

Colonization and Diversification in the African ‘Sky Islands’: Insights from Fossil-Calibrated Molecular Dating of *Lychnis* (Caryophyllaceae)

Authors

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Abstract

The flora on the isolated high African mountains or ‘sky islands’ is remarkable for its peculiar adaptations, local endemism and striking biogeographical connections to remote parts of the world. Ages of the plant lineages and the timing of their radiations have frequently been debated but remain contentious as there are few estimates based on explicit models and fossil-calibrated molecular clocks.

We used the plastid region maturaseK (*matK*) and a *Caryophylloflora paleogenica* fossil to infer the age of the genus *Lychnis*, and constructed a data set of three plastid (*matK*; a ribosomal protein S16 (*rps16*); and an intergenic spacer (*psbE-petL*)) and two nuclear (internal transcribed spacer (*ITS*) and a region spanning exon 18-24 in the second largest subunit of RNA polymerase II (*RPB2*)) loci for joint estimation of the species tree and divergence time of the African representatives.

The time of divergence of the African high-altitude *Lychnis* was placed in the late Miocene to early Pliocene. A single speciation event was inferred in the early Pliocene; subsequent speciation took place sporadically from the late Pliocene to the middle Pleistocene.

We provide further support for a Eurasian origin of the African ‘sky islands’ floral elements, which seem to have been recruited via dispersals at different times: some old, as in *Lychnis*, and others very recent. We show that dispersal and diversification within Africa play an important role in shaping these isolated plant communities.