EUGLOSSINE BEES (HYMENOPTERA: APIDAE) OF BURITICUPU, AMAZONIA OF MARANHÃO, BRAZIL[1]

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ABSTRACT — Male euglossine bees attracted to cineole, vanillin, methyl salicylate, eugenol and benzyl benzoate, were collected from October 1995 to September 1996, twice a month, between 06.00 and 12.00 hours, at the Companhia Vale do Rio Doce Forest Reserve, Buriticupu-MA. It were sampled 1740 individuals, 37 species and 4 genera. *Euglossa* was the most abundant genus (23 species), followed by *Eufriesea* (8), *Eulaema* (4) and *Exaerete* (2). The most frequent species were *Euglossa pleosticta* (33% of the collected individuals), *Euglossa truncata* (12,7%), *Euglossa avicula* (6,3%), *Eufriesea superba* (5,2%), *Euglossa fimbriata* (4,8%) *Euglossa violaceifrons* (4,4%), *Eulaema nigrita* (4,1%), *Euglossa cordata (*4,0%), *Eulaema meriana* (3,4%). Cineole attracted 66% of males and 70% of species, vanillin (20%; 59%), methyl salicylate (7,4%; 54%), eugenol (5,6%; 44%) and benzyl benzoate (0,7%; 10,8%). The highest abundance of individuals (78,3%) and species (34) occurred in the rainy season (January-June). The species of the genus *Eufriesea* occurred only in this period. Regarding the hourly activity, the euglossine bees were more frequently found between 10.00 and 11.00 hours, accounting for 33,5% of the individuals and 86,4% of the species.

Key-words: bees, Euglossinae, Amazonia of Maranhão

Abelhas Euglosssinae (Hymenoptera: Apidae) de Buriticupu, Amazônia maranhense, Br.azil

RESUMO — Machos de Euglossinae atraídos por cineol, vanilina, salicilato de metila, benzoato de benzila e eugenol, foram coletados de outubro de 1995 à setembro de 1996, quinzenalmente, das 06:00 às 12:00 horas, na Reserva Florestal da Companhia Vale do Rio Doce (CVRD), em Buriticupu-MA. Foram coletadas um total de 1740 indivíduos pertencentes a 37 espécies de 4 gêneros. *Euglossa* foi o mais comum (23 espécies), seguido por *Eufriesea* (8), *Eulaema* (4) e *Exaerete* (2). As espécies mais freqüentes foram *Euglossa pleosticta* (33% dos indivíduos coletados), *Euglossa truncata* (12,7%), *Euglossa avicula* (6,3%), *Eufriesea superba* (5,2%), *Euglossa fimbriata* (4,8%) *Euglossa violaceifrons* (4,4%), *Eulaema nigrita* (4,1%), *Euglossa cordata (*4,0%), *Eulaema meriana* (3,4%). Cineol atraiu 66% dos machos e 70% das espécies, vanilina (20%; 59%), salicilato de metila (7,4%; 54%), eugenol (5,6%; 44%) e benzoato de benzila (0,7%; 10,8%). A maior abundância de indivíduos (78,3%) e espécies (34) ocorreu na estação chuvosa (janeiro-junho). As espécies do gênero *Eufriesea* ocorreram somente neste período. O intervalo com maior atividade foi entre 10 e 11 horas (33,5% dos indivíduos e 86,4% das espécies).

Palavras-chave: abelhas, Euglossinae, Amazônia maranhense

INTRODUCTION

Euglossine bees are known as "the orchid bees", due to the behavior of taking up aromatic substances mainly from the orchids (Dodson *et al.*, 1969) probably as part of their mating procedure (Vogel, 1966; Williams & Witthen, 1983).

