Glades and Barrens of Crawford and Perry Counties, Indiana

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Introduction

Glades and barrens are natural openings within the forest in southern Indiana. The openings termed glades are those with bedrock at or near the surface, and are usually on steep south, southwest, or west-facing slopes. In southern Indiana, remnant glades occur most commonly on limestone (2), and this is the case in Crawford and Perry Counties. However, sandstone glades are known to occur in other states in the Midwest (26), and one remnant was found in Perry County.

Barrens are found on relatively deep soils, sometimes with very little slope. In presettlement times, they were rather extensive in portions of southern Indiana (16), but apparently quickly disappeared following settlement (9). This natural community has not been previously described in studies of Indiana's extant plant communities (15,20).

In this paper, barrens, limestone glades, and the sandstone glade, all of which were recently located in Crawford and Perry Counties, will be discussed. The methods used to locate and evaluate them are also discussed, and preliminary species lists for each community are presented.

Methods

A systematic search for glade and barren remnants was made in Crawford and Perry Counties during 1981 and 1982 (13,14). The methods used were similar to those used to find glades in Harrison County, Indiana (1,12). The most recent aerial photographs available at the Agriculture Stabilization and Conservation Service offices in each county were examined, in conjunction with the 7.5 minute United States Geological Survey topographic quadrangle maps. Openings in the forest were scrutinized in an effort to locate those with potential to be natural. Openings that were obviously man-made were eliminated from consideration. Older aerial photographs were examined to further evaluate the past history of these openings.

Each potential natural opening was then checked from the air. A high-wing Cessna aircraft was used, at an altitude of 1,000 feet. The flight took place following the growing season, so that vegetation could be analyzed using the characteristic coloration of the native prairie grasses as compared to old world flora. The sites with high potential were then examined on the ground.

During the ground survey, a number of significant sites were found. These included one sandstone glade and a number of both barrens and glades. These areas were determined to be of high natural quality based on such factors as the relative absence of alien species, a high diversity of native species, a lack of woody encroachment, and the lack of obvious signs of disturbance.

Results

One sandstone glade was located in southern Perry County. This community occupied a long, narrow strip at the top of a 150 foot high cliff. Vegetation is sparse, as bedrock covers much of the area. The limited amount of soil is of the Muskingum-Gilpin Association (21). Lichens, mosses, and clumps of grasses and forbs are scattered throughout. Gnarled cedars (*Juniperus virginiana crebra*) and oaks, including post oak (*Quercus stellata*) and black jack oak (*Q. marilandica*) attest to the xeric environment. Thirty-two native taxa were identified. (Table 1). Broomsedge (*Andropogon virginicus*), little bluestem (*A. scoparius*), and *Danthonia spicata* are the most common grasses. *Tephosia virginiana* and *Viola pedata* are the most common forbs. Shrubs are also common here, including mountain laurel (*Kalmia latifolia*), and three species of *Vaccinium* (*arboreum, stamineum,* and *vacillans*).

A limestone glade was also located in Perry County. In contrast to Harrison County glades (1) it has deeper soils. It is on south-southwest facing slopes, with limestone outcropping. Soils here are Gilpin, Wellston and Muskingum (21). Indian grass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardi*) and little bluestem are common grasses. A rich diversity of forbs, including *Eryngium yuccifolium*, *Helianthus mollis*, *Gentiana quinquefolia* and *Liatris aspera* also occur here. Forty-seven native taxa were found here (Table 1).

The barrens and glades in Crawford County were found on silty clay loam and silt loam soils (Hagerstown, Wellston and Zanesville) (25). The glades had deeper soils than those in Harrison County (1). Some erosion was evident. Species composition was similar to that of the Perry County glade. However, over 100 native taxa were found, probably due to the higher number of sites located. On the barrens, prairie dock (*Silphium terebinthinaceum*) was very common, and Elliott's bluestem (*Andropogon elliottii*) was an important grass, in addition to big bluestem, little bluestem, and Indian grass.

A number of species considered rare in Indiana (3,4) were found in these communities. In addition, ten of the taxa reported from Perry County sites and 25 from Crawford County sites were not reported by Deam (7). Thrity-nine of the taxa were also reported to occur on the limestone glades located in nearby Harrison County. This information is presented in Table 1.

Discussion

The glades and barrens presented in this paper are presumably remnants of the presettlement barrens that covered much of southern Indiana (7,9,16). The presettlement barrens of Harrison and Washington Counties were primarily restricted to the Mitchell Plain Physiographic Province (16), where a number of remnant limestone glades were recently described (1). No remnant barrens were located in those counties. The barrens and limestone glades described in this paper are found west of the Mitchell Plain, in the Crawford Upland Province (18), indicating presettlement barrens may have been widespread.

