

Notes on the Flora of the Sinking Creek System and Elkhorn Source Areas in the Inner Blue Grass Region of Kentucky

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ABSTRACT

Little known relict plant communities investigated in the Inner Blue Grass Region along Sinking Creek between Jessamine Creek and Roaring Springs and along outliers of South and North Elkhorn creeks suggest that before the arrival of the first white settlers the area was partly covered by swamp forests possibly still in connection with those along the lower Ohio and Mississippi rivers.

Three localities of *Taxodium distichum*, 2 with trees over 200 years old, 6 localities of *Quercus bicolor*, 1 with about 200 trees, and 1 locality of *Quercus lyrata* were discovered in the area.

The orchid *Spiranthes cernua* var. *odorata* is locally common along Sinking Creek, in association with *Chelone glabra* and *Carex hyalinolepis*. The mimosoid legume *Desmanthes illinoensis* has its most eastern locality along Sinking Creek in Woodford County.

INTRODUCTION

This paper is a preliminary floristic note on the relict flora of the Inner Blue Grass Region investigated in cooperation with members of the Buckley Hills Audubon Wildlife Society and Woodford County Save the Land Association, especially along a series of sinkholes and sinking creeks that stretches from Ashgrove Pike near the Lexington-Nicholasville road west of the Hickman Creek sewage disposal plant through the northern part of Jessamine County, along Versailles and towards Midway in Woodford County, and ending in Roaring Springs in northeastern Franklin County. Part of this system was described by Jillson (1945).

Increased interest in this area has been shown by landowners who benefit from clearwater springs from caves and underground streams, feeding creeks and natural ponds.

Problems of land use and zoning and the great lack of open space for nature recreation in the Inner Blue Grass Region have raised new interest in the geology, flora, and fauna of this karst landscape. Encroaching housing developments, trailer parks, and industrial development threaten

the last remains of the once rich swamp flora of the creeks and sinkholes along this system.

ACKNOWLEDGMENTS

Field work was done during the spring and summer of 1974 in cooperation with Mr. Ellwood Carr, Mr. Van Ship, Mrs. Alex Bowen, Mrs. El. Jones, and Mrs. Patricia DeCamp of the Buckley Hills Audubon Society who acted as guides and companions in the area and who introduced the author to landowners on the farms around Sinking Creek. My former students John MacGregor and Max Leach, the latter now forester in Madisonville, directed me to localities of *Taxodium distichum* in Jessamine and Fayette counties. Mr. Harold R. Wallace, District Conservationist for Jessamine and Fayette counties, joined me in exploration of the Delaney Ferry Road section of Sinking Creek.

METHODS

The study area was divided into sections on the basis of topography, and separate lists of floristic notes and herbarium collections were kept for each area. Identi-

