

A Floristic Survey of the Yellow Birch Ravine Nature Preserve, Crawford County, Indiana

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Introduction

The Crawford Upland Section of the Shawnee Hills Natural Region in unglaciated southern Indiana (4) is characterized by scenic topography, with numerous deep ravines and massive sandstone outcrops. The Yellow Birch Ravine Preserve in Crawford County is one of the finest examples of this natural region in the state. The site has long been of interest to botanists, but no comprehensive floristic inventory has previously been attempted for the area. Our purpose in studying the flora of this preserve was to both survey the vascular plant species presently growing there and examine the floristic changes that may have taken place during the last 40 years of changing vegetation and human impact.

Physical Setting

Yellow Birch Ravine is situated just south and east of the town of Taswell, in Crawford County and occupies portions of sections 19, 20, and 30 in T2S R1W. The 440 acre preserve is bisected by the graded road that runs north from nearby Mifflin to State Highway 64. The outstanding geological feature of the property is a massive series of nearly continuous bluffs formed by outcrops of Pennsylvanian age sandstone bedrock. Limestone outcrops from formations underlying this sandstone are extremely restricted and are found only in a few streambed areas, where water flow has exposed them slightly. Soils on the steep, easily eroded slopes and tops belong to the Wellston-Gilpin-Zanesville-Berks Association of well-drained medium-textured soils that are characteristic of this region (4, 7), while the Haymond silt-loam of the drainage bottoms (7) tends to be somewhat finer and less well drained.

The major vegetation types in the eastern half of the preserve were documented by Lindsey et al. (6) and are identical to those found elsewhere in Yellow Birch Ravine. In general, the bottoms are dominated by a beech-maple forest, while the drier ridgetops are dominated by oak and hickory species (see table 1). Most of the area was lumbered

TABLE 1. Floristic inventory of Yellow Birch Ravine Nature Preserve. Asterisks indicate county records noted during this study.

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| <i>Acer rubrum</i> L. var. <i>rubrum</i> |
| <i>Acer saccharum</i> Marsh |
| * <i>Achillea millefolium</i> L. ssp. <i>lanulosum</i> (Nutt.) Piper |
| <i>Actaea alba</i> (L.) Mill. |
| <i>Adiantum pedatum</i> L. |
| <i>Agalinus tenuifolia</i> (Vahl) Raf. var. <i>tenuifolia</i> |
| <i>Agrimonia parviflora</i> Ait. |
| <i>Agrimonia pubescens</i> Wallr. |
| <i>Agrimonia rostellata</i> Wallr. |
| <i>Agrostis perennans</i> (Walt.) Tuckerm. |
| * <i>Allium canadense</i> L. |
| * <i>Ambrosia artemisiifolia</i> L. |
| * <i>Ambrosia bidentata</i> Michx. |
| <i>Ambrosia trifida</i> L. |
| <i>Amelanchier canadensis</i> (L.) Medic. |
| * <i>Amelanchier laevis</i> Wieg. |

TABLE 1.—Continued

- Ampelamus albidus* (Nutt.) Britt.
Amphicarpa bracteata (L.) Fern. var. *comosa* Fern.
Andropogon scoparius Michx. var. *scoparius*
Anemone virginiana L.
Anemonella thalictroides (L.) Spach
**Antennaria plantaginifolia* (L.) Richards. var. *ambigens* (Greene) Cronq.
**Apios americana* Medic.
Aplectrum hyemale (Muhl.) Torr.
Aquilegia canadensis L.
Arabis laevigata (Muhl.) Poir.
Aralia racemosa L.
Aralia spinosa L.
**Arctium minus* Schkuhr
Arisaema dracontium (L.) Schott
Arisaema triphyllum (L.) Schott var. *triphyllum*
Aristida dichotoma Michx.
Aristida longespicata Poir.
Aristida oligantha Michx.
Aronia melanocarpa (Michx.) Ell.
Asarum canadense L. var. *canadense*
Asclepias tuberosa L.
Ascyrum hypericoides L. var. *multicaule* (Michx.) Fern.
Asimina triloba (L.) Dunal
**Asparagus officinalis* L.
Asplenium montanum Willd.
Asplenium pinnatifidum Nutt.
Asplenium platyneuron (L.) Oakes ex D.C. Eaton
Asplenium rhizophyllum L.
Asplenium trichomanes L.
Aster cordifolius L. var. *cordifolius*
Aster pilosus Willd. var. *pilosus*
Athyrium filix-femina (L.) Roth var. *asplenioides* (Michx.) Farw.
Athyrium pycnocarpon (Spreng.) Tidestrom
Athyrium thelypteroides (Michx.) Desv.
Aureolaria flava (L.) Farw. var. *macrantha* Pennell
**Barbarea vulgaris* R. Br. var. *arcuata* (Opiz) Fries
**Bartonia virginica* (L.) BSP.
Betula lutea Michx. f.
Blephilia ciliata (L.) Benth.
Blephilia hirsuta (Pursh) Benth.
Boehmeria cylindrica (L.) Sw.
Botrychium dissectum Spreng. f. *obliquum* (Muhl.) Clute
Botrychium virginianum
**Brachyletrum erectum* (Schreb.) Beauv.
Bromus purgans L.
Bulbostylis capillaris (L.) Clarke
Cacalia atriplicifolia L.
Campanula americana L.
**Campsis radicans* (L.) Seem.
**Capsella bursa-pastoris* (L.) Medic.
Cardamine parviflora L. var. *arenicola* (Britt.) Schulz
Cardamine pensylvanica Muhl.
Carex amphibola Steud.
**Carex cephalophora* Muhl.
Carex communis Bailey
Carex complanata Torr. & Hook.
Carex digitalis Willd.
Carex frankii Kunth
Carex glaucoidea Tuckerm.
Carex gracillima Schw.
Carex hirtifolia Mack.
Carex laxiculmis Schw.

