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# The Vascular Flora of the University of the South, Sewanee, Tennessee

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**ABSTRACT** Sewanee: The University of the South, located in Franklin County, Tennessee, is a 5,263 ha site that encompasses a variety of plateau and cove habitats on the southern Cumberland Plateau in southeastern Tennessee. The vascular flora of the University of the South was documented from 1948–2015 and comprises 1,118 species and lesser taxa in 553 genera and 150 families. We documented 229 exotic taxa, 20.5% of the flora. This flora contains six state records, 74 Franklin County records, and two potential new species. Eighteen taxa are listed as protected either at the state or federal level, including the federally listed endangered *Clematis morefieldii* and state listed endangered *Diamorpha smallii*, *Silphium brachiatum*, and *Symphytotrichum pratense*. When compared to the five other published floras for the southern Cumberland Plateau in Tennessee, the University of the South flora is the most diverse, capturing 69% of the total taxa at the species level for the region. The high diversity of plant species in the University of the South flora reflects the broad range of habitats that can be found within the campus and contiguous natural areas. This flora demonstrates that herbaria at small liberal arts colleges can play an important role in the documentation and promotion of plant biodiversity within their region.

**Key words:** Cumberland Plateau, flora, floristic inventory, plant communities, rare species, Sewanee, Tennessee.

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**INTRODUCTION** The campus and contiguous lands owned by Sewanee: The University of the South (UoS) (referred to locally as the “Sewanee Domain”) are located on the Cumberland Plateau in southeastern Tennessee, a region of high botanical diversity within the United States (Kartesz 2015). The area around UoS has been the focal point for several published floras that have contributed to our understanding of this diversity (Clark 1966, Wofford et al. 1979, Clements and Wofford 1991, Fleming and Wofford 2004, Beck and Van Horn 2007). A number of factors contribute to the potential for the UoS to capture a large percentage of the region’s

botanical diversity: (a) much of the land has been under continuous ownership since 1875, with management for education being a primary landowner objective; (b) there is a spectrum of habitats associated with a variety of historical land uses; and (c) the landscape encompasses a broad range of ecological communities associated with major variation in geology, hydrology, and topography.

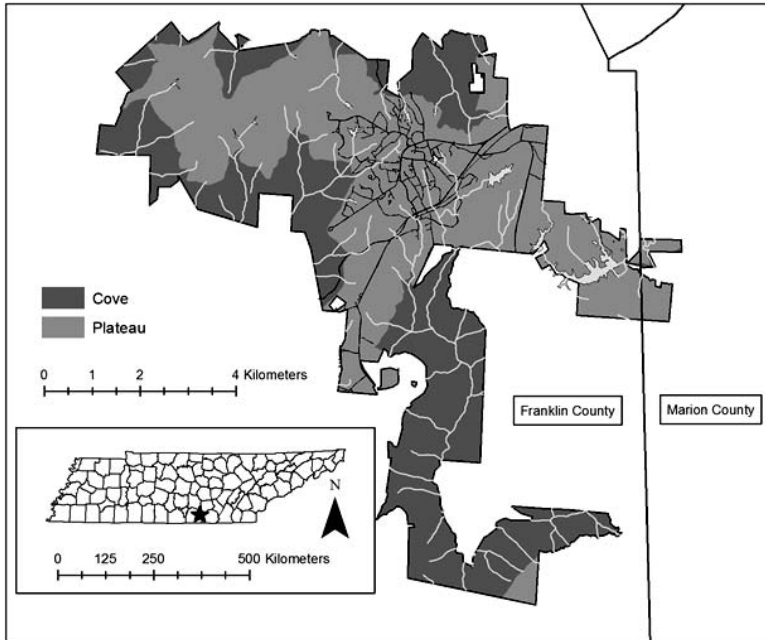
The goals of this study were (a) to document the vascular flora of the UoS, (b) document rare or threatened plants, (c) document exotic plants, (d) document new state and Franklin county records, (e) list characteristic habitats for each taxon, and (f) compare floristic similarity of five Tennessee Cumberland Plateau floras. This study represents 50 yr of accumulated botanical

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**Figure 1.** Map of the University of the South lands with location within Tennessee. Plateau forest type is shown in dark gray, and cove forest type is shown in lighter gray. Streams and water bodies are shown in light gray. Paved roads and county lines overlay the map in black.

study and collecting at this institution and is the first published record of the UoS flora.

### *Study Area*

The land owned by the University of the South is located in southeast Tennessee. The majority of the land is in Franklin County, but a small portion reaches into Marion County (Figure 1). The UoS, a 5,263 ha area, is located between 35°07'13"N and 35°13'52"N latitudes and between 85°51'24"W and 85°59'27"W longitudes. It is approximately 132 km southeast of Nashville and 58 km northwest of Chattanooga. The UoS occupies the Sewanee, Monteagle, and Sinking Cove USGS topographic sheet quadrangles and is part of the Appalachian Plateau Province. The landscape of the UoS consists of both upland (tableland) and cove environments, spanning an elevational range from 289 to 612 m. The UoS currently consists of an academic campus (155 ha) with adjacent commercial and residential areas (317 ha) that are embedded within and surrounded by diverse natural lands (4,791 ha). There are 15 reservoirs (67.5 ha), and the UoS is crossed by 9 km of major Tennessee Valley Authority (TVA) powerline rights-of-way

(two lines, established in 1942 and 1951) that are kept free of woody vegetation. The continuum that exists on the UoS between the human-built environment and the surrounding natural environment contributes to the diversity of plant species.

### *Land Use and Disturbance History*

The lands that make up the present-day UoS have been affected by both prehistoric and historic human management. For 10,000 yr, Native Americans (the last of which were the Cherokees) used the Cumberland Plateau as seasonal hunting grounds and increased the level of fire on the landscape through their burning practices (Miller 2004). Settlers of European descent arrived in the Sewanee area in the early 1800s and began using land for grazing animals and resource extraction including coal and timber (Miller 2004). They also continued the practice of burning in the forests. By the time the University of the South was founded in 1857, Sewanee was a small town and much of the upland forest had been heavily logged to generate income (Cheston 1953). The arrival of the railroad on the mountain in 1852 promoted

later economic activity associated with the new University and also resulted in fire disturbances.

In response to concerns about forest condition, in 1900 the University commissioned a forest assessment and plan for the UoS by Gifford Pinchot's Bureau of Forestry in the United States Department of Agriculture (USDA). This assessment concluded that fire, overgrazing, and overlumbaring were suppressing regeneration and causing the forest to decrease in value (Foley 1903). During this time, the Department of Forestry was created at the University (Cheston 1953), and a forest manager was hired in the early 20th century to survey the forest and implement regulated timber extraction plans (Miller 2004). Fire suppression began in the 1900s, and by the 1950s, fires no longer represented an important ecological disturbance regime at Sewanee. Water impoundments were initially created for the purpose of fighting fires and later for providing drinking water and recreation areas. A network of firelanes was established in the 1930s and expanded in the 1950s, serving the dual purpose of fire control and recreational access across the upland area of the UoS. *Pinus strobus* was planted along firelanes to provide aerial visualization of compartment boundaries (Smith et al. 2010) and is now considered invasive as second-generation trees have spread from seed beyond original plantings. *Pinus strobus*, *Pinus taeda*, and other species were also planted in scattered experimental plantations by the University in conjunction with United States Forest Service (USFS) silvicultural scientists, who maintained a research station at the University from 1956–1985.

By the 1960s and continuing to the present day, the University significantly decreased logging activities in favor of preserving its forests and promoting recreation and aesthetics. Two old-growth forests, Dick Cove and Shakerag Hollow, have been set aside as a result of their biological diversity. In 2008, the University most recently acquired an adjacent 1,200 ha tract in Lost Cove that is currently managed as a natural area (Smith and Williamson 2008).

A University farm established in 1899 included 6 ha of land managed for pasture and vegetable production (Smith et al. 2010). The practice of running free-range livestock (cattle, pigs) in the forest that predated the University ended by the 1940s. The University farm fenced off large tracts of forest (400 ha) for pasture and running

cattle. The original farm operation ceased in the 1960s, with farm fields being allocated to other purposes such as an equestrian center and sports fields. Some were maintained as open fields, and others were abandoned. A new University farm program was established in 2012 and currently occupies 1 ha of land used for agricultural purposes.

As a result of severe hunting pressure during the 1930s, white-tailed deer (*Odocoileus virginianus*) were largely eliminated from the Sewanee area. Deer were reintroduced in the 1950s, and a predator trapping program was established, targeting bobcats and feral dogs. By the late 1990s, deer densities had increased to levels impacting forest regeneration on the UoS (Reid et al. 2008).

*Castanea dentata*, once abundant on upland ridges and cove habitats with sandstone colluvium, was decimated by chestnut blight epidemics of the 1930s (Myers et al. 2004), so there are no reproductive individuals present on the UoS. Similarly, the dogwood anthracnose blight caused high mortality in *Cornus florida* populations in both cove and upland forest communities (Hiers and Evans 1997).

### Vegetation

Typical of the southern Cumberland Plateau in Tennessee, the UoS has two major forest types draped across the plateau topography: an upland forest type and adjacent cove forest type (Hinkle 1989). The xeric upland forest is composed of a mixture of oak species (*Quercus alba*, *Quercus coccinea*, *Quercus prinus*, *Quercus stellata*, *Quercus velutina*) and hickory species (*Carya glabra*, *Carya pallida*, *Carya tomentosa*) in the canopy along with *Acer rubrum*, *Nyssa sylvatica*, and *Oxydendrum arboreum* (Reid et al. 2008). The understory of the upland forest is composed of a variety of woody shrubs including *Kalmia latifolia*, *Rhododendron* spp., and *Vaccinium* spp., along with a large number of grasses, sedges, and fall-blooming composites (Clements and Wofford 1991). The composition of the adjacent cove forest varies as a function of slope and aspect, but is generally characterized as having a diverse, mixed mesophytic canopy (*Aesculus flava*, *Carya ovata*, *Juglans nigra*, *Liriodendron tulipifera*, *Tilia americana*) with an oak (*Quercus* spp.) component and an *Acer saccharum* dominated understory and midstory (McGee 1986, Hinkle 1989, Reid et al. 2008). The

cove forest understory has a diverse assemblage of herbaceous species (Duffy and Meier 1992).

The upland and cove forest communities differ ecologically. Upland plateau forest dynamics are driven by limited soil resource availability (Hinkle 1989), whereas cove forest dynamics are controlled to a greater degree by limited light availability (Martin 1992). Floristic studies from nearby locations on Cumberland Plateau in southern Tennessee (Wofford et al. 1979: Savage Gulf, Grundy County; Clements and Wofford 1991: Wolf Cove, Franklin County) have determined that less than 25% of the vascular plant species associated with the upland forest is also found in the cove forest. These studies also reveal that despite this dissimilarity, the plateau forest is just as diverse as the cove forest with upland forest species representing 48% of the total flora in both study areas.

### *Geology*

The Cumberland Plateau represents the southern extension of the Appalachian Plateau that extends from West Virginia and Kentucky through Tennessee, terminating in Alabama. It is considered the westernmost part of the southern Appalachian region (Southern Appalachian Man and the Biosphere [SAMAB] 1996), bounded by the Ridge and Valley Province to the east and by the Interior Lowland Plateau to the west. The UoS is located on the southern portion of the Cumberland Plateau in Tennessee, which is characterized as having a flat to gently rolling surface underlain by highly resistant Pennsylvanian sandstones and shales (surface: Warren Point Sandstone, Sewanee Conglomerate and Whitwell Shale; Upper Slope: Signal Point Shales and Raccoon Mountain Formations). Where drainages have breached the sandstone, the less resistant Mississippian limestones underneath have eroded to form extensive steep-sided coves (Midslope: Pennington Formation; Lower Slope: Bangor Limestone and Hartselle Formation; Bottomlands: Monteagle Limestone; Fenneman 1938, Knoll et al. 2015).

### *Soils*

The soils of this region reflect their underlying substrate and this, along with topographic position, is responsible for the large compositional differences between the forest of the plateau surface (hereafter referred to as plateau forest) and that of the coves (hereafter referred to as cove forest). Soils on the plateau are derived from sedimentary rocks and are acidic

and well drained. Soils include Hartsells, Albertville, Lonewood, Ramsey, Hector, and Gilpin. Soils in the bottomlands of the cove are moderately fertile, deep, and moderately well drained. These soils include Sewanee, Ealy, and Clifty. Upper slopes of the cove developed from sandstone, siltstone, and shale. Soils on lower slopes developed from limestone. Slope soils include Grimsley, Jefferson, Bouldin, and Allen (Smalley 1982).

The soils of the plateau surface, being derived from the underlying sandstone, have a very high sand content. This condition makes these soils nutrient poor (low ion exchange capacity), drought prone, and highly acidic with little buffering capacity (Francis and Loftus 1977, Mays et al. 1991). Most of the fine root matter within the plateau forest soil is located in the upper 5 cm of the organic layer. This carpet-like mat of roots suggests that soil resource input (water and nutrients) is mostly coming from above through precipitation and litter turnover. In a study examining the potential impact of increased acid precipitation on cation-poor forest systems, Kelly (1988) observed an annual net loss of base cations (principally  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$ ) over a five yr period from two forested plateau watersheds (Cross Creek, Franklin County, and Camp Branch, Bledsoe County) near UoS.

### *Climate*

The climate of UoS is summarized using the last three decades of weather data taken on the uplands of the Cumberland Plateau by the University. The highest average temperatures occur in July (28.07°C) and August (28.08°C). The lowest average temperature occurs in January (-1.42°C). December and March have the highest precipitation, at 15.43 and 13.92 cm, respectively. Precipitation is lowest in May (11.61 cm) and August (11.33 cm). The average annual precipitation is 155.13 cm.

**MATERIALS AND METHODS** The vascular flora of the UoS has been studied informally throughout its history, and collections have been made as early as 1948. Some collections were made starting in 1958 as a result of a Plant Systematics course taught at the University. A formal inventory of the UoS flora began in 1995 with the creation of the Sewanee Herbarium (*Index Herbariorum* Code: UOS). Thorough descriptions of location and habitat are associated with each specimen, and species associations

**Table 1. Taxonomic summary of the flora of the University of the South, Franklin County, Tennessee. Exotic taxa include those that are introduced, invasive, exotic to the UoS, and persistent plantings.**

Group	Total Taxa	Percent Composition	Total Families	Total Genera	Native Taxa	Exotic Taxa
Basal dicots	14	1.3%	7	12	12	2
Monocots	276	24.7%	28	116	226	50
Eudicots	773	69.1%	98	388	601	172
Gymnosperms	8	0.7%	2	5	3	5
Pteridophytes	47	4.2%	15	32	47	0
Total	1,118	100.0%	150	553	889	229

with major habitats have been described using UoS permanent vegetation plots. Standard references used in the identification of species include Radford et al. (1968), Cronquist (1980), Holmgren and Holmgren (1998), Wofford and Chester (2002), Jones (2005), and Weakley (2006). Nomenclature conforms to the Fifth Checklist of Tennessee Vascular Plants (Chester et al. 2009); exceptions were determined by D. Estes. The complete vouchers are stored in the Herbarium of Sewanee: The University of the South (UOS).

Presence of taxa within Franklin County was determined using the Biota of North America (BONAP) taxonomic data center (Kartesz 2015). Native and exotic taxa status was determined using USDA PLANTS database nativity data (USDA, NRCS 2016). When taxa were designated as “Native and Introduced” or “Cultivated, or not in the U.S.” we conformed to the status as listed in the Fifth Checklist of Tennessee Vascular Plants (Chester et al. 2009). Invasive exotic taxa were determined and ranked using the Tennessee Exotic Pest Plant Council list (TNEPPC; 2009). All exotic taxa listed in the appendix were also grouped into the following categories: Invasive, Introduced, and Persistent Planting. Invasive species were defined as all that were on the TNEPPC list (2009). Persistent Plantings were species that appeared to be planted, but had survived for 15 or more years in a natural habitat without tending. Introduced taxa are those that do not fit into the other categories. Not included in the flora are species that were deliberately planted and currently maintained as a defined planting. State and federal status of protected taxa were determined using the Tennessee Natural Heritage Program Rare Plant List (Crabtree 2014).

#### *Floristic Comparison using Sørensen's Coefficient of Community*

The flora of the UoS was compared to five others within the Cumberland Plateau in Tennessee to

determine similarity. These include (with proximity to UoS noted): Fiery Gizzard (19 km; Clark 1966), Savage Gulf (39 km; Wofford et al. 1979), Wolf Cove (20 km; Clements and Wofford 1991), Fall Creek Falls State Park (74 km; Fleming and Wofford 2004), and Prentice Cooper State Forest and Wildlife Management Area (45 km; Beck and Van Horn 2007). We compared the similarity of these communities using Sørensen's coefficient of community (CC) repeating the methods in Beck and Van Horn (2007). This calculation did not incorporate area or other physical factors that might influence the results.

## RESULTS AND DISCUSSION

### *Survey of the Flora*

A total of 3,135 collections were made on the UoS, representing 1,118 species and lesser taxa. The flora of the UoS represent 553 genera, and 150 families (Table 1). The four largest families are Asteraceae (151 taxa), Poaceae (98 taxa), Cyperaceae (76 taxa), and Fabaceae (56 taxa). These four families make up 34.3% of the total flora of the UoS. The largest genera are *Carex* (53 taxa), *Viola* (17 taxa), *Solidago* (15 taxa), *Dichanthelium* (12 taxa), and *Symphytotrichum* (12 taxa).

