Vascular flora of a site along the Arkansas River, Pawnee County, Oklahoma

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This article reports the results of an inventory of the vascular plants from a site in north-central Oklahoma. Three hundred thirty-eight species of vascular plants in 224 genera and 78 families were collected. The most species were collected from the families Asteraceae (56), Poaceae (50), and Fabaceae (27). One hundred fifteen species were annuals, 221 perennials, and 2 were biennials. Forty-nine species of woody plants were present. Twenty-seven exotic species were collected representing 8% of the flora. No species listed as threatened or endangered by the U.S. Fish and Wildlife Service were encountered. However, four species tracked by the Oklahoma Natural Heritage Inventory (2005); Fraxinus quadrangulata (G5S2S3), Penstemon oklahomensis (G3S3), Symphyotrichum dumosum (G5S1), and Urtica chamaedryoides (G5G4S?) were present.

INTRODUCTION

Biotic inventories are the foundation of conservation biology and biogeographic research. Botanical study of Pawnee County began on 15 July 1905, when A. H. Van Vleet collected Oxalis stricta. Van Vleet collected 13 additional species (Agrimonia pubescens, Arnoglossum atriplicifolium, Astragalus carolinianus, Bidens bipinnata, Chamaecrista nictitans, Eryngium yuccifolium, Euphorbia cyathophora, Fraxinus pennsylvanica, Helianthus amarum, Mimulus alatus, Pycnanthemum tenuifolium, Rudbeckia triloba, and Vitis vulpina) between 25–27 July 1905 (Hoagland et al. 2005). Prior to 1998, 172 species were reported from Pawnee County (Hoagland et al. 2005). To enhance floristic data, collections were made at locales throughout the county by Hoagland and McCarty in 1998 (93 specimens) and by the current authors (Hoagland & Buthod 2003) (149 specimens). As a result, the species count for Pawnee County increased to 377. The current project was initiated on the assumption that focused collection effort at a given site would yield additional county records, thus filling a gap in floristic data for central Oklahoma.

STUDY AREA

The study area encompasses 64.7 ha in Pawnee County (Fig.) along the Arkansas River. Latitudinal extent ranges from 36.286°N to 36.296°N and longitudinal extent from 96.550°W to 96.532°W. The study area is located within the subtropical humid (Cf) climate zone (Trewartha 1968). Summers are warm (mean July temperature = 27.6°C) and humid, whereas winters are relatively short and mild (mean January temperature = 1.8°C). Mean annual precipitation is 99.6 cm, with periodic severe droughts (Oklahoma Climatological Survey 2005). Physiographically, the study area is located within the Osage Plains section of the Central Lowlands province (Hunt 1974) and the Eastern Sandstone Cuesta Plains province of
Oklahoma (Curtis and Ham 1979). The surface geology is primarily Pennsylvanian sandstone with Quaternary silt, sand, and clay along the Arkansas River floodplain (Branson and Johnson 1979). Elevation ranges from 286.5 m to 219.4 m. The primary soil associations are the Port-Yahola-Dale-Brewer silt loam deep bottomland soils and the Darnell-Talihina-Stephenville fine sandy loams soils on rough uplands (Galloway et al. 1959). The predominant potential vegetation types are *Quercus stellata-Q. marilandica* forest and woodlands, bottomland forests, and tallgrass prairies (Duck and Fletcher 1943).

**METHODS**

Collections were made during monthly visits from March through October 2004. The predominant vegetation association at the site were ascribed according to Hoagland (2000) and attributed to each collection. Vouchers for species exotic to North America were made from naturalized populations only, thus excluding cultivated and ornamental plants. Specimens were processed at the Robert Bebb Herbarium of the University of Oklahoma (OKL) following standard procedures. Manuals used for specimen identification included Waterfall (1969), Great Plains Flora Association (1986), and Diggs et al. (1999). Origin, either native or introduced, was determined by using Taylor and Taylor (1991) and US Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS; 2005). Nomenclature follows the (USDA-NRCS 2005). Voucher specimens were deposited at OKL.

**RESULTS AND DISCUSSION**

Three hundred thirty-eight species of vascular plants in 224 genera and 78 families were collected (appendix 1). The most species were from the families Asteraceae (56), Poaceae (50), and Fabaceae (27). The largest genera were *Symphyotrichum* (8 species), *Juncus* (7), *Cyperus, Quercus*, and *Eragrostis* (each with 6 species). There were eight species of ferns, one gymnosperm, 85 monocots, and 245 dicots (Table). One hundred fifteen species were annuals, 221 perennials, and 2 were biennials. Forty-nine species of woody plants were present. This study contributed an additional 183 species to the flora of Pawnee County for a total of 560 species.

Twenty-seven species, non-native to North America, were collected representing 8.3% of the flora. The families with the greatest number of introduced species were Poaceae (8) and Fabaceae (3). These values are consistent with other floristic studies from Oklahoma, in which exotic species constitute 9% - 15% of the flora (Hoagland and Buthod 2003, Hoagland and Buthod 2004, Hoagland and Johnson 2001, Hoagland and Johnson 2004a, Hoagland and Johnson 2004b). An exception is Red Slough and Grassy Slough, where exotic species constituted 6.6% (Hoagland and Johnson, 2004b).