TABLE 1.—Continued

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- **Carex laxiflora* Lam. var. *blanda* (Dewey) Boott
Carex laxiflora Lam. var. *latifolia* Boott
Carex laxiflora Lam. var. *laxiflora*
Carex lurida Wahl
Carex nigromarginata Schw. var. *muhlenbergii* (A. Gray) Gleason
Carex normalis Mack.
Carex oligocarpa Schk.
Carex plantaginea Lam.
 **Carex rosea* Schkuhr
Carex sparganioides Muhl.
Carex squarrosa L.
 **Carex torta* Boott
Carex virescens Muhl.
Carex vulpinoidea Michx.
Carex willdenowii Schkuhr
Carpinus caroliniana Walt.
Carya cordiformis (Wang.) K. Koch
Carya glabra (Mill.) Sweet
Carya ovata (Mill.) K. Koch
Cassia fasciculata Michx.
Cassia marilandica L.
Cassia nictitans L. var. *nictitans*
Caulophyllum thalictroides (L.) Michx.
Cercis canadensis L.
 **Chelone glabra* L.
 **Chenopodium album* L.
Cinna arundinacea L.
Circaea quadrisulcata (Maxim.) Franch. & Sav. var. *canadensis* (L.) Hara
Cirsium altissimum (L.) Spreng.
 **Cirsium discolor* (Muhl.) Spreng.
 **Claytonia virginica* L.
Collinsonia canadensis L.
Conopholis americana (L.) Wallr.
Conyza canadensis (L.) Cronq.
Corallorhiza wisteriana Conrad
Coreopsis tripteris L.
Cornus florida L.
 **Coronilla varia* L.
Corydalis flavula (Raf.) DC.
Corylus americana Walt.
Croton monanthogynous Michx.
Cryptotaenia canadensis (L.) DC.
 **Cuscuta gronovii* Willd.
Cynoglossum virginianum L.
Cyperus flavescens L.
Cyperus strigosus L.
Cypripedium calceolus L. var. *pubescens* (Willd.) Correll
Cystopteris bulbifera (L.) Bernh.
Cystopteris protруса (Weath.) Blasdell
Danthonia spicata (L.) Beauv.
Daucus carota L.
Dennstaedtia punctilobula (Michx.) Moore
Dentaria heterophylla Nutt.
Dentaria laciniata Muhl. ex Willd.
Desmodium ciliare (Muhl.) DC.
Desmodium glutinosum (Muhl.) Wood
Desmodium nudiflorus (L.) DC.
Desmodium pauciflorus (Nutt.) DC.
 **Desmodium rigidum* (Ell.) DC.
Desmodium rotundifolium DC.
Dicentra canadensis (Goldie) Walp.
Dicentra cucullaria (L.) Bernh.

