

THE VASCULAR FLORA OF HALE SCOUT RESERVATION LEFLORE COUNTY, OKLAHOMA

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ABSTRACT

The Hale Scout Reservation is located in the Ouachita Mountains of southeastern Oklahoma, a region of high plant diversity in the state. A vascular plant inventory yielded 463 species of vascular plants in 288 genera and 99 families. The largest families were the Asteraceae (with 65 species) and Poaceae (56). The flora consisted of 120 annuals, 1 biennial, and 342 perennials. Forty-two non-native species were collected, representing 8.8% of the flora. Sixteen species tracked by the Oklahoma Natural Heritage Inventory were present: *Amorpha ouachitensis* (S1), *Aristolochia serpentaria* (S1), *Baptisia nuttalliana* (S2), *Brachyelytrum erectum* (S1), *Brasenia schreberi* (S1), *Carex ouachitana* (S1), *Chionanthus virginicus* (S2), *Clematis crispa* (S1), *Didiplis diandra* (S1S2), *Galium arkansanum* (S2), *Houstonia ouachitana* (S1), *Juncus repens* (S1), *Modiola caroliniana* (S2), *Monotropa hypopithys* (S1), *Muhlenbergia bushii* (S1), and *Ribes cynosbati* (S2) (Oklahoma Natural Heritage Inventory, 2010).

INTRODUCTION

The Ouachita Mountains are a region of high species richness and habitat diversity within the Interior Highlands of the United States (Zollner et al. 2005). The first botanist to visit the Oklahoma Ouachita Mountains was Thomas Nuttall during his expedition from Fort Smith to the Kiamichi River in 1819. Since then, the unique nature of the Ouachita Mountain flora has continued to attract botanists. In April 1913, almost a century after Nuttall, G. W. Stevens visited the Ouachitas and collected 350 plant specimens (Hoagland et al. 2010). Drawing upon botanical records from the region, Zollner et al. (2005) compiled a list of 31 vascular plant species endemic to the Ouachita Mountains. Nineteen of these occur in Oklahoma. In addition, several state rare plant species tracked by the

Oklahoma Natural Heritage Inventory (ONHI; 2010) occur in the Ouachitas.

Despite a long history of botanical collecting in the Ouachita uplift, only three floristic lists from the Oklahoma Ouachitas have been published: Smith et al. (1997), Crandall and Tyrl (2006), and Hoagland and Buthod (2009). Smith et al. (1997) inventoried the vascular flora of the McCurtain County Wilderness Area located 66 km southeast of our study site in the Beavers Bend Hills sub-region of the Ouachitas. Fifty-one km west of our study area in Pushmataha County, Crandall and Tyrl (2006) inventoried the vascular plants of Oklahoma Department of Wildlife Conservation's Pushmataha Wildlife Management Area. Hoagland and Buthod (2009) inventoried The Nature Conservancy's Cucumber Creek Nature Preserve 31 km east in LeFlore County.

The objective of this study was to inventory the vascular plants of the Hale Scout Reservation. The resulting list will be used as an educational tool at the camp and will enhance the knowledge of plant distributions in the Ouachita Mountains.

STUDY AREA

The Hale Scout Reservation (HSR) is located in the Ouachita Mountains of LeFlore County, Oklahoma (34.736° latitude, 94.888° longitude). It is a 192.4 hectare (= 475.4 acre) inholding within the Ouachita National Forest and has been operated by the Boy Scouts of America since 1961 (Boy Scouts of America 2010). Elevation at the site ranges from 251 m to 457 m. The site is drained by Bohannon Creek, which bisects HSR from north to south, and is impounded by 7.7 hectare Bohannon Lake.

The climate is subtropical humid (Cf) (Trewartha 1968). Summers are warm and humid (mean July temperature = 26.9° C; 80° F) and winters are relatively short and mild (mean January temperature = 2.7° C; 37° F). Mean annual precipitation is 122 cm; 48 in., with the highest monthly precipitation occurring in April (13 cm; 5.1 in.) and May (15 cm; 5.9 in., Oklahoma Climatological Survey 2010).

The HSR is located in the Ridge and Valley Belt of the Ouachita Mountain physiographic province of southeastern Oklahoma (Curtis and Ham 1979). The region is characterized by broadly folded Mississippian and Pennsylvanian sandstones (Branson and Johnson 1979). Soils on the floodplain of Bohannon Creek belong to Kenn-Ceda complex, which occurs on slopes of 0-2% and are occasionally flooded (Abernathy et al. 1983). The surface layer is dark brown in color and ranges from 18 – 20 cm (7.1-7.9 in.) in depth. The upland soils belong to the Carnasaw-Caston complex and the Carnasaw-Octavia complex. The Carnasaw-Caston complex

consists of two units, one on slopes of 4%-15%, the other on slopes of 15%-35%. These soils are well-drained, with a surface layer of brown stony loam approximately 7.6 cm (3 in.). The Carnasaw-Octavia complex occupies slopes of 35% - 50% and is well-drained, dark grayish brown, and varies from sandy loam to stony loam.

METHODS

Plant collections were made opportunistically throughout the study area from June 2006 through October 2007. The predominant vegetation associations of HSR were classified according to Hoagland (2000). Vouchers for exotic species were made from naturalized populations only, thus excluding cultivated and ornamental plants. Specimens were processed at the Robert Bebb Herbarium (OKL) at the University of Oklahoma following standard procedures. Manuals used for specimen identification included Waterfall (1973), Smith (1994), and Yatskievych (1999). Origin, either native or introduced to North America, was determined using the United States Department of Agriculture-Natural Resources Conservation Service (2010). Nomenclature and systematics also follow the USDA-NRCS (2010). Voucher specimens were deposited at the Robert Bebb Herbarium at the University of Oklahoma.

RESULTS AND DISCUSSION

A total of 463 vascular plant species in 288 genera and 99 families were collected at HSR, including seven species of ferns (1.5% of the flora), one gymnosperm (0.22%), 333 dicots (72%), and 123 monocots (26.5%) (Table, Appendix). The Asteraceae and Poaceae had the greatest numbers of species, with 65 and 56, respectively. The largest genus was *Carex* with 14 species (3%). There were 120 annuals (25.9%), 1 biennial, and 343 perennials (73.9%).

Ninety-four species (27.6%) were trees (49 species), shrubs (31), or woody vines (14). Forty-two species (8.8%) were non-native to North America.

