

THE VASCULAR FLORA IN THREE PRAIRIE CEMETERIES IN HENRY COUNTY, INDIANA

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ABSTRACT. An inventory of the vascular flora occurring at three mesic, tallgrass prairie cemeteries (Bechtelheimer Cemetery, Current Cemetery, and Rogersville Cemetery) located in northeast Henry County, Indiana, revealed a total of 184 species representing 134 genera from 60 families. Of the 184 species, 138 (75%) were native, 46 (25%) were exotic, and 98 (~53%) occurred in eight families, i.e., Asteraceae, Poaceae, Cyperaceae (all *Carex*), Rosaceae, Apiaceae, Caprifoliaceae, Lamiaceae, and Liliaceae. Of the 46 exotics documented, 29 species (~63%) occurred in the same families minus the Cyperaceae, and 10 were from the Poaceae. Bechtelheimer Cemetery had 110 species, Current Cemetery had 103 species, and Rogersville Cemetery had 104 species. Forty-three species occurred in all three cemeteries. Bechtelheimer and Rogersville cemeteries were dominated by graminoids and forbs, while Current Cemetery was dominated by woody plants. Of the three cemeteries, Rogersville was the most prairie-like due to recent management practices. FQIs for native species ranged from 23.6 to 30.3, and the C_{av} ranged from 2.6 to 3.3. The low FQIs obtained for these sites were due to their size (approximately 0.2 hectares each). Eight species are Henry County records, including *Calystegia spithamea*, *Carex meadii*, *Lysimachia lanceolata*, and *Symphytotrichum laeve*. The use of fire to enhance and maintain these cemeteries as tallgrass prairies is recommended.

Keywords: Henry County Indiana, prairie, prairie cemetery, county records–vascular plants, Floristic Quality Index (FQI), flora of Indiana

In Indiana, prairies are complex natural plant communities dominated by tall grasses intermixed with a variety of forbs and an occasional woody plant (Fisher 1991; IDNR 2002; Larabee & Altman 2001). Prairies have always been a symbol of the Midwest, and tallgrass prairie once stretched from Iowa and Missouri through central Ohio. A part of Indiana's natural history, prairie once covered approximately 15% of the area in the state, occurring primarily in the west-central and northwest portions of the state (IDNR 2002; Post 1997). However, because mesic, tallgrass prairies drain well, have good soil moisture during the growing season, and have deep, rich soil, most of these prairies have been lost to agriculture (as well as urbanization). Thus, less than 1% of the original prairie remains in Indiana today (Friesner Herbarium 2008).

Many of the small remnant prairie tracts remaining in Indiana are old railroad right-of-ways that were never plowed and pioneer cemeteries (IDNR 2002), such as Bechtelheimer

Cemetery, Current Cemetery, and Rogersville Cemetery, all located in Stoney Creek Township in northeast Henry County. All three cemeteries are mesic, tallgrass prairies (Jeff Ray, site manager, pers. comm.; Kevin Tungschick, Spence Nursery, pers. comm.).

This study of the prairie cemeteries in Henry County was undertaken as a continuing effort to determine the flora and floral communities in east-central Indiana. Additionally, we are unaware of any study/inventory published for prairies in east-central Indiana. Given the high rate of mesic, tallgrass prairie loss (IDNR 2002; Friesner Herbarium 2008), it is important to document sites that potentially retain remnant natural quality. These inventories and habitat descriptions can then provide guidance for future prairie protection and restoration.

Anthropogenic disturbance, in and especially around these cemeteries, has been extensive. Given the severity of human impact on these sites, an inventory was necessary to document plant biodiversity before it was lost. Thus, the goals of the study were (1) to inventory and voucher the vascular flora occurring in each

cemetery; (2) to identify plants, if any, of special concern; and (3) to suggest recommendations for future management.

BRIEF HISTORY AND STUDY AREA

The three cemeteries are located in Stoney Creek Township in northeast Henry County, Indiana. All are under a Conservation Management Agreement between the Central Indiana Land Trust Inc. (CILTI) and Stoney Creek Township. Under this agreement, CILTI manages the native prairie habitat on the properties for preservation purposes. Below is a short description for each cemetery provided by Henry County Genealogical Services (2009).

Bundy-Bechtelheimer Cemetery.—Today, everyone associated with this cemetery refers to it as the Bechtelheimer Cemetery. Hence, in this paper we will cite it as the Bechtelheimer Cemetery. This cemetery is located in section #28 of Stoney Creek Township. The site was once owned by Samuel Bechtelheimer who purchased it in September of 1828. His father, Joseph Bechtelheimer, was the first known burial in this graveyard; he died in 1833. Later, Bechtelheimer sold the land to Samuel Bundy, one of the first African-American pioneers in this part of Henry County. The graveyard (hereafter called the Bechtelheimer Cemetery) became known as the Bundy burial grounds because most of the burials were from the Bundy family. In June of 1866, Samuel Bechtelheimer re-purchased the cemetery land from the Bundy family and set aside the land as a cemetery. It continued to be used as a neighborhood cemetery into the early 20th century; the last known burial was sometime around 1904. For a list of the people buried here see <http://www.hcgs.net/bundy.html>.

Current Cemetery.—This cemetery, located in section #29 in Stoney Creek Township, is on the Walradth farm on Buck Creek Pike. It was established as a burial ground by James Current who settled here in the 1830s. It has received very little care in recent years and is completely overgrown with native, woody vegetation. At one time a Boy Scout group took care of the grounds, keeping the weeds mowed. In 1995, the Indiana Junior Historical Society undertook a major cleanup of the cemetery, cutting back the trees, brush, and weeds, and restoring many stones that were down due to weathering and the ages of time. In recent years Jeff Ray, local CILTI caretaker,

has removed the woody vegetation. For a list of the people buried here see <http://www.hcgs.net/current.html>.

Rogersville Cemetery.—This cemetery is located in section #5 in Stoney Creek Township. It was started by the Methodist-Episcopal Church (M.E. Church) in 1834, when Jabish Luellen deeded the land to the church to be used for the erection of a church or house of worship and a burial ground for its members. Rogersville, laid out by James O. Rogers and John Colburn, was a flourishing small village in the mid 1800s with a population of about seventy. It was the mid-point between New Castle and Muncie on the old Messick Pike. It had a hotel, blacksmith shop, doctor, dry goods store, harness shop, and a shoe store. Additionally it was also a stop on the “underground railroad.” The once-thriving village disappeared when railroads and major roads were built too far away. For a list of the people buried here see <http://www.hcgs.net/rogerscem.html>.

General.—These cemeteries lie in the Tipton Till Plain area of the Central Till Plain natural region (Homoya 1985). Each cemetery is approximately 0.2 hectare (one-half acre) in size. Current Cemetery is enclosed entirely by a fence, while Bechtelheimer and Rogersville cemeteries are bordered on three sides by a fence and by a county road on the fourth. All three cemeteries lie on the top of mounds or small hills.

The soils are nearly similar at the three sites. Bechtelheimer and Current cemeteries have Losantville silt loam soil, while the soil at Rogersville Cemetery is classified as Losantville clay loam (WSS 2009). The Losantville series consists of very deep, moderately well-drained soils that are shallow-to-dense till (NCSS 2007). Losantville soils are on till plains of Wisconsin age, have slopes ranging from 2–12%, and are eroded-to-severely-eroded (NCSS 2007; WSS 2009).

METHODS

During the 2008 growing season, a foray was made into each cemetery every 7 to 14 days. Voucher specimens for each species observed were collected and deposited in the Ball State University Herbarium (BSUH). Notes on vegetation consisted of species lists (see catalog of vascular plants, see Appendix) with visual estimates of their abundance. Nomenclature follows the USDA Plants Database (USDA

2008). The floristic quality index (FQI) for each site was determined using the program developed by the Conservation Research Institution (Wilhelm & Masters 2000) in conjunction with Rothrock (2004).

RESULTS

The catalog of the vascular flora documented at the three prairie cemeteries is listed in the Appendix. A total of 184 species was collected representing 134 genera from 60 families. Ninety-eight species (~53%) occur in only 8 families, e.g., Asteraceae (28 spp.), Poaceae (19 spp.), Cyperaceae (14 spp., all *Carex*), Rosaceae (11 spp.), Apiaceae (8 spp.), Caprifoliaceae (6 spp.), Lamiaceae (6 spp.), and the Liliaceae (6 spp.). Additionally, of the 46 exotics documented, 29 spp. (~63%) occur in the same families minus the Cyperaceae, and 10 are from the Poaceae.