No species listed as threatened or endangered by the U.S. Fish and Wildlife Service were encountered. However, there were four species tracked by the Oklahoma Natural Heritage Inventory (2005); *Fraxinus quadrangulata* (G5S2S3), *Penstemon oklahomensis* (G3S3), *Symphyotrichum dumosum* (G5S1), and *Urtica chamaedryoides* (G5G4S?). Species are ranked by the ONHI according to level of imperilment at the global [G] and state [S] level on a scale of 1-5; with 1 representing a species that is imperiled and 5 a species that is secure [Groves et al. 1995]).

**Vegetation associations at the study area with a brief list of associated species.**

1. *Platanus occidentalis - Acer negundo* forest association occurred in a narrow strip along the Arkansas River floodplain. Associated species included *Apios americana, Bidens frondosa, Brickellia eupatorioides, Bromus pubescens, Cardiospermum helicacabum, Chasmanthium...*
latifolium, Commelina erecta, Eupatorium rugosum, Fraxinus pennsylvanica, Impatiens capensis, Laportea canadensis, Leucospora multifida, Panicum anceps, Rorippa islandica, Sanicula canadensis, and Teucrium canadense.

2. *Quercus muehlenbergii* - *Quercus shumardii* forest association occurred along mesic slopes above the Arkansas River. The geomorphology was characterized by large sandstone boulders and shallow soils. Associated species included Acalypha gracilens, Agrimonia rostellata, Arisaema triphyllum, Botrychium virginianum, Celastrus scandens, Desmodium glutinosum, Dicranum scoparium, Elephantopus carolinus, Elymus canadensis, Erythronium mesochoreum, Fraxinus quadrangulata, Geum canadense, Phryma leptostachya, Quercus rubra, Scrophularia marilandica, Sixos angulatus, Solidago nemoralis, Symphyotrichum dumosum, and Urtica chamaedryoides. *Fraxinus quadrangulata*, *Symphyotrichum dumosum*, and *Urtica chamaedryoides* are species tracked by the ONHI found in this habitat.

3. *Quercus stellata* - *Q. marilandica* - *Carya texana* forest association occurred on uplands with sandy soils. Associated species include Amelanchier arborea, Amphicarpaea bracteata, Antennaria parlinii, Carex albicans, Careya texana, Danthonia spicata, Helianthus bursutus, Hieracium longipilum, Hypericum hypericoides, Juniperus virginiana, Lespedeza procumbens, Muhlenbergia sobolifera, Passiflora lutea, Smilax rotundifolia, Solidago ulmifolia, Symphyotrichum patens, and Woodia obtusa. *Fraxinus quadrangulata*, *Symphyotrichum dumosum*, and *Urtica chamaedryoides* are species tracked by the ONHI found in this habitat.

4. *Andropogon gerardii* - *Sorghastrum nutans* herbaceous association occurred on upland sandy-loam soils. Most of the grasslands were cut for hay and intergraded with old-fields. Associated species included Achillea millefolium, Apocynum cannabinum, Aristida oligantha, Asclepias viridis, Bonteloua curtipendula, Buchnera americana, Castilleja indivisa, Chamaecrista fasciculata, Cirsium undulatum, Coreopsis grandiflora, Cyperus echinatus, Desmodium sessilifolium, Dianthus acuminatus, Eragrostis hirsuta, Euphorbia corollata, Euphorbia laloerula, Helianthus mollis, Lespedeza capitata, L. virginica, Liatris aspera, Lithospermum incisum, Nothoscordum bivalve, Polygala incarnata, Polyna nigella, Pulmonaria obscura, Phyllanthus capillaceus, Raoulia humilis, Salvia azurea, Scleria ciliata, Spergularia divaricata, Symphyotrichum ericoides, Tradescantia obiensis, Tridens flavus, and Vernonia baldwinii. Penstemon oklahomensis is a species tracked by the ONHI found in this habitat.

5. Wetland and aquatic vegetation was of restricted to human-made ponds. Associated species included Amorpha fruticosa, Bidens aristosa, Cephalanthus occidentalis, Ceratophyllum demersum, Echinochloa crus-galli, Eclipta prostrata, Juncus effusissimus, Justicia americana, Ludwigia alternifolia, Lycopus americanus, Mimulus alatus, Neeragrostis reptans, Nelumbo lutea, Penthorum sedoides, Phleum camphorata, Polygonon hydropiperoides, P. lapathifolium, P. pensylvanicum, P. punctatum, Potamogeton nodosus, Rorippa palustris, Sagittaria calycina, Sagittaria calycina, S. graminea, Scirpus ophiurus, Symphyotrichum subulatum, and Typha domingensis.

