# THE DISTRIBUTION OF RIVER BIRCH IN CUMBERLAND COUNTY, ILLINOIS

HAROLD C. FRITTS AND BARBARA J. KIRKLAND
*University of Arizona, Tucson, and Eastern Illinois University, Charleston*

In the spring of 1959 a study was conducted on the distribution of river birch (*Betula nigra* L.) in Cumberland County, an area of about 350 square miles, located in the southeastern part of Illinois. The residual soils of the greater part of the county are derived from parent materials of the Illinoian age, and the streams draining this area carry alluvial deposits low in minerals and with an acid reaction. Two soils are described for this alluvium (Smith and Smith, 1940; Wascher *et al.*, 1950); (1) the slight to medium acid Sharon silt loam; and (2) the strongly acid Bonnie silt loam. On the steep ravine slopes, the medium to strongly acid Hickory gravelly loam occurs.

Near the northern border of the county, however, the soils are younger, since they are derived from the more recent Wisconsin glacial till. Thus the Embarrass River and several of its major tributaries, flowing through the county from the north to the south, and having their origins in the younger soils, carry alluvium richer in minerals and with a neutral reaction. The soil described on this alluvium is Huntsville loam (Smith and Smith, 1940).

At all streams in the county accessible by road, observations were made on the presence or absence of river birch. Where river birch was present, notations were made as to size of trees and abundance of reproduction. At selected stations, soil pH was measured in the surface layer, using a Soiltex kit. The location of each observation is mapped in Figure 1, with solid or open circles indicating the presence or absence of river birch.

It can be noted from Figure 1 that the Embarrass River, as well as the Muddy, Hurricane, and Cottonwood creeks, drain the Wisconsin till, and the soils derived from their alluvium in the north and central part of the county are mapped by Smith and Smith (1940) as neutral Huntsville loam. In southern Cumberland County the tributaries of both the Muddy and Cottonwood creeks bring in more acid alluvium so that the soils developed here are mapped as the medium acid Sharon silt loam.

It is apparent from Figure 1 that river birch is common along many streams with more acid soils which drain exclusively the areas of Illinoian age, but is absent along streams which carry predominantly the more alkaline materials from the Wisconsin moraine. A similar association with soil pH is apparent when its natural range in the midwest as a whole is considered. In Wisconsin, Illinois, Indiana, and Ohio, river birch is reported for counties south of the Wisconsin glacial border (Fassett, 1957; Jones, 1950; Deam, 1940; and C. L. Weishaupt, personal communication)

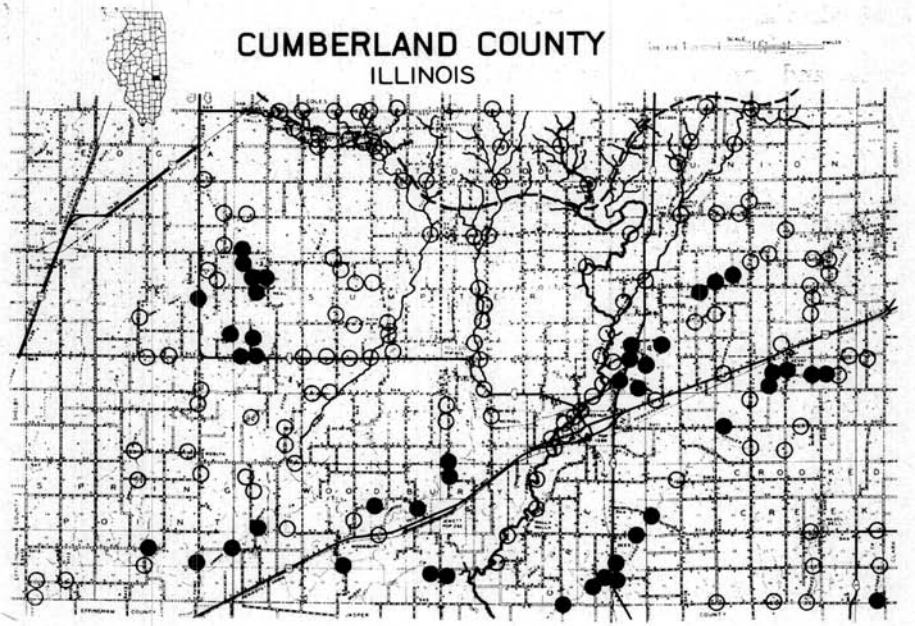


Fig. 1.—Locations of observations, with solid and open circles indicating presence and absence of river birch. Dashed line indicates Wisconsin glacial border. Only those streams which give rise to the neutral Huntsville loam are emphasized.

where soils are older and inclined to be more acid. There are thirteen counties north of the glacial border with collections of this species. These are in Illinois and Indiana just south of Lake Michigan, and in northeastern Ohio. The location of these sites suggests that the alluvial soils in these areas were probably derived from sands or shales and are also acid in reaction. In Kentucky, too, river birch occurs on the more acid soils, in the counties lying outside the limestone area (Braun, 1943).

The distributions in Cumberland County and throughout the entire midwest suggest that some factor associated with neutral and alkaline soils is limiting to river birch. Although the pH tests made in Cumberland County show an acid tendency wherever river birch is present, in some cases readings higher than 7.0 were obtained. The facts that seedlings and small trees were generally absent except in two locations, both on residual acid Hickory gravelly loam, and that most of the older trees had partially buried trunks and in general lacked vigor, suggest that this species is not generally reproducing in Cumberland County today. It may be that the present high applications of lime and fertilizers to the farmland of the area have raised the reaction of re-

cent alluvial deposits so that the soil is now unfavorable to the establishment and spread of river birch in the area.

## Literature Cited

Braun, E. Lucy. 1943. An annotated catalog of spermatophytes of Kentucky. Cincinnati, J. S. Swift Co., 161 pp.

Deam, C. C. 1940. Flora of Indiana. Indianapolis, W. B. Burford Printing Co., 1,236 pp.

Fassett, N. C. 1957. Spring flora of Wisconsin. 3d ed. Madison, Univ. of Wisconsin Press, vi + 189 pp.

Jones, G. N. 1950. Flora of Illinois. 2d ed. Notre Dame, University Press, 368 pp.

Smith, R. S., and L. H. Smith. 1940. Cumberland County soils. Univ. Ill. Agr. Exper. Sta., Soil Rept. no. 69. 39 pp.

Wascher, H. L., *et al.* 1950. Illinois soil type description. Univ. Ill. Agr. Exper. Sta. AG-1443. 293 pp.

*Manuscript received May 24, 1960.*