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Original article

Leaf foraging sources of leafcutter bees in a tropical environment: implications for conservation

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Abstract – Leafcutter bees collect leaf discs to encase brood cells. However, our understanding of their use of plants as nesting resources, which is critical for their conservation, is poor. We followed plants and observed bees cutting leaves to understand the leaf and plant traits of the leaf forage plants of *Megachile* spp. We studied whether the leaf size explains the cut size and the number of cuts in the leaves. The bees collected leaves from 59 species, 49 genera and 25 families of plants of various habits. Plant habit, leaf morphotype and leaf size did not influence leaf choice by the bees. Of the plants surveyed, 45.22% had the distinguishable cutting marks. About 63% and 98% of the plants the bees used are native to the region and to the tropical southern hemisphere, respectively. Bees selected leaves over an extreme size range, and the leaf size predicted the number of cuts on a leaf. Comparing our results with other studies, we conclude that the leafcutter bees' selection of plants is adapted to the local environment.

Megachile **/ Megachilidae / leafcutter bee / urban ecosystem / pollinator**

1. INTRODUCTION

Bees, evolved from sphecoid wasps (Cardinal and Danforth 2013; Grimaldi 1999), have retained their ancestors' provisioning habit in nests (Radchenko and Pesenko 1996). However, they use plant matter, such as a blended pollen and nectar mixture (Michener 1964; Cane et al. 2011), rather than their ancestors' likely choice of animal matter (Evans 1971) as food for their developing larvae. They have also evolved the habit of lining the brood cells (Michener 1964). Ancestral sphecoid wasps nested in burrows in the soil and stored the larvae (the provision of the brood) there for many days to weeks in unlined brood cells (Kaltenpoth et al. 2005). Being hydrophilic in nature, the provision of bee hives is susceptible to early spoilage, particularly from infectious fungal molds (Müller et al. 1996; Messer 1985). Larvae are also vulnerable to predation and parasitism (Eltz et al. 2015; Krunić et al. 2005), so bees construct lined brood cells in the burrows in pre-existing cavities below and above ground to reduce predation risk (Eltz et al. 2015; Cane et al. 1983; Messer 1985). Most bees use a glandular secretion from Dufour's gland to line the brood cell (Williams et al. 1986; Hefetz 1987; Mitra 2013), but some species of bees have evolved the habit of using foreign materials, predominantly plant derivatives and soil particles, as their lining (MacIvor 2016; Litman et al. 2011; Cane et al. 1983; Messer 1985).

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