

ERIGENIA

Number 27
Fall 2018



Carex festucacea
Mark A. Basinger 2890, 3469

Journal of the
Illinois Native Plant Society

ERIGENIA

Number 27, Fall 2018

The Illinois Native Plant Society Journal

The Illinois Native Plant Society is dedicated to the preservation, conservation, and study of the native plants and vegetation of Illinois.

ERIGENIA STAFF

Acting Editor: Jean Seller

Editorial Board: Paul Marcum, Marisa Szubryt,
Eric Ulaszek, Andy West

The editors wish to thank the anonymous reviewers.

EXECUTIVE COMMITTEE

President: Paul Marcum

Past President: Chris Benda

Secretary: Angela Kerber

Treasurer: Jim Payne

Membership: Amanda Pankau

Erigenia Editor: Dr. John Taft

Harbinger Editor: Chris Benda

At-Large Board:

Susane Masi

Jean Seller

Jason Zylka

MEMBERSHIP

Yearly membership includes a subscription to *Erigenia* and the quarterly newsletter, *Harbinger*. For more information, visit our website at www.ill-inps.org or write to:

Illinois Native Plant Society

P.O. Box 271

Carbondale, IL 62903

illinoisplants@gmail.com

www.ill-inps.org

ERIGENIA is named for *Erigenia bulbosa* (Michx.) Nutt. (harbinger of spring), one of our earliest blooming woodland plants. The first issue was published in August, 1982.

Copyright 2018 The Illinois Native Plant Society
(ISSN 8755-2000)

COVER ILLUSTRATION: Drawing of *Carex festucacea* by Angela Iseli from specimen collected by Mark Basinger in the SIU Herbarium.

ERIGENIA

NUMBER 27, FALL 2018

TABLE OF CONTENTS

Research Paper

Changes in Woody Understory and Herbaceous Vegetation, Lake Sara Post Oak Flatwoods, Effingham County, Illinois, 1989 to 2011
John E. Ebinger^{1,4}, Bob Edgin², Mark Hanft³, Kelly Hoffman⁴, Stefanie Ervin⁵, and Michael Blackowicz 1

Floral Updates

Summary of Field Guide to the Vascular Flora of Illinois, 4th Edition
Robert H. Mohlenbrock 11

Kyllinga gracillima: A Plant New to Illinois
John Van Dyk 23

Illinois Flora Updates: New Distribution Records and Other Noteworthy Finds
Illinois Native Plant Society Flora Update Committee 25

Cyrtomium fortunei and *Trillium stamineum*: Two New Plant Species to Illinois
Christopher David Benda 31

Obituary

Raymond E. Stotler Memoria 33

¹Emeritus Professor of Botany, Eastern Illinois University, Charleston, Illinois 61920
²Illinois Nature Preserves Commission, One Natural Resources Way, Springfield, Illinois 62702
³RR 3, Box 126, Alton, Illinois 62411
⁴Department of Plant Biology, Southern Illinois University, Carbondale, Illinois 62901
⁵Department of Biological Sciences, Eastern Illinois University, Charleston, Illinois 61920
^{*}email: jebinger@niu.edu

growth rates and the stands usually had trees. On the post oak flatwoods, the post oak may grow in association with black oak, while improved drainage black oak, shingle oak, and hickories were associated with the post oak. Vostel (1936) suggested that these open flats with a grassy ground cover may have been the "barrens" mentioned by the early settlers and travelers in Illinois (Engelmann 1863). This community type was studied by Berger (1968) at the Crab Orchard National Wildlife Refuge, Williamson County, Illinois. He found that post oak dominated, accounted for more than 50% of the individual trees and basal area, and reported black and blackjack oak as second and third in importance. Vogel and Mohlenbrock (1964) obtained similar results for a xeric upland site in extreme southern Illinois while Fralich (1988) described the same forest type from Posey Woods Nature Preserve, Washington County, Illinois. In the Illinois Natural Areas Inventory, White and Madany (1978) described this community type dominated by post and blackjack oaks, as occurring on level areas with well-developed hardwoods, usually on glacial till of Illinoian age, and commonly containing depressions with ephemeral ponds. The herbaceous component of these post oak flatwoods was typical of open forest and lacked many characteristic prairie species. Coates

CHANGES IN WOODY UNDERSTORY AND HERBACEOUS VEGETATION, LAKE SARA POST OAK FLATWOODS, EFFINGHAM COUNTY, ILLINOIS, 1989 TO 2011

John E. Ebinger^{1,6}, Bob Edgin², Mark Hanft³, Kelly Hoffman⁴, Stefanie Ervin⁵,
and Michael Blackowicz⁵

ABSTRACT: Post oak flatwoods, relatively open forest communities growing on nearly level soils with compact clayey subsoil, reach their northern limits in the Southern Till Plain Natural Division of central Illinois. At Lake Sara Post Oak Flatwoods Natural Heritage Landmark, the overstory and woody understory was first surveyed in 1989 and at various times until the present. The ground layer was surveyed three times: 1995, 1996, and 2011. Prescribed fire was used in 1989, 1990, 1991, 1997, 1999, 2001, 2002, 2004, and 2009. The number of woody seedlings/ha has remained relatively constant during the 22 years of the study, increasing from 25126 stems/ha in 1989 to 28124 stems/ha in 2011, a 10% increase. During this period, however, there has been a dramatic increase in the numbers of small saplings, from 84 stems/ha in 1989 to 10772 stems/ha in the 2011 survey. Small saplings accounted for only 0.3% of the woody understory in the 1989 study, increasing to 38.3% by 2011. It appears that Lake Sara post oak flatwoods needs nearly yearly fires to maintain the open aspect that was present in 1989.

INTRODUCTION

Post oak flatwoods are upland, relatively open forest communities dominated by post oak, growing on nearly level soils with compact clayey subsoil. In Illinois, this forest type reaches its northern limits in the Southern Till Plain Natural Division (Schwegman 1973) just south of the Shelbyville Terminal Moraine of Wisconsin glaciation in the central part of the state. Hall and Ingall (1910) mentions that these “post oak” flats commonly occur at the edge of the true prairie and are dominated by open stands of post and blackjack oak, a few hickories, with occasional patches of shingle or pin oak where shallow depressions create ephemeral ponds. Telford (1926) mentions a similar composition and found that these

species had low growth rates and the stands usually had a large number of stunted bushy trees. On the poorest soils he mentions that post oak may grow in pure stands or in association with blackjack oak; while with improved drainage black oak, shingle oak, and hickories were associated with the post oak.

Vestal (1936) suggested that these open flatwoods with a grassy ground cover may have been the “barrens” mentioned by the early settlers and travelers in Illinois (Engelmann 1863). This community type was studied by Borger (1968) at the Crab Orchard National Wildlife Refuge, Williamson County, Illinois. He found that post oak dominated, accounted for more than 50% of the individual trees and basal area, and reported black and blackjack oak as second and third in importance. Voigt and Mohlenbrock (1964) obtained similar results for a xeric upland site in extreme southern Illinois while Fralish (1988) described the same forest type from Posen Woods Nature Preserve, Washington County, Illinois.

In the Illinois Natural Areas Inventory, White and Madany (1978) described this community type dominated by post and blackjack oaks, as occurring on level areas with well-developed hardpans, usually on glacial till of Illinoian age, and commonly containing depressions with ephemeral ponds. The herbaceous component of these post oak flatwoods was typical of open forest and lacked many characteristic prairie species. Coates

¹Emeritus Professor of Botany, Eastern Illinois University, Charleston, Illinois 61920

²Illinois Nature Preserves Commission, One Natural Resources Way, Springfield, Illinois 62702

³RR 3, Box 126, Altamont, Illinois 62411

⁴Department of Plant Biology, Southern Illinois University, Carbondale, Illinois 62901

⁵Department of Biological Sciences, Eastern Illinois University, Charleston, Illinois 61920

⁶email: jeebinger@eiu.edu

et al. (1992), in a survey of the woody overstory and understory of Lake Sara flatwoods, speculated that the flatwoods were probably a transition zone from forest to prairie, and that fire was an important factor in maintaining this community. More recently, six flatwoods located on the Illinoian till plain were examined, including Lake Sara flatwoods (Taft et al. 1995). Their findings suggested that ground-cover species diversity was maintained or strongly enhanced with prescribed fire. The present study was undertaken to determine the composition of the herbaceous layer of this flatwoods and to describe what effects fire has had on the woody understory.

DESCRIPTION OF STUDY AREA

Lake Sara Post Oak Flatwoods Natural Heritage Landmark is 5 km northwest of Effingham, Effingham County, Illinois (NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sect. 22, T8N, R5E, 3PM). Located on Illinoian glacial till in the Effingham Plain Section of the Southern Till Plain Natural Division (Schwegman 1973), the 17 ha area at the edge of Lake Sara is owned by the Effingham Water Authority. This flatwoods is located less than 350 m from a historic forest-prairie transition zone (General Land Office Survey Field notes Vol. 171). Much of the area surrounding the flatwoods has been used as park and buffer in the watershed of Lake Sara. According to the Illinois Department of Natural Resources, the flatwoods is considered one of the best remaining examples of flatwoods in Illinois. At the time this flatwoods was initially studied (Coates et al. 1992), the site was well maintained, and in an attempt to keep the woods open, the understory had been burned yearly for at least 12 years prior to 1991 (Coates et al. 1992). Recent burn history includes winter or early spring burns in 1997, 1999, 2001, 2002, 2004, and 2009. Lake Sara Flatwoods is located at the northern edge of the range for *Quercus stellata* which extends from central Florida to southeastern Massachusetts, west to southern Iowa, and south through central and southeastern Texas (Little 1988).

Soils in the study area are Wynoose silt loam and Blufford silt loam acidic forest soils with less than 5% slope. They are poorly drained, the subsoil being a compact, plastic, almost impervious silty clay loam to silty clay. Surface runoff is slow, and the season high water table is perched near the surface from March through June in most years (Awalt 1991). Elevation of the flatwoods is nearly level and ranges from 181 m to 182.5 m; the elevation of Lake Sara being 176.8 m. In this part of Illinois annual precipitation averages 97.5 cm with April having the highest rainfall (9.4 cm). Mean annual temperature is 11.8°C with July being the hottest month (average of 24.6°C), the coldest being January (-3°C). The average number of frost-free days is 171 (Midwestern Regional Climate Center 2011).

The overstory and woody understory were initially surveyed in late spring of 1989 (Coates et al. 1992). At that time, the woody overstory was dominated by *Quercus stellata* Wangenh. (I.V. of 104.8 out of 200) with an average diameter of 26.5 cm. *Quercus velutina* Lam. was second in I.V. (51.1) with an average diameter of 37.1 cm, followed by *Q. marilandica* (L.) Münchh. (I.V. of 14.2), *Q. alba* L. (I.V. of 10.3) *Carya texana* Buckley (I.V. of 7.9), and *Q. imbricaria* Michx. (I.V. of 5.1). A few individuals of *C. tomentosa* (Lam.) Nutt., *Q. palustris* Münchh., *Sassafras albidum* (Nutt.) Nees, *Juglans nigra* L., and *Prunus serotina* Ehrh. also were encountered. Canopy cover was 80%. The woody understory was also surveyed at that time.

METHODS

Floristic composition

The flatwoods was visited more than 25 times during the growing seasons since the original survey in 1989 (Coates et al. 1992). During these visits voucher specimens were collected and deposited in the Stover/Ebinger Herbarium, Eastern Illinois University, Charleston, Illinois (EIU) (Appendix). The designation of exotic species follows Gleason and Cronquist (1991), Mohlenbrock (2002), and Taft et al. (1997), while nomenclature follows Mohlenbrock (2002).

The Floristic Quality Index (FQI) was determined for the flatwoods using the coefficient of conservatism (CC) assigned to each species by Taft et al. (1997). As used here, the FQI is a weighted index of species richness (N) and is the arithmetic product of the mean coefficient of conservatism (C-value), multiplied by the square root of species richness (\sqrt{N}) of the site [FQI = C-value (\sqrt{N})].

Woody understory

In 1989 (Coates et al. 1992), 1993 (Hanft and Ebinger 1994), 1996 (Ebinger, not published), and 2011 (present survey), the woody understory composition and density were determined using nested circular plots 0.0001, 0.001, and 0.01 ha in size with the centers located at 5 to 10 m intervals along randomly located north/south transects within the study area (50 center points). In the 0.0001 ha plots, woody seedlings (≤ 40 cm tall) were counted and in the 0.001 ha circular plots small saplings (> 40 cm tall and < 1 cm dbh) were recorded. Large saplings (1.1-9.9 cm dbh) were recorded, but since they were very rare or not present are not included in Table 2. From these data the density (plants/ha) by height and diameter class was determined for the species present.

Table 1: Density (individuals/ha) of woody seedlings (< 40 cm tall) surveyed in 1989, 1993, 1996, and 2011 at Lake Sara Flatwoods, Effingham County, Illinois.

Species	1989 (Coates et al. 1992)	1993 (Hanft & Ebinger 1994)	1996 (JEE)	2011 (present survey)
<i>Sassafras albidum</i>	15896	12000	6250	3125
<i>Quercus velutina</i>	3375	7500	12708	7083
<i>Quercus marilandica</i>	1792	4750	1875	833
<i>Quercus imbricaria</i>	1229	2000	2292	833
<i>Quercus stellata</i>	875	–	1250	8750
<i>Carya texana</i>	833	–	417	208
<i>Prunus serotina</i>	792	1000	1458	1042
<i>Quercus alba</i>	292	–	208	2500
<i>Carya ovata</i>	42	–	417	833
<i>Carya tomentosa</i>	–	–	208	1042
<i>Corylus americana</i>	–	–	–	1875
<i>Diospyros virginiana</i>	–	–	–	–
<i>Quercus rubra</i>	–	–	–	–
<i>Viburnum rafinesquianum</i>	–	–	–	–
Totals	25126	27250	27083	28124

Ground layer

The ground layer was surveyed in 1995 and 1996 by one of the authors (JEE) using $\frac{1}{4}$ m² quadrats. The same area was surveyed in 2011 using 1 m² quadrats. During each survey, undertaken in early summer, three transects 50 m long were located randomly along north/south cardinal compass directions within the central part of the flatwoods. Quadrats were located alternately along each transect (total of 150 quadrats). Species cover was determined using the Daubenmire (1959) cover class system as modified by Bailey and Poulton (1968): class 1 = 0 to 1%; class 2 = >1 to 5%; class 3 = >5 to 25%; class 4 = >25 to 50%; class 5 = >50 to 75%; class 6 = >75 to 95%; class 7 = >95 to 100%. Only ground layer species rooted within the quadrat frame were recorded. Tree seedlings (< 40 cm tall) were included with the woody understory survey and not included with the ground layer survey. Mean cover was determined for each taxon using the mid-point values for each cover class, while Importance Value (I.V.) was calculated by summing relative cover and relative frequency (total possible 200).

RESULTS

Floristic composition

The flatwoods supports a total of 170 vascular plant taxa in 59 families (Appendix). No ferns, fern-allies, or gymnosperms were encountered. Of the taxa observed, 43 were monocots in 10 families, and 127 were dicots in 49 families. Non-native (exotic) species accounted for

eight taxa, about 5% of the species collected. Predominant plant families were Asteraceae (24 species), Poaceae (17), and Cyperaceae (16). No state threatened or state endangered species were encountered (Illinois Endangered Species Protection Board 2011). The C-value and FQI for all species were 4.00 and 52.2 respectively with 16 species having a CC of seven or more.

Woody understory

The woody understory of Lake Sara flatwoods was first surveyed in 1989 when woody seedlings averaged 25126 stems/ha (Table 1) and small saplings accounted for only 84 stems/ha (Table 2). When the flatwoods was surveyed in 1993, after two years of fire suppression, seedlings had increased to 27250 stems/ha while saplings had increased to 3475 stems/ha.

Overall, oak seedlings nearly doubled in four years with *Quercus velutina*, *Q. marilandica*, and *Q. imbricaria* showing dramatic increases. Most other species decreased in abundance. *Sassafras albidum*, which was the most common species encountered in both surveys, declined by more than 2000 stems/ha.

The number of woody seedlings/ha has remained relatively constant during the 22 years of the study, increasing from 25126 stems/ha in 1989 to 28124 stems/ha in 2011, a 10% increase (Table 1). During this period, however, there has been a dramatic increase in the numbers of small saplings, from 84 stems/ha in 1989 to 10772 stems/ha in the 2011 survey (Table 2). Small saplings accounted for only 0.3% of the woody understory in the 1989 study, increasing to 38.3% by 2011. Few

Table 2: Density (individuals/ha) of woody saplings (> 40 cm tall/< 1 cm dbh) surveyed in 1989, 1993, 1996, and 2011 at Lake Sara Flatwoods, Effingham County, Illinois.

Species	1989 (Coates et al. 1992)	1993 (Hanft & Ebinger 1994)	1996 (JEE)	2011 (present survey)
<i>Sassafras albidum</i>	–	1300	3313	833
<i>Quercus velutina</i>	42	1425	2625	5167
<i>Quercus marilandica</i>	–	50	313	21
<i>Quercus imbricaria</i>	–	75	854	1792
<i>Quercus stellata</i>	–	75	313	458
<i>Carya texana</i>	42	450	–	292
<i>Prunus serotina</i>	–	75	167	313
<i>Quercus alba</i>	–	25	21	250
<i>Carya ovata</i>	–	–	375	708
<i>Carya tomentosa</i>	–	–	167	729
<i>Corylus americana</i>	–	–	–	83
<i>Diospyros virginiana</i>	–	–	–	42
<i>Quercus rubra</i>	–	–	–	42
<i>Viburnum rafinesquianum</i>	–	–	–	42
Totals	84	3475	8148	10772

large saplings were encountered with only 41 individuals found in 1989, 84 in 1993, 42 in 1996, and none in 2011.

Ground layer

In the three ground layer surveys from 1995 to 2011 *Helianthus divaricatus* was the dominant herbaceous species with the importance value (I.V.) of 38.6 in 1995 to 48.5 in 2011 (Table 3). Of the woody species encountered, the trailing *Rubus flagellaris* had an I.V. of 25.1 in 1995, increasing to 34.4 in 1996, and decreasing to 29.8 in 2011. In both the 1995 and 1996 surveys 27 taxa were recorded from the quadrats. In addition to the two species listed above, *Agrostis hyemalis*, *Carex pennsylvanica/albicans*, *C. hirsuta/bushii*, *C. festucea*, and *Danthonia spicata* mostly had I. V. values exceeding 10. As many of the species of the genus *Carex* were sterile at the time of the study, it was sometimes only possible to distinguish species groups.

