba (L.) Nutt. ex Ell. - P; QUAU, QMAS; CC367
Carya cordiformis (Wangenh.) K. Koch - P; QUAU, QMAS; CC373
Carya ovata (P. Mill.) K. Koch - P; QMAS; CC328
Carya texana Buckl. - P; QMAS; CC323
Juglans nigra L. - P; QMAS; CC262

LAMIACEAE

Agastache nepetoides (L.) Kuntze - P; DA; CC377
Cunila origanoides (L.) Britt. - P; QMAS; CC287
Lycopus virginicus L. - P; HVCO; CC357
Monarda fistulosa L. - P; QUAU, QMAS; CC261
Monarda russeliana Nutt. ex Sims - P; QUAU, QMAS; CC135
Prunella vulgaris L. - P; DA, HVCO; CC082
Pycnanthemum albescens Torr. & Gray - P; DA; CC286
Pycnanthemum tenuifolium Schrad. - P; DA; CC159
Salvia lyrata L. - P; DA; CC034
Scutellaria ovata Hill - P; QMAS; CC196
‡*Stachys eplingii* J. Nelson - P; QUAU; CC203

LAURACEAE

Sassafras albidum (Nutt.) Nees - P; QMAS; CC078

LINACEAE

Linum striatum Walt. - A; DA; CC232

LOGANIACEAE

‡*Spigelia marilandica* (L.) L. - P; QUAU; CC184

LYTHRACEAE

Rotala ramosior (L.) Koehne - A; HVCO; CC280

MAGNOLIACEAE

‡*Magnolia tripetala* (L.) L. - P; QMAS; CC129

MENISPERMACEAE

Cocculus carolinus (L.) DC. - P; DA; CC273
Menispermum canadense L. - P; DA, QMAS; CC378

MORACEAE

Morus rubra L. - P; QUAU, QMAS; CC371

NYSSACEAE

Nyssa sylvatica Marsh. - P; QUAU, QMAS; CC088

OLEACEAE

‡*Chionanthus virginicus* L. - P; QUAU; CC150
Fraxinus americana L. - P; QUAU, QMAS; CC202
‡*Fraxinus quadrangulata* Michx. - P; QMAS; AB2898
**Ligustrum sinense* Lour. - P; DA; CC147

ONAGRACEAE

Ludwigia alternifolia L. - P; HVCO; CC345

OXALIDACEAE

Oxalis stricta L. - P; DA; CC067
Oxalis violacea L. - P; DA, QMAS; CC014

PAPAVERACEAE

Sanguinaria canadensis L. - P; QUAU, QMAS; CC016

PHYTOLACCACEAE

Phytolacca americana L. - P; DA; CC163

PLANTAGINACEAE

Plantago rhodosperma Dcne. - A; DA; CC134
Plantago rugelii Dcne. - P; DA; CC200

PLATANACEAE

Platanus occidentalis L. - P; HVCO; CC183

POLEMONIACEAE

Phlox pilosa L. - P; QAU, QMAS; CC059
Polemonium reptans L. - P; QMAS; CC111

POLYGALACEAE

‡*Polygala polygama* Walt. - P; DA; CC156

POLYGONACEAE

Polygonum punctatum Ell. - P; HVCO; CC339
Polygonum virginianum L. - P; QAU, QMAS; CC268
 **Rumex obtusifolius* L. - P; DA, HVCO; CC208

PORTULACACEAE

Claytonia virginica L. - P; QAU, QMAS; CC008

PRIMULACEAE

Lysimachia lanceolata Walt. - P; HVCO; CC189

RANUNCULACEAE

‡*Actaea pachypoda* Ell. - P; QMAS; CC168
Anemone virginiana L. - P; DA, QMAS; CC205
Clematis reticulata Walt. - P; DA, QMAS; CC214
Delphinium carolinianum Walt. - P; DA; CC176
Enemion biternatum Raf. - P; QAU, QMAS; CC022
Ranunculus abortivus L. - P; HVCO; CC048
Ranunculus harveyi (Gray) Britt. - A; QAU, QMAS; CC018
Ranunculus recurvatus Poir. - P; QAU, QMAS; CC216

RHAMNACEAE

Berchemia scandens (Hill) K. Koch - P; DA, HVCO; QAU, QMAS; CC039
Fragula caroliniana (Walt.) Gray - P; QAU, QMAS; CC141