The occurrence of species at each cemetery is seen in Table 1. Bechtelheimer has 110 species, Current has 103 species, and Rogersville has 104 species. Of the 184 species documented at the cemeteries, 43 occur in all three, 23 occur in Bechtelheimer and Current, 13 occur in Current and Rogersville, 11 occur in Bechtelheimer and Rogersville, 37 occur just in Rogersville, 33 occur just in Bechtelheimer, and 24 occur just in Current. Of the 43 species occurring in all three cemeteries, 34 (~79%) are native. The nine exotics included six species of grass and three forbs, e.g., *Medicago lupulina*, *Melilotus officinalis* and *Taraxacum officinale*.

The physiognomic analyses of the flora occurring at each cemetery are seen in Table 2. The analyses suggest that the cemeteries are dominated by herbaceous plants (forbs and graminoids), e.g., Bechtelheimer Cemetery: 85 species herbaceous (~77%) and 25 species woody (~23%); Current Cemetery: 76 species herbaceous (~74%) and 27 species woody (~26%); and Rogersville Cemetery: 74 species herbaceous (~71%) and 30 species woody (~29%). The majority of woody plants occur along the fence rows enclosing the cemeteries.

The Floristic Quality Indices (FQI) and mean Coefficients of Conservatism (C_{av}) are shown in Table 3. Of the 184 species documented, one species, *Symphotrichum laeve*, has $C = 10$, four species have $C = 8$, and seven species have $C = 7$ (see Appendix). Thirty plant species occurring in the cemeteries that are commonly found in prairies from Illinois to Ohio include *Andropogon gerardii*, *Anemone*

virginiana, *Antennaria plantaginifolia*, *Arnoglossum atriplicifolium*, *Calystegia spithamea*, *Carex meadii*, *Carya tomentosa*, *Ceanothus americanus*, *Celastrus scandens*, *Cirsium discolor*, *Comandra umbellata*, *Desmodium canescens*, *Elymus virginicus*, *Euphorbia corollata*, *Helianthus hirsutus*, *Lactuca canadensis*, *Lobelia spicata*, *Lysimachia lanceolata*, *Monarda fistulosa*, *Rubus occidentalis*, *Rudbeckia hirta pulcherrima*, *Silphium integrifolium*, *Smilax lasioneura*, *Solidago canadensis*, *Symphotrichum laeve*, *S. cordifolium (sagittifolium)*, *S. novae-angliae*, *S. pilosum*, *Tradescantia virginiana* and *Vernonia gigantea* (INHS 2005; Kirt et al. 1998; Mack & Boerner 2004; OPA 2010; Robison et al. 2010).

Based upon the Indiana Natural Heritage Data Center's records for Henry County and the plants reported at Wilbur Wright Fish and Wildlife Area (Ruch et al. 2002), the IMI wetland complex (Ruch et al. 2008b), and the Bennett wetland complex (Ruch et al. 2009), eight species documented at the three prairie cemeteries represent Henry County records, including *Calystegia spithamea*, *Carex meadii*, *Hylotelophium telephium*, *Lysimachia lanceolata*, *Phlox subulata*, *Rubus flagellaris*, *Sisyrinchium albidum*, and *Symphotrichum laeve*. Although *Hylotelophium telephium* and *Phlox subulata* are both exotics and were initially planted at Rogersville Cemetery, both have naturalized and are spreading. Lastly, none of the plants documented at the cemeteries have a state ranking by the Divisions of Nature Preserves, Indiana Department of Natural Resources (Division of Nature Preserves 2007).

HABITAT DESCRIPTIONS

Although all three cemeteries are remnants of mesic, tallgrass prairie, the community structure and dominant or abundant species differ at each. This difference is due in part to the plant communities bordering each cemetery and in part to the management each receives. Below is a description of each cemetery.

Bechtelheimer Cemetery.—This site is dominated by graminoids, having 14 grass species and 10 sedge (*Carex*) species. Graminoids made up 22% (24 of 110) of the species occurring here. The dominant native grasses include *Andropogon gerardii*, *Elymus riparius*, *E. virginicus*, and *Festuca subverticillata*. Dominant exotics grasses include *Bromus inermis*, *Poa pratensis*, and *Schedonorus phoenix*. The richness of graminoids is explained in part by the

Table 1.—Species documented at each cemetery. See the Appendix for subspecies or varieties.

| Species | Bechtelheimer | Current | Rogersville |
|------------------------------------|---------------|---------|-------------|
| <i>Acer saccharum</i> | | | X |
| <i>Achillea millefolium</i> | | X | X |
| <i>Aesculus glabra</i> | | X | |
| <i>Ageratina altissima</i> | | X | |
| <i>Agrostis gigantea</i> | | X | X |
| <i>Alliaria petiolata</i> | X | X | |
| <i>Ambrosia artemisiifolia</i> | X | X | X |
| <i>Ambrosia trifida</i> | X | X | X |
| <i>Andropogon gerardii</i> | X | X | X |
| <i>Anemone virginiana</i> | X | X | X |
| <i>Antennaria plantaginifolia</i> | | | X |
| <i>Apocynum cannabinum</i> | X | | |
| <i>Arctium minus</i> | | X | |
| <i>Arisaema dracontium</i> | X | | |
| <i>Aristolochia serpentaria</i> | | X | |
| <i>Arnoglossum atriplicifolium</i> | | | X |
| <i>Asclepias syriaca</i> | X | | |
| <i>Barbarea vulgaris</i> | | X | |
| <i>Bromus arvensis</i> | | X | |
| <i>Bromus inermis</i> | X | X | X |
| <i>Calystegia sepium</i> | | | X |
| <i>Calystegia spithamea</i> | | | X |
| <i>Campanulastrum americanum</i> | | X | |
| <i>Campsis radicans</i> | | | X |
| <i>Carex aggregata</i> | X | | |
| <i>Carex amphibola</i> | | X | |
| <i>Carex blanda</i> | X | X | |
| <i>Carex cephalophora</i> | X | X | X |
| <i>Carex conjuncta</i> | X | | |
| <i>Carex davisii</i> | X | X | |
| <i>Carex granularis</i> | | | X |
| <i>Carex grisea</i> | X | | |
| <i>Carex hirtifolia</i> | X | X | |
| <i>Carex meadii</i> | | | X |
| <i>Carex normalis</i> | X | X | |
| <i>Carex pellita</i> | X | | X |
| <i>Carex pennsylvanica</i> | | X | X |
| <i>Carex radiata</i> | X | X | |
| <i>Carya alba (C. tomentosa)</i> | | | X |
| <i>Carya cordiformis</i> | | X | |
| <i>Carya ovata</i> | | X | X |
| <i>Catalpa speciosa</i> | | X | |
| <i>Ceanothus americanus</i> | | X | X |
| <i>Celastrus scandens</i> | X | X | X |
| <i>Celtis occidentalis</i> | X | X | X |
| <i>Cerastium fontanum</i> | | X | |
| <i>Cichorium intybus</i> | X | | |
| <i>Circaea lutetiana</i> | X | | |
| <i>Cirsium discolor</i> | X | X | X |
| <i>Claytonia virginica</i> | X | X | X |
| <i>Comandra umbellata</i> | | X | X |
| <i>Conium maculatum</i> | X | | |
| <i>Convallaria majalis</i> | | | X |
| <i>Cornus drummondii</i> | X | X | X |
| <i>Crataegus mollis</i> | X | X | X |

Table 1.—Continued.