### *New Species, State, and County Records*

Two specimens (*Helianthus* sp. nov. and *Sisyrinchium* sp. nov.) are thought to be new species and are being evaluated by D. Estes. We documented four native state records, *Agrimonia microcarpa*, *Carex rugosperma*, *Rubus longii*, *Viburnum alabamense*, and two exotic state records, *Arum italicum* and *Salvia pratensis*. The taxa included in the UoS flora represent 38.7% of the Tennessee vascular plant taxa (Chester et al. 2009). This study documented 74 county records for Franklin County based on Biota of North America data (Kartesz 2015). This increases the number of documented

**Table 2. List of habitats for upland and cove environments associated with the University of the South.**

Upland	Cove
Plateau surface	Sandstone cliff face and rockhouse
Sandstone outcrop and bluff	Upper slope mesic
Plateau wetland	Upper slope dry
Reservoir	Lower slope mesic
Former agriculture	Lower slope dry
Lawn	Limestone outcrop and glades
Plateau open	Floodplain
	Cove open

species in Franklin County from 1,971 to 2,053. The taxa included in the UoS flora represent of 43.5% of the documented Franklin County species (Kartesz 2015).

#### Exotic Taxa

The UoS flora contains 229 exotic taxa, making up 20.5% of the total vascular plant flora. Of these, 73 are designated as invasive by the TNEPPC representing 54% of all invasive plant species in the state (2009). In the Appendix, the following species were considered exotic in Tennessee (Chester et al. 2009) despite their native status in USDA Plants Database (USDA, NRCS 2016): *Amaranthus spinosus*, *Chamaesyce prostrata*, *Dichondra carolinensis*, *Gailardia pulchella*, *Helianthus annuus*, *Iva anua*, *Magnolia grandiflora*, *Oenothera speciosa*, *Oxalis corniculata*, and *Prunella vulgaris*. We also deviate from the USDA PLANTS database (USDA, NRCS 2016) and Fifth Checklist of Vascular Plants in Tennessee (Chester et al. 2009) in listing seven species as exotic to the UoS: *Catalpa speciosa*, *Halesia tetraptera*, *Magnolia macrophylla*, *P. taeda*, *Quercus phellos*, *Taxodium distichum*, and *Tsuga canadensis*. These represent naturalized populations that are the offspring of plantings. *Pinus strobus* was treated as another exception, listing it as both invasive and exotic to the Cumberland Plateau (Little 1971). Eighteen taxa were listed as persistent plantings: *Abelia* × *grandiflora*, *Forsythia viridissima*, *Hyacinthoides non-scripta*, *Ilex crenata*, *Lamium galeobdolon*, *Lysimachia clethroides*, *Malus prunifolia*, *Narcissus triandrus*, *Picea abies*, *Philadelphus inodorus* (native to Tennessee planting), *Phlox subulata* (native to Tennessee planting), *Phyllostachys aurea*, *Prunus avium*, *Pyrus communis*, *Rosa*

*wichuraiana*, *Viburnum carlesii*, *Viburnum rhytidophyllum*, and *Yucca flaccida* (native to Tennessee planting). Of these persistent taxa, *I. crenata*, *M. prunifolia*, *P.s aurea*, and *V. rhytidophyllum* are beginning to invade Tennessee and these populations will continue to be monitored.

#### Protected Taxa

The UoS lands contain eighteen taxa (1.6% of the flora) that are considered protected at the state or federal level. The most notable of these are *Clematis morefieldii*, which is federally listed endangered (LE), and *Diamorpha smallii*, *Silphium brachiatum*, and *S. pratense*, which are listed endangered by the state. State threatened species include: *Allium burdickii*, *Juglans cinerea*, *Liatris cylindracea*, *Lycopodiella alopecuroides*, *Phemeranthus teretifolius*, *Sceptridium jenmanii*, *Silphium pinnatifidum*, and *Trichomanes boschianum*. Special concern species include: *Berberis canadensis*, *Danthonia epilis*, *Helianthus eggertii*, *Lonicera dioica*, *Panax quinquefolius*, and *Thermopsis mollis*.

#### Habitats and Characteristic Species

Species were assigned to one or more of 15 habitat types divided between upland (plateau surface) and cove environments (Table 2). Habitats within the upland and cove environments were further differentiated as a function of canopy openness, geology, topography and human disturbance regime. The 10 nonanthropogenic habitat types correspond to the NatureServe Terrestrial Ecological Classification System (NatureServe 2013) in the following way: **Plateau Surface**—Allegheny-Cumberland Dry Oak Forest and Woodland (CES 202.359), Southern Appalachian Low Elevation Pine Forest (CES 202.332); **Sandstone Outcrop and Bluff**—Cumberland Sandstone Glade and Barrens (CES 202.337); **Plateau Wetland**—Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES 202.018), Cumberland Seepage Forest (CES 202.361); **Sandstone Cliff Face and Rockhouse**—Cumberland Acidic Cliff and Rockhouse (CES 202.309), Southern Appalachian Spray Cliff (CES 202.288); **Upper Slope Dry**—Southern Interior Low Plateau Dry-Mesic Oak Forest (CES 202.898); **Upper Slope Mesic**—South-Central Interior Mesophytic Forest (CES 202.887); **Limestone Outcrop and Glades**—Central Interior Highlands Calcareous Glades and Barrens (CES 202.691), Southern

Interior Calcareous Cliff (CES 202.356); **Lower Slope Dry**—Southern Ridge and Valley/Cumberland Dry Calcareous Forest (CES 202.457); **Floodplain**—South Central Interior Large Floodplain (CES 202.705); **Lower Slope Mesic**—South Central Interior Mesophytic Forest (CES 202.887). The 5 anthropogenically-modified habitats are **Reservoir**, **Former Agriculture**, **Lawn**, **Plateau Open**, and **Cove Open**.

### *Upland Habitats*

*Plateau surface.* The upland topography gently varies from convex to concave surfaces, and there are subtle changes in vegetation that follow these gradients. Oaks (*Q. alba*, *Q. coccinea*, *Q. montana*, and *Q. velutina*) and hickories (*C. glabra*, *C. pallida*, and *C. tomentosa*) dominate the canopy along with *A. rubrum*, *N. sylvatica*, *O. arboreum*, and *Prunus serotina*. There is a distinct understory layer of shrubs and small trees including: *Sassafras albidum*, *Vaccinium corymbosum*, *Vaccinium stamineum*, and *Viburnum acerifolium*. Common vines include: *Parthenocissus quinquefolia*, *Smilax* spp., *Toxicodendron radicans*, and *Vitis vulpina*. Common herbaceous species include: *Carex digitalis* var. *digitalis*, *Chimaphila maculata*, *Coreopsis major*, *Dichanthelium acuminatum*, *Dichanthelium boscii*, *Ipomaea pandurata*, *Houstonia caerulea*, and *Houstonia purpurea*. *Arundinaria appalachiana*, a species associated with this habitat, was recently described as a distinct species (Triplett et al. 2006) and forms large clonal populations along upland drainages.

*Sandstone outcrop and bluff.* On the plateau surface, there are places where the soil is thin and the underlying sandstone is sometimes exposed. Gradients of soil depth determine openness of canopy. On the UoS, sandstone outcrops are associated with the Sewanee Conglomerate formation. Shallow depressions and fissures in the rock surface maintain a thin layer of soil and support a variety of annual and perennial herbs including four plant species that are endemic on the UoS to these habitats: *D. smallii*, *Minuartia glabra*, *Opuntia humifusa*, and *PheMERanthus teretifolius*. Sandstone outcrops are generally embedded in a matrix of open woodland of low statured trees dominated by *Pinus virginiana*, *Q. coccinea*, *Quercus marilandica*, *Q. montana*, and *Vaccinium arboreum*. On the bluff edge and

upland ridges, *Q. montana* is often the dominant species, sometimes forming open woodlands with an ericaceous understory of heath species including: *K. latifolia*, *V. corymbosum*, and *Viburnum pallidum*. These ridges were once codominated by *C. dentata* before the chestnut blight (Foley 1903). At one such bluff edge site, a remnant *Pinus echinata* population can be found comingled with *Q. prinus*. *Cypripedium acaule* and *Danthonia sericea* are characteristic herbs of this habitat.

*Plateau wetland.* There are a variety of wetland habitats associated with the plateau surface including streams, vernal pools, and maple-gum swamps. Canopy species associated with these habitats include: *A. rubrum*, *L. tulipifera*, *Liquidambar styraciflua*, *N. sylvatica*, and *Q. alba*. Species typical of the subcanopy and shrub layer include *A. rubrum*, *Aronia arbutifolia*, *Ilex opaca*, *O. arboreum*, *Rhododendron canescens*, *Rubus hispidus*, *Smilax bona-nox*, *Vaccinium fuscum*, and *Viburnum nudum*. A variety of ferns, forbs, and sedges are common in the understory, including *Carex debilis*, *Medeola virginiana*, *Mitchella repens*, *Osmunda regalis*, *Osmundastrum cinnamomea*, *Polygonatum biflorum*, and *Thelypteris noveboracensis*. *Bartonia virginica* is an uncommon mycoheterotrophic species restricted to the fringes of vernal pools and upland seeps.

*Reservoir.* Reservoirs represent novel habitats on the Cumberland Plateau since there are no natural permanent bodies of water. Plants species associated with the open aquatic habitats arrived through long-distance dispersal and have accumulated over time. *Brasenia schreberi* is a common, rooted, floating species found in most reservoirs. Rooted submerged and emergent species associated with reservoir edges include: *Callitriche heterophylla*, *Eleocharis* spp., *Fimbristylis autumnalis*, *Iris pseudacorus*, *Isoetes engelmannii*, *Juncus* spp., *Murdannia keisak*, *Myriophyllum aquaticum*, *Scirpus georgianus*, *Potamogeton* spp., and *Rhynchospora* spp.

*Former agriculture.* In addition to the former agricultural land associated with the University farm, there are several small abandoned farm areas on the upland portion of UoS that are in the process of reverting back to



forest. Some of these fields were planted in *P. taeda* and *P. strobus* by the University after they were no longer used for agricultural purposes. *Pinus strobus* plantations still persist in places; however, many of the *P. taeda* stands have succumbed to pine bark beetle mortality. *Pinus strobus* has spread into the native forest as a result of wind dispersal from these plantings creating belts of dense understory pine parallel to these roads. The plant communities that have recolonized former farm sites represent novel mixtures of both cove and plateau species, along with introduced species (*Lonicera japonica*, *Microstegium vimineum*, and *Rosa multiflora*) and persistent plantings (*P. avium*, *P. communis*, and *Y. flaccida*). The intensive liming of the soil within farmed areas substantially changed soil properties and may be contributing to the presence of the more calciphilic species typical of the nearby cove habitats such as *A. saccharum* and *Quercus muehlenbergii*. Common tree species include *A. rubrum*, *C. florida*, *Diospyros virginiana*, *L. tulipifera*, *L. styraciflua*, *P. virginiana*, and *Robinia pseudoacacia*. Common herbs include *Asplenium platyneuron*, *Botrypus virginianus*, *Carex albicans* var. *albicans*, *Cynoglossum virginianum*, *Oxalis dillenii*, *Polystichum acrostichoides*, *Pycnanthemum loomisii*, and *Sanicula canadensis*.

**Lawn.** The University campus and its associated residential areas have maintained open mown lawns, cemeteries, and fields for more than 175 years. These areas have accumulated novel assemblages of grasses and forbs that are dominated by introduced and native species, such as *Anthoxanthum odoratum*, *Cerastium fontanum*, *Cynodon dactylon*, *Dichondra carolinensis*, *Glechoma hederacea*, *Ranunculus abortivus*, *Schedonorus arundinaceus*, *Taraxacum officinale*, *Trifolium repens*, and *Viola sororia*.

**Plateau open.** A large group of native and exotic species can be found in edge habitats at the intersection of forest and various land uses such as roads, fields, utility corridors and other clearings in the upland portion of the UoS. Wooded greenways along creeks through the campus and residential areas of the UoS represent another novel assemblage of species dominated by woody exotics including *Celastrus orbiculatus*, *Lespedeza cuneata*, *Ligustrum*

*sinense*, *Lonicera fragrantissima*, *L. japonica*, and *R. multiflora*.

#### Cove Habitats

**Sandstone cliff face and rockhouse.** Beneath the bluff, where the sandstone cap of the plateau upland gives way to cove below, there are a number of habitats that include the sandstone cliff face, rockhouse, and spray zones of waterfalls. The sandstone cliff face represents vertical sandstone habitats ranging from dry to wet, including waterfall spray zones. Characteristic species include: *Asplenium montanum*, *Asplenium pinnatifidum*, *Dentaria multifida*, *Heuchera* spp., *Huperzia porophila*, *Iris cristata*, *Micranthes careyana*, *M. repens*, *Rhododendron maximum*, *Sedum ternatum*, *Silene rotundifolia*, *Stellaria pubera*, and *Thalictrum* spp. *Rhododendron maximum* is at the southwestern edge of its range (Kartesz 2015) and is represented on UoS by a single population. At the base of these cliffs, where less resistant sedimentary layers have eroded, there exist extensive overhangs, or rockhouses, that Native Americans used for thousands of years as temporary rock shelters (Walck et al 1996). *Trichomanes boschianum* is a rare fern endemic to this unique habitat.

**Upper and lower slope mesic.** Upper cove slopes with a north or east facing aspect support what is typically referred to as a "mixed mesophytic" community (Duffy and Meier 1992). This moist cove forest type supports a rich assemblage of characteristic canopy species including *A. saccharum*, *A. flava*, *C. ovata*, *Fraxinus biltmoreana*, *J. nigra*, *Quercus rubra*, and *T. americana*. Understory trees and shrubs include *Asimina triloba*, *Cercis canadensis*, *Lindera benzoin*, and *Staphylea trifolia*. The old growth forests in Shakerag Hollow and Dick Cove support a diverse vernal herbaceous flora: *Arisaema triphyllum*, *Caulophyllum thalictroides*, *Claytonia virginica*, *Delphinium tricornis*, *Dicentra cucullaria*, *Hydrophyllum canadense*, *Podophyllum peltatum*, *Polymnia laevigata*, *Phacelia bipinnatifida*, *Phlox divaricata*, *Sanguinaria canadensis*, *Tradescantia subaspera*, *Trillium* spp., and *Viola* spp. On the lower slopes, deeper and more basic soils support the highest plant diversity on the UoS. Characteristic canopy species include *A. saccharum*, *Celtis occidentalis*, *Fagus grandifolia*, *F. biltmoreana*, and *Q. muehlenbergii*. Understory herb species include: *Anemone acutiloba*,

*Epifagus virginiana*, *Hexastylis arifolia*, and *Sanicula* spp. Understory vines and shrubs include: *Isotrema macrophyllum*, *Bignonia capreolata*, *Euonymus americanus*, *L. benzoin*, *P. quinquefolius*, *Smilax* spp., and *Viburnum rufidulum*. Large, dense *Arundinaria gigantea* clones can be found in some locations within this habitat.

*Upper and lower slope dry.* Upper slopes of the cove with a south or west facing aspect support forest communities characterized by the following woody plants: *A. saccharum*, *C. ovata*, *F. biltmoreana*, *L. tulipifera*, *Q. alba*, *R. pseudoacacia*, *Ulmus alata*, and *V. rufidulum*. The herbaceous community includes *A. triphyllum*, *Bromus pubescens*, *D. boscii*, *Galium* spp., *P. acrostichoides*, *Scleria oligantha*, and *Smallanthus uvedalius*. Upper portions of both dry and mesic slopes often contain sandstone colluvium that host bouldertop communities (*P. bipinnatifida*, *P. biflorum*, *Polymnia laevigata*, *Polypodium appalachianum*, *T. radicans*, and *Tradescantia subaspera*). This unique plant assemblage is associated with the shallow soils that accumulate on top of boulders, and has been shown to serve as a refugia in areas of high deer browse (Comisky et al. 2005). With decreasing elevation in the cove, the influence of limestone substrate on soil characteristics becomes more important and there is a corresponding shift in species composition. On the lower portion of dry slopes, common species in the canopy and midstory include: *A. saccharum*, *Carya carolinae-septentrionalis*, *C. glabra*, *Crataegus* spp., *F. biltmoreana*, *Ostrya virginiana*, *Q. alba*, *Q. coccinea*, *Rhus aromatica*, *U. alata*, and *V. rufidulum*. Common vines include: *B. capreolata*, *Campsis radicans*, and *T. radicans*. The following are common herbaceous understory species: *Carex oxylepis*, *H. arifolia*, *Solidago auriculata*, *Vernonia flaccidifolia*, and *Viola* spp.

*Limestone outcrop and glades.* Places within the lower coves that have exposed limestone (cliff faces, outcrops) support a unique flora including *Asplenium ruta-muraria*, *L. dioica*, *Pellaea atropurpurea*, and *Polypodium polypodioides*. Outcrops can be surrounded by an open woodland or glade community dominated by a rich assemblage of trees and vines: *Amelanchier arborea*, *Berchemia scandens*, *B. capreolata*, *C. carolinae-septentriona-*

*lis*, *Celtis tenuifolia*, *C. canadensis*, *Fraxinus quadrangulata*, *Juniperus virginiana*, *Ostrya virginiana*, *P. quinquefolia*, *Q. rubra*, *Rhamnus caroliniana*, *R. aromatica*, *Sideroxylon lycioides*, *Symphoricarpos orbiculatus*, and *U. alata*. Characteristic herbs include *Brachyelytrum erectum*, *Desmodium* spp., *D. boscii*, *Elymus hystrix*, *Eryngium yuccifolium*, *Mafreda virginica*, *Matelea carolinensis*, *S. oligantha*, *Ruellia humilis*, *Salvia lyrata*, and *Zizia aptera*.