ROSACEAE

Agrimonia pubescens Wallr. - P; QAU, QMAS; CC321
Amelanchier arborea (Michx. f.) Fern. - P; QMAS; CC005
Crataegus calpodendron (Ehrh.) Medik. - P; QMAS; CC144
Crataegus coccinioides Ashe - P; QAU, QMAS; CC123
Crataegus marshallii Egglest. - P; QAU, QMAS; CC119
Crataegus spathulata Michx. - P; QMAS; CC081
Crataegus viridis L. - P; QAU, QMAS; CC122
Geum canadense Jacq. - P; QAU, QMAS; CC188
Geum vernum (Raf.) Torr. & Gray - P; QAU, QMAS; CC221
Potentilla simplex Michx. - P; QMAS; CC136
Prunus americana Marsh. - P; DA; CC031
Prunus mexicana S. Wats. - P; QMAS; CC311
Prunus serotina Ehrh. - P; QMAS; CC343
Rosa setigera Michx. - P; DA, QMAS; CC215
Rubus flagellaris Willd. - P; QAU, QMAS; CC057
Rubus frondosus Bigelow - P; QAU, QMAS; CC124
Rubus ostryaefolius Rydb. - P; DA; CC108

RUBIACEAE

Cephalanthus occidentalis L. - P; HVCO; CC296
Galium aparine L. - A; QAU, QMAS; CC042
 ‡*Galium arkansanum* Gray - P; QMAS; CC219
Galium circaeazans Michx. - P; QAU, QMAS; CC228
Galium pilosum Ait. - P; QAU, QMAS; CC253
Houstonia ouachitana (E. B. Sm.) Terrell - A; QMAS; CC096
Houstonia purpurea L. - P; DA; CC229
Houstonia pusilla Schoeph. - A; DA; CC009
 ‡*Mitchella repens* L. - P; QAU, QMAS; CC092

SALICACEAE

Salix caroliniana Michx. - P; HVCO; CC329

SAPOTACEAE

Sideroxylon lanuginosum Michx. - P; QMAS; CC076

SAXIFRAGACEAE

Heuchera americana L. - P; QAU, QMAS; CC083

SCROPHULARIACEAE

Aureolaria grandiflora (Benth.) Pennell - A; QAU, QMAS; CC368
Gratiola neglecta Torr. - A; HVCO; CC279
Pedicularis canadensis L. - P; QAU, QMAS; CC012
Penstemon arkansanus Pennell - P; DA; CC112
 **Veronica arvensis* L. - A; DA; CC050

STAPHYLEACEAE

Staphylea trifolia L. - P; QMAS; CC128

STYRACACEAE

‡*Halesia tetraptera* Ellis - P; QAU, QMAS; CC171

THYMELAEACEAE

‡*Dirca palustris* L. - P; HVCO; CC385

TILIACEAE

Tilia americana L. - P; QMAS; CC223

ULMACEAE

Celtis tenuifolia Nutt. - P; QMAS; CC360
Ulmus alata Michx. - P; QMAS; CC292

URTICACEAE

Boehmeria cylindrica (L.) Sw. - P; QAU, QMAS; CC252

VALERIANACEAE

Valerianella radiata (L.) Dufur. - A; DA, HVCO; CC138

VERBENACEAE

Phryma leptostachya L. - P; QAU, QMAS; CC154
Verbena urticifolia L. - A; DA, HVCO; CC181

VIOLACEAE

Hybanthus concolor (T. F. Forst.) Spreng. - P; QMAS; CC086
Viola bicolor Pursh - A; DA; CC007
Viola palmata L. - P; QAU, QMAS; CC054
Viola pedata L. - P; QAU, QMAS; CC004
Viola pubescens Ait. - P; QAU, QMAS; CC062
Viola sororia Willd. - P; DA, QAU, QMAS; CC021
Viola villosa Walt. - P; QMAS; CC019

VISCACEAE

Phoradendron leucarpum (Raf.) Reveal & M. C. Johnston - P; QAU, QMAS; CC052

VITACEAE

Vitis cinerea (Engelm.) Millard - P; DA; CC100
Vitis riparia Michx. - P; HVCO; CC106
Vitis rotundifolia Michx. - P; QMAS; CC105

MAGNOLIOPHYTA

LILIOPSIDA
AGAVACEAE

Manfreda virginica (L.) Salisb. ex Rose - P; DA; CC298
Yucca arkansana Trel. - P; DA; CC295