Sixteen species tracked by the Oklahoma Natural Heritage Inventory (2007) were encountered: *Amorpha ouachitensis* (G3QS1), *Aristolochia serpentaria* (G4S1), *Baptisia nuttalliana* (G5S2), *Brachyelytrum erectum* (G5S1), *Brasenia schreberi* (G5S1), *Carex ouachitana* (G4S1), *Chionanthus virginicus* (G5S2), *Clematis crispa* (G5S1), *Didiplis diandra* (G5S1), *Galium arkansanum* (G5S2), *Houstonia ouachitana* (G3S1), *Juncus repens* (G5S1), *Modiola caroliniana* (G5S2), *Monotropa hypopithys* (G5S1), *Muhlenbergia bushii* (G5S1), and *Ribes cynosbati* (G5S2). Species are ranked according to level of imperilment at the state (S) and global (G) levels on a scale of 1 through 5, where 1 represents a species that is critically imperiled and 5 one that is secure (Groves et al. 1995). *Galium arkansanum* and *Houstonia ouachitana* are endemic species of the Ouachita Mountains (Zollner et al. 2005).

The HSR flora consists of more species than the Cucumber Creek Nature Preserve (with 341 species), McCurtain County Wilderness Area (359), and Pushmataha Wildlife Management Area (447), which is interesting since these sites are larger than the HSR; Cucumber Creek Nature Preserve = 1,333 ha, McCurtain County Wilderness Area = 5,701 ha, and Pushmataha Wildlife Management Area = 7,690 ha. As expected, there are numerous species that occur in both the HSR flora and the other sites; HSR shares 236 shared species with the Pushmataha Wildlife Management Area and 178 with Cucumber Creek Nature Preserve. Smith et al (1997) did not include a species list, so comparison with HSR flora was not possible.

Land use and the number of non-native species might account for the greater number of species at HSR. In the case of Cucumber Creek, the site has very little development and consists primarily of

second growth, closed canopy forests. Of the three sites, the Pushmataha WMA has the most development for hunting and recreation. The McCurtain County Wilderness Area could be characterized as intermediate. The HSR, however, is heavily developed to maximize potential as a Scouting venue. This is reflected in its number of non-native species (42 species), which is greater than that from the Cucumber Creek Nature Preserve (16), the McCurtain County Wilderness (21), and the Pushmataha Wildlife Management Area (31).

Four vegetation associations were identified at HSR. Dry upland forests were the most prevalent natural vegetation type, followed by the extensive area that suffers from anthropogenic disturbance. Although Bohannon Lake occupies a small percentage of the total area at HSR, it supported numerous wetland and aquatic plant species. Descriptions of all vegetation categories follow.

1. *Pinus echinata* – *Quercus rubra* – *Quercus falcata* forest association (PEQRF)

This was the predominant upland forest type, but in some locales, *P. echinata* was absent. In these situations, *Q. velutina* was the co-dominant. Canopy cover was closed for the most part, but small patches of open woodland did exist. Associated species included *Antennaria plantaginifolia*, *Carya texana*, *Clitoria mariana*, *Helianthus hirsutus*, *Hypericum hypericoides*, *Scutellaria ovata*, *Tephrosia virginiana*, *Vaccinium arboreum*, and *V. pallidum*. *Aristolochia serpentaria* and *Baptisia nuttalliana* are species tracked by ONHI that were found in this habitat type.

2. *Acer saccharum* – *Quercus alba* – *Carya alba* forest association (ASQA)

This forest association occurred on low and north-facing slopes. *Pinus echinata* and other xeric tree species were often canopy components, but not dominants. *Quercus rubra* and *Nyssa sylvatica* were locally

abundant. Associated species included *Agrimonia rostellata*, *Asclepias quadrifolia*, *Frangula caroliniana*, *Fraxinus americana*, *Geum canadense*, *Morus rubra*, *Nyssa sylvatica*, *Ostrya virginiana*, *Pblox pilosa* ssp. *ozarkana*, *Podophyllum peltatum*, *Polystichum acrostichoides*, and *Zizia aurea*. *Brachyelytrum erectum*, *Carex ouachitana*, *Chionanthus virginicus*, *Clematis crispa*, *Galium arkansanum*, *Houstonia ouachitana*, *Modiola caroliniana*, *Monotropa hypopithys*, *Muhlenbergia bushii*, and *Ribes cynosbati* are species tracked by ONHI found in this habitat.

3. Wetland (WETL)

Wetland vegetation was restricted to Bohannon Lake and consisted of emergent and floating leaf vegetation. Emergent vegetation occurred along the banks of the lake and consisted of species such as *Amorpha fruticosa*, *Carex crinita*, *Cornus obliqua*, *Eleocharis quadrangulata*, *Hydrolea ovata*, *Juncus effusus*, *Polygonum lapathifolium*, *Sagittaria platyphylla*, and *Steinchisma bians*. The predominant species of floating leaf vegetation were *Brasenia schreberi* and *Nuphar lutea*. Associated species included *Elodea canadensis*, *Nymphaea odorata*, *Myriophyllum heterophyllum*, *Polygonum hydropiperoides*, *Potamogeton nodosus*, and *Spirodela polyrrhiza*. Species tracked by ONHI in this habitat were *Brasenia schreberi*, *Didiplis diandra*, and *Juncus repens*.

4. Disturbed areas and old fields (DAOF)

Locations, including mown lawns, campsites, roadsides, or sites exhibiting signs of physical disruption, were designated as disturbed areas. Common plants in disturbed areas included *Ambrosia bidentata*, *Andropogon virginicus*, *Conyza canadensis*, *Cynodon dactylon*, *Digitaria sanguinalis*, *Lespedeza cuneata*, *Kummerowia stipulacea*, *Rhus glabra*, *Sorghum halepense*, and *Trifolium dubium*. *Modiola caroliniana* is a species tracked by ONHI found in this habitat.

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Table Summary of floristic collections from HSR in the Ouachita Mountains, LeFlore County, Oklahoma *

Taxonomic Group	Species	Native	Exotic
Pteridophyta	7	7	0
Coniferophyta	1	1	0
Magnoliophyta			
Magnoliopsida	332	304	28
Liliopsida	123	109	14
Total	463	421	42

* Table format follows Palmer et al. (1995).

