
New databases on orchid-pollinator interaction and fruit set in the Euro-Mediterranean region

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Abstract

Biotic interactions have played a major role in the generation of biodiversity in both the plant and animal kingdoms. One of the major challenges in the study of plant-pollinator interactions is to determine what factors underlie similarity in pollination niches between plants, a question that is relevant both to ecology and evolutionary biology. In addition, the relative contribution of plant-pollinator interactions and other environmental factors in determining plant reproductive success is important both to predict the evolutionary outcome of pollination interactions and to set up appropriate conservation strategies. In this context, we present here two new databases concerning Euro-Mediterranean orchids: 1) one on orchid-pollinator interactions (1278 interactions between 243 orchid and 773 pollinator species) and 2) one on the fruit set of these orchids (171 orchid species from 1750 populations). By analysing the first database using a network approach, we show that specialization in orchid-pollinator interactions depends on orchids' pollination strategy, but also on their geographical range. We further demonstrate that the number and identity of insect families with which orchids interact depend on their pollination strategy and phylogeny, while the number and identity of insect species with which they interact depend on their spatio-temporal distribution. This suggests that if there are consistent associations between some pollination strategies or phylogenetic groups and some insect families, at a finer scale, orchid-pollinator interactions may be more opportunistic than previously thought. By analysing the second database using generalized linear mixed models, we show that orchid fruit set varies among pollination strategies and may be influenced by floral display traits, while ecological preferences of orchid species seem to have no impact on their reproductive success. These two databases on orchid-pollinator interactions and fruit set will allow comparative analysis on reproductive ecology of Euro-Mediterranean orchids and provide relevant information for population dynamics and conservation studies.

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