TABLE 1.—Continued

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| <i>Digitaria ischaemum</i> (Schreb.) Muhl. |
| <i>Diodia teres</i> Walt. |
| <i>Dioscorea quaternata</i> (Walt.) Gmel. var. <i>quaternata</i> |
| <i>Diospyros virginiana</i> L. var. <i>virginiana</i> |
| <i>Dodecatheon meadia</i> L. |
| <i>Dryopteris intermedia</i> (Muhl. ex Willd.) A. Gray |
| <i>Dryopteris marginalis</i> (L.) A. Gray |
| <i>Echinochloa microstachya</i> (Weig.) Rydb. |
| <i>Elephantopus carolinianus</i> Willd. |
| <i>Epifagus virginiana</i> (L.) Bart. |
| * <i>Epilobium coloratum</i> Biehler |
| * <i>Equisetum arvense</i> L. |
| <i>Eragrostis spectabilis</i> (Pursh) Steud. |
| * <i>Erianthus alopecuroides</i> (L.) Ell. |
| <i>Erigeria bulbosa</i> (Michx.) Nutt. |
| <i>Erigeron annuus</i> L. |
| <i>Erigeron philadelphicus</i> L. |
| <i>Erigeron strigosus</i> Muhl. var. <i>strigosus</i> |
| <i>Erythronium americanum</i> Ker. |
| <i>Euonymus atropurpureus</i> L. |
| <i>Euonymus obovatus</i> Nutt. |
| * <i>Eupatorium altissimum</i> L. |
| <i>Eupatorium coelestinum</i> L. |
| * <i>Eupatorium hyssopifolium</i> L. var. <i>hyssopifolium</i> |
| <i>Eupatorium perfoliatum</i> L. |
| <i>Eupatorium purpureum</i> L. |
| <i>Eupatorium rugosum</i> Houtt. |
| <i>Eupatorium serotinum</i> Michx. |
| <i>Eupatorium sessilifolium</i> L. |
| <i>Euphorbia corollata</i> L. |
| * <i>Euphorbia dentata</i> Michx. |
| <i>Euphorbia preslii</i> Guss. |
| <i>Fagus grandifolia</i> var. <i>grandifolia</i> |
| * <i>Festuca elatior</i> L. |
| <i>Festuca obtusa</i> Biehler |
| <i>Fraxinus americana</i> L. |
| <i>Fraxinus pensylvanica</i> Marsh var. <i>subintegerrima</i> (Vahl) Fern. |
| <i>Galactia volubilis</i> (L.) Britt. var. <i>mississippiensis</i> Vail |
| <i>Galium aparine</i> L. var. <i>aparine</i> |
| <i>Galium circaezans</i> Michx. |
| <i>Galium concinnum</i> Torr. & Gray |
| <i>Galium pilosum</i> Ait. var. <i>pilosum</i> |
| <i>Gaylussacia baccata</i> (Wang.) K. Koch |
| <i>Geranium carolinianum</i> L. var. <i>carolinianum</i> |
| <i>Geranium maculatum</i> L. |
| <i>Geum canadense</i> Jacq. |
| <i>Geum vernum</i> (Raf.) Torr. & Gray |
| * <i>Glechoma hederacea</i> L. |
| <i>Gnaphalium obtusifolium</i> L. var. <i>obtusifolium</i> |
| <i>Gnaphalium purpureum</i> L. var. <i>purpureum</i> |
| <i>Goodyera pubescens</i> (Willd.) R. Br. |
| <i>Hamamelis virginiana</i> L. |
| <i>Helenium autumnale</i> L. var. <i>autumnale</i> |
| <i>Helianthus divaricatus</i> L. |
| <i>Helianthus microcephalus</i> Torr. & Gray |
| <i>Heliopsis helianthoides</i> (L.) Sweet |
| <i>Hepatica acutiloba</i> DC. |
| <i>Heuchera americana</i> L. var. <i>brevipetala</i> R. B. & L. |
| <i>Heuchera parviflora</i> Bartl. var. <i>rugelii</i> (Shuttlew.) R. B. & L. |
| <i>Hieracium gronovii</i> L. |
| <i>Hieracium paniculatum</i> L. |
| <i>Houstonia purpurea</i> L. var. <i>purpurea</i> |