| Species | Bechtelheimer | Current | Rogersville |
|----------------------------------|---------------|---------|-------------|
| <i>Cryptotaenia canadensis</i> | X | X | |
| <i>Dactylis glomerata</i> | X | X | X |
| <i>Daucus carota</i> | X | X | |
| <i>Desmodium canescens</i> | X | X | X |
| <i>Dianthus armeria</i> | | X | |
| <i>Dichantheium acuminatum</i> | | X | X |
| <i>Dipsacus fullonum</i> | X | | |
| <i>Elaeagnus umbellata</i> | | | X |
| <i>Elymus hystrix</i> | | | X |
| <i>Elymus repens</i> | X | X | |
| <i>Elymus riparius</i> | X | | X |
| <i>Elymus villosus</i> | | X | |
| <i>Elymus virginicus</i> | X | X | |
| <i>Erigeron annuus</i> | X | X | X |
| <i>Euonymus atropurpureus</i> | X | | X |
| <i>Eupatorium purpureum</i> | | | X |
| <i>Euphorbia corollata</i> | X | X | X |
| <i>Festuca subverticillata</i> | X | | |
| <i>Fragaria virginiana</i> | X | X | |
| <i>Fraxinus americana</i> | | | X |
| <i>Fraxinus pennsylvanica</i> | | X | X |
| <i>Galium aparine</i> | X | X | X |
| <i>Galium concinnum</i> | X | X | X |
| <i>Galium triflorum</i> | | X | |
| <i>Geranium maculatum</i> | X | X | X |
| <i>Geum canadense</i> | X | X | |
| <i>Geum vernum</i> | X | X | |
| <i>Glechoma hederacea</i> | X | | |
| <i>Gleditsia triacanthos</i> | X | X | |
| <i>Hackelia virginiana</i> | | X | X |
| <i>Helianthus grosseserratus</i> | X | | |
| <i>Helianthus hirsutus</i> | X | X | X |
| <i>Hemerocallis fulva</i> | | | X |
| <i>Hylotelephium telephium</i> | | | X |
| <i>Hypericum punctatum</i> | X | | |
| <i>Iris germanica</i> | | | X |
| <i>Juglans nigra</i> | X | X | X |
| <i>Juncus dudleyi</i> | | | X |
| <i>Juncus tenuis</i> | | X | |
| <i>Juncus torreyi</i> | | | X |
| <i>Juniperus virginiana</i> | | | X |
| <i>Lactuca canadensis</i> | X | X | X |
| <i>Lamium purpureum</i> | X | X | |
| <i>Leonurus cardiaca</i> | X | | |
| <i>Lobelia spicata</i> | | | X |
| <i>Lonicera japonica</i> | | X | |
| <i>Lonicera maackii</i> | X | | X |
| <i>Lonicera morrowii</i> | X | X | |
| <i>Lysimachia lanceolata</i> | X | X | X |
| <i>Maclura pomifera</i> | X | | |
| <i>Maianthemum racemosum</i> | | | X |
| <i>Medicago lupulina</i> | X | X | X |
| <i>Melilotus officinale</i> | X | X | X |
| <i>Menispermum canadense</i> | X | | X |
| <i>Monarda fistulosa</i> | X | X | X |

Table 1.—Continued.

| Species | Bechtelheimer | Current | Rogersville |
|-------------------------------------|---------------|---------|-------------|
| <i>Morus alba</i> | X | X | |
| <i>Muhlenbergia schreberi</i> | X | | |
| <i>Muscari botryoides</i> | | | X |
| <i>Ornithogalum umbellatum</i> | X | | |
| <i>Osmorhiza longistylis</i> | X | X | |
| <i>Oxalis stricta</i> | X | X | X |
| <i>Packera glabella</i> | X | | |
| <i>Packera obovata</i> | | | X |
| <i>Parthenocissus quinquefolia</i> | X | | |
| <i>Pastinaca sativa</i> | X | | |
| <i>Phleum pratense</i> | X | X | X |
| <i>Phlox subulata</i> | | | X |
| <i>Phryma leptostachya</i> | | X | |
| <i>Phytolacca americana</i> | X | | |
| <i>Poa compressa</i> | X | X | X |
| <i>Poa pratensis</i> | X | X | X |
| <i>Poa trivialis</i> | X | | |
| <i>Podophyllum peltatum</i> | | X | |
| <i>Polemonium reptans</i> | X | | |
| <i>Polygonatum biflorum</i> | X | | |
| <i>Polygonum scandens</i> | X | | |
| <i>Potentilla simplex</i> | | | X |
| <i>Prunella vulgaris</i> | | | X |
| <i>Prunus serotina</i> | X | X | X |
| <i>Quercus alba</i> | | | X |
| <i>Quercus imbricaria</i> | X | | X |
| <i>Quercus rubra</i> | | | X |
| <i>Ranunculus abortivus</i> | | X | |
| <i>Rhus glabra</i> | | X | X |
| <i>Rosa carolina</i> | X | | X |
| <i>Rosa multiflora</i> | X | X | |
| <i>Rosa setigera</i> | | X | |
| <i>Rubus flagellaris</i> | | X | |
| <i>Rubus occidentalis</i> | X | X | X |
| <i>Rudbeckia hirta</i> L. | | X | X |
| <i>Sabatia angularis</i> | | | X |
| <i>Sambucus nigra</i> | X | | |
| <i>Sanicula canadensis</i> | X | | |
| <i>Sanicula odorata</i> | X | X | X |
| <i>Sassafras albidum</i> | | X | |
| <i>Schedonorus phoenix</i> | X | X | X |
| <i>Scrophularia marilandica</i> | X | | |
| <i>Silphium integrifolium</i> | | | X |
| <i>Sisyrinchium albidum</i> | | | X |
| <i>Sisyrinchium angustifolium</i> | X | X | |
| <i>Smilax lasioneura</i> | X | X | X |
| <i>Smilax tamnoides</i> | X | | X |
| <i>Solidago canadensis</i> | X | X | X |
| <i>Solidago juncea</i> | | | X |
| <i>Sphenopholis intermedia</i> | X | | |
| <i>Symphyotrichum cordifolium</i> | X | X | X |
| <i>Symphyotrichum laeve</i> | | | X |
| <i>Symphyotrichum lanceolatum</i> | X | | X |
| <i>Symphyotrichum novae-angliae</i> | X | | X |
| <i>Symphyotrichum pilosum</i> | X | X | X |

Table 1.—Continued.

| Species | Bechtelheimer | Current | Rogersville |
|--------------------------------|---------------|---------|-------------|
| <i>Taraxacum officinale</i> | X | X | X |
| <i>Teucrium canadense</i> | X | | |
| <i>Thaspium trifoliatum</i> | | | X |
| <i>Toxicodendron radicans</i> | X | X | X |
| <i>Tradescantia virginiana</i> | | X | X |
| <i>Tragopogon pratensis</i> | X | X | |
| <i>Trifolium pratense</i> | X | X | X |
| <i>Triosteum perfoliatum</i> | X | | |
| <i>Ulmus pumila</i> | X | | |
| <i>Ulmus rubra</i> | X | X | |
| <i>Verbena urticifolia</i> | | X | |
| <i>Vernonia gigantea</i> | X | X | X |
| <i>Viburnum prunifolium</i> | | | X |
| <i>Vinca minor</i> | | X | X |
| <i>Viola palmate</i> | | X | |
| <i>Viola sororia</i> | X | X | X |
| <i>Vitis vulpina</i> | X | X | X |
| <i>Vitis riparia</i> | X | X | |
| <i>Yucca filamentosa</i> | | | X |

occurrence of graminoid-dominated old fields occurring on three side of the cemetery. All trees occurred between the grave sites and the fenced border on the eastern side or along the fenced border on the northern and southern sides. Likewise, all shrubs and woody vines occurred in the same locations with the exception of *Celastrus scandens*, which grew abundantly in the southern quarter of the cemetery. Herbaceous forbs composed ~54% (59 of 110) species at the site. However, only one species, *Lysimachia lanceolata*, has a C ≥ 7. Dominant herbaceous forbs included *Cirsium discolor*, *Desmodium canescens*, *Helianthus*

grosseserratus, *H. hirsutus*, *Monarda fistulosa*, *Smilax lasioneura*, *Solidago canadensis*, and *Symphotrichum cordifolium (sagittifolium)*. Of the 30 plant species commonly found in prairies from Illinois to Ohio listed earlier, 18 were documented in Bechtelheimer Cemetery.

