
Alien ant-disrupted pollination mutualism of a declining island endemic plant varies temporally and is worsened by alien plant invasion

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Abstract

Invasive alien species, through their varied impacts, pose the greatest threat to the thousands of island plants currently considered as highly threatened with extinction. Among these, disruptions of plant-pollinator mutualisms have been receiving increased attention recently. Such threat, however, is likely to vary much spatio-temporally, particularly when driven by alien ants for instance, but this variation remains relatively rarely studied. We examined an endangered Mauritius endemic scrambler (*Roussea simplex*) about a decade after its pollination by an endemic reptile was found to be disrupted by a widespread invasive alien ant (*Technomyrmex albipes*). We quantified alien ants' impact by estimating natural ant-infestations of flowers in four populations and through baiting experiments done at four equidistant heights (50-200 cm) above ground over two consecutive years at two sites. We also characterised the influence of alien plant invasion on the plant's stature. Two alien (*Anoplolepis gracilipes* and *Technomyrmex albipes*) and one native (*Plagiolepis madecassa*) ant species were found visiting flowers. Only 6.4% of flowers bore alien ants and they occurred predominantly closer to the ground. Mean frequency of infested baits and mean alien ant density per bait varied seasonally and annually and infestations predominated up to 100 cm above ground. *Roussea* plants were about three times taller in well preserved habitats than in invaded ones. New invasive ant species may appear with time and appear to displace pre-existing species and flowers may also provide resources to native ants. The severity of mutualism-disruption varies spatially and seasonally as well as inter-annually and in longer time span. Alien plant invasions increase loss of host plants which causes the scrambler to collapse closer to the ground thereby increasing accessibility of its flowers to alien ants. Alien plant invasion thus amplifies deleterious impacts of invasive ants. Conservation managers should pay attention to spatio-temporal variation in severity of threats that have been documented. It is also important to study documented threats in a broader context to unravel eventual cascading effects. In the current example, to address alien-ant disrupted pollination mutualism, reversing invasive alien plant impact may be the management to adopt instead of controlling the ants themselves.

Keywords: conservation, invasive ants, invasive plants, Mauritius, mutualism disruption, oceanic island

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