
Diversification, evolution of floral traits and integrative taxonomy of the *Pseudophrys* section (Orchidaceae)

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Abstract

The *Orchidaceae* family is famous for its great taxonomic and floral diversity. This is particularly true for species of the genus *Ophrys*, which are also known for their specific interactions with pollinators and their insect-mimicking flowers. In the genus *Ophrys*, floral scents mimic sexual pheromones of female insects and speciation is supposed to occur when a mutation on one of the genes controlling for floral scent emission induce the attraction of a new pollinator species. Diversification and evolution of floral traits are therefore thought to be primarily pollinator-driven in the genus *Ophrys*. However, few studies have addressed this question using a macroevolutionary approach and multiple datasets to investigate both phylogenetic patterns and floral divergence between *Ophrys* species. Here, we used molecular phylogeny, morphometry, chemical ecology and pollinator records to investigate the role of pollinators in the diversification of the monophyletic *Pseudophrys* section and in the evolution of floral traits in some *Pseudophrys* species from Western Europe. More specifically, we aimed to answer two questions: (i) Is speciation always associated with pollinator shifts? (ii) Are pollinator shifts correlated with shifts in floral traits? In addition, we used our multiple datasets to clarify the taxonomic status of some narrow endemics in the framework of integrative taxonomy, in order to allow for a better conservation of these charismatic but endangered orchids.

Keywords: Orchid, pollination, molecular phylogeny, floral scents, integrative taxonomy

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