



How did Conifers grow in Mesozoic times? A Jurassic case of growth architecture in Araucariaceae from the La Matilde Formation, Patagonia, Argentina

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The architecture of a plant represents the expression of the equilibrium between endogenous growth processes and environmental constraints. Simple morphological traits are used to describe a tree's architecture: the growth and branching process, the morphological differentiation of axes, and the position of reproductive structures. The purpose of this contribution is to describe the growth architecture of the Jurassic araucarian trees (in organic connection with *Araucaria mirabilis* (Spegazzini) emend. Calder cones) present at the most basal part of the La Matilde Formation in the locality of Monumento Natural Bosques Petrificados, Santa Cruz province, Argentina, and to compare them with extant Araucariaceae. Both young and adult specimens had three branching categories from trunk (TA1) to branchlets (A3), corresponding to the typical pattern in extant Araucariaceae. The main, orthotropic stem (TA1) had rhythmic growth and branching, bearing plagiotropic branches in pseudowhorls. Main branches (A2) had rhythmic branching with A3 in two orthostichies. Female cones were terminal at the tip of peduncles, lateral in position with respect to A2 branches, peduncles had a position equivalent to A3 branches. Reiteration patterns are present: total reiterations (bifurcated trunks and big orthotropic branches in trunks with normal plagiotropic branches) and partial reiterations (epicormic branching). Two architectural "morphotypes" were recognized: the "Araucarioid morphotype or morphotype A" includes most of the studied specimens; showing pseudowhorls of plagiotropic branches and reiteration evidences; these characters correspond to Massart's model. "Morphotype B" was observed in bigger trunks, with clearly orthotropic branches irregularly arranged, and no reiteration evidences; they could represent Attim's model. Reiteration patterns are described for the first time for Jurassic gondwanic conifers, in agreement with observations made in Triassic conifers from Arizona and Jurassic conifers from the United Kingdom. Moreover, we can follow Massart's model from some Upper Palaeozoic Walchiaceae to the Mesozoic Araucariaceae studied in this contribution.

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