APPENDIX

Annotated species list for the Hale Scout Reservation, LeFlore County, Oklahoma. Nomenclature and systematics also follows the USDA-NRCS (2010). The first entry indicates habitat (ASQA=*Acer saccharum* – *Quercus alba* – *Carya alba* forest association, DAOF = disturbed areas and old fields, PEQR = *Pinus echinata* – *Quercus rubra* – *Quercus falcata* forest association, WETL = wetland and riparian). Habitat designation is followed by life history (A=annual, B=biennial, P=perennial), and collection number. Species not native to North America are noted with an asterisk (*) and species tracked by the Oklahoma Natural Heritage Inventory with a symbol (+). Voucher specimens were deposited at the Robert Bebb Herbarium at the University of Oklahoma (OKL).

PTERIDOPHYTA

Aspleniaceae

Asplenium platyneuron (L.) Britton, Sterns & Poggenb. – PEQR; P; CTH464

Dennstaedtiaceae

Pteridium aquilinum (L.) Kuhn – DAOF, PEQRF; P; CTH511

Dryopteridaceae

Onoclea sensibilis L. – WETL; P; CTH027

Polystichum acrostichoides (Michx.) Schott – ASQA, PEQR; CTH321

Woodsia obtusa (Spreng.) Torr. – ASQA; P; CTH475

Polypodiaceae

Pleopeltis polypodioides (L.) Andrews & Windham – PEQR; P; CTH109

Pteridaceae

Pellaea atropurpurea (L.) Link – PEQR; P; CTH071

CONIFEROPHYTA

Pinaceae

Pinus echinata P. Mill. – ASQA, PEQR; P; CTH520

MAGNOLIOPHYTA

MAGNOLIOPSIDA

Acanthaceae

Justicia americana (L.) Vahl – WETL; P; CTH062

Ruellia humilis Nutt. – DAOF; P; CTH022

Aceraceae

Acer rubrum L. – ASQA, PEQR; P; CTH441

Acer saccharum Marsh. – ASQA, PEQRF; P; CTH337

Anacardiaceae*Rhus aromatica* Aiton – DAOF, PEQR; P; CTH070*Rhus copallinum* L. – DAOF; P; CTH223*Rhus glabra* L. – DAOF; P; CTH060*Toxicodendron radicans* (L.) Kuntze – ASQA, DAOF, PEQRF, WETL; P; CTH543**Apiaceae***Ammoselinum butleri* (Engelm. ex S. Wats.) Coult. & Rose – DAOF; A; CTH409*Chaerophyllum tainturieri* Hook. – DAOF; A; CTH478*Cicuta maculata* L. – WETL; P; CTH028*Eryngium prostratum* Nutt. ex DC. – WETL; P; CTH163*Eryngium yuccifolium* Michx. – PEQR ;P; CTH078*Ptilimnium capillaceum* (Michx.) Raf. – DAOF; A; CTH370*Sanicula canadensis* L. – ASQA; P; CTH054*Spermolepis inermis* (Nutt. ex DC.) Mathias & Constance – DAOF; A; CTH085*Taenidia integerrima* (L.) Drude – PEQR; P; CTH535**Torilis arvensis* (Huds.) Link – DAOF; A; CTH091*Zizia aurea* (L.) W.D.J. Koch – ASQA; P; CTH434**Apocynaceae***Amsonia tabernaemontana* Walter – ASQA; P; CTH445*Trachelospermum difforme* (Walter) A. Gray – WETL; P; CTH136**Aquifoliaceae***Ilex decidua* Walter – ASQA, WETL; P; CTH224**Aristolochiaceae**+*Aristolochia serpentaria* L. – PEQR; P; CTH466**Asclepiadaceae***Asclepias quadrifolia* Jacq. – ASQA; P; CTH487*Asclepias tuberosa* L. – DAOF; P; CTH053*Asclepias variegata* L. – ASQA, PEQR; P; CTH512*Asclepias verticillata* L. – DAOF; P; CTH440**Asteraceae***Achillea millefolium* L. – DAOF; P; CTH067*Ambrosia bidentata* Michx. – DAOF; A; CTH263*Ambrosia psilostachya* DC. – DAOF, PEQR; P; CTH318*Antennaria plantaginifolia* (L.) Richardson – ASQA, PEQR; P; CTH411*Arnoglossum plantagineum* Raf. – PEQR; P; CTH079*Astranthium integrifolium* (Michx.) Nutt. – DAOFA; A; CTH465*Baccharis halimifolia* L. – WETL; P; CTH348*Bidens aristosa* (Michx.) Britt. – WETL; A; CTH335*Bidens discoidea* (Torr. & A. Gray) Britt. – WETL; A; CTH272*Boltonia diffusa* Ell. – WETL; P; CTH186*Brickellia eupatorioides* (L.) Shinnery – DAOF; P; CTH336

