POLLEN SPECTRUM OF HONEY OF "URUÇU" BEE (*Melipona scutellaris* LATREILLE, 1811)

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(With 1 figure)

ABSTRACT

In spite of the importance of the "uruçu" bee as honey producer of excellent quality, as well, potential pollinator both in agricultural and natural ecosystems, mainly in North-eastern Brazil, just some information is found in literature about sources that such bees utilize to collect nectar and pollen. The identification of the plants visited by *Melipona scutellaris* was accomplished with base on the analysis of pollen types found in the honey samples collected every two months, from March 1997 to February 1998, in 15 colonies located in Catu, State of Bahia, Brazil (12°21'00"S, 38°22'40"W, 76 m of altitude). Qualitative and quantitative analysis of the pollen types were carried out determining the percentage and occurrence classes. Twenty-eight pollen types were found, being considered dominant pollen, the *Eucalyptus* spp. and *Psidium* sp. types and secondary pollen, *Bauhinia* sp., *Caesalpinia* sp. and *Mimosa verrucata* types. It was verified dominant pollen of *Eucalyptus* spp. in honeys produced in November/December 1997 and January/February 1998. The families Caesalpiniaceae (14%), Mimosaceae (25%) and Myrtaceae (56%) were the most represented in the pollen spectrum.

Key words: pollen, honey, bee plants, Meliponinae.

RESUMO

Espectro polínico do mel da abelha uruçu (*Melipona scutellaris* Latreille, 1811)

Apesar da importância da abelha uruçu como produtora de mel de excelente qualidade, bem como polinizadora potencial de plantas em ecossistemas naturais e agrícolas, principalmente no nordeste brasileiro, poucas são as informações, encontradas na literatura, sobre as fontes que essas abelhas utilizam para coleta de néctar e pólen. A identificação das plantas visitadas por *Melipona scutellaris* foi realizada com base na análise dos tipos polínicos encontrados em amostras de mel coletadas bimestralmente de março de 1997 a fevereiro de 1998, em 15 colônias localizadas em Catu, Estado da Bahia, Brasil (12°21'00"S, 38°22'40"W, 76 m de altitude). Realizaram-se análises qualitativa e quantitativa dos tipos polínicos, determinando-se as porcentagens e classes de ocorrência. Foram encontrados 28 tipos polínicos, sendo considerados dominantes os de *Eucalyptus* spp. e *Psidium* sp. e acessórios os de *Bauhinia* sp., *Caesalpinia* sp. e *Mimosa verrucata*. Verificou-se a presença de pólen dominante de *Eucalyptus* spp. nos méis de novembro/dezembro de 1997 e janeiro/fevereiro de 1998. As famílias Caesalpiniaceae (14%), Mimosaceae (25%) e Myrtaceae (56%) foram as mais representadas no espectro polínico contaminante do mel.

Palavras-chave: pólen, mel, plantas apícolas, Meliponinae.

INTRODUCTION

The honey samples analysis supply information about bee flora in a determined region, becoming an important tool, both for apiculturist (Kerr *et al*., 1987), and researches. There are some controversies about the utilization of the pollen which is present in the honey as indication of botanical origin (Molan, 1998), but until the present date, this is the method most utilized for this purpose.

Among species of stingless bees the "uruçu" (*Melipona scutellaris* Latreille, 1811) is one of the most known in the Northeast of Brazil (Nogueira-Neto, 1970; Nogueira-Neto *et al*., 1986), being found in nests beehives and in rural and urban zones.

In spite of its importance as a potential pollinator in both agricultural and natural ecosystems and the peculiar quality of its honey, exists just some information about food sources that the "uruçú" utilize for nectar and pollen collection (Kerr *et al*., 1996).

The pollen spectrum analysis of honey indicates the plants visited by bees and permit the characterization of bee plants in a geographic region or time of the year. Can be used as auxiliary method in the indication of possible frauds in honeys found in the market (Durkee, 1971; Barth, 1989; Seijo *et al*., 1992).

The aim of this paper was to identify the plants visited by *M. scutellaris*, the "uruçu" bee by means of analysis of pollen types found in the honey.