6. Disturbed areas and old-field vegetation included roadsides, and areas exhibiting signs of physical disruption. Associated species included Amaranthus palmeri, Ambrosia artemisiifolia, A. trifida, Arenaria serpyllifolia, Bothriochloa ischaemum, Bromus catharticus, Baglania arvensis, Chamaesyce maculata, Conyza canadensis, Croton glandulosus, Geranium carolinianum, Helianthemum amarum, Hordeum pusillum, Lespedeza cuneata, Melilotus officinalis, Oenothera laciniata, Pseudognaphalium obtusifolium, Torilis arvensis, and Viola bicolor.
Table  Summary of floristic collections from a study site in Pawnee County, Oklahoma*

| Taxonomic group | Species | Native spp. |Introduced spp. |
|-----------------|---------|-------------|-----------------|
| Pteridophyta    | 8       | 8           | 0               |
| Coniferophyta   | 1       | 1           | 0               |
| Magnoliophyta   | Magnoliopsida | 245        | 227             | 19              |
|                 | Liliopsida | 84          | 76              | 8               |
| **Total**       | 338     | 312         | 27              |

* Table format follows Palmer et al. (1995).
REFERENCES
Branson, C.C. and K.S. Johnson. 1979. Generalized geologic map of Oklahoma. In: Johnson, K. S., C.C. Branson, N.M. Curtis, W.E. Ham, W.E. Harrison, M.V. Marcher, and J.F. Roberts, editors. Geology and earth resources of Oklahoma. Oklahoma Geological Survey, Norman. p 4.
Curtis, N.M. and W.E. Ham. 1979. Geomorphic provinces of Oklahoma. In: Johnson K. S., C. C. Branson, N.M. Curtis, W.E. Ham, W.E. Harrison, M.V. Marcher, and J.F. Roberts, editors. Geology and earth resources of Oklahoma. Oklahoma Geological Survey, Norman. p 5.
Diggins, G.M., B.L. Lipscomb, R.J. O’Kennon. 1999. Shinners and Mahler’s illustrated flora of North Central Texas. Botanical Research Institute of Texas and Austin College, Fort Worth. 1626 p.
Duck, L.G. and J.B. Fletcher. 1943. A game type map of Oklahoma. A survey of the game and fur-bearing animals of Oklahoma. Oklahoma Department of Wildlife Conservation, Oklahoma City.
Galloway, H.M., E.H. Templin, and H. Oakes. 1959. Soil survey of Pawnee County,
Oklahoma. United States Department of Agriculture, Washington, D.C. 71 p.

Groves C.R., M.L. Klein, and T.F. Breden. 1995. Natural Heritage Programs: public-private partnerships for biodiversity conservation. Wildlife Society Bulletin 23:784-790.

Hoagland, B.W. 2000. The vegetation of Oklahoma: a classification of landscape mapping and conservation planning. Southwest Naturalist 45:385-420.

Hoagland, B.W. and A. Buthod. 2003. Vascular flora of the Keystone Wildlife Management Area, Creek, Pawnee, and Osage Counties, Oklahoma. Oklahoma Native Plant Record 3:23-37.

Hoagland, B.W. and A. Buthod. 2004. Vascular flora of Hugo Lake Wildlife Management Area, Choctaw County, Oklahoma. Southeastern Naturalist 30: 701-714.

Hoagland, B.W. and F.L. Johnson. 2001. Vascular flora of the Chickasaw National Recreation Area, Murray County, Oklahoma. Castanea 66:383-400.

Hoagland, B.W. and F.L. Johnson. 2004a. Vascular Flora of Chouteau Wildlife Management Area, Wagoner County, Oklahoma. Oklahoma Native Plant Record 4:30-39.

Hoagland, B.W. and F.L. Johnson. 2004b. Vascular flora of Red Slough and Grassy Slough Wildlife Management Areas, Gulf Coastal Plain, McCurtain County, Oklahoma. Castanea 69:284-296.

Hoagland, B.W and K. Wallick. 2003. Vascular flora of Oologah Wildlife Management Area, Nowata County, Oklahoma. Proceedings of the Oklahoma Academy of Science 83:47-62.

Hoagland, B.W., A. Buthod and W. Elisens. 2004a. Vascular flora of Washita Battlefield National Historic Site, Roger Mills County, Oklahoma. Sida 21:1187-1197.

Hoagland, B.W., P. Crawford-Callahan, P. Crawford, and F.L. Johnson. 2004b. Vascular flora of Hackberry Flat, Fredrick Lake, and Suttle Creek, Tillman County, Oklahoma. Sida 21 429-445.

Hoagland, B., A. Buthod, I. Butler, P. Callahan-Crawford, W. Elisens, A. Udasi, and R. Tyrl. 2005. Oklahoma Vascular Plants Database. [online]. Available: http://www.biosurvey.ou.edu. (Accessed on 1 March 2005).

Hunt, C.B. 1974. Natural Regions of the United States and Canada. W.H. Freeman, San Francisco. 725 p.

Oklahoma Climatological Survey. 2005. Oklahoma Climatological Data [online]. (accessed on 1 March 2005). Available from http://www.ocs.ou.edu/.

Oklahoma Natural Heritage Inventory. 2005. ONHI working list of rare Oklahoma plants [online]. (accessed on 1 March 2005). Available from http://www.biosurvey.ou.edu/publicat.htm.

Palmer, M.W., G.L. Wade, and P. Neal. 1995. Standards for the writing of floras. Bioscience 45:339-345.

Plains Flora Association. 1986. Flora of the Great Plains. University Press of Kansas, Lawrence.