- Chrysopsis pilosa* Nutt. – DAOF; A; CTH153
Cirsium carolinianum (Walter) Fern. & Schub. – DAOF, PEQR; P; CTH019
**Cirsium vulgare* (Savi) Ten. – DAOF; A; CTH246
Conoclinium coelestinum (L.) DC. – WETL; P; CTH226
Conyza canadensis (L.) Cronq. – DAOF; A; CTH214
Coreopsis grandiflora Hogg ex Sweet – DAOF, PEQR; P; CTH527
Coreopsis palmata Nutt. – PEQR; P; CTH016
Coreopsis tinctoria Nutt. – DAOF, WETL; A; CTH069
Echinacea pallida (Nutt.) Nutt. – PEQR; P; CTH304
Eclipta prostrata (L.) L. – WETL; A; CTH309
Elephantopus carolinianus Raeusch. – ASQA; P; CTH236
Elephantopus tomentosus L. – ASQA; P; CTH252
Erechtites hieraciifolia (L.) Raf. ex DC. – ASQA, PEQR; A; CTH284
Erigeron pulchellus Michx. – DAOF; P; CTH450
Erigeron strigosus Muhl. ex Willd. – ASQA; A; CTH017
Erigeron tenuis Torr. & A. Gray – DAOF; P; CTH432
Eupatorium capillifolium (Lam.) Small – DAOF; P; CTH317
Eupatorium serotinum Michx. – DAOF, WETL; P; CTH267
Eurybia hemispherica (Alexander) Nesom – ASQA; P; CTH280
**Facelis retusa* (Lam.) Schultz-Bip. – DAOF; A; CTH493
Gamochaeta falcata (Lam.) Cabrera – DAOF; P; CTH048
Gamochaeta purpurea (L.) Cabrera – DAOF; A; CTH442
Helenium amarum (Raf.) H. Rock – DAOF; A; CTH004
Helianthus hirsutus Raf. – PEQR; P; CTH105
Helianthus tuberosus L. – DAOF; P; CTH380
Hieracium gronovii L. – PEQR; P; CTH437
Krigia dandelion (L.) Nutt. – ASQA; P; CTH486
Krigia caespitosa (Raf.) Chambers – DAOF; A; CTH303
Lactuca canadensis L. – DAOF; A; CTH198
Liatris squarrosa (L.) Michx. – DAOF, PEQR; P; CTH245
Mikania scandens (L.) Willd. – WETL; P; CTH142
Packera obovata (Muhl. ex Willd.) W. A. Weber & A. Love – AQSA; P; CTH
Pityopsis graminifolia (Michx.) Nutt. – PEQR; P; CTH258
Pluchea camphorata (L.) DC. – WETL; P; CTH256
Pseudognaphalium obtusifolium (L.) Hilliard & Burt – DAOF; A; CTH326
Pyrrhopappus carolinianus (Walter) DC. – DAOF; A; CTH545
Rudbeckia grandiflora (D. Don) J.F. Gmel. ex DC. – DAOF, PEQR; P; CTH322
Rudbeckia hirta L. – DAOF; P; CTH094
Rudbeckia subtomentosa Pursh – ASQA; P; CTH277
Solidago hispida Muhl. ex Willd. – DAOF; P; CTH530
Solidago mollis Bartlett – DAOF; P; CTH529
Solidago nemoralis Aiton – PEQR; P; CTH531
Solidago petiolaris Aiton – ASQA; P; CTH333
Solidago rugosa P. Mill – DAOF; P; CTH323
Solidago ulmifolia Muhl. ex Willd. var. *microphylla* A. Gray – ASQA, PEQR; P; CTH160
**Sonchus asper* (L.) Hill – DAOF; A; CTH510
Symphotrichum anomalum (Engelm.) Nesom – ASQA; P; CTH025

Symphytotrichum dumosum (L.) Nesom var. *dumosum* – DAOF; P; CTH360
Symphytotrichum patens (Aiton) Nesom var. *patens* – ASQA, PEQR; P; CTH285
 **Taraxacum officinale* G. H. Weber ex Wiggers – DAOF; P; CTH416
Verbesina helianthoides Michx. – ASQA; P; CTH039
Vernonia baldwinii Torr. – DAOF; P; CTH266
Vernonia fasciculata Michx. – DAOF; P; CTH195
Vernonia lettermannii Engelm. ex A. Gray – WETL; P; CTH148

Balsaminaceae

Impatiens capensis Meerb. – WETL; P; CTH312

Berberidaceae

Podophyllum peltatum L. – ASQA; P; CTH477

Betulaceae

Carpinus caroliniana Walter – ASQA; P; CTH445
Corylus americana Walter – ASQA; P; CTH056
Ostrya virginiana (Mill.) K. Koch – ASQA, PEQR; P; CTH077

Bignoniaceae

Campsis radicans (L.) Seem. ex Bureau – DAOF, WETL; P; CTH076

Boraginaceae

Myosotis verna Nutt. – ASQA; A; CTH459

Brassicaceae

Arabis canadensis L. – PEQR; B; CTH046
 **Capsella bursa-pastoris* (L.) Medik. – DAOF; A; CTH397
 **Cardamine hirsuta* L. – DAOF; A; CTH415
Cardamine parviflora L. var. *arenicola* (Britton) O.E. Schulz – ASQA; A; CTH410
Draba brachycarpa Nutt. ex Torr. & A. Gray – DAOF; A; CTH418
Lepidium densiflorum Schrad. – DAOF; A; CTH434
Lepidium virginicum L. – DAOF; A; CTH170
 **Sisymbrium officinale* (L.) Scop. – DAOF; A; CTH436
 **Thlaspi arvense* L. – DAOF; A; CTH479

Buddlejaceae

Polypremum procumbens L. – DAOF; A; CTH259

Cabombaceae

+*Brasenia schreberi* J. F. Gmel. – WETL; P; CTH564

Callitrichaceae

Callitriche heterophylla Pursh – WETL; A; CTH472

Campanulaceae

- Lobelia appendiculata* A. DC. – DAOF; P; CTH365
Lobelia cardinalis L. – WETL; P; CTH227
Lobelia siphilitica L. – WETL; P; CTH242
Triodanis biflora (Ruiz & Pav.) Greene – DAOF; A; CTH305

Caprifoliaceae

- Viburnum rufidulum* Raf. – ASQA, PEQR; P; CTH554

Caryophyllaceae

- **Cerastium glomeratum* Thuill. – DAOF; A; CTH412
**Cerastium pumilum* W. Curtis – DAOF; A; CTH461
Sagina decumbens (Ell.) Torr. & A. Gray – DAOF; A; CTH467
**Scleranthus annuus* L. – DAOF; A; CTH458
Silene virginica L. – ASQA; P; CTH481
**Stellaria media* (L.) Vill. – DAOF; A; CTH395

Chenopodiaceae

- **Chenopodium pumilio* R. Br. – DAOF; A; CTH238

Cistaceae

- Lechea tenuifolia* Michx. – DAOF; P; CTH001

Clusiaceae

- Hypericum drummondii* (Grev. & Hook.) Torr. & A. Gray – DAOF; A; CTH276
Hypericum hypericoides (L.) Crantz – ASQA, PEQR; P; CTH216
Hypericum mutilum L. – WETL; P; CTH247
Hypericum prolificum L. – ASQA; P; CTH253
Hypericum punctatum Lam. – DAOF; P; CTH167

Convolvulaceae

- Dichondra carolinensis* Michx. – DAOF; P; CTH093
Ipomoea pandurata (L.) G. Mey. – DAOF; P; CTH089

Cornaceae

- Cornus florida* L. – ASQA; P; CTH288
Cornus obliqua Raf. – WETL; P; CTH037
Nyssa sylvatica Marsh. – ASQA; P; CTH201

