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## AN EARLY PERMIAN FLORA WITH LATE PERMIAN AND MESOZOIC AFFINITIES FROM NORTH-CENTRAL TEXAS

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## Abstract

Early Permian (late Leonardian Series) plant assemblages from King, Knox, and Stonewall Counties of North-Central Texas are dominated by seed plants, some apparently congeneric with taxa heretofore known only from the Late Permian or the Mesozoic. Conifers are the dominant elements, including one or more species of *Ullmannia*, *Pseudovoltzia liebeana*, both known from the Late Permian Zechstein flora of Germany and England, *Podozamites* sp., characteristic of the Mesozoic, and *Walchia* sp., abundant in Early Permian floras. Locally common are *Taeniopteris* cf. *eckardtii*, a Zechstein species, an unidentified plant represented by pinnule-like laminae with fine parallel veins, similar to pinnules of some Mesozoic cycads, and calamite stems. Rarely encountered are leaf fragments of the Paleozoic ginkgophyte *Dicranophyllum*, flabellate ginkgophyte leaves, leaves with a broad midvein and narrow, fimbriate lamina, and *Wattia*, typical of the Early Permian. Associated with these foliar remains are ovulate reproductive structures including the presumed cycad megasporophyll *Dioonitocarpidium*, known only from the Mesozoic, a voltzialean cone scale similar to *Swedenborgia*, and a variety of seeds, some remarkably similar to *Agathis*, of Cretaceous age. The assemblage includes only rare scraps of foliage and seeds possibly attributable to the pteridophyllous elements (gigantopterids, callipterids, and ferns) that dominate the Permian. The fossil plants occur in multistorey, fining-upwards, tidal-channel deposits that also include pelecypods and fragmentary palaeoniscoid fish. The occurrence of derived lineages in xeric habitats during the Early Permian indicates that some supposed Mesozoic groups actually preceded and survived the end-Permian extinction, reappearing in basinal lowlands during the mid-Mesozoic.

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Gymnospermae Knox County Texas Permian King County Texas Cordaitales Cycadales Coniferales Paleozoic Equisetales Lower Permian Plantae Pteridophyta Stonewall County Texas Sphenopsida Texas Spermatophyta Leonardian Upper Permian United States

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