ARACEAE

Ariseama triphyllum (L.) Schott - P; QAU, QMAS; CC046

COMMELINACEAE

Tradescantia hirsuticaulis Small - P; QMAS; CC061

Tradescantia ohiensis Raf. - P; QMAS; CC139

CYPERACEAE

Carex albicans Willd. ex Spreng. - P; QMAS; CC010

Carex blanda Dewey - P; QAU, QMAS; CC246

‡*Carex cephalophora* Muhl. ex Willd. - P; QAU, QMAS; CC234

Carex cherokeensis Schwein. - P; QAU, QMAS; CC236

Carex communis Bailey - P; QAU, QMAS; CC239

Carex festucacea Schkuhr ex Willd. - P; HVCO, QAU, QMAS; CC248

Carex frankii Kunth - P; HVCO; CC235

Carex granularis Muhl. ex Willd. - P; QAU, QMAS; CC244

Carex gravida Bailey - P; QAU, QMAS; CC243

‡*Carex latebracteata* Waterfall - P; QMAS; CC036

Carex laxiflora Lam. - P; QMAS; CC074

Carex leavenworthii Dewey - P; QAU, QMAS; CC247

Carex ouachitana Kral, Manhart & Bryson - P; QMAS; CC073

Carex reniformis (Bailey) Small - P; QAU, QMAS; CC240

Carex squarrosa L. - P; HVCO; CC350

‡*Carex striatula* Michx. - P; QAU, QMAS; CC241

Eleocharis lanceolata Fern. - A; HVCO; CC278

Rhynchospora globularis (Chapman) Small - P; HVOC; CC136a

Rhynchospora glomerata (L.) Vahl - P; HVCO; CC275

DIOSCOREACEAE

Dioscorea quaternata J. F. Gmel. - P; QMAS; CC107

IRIDACEAE

‡*Iris cristata* Ait. - P; QAU, QMAS; CC043

Sisyrinchium angustifolium P. Mill. - P; DA; CC137

JUNCACEAE

Juncus bufonius L. - A; HVCO; CC227

Juncus coriaceous Mackenzie - P; HVCO; CC199

Luzula bulbosa (Wood) Smyth & Smyth - P; QMAS; CC003

LILIACEAE

Allium canadense L. - P; QAU, QMAS; CC064

Camassia scilloides (Raf.) Cory - P; QMAS; CC047

Erythronium rostratum W. Wolf - P; QAU, QMAS; CC030

Maianthemum racemosum (L.) Link - P; QAU, QMAS; CC131

Nothoscordum bivalve (L.) Britt. - P; DA; CC040

Polygonatum biflorum (Walt.) Ell. - P; QAU, QMAS; CC090

‡*Uvularia grandiflora* Sm. - P; QAU, QMAS; CC045

ORCHIDACEAE

Spiranthes cernua (L.) L. C. Rich. - P; DA; CC379

POACEAE

Agrostis perennans (Walt.) P. Tuckerman - P; HVCO; CC366

Andropogon gerardii Vitman - P; DA, QMAS; CC300

Bromus pubescens Muhl. ex Willd. - P; QAU, QMAS; CC094

**Bromus secalinus* L. - A; DA; CC225

Chasmanthium latifolium (Michx.) Yates - P; QAU, QMAS; CC264

Chasmanthium sessiliflorum (Poir.) Yates - P; QAU, QMAS; CC282

**Dactylis glomerata* L. - P; DA; CC079

Dichanthelium acuminatum (Sw.) Gould & C. A. Clark - P;

QAU, QMAS; CC230

Dichanthelium boscii (Poir.) Gould & C. A. Clark - P; QAU, QMAS; CC114

Dichanthelium commutatum (J. A. Schultes) Gould - P;

QAU, QMAS; CC125

Dichanthelium dichotomum (L.) Gould - A; QMAS; CC313

Dichanthelium laxiflorum (Lam.) Gould - P; QMAS; CC110

Dichanthelium linearifolium (Scribn. ex Nash) Gould - P;

QMAS; CC118

Dichanthelium sphaerocarpon (Ell.) Gould - P; QAU, QMAS; CC231

**Echinochloa crus-galli* (L.) Beauv. - A; DA, HVCO; CC283

Elymus hystrix L. - P; QMAS; CC157

Elymus virginicus L. - P; QMAS; CC222

Festuca subverticillata (Pers.) Alexeev - P; HVCO, QAU, QMAS; CC191

Glyceria striata (Lam.) A. S. Hitchc. - P; HVCO; CC198

Leptochloa panicea (Retz.) Ohwi - A; HVCO; CC334

Melica mutica Walt. - P; QMAS; CC069

Panicum anceps Michx. - P; DA, QAU, QMAS; CC307

‡*Piptochaetium avenaceum* (L.) Parodi - P; HVCO; CC152

**Poa annua* L. - A; DA; CC006

Poa autumnalis Muhl. ex Ell. - P; DA, QAU, QMAS; CC072

Poa sylvestris Gray - P; QAU, QMAS; CC145

Tridens flavus (L.) A. S. Hitchc. - P; DA; CC306

SMILACACEAE

Smilax bona-nox L. - P; DA, QAU, QMAS; CC077

Smilax glauca Walt. - P; DA, QAU, QMAS; CC285

Smilax laurifolia L. - P; QAU, QMAS; CC071

Smilax rotundifolia L. - P; DA; CC085

Smilax tamnoides L. - P; QMAS; CC089