*Floodplain.* There is limited bottomland habitat present on the UoS along Lost Cove Creek and at the bottom of Shakerag Hollow on Mud Creek. There is a small portion of floodplain habitat near the big sink that experiences substantial annual flooding. Canopy tree species include *Acer negundo*, *A. saccharum*, *F. grandifolia*, *L. tulipifera*, and *L. styraciflua*. Understory woody species include *Carpinus caroliniana*, *Cornus alternifolia*, and *L. benzoin*. Alluvial soils support a characteristic herbaceous community: *Arnoglossum reniforme*, *Diphasiastrum digitatum*, *Mertensia virginica*, *Pedicularis canadensis*, and *Samolus valerandi*.

*Cove open.* Old fields, abandoned homesites, roadsides, and TVA transmission line rights-of-way are included here. Limestone-based soils vary in depth, and slope varies from level to gently sloping. This habitat is dominated by graminoids and forbs. Graminoid species include *Carex* spp., *Chasmanthium sessiliflorum*, *Elymus virginicus*, *Muhlenbergia sobolifera*, *Panicum* spp., and *Saccharum alopecuroides*. Herbs include *Allium canadense*, *Anemone virginiana*, *Calystegia silvatica*, *Chenopodium album*, *Desmodium cuspidatum*, *Frasera carolinensis*, *Lespedeza procumbens*, *Packera glabella*, *R. humilis*, *S. auriculata*, and *V. flaccidifolia*. Woody plants include semiwoody *Hypericum sphaerocarpum*, as well as lianas, *Cocculus carolinus* and *Lonicera sempervirens*, and small trees such as *Crataegus intricata* and *Prunus americana*.

Two TVA transmission powerline rights-of-way (constructed in 1942 and 1951) extend across the UoS property. With the primary management objective of keeping the lines clear of woody plants, TVA's approach is to maintain an early-successional habitat dominated by woodland grasses, ferns, and low-growing

**Table 3. Comparison of Tennessee Cumberland Plateau floras including number of species, number of species on University of the South (UoS), percent of total species on the UoS, number of native and exotic species, and community coefficient of native and exotic species.**

Flora	Species	Number of UoS Species	Percent UoS Species	Exotic	Native	Percent Exotic Species	CC (%)	CC (%) Native Only
Prentice Cooper <sup>1</sup>	990	724	73.1%	169	821	17.1%	69.2	70.0
Fall Creek Falls <sup>2</sup>	873	696	79.7%	114	759	13.1%	70.5	72.6
Savage Gulf <sup>3</sup>	674	539	80.0%	43	631	6.4%	60.7	65.5
Wolf Cove <sup>4</sup>	565	477	84.4%	30	535	5.3%	57.3	63.0
Fiery Gizzard <sup>5</sup>	595	475	79.8%	41	554	6.9%	56.0	59.9
UoS	1,102	1,102	100.0%	228	874	20.7%	100.0	100.0

<sup>1</sup>Beck and Van Horn (2007).

<sup>2</sup>Fleming and Wofford (2004).

<sup>3</sup>Wofford et al. (1979).

<sup>4</sup>Clements and Wofford (1991).

<sup>5</sup>Clark (1966).

shrubs. A limestone barren type habitat is present in the older right-of-way on a west-facing slope of the plateau. This small (0.5 ha) area is characterized by thin calcareous soil with patches of exposed rock and gravel on level to slightly sloping ground. Dominant perennial grasses include *Panicum* spp., *Schizachyrium scoparium* var. *scoparium*, and *Sorghastrum nutans*. The many sedge species include *Carex glaucoidea*, *C. granularis*, *C. kraliana*, *C. meadii*, and *C. vulpinoidea*. Rare herbaceous species, including *L. cylindracea*, *S. pinnatifidum*, and *S. pratense*, are found here, among other forbs such as *M. virginica*, *Ratibida pinnata*, and *Verbesina alternifolia*.

#### Community Comparisons

The flora of UoS was compared to the species found in five other southern Cumberland Plateau floras: Fiery Gizzard (Clark 1966), Savage Gulf (Wofford et al. 1979), Wolf Cove (Clements and Wofford 1991), Fall Creek Falls (Fleming and Wofford 2004), and Prentice Cooper (Beck and Van Horn 2007). If the intersection of these six floras is interpreted to be a representation of a regional flora for the southern Cumberland Plateau in Tennessee (1,595 species of vascular plants), then UoS flora is the most diverse, capturing 69% of all taxa at the species level. The coefficient of community indicated that it was most similar to Fall Creek Falls (total: 70.6; native-only: 72.9) and Prentice Cooper (total: 66.8; native-only: 70.8) when considering both the total flora and the native only species. The least similar was Fiery Gizzard (total: 55.8; native-only: 61.2). The flora of the UoS contained the highest percentage of exotic species (20.7%),

with Prentice Cooper coming in second (17.1%), followed by Fall Creek Falls (13.1%). Wolf Cove (5.3%), Savage Gulf (6.4%), and Fiery Gizzard (6.9%) had fewer exotic species. When taking into account the total species found at each location, we found that the UoS flora contained 84.4% of the Wolf Cove flora, 79.7% of the Fall Creek Falls flora, and 79.8% of the Fiery Gizzard flora, closely followed by the others (Table 3).

**CONCLUSION** The UoS flora represents a large percentage of the total Tennessee flora (39%; Chester et al. 2009) as well as the flora of Franklin County (44%; Kartesz 2015) and the southern Cumberland Plateau region (69%). At the species level, the UoS flora is the most diverse flora compiled for the south Cumberland Plateau in Tennessee and it contains 18 listed state/federal rare, threatened, and endangered species along with six state records. The high diversity of plant species in the UoS flora reflects the broad range of habitats that can be found within the campus and contiguous natural areas of the University of the South. The UoS property contains 13 of the characteristic ecological systems associated with the Cumberland Plateau region as identified by NatureServe (2013). Augmenting the high diversity of native plant species are a novel assemblage of introduced species that reflect the long history of varied land use within this landscape.

Colleges and universities in this country that own natural areas have a unique opportunity to both protect and study the biodiversity for which they are stewards (Muller and Maehr 2000). While natural area stewardship is now recognized as an important part of the sustainability commitment

manifest by academic institutions (Krasny and Delia 2014), it is unusual for American universities or colleges to make conservation of biodiversity a primary objective of land management (Straka 2010). As one of the largest owners of natural lands of any college or university in the country, the University of the South has prioritized the protection of biodiversity and specifically its rich vascular plant flora as part of its ecosystem management philosophy. In addition, having a carefully catalogued living flora in association with an academic campus provides an unparalleled educational opportunity for the study of botany. Finally, this flora demonstrates that herbaria at small liberal arts colleges can play an important role in the documentation and promotion of plant biodiversity within their region (Boyd 2008, Thompson 2008).

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**ANNOTATED APPENDIX** This list of taxa consists of five groups: Pteridophytes, Gymnosperms, Basal Dicots, Monocots, and Eudicots. Taxa are arranged inside of these groups alphabetically by family. Nomenclature follows the Tennessee Flora; exceptions are determined by D. Estes. An asterisk (\*) indicates that the taxa is exotic. A double asterisk (\*\*) indicates that it is considered invasive according to Tennessee Exotic Pest Plant Council (2009). A plus sign (+) indicates that it is not native to the southern Cumberland Plateau, but is native to the Southeastern United States. Protected taxa are noted with bold letters; LE = listed endangered, E = endangered, T = threatened, S = special concern, CE = commercially exploited. Characteristic habitats are given as codes: 1 = Sandstone Outcrop and Bluff, 2 = Plateau Surface, 3 = Plateau Wetland, 4 = Former Agriculture, 5 = Reservoir, 6 = Lawn, 7 = Plateau Open, 8 = Sandstone Cliff Face and Rockhouse, 9 = Upper Slope Dry, 10 = Upper Slope Mesic, 11 = Limestone Outcrop and Glades, 12 = Lower Slope Dry, 13 = Lower Slope Mesic, 14 = Floodplain, 15 = Cove Open. Following the habitat codes is the specimen collection number.

### Pteridophytes

#### ASPLENIACEAE

- Asplenium montanum* Willd.; 8.UOS-100.  
*Asplenium pinnatifidum* Nutt.; 8.UOS-6269.  
*Asplenium platyneuron* (L.) B.S.P.; 3, 4, 7, 8, 9, 10, 11, 13, 14.UOS-1366.  
*Asplenium resiliens* Kunze; 11.UOS-3988.

*Asplenium rhizophyllum* L.; 8, 10, 11.UOS-1651.

*Asplenium ruta-muraria* L.; 11.UOS-8177.

*Asplenium trudelli* Wherry (pro sp.) [montanum × pinnatifidum]; 8.UOS-8530.

#### BLECHNACEAE

*Woodwardia areolata* (L.) T. Moore; 3.UOS-1705.

#### DENNSTAEDTIACEAE

*Dennstaedtia punctilobula* (Michx.) T. Moore; 2.UOS-6138.

*Pteridium aquilinum* (L.) Kuhn; 7.UOS-139.

#### DRYOPTERIDACEAE

*Dryopteris celsa* (Wm. Palmer) Knowlt., Palmer & Pollard ex Small; 14.UOS-8333.

*Dryopteris goldiana* (Hook. ex Goldie) Gray; 10.UOS-7799.

*Dryopteris marginalis* (L.) Gray; 10, 14.UOS-1360.

*Polystichum acrostichoides* (Michx.) Schott; 1, 2, 3, 4, 9, 10, 11, 13, 14, 15.UOS-2210.

#### EQUISETACEAE

*Equisetum arvense* L.; 7.UOS-2487.

#### HYMENOPHYLLACEAE

*Trichomanes boschianum* Sturm; 8.UOS-6265. **T.**

*Trichomanes intricatum* Farrar; 13.UOS-8527.

#### ISOETACEAE

*Isoetes engelmannii* A. Braun; 5.UOS-8511.

#### LYCOPODIACEAE

*Dendrolycopodium obscurum* (L.) A.Haines; 2, 4.UOS-8634.

*Diphasiastrum digitatum* (Dill. ex A. Braun) Holub; 2, 4, 14.UOS-4845.

*Huperzia porophila* (Lloyd & Underw.) Holub; 8.UOS-4861.

*Lycopodiella alopecuroides* (L.) Cranfill; 5, 7.UOS-7688. **T.**

#### ONOCLEACEAE

*Onoclea sensibilis* L.; 3.UOS-2476.

#### OPHIOGLOSSACEAE

*Botrypus virginianus* (L.) Holub; 3, 9, 10, 11, 14.UOS-4473.

*Ophioglossum pycnostichum* (Fernald) A. Löve & D. Löve; 3, 14.UOS-6251.

*Sceptridium bitermatum* (Sav.) Lyon; 3, 7, 10, 14.UOS-2053.

*Sceptridium dissectum* (Spreng.) Lyon;  
4.UOS-8322.

*Sceptridium jenmanii* (Underw.) Lyon;  
4.UOS-8371. T.

#### OSMUNDACEAE

*Osmunda claytoniana* L.; 3.UOS-8889.

*Osmunda regalis* L. var. *spectabilis* (Willd.) A.  
Gray; 3.UOS-2685.

*Osmundastrum cinnamomea* L.; 1, 3.UOS-  
7912.

#### POLYPODIACEAE

*Pleopeltis polypodioides* (L.) Andrews &  
Windham var. *michauxiana* (Weath.) Andrews  
& Windham; 11.UOS-4871.

*Polypodium appalachianum* Hauffler & Wind-  
ham; 1, 8.UOS-1369.

*Polypodium virginianum* L.; 10.UOS-4033.

#### PTERIDACEAE

*Adiantum pedatum* L.; 10.UOS-3989.

*Cheilanthes lanosa* (Michx.) D.C. Eaton;  
11.UOS-123.

*Pellaea atropurpurea* (L.) Link; 11, 15.UOS-  
7413.

*Vittaria appalachiana* Farrar & Mickel;  
8.UOS-8367.

#### THELYPTERIDACEAE

*Phegopteris hexagonoptera* (Michx.) Fée; 9,  
10, 13.UOS-2700.

*Thelypteris noveboracensis* (L.) Nieuwl.; 2,  
3.UOS-2735.

#### WOODSIACEAE

*Athyrium filix-femina* (L.) Roth ssp. *asple-  
nioides* (Michx.) Hultén; 3.UOS-2681.

*Cystopteris bulbifera* (L.) Bernh.; 10, 11.UOS-  
3984.

*Cystopteris protrusa* (Weatherby) Blasdell; 8,  
10, 14.UOS-6342.

*Cystopteris tennesseensis* Shaver; 8, 11.UOS-  
8496.

*Deparia acrostichoides* (Sw.) M. Kato;  
14.UOS-8655.

*Diplazium pycnocarpon* (Spreng.) Broun; 9,  
10.UOS-3990.

*Woodsia obtusa* (Spreng.) Torr.; 13.UOS-8620.

#### Gymnosperms

##### CUPRESSACEAE

*Juniperus virginiana* L.; 1, 2, 4, 7, 9, 11,  
14.UOS-1394.

+*Taxodium distichum* (L.) Rich.; 7.UOS-8288.

##### PINACEAE

\**Picea abies* (L.) Karst.; 7.UOS-8522.

*Pinus echinata* Mill.; 1.UOS-1401.

+*Pinus strobus* L.; 2, 3, 4, 7.UOS-1395.

+*Pinus taeda* L.; 4, 7.UOS-1403.

*Pinus virginiana* Mill.; 1, 2, 4, 7.UOS-1402.

+*Tsuga canadensis* (L.) Carr.; 7.UOS-8215.

#### Basal Dicots

##### ANNONACEAE

*Asimina triloba* (L.) Dunal; 4, 9, 10.UOS-3320.

##### ARISTOLOCHIACEAE

*Asarum canadense* L.; 10.UOS-4034.

*Endodeca serpentaria* (L.) Raf.; 2, 9, 10, 11, 12,  
13, 14.UOS-7725.

*Hexastylis arifolia* (Michx.) Small var. *ruthii*  
(Ashe) Blomquist; 10, 12, 13, 14.UOS-1570.

*Isotrema macrophyllum* (Lam.) C.F.Reed; 10,  
11.UOS-7803.

##### CABOMBACEAE

*Brasenia schreberi* J.F. Gmel.; 5.UOS-1993.

##### CALYCANTHACEAE

*Calycanthus floridus* L. var. *floridus*; 2,  
3.UOS-4447.

##### LAURACEAE

*Lindera benzoin* (L.) Blume; 9, 10, 13, 14.UOS-  
546.

*Sassafras albidum* (Nutt.) Nees; 1, 2, 3, 9,  
11.UOS-513.

##### MAGNOLIACEAE

*Liriodendron tulipifera* L.; 1, 2, 3, 4, 7, 9, 10,  
13, 14.UOS-4484.

*Magnolia acuminata* (L.) L.; 9, 10, 12, 13,  
14.UOS-3322.

+*Magnolia grandiflora* L.; 2.UOS-4851.

+*Magnolia macrophylla* Michx.; 2, 3.UOS-4806.

##### SAURURACEAE

*Saururus cernuus* L.; 5.UOS-2200.

#### Monocots

##### AGAVACEAE

*Camassia scilloides* (Raf.) Cory; 14.UOS-  
8368.

*Manfreda virginica* (L.) Salisb. ex Rose; 11,  
15.UOS-4733.

+*Yucca filamentosa* L.; 7.UOS-6249.

##### ALISMACEAE

*Alisma subcordatum* Raf.; 7.UOS-7709.

*Sagittaria australis* (J.G. Sm.) Small; 3.UOS-2067.

#### ALLIACEAE

*Allium burdickii* (Hanes) A.G. Jones; 10.UOS-7702. **T-CE.**

*Allium canadense* L.; 9, 15.UOS-7866.

*Allium cernuum* Roth; 10, 11.UOS-7717.

\*\**Allium vineale* L.; 4, 7.UOS-948.

*Nothoscordum bivalve* (L.) Britton; 7.UOS-3709.

#### AMARYLLIDACEAE

\**Leucojum aestivum* L.; 3.UOS-7807.

\**Narcissus poeticus* L.; 4.UOS-7580.

\**Narcissus pseudonarcissus* L.; 10.UOS-7565.

\**Narcissus triandrus* L.; 7.UOS-8888.

#### ARACEAE

*Arisaema dracontium* (L.) Schott; 9.UOS-8713.

*Arisaema triphyllum* (L.) Schott; 9, 10, 11, 13, 14.UOS-2313.

\**Arum italicum* Mill.; 7.UOS-8247.

*Landoltia punctata* (G. Mey.) D.H. Les & D.J. Crawford; 5.UOS-8616.

#### ASPARAGACEAE

\**Asparagus officinalis* L.; 7.UOS-2059.

#### COLCHICACEAE

*Uvularia grandiflora* Sm.; 10, 12.UOS-7870.

*Uvularia perfoliata* L.; 9, 10, 11, 12.UOS-934.

*Uvularia sessilifolia* L.; 3, 11.UOS-6271.

#### COMMELINACEAE

\**Commelina communis* L.; 7, 14.UOS-2065.

*Commelina virginica* L.; 3.UOS-7860.

\*\**Murdannia keisak* (Hassk.) Hand.-Maz.; 5.UOS-8883.

*Tradescantia ohiensis* Raf.; 2.UOS-7926.

*Tradescantia subaspera* Ker-Gawl.; 9, 10, 14.UOS-2075.

#### CYPERACEAE

*Carex aggregata* Mackenzie; 15.UOS-8365.

*Carex albicans* Willd. ex Spreng. var. *albicans*; 4, 15.UOS-6608.

*Carex albolutescens* Schwein.; 3.UOS-8006.