Except for historical accounts, barrens and glades have been previously undescribed and unmapped in southern Indiana (11,15,17,20,23) until recently (1,16). In the early accounts (6), the term "barrens" probably included both the glade and the barren communities. Charles Deam was aware that presettlement barrens once existed in Indiana (9) but apparently never located any (7). This is further evidenced by the fact that several praire species, including *Eryngium yuccifolium*, *Helianthus mollis*, *Silphium terebinthinaceum* and *Solidago rigida* were not reported from Crawford County in his 1940 *Flora of Indiana* (7).

TABLE 1. *A preliminary species list for glades and barrens of Crawford and Perry Counties, Indiana.*[4]
* = *on the "Preliminary list of endangered and threatened vascular plants of Indiana"* (3,4)

Taxon	Sandstone Glade Perry County	Limestone Glade Perry County	Glade/Barren Crawford Co.
Acer rubrum [1]	x		x
Agave virginica [3]		x	x
Amelanchier sp.	x		
Andropogon elliottii [2]			x
Andropogon gerardii [2,3]		x	x
Andropogon scoparius [3]	x	x	x
Andropogon virginicus	x		x
Anemone virginiana [3]			x
Angelica venenosa			x
Antennaria plantaginifolia	x		
Apocynum cannabinum [2]		x	x
Aristida longespica[1]	x		
Aronia melanocarpa			x
Asclepias tuberosa			x
Asclepias verticillata [3]		x	x
Asclepias viridiflora [2]			x
Ascyrum hypericoides			x
Aster laevis [2]		x	x
Aster novae-angliae [2]			x
Aster patens [3]			x
Aster puniceus [2]			
**Aster solidagineus*			x
Blephilia ciliata		x	
Carya ovata			x
Cassia fasciculata		x	x
Ceanothus americanus			x
Celtis pumila			x
Cercis canadensis [3]		x	x
Convolvulus spithamaeus			x
Coreöpsis tripteris [3]			x
Cornus florida		x	x
Corylus americana			x
Crataegus sp.			x
Cunila origanoides	x		
Danthonia spicata [3]	x		x
Desmodium rotundifolius			x
Diodia teres setifolia		x	
Diospyros virginiana	x		x
Eleocharis compressa			x
Eryngium yuccaefolium [1,2,3]		x	x
Eupatorium fistulosum		x	
Euphorbia corollata [3]	x	x	x
Fagus grandifolia	x		x
Fraxinus americana			x
**Galactia volubilis mississippiensis* [2,3]			x
Gentiana quinquefolia [1,3]		x	
Gerardia tenuifolia [3]			x
Helianthus divaricatus		x	x
Helianthus hirsutus			x
Helianthus mollis [1,2]		x	x
Helianthus occidentalis			x

1. Taxon not reported for Perry County in *Flora of Indiana* (7).
2. Taxon not reported for Crawford County in *Flora of Indiana* (7).
3. Taxon also reported from limestone glades in Harrison County, Indiana (2).
4. Nomenclature according to Gleason and Cronquist (10).

TABLE 1.—Continued

Taxon	Sandstone Glade Perry County	Limestone Glade Perry County	Glade/Barren Crawford Co.
**Hypericum dolabriforme*			x
Hypericum gentianoides	x		
Hypericum prolificum			x
Hypericum punctatum			x
Juniperus virginiana crebra [3]	x	x	x
**Kalmia latifolia*	x		
Krigia dandelion	x		
Lechea tenuifolia	x		
Lespedeza capitata [1,3]		x	
Lespedeza cuneata			x
Lespedeza hirta			x
Lespedeza procumbens		x	x
Lespedeza virginica			x
Liatris aspera [3]		x	x
Liatris spicata [3]			x
**Liatris squarrosa* [1,3]	x	x	x
Linum medium [1]	x	x	x
**Linum sulcatum* [3]			x
Linum virginicum			x
Lithospermum canescens [3]		x	x
Lobelia spicata [2,3]		x	x
Lysimachia quadrifolia			x
Monarda clinipodia			x
Monarda fistulosa [2,3]		x	x
Ostrya virginiana [3]		x	x
Panicum depauperatum [1]	x		
Panicum sp.			x
Phlox pilosa [2,3]		x	x
Physostegia virginiana [2,3]		x	x
Polygala verticillata [2]			x
Potentilla simplex argyrisma	x	x	x
Psoralea psoralioides eglandulosa			x
Pycnanthemum flexuosum		x	x
Pycnanthemum pycnanthemoides			x
Quercus alba	x	x	x
Quercus coccinea [1]	x		x
Quercus imbricaria			x
Quercus marilandica	x	x	x
Quercus muhlenbergii [3]			x
Quercus prinus	x		
Quercus velutina			x
Ratibida pinnata [2,3]		x	x
Rhamnus caroliniana [3]		x	x
Rhus aromatica			x
Rhus copallina			x
Rhus glabra	x		x
Robinia pseudo-acacia	x		
Rosa carolina [3]		x	x
Rudbeckia fulgida [2,3]			x
Rudbeckia hirta		x	x
Ruellia caroliniensis [3]		x	x
Sabatia angularis [3]		x	x
Sassafras albidum	x	x	x
Scirpus lineatus			x
Scleria sp.			x
Senecio obovatus [2]			x