MATERIAL AND METHODS

In the period from March 1997 to February 1998 every two months collections were accomplished in 15 colonies located in Catu, State of Bahia, Brazil (12°21'00"S, 38°22'40"W, 76 m of altitude). From each colony were taken off 10ml of honey which were deluded into 20 ml of distilled water and centrifuged for 5 minutes at 2,500 rpm speed. After taking out the supernatant, the sediment which was found at the bottom of the test tube was included in non colored glycerin jelly and deposited in microscopic slides under tiny slide being sealed with paraffin (Barth, 1989).

The pollen types qualitative analysis was based on specialized literature (Barth, 1970a, b, c, 1989; Souza *et al*., 1993) and in the field information while the quantitative analysis was accomplished by means of consecutive counting of 200 grains, according to Ranta & Lundberg (1981), determining the percentages and occurrence classes according to Louveaux *et al*. (1978) that classify the pollen types: dominant pollen (DP) (> 45%), secondary pollen (SP) (16% to 45%), important minor pollen (IMP)(3 to 15%) and minor pollen (MP) (< 3%).

RESULTS AND DISCUSSION

The visited flora, from March 1997 to February 1998, was represented by 28 pollen types, *Bauhinia* sp, *Caesalpinia* sp, *Eucalyptus* spp, *Mimosa verrucata* and *Psidium* sp. types were the most frequent (Table 1).

The *Eucalyptus* spp type appeared either as DP (80.0% to 87.8%) or as SP (19.18% to 33.6%) in practically all the samples, except that obtained in September/October 1997 (Tables 1 and 2). The pollen of the family Mimosaceae was found in all the samples, mainly as IMP, so this being the *Mimosa verrucata* type was observed as SP in three samples: March/April (29.1%), May/June (23.0%) and July/August (20.8%) (Table 1). The *Psidium* sp type was DP in one sample of September/October (51.4%) (Table 1).

The main pollen types found in honey samples of "uruçu" bee at the site studied are illustrated in the Fig. 1.

Comparing to literature data we certify that *Eucalyptus* spp. and *Mimosa* spp. types were also remarked by Barth (1989), Durán *et al*. (1996) and Moreti *et al*. (1998) in samples of *Apis mellifera* honey coming from Bahia. In spite of the *Eucalyptus* spp. type having been considered by Barth (1989), just as SP, it was observed that these species are found as DP in the samples of *A. mellifera* honey in different regions in the State of Bahia, principally due to the increase of reforested areas with this vegetable species in the latest years (Moreti *et al*., 1998).

Studies held in Amazon by Absy *et al*. (1980), identified 53 vegetable species whose pollen types were found in the nectar carried by forager bees of *M. rufiventris* and *M. seminigra*.

TABLE 1

Percentage (%) of pollen types in samples of *Melipona scutellaris* honey collected in Catu, State of Bahia, Brazil, from March 1997 to February 1998 (DP = dominant pollen > 45%; SP = secondary pollen from 16% to 45%; IMP = important minor pollen from 3% to 15%; and MP = minor pollen < 3%).