Cucurbitaceae

- Melothria pendula* L. – DAOF; P; CTH313

Cuscutaceae

- Cuscuta cuspidata* Engelm. – DAOF; A; CTH319
Cuscuta indecora Choisy – DAOF; A; CTH369
Cuscuta pentagona Engelm. – DAOF; A; CTH183

Ebenaceae

Diospyros virginiana L. – DAOF, ASQA, PEQR; P; CTH129

Ericaceae

Vaccinium arboreum Marsh. – PEQR; P; CTH110

Vaccinium pallidum Aiton – PEQR; P; CTH033

Vaccinium stamineum L. – ASQA; P; CTH523

Euphorbiaceae

Acalypha monococca (Engelm. ex A. Gray) Lill. W. Mill. & Gandhi – DAOF; A; CTH257

Acalypha rhomboidea Raf. – DAOF; A; CTH050

Chamaesyce nutans (Lag.) Small – DAOF; A; CTH145

Croton capitatus Michx. – DAOF; A; CTH173

Croton glandulosus L. – DAOF; A; CTH212

Croton monanthogynus Michx. – DAOF; A; CTH158

Croton willdenowii G. L. Webster – DAOF; A; CTH199

Euphorbia corollata L. – DAOF; P; CTH233

Euphorbia longicuris Scheele – DAOF; A; CTH455

Euphorbia spathulata Lam. – DAOF; A; CTH456

Phyllanthus caroliniensis Walter – DAOF; A; CTH240

Fabaceae

Amorpha canescens Pursh – DAOF; P; CTH561

+*Amorpha ouachitensis* Wilbur – WETL; P; CTH522

Apios americana Medik. – WETL; P; CTH562

Baptisia bracteata Muhl. ex Ell. var. *leucophaea* (Nutt.) Kartesz & Gandhi – DAOF, PEQR; P; CTH426

+*Baptisia nuttalliana* Small – PEQR; P; CTH528

Cercis canadensis L. – ASQA, PEQR; P; CTH442

Chamaecrista nictitans (L.) Moench – DAOF; A; CTH133

Clitoria mariana L. – PEQR; P; CTH152

Crotalaria sagittalis L. – DAOF; P; CTH302

Dalea candida Michx. ex Willd. – DAOF; P; CTH088

Desmodium nuttallii (Schindl.) Schub. – ASQA; P; CTH354

Galactia volubilis (L.) Britt. – ASQA; P; CTH228

**Kummerowia stipulacea* (Maxim.) Makino – DAOF; A; CTH064

**Kummerowia striata* (Thunb.) Schindl. – DAOF; A; CTH208

Lathyrus venosus Muhl. ex Willd. – DAOF; P; H; CTH425

Lespedeza capitata Michx. – DAOF; P; CTH283

**Lespedeza cuneata* (Dum.-Cours.) G. Don – DAOF; P; CTH220

Lespedeza repens (L.) W. Bart. – PEQR; P; CTH306

Lespedeza violacea (L.) Pers. – DAOF; P; CTH265

Lespedeza virginica (L.) Britt. – DAOF, PEQR; P; CTH264

**Medicago lupulina* L. – DAOF; A; CTH308

Mimosa nuttallii (DC.) B. L. Turner – DAOF; P; CTH112

Orbexilum pendunculatum (P. Mill.) Rydb. – DAOF; P; CTH548

Rhynchosia latifolia Nutt. ex Torr. & A. Gray – DAOF, PEQR; P; CTH429

Robinia pseudoacacia L. – DAOF; P; CTH551

Sesbania herbacea (P. Mill.) McVaugh – WETL; A; CTH262
Strophostyles leiosperma (Torr. & A. Gray) Piper – DAOF; P; CTH111
Stylosanthes biflora (L.) Britton, Sterns & Poggenb. – DAOF; P; CTH207
Tephrosia virginiana (L.) Pers. – PEQR; P; CTH035
**Trifolium reflexum* L. – DAOF; P; CTH549
**Trifolium repens* L. – DAOF; P; CTH029
Vicia minutiflora F. G. Diétr. – ASQA; A; CTH422
**Vicia sativa* L. – DAOF; A; CTH430

Fagaceae

Quercus alba L. – ASQA, PEQR; P; CTH191
Quercus falcata Michx. – ASQA, PEQR; P; CTH204
Quercus marilandica Münchh. – PEQR; P; CTH126
Quercus nigra L. – ASQA; P; CTH490
Quercus phellos L. – ASQA; P; CTH131
Quercus rubra L. – ASQA, PEQR; P; CTH331
Quercus shumardii Buckl. – ASQA; P; CTH332
Quercus stellata Wangenh. – ASQA, PEQR; P; CTH292
Quercus velutina Lam. – ASQA, PEQR; P; CTH451

Geraniaceae

Geranium carolinianum L. – DAOF; A; CTH435

Grossulariaceae

+*Ribes cynosbati* L. – ASQA; P; CTH102

Haloragaceae

Myriophyllum heterophyllum Michx. – WETL; P; CTH500
Proserpinaca palustris L. – WETL; P; CTH482

Hamamelidaceae

Hamamelis vernalis Sarg. – ASQA; P; CTH421
Hamamelis virginiana L. – ASQA; P; CTH211
Liquidambar styraciflua L. – ASQA, WETL; P; CTH128

Hydrophyllaceae

Hydrolea ovata Nutt. ex Choisy – WETL; P; CTH194
Phacelia hirsuta Nutt. – DAOF; A; CTH454

Juglandaceae

Carya alba (L.) Nutt. ex Ell. – ASQA, PEQR; P; CTH443
Carya cordiformis (Wangenh.) K. Koch – ASQA; P; CTH544
Carya texana Buckl. – ASQA, PEQR; P; CTH351

Lamiaceae

Hedeoma hispida Pursh – DAOF; A; CTH300
**Lamium amplexicaule* L. – DAOF; A; CTH407

Lycopus virginicus L. – WETL; P; CTH018
Monarda fistulosa L. – ASQA, PEQR; P; CTH058
Monarda russeliana Nutt. ex Sims – ASQA; P; CTH516
Prunella vulgaris L. – ASQA, DAOF; P; CTH101
Pycnanthemum albescens Torr. & A. Gray – PEQR; P; CTH196
Pycnanthemum tenuifolium Schrad. – DAOF, WETL; P; CTH103
Salvia azurea Michx. ex Lam. – DAOF; P; CTH315
Salvia lyrata L. – ASQA, DAOF; P; CTH106
Scutellaria ovata Hill – ASQA; P; CTH082

