First Argentinean fossil record of palm fruits (Salamanca Fm., Paleocene) from Chubut, Patagonia.

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We describe fossil palm fruits that belong to the monophyletic subfamily Arecoideae within the family Arecaceae. Fossils were collected in outcrops of the Salamanca Fm. (Danian, Paleocene, 63.3-61.9 Ma) at Ea. Las Violetas locality. The fossils are preserved as three-dimensional petrifications; longitudinal, tangential and cross-sections and CT scans were examined. The fruits are ovoid and longitudinally furrowed, with three well defined-grooves and a single germination pore that it is opposite to the pedicel. Internally, there is not a clear distinction between the exocarp and the mesocarp; the endocarp is thin and not sculptured. The fruits are single-seeded; the seeds are deltoid with an acute apex and are basally attached to the fruit, the endosperm is ruminate. Diagnostic characters preserved are the possible tannin cells near the endocarp, raphides and a system of longitudinal and radial fibrous bundles with associated brachysclereids. They present a suite of characters that correspond to members of the subfamily Arecoideae and have a possible affinity with the tribes Cocoseae and Areceae. Although the presence of fossils stems was previously known from Patagonia, this report constitutes the first record for fruit for Patagonia and for Argentina.

Early Paleocene Macrofloras of Patagonia and their Significance for Austral Biogeography and Biodiversity

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We report on new and rediscovered macrofloras from southern Chubut Province, Patagonia, Argentina that represent the first stratigraphically controlled and quantitatively collected Paleocene macrofloras from southern South America. The floras provide critical information about floristic diversity and composition following the Cretaceous-Paleogene boundary (K-T) and prior to the extremely high plant diversity in Patagonia by the warm early Eocene. The collections, from several sites in the estuarine Salamanca Formation and the overlying, fluvial Peñas Coloradas Fm., date from ca. 61.7 Ma, about ~4 63 / 150 m.y. after the K-T boundary. The floras represent varied paleocommunities preserving more than 50 species of angiosperm leaves as well as flowers, fruits and seeds, ferns, and conifer leaves and reproductive structures. Among the lineages identified are: Akaniaceae, probable Nothofagaceae, and Nageia-like and other Podocarpaceae leaves, as well as Lygodium, Araucariaceae, Palmae, Fabaceae, Menispermaceae, Rosaceae, Lauraceae, Salicaceae, Sapindaceae, Malvaceae, Urticaceae, and a Brassicales flower. Although the biogeographic signature of the flora is clearly gondwanic, there appears to be greater compositional distinctiveness from coeval Australian floras than is seen in Patagonian Eocene floras, suggesting some degree of endemism after the K-T followed by increased interchange across Antarctica with Eocene warming.

Geochronology of Southern plant clade appearances: Examples from Patagonia

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Molecular data do not yield accurate clade ages, for which well-identified fossils from well-dated rocks comprise the only reliable information. We report on extremely diverse and heavily sampled latest Cretaceous through middle Eocene floras from Chubut and Río Negro provinces in Patagonia, Argentina, the biogeographic crossroads of South America and Australasia via Antarctica. The Campanian-Maastrichtian La Colonia Formation and lower Lefipán Formation, the terminal Maastrichtian upper

Lefipán Fm., and the ca. 61.7 Ma Salamanca and Peñas Coloradas fms. represent coastal lowland environments. The age estimates for these sites are derived from microfossil biostratigraphy and magnetic stratigraphy. At the Eocene sites, which represent caldera lakes, volcanic ash beds in the lake sediments yield precise 40Ar-39Ar ages of 54.24 ± 0.45 Ma for the Pampa de Jones flora, 51.91 +/- 0.22 21 / 150 Ma for the Laguna del Hunco (LH) flora, and 47.46 +/- 0.05 Ma for the Río Pichileufú flora. At LH, the global correlation is further improved from six magnetic polarity reversals present in the lake sequence. These results contribute a considerably improved geologic framework to the South American component of plant evolution in Gondwana. Examples of well-dated discoveries are Cretaceous Nelumbonaceae fruits and leaves, Paleocene Brassicales flowers and leaves, Eucalyptus and Gymnostoma at LH, and diverse conifers throughout including Eocene Papuacedrus, Acmopyle, Dacrycarpus, and Retrophyllum.