Family	1997					1998	% Total
Genus/species	Mar-Apr	May-Jun	Jul-Aug	Sept-Oct	Nov-Dec	Jan-Feb	by family
Myrtaceae							56%
Eucalyptus spp.	33.57 (SP)	19.18 (SP)	28.86 (SP)	–	87.80 (DP)	80.00 (DP)	
Myrtaceae type	–	–	–	6.40 (IMP)	–	–	
Psidium sp.	3.78 (IMP)	11.93 (IMP)	10.85 (IMP)	51.41 (DP)	6.60 (IMP)	10.20 (IMP)	
Mimosaceae							25%
Mimosa sp.	0.47 (MP)	–	–	–	1.00 (MP)	1.20 (MP)	
Mimosa caesalpinifolia	–	–	3.49 (IMP)	9.72 (IMP)	–	–	
Mimosa scabrella	–	11.22 (IMP)	8.46 (IMP)	4.60 (IMP)	–	1.40 (MP)	
Mimosa verrucata	29.08 (SP)	23.01 (SP)	20.77 (SP)	5.37 (IMP)	–	–	
Tibouchina sp.	5.20 (IMP)	4.69 (IMP)	6.80 (IMP)	2.30 (MP)	1.80 (MP)	1.00 (MP)	
Acacia type	–	–	–	0.51 (MP)	–	–	
Caesalpiniaceae							14%
Bauhinia sp.	18.20 (SP)	1.70 (MP)	5.51 (IMP)	0.26 (MP)	–	–	
Caesalpinia sp. 1	3.55 (IMP)	27.13 (SP)	1.58 (MP)	–	–	–	
Caesalpinia sp. 2	–	–	3.31 (IMP)	10.23 (IMP)	–	–	
No identified (NI)							4%
NI sp. 1 type	5.20 (IMP)	–	–	—	–	–	
NI sp. 2 type	0.24 (MP)	–	0.37 (MP)	3.07 (IMP)	2.00 (MP)	1.80 (MP)	
NI sp. 3 type	–	0.14 (MP)	0.55 (MP)	–	–	–	
NI sp. 4 type	–	–	2.94 (MP)	–	–	–	
NI sp. 5 type	–	–	0.74 (MP)	–	–	–	
NI sp. 6 type	–	–	1.29 (MP)	–	–	–	
NI sp. 7 type	–	–	0.18 (MP)	–	–	–	
NI sp. 8 type	–	–	–	2.30 (MP)	–	–	
NI sp. 9 type	–	–	–	3.07 (IMP)	0.40 (MP)	0.60 (MP)	
NI sp. 10 type	–	–	–	0.36 (MP)	–	–	
NI sp. 11 type	–	–	–	0.26 (MP)	–	–	
Arecaceae							0.72%
Arecaceae type	–	0.99 (MP)	–	–	–	3.20 (IMP)	
Astrocaryum sp.	–	–	–	–	–	0.40 (MP)	
Asteraceae							0.25%
Asteraceae type	0.71 (MP)	–	–	0.51 (MP)	0.20 (MP)	–	
Sonchus sp.	–	–	–	–	0.20 (MP)	–	
Moraceae							0.03%
Cecropia sp.	–	–	–	–	–	0.20	