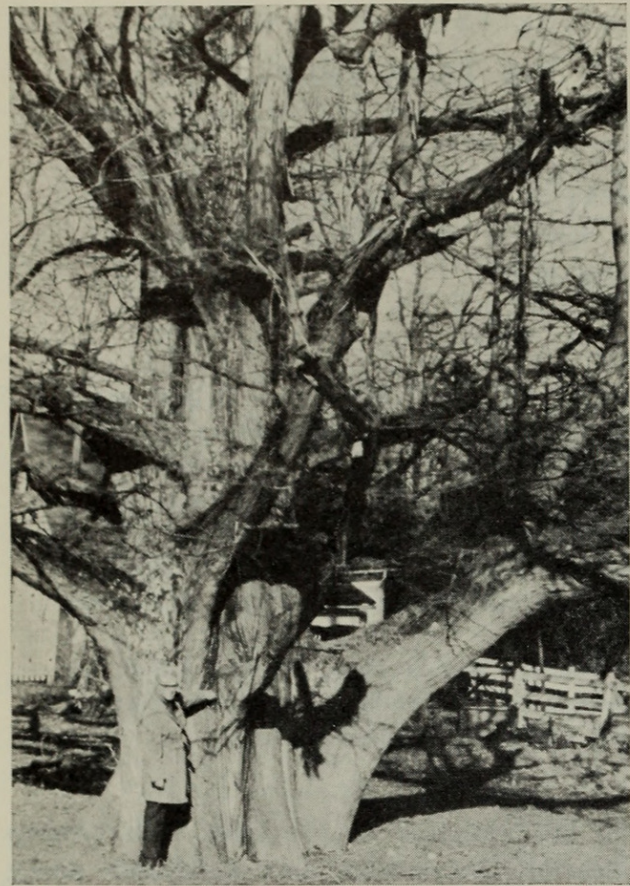


FIG. 1. *Taxodium distichum* near Old Frankfort Pike, Mr. Proctor's home, Lexington, Kentucky.

fications of specimens were made in the field or later in the herbarium.

The project stimulated renewed studies of the difficult genus *Carex* of which around 85 species are known from Kentucky. A combination of an unpublished key for this genus for Kentucky (Meijer unpublished), text and illustrations by Mackenzie (1931, 1940) for the Flora of North America, and authentic specimens in the herbarium made it possible to identify species in a reliable way.

RESULTS

Bryophyta

Fissidens grandifrons Brid.—This is an aquatic moss observed in Cogar Springs south of Midway, in Gay Spring, and in the Alexander Spring and along a creek near Parkers Mill Road, Lexington. Crum (1973) mentioned it from the Great Lakes forest in Michigan and referred to it as widespread in North America south to

Guatemala. No specimens were reported from Kentucky by Fulford and Shacklette (1942). This moss seems to be typical for clear water in cold springs in limestone. According to Dr. A. J. Sharp (Univ. Tennessee, pers. comm.) it has been found at similar locations in Tennessee. The range given by Grout (1936) is southern Canada, Alberta to Ontario, Washington to California, east to New York, West Virginia, and Tennessee.

Gymnosperms

Taxodiaceae

Taxodium distichum (L.) Rich, Bald Cypress.—A population of 5 trees was discovered along Beals Branch on the Crosbey's farm just south of the Old Frankfort Pike southwest of Midway in Woodford County.

Measurements of trees at breast height were:

	Girth		Diameter	
	feet	inches	inches	cm
No. 1	16	8	63	160
No. 2	12		45.8	116
No. 3	10		38	96
No. 4	9	2	35	89
No. 5	7	4.5	28	71

According to Fowells (1965), second growth stands of *Taxodium distichum* in Maryland have trees 100 years of age with diameter of 21.3 inches (54 cm) and a diameter increase of about 2 inches (5 cm) every 10-year period.

Fowells (1965) stated that there is good evidence that diameter growth in Louisiana also is 2 inches (5 cm) in 10 years. Even if we assume that on the fertile soils of the Inner Blue Grass Region this tree would grow 0.25 inch (6 mm) per year instead of 0.20 inch (5 mm) as in Maryland and Louisiana, the estimated age of the tree with 63 inches diameter would be more than 200 years. At an increase in diameter of 2 inches in 10 years, the age would be around 300 years.

A second relict locality of *Taxodium distichum* was discovered by John Mac-

Gregor along Linden Lane in Jessamine County in southern Nicholasville just west of Highway 27 near a former pond still shown at the northern margin of Little Hickman Topographic Quadrangle, 1952 edition. Two trees measuring 91 and 86.5 inches (227.5 and 215 cm, respectively) in girth, approximately 120–140 years old, grew here in company of *Platanus occidentalis*, *Quercus macrocarpa* (girth, 10 feet; 3.05 m), *Juglans nigra*, and *Carya laciniosa* in a former farmland without any trace of planted trees around them.