TABLE 1.—Continued

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- Hybanthus concolor* (Forst.) Spreng.
Hydrangea arborescens L. var. *arborescens*
 **Hydrastis canadensis* L.
Hydrophyllum macrophyllum Nutt.
Hypericum drummondii (Grev. & Hook.) Torr. & Gray
Hypericum gentianoides (L.) BSP.
Hypericum mutilum L. var. *parviflorum* (Willd.) Fern.
Hypericum punctatum Lam.
Hystrix patula Moench
Impatiens biflora Walt.
Impatiens pallida Nutt.
Iris cristata Ait.
Isopyrum biternatum (Raf.) Torr. & Gray
Jeffersonia diphylla (L.) Pers.
 **Juglans nigra* L.
Juncus biflorus Ell.
Juncus effusus L. var. *solutus* Fern. & Wieg.
Juncus tenuis Willd.
Juniperus virginiana L. var. *crebra* Fern.
Kalmia latifolia L.
Krigia biflora (Walt.) Blake
Lactuca floridana (L.) Gaertn. var. *villosa* (Jacq.) Cronq.
 **Lamium purpureum* L.
Laportea canadensis (L.) Wedd.
Lechea tenuifolia Michx.
Leersia oryzoides (L.) Sw.
Leersia virginica Willd.
 **Lepidium campestre* (L.) R. Br.
Lespedeza cuneata (Dumont) G. Don
Lespedeza hirta (L.) Hornem.
Lespedeza intermedia (S. Wats.) Britt.
Lespedeza stipulacea Maxim.
Lespedeza striata (Thunb.) Hook. & Arn.
Lespedeza violacea (L.) Pers.
Lindera benzoin (L.) Blume
Linum virginicum L.
Liriodendron tulipifera L.
Lobelia inflata L.
Lobelia puberula Michx.
Lobelia spicata Lam. var. *spicata*
Lobelia syphilitica L. var. *syphilitica*
Lonicera japonica Thunb.
Ludwigia alternifolia L.
Luzula campestris (L.) DC. var. *echinata* (Small) Fern. & Wieg.
Lycopodium dendroideum Michx.
Lycopodium digitatum Dillen. ex A. Braun
Lycopodium porophyllum Lloyd & Underw.
 **Lycopus americanus* Muhl.
Lycopus virginicus L.
Lysimachia quadrifolia Sims.
 **Medeola virginica* L.
 **Medicago lupulina* L.
Melica mutica Walt.
Melilotus alba Desr.
Melilotus officinalis (L.) Desr.
Mentha piperata L.
 **Mimulus ringens* L.
Mitchella repens L.
Mitella diphylla L.
Monarda fistulosa L. var. *fistulosa*
Monotropa uniflora L.
 **Morus alba* L.

TABLE 1.—Continued

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| <i>Muhlenbergia sobolifera</i> (Muhl.) Trin. |
| <i>Muhlenbergia sylvatica</i> Torr. |
| <i>Nyssa sylvatica</i> Marsh |
| * <i>Obolaria virginica</i> L. |
| <i>Oenothera biennis</i> L. var. <i>biennis</i> |
| <i>Onoclea sensibilis</i> L. |
| <i>Orchis spectabilis</i> L. |
| <i>Ornithogalum umbellatum</i> L. |
| <i>Osmorhiza claytonii</i> (Michx.) Clarke |
| <i>Osmunda cinnamomea</i> L. |
| <i>Ostrya virginiana</i> (Mill.) K. Koch |
| <i>Oxalis violacea</i> L. |
| <i>Panax quinquefolium</i> L. |
| <i>Panicum anceps</i> Michx. |
| <i>Panicum boscii</i> Poir. |
| <i>Panicum commutatum</i> Schult. var. <i>commutatum</i> |
| <i>Panicum dichotomum</i> L. |
| <i>Panicum flexile</i> (Gatt.) Scribn. |
| <i>Panicum lanuginosum</i> Ell. var. <i>fasciculatum</i> (Torr.) Fern. |
| <i>Panicum laxiflorum</i> Lam. |
| <i>Panicum polyanthes</i> Schult. |
| <i>Parietaria pensylvanica</i> Muhl. |
| <i>Paronychia canadensis</i> (L.) Wood |
| <i>Parthenocissus quinquefolia</i> (L.) Planch. |
| <i>Passiflora lutea</i> L. |
| * <i>Pedicularis canadensis</i> L. |
| <i>Penthorum sedoides</i> L. |
| * <i>Perilla frutescens</i> (L.) Britt. |
| <i>Phacelia bipinnatifida</i> Michx. |
| <i>Phlox divaricata</i> L. var. <i>divaricata</i> |
| <i>Physostegia virginiana</i> (L.) Benth. |
| <i>Pilea pumila</i> (L.) A. Gray |
| <i>Plantago rugelii</i> Decne. |
| * <i>Platanthera peramoena</i> (A. Gray) A. Gray |
| <i>Platanus occidentalis</i> L. |
| <i>Poa compressa</i> L. |
| <i>Poa pratensis</i> L. |
| <i>Poa sylvestris</i> A. Gray |
| <i>Podophyllum peltatum</i> L. |
| <i>Polemonium reptans</i> L. var. <i>reptans</i> |
| * <i>Polygonatum biflorum</i> (Walt.) Ell. |
| * <i>Polygonum arifolium</i> L. |
| <i>Polygonum aviculare</i> L. |
| <i>Polygonum erectum</i> L. |
| <i>Polygonum hydropiperoides</i> Michx. var. <i>hydropiperoides</i> |
| * <i>Polygonum punctatum</i> Ell. |
| <i>Polygonum sagittatum</i> L. |
| <i>Polygonum virginianum</i> L. |
| <i>Polypodium polypodioides</i> (L.) Watt var. <i>michauxianum</i> Weath. |
| <i>Polypodium virginianum</i> L. |
| <i>Polystichum acrostichoides</i> (Michx.) Schott |
| <i>Populus grandidentata</i> Michx. |
| <i>Potentilla simplex</i> Michx. |
| <i>Prenanthes altissima</i> L. var. <i>cinnamomea</i> Fern. |
| <i>Prunella vulgaris</i> L. var. <i>lanceolata</i> (Barton) Fern. |
| <i>Prunus serotina</i> Ehrh. |
| <i>Pteridium aquilinum</i> (L.) Kuhn var. <i>pseudocaudatum</i> (Clute) Heller |
| <i>Pycnanthemum flexuosum</i> (Walt.) BSP. |
| <i>Pycnanthemum pycnanthemoides</i> (Leavenw.) Fern. var. <i>pycnanthemoides</i> |
| <i>Quamoclit coccinea</i> (L.) Moench |
| <i>Quercus alba</i> L. |
| <i>Quercus coccinea</i> Moench |