Current Cemetery.—Unlike Bechtelheimer Cemetery, Current Cemetery became dominated by woody vegetation as the season progressed. The larger trees, such as *Carya cordiformis*, *C. ovata*, and *Celtis occidentalis*, grew along the fenced border. However, the graveyard proper was overgrown with small trees and shrubs, including *Aesculus glabra*,

Table 2.—Physiognomic analyses of the flora occurring at each cemetery. Numbers in parentheses are percentages.

| | Bechtelheimer | | Current | | Rogersville | |
|-----------------|---------------|-----------|-----------|-----------|-------------|-----------|
| | Native | Exotic | Native | Exotic | Native | Exotic |
| Tree | 7 (6.4) | 3 (2.7) | 12 (11.7) | 1 (1.0) | 13 (12.5) | 0 (0.0) |
| Shrub | 5 (4.5) | 3 (2.7) | 6 (5.8) | 3 (2.9) | 7 (6.7) | 4 (3.8) |
| Woody vine | 7 (6.4) | 0 (0.0) | 4 (3.9) | 1 (1.0) | 6 (5.8) | 0 (0.0) |
| Herbaceous vine | 2 (1.8) | 0 (0.0) | 1 (1.0) | 0 (0.0) | 1 (1.0) | 0 (0.0) |
| Perennial forb | 36 (32.7) | 6 (5.5) | 35 (34.0) | 2 (1.9) | 39 (37.5) | 9 (8.7) |
| Biennial forb | 4 (3.6) | 7 (6.4) | 3 (2.9) | 6 (5.8) | 4 (3.8) | 1 (1.0) |
| Annual forb | 4 (3.6) | 2 (1.8) | 5 (4.9) | 3 (2.9) | 3 (2.9) | 1 (1.0) |
| Perennial grass | 6 (5.5) | 8 (7.3) | 4 (3.9) | 8 (7.8) | 4 (3.8) | 7 (6.7) |
| Annual grass | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (1.0) | 0 (0.0) | 0 (0.0) |
| Sedge | 10 (9.1) | 0 (0.0) | 8 (7.8) | 0 (0.0) | 5 (4.8) | 0 (0.0) |
| Total | 81 (73.6) | 29 (26.6) | 78 (75.7) | 25 (24.3) | 82 (78.8) | 22 (21.2) |

Table 3.—Floristic Quality summary for the three prairie cemeteries. C_{av} = mean Coefficient of Conservatism, FQI = Floristic Quality Index, B = Bechtelheimer Cemetery, C = Current Cemetery, R = Rogersville Cemetery. Total Species is native plus exotic species.

| | Species count | | | C_{av} | | | FQI | | |
|----------------|---------------|-----|-----|----------|-----|-----|------|------|------|
| | B | C | R | B | C | R | B | C | R |
| Native species | 81 | 78 | 82 | 2.6 | 2.8 | 3.3 | 23.6 | 24.8 | 30.3 |
| Total species | 110 | 103 | 104 | 1.9 | 2.1 | 2.6 | 20.3 | 21.6 | 26.9 |

Catalpa speciosa, *Fraxinus pennsylvanica*, *Juglans nigra*, *Rhus glabra*, *Sassafras albidum*, and *Ulmus rubra*. *Juglans nigra*, *R. glabra*, and *S. albidum* were especially abundant. *Ceanothus americanus*, a quality prairie species, formed a small colony on the southern side. Graminoids made up ~20% of the species in this cemetery, including 13 species of grasses and eight species of sedges, all *Carex*. Of the grasses, four were native and nine were exotic. None of the native grasses were dominant, only occurring in restricted locations. Of the nine exotic grasses, only *Bromus inermis*, *Poa pratensis*, and *Schedonorus phoenix* were dominant and widespread. Herbaceous forbs composed ~52.5% (54 of 103) species at the site. Four forb species had $C \geq 7$, including *Aristolochia serpentaria*, *Comandra umbellata*, *Lysimachia lanceolata*, and *Tradescantia virginiana*. Many of the forbs occurring in this cemetery were woodland species, including *Ageratina altissima*, *Campanulastrum americanum*, *Cryptotaenia canadensis*, *Geranium maculatum*, *Osmorhiza longistylis*, *Phryma leptostachya*, *Podophyllum peltatum* and *Symphyotrichum cordifolium* (*sagittifolium*). No doubt these woodland species seeded in from the large woods on the northern side of the cemetery. Dominant herbaceous forbs included *Cirsium discolor*, *Comandra umbellata*, *Desmodium canescens*, *Galium concinnum*, *Helianthus hirsutus*, *Lactuca canadensis*, *Solidago canadensis*, and *Symphyotrichum cordifolium* (*sagittifolium*). Of the 30 plant species commonly found in prairies from Illinois to Ohio listed earlier, 21 were documented in Current Cemetery.

Rogersville Cemetery.—Of the three cemeteries, Rogersville Cemetery is the most prairie-like. It is dominated by graminoids but has an excellent mix of prairie forbs. There are 11 grasses, including four native and seven exotic species. The dominant native grasses are *Andropogon gerardii* and *Elymus riparius*, and the dominant exotics species include *Bromus inermis*, *Poa compressa*, *P. pratensis*, and

Schedonorus phoenix. The sedges were all in the genus *Carex*, and included the prairie species *C. meadii*. With the exception of *Campsis radicans* and a large colony of *Ceanothus americanus*, all woody vines, shrubs, and trees, occurred along the fenced border. Herbaceous forbs composed ~55% (57 of 104) species at the site. Eight forb species had $C \geq 7$, including *Calystegia spithamea*, *Comandra umbellata*, *Lobelia spicata*, *Lysimachia lanceolata*, *Packera obovata*, *Silphium integrifolium*, *Symphyotrichum laeve*, and *Tradescantia virginiana*. Dominant herbaceous forbs included *Arnoglossum atriplicifolium*, *Cirsium discolor*, *Comandra umbellata*, *Desmodium canescens*, *Euphorbia corollata*, *Helianthus hirsutus*, *Lobelia spicata*, *Monarda fistulosa*, *Rudbeckia hirta*, *Silphium integrifolium*, *Solidago juncea*, *Symphyotrichum cordifolium*, *S. laeve*, and *Thaspium trifoliatum*. Additionally, a number of exotics have been planted at various gravesites by visitors, including *Convallaria majalis*, *Hemerocallis fulva*, *Hylotelephium telephium*, *Iris germanica*, *Muscari botryoides*, and *Vinca minor*. Of the 30 plant species commonly found in prairies from Illinois to Ohio listed earlier, 28 were documented in Rogersville Cemetery. The higher number of species found in prairies at this cemetery reflects recent management at the site (see discussion). In 2008, the agricultural fields adjacent to Rogersville Cemetery were planted with native prairie plants (Kevin Tungsveck pers. comm.).

DISCUSSION

Floristic Quality Index (FQI).—The FQI for the three prairie cemeteries ranges from 23.6 to 30.3 for native species and from 20.3 to 26.9 for all species (Table 3). FQI is a tool to measure the conservatism and richness of species in an area, and it has been used to assess the quality of a number of sites in Indiana and across the Midwest. According to Swink & Wilhelm (1994), land with an FQI less than 20 essentially

has no significance from a natural area prospective, while areas with an FQI greater than 35 possess sufficient conservation and richness to be of profound importance from a regional perspective, and areas registering in the 50s and higher are of paramount importance. However, FQI is calculated by multiplying the mean C times the square root of the total number of species present (Rothrock 2004; Swink & Wilhelm 1994; Taft et al. 1997). Because of the way FQI is calculated, its value is influenced by the total number of species. Thus, the low FQIs are a reflection of the size of these sites, i.e., ~0.2 hectare (0.5 acres) each, which in turn limits habitats and the number of species occurring at each, i.e., just over 100 species documented at each site. Due to the size of the prairie cemeteries, their FQI values cannot be directly compared to larger sites, such as Mounds State Park (Rothrock et al. 1993), Wilbur Wright Fish and Wildlife Area (Ruch et al. 2002) or Turkey Run State Park (Scott 2009), or even sites as small as 2–17 hectares, such as Botany Glen (Stonehouse 2003), Lick Creek Summit Nature Preserve (Ruch et al. 2008), IMI wetland complex (Ruch et al. 2008), or the Bennett wetland complex (Ruch et al. 2009).

Their FQI values can be used, however, to compare one cemetery to another. Based on FQI, it is clear that Rogersville Cemetery has the highest quality, having a FQI more than 5 units higher than the other two. As previously noted in the results, Rogersville Cemetery had 28 of 30 plant species commonly found in prairies from Illinois to Ohio, while the other two cemeteries each had less than 22 of these species. The higher quality noted at Rogersville Cemetery is most likely due to a series of prescribed burns in recent years (Kevin Tungevic pers. comm.).