Linaceae

Linum medium (Planch.) Britt. var. *texanum* (Planch.) Fernald – ASQA; P; CTH007
Linum striatum Walter – DAOF; A; CTH552

Lythraceae

+*Didiplis diandra* (Nutt. ex DC.) Wood – WETL; A; CTH499
Rotala ramosior (L.) Koehne – WETL; A; CTH175

Malvaceae

Callirhoe pedata (Nutt. ex Hook.) A. Gray – DAOF; P; CTH298
 +*Modiola caroliniana* (L.) G. Don – DAOF; A; CTH462
Sida spinosa L. – DAOF; A; CTH161

Menispermaceae

Cocculus carolinus (L.) DC. – DAOF; P; CTH149

Molluginaceae

Mollugo verticillata L. – DAOF; A; CTH231

Monotropaceae

+*Monotropa hypopithys* L. – ASQA; P; CTH084

Moraceae

Morus rubra L. – ASQA; P; CTH169

Nymphaeaceae

Nuphar lutea (L.) Sm. – WETL; P; CTH080
Nymphaea odorata Aiton – WETL; P; CTH188

Oleaceae

+*Chionanthus virginicus* L. – ASQA; P; CTH488
Fraxinus americana L. – ASQA; P; CTH521

Onagraceae

Ludwigia decurrens Walter – WETL; P; CTH139
Ludwigia glandulosa Walter – WETL; P; CTH241
Ludwigia palustris (L.) Ell. – WETL; P; CTH182

Ludwigia peploides (Kunth) P.H. Raven – WETL; P; CTH250

Oenothera fruticosa L. – DAOF; A; CTH372

Oenothera laciniata Hill – DAOF; A; CTH492

Oenothera linifolia Nutt. – DAOF; A; CTH073

Oxalidaceae

Oxalis stricta L. – DAOF; P; CTH104

Oxalis violacea L. – PEQR; P; CTH314

Passifloraceae

Passiflora lutea L. – ASQA; P; CTH065

Phytolaccaceae

Phytolacca americana L. – DAOF; P; CTH143

Plantaginaceae

Plantago aristata Michx. – DAOF; A; CTH068

Plantago elongata Pursh – DAOF; A; CTH534

Plantago pusilla Nutt. – DAOF; A; CTH457

Plantago rhodosperma Dcne. – DAOF; A; CTH439

Plantago virginica L. – DAOF; A; CTH460

Platanaceae

Platanus occidentalis L. – WETL; P; CTH121

Polemoniaceae

Phlox pilosa L. ssp. *ozarkana* (Wherry) Wherry – ASQA; P; CTH429

Polygalaceae

Polygala alba Nutt. – DAOF, PEQR; P; CTH098

Polygonaceae

Polygonum hydropiperoides Michx. – WETL; P; CTH159

Polygonum lapathifolium L. – WETL; A; CTH138

Polygonum punctatum Ell. – WETL; A; CTH340

Polygonum scandens L. – WETL; P; CTH268

**Rumex crispus* L. – DAOF, WETL; P; CTH040

Rumex hastatulus Baldw. – DAOF; P; CTH423

Portulacaceae

Claytonia virginica L. – ASQA, DAOF; P; CTH400

Portulaca oleracea L. – DAOF; A; CTH180

Ranunculaceae

Anemone caroliniana Walter – ASQA; P; CTH413

+*Clematis crispa* L. – ASQA; P; CTH447

Clematis versicolor Small ex Rydb. – DAOF; P; CTH023

Ranunculus fascicularis Muhl. ex Bigelow – WETL; P; CTH441
Ranunculus hispidus Michx. – WETL; P; CTH408
Ranunculus micranthus Nutt. – WETL; P; CTH451
 **Ranunculus parviflorus* L. – WETL; A; CTH020
Ranunculus pusillus Poir. – WETL; A; CTH362
Ranunculus recurvatus Poir. – WETL; P; CTH468

Rhamnaceae

Berchemia scandens (Hill) K. Koch – ASQA, DAOF; P; CTH057
Ceanothus americanus L. – PEQR; P; CTH044
Ceanothus herbaceus Raf. – DAOF, PEQR; P; CTH428
Frangula caroliniana (Walter) A. Gray – ASQA; P; CTH118

Rosaceae

Agrimonia rostellata Wallr. – ASQA; P; CTH237
Amelanchier arborea (Michx. f.) Fern. – PEQR; P; CTH123
Crataegus crus-galli L. – PEQR; P; CTH538
Crataegus marshallii Egglest. – ASQA; P; CTH484
Crataegus spathulata Michx. – ASQA, PEQR; P; CTH515
Crataegus viridis L. – WETL; P; CTH024
Geum canadense Jacq. – ASQA, DAOF; P; CTH563
Gillenia stipulata (Muhl. ex Willd.) Nutt. – ASQA; P; CTH514
Potentilla simplex Michx. – ASQA, DAOF; P; CTH452
Prunus mexicana S. Watson – ASQA, PEQR; P; CTH444
Prunus serotina Ehrh. – ASQA; P; CTH287
Rosa carolina L. – ASQA, DAOF; P; CTH524
Rubus allegheniensis Porter – DAOF; P; CTH553
Rubus ostryaefolius Rydb. – DAOF; P; CTH032

Rubiaceae

Cephalanthus occidentalis L. – WETL; P; CTH150
 **Cruciata pedemontana* (Bellardi) Ehrend. – DAOF; A; CTH496
Diodia teres Walter – DAOF; A; CTH219
Diodia virginiana L. – WETL; P; CTH433
Galium aparine L. – ASQA; A; CTH470
 +*Galium arkansanum* A. Gray – ASQA; P; CTH045
Galium obtusum Bigelow – ASQA; P; CTH038
 +*Houstonia ouachitana* (E.B. Sm.) Terrell – ASQA, PEQR; CTH566
Houstonia pusilla Schoepf – DAOF; A; CTH401
 **Sherardia arvensis* L. – DAOF; A; CTH480

Rutaceae

Zanthoxylum clava-herculis L. – WETL; P; CTH450

Salicaceae

Salix caroliniana Michx. – WETL; P; CTH251
Salix nigra Marsh. – WETL; P; CTH125

Sapindaceae

Sapindus saponaria L. var. *drummondii* (Hook. & Arn.) L.D. Benson – DAOF; P; CTH125