Taylor, R.J. and C.S. Taylor. 1991. An annotated list of the ferns, fern allies, gymnosperms, and flowering plants of Oklahoma. Southeastern Oklahoma State University, Durant. 133 p.

Trewartha, G.T. 1968. An introduction to climate. McGraw-Hill, New York. 399 p.

USDA-NRCS. 2005. The PLANTS database [online]. (Accessed on 1 March 2005). Available from http://plants.usda.gov/plants. National Plant Data Center, Baton Rouge, LA.

Waterfall, U.T. 1969. Keys to the flora of Oklahoma, 4th ed. Published by the author, Stillwater. 246 p.
APPENDIX 1
Annotated species list.

The first entry is habitat (PO-AN = Platanus occidentalis - Acer negundo forest association, QM-QS = Quercus muehlenbergii - Quercus shumardii forest association, QS-CT, = Quercus stellata-Q. marilandica-Carya texana forest association, AG-SN = Andropogon gerardii - Sorghastrum nutans herbaceous association, WETL = wetland and aquatic vegetation, DAO = disturbed areas and old-field vegetation), followed by life history (A=annual, B=biennial, P=perennial), and collection number. Exotic species are denoted with an asterisk. Voucher specimens were deposited at the Robert Bebb Herbarium at the University of Oklahoma (OKL).

PTERIDOPHYTA

Aspleniaceae
Asplenium platyneuron (L.) B.S.P. - QS-CT; P; AB-4868
Asplenium rhizophyllum L. - QM-QS; AB-4499

Dryopteridaceae
Woodsia obtusa (Spreng.) Torr. - QM-QS; P; AB-4680

Ophioglossaceae
Botrychium virginianum (L.) Sw. - QM-QS; P; AB-4688
Ophioglossum engelmannii Prandl - QS-CT; P; AB-4515

Polypodiaceae
Pleopeltis polyiodoides (L.) Andrews & Windham - QM-QS; P; AB-5043

Pteridaceae
Cheilanthes lanosa (Michx.) D.C. Eat. - QM-QS; P; AB-4498

PINOPHYTA

Cupressaceae
Juniperus virginiana L. - QS-CT; P; AB-4843

MAGNOLIOPHYTA

MAGNOLIOPSIDA

Acanthaceae
Justicia americana (L.) Vahl - WETL; P; AB-6411
Ruellia humilis Nutt. - AG-SN; P; AB-4874

Aceraceae
Acer negundo L. - PO-AN; P; AB-5035

Amaranthaceae
Amaranthus palmeri S. Wats. - DAO; A; AB-6439a
Amaranthus rudis Sauer - DAO; A; AB-6385

Anacardiaceae
Rhus copallinum L. - QS-CT; P; AB-4887

Apiceae
Chaerophyllum tainturieri Hook. - DAO; A; AB-4685

Asteraceae
Achillea millefolium L. - AG-SN; P; AB-6411
Ambrosia artemisiifolia L. - DAO; A; AB-6380
Ambrosia psilostachya DC. - AG-SN; P; AB-6091
A. trifida L. - DAO; P; AB-6353
Antennaria parlinii Fern. - QS-CT; P; AB-4519
Bidens aristosa (Michx.) Britt. - WETL; A; AB-6426
B. bipinnata L. - PO-AN; A; AB-6390
B. frondosa L. - PO-AN; A; AB-6415
Brickellia eupatorioides (L.) Shinners - PO-AN; P; AB-6407

Apocynaceae
Apocynum cannabinum L. - AG-SN; P; AB-5037

Asclepiadaceae
Asclepias tuberosa L. - AG-SN; A; AB-4856
A. viridis Walt. - DAO; P; AB-5142