*Carex albursina* Sheldon; 10.UOS-7822.

*Carex amphibola* Steud.; 4, 10, 11.UOS-8327.

*Carex atlantica* Bailey ssp. *atlantica*; 7.UOS-1695.

*Carex basiantha* Steud.; 4, 9.UOS-8703.

*Carex blanda* Dewey; 2, 10, 13, 14.UOS-6606.

*Carex careyana* Torr. ex Dewey; 10, 14.UOS-8658.

*Carex caroliniana* Schwein.; 4, 9.UOS-8675.

*Carex cephalophora* Muhl. ex Willd.; 7, 12.UOS-8005.

*Carex cherokeensis* Schwein.; 7.UOS-8374.

*Carex communis* Bailey; 10, 15.UOS-8325.

*Carex complanata* Torr. & Hook.; 5.UOS-3698.

*Carex crinita* Lam. var. *brevicrinis* Fern.; 3, 7.UOS-8022.

*Carex cumberlandensis* Naczi, Kral & Bryson; 9, 10.UOS-8001.

*Carex debilis* Michx. var. *debilis*; 2, 3.UOS-8400.

*Carex digitalis* Willd. var. *digitalis*; 2, 10.UOS-8302.

*Carex frankii* Kunth; 3, 15.UOS-1230.

*Carex glaucescens* Ell.; 3.UOS-8021.

*Carex glaucodea* Tuckerman ex Olney; 15.UOS-8649.

*Carex granularis* Muhl. ex Willd.; 14.UOS-6604.

*Carex gravida* Bailey; 13.UOS-8397.

*Carex gynandra* Schwein.; 3.UOS-8755.

*Carex hirsutella* Mackenzie; 2, 4, 11, 12, 15.UOS-8328.

*Carex intumescens* Rudge; 3.UOS-1691.

*Carex jamesii* Schwein.; 4, 9, 15.UOS-8644.

*Carex jorii* Bailey; 3.UOS-4317.

*Carex kraliana* Naczi & Bryson; 12, 15.UOS-8642.

*Carex laxiflora* Lam.; 14.UOS-8654.

*Carex longii* Mackenzie; 1, 7.UOS-8366.

*Carex louisianica* Bailey; 3.UOS-7826.

*Carex lurida* Wahlenb.; 3, 10.UOS-2632.

*Carex meadii* Dewey; 15.UOS-8641.

*Carex mitchelliana* M.A. Curtis; 3.UOS-8517.

*Carex nigromarginata* Schwein.; 2, 10.UOS-7999.

*Carex oligocarpa* Schkuhr ex Willd.; 11, 12, 15.UOS-8329.

*Carex oxylepis* Torr. & Hook. var. *oxylepis*; 12, 13, 15.UOS-8355.

*Carex pensylvanica* Lam.; 1, 9, 12.UOS-8638.

*Carex plantaginea* Lam.; 10.UOS-1683.

*Carex prasina* Wahlenb.; 10.UOS-7825.

*Carex purpurifera* Mackenzie; 9, 10, 11, 14.UOS-7610.

*Carex reznicekii* Werier; 2, 10.UOS-8659.

*Carex rosea* Schkuhr ex Willd.; 13, 14.UOS-4464.

*Carex rugosperma* Mack.; 1.UOS-8637.

*Carex seorsa* Howe; 10.UOS-7640.

*Carex striatula* Michx.; 2, 9.UOS-8646.



- Carex styloflexa* Buckley; 3.UOS-7641.  
*Carex swanii* (Fern.) Mackenzie; 3.UOS-7997.  
*Carex texensis* (Torr.) L.H. Bailey; 14.UOS-8754.  
*Carex venusta* Dewey; 14.UOS-8753.  
*Carex virescens* Muhl. ex Willd.; 2, 3, 4, 7.UOS-4470.  
*Carex vulpinoidea* Michx.; 7, 15.UOS-3054.  
*Cyperus croceus* Vahl; 6.UOS-1759.  
*Cyperus echinatus* (L.) Alph. Wood; 6.UOS-4802.  
*\*Cyperus esculentus* L.; 7.UOS-8882.  
*Cyperus flavescens* L.; 7.UOS-3704.  
*Cyperus squarrosus* L.; 1.UOS-8364.  
*Cyperus strigosus* L.; 7.UOS-525.  
*Dulichium arundinaceum* (L.) Britton; 5.UOS-6334.  
*Eleocharis acicularis* (L.) Roem. & Schult.; 5.UOS-7707.  
*Eleocharis erythropoda* Steud.; 9.UOS-8765.  
*Eleocharis microcarpa* Torr. var. *filiculmis* Torr.; 5.UOS-7533.  
*Eleocharis obtusa* (Willd.) Schult.; 5.UOS-1699.  
*Eleocharis quadrangulata* (Michx.) Roem. & Schult.; 5.UOS-2719.  
*Eleocharis tenuis* (Willd.) Schult. var. *verrucosa* (Svens.) Svens.; 5, 7.UOS-6601.  
*Fimbristylis autumnalis* (L.) Roem. & Schult.; 5.UOS-7844.  
*Isolepis carinata* Hook. & Arn. ex Torr.; 6.UOS-8714.  
*Rhynchospora capitellata* (Michx.) Vahl; 5.UOS-3261.  
*Rhynchospora glomerata* (L.) Vahl; 5.UOS-6610.  
*Schoenoplectus purshianus* (Fernald) M.T. Strong; 5.UOS-4826.  
*Scirpus atrovirens* Willd.; 3, 5.UOS-3701.  
*Scirpus cyperinus* (L.) Kunth; 5, 7.UOS-3084.  
*Scirpus georgianus* R.M.Harper; 5.UOS-3699.  
*Scirpus pendulus* Muhl.; 5, 15.UOS-8353.  
*Scleria oligantha* Michx.; 4, 7, 9, 11, 15.UOS-7406.

#### DIOSCOREACEAE

- \*\*Dioscorea polystachya** Turcz.; 7, 14.UOS-4456.  
*Dioscorea villosa* L.; 2, 7, 9, 10, 11, 12, 13.UOS-7992.

#### HEMEROCALLIDACEAE

- \*Hemerocallis fulva** (L.) L.; 7, 15.UOS-906.

#### HYACINTHACEAE

- \*Hyacinthoides non-scripta** (L.) Chouard ex Rothm.; 7.UOS-8277.

- \*\*Muscari neglectum** Guss. ex Ten.; 6, 7.UOS-3457.

- \*\*Ornithogalum umbellatum** L.; 6, 10.UOS-7569.

#### HYDROCHARITACEAE

- \*\*Egeria densa** Planch.; 5.UOS-1687.

- \*\*Najas minor** All.; 5.UOS-2111.

#### HYPOXIDACEAE

- Hypoxis hirsuta* (L.) Coville; 2, 10, 11.UOS-2470.

#### IRIDACEAE

- Iris cristata* Aiton; 8, 10, 14.UOS-7594.

- \*\*Iris pseudacorus** L.; 5.UOS-7724.

- Iris virginica* L.; 7.UOS-1709.

- Sisyrinchium albidum* Raf.; 9.UOS-2575.

- Sisyrinchium angustifolium* Mill.; 9, 10.UOS-2569.

- Sisyrinchium atlanticum* E.P. Bicknell; 3, 7, 15.UOS-1582.

- Sisyrinchium* sp. nov. ; 13.UOS-8879.

#### JUNCACEAE

- Juncus acuminatus* Michx.; 5.UOS-4830.

- Juncus antheratus* (Wiegand) R.E. Brooks; 7.UOS-8396.

- Juncus canadensis* J. Gay ex Laharpe; 3.UOS-4313.

- Juncus coriaceus* Mackenzie; 7.UOS-7663.

- Juncus debilis* Gray; 3, 7.UOS-4314.

- Juncus diffusissimus* Buckl.; 3, 7.UOS-4829.

- Juncus effusus* L.; 5, 7.UOS-886.

- Juncus longii* Fern.; 5.UOS-8037.

- Juncus marginatus* Rostk.; 7.UOS-4315.

- Juncus repens* Michx.; 5.UOS-7422.

- Juncus tenuis* Willd.; 1, 2, 3, 4, 7.UOS-4316.

- Luzula acuminata* Raf. var. *carolinae* (S. Watson) Fern.; 14.UOS-8203.

- Luzula bulbosa* (Alph. Wood) Smyth & Smyth; 2, 6.UOS-2857.

- Luzula echinata* (Small) F.J. Herm.; 1, 2, 4, 7, 9, 14.UOS-7905.

- Luzula multiflora* (Ehrh.) Lej.; 4, 6, 7.UOS-2947.

#### LILIACEAE

- Erythronium americanum* Ker-Gawl.; 10.UOS-6272.

- Lilium canadense* L.; 3.UOS-913.

- Medeola virginiana* L.; 2, 3.UOS-6274.

- Prosartes lanuginosa* (Michx.) D. Don; 9, 10, 13, 14.UOS-6279.

- Prosartes maculata* (Buckley) A. Gray; 9, 10.UOS-6344.

## MELANTHIACEAE

- Amianthium muscitoxicum* (Walt.) Gray; 3.UOS-6331.  
*Chamaelirium luteum* (L.) Gray; 3.UOS-2998.  
*Melanthium parviflorum* (Michx.) S. Watson; 10.UOS-4860.  
*Stenanthium gramineum* (Ker-Gawl.) Morong; 3.UOS-7859.  
*Trillium cuneatum* Raf.; 9, 10, 13, 14.UOS-3166.  
*Trillium grandiflorum* (Michx.) Salisb.; 10, 14.UOS-6276.  
*Trillium sulcatum* Patrick; 10.UOS-6275.

## NARTHECIACEAE

- Aletris farinosa* L.; 3, 7.UOS-6358.

## ORCHIDACEAE

- Aplectrum hyemale* (Muhl. ex Willd.) Torr.; 10.UOS-8274.  
*Corallorhiza odontorhiza* (Willd.) Poir. var. *odontorhiza*; 6.UOS-4757.  
*Corallorhiza wisteriana* Conrad; 6.UOS-1659.  
*Cypripedium acaule* Ait.; 1, 2.UOS-3014. **CE.**  
*Cypripedium pubescens* Willd.; 10.UOS-8275.  
*Galearis spectabilis* (L.) Raf.; 10.UOS-5672.  
*Goodyera pubescens* (Willd.) R. Br.; 2, 10, 13.UOS-4836.  
*Isotria verticillata* Raf.; 2, 3, 10.UOS-2800.  
*Liparis liliifolia* (L.) Rich. ex Ker Gawl.; 4, 11.UOS-8502.  
*Malaxis unifolia* Michx.; 2, 6.UOS-1706.  
*Platanthera ciliaris* (L.) Lindl.; 7.UOS-4867.  
*Platanthera clavellata* (Michx.) Luer; 3.UOS-7414.  
*Spiranthes cernua* (L.) Rich.; 7.UOS-2112.  
*Spiranthes lacera* (Raf.) Raf. var. *gracilis* (Bigelow) Luer; 7.UOS-2754.  
*Spiranthes ovalis* Lindl. var. *erostellata* Cating; 13.UOS-8520.  
*Spiranthes vernalis* Engelm. & Gray; 7.UOS-6327.  
*Tipularia discolor* (Pursh) Nutt.; 2, 11.UOS-4783.
- POACEAE
- Agrostis perennans* (Walt.) Tuckerman; 2, 4, 7.UOS-4319.  
 \*\**Agrostis stolonifera* L.; 4.UOS-8326.  
*Andropogon gerardii* Vitman; 7.UOS-3263.  
*Andropogon glomeratus* (Walt.) B.S.P.; 3.UOS-3318.  
*Andropogon gyrans* Ashe; 7.UOS-7862.  
*Andropogon ternarius* Michx.; 7.UOS-3076.  
*Andropogon virginicus* L.; 4, 7.UOS-7956.

- \**Anthoxanthum odoratum* L.; 4, 6, 7.UOS-3174.  
*Aristida dichotoma* Michx. var. *dichotoma*; 7.UOS-3264.  
 \*\**Arthraxon hispidus* (Thunb.) Makino; 7.UOS-7011.  
*Arundinaria appalachiana* Triplett, Weakley & L.G. Clark; 2.UOS-8027.  
*Arundinaria gigantea* (Walt.) Muhl.; 11, 12, 13.UOS-7941.  
*Brachyelytrum erectum* (Schreb. ex Spreng.) P. Beauv.; 9, 10, 11, 14.UOS-7015.  
 \**Bromus commutatus* Schrad.; 7.UOS-8766.  
 \**Bromus hordeaceus* L.; 4.UOS-8280.  
*Bromus pubescens* Muhl. ex Willd.; 1, 2, 9, 10, 11, 13, 14, 15.UOS-4485.  
 \**Bromus racemosus* L.; 7.UOS-8035.  
*Calamagrostis cinnoides* (Muhl.) W.P.C. Barton; 5.UOS-7693.  
*Chasmanthium latifolium* (Michx.) Yates; 4, 7.UOS-2694.  
*Chasmanthium laxum* (L.) Yates; 2.UOS-4320.  
*Chasmanthium sessiliflorum* (Poir.) Yates; 2, 4, 13, 15.UOS-8238.  
*Cinna arundinacea* L.; 7.UOS-8362.  
 \**Cynodon dactylon* (L.) Pers.; 6.UOS-8617.  
 \**Dactylis glomerata* L.; 4, 7.UOS-2017.  
*Danthonia epilis* Scribn.; 1, 7.UOS-8009. **S.**  
*Danthonia sericea* Nutt.; 1.UOS-8010.  
*Danthonia spicata* (L.) P. Beauv. ex Roem. & Schult.; 1, 2, 4, 7, 9, 11, 12.UOS-3172.  
*Diarrhena americana* P. Beauv.; 13.UOS-8471.  
*Dichantheium acuminatum* (Sw.) Gould & C.A. Clark ssp. *fasciculatum* (Torr.) Freckmann & Lelong; 1, 2, 3.UOS- 3253.  
*Dichantheium acuminatum* (Sw.) Gould & C.A. Clark ssp. *lindheimeri* (Nash) Gould & C.A. Clark; 1, 2, 3, 4, 7.UOS- 8622.  
*Dichantheium boscii* (Poir.) Gould & C.A. Clark; 1, 2, 3, 4, 7, 9, 10, 11, 12, 13, 14.UOS-4318.  
*Dichantheium clandestinum* (L.) Gould; 7.UOS-7651.  
*Dichantheium commutatum* Schult. ssp. *ashei* (Pearson ex Ashe) Freckmann & Lelong; 2.UOS-8751.  
*Dichantheium commutatum* (J.A.Schultes) Gould ssp. *commutatum*; 2, 4, 7.UOS-7644.  
*Dichantheium depauperatum* (Muhl.) Gould; 7.UOS-8652.  
*Dichantheium dichotomum* (L.) Gould ssp. *dichotomum*; 2.UOS-7534.