The third locality of bald cypress (Fig. 1) discovered by Max Leach is in Fayette County along the Old Paris Pike west of Interstate 75 northwest of Bryan Station High School on the land of Mr. Proctor. The girths of the trees were:

No. 1—21 feet 6 inches at base ca 15 feet at main bole	655 cm
No. 2—9 feet, 2 inches	279 cm
No. 3—6 feet, 9 inches	206 cm
No. 4—7 feet	213 cm
No. 5—9 feet	274 cm
No. 6—17 feet	518 cm
No. 7—4 feet, 5 inches	122 cm
No. 8—6 inches	15 cm

Several trees grow around a natural pond fed by a spring. The young tree of 6-inch (15-cm) girth shows that the species is still regenerating at this locality.

On the adjacent property of Mr. Owen Hitt, the girths of the following trees were:

	Feet	Inches	cm
No. 1	8	11	272
No. 2	11	4	345
No. 3	7	9	236
No. 4	12	7	383
No. 5	13	9	419

If we assume that trees of about 12 feet (366 cm) girth are about 200 years old at the growth rate of 2 inches per 10 years then there are at least 4 out of a population of 13 trees older than 200 years. From these data it seems well established that bald cypress grew in the Inner Blue Grass Region before the arrival of the

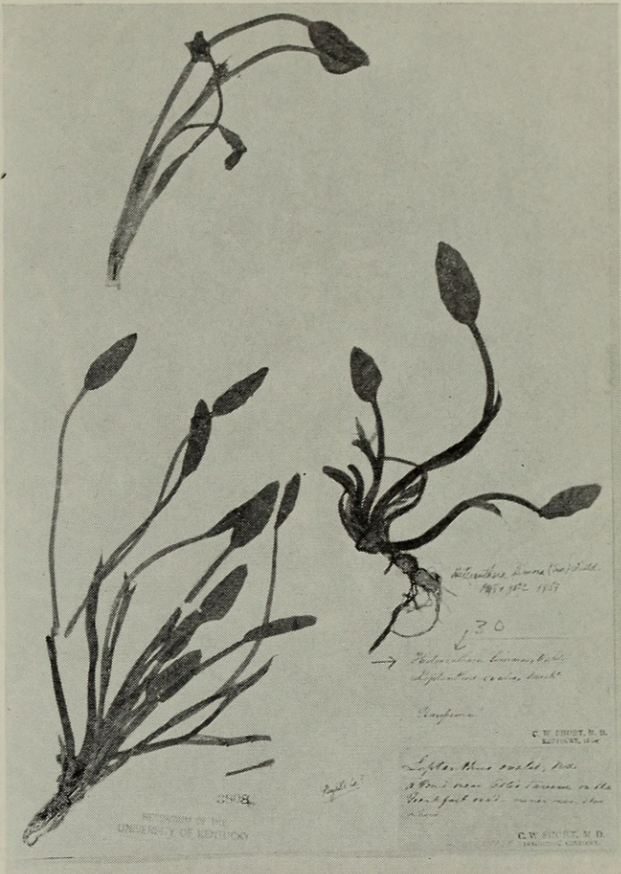


FIG. 2. The historical specimen of *Heteranthera limosa* collected by C. W. Short in 1838 near Cole's Tavern on the Frankfort Road in Woodford County.

first white settlers. The localities in the Inner Blue Grass Region are disjunct from the main range of this species. (See map 84E in Little 1971.)

Monocotyledons
Pontederiaceae

Heteranthera limosa (Sw.) Willd., Smaller Mud Plantain.—A specimen in the Herbarium of the School of Biological Sciences, University of Kentucky collected by C. W. Short in 1838 (Fig. 2) is labeled "A Pond near Cole's Tavern on the Frankfort Road, never seen elsewhere." This is the only locality of this plant reported from Kentucky. Lucy Braun (1943) reported it as being in the University of Cincinnati Herbarium without locality. The genus ranges from the tropics to North America. Fernald (1950) reported the range of this species as Florida to New Mexico, north



FIG. 3. *Spiranthes cernua* var. *odorata* Correll in swamp along Lees Branch, Woodford County, 28 September 1974.