1. Taxon not reported for Perry County in *Flora of Indiana* (7).
2. Taxon not reported for Crawford County in *Flora of Indiana* (7).
3. Taxon also reported from limestone glades in Harrison County, Indiana (2).

TABLE 1.—Continued

Taxon	Sandstone Glade Perry County	Limestone Glade Perry County	Glade/Barren Crawford Co.
Silphium integrifolium [1]		x	
Silphium terebinthinaceum [2]		x	x
Silphium trifoliatum [3]		x	x
Sisyrinchium albidum [3]			x
**Smilax bona-nox* [3]			x
Smilax sp.			x
Solidago graminifolia			x
Solidago juncea [2]			x
Solidago rigida [1,2]		x	x
Sorghastrum nutans [3]		x	x
Sporobolus vaginiflorus [3]			x
Strophostyles umbellata			x
Stylosanthes biflora [2]			x
Swertia carolinensis [3]		x	
Tephrosia virginiana	x		x
Thaspium trifoliatum [2]			x
Ulmus alata			x
**Vaccinium arboreum*	x		
Vaccinium stamineum	x		x
Vaccinium vacillans	x		
Viburnum rufidulum [3]		x	
Viola pedata	x		
**Zizea aptera* [2]			x
Totals	32	47	108

1. Taxon not reported for Perry County in *Flora of Indiana* (7).
2. Taxon not reported for Crawford County in *Flora of Indiana* (7).
3. Taxon also reported from limestone glades in Harrison County, Indiana (2).

Apparently, the barrens as a major plant community in Indiana disappeared quickly following settlement. The disappearance of this community is attributed primarily to cultivation and fire suppression (6,9,16,19).

The limestone glades and barrens remnants described in this paper are rich and prairie-like in both species composition and appearance. They are not very similar to those described for Illinois by Vestal (24), who spoke of "a high proportion of forest herbs, and lacking many prairie plants." Rather they resemble those described in Kentucky (8), as a "beautiful meadow, where grass was from two to three feet high" (19). Collett (6) described the barrens of south-central Indiana as "a nearly typical prairie exhibiting a few gnarled and scotched shrubs, and covered with a luxuriant growth of tall prairie grasses, herbs and vines." They have a high affinity to the prairies and savannas of northwest Indiana—sixty taxa recorded here are found in those communities (22).

The remnants described here appear to be of a high quality, based on the diversity and lack of aliens. It is probably impossible to ascertain why they still remain today, but possible explanations may include all or a combination of the following: mowing, grazing, erosion, sterility of soils (2), or succession from agriculture undertaken very long ago (5).

Floristically, the sandstone glade is quite different from the other glades and barrens. The differences include a lack of Indian grass, very few forbs and the presence of a variety of ericaceous shrubs.

The glades and barrens really cannot be separated floristically. The main difference was visual, with deeper soils and the presence of prairie dock

distinguishing the barrens. These communities, although seperated by geographic distance and man-made barriers today, were probably very interrelated during presettlement times.

Protection and management of these communities will be necessary if they are to continue to exist in Indiana. Management needs include both prescribed burning, and cutting of woody speices. The aerial photographs show a remarkable decrease in size in the last forty years due to encroachment by woody species. Erosion is also a threat in some of these areas. Several of the barren remnants have recently been dedicated as an Indiana State Nature Preserve, which will provide legal protection. Other glade and barren remnants are in public ownership within Harrison-Crawford State Forest and the Hoosier National Forest. Hopefully, these and some of those in private ownership will be also given protection.

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