During the 2011 ground-layer survey, 44 taxa were encountered in the plots. Most of the species encountered in 1995 and 1996 were still present, but their I. V. ranking had changed with a major decrease in the importance of *Agrostis hyemalis*, a large increase in *Potentilla simplex*, and the addition of 20 species that were not recorded in earlier surveys. No exotic species were encountered in the quadrats (Table 3).

DISCUSSION

Grasses and sedges were abundant species in the flatwoods and nearly dominated the herbaceous layer

(Table 3). These species would be expected in open woods, though they are rarely associated with fields and prairies. The grasses *Agrostis hyemalis*, *Danthonia spicata*, and *Dichanthelium acuminatum* were relatively common as were a number of species of *Carex*, while *Eleocharis verrucosa* was common in wet depressions. No prairie grasses were encountered in or around the flatwoods (Appendix).

Though prairie species were encountered in the flatwoods, most were uncommon, being collected from the edge of the flatwoods, or in large openings associated with tree-falls. Only a few were recorded from the quadrats and these were found in low numbers. Generally, all of the herbaceous species encountered in the plots were typical of open woods and barrens. A few, such as *Comandra umbellata*, *Parthenium integrifolium*, *Pycnanthemum tenuifolium*, *Solidago nemoralis*, and *Tradescantia ohiensis* are taxa of prairies as well as open woods in central Illinois.

For at least 12 years prior to the original survey in 1989 and until 1991, Lake Sara flatwoods was burned yearly, usually in the spring (Coates et al. 1992). After 1991, we have no record of fire history until staff from the Illinois Department of Natural Resources and the Illinois Nature Preserves Commission started managing the area in 1997. Their records show that fire was gradually incorporated into the management with winter or early spring burns in 1997, 1999, 2001, 2002, 2004, and 2009 (Bob Edgin, personal communication). It appears likely that the yearly fires until 1991 kept the woody understory open and low, few woody individuals entering the small sapling category (> 40 cm tall). Also, many of

Table 3: Mean cover (% of total area) and importance value (I.V.) for the ground layer species at Lake Sara Flatwoods, Effingham County, Illinois during the surveys conducted in 1995, 1996, and 2011. Small seedlings of trees species were not included. (*exotics)

Species	Mean Cover			Importance Value		
	1995	1996	2011	1995	1996	2011
<i>Helianthus divaricatus</i>	3.08	2.62	9.09	38.6	41.0	48.5
<i>Agrostis hyemalis</i>	1.97	0.56	0.06	28.8	12.4	1.6
<i>Rubus flagellaris</i>	1.98	1.96	5.60	25.1	34.4	29.8
<i>Carex pensylvanica/albicans</i>	1.06	1.04	0.66	18.9	22.0	5.9
<i>Carex hirsutella/bushii</i>	0.99	0.81	0.89	18.5	21.2	9.1
<i>Carex festucacea</i>	0.78	0.62	2.72	14.2	12.7	22.8
<i>Danthonia spicata</i>	0.67	0.20	0.63	10.7	5.6	5.7
<i>Podophyllum peltatum</i>	1.02	–	0.10	8.9	–	0.5
<i>Dichanthelium acuminatum</i>	0.25	0.04	0.17	6.0	1.4	4.9
<i>Eleocharis verrucosa</i>	0.10	0.16	0.18	5.9	7.3	2.0
<i>Aster turbinellus</i>	0.19	0.02	0.15	3.7	0.5	1.3
<i>Carex brachyglossa</i>	0.15	0.06	0.12	3.6	1.6	0.7
<i>Solidago nemoralis</i>	0.22	0.10	0.91	3.6	1.2	6.6
<i>Parthenocissus quinquefolia</i>	0.15	0.34	0.12	2.5	6.3	0.9
<i>Carex blanda</i>	0.09	0.02	–	2.3	0.5	–
<i>Hieracium scabrum</i>	0.08	0.10	–	1.7	2.6	–
<i>Viola sagittata</i>	0.03	–	0.09	1.7	–	1.5
<i>Tradescantia ohiensis</i>	0.06	0.02	0.28	1.3	0.5	2.0
<i>Rosa carolina</i>	0.02	0.46	0.46	0.7	6.7	3.4
<i>Lespedeza virginica</i>	0.01	0.02	0.01	0.6	0.5	0.2
<i>Cinna arundinacea</i>	0.02	–	–	0.5	–	–
<i>Festuca subverticillata</i>	0.02	–	–	0.5	–	–
<i>Potentilla simplex</i>	0.02	0.10	2.34	0.5	3.0	14.8
<i>Galium circaezans</i>	0.01	0.02	0.01	0.3	0.5	0.3
<i>Hypericum punctatum</i>	0.01	–	0.02	0.3	–	0.3
<i>Juncus tenuis</i>	0.01	–	–	0.3	–	–
<i>Sphenopholis obtusata</i>	0.01	–	–	0.3	–	–
<i>Parthenium integrifolium</i>	–	1.24	0.10	–	14.0	0.6
<i>Toxicodendron radicans</i>	–	0.04	0.02	–	1.1	0.9
<i>Hypoxis hirsuta</i>	–	0.01	–	–	0.8	–
<i>Triodanis perfoliata</i>	–	0.01	0.01	–	0.8	0.2
<i>Parietaria pensylvanica</i>	–	0.02	–	–	0.5	–
<i>Commandra umbellata</i>	–	0.02	–	–	0.5	–
<i>Myosotis verna</i>	–	0.01	–	–	0.4	–
<i>Lysimachia lanceolata</i>	–	–	0.71	–	–	6.1
<i>Krigia biflora</i>	–	–	0.77	–	–	4.6
<i>Pycnanthemum tenuifolium</i>	–	–	0.63	–	–	4.4
<i>Solidago ulmifolia</i>	–	–	0.69	–	–	4.3
<i>Porteranthus stipulatus</i>	–	–	0.61	–	–	3.1
<i>Carex glaucoidea</i>	–	–	0.09	–	–	2.3
<i>Baptisia bracteata</i>	–	–	0.37	–	–	1.8
<i>Bromus pubescens</i>	–	–	0.13	–	–	1.8
<i>Amphicarpaea bracteata</i>	–	–	0.13	–	–	1.1
<i>Oxalis stricta</i>	–	–	0.02	–	–	1.1
<i>Orbexilum pedunculatum</i>	–	–	0.14	–	–	1.0
<i>Phlox pilosa</i>	–	–	0.11	–	–	0.9
<i>Ageratina altissima</i>	–	–	0.12	–	–	0.7

Table 3: Continued.

Species	Mean Cover			Importance Value		
	1995	1996	2011	1995	1996	2011
<i>Viola pratincola</i>	–	–	0.01	–	–	0.5
<i>Smilax lasioneuron</i>	–	–	0.10	–	–	0.5
<i>Monarda bradburiana</i>	–	–	0.02	–	–	0.4
<i>Tradescantia virginiana</i>	–	–	0.02	–	–	0.3
<i>Aristolochia serpentaria</i>	–	–	0.01	–	–	0.2
<i>Elymus virginicus</i>	–	–	0.01	–	–	0.2
<i>Liatris pycnostachya</i>	–	–	0.01	–	–	0.2
Totals	13.00	10.62	29.44	200.0	200.0	200.0

the oak seedlings (and small saplings in later years) had one to four stems developed from a thick basal caudix. The yearly fires had top-killed these seedlings, allowing for multiple stem development.

With the longer cycle between prescribed burns there has been a dramatic increase in small saplings (<1 cm dbh) and the understory of Lake Sara flatwoods is taking on a brushy appearance (Table 2). However, no large saplings were encountered during this study. The prescribed burn cycle of 2 to 4 years has allowed the small saplings to increase and may be responsible for the decrease in large saplings but does not appear to have a detrimental effect on the ground layer species. Anderson and Brown (1986) found that longer fire return interval allowed for more fuel build-up and hotter fires that were more likely to control forest species. Only 27 species were encountered during sampling in both 1995 and 1996, yet 45 species were encountered in 2011 (Table 3). Of these, *Helianthus divaricatus*, *Rubus flagellaris*, *Carex festucacea*, *Solidago nemoralis*, *Tradescantia ohioensis*, *Rosa carolina*, and *Potentilla simplex* experienced fairly large increases in mean cover in 2011 from 1995 and 1996 (Table 3). Additionally, *Pycnanthemum tenuifolium*, *Solidago ulmifolia*, *Porteranthus stipulatus*, *Baptisia bracteata*, *Orbexilum pedunculatum*, *Phlox pilosa*, *Monarda bradburiana*, and *Liatris pycnostachya* were encountered during sampling for the first time in 2011. Tester (1989) found that species richness reached its maximum with a burn frequency of eight to nine per 20-year cycle. He suggested the increase in richness associated with such a burn regime may be due to the persistence of forest trees and shrubs and an increase in prairie species. However, at Lake Sara flatwoods some of these differences are probably due to the increase in sample size in 2012.

Presently the understory has a shrubby appearance, but there have not been many large saplings (1.1-9.9 cm dbh) in this flatwoods for over twenty years. The data seems to suggest that even less frequent fires (6 over a

period of 12 years) is sufficient to keep nearly all small saplings from reaching large sapling size.

Over the past 25 years, several canopy gaps have developed. These gaps were the result of tree mortality and a policy that allowed weak or declining trees to be removed for firewood (Bob Edgin, personal communication). These gaps may be responsible for more species entering the flatwoods. The tree removal policy has been suspended.

Also, there seems to be a shift in composition in the woody understory. *Sassafras albidum* has experienced a steady decline from 15896 seedling/ha (63% of the total in 1989) to 3125 seedlings/ha in 2011 (11% of the total). Over that same period, *Quercus* seedlings, which accounted for only 26% of the total stems in 1989, accounted for 71% of the total in the seedling category and 71% of the small saplings in 2011. Additionally, *Corylus americana*, a common shrub in forests near historic forest-prairie interfaces, was encountered during sampling for the first time in 2011 and accounted for 6.7% of the total stems (Table 2).

Petersen and Reich (2001) reported no sapling layer, no canopy ingrowth and low overstory tree density and basal area in stands that experienced 11 or more fires in 32 years. Savannas or open oak woodlands dominated by species such as bur oak may be stable over decade long time intervals under a high-frequency, low-intensity fire regime that suppresses understory woody plants, prevents ingrowth, and minimizes overstory tree mortality. However, long fire intervals may be needed to permit occasional ingrowth and to maintain stability at century time scales. The current burn cycle at Lake Sara seems to be adequate for maintaining the herbaceous component of the flatwoods while keeping saplings in check. However, the lack of large saplings, decrease in overall tree density and continuing maturity of canopy trees does not bode well for the long-term maintenance of the forest component. In the future, the fire frequency may need to be lengthened to allow some saplings to

reach a stage where they are less susceptible to fire; thus providing for stand replacement as canopy trees die.

LITERATURE CITED

- Anderson, R.C. and L.E. Brown. 1986. Stability and Instability in Plant Communities Following Fire. *American Journal of Botany* 73: 364–368.
- Awalt, F.L. 1991. Soil Survey of Effingham County, Illinois. United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the Illinois Agricultural Experiment Station, Champaign, Illinois.
- Bailey, A.W. and C.E. Poulton. 1968. Plant Communities and Environmental Relationships in a Portion of the Tillamook Burn, Northwestern Oregon. *Ecology* 49:1–13.
- Borger, W.M. 1968. A Phytosociological Survey of a Post Oak (*Quercus stellata*) Community at Crab Orchard National Wildlife Refuge. Research Report. Southern Illinois University, Carbondale, Illinois. 12 pp.
- Coates, D.T., K.J. Lyman, and J.E. Ebinger. 1992. Woody Vegetation Structure of a Post Oak Flatwoods in Illinois. *Castanea* 57:196–201.
- Daubenmire, R. 1959. A Canopy Coverage Method of Vegetation Analysis. *Northwest Science* 33:43–64.
- Engelmann, H. 1863. Remarks upon the Causes Producing the Different Characters of Vegetation Known as Prairies, Flats, and Barrens in Southern Illinois, with Special Reference to Observations Made in Perry and Jackson Counties. *American Journal of Science and Arts* 36:384–396.
- Fralish, J.S. 1988. Diameter-height-biomass Relationships for *Quercus* and *Carya* in Posen Woods Nature Preserve. *Transactions of the Illinois State Academy of Science* 81:31–38.
- Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Second Edition. The New York Botanical Garden, Bronx, New York.
- Hall, R.C. and O.D. Ingall. 1910. Forest Conditions of Illinois. *Bulletin Illinois State Laboratory of Natural History* 9:175–253.
- Hanft, M. and J.E. Ebinger. 1994. Fire Suppression and Understory at Lake Sara Post Oak Flatwoods, Effingham County, Illinois. Report, Botany Department, Eastern Illinois University, Charleston, Illinois. 7 pp. (Student paper, never published)
- Illinois Endangered Species Protection Board. 2011. Checklist of Endangered and Threatened Animals and Plants of Illinois. Illinois Endangered Species Protection Board, Springfield, Illinois. 18 pp.
- Little, E.L. 1988. The Audubon Society Field Guide to North American Trees (Eastern Region). Alfred A. Knopf, New York. 714 pp.
- Midwestern Regional Climate Center. 2011. <http://mcc.sws.uiuc.edu>.
- Mohlenbrock, R.H. 2002. Vascular Flora of Illinois. Southern Illinois University Press, Carbondale and Edwardsville, Illinois.
- Peterson, D.W. and P.B. Reich. 2001. Prescribed Fire in Oak Savanna: Fire Frequency Effects on Stand Structure and Dynamics. *Ecological Applications* 11(3):914–927.
- Schwegman, J.E. 1973. Comprehensive Plan for the Illinois Nature Preserves System. Part 2. The Natural Divisions of Illinois. Illinois Nature Preserves Commission, Rockford, Illinois.
- Taft, J.B., M.W. Schwartz, and R.L. Phillippe. 1995. Vegetation Ecology of Flatwoods on the Illinois Till Plain. *Journal of Vegetation Science* 6:647–666.
- Taft, J.B., G.S. Wilhelm, D.M. Ladd, and L.A. Masters. 1997. Floristic Quality Assessment for Vegetation in Illinois, a Method for Assessing Vegetation Integrity. *Erigenia* 15:1–95.
- Telford, C.J. 1926. Third Report on a Forest Survey of Illinois. *Bulletin Illinois Natural History Survey* 16:1–102.
- Tester, J.R. 1989. Effects of Fire Frequency on Oak Savanna in East Central Minnesota. *Bulletin of the Torrey Botanical Club* 116:134–144.
- Vestal, A.G. 1936. Barrens Vegetation in Illinois. *Transaction of the Illinois State Academy of Science* 29:79–80.
- White, J. and M.H. Madany. 1978. Classification of Natural Communities in Illinois. p. 310–405. In White, J. (ed.). Illinois natural areas inventory. Technical report. Illinois Natural Areas Inventory, Urbana, Illinois

APPENDIX

Vascular plant species encountered at Lake Sara Flatwoods, Effingham County, Illinois are listed alphabetical by family under major plant groups. Collecting numbers are preceded by the initial of the collector (E = John E. Ebinger). A few species were not collected and are listed as observed. Specimens are deposited in the Stover/Ebinger Herbarium (EIU), Eastern Illinois University, Charleston, Illinois. (*exotic species).

DICOTS

ACANTHACEAE

Ruellia humilis Nutt.: E33032

ANACARDIACEAE

Rhus glabra L.: E33065

Toxicodendron radicans (L.) Kuntze: E33064

APIACEAE

Zizia aurea Koch: E24232

APOCYNACEAE

Apocynum androsaemifolium L.: E24322

Apocynum cannabinum L.: E32885

ARISTOLOCHIACEAE

Aristolochia serpentaria L.: observed

ASCLEPIADACEAE

Asclepias purpurascens L.: E32881

ASTERACEAE

**Achillea millefolium* L.: E32882

Ageratina altissima (L.) R.M. King & H.

Rob.: E24603

Antennaria plantaginifolia (L.) Richardson: E24231

Aster pilosus Willd.: E24606

Aster shortii Lindl.: E24608

Aster turbinellus Lindl.: E33272

Aster urophyllus Lindl. ex DC.: E24605

Erigeron annuus (L.) Pers.: E24348

Eupatoriadelphus purpureus (L.) R.M. King & H.

Robins.: E24604

Eupatorium sessilifolium L. var. *brittonianum* Porter:
E24602

Helianthus divaricatus L.: E24601

Hieracium scabrum Michx.: E24598

Krigia biflora (Walt.) S.F.Blake: E25714

Krigia dandelion (L.) Nutt.: E24321

Lactuca canadensis L.: E24509

Liatris pycnostachya Michx.: E24599

Liatris scabra (Greene) K. Schum.: E24600

Parthenium integrifolium L.: E24505

Rudbeckia hirta L.: E24488

Senecio glabellus Poir.: E32767

Solidago nemoralis Ait.: E24609

Solidago speciosa A.Gray: E24611

Solidago ulmifolia Muhl. ex Willd.: E24610

Verbesina helianthoides Michx.: E24504

BERBERIDACEAE

Podophyllum peltatum L.: E24217

BORAGINACEAE

Myosotis verna Nutt.: E24331

BRASSICACEAE

Cardamine parviflora L. var. *arenicola* (Britt.) O.E.

