

DIVERSITY OF THE BEE FAUNA OF THE BRAZILIAN CAATINGA

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ABSTRACT

This paper discusses the diversity of bees found in the caatinga of Brazil. It compares the population diversity of the caatinga area to other Brazilian ecosystems and the possible reasons behind the differences. Certain endemic species of bees are discussed.

INTRODUCTION

Biodiversity in recent years has become prominent not only as a research paradigm, but also as a popular subject for audience attraction in the media. In spite of this, the current knowledge on the biodiversity of ecosystems as, for example, of the Neotropical region, is still very embryonic. In Northeastern Brazil, particularly in semiarid regions, very little is known about the diversity of several groups of animals and plants.

The ecosystem of the Caatinga occupies 750,000 km², approximately 10% of the Brazilian territory. According to Andrade-Lima (1981), there are at least 12 Caatinga types. The areas of the Caatinga are suffering from strong human influence, and the fauna and flora are becoming greatly altered before a good knowledge of the local community structures and their flora and faunal diversity can be gained.

It is known that the mammals and terrestrial vertebrates of the Caatinga, besides having a low diversity also comprise a low percentage of endemic species.

In comparison, the insects represent a larger degree of endemism. This probably reflects, at least partially, the narrower relationship between insects and plants and also as yet unknown historical factors. The oscillations of the standing crop of the biota in an area with low annual precipitation (300 - 800 mm.) highly irregularly distributed in time and space greatly influence the insect fauna of the Caatinga. Many insect species seem well adapted to the long dry periods. Some survival strategies in the Caatinga are prolonged development of larval stages or to enter into a period of diapause or both. Some species adopt nocturnal habits primarily to take advantage of lower temperatures and higher humidity levels (Barrios 1994,1995). Countless examples of specific relationships between insects and plants exist among the Orthoptera, Lepidoptera, Heteroptera and Coleoptera. Among bees, worth special mention is *Ceblurgus longipalpis* (Hymenoptera, Halictidae), an oligolectic bee that forages mostly on the flowers of *Cordia leucocephala* (Boraginaceae) (Aguiar and Martins 1994). Other oligolectic relationships are found between species of *Melitoma* and *Ipomoea* (Anthophoridae), *Bicolletes* and *Loasa rupestris* (Colletidae), and *Sarocolletes* and *Sida galheirensis* (Colletidae). (Martins 1990 and unpublished data) (Table 1). However, the existing information on the diversity and biology of the insects is still scarce and dispersed, owing mainly to the lack of good collections, extensive and intensive surveys and/or to taxonomic difficulties in the study of some groups (Barrios *op. cit.*).

Regarding bees (Apoidea), recent studies present some interesting data. Martins (1990, 1994), using a standardized methodology to study the relationships between bees and the plants they visit in the Caatinga, found about 15% new and/or endemic species in an arboreous-shrubby Caatinga in the district of Casa Nova, Bahia State.

Compared with other ecosystems (e.g. Savanna and Atlantic Wet Forest), the diversity of bees found in the Caatinga is low (Martins 1990, 1994, and unpublished data; Aguiar and Martins 1997; Aguiar 1995). However, similar studies suggest that although the species richness (alpha diversity) is low in each specific area and that different areas present several exclusive species (beta diversity). This suggests high gamma diversity (although lower in comparison with other Brazilian biomes) as proposed by Whittaker (1972) and Schluter and Ricklefs (1993), when all the semiarid regions are considered. These concepts are relevant to the study being developed by Zanella (1998). In a preliminary list of the bee fauna of the Caatinga, excluding areas with other biomes within the domain of the Caatinga, Zanella (1998) observed about 180 species, with a high rate of endemism suggested to be about 30% of the collected species.

An interesting group that presents similar species richness as in other ecosystems of opened areas of the Neotropical region is the eusocial Meliponinae. In the surveys and studies of bees in Bahia State (Martins 1994; Martins and Aguiar 1992) and in Paraíba State (Aguiar and Martins 1997; Martins *et al.* submitted), the following stingless bees species were observed: *Melipona asilvae*, *Melipona subnitida*, *Melipona mandacaia*, *Scaptotrigona* sp. n. - group *depilis*, *Scaptotrigona* sp. n. - group *tubiba*, *Plebeia flavocincta*, *Plebeia* spp including spp. n., *Trigona spinipes*, *Trigonisca pediculana*, *Trigonisca* sp. n., *Frieseomelitta* sp. n., *Frieseomelitta varia*, *Partamona* sp. n. *aff. nigrior* and *Lestrimelitta limao*.

Besides the similar species richness to the other biomes of opened areas, several species of Meliponinae of the Caatinga are also likely endemic. Honey and pollen stores of the colonies of many of these species are harvested by honey-hunters and local beekeepers. And because of deforestation, management techniques of natural and agroecosystem resources and other human influences, some of these species (*Melipona* spp.) are already rare and threatened by extinction in some areas (Table 2).

Considering the importance of an endemic fauna adapted to the xeric conditions of the Caatinga, the pollination potential of meliponine bees, honey and pollen production, and consequently relevant role in the sustainable development use of the Caatinga, the preservation and recovery of the ecosystems located in the semiarid region of Northeastern Brazil is urgent. There is much to study and discover about the fauna of the Caatinga and its adaptations to this unique environment.

TABLE 1. Some examples of oligolectic bees and the plant species they visited.

Bee Species	Bee Family	Plant Species	Plant Family
<i>Ceblurgus longipalpis</i>	Halictidae	<i>Cordia leucocephala</i>	Boraginaceae
<i>Melitoma</i> -spp	Anthophoridae	<i>Ipomoea</i> spp	Convolvulaceae
<i>Bicolletes</i> spp	Colletidae	<i>Loasa rupestris</i>	Loasaceae
<i>Sarocolletes</i> sp	Colletidae	<i>Sida alheirensis</i>	Malvaceae

TABLE 2. Meliponinae observed in the Caatinga of Bahia and Paraíba State, Northeastern Brazil.

Bee Species	Situation	Endemic
<i>Melipona asilvae</i>	Threatened	*
<i>Melipona subnitida</i>	Threatened	*
<i>Melipona mandacaia</i>	Threatened	*

<i>Scaptotrigona</i> n. sp. – grupo <i>depilis</i>		*
<i>Scaptotrigona</i> n sp. – grupo <i>tubiba</i>		*
<i>Trigona spinipes</i>		
<i>Plebeia flavocincta</i>		*?
<i>Plebeia</i> spp		*
<i>Trigonisca pediculana</i>		
<i>Trigonisca</i> n. sp.		*
<i>Frieseomelitta</i> n. sp.		*
<i>Frieseomelitta varia</i>		
<i>Partamona</i> n. sp. <i>aff. nigrior</i>		*
<i>Lestrimelitta limao</i>		

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