Several compounds have already

1. Financial support: Companhia Vale do Rio Doce-CVRD and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico)
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been identified and isolated from the orchid fragrances (Dodson & Hills, 1966; Hills *et al.*, 1968, 1972; Dodson *et al.*, 1969; Dodson, 1970; Williams & Dodson, 1972) and some of these compounds have been utilized, as scent baits, in the faunistic inventories carried out in different areas of the neotropical region, such as Panamá (Ackerman, 1983, 1989; Roubik & Ackerman, 1987; Zimmerman & Madriñan, 1988), Costa Rica (Janzen *et al.*, 1982), Peru (Pearson & Dressler, 1985) including Brazil where our understanding about euglossine is based upon researches performed in Central Amazonia (Powell & Powell, 1987; Becker *et al.*, 1991; Morato *et al.*, 1992; Oliveira & Campos, 1995), Bahia (Raw, 1989), Paraíba, (Bezerra pers. inf.), Northern São Paulo (Rebêlo & Garófalo, 1991, 1997) and Rio Grande do Sul (Wittman *et al.*, 1988).

In Maranhão the standardized studies (including monographic works) have been initiated only within the last decade, providing a consistent information on the composition of euglossine species in the northern section of the state (Gonçalves *et al.*, 1996; Rebêlo & Cabral, 1997).

This study consists of a survey on euglossine bees fauna undertaken at the Companhia Vale do Rio Doce (CVRD) Forest Reserve in Buriticupu, Amazonia of Maranhão, in agreement with a series of researches planned to be done in the entire State of Maranhão. This work is focused on studying the species richness, seasonal variation and the association between the males and the collected fragrances.

MATERIAL AND METHODS

Study site

The municipality of Buriticupu is situated between 4°-5° LS and 45° 30'-47° LW, in the Amazonia of Maranhão. The mean altitude is 200m. The region is characterized by a transitional weather between the amazonian wet and the semi-arid northeastern climate, with a 6-month dry (July-December) and 6-month rainy season (January-June), with an annual mean precipitation of 1800mm (DNPM, 1973).

The kind of soil in the surveyed area is the yellow latosoil, occurring in both Terciaries and Cretaceous plateaus. The texture varies according to topographic situation and original material. The old, acid, good-drained and permeable soils are composed of argilous, sandy or sandy-clay sediments (DNPM, 1973).

The original vegetation, which is constituted by Dense Perennial Stationary Forest, has been devastated by timber exploration and agricultural projects and, to date, is represented by fragments of forests on some plateaus (DNPM, 1973).

Pindaré river is the main waterflow in the region belonging to Mearim basin. The river is about 468 km long. The margins, once covered by plants that lie along the river, has endured an intense deforesting process in the latest years, contributing to the elevation of evaporation index especially during the dry period (DNPM, 1973).

The actual study area was the boundary of an uncovered section (600 m2) located at the CVRD Forest Reserve, approximately 45 km from Buriticupu, at MR-006 highway which links BR-222 to the "Arame" community. The reserve goes through 10,000 hectares of Amazonian Forest surrounded by deforested areas due to wood exploration and agricultural activities.

Scent baits

Cineole, methyl salicylate, vanillin, eugenol and benzyl benzoate were the scent baits used to attract male euglossine bees. Five pellets of cotton suspended by a string were hooked in the branches, about 1,50m over the ground, and dampened with the respective compounds every hour. The scent baits were kept 6 meters distant from one another.

Sample

The inventory was undertaken from October 1995 to September 1996, twice a month, between 6.00 and 12.00 hours. The attracted males were captured using an entomological net, killed in a recipient containing ethyl acetate ($C_4H_8O_2$) and finally stored in plastic bags. All collected specimens were identified by the authors and is deposited in the entomological collection of the Department of Biology, Federal University of Maranhão, Bacanga Campus, São Luís, Maranhão, Brazil.

RESULTS

Numbers of species, individuals and attractivity to baits

Males of 37 species, belonging to four genera, were attracted to the scent baits (table 1). *Euglossa* was the most common genus represented by 23 species, followed by *Eufriesea* (8), *Eulaema* (4) and *Exaerete* (2).

