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Salle 201, Bâtiment PS2, CIRAD-UMR AMAP,
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The Medullosales: A key plant group to understand ecosystem dynamics in deep time?

presented by

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ABSTRACT In the late Paleozoic era (350–250 million years), the Earth was struck by significant global change. The ancient vegetation has witnessed these changes, testifying on evolutionary dynamics driven by environmental forces. The medullosans are a significant plant group at this time, belonging to seed ferns (pteridosperms), a paraphyletic group of seed plants which occurred from the late Devonian to the late Mesozoic (375–65 million years). The medullosans which originated about 330 million years ago were first part of extended tropical forest ecosystems, but later also of seasonally-dry habitats, such as the Chemnitz Fossil Forest in central-east Germany, 291 million years ago. Due to exceptional preservation in this fossil assemblage, we are able to reconstruct these plants from their roots to the tips of the leaves, for the first time in paleobotanical research history. The medullosans have an unusual and complex xylem architecture and large fronds with fern-like leaves. Their nearest living relatives are the cycads. Not much is known about their growth habit and water transporting vascular system. Were they climbing vines or self-supporting? Do their conducting tissues and high leaf surface point to a large evapotranspiration potential, which would be comparable to modern angiosperms? The three-dimensional preservation of the fossils may bear the potential to apply modelling approaches on biomechanics and water conductance, which have been developed for living plants of modern forest ecosystems.

KEY WORDS Permian; seasonally-dry habitats; seed ferns; tissue functionality; plant architecture

Invited and animated by: Dr. Brigitte Meyer-Berthaud (UMR AMAP)
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