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First record of silicified woods in the Late Carboniferous basins of the Pyrenees

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The Upper Carboniferous intramontane basins from the Pyrenees are rich in fossil plant adpressions but generally devoid in permineralized remains. Recently, well-preserved specimens of silicified wood were found in the Stephanian C of the Erillcastell Basin (Central Pyrenees, Catalonia, Spain) and are studied here from the anatomical and taxonomical viewpoint. These specimens correspond to the secondary xylem of a Calamitale and a Cordaitale.

The calamitalean specimen shows two types of medullar rays i.e., large and narrow, both displaying a fusiform shape in tangential section. They are composed of parenchyma cells that have a square or rectangular shape in transverse section, with conspicuous uniseriate and multiseriate simple pits. These pits are spaced and located near the transversal walls and occasionally in the tangential walls. Often, brownish dark rounded organic content that could correspond to fungi are observed within the ray cells. The rays separate tracheids that show variable lumen sizes but a constant wall thickness in transverse sections. The radial section of the wood shows long tracheids with scalariform-bordered pits. Cross-field areas show crowded multiseriate pits with an elongated and sub-rounded irregular shape. These features are consistent with the anatomy of the genus *Arthropitys*. Comparison with similar wood from coeval plant localities suggests that the *Arthropitys* from Erillcastell is most similar to *A. medullata* and *A. ezonata*.

The Cordaitalean specimen has uniseriate to rarely biseriate rays in transverse section. Occasionally, pale brown spherical organic content occurs within the ray cells and may correspond to fungal hyphae. Rays separate rows of tracheids with a square to rectangular shape. The tangential sections of the xylem show long tracheids and fusiform-shaped rays. The radial section shows araucarin pitting on the tracheid walls, with a uni- to triseriate arrangement. The pits are circular or oval with spindle-shaped aperture. Locally, some tracheids are filled by an ochre-orange content with polygonal shapes that likely corresponds to a late stage of tylose formation. Cross-fields shows crowded uni- or biseriate circular small pits with a spindle-shaped aperture. These features are consistent with the genus *Dadoxylon*. Comparison with other late Palaeozoic cordaitalean silicified wood from southwest Europe, i.e., Graissessac-Lodève and Autun (Central Massif, France) and Arnao (Cantabrian Mountains, NW Iberian Peninsula) shows well-marked differences in the pitting patterns. Despite the good preservation of anatomical characters in *Dadoxylon* from Erillcastell, the primary xylem remains unknown, hindering its taxonomic ascription to the species level.

Anatomical features of the specimens here studied provide complementary information about the environment where these plants grew. For instance, *Arthropytis* with tracheids showing variable lumen size and constant wall thickness may indicate changes in growth linked to environmental factors such as drought, volcanic activity, or seasonality. Tyloses in *Dadoxylon* could also be linked to environmental conditions such as high temperatures or severe drought. However, a larger sample would be necessary to verify this hypothesis.

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