- Dichantheium laxiflorum* (Lam.) Gould; 1, 4, 7, 11.UOS-7646.
- Dichantheium ovale* (Elliot) Gould & C.A. Clark ssp. *villosissimum* (Nash) Freckmann & Lelong; 9.UOS-8475.
- Dichantheium polyanthes* (Schult.) Mohlenbr.; 4, 7.UOS-6616.
- Dichantheium scoparium* (Lam.) Gould; 7.UOS-7624.
- Digitaria ciliaris* (Retz.) Koel.; 7.UOS-6597.
- \**Digitaria ischaemum* (Schreb.) Schreb. ex Muhl.; 7.UOS-3262.
- \**Echinochloa colona* (L.) Link; 15.UOS-8363.
- \**Eleusine indica* (L.) Gaertn.; 6.UOS-2722.
- Elymus glabriflorus* (Vasey) Scribn. & C.R. Ball; 7.UOS-7849.
- Elymus hystrix* L.; 2, 9, 11, 12, 13, 14.UOS-1950.
- Elymus villosus* Muhl. ex Willd.; 2.UOS-8361.
- Elymus virginicus* L. var. *virginicus*; 1, 6, 15.UOS-8482.
- \**Eragrostis cilianensis* (All.) Vign. ex Janchen; 4.UOS-7961.
- Eragrostis hirsuta* (Michx.) Nees; 7.UOS-4079.
- Eragrostis spectabilis* (Pursh) Steud.; 7.UOS-8038.
- Festuca subverticillata* (Pers.) Alexeev; 14.UOS-8011.
- Glyceria striata* (Lam.) Hitchc.; 3, 7.UOS-4907.
- \**Holcus lanatus* L.; 7.UOS-2018.
- Hordeum pusillum* Nutt.; 7.UOS-8111.
- Leersia oryzoides* (L.) Sw.; 7.UOS-7662.
- Leersia virginica* Willd.; 3.UOS-7877.
- \**Lolium multiflorum* Lam.; 7.UOS-3055.
- Melica mutica* Walt.; 2, 4, 9, 11, 14, 15.UOS-6340.
- \*\**Microstegium vimineum* (Trin.) A. Camus; 2, 3, 4, 9, 13, 14, 15.UOS-2737.
- \*\**Miscanthus sinensis* Anderss.; 7.UOS-3327.
- Muhlenbergia schreberi* J.F. Gmel.; 7.UOS-8039.
- Muhlenbergia sobotifera* (Muhl. ex Willd.) Trin.; 12, 15.UOS-8308.
- Muhlenbergia tenuiflora* (Willd.) B.S.P.; 10.UOS-6592.
- Panicum anceps* Michx. ssp. *anceps*; 2, 15.UOS-3058.
- Panicum flexile* (Gattinger) Scribn.; 7, 15.UOS-7830.
- Panicum philadelphicum* Bernh. ex Trin. ssp. *gattingeri* (Nash) Freckmann & Lelong; 7.UOS-7854.
- Panicum rigidulum* Bosc ex Nees ssp. *rigidulum*; 7.UOS-3265.
- Panicum verrucosum* Muhl.; 7.UOS-7697.
- \**Paspalum dilatatum* Poir.; 7.UOS-2740.
- Paspalum laeve* Michx.; 7.UOS-8033.
- Paspalum pubiflorum* Rupr. ex Fourn.; 7, 15.UOS-8317.
- \**Phleum pratense* L.; 4.UOS-8605.
- \**Phyllostachys aurea* Carrière ex A. Rivière & C. Rivière; 7.UOS-8323.
- Piptochaetium avenaceum* (L.) Parodi; 2, 11.UOS-4474.
- \**Poa annua* L.; 7.UOS-7656.
- Poa autumnalis* Muhl. ex Ell.; 4, 10.UOS-8013.
- \**Poa compressa* L.; 1, 4.UOS-8014.
- \**Poa pratensis* L.; 4, 7.UOS-8015.
- Poa sylvestris* Gray; 7, 13, 14, 15.UOS-6614.
- \**Poa trivialis* L.; 4.UOS-8241.
- Saccharum alopecuroides* (L.) Nutt.; 7, 15.UOS-3328.
- \*\**Schedonorus arundinaceus* (Schreb.) Dumort.; 6, 7.UOS-8240.
- Schizachyrium scoparium* (Michx.) Nash var. *scoparium*; 7, 15.UOS-8000.
- \*\**Setaria faberi* Herrm.; 4.UOS-8603.
- Setaria parviflora* (Poir.) Kerguelen; 4, 7.UOS-7657.
- \*\**Setaria pumila* (Poir.) Roemer & J.A.Schultes; 4, 7.UOS-930.
- \*\**Setaria viridis* (L.) P. Beauv. var. *viridis*; 7.UOS-2799.
- Sorghastrum nutans* (L.) Nash; 7, 15.UOS-2723.
- \*\**Sorghum halepense* (L.) Pers.; 7.UOS-2662.
- Sphenopholis nitida* (Biehler) Scribn.; 4, 7.UOS-8016.
- Sporobolus clandestinus* (Biehler) Hitchc.; 11.UOS-8357.
- Sporobolus compositus* (Poir.) Merr. var. *drummondii* (Trin.) Kartesz & Gandhi; 15.UOS-8345.
- \**Sporobolus indicus* (L.) R. Br.; 7.UOS-7850.
- Sporobolus vaginiflorus* (Torr. ex Gray) Wood var. *vaginiflorus*; 7.UOS-7851.
- Tridens flavus* (L.) Hitchc.; 7, 13, 15.UOS-3254.
- \**Vulpia myuros* (L.) C.C. Gmel.; 4.UOS-8242.
- Vulpia octoflora* (Walt.) Rydb. var. *glauca* (Nutt.) Fern.; 9.UOS-8647.

## PONTEDERIACEAE

- \**Eichhornia crassipes* (Mart.) Solms; 5.UOS-7743.

## POTAMOGETONACEAE

- Potamogeton diversifolius* Raf.; 5.UOS-2699.  
*Potamogeton nodosus* Poir.; 5.UOS-1696.

## RUSCACEAE

- \**Convallaria majalis* L. var. *majalis*; 7.UOS-3452.  
*Maianthemum racemosum* (L.) Link; 2, 3, 10, 13, 14.UOS-1965.  
*Polygonatum biflorum* (Walt.) Ell.; 2, 3, 10, 11, 12, 13.UOS-2248.

## SMILACACEAE

- Smilax bona-nox* L.; 1, 2, 3, 7, 9, 11, 12, 13, 14.UOS-2027.  
*Smilax glauca* Walt.; 1, 2, 9, 13, 14.UOS-2621.  
*Smilax hugeri* (Small) J.B.S. Norton ex Pennell; 10, 11, 13.UOS-4858.  
*Smilax rotundifolia* L.; 1, 2, 3, 10, 11, 13.UOS-630.  
*Smilax tamnoides* L.; 10, 13, 14.UOS-8167.

## SPARGANIACEAE

- Sparganium americanum* Nutt.; 5.UOS-4827.

## TYPHACEAE

- Typha latifolia* L.; 5.UOS-2671.

## XYRIDACEAE

- Xyris torta* Sm.; 3.UOS-4810.

**Eudicots**

## ACANTHACEAE

- Ruellia caroliniensis* (J.F. Gmel.) Steud.; 7, 11, 15.UOS-7921.  
*Ruellia humilis* Nutt.; 6, 15.UOS-4737.

## ADOXACEAE

- Sambucus canadensis* L.; 3, 7, 10, 13.UOS-950.  
*Viburnum acerifolium* L.; 1, 2, 10.UOS-900.  
*Viburnum alabamense* (McAtee) Sorrie; 3.UOS-4498.  
 \**Viburnum carlesii* Hemsl.; 7.UOS-8533.  
*Viburnum cassinoides* L.; 2.UOS-7619.  
*Viburnum nudum* L.; 3.UOS-4084.  
*Viburnum recognitum* Fernald; 3.UOS-4811.  
 \**Viburnum rhytidophyllum* Hemsl.; 7.UOS-8358.  
*Viburnum rufidulum* Raf.; 2, 9, 11, 12, 13, 14.UOS-3748.

## ALTINGIACEAE

- Liquidambar styraciflua* L.; 2, 3, 4, 7, 13, 14.UOS-819.

## AMARANTHACEAE

- +*Amaranthus spinosus* L.; 7.UOS-4843.  
 \**Chenopodium album* L. var. *album*; 15.UOS-8344.  
 \**Dysphania ambrosioides* (L.) Mosyakin & Clemants; 7.UOS-2026.

## ANACARDIACEAE

- Rhus aromatica* Ait.; 9, 11, 12, 13.UOS-860.  
*Rhus copallinum* L.; 1, 4, 7.UOS-1948.  
*Rhus glabra* L.; 7, 15.UOS-8515.  
*Toxicodendron radicans* (L.) Kuntze; 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14.UOS-4475.  
*Toxicodendron vernix* (L.) Kuntze; 3.UOS-4081.

## APIACEAE

- Chaerophyllum tainturieri* Hook.; 7.UOS-2217.  
 \*\**Conium maculatum* L.; 7.UOS-3171.  
*Cryptotaenia canadensis* (L.) DC.; 10.UOS-4505.  
 \*\**Daucus carota* L.; 4, 7.UOS-924.  
*Erigenia bulbosa* (Michx.) Nutt.; 10.UOS-7563.  
*Eryngium prostratum* Nutt. ex DC.; 5.UOS-7417.  
*Eryngium yuccifolium* Michx.; 7, 11.UOS-4911.  
 \**Foeniculum vulgare* Mill.; 7.UOS-8886.  
*Osmorhiza claytonii* (Michx.) C.B. Clarke; 10.UOS-3703.  
*Osmorhiza longistylis* (Torr.) DC.; 2, 10, 13.UOS-4798.  
*Oxyopolis rigidior* (L.) Raf.; 3.UOS-4075.  
*Sanicula canadensis* L.; 2, 3, 9, 10, 13.UOS-4506.  
*Sanicula odorata* (Raf.) K.M. Pryer & L.R. Phillippe; 10, 13.UOS-4489.  
*Sanicula smallii* E.P. Bicknell; 15.UOS-7809.  
*Sanicula trifoliata* E.P. Bicknell; 10.UOS-7625.  
*Taenidia integerrima* (L.) Drude; 11, 12, 15.UOS-7673.  
*Thaspium barbinode* (Michx.) Nutt.; 9, 10, 11, 13, 14, 15.UOS-6518.  
*Thaspium chapmanii* (Coul. & Rose) Small; 11.UOS-8253.  
*Thaspium trifoliatum* (L.) A. Gray var. *trifoliatum*; 9.UOS-550.  
 \**Torilis arvensis* (Huds.) Link; 7.UOS-2654.  
*Zizia aptera* (Gray) Fern.; 12, 15.UOS-7674.  
*Zizia aurea* (L.) W.D.J. Koch; 7.UOS-1960.

## APOCYNACEAE

- Amsonia tabernaemontana* Walt. var. *tabernaemontana*; 15.UOS-7425.

- Apocynum cannabinum* L.; 7.UOS-1233.  
*Asclepias amplexicaulis* Sm.; 7.UOS-4799.  
*Asclepias exaltata* L.; 7.UOS-4797.  
*Asclepias quadrifolia* Jacq.; 2, 9.UOS-850.  
*Asclepias syriaca* L.; 4, 7.UOS-912.  
*Asclepias tuberosa* L. ssp. *tuberosa*; 7, 11.UOS-1491.  
*Asclepias variegata* L.; 2, 7.UOS-896.  
*Asclepias verticillata* L.; 11, 15.UOS-4742.  
*Gonolobus suberosus* auct. non (L.) R. Br.; 14.UOS-8319.  
*Matelea carolinensis* (Jacq.) Woods.; 11, 15.UOS-6247.  
 \*\**Vinca major* L.; 6.UOS-8524.  
 \*\**Vinca minor* L.; 7.UOS-4759.

## AQUIFOLIACEAE

- Ilex ambigua* (Michx.) Torr.; 2.UOS-4529.  
 \**Ilex crenata* Thunb.; 2.UOS-8516.  
*Ilex longipes* Chapman ex Trel.; 9.UOS-8158.  
*Ilex montana* Torr. & Gray ex Gray; 2.UOS-7971.  
*Ilex opaca* Ait.; 2, 3, 4, 14.UOS-2228.  
*Ilex verticillata* (L.) Gray; 2.UOS-4528.

## ARALIACEAE

- Aralia racemosa* L.; 10.UOS-3978.  
*Aralia spinosa* L.; 7.UOS-2684.  
 \*\**Hedera helix* L.; 7, 15.UOS-4760.  
 \**Hydrocotyle sibthorpioides* Lam.; 6.UOS-8321.  
*Panax quinquefolius* L.; 9, 10.UOS-3175. **S-CE.**

## ASTERACEAE

- Achillea millefolium* L. var. *occidentalis* DC.; 4, 7.UOS-952.  
*Ageratina altissima* (L.) King & H. Rob. var. *altissima*; 7, 10, 14, 15.UOS-2047.  
*Ambrosia artemisiifolia* L.; 7.UOS-482.  
*Ambrosia trifida* L.; 7.UOS-2006.  
*Antennaria plantaginifolia* (L.) Richardson; 1, 2.UOS-2326.  
*Antennaria solitaria* Rydb.; 2.UOS-7571.  
 \**Anthemis arvensis* L.; 7, 15.UOS-2646.  
 \**Arctium minus* Bernh.; 7.UOS-1625.  
*Arnoglossum atriplicifolium* (L.) H. Rob.; 2.UOS-8352.  
*Arnoglossum reniforme* (Hook.) H. Rob.; 10, 14.UOS-8213.  
 \**Artemisia vulgaris* L.; 7.UOS-2032.  
*Bidens aristosa* (Michx.) Britton; 7.UOS-2044.  
*Bidens bipinnata* L.; 7.UOS-2691.  
*Bidens frondosa* L.; 7, 15.UOS-2045.

- Bidens polylepis* S.F. Blake; 15.UOS-6337.  
*Brickellia eupatorioides* (L.) Shinnery; 13, 14.UOS-8041.  
 \*\**Carduus nutans* L.; 4, 7.UOS-7939.  
*Chrysopsis mariana* (L.) Ell.; 7.UOS-2176.  
 \*\**Cichorium intybus* L.; 7.UOS-4864.  
*Cirsium altissimum* (L.) Hill; 9, 15.UOS-3982.  
*Cirsium discolor* (Muhl. ex Willd.) Spreng.; 7.UOS-4818.  
 \*\**Cirsium vulgare* (Savi) Ten.; 4, 7.UOS-8348.  
*Conoclinium coelestinum* (L.) DC.; 3, 7.UOS-2033.  
*Conyza canadensis* (L.) Cronquist var. *canadensis*; 7.UOS-2025.  
*Conyza canadensis* (L.) Cronquist var. *pusilla* (Nutt.) Cronquist; 6.UOS-6360.  
*Coreopsis lanceolata* L.; 4, 6, 7.UOS-2152.  
*Coreopsis major* Walt.; 1, 2, 12.UOS-951.  
*Coreopsis tinctoria* Nutt.; 7.UOS-3326.  
*Coreopsis tripteris* L.; 15.UOS-4747.  
*Doellingeria infirma* (Michx.) Greene; 9, 10.UOS-8263.  
*Doellingeria umbellata* (Mill.) Nees; 3.UOS-7405.  
*Elephantopus carolinianus* Raeusch.; 4, 10, 13.UOS-3979.  
*Elephantopus tomentosus* L.; 4, 7.UOS-1221.  
*Erechtites hieracifolia* (L.) Raf. ex DC.; 7.UOS-4086.  
*Erigeron annuus* (L.) Pers.; 3, 7.UOS-2339.  
*Erigeron philadelphicus* L.; 6.UOS-2625.  
*Erigeron pulchellus* Michx.; 6, 7, 9.UOS-2312.  
*Erigeron strigosus* Muhl. ex Willd. var. *strigosus*; 4, 7.UOS-2405.  
*Eupatorium album* L. var. *album*; 7.UOS-2159.  
*Eupatorium altissimum* L.; 7.UOS-7691.  
*Eupatorium capillifolium* (Lam.) Small; 7.UOS-7954.  
*Eupatorium hyssopifolium* L.; 7.UOS-1212.  
*Eupatorium perfoliatum* L.; 7.UOS-2029.  
*Eupatorium pilosum* Walt.; 7.UOS-7758.  
*Eupatorium rotundifolium* L. var. *ovatum* (Bigelow) Torr.; 7.UOS-2157.  
*Eupatorium rotundifolium* L. var. *rotundifolium*; 7.UOS-2021.  
*Eupatorium serotinum* Michx.; 2, 7.UOS-2022.  
*Eupatorium sessilifolium* L.; 11.UOS-2705.  
*Eurybia divaricata* (L.) Nesom; 10, 15.UOS-7012.

- Eurybia hemispherica* (Alexander) Nesom; 7, 15.UOS-6590.
- Eurybia surculosa* (Michx.) Nesom; 1, 7.UOS-2821.
- Eutrochium fistulosum* (Barratt) Lamont; 7.UOS-2035.
- Eutrochium purpureum* (L.) Lamont; 7, 9, 10.UOS-4819.
- Fleischmannia incarnata* (Walter) King & H. Rob.; 12, 15.UOS-8046.
- +*Gaillardia pulchella* Foug.; 7.UOS-7637.
- \**Galinsoga quadriradiata* Cav.; 6, 15.UOS-910.
- Gamochaeta argyrinea* G. L. Nesom; 7.UOS-7937.
- Helenium amarum* (Raf.) H. Rock; 7.UOS-8350.
- Helenium flexuosum* Raf.; 7, 15.UOS-3268.
- +*Helianthus annuus* L.; 7.UOS-8885.
- Helianthus divaricatus* L.; 7.UOS-3841.
- Helianthus eggertii* Small; 12.UOS-8291. **S.**
- Helianthus hirsutus* Raf.; 12.UOS-8880.
- Helianthus microcephalus* Torr. & Gray; 7.UOS-2074.
- Helianthus sp. nov.*; 15.UOS-8064.
- Helianthus strumosus* L.; 7.UOS-4541.
- Helianthus tuberosus* L.; 7.UOS-488.
- Heliopsis helianthoides* (L.) Sweet; 12, 14, 15.UOS-4753.
- Heterotheca camporum* (Greene) Shinnery var. *glandulissima* Semple; 7.UOS-4543.
- Hieracium gronovii* L.; 2, 7.UOS-7960.
- Hieracium venosum* L.; 2, 7.UOS-7788.
- \**Hypochaeris radicata* L.; 4.UOS-8281.
- Ionactis linariifolia* (L.) Greene; 1, 2, 7.UOS-4823.
- +*Iva annua* L.; 7.UOS-7720.
- Krigia biflora* (Walt.) Blake; 4, 7.UOS-4476.
- Krigia caespitosa* (Raf.) Chambers; 4.UOS-7631.
- Krigia dandelion* (L.) Nutt.; 6.UOS-7918.
- Krigia virginica* (L.) Willd.; 1, 7, 9.UOS-4446.
- Lactuca canadensis* L.; 2, 7.UOS-6335.
- Lactuca floridana* (L.) Gaertn.; 7, 13.UOS-1947.
- \**Lactuca saligna* L.; 7, 15.UOS-4544.
- \**Lapsana communis* L.; 3.UOS-4801.
- \*\**Leucanthemum vulgare* Lam.; 7.UOS-2255.
- Liatris cylindracea* Michx.; 15.UOS-4732. **T.**
- Liatris microcephala* (Small) K. Schum.; 1.UOS-2039.
- Liatris scariosa* (L.) Willd.; 1.UOS-4820.
- Liatris squarrosa* Michx.; 4, 7.UOS-2051.
- Mikania scandens* (L.) Willd.; 7.UOS-8360.
- Packera anonyma* (Alph. Wood) W.A. Weber & A. Löve; 1, 7.UOS-855.
- Packera glabella* (Poir.) C. Jeffrey; 7.UOS-2189.
- Packera obovata* (Muhl. ex Willd.) W.A. Weber & A. Löve; 15.UOS-3528.
- Parthenium integrifolium* L. var. *integrifolium*; 7.UOS-2656.
- Pityopsis aspera* (Shuttlw. ex Small) Small var. *adenolepis* (Fernald) Semple & F.D. Bowers; 7.UOS-3732.
- Pityopsis graminifolia* (Michx.) Nutt. var. *latifolia* (Fernald) Semple & F.D. Bowers; 7.UOS-7767.
- Pluchea camphorata* (L.) DC.; 3.UOS-2181.
- Polymnia canadensis* L.; 7, 9, 13.UOS-949.
- Polymnia laevigata* Beadle; 7, 9, 10, 11, 13.UOS-7016.
- Prenanthes altissima* L.; 10.UOS-4825.
- Prenanthes serpentaria* Pursh; 2, 7, 13.UOS-4083.
- Pseudognaphalium obtusifolium* (L.) Hilliard & Burt; 7.UOS-2030.
- Pyrrhopappus carolinianus* (Walt.) DC.; 7, 15.UOS-8267.
- Ratibida pinnata* (Vent.) Barnh.; 7, 15.UOS-4734.
- Rudbeckia fulgida* Aiton var. *fulgida*; 12.UOS-8264.
- Rudbeckia hirta* L. var. *hirta*; 7.UOS-2072.
- Rudbeckia hirta* L. var. *pulcherrima* Farw.; 4.UOS-3682.
- Rudbeckia laciniata* L. var. *laciniata*; 14.UOS-8183.
- Rudbeckia triloba* L. var. *triloba*; 7.UOS-653.
- \**Senecio vulgaris* L.; 7.UOS-8531.
- Sericocarpus asteroides* (L.) Britton, Sterns & Poggenb.; 7.UOS-8266.
- Sericocarpus linifolius* (L.) B.S.P.; 7.UOS-1208.
- Silphium asteriscus* L. var. *asteriscus*; 7.UOS-2665.
- Silphium asteriscus* L. var. *dentatum*; 7.UOS-8660.
- Silphium brachiatum* Gattinger; 12.UOS-8176. **E.**
- Silphium pinnatifidum* Ell.; 15.UOS-4736. **T.**
- Smallanthus uvedalia* (L.) Mack. Ex Small; 9, 15.UOS-4743.
- Solidago altissima* L. ssp. *altissima*; 4, 7.UOS-7955.

