

## The Discovery of Native Rare Vascular Plants in Northern Indiana

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### Introduction

Active field surveys during recent years have greatly increased our knowledge of the endangered and threatened flora of northern Indiana. This paper includes several new occurrences for endangered and threatened species, several of which have gone unreported for over 50 years.

All of the occurrences of these species have been mapped and recorded in the data base maintained by the Indiana Natural Heritage Program from which information on the historical sites has also been gleaned (7). Voucher specimens are to be deposited at the Deam Herbarium of Indiana University—Bloomington. The nomenclature follows Gleason and Cronquist (6) with the exception of *Platanthera* which follows Luer (8). The endangered and threatened status is based on the work by Bacone and Hedge (1) and Bacone *et al* (2).

### Rare Species

#### *Aster furcatus* Burgess. (Forked Aster)

A healthy population of this state endangered species, which is endemic to the Midwest, was found along a tributary to Big Pine Creek at Fall Creek Gorge, Warren County. The plants were growing on sandstone in small circum-neutral seepage areas. Characteristic associates include *Parnassia glauca*, *Selaginella apoda*, and *Dryopteris marginalis* (August 27, 1982 Aldrich s. n.). Forked aster is also known to occur in similar situations at a few other locations along Big Pine Creek.

#### *Berberis canadensis* Mill. (Allegheny Barberry)

The only extant site for this species (photo voucher) was rediscovered one kilometer northeast of Buffalo (May 19, 1981 Aldrich and Cummings). It had last been collected there in 1924 by Charles Deam (73943 IND). Six individuals were growing in sandy soil on the steep west facing slope overlooking the Tippecanoe River. The slope, dominated by *Quercus velutina*, was relatively open. Characteristic associates included *Lithospermum canescens*, *Hepatica acutiloba*, *Carex pensylvanica* and the state endangered *Besseyia bullii*. Deam (4) regarded this species as native to Indiana. However, in 1932 (3) he excluded it from the flora because in 1923 the state undertook the "Barberry Eradication Campaign" to eradicate every appearance of the species in Indiana. Unfortunately, in 1983 the remaining *B. canadensis* was eradicated by a biologist from the Barberry Eradication Program.

#### *Botrychium matricariaefolium* A. Br. (Grape Fern)

This tiny grape fern was not reported by Deam, but according to Swink and Wilhelm (12), it was collected at Indiana Dunes State Park in Porter County by Alvah Armstrong and Vlademar Schwarz in 1965. It was relocated at this site by Marlin Bowles in 1984. It was found at Moraine Nature Preserve, also in Porter County, in sandy soil about 8 meters from a pond where about twenty-five plants grew under *Prunus*

*serotina*, *Acer rubrum*, *Carpinus caroliniana* and *Hamamelis virginiana* (June 24, 1982 Casebere). In Lagrange County, it was collected at Tamarack Bog Nature Preserve where it occurred on a sandy slope near the border of a *Larix laricina* swamp under *Ulmus rubra* with *Rubus hispidus*, *Botrychium dissectum*, and *Carex* sp. (June 6, 1975 Casebere s.n.). Tom Blodgett and Vic Riemenschneider found this species in May of 1982 at Bendix Park in St. Joseph County. It is likely that this species occurs rarely here and there in the northern two tiers of Indiana counties in young successional communities on sandy soils. However, because of its small size it may be easily overlooked.

*Carex disperma* Dewey. (Sedge)

This state threatened sedge is known from only two extant sites. It occurs commonly in tamarack bogs in Steuben and Kosciusko Counties. Typically *C. disperma* grows in saturated *Sphagnum* in densely shaded areas under *Larix laricina*. Other associates for this species include *Rubus pubescens*, *Coptis trifolia*, *Carex leptalea*, *Mitchella repens* and *Caltha palustris*. The Steuben County site is eight kilometers northwest of Angola (June 22, 1982 Starcs, Aldrich and Homoya s.n.) and the Kosciusko County site is eight kilometers southeast of Warsaw (June 3, 1984 Aldrich, Homoya and Casebere s.n.).