Hydrophyta
Hydrophyllum virginianum L. - WETL; P; AB-6411

Hydrocharitaceae
Hydrilla verticillata L. - AG-SN; A; AB-6850

Hoagland & Buthod
Chrysopsis pilosa Nutt. - AG-SN; A; AB-4859
Cirsium altissimum (L.) Hill - QM-QS; P; AB-6096
C. undulatum (Nutt.) Spreng. - AG-SN; P; AB-4847
Conoclinium coelestinum (L.) DC. - PO-AN; P; AB-6381
Conyza canadensis (L.) Cronq. - DAOF; A; AB-6072
Coreopsis grandiflora Hogg ex Sweet - AG-SN; P; AB-6381
C. tinctoria Nutt. - AG-SN; A; AB-5052
Eclipta prostrata (L.) L. - WETL; A; AB-5055
Elephantopus carolinianus Raeusch. - QM-QS; P; AB-6389
Eupatorium rugosum Houtt. - PO-AN; P; AB-6372
E. serotinum Michx. - QM-QS; P; AB-6082
Euthamia gymnospermoides Greene - QM-QS; P; AB-6369
Evax verna Raf. - DAOF; A; AB-4712
Gamochaeta purpurea (L.) Cabrera - QS-CT; P; AB-5153
Grindelia papposa Nesom & Suh - AG-SN; A; AB-6093
Helenium amarum (Raf.) H. Rock - DAOF; A; AB-6068
Helianthus bursatus Raf. - QS-CT; P; AB-5003
H. mollis Lam. - AG-SN; P; AB-5056
Hieracium longipilum Torr. - QS-CT; P; AB-5005
Krigia caespitosa (Raf.) Chambers - QS-CT; A; AB-4704
Lactuca floridana (L.) Gaertn. - DAOF; A; AB-6383
L. ludoviciana (Nutt.) Riddell - DAOF; A; AB-5020
Liatris aspera Michx. - AG-SN; P; AB-6403
L. punctata Hook. - AG-SN; P; AB-6083
Oligoneuron rigidum (L.) Small - QS-CT; P; AB-6360
Pluchea camphorata (L.) Pers. - QM-QS; P; AB-6079
Pseudognaphalium obtusifolium (L.) Hilliard & Burtt - DAOF; A; AB-6432
Pyrrhopappus grandiflorus (Nutt.) Nutt. - QS-CT; P; AB-6486
Ratibida columnifera (Nutt.) Woot. & Standl. - AG-SN; P; AB-4857
Solidago canadensis L. - AG-SN; P; AB-6424
S. missouriensis Nutt. - AG-SN; P; AB-6103
S. nemoralis Ait. - QM-QS; P; AB-6425
S. ulmifolia Nutt. ex Willd. - QS-CT; P; AB-6106
Symphyotrichum drummondii (Lindl.) Nesom - QM-QS; P; AB-6370
S. dumosum (L.) Nesom; QM-QS; P; AB-6107
S. ericoides (L.) Nesom - AG-SN; P; AB-6365
S. lanceolatum (Willd.) Nesom - QM-QS; P; AB-6434
S. oolentangiense (Riddell) Nesom - QS-CT; P; AB-6374
S. patens (Ait.) Nesom - QS-CT; P; AB-6070
S. subulatum (Michx.) Nesom - WETL; A; AB-6106
Teanacum officinale G.H. Weber ex Wiggers* - DAOF; P; AB-4517
Tragopogon dubius Scop.* - DAOF; A; AB-4672
Vernonia baldwinii Torr. - AG-SN; P; AB-5021
Balsaminaceae
Impatiens capensis Meerb. - PO-AN; A; AB-5034
Boraginaceae
Buglossoides arvensis (L.) I.M. Johnson - DAOF; A; AB-4696
Heliotropium indicum L.* - PO-AN; A; AB-6393
Lithospermum incisum Lehm. - AG-SN; P; AB-4499
Brassicaceae
Arabis canadensis L. - QS-CT; B; AB-5023
Cardamine parviflora L. - DAOF; A; AB-4504
Draba brachycarpa Nutt. ex Torr. & Gray - DAOF; A; AB-4518
D. cuneifolia; Nutt. ex Torr. & Gray - DAOF; A; AB-4523
Lesquerella gracilis (Hook.) S. Wats. - AG-SN; A; AB-4726
Rorippa islandica (Oeder) Borbas - PO-AN; A; AB-5012
R. palustris (L.) Bess. - WETL; A; AB-4735
Cactaceae
Opuntia macrorhiza Engelm. - QM-QS; P; AB-5125
Campanulaceae
Triodanis perfoliata (L.) Nieuwl. - QM-QS; P; AB-4877
Caprifoliaceae
Symphoricarpos orbiculatus Moench - QS-CT; P; AB-4890
Viburnum rufidulum Raf. - QS-CT; P; AB-4865

Hoagland & Buthod
Caryophyllaceae
Arenaria serpyllifolia L.* - DAOF; A; AB-4511
Cerastium glomeratum Thuill.* - DAOF; A; AB-5054
Stellaria media (L.) Vill.* - DAOF; A; AB-4512

Celastraceae
Celastrus scandens L. - QM-QS; P; AB-6382

Cerastium glomeratum
Thuill.* - DAOF; A; AB-5054

Chenopodiaceae
Chenopodium album L.* - DAOF; A; AB-6392
C. berlandieri Moq. - AG-SN; A; AB-6401
C. ambrosioides L.* - QS-CT; A; AB-6409

Cistaceae
Lechea mucronata Raf. - QS-CT; P; AB-5000
L. tenuifolia Michx. - QS-CT; P; AB-4861

Clusiaceae
Hypericum hypericoides (L.) Crantz - QS-CT; P; AB-4879
H. punctatum Lam. - AG-SN; P; AB-5010

Cornaceae
Cornus drummondii C.A. Mey. - QS-CT; P; AB-4884

Crassulaceae
Penthorum sedoides L. - WETL; P; AB-5053

Cucurbitaceae
Sicyos angulatus L. - QM-QS; A; AB-6412

Ebenaceae
Diospyros virginiana L. - QS-CT; P; AB-5149

Euphorbiaceae
Acalypha gracilens Gray - QM-QS; A; AB-5006
A. monoica (Engelm. ex Gray) L. Mill. & Gandhi - PO-AN; A; AB-5024
Chamaesyce maculata (L.) Small - DAOF; A; AB-6097
C. nutans (Lag.) Small - DAOF; A; AB-6101
Crinum capitatum Michx. - AG-SN; A; AB-6076
C. glandulosus L. - DAOF; A; AB-5049
C. wildenewii G. L. Webster - AG-SN; A; AB-5016
Euphorbia corollata L. - AG-SN; P; AB-6069
E. dentata Michx. - DAOF; A; AB-6362
E. marginata Pursh - AG-SN; A; AB-6073
E. spatulata Lam. - DAOF; A; AB-4681