*Solidago arguta* Aiton var. *caroliniana* A. Gray; 7.UOS-6582.

*Solidago auriculata* Shuttlw. ex Blake; 11, 12, 15.UOS-8047.

*Solidago caesia* L.; 2, 10, 12, 13.UOS-4815.

*Solidago curtisii* Torr. & A. Gray var. *flaccidifolia* (Small) R.E.Cook & Semple; 10, 15.UOS-8628.

*Solidago erecta* Pursh; 7.UOS-7632.

*Solidago flexicaulis* L.; 9, 10.UOS-7804.

*Solidago hispida* Muhl. ex Willd.; 7.UOS-8301.

*Solidago nemoralis* Ait.; 7.UOS-1219.

*Solidago odora* Ait.; 2.UOS-4816.

*Solidago patula* Muhl. ex Willd.; 7.UOS-7721.

*Solidago rigida* L. ssp. *glabrata* (E.L. Braun) Heard & Semple; 12, 15.UOS-8484.

*Solidago rugosa* Mill. *aspera* (Aiton) Cronquist ssp. *aspera* (Aiton) Cronquist; 7.UOS-6764.

*Solidago speciosa* Nutt. *speciosa* ssp. *speciosa*; 10.UOS-4817.

*Solidago ulmifolia* Muhl. ex Willd.; 9, 10, 11, 12.UOS-7728.

\**Sonchus asper* (L.) Hill; 7.UOS-2645.

*Symphytotrichum concolor* (L.) Nesom; 1.UOS-6520.

*Symphytotrichum cordifolium* (L.) Nesom; 10, 12.UOS-1225.

*Symphytotrichum dumosum* (L.) Nesom; 7.UOS-6523.

*Symphytotrichum laeve* (L.) A. Löve & D. Löve var. *laeve*; 11.UOS-8356.

*Symphytotrichum lanceolatum* (Willd.) Nesom var. *latifolium* (Semple & Chmielewski) G.L. Nesom; 7.UOS-7699.

*Symphytotrichum lateriflorum* (L.) A. Löve & D. Löve; 3, 14.UOS-6763.

*Symphytotrichum ontarionis* (Wieg.) Nesom; 7.UOS-7698.

*Symphytotrichum patens* (Ait.) Nesom var. *patens*; 7, 11, 13.UOS-1211.

*Symphytotrichum pilosum* (Willd.) Nesom; 7.UOS-1226.

*Symphytotrichum pratense* (Raf.) Nesom; 15.UOS-7993. **E.**

*Symphytotrichum shortii* (Lindl.) Nesom; 9, 12, 15.UOS-4824.

*Symphytotrichum undulatum* (L.) Nesom; 7.UOS-7783.

\**Tanacetum vulgare* L.; 7.UOS-7813.

\**Taraxacum officinale* F.H. Wigg.; 6, 7.UOS-3966.

\*\**Tragopogon dubius* Scop.; 7.UOS-8468.

*Verbesina alternifolia* (L.) Britton ex Kearney; 15.UOS-7687.

*Verbesina virginica* L.; 7, 11, 15.UOS-3981.

*Vernonia flaccidifolia* Small; 11, 12, 15.UOS-8157.

*Vernonia gigantea* (Walter) Trel.; 7.UOS-2034.

*Xanthium strumarium* L.; 7.UOS-8756.

#### BALSAMINACEAE

*Impatiens capensis* Meerb.; 3, 7.UOS-2048.

*Impatiens pallida* Nutt.; 10, 15.UOS-7930.

#### BERBERIDACEAE

\*\**Berberis bealei* Fortune; 7.UOS-2729.

*Berberis canadensis* Mill.; 11.UOS-8656. **S.**

\*\**Berberis thunbergii* DC.; 2, 7.UOS-6270.

*Caulophyllum thalictroides* (L.) Michx.; 10, 13.UOS-3190.

*Jeffersonia diphylla* (L.) Pers.; 13.UOS-8185.

*Podophyllum peltatum* L.; 9, 10, 14.UOS-2345.

#### BETULACEAE

*Alnus serrulata* (Ait.) Willd.; 5.UOS-2179.

*Betula nigra* L.; 7.UOS-4077.

*Carpinus caroliniana* Walt.; 13, 14.UOS-8168.

*Corylus americana* Walt.; 10.UOS-2184.

*Ostrya virginiana* (Mill.) K. Koch; 11, 12, 13.UOS-2706.

#### BIGNONIACEAE

*Bignonia capreolata* L.; 9, 11, 12, 13, 14.UOS-2702.

*Campsis radicans* (L.) Seem. ex Bureau; 7, 9, 12.UOS-1681.

+*Catalpa speciosa* (Warder) Warder ex Engelm.; 4, 7.UOS-8467.

#### BORAGINACEAE

\*\**Buglossoides arvensis* (L.) I.M. Johnst.; 6.UOS-8476.

*Cynoglossum virginianum* L.; 4, 9, 10, 12, 13, 14.UOS-2474.

*Hydrophyllum appendiculatum* Michx.; 10.UOS-2631.

*Hydrophyllum canadense* L.; 7, 10.UOS-874.

*Hydrophyllum macrophyllum* Nutt.; 10.UOS-4805.

*Lithospermum canescens* (Michx.) Lehm.; 9, 10.UOS-8174.

*Lithospermum tuberosum* Rugel ex DC.; 11, 12, 13.UOS-4452.

*Mertensia virginica* (L.) Pers. ex Link; 14.UOS-8099.

*Myosotis macrosperma* Engelm.; 7, 9.UOS-2359.

\*\**Myosotis scorpioides* L.; 7.UOS-2361.

*Nemophila aphylla* (L.) Brummitt; 7, 13.UOS-8100.

*Phacelia bipinnatifida* Michx.; 10, 14.UOS-1637.

#### BRASSICACEAE

\*\**Alliaria petiolata* (Bieb.) Cavara & Grande; 7, 15.UOS-4443.

\**Arabidopsis thaliana* (L.) Heynh.; 6.UOS-2394.

\**Barbarea verna* (Mill.) Asch.; 7.UOS-2422.

\**Barbarea vulgaris* W.T. Aiton; 7.UOS-7893.

*Boechera canadensis* (L.) Al-Shehbaz; 11.UOS-2703.

*Boechera laevigata* (Muhl. ex Willd.) Al-Shehbaz; 11, 12.UOS-7598.

\**Brassica rapa* L.; 7, 15.UOS-8526.

\**Capsella bursa-pastoris* (L.) Medik.; 7.UOS-2373.

\**Cardamine hirsuta* L.; 3, 6, 7, 8.UOS-2463.

*Cardamine parviflora* L. var. *arenicola* (Britton) O.E. Schulz; 9.UOS-6346.

*Cardamine pennsylvanica* Muhl. ex Willd.; 14.UOS-7601.

*Dentaria diphylla* Michx.; 9, 10, 14.UOS-3973.

*Dentaria laciniata* Muhl. ex Willd.; 10, 12.UOS-5668.

*Dentaria multifida* Muhl. ex Ell.; 10.UOS-1568.

\**Draba verna* L.; 6, 7.UOS-2461.

\*\**Hesperis matronalis* L.; 2.UOS-8169.

\*\**Lepidium campestre* (L.) W.T. Aiton; 7.UOS-7891.

*Lepidium virginicum* L.; 7.UOS-943.

\**Lunaria annua* L.; 7, 15.UOS-7863.

\*\**Rorippa nasturtium-aquaticum* (L.) Hayek; 7.UOS-2638.

*Sibara virginica* (L.) Rollins; 6.UOS-3951.

\**Sisymbrium officinale* (L.) Scop.; 7, 15.UOS-947.

\**Thlaspi arvense* L.; 7.UOS-8249.

#### CACTACEAE

*Opuntia humifusa* (Raf.) Raf.; 1.UOS-3278.

#### CAMPANULACEAE

*Campanula americana* L.; 13, 15.UOS-4764.

*Lobelia cardinalis* L.; 3.UOS-1528.

*Lobelia inflata* L.; 7, 15.UOS-2070.

*Lobelia puberula* Michx.; 7.UOS-2010.

*Lobelia spicata* Lam.; 4, 7, 15.UOS-6336.

*Triodanis perfoliata* (L.) Nieuwl. var. *perfoliata*; 4, 7.UOS-878.

#### CANNABACEAE

*Celtis laevigata* Willd.; 7, 10.UOS-2046.

*Celtis occidentalis* L.; 2, 9, 13.UOS-8721.

*Celtis tenuifolia* Nutt.; 11, 13.UOS-8210.

#### CAPRIFOLIACEAE

*Lonicera dioica* L.; 11.UOS-8712. S.

\*\**Lonicera fragrantissima* Lindl. & Paxton; 7.UOS-4451.

\*\**Lonicera japonica* Thunb.; 3, 7, 13, 14.UOS-871.

\*\**Lonicera maackii* (Rupr.) Herder; 4.UOS-8320.

\*\**Lonicera morrowii* Gray; 7.UOS-3180.

*Lonicera sempervirens* L.; 7, 10, 15.UOS-925.

*Symphoricarpos orbiculatus* Moench; 7, 11, 13, 14.UOS-4869.

#### CARYOPHYLLACEAE

\**Arenaria serpyllifolia* L. var. *tenuior* Mert. & W.D.J. Koch; 7.UOS-2918.

\**Arenaria serpyllifolia* L. var. *serpyllifolia*; 4.UOS-7928.

*Cerastium brachypodum* (Engelm. ex A. Gray) B.L. Rob.; 7.UOS-4065.

\**Cerastium fontanum* Baumg. ssp. *vulgare* (Hartman) Greuter & Burdet; 4, 6, 7.UOS-4069.

\**Cerastium glomeratum* Thuill.; 7.UOS-2634.

\**Cerastium semidecandrum* L.; 7.UOS-4071.

\**Dianthus armeria* L.; 4.UOS-956.

*Minuartia glabra* (Michx.) Mattf.; 1.UOS-2978.

\**Saponaria officinalis* L.; 4, 7.UOS-4080.

*Silene antirrhina* L.; 7.UOS-4104.

*Silene rotundifolia* Nutt.; 8.UOS-870.

*Silene stellata* (L.) W.T. Aiton; 2, 9.UOS-3179.

*Silene virginica* L. var. *virginica*; 2.UOS-3782.

\**Silene vulgaris* (Moench) Garcke; 7.UOS-8040.

\**Stellaria media* (L.) Vill.; 7, 10.UOS-2460.

*Stellaria pubera* Michx.; 8, 9, 10, 13, 14, 15.UOS-4108.

#### CELASTRACEAE

\*\**Celastrus orbiculatus* Thunb.; 7.UOS-2028.

\*\**Euonymus alatus* (Thunb.) Siebold; 2, 10.UOS-6338.

*Euonymus americanus* L.; 3, 7, 13.UOS-2627.

*Euonymus atropurpureus* Jacq.; 10, 14, 15.UOS-8314.

\*\**Euonymus hederaceus* Champ. & Benth.; 7, 10.UOS-7426.

#### CISTACEAE

*Lechea racemulosa* Michx.; 7.UOS-7988.



## CONVOLVULACEAE

- Calystegia catesbeiana* Pursh; 7.UOS-3794.  
*Calystegia silvatica* (Kit.) Griseb. ssp. *fraterniflora* (Mack. & Bush) Brummitt; 15.UOS-1371.  
*Cuscuta pentagona* Engelm.; 15.UOS-8316.  
<sup>†</sup>*Dichondra carolinensis* Michx.; 6.UOS-8519.  
<sup>\*</sup>*Ipomoea hederacea* Jacq.; 7.UOS-2676.  
*Ipomoea pandurata* (L.) G. Mey.; 2.UOS-2689.  
<sup>\*</sup>*Ipomoea purpurea* (L.) Roth; 7.UOS-2752.

## CORNACEAE

- Cornus alternifolia* L. f.; 14.UOS-8165.  
*Cornus amomum* Mill.; 3.UOS-5769.  
*Cornus florida* L.; 2, 4, 9, 12, 13, 14.UOS-3763.

## CRASSULACEAE

- Diamorpha smallii* Britton ex Small; 1.UOS-2985. **E.**  
<sup>\*</sup>*Sedum sarmentosum* Bunge; 1.UOS-2640.  
*Sedum ternatum* Michx.; 8, 10, 14.UOS-3815.

## CUCURBITACEAE

- Melothria pendula* L.; 7.UOS-2186.  
*Sicyos angulatus* L.; 15.UOS-8303.

## EBENACEAE

- Diospyros virginiana* L.; 1, 2, 4, 7, 9, 11, 12, 13.UOS-2199.

## ELAEAGNACEAE

- <sup>\*\*</sup>*Elaeagnus umbellata* Thunb. var. *parviflora* (Wall. ex Royle) C.K. Schneid.; 7.UOS-6325.

## ERICACEAE

- Chimaphila maculata* (L.) Pursh; 1, 2, 3, 9, 13, 14.UOS-818.  
*Epigaea repens* L.; 1, 2.UOS-2479.  
*Kalmia latifolia* L.; 1, 2.UOS-1682.  
*Lyonia ligustrina* (L.) DC. var. *ligustrina*; 3.UOS-8436.  
*Monotropa hypopithys* L.; 2.UOS-6329.  
*Monotropa uniflora* L.; 10.UOS-4839.  
*Oxydendrum arboreum* (L.) DC.; 1, 2, 3, 4, 9, 14.UOS-3449.  
*Rhododendron canescens* (Michx.) Sweet; 3.UOS-4223.  
*Rhododendron maximum* L.; 8.UOS-4535.  
*Vaccinium arboreum* Marsh.; 1, 2.UOS-865.  
*Vaccinium corymbosum* L.; 1, 2, 3, 4, 9, 11.UOS-1423.  
*Vaccinium fuscatum* Ait.; 3.UOS-8251.  
*Vaccinium pallidum* Ait.; 1, 2, 3.UOS-4237.  
*Vaccinium stamineum* L.; 1, 2, 4.UOS-813.

## EUPHORBIACEAE

- Acalypha ostryifolia* Riddell; 6.UOS-8487.  
*Acalypha rhomboidea* Raf.; 7.UOS-7739.

*Chamaesyce nutans* (Lag.) Small; 7.UOS-1963.

<sup>†</sup>*Chamaesyce prostrata* (Ait.) Small; 7.UOS-2721.

*Croton monanthogynus* Michx.; 7.UOS-2930.

*Croton willdenowii* G.L. Webster; 1.UOS-4847.

*Euphorbia corollata* L.; 7, 9.UOS-1207.

*Euphorbia cyathophora* Murr.; 7.UOS-4756.

<sup>\*</sup>*Euphorbia dentata* Michx.; 7, 15.UOS-7738.

<sup>\*</sup>*Euphorbia helioscopia* L.; 7, 15.UOS-8105.

*Euphorbia mercurialina* Michx.; 10, 13.UOS-4487.

## FABACEAE

<sup>\*\*</sup>*Albizia julibrissin* Durazz.; 7.UOS-1962.

*Amorpha fruticosa* L.; 7.UOS-4483.

*Amphicarpaea bracteata* (L.) Fern.; 2, 9, 10, 11, 14.UOS-2077.

*Apios americana* Medik.; 7.UOS-6246.

*Cercis canadensis* L.; 9, 10, 11, 12, 13.UOS-2669.

*Chamaecrista fasciculata* (Michx.) Greene; 7.UOS-7014.

*Chamaecrista nictitans* (L.) Moench; 7, 11, 14, 15.UOS-4539.

*Cladrastis kentukea* (Dum.-Cours.) Rudd; 10.UOS-4467.

*Clitoria mariana* L.; 2, 11.UOS-1733.

*Desmodium cuspidatum* (Muhl. ex Willd.) DC. ex Loud.; 15.UOS-4750.