Sapotaceae

Sideroxylon lanuginosum Michx. – PEQR; P; CTH232

Saxifragaceae

Heuchera americana L. – ASQA; P; CTH435

Scrophulariaceae

Gratiola brevifolia Raf. – WETL; P; CTH382

Lindernia dubia (L.) Pennell – WETL; A; CTH066

Nuttallanthus canadensis (L.) D.A. Sutton – DAOF; A; CTH437

Pedicularis canadensis L. – ASQA; P; CTH393

Penstemon arkansanus Pennell – PEQR; P; CTH433

Penstemon digitalis Nutt. ex Sims – DAOF; P; CTH525

**Verbascum thapsus* L. – DAOF; A; CTH072

Veronica peregrina L. – DAOF; A; CTH533

Solanaceae

Physalis pubescens L. – DAOF; A; CTH172

Solanum americanum P. Mill. – DAOF; P; CTH041

Solanum rostratum Dunal – DAOF; A; CTH134

Tiliaceae

Tilia americana L. – ASQA; P; CTH114

Ulmaceae

Celtis laevigata Willd. var. *reticulata* (Torr.) L.D. Benson – ASQA; P; CTH423

Ulmus alata Michx. – ASQA, PEQR; P; CTH127

Ulmus americana L. – ASQA; P; CTH356

Ulmus rubra Muhl. – ASQA; P; CTH130

Urticaceae

Boehmeria cylindrica (L.) Sw. – WETL; P; CTH135

Valerianaceae

Valerianella radiata (L.) Dufr. – DAOF; A; CTH010

Verbenaceae

Callicarpa americana L. – ASQA, PEQR; P; CTH137

Glandularia canadensis (L.) Nutt. – DAOF; P; CTH271

Verbena urticifolia L. – DAOF; A; CTH141

Violaceae

- Viola bicolor* Pursh – DAOF; A; CTH396
Viola pedata L. – ASQA, DAOF; P; CTH414
Viola sagittata Aiton – ASQA; P; CTH443
Viola sororia Willd. – ASQA, DAOF; P; CTH420

Vitaceae

- Parthenocissus quinquefolia* (L.) Planch. – DAOF; P; CTH144
Vitis aestivalis Michx. – DAOF; P; CTH185
Vitis cinerea (Engelm.) Engelm. ex Millard – DAOF; P; CTH539
Vitis rotundifolia Michx. – ASQA, PEQR; P; CTH210

LILIOPSIDA**Agavaceae**

- Manfreda virginica* (L.) Salisb. ex Rose – PEQR; P; CTH327
Yucca glauca Nutt. – PEQR; P; CTH550

Alismataceae

- Sagittaria platyphylla* (Engelm.) J. G. Sm. – WETL; P; CTH026

Commelinaceae

- Commelina virginica* L. – ASQA; P; CTH361
Tradescantia ohiensis Raf. – ASQA; P; CTH012

Cyperaceae

- Carex albicans* Willd. ex Spreng. – ASQA, PEQR; P; CTH507
Carex arkansana (Bailey) Bailey – ASQA; P; CTH387
Carex bushii Mackenzie – ASQA; P; CTH505
Carex crinita Lam. – WETL; P; CTH385
Carex decomposita Muhl. – WETL; P; CTH386
Carex gravida Bailey – ASQA; P; CTH391
Carex hirsutella Mackenzie – WETL; P; CTH503
Carex hystericina Muhl. ex Willd. – WETL; P; CTH388
Carex lupulina Muhl. ex Willd. – WETL; P; CTH157
Carex lurida Wahlenb. – WETL; P; CTH383
+*Carex ouachitana* Kral, Manhart & Bryson – ASQA; P; CTH504
Carex texensis (Torr.) Bailey – ASQA, PEQR; P; CTH502
Carex tribuloides Wahlenb. – WETL; P; CTH384
Carex vulpinoidea Michx. – WETL; P; CTH506
Cyperus echinatus (L.) Wood – DAOF, PEQR; P; CTH230
Cyperus lupulinus (Spreng.) Marcks – DAOF; P; CTH428
Cyperus odoratus L. – DAOF; A; CTH274
Cyperus pseudovegetus Steud. – WETL; P; CTH051
Cyperus retrorsus Chapman – DAOF; P; CTH346
Cyperus strigosus L. – WETL; P; CTH560
Eleocharis lanceolata Fernald. – WETL; A; CTH295
Eleocharis montevidensis Kunth – WETL; P; CTH381

Eleocharis obtusa (Willd.) J. A. Schultes – WETL; A; CTH275
Eleocharis quadrangulata (Michx.) Roemer & J. A. Schultes – WETL; P; CTH146
Eleocharis tenuis (Willd.) J. A. Schultes var. *verrucosa* – WETL; A; CTH168
Fimbristylis autumnalis (L.) Roemer & J. A. Schultes – WETL; A; CTH347
Fimbristylis vahlii (Lam.) Link – WETL; A; CTH217
Isolepis carinata Hook. & Arn. ex Torr. – DAOF; A; CTH536
Rhynchospora globularis (Chapman) Small – DAOF; P; CTH363
Rhynchospora glomerata (L.) Vahl – DAOF; P; CTH260
Scirpus cyperinus (L.) Kunth – WETL; P; CTH165
Scirpus atrovirens Willd. – WETL; P; CTH432
Scleria oligantha Michx. – DAOF; P; CTH373

Dioscoreaceae

Dioscorea quaternata J. F. Gmel. – ASQA; P; CTH523

Hydrocharitaceae

Elodea canadensis Michx. – WETL; P; CTH509

Iridaceae

Sisyrinchium angustifolium P. Mill. – DAOF; P; CTH424

Juncaceae

Juncus acuminatus Michx. – WETL; P; CTH278
Juncus coriaceus Mackenzie – WETL; P; CTH184
Juncus diffusissimus Buckl. – WETL; P; CTH162
Juncus effusus L. – WETL; P; CTH154
Juncus interior Wieg. – DAOF; P; CTH427
Juncus marginatus Rostk. – WETL; P; CTH431
Juncus nodatus Coville – WETL; P; CTH425
+*Juncus repens* Michx. – WETL; P; CTH164
Juncus tenuis Willd. – ASQA, DAOF; P; CTH368
Luzula bulbosa (Wood) Smyth & Smyth – ASQA, DAOF; P; CTH471