to Kentucky, southern Illinois, Minnesota, Nebraska, and Colorado. A good illustration is given by Mohlenbrock (1970). The map in Muenscher (1944) is incomplete though it added Virginia to the range. Through the kind assistance of Mr. and Mrs. Richard DeCamp, Lexington, I contacted Mr. W. Julian Walden, Versailles Pike near Nugents Cross Roads at the junction of the Old Frankfort Pike with the Versailles-Midway Road, who informed me that Cole's Tavern was the Black Horse Tavern at the stage stop near the cross-roads. There is a pond along Lees Branch just east of this place but I could not find any specimens of *Heteranthera* there. A more systematic search of natural farm ponds or old oxbow lakes in Kentucky might well turn up new localities of this rare water plant.

Orchidaceae

Spiranthes cernua (L.) Richard.—This orchid (Fig. 3) occurs abundantly in wet



FIG. 4. *Chelone glabra* turtlehead. In swamp along Lees Branch, Woodford County.

meadows, around swamps filled with turtle head *Chelone glabra* (Fig. 4), *Lobelia cardinalis*, *Asclepias incarnata*, and *Leersia oryzoides* along the margin of the swampy valley along Lees Branch just south of the Old Frankfort Pike in Woodford County. It formed impressive colorful vegetation in September 1974 in places full of blue flowering *Lobelia siphilitica*. Lucy Braun (1943) only mentioned it in Laurel, Letcher, Menifee, Montgomery, and Rowan counties. Recent discoveries were made of this orchid near Clay City in Powell County and along Chimney Creek in Wolfe County in the Red River Gorge. As a consequence of mowing in the locality in October 1974, or the dry summer of 1975 or too much grazing, no flowering plants could be found along Lees Branch in September 1975. It is unlikely that the flora at this locality, unique for Woodford County, will survive with continued heavy grazing.

Cyperaceae

The Sinking Creek System is the best place in the Blue Grass Region to study

genera and species of this much neglected family. The greatest concentration of species can be found along Lees Branch where the cool, clear, running creek is lined with a swamp community of *Scirpus lineatus*, *Scirpus atrovirens*, *Scirpus validus*, *Cyperus strigosus*, *Eleocharis palustris* (possibly new for Kentucky, at the southern boundary of its range, see Map 162 in Muenscher [1944]), *Eleocharis obtusa*, and species of *Carex*.

The latter genus contains at least 85 species in Kentucky (Braun 1943). It is one of the most suitable genera to indicate species diversity of natural areas.

The distribution of species of *Carex* in the 2 most swampy sections of the Sinking Creek system is as follows (+ only one colony, × fairly common, ×× common):

	Lees Branch	Delaney Ferry
<i>C. blanda</i>	×	—
<i>C. stipata</i>	××	××
<i>C. shortiana</i>	×	×
<i>C. granularis</i>	××	××
<i>C. lurida</i>	×	×
<i>C. lupulina</i>	××	×
<i>C. hyalinolepis</i>	+	—
(= <i>C. riparia</i> var. <i>lacustris</i>)		
<i>C. normalis</i>	××	×
<i>C. vulpinoidea</i>	××	××
<i>C. frankii</i>	—	×
<i>C. leavenworthii</i>	—	×
<i>C. amphibola</i>	—	×
<i>C. cephalophora</i>	—	×
<i>C. jamesii</i>	—	×

Carex lupulina has also been recorded in the Brannon-Catnip section which needs further investigation of its *Carex* flora during spring.

The rarest *Carex* among these species is *C. hyalinolepis* Steudel syn. *C. riparia* var. *lacustris* (Willd.) Kükenth.

This form is so far only known from western Kentucky where it was collected by Jim Conrad and Amy Boyarsky, Coll. No. 1660, 16 June 1971 in Marshall County, 2 miles (5.2 km) south-southwest of Kentucky Dam Village State Park, in Muehlenberg County (Jim Conrad Coll. No. 635),

and from a swamp in the Backbone old bend of the Elkhorn Creek northeast of Frankfort.