TABLE 1.—Continued

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| <i>Quercus muhlenbergii</i> Engelm. |
| <i>Quercus rubra</i> L. |
| <i>Quercus stellata</i> Wang. |
| <i>Quercus velutina</i> Lam. |
| <i>Ranunculus hispidus</i> Michx. var. <i>hispidus</i> |
| <i>Ranunculus recurvatus</i> Poir. |
| <i>Rhus copallina</i> L. |
| <i>Rhus glabra</i> L. |
| <i>Rhus radicans</i> L. var. <i>radicans</i> |
| * <i>Rhynchospora capitellata</i> (Michx.) Vahl |
| <i>Rosa carolina</i> L. |
| * <i>Rosa multiflora</i> Thunb. |
| * <i>Rubus ensenii</i> Tratt. |
| <i>Rubus occidentalis</i> L. |
| <i>Rudbeckia hirta</i> L. var. <i>hirta</i> |
| <i>Rudbeckia triloba</i> L. var. <i>triloba</i> |
| <i>Rumex crispus</i> L. |
| <i>Sabatia angularis</i> (L.) Pursh |
| * <i>Sagittaria brevirostra</i> Mack. & Bush |
| <i>Salix nigra</i> L. |
| <i>Salix sericea</i> Marsh |
| <i>Salvia lyrata</i> L. |
| <i>Samolus floribundus</i> HBK. |
| <i>Sanguinaria canadensis</i> L. |
| <i>Sanicula canadensis</i> L. |
| <i>Sanicula gregaria</i> Bickn. |
| <i>Sassafras albidum</i> (Nutt.) Nees |
| <i>Scirpus atrovirens</i> Willd. var. <i>atrovirens</i> |
| <i>Scirpus cyperinus</i> (L.) Kunth |
| <i>Scirpus lineatus</i> Michx. |
| * <i>Scirpus polyphyllus</i> Vahl |
| * <i>Scrophularia marilandica</i> L. |
| <i>Scutellaria incana</i> Biehler var. <i>incana</i> |
| <i>Scutellaria lateriflora</i> L. |
| <i>Sedum ternatum</i> Michx. |
| <i>Selaginella apoda</i> (L.) Spring |
| <i>Senecio aureus</i> L. |
| <i>Senecio glabellus</i> Poir. |
| <i>Setaria geniculata</i> (Lam.) Beauv. |
| <i>Silene antirrhina</i> L. |
| * <i>Silene stellata</i> (L.) Ait. f. var. <i>scabrella</i> (Nieuwl.) Palmer & Stey. |
| <i>Silene virginica</i> L. |
| <i>Smilacina racemosa</i> (L.) Desf. |
| <i>Smilax glauca</i> Walt. var. <i>glauca</i> |
| <i>Smilax hispida</i> Muhl. |
| <i>Solidago bicolor</i> L. |
| <i>Solidago caesia</i> L. |
| <i>Solidago canadensis</i> (L.) |
| <i>Solidago erecta</i> Pursh |
| <i>Solidago flexicaulis</i> L. |
| <i>Solidago graminifolia</i> (L.) Salisb. var. <i>graminifolia</i> |
| <i>Solidago nemoralis</i> Ait. var. <i>nemoralis</i> |
| <i>Solidago sphacelata</i> Raf. |
| <i>Sorghum halepense</i> (L.) Pers. |
| <i>Sphenopholis nitida</i> (Biehler) Scribn. |
| <i>Spiranthes cernua</i> (L.) Rich. var. <i>cernua</i> |
| <i>Spiranthes gracilis</i> (Bigel.) BEck |
| <i>Spiranthes ovalis</i> (Lindl.) |
| <i>Spiranthes tuberosa</i> Raf. |
| <i>Staphylea trifolia</i> L. |
| * <i>Stellaria media</i> (L.) Cyrill. |
| <i>Stellaria pubera</i> Michx. |