Schultz: E24330

CAESALPINIACEAE

Chamaecrista fasciculata (Michx.) Greene: E24480

CALLITRICHACEAE

Callitriche terrestris Raf.: E24223

CAMPANULACEAE

Lobelia spicata Lam.: E32883

Triodanis perfoliata (L.) Nieuwl.: E24353

CAPRIFOLIACEAE

**Lonicera maackii* (Rupr.) Maxim.: E33274

Symphoricarpos orbiculatus Moench.: E32770

Viburnum rafinesquianum Schultes var. *affine* (Bush)
House: E33031

CARYOPHYLLACEAE

**Cerastium fontanum* Baumg.: E32769

Cerastium nutans Raf.: E24224

Paronychia fastigiata (Raf.) Fernald: E24478

Silene antirrhina L.: E24218

Silene stellata (L.) W.T.Aiton: E24503

CELASTRACEAE

Celastrus scandens L.: observed

CISTACEAE

Lechea tenuifolia Michx.: E24479

CORYLACEAE

Corylus americana Walter: (observed)

EBENACEAE

Diospyros virginiana L.: (observed)

EUPHORBIACEAE

Euphorbia corollata L.: E24597

FABACEAE

Amphicarpaea bracteata (L.) Fernald: E33071

Baptisia bracteata Elliott: E24324

Crotalaria sagittalis L.: E24498

Desmodium glutinosum (Willd.) Alph. Wood: E24512

Desmodium nudiflorum (L.) DC.: E24575

Desmodium paniculatum (L.) DC.: E24576

Desmodium rotundifolium (Michx.) DC.: E24574

**Kummerowia striata* (Thunb.) Schindl.: E24594

Lespedeza procumbens Michx.: E24571

Lespedeza virginica (L.) Britton: E24573

Orbexilum pedunculatum (Mill.) Rydb.: E25771

FAGACEAE

Quercus alba L.: E24590

Quercus imbricaria Michx.: E33270

Quercus marilandica (L.) Münchh.: E33271

Quercus rubra L.: (observed)

Quercus stellata Wangenh.: E33269

Quercus velutina Lam.: E33268

GERANIACEAE

Geranium carolinianum L.: E24502

Geranium maculatum L.: E24225

HYDRANGACEAE

Hydrangea arborescens L.: E24481

HYPERICACEAE

Hypericum punctatum Lam.: E24593

JUGLANDACEAE

Carya ovata (Mill.) K.Koch: E24524

Carya texana Buckl.: E24522

Carya tomentosa (Lam.) Nutt.: E24525

LAMIACEAE

Monarda bradburiana Beck: E24325

Pycnanthemum tenuifolium Schrad.: E24507

Scutellaria australis (Fassett) Epling: E25704

Scutellaria incana Spreng: E24486

LAURACEAE

Sassafras albidum (Nutt.) Nees: E24483

LYTHRACEAE

Cuphea viscosissima Jacq.: E24586

ONAGRACEAE

Ludwigia alternifolia L.: E33067

OXALIDACEAE

Oxalis stricta L.: E33073

Oxalis violacea L.: E24204

POLEMONIACEAE

Phlox divaricata L. spp. *laphamii* (Wood) Wherry: E24207

Phlox pilosa L.: E25705

POLYALACEAE

Polygala sanguinea L.: E24516

Polygala verticillata L.: E24500

POLYGONACEAE

Persicaria punctata (Ell.) Small: E33069

PORTULACACEAE

Claytonia virginica L.: E24226

Primulaceae

Dodecatheon meadia L.: E24221

Lysimachia lanceolata Walter: E24496

RANUNCULACEAE

Anemone virginiana L.: E24513

Ranunculus micranthus Nutt.: E24227

Ranunculus septentrionalis Poir.: E24228

Thalictrum dioicum L.: E24215

RHAMNACEAE

Ceanothus americanus L.: E24506

ROSACEAE

Agrimonia rostellata Wallr.: E24485

Geum vernum (Raf.) Torr. & A.Gray: E32771

Porteranthus stipulatus (Muhl. ex Willd.) Britt.: E25770

Potentilla simplex Michx.: E24323

Prunus serotina Ehrh.: E33273

Rosa carolina L.: E24515

Rubus allegheniensis Porter: E24350

Rubus flagellaris Willd.: E25709

RUBIACEAE

Galium aparine L.: E32768

Galium circaezans Michx.: E25764

Galium concinnum Torr. & A.Gray: E25763

Houstonia lanceolata (Poir.) Britton: E24346

RUTACEAE

Ptelea trifoliata L.: E24491

SALICACEAE

Salix humilis Marshall: E24514

SANTALACEAE

Comandra umbellata (L.) Nutt.: E24216

SAXIFRAGACEAE

Heuchera americana L.: E24326

SCROPHULARIACEAE

Agalinis tenuifolia (Vahl) Raf.: E24583

Aureolaria flava (L.) Farw. var. *micrantha* (Pennell)
Pennell: E24592

Gratiola neglecta Torr.: E33072

Penstemon digitalis Nutt. ex Sims: E32886

Penstemon pallidus Small: E25702

Veronicastrum virginicum (L.) Farw.: E24511

ULMACEAE

Ulmus rubra Muhl.: E24484

URTICACEAE

Parietaria pensylvanica Muhl. ex Willd.: E24493

VIOLACEAE

Viola palmata L.: E24203

Viola pratincola Greene: E24202

Viola sagittata Aiton: E25706

VITACEAE

Parthenocissus quinquefolia (L.) Planch.: E33070

Vitis aestivalis Michx.: E24578

MONOCOTS

AMARYLLIDACEAE

Hypoxis hirsuta (L.) Coville: E24206

ARACEAE

Arisaema triphyllum (L.) Schott: E24222

COMMELINACEAE

Tradescantia ohiensis Raf.: E24329

Tradescantia virginiana L.: E24213

CYPERACEAE

Carex albicans Willd. ex Spreng.: E24209

Carex blanda Dewey: E24212

Carex brachyglossa Mack.: E25720

Carex brevior (Dewey) Mack. ex Lunell: E24210

Carex bushii Mack.: E25718

Carex cephalophora Muhl. ex Willd.: E24340

Carex festucacea Schkuhr ex Willd.: E25722

Carex glaucoidea Tuck. ex Onley: E24338

Carex hirsutella Mack.: E25772

Carex muhlenbergii Schk. var. *enervis* Boott.: E24354

Carex pensylvanica Lam.: E24211

Carex retroflexa Muhl. ex Willd.: E25717

Carex rosea Willd.: E24337

Carex tenera Dewey: E24339

Eleocharis verrucosa (Svenson) L.J.Harms: E25724

Scirpus georgianus R.M.Harper: E33068

DIOSCOREACEAE

Dioscorea quaternata J.F. Gmel.: E24492

IRIDACEAE

Sisyrinchium albidum Raf.: E24205

JUNCACEAE

Juncus interior Wiegand: E32887

Juncus tenuis Willd.: E24499

LILIACEAE

Smilacina racemosa (L.) Desf.: E25703

POACEAE

Agrostis hyemalis (Walter) Britton, Sterns & Poggenb.:
E24333

Bromus pubescens Muhl. ex Willd.: E24508

Cinna arundinacea L.: E24585

**Dactylis glomerata* L.: observed

Danthonia spicata (L.) Roem. & Schult.: E24501

Dichanthelium acuminatum (Sw.) Gould & C.A.Clark:
E27765

Dichanthelium clandestinum (L.) Gould: E24487

Dichanthelium microcarpon (Muhl.) Mohlenbr.: E24589

Elymus hystrix L.: E33066

Elymus virginicus L.: E24494

**Festuca arundinacea* Schreb.: E24345

Festuca subverticillata (Pers.) E.B. Alexeev: E32884

**Poa compressa* L.: E24495

**Poa pratensis* L.: E25768

Sphenopholis obtusata (Michx.) Scribn.: E24344

Tridens flavus (L.) Hitchc.: E24587

Vulpia octoflora (Walter) Rydb.: E24332

SMILACACEAE

Smilax lasioneuron Hook.: E24357

SUMMARY OF FIELD GUIDE TO THE VASCULAR FLORA OF ILLINOIS, 4TH EDITION

Robert H. Mohlenbrock¹

ABSTRACT: This paper summarizes the contents of my *Field Guide to the Vascular Flora of Illinois* that was published in 2014. It lists the 314 taxa of plants that have been added to the Illinois flora since the third edition in 2002. It lists the nomenclatural changes between the third and fourth editions. A list of new family names in the fourth edition is presented, followed by a list of species I have concluded are not in Illinois but were attributed to the state at one time. Finally, reflections by the author on the flora of Illinois are provided.

When the fourth edition of my *Field Guide to the Vascular Flora of Illinois* was published in 2014, it had been twelve years since the third edition had been published. During that span, 314 taxa of plants have been added to the Illinois flora, 254 plants have different scientific names, and 15 families of plants are either new to Illinois or have been carved out of previous family names. I have divided this article into five parts. The first is a list of taxa new to the Illinois flora. The second part contains the nomenclatural changes between the third and fourth editions of the flora. The third is a list of different family names for Illinois plants. The fourth is a list of species I previously included in the Illinois flora but which I now reject from the flora. I conclude the article on some of my thoughts concerning the flora of Illinois.

TAXA ADDED TO THE ILLINOIS FLORA

Non-native taxa are indicated by an asterisk (*).

- Dendrolycopodium hickeyi* (W.H. Wagner, Beitel, & R.C. Moran) A. Haines LYCOPODIACEAE
**Ginkgo biloba* L. GINKGOACEAE
**Picea glauca* (Moench) A. Voss PINACEAE
**Pinus virginiana* Mill. PINACEAE
**Metasequoia glyptostroboides* Hu & W.C. Cheng TAXODIACEAE
**Sesuvium maritimum* (Walt.) BSP. AIZOACEAE
**Achyranthes japonica* (Miq.) Nakai AMARANTHACEAE
**Amaranthus caudatus* L. AMARANTHACEAE
**Eryngium planum* L. APIACEAE
**Oenanthe japonica* (Blume) DC. APIACEAE

- **Aristolochia clematitis* L. ARISTOLOCHIACEAE
**Asarum europaeum* L. ARISTOLOCHIACEAE
**Ageratum conyzoides* L. ASTERACEAE
Acmella repens (Walt.) Rich. in Pers. ASTERACEAE
Ambrosia X intergradiens W.H. Wagner ASTERACEAE
**Bidens alba* (L.) DC. ASTERACEAE
Bidens laevis (L.) BSP. ASTERACEAE
Bidens tripartita L. ASTERACEAE
Boltonia asteroides (L.) L'Her. var. *latisquama* (Gray) Cronq. ASTERACEAE
Boltonia diffusa L. var. *diffusa* ASTERACEAE
**Carduus crispus* L. ASTERACEAE
**Centaurea calcitrapa* L. ASTERACEAE
**Centaurea melitensis* L. ASTERACEAE
**Centaurea X monctonii* C.E. Britt. ASTERACEAE
**Centaurea montana* L. ASTERACEAE
**Centaurea phrygia* L. ASTERACEAE
**Centaurea stoebe* L. ssp. *micranthos* (S.G. Gmel. ex Gugler) Hayak ASTERACEAE
**Chondrilla juncea* L. ASTERACEAE
Cirsium flodmanii (Rydb.) Arthur ASTERACEAE
Echinacea angustifolia DC. ASTERACEAE
Eupatorium capillifolium (Lam.) Small ASTERACEAE
Eurybia chasei (G.N. Jones) Mohlenbr. ASTERACEAE
**Grindelia perennis* A. Nelson ASTERACEAE
**Guizotia abyssinica* (L.f.) Cass. in F. Cuv. ASTERACEAE
Helianthus X brevifolius E.E. Wats. ASTERACEAE
Helianthus X cinereus Torr. & Gray ASTERACEAE
Helianthus X intermedius R.W. Long ASTERACEAE
Oligoneuron rigidum (L.) Small var. *glabratum* (E.L. Braun) G.L. Nesom ASTERACEAE
Packera paupercula (Michx.) A. Love & D. Love var. *bal-samitae* (Muhl. ex Willd.) Mohlenbr. ASTERACEAE

¹112 Birdsong Drive, Carbondale, Illinois 62903

- Packera paupercula* (Michx.) A. Love & D. Love var. *pseudotomentosa* (Mack. & Bush) R. Kowal ASTERACEAE
- Packera paupercula* (Michx.) A. Love & D. Love var. *savannarum* R. Kowal ASTERACEAE
- Prionopsis ciliata* (Nutt.) Nutt. ASTERACEAE
- Rudbeckia palustris* Eggert in Boynt. & Beadle ASTERACEAE
- Rudbeckia serotina* Nutt. var. *lanceolata* (Bisch.) Fern. & Schub. ASTERACEAE
- Rudbeckia speciosa* Wenderoth ASTERACEAE
- Rudbeckia tenax* Boynt. & Beadle ASTERACEAE
- Rudbeckia triloba* L. var. *beadleyi* (Small) Fern. ASTERACEAE
- Rudbeckia umbrosa* Boynt. & Beadle ASTERACEAE
- Silphium asteriscus* L. var. *trifoliatum* (L.) J.A. Clevinger ASTERACEAE
- Silphium pinnatifidum* Ell. ASTERACEAE
- Solidago arguta* Ait. var. *caroliniana* Gray ASTERACEAE
- Solidago boottii* Hook. ASTERACEAE
- **Symphotrichum divaricatum* (Nutt.) G.L. Nesom ASTERACEAE
- Symphotrichum lanceolatum* (Willd.) G.L. Nesom var. *hirsuticaule* (Semple & Chmielewski) G.L. Nesom ASTERACEAE
- Symphotrichum lanceolatum* (Willd.) G.L. Nesom var. *latifolium* (Semple & Chmielewski) G.L. Nesom ASTERACEAE
- Symphotrichum patentissimum* (Lindl. ex DC.) Mohlenbr. ASTERACEAE
- Symphotrichum texanum* (E.S. Burgess) Semple ASTERACEAE
- Verbesina occidentalis* (L.) Walt. ASTERACEAE
- Xanthium chasei* Fern. ASTERACEAE
- Xanthium chinense* Mill. ASTERACEAE
- Xanthium globosum* Small ASTERACEAE
- Xanthium inflexum* Mack. & Bush ASTERACEAE
- Xanthium italicum* Moretti ASTERACEAE
- Xanthium pennsylvanicum* Wallr. ASTERACEAE
- Xanthium speciosum* Kearney ASTERACEAE
- **Youngia japonica* (L.) DC. ASTERACEAE
- **Amsinckia intermedia* Fisch. & C.A. Meyer BORAGINACEAE
- **Anchusa azurea* Mill. BORAGINACEAE
- **Brunnera macrophylla* (Adams.) I.M. Johnston BORAGINACEAE
- **Pulmonaria officinalis* L. BORAGINACEAE
- **Pulmonaria saccharata* Mill. BORAGINACEAE
- **Arabis caucasica* Willd. BRASSICACEAE
- Boechera missouriensis* (Greene) Al-Shehbaz BRASSICACEAE
- Erysimum asperum* (Nutt.) DC. BRASSICACEAE
- Rorippa austriaca* (Crantz) Besser BRASSICACEAE
- Rorippa curvipes* Greene BRASSICACEAE
- Callitriche hermaphroditica* L. CALLITRICHACEAE
- Lobelia appendiculata* A. DC. CAMPANULACEAE
- **Lonicera hirsuta* Eat. CAPRIFOLIACEAE
- **Lonicera subsessilis* Rehd. CAPRIFOLIACEAE
- Sambucus nigra* L. var. *laciniata* L. CAPRIFOLIACEAE
- **Viburnum carlesii* Hemsl. CAPRIFOLIACEAE
- Viburnum dentatum* L. var. *indianense* (Rehd.) Fern. CAPRIFOLIACEAE
- Viburnum dentatum* L. var. *scabrellum* Torr. & Gray CAPRIFOLIACEAE
- **Viburnum plicatum* Thunb. var. *tomentosum* Miq. CAPRIFOLIACEAE
- Cerastium arvense* L. ssp. *strictum* Gaudin CARYOPHYLLACEAE
- Minuartia glabra* (Michx.) Mattfeld CARYOPHYLLACEAE
- **Montia linearis* (Dougl. ex Hook.) Greene CARYOPHYLLACEAE
- **Silene flos-cuculi* (L.) Clairville CARYOPHYLLACEAE
- **Corispermum pallasii* Steven CHENOPODIACEAE
- **Dysphania anthelmintica* (L.) Mosyakin & Clements CHENOPODIACEAE
- **Cleroserrata speciosa* (Raf.) H.H. Iltis CLEOMACEAE
- Dichondra carolinensis* Michx. CONVULVULACEAE
- **Ipomoea setosa* L. CONVULVULACEAE
- **Phedimus aizoon* (L.) 't Hart & U. Eggli CRASSULACEAE
- **Sedum album* L. CRASSULACEAE
- **Sedum sexangulare* L. CRASSULACEAE
- **Cucurbita pepo* L. var. *pepo* CUCURBITACEAE
- Elatine brachysperma* Gray ELATINACEAE
- Rhododendron canescens* (Michx.) Sweet ERICACEAE
- **Phyllanthus tenellus* Roxb. EUPHORBIACEAE
- **Arachis hypogaea* L. FABACEAE
- **Astragalus cicer* L. FABACEAE
- Desmodium viridiflorum* (L.) DC. FABACEAE
- Lespedeza X longifolia* DC. FABACEAE
- Lespedeza X neglecta* (Britt.) Mack. & Bush FABACEAE
- **Lupinus polyphyllus* Lindl. FABACEAE
- **Medicago minima* (L.) Desr. FABACEAE
- **Phaseolus vulgaris* L. FABACEAE
- Trifolium stoloniferum* Eat. FABACEAE
- **Quercus nigra* L. FAGACEAE
- Corydalis montana* Engelm. ex Gray FUMARIACEAE
- **Gernaium napalense* Sweet var. *thunbergii* (Sieb. & Zucc.) Kudo GERANIACEAE
- **Geranium sylvaticum* L. GERANIACEAE
- Aesculus X bushii* C.K. Schneid. HIPPOCASTANACEAE
- **Phacelia congesta* Hook. HYDROPHYLLACEAE
- Calamintha nepeta* (L.) Savi LAMIACEAE
- **Cariopteris incana* (L.) L. LAMIACEAE
- **Lamium galeobdolon* (L.) L. LAMIACEAE

