
Diversity of *Pityostrobus andraei* (Pinaceae) from the Belgian Wealden : morphometry and phylogeny.

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Abstract

In the Lower Cretaceous (145.0-100.5 Ma), important floristic changes take place. They are notably marked by a peak of diversity in conifers and more precisely in the Pinaceae family. This expansion is particularly clear among the numerous female cone fossils that are found mainly in Western Europe and North America. Exceptional deposits in the Belgian Wealden facieses (125.0 – 100.5 Ma, La Louvière, Houdeng-Aimeries), have delivered hundreds of exceptionally well preserved cones. The most represented species, *Pityostrobus andraei* has been studied following a traditional morphometric and geometric framework to test intra and interspecific variations. The descriptions and morphometry show that two species are included in *P. andraei*. A preliminary phylogenetic analysis shows paraphily of the form-genus *Pityostrobus* and confirms clades that are found in previous phylogenies, as well as the proximity of current *Pinus* species with the form genera *Pityostrobus* and *Pseudoaraucaria*. The non-metric multidimensional scaling supports the biogeographic hypothesis of a European and North American diversification. This work allows the application of statistical tests on a large fossil sample and opens doors to future comparisons with current variability. It confirms the usefulness of morphometry on this type of remains, which can be applied to other Pinaceae species found in Belgium and elsewhere in the world.

Keywords: Palaeobotany, Cretaceous, Pinaceae, Morphometry, Phylogeny

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