*Carex eburnea* Boott. (Sedge)

This state endangered sedge was found in Warren County on a small west-facing limestone outcrop and the adjacent slope overlooking Big Pine Creek. Here it was growing in association with *Pinus strobus*, *Quercus rubra*, *Juniperus virginiana*, *Smilacina stellata*, and *Aquilegia canadensis* (May 12, 1983 Aldrich s.n.). This species is also known from the Lake Michigan region and from southern Indiana (4).

*Carex flava* L. (Sedge)

This northern species has a healthy, abundant population in Steuben County at Lime Lake Fen. Here it occurs mostly around marl flats, where on many tussocks it is interwoven with *Carex stricta* var. *strictior* and *Deschampsia caespitosa* (May 23, 1984 Aldrich s.n. and July 2, 1984 Starcs s.n.). At a second Steuben County site (marly south shore of Gannon Lake) where it was found in 1972, it has been "drowned-out" by an elevated water table. Another Steuben County site—a seep southeast of Gannon Lake and east of S.R. 327—is still extant. Lagrange County has this species in the Sawmill Fen west of Mongo along a seepy rivulet with an abundance of *Carex sterilis*. The southernmost site for Indiana occurs in Tippecanoe County at Americus Fen. Some specimens here integrade with *Carex cryptolepis* (May 24, 1983 Aldrich, Homoya, Post and June 12, 1984 Starcs).

*Carex flava* has been extirpated at the two sites reported by Deam (4). The marly marsh on the Wolverton Estate southwest of South Bend is now destroyed and the springy wooded bank of Flat Rock River, one kilometer north of St. Paul in Decatur County, is overgrown by trees and shrubs.

*Carex woodii* Dewey. (Sedge)

A new site for this rare woodland sedge was discovered in the northwest corner of Dekalb County at the Douglas Woods (June 3, 1982 Aldrich, Homoya, Starcs s.n.). It is well established here on the lower part of a gentle slope in a mixed beech/maple—oak/hickory woods with *Viburnum acerifolium*, *Carex laxiculmis* and *Hepatica acutiloba*. Nearby in the same woods on slightly more elevated ground *Luzula acuminata* was found. Another site for *C. woodii* was found at the Butternut Springs Woods in Porter County five kilometers northwest of Valparaiso. It is abundant here in a large area in the deep leaf mold of a rich beech/maple woods (May 31, 1982 Starcs, Swink, Dritz, Aldrich s.n.).

*Cornus canadensis* L. (Bunchberry)

This has always been a very rare plant in Indiana, historically known only from boggy habitats in Porter and Lake Counties (4, 10, 11). There are only two known extant sites for this small dogwood. It still occurs at the site historically known as the Mineral Springs Bog, which is now more commonly called Cowles Bog (14). Here it is found with *Betula lutea*, *Larix laricina*, *Acer rubrum*, *Trientalis borealis* and *Maianthemum canadense*. It was recently discovered in Steuben County where Aldrich, Post and Casebere found it on May 19, 1983 (photo voucher) growing with a rich complement of boreal associates. In addition to the species listed above for the Cowles Bog site, it grew with *Coptis trifolia*, *Cypripedium acaule* and *Geum rivale*.

*Deschampsia caespitosa* (L.) Beauv. (Tufted Hairgrass)

Deam had specimens of this plant from St. Joseph and Laporte Counties at one location each (4). In both cases, it was found growing in a "marly, springy place." Starcs found this species at separate sites in Madison and Marion Counties in 1957, where it is still extant today. Since 1979, we have found it at four different sites on Pigeon River Fish and Wildlife Area in Lagrange and Steuben Counties. It was found in 1984 by Aldrich, Casebere, Homoya, et. al. (photo voucher) at two new locations in St. Joseph County in the same general vicinity as the destroyed Wolverton Estate Bog where it was known to occur historically. In all cases, the plants were growing in calcareous seepages, usually associated with rather extensive calcareous fen communities. Common associates include *Triglochin maritima*, *Parnassia glauca*, *Tofieldia glutinosa*, *Solidago ohioensis*, *Scleria verticillata*, *Sarracenia purpurea* and *Silphium terebinthinaceum*.

