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ORIGINAL PAPER

Ant pollination of *Syzygium occidentale*, an endemic tree species of tropical rain forests of the Western Ghats, India

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Abstract

Although mutualism between ants and flowering plants is wide spread, ant pollination has not evolved as a major pollination syndrome. So far ant pollination has been reported largely in herbaceous species, growing in warm and dry habitats. While studying pollination ecology of *Syzygium* species (Myrtaceae), growing in tropical forests of the Western Ghats, India, we observed one of the ant species, *Technomyrmex albipes*, to be the dominant floral visitor in *S. occidentale* (Bourd.) Chithra among a range of other insect (species of *Xylocopa* and *Trigona*, and *Apis cerana*) and bird visitors. We studied the role of ant species in pollination when compared to other floral visitors. The fruit set in flowers exclusively visited by *T. albipes* was significantly higher than those visited by any other visitor. The day and night exclusive pollination experiments allowing only *T. albipes* indicated diel pollination by *T. albipes*, which was the only active flower visitor during the night. The breeding system of the species was studied through controlled pollinations. The species is partially self-compatible and exhibits considerable autogamy.

Keywords Breeding system · Myrmecophily · Myrtaceae · Pollination efficiency · *Technomyrmex albipes*

Introduction

Mutualism between plants and ants is widespread. Two of these mutualisms involving ants in protecting plants from herbivores, and in seed dispersal (myrmecochory), are well known and intensively studied (Herrera and Pellmyr 2002; Bronstein et al. 2006; Rico-Gray and Oliveira 2007; Schaefer and Ruxton 2011). Ants are closely related to bees and wasps, and have developed very complex social structure. They are the most abundant among the insects, and present in almost all habitats. Ants were present during the explosive radiation of the flowering plants in the late Cretaceous, even before the appearance of bees (Beattie et al. 1984; Beattie 1985). In spite of these positive features for the evolution of a strong ant-pollination syndrome, ant pollination is very rare when compared to their sister groups, bees and wasps (Dutton and Frederickson 2012). So far, ant pollination has been reported in about 46 species of flowering plants (de Vega et al. 2014; de Vega and Gomez 2014). Most of the ant pollination has been reported from dry or cold zones (Hickman 1974; Dutton and Frederickson 2012; de Vega and Gomez 2014; Ibarra-Isassil and Sendoya 2016). Several hypotheses have been put forward to explain the rarity of ant pollination (Beattie 1985; Dutton and Frederickson 2012). Two of the hypotheses that have some evidences are (i) movements of ants are usually restricted to within the plant and thus result largely in geitonogamous self-pollination; and (ii) secretion of antibiotics from metapleural glands (MG), present in most of the ant species, reduce pollen viability (Beattie et al. 1984, 1985; Peakall et al. 1990;

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