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A reinvestigation of the lower Eocene flora from the southeastern states described by E. W. Berry in 1916 and revised by him in 1930 has been undertaken. This reinvestigation focuses particular attention on the fine venation and the frequently preserved cuticular material of these fossils in addition to the more general diagnostic leaf characters used by Berry. Additional fossil material has been collected from the western Tennessee Eocene clay deposits which Berry studied. A preliminary survey of this material indicates that several revisions should be made concerning the affinities of these fossil leaves with modern taxa. Leafy shoots of gymnospermous material similar to the fossils identified by Berry as Taxodium dubium and Taxites? sp. were studied in this investigation. The leaves of the fossil material are attached to the axis spirally which is characteristic of Taxus, Taxodium and Sequoia. Because these three genera all have spiral leaves which are arranged distichously on the shoots it is often somewhat difficult to determine if compressed leafy shoots are most similar to Taxodium, Taxus, or Sequoia. However, the epidermal features of these genera are quite characteristic. The papillate epidermal cells of Taxus differ conspicuously from the non-papillate epidermal cells of Taxodium and Sequoia and the irregular transverse arrangement of the stomata of Taxodium is quite different from the longitudinally oriented stomata of Sequoia. The fossil material has cuticle preserved which was used in this study. The disposition of the stomata on the upper and lower epidermis, the nature of the epidermal cells and the accessory cells, and the longitudinal orientation of the stomata of the fossil material is nearly identical to that found in modern Sequoia sempervirens. The leafy shoots of Sequoia sempervirens commonly have smaller basal leaves and a terminal bud. Several of the fossil leafy shoots also show these characters. Therefore, on the basis of observations of the gross morphological and cuticular characters it is suggested that Sequoia was present in southeastern North America during the Eocene.

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