TABLE 1.—Continued

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| <i>Strophostyles umbellata</i> (Muhl.) Britt. |
| * <i>Taraxacum officinale</i> Weber |
| <i>Tephrosia virginiana</i> (L.) Pers. |
| <i>Thaspium trifoliatum</i> (L.) A. Gray var. <i>flavum</i> Blake |
| <i>Thelypteris hexagonoptera</i> (Michx.) Weath. |
| <i>Tilia americana</i> L. |
| <i>Tipularia discolor</i> (Pursh) Nutt. |
| <i>Tradescantia subaspera</i> Ker. var. <i>subaspera</i> |
| <i>Tradescantia virginiana</i> L. |
| <i>Trichomanes boschianum</i> Sturm ex Bosch |
| * <i>Trifolium repens</i> L. |
| <i>Trillium gleasonii</i> Fern. |
| <i>Trillium recurvatum</i> Beck |
| <i>Triodia flava</i> (L.) Smyth. |
| <i>Tsuga canadensis</i> (L.) Carr. |
| * <i>Typha latifolia</i> L. |
| <i>Ulmus americana</i> L. |
| <i>Ulmus rubra</i> Muhl. |
| <i>Uvularia grandiflora</i> Sm. |
| <i>Vaccinium stamineum</i> L. |
| <i>Vaccinium vacillans</i> Kalm ex Torr. |
| * <i>Valeriana pauciflora</i> Michx. |
| <i>Verbascum thapsus</i> L. |
| <i>Verbena urticifolia</i> L. var. <i>urticifolia</i> |
| <i>Verbesina alternifolia</i> (L.) Britt. |
| <i>Vernonia altissima</i> Nutt. |
| <i>Veronica peregrina</i> L. var. <i>peregrina</i> |
| <i>Viburnum acerifolium</i> L. |
| * <i>Viola eriocarpa</i> Schw. |
| * <i>Viola missouriensis</i> Greene |
| <i>Viola striata</i> Ait. |
| <i>Viola triloba</i> Schw. var. <i>triloba</i> |
| <i>Vitis aestivalis</i> Michx. var. <i>argentifolia</i> (Munson) Fern. |
| <i>Vittaria</i> sp. |
| <i>Woodsia obtusa</i> (Spreng.) Torr. |

at various times prior to the establishment of the nature preserve and few large trees remain. Shrubby second-growth thickets occupy portions of the bottoms in the western half, with a substantial tangle of Japanese honeysuckle (*Lonicera japonica*) dominant in one area.

The preserve also supports a number of old fields in various stages of succession, primarily on ridgetops that were previously lumbered and/or farmed. These are dominated by little bluestem (*Andropogon scoparius* var. *scoparius*) and curly oat grass (*Danthonia spicata*), with scattered red cedars (*Juniperus virginiana* var. *crebra*), flowering dogwoods (*Cornus florida*), and blueberries (*Vaccinium* spp.), among others. A small hillside seepage area, dominated by cattail (*Typha latifolia*) and silky willow (*Salix sericea*), occupies a portion of one old field, while other fields contain areas that are somewhat eroded, mainly with a thin covering of lichens and annuals.