*Eleocharis robbinsii* Oakes. (Spike Rush)

Six new sites for this state endangered spike rush, which was last reported for Indiana by Charles C. Deam in 1934, were found in St. Joseph, Elkhart, Lagrange and Steuben Counties. It is usually found growing in full sun on saturated, floating peaty muck flats in 1 to 10 cm of water. Typically, its associates include *Utricularia gibba*, *Fimbristylis autumnalis*, *Eleocharis olivacea*, and *Nuphar advena*. In St. Joseph County this species was found at Deer Lake and Mud Lake (August 23, 1984 Aldrich and Starcs s.n.); it was found at East Lake in both Lagrange and Elkhart Counties (August 10, 1983 Aldrich, Casebere and Meyers s.n.); it also occurs at Pipewort Pond in Elkhart County (October 5, 1983 Aldrich and Post s.n.); and in Steuben County it is known from Bass Lake (August 20, 1983 Aldrich and Homoya) and Loon Lake (July 21, 1982 Aldrich s.n.).

*Geum rivale* L. (Purple Avens)

The only historical Indiana records for this plant are from Noble, Lagrange and Steuben Counties in northeastern Indiana (4). Efforts by the Indiana Natural Heritage Program to relocate this species at historical sites have been unsuccessful. However, three new locations have been found in recent years. On June 4, 1976 a single plant was observed by Casebere (photo voucher) along a small spring-fed stream growing with *Carex stricta* in a *Larix laricina* swamp about two kilometers southeast of Mongo in Lagrange County. On May 19, 1983 this species was found by Aldrich, Post and Casebere (photo voucher) scattered throughout an old *L. laricina* swamp in Steuben County. It was further associated with *Cardamine pratensis* var. *palustris*, *Cypripedium calceolus* var. *pubescens*, *Rubus pubescens*, *Symplocarpus foetidus* and *Trillium grandiflorum*. It was found again in Steuben County by Aldrich in June 1983 in a remnant tamarack swamp.

*Isotria verticillata* (Willd.) Raf. (Whorled Pogonia)

Over 100 plants of this attractive state threatened orchid were found growing



in partial shade in a small tamarack bog eight kilometers southeast of Warsaw, Kosciusko County. Most of the plants were growing on dried peat under *Larix laricina*. The characteristic associates of this species included *Maianthemum canadense*, *Gaylussacia baccata* and *Aronia melanocarpa* (May 25, 1983 Aldrich and Brack photo voucher).

*Lycopodium clavatum* L. (Running Ground Pine)

Deam (4) mentions that this boreal clubmoss was reported for Lake County by Ball and by Pepoon, but he listed it as an excluded species since there were no confirming specimens. Apparently, the first Indiana collection for this species was made in Porter County (March 1, 1951 Grow and Segal 1377434 Field Museum). According to Wilhelm (14), it is still extant at another Porter County site, and a specimen from that site collected by Lois Howes on March 13, 1971 is deposited in the herbarium at the Morton Arboretum in Lisle, Illinois. It was observed by Kurz, Bowles, Post, and McFall in Laporte County in 1979 during the Coastal Zone Management Natural Area Inventory. Here it occurred in a woods with a large number of other species with boreal affinities including *Lycopodium obscurum*, *Coptis trifolia*, *Betula papyrifera*, *Carex arctata*, *Cornus rugosa* and *Pyrola elliptica*.

There are several recent records for northeastern Indiana including an observation of the species at the Ropchan Memorial Nature Preserve in Steuben County by Aldrich and Starcs (s.n.) in 1982. In Noble County it was found growing in a remnant bog in highly organic soil under *Acer rubrum* and dead *Larix laricina* and associated with *Vaccinium corymbosum*, *Rubus hispidus* and *Maianthemum canadense* (July 16, 1980 Casebere s.n.). It has been observed at three locations within the Pigeon River Fish and Wildlife Area in Lagrange County where it was found growing in sandy black and white oak woods on the border of swamps or marshes. In this habitat it associated with *Gaultheria procumbens*, *Vaccinium vacillans* and *Gaylussacia baccata*. There is a specimen from one of these Lagrange County sites (August 8, 1974 Casebere s.n.).