Fabaceae
Albizia julibrissin Durazz.* - QM-QS; P; AB-4894
Amorpha canescens Pursh - AG-SN; P; AB-5040
A. fruticosa L. - WETL; P; AB-6416
Amphicarpaea bracteata (L.) Fern. - QS-CT; A; AB-6414
Aplos americana Medik. - PO-AN; P; AB-6357
Astragalus canadensis L. - QS-CT; P; AB-5022
Cercis canadensis L. - QS-CT; P; AB-4513
Chamaecrista fasciculata (Michx.) Greene - AG-SN; A; AB-6087
C. nictitans (L.) Moench - AG-SN; A; AB-6074
Desmanthus illinoensis (Michx.) MacM. Ex B.L. Robins. & Fern. - PO-AN; P; AB-6112
Desmodium ciliare (Muhl. ex Willdl.) DC. - QS-CT; P; AB-6095
D. glutinosum (Muhl. ex Willdl.) Wood - QM-QS; P; AB-5122
D. paniculatum (L.) DC. - AG-SN; P; AB-5126
D. sessilifolium (Torr.) Torr. & Gray - AG-SN; P; AB-5026
Galactia volubilis (L.) Britt. - PO-AN; P; AB-6423
Gymnocladus dioicus (L.) K. Koch - QM-QS; P; AB-5046
Lespedeza capitata Michx. - AG-SN; P; AB-6065
L. cuneata (Dun.-Cours.) G. Don* - DAOF; P; AB-6076
L. procumbens Michx.- QS-CT; P; AB-5027
L. stuevei Nutt. - AG-SN; P; AB-6019
L. virginica (L.) Britt. - AG-SN; P; AB-6078
Melilotus officinalis (L.) Lam.* - DAOF; A; AB-4682
Neptunia lutea (Leavenworth) Benth. - AG-SN; P; AB-5039
Pediocarpum linearifolium (Torr. & Gray) J. Grimes - AG-SN; P; AB-4867
Robinia pseudoacacia L. - DAOF; P; AB-4892
Stylosanthes biflora (L.) B.S.P. - AG-SN; P; AB-4578
Trifolium campestre Schreb.* - DAOF; A; AB-4703

Fagaceae
Quercus marilandica Muenchh. - QS-CT; P; AB-4891
Q. muehlenbergii Engelm. - QM-QS; P; AB-4684
Q. palustris Muenchh. T, P; AB-4274
Q. rubra L. - QM-QS; P; AB-4714
Q. shumardii Buckl. - QM-QS; P; AB-4713
Q. stellata Wangenh. - QS-CT; P; AB-4893

Gentianaceae
Sabatia campestris Nutt. - AG-SN; A; AB-4852

Geraniaceae
Geranium carolinianum L. - B.S.P. - AG-SN; P; AB-4578

Grossulariaceae
Ribes aureum Pursh - QS-CT; P; AB-4500

Hoagland & Buthod
**Juglandaceae**
*Carya cordiformis* (Wangenh.) K. Koch - QM-QS; P; AB-5015
*C. illinoinensis* (Wangenh.) K. Koch - QM-QS; P; AB-5161
*C. texana* Buckley. - QS-CT; P; AB-5162

**Lamiaceae**
*Hedeoma hispida* Pursh - AG-SN; A; AB-4673
*Lamium amplexicaule* L.* - QM-QS; A; AB-4503
*Lycopus americanus* Muhl. ex W. Bart - WETL; P; AB-5011
*Prunella vulgaris* L.* - QM-QS; P; AB-4896
*Salvia azurea* Michx. ex Lam. - AG-SN; A; AB-6363
*Stachys tenuifolia* Willd. - QM-QS; P; AB-5025
*Tecucrium canadense* L. - PO-AN; P; AB-4888

**Linaceae**
*Linum pratense* (J.B.S. Norton) Small - AG-SN; A; AB-4725
*L. rigidum* Pursh - AG-SN; A; AB-4853

**Lythraceae**
*Rotala ramosior* (L.) Koehne - WETL; A; AB-6080

**Menispermaceae**
*Cocculus carolinus* (L.) DC. - QM-QS; P; AB-4868
*Menispermum canadense* L. - PO-AN; P; AB-4669

**Molluginaceae**
*Mollugo verticillata* L. - DAOF; A; AB-5047

**Nelumbonaceae**
*Nelumbo lutea* Willd. - WETL; P; AB-5032

**Oleaceae**
*Fraxinus americana* L. - QM-QS; P; AB-5160
*F. pennsylvanica* Marsh. - PO-AN; P; AB-4715
*F. quadrangulata* Michx. - QM-QS; P; AB-4713