- **Mentha aquatica* L. LAMIACEAE
 **Mentha longifolia* L. LAMIACEAE
Stachys hyssopifolia L. LAMIACEAE
Utricularia ochroleuca R. Hartm.
 LENTIBULARIACEAE
Utricularia purpurea Walt. LENTIBULARIACEAE
Utricularia subulata L. LENTIBULARIACEAE
Ammannia auriculata Willd. LYTHRACEAE
 **Lagerstroemia indica* L. LYTHRACEAE
 **Lythrum hyssopifolia* L. LYTHRACEAE
 **Lythrum virgatum* L. LYTHRACEAE
 **Magnolia stellata* Maxim. MAGNOLIACEAE
 **Malva parviflora* L. MALVACEAE
 **Fatoua villosa* (Thunb.) Nakai MORACEAE
Morus murrayana D.E. Saar & S.J. Galla MORACEAE
 **Nelumbo nucifera* Gaertn. NELUMBONACEAE
 **Chionanthus virginicus* L. OLEACEAE
 **Forsythia X intermedia* Zabel OLEACEAE
 **Forsythia viridissima* Lindl. OLEACEAE
 **Syringa X chinensis* Willd. OLEACEAE
 **Syringa pubescens* Turcz. ssp. *patens* (Palib.) M.C. Chang & X.Y. Chen OLEACEAE
Epilobium palustre L. ONAGRACEAE
 **Epilobium parviflorum* Schreb. ONAGRACEAE
 **Oenothera glazioviana* Micheli ONAGRACEAE
Orobanche riparia L.T. Collins OROBANCHACEAE
 **Phlox drummondii* Hook. POLEMONIACEAE
Fallopia cilinodis (Michx.) Holub POLYGONACEAE
Fallopia dumetorum (L.) Holub POLYGONACEAE
Persicaria hydropiperoides (Michx.) Small var. *bushiana* (Stanford) Mohlenbr. POLYGONACEAE
 **Persicaria minor* (Hudson) Opiz POLYGONACEAE
 **Persicaria posumbu* (Buch.-Hand. ex D. Don) H. Gross POLYGONACEAE
Persicaria robustior (Small) E.P. Bicknell POLYGONACEAE
 **Polygonum patulum* M. Bieberstein POLYGONACEAE
 **Polygonum rurivagum* Jordan ex. Bor. POLYGONACEAE
 **Reynoutria X bohémica* Chrték & Chrtkova POLYGONACEAE
 **Rumex stenophyllus* Ledeb. POLYGONACEAE
 **Rumex thyrsiflorus* Fingerh. POLYGONACEAE
Lysimachia X producta (Gray) Fern. PRIMULACEAE
 **Anemone blanda* Schott & Kotschy RANUNCULACEAE
 **Clematis integrifolia* L. RANUNCULACEAE
 **Consolida pubescens* (DC.) Soo RANUNCULACEAE
 **Ranunculus ficaria* L. ssp. *bulbifer* Lambinon RANUNCULACEAE
 **Ranunculus ficaria* L. ssp. *calthifolius* (Reichenb.) Ar-cangelis RANUNCULACEAE
 **Reseda lutea* L. RESEDACEAE
 **Rhamnus arguta* Maxim. var. *velutina* Hand.-Mazz. RHAMNACEAE
Agrimonia striata Michx. ROSACEAE
Amelanchier canadensis (L.) Medic. ROSACEAE
 **Chaenomeles speciosa* (Sweet) Nakai ROSACEAE
 **Cotoneaster acutifolius* Turcz. ROSACEAE
 **Cotoneaster apiculatus* Rehd. & E.H. Wilson ROSACEAE
 **Cotoneaster divaricatus* Rehd. & E.H. Wilson ROSACEAE
 **Cotoneaster magnificus* J. Fryer & B. Hylmo ROSACEAE
Crataegus assurgens Sarg. ROSACEAE
Crataegus cyanophylla Sarg. ROSACEAE
Crataegus divida Sarg. ROSACEAE
Crataegus laxiflora Sarg. ROSACEAE
Crataegus longispina Sarg. ROSACEAE
Crataegus macracantha Sarg. ROSACEAE
Crataegus magniflora Sarg. ROSACEAE
Crataegus paucispina Sarg. ROSACEAE
Crataegus peoriensis Sarg. ROSACEAE
Crataegus putnamiana Sarg. ROSACEAE
Crataegus sertata Sarg. ROSACEAE
Crataegus sextilis Sarg. ROSACEAE
Crataegus tarda Sarg. ROSACEAE
Crataegus trachyphylla Sarg. ROSACEAE
Crataegus vegetus Sarg. ROSACEAE
 **Malus astracantha* (Dums.-Cours) DC. ROSACEAE
 **Malus floribunda* Van Houtte ROSACEAE
 **Malus X purpurea* (Barbier) Rehd. ROSACEAE
 **Prunus subhirtella* Miq. ROSACEAE
 **Pyrus betulaefolia* Bunge ROSACEAE
 **Rosa centifolia* L. ROSACEAE
 **Rosa cinnamomea* L. ROSACEAE
 **Rosa X harisonii* Rivers ROSACEAE
Rubus abrotinus Bailey ROSACEAE
Rubus aoriginus Rydb. ROSACEAE
 **Rubus caesius* L. ROSACEAE
Rubus curtipes Bailey ROSACEAE
Rubus fulleri Bailey ROSACEAE
Rubus impar Bailey ROSACEAE
Rubus missourica Bailey ROSACEAE
Rubus multiflorus Bailey ROSACEAE
Rubus mundus Bailey ROSACEAE
Rubus X neglectus Peck ROSACEAE
 **Rubus parvifolius* L. ROSACEAE
Rubus plicatifolius Blanch. ROSACEAE
Rubus satts Bailey ROSACEAE
Rubus semisetosus Bailey ROSACEAE
Rubus steelei Bailey ROSACEAE
 **Sorbus X thuringiaca* (Nymar) Schorach ROSACEAE
 **Spiraea billardii* Hort. ex K. Koch ROSACEAE
 **Spiraea douglasii* Hook. ROSACEAE
 **Spiraea X thunbergii* Sieb. ex Blume ROSACEAE
Galium brevipes Fern. & Weig. RUBIACEAE
 **Galium odoratum* (L.) Scop. RUBIACEAE
 **Galium sylvaticum* L. RUBIACEAE
Salix X glatfelteri Schneid. SALICACEAE

- **Salix X jesupii* Fern. SALICACEAE
 **Salix X pendulina* Wender SALICACEAE
Salix pyrifolia Anderss. SALICACEAE
 **Salix X sepulcralis* Simoski SALICACEAE
 **Collinsia heterophylla* Graham
 SCROPHULARIACEAE
 **Digitalis grandiflora* Mill. SCROPHULARIACEAE
Gratiola quartermaniae D. Estes
 SCROPHULARIACEAE
 **Datura innoxia* Mill. SOLANACEAE
 **Petunia parviflora* Juss. SOLANACEAE
 **Ulmus carpinifolia* Gled. ULMACEAE
 **Ulmus glabra* Huds. ULMACEAE
Viola rugulosa Greene VIOLACEAE
 **Yucca flaccida* Haworth AGAVACEAE
 **Allium aflatumense* B. Fedtsch ALLIACEAE
Allium canadense L. var. *lavendulare* (J.M. Bates) Own-
 bey & Aase ALLIACEAE
 **Allium giganteum* Regel ALLIACEAE
 **Allium tuberosum* Rottb. ex Spreng. ALLIACEAE
 **Narcissus jonquilla* L. AMARYLLIDACEAE
 **Pistia stratiotes* L. ARACEAE
Carex abscondita Mack. CYPERACEAE
Carex annectens (Bickn.) Bickn. CYPERACEAE
Carex arctata Boott CYPERACEAE
Carex aureolensis Steud. CYPERACEAE
Carex cherokeensis Schwein. CYPERACEAE
Carex complanata Torr. & Hook.
 CYPERACEAE
Carex copulata (Bailey) Mack. CYPERACEAE
Carex debilis Michx. CYPERACEAE
Carex echinodes (Fern.) P.E. Rothrock,
 Reznicek, & Hipp CYPERACEAE
Carex fissa Mack. CYPERACEAE
Carex flava L. CYPERACEAE
Carex gynandra Schwein. CYPERACEAE
Carex houghtoniana Torr. ex Dewey CYPERACEAE
Carex kraliana Naczi & Bryson CYPERACEAE
Carex leptonevia (Fern.) Fern. CYPERACEAE
Carex macropoda (Fern.) Mohlenbr.
 CYPERACEAE
Carex missouriensis P.E. Rothrock & Reznicek CYPER-
 ACEAE
Carex molestiformis Reznicek & P.E. Rothrock CYPER-
 ACEAE
Carex oklahomensis Mack. CYPERACEAE
Carex opaca (F.J. Hermann) P.E. Rothrock & Reznicek
 CYPERACEAE
Carex peckii Howe CYPERACEAE
Carex pseudocyperus L. CYPERACEAE
Carex rugosperma Mack. CYPERACEAE
Carex sangamonensis (Clokey) Mohlenbr.
 CYPERACEAE
Carex setacea Dewey CYPERACEAE
Carex timida Naczi & B.A. Ford CYPERACEAE
Carex triangularis Boeck. CYPERACEAE
Carex vaginata Tausch. CYPERACEAE
Eleocharis acicularis (L.) Roem. & Schultes var.
gracilescens Svenson CYPERACEAE
Eleocharis acicularis (L.) Roem. & Schultes var. *porcata*
 S.G. Smith CYPERACEAE
Eleocharis bella (Piper) Svenson
 CYPERACEAE
Hemicarpha aristulatus (Cov.) Smythe CYPERACEAE
 **Isolepis cernua* (Vahl) Roem. & Schultes
 CYPERACEAE
Schoenoplectus americanus (Pers.) Volkert ex Schinz &
 R. Keller CYPERACEAE
Schoenoplectus saximontanus (Fern.) J.Raynal CYPER-
 ACEAE
Scirpus cyperinus (L.) Kunth var. *pelius* Fern. CYPER-
 ACEAE
Scirpus rubricosus Fern. CYPERACEAE
 **Gladiolus X ganvadenis* Van Houtte IRIDACEAE
Iris fulva Ker. f. *fulvaurea* Small IRIDACEAE
 **Iris sibirica* L. IRIDACEAE
 **Juncus compressus* L. JUNCACEAE
Juncus debilis Gray JUNCACEAE
Juncus validus Coville JUNCACEAE
Lemna aequinoctialis Welw. LEMNACEAE
Wolffia globosa (Roxb.) Hartog & Plas. LEMNACEAE
 **Tulipa sylvatica* L. LILIACEAE
Corallorhiza maculata (Raf.) Raf. var.
occidentalis (Lindl.) Ames ORCHIDACEAE
Cypripedium parviflorum Salisb. var. *makasin* (Farw.)
 Sheviak ORCHIDACEAE
Aristida lanosa Muhl. ex Ell. POACEAE
Aristida purpurea Nutt. POACEAE
 **Bothriochloa bladhii* (Retz.) S.F. Blake POACEAE
 **Briza minor* L. POACEAE
 **Bromus diandrus* Roth ssp. *rigidus* (Roth) Lainz.
 POACEAE
Cenchrus spinifex Cav. POACEAE
 **Chloris virgata* Sw. POACEAE
Dichanthelium sabulorum (Lam.) Gould & C.A. Clark
 var. *patulum* (Scribn. & Merrill) Gould & C.A. Clark
 POACEAE
 **Eleusine tristachya* (Lam.) Lam. POACEAE
Elymus canadensis L. var. *brachystachys* (Scribn. & Ball)
 Farw. POACEAE
Elymus canadensis L. var. *robustus* (Scribn. & J.G. Sm.)
 Mack. & Bush POACEAE
Elymus diversiglumis Scribn. & C.R. Ball POACEAE
Elymus hirsutiglumis Scribn. POACEAE
Elymus jejunus (Ramaley) Rydb. POACEAE
Elymus macgregori R. Brooks & J.J.P. Campb.
 POACEAE
Glyceria declinata Breb. POACEAE
Glyceria melicaria (Michx.) F.T. Hubb. POACEAE
Glyceria X pedicellata F. Towns POACEAE
 **Miscanthus sinensis* Anderss. var. *gracillimus* Hitchc.
 POACEAE

Muhlenbergia schreberi J.F. Gmel. var. *palustris* (Scribn.) Scribn. POACEAE

**Nassella trichotoma* (Nees) Hack. & Arechav. POACEAE

**Paspalum urvillei* Steud. POACEAE

Phragmites australis (Cav.) Trin. var. *americana* Saltonstall, P.M. Peterson, & Soreng POACEAE

**Phyllostachys aurea* Carr. ex Riv. & Riv. POACEAE

**Rottboellia cochinchinensis* (Lour.) Clayton POACEAE

Schizachyrium littorale (Nash) E.P. Bickn. POACEAE

**Tridens albescens* (Vasey) Wootton & Standl. POACEAE

**Urochloa ramosa* (L.) T.Q. Nguyen POACEAE

Potamogeton bicupulatus Fern.

POTAMOGETONACEAE

Potamogeton X haynesii Hellq. & Crow POTAMOGETONACEAE

NOMENCLATURAL CHANGES FROM THIRD EDITION TO FOURTH EDITION

In the list that follows, each entry is preceded by the nomenclature used in the third edition, followed by the nomenclature used in the fourth edition. The sequence follows that used in the third edition.

Hymenophyllaceae

Trichomanes boschianum Sturm = *Vandenboschia boschia* (Sturm) Ebihara & K. Iwats.

Trichomanes intricatum Farrar = *Crepidomanes intricatum* (Farrar) Ebihara & Weakley

Lycopodiaceae

Botrychium biternatum (Sav.) Underw. = *Sceptridium biternatum* (Sav.) Lyon

Botrychium dissectum Spreng. var. *dissectum* = *Sceptridium dissectum* (Spreng.) Lyon var. *dissectum*

Botrychium dissectum Spreng. var. *obliquum* (Muhl.) Clute = *Sceptridium dissectum* (Spreng.) Lyon var. *obliquum* (Muhl.) Mohlenbr.

Botrychium multifidum (Gmel.) Rupr. = *Sceptridium multifidum* (Gmel.) Nishida & Tagawa

Botrychium oneidense (Gilb.) House = *Sceptridium oneidense* (Gilb.) Holub

Botrychium virginianum (L.) Sw. = *Botrypus virginianum* (L.) Michx.

Osmundaceae

Osmunda regalis L. var. *spectabilis* (Willd.) Gray = *Osmunda spectabilis* Willd.

Aceraceae

Acer rubrum L. var. *drummondii* Hook. & Arn. = *Acer drummondii* Hook. & Arn.

Aristolochiaceae

Aristolochia hastata Nutt. = *Endodeca hastata* (Nutt.) Raf.

Aristolochia serpentaria L. = *Endodeca serpentaria* (L.) Raf.

Asteraceae

Anthemis tinctoria L. = *Cota tinctoria* (L.) J. Gay ex Gussone

Arnoglossum muhlenbergii (Sch.-Bip.) Fern. = *Arnoglossum reniforme* (Hook.) H. Robins.

Artemisia campestris L. var. *caudata* (Michx.) Hall & Clem. = *Artemisia caudata* Michx.

Aster X amethystinus Nutt. = *Symphotrichum*

X amethystinum (Nutt.) G.L. Nesom

Aster anomalus Engelm. = *Symphotrichum anomalum* (Engelm. ex Torr. & Gray) G.L. Nesom

Aster borealis (Torr. & Gray) Prov. = *Symphotrichum boreale* (Torr. & Gray) A. Love & D. Love

Aster ciliolatus Lindl. = *Symphotrichum ciliolatum* (Lindl.) A. Love & D. Love

Aster concinnus Willd. = *Symphotrichum concinnum* (Willd.) Mohlenbr.

Aster cordifolius L. = *Symphotrichum cordifolium* (L.) G.L. Nesom

Aster drummondii Lindl. = *Symphotrichum drummondii* (Lindl.) G.L. Nesom

Aster dumosus L. = *Symphotrichum dumosum* (L.) G.L. Nesom

Aster ericoides L. var. *ericoides* = *Symphotrichum ericoides* (L.) G.L. Nesom var. *ericoides*

Aster ericoides L. var. *prostratus* (Ktze.) Blake = *Symphotrichum ericoides* (L.) G.L. Nesom var. *prostratum* (Kuntze) G.L. Nesom

Aster falcatus Lindl. = *Symphotrichum falcatum* (Lindl.) G.L. Nesom var. *commutatum* (Torr. & Gray) G.L. Nesom

Aster firmus = *Symphotrichum firmum* (Nees) G.L. Nesom

Aster furcatus Burgess = *Eurybia furcata* (Burgess) G.L. Nesom

Aster laevis L. = *Symphotrichum laeve* (L.) A. Love & D. Love

Aster lanceolatus Willd. var. *simplex* (Willd.) A.G. Jones = *Symphotrichum lanceolatum*

(Willd.) G.L. Nesom var. *lanceolatum*

Aster lanceolatus (Willd.) var. *interior* (Wieg.) Semple & Chmielewski = *Symphotrichum lanceolatum* (Willd.) G.L. Nesom var. *interior* (Wieg.) G.L. Nesom

