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The Asselian flora of the Lodève Basin, France: diversity and significance of a classical early Permian assemblage.

Mathilde Le Pallec¹, Anne-Laure Decombeix²

¹University of Rennes, OSUR Rennes Observatory for the Sciences of the Universe, Rennes, France (mathildelepallec99@gmail.com)

²UMR AMAP, Univ. Montpellier, CNRS, CIRAD, INRA, IRD, Montpellier, France (anne-laure.decombeix@cnrs.fr)

The late Pennsylvanian-Permian was a period of major environmental transition. In the paleotropics of the supercontinent Pangea a stepwise aridification led to a decline of the wetland vegetation and the diversification of several major groups of seed plants including the peltasperms, cycads, ginkgos, and conifers. In this context, the well-preserved early Permian compression floras of the Lodève Basin in southern France have attracted the attention of numerous palaeobotanists since the 19th century, including Brongniart, Zeiller, Florin, Doubinger, and more recently Broutin and Galtier. In this study, we present a synthesis of the highly diversified macroflora of the Usclas-St Privat Formation ("grey Autunian", Asselian) based on the study of more than 1200 specimens from the collections of the University of Montpellier and of the Muséum National d'Histoire Naturelle in Paris.

Coniferales dominate by far the assemblage (78% of the specimens and 10 morphospecies) with an abundance of shoots belonging to *Walchia piniformis*, *Otovicia hypnoides*, and *Culmitchia frondosa*. Other seed plants include pteridosperms, which are largely represented by peltasperm foliage formerly assigned to the genus *Callipteris* (13% of the specimens). *Autunia conferta* is dominant in this group, followed by *Lodevia nicklesi*. Other seed plants, such as cycadophytes (with the genus *Taeniopteris*) and ginkgophytes (e.g., *Ginkgophyllum*, *Trichopitys*), are relatively rare (1-2%) but significant from an evolutionary point of view. Although the changing climate favoured new groups, the assemblage still contains a small number of taxa characteristic of coal swamp floras (less than 1%) such as lycophytes (*Syringodendron*), sphenophytes (*Calamites*) and pteridophytes (*Pecopteris*). We compare this typical "Autunian" flora to several coeval assemblages from North America and Europea and highlight its importance for future paleoenvironmental and evolutionary studies of the early Permian tropical vegetation.