Euglossa pleosticta (33% of the individuals), *Euglossa truncata* (12,7%), *Euglossa avicula* (6,3%), *Eufriesea superba* (5,2%), *Euglossa fimbriata* (4,8%) *Euglossa violaceifrons* (4,4%), *Eulaema nigrita* (4,1%), *Euglossa cordata* (4,0%), *Eulaema meriana* (3,4%) were the most abundant species. The others males together represented 22,1% of the total sample. *Euglossa* sp.1, *Euglossa* sp.2, *Euglossa* sp.3, *Euglossa* sp.4 and *Euglossa* sp.5 have been studied and appear to be new species.

Cineole was the most visited scent bait, attracting 66% of the males and 70% of all the species sampled (Tab. 1). *Euglossa pleosticta, Euglossa truncata, Euglossa fimbriata, Euglossa cordata, Euglossa violaceifrons* and *Eulaema nigrita,* were the species which preferably visited this bait.

Vanillin attracted 20% of the males and 59% of the species. Among the species found at vanillin, *Euglossa pleosticta* was the most frequent, however, when taking all baits into account, it preferred cineole. On the other hand, *Eufriesea superba, Euglossa avicula* and *Eulaema cingulata* were more commonly found at vanillin than at the others. *Euglossa piliventris* and *Eulaema mocsaryi*

Table 1. Frequency of male Euglossinae bees collected at cineole (CI), eugenol (EG), methyl salicylate (MS), vanillin (VN) and benzyl benzoate (BB), in Buriticupu-MA, from October 1995 to September 1996.

EUGLOSSINAE	CI	EG	MS	VN	BB	TOTAL
Eufriesea aff. *macroglossa*	01		13	01		15
Eufriesea eburneocincta	01		01	01		03
Eufriesea elegans				02		02
Eufriesea nigrescens		02		07		09
Eufriesea ornata		06			05	11
Eufriesea pulchra			11	01	04	16
Eufriesea superba	23	01	02	65		91
Eufriesea surinamensis			01	07		08
Euglossa augaspis	06	19	10	15		50
Euglossa avicula	23		02	84		109
Euglossa bidentata	01	01	01	01		04
Euglossa chalybeata	25	01	12			38
Euglossa cognata			29			29
Euglossa cordata	68	01			01	70
Euglossa fimbriata	83			01		84
Euglossa gaianii	03		06			09
Euglossa imperialis	37		12	05		54
Euglossa liopoda	05	01				06
Euglossa modestior	08		01			09
Euglossa piliventris				10		10
Euglossa pleosticta	467	14	01	95		577
Euglossa securigera	06	03				09
Euglossa sp.1	01					01
Euglossa sp.2			01			01
Euglossa sp.3	01					01
Euglossa sp.4	01					01
Euglossa sp.5	01					01
Euglossa townsendi	05					05
Euglossa truncata	185	28	01	07		221
Euglossa violaceifrons	75			01		76
Euglossa viridis			01			01
Eulaema cingulata		13	01	27		41
Eulaema meriana	33	01	22	03		59
Eulaema mocsaryi				01		01
Eulaema nigrita	68			04		72
Exaerete frontalis	08	04	01	01		14
Exaerete smaragdina *	14	03		12	03	32
TOTAL	1149	98	129	351	13	1740

were attracted exclusively to vanillin.

Methyl salicylate attracted 7,4% of the males and 54% of the species. Although visiting others baits, the following species showed a given preference for Methyl salicylate: *Eufriesea aff. macroglossa, Eufriesea pulchra,* and *Euglossa gaianii.* The exclusivity was shown by *Euglossa cognata, Euglossa viridis* and *Euglossa* sp.2.

Eugenol attracted 5,6% of the males and 44% of the species. This odor was not specific to any of the species. *Euglossa augaspis* and *Eufriesea ornata* were the most regular species at this chemical bait.

Benzyl benzoate was the least attractive compound, where 0,7% of the males and 10,8% of the species visited this odor. The species which visited this bait with more frequency were *Eufriesea ornata, Eufriesea pulchra, Exaerete smaragdina* and *Euglossa cordata.* No euglossine males were attracted preferably to this bait.