This species is closely related to, if not identical with, the European *Carex riparia*, well known to the present author from swamps in the Netherlands.

Dicotyledons

Ranunculaceae

Ranunculus, section *Batrachium*, Water Crowfoot.—From records in Muenscher (1944) and Fernald (1950), it appears that only 1 species of white flowering water crowfoot *Ranunculus longirostris* Godron is known from Kentucky. It has flowers with about 16 pistils which may carry 8 achenes with wrinkled more or less globular base and a curved beaked apex. The leaves have stipular sheaths which are from one-half or, more generally, three-fourths to entirely adnate to the petiole. Submerged leaves stay firm when lifted from the water. On 10 May 1974, we collected flowering and fruiting material of this species in Lees Branch quite near the Old Frankfort Pike in clear running cool water. Later on we discovered extensive patches of this species further south, some in quite shallow water on very muddy blackish soil.

Muenscher (1944) mapped this species only for western Kentucky. Lucy Braun (1943) did not mention it for the state. Short (1829) mentioned river crowfoot from the Elkhorn Creek on the Georgetown Road under the obsolete name *Ranunculus fluviatilis* (syn. *R. pantothrix* Elliott). Apparently, *R. fluviatilis* Pursh, Flora Am. Sept. 2:395, is a synonym of *R. aquatilis* Linn. Since Lees Branch is part of the Elkhorn Creek catchment area, this record may refer to *R. longirostris* also.

Fagaceae

Quercus bicolor, Swamp White Oak.—The main distribution area of this species is from western Kentucky along the lower Ohio River towards Missouri, Iowa, south-eastern Minnesota, Wisconsin, southern



FIG. 5. One of the largest trees of *Quercus bicolor* swamp white oak along Lees Branch, Woodford County.

Michigan, southern Ontario and Quebec, and New England. Localities in Tennessee, North Carolina, and Virginia are rather scattered. The map of the distribution given by Little (1971) shows the absence of this species in the Eastern Coal Fields (Cumberland Plateau) in Kentucky, except in Laurel and Whitley counties and in parts of the Inner Blue Grass Region. However, Anderson County, where Dr. William Bryant showed me this tree in swamp forests along an old course of the Kentucky River, has to be added, and a new locality was discovered by the author with John MacGregor and Charles Andre in the Broadhead Quadrangle, Rockcastle County; to this can be added a locality in Trumbo Bottom south of Frankfort, Franklin County, a collection by Dr. Mary Wharton along the Kentucky River in Henry County (University of Kentucky, School of Biological Sciences Herbarium), and a locality west of Georgetown dis-

covered by Mr. J. W. Singer of Singer's Garden, Stamping Ground and others along Elkhorn Creeks and the Kentucky River north of Frankfort surveyed by me in August–September 1975. Swamp white oak occurs in Kentucky as far south as the lower Licking River flats, in Fleming and Bath counties, Little Laurel River in Laurel County, Caney Creek in Lincoln County, the headwaters of the Dix River near Crab Orchard, and the headwaters of the Green River in Casey and Adair counties. The Sinking Creek system of the Inner Blue Grass Region contains *Quercus bicolor* in all sections where there is a rather wide valley developed: Ashbrook Pike, Brannon–Catnip, Delaney Ferry, and Lees Branch.

A rather well preserved locality is the Delaney Ferry section where this species occurs scattered through forest dominated by *Fraxinus americana*. Along Lees Branch, 1 large tree (Fig. 5) was found in the northern part a few minutes walk from the Old Frankfort Pike, and a much larger stand of about 200 trees in the southern part of the forested area.

In the Brannon–Catnip section, the species might be hybridizing with *Quercus lyrata*, and in the very small forest along Ashbrook Pike, 1 tree is a probable hybrid with nearby *Quercus muehlenbergii* and another with *Quercus macrocarpa*. The largest sized tree among a population of 10 trees is here about 13 feet (4 m) girth.