A comparison of the FQI values for native species and for all species (Table 3) reveals that for all three cemeteries the native FQI value decreased about 3.3 units. Similarly, a comparison of the C_{av} for native species and for all species (Table 3) reveals that for all three cemeteries the native C_{av} value decreased 0.7 units. Rothrock & Homoya (2005) have suggested that natural quality of an area is compromised when adventive diversity lowers C_{av} by more than 0.7 units. Although right at the “cut-off” value, it appears that exotics are having a negative impact on the nature flora,

especially the exotic grasses *Bromus inermis*, *Poa pratensis*, and *Schedonorus phoenix*, which dominate and crowd out native species at these sites. For example, the CILTI Site Management Plan lists both *Schizachyrium scoparium* (Michx.) Nash and *Sorghastrum nutans* (L.) Nash as being present in one or more of the cemeteries (Jeff Ray pers. comm.). However, we observed neither species in any of the sites. Lastly, even though the FQI values suggest these sites have little or no significant value from the natural area prospective (Swink & Wilhelm 1994), we disagree, especially for the Rogersville Cemetery.

Fire and prairies.—Periodic fire is considered essential for the maintenance and function of mesic tallgrass prairie within central North America (Axelrod 1985; Collins & Wallace 1990). In fact, fire plays a dominant role in affecting resource availability and shaping plant community structure and composition of this prairie type (Towne & Knapp 1996; Veen et al. 2008). In the absence of periodic fire, high productivity leads to the accumulation of a dense detrital layer, and as the time between fires increases, grass productivity decreases and woody species increase in both frequency and cover (Bragg & Hulbert 1976; Heisler et al. 2004; Hoch & Briggs 1999; Knight et al. 1994). Without fire an increase in woody plant abundance in grasslands and savannas has been recorded worldwide (Briggs et al. 2002; Brown & Carter 1998; Roques et al. 2001; Van Auken 2000). As woody species increase in both frequency and cover, the canopy closes and the accumulation of grasses and other easily ignitable fuels decline. As a result, when fire is reintroduced after years of absence, it is not always effective at restoring the open structure characteristic of this community (Harrington & Kathol 2009).

Prior to European settlement in the Midwest, fires started by lightning and/or Native Americans prevented the invasion of trees and woody shrubs into these prairies. Because of their considerable investment in above ground tissue and above ground meristems, shrubs and small trees suffer considerable loss when exposed to fire (Heisler et al. 2004; IDNR 2002). Productivity of prairie grasses with below ground meristems is stimulated directly by fire (IDNR 2002). By removing standing detrital biomass and enhancing light availability and nutrients, grasses are quick to sprout following fire (Heisler et al. 2004; IDNR 2002; Knapp & Seastedt 1986).

According to the Central Indiana Land Trust Incorporated (CILTI) Site Management Plan, one of their long-term objectives for the prairie cemeteries is to “optimize the success of tall grasses and forbs by mowing, cutting of woody plants, and prescribed burning, while respecting their function as pioneer cemeteries” (Jeff Ray pers. comm.). The management plan stipulates the sites be mowed in the fall, prescribed burns and woody plant control in the spring, and mowing the cemeteries for access in May. Rogersville Cemetery was last burned in spring 2007. However, Bechtelheimer and Current cemeteries have not been burned recently, perhaps for ten or more years (Jeff Ray pers. comm.). Jeff Ray does remove the shrubby vegetation from Current each spring, but it returns. Based on the enhancement of prairie species as a result of burning, we recommend that CILTI arrange prescribed burns for all three cemeteries. The frequency of prescribed burns depends on the final prairie community desired. Annual burning in late spring favors warm-season perennial grasses but reduces species diversity and structural heterogeneity (Abrams & Hulbert 1987; Collins 1992; Gibson 1988).

Following a fire, the diversity and abundance of forb species increases through the first six years, then declines (Gibson & Hulbert 1987). Thus, a continuous cycle of prescribed burns, perhaps every five to six years, is necessary to maintain the prairie community at these cemeteries.

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APPENDIX

CATALOG OF VASCULAR FLORA IN THE PRAIRIE CEMETERIES, HENRY COUNTY

(arranged alphabetically by family within divisions)

Listed are voucher specimens for all species observed at the three prairie cemeteries in Henry County, Indiana. Nomenclature follows the USDA Plants Database (USDA 2008). Each species report contains the following information: (1) current scientific name based on the USDA Plants Database; (2) current taxonomic synonyms, if appropriate; (3) common name(s), based primarily on Gleason & Cronquist (1991), Swink & Wilhelm (1994), and Yatskievych (2000); (4) the coefficient of conservatism (C-value) for Indiana (Rothrock 2004); (5) the Ball State University Herbarium (BSUH) number(s); [numbers, listed by the cemetery [alphabetically] were collections were made, are separated by semicolons]; and (6) an occasional note about the species.

The symbols in parentheses immediately preceding each species refer to the following: * = naturalized, non-native (exotic) species, # = Henry County record and z = not found in current study but reported earlier at the site and photographed. Species were deemed unreported for Henry County (and hence considered a county record) if they did not appear in the computer database of Keller et al. (1984) or reported from Wilbur Wright Fish and Wildlife Area (Ruch et al. 2002), the IMI wetland complex (Ruch et al. 2008b), or the Bennett wetland complex (Ruch et al. 2009). (The database of Keller et al. (1984) contains the same list of plants for Henry County as that from the Indiana Natural Heritage Data Center, IDNR). No plants documented in this study are on the Divisions of Nature Preserves, Indiana Department of Natural Resources “Endangered, Threatened, Rare and Extirpated Plants of Indiana” list (Division of Nature Preserves 2007). There are nine Henry County records.

DIVISION CONIFEROPHYTA

Gymnosperms or Conifers

Cupressaceae (Cypress Family)

Juniperus virginiana L.; Eastern Red Cedar; C = 2; BSUH 16335.

DIVISION MAGNOLIOPHYTA

Angiosperms

Aceraceae (Maple Family)

Acer saccharum Marshall; Sugar Maple; C = 4; BSUH 16325, 16353.

Agavaceae (Agave Family)

(*) *Yucca filamentosa* L.; Spanish Bayonet, Adam's Needle; C = 0; BSUH 16408.

Anacardiaceae (Cashew Family)

Rhus glabra L.; Smooth Sumac; C = 1; BSUH 16642; 16397.

Toxicodendron radicans (L.) Kuntze subsp. *negundo* (Greene) Gillis; Common or Eastern Poison Ivy; C = 1; BSUH 16524; 16631; 16409.

Apiaceae (Carrot Family)

(*) *Conium maculatum* L.; Poison Hemlock; C = 0; BSUH 16529.

Cryptotaenia canadensis (L.) DC.; Canadian Honewort; C = 3; BSUH 16523; 16625.

(*) *Daucus carota* L.; Wild Carrot, Queen Anne's-Lace; C = 0; BSUH 16551; 16571.

Osmorhiza longistylis (Torr.) DC.; Long-styled Sweet Cicely, Aniseroot; C = 3; BSUH 16512; 16601.

(*) *Pastinaca sativa* L.; Wild Parsnip; C = 0; BSUH 16540.

Sanicula canadensis L. var. *canadensis*; Canada Black Snakeroot, Canada Sanicle; C = 2; BSUH 16527.

Sanicula odorata (Raf.) K.M. Pryer & L.R. Phillippe; SYN: *Sanicula gregaria* Bickn.; Cluster Sanicle, Clustered Black Snakeroot; C = 2; BSUH 16475; 16603; 16356.

Thaspium trifoliatum (L.) A. Gray var. *aureum* Britton; Smooth or Yellow Meadow Parsnip; C = 5; BSUH 16355.

Apocynaceae (Dogbane Family)

Apocynum cannabinum L.; Dogbane, American Indian Hemp; C = 2; BSUH 16450.

(*) *Vinca minor* L.; Myrtle, Common Periwinkle; C = 0; BSUH 16588; 16354.

Araceae (Arum Family)

Arisaema dracontium (L.) Schott; Green Dragon, Dragon Root; C = 5; BSUH 16453.

Aristolochiaceae (Birthwort Family)

Aristolochia serpentaria L.; Virginia Snakeroot; C = 8; BSUH 16614.

Asclepiadaceae (Milkweed Family)

Asclepias syriaca L.; Common Milkweed; C = 1; BSUH 16469.

Asteraceae (Aster Family)

Achillea millefolium L.; Common Yarrow, Common Milfoil; C = 0; BSUH 16612; 16407.

Ageratina altissima (L.) R.M. King & H. Rob.; SYN: *Eupatorium rugosum* Houtt.; White Snakeroot; C = 2; BSUH 16582, 16583.