- Aster lateriflorus* (L.) Britt. = *Symphytotrichum lateriflorum* (L.) G.L. Nesom, A. Love, & D. Love
Aster macrophyllus L. = *Eurybia macrophylla* (L.) Cass. in F. Cuv.
Aster novae-angliae L. = *Symphytotrichum novae-angliae* (L.) G.L. Nesom
Aster oblongifolius Nutt. = *Symphytotrichum oblongifolium* (Nutt.) G.L. Nesom
Aster ontarionis Wieg. = *Symphytotrichum ontarionis* (Wieg.) G.L. Nesom
Aster oolentangiensis Riddell var. *oolentangiensis* = *Symphytotrichum oolentangiense* (Riddell) G.L. Nesom var. *oolentangiense*
Aster oolentangiensis Riddell var. *laevicaulis* (Fern.) A.G. Jones = *Symphytotrichum oolentangiense* (Riddell) G.L. Nesom var. *laevicaule* (Fern.) Mohlenbr.
Aster parviceps (Burgess) Mack. & Bush = *Symphytotrichum parviceps* (E.S. Burgess) G.L. Nesom
Aster patens Aiton = *Symphytotrichum patens* (Ait.) G.L. Nesom
Aster phlogifolius Muhl. = *Symphytotrichum phlogifolium* (Muhl. ex Willd.) G.L. Nesom
Aster pilosus Willd. = *Symphytotrichum pilosum* (Willd.) G.L. Nesom var. *pilosum*
Aster praealtus Poir. var. *praealtus* = *Symphytotrichum praealtum* (Poir.) G.L. Nesom var. *praealtum*
Aster praealtus Poir. var. *angustior* Wieg. = *Symphytotrichum praealtum* (Poir.) G.L. Nesom var. *angustior* (Wieg.) G.L. Nesom
Aster praealtus Poir. var. *subasper* (Lindl.) Wieg. = *Symphytotrichum praealtum* (Poir.) G.L. Nesom var. *subasper* (Lindl.) G.L. Nesom
Aster prenanthoides Muhl. = *Symphytotrichum prenanthoides* (Muhl. ex Willd.) G.L. Nesom
Aster pringlei (Gray) Britt. = *Symphytotrichum pilosum* (Willd.) G.L. Nesom var. *pringlei* (Gray) G.L. Nesom
Aster puniceus L. = *Symphytotrichum puniceum* (L.) A. Love & D. Love
Aster racemosus L. = *Symphytotrichum racemosum* (L.) G.L. Nesom var. *subdumosum* (Wieg.) G.L. Nesom
Aster sagittifolius Willd. = *Symphytotrichum urophyllum* (Lindl. ex DC.) G.L. Nesom
Aster schreberi Nees = *Eurybia schreberi* (Nees) Nees
Aster sericeus Vent. = *Symphytotrichum sericeum* (Vent.) G.L. Nesom
Aster shortii Lindl. = *Symphytotrichum shortii* (Lindl.) G.L. Nesom
Aster subulatus Michx. = *Symphytotrichum subulatum* (Michx.) G.L. Nesom
Aster turbinellus Lindl. = *Symphytotrichum turbinellum* (Lindl.) G.L. Nesom
Aster undulatus L. = *Symphytotrichum undulatum* (L.) G.L. Nesom
Aster urophyllum Lindl. = *Symphytotrichum urophyllum* (Lindl.) G.L. Nesom
Balsamita major Desf. = *Tanacetum balsamita* L.
Bidens coronata (L.) Britt. var. *coronata* = *Bidens trichosperma* (Michx.) Britt. var. *trichosperma*
Bidens coronata (L.) Britt. var. *tenuiloba* (Gray) Sherff = *Bidens trichosperma* (Michx.) Britt. var. *tenuiloba* (Gray) Britt.
Centaurea americana Nutt. = *Plectocephalus americanus* (Nutt.) D. Don in R. Sweet
Cirsium hillii (Canby) Fern. = *Cirsium pumilum* (Nutt.) Spreng. var. *hillii* (Canby) C. Boivin
Cnicus benedictus L. = *Centaurea benedicta* (L.) L.
Coreopsis lanceolata L. var. *villosa* Michx. = *Coreopsis crassifolia* Ait.
Doellingeria sericocarpa Small = *Doellingeria pubens* (Gray) Rydb.
Eupatoriadelphus fistulosus (Barratt) R.M. King & H. Robins = *Eutrochium fistulosum* (Barratt) E.E. Lamont
Eupatoriadelphus maculatus (L.) R.M. King & H. Robins = *Eutrochium maculatum* (L.) E.E. Lamont
Eupatoriadelphus purpureus (L.) R.M. King & H. Robins var. *purpureus* = *Eutrochium purpureum* (L.) E.E. Lamont var. *purpureum*
Eupatoriadelphus purpureus (L.) R.M. King & H. Robins. var. *holzingeri* (Rydb.) R.M. King & H. Robins. = *Eutrochium purpureum* (L.) E.E. Lamont var. *holzingeri* (Rydb.) E.E. Lamont
Euthamia remota Greene = *Euthamia caroliniana* Greene ex Porter & Britt.
Hieracium canadense Michx. var. *fasciculatum* (Pursh) Fern. = *Hieracium umbellatum* L.
Iva xanthifolia Nutt. = *Cyclachaena xanthifolia* (Nutt.) Fres.
Krigia caespitosa (Raf.) Chambers = *Serinia caespitosa* Raf.
Lactuca pulchella (Pursh) DC. = *Mulgedium pulchellum* (Pursh) G. Don in R. Sweet
Leontodon taraxicoides (Villars) Marat. = *Leontodon saxatilis* L.
Liatris squarrosa (L.) Michx. var. *hirsuta* (Rydb.) Gaiser = *Liatris hirsuta* Rydb.
Matricaria recutita L. = *Matricaria chamomilla* L.
Oligoneuron rigidum (L.) Small var. *humile* (T.C. Porter) Nesom = *Oligoneuron canescens* Rydb.
Picris echioides L. = *Helminotheca echioides* (L.) Holub
Prenanthes alba L. = *Nabalus albus* (L.) Hook.
Prenanthes altissima L. var. *altissima* = *Nabalus altissimus* (L.) Hook. var. *altissimus*
Prenanthes altissima L. var. *cinnamomea* Fern. = *Nabalus altissimus* (L.) Hook. var. *cinnamomeus* (Fern.) Mohlenbr.
Prenanthes asper Michx. = *Nabalus asper* (Michx.) Torr. & Gray
Prenanthes crepidinea Michx. = *Nabalus crepidineus* (Michx.) DC.
Prenanthes racemosa Michx. var. *racemosa* = *Nabalus racemosus* (Michx.) Hook. var. *racemosus*

- Prenanthes racemosa* Michx. var. *multiflora* (Cronq.)
Cronq. = *Nabalus racemosus* (Michx.) Hook. var.
multiflorus (Cronq.) Mohlenbr.
Pseudognaphalium viscosum (HBK.) W.A. Weber =
Pseudognaphalium macounii (Greene) Kartesz
Rudbeckia fulgida Ait. var. *deamii* (Blake) Perdue =
Rudbeckia deamii S.F. Blake
Rudbeckia hirta L. var. *pulcherrima* Fern. = *Rudbeckia*
serotina Nutt. var. *serotina*
Senecio aureus L. var. *gracilis* (Pursh) Wood = *Packera*
aurea (L.) A. Love & D. Love
Senecio aureus L. var. *intercurus* Fern. = *Packera aurea*
(L.) A. Love & D. Love
Senecio glabellus Poir. = *Packera glabella* (Poir.) C. Jef-
frey
Senecio obovatus Muhl. = *Packera obovata* (Muhl. ex
Willd.) W.A. Weber & A. Love
Senecio pauperculus Michx. = *Packera paupercula*
(Michx.) A. Love & D. Love
Senecio plattensis Nutt. = *Packera plattensis* (Nutt.)
W.A. Weber & A. Love
Senecio pseudoreus Rydb. var. *semicordatus* (Mack. &
Bush) T.M. Barkley = *Packera pseudoreus* (Rydb.)
W.A. Weber & A. Love var. *semicordata* (Mack. &
Bush) Trock & T.M. Barkley
Solidago canadensis L. var. *gilvocanescens* Rydb. = *Sol-*
idago canadensis L. var. *canadensis*
Solidago missouriensis Nutt. var. *missouriensis* = *Sol-*
idago glaberrima M. Martens
Solidago missouriensis Nutt. var. *fasciculata* Holz. = *Sol-*
idago glaberrima M. Martens
Solidago petiolaris Ait. var. *angusta* (Torr. & Gray) Gray
= *Solidago angusta* (Torr. & Gray) Gray
Solidago rugosa Mill. var. *aspera* (Ait.) Fern. = *Solidago*
aspera Ait.
Solidago speciosa Nutt. var. *jejuniifolia* (Steele)
Cronq. = *Solidago jejuniifolia* Steele
Solidago speciosa Nutt. var. *rigidiuscula* Torr. & Gray =
Solidago rigidiuscula (Torr. & Gray) Porter
Sonchus arvensis L. var. *glabrescens* Grab. & Wimm. =
Sonchus uliginosus Bieb.
Tagetes patula L. = *Tagetes erecta* French
Tripleurospermum perforatum (L.) Lainz = *Tripleuros-*
permum inodorum (L.) Sch.-Bip.
Verbesina alternifolia (L.) Britt. = *Actinomeris alternifo-*
lia (L.) Benth.
Verbesina encelioides (Cav.) Benth. & Hook. = *Ximene-*
sia encelioides Cav.
Verbesina helianthoides Michx. = *Actinomeris helian-*
thoides (Michx.) Nutt.

Betulaceae

- Alnus incana* (L.) Muench. var. *americana* Regel = *Alnus*
rugosa (DuRoi) Spreng.

Boraginaceae

- Onosmodium molle* Michx. var. *hispidissimum* (Mack.)
Cronq. = *Onosmodium molle* Michx.
Onosmodium molle Michx. var. *occidentale* (Mack.)
Cochrane = *Onosmodium occidentale* Mack.

Brassicaceae

- Arabis divaricarpa* A. Nelson = *Bocchera grahamii*
(Lehmann) Windham & Al Shehbaz
Arabis drummondii Gray = *Boechera stricta* (Graham)
Al-Shehbaz
Arabis glabra (L.) Benth. = *Turritis glabra* L.
Arabis laevigata (Willd.) Poir. = *Bocchera laevigata*
(Muhl. ex Willd.) Al Shehbaz
Arabis lyrata L. = *Arabidopsis lyrata* (L.) O'Kane & I
Shehbaz
Arabis shortii (Fern.) Gl. var. *shortii* = *Boechera dentata*
(Raf.) Al-Shehbaz var. *dentata*
Arabis shortii (Fern.) Gl. var. *phalarocarpa* (M. Hopkins)
Steyerm. = *Boechera dentata* (Raf.) Al-Shehbaz var.
phalarocarpa (M. Hopkins) Mohlenbr.
Cardaria draba (L.) Desr. = *Lepidium draba* L.
Coronopus didymus (L.) Sm. = *Lepidium didymum* L.
Eriophila verna (L.) Chev. ssp. *verna* = *Draba verna* L.
ssp. *verna*
Eriophila verna (L.) Chev. ssp. *praecox* (Stevens) S.M.
Walters = *Draba verna* L. ssp. *praecox* Stevens
Lesquerella gracilis (Hook.) S. Wats. = *Physaria gracilis*
(Hook.) O'Kane & Al-Shehbaz
Lesquerella ludoviciana (Nutt.) S. Wats. = *Physaria*
ludoviciana (Nutt.) O'Kane & Al-Shehbaz
Sibaria virginica (L.) Rollins = *Planodes virginica* (L.)
Greene
Thlaspi perfoliatum L. = *Microthlaspi perfoliatum* (L.)
F.K. Meyer

Cactaceae

- Coryphantha missouriensis* (Sweet) Britt. & Rose = *Es-*
cobaria missouriensis (Sweet) D.R. Hunt

Capparaceae = Cleomaceae

- Cleome hassleriana* Chod. = *Tarenaya hassleriana*
(Chod.) H.H. Iltis
Cleome serrulata Pursh = *Peritoma serrulata* (Pursh)
DC.
Polanisia dodecandra (L.) DC. ssp. *dodecandra* =
Polanisia dodecandra (L.) DC.
Polanisia dodecandra (L.) DC. ssp. *trachysperma* (Torr.
& Gray) Iltis = *Polanisia trachysperma* Torr. & Gray

Caprifoliaceae

- Sambucus canadensis* L. var. *canadensis* = *Sambucus nigra* L. var. *nigra*
Sambucus canadensis L. var. *submollis* Rehd. = *Sambucus nigra* L. var. *submollis* Rehd.

Caryophyllaceae

- Cerastium arvense* L. var. *villosum* Holl. & Britt. = *Cerastium velutinum* Raf.
Lycnis chalconica L. = *Silene chalconica* (L.) E.H.L. Krause in J. Sturm
Lycnis coronaria (L.) Desr. = *Silene coronaria* (L.) E.H.L. Krause in J. Sturm
Silene pratensis (Spreng.) Godron & Gren. = *Silene latifolia* Poiret
Spergularia marina (L.) Griseb. = *Spergularia salina* J. Presl & C. Presl
Spergularia rubra (L.) J. Presl & C. Presl = *Spergularia maritima* Chiov.

Celastraceae

- Euonymus fortunei* (Turcz.) Hand.-Mazz. = *Euonymus hederaceus* Champ. ex Benth.

Chenopodiaceae

- Chenopodium ambrosioides* L. = *Dysphania ambrosioides* (L.) Mosakin & Clemants
Chenopodium botrys L. = *Dysphania botrys* (L.) Mosyakin Clemants
Chenopodium pumilio R. Br. = *Dysphania pumilio* (R. Br.) Mosyakin & Clemants
Corispermum hyssopifolium L. = *Corispermum americanum* (Nutt.) Nutt.
Corispermum orientale Lam. var. *emarginatum* (Rydb.) J.F. Macbr. = *Corispermum villosum* Rydb.
Salicornia europaea L. = *Salicornia rubra* A. Nels.

Crassulaceae

- Sedum X erythrostichum* Miq. = *Hylotelephium X erythrostichum* (Miq.) H. Ohba
Sedum spurium M. Bieb. = *Phedimus spurium* (M. Bieb.) 't Hart
Sedum telephioides Michx. = *Hylotelephium telephioides* (Michx.) H. Ohba
Sedum telephium L. = *Hylotelephium telephium* (L.) H. Ohba

Ericaceae

- Vaccinium macrocarpon* Ait. = *Oxycoccus macrocarpus* (Ait.) Pers.

Vaccinium oxycoccus L. = *Oxycoccus microcarpus* Turcz.

Escalloniaceae = Iteaceae**Fabaceae**

- Pueraria lobata* (Willd.) Ohwi = *Pueraria montana* (Lour.) Merr.

Gentianaceae

- Gentianopsis procera* (Holm) Ma = *Gentianopsis virgata* (Raf.) Holub

Grossulariaceae

- Ribes odoratum* Wendl. f. = *Ribes aureum* Pursh. var. *villosum* (Pursh) DC.

Lamiaceae

- Calamintha arkansana* (Nutt.) Shinnars = *Clinopodium arkansanum* (Nutt.) House
Pycnanthemum pilosum Nutt. = *Pycnanthemum verticillatum* (Michx.) Pers.
Salvia nemorosa L. = *Salvia sylvestris* L.

Myricaceae

- Myrica cerifera* L. = *Morella cerifera* (L.) Small

Onagraceae

- Epilobium angustifolium* L. = *Chamerion angustifolium* (L.) Holub

Polygalaceae

- Polygala verticillata* L. var. *ambigua* (Nutt.) Wood = *Polygala ambigua* Nutt.

Polygonaceae

- Persicaria cespitosa* (Blume) Nakai = *Persicaria longiseta* (DeBruyn) Kitagawa
Persicaria densiflora (Meisn.) Moldenke = *Persicaria glabra* (Willd.) M. Gomez
Persicaria vulgaris Webb & Moq. = *Persicaria maculosa* S.F. Gray
Rheum rhaponticum L. = *Rheum rhabarbarum* L.
Rumex maritima L. var. *fueginus* (Phil.) Dusen = *Rumex fueginus* Phil.
Rumex orbiculatus Gray = *Rumex brittanica* L.

Portulacaceae

- Talinum calycinum* Engelm. = *Phemeranthus calycinus* (Engelm.) Kiger

Talinum parviflorum Nutt. = *Phemeranthus parviflorus*
(Nutt.) Kiger

Talinum rugospermum Holz. = *Phemeranthus rugosper-*
mus (Holz.) Kiger

Primulaceae

Lysimachia ciliata L. = *Steironema ciliatum* (L.) Bando

Lysimachia hybrida Michx. = *Steironema hybridum*
(Michx.) Raf.

Lysimachia lanceolata Walt. = *Steironema lanceolatum*
(Walt.) Gray

Lysimachia quadriflora Sims = *Steironema quadriflorum*
(Sims) Hitchc.

Lysimachia radicans Hook. = *Steironema radicans*
(Hook.) Gray

Lysimachia thyrsoiflora L. = *Naumbergia thyrsoiflora* (L.)
Reich.

Rosaceae

Aronia melanocarpa (Michx.) Ell. = *Photinia*
melanocarpa (Michx.) Robertson & Phipps.

Aronia prunifolia (Marsh.) Rehd. = *Photinia prunifolia*
(Marsh.) Robertson & Phipps

Malus sieboldii (Regel) Rehd. = *Malus toringa*
(Sieb.) Sieb. ex deVereis

Pentaphylloides floribunda (Pursh) A. Love = *Dasiphora*
fruticosa (L.) Rydb. ssp. *floribunda* (Pursh) Kartesz

Potentilla arguta Pursh = *Drymocallis arguta* (Pursh)
Rydb.

Prunus susquehanae Willd. = *Prunus pumila* L.

Rosa rubrifolia L. = *Rosa ferruginea* L.

Rubus discolor Weihe & Nees = *Rubus armeniicus* Focke

Salicaceae

Salix discolor Muhl. var. *latifolia* Anderss. = *Salix X*
conifera Wangenh.

Salix glaucophylloides Fern. var. *glaucophylla* (Bebb)
Schneid. = *Salix myricoides* Muhl.

Salix syrticola Fern. = *Salix cordata* Michx.

Saxifragaceae

Penthorum L. Now in Penthoraceae

Saxifraga forbesii Vasey = *Micranthes forbesii* (Vasey)
Mohlenbr.

Saxifraga pensylvanica L. = *Micranthes*
pensylvanica (L.) Haworth

Saxifraga virginensis Michx. = *Micranthes virginensis*
(Michx.) Small

Scrophulariaceae

Paulownia L. Now in Paulowniaceae

Solanaceae

Solanum sarachoides Sendtn. = *Solanum physalifolium*
Rusby

Verbenaceae

Verbena brasiliensis Vellozo = *Verbena litoralis* Kunth

Violaceae

Viola conspersa Reichenb. = *Viola labradorica* Schrank

Amaryllidaceae

Hypoxis L. Now in Hypoxidaceae

Cyperaceae

Carex amphibola Steud. var. *globosa* L.H. Bailey =
Carex corrugata Fern.

Carex amphibola Steud. var. *rigida* (L.H. Bailey) Fern.
= *Carex planispicata* Naczi

Carex debilis Michx. var. *rudgei* Bailey = *Carex flexuosa*
Muhl. ex Willd.

Carex foenea Willd. var. *foenea* = *Carex siccata* Dewey
var. *siccata*

Carex foenea Willd. var. *enervis* Evans & Mohlenbr. =
Carex siccata Dewey var. *enervis* (Evans & Mohlenbr.)
Mohlenbr.

Carex granularis Muhl. var. *haleana* (Olney) Porter =
Carex haleana Olney

Carex gravida L.H. Bailey var. *lunelliana* (Mack.) F.J.
Hermann = *Carex lunelliana* Mack.

Carex mühlenbergii Schk. var. *austrina* Small = *Carex*
austrina (Small) Mack.

Carex mühlenbergii Schk. var. *enervis* Boott = *Carex*
plana Mack.

Carex stenophylla Wahl. var. *enervis* (C.A. Mey.)
Kukenth. = *Carex duriuscula* C.A. Mey.

Eleocharis ovata (Roth) Roth & Schultes var. *detonsa*
(Gray) Mohlenbr. = *Eleocharis engelmannii* Steud.

Eleocharis ovata (Roth) Roem. & Schultes var. *obtusata*
(Willd.) Kukenth. = *Eleocharis obtusata* (Roth) Schultes

Trichophorum verecundum (Fern.) Mohlenbr. = *Tri-*
chophorum planifolium (Spreng.) Palla

Dioscoreaceae

Dioscorea oppositifolia L. = *Dioscorea polystachys*
Turez.

Juncaceae

Juncus balticus Willd. var. *littoralis* Engelm. =

Juncus arctatus L. var. *balticus* (Willd.) Trautv.

Lemnaceae

Lemna miniuscula Hertel = *Lemna minuta* HBK.

