

ON THE HISTORY OF COASTAL PLAIN SPECIES ON THE CUMBERLAND PLATEAU AND HIGHLAND RIM

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ABSTRACT

Distributional studies of the coastal plain species isolated on the Cumberland Plateau and Highland Rim indicate that they are southern species which migrated onto the plateaus in late Pleistocene from northern Alabama.

INTRODUCTION

Henry Svenson (1941) worked on the Cumberland Plateau and Highland Rim of Tennessee during the decade of the 1930s. Here he turned up many coastal plain species, and he points out that, "Though the Cumberland Plateau is separated from the Highland Rim by a wall of limestone and sandstone nearly a thousand feet high, the coastal plain element is much the same on both plateaus (p. 111). And later (p. 112), "The problem in its larger aspects has been admirably discussed (with many maps showing distribution of species) by Professor Braun and Professor Fernald."

During these years Professor Braun (1937) was finding many coastal plain species on the Cumberland Plateau of Kentucky, and both she and Professor Fernald (1937) contended that these are ancient species, originating in the Appalachian highlands, which have migrated out onto the coastal plain.

On this suggestion that isolated colonies of coastal plain species within the Appalachian highlands represent ancestral stocks, Lloyd Shinnars (1964, p. 260) wrote, "I think a more likely explanation is just the reverse: they are late emigrants *from* the Coastal Plain." And further (p. 261), "There have been shore lines and hence coastal plains, however small, for as long as sea and land have been differentiated. I see no reason to imagine that typical Coastal Plain plants ever had to exist anywhere else." Now, with the vast field data amassed during the last several decades, we can get a better picture of patterns of distribution and migration pathways of coastal plain species in southeastern North America.

THE COASTAL PLAIN ELEMENT

In his "*Notes on the Tennessee Flora*" Svenson designates the following thirteen species as coastal plain plants occurring on the Cumberland Plateau and/or the Highland Rim. They are all wetland plants and are all southern

species with the bulk of their populations south of the Mason-Dixon Line, a good biological as well as political line according to John K. Small (see Shinnars, 1962, p. 29).

Lycopodium alopecuroides
Erianthus strictus
Muhlenbergia torreyana
Rhynchospora perplexa
Xyris iridifolia
Juncus elliotii
Zigadenus densus

Iris prismatica
Polygonella americana
Hypericum nudiflorum
Ludwigia hirtella
Gaylussacia dumosa
Cynoctonum mitreola

Although only one sedge is listed above, *Rhynchospora perplexa*, studies of the overall distributions of the sedges which occur in Virginia show that no less than fifteen of our coastal species are now known from the plateau regions of Tennessee, and seven of these, marked with an asterisk, are found elsewhere mostly on or near the coastal plain.

Carex gigantea (Fig. 2)
 **C. glaucescens*
C. jooii
Cyperus albomarginatus
 **C. haspan*
Eleocharis microcarpa
E. tuberculosa
Rhynchospora caduca

**R. chalarocephala*
R. corniculata
 **R. debilis*
 **R. filifolia*
R. gracilentia
 **R. perplexa*
 **R. rarifolia*

Five more of Virginia's coastal plain species occur in northern Alabama, and all of them are wetland plants, and they too are almost restricted to the coastal plain:

Cyperus filicinus
Eleocharis baldwinii (Fig. 1)
E. fallax

Rhynchospora inexpansa
Scirpus divaricatus

PATHWAYS TO THE PLATEAUS

Figures 1 and 2 suggest migration pathways of species which move inland when they extend westward beyond the piedmont. Going westward from the eastern seaboard, Alabama is the first state which offers relatively easy access to the plateaus of Tennessee, with almost continuous streams and wetlands favorable for the migrations of wetlands species. Thus, the key to the distributions of these isolated populations on the Cumberland Plateau and Highland Rim appears to be northern Alabama, for here there is an approach to a continuity of wetland habitats.

Fenneman (1938, p. 336) writes on northern Alabama: "The boundary between the [Cumberland] Plateau and the Gulf Coastal Plain has no marked features. In the margin of the former, hills may be capped by remnants of coastal plain sediments. In the margin of the latter streams cut down into the older rocks of the plateau. Between these two phases there is grad-

uation." And Harper (1937, p. 13) discussing the Cumberland Plateau: ". . . at its southwestern extremity (which is all in Alabama), the sandstone of the plateau dips gradually beneath the unconsolidated clay, and gravel of the coastal plain, and the boundary is very irregular or indefinite . . . In Franklin County, for example around Spruce Pine and Phil Campbell, the coastal plain deposits attain an altitude of a little over 1,000 feet above sea level, which is the highest recorded elevation in the coastal plain in the eastern United States." Thus there is no sharp break between the piedmont and the coastal plain as in most of the region to the east of Alabama.