Seasonal fluctuation and hourly activity

The highest abundance of male euglossine bees has been found between January and June, during the rainy season (Tab. 2; Fig. 1). April and June (21,6% and 15%, respectively) were the months which showed the highest peak of individuals. The greatest number of species was found in February (72,9%), followed by March and June, both presenting 59,4% of the species sampled.

The males frequency at the baits was higher in the rainy season (January-June) than in the dry one (July-December). Only *Euglossa securigera, Eulaema nigrita* and *Eulaema cingulata* showed to be more frequently found in the dry period. August (0,9%) and September (1,1%) were the less visited months throughout the year of study.

Eufriesea species occurred only in the rainy season (Tab. 2). Males of *Eufriesea ornata* visited the baits in May and June. *Eufriesea nigrescens, Eufriesea pulchra, Eufriesea surinamensis, Eufriesea aff. macroglossa* and *Eufriesea elegans* visited the scent baits early in the wet season. The high number of individuals collected in March is associated with *Eufriesea superba* which accounted for 29% of the specimens. This species appeared in the entire rainy season and peaked in March (72,5% of the individuals).

During the course of the study the following species were always present: *Euglossa pleosticta, Euglossa truncata, Euglossa fimbriata, Euglossa violaceifrons, Euglossa augaspis* and *Eulaema nigrita.* The others were abundantly found in the wet season. The highest abundance of *Euglossa imperialis* and *Euglossa violaceifrons* took place in February; *Euglossa pleosticta, Euglossa avicula, Euglossa cognata* and *Euglossa gaianii*, in April; *Euglossa truncata* was more frequent in May; *Euglossa chalybeata* and *Euglossa piliventris* in June; *Euglossa fimbriata* and *Euglossa cordata* had their abundance peak in July. *Euglossa townsendi* visited the scent baits late in the wet season.

With regard to the hourly activ-

Table 2. Seasonal fluctuation of Euglossinae bees collected at scent baits in Buriticupu-MA from October 1995 to September 1996.

EUGLOSSINAE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Eufriesea aff. *macroglossa*		03	12										15
Eufriesea eburneocincta		01		01			01						03
Eufriesea elegans		01	01										02
Eufriesea nigrescens		05	02	02									09
Eufriesea ornata					01	01							02
Eufriesea pulchra		02	01	06	06					01			16
Eufriesea superba	01	05	66	11		06	01			01			91
Eufriesea surinamensis		07	01										08
Euglossa augaspis	08	08	03	04	05	05	01		02	02	05	06	50
Euglossa avicula		63	11	32	02	01							109
Euglossa bidentata	01	02		01									04
Euglossa chalybeata	03	05	04	07	05	09			02	01	02		38
Euglossa cognata		07	01	09	07	04						01	29
Euglossa cordata		02	01			05	22	03	02	15	17	03	70
Euglossa fimbriata		01		02	01	09	31	03	02	12	19	04	84
Euglossa gaianii				03	01	01				01		02	09
Euglossa imperialis		15	06	03	08	08	06			06	02		54
Euglossa liopoda		03	01			01	01						06
Euglossa modestior	01	01	01		02	03				01			09
Euglossa piliventris				04		05				01			10
Euglossa pleosticta	01	70	65	240	59	123	13		01	01	04		577
Euglossa securigera		01			01			01		01	03	02	09
Euglossa sp.1										01			01
Euglossa sp.2		01											01
Euglossa sp.3						01							01
Euglossa sp.4									01				01
Euglossa sp.5										01			01
Euglossa townsendi						02	02				01		05
Euglossa truncata	03	18	29	27	80	38	11	01		02	11	01	221
Euglossa violaceifrons	01	14	07	04		12	11	06	02	04	09	06	76
Euglossa viridis		01											01
Eulaema cingulata	01	05	05	02	01	08			01	06	09	03	41
Eulaema meriana		07	06	16	10	05	04			02	05	04	59
Eulaema mocsaryi			01										01
Eulaema nigrita	02		01		08	09	08	02	04	24	13	01	72
Exaerete frontalis		03		02	06						01	02	14
Exaerete smaragdina	01	06	04		03	05			02	02	05	04	32
TOTAL	23	258	229	376	215	261	112	16	19	85	106	39	1740