*Lycopodium inundatum* L. (Bog Club Moss)

This rare and local clubmoss has been historically reported from various wet or moist habitats in northern Indiana including swamps, ditches and sphagnum bogs (9), sedge swamps (10), and acid, sandy lake borders (4). It is interesting that most recent records are not from natural communities, but rather in areas where acid sand has been scraped or excavated down to the water table. Swink and Wilhelm (12) report this situation and present a long list of associates. We have a recent record from this sand scrape habitat in Lagrange County where *L. inundatum* is found with *Polytrichum* sp., *Xyris torta*, *Drosera intermedia*, *Polygala sanguinea*, *Spiranthes cernua*, *Viola lanceolata*, *Spiraea tomentosa* and *Rhexia virginica* (Casebere photo voucher).

*Luzula acuminata* Raf. (Hairy Wood Sedge)

This endangered species was rediscovered in Dekalb County at the Douglas Woods in a rich mixed beech/maple—oak/hickory woods with *Carex pensylvanica*, *C. woodii*, *Hepatica acutiloba* and *Viburnum acerifolium* (June 3, 1982 Aldrich, Homoya, Starcs s.n.). The species had previously been reported from this site by Deam in 1927 (68402 IND). Swink and Wilhelm (12) report *L. acuminata* from Laporte County where it was rediscovered in 1985 (Aldrich and Wilhelm s.n.).

*Malaxis unifolia* Michx. (Green Adders Mouth)

Historically, this state endangered species was known from three sites in northern Indiana (7). Deam collected it at the Leesburg Swamp in Kosciusko County, Van Gorder discovered it at Pleasant Lake in Noble County in 1885, and it has been reported by several botanists for Pinhook Bog in Laporte County (14). Of these three sites, only Pinhook Bog is still extant. On July 18, 1984 a single plant was found growing

in a graminoid bog about one kilometer northeast of Heaton Lake, Elkhart County. The plant was growing in sphagnum on a hummock formed by *Osmunda regalis* in association with *Toxicodendron vernix*, *Carex lasiocarpa*, *Menyanthes trifoliata*, and the state threatened *Eriophorum viridi-carinatum* (Aldrich and Starcs).

*Melanthium virginicum* L. (Bunch-flower)

The state threatened bunch-flower was rediscovered in a railroad prairie where it had previously been collected by Deam in 1930 (68777 IND). Here it was growing in association with *Andropogon gerardi*, *Dodecatheon meadia*, and *Zizia aurea* (June 28, 1980 Starcs, Hedge and Aldrich photo voucher). The species is also extant in a fen in Randolph County (5). To our knowledge this species is no longer extant at the other sites reported by Deam (4).

*Millium effusum* L. (Millet Grass)

This state threatened grass was found growing in a swamp forest predominated by *Betula lutea*, *Acer rubrum*, and *Larix laricina* just north of Clear Lake, Steuben County. Here its characteristic associates included *Lindera benzoin*, *Lonicera dioica*, *Nemopanthus mucronata*, *Osmunda cinnamomea*, *Symplocarpus foetidus* and *Caltha palustris* (June 22, 1983 Aldrich s.n.). Another extant site for this species is the swamp forest at Indiana Dunes State Park, Porter County (14).

*Napaea dioica* L. (Glade Mallow)

A large population of glade mallow was found growing in a shallow drainage along a county gravel road east of Logansport, Cass County. This is one of four extant populations known in Indiana (June 25, 1985 Homoya and Brothers 132300 IND).

*Oryzopsis racemosa* (Smith) Ricker. (Black-seeded Rice Grass)

Several clumps of the black-seeded rice grass were noted growing on a steep, north-facing limestone slope above the Wabash River in Cass County. This is the third extant population known for Indiana (June 25, 1985 Homoya and Brothers 132286 IND).

*Platanthera dilatata* (Pursh.) Lindley ex Beck (Bog Candle)

This orchid was historically known from Lake, Porter, Laporte and St. Joseph Counties (4) where it had been found very rarely in wet, calcareous habitats. It was presumed extirpated in Indiana since searches of historic sites revealed either no *P. dilatata* or that the habitat had been destroyed. However, on June 5, 1984 several plants were found by Aldrich, Casebere, Homoya, V. and M. Riemenschneider and J. Bogucki in a calcareous fen in St. Joseph County. The plants were found mostly in very wet, marly spots associated with *Deschampsia caespitosa*, *Carex viridula*, *Silphium terebinthinaceum*, *Eleocharis rostellata*, *Sarracenia purpurea* and *Rhynchospora capillacea*. This fen is located approximately five kilometers from the well-known Wolverton Estate Bog (actually a calcareous fen) which is now destroyed and where *P. dilatata* was known to occur.