Much of the floristic diversity of the preserve can be attributed to the relatively large variety of microhabitats present. Various degrees and directions of exposure are found along the bluffs, at both wetter and drier sites. Stream flow varies from permanent to highly intermittent, at sites with bedrock, gravelly sand, and fine silt substrates. Each of these smaller habitats contains herbaceous species not found elsewhere in the preserve. In addition, degree of erosion and successional status of the various old fields have allowed colonization by a large number of weedy and nonweedy plant species.

Other disturbed habitats have also affected the floristic diversity of the preserve. Three small mines (inactive for some time) provide sheltered vertical habitat and are being recolonized by both vascular and nonvascular species. The shale and limestone spoils from one of these are a novel substrate for the area. Of greater importance is an inactive sandstone quarry (and the roadbed leading to it) on a ridgetop in the eastern half of the preserve. Soil cover over the sandstone in this formerly bare area is thin to nonexistent in places, creating an edaphically harsh environment that most of the plants found elsewhere in the preserve are unable to colonize. Several species not found elsewhere in the area have, however, been successful in utilizing portions of this habitat, notably mountain laurel (*Kalmia latifolia*) and small-flowered ladies' tresses orchid (*Spiranthes tuberosa*), considered respectively rare and threatened in the state (1).

History of Botanical Study

The series of ravines comprising the present preserve have along been known to Indiana botanists, with collections accessioned at the Deam Herbarium of Indiana University (IND) dating from the end of the last century. They were a favorite Crawford County collecting site for Deam, who made 11 trips there from 1911 to 1945. Other well known Indiana botanists, including Potzger and Friesner, also collected in the area during this time. Lindsey and his associates completed vegetational and floristic work in 1967, during their natural areas survey of the state. It was at this time that the name Yellow Birch Ravine first came into usage to commemorate the only southern Indiana station for yellow birch (*Betula lutea*), previous collectors having referred to the area simply as "ravines 1 miles east of Taswell". Prior to and during the acquisition of the land parcels comprising the present preserve, personnel of the Indiana Department of Natural Resources searched for uncommon plant species and assembled a preliminary plant list for the property. Recent collections at IND from the preserve include those of Aldrich, Homoya, Huffman, Post, and Ritter, among others.

Methods

We took several preliminary trips to the preserve in 1983 (September, November) and 1985 (April), followed by approximately triweekly forays during 1986 (March to September). Species lists were compiled in the field during all visits and, when necessary for identification, pressed specimens were taken for later herbarium study. These vouchers are accessioned at IND. Many species were also photographed in the field. Potential county records were checked against the distribution records in Deam's flora (2), subsequent records reported in numerous volumes of the *Proceedings of the Indiana Academy of Science*, the computerized *Floristic Atlas for Indiana* (5), and specimens already accessioned at IND. Nomenclature follows that of Gleason and Cronquist (3), updated where necessary.

Two lists served as starting points for our survey. A preserve plant list was generously provided by the Division of Nature Preserves, consisting of 172 species noted during numerous visits by Indiana Department of Natural Resources personnel over the last few decades. A second list of some 132 specimens (93 taxa) was compiled from the collection books of Charles Deam housed at IND. From the latter list it was possible to assess qualitatively what levels of species turnover had occurred in the preserve since the time of Deam's last visit, in 1945.

Results and Discussion

The combined species inventory for the Yellow Birch Ravine Preserve, including data from our study and previous lists, is detailed in table 1. Of the 423 taxa listed, 380 were verified during our field work. An additional nine species present on the state's preserve plant list were excluded, as these are probably taxa misdetermined by previous

workers. The 43 other species noted by earlier workers and not rediscovered by us probably represent cases of both extirpations in the area due to natural or human-mediated causes and oversights on our part of localized populations.

The preserve supports populations of eleven species presently on the state register of endangered, threatened, and rare plant species (1). These are: the state endangered mountain spleenwort (*Asplenium montanum*), southern dewberry (*Rubus enslenii*), filmy fern (*Trichomanes boschianum*), and ground pine (*Lycopodium dendroideum*); the state threatened Mississippi milk pea (*Galactia volubilis* var. *mississippiensis*), late alum root (*Heuchera parviflora* var. *rugelii*), and two ladies' tresses orchids (*Spiranthes ovalis*, *S. tuberosa*); and the state rare hay-scented fern (*Dennstaedtia punctilobula*), mountain laurel (*Kalmia latifolia*), and Lloyd's clubmoss (*Lycopodium porophyllum*). In addition several other species uncommon in southern Indiana are present (see table 1).