INVASIONS OF THE PLATEAUS

Quoting again from the Shinnars paper (1964, pp. 260-261): "We know from geological evidence that the close of the Pleistocene was a period of

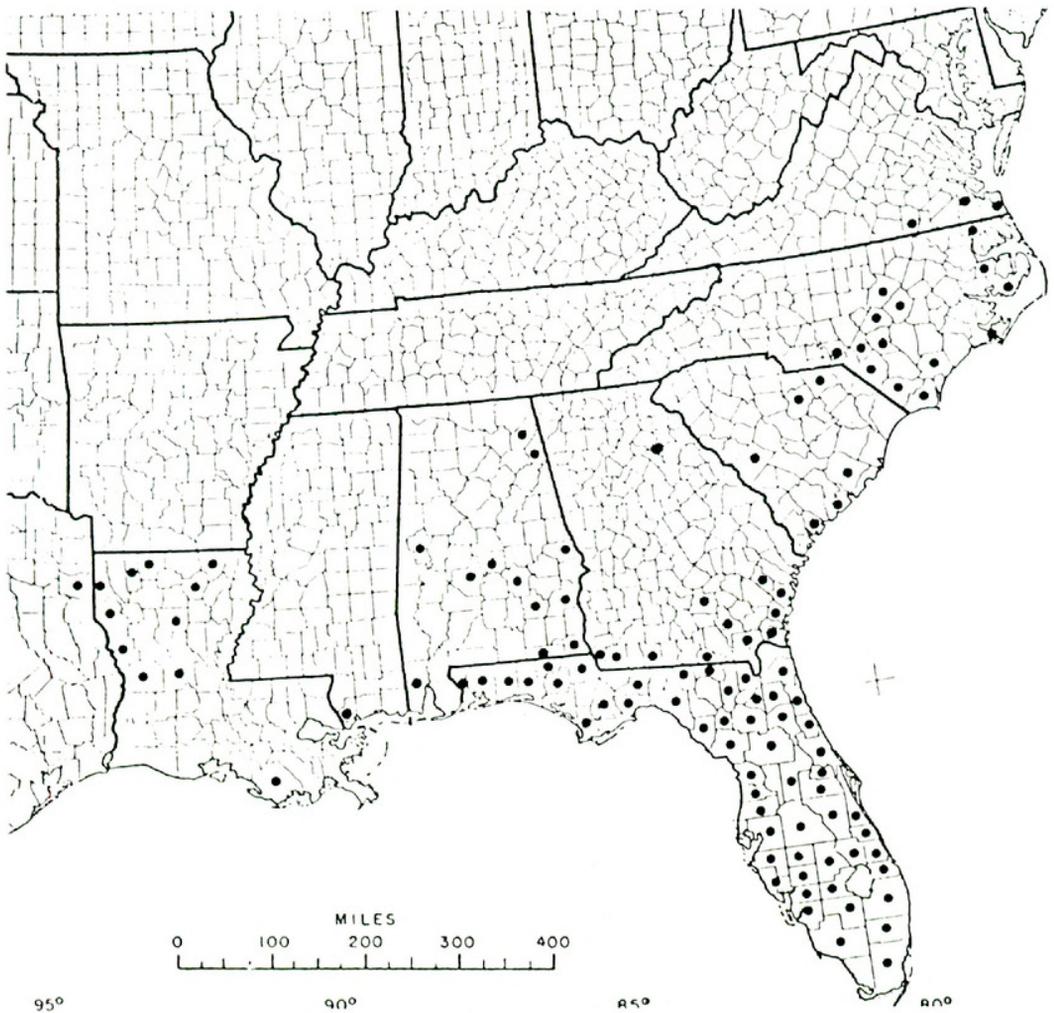


Figure 1. Distribution of *Eleocharis baldwinii* illustrating probable migration route to the plateaus.

vast flooding and erosion, with the development of flood plains and terraces outside the glaciated area. It seems to me highly probable that the predominantly weedy Coastal Plain species were rapid invaders, spreading far out of the Coastal Plain itself (the handful of Coastal Plain species about the western Great Lakes are well known illustrations), to be replaced more gradually in succession by the Appalachian flora."