*Poa wolfii* Scribn. (Wolf's Bluegrass)

Wolf's bluegrass was collected from a gravelly, northeast-facing slope in a deep, forested ravine near Big Pine Creek in Warren County. This is the only extant population known in Indiana (May 13, 1985 Homoya 132287 IND).

*Scheuchzeria palustris* L. var. *americana* Fern. (Arrow Grass)

This state endangered member of the Juncaginaceae was known from 3 sites historically. Of these, only one site, Pinhook Bog, is still extant and efforts to rediscover it here have been unsuccessful. To our knowledge, it has not been seen here since Deam collected it in 1929. On August 15, 1984 a dense colony was found growing in a 10 meter square area in a small leatherleaf bog in Noble County. The species

was growing in full sunlight in water-saturated sphagnum in association with *Rhynchospora alba*, *Eriophorum virginicum*, *Carex oligosperma*, *Pogonia ophioglossoides* and *Vaccinium oxycoccos* (Aldrich s.n.). None of the plants at this site fruited in 1984 or 1985. However, the distinctive pore at the tip of each leaf, which is discussed by Voss (13), and the rhizomatous habit of this species make its identity unmistakable.

*Schizachne purpurascens* (Torr.) Swallen. (False Melic Grass)

Eight clumps of the false melic grass were observed growing on a limestone slope west of Logansport in Cass County. The site is across the Wabash River from where C.C. Deam collected the species in 1923. The Deam population, now apparently extirpated, was previously the only known occurrence for the grass in Indiana (June 25, 1985 Homoya and Brothers 132288 IND).

*Silene regia* Sims. (Royal Catchfly)

The rediscovery of the state endangered royal catchfly in Vermillion County represents the third known extant occurrence for this species (which is also rare throughout its range) in the state. Over 100 plants were found growing in a cemetery prairie with *Amorpha fruticosa*, *Andropogon gerardi* and the state threatened *Viola pedatifida* (August 23, 1979 Hedge and Aldrich photo voucher).

*Stenanthium gramineum* (Ker) Morong. (Featherbells)

The state threatened featherbells, a member of the Liliaceae, was known from 9 sites historically. Its rediscovery in Cass County represents the only extant site for it. About 50 plants were growing in sandy soil in a relatively open black oak-white oak woods (possibly a former savanna). Its associates included *Ceanothus americanus*, *Coreopsis palmata*, *Echinacea purpurea*, *Cacalia atriplicifolia* and *Pteridium aquilinum* (August 14, 1980 Aldrich and Hedge photo voucher). It had last been recorded from this site by Ek in 1942 (n.d. BUT).

*Stipa avenacea* L. (Black Oat Grass)

The state endangered black oat grass was rediscovered on July 3, 1981 by Aldrich and Casebere (s.n.) at Tamarack Bog Nature Preserve in Lagrange County where it had last been reported by Potzger in 1937 (79841 DPU). This same species was also found in Elkhart County about two kilometers northwest of Heaton Lake (July 18, 1984 Aldrich and Starcs s.n.). At both sites it grew abundantly in sandy soil in open black oak woods where it was associated with *Aster macrophyllus*, *Carex pensylvanica*, *Gaylussacia baccata* and *Pteridium aquilinum*.

*Utricularia cornuta* Michx. (Horned Bladderwort)

Deam (3) considered this to be one of Indiana's rarest bladderworts and his only specimens came from Lake, St. Joseph and Elkhart Counties. Wilhelm (14) certainly felt that there was little chance that it could be found elsewhere in Indiana when he made the statement that the calcareous pannes of the Miller and West Beach Units (Indiana Dunes National Lakeshore, Lake and Porter Counties) ". . . are probably the only loci in the state of Indiana where living populations of this species still survive." In this habitat, they associate with *Cladium mariscoides*, *Lobelia kalmii* and *Scleria verticillata*. We have found this species elsewhere, though, in two similar calcareous habitats in Lagrange and Steuben counties. The Lagrange County habitat is in marl flats and calcareous seeps in fen communities along the Pigeon River. The Steuben County sites are on the borders of very marly lakes. In both of these situations the plants grow in moist, marly mud often in shallow water up to one centimeter in depth. Associates include *Scleria verticillata*, *Triglochin maritima*, *Tofieldia glutinosa*, *Eleocharis rostellata*, *Rhynchospora capillacea*, *Lobelia kalmii*, *Parnassia glauca* and *Cladium mariscoides*.