Species recruitment during the last forty years has been appreciable, particularly in the relatively recently disturbed habitats adjacent to the two old road beds that traverse the property, and at the old quarry site. Species such as toothed ragweed (*Ambrosia bidentata*), yellow bartonia (*Bartonia virginica*), purple fringeless orchid (*Platanthera peramoena*), small-headed beaked rush (*Rhynchospora capitellata*), short-beaked arrowhead (*Sagittaria brevirostra*), and small-flowered ladies' tresses orchid (*Spiranthes tuberosa*), among others, have probably all colonized the preserve since the time of Deam's collections and are all restricted to these relatively recently altered sites.

Species attrition in the preserve is less easily documented. Some distinctive and easily recognizable plants present on the state's preserve plant list were not relocated during our survey, such as black-fruited chokeberry (*Aronia melanocarpa*), large yellow ladies' slipper orchid (*Cypripedium calceolus* var. *pubescens*), and American elm (*Ulmus americanus*), and probably represent localized extinctions. In fact, excluding the 9 unlikely taxa mentioned previously, we failed to relocate 24 (14%) of the 172 species on the preserve plant list. Of these 24, however, 8 are species of the large and taxonomically difficult genus *Carex* (sedges) for which no previously collected vouchers from the preserve could be located and whose presence in Yellow Birch Ravine is problematic.

Of the 93 taxa collected by Deam, we were unable to relocate 16 (17%) during our field work. Some of these, such as the bracken fern variety *Pteridium aquilinum* var. *pseudocaudatum*, which is a large and easily recognized fern that is uncommon in Indiana, have undoubtedly become extirpated since the time of Deam's collections. This is particularly true of the eight species from the above list that Deam collected in open ridgetop areas (often listed as adjacent to cleared areas or along cultivated fields), where the greatest rate of species turnover in the preserve has probably taken place. For unrelocated taxa both from Deam's list and from the state's preserve plant list, one cannot, however, rule out the possibility that we simply overlooked highly localized or otherwise uncommon plants still present in the preserve. The period of time available for our fieldwork was too short to exhaustively survey every square meter of the area. We nevertheless feel confident that the floristic inventory presented in table 1 is reasonably complete for both common and rare plant species that occur in Yellow Birch Ravine today.

This inventory contains more than twice the number of plants previously reported for the area, and includes 63 Crawford County records (see table 1). Slightly over one half of the 666 vascular plant species records for Crawford County contained in the computerized floristic atlas for the state (5) are present in the preserve. These figures indicate that both the county and the preserve have not been well inventoried in the past and suggest that the percent of unrelocated species, calculated by comparing Deam's and the state's plant lists with our field notes, may be biased because of the relatively large number of common taxa not recorded by previous investigators.

Our study has documented that Yellow Birch Ravine has retained a high level of

plant species diversity in spite of the significant vegetational changes during this century caused by mining, lumbering, and farming, as well as natural successional processes. While the apparent extinction of some species and the invasion of other native and non-native taxa can be documented, the overall floristic complement of the property has probably remained fairly constant. Thus, in spite of relatively high levels of human impact and a resultant relatively poor forest rating by Lindsey et al. (6), the preserve remains an outstanding physical and botanical example of the Crawford Upland Division of the Shawnee Hills Natural Region as seen in southern Indiana.

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Literature Cited

1. Aldrich, J.R. and J.A. Bacone. 1986. List of extirpated, endangered, threatened and rare vascular plants in Indiana: an update. Proc. Indiana Acad. Sci. 95:413-419.
2. Deam, C.C. 1940. Flora of Indiana. Indiana Department of Conservation, Indianapolis, IN. 1236 p.
3. Gleason, H.A. and A. Cronquist. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. D. Van Nostrand Co., New York, NY. 810 p.
4. Homoya, M.A., D.B. Abrell, J.R. Aldrich, and T.W. Post. 1985. The natural regions of Indiana. Proc. Indiana Acad. Sci. 94:245-268.
5. Keller, C., T. Crovello, and K. Guild. 1984. Floristic Atlas for Indiana. Unpublished microcomputer database program (for description, see C. Keller. 1986. The computerization of regional floristic data. Proc. Indiana Acad. Sci. 95:412.
6. Lindsey, A.A., D.V. Schmelz, and S.A. Nichols. 1969. Natural Areas in Indiana and Their Preservation. Indiana Natural Areas Survey, Purdue University, Lafayette, IN. 594 p.
7. Wingard, R.C., Jr. 1975. Soil Survey of Crawford County, Indiana. U.S.D.A. Soil Conservation Service, Washington, D.C. 60 p.

Note

^{1,2} Present address: Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166.