*Desmodium glabellum* (Michx.) DC.; 7, 13.UOS-7737.

*Desmodium glutinosum* (Muhl. ex Willd.) Wood; 7, 13.UOS-4808.

*Desmodium nudiflorum* (L.) DC.; 2.UOS-481.

*Desmodium paniculatum* (L.) DC.; 7, 11, 12.UOS-7736.

*Desmodium pauciflorum* (Nutt.) DC.; 7, 10, 12, 14.UOS-7415.

*Desmodium perplexum* Schub.; 7.UOS-7013.

*Desmodium rotundifolium* DC.; 4, 7, 11.UOS-2049.

*Desmodium viridiflorum* (L.) DC.; 7.UOS-8255.

*Galactia volubilis* (L.) Britton; 2, 11, 13.UOS-8395.

*Gleditsia triacanthos* L.; 7, 9, 11, 14, 15.UOS-2660.

*Gymnocladus dioicus* (L.) K. Koch; 9.UOS-8724.

<sup>\*\*</sup>*Kummerowia striata* (Thunb.) Schindl.; 15.UOS-8354.

<sup>\*</sup>*Lathyrus hirsutus* L.; 7.UOS-8469.

- \**Lathyrus latifolius* L.; 7.UOS-894.  
 \*\**Lespedeza bicolor* Turcz.; 7.UOS-465.  
 \*\**Lespedeza cuneata* (Dum. Cours.) G. Don; 3, 4, 7.UOS-2076.  
*Lespedeza hirta* (L.) Hornem.; 4.UOS-2050.  
*Lespedeza intermedia* (S. Watson) Britton; 7.UOS-8523.  
*Lespedeza procumbens* Michx.; 2, 11, 13, 15.UOS-4769.  
*Lespedeza repens* (L.) W. Bartram; 7.UOS-4795.  
*Lespedeza violacea* (L.) Pers.; 2, 7.UOS-6758.  
*Lespedeza virginica* (L.) Britton; 11, 13.UOS-8472.  
 \**Medicago lupulina* L.; 4, 7.UOS-2559.  
 \*\**Melilotus alba* Medikus; 7.UOS-1957.  
 \*\**Melilotus officinalis* (L.) Lam.; 7.UOS-1958.  
*Mimosa microphylla* Dry.; 7.UOS-954.  
*Orbexilum pedunculatum* (Mill.) Rydb.; 3.UOS-8439.  
*Phaseolus polystachios* (L.) B.S.P.; 13.UOS-8610.  
 \*\**Pueraria montana* (Lour.) Merr. var. *lobata*; 7, 15.UOS-1213.  
*Robinia hispida* L. var. *hispida*; 7.UOS-4916.  
*Robinia hispida* L. var. *rosea* Pursh; 4, 7.UOS-2489.  
*Robinia pseudoacacia* L.; 1, 2, 4, 7, 9, 10, 12.UOS-2464.  
 \**Securigera varia* (L.) Lassen; 7.UOS-2052.  
*Senna marilandica* (L.) Link; 3.UOS-7404.  
*Stylosanthes biflora* (L.) B.S.P.; 4, 7.UOS-2173.  
*Tephrosia virginiana* (L.) Pers.; 7.UOS-1700.  
*Thermopsis mollis* (Michx.) M.A. Curtis ex A. Gray; 2.UOS-2473. S.  
 \**Trifolium campestre* Schreb.; 4, 6, 7.UOS-2560.  
 \**Trifolium dubium* Sibth.; 7.UOS-2558.  
 \**Trifolium incarnatum* L.; 4.UOS-2556.  
 \**Trifolium pratense* L.; 4, 6, 7.UOS-884.  
 \**Trifolium repens* L.; 6.UOS-2841.  
*Vicia caroliniana* Walt.; 12, 15.UOS-6347.  
 \**Vicia sativa* L. ssp. *nigra* (L.) Ehrh.; 4, 6, 7.UOS-1686.  
 \**Vicia villosa* Roth ssp. *varia* (Host) Corb.; 6, 7, 12.UOS-6250.  
 \*\**Wisteria sinensis* (Sims) DC.; 7.UOS-3564.
- FAGACEAE  
*Castanea dentata* (Marsh.) Borkh.; 2.UOS-2732.  
*Fagus grandifolia* Ehrh.; 2, 13, 14.UOS-2733.

- Quercus alba* L.; 1, 2, 3, 4, 9, 12, 13, 14.UOS-1152.  
*Quercus coccinea* Münchh.; 1, 2, 3, 4, 7, 9, 12.UOS-7990.  
*Quercus falcata* Michx.; 1, 2, 4, 9.UOS-7900.  
*Quercus marilandica* Münchh.; 1.UOS-3002.  
*Quercus montana* Willd.; 1, 2.UOS-1475.  
*Quercus muehlenbergii* Engelm.; 4, 9, 10, 11, 12, 13, 14.UOS-7608.  
 †*Quercus phellos* L.; 7.UOS-7970.  
*Quercus rubra* L.; 9, 10, 11.UOS-7934.  
*Quercus shumardii* Buckl.; 11, 14.UOS-8311.  
*Quercus stellata* Wangenh.; 2, 11.UOS-3601.  
*Quercus velutina* Lam.; 1, 2, 4, 9.UOS-822.

## GENTIANACEAE

- Bartonia virginica* (L.) B.S.P.; 3.UOS-6266.  
*Frasera caroliniensis* Walt.; 9, 15.UOS-8260.  
*Gentiana saponaria* L.; 3.UOS-3324.  
*Gentiana villosa* L.; 4, 15.UOS-8335.  
*Obolaria virginica* L.; 9, 10, 11.UOS-1629.  
*Sabatia angularis* (L.) Pursh; 15.UOS-8257.

## GERANIACEAE

- Geranium carolinianum* L.; 4, 6, 7.UOS-2446.  
 \**Geranium dissectum* L.; 7.UOS-8248.  
*Geranium maculatum* L.; 9, 10, 12.UOS-1.

## HALORAGACEAE

- \*\**Myriophyllum aquaticum* (Vell.) Verdc.; 5.UOS-2718.  
*Proserpinaca palustris* L. var. *crebra* Fern. & Griseb.; 5.UOS-2697.

## HAMAMELIDACEAE

- Hamamelis virginiana* L.; 2.UOS-2709.

## HYDRANGEACEAE

- \**Deutzia scabra* Thunb.; 7.UOS-8635.  
*Hydrangea arborescens* L.; 10.UOS-8534.  
*Hydrangea cinerea* Small; 10, 11, 15.UOS-7897.  
*Philadelphus hirsutus* Nutt.; 11.UOS-6352.  
 †*Philadelphus inodorus* L.; 7.UOS-705.

## HYPERICACEAE

- Hypericum canadense* L.; 7.UOS-8892.  
*Hypericum crux-andreae* (L.) Crantz; 2, 7.UOS-2756.  
*Hypericum frondosum* Michx.; 11.UOS-7727.  
*Hypericum gentianoides* (L.) B.S.P.; 1, 4.UOS-1144.  
*Hypericum hypericoides* (L.) Crantz; 7.UOS-8279.  
*Hypericum mutilum* L.; 7.UOS-2759.

*Hypericum nudiflorum* Michx. ex Willd.; 7.UOS-6332.

*Hypericum prolificum* L.; 7.UOS-1949.

*Hypericum punctatum* Lam.; 1, 15.UOS-8225.

*Hypericum sphaerocarpum* Michx.; 15.UOS-6362.

*Hypericum stragulum* P. Adams & N. Robson; 2, 4, 7.UOS-1169.

#### ITEACEAE

*Itea virginica* L.; 3.UOS-6354.

#### JUGLANDACEAE

*Carya caroliniae-septentrionalis* (Ashe) Engl. & Graebn.; 10, 11, 12.UOS-8336.

*Carya cordiformis* (Wangenh.) K. Koch; 14.UOS-8315.

*Carya glabra* (Mill.) Sweet; 2, 9, 12, 13.UOS-8318.

*Carya ovalis* (Wangenh.) Sarg.; 9.UOS-8890.

*Carya ovata* (Mill.) K. Koch; 9, 10, 13.UOS-8312.

*Carya pallida* (Ashe) Engl. & Graebn.; 1, 2, 9.UOS-8024.

*Carya tomentosa* (Lam. ex Poir.) Nutt.; 1, 2.UOS-8604.

*Juglans cinerea* L.; 14.UOS-8237. T.

*Juglans nigra* L.; 4, 9, 10, 13, 14.UOS-4781.

#### LAMIACEAE

*Agastache nepetoides* (L.) Kuntze; 14, 15.UOS-8347.

\**Ajuga reptans* L.; 7.UOS-7819.

*Blephilia hirsuta* (Pursh) Benth.; 13, 14.UOS-8211.

\**Calamintha nepeta* (L.) Savi; 4.UOS-7957.

*Callicarpa americana* L.; 9, 12.UOS-3983.

*Collinsonia canadensis* L.; 7.UOS-6587.

\*\**Glechoma hederacea* L.; 6, 7.UOS-2905.

*Hedeoma pulegioides* (L.) Pers.; 9, 15.UOS-8307.

\**Lamiastrum galeobdolon* (L.) Ehrend. & Polatschek; 7.UOS-8535.

\**Lamium amplexicaule* L.; 6.UOS-2612.

\**Lamium purpureum* L.; 6, 7.UOS-2616.

*Lycopus virginicus* L.; 4, 7.UOS-2175.

\*\**Mentha piperita* L. (pro sp.); 7.UOS-6359.

\**Mentha rotundifolia* (L.) Huds. (pro sp.); 7.UOS-3177.

*Monarda fistulosa* L.; 7, 11.UOS-4803.

\**Mosla dianthera* (Buch.-Ham. ex Roxb.) Maxim.; 4, 7, 15.UOS-4087.

\**Perilla frutescens* (L.) Britton; 7.UOS-2020.

*Physostegia virginiana* (L.) Benth. ssp. *praemorsa* (Shinners) Cantino; 15.UOS-7407.

+*Prunella vulgaris* L.; 6, 7, 15.UOS-946.

*Pycnanthemum loomisii* Nutt.; 2, 4, 15.UOS-8306.

*Pycnanthemum muticum* (Michx.) Pers.; 7.UOS-8096.

*Pycnanthemum tenuifolium* Schrad.; 9.UOS-8262.

*Salvia lyrata* L.; 6, 11, 13.UOS-1442.

\**Salvia pratensis* L.; 7.UOS-8538.

*Salvia urticifolia* L.; 9, 12.UOS-8126.

*Scutellaria elliptica* Muhl. ex Spreng. var. *hirsuta* (Short & Peter) Fern.; 2, 4, 11.UOS-2714.

*Scutellaria integrifolia* L.; 1.UOS-4891.

*Scutellaria ovata* Hill; 7, 9, 15.UOS-8387.

*Scutellaria pseudoserrata* Epling; 9, 10, 15.UOS-4491.

*Trichostema dichotomum* L.; 15.UOS-3271.

*Trichostema setaceum* Houtt.; 7.UOS-6261.

#### LENTIBULARIACEAE

*Utricularia gibba* L.; 5.UOS-7705.

#### LINACEAE

*Linum medium* (Planch.) Britton var. *texanum* (Planch.) Fernald; 7.UOS-8884.

*Linum striatum* Walt.; 7.UOS-2716.

#### LINDERNIACEAE

*Lindernia dubia* (L.) Pennell var. *anagallidea* (Michx.) Cooperr.; 5.UOS-7630.

#### LINNAEACEAE

\**Abelia grandiflora* (Rovelli ex André) Rehd. [chinensis × uniflora]; 7.UOS-8494.

#### LOGANIACEAE

*Spigelia marilandica* (L.) L.; 8, 9, 11.UOS-6348.

#### LYTHRACEAE

*Cuphea viscosissima* Jacq.; 15.UOS-8304.

#### MALVACEAE

\*\**Hibiscus syriacus* L.; 7, 14.UOS-1853.

*Tilia americana* L. var. *americana*; 9, 13.UOS-462.

*Tilia americana* L. var. *heterophylla* (Vent.) Loud.; 10, 13.UOS-7903.

#### MELASTOMATACEAE

*Rhexia mariana* L. var. *mariana*; 7.UOS-2667.

*Rhexia virginica* L.; 3.UOS-2757.

#### MENISPERMACEAE

*Cocculus carolinus* (L.) DC.; 12, 15.UOS-7991.

*Menispermum canadense* L.; 9, 10, 11, 12, 14.UOS-8332.

#### MENYANTHACEAE

\**Nymphoides peltata* (Gmel.) Kuntze; 5.UOS-8373.

#### MOLLUGINACEAE

*Mollugo verticillata* L.; 7.UOS-7976.

#### MONTIACEAE

*Claytonia caroliniana* Michx.; 10.UOS-4440.

*Claytonia virginica* L.; 6, 10, 14.UOS-1449.

*Phemeranthus teretifolius* (Pursh) Raf.; 1.UOS-7627. T.

#### MORACEAE

\*\**Broussonetia papyrifera* (L.) L'Hér. ex Vent.; 7.UOS-8749.

\**Fatoua villosa* (Thunb.) Nakai; 6.UOS-8390.

\**Morus alba* L.; 7.UOS-1030.

*Morus rubra* L.; 10.UOS-8222.

#### MYRSINACEAE

\**Anagallis arvensis* L.; 7.UOS-8752.

\**Lysimachia clethroides* Duby; 7.UOS-5722.

\*\**Lysimachia nummularia* L.; 3, 7.UOS-2147.

*Lysimachia quadrifolia* L.; 2, 3.UOS-864.

#### NYSSACEAE

*Nyssa sylvatica* Marsh. var. *sylvatica*; 1, 2, 3, 4, 9, 10, 14.UOS-4472.

#### OLEACEAE

*Chionanthus virginicus* L.; 9, 12.UOS-3880.

*Forestiera ligustrina* (Michx.) Poir.; 11.UOS-8196.

\**Forsythia viridissima* Lindl.; 7.UOS-8525.

*Fraxinus biltmoreana* Beadle; 2, 4, 9, 10, 11, 12, 13, 14.UOS-7021.

*Fraxinus quadrangulata* Michx.; 9, 10, 11, 14.UOS-6353.

\*\**Ligustrum obtusifolium* Sieb. & Zucc.; 7, 15.UOS-7816.

\*\**Ligustrum sinense* Lour.; 3, 4, 7, 15.UOS-893.

#### ONAGRACEAE

*Circaea lutetiana* L. ssp. *canadensis* (L.) Asch. & Magnus; 3, 10, 11, 13.UOS-2712.

*Epilobium coloratum* Biehler; 7, 10.UOS-3985.

*Gaura filipes* Spach; 15.UOS-4739.

*Ludwigia alternifolia* L.; 7, 15.UOS-2037.

*Ludwigia palustris* (L.) Ell.; 5.UOS-2698.

*Oenothera biennis* L.; 7, 15.UOS-496.

*Oenothera laciniata* Hill; 7.UOS-2644.

+*Oenothera speciosa* Nutt.; 7.UOS-1455.

#### OROBANCHACEAE

*Agalinis gattingeri* (Small) Small; 7.UOS-1209.

*Agalinis purpurea* (L.) Pennell; 4, 7.UOS-2724.

*Agalinis tenuifolia* (Vahl) Raf.; 4, 7.UOS-4714.

*Aureolaria pectinata* (Nutt.) Pennell; 7.UOS-4542.

*Aureolaria virginica* (L.) Pennell; 7, 11, 15.UOS-944.

*Conopholis americana* (L.) Wallr.; 2, 9, 10, 11, 12.UOS-1626.

*Epifagus virginiana* (L.) W. Bartram; 13, 14.UOS-8195.

*Melampyrum lineare* Desr. var. *latifolium* Bart.; 2.UOS-7894.

*Orobanche uniflora* L.; 9.UOS-4448.

*Pedicularis canadensis* L.; 10, 14, 15.UOS-3787.

#### OXALIDACEAE

+*Oxalis corniculata* L.; 6.UOS-8503.

*Oxalis dillenii* Jacq.; 4, 6, 7, 13.UOS-7904.

*Oxalis illinoensis* Schwegm.; 10, 13.UOS-4449.

*Oxalis violacea* L.; 2, 9, 10, 11, 12.UOS-4442.

#### PAPAVERACEAE

*Dicentra cucullaria* (L.) Bernh.; 10.UOS-2306.

*Sanguinaria canadensis* L.; 10, 13, 14.UOS-7564.

*Stylophorum diphyllum* (Michx.) Nutt.; 10.UOS-7573.

#### PARNASSIACEAE

*Parnassia asarifolia* Vent.; 3.UOS-2738.

#### PASSIFLORACEAE

*Passiflora incarnata* L.; 4.UOS-492.

*Passiflora lutea* L.; 10, 13.UOS-4032.

#### PAULOWNIACEAE

\*\**Paulownia tomentosa* (Thunb.) Sieb. & Zucc. ex Steud.; 7, 9.UOS-3719.

#### PENTHORACEAE

*Penthorum sedoides* L.; 3.UOS-7421.

#### PHRYMACEAE

\**Mazus pumilus* (Burm. f.) Steenis; 6, 7.UOS-2884.

*Mimulus alatus* Ait.; 15.UOS-1210.

*Mimulus ringens* L.; 3.UOS-1997.

*Phryma leptostachya* L.; 9, 13.UOS-3183.

#### PHYLLANTHACEAE

*Phyllanthus caroliniensis* Walt.; 7.UOS-7986.

#### PHYTOLACCACEAE

*Phytolacca americana* L.; 1, 2, 7.UOS-942.

#### PLANTAGINACEAE

*Callitriche heterophylla* Pursh; 5.UOS-8470.