*Utricularia minor* L. (Small Bladderwort)

Three extant sites are known for this state endangered bladderwort. It occurs at the Crooked Lake Nature Preserve in Whitley County (June 4, 1982 Starcs and Aldrich s.n.) and in Steuben County it was found at Loon and Jimmerson Lakes (August 15, 1983 Aldrich s.n.). Its habitat appears to be quite variable. In Steuben County it grew in small shaded wet depressions between hummocks of *Decodon verticillata* and *Osmunda regalis*. However, in Whitley County it was found in full sun in a tire rut that traversed a disturbed calcareous seep. Here it was associated with *Parnassia glauca*, *Carex sterilis* and the state threatened *Spiranthes lucida*.

*Utricularia purpurea* Walt. (Purple Bladderwort)

C.C. Deam reported five locations for this species (4). However, it is no longer extant at three of these sites; Goose Lake in Porter County has been destroyed. And presumably because of water quality degradation, it no longer occurs at Lake Cicott (Cass County) and Simonton Lake (Elkhart County). Fortunately, recent field surveys have resulted in the discovery of thirteen extant sites for this species. It occurs at several sites in Steuben County including Seven Sisters, Loon and Bass Lakes. Purple bladderwort occurs at three sites each in Elkhart and St. Joseph Counties including Pipewort Pond and Deer Lake respectively. Typical associates for this floating aquatic include *Utricularia vulgaris*, *Nymphaea tuberosa*, *Brasenia shreberi* and *Potamogeton* spp.

*Vaccinium oxyccos* L. (Small Cranberry)

Deam (4) was justifiably concerned that, with the exception of the Pinhook Bog population, the small cranberry would become extinct in Indiana because of habitat destruction. Fortunately, large populations were found in Lagrange (August 26, 1983 Aldrich and Casebere s.n.), Noble (August 15, 1984 Aldrich s.n.) and Kosciusko Counties (June 21, 1983 Aldrich, Post and Homoya s.n.) and a small population still remains at Tamarack Bog Nature Preserve (May 28, 1979 Casebere). Its characteristic associates include *Chamaedaphne calyculata*, *Drosera rotundifolia*, *Sarracenia purpurea*, *Sphagnum* sp. and *Rhynchospora alba*.

*Xyris caroliniana* Walt. (Tall Yellow-eyed Grass)

Four additional sites were found for the state endangered yellow-eyed grass. It was abundant at Deer Lake and South Clear Lake in St. Joseph County (August 23, 1984 Aldrich and Starcs s.n.) as well as at Yost Pond in Lagrange County (August 26, 1983 Aldrich and Casebere s.n.). However, only a single plant was found at Pipewort Pond in Elkhart County (August 24, 1984 Aldrich, Starcs and Dritz). It was typically found in association with *Rhynchospora alba*, *Elocharis olivacea* and *Utricularia gibba* in leatherleaf bogs and on hydric peaty muck flats.

*Zigadenus elegans* Pursh. (White Camas)

Two "types" of white camas were discovered growing on a mesic limestone cliff bordering the Wabash River in Cass County (June 25, 1985 Homoya and Brothers 132292 and 132293 IND). One type has large, deep green leaves and perianth parts, and the other has narrow, light green leaves and perianth parts. The small, light green type suggests *Zigadenus elegans* Pursh., and the large, deep green type suggests *Zigadenus glaucus* Nutt. There is apparently considerable overlapping of characters throughout the range of these two "species", leading some botanists to consider the two to be the same species, as *Zigadenus elegans*, with the former *Z. glaucus* being *Z. elegans* subsp. *glaucus* (Nutt.) Hulten.

This site is the only known cliff habitat in Indiana for *Zigadenus*, a plant normally found in fen communities. Interestingly, another fen and seep spring plant, *Deschampsia caespitosa*, was discovered from its only cliff occurrence in Indiana at

this site also. Other associates included *Arenaria stricta*, *Campanula rotundifolia*, *Aquilegia canadensis* and *Pellaea glabella*.

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