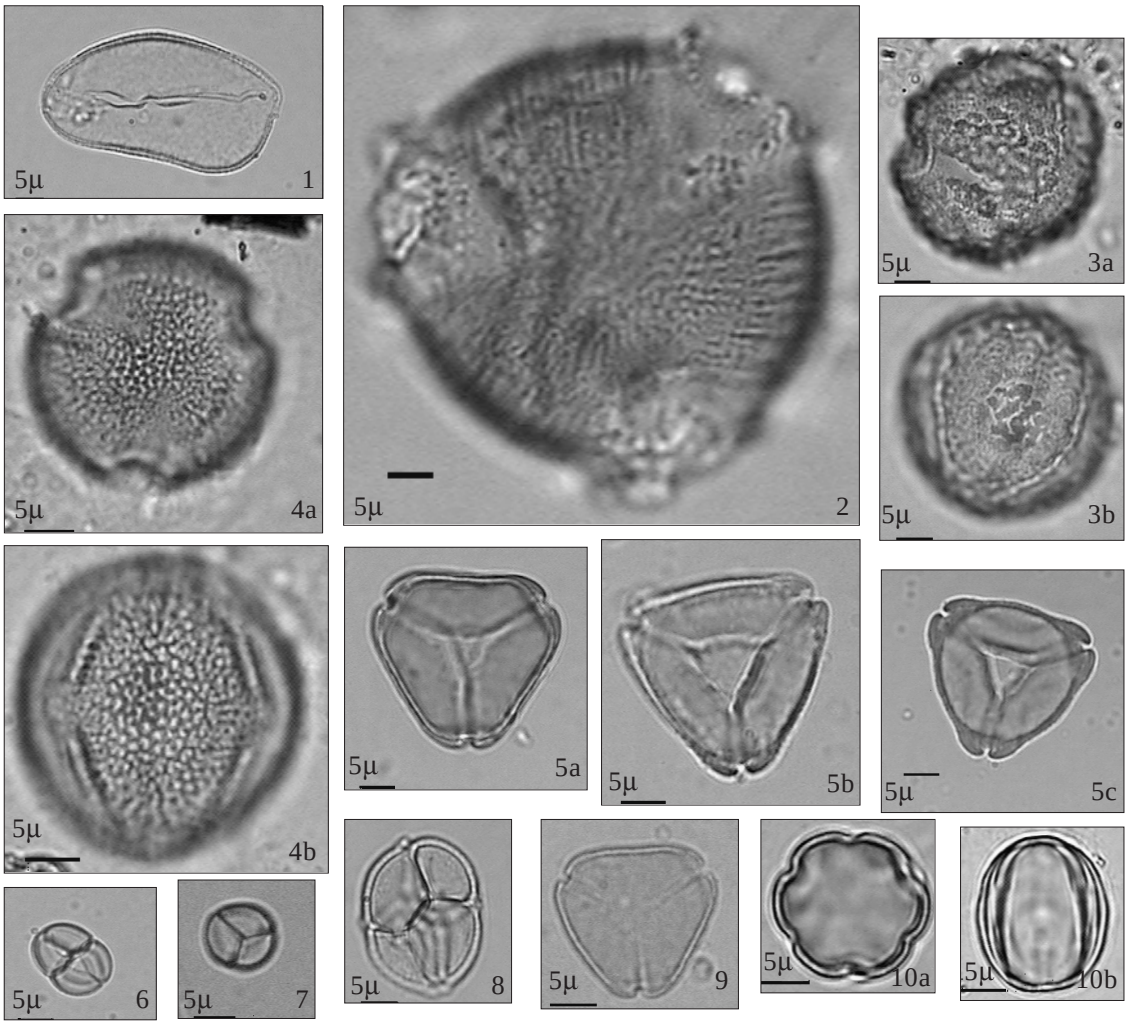

Fig. 1 — Main pollen types in samples of *Melipona scutellaris* honey collected in Catu, State of Bahia, Brazil, from March 1997 to February 1998. **1—** Arecaceae type; **2 —** *Bauhinia* sp. **3 —** *Caesalpinia* sp. 1, a) polar view, b) Equatorial view; **4 —** *Caesalpinia* sp. 2, a) polar view, b) Equatorial view; **5a,b,c —** *Eucalyptus* spp.; **6 —** *Mimosa caesalpinifolia;* **7 —** *Mimosa scabrella*; **8 —** *Mimosa verrucata*; **9 —** *Myrcia* type *(Psidium* sp.); **10 —** *Tibouchina* sp. a) Polar view, b) Equatorial view.

In this work just 28 types were found in the honey produced by *M. scutellaris*. We believe that those differences are not only related to the bee species, but also to the diversity and characteristics of the local flora, edapho-climatic conditions, distance from the colonies to the food sources and vegetation degradation level, among other factors.

In the list presented by Kerr *et al*. (1987) containing 79 species of plants visited by *M. compressipes fasciculata* in the State of Maranhão, in Northeast of Brazil, for nectar and pollen collection, the authors considered as good nectar producers, 27 species among them *Eucalyptus* spp. e *Bauhinia* sp., which ones were also verified in the present survey.

Results obtained in this work get near those ones found by Vit & d'Albore (1994) who studied the pollen spectrum in 48 honey samples of three species of *Melipona* in Venezuela, verifying that 28 samples contained dominant pollen, being 11 of *Mimosa* spp. and 3 of Myrtaceae. It was observed also similarity with the list of plants visited by Meliponinae and *A. mellifera* in neotropical region presented by Ramalho *et al*. (1990) in which

were reported 8 species of *Mimosa* and 5 species of *Eucalyptus*.

The families Caesalpiniaceae, Mimosaceae and Myrtaceae were those that presented the greater number of species in pollen spectrum of the collected samples (Table 1). Those families were well represented in several studies with bee plants (Guibu *et al*. 1988; Ramalho *et al*., 1990), as species of Caesalpiniaceae that presents ample distribution and are part of several Meliponinae and *A. mellifera* diet supplying both pollen and nectar (Sommeijer *et al*., 1983; Ramalho *et al*., 1994).

CONCLUSION

The *Eucalyptus* spp. type was considered DP in "uruçu" bee honey produced in November/December 1997 and January/February 1998. The other samples presented a moisture of pollen types, without dominance of one, being main plants visited: *Eucalyptus* spp., *Psidium* sp., *Mimosa verrucata*, *Bauhinia* sp., *Caesalpinia* spp. and *Mimosa scabrella*.

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