Liliaceae

Aletris L. Now in Nartheciaceae
Allium L. Now in Alliaceae
Asparagus L. Now in Asparagaceae
Camassia Lindl. Now in Hyacinthaceae
Chamaelirium Willd. Now in Melanthiaceae
Chionodoxa Boiss. Now in Hyacinthaceae
Chionodoxa forbesii Baker = *Chionodoxa luciliae* Boiss.
Convallaria L. Now in Ruscaceae
Hemerocallis L. Now in Hemerocallaceae
Liriope L. Now in Nartheciaceae
Maianthemum Weber Now in Ruscaceae
Medeola L. Now in Trilliaceae
Malanthium L. Now in Melanthiaceae
Muscari L. Now in Hyacinthaceae
Nothoscorsum Kunth Now in Alliaceae
Ornithogalum L. Now in Hyacinthaceae
Polygonatum Mill. Now in Ruscaceae
Scilla L. Now in Hyacinthaceae
Smilacina Desf. Now in Ruscaceae
Stenanthium Gray Now in Melanthiaceae
Tofieldia Huds. Now in Tofieldiaceae
Tofieldia glutinosa (Michx.) Pers. = *Triantha glutinosa* Michx.
Trillium L. Now in Trilliaceae
Uvularia L. Now in Colchicaceae
Vereatrum L. Now in Melanthiaceae
Zigadenus Michx. Now in Melanthiaceae
Zigadenus venenosus S. Wats. var. *gramineus* (Rydb.) Walsh = *Zigadenus elegans* Pursh

Orchidaceae

Cypripedium parviflorum Salisb. = *Cypripedium parviflorum* Salisb. var. *parviflorum*
Cypripedium parviflorum Salisb. = *Cypripedium parviflorum* Salisb. var. *pubescens* (Willd.) O.W. Knight
Platanthera hyperborea (L.) Lindl. var. *huronensis* (Nutt.) Luer = *Platanthera aquilonis* Sheviak
Platanthera psycodes (L.) Lindl. Name is correct. I erred in calling it *Platanthera fissa* (Muhl. ex Willd.) Lindl.
Spiranthes ovalis Lindl. = *Spiranthes ovalis* Lindl. var. *erostellata* Catling

Poaceae

Bothriochloa saccharoides (Swartz) Rydb. = *Bothriochloa laguroides* (DC.) Herter.
Calamagrostis neglecta (Ehrh.) Gaertn. = *Calamagrostis stricta* (Timm.) Koeler

Dichantherium acuminatum (Sw.) Gould & Clark var. *implicatum* (Scribn.) Gould & Clark = *Dichantherium implicatum* (Scribn.) Kerguelen
Dichantherium commutatum (Schult.) Gould var. *ashei* (Fern.) Mohlenbr. = *Dichantherium ashei* (T.G. Pearson in Ashe) Mohlenbr.
Dichantherium linearifolium (Scribn.) Gould var. *wernerii* (Scribn.) Mohlenbr. = *Dichantherium wernerii* (Scribn.) Mohlenbr.
Dichantherium meridionale (Ashe) Freckm. var. *albemarlense* (Ashe) Mohlenbr. = *Dichantherium albemarlense* (Ashe) Mohlenbr.
Dichantherium oligosanthes (Schult.) Gould var. *helleri* (Nash) Mohlenbr. = *Dichantherium helleri* (Nash) Mohlenbr.
Dichantherium oligosanthes (Schult.) Gould var. *scribnerianum* (Nash) Gould = *Dichantherium scribnerianum* (Nash) Gould
Dichantherium villosissimum (Nash) Freckm. var. *pseudopubescens* (Nash) Mohlenbr. = *Dichantherium pseudopubescens* (Nash) Mohlenbr.
Elymus virginicus L. var. *glabriflorus* (Vasey) Bush = *Elymus flabriflorus* (Vasey ex L.H. Dewey) Scribn. & Ball
Elymus virginicus L. var. *submuticus* Hook. = *Elymus curvatus* Piper
Eragrostis glomerata (Walt.) L.H. Dewey = *Eragrostis japonica* L.
Eragrostis neomexicana Vasey = *Eragrostis mexicana* (Hornem.) Link
Hordeum geniculatum All. = *Hordeum marinum* Huds.
Panicum anceps Michx. = *Coleataenia anceps* (Michx.) Soreng
Panicum longifolium Torr. = *Coleataenia longifolia* (Torr.) Soreng
Panicum obtusum Kunth = *Hopia obtusa* (Kunth) Zuloaga & Morrone
Panicum rigidulum Bosc var. *rigidulum* = *Coleataenia rigidula* (Bosc ex Nees) LeBlond
Panicum rigidulum Bosc var. *candensum* (Nash) Mohlenbr. = *Coleataenia condensa* (Nash) Mohlenbr.
Panicum stipitatum Nash = *Coleataenia stipitata* (Nash) LeBlond
Paspalum lentiferum Lam. = *Paspalum praecox* Walt.
Pennisetum americanum (L.) Leeke = *Pennisetum glaucum* (L.) R. Br.
Setaria geniculata (Lam.) P. Beauv. = *Setaria parviflora* (Lam.) Kerg.
Setaria glauca (L.) P. Beauv. = *Setaria pumila* (Poir.) Roem. & Schultes

FAMILY NAME CHANGES

Iteaceae – Change from Escalloniaceae
 Penthoraceae – Segregated from Saxifragaceae
 Paulowniaceae – Segregated from Scrophulariaceae

Alliaceae – Segregated from Liliaceae
 Asparagaceae – Segregated from Liliaceae
 Colchicaceae – Segregated from Liliaceae
 Hemerocallaceae – Segregated from Liliaceae
 Hyacinthaceae – Segregated from Liliaceae
 Hypoxidaceae – Segregated from Amaryllidaceae
 Melanthiaceae – Segregated from Liliaceae
 Nartheciaceae – Segregated from Liliaceae
 Ruscaceae – Segregated from Liliaceae
 Tofieldiaceae – Segregated from Liliaceae
 Trilliaceae – Segregated from Liliaceae

PLANTS EXCLUDED FROM THE ILLINOIS FLORA

Dryopteridaceae

Gymnocarpium X brittonianum (Sarvela) Pryer & Haufler

Asteraceae

Hieracium venosum L.
Xanthium strumarium L. var. *strumarium*
Xanthium strumarium L. var. *canadense* (Mill.)
 Torr. & Gray
Xanthium strumarium L. var. *glabratum* (DC.) Cronq.

Caprifoliaceae

Viburnum nudum L.

Fabaceae

Centrosema virginianum (L.) Benth.

Lamiaceae

Agastache foeniculum (Pursh) Ktze.
Stachys clingmanii Small

Polygonaceae

Eriogonum annuum Nutt.

Scrophulariaceae

Veronica agrestis L.

Violaceae

Viola emarginata (Nutt.) LeConte

Vitaceae

Vitis rupestris Scheele

Cyperaceae

Carex tinctoria (Fern.) Fern.

Potamogetonaceae

Stuckenia vaginata (Turcz.) Holub

REFLECTIONS ON THE FLORA OF ILLINOIS

I want to reflect over nearly seventy years of botanizing in Illinois. During my junior year at Murphysboro (Illinois) Township High School (1947-48), I reluctantly took my first biology class. My great fortune was that my biology teacher was Miss E. Esther Smith (a native of Batavia, Illinois). During the first week of class, Miss Smith mentioned that anyone interested in learning more about plants and/or animals could come into her laboratory during free hours and after school. I elected to take advantage of this invitation, and it was the beginning of a love for plants that I have had for the rest of my life. Miss Smith, using her own time and vehicle, offered to take those interested on field trips during the weekends and during the summer. There were six other boys who took advantage of this offer, and each of us eventually went on to receive doctoral degrees in either botany or zoology and to teach and do research at a major institution of higher learning.

During my final two years of high school, I chose to learn about every kind of native tree that grew in southern Illinois. It was during that time that I rediscovered (along with the help of my father) the location of *Cladrastis kentukea* (yellowwood tree) in Alexander County and the rediscovery of the second location for *Pinus echinata* (shortleaf pine) at Piney Creek Ravine along the Jackson-Randolph county line. It was during my first trip to Piney Creek that I found my first Illinois state record – *Ranunculus harveyi* (Harvey's buttercup). On my next trip I discovered *Asplenium bradleyi* (Bradley's spleenwort), a fern new to Illinois. These exciting discoveries, while I was still a teenager, spurred me on to a career in field botany. I published my first scientific paper in 1953, at the age of 21, in the journal *Rhodora*, and I decided I would like to write a Flora of Southern Illinois. All during my college experiences at Southern Illinois University and Washington University in St. Louis, where I obtained my doctorate, I was busy working on my southern Illinois flora in addition to my doctoral research on the leguminous genus *Stylosanthes*.

When I received my doctorate in January, 1957, at the age of 25, I was hired to teach botany at Southern Illinois University. I spent thirty-four years at SIU, serving as Chairman of the Department of Botany for sixteen of those years. During that time, I was major professor for ninety masters and doctoral students who, among themselves, have written sixty-two books. In 1957, Dr. John W. Voigt became my co-author of *A Flora of*

Southern Illinois, published by the Southern Illinois University Press. The next year I decided I would like to write *The Illustrated Flora of Illinois*, where every species of plant in Illinois would be described and fully illustrated by a botanical illustrator. No state had ever had such a project, and most of my colleagues scoffed that such an undertaking could not be authored by one person. In 1963, the first volume, *Ferns*, was published in *The Illustrated Flora of Illinois* series. At the time of this writing, twenty-one volumes have been published and two additional volumes on the Asteraceae are nearing publication. I have had at least one publication each year for 64 consecutive years.

After G. Neville Jones decided not to continue his flora of Illinois, I took it upon myself to become the guardian of the spontaneous flora of Illinois. In 1975, I published my first *Guide to the Vascular Flora of Illinois*, with subsequent editions in 1986, 2002, and 2014. Many plants have been added to the Illinois flora during this time. All of my identifications are based on morphological features exhibited by the plants. New tools for classifying plants are always being tried. Many years ago, counting chromosomes was the thing to do. The DNA profiles later became the rage among some botanists. Now, the angiosperm group is using narrow phytochemical characters to reorganize the classification of flowering plants. Each of these tools provides more information about plants, but none is more important than the overall morphology of each species. My fourth edition of *A Field Guide to the Vascular Flora of Illinois* still relies upon the morphological characteristics of each species, and not the phytochemical or chromosome makeup of each species.

Through the years there have been numerous name changes for Illinois plants. When a different name is proposed, I read carefully the publication and decide for myself if I believe the study has valid conclusions and in line with my concept of species. I often agree with the name changes, regardless of the inconvenience some of these changes bring about. Thus I do follow the more recent treatments of *Aster*, *Polygonum*, and others. On the other hand, I do not accept some name changes I feel are not warranted based upon morphological characteristics, such as placing *Smilacina* into *Maianthemum*, *Dodecatheon* into *Primula*, and a few others.

I also have made several changes from traditional concepts, particularly in the genera *Symphotrichum*

(asters), *Solidago* (goldenrods), *Rudbeckia* (black-eyed Susans), *Xanthium* (cocklebur), *Verbesina* (wingstems), *Lysimachia* (loosestrifes), *Persicaria* (knotweeds and smartweeds), *Nabalus* (white lettuces), and *Carex* (sedges). My species concepts are reflected in the fourth edition of *A Field Guide to the Vascular Flora of Illinois*, and my reasoning for my views about *Symphotrichum*, *Solidago*, *Rudbeckia*, *Verbesina*, *Xanthium*, and *Nabalus* are explained in the forthcoming volumes on the Asteraceae in *The Illustrated Flora of Illinois* series. The first of these volumes was published in March, 2015, my sixty-fourth book.

Ever since my publication of my fourth edition of Illinois vascular plants in 2014, I continue to see where additional changes should be made, based on a more careful study of the morphology of the plants involved. I now believe that three species of *Desmodium* – *D. glutinosum* (Michx. ex Willd.) Wood, *D. nudiflorum* (L.) DC., *D. pauciflorum* (Nutt.) DC. – should be placed in the genus *Hylodesmum*, becoming *H. glutinosum* (Muhl. ex Willd.) Ohasi & R.R. Mill., *H. nudiflorum* (L.) Ohasi & R.R. Mill., and *H. pauciflorum* (Nutt.) Ohasi & R.R. Mill., respectively. I now believe that *Dalea candida* (Michx.) Willd., *D. foliosa* (Gray) Barneby, and *D. purpurea* Vent. should be returned to the genus *Petalostemum*, becoming *Petalostemum candidum* Michx., *P. foliosum* Gray, and *P. purpureum* (Vent.) Rydb., respectively. I also now believe that *Festuca arundinacea* Schreb. and *Festuca pratensis* Huds. should be transferred to *Schenodorus*, thus becoming *Schenodorus arundinaceus* (Schreb.) Dumort and *S. pratensis* (Huds.) Holub.

When compiling a state flora, it is customary to include all native species that have been collected in the state, even though that species may not have been found in recent years. The flora also includes non-native species. The rule of thumb for including non-natives is that each species must have germinated on its own and must have persisted for more than one year. Unfortunately, this has led to some questionable members of our spontaneous flora. To site a few examples, I was reluctant to include *Metasequoia glyptostroboides* Hu & W.C. Cheng since the record is based on a seedling that came up and persisted near an obviously planted ornamental that provided the seed source. Other plants among very many that have “escaped” from cultivation and included in the flora include *Tulipa sylvestris* L., *Ginkgo biloba* L., and *Lagerstroemia indica* L.

KYLLINGA GRACILLIMA: A PLANT NEW TO ILLINOIS

John Van Dyk¹

ABSTRACT: A new Illinois sedge, *Kyllinga gracillima*, is reported from Williamson County.

On September 28, 2014, I discovered an extensive growth of *Kyllinga gracillima* in a large moist depression behind the First Presbyterian Church on Carbon Street in Marion (Williamson County). At first I thought I was seeing a diminutive form of *Cyperus lupulinus* (*filiculmis*), but a closer look revealed it to be *Kyllinga*. Subsequently the identification was confirmed by Gordon Tucker (who wrote the section on the genus *Kyllinga* for the *Flora of North America*) and George Yatskievych (Missouri Botanical Garden). Specimens were deposited at Southern Illinois University (SIU), Illinois Natural History Survey (INHS), Eastern Illinois University (EIU) and Missouri Botanical Garden (MBG) herbaria.

Kyllinga gracillima is a relatively low-growing plant (aerial stems up to about 20 cm), the spikelets show only two scales, and two, not three stigmas. The rhizomes and the solitary spikes distinguish it from *K. pumila*. Yatskievych (1999) states that *K. gracillima* is closely related to *K. brevifolia*. The latter, however, is a more southern species (it does not occur in Kentucky or Missouri).

This plant is not listed in the Mohlenbrock's current edition (2014) of *Vascular Flora of Illinois*, and from various sources it appears that it has not yet been reported in Illinois. In Missouri it has been found in St. Charles County (Yatskievych 1999). Ronald Jones (2005) reports it as frequent across Kentucky. The USDA Plant database shows that it occurs in Indiana.

The plant rapidly is covering a large area (which appears to have been mowed) and invading the grassy sites nearby. Other plants in the area are *Commelina diffusa*, *Persicaria cespitosa*, *Oxalis* sp., *Trifolium* sp. and various weedy grasses, including *Setaria* and *Digitaria* species.

This plant may be invasive. If so, some control measures may be in order.

ACKNOWLEDGMENTS

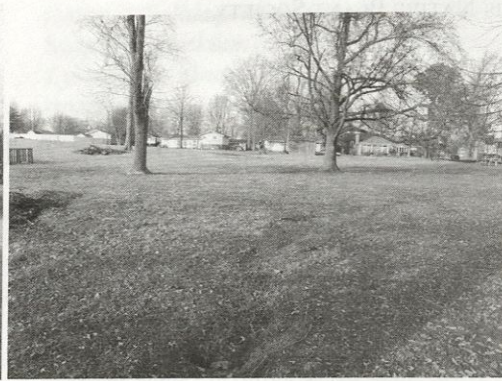
I thank George Yatskievych and Gordon Tucker for confirming my identification of the species.

LITERATURE CITED

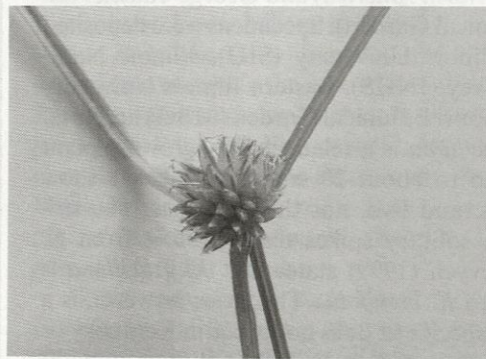
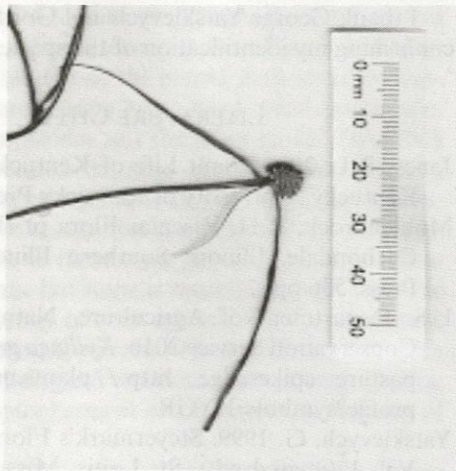
- Jones, R.L. 2005. Plant Life of Kentucky. Lexington, Kentucky: University of Kentucky Press. 814 pp.
- Mohlenbrock, R.H. Vascular Flora of Illinois. 4th ed. Carbondale, Illinois: Southern Illinois University Press. 536 pp.
- U.S. Department of Agriculture, Natural Resources Conservation Service 2016. *Kyllinga gracillima* Miq., pasture spikesedge. <http://plants.usda.gov/core/profile?symbol=KYGR>
- Yatskievych, G. 1999. Steyermark's Flora of Missouri. Vol. 1 (revised ed.). St. Louis, Missouri: Missouri Department of Conservation and Missouri Botanical Garden Press. 991 pp.

Dr. John Van Dyk is a retired Professor of Philosophy. In addition to his scholarly work in philosophy, he is a skilled naturalist and amateur botanist with special interests in graminoids (including grasses and cyperaceous plants). Since moving to southern Illinois, he has been working on a floristic update of plants at Crab Orchard National Wildlife Refuge. His treatment of monocots is nearly complete and should appear in a future issue of *Erigenia*.