The species occurs in Woodford County also in the company of *Nyssa sylvatica* and *Acer rubrum* in the abandoned Warwick channel of the Kentucky River near Cloverbottom, mapped by Jillson (1947b, 1948) and along Clear Creek north of Stonehedge Farm 2 miles (3.2 km) southwest of Pinckard, Keene Top Quadrangle, only 3 miles (4.8 km) west-southwest from the Delaney Ferry section of the Sinking Creek in Jessamine County.

The suspected hybrids of swamp white oak along Ashgrove Pike and south of Brannon Road would suggest that fruits are not dispersed very far from the mother trees by water or rodents. However, long-distance dispersal of this species over the



FIG. 6. *Quercus lyrata* overcup oak, from swamp forest near Brannon Road, Jessamine County.

postglacial plains north of the Ohio River might well be done by wood ducks (Fowells 1965). Seeds float in the water below the trees in the fall.

Quercus lyrata, Overcup Oak.—A colony of 3 trees (Fig. 6) was discovered 20 August 1974 in a swamp forest with permanently stagnant water with *Alisma subcordata*, *Boehmeria cylindrica*, *Lysimachia ciliata*, *Carex lupulina*, *Lobelia cardinalis*, and *Scutellaria lateriflora*, 1 mile (1.6 km) south of the middle of Brannon Road in Jessamine County.

The tree flora at and around this site consisted of *Carya laciniosa*, *Fraxinus americana*, *Acer rubrum*, *A. saccharinum*, *A. negundo*, *Asimina triloba*, *Tilia americana*, *Quercus macrocarpa*, *Q. muehlenbergii*, *Platanus occidentalis*, *Ulmus americana*, and *Celtis occidentalis*.

This locality of *Quercus lyrata*, a coastal plain species, similar in distribution to *Taxodium distichum*, is 150 miles (250 km) east of the main range of this species in

western Kentucky and 80 miles (130 km) from a locality mapped by Little (1971) in Jefferson County, apparently in the Scottsburg lowlands.

It is remarkable how little the distributional areas of swamp *Q. bicolor* and *Q. lyrata* overlap; mainly in the lower Ohio River drainage and near the junction with the Mississippi Valley. From a close study of individual trees and leaf shapes it would appear that hybridization with *Q. bicolor* has taken place at this locality.

Leguminosae

Subfamily Mimosoideae

Desmanthus illinoensis, Illinois Mimosa.—Lucy Braun (1943) reported this species from river banks in Boone, Fulton, Gallatin, Hickman, and Oldham counties. The locality along Lees Branch, south of Old Frankfort Pike along the old Versailles-Georgetown railways track is at the eastern margin of the range of this species (Isely 1973, with map).

DISCUSSIONS AND CONCLUSIONS

A floristic survey of the Sinking Creek System, more or less parallel with the South Elkhorn Creek would suggest that it is part of what was once a continuous river drainage system similar to the former Mesozoic course of the Kentucky River across the Blue Grass Region as delineated by Jillson (1963). Further hydrological and geological work is needed to test this assumption. The streams which run at present through the Sinking Creek System are far too small to explain the extensive accumulation of alluvium and colluvium in Lees Branch and at other places. A soil depth of 12 feet (365 cm) has been established by me in a recent sinkhole on a side branch of Lees Branch south of Midway. Mr. Walden picked up a rounded granite boulder at his farm near Nugents Crossroads which must have been transported by a river. This suggests the possible existence of sandy alluvium and gravels in underground water courses with good consequences for filtration of water. A search

can be made for alluvial deposits in nearby caves which could supply pollen samples which could give clues to the vegetational history of the area. Out of a pure floristic research there might arise a combined study of landforms and vegetational history of the Blue Grass which could lend support to land use efforts to prevent the Sinking Creeks from becoming stinking creeks.

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