

Why are orchids so successful?

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The oil-collecting bee *Rediviva longimanus* on the orchid *Pterygodium schelpei*.
Credit: A. Pauw

In terms of diversity, orchids are one of the most successful groups of flowering plants, with over 22,000 species. Both pollinating animals and mycorrhizal fungi are believed to have been important in the diversification of orchids (and other flowering plants), but the mechanisms by which these above- and below-ground mutualisms affect speciation remain obscure.

Scientists from Kew, Imperial College London, and Stellenbosch, Washington and Bayreuth universities have been investigating these

mechanisms in a study of 52 orchid species in a small region of South Africa. Their results, published in an e-article of *The [American Naturalist](#)*, showed that recently diverged orchid species either use a variety of different pollinators, or place pollen on different parts of the same pollinator, consistent with the theory of pollination-mode shifts in speciation. In contrast, fungal partners are conserved between closely related species, and orchids recruit the same fungal species even when transplanted to different areas. However, co-occurring orchid species tend to use different fungal partners, consistent with their expected role in reducing competition for nutrients.

The results demonstrate that these two dominant mutualisms in [terrestrial ecosystems](#) can play major but contrasting roles in plant community assembly and speciation.

More information: Waterman, R.J., et al. (2011). The effects of above- and belowground mutualisms on orchid speciation and coexistence. *Amer. Nat.* 177, E54.

Provided by Royal Botanic Gardens, Kew

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