**Onagraceae**
*Gaura longiflora* Spach - AG-SN; A; AB-6104
*Ludwigia alternifolia* L. - WETL; P; AB-5001
*L. glandulosa* Walt. - WETL; P; AB-5014
*Oenothera laciniata* Hill - DAOF; P; AB-4694
*O. linifolia* Nutt. - DAOF; A; AB-4691

**Oxalidaceae**
*Oxalis stricta* L. - DAOF; P; AB-4693
*O. violacea* L. - QS-CT; P; AB-4692

**Passifloraceae**
*Passiflora incarnata* L. - DAOF; P; AB-4844
*P. lutea* L. - QS-CT; P; AB-5044

**Phytolaccaceae**
*Phytolacca americana* L. - DAOF; P; AB-5041

**Plantaginaceae**
*Plantago aristata* Michx. - DAOF; A; AB-4867
*P. heterophylla* Nutt. - QS-CT; A; AB-4731
*P. major* L. - PO-AN; P; AB-6396
*P. patagonica* Jacq. - AG-SN; A; AB-4846
*P. virginica* L. - QS-CT; A; AB-4709

**Plantanaceae**
*Platanus occidentalis* L. - PO-AN; P; AB-6364

**Polygalaceae**
*Polygala incarnata* L. - AG-SN; A; AB-4845

**Polygonaceae**
*Polygonum hydropiperoides* Michx. - WETL; P; AB-6098
*P. lapathifolium* L. - WETL; A; AB-6399
*P. pennsylvanicum* L. - WETL; A; AB-6368
*P. punctatum* Ell. - WETL; A; AB-5004
*P. virginianum* L. - PO-AN; P; AB-6359

**Portulacaceae**
*Claytonia virginica* L. - AG-SN; P; AB-4527

**Primulaceae**
*Samolus valerandi* L. - WETL; P; AB-6394

**Rosaceae**
*Agrimonia rostellata* Wallr. - QM-QS; P; AB-5028
*Amelanchier arborea* (Michx. f.) Fern. - QS-CT; P; AB-5036
*Geum canadense* Jacq. - QM-QS; P; AB-5051
*Rosa multiflora* Thunb. Ex Murr.* - QS-CT; P; AB-4707
*Potentilla recta* L.* - DAOF; P; AB-4870
*Prunus angustifolia* Marsh. - AG-SN; P; AB-4666
*Rubus aboriginum* Rydb. - QM-QS; P; AB-4708

**Rubiaceae**
*Cephalanthus occidentalis* L. - WETL; P; AB-5057
*Disidea teres* Walt. - DAOF; A; AB-5002
*Galium aparine* L. - QS-CT; A; AB-4668
*Galium circinaeans* Michx. - QM-QS; P; AB-4889
*Houstonia pusila* Schoepf - DAOF; A; AB-4525
*Sherardia arvensis* L.* - DAOF; P; AB-4524
### Salicaceae