\**Chaenorhinum minus* (L.) Lange; 15.UOS-8539.

*Chelone glabra* L.; 3.UOS-4082.

\**Cymbalaria muralis* G. Gaertn., B. Mey. & Scherb.; 6.UOS-8891.

*Gratiola neglecta* Torr.; 3.UOS-7672.

*Gratiola virginiana* L.; 3.UOS-4828.

*Mecardonia acuminata* (Walt.) Small; 7.UOS-7639.

*Penstemon brevisepalus* Pennell; 7.UOS-8726.

*Penstemon calycosus* Small; 15.UOS-4800.

*Penstemon canescens* (Britton) Britton; 2, 7, 15.UOS-7856.

*Penstemon laevigatus* Aiton; 7.UOS-873.

*Plantago aristata* Michx.; 4, 7.UOS-1995.

\**Plantago lanceolata* L.; 4, 6.UOS-888.

*Plantago rugelii* Decne.; 6, 15.UOS-2949.

*Plantago virginica* L.; 7.UOS-2406.

\**Veronica arvensis* L.; 4, 6, 7.UOS-7906.

\**Veronica officinalis* L.; 4, 7.UOS-3628.

\**Veronica persica* Poir.; 6, 7.UOS-2462.

\**Veronica serpyllifolia* L.; 6, 7.UOS-3627.

*Veronicastrum virginicum* (L.) Farw.; 14, 15.UOS-1500.

#### PLATANACEAE

*Platanus occidentalis* L.; 10.UOS-417.

#### POLEMONIACEAE

*Phlox amoena* Sims; 2.UOS-2471.

*Phlox amplifolia* Britton; 15.UOS-8209.

*Phlox carolina* L.; 15.UOS-8252.

*Phlox divaricata* L. var. *laphamii* Wood; 9.UOS-2340.

*Phlox divaricata* L. var. *divaricata*; 10.UOS-727.

*Phlox maculata* L. ssp. *pyramidalis* (Sm.) Wherry; 7.UOS-2686.

*Phlox maculata* L. ssp. *maculata*; 7.UOS-493.

*Phlox pilosa* L. ssp. *pilosa*; 10.UOS-8109.

+*Phlox subulata* L.; 7.UOS-8532.

#### POLYGALACEAE

*Polygala curtissii* Gray; 7.UOS-2174.

*Polygala senega* L. var. *senega*; 9.UOS-557.

*Polygala senega* L. var. *latifolia* Torr. & A. Gray; 11.UOS-8359.

*Polygala verticillata* L.; 4.UOS-4812.

#### POLYGONACEAE

\*\**Fallopia japonica* (Houtt.) Ronse Decr.; 4.UOS-4716.

*Fallopia scandens* (L.) Holub; 7.UOS-2060.

\*\**Persicaria longiseta* (Bruijn) Kitag.; 7, 10, 15.UOS-6595.

\*\**Persicaria maculosa* Gray; 7, 9.UOS-2069.

*Persicaria pensylvanica* (L.) Small; 3, 7.UOS-7987.

*Persicaria punctata* (Ell.) Small; 7, 9.UOS-6361.

*Persicaria sagittata* (L.) Gross.; 7.UOS-1697.

*Persicaria virginiana* (L.) Gaertn.; 10, 13, 14.UOS-4731.

\**Polygonum aviculare* L.; 7.UOS-8750.

\**Rumex acetosella* L.; 4, 6.UOS-6141.

\**Rumex conglomeratus* Murr.; 7.UOS-4512.

\**Rumex crispus* L.; 7.UOS-1955.

\**Rumex obtusifolius* L.; 7.UOS-1964.

#### PRIMULACEAE

*Primula meadia* (L.) A.R.Mast & Reveal; 13, 15.UOS-1677.

#### RANUNCULACEAE

*Actaea pachypoda* Ell.; 10, 13.UOS-936.

*Anemone acutiloba* (DC.) G. Lawson; 9, 10, 13, 14.UOS-396.

*Anemone quinquefolia* L. var. *quinquefolia*; 3.UOS-7622.

*Anemone virginiana* L.; 11, 15.UOS-8045.

*Clematis catesbyana* Pursh; 15.UOS-8305.

*Clematis morefieldii* Kral; 12.UOS-6248. **LE.**

\*\**Clematis terniflora* DC.; 7.UOS-2750.

*Clematis virginiana* L.; 3, 7, 10, 12.UOS-1746.

*Delphinium tricornis* Michx.; 9, 10.UOS-2283.

*Hydrastis canadensis* L.; 9, 14.UOS-7583. **CE.**

*Ranunculus abortivus* L.; 2, 3, 4, 6, 7, 9, 10.UOS-1172.

\*\**Ranunculus bulbosus* L.; 6, 7.UOS-8657.

*Ranunculus hispidus* Michx. var. *hispidus*; 3, 7, 9, 15.UOS-1187.

\**Ranunculus parviflorus* L.; 7.UOS-2244.

*Ranunculus recurvatus* Poir.; 9, 10.UOS-3971.

\**Ranunculus sardous* Crantz; 6, 7.UOS-2264.

*Thalictrum clavatum* DC.; 8.UOS-7864.

*Thalictrum dioicum* L.; 8, 10.UOS-4490.

*Thalictrum thalictroides* (L.) Eames & B. Boivin; 9, 10, 12, 13, 14.UOS-1595.

*Trautvetteria caroliniensis* (Walt.) Vail; 3.UOS-7895.

*Xanthorhiza simplicissima* Marsh.; 3, 8.UOS-2482.

#### RHAMNACEAE

*Berchemia scandens* (Hill) K. Koch; 11.UOS-8163.

*Ceanothus americanus* L.; 7.UOS-2647.

*Rhamnus caroliniana* Walt.; 4, 7, 11, 13.UOS-2619.

#### ROSACEAE

*Agrimonia microcarpa* Wallr.; 10.UOS-4814.

*Agrimonia parviflora* Ait.; 7.UOS-7711.

*Agrimonia pubescens* Wallr.; 7, 15.UOS-2009.

*Agrimonia rostellata* Wallr.; 13, 15.UOS-4730.

*Amelanchier arborea* (Michx. f.) Fernald; 1, 2.UOS-7591.

*Amelanchier laevis* Wieg.; 1.UOS-4288.

\**Aphanes microcarpa* (Boiss. & Reut.) Rothm.; 6.UOS-8639.

*Aronia arbutifolia* (L.) Pers.; 2, 3.UOS-3317.

*Aronia melanocarpa* (Michx.) Ell.; 1, 2.UOS-821.

*Aruncus dioicus* (Walt.) Fern.; 8, 10.UOS-869.

*Crataegus berberifolia* Torr. & Gray; 9.UOS-8285.

*Crataegus calpodendron* (Ehrh.) Medik.; 11, 12.UOS-8289.

*Crataegus collina* Chapman; 10, 11.UOS-8309.

*Crataegus crus-galli* L.; 11.UOS-8160.

*Crataegus intricata* Lange; 15.UOS-8044.

*Crataegus iracunda* Beadle; 7.UOS-4872.

*Crataegus macrosperma* Ashe; 3.UOS-7617.

*Crataegus pruinosa* (Wendl. f.) K. Koch; 2, 9, 10.UOS-6267.

\**Duchesnea indica* (Andrews) Focke; 3, 6, 7, 9.UOS-877.

*Fragaria virginiana* Duchesne; 2.UOS-3121.

*Geum canadense* Jacq.; 2, 7, 8, 10, 13, 15.UOS-4906.

*Geum vernum* (Raf.) Torr. & Gray; 3.UOS-8504.

*Geum virginianum* L.; 7, 9, 10, 15.UOS-8221.

*Malus angustifolia* (Ait.) Michx.; 1, 2.UOS-4874.

*Malus coronaria* (L.) Mill.; 2.UOS-7815.

\**Malus prunifolia* (Willd.) Borkh.; 7.UOS-8506.

\**Malus pumila* Mill.; 7.UOS-7808.

*Porteranthus stipulatus* (Muhl. ex Willd.) Britton; 2, 7.UOS-861.

*Porteranthus trifoliatus* (L.) Britton; 7.UOS-2637.

*Potentilla canadensis* L.; 4, 10.UOS-6140.

\**Potentilla recta* L.; 7.UOS-777.

*Potentilla simplex* Michx. var. *simplex*; 2, 3, 7, 12.UOS-7911.

*Prunus americana* Marsh.; 15.UOS-8299.

*Prunus angustifolia* Marsh.; 7.UOS-8627.

\**Prunus avium* (L.) L.; 7.UOS-7570.

*Prunus mexicana* S. Watson; 9.UOS-8043.

*Prunus munsoniana* W. Wight & Hedrick; 7.UOS-7855.

*Prunus serotina* Ehrh.; 1, 2, 3, 4, 9, 10, 12, 13, 14.UOS-2855.

\*\**Pyrus calleryana* Decne.; 4.UOS-8398.

\**Pyrus communis* L.; 4, 7.UOS-8290.

*Rosa carolina* L. ssp. *carolina*; 2.UOS-2628.

\*\**Rosa multiflora* Thunb. ex Murr.; 3, 4, 7, 10, 15.UOS-889.

*Rosa setigera* Michx.; 15.UOS-1703.

\**Rosa wichuraiana* Crép.; 7.UOS-8505.

*Rubus allegheniensis* Porter; 1.UOS-1489.

*Rubus argutus* Link; 2, 4, 7.UOS-7910.

*Rubus flagellaris* Willd.; 2, 3, 8, 9.UOS-4003.

*Rubus hispidus* L.; 1, 3, 7.UOS-1693.

*Rubus longii* Fernald; 7.UOS-4293.

*Rubus occidentalis* L.; 7.UOS-4454.

\*\**Rubus phoenicolasius* Maxim.; 7, 8.UOS-922.

\*\**Spiraea japonica* L. f.; 7, 14, 15.UOS-898.

#### RUBIACEAE

*Cephalanthus occidentalis* L.; 3.UOS-2736.

*Diodia teres* Walt.; 1.UOS-4538.

*Diodia virginiana* L.; 6, 7.UOS-2715.

*Galium aparine* L.; 3, 7, 10, 13.UOS-2876.

*Galium circaezans* Michx.; 2, 3, 8, 9, 10, 11, 12, 13, 15.UOS-3839.

*Galium lanceolatum* Torr.; 2.UOS-7898.

\**Galium pedemontanum* (Bellardi) All.; 4.UOS-8216.

*Galium pilosum* Ait.; 4, 7.UOS-7977.

*Galium tinctorium* (L.) Scop.; 7.UOS-7256.

*Galium triflorum* Michx.; 9, 10, 11, 14.UOS-7902.

*Houstonia caerulea* L.; 2, 3.UOS-1501.

*Houstonia canadensis* Willd. ex Roem. & Schult.; 2.UOS-1494.

*Houstonia longifolia* Gaertn.; 2.UOS-856.

*Houstonia purpurea* L. var. *purpurea*; 2, 9, 13, 15.UOS-2635.

*Houstonia purpurea* L. var. *calycosa* A. Gray; 2.UOS-3484.

*Houstonia pusilla* Schoepf; 2.UOS-2478.

*Mitchella repens* L.; 1, 3, 8, 14.UOS-2636.

\**Sherardia arvensis* L.; 6.UOS-6341.

#### RUTACEAE

*Ptelea trifoliata* L.; 9, 11.UOS-4516.

#### SALICACEAE

\*\**Populus alba* L.; 4.UOS-8243.

*Populus deltoides* Bartr. ex Marsh.; 7.UOS-8349.

*Salix caroliniana* Michx.; 7.UOS-4831.

*Salix humilis* Marsh. var. *microphylla* (Andersson) Fernald; 7.UOS-8131.

*Salix nigra* Marsh.; 7, 15.UOS-881.

#### SANTALACEAE

*Phoradendron serotinum* (Raf.) M.C. Johnst.; 2, 7.UOS-4308.

#### SAPINDACEAE

*Acer negundo* L.; 7, 9, 14.UOS-2466.

*Acer rubrum* L. 1.; 1, 2, 3, 4, 10, 11, 13, 14.UOS-833.

*Acer saccharinum* L.; 7.UOS-4780.

*Acer saccharum* Marsh. ssp. *floridanum* (Chapman) Desmarias; 10, 13.UOS-8372.

*Acer saccharum* Marsh. ssp. *saccharum*; 9, 10, 11, 12, 13, 14.UOS-392.

*Aesculus flava* Ait.; 9, 10, 13, 14.UOS-4784.

*Aesculus glabra* Willd.; 13.UOS-2539.

\**Cardiospermum halicacabum* L.; 7. UOS-8893.

#### SAPOTACEAE

*Sideroxylon lycioides* L.; 9, 11, 13.UOS-7718.

#### SAXIFRAGACEAE

*Astilbe biternata* (Vent.) Britton; 9, 14.UOS-8440.

*Heuchera americana* L. var. *americana*; 1, 8.UOS-7817.

*Heuchera parviflora* Bartl.; 8.UOS-2682.

*Heuchera villosa* Michx. var. *villosa*; 11.UOS-7715.

*Micranthes careyana* (Gray) Small; 8, 10.UOS-4789.

*Mitella diphylla* L.; 14.UOS-8180.

*Tiarella cordifolia* L.; 10, 14.UOS-591.

#### SCROPHULARIACEAE

\*\**Buddleja davidii* Franch.; 7.UOS-8887.

*Scrophularia marilandica* L.; 7, 10, 15.UOS-7985.

\**Verbascum blattaria* L.; 7.UOS-921.

\*\**Verbascum thapsus* L.; 7.UOS-2066.

#### SIMAROUBACEAE

\*\**Ailanthus altissima* (Mill.) Swingle; 7.UOS-2659.

#### SOLANACEAE

\**Datura stramonium* L.; 7.UOS-945.

*Physalis heterophylla* Nees; 8, 11.UOS-8062.

*Solanum carolinense* L.; 4, 7.UOS-4833.

\**Solanum physalifolium* Rusby; 7.UOS-8633.

*Solanum ptychanthum* Dunal; 7.UOS-4866.

#### STAPHYLEACEAE

*Staphylea trifolia* L.; 9, 10.UOS-6343.

#### STYRACACEAE

+*Halesia tetraptera* Ellis; 7.UOS-7701.

#### THEACEAE

*Stewartia ovata* (Cav.) Weatherby; 2.UOS-4508.

#### THEOPHRASTACEAE

*Samolus valerandi* L. ssp. *parviflorus* (Raf.) Hultén; 14.UOS-8188.

#### ULMACEAE

*Ulmus alata* Michx.; 2, 3, 9, 10, 11, 12.UOS-4488.

*Ulmus americana* L.; 7.UOS-4856.

*Ulmus rubra* Muhl.; 9, 13.UOS-4469.

*Ulmus serotina* Sarg.; 9, 11.UOS-7401.

#### URTICACEAE

*Boehmeria cylindrica* (L.) Sw.; 1, 9, 13.UOS-3980.

*Laportea canadensis* (L.) Weddell; 10.UOS-4859.

*Parietaria pensylvanica* Muhl. ex Willd.; 7.UOS-7975.

*Pilea pumila* (L.) Gray; 3, 10, 14.UOS-4074.

\**Urtica dioica* L. ssp. *dioica*; 4, 10, 14.UOS-8049.

#### VALERIANACEAE

*Valerianella radiata* (L.) DuRoi; 7.UOS-1684.

#### VERBENACEAE

*Phyla lanceolata* (Michx.) Greene; 7.UOS-7820.

*Verbena simplex* Lehm.; 4, 7.UOS-811.

*Verbena urticifolia* L.; 7.UOS-2007.

#### VIOLACEAE

*Hybanthus concolor* (T.F. Forst.) Spreng.; 10.UOS-4438.

*Viola bicolor* Pursh; 7.UOS-2650.

*Viola blanda* Willd.; 8, 10.UOS-2480.

*Viola canadensis* L.; 10.UOS-8121.

*Viola cucullata* Ait.; 3.UOS-7578.

*Viola hastata* Michx.; 2, 10.UOS-2320.

*Viola hirsutula* Brainerd; 2.UOS-8245.

*Viola lanceolata* L.; 4, 7.UOS-7621.

*Viola palmata* L.; 2, 4, 9, 10, 11, 15.UOS-3772.

*Viola pedata* L.; 4, 7.UOS-2483.

*Viola primulifolia* L.; 3, 10.UOS-6136.

*Viola pubescens* Aiton var. *scabriuscula* Schwein. ex Torr. & A. Gray; 2, 10, 13, 15.UOS-7582.

*Viola rostrata* Pursh; 10.UOS-4268.

*Viola sagittata* Aiton var. *sagittata*; 1.UOS-7603.

*Viola sororia* Willd. var. *sororia*; 6, 7, 10.UOS-1596.

*Viola striata* Ait.; 3, 6, 7, 10.UOS-8246.

*Viola subsinuata* (Greene) Greene; 7.UOS-8282.

*Viola tripartita* Elliot var. *glaberrima* (DC.) Harper; 14.UOS-8244.

#### VITACEAE

*Ampelopsis arborea* (L.) Koehne; 7.UOS-8488.

*Parthenocissus quinquefolia* (L.) Planch.; 2, 4, 9, 10, 11, 12, 13, 14.UOS-2620.

*Vitis aestivalis* Michx. var. *aestivalis*; 2, 7, 8, 10, 11.UOS-7935.

*Vitis cinerea* (Engelm.) Engelm. ex Millard var. *baileyana* (Munson) Comeaux; 2, 9, 11, 15.UOS-832.

*Vitis rotundifolia* Michx.; 7.UOS-5942.

*Vitis vulpina* L.; 2, 10.UOS-2180.