¹12565 Sarilda Lane, Marion IL 62959
drjohnvandyk@gmail.com



Plates 1 and 2. *Kyllinga gracillima* collection site, west of First Presbyterian Church (Marion)



Plates 3 and 4. *Kyllinga gracillima* globose spike

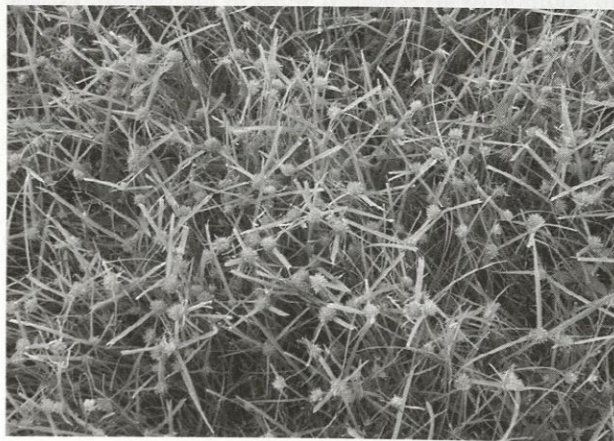


Plate 5. *Kyllinga gracillima* habit (mat)



Plate 6. *Kyllinga gracillima* habit (rhizomes)

ILLINOIS FLORA UPDATES: NEW DISTRIBUTION RECORDS AND OTHER NOTEWORTHY FINDS

By Illinois Native Plant Society Flora Update Committee

We propose this feature in *Erigenia* as a solution to several issues:

1. Many new distribution records, especially county distribution records, are never published and thus remain unknown to those studying the Illinois flora, especially in regards to decisions concerning conservation of our plant flora. Also, both local and county level records are useful for planning restoration projects.
2. There have been rediscoveries of many species and populations considered rare or extirpated but not tracked by the Illinois Endangered Species Protection Board.
3. Several non-native plant species are now spreading explosively across Illinois and adjacent regions of North America, without adequate tracking of this spread.
4. No one individual or database is tracking or verifying all new finds and discoveries from Illinois.

We hope this feature will act as a clearinghouse for new and updated information on the distribution of plants in Illinois, and thus stimulate further botanical discoveries and floristic work in Illinois.

The first published atlas of vascular plant distribution by county for Illinois was in 1955 (Jones and Fuller 1955) with added records in 1960 (Winterringer and Evers 1960). The next atlas covering the distribution of all vascular plants came in 1978 (Mohlenbrock and Ladd 1978), with updates in 1983 (Ladd and Mohlenbrock) and 1985 (Mohlenbrock). Earlier publications contributing local and county records include Mead's 1846 flora (mostly Hancock County), Brendel's 1887 Flora Peoriana, Higley and Raddin (1891; mostly Cook County, but also Lake County, Indiana), and Gates (1922, Cass County). More recent county inventories include Macon (Evans 1990) and Kane (Young, 2007). Otherwise, recent works covering the Illinois vascular flora have generally lacked precise information on species' distribution (Mohlenbrock 2002, 2014), have focused on a specific region of Illinois (Swink and Wilhelm 1994; Wilhelm and Rericha 2017), treat or cover one

plant family (Lynn 2001) or a single genus (Phillippe et al. 2006). The *Illustrated Flora of Illinois* series, consisting of many volumes with recent second editions, has provided detailed county distribution updates (Mohlenbrock 1967–2015) but is not yet complete. Recent publications publicizing species new to Illinois (Basinger 2001; Yatskievych and Kobal 2008; Marcum and Ketzner 2012) generally have not treated new distribution records of species already known from our state. Many other flora update publications exist; these are included in references to allow future authors to verify that their find is truly new and not published elsewhere. In a few cases, new records have been included in published floristic and ecological studies, but close reading and cross-referencing is sometimes required to determine if any new distribution records were discovered in the course of these studies.

At least for now, the updates will focus on vascular plants (flowering plants, conifers, ferns, and fern allies). These are the only terrestrial plants for which state-wide distribution data is widely available, primarily through the publications cited in the previous paragraph. The updates will also include summaries of new reports published elsewhere concerning additions and range extensions to the Illinois flora. We request that authors inform us of new finds with relevant information (after publication, of course). Given the current lack of stability in scientific names, the update will alert Illinois plant enthusiasts to published changes in these names. We will provide citations, and a brief relevant summary concerning the rationale behind the change.

Another purpose of the update is to track the spread of non-native plants. At present, many widespread non-native plants are under-recorded, and we encourage the collection of vouchers to document their distribution and spread. Among the under-collected are a number of invasive plants, including autumn-olive (*Elaeagnus umbellata*), Amur honeysuckle (*Lonicera maackii*), and Callery pear (*Pyrus calleryana*); they may now be present in every county (White et al. 2005). Also needed is documentation of invasive plants that are just arriving in Illinois (Giant Hogweed, *Heracleum mantegazzianum*) or likely to arrive in the near future

(Mile-a-minute, *Polygonum perfoliatum*). As impacts on Illinois's natural landscape continues to intensify, this feature could become an invaluable resource for land managers and invasive species biologists.

WHY ARE WE REQUIRING VOUCHER SPECIMENS?

A voucher specimen is a physical entity that allows future examination of the material, allowing future information to be incorporated in the confirmation of its identity. New knowledge can result in changes in the specimen's identification. For example, several vascular plant species have been added to the Illinois list within the last few decades largely because they were long-overlooked, essentially masquerading as related forms (e.g. *Carex aureolensis* Steud. was formerly included within the species' concept of the more common *Carex frankii* Kunth.). Study of voucher specimens contributes to this process, and also helps botanists determine the distribution of these previously unrecognized entities. Without voucher specimens the distribution of two, now distinct, taxa, would be impossible. Unvouchered work that cannot be refuted or substantiated will usually be rejected for publication. Little validity may be given to floristic lists if vouchers are lacking (Palmer and Richardson 2012).

Physical specimens can also contribute to other forms of taxonomic and ecological study. Genetic material can be extracted from well-curated herbarium specimens and used to understand evolutionary relationships and population genetics for particular plant species and groups. Comparisons between voucher specimens collected at different times can reveal differences in pollutants and pathogens (Willis et al. 2017). And voucher specimens serve as a basis for studies in ethnobotany and pharmaceutical uses.

Information on herbarium labels can also assist conservationists in relocating populations of rare plants, especially as populations of many native plants continue to decline. Better information about declining species helps make better decisions about listing and protecting rare species.

Process

We will only accept records that are based on voucher specimens deposited at an institutional herbarium (there are a few exceptions). We strongly recommend deposition of specimens at active herbaria; the two most appropriate are the Illinois Natural History Survey (all Illinois plants) and The Morton Arboretum (plants collected in northeastern Illinois).

Herbarium
The University of Illinois
Prairie Research Institute
Illinois Natural History Survey
1816 South Oak Street

Champaign IL 61820
217-244-7332
Collections Manager email: minnaert@illinois.edu
<http://wwx.inhs.illinois.edu/collections/plants>

Herbarium
The Morton Arboretum
4100 Illinois Route 53
Lisle Illinois 60532
630-968-0074
Curator email: ahipp@mortonarb.org
<http://www.mortonarb.org/science-conservation/herbarium>

Other herbaria that specialize in the Illinois flora include those at Illinois' universities and large colleges, museums (Field Museum and Illinois State Museum), and public gardens (Chicago Botanic Garden and Missouri Botanic Garden).

If you locate existing herbarium specimens that add to a species' distribution information, we would appreciate reports.

We will make exceptions for certain vulnerable species, for which a high-resolution image will be accepted. Recommended is 1200 × 900 pixels (1200 in the longest dimension for either landscape or portrait orientation). Photographs should include sufficient detail to accurately identify the species, targeting characteristics (leaf shape, flower, fruit) used to identify the species in local or regional floras. Again, these should also be submitted to a herbarium. As for rare plants not listed as threatened or endangered, we suggest some 'rules-of-thumb' to minimize adverse impacts on rare plant populations:

1. Do not collect a specimen of the population if you observe fewer than twenty reproductive individuals (or stems).
2. Do not collect an entire plant unless you observe more than fifty reproductive individuals (or stems).
3. For woody plants, or large herbaceous plants, taking a specimen won't do much harm, especially if the collector keeps the portion removed below 5% of the total plant's biomass. Don't leave ragged tears or stumps which will heal poorly. Of course, invasive plants are an exception to these rules.

We also encourage all botanists (both professional and amateur) to limit collections of uncommon species to the minimum needed to confirm the plant's identity. Hopefully, such self-policing will prompt a more careful survey of the population and its environs for additional plants and will result in a more accurate population estimate. We will NOT publish sight records. Rediscoveries or verifications of previously known populations belonging to species of conservation concern

(Federal T&E, State E&T, Regional Forester Sensitive Species for the Midewin National Tallgrass Prairie and Shawnee National Forest) must be accompanied by a verifiable photograph (see above). All other reports must be backed by a specimen deposited at an institutional herbarium, please. And Element Occurrence Records (EORs) should be sent to the appropriate agency.

SOME ETHICS AND COLLECTING TIPS

When collecting known or potentially invasive plants, caution should be used to prevent the spread of these plants by seeds, roots or other parts that may establish new populations. Please do not unintentionally assist in the spread of non-native plants!

Collect sufficient material to ensure positive identification of the specimen. Don't collect one leaf if the characters needed for confirmation are only in the flowers or fruits.

We may question reports (even with vouchers) of cultivated plants reported as 'new'; we do not want this feature to serve as a horticultural record for what can be grown in Illinois gardens. Only genuine escapes (spreading by seed, bulbils, or rhizome fragments) from cultivation should be considered part of the spontaneous flora of Illinois. This may prove difficult when formerly cultivated plants persist at abandoned homesites or nurseries. Some common examples include daylily (*Hemerocallis fulva*) and daffodils (*Narcissus* spp.), but also various ornamental shrubs (*Syringa* spp., *Forsythia* spp., *Philadelphus* spp., and others). Remember, natives are also planted or grown in gardens; a range extension of a native species can also be the result of human agency. So while a plantation of tulip-poplar (*Liriodendron tulipifera*) in Sangamon County would not be a county record, any young trees growing from the seed of planted trees that had dispersed into surrounding native forests would be considered a record. But that's information that a good collector needs to include in their notes.

Get permission

Plants belong to the landowner; even taking specimens that consists of a twig with some leaves and buds from a mature tree could be misconstrued as theft. This is true for public and private land. Although there usually appears to be no one patrolling our rights-of-ways for plant collectors, you may get stopped. You will need a permit to collect plants on state parks, state fish and wildlife areas, county parks, forest preserves, national forests, and national wildlife refuges. In some cases, getting permission is easy; in some it will be more difficult, for example, on a state nature preserve. A letter to the proper authorities administering the site is essential, stating your purpose – and that you will be depositing vouchers at a herbarium will support 'adding to the scientific body of knowledge concerning

Illinois' wild plants.' You will need a permit from the Illinois Endangered Species Protection Board to collect state-listed plants; and from US Fish and Wildlife Service to collect Federally Listed plants.

There are several publications available on the proper methodology and equipment for collecting voucher specimens (Smith 1971; Robertson 1980; Oskins 1982; Hill 1996). These publications include sources of plant-presses and other equipment, but are now outdated; searching the Internet is now the recommended way to find providers of plant-collecting equipment. The appendix includes several online sources for plant collecting equipment. There are also many books (remember those?) which include directions on making and processing plant specimens.

How does one know they've found a significant record? There are a number of resources, some already mentioned here and listed in the references; even older editions will occasionally have information not present in later versions. Checking relevant publications is essential to ensure that a record is new. We now have online sources; the two most relevant are:

1. **USDA Plants Database** (USDA, NRCS 2015). This database is maintained by the Natural Resource Conservation Service of the United State Department of Agriculture. For each species, subspecies, and variety recognized, there are county-level maps for Illinois. Not all species are mapped to county-level in other states, however. <http://plants.usda.gov>
2. **Biota of North America Program** (BONAP), North American Vascular Flora (Kartez 2015). This database is maintained by botanist John Kartez. Maps are provided at the county level for all fifty states, but only for species, not for subspecies or varieties. <http://bonap.org>

Both databases are very useful resources; however, they have their limitations as they depend on either published sources or reports provided by contributors. Both have frequent updates based on new information; however, changing distribution maps can be flawed without re-examining the original voucher specimens.

All records (not specimens) should be sent to:
 Illinois Flora Update Committee
 University of Illinois
 Prairie Research Institute
 Illinois Natural History Survey, MC-652
 1816 South Oak Street
 Champaign IL 61820
eulazsek@illinois.edu

The coordinator will work with other botanists and herbaria managers to confirm the significance of these

reports. The coordinator will then organize the reports into a format suitable for *Erigenia*. All reports should include the following information. If any of the fields marked with an asterisk (*) are omitted, we will return the report.

- *Genus species* Author (Family)
- COUNTY: Day Month Year; Location with coordinates, legal location, township, park or preserve (we will omit precise location in *Erigenia* to protect vulnerable species)
- Habitat information including community type and associates
- Collector(s) with collection # (Herbarium Accession #)
- Significance: County Record? State Record? Range extension? Other useful information here would include: the status of the species in Illinois; the size of the population; and if the population is known to be native or introduced.

Each report should follow this format:

Crataegus phaenopyrum (L. f.) Medik (ROSACEAE)
CLAY COUNTY: 26 June 1993; northeast of Flora near Elm Creek; SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 18, T3N, R7E; thicket along the creek, adjacent to a cultivated field.

David Ketzner #1536 (Illinois Natural History Survey, ILLS; Accession # 188698)

Significance: New county record. Occasional in the southern third of the state (Mohlenbrock 2002). The Cook County record is based on an escape from cultivation (Swink and Wilhelm 1994); this record may be from a native population, although the collection site was a rather disturbed area.

Remember, anyone can submit a report, provided there is documentation, preferably a specimen. Reports may be edited. Please include your name, email, telephone number, and postal address; we may need to contact you. At present, there is no charge for publishing distribution records.

At present, the committee consists of Rachel Goad (Chicago Botanic Garden), Paul Marcum (Illinois Natural History Survey), Jamie Minnaert (Illinois Natural History Survey), and Eric Ulaszek (Illinois Natural History Survey). We are actively seeking new members to confirm identification of new records.

LITERATURE CITED

- Basinger, M.A. 1995. Additions to the Vascular Flora of Illinois. *Erigenia* 14:57–58.
- Basinger, M.A. 2001. Additions to the Vascular Flora of Illinois. *Transactions of the Illinois Academy of Science* 94:199–205.
- Bittner, R.T. 1995. New Populations of Rare Species in Southern Illinois. *Erigenia* 14:59–60.
- Bollinger, P. 2006. Savanna Blazing Star, *Liatrix scariosa* (L.) Willd. var. *nieuwlandii* Lunell, a New Record for DuPage County, Illinois. *Erigenia* 21:22–24.
- Bowles, M.L. 1991. Some Aspects of the Status and Ecology of Seven Rare Wetland Plant Species in the Chicago Region of Northeastern Illinois. *Erigenia* 11:52–66.
- Brendel, F. 1887. Flora Peoriana; the Vegetation in the Climate of Middle Illinois. JW Franks & Sons, Peoria, Illinois. 89 pp.
- Curtis, L.W. 2010. Additions to the Volo Bog Herbarium, Illinois Nature Preserve, Lake County, Illinois. *Erigenia* 23:34–38.
- Dolbeare, B. and J. Ebinger. 1974. Distribution of the Common Vascular Hydrophytes in Illinois. *Transactions of the Illinois Academy of Science* 67(4): 402–417.
- Ebinger, J.E. and W. McClain. 1998. Notes on Some Woody Plant Species Naturalized in Illinois. *Erigenia* 16:67–70.
- Evans, M.M. 1990. Green Heritage: Vascular Flora of Macon County, Illinois and Environs. Abbott & Foran, Inc., Decatur, Illinois. 362 pp.
- Evert, E.F. 1988. New Distribution Data for the Vascular Flora of Northern Illinois. *Erigenia* 10: 28–37.
- Gardner, D. 1992. Additions to the Flora of Ford County, Illinois. *Erigenia* 12:13–16.
- Gates, F.C. 1922. Contribution to the Flora of Cass County, Illinois. *Transactions of the Illinois Academy of Science* 15:165–171.
- Henry, R.D., A.R. Scott, and P. Shildneck. 1978. Additions to the Distribution of Illinois Vascular Plants. *Transactions of the Illinois Academy of Science* 71(1):51–61.
- Hess, W.J., N.J. Podasky, and N.A. Stoyoff. 1986. New County Records for the Flora of Illinois. *Transactions of the Illinois Academy of Science* 79(1 and 2): 31–34.
- Higley, W.K. and C.S. Raddin. 1891. The Flora of Cook County, Illinois, and a Part of Lake County, Indiana. *Bulletin of the Chicago Academy of Sciences* 2(1):1–168.
- Hill, S.R. 1995. How to Make a Plant Collection. Herbarium Supply Company, Menlo Park CA. 8 pp.
- Illinois Flora Update Committee. 2003. Illinois Flora Updates: New Distribution Records and Other Noteworthy Finds. *Erigenia* 19:65–67.
- Jones, G.N. and G.D. Fuller. 1955. Vascular Plants of Illinois. University of Illinois Press, Champaign-Urbana. 593 pp.
- Ketzner, D.M. 2004. Illinois Flora Updates 2004: New Distribution Records and Noteworthy Collections. *Erigenia* 20:98–104.
- Kline, G.J. and P.D. Sorensen. 2000. The Genus *Agri- monia* (Rosaceae) in Illinois. *Erigenia* 18:15–21.