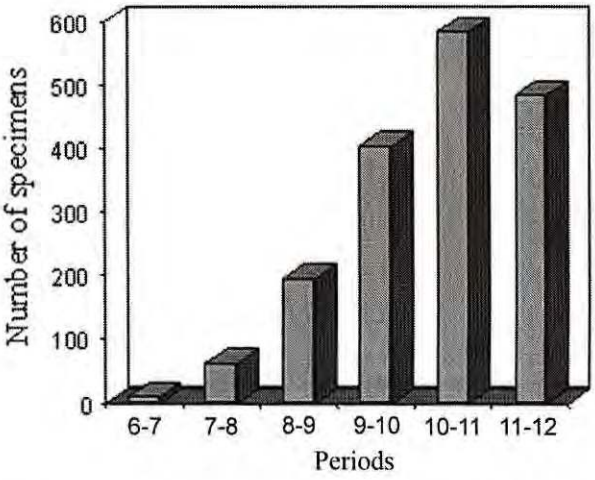

Figure 1. Seasonal fluctuation of euglossine bees collected at scent baits in Buriticupu-MA from October 1995 to September 1996.

ity, the euglossine bees showed increased active between 10.00 and 11.00 hours (33,5% of the individuals and 86,4% of the species) followed by the period between 11.00 and 12.00 hours (27,7% of the individuals and 78,3% of the species) (Tab. 3; Fig. 2). *Eufriesea superba, Eulaema nigrita* and *Eulaema cingulata* occurred in all intervals (from 06.00 to 12.00 hours). The abundance peak of *Eufriesea superba* was between 10.00 and 11.00. *Eulaema nigrita* were more frequent between 09.00 and 10.00, *Eulaema cingulata* between 08.00 and 09.00. *Euglossa chalybeata* and *Eulaema cingulata* between 08.00 and 09.00 and *Eufriesea surinamensis, Eufriesea aff. macroglossa, Euglossa truncata* and *Eulaema nigrita* between 09.00 and 10.00 (Tab. 3).

DISCUSSION

The fauna of euglossine bees found in the RDCV Forest Reserve was more abundant and diversified than that encountered in others surveyed areas in the State of Maranhão. This finding agrees with the stated point that the wet tropical forests indeed hold the areas in which bees reach increased richness (Ducke, 1902; Dressler, 1982). The high number of species sampled in the present work set Buriticupu as one of the wealthiest region in Brazil, in euglossine bees attracted to scent baits, only comparable to the central Amazonian region (Oliveira & Campos, 1995). These authors have found 32 and 36 species at two distinct areas in this region, respectively, using eight kinds of scent compounds. The

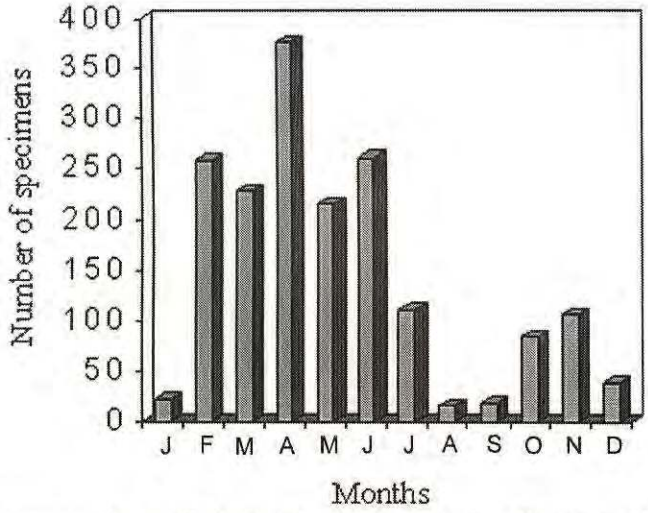

Figure 2. Frequency of euglossine bees collected at scent baits in Buriticupu-MA, in relation to daily activity (from 06.00 A.M. to 12.00 A.M.), from October 1995 to September 1996.