Lemnaceae

Spirodela polyrrhiza (L.) Schleid. – WETL; P; CTH569

Liliaceae

Allium canadense L. – DAOF; P; CTH367
Allium stellatum Nutt. ex Ker-Gawl. – DAOF; P; CTH269
Camassia scilloides (Raf.) Cory – DAOF, PEQR; P; CTH473
Erythronium rostratum W. Wolf – ASQA; P; CTH419
Hypoxis hirsuta (L.) Coville – DAOF, ASQA, PEQR; P; CTH474
Nothoscordum bivalve (L.) Britt. – DAOF; P; CTH405

Najadaceae

Najas guadalupensis (Spreng.) Magnus – WETL; P; CTH497

Orchidaceae*Spiranthes tuberosa* Raf. – WETL; P; CTH329**Poaceae***Agrostis hyemalis* (Walter) Britton, Sterns & Poggenb. – WETL; P; CTH338*Agrostis perennans* (Walter) Tuckerman – ASQA; P; CTH555**Aira caryophyllea* L. – DAOF; A; CTH095*Andropogon gerardii* Vitman – DAOF, PEQR; P; CTH222*Andropogon virginicus* L. – DAOF; P; CTH345*Aristida oligantha* Michx. – DAOF; A; CTH239+*Brachyelytrum erectum* (Schreb. ex Spreng.) Beauv. – ASQA; P; CTH279**Bromus arvensis* L. – DAOF; A; CTH436**Bromus catharticus* Vahl – DAOF; A; CTH440*Bromus pubescens* Muhl. ex Willd. – ASQA; P; CTH177*Chasmanthium latifolium* (Michx.) Yates – ASQA, WETL; P; CTH147*Chasmanthium laxum* (L.) Yates – ASQA, PEQR; P; CTH124*Cinna arundinacea* L. – ASQA; P; CTH255**Cynodon dactylon* (L.) Pers. – DAOF; P; CTH—061**Dactylis glomerata* L. – DAOF; P; CTH374*Danthonia spicata* (L.) Beauv. ex Roemer & J. A. Schultes – PEQR; P; CTH092*Dichantherium aciculare* (Desv. ex Poir.) Gould & C. A. Clark – DAOF; P; CTH371*Dichantherium acuminatum* (Sw.) Gould & C. A. Clark var. *fasiculatum* (Torr.) Freckmann – ASQA; P; CTH042*Dichantherium boscii* (Poir.) Gould & C. A. Clark – ASQA; P; CTH081*Dichantherium dichotomum* (L.) Gould var. *dichotomum* – ASQA, DAOF, PEQR; A; CTH176*Dichantherium laxiflorum* (Lam.) Gould – ASQA; P; CTH541*Dichantherium linearifolium* (Scribn. ex Nash) Gould – ASQA, PEQR; P; CTH074*Dichantherium scoparium* (Lam.) Gould – DAOF; P; CTH171*Dichantherium sphaerocarpon* (Ell.) Gould var. *isophyllum* (Scribn.) Gould & C.A. Clark – DAOF; P; CTH034*Dichantherium villosissimum* (Nash) Freckmann var. *praecocius* (Hitchc. & Chase) Freckmann – ASQA; P; CTH375**Digitaria ischaemum* (Schreb.) Schreb. ex Muhl. – DAOF; A; CTH197*Digitaria sanguinalis* (L.) Scop. – DAOF; A; CTH364**Echinochloa crus-galli* (L.) Beauv. – WETL; A; CTH174*Elymus canadensis* L. – DAOF, ASQA; P; CTH055*Eragrostis hirsuta* (Michx.) Nees – DAOF; P; CTH031*Eragrostis intermedia* A. S. Hitchc. – DAOF; P; CTH003*Eragrostis spectabilis* (Pursh) Steud. – DAOF; P; CTH359*Festuca paradoxa* Desv. – ASQA; P; CTH556*Gymnopogon ambiguus* (Walter) Britton, Sterns & Poggenb. – DAOF; P; CTH281*Hordeum pusillum* Nutt. – DAOF; A; CTH494*Leersia oryzoides* (L.) Sw. – WETL; P; CTH341**Lolium perenne* L. – DAOF; P; CTH519+*Muhlenbergia bushii* Pohl – ASQA; P; CTH328*Panicum anceps* Michx. – WETL; P; CTH202*Panicum dichotomiflorum* Michx. – DAOF; P; CTH005

Panicum rigidulum Bosc ex Nees – DAOF, WETL; P; CTH379
Panicum virgatum L. – DAOF, WETL; P; CTH289
**Paspalum dilatatum* Poir. – DAOF; P; CTH011
**Paspalum notatum* Flueggé – DAOF; CTH261
Paspalum setaceum – WETL; P; CTH087
**Poa annua* L. – DAOF; A; CTH406
Schizachyrium scoparium (Michx.) Nash – PEQR; P; CTH221
Setaria parviflora (Poir.) Kerguelen – DAOF; P; CTH342
**Setaria viridis* (L.) Beauv. – DAOF; A; CTH209
Sorghastrum nutans (L.) Nash – DAOF, PEQR; P; CTH286
**Sorghum halepense* (L.) Pers. – DAOF; P; CTH052
Sporobolus cryptandrus (Torr.) A. Gray – DAOF; P; CTH557
Steinchisma hians (Ell.) Nash – WETL; P; CTH310
Tridens flavus (L.) A. S. Hitchc. – ASQA, DAOF, PEQR; P; CTH215
Tridens strictus (Nutt.) Nash – DAOF, PEQR; P; CTH320
Vulpia octoflora (Walter) Rydb. – DAOF; A; CTH008

Potamogetonaceae

Potamogeton diversifolium Raf. – WETL; P; CTH325
Potamogeton illinoensis Morong – WETL; P; CTH537
Potamogeton nodosus Poir. – WETL; P; CTH189

Smilacaceae

Smilax bona-nox L. – DAOF, ASQA, PEQR; P; CTH282
Smilax rotundifolia L. – DAOF, ASQA, PEQR; P; CTH099
Smilax tamnoides L. – ASQA, PEQR; P; CTH119

Typhaceae

Typha domingensis Pers. – WETL; P; CTH254