*Populus deltoides* Bartr. ex Marsh. - PO-AN; P; AB-4674

*Salix nigra* Marsh. - WETL; P; AB-4883

### Sapindaceae

*Cardiospermum halicacabum* L. - PO-AN; A; AB-6384

*Sapindus saponaria* L. - PO-AN; A; AB-6354

### Sapotaceae

*Sideroxylon lanuginosum* Michx. - QS-CT; P; AB-4667

### Scrophulariaceae

*Buchnera americana* L. - AG-SN; P; AB-4842

*Castilleja indivisa* Engelm. - AG-SN; A; AB-4676

*Leucospora multifida* (Michx.) Nutt. - PO-AN; A; AB-6377

*Lindernia dubia* (L.) Pennell - WETL; A; AB-6398

*Mimulus alatus* Ait. - WETL; P; AB-6356

*Nuttallanthus texanus* (Schelle) D.A. Sutton - AG-SN; A; AB-4732

*Penstemon oklahomensis* Pennell - AG-SN; P; AB-4689

*Phyla lanceolata* (Michx.) Greene - WETL; P; AB-5008

*Verbena urticifolia* L. - WETL; P; AB-6430

### Violaceae

*Viola bicolor* Pursh - DAOF; A; AB-4522

*V. nephrphylla* Greene - PO-AN; P; AB-4520

### Vitaceae

*Ampelopsis cordata* Michx. - PO-AN; P; AB-5045

*Cissus trifoliata* (L.) - QS-CT; P; AB-4875

*Partbenocissus quinquefolia* (L.) Planch. - QM-QS; P; AB-4670

*Vitis cinerea* (Engelm.) Millard - QS-CT; P; AB-4727

*V. vulpina* L. - QS-CT; P; AB-5156

### LILIOPSIDA

#### Alismataceae

*Sagittaria calycina* Engelm. - WETL; P; AB-6081

*S. graminea* Michx. - WETL; P; AB-5007

### Araceae

*Arisaema triphyllum* (L.) Schott - QM-QS; P; AB-4679

### Commelinaceae

*Commelina erecta* L. - PO-AN; P; AB-5124

*Tradescantia ohiensis* Raf. - AG-SN; P; AB-4864

### Cyperaceae

*Carex altifrons* Willd. ex Spreng. - QS-CT; P; AB-4510

*Cyperus echinatus* (L.) Wood - AG-SN; P; AB-5150

*C. erythrorhizos* Muhl. - WETL; A; AB-6397

*C. odoratus* L. - PO-AN; A; AB-6400

*Cyperus pseudovegetus* Steud. - WETL; P; AB-5128

*C. squarrosois* L. - WETL; A; AB-5121

*C. strigosus* L. - WETL; A; AB-5125

Fimbristylis puberula (Michx.) Vahl - AG-SN; P; AB-4872

*F. rabilii* (Lam.) Link - PO-AN; A; AB-6473

*Isolepis carinata* Hook. & Arn. Ex Torr. - DAOF; A; AB-4697

*Rhynchospora barreyi* W. Boott - AG-SN; P; AB-5131

*Scirpus pendulus* Muhl - WETL; P; AB-4700

*Scleria ciliata* Michx. - AG-SN; P; AB-4698

### Iridaceae

*Sisyrinchium angustifolium* P. Mill - AG-SN; P; AB-4690

*Stizyrischium angustifolium* P. Mill - AG-SN; P; AB-4690

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**Hoagland & Buthod**
Juncaceae

*Juncus acuminatus* Michx. - WETL; P; AB-6431
*J. brachycarpus* Engelm. - WETL; P; AB-5132
*J. bufonius* L. - WETL; A; AB-5127
*J. diffusissimus* Buckl. - WETL; P; AB-5157
*J. interior* Wieg. - AG-SN; P; AB-4701
*J. marginatus* Rostk. - WETL; P; AB-5129
*J. nodatus* Coville - WETL; P; AB-5133

Liliaceae

*Erythronium mesochoreum* Knerr - QM-QS; P; AB-4516
*Nothoscordum bivalve* (L.) Britt - AG-SN; P; AB-4506
*Polygonatum biflorum* (Walt.) Ell. - QM-QS; P; AB-5013

Poaceae

*Andropogon gerardii* Vitman - AG-SN; P; AB-6063
*A. ternarius* Michx. - AG-SN; P; AB-6142
*A. virginicus* L. - AG-SN; P; AB-6422
*Agrostis elliottiana* J.A. Schultes - QM-QS; P; AB-4722
*Aira elegans* Willd. ex Kunth* - AG-SN; A; AB-4705
*Aristida oligantha* Michx. - AG-SN; A; AB-6100
*Bothriochloa ischaemum* (L.) Keng - DAOF; AB-5154
*B. saccharoides* (Sw.) Rydb. - AG-SN; P; AB-6428
*Botelousa curtipendula* (Michx.) Torr. - AG-SN; P; AB-5033
*B. hirsuta* Lag. - AG-SN; P; AB-6110
*Bromus catharticus* Vahl.* - DAOF; A; AB-4671
*B. japonicus* Thunb. Ex Murr.* - AG-SN; P; AB-6111
*Echinochloa crus-galli* (L.) Beauv.* - WETL; A; AB-5135
*Elymus canadensis* L. - QM-QS; P; AB-4860
*E. virginicus* L. - QS-CT; P; AB-4863
*Eragrostis barrelieri* Daveau* - DAOF; A; AB-4816
*E. hirusta* (Michx.) Nees - AG-SN; P; AB-6440a
*E. intermedia* A.S. Hitchc. - AG-SN; P; AB-6440a
*E. secundiflora* J. Presl - AG-SN; P; AB-5134
*E. spectabilis* (Pursh) Steud. - AG-SN; P; AB-6018
*E. trichodes* (Nutt.) Wood - AG-SN; P; AB-6433
*Hordeum pusillum* Nutt. - DAOF; A; AB-4695
*Leptochloa panicea* (Retz.) Ohwi - WETL; A; AB-6440a
*Muhlenbergia racemosa* (Michx.) B.S.P. - QM-QS; P; AB-5139
*M. sobolifera* (Muhl. Ex Willd.) Trin. - QS-CT; P; AB-6402
*Neeragrostis reptans* (Michx.) Nicora - WETL; A; AB-6404
*Panicum anceps* Michx. - PO-AN; P; AB-6067
*P. dichotomiflorum* Michx. - QM-QS; A; AB-6413
*P. virgatum* L. - WETL; P; AB-6391
*Paspalum floridanum* Michx. - WETL; P; AB-6088
*P. leavv Michx. - AG-SN; P; AB-6099
*P. setaceum* Michx. - AG-SN; P; AB-5138
*Poa annua* L.* - QM-QS; A; AB-4505
*Setaria parviflora* (Poir.) Kerguelen - DAOF; P; AB-5151
*Sorghastrum nutans* (L.) Nash - AG-SN; P; AB-6075
*Tridens flavus* (L.) A.S. Hitchc. - AG-SN; P; AB-5137
*Vulpia octoflora* (Walt.) Rydb. - QS-CT; A; AB-4737

Potamogetonaceae

*Potamogeton nodosus* Poir. - WETL; P; AB-5159

Smilacaceae

*Smilax rotundifolia* L. - QS-CT; P; AB-5146
*Smilax tamnoides* L. - QS-CT; P; AB-4882

Typhaceae

*Typha domingensis* Pers. - WETL; P; AB-4886
*T. latifolia* L. - WETL; P; AB-4885