
Contrasted populations dynamics of orchid species between insular and continental situations

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Abstract

Orchids are known to be particularly sensitive to environmental changes due to their double dependence to pollinators (for reproduction) and mycorrhizae (for nutrition). Lack of data at the community level limits our ability to evaluate how traits of different orchid species influence their responses to habitat change. We used a diachronic survey of orchid communities in three Mediterranean regions (PACA, LR and Corsica) in France to examine this question. Comparing data from two campaigns conducted about 25 years apart (1982-1984, 2006-2014) in the several tens of sites per region, we evaluated the impact of increase in woody plant cover (WPC) on the local extinction/colonization dynamics of orchids. We applied a Bayesian multispecies site-occupancy model to each orchid species recorded in these sites to estimate the probability of detection of each species, enabling us to account for underdetection in estimating their dynamics. Between our ancient and contemporary periods, WPC increased in most sites in each of the three regions, but twice lesser in Corsica than the two other regions. In Corsica, no significant change was detected in the richness of orchid communities at the regional scale, despite marked changes in species composition at the local scale. In the two continental regions, both richness and composition of orchid species strongly decline. In the three regions, abundance of shade-intolerant species tended to decline more sharply than that of shade-requiring species. Such contrasted populations dynamics of orchids between insular and continental situations appears strongly linked to the different levels of increase in WPC.

Keywords: Orchid communities, conservation, Mediterranean, Bayesian model, landscape closure

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