Ambrosia artemisiifolia L. var. *elatio* Descourt.; Common or Annual Ragweed; C = 0; BSUH 16467; 16575; 16380.

Ambrosia trifida L.; Giant Ragweed; C = 0; BSUH 16451; 16580; 16412.

Antennaria plantaginifolia (L.) Hook.; Common or Plantain Pussytoes, Woman's Tobacco; C = 3; BSUH 16338.

(*) *Arctium minus* Bernh.; Common or Lesser Burdock; C = 0; BSUH 16620.

Arnoglossum atriplicifolium (L.) H. Rob.; SYN: *Cacalia atriplicifolia* L.; Pale Indian Plantain; C = 6; BSUH 16386.

(*) *Cichorium intybus* L.; Chicory; C = 0; BSUH 16541.

Cirsium discolor (Muhl.) Spreng.; Field or Pasture Thistle; C = 3; BSUH 16442; 16578; 16390.

Erigeron annuus (L.) Pers.; Annual Fleabane, Eastern Daisy Fleabane; C = 0; BSUH 16528; 16622; 16364.

Eupatorium purpureum L. var. *purpureum*; SYN: *Eupatoriadelphus purpureus* (L.) King & H. Rob.; Green-Stemmed, Purple-Node, or Sweet-Scented Joe Pye Weed; C = 5; BSUH 16385, 16389.

Helianthus grosseserratus M. Martens; Saw-Toothed Sunflower; C = 3; BSUH 16449.

Helianthus hirsutus Raf.; Oblong, Hispid, or Hairy Sunflower; C = 5; BSUH 16445, 16446; 16576, 16619; 16352, 16351.

Lactuca canadensis L. var. *canadensis*; Tall or Canada Wild Lettuce; C = 2; BSUH 16535; 16572; 16401.

Packera glabella (Poir.) C. Jeffrey; SYN: *Senecio glabellus* Poir.; Butterweed, Yellowtop; C = 0; BSUH 16539.

Packera obovata (Muhl.) W.A. Weber & A. Löve; SYN: *Senecio obovatus* Muhl.; Round-Leaved Ragwort, Running Groundsel; C = 7; BSUH 16334.

Rudbeckia hirta L. var. *pulcherrima* Farw.; Black-eyed Susan; C = 2; BSUH 16621; 16358.

Silphium integrifolium Michx. var. *integrifolium*; Prairie Rosinweed, Entire-Leaved Rosinweed; C = 7; BSUH 16347, 16348.

Solidago canadensis L. var. *canadensis*; Common, Tall or Canada Goldenrod; C = 0; BSUH 16440, 16447; 16569; 16373.

Solidago juncea Aiton; Early Goldenrod; C = 3; BSUH 16383.

Symphotrichum cordifolium (L.) G.L. Nesom; SYN: *Aster sagittifolius* Wedemeyer ex Willd.; *Aster cordifolius* L. var. *sagittifolius* (Wedemeyer ex Willd.) A.G. Jones; Arrow-Leaved Aster, Common Blue

Wood Aster, Common Blue Heart-Leaved Aster; C = 5; BSUH 16446; 16579; 16381.

(#) *Symphytotrichum laeve* (L.) A Löve and D. Löve var. *laeve*; SYN: *Aster laevis* L. var. *laevis*; Smooth Blue Aster; C = 10; BSUH 16378.

Symphytotrichum lanceolatum (Willd.) G.L. Nesom subsp. *lanceolatum* var. *lanceolatum*; SYN: *Aster lanceolatus* Willd. var. *simplex* (Willd.) A.G. Jones, *Aster simplex* Willd.; White Panicle Aster, Eastern Lined Aster; C = 3; BSUH 16455; 16375.

Symphytotrichum novae-angliae (L.) G.L. Nesom; SYN: *Aster novae-angliae* L.; New England Aster; C = 3; BSUH 16441, 16444; 16376.

Symphytotrichum pilosum (Willd.) G.L. Nesom var. *pilosum*; SYN: *Aster pilosus* Willd. var. *pilosus*; Awn Aster, Hairy White Old-Field Aster, Heath Aster; C = 0; BSUH 16443; 16616; 16377.

(*) *Taraxacum officinale* Weber subsp. *officinale*; Common Dandelion; C = 0; BSUH 16463; 16585; 16337.

(*) *Tragopogon lamottei* Rouy; SYN: *Tragopogon pratensis* L.; Common Goat's Beard, Jack-Go-To-Bed-At-Noon; C = 0; BSUH 16473; 16598, 16608.

Vernonia gigantea (Walt.) Trel.; Tall Ironweed; C = 2; BSUH 16452, 16454; 16577; 16391.

Berberidaceae (Barberry Family)

Podophyllum peltatum L.; Mayapple; C = 3; BSUH 16593.

Bignoniaceae (Trumpet Creeper Family)

Campsis radicans (L.) Seem. ex Bureau; SYN: *Bignonia radicans* L.; Trumpet Creeper; C = 1; BSUH 16384.

Catalpa speciosa (Warder) Warder ex Engelm.; Northern Catalpa; C = 0; BSUH 16570.

Boraginaceae (Borage Family)

Hackelia virginiana (L.) I.M. Johnston; Stickseed, Beggar's Lice; C = 0; BSUH 16574; 16402.

Brassicaceae (Mustard Family)

(*) *Alliaria petiolata* (Bieb.) Cavara & Grande; Garlic Mustard; C = 0; BSUH 16459; 16595.

(*) *Barbarea vulgaris* W.T. Aiton; Yellow Rocket; C = 0; BSUH 16594.

Campanulaceae (Bellflower Family)

Campanulastrum americanum (L.) Small; SYN: *Campanula americana* L.; Tall or American Bellflower; C = 4; BSUH 16651.

Lobelia spicata Lam. var. *leptostachys* (A. DC.) Mack. & Bush; Spiked or Pale-Spiked Lobelia; C = 7; BSUH 16395.

Caprifoliaceae (Honeysuckle Family)

(*) *Lonicera japonica* Thunb.; Japanese Honeysuckle; C = 0; BSUH 16627.

(*) *Lonicera maackii* (Rupr.) Herder; Amur Honeysuckle; C = 0; BSUH 16482; 16329.

(*) *Lonicera morrowii* A. Gray; Morrow's Honeysuckle; C = 0; BSUH 16544; 16600.

Sambucus nigra L. subsp. *canadensis* (L.) R. Bolli; SYN: *Sambucus canadensis* L.; Common Elder or Elderberry; C = 2; BSUH 16545.

Triosteum perfoliatum L.; Perfoliate Horse Gentian, Feverwort; C = 5; BSUH 16481.

Viburnum prunifolium L.; Black Haw; C = 4; BSUH 16349.

Caryophyllaceae (Pink Family)

(*) *Cerastium fontanum* Baumg. subsp. *vulgare* (Hartm.) Greuter & Burdet; SYN: *Cerastium vulgatum* L.; Common Mouse-Ear Chickweed, Big Chickweed; C = 0; BSUH 16617.

(*) *Dianthus armeria* L.; Deptford Pink; C = 0; BSUH 16630.

Celastraceae (Staff-tree Family)

Celastrus scandens L.; American or Climbing Bittersweet; C = 2; BSUH 16526; 16581; 16370.

Euonymus atropurpurea Jacq.; Eastern Wahoo; C = 5; BSUH 16517; 16392.

Clusiaceae (Mangosteen Family)

Hypericum punctatum Lam.; Spotted St. John's-Wort; C = 3; BSUH 16533.

Commelinaceae (Spiderwort Family)

Tradescantia virginiana L.; Virginia Spiderwort; C = 7; BSUH 16606; 16330.

Convolvulaceae (Morning-glory Family)

Calystegia sepium (L.) R. Br.; American or Hedge Bindweed; C = 1; BSUH 16399.

(#) *Calystegia spithamea* (L.) Pursh subsp. *spithamea*; SYN: *Convolvulus spithameus* L.; Low Bindweed, Upright Bindweed; C = 8; BSUH 16365.

Cornaceae (Dogwood Family)

Cornus drummondii C.A. Mey.; Rough-leaved Dogwood; C = 2; BSUH 16546; 16639; 16404.

Crassulaceae (Stonecrop Family)

(*, #) *Hylotelephium telephium* (L.) Ohba subsp. *telephium*; SYN: *Sedum telephium* L., *Sedum purpureum* (L.) Schult., *Sedum telephium* L. subsp. *purpureum* (L.) Schinz. & Keller; Witch's Moneybags, Live-Forever; C = 0; BSUH 16388. [Originally planted, naturalized and spreading.]

Cyperaceae (Sedge)

Carex aggregata Mack.; Smooth Clustered Sedge; C = 2; BSUH 16891.

Carex amphibola Steud.; False Gray Sedge; Common; C = 8; BSUH 16898.

Carex blanda Dewey; Common Wood Sedge; C = 1; BSUH 16897; 16899.

Carex cephalophora Muhl. ex Willd.; Short-headed Bracted Sedge; C = 3; BSUH 16892; 16900; 16903.

Carex conjuncta Boott; Green-Headed Fox Sedge, Soft Fox Sedge; C = 6; BSUH 16893.

Carex davisii Schwein. & Torr.; Awned Graceful Sedge, Davis' Sedge; C = 3; BSUH 16896; 16555, 16553.

Carex granularis Muhl.; Pale Sedge, Limestone Meadow Sedge; C = 2; BSUH 16309.

Carex grisea Wahlenb.; Wood Gray Sedge, Inflated Narrow-Leaf Sedge; C = 3; BSUH 16895.

Carex hirtifolia Mack.; Hairy Wood Sedge; C = 5; BSUH 16418, 16419; 16556.

(#) *Carex meadii* Dewey; Mead's Stiff Sedge; C = 7; BSUH 16307.

Carex normalis Mack.; Spreading Oval Sedge; C = 3; BSUH 16496, 16894; 16902.

Carex pellita Willd.; Broad-leaved Woolly Sedge, Woolly Sedge; C = 2; BSUH 16421; 16308.

Carex pensylvanica Lam.; Common Oak Sedge; C = 5; BSUH 16901; 16904.

Carex radiata (Wahlenb.) Small; Straight-Styled Wood Sedge, Eastern Star Sedge; C = 4; BSUH 16420; 16554, 16557.

Dipsacaceae (Teasel Family)

(*) *Dipsacus fullonum* L. subsp. *sylvestris* (Huds.) Clapham; SYN: *Dipsacus sylvestris* Huds.; Common or Fuller's Teasel; C = 0; BSUH 16534.

Elaeagnaceae (Oleaster Family)

(*) *Elaeagnus umbellata* Thunb.; Autumn Olive; C = 0; BSUH 16328.

Euphorbiaceae (Spurge Family)

Euphorbia corollata L. var. *corollata*; Flowering Spurge; C = 4; BSUH 16547; 16652; 16405.

Fabaceae (Pea or Bean Family)

Desmodium canescens (L.) DC.; Hoary Tick-Trefoil; C = 3; BSUH 16448, 16472; 16573, 16618; 16346.

Gleditsia triacanthos L.; Honey Locust; C = 1; BSUH 16509, 16552; 16584.

(*) *Medicago lupulina* L.; Black Medic; C = 0; BSUH 16506; 16604; 16321.

(*) *Melilotus officinalis* (L.) Lam.; SYN: *Melilotus alba* Medik.; White Sweet Clover; C = 0; BSUH 16542; 16634; 16411.

(*) *Melilotus officinalis* (L.) Lam.; Yellow Sweet Clover; C = 0; BSUH 16520; 16359.

(*) *Trifolium pratense* L.; Red Clover; C = 0; BSUH 16521; 16656; 16360.

Fagaceae (Beech Family)

Quercus alba L.; White Oak; C = 5; BSUH 16362.
Quercus imbricaria Michx.; Single Oak; C = 3; BSUH 16457; 16322.

Quercus rubra L.; Northern Red Oak; C = 4; BSUH 16363.

Gentianaceae (Gentian Family)

(z) *Sabatia angularis* (L.) Pursh; Rose-Pink, Common Marsh-Pink; C = 3; BSUH 16906.

Geraniaceae (Geranium Family)

Geranium maculatum L.; Wild Geranium; C = 4; BSUH 16483; 16607; 16327.

Hippocastanaceae (Horse-chestnut Family)

Aesculus glabra Willd.; Ohio Buckeye; C = 5; BSUH 16596.

Iridaceae (Iris Family)

(*) *Iris germanica* L.; German Iris; C = 0; BSUH 16323.

(#) *Sisyrinchium albidum* Raf.; Common Blue-Eyed Grass, White Blue-Eyed Grass; C = 4; BSUH 16332.

Sisyrinchium angustifolium P. Mill.; Stout Blue-eyed Grass; C = 3; BSUH 16511; 16643.

Juglandaceae (Walnut Family)

Carya cordiformis (Wangenh.) K. Koch; Bitternut Hickory; C = 5; BSUH 16610.

Carya ovata (Mill.) K. Koch; Shagbark Hickory; C = 4; BSUH 16637, 16638; 16394.

Carya alba (L.) Nutt.; SYN: *Carya tomentosa* (Lam.) Nutt.; Mockernut Hickory; C = 6; BSUH 16374, 16406.

Juglans nigra L.; Black Walnut; C = 2; BSUH 16474; 16628; 16410.

Juncaceae (Rush Family)

Juncus dudleyi Wiegand; Dudley's Rush; C = 2; BSUH 16331.

Juncus tenuis Willd.; Path Rush, Poverty Rush; C = 0; BSUH 16648.

Juncus torreyi Coville; Torrey's Rush; C = 3; BSUH 16393.

Lamiaceae (Mint Family)

(*) *Glechoma hederacea* L.; Ground Ivy, Gill-Over-The-Ground, Creeping Charlie; C = 0; BSUH 16480.

(*) *Lamium purpureum* L. var. *purpureum*; Purple Dead Nettle; C = 0; BSUH 16462; 16592.

(*) *Leonurus cardiaca* L. subsp. *cardiaca*; Common Motherwort; C = 0; BSUH 16522.

Monarda fistulosa L.; Wild Bergamot; C = 3; BSUH 16531; 16653; 16403.

(* *Prunella vulgaris* L. subsp. *vulgaris*; Common Self Heal, Heal-All, Lawn Prunella (exotic); C = 0; BSUH 16357.

Teucrium canadense L.; SYN: *Teucrium canadense* L. var. *virginicum* (L.) Eat.; American Germander; C = 3; BSUH 16438.

Lauraceae (Laurel Family)

Sassafras albidum (Nutt.) Nees, Sassafras; C = 1; BSUH 16599.

Liliaceae (Lily Family)

(* *Convallaria majalis* L.; European Lily-of-the-Valley; C = 0; BSUH 16340.

(* *Hemerocallis fulva* (L.) L.; Orange Day-Lily; C = 0; BSUH 16396.

Maianthemum racemosum (L.) Link; SYN: *Smilacina racemosa* (L.) Desf.; Feathery False Solomon's Seal, Feathery Solomon's Plume; C = 4; BSUH 16379.

(* *Muscari botryoides* (L.) Mill.; Common Grape Hyacinth; C = 0; BSUH 16333.

(* *Ornithogalum umbellatum* L.; Common Star-of-Bethlehem; C = 0; BSUH 16503.

Polygonatum biflorum (Walt.) Elliot var. *commutatum* (Schult. & Schult. f.) Morong; Smooth Solomon's Seal; C = 4; BSUH 16510.

Menispermaceae (Moonseed Family)

Menispermum canadense L.; Common Moonseed; C = 3; BSUH 16513; 16417.

Moraceae (Mulberry Family)

(* *Maclura pomifera* (Raf.) C.K. Schneid.; Osage-Orange, Hedge Apple; C = 0; BSUH 16515.

(* *Morus alba* L.; White Mulberry; C = 0; BSUH 16476; 16597.

Oleaceae (Olive Family)

Fraxinus americana L.; White Ash; C = 4; BSUH 16368.

Fraxinus pennsylvanica Marshall var. *subintegririma* (Vahl) Fernald.; SYN: *Fraxinus pennsylvanica* Marshall var. *lanceolata* (Borkh.) Sarg.; Green Ash; C = 1; BSUH 16632; 16416.

Onagraceae (Evening Primrose Family)

Circaea lutetiana L. subsp. *canadensis* (L.) Asch. & Magnus; Broadleaf Enchanter's Nightshade; C = 2; BSUH 16548.

Oxalidaceae (Wood Sorrel Family)

Oxalis stricta L.; Lady's Wood Sorrel, Common Yellow Oxalis; C = 0; BSUH 16470; 16640; 16387.

Phytolaccaceae (Pokeweed Family)

Phytolacca americana L.; American Pokeweed or Pokeberry; C = 0; BSUH 16549.

Poaceae (Grass Family)

(* *Agrostis gigantea* Roth; Redtop; C = 0; BSUH 16648; 16317.

Andropogon gerardii Vitman; Big Bluestem; C = 5; BSUH 16429; 16562; 16319.

(* *Bromus arvensis* L.; SYN: *Bromus japonicus* Thunb.; Japanese Chess, Field Brome; C = 0; BSUH 16729.

(* *Bromus inermis* Leyss.; Smooth or Hungarian Brome; C = 0; BSUH 16432; 16566; 16315.

(* *Dactylis glomerata* L.; Orchard Grass; C = 0; BSUH 16430; 16563; 16316.

Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. *fasciculatum* (Torr.) Freckmann; SYN: *Panicum implicatum* Britton, *Panicum lanuginosum* Elliot var. *implicatum* (Scribn.) Fernald; Woolly, Western, or Old-Field Panic Grass; C = 2; BSUH 16567; 16313.

Elymus hystrix L.; Eastern Bottlebrush Grass; C = 5; BSUH 16318.

(* *Elymus repens* (L.) Gould; SYN: *Elytrigia repens* (L.) Nevski; Quack Grass; C = 0; BSUH 16433, 16434; 16568.

Elymus riparius Wieg.; Streambank Wild Rye; C = 5; BSUH 16436, 16437; 16320.

Elymus villosus Muhl. ex Willd.; Downy or Hairy Wild Rye; C = 4; BSUH 16558.

Elymus virginicus L.; Virginia Wild Rye; C = 3; BSUH 16427; 16559.

Festuca subverticillata (Pers.) E. Alexeev; SYN: *Festuca obtusa* Biehler; Nodding Fescue; C = 4; BSUH 16423.

Muhlenbergia schreberi J.F. Gmel.; Nimblewill; C = 0; BSUH 16428.

(* *Phleum pratense* L.; Timothy; C = 0; BSUH 16435; 16565; 16314.

(* *Poa compressa* L.; Canada Bluegrass; C = 0; BSUH 16431; 16564; 16310.

(* *Poa pratensis* L.; Kentucky Bluegrass; C = 0; BSUH 16426; 16561; 16312.

(* *Poa trivialis* L.; Rough Blue Grass; C = 0; BSUH 16425.

(* *Schedonorus phoenix* (Scop.) Holub; SYN: *Festuca arundinacea* Schreb., *Festuca elatior* L. var. *arundinacea* (Schreb.) Wimm., *Lolium arundinaceum* (Schreb.) Darbysh.; Tall Fescue; C = 0; BSUH 16424; 16560; 16311.

Sphenopholis intermedia (Rydb.) Rydb.; SYN: *Sphenopholis obtusata* (Michx.) Scribn. var. *major* (Torr.) K.S. Erdman; Slender Wedge Grass, Slender Wedge-Scale; C = 3; BSUH 16422.

Polemoniaceae (Phlox Family)

(*, #) *Phlox subulata* L. subsp. *subulata*; Moss Phlox; C = 0; BSUH 16336. [Planted, naturalized and spreading.]

Polemonium reptans L.; Spreading Jacob's Ladder, Greek Valerian; C = 5; BSUH 16465.

Polygonaceae (Smartweed Family)

Polygonum scandens L.; SYN: *Fallopia scandens* (L.) Holub; Climbing False Buckwheat; C = 0; BSUH 16456.

Portulacaceae (Purslane Family)

Claytonia virginica L.; Virginia Spring Beauty; C = 2; BSUH 16458; 16587; 16341.

Primulaceae (Primrose Family)

(#) *Lysimachia lanceolata* Walter; Lance-Leaved Loosestrife; C = 7; BSUH 16536; 16644; 16400.

Ranunculaceae (Buttercup Family)

Anemone virginiana L.; Tall Anemone, Tall Thimbleweed; C = 4; BSUH 16532; 16641; 16398.

Ranunculus abortivus L.; Small-Flowering Crow-foot; Little-Leaf Buttercup; C = 0; BSUH 16609.

Rhamnaceae (Buckthorn Family)

Ceanothus americanus L.; New Jersey Tea; C = 8; BSUH 16657; 16414.

Rosaceae (Rose Family)

Crataegus mollis (Torr. & A. Gray) Scheele; Downy Hawthorn; C = 2; BSUH 16508; 16589; 16343.

Fragaria virginiana Duchesne subsp. *virginiana*; Thick-leaved Wild Strawberry, Virginia Strawberry; C = 2; BSUH 16543; 16611.

Geum canadense Jacq.; White Avens; C = 1; BSUH 16538; 16645.

Geum vernum (Raf.) Torr. & A. Gray; Spring Avens; C = 1; BSUH 16461; 16586.

Potentilla simplex Michx.; Old-Field Five Fingers, Old-Field Cinquefoil, C = 2; BSUH 16369.

Prunus serotina Ehrh.; Wild Black Cherry; C = 1; BSUH 16479; 16626; 16367.

Rosa carolina L. var. *carolina*; Carolina or Pasture Rose; C = 4; BSUH 16439; 16345, 16372.

(*) *Rosa multiflora* Thunb.; Multiflora or Japanese Rose; C = 0; BSUH 16525; 16633.

Rosa setigera Michx.; Climbing Prairie Rose, Illinois Rose; C = 4; BSUH 16646.

(#) *Rubus flagellaris* Willd.; Common or Northern Dewberry; C = 2; BSUH 16613.

Rubus occidentalis L.; Black Raspberry; C = 1; BSUH 16505; 16605; 16324.

Rubiaceae (Madder Family)

Galium aparine L.; Cleavers, Annual Bedstraw; C = 1; BSUH 16504; 16905; 16326.

Galium concinnum Torr. & A. Gray; Shining Bedstraw; C = 5; BSUH 16537; 16658; 16415.

Galium triflorum Michx.; Sweet-Scented or Fragrant Bedstraw; C = 5; BSUH 16655.

Santalaceae (Sandalwood Family)

Comandra umbellata (L.) Nutt. subsp. *umbellata*; SYN: *Comandra richardsiana* Fernald; Star or Bastard Toad Flax; C = 7; BSUH 16591; 16342; 16350.

Scrophulariaceae (Figwort Family)

Scrophularia marilandica L.; Eastern or Late Figwort; C = 5; BSUH 16471.

Smilacaceae (Catbrier Family)

Smilax lasioneura Hook.; SYN: *Smilax herbacea* L. var. *lasioneura* (Hook.) A. DC.; Common Carrion Flower, Blue Ridge Carrion Flower; C = 4; BSUH 16514; 16623; 16366.

Smilax tamnoides L.; SYN: *Smilax hispida* Muhl. ex Torr., *Smilax tamnoides* L. var. *hispida* (Muhl. ex Torr.) Fernald; Bristly Greenbrier or Catbrier; C = 3; BSUH 16518; 16413.

Ulmaceae (Elm Family)

Celtis occidentalis L.; Northern or Common Hackberry; C = 3; BSUH 16478; 16629; 16361.

(*) *Ulmus pumila* L.; Siberian or Chinese Elm; C = 0; BSUH 16519.

Ulmus rubra Muhl.; Slippery or Red Elm; C = 3; BSUH 16464, 16468, 16516; 16624.

Verbenaceae (Vervain Family)

Phryma leptostachya L.; American Lopseed; C = 4; BSUH 16650.

Verbena urticifolia L.; White Vervain; C = 3; BSUH 16654.

Violaceae (Violet Family)

Viola palmata L. var. *palmata*; Wood Violet, Early Blue Violet, Three-Lobed Violet; C = 5; BSUH 16602.

Viola sororia Willd.; Dooryard Violet, Common Blue Violet, Dooryard Violet; C = 1; BSUH 16460; 16590; 16339.

Vitaceae (Grape Family)

Parthenocissus quinquefolia (L.) Planch.; Virginia Creeper, Woodbine; C = 2; BSUH 16477, 16550.

Vitis riparia Michx.; Riverbank Grape; C = 1; BSUH 16507; 16615.

Vitis vulpina L.; Frost Grape; C = 3; BSUH 16530; 16635, 16636; 16371.

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