Since this was written, the pluvial period from 24,000 to 10,000 years B. P. has gained further documentation (Flint, 1971), providing the cause of the flooding and erosion, as well as the wetlands and disturbed areas favorable for rapid invasions. Moreover, the earliest expansion of deciduous forest from full-glacial refuges has been recorded at 16,500 years B. P. (Delcourt and Delcourt, 1979). Thus, the coastal plain species must have moved onto the Cumberland Plateau and Highland Rim in late Pleistocene

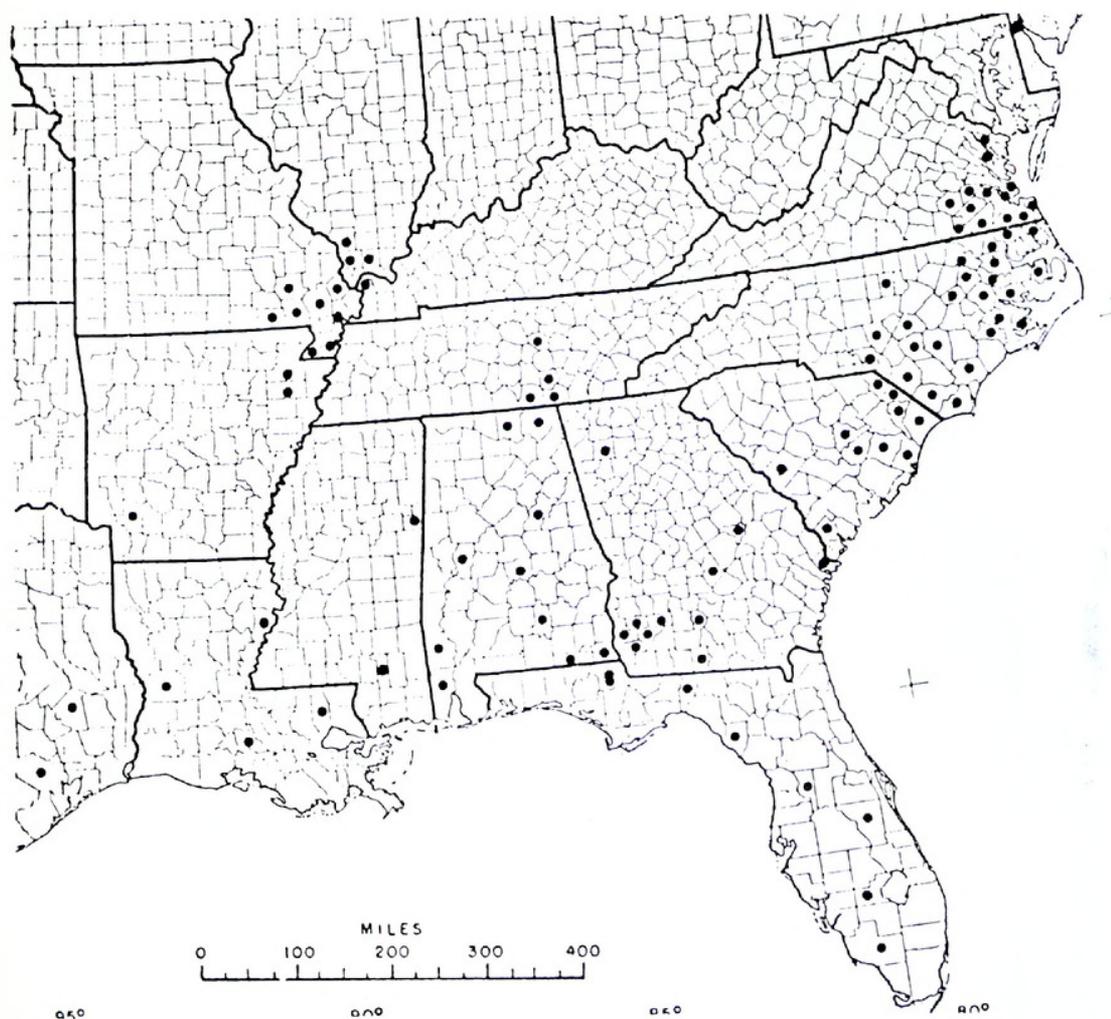


Figure 2. Distribution of *Carex gigantea*.

as Shinnars suggested. Their replacement in succession, in all but the most favorable habitats, was undoubtedly speeded up by the *xerothermic* period from about 8,000 to 5,000 B. P., thereby making the coastal plain—mountains disjunctions which have long been famous.

EPILOGUE

In the heyday of explorations in our region by Braun, Fernald and Svenson, the distributional data available to them were not nearly enough to provide a basis for sound phytogeographic conclusions. This paucity of data is now being rectified by the activity of many able field botanists throughout the southland, and with important advances in palynology, we are getting the foundations to eventually understand many of the distributional anomalies.

ACKNOWLEDGMENTS

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