- Kobal, S.N. and W.A. Lampa. 2004. Important Floristic Finds from DuPage County, Illinois. *Erigenia* 20:53–58.
- Kobal, S.N. 2004. Illinois Flora Updates 2004: New Distribution Records and Noteworthy Collections. *Erigenia* 20:67–97.
- Ladd, D.M., and R.H. Mohlenbrock. 1983. New Distribution Data for Illinois Vascular Plants. *Erigenia* 3:2–21.
- Lynn, K.W. 2001. Additions to the Orchid Flora of Madison County, Illinois. *Transactions of the Illinois Academy of Science* 94:207–211.
- Marcum, P.B., D.T. Busemeyer, L.R. Phillippe, and J.E. Ebinger. 2010. Vascular Flora and Woody Plant Structure and Composition at Gooseberry Island Nature Preserve, Kankakee County, Illinois. *Castanea* 75(3):341–352.
- Marcum, P.B. and D.M. Ketzner. 2012. *Lythrum hyssopifolia* L. (Hyssop Loosestrife or Grass Poly, Lythraceae): A New Species in the Illinois Flora. *Castanea* 77:270–272.
- Mead, S.B. 1846. Catalogue of the Plants Growing Spontaneously in the State of Illinois, the Principal Part Near Augusta, Hancock County. *Prairie Farmer* 6:35–36, 60, 93, 119–122.
- Mohlenbrock, R.H. 1967–2015. Illustrated Flora of Illinois. Southern Illinois University Press, Carbonale, Illinois.
- Mohlenbrock, R.H. 1985. New Distribution Data for Illinois Vascular Plants II. *Erigenia* 5:53–64.
- Mohlenbrock, R.H. 1987. New Distribution Data for Illinois Vascular Plants III. *Erigenia* 9:10–16.
- Mohlenbrock, R.H. 2002. Vascular Flora of Illinois, 3rd Edition. Southern Illinois University Press, Carbondale and Edwardsville. 491 pp.
- Mohlenbrock, R.H. 2014. Vascular Flora of Illinois, 4th Edition. Southern Illinois University Press, Carbondale. 535 pp.
- Mohlenbrock, R.H. and D.M. Ladd. 1978. Distribution of Illinois Vascular Plants. Southern Illinois University Press, Carbondale and Edwardsville. 282 pp.
- Oskins, W. 1982. Collecting Plant Specimens. *Erigenia* 1:9–21.
- Palmer, M.W., and J.C. Richardson. 2012. Biodiversity Data in the Information Age: Do 21st Century Floras Make the Grade? *Castanea* 77:46–59.
- Phillippe, L.R., D.T. Busemeyer, and J.E. Ebinger. 2006. The Black Snakeroot Species (*Sanicula* L., Apiaceae) of Illinois. *Erigenia* 21:25–31.
- Queensland Museum. 2013. Collection and Preserving Plant Specimens, a Manual. Department of Science, Information Technology, Innovation, and the Arts. Toowong, Queensland. 22 pp. <http://www.qld.gov.au/environment/assets/documents/plants-animals/herbarium/collecting-manual.pdf>
- Raveill, J. 1982. Why Collect Plant Specimens? *Erigenia* 1:2–6.
- Robertson, K.R. 1980. Observing, Photographing, and Collecting Plants. Illinois Natural History Circular 55. Urbana Illinois. 62 pp.
- Schwegman, J.E. 1982. Additions to the Vascular Flora of Illinois. *Castanea* 47:243–247.
- Schwegman, J.E. 1991. New Records for Illinois Vascular Plants. *Erigenia* 11:9–12.
- Smith, C.E., Jr. 1971. Preparing Herbarium Specimens of Vascular Plants. Agricultural Information Bulletin No. 348. United States Department of Agriculture, Washington DC.
- Sorensen, P.D. 1984. Notes on the Distribution of Some Vascular Plants of Northern Illinois. *Transactions of the Illinois Academy of Science* 77(1 and 2):51–57.
- Steffen, J.F. 1998. *Deschampsia flexuosa* (L.) Trin.: Addition to the Flora of Illinois. *Erigenia* 16:66.
- Stritch, L.R. 1982. The Ethics of Plant Collecting. *Erigenia* 1:7–8.
- Swink, F., and G. Wilhelm. 1994. Plants of the Chicago Region, 4th Edition. Indiana Academy of Science, Indianapolis. 921 pp.
- Tucker, G.C. 2000. Some Notable Plant Records from East-central and Southern Illinois. *Erigenia* 18:75–79.
- Van Lonkhuyzen, R., K. Dritz, and K. Johnson. 2006. *Echinodorus berteroi* var. *lanceolatus*: A Species New to Northeastern Illinois. *Erigenia* 21:40–43.
- Wenzel, M.B. and J.E. Ebinger. 1999. The Avens Species (*Geum* L., Rosaceae) of Illinois. *Erigenia* 17:8–13.
- White, J., W.E. McClain, and J.E. Ebinger. 2005. Naturalized Callery Pear (*Pyrus calleryana* Decne.) in Illinois. *Transactions of the Illinois Academy of Science* 98:123–130
- Wilhelm, G., and L. Rericha. 2017. Flora of the Chicago Region: A Floristic and Ecological Synthesis. Indiana Academy of Science, Indianapolis. 1371 pp.
- Willis, C.G., E.R. Ellwood, R.B. Primack, C.C. Davis, K.D. Pearson, A.S. Gallinat, J.M. Yost, G. Nelson, S.J. Mazer, N.L. Rossington, T.H. Sparks, and P.S. Soltis. 2017. Old Plants, New Tricks: Phenological Research Using Herbarium Specimens. *Trends in Ecology and Evolution* 32:531–546.
- Winterringer, G.S., and R.A. Evers. 1960. New Records for Illinois Vascular Plants. Illinois State Museum Scientific Papers Series Vol. XI. Springfield, IL. 135 pp.
- Yatskievych, G. 1999. Steyermark's Flora of Missouri, Revised Edition. Volume 1. Missouri Department of Conservation, Jefferson City, and Missouri Botanical Garden Press, St. Louis. 991 pp.
- Yatskievych, G. 2006. Steyermark's Flora of Missouri, Revised Edition. Volume 2. Missouri Department of

Conservation, Jefferson City, and Missouri Botanical Garden Press, St. Louis. 1181p.
 Yatskievych, G. 2013. Steyermark's Flora of Missouri, Revised Edition. Volume 3. Missouri Department of Conservation, Jefferson City, and Missouri Botanical Garden Press, St. Louis. 1382p.

Yatskievych, G., and S. Kobal. 2008. The genus *Cystopteris* at Waterfall Glen Preserve, DuPage County, Illinois. *American Fern Journal* 98:253–258.
 Young, D. 2007. Kane County Plants and Natural Areas, Third Addition. Kane County Forest Preserve District, Geneva, Illinois. 218 pp.

APPENDIX: SOURCES OF PLANT-COLLECTING AND PROCESSING EQUIPMENT

This is not a complete list; there are many other on-line sources for collecting and pressing plants.

- BioQuip
www.bioquip.com
- Carolina Biological Supply
www.carolina.com
- eNasco
www.enasco.com
- Forestry Suppliers, Inc.
<http://www.forestry-suppliers.com/>
- Herbarium Supply Co
www.herbariumsupply.com
- Home Science Tools
www.hometrainingtools.com
- Pacific Papers
www.pacific-papers.com
- University Products
www.universityproducts.com

CYRTOMIUM FORTUNEI AND TRILLIUM STAMINEUM: TWO NEW PLANT SPECIES TO ILLINOIS

Christopher D. Benda

On October 15, 2013, several fronds belonging to one individual of a fern species previously unknown from Illinois were discovered growing out of a rock crevice on a sandstone cliff along the Giant City Nature Trail at Giant City State Park in Union County, Illinois (N37.595360, W89.191207). Using photos of the fronds and sori, this species was confirmed as *Cyrtomium fortunei* J. Sm. by Eric Ulaszek, botanist with the Illinois Natural History Survey, and George Yatskievych, author of the *Cyrtomium* genus treatment in electronic floras (online Flora of North America 2008) and the revised *Flora of Missouri* (1999). This genus is native to Asia and is used in the horticultural trade. It is known to occur in the wild in Oregon, Louisiana, Mississippi, Alabama, Georgia, Arkansas, South Carolina, Tennessee, Kentucky, and southern Indiana (Kartesz 2014). Mild winters in southern Illinois in combination with climate change are likely contributing to this species extending its range north into Illinois.

This species is not listed in *Vascular Flora of Illinois* (Mohlenbrock 2014), nor is it in *Flora of Missouri* (Yatskievych 1999). Of the three *Cyrtomium* species present in North America, *C. fortunei* has the widest range, possibly because it is more tolerant to cold weather (Eric Ulaszek pers. comm., October 16, 2013). There is one individual with several fronds growing out of the sandstone cliffs along the Giant City Nature Trail at Giant City State Park. Other nearby vegetation include *Heuchera parviflora*, *Solidago caesia*, and *Hydrangea arborescens*. After a permit was obtained from the Illinois Department of Natural Resources, a specimen (Benda *s.n.*) was collected by the author on August 16, 2016 and deposited at the Illinois Natural History Survey herbarium (ILLS) in Champaign, Illinois.

Additionally, a geographically restricted species of *Trillium* was discovered in Jackson County, Illinois. A survey of vegetation on the property of Midland Hills Country Club (MHCC) in Makanda, Illinois was performed on April 11, 2016. The survey revealed four stems of *Trillium stamineum* growing in the steep hillside along a stream and Krysher Road (N37.648499, W89.251248). No collection was made, but photo vouchers were de-

posited at the Illinois Natural History Survey herbarium (ILLS) in Champaign, Illinois.

The habitat is a south-facing slope with sandstone bedrock beneath the soil along an ephemeral creek that drains into Midland Hills Lake. The surrounding area is mostly leaf litter and small trees. The vegetation in this area is sparse and the trees are young. The area is easily accessible and probably significantly disturbed historically, but essentially undisturbed in the last 50 years, according to local residents. There is one house within 100 meters of the population. Subsequent investigation revealed no evidence indicating that this plant was transplanted or planted from seed intentionally by anyone who lived in the nearest house or anyone else living at MHCC over the past 100 years, although it is grown and sold by gardeners in warmer climates.

Trillium stamineum is characterized by having sessile leaves and sessile flowers. Stamens are large and maroon. The green sepals are spreading at bloom time, as are the twisted petals. The twisted petals are the key characteristic distinguishing this species from other *Trillium* species known from Illinois. The other species in Illinois with sessile leaves are *Trillium cuneatum*, *Trillium sessile*, and *Trillium viride*, and they all have petals that are not twisted. Two blooming stems were observed, with an additional two immature stems observed within a half meter of the blooming stems. Dr. Robert Mohlenbrock, Professor Emeritus of Botany at Southern Illinois University in Carbondale visited the area on April 19, 2016, verified the occurrence, and suggest it be documented, as did Georgia DNR botanist Tom Patrick (pers. comm. May 17, 2016), a regional expert on the *Trillium* genus.

This species is known only from Alabama, Mississippi, and Tennessee (Kartesz 2014). However, it is expected to occur in southern Kentucky (Jones 2005) and in 2016 it was discovered on private land in western Kentucky, (Mason Brock pers. comm., April 2016) so additional unknown populations might be fairly close to this occurrence in southern Illinois. It's impossible to know if this occurrence is natural, but disjunct populations of *Trillium* species are not unprecedented in Illinois as *Trillium cuneatum* has been vouchered for

Jackson County as well (Mohlenbrock 2014). This species, like many spring ephemeral plants, has seeds covered in an elaiosome that is dispersed primarily by ants (Handel *et al.*, 1981), but seeds can also be moved by other animals (Vellend *et al.*, 2003). With the nearest population within 100 miles it is not impossible that this individual has grown from naturally dispersed seed, especially given climate change favoring southern adapted species moving north.

LITERATURE CITED

eFloras (2008). Published on the Internet <http://www.efloras.org> [accessed 22 December 2016] Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
 Handel, S. N., Susan B. Fisch and George E. Schatz. 1981. Ants Disperse a Majority of Herbs in a Mesic

Forest Community in New York State. *Bulletin of the Torrey Botanical Club* 108(4):430-437.
 Jones, Ronald L. 2005. Plant Life of Kentucky: An Illustrated Guide to the Vascular Flora. The University Press of Kentucky, Lexington. 834 pp.
 Kartesz, J.T., The Biota of North America Program (BONAP). 2015. North American Plant Atlas. (<http://bonap.net/napa>). Chapel Hill, N.C.
 Mohlenbrock, R. H. 2014. Vascular Flora of Illinois 4th edition. Southern Illinois University Press, Carbondale and Edwardsville. 536 pp.
 Vellend, M., J. A. Myers, S. Gardescu, and P. L. Marks. 2003. Dispersal of *Trillium* Seeds by Deer: Implications for Long-distance Migration of Forest Herbs. *Ecology* 84:1067-1072.
 Yatskiyevych, G. A. 1999. Steyermark's Flora of Missouri. Volume 1 (rev. ed). Missouri Department of Conservation, Jefferson City, Missouri. 991 pp.

MEMORIA

Raymond E. Stotler

A leader in international bryology, Raymond E. Stotler died at his home in Makanda, December 4, 2013. Ray was born March 30, 1940 in Peoria. He graduated from Western Illinois University with a bachelor's degree in biology education (1962) and went on to graduate studies at Southern Illinois University Carbondale under Dr. Robert H. Mohlenbrock. His thesis on Illinois Characeae was his first venture into taxonomy. He earned his M.S. in botany from SIUC in 1964. His doctoral studies at the University of Cincinnati were with famed bryologist Dr. Margaret Fulford. He met Barbara Crandall during Dr. Jack Sharp's bryology class in the Great Smokey Mountains. Thereafter, he and Barbara began a lifelong commitment to each other and to exploring the intricacies of hepatic biology. During their final year at Cincinnati they initiated an extensive monograph on the liverwort genus *Bryopteris*. In 1969 after completing separate post-doctorates, they married in Munich, Germany. They were hired at SIUC later that year, Ray to inventory liverworts of southern Illinois natural areas and Barbara to teach introductory biology classes. In 1972 Ray was awarded tenure, Barbara in 1976.

For over more than 40 years at SIUC, Raymond taught undergraduate classes in ecology, local flora, plant systematics, and plant diversity. He mentored 9 doctoral and 16 master's students in the Department of Plant Biology. His graduate courses included botanical nomenclature, literature in botany, and a field course on bryophytes and lichens. It was the latter that honestly defined Raymond's love of these organisms. He wholeheartedly taught field ID and bryo-lichen ecology. Countless new botanists were inspired by his enthusiastic teaching style and engaging manner. A former student remarked that he taught her that mosses, liverworts, hornworts, and lichens could be recognized

and studied "... just like real plants." His studies on species associations and communities (particularly those on cliff-face habitats in the Shawnee Hills) were second to none. Besides his 32 years as Professor of Plant Biology, he was a research associate of the Missouri Botanical Gardens for over 25 years. He retired from SIUC in 2001, but was actively engaged in research as an emeritus professor until shortly before his death. His final illness and passing cut short significant nomenclatural works for the Early Land Plants Today project and a new checklist and synopsis of North American liverworts (north of Mexico). Barbara capably continues that work.

Over the years he produced 65 technical papers and completed 55 postings for *The Bryologist's* Recent Literature on Hepatics. Ray treasured old books and journals. He found nomenclatural rules, especially the International Code of Nomenclature, fascinating reading. For several years he was a member of the International Committee of Botanical Nomenclature and in 1996 was elected a Fellow of the Linnaean Society. Professional associations included the Botanical Society of America, American Bryological and Lichenological Society (for which he was director of the Hepatic Exchange and executive council member for 30 years), International Association of Plant Taxonomists, and American Association of Plant Taxonomists. He and Barbara traveled extensively for international and North American conferences and field excursions, as well as to visit hepatic herbaria and culture collections throughout Europe and the USA.

Ray is sorely missed by his family, friends, and many colleagues. He was a "people's professor" who enjoyed interacting with students and bryologists from around the world. He is survived by Dr. Barbara Crandall-Stotler, his wife of nearly 50 years.

MEMORIA

Raymond E. Stolter

and studied... just like the rest of the students... species associations and communities... on cliff face habitat in the Sauerbeek... to none... the 71-year-old... 2001... his... and passing out... new... work for the... work... work... work...

Over the years he produced... completed 22... on... He found... for several years... elected a fellow... Association... for which he was... and executive... Association of Plant Taxonomists... ed... and field... and the USA.

His work... friends and many colleagues... who enjoyed... and... the world... Stolter, his wife of nearly 30 years

A leader in international... Stolter died at his home in... Ray was born... from Western Illinois University... gave in biology education... under Dr. Robert H. M... non... earned his M.S. in botany... transferred at the University of... lated... the Great Smoky Mountains... data... to explore the... their final year... monograph on the... all... in... the year... not... biology classes... data in 1978.

For over more than 40 years at SIUC, Raymond taught undergraduate classes in ecology, local flora, plant systematics, and plant diversity. He mentored 9 doctoral and 16 master's students in the Department of Plant Biology. His graduate courses included botanical nomenclature, molecular in botany, and a field course on phytophages and lichens. It was the latter that non-cultured Raymond's love of these organisms. He wholeheartedly taught field ID and phylogenetic systematics. His courses were inspired by his own classic teaching style and engaging manner. A former student remarked that he taught not just the material, but the way it could be recognized.

INVITATION FOR SUBMISSION OF ARTICLES

ERIGENIA is a peer-reviewed journal of the Illinois Native Plant Society. We invite the submission of original articles on the biota of Illinois and adjacent states. This is a partial list of articles of interest to society members.

TAXONOMY of vascular plants, fungi, lichens, and mosses

ECOLOGY of native species and plant communities; interactions and effects of birds, mammals, and insects on our ecosystem

NATURAL HISTORY of our state, including geology and geography

ETHNOBOTANY of native plants, their use by Native Americans

CULTURAL HISTORY as it intersects with natural history

BOTANISTS, SCIENTISTS, EXPLORERS, and BOTANICAL ARTISTS who have played a major role in our understanding of our state and its natural resources

RESTORATION of our native landscapes, management techniques and results

HORTICULTURE as it relates to native plants in restored or cultural environments

INSTRUCTIONS FOR AUTHORS

Authors may submit material as an e-mail attachment to erigenia.editor@gmail.com

Manuscripts must be submitted as an MS Word document in a single font, double-spaced, and left-aligned. Tables and illustrations must fit in a 7 x 9 inch area. Authors should retain copies of all material submitted.

The title page of the manuscript should state the affiliation and complete addresses of all the authors; the telephone number of the corresponding author should also be supplied. All papers will be reviewed and copy-edited.

ABSTRACTS

Research and technical papers should include a one-paragraph abstract of not more than 250 words. The abstract should state concisely the goals, principal results, and major conclusions of the paper.

TAXONOMIC NAMES

Either a standard taxonomic manual should be cited whose names are followed consistently, or the scientific names should be followed by their authority. Common names, if used, should be referenced to a scientific name. Thereafter, scientific names are recommended, but either may be used if done so consistently.

PAGE CHARGES

Page charges for society members are \$50.00 per article. Page charges of \$25 per page will be assessed for non-members.

Research Paper

- 1 Changes in Woody Understory and Herbaceous Vegetation, Lake Sara Post Oak Flatwoods, Effingham County, Illinois, 1989 to 2011

John E. Ebinger, Bob Edgin, Mark Hanft, Kelly Hoffman, Stefanie Ervin, and Michael Blackowicz

Floral Updates

- 11 Summary of Field Guide to the Vascular Flora of Illinois, 4th Edition

Robert H. Mohlenbrock

- 23 *Kyllinga gracillima*: A Plant New to Illinois

John Van Dyk

- 25 Illinois Flora Updates: New Distribution Records and Other Noteworthy Finds

Illinois Native Plant Society Flora Update Committee

- 31 *Cyrtomium fortunei* and *Trillium stamineum*: Two New Plant Species to Illinois

Christopher David Benda

Obituary

- 33 Raymond E. Stotler Memoria