current study although utilizing only 5 scent baits and carried out at the boundaries of an open area in the forest environment, sampled 37 species, of which 15 were not found in the Central Amazonia. These differences may be due to the transitional position occupied by Maranhão among the macro-regions (Amazonian Forest, Cerrado and Caatinga) which characterize Brazil, since the fauna encountered in Buriticupu, although dominant by Amazonian species, also possesses common elements from the northeast and central-south Brazil fauna, as already observed by Rebêlo & Cabral (1997).

Among bees, *Euglossa* is the most diversified genus holding a large variety of species spread all over the Neotropics. This variety was present in Buriticupu where *Euglossa* was represented by several species occurring all year round. *Euglossa pleosticta* was the most abundant species and has previously been found only in south-southeast Brazil (south Bahia down to northeast São Paulo, Rio de Janeiro, Espírito Santo, Minas Gerais). Therefore, this work presents the first data of this species in the north Brazil. *Euglossa violaceifrons* and *Euglossa truncata* also follows this distribution pattern, since they have been described from the semidecidual forest of northeast São Paulo State (Rebêlo & Moure, 1995) with no records, thus far, on these euglossine bees has been found rather than south Brazil. Together with the two latter species is *Euglossa avicula* which former reports comes from north (Oliveira & Campos, 1995) and south Brazil (Dressler, 1982). On this basis, these species show a discontinuous distribution pattern since they have not been encountered in the areas situated in northeastern areas of Brazil such as Bahia and Paraíba, where inventories have al-

Table 3. Frequency of Euglossinae males collected at scent baits in Buriticupu-MA, in relation to daily actvity (from 06.00 A.M. to 12.00 A.M.), from October 1995 to September 1996.

EUGLOSSINAE	06-07	07-08	08-09	09-10	10-11	11-12	TOTAL
Eufriesea aff. *macroglossa*		01	02	07	04	01	15
Eufriesea eburneocincta					01	02	03
Eufriesea elegans					02		02
Eufriesea nigrescens		01	01	04	03		09
Eufriesea ornata			02	03	04	02	11
Eufriesea pulchra			01	02	07	06	16
Eufriesea superba	01	02	05	22	33	28	91
Eufriesea surinamensis			03	04	01		08
Euglossa augaspis		03	05	06	16	20	50
Euglossa avicula		02	07	11	46	43	109
Euglossa bidentata						04	04
Euglossa chalybeata		11	13	05	05	04	38
Euglossa cognata		01	01	02	16	09	29
Euglossa cordata			04	14	29	23	70
Euglossa fimbriata			04	27	29	24	84
Euglossa gaianii			01		04	04	09
Euglossa imperialis		01	04	09	14	26	54
Euglossa liopoda					05	01	06
Euglossa modestior				04	04	01	09
Euglossa piliventris		01			02	07	10
Euglossa pleosticta		27	71	146	213	140	577
Euglossa securigera			03		04	02	09
Euglossa sp.1					01		01
Euglossa sp.2		01					01
Euglossa sp.3					01		01
Euglossa sp.4						01	01
Euglossa sp.5					01		01
Euglossa townsendi					03	02	05
Euglossa truncata		01	25	73	65	57	221
Euglossa violaceifrons		01	05	12	27	31	76
Euglossa viridis						01	01
Eulaema cingulata	01	06	13	11	06	04	41
Eulaema meriana	04	09	08	07	15	16	59
Eulaema mocsaryi			01				01
Eulaema nigrita	03	16	11	21	10	11	72
Exaerete frontalis				02	08	04	14
Exaerete smaragdina			07	10	06	09	32
TOTAL	10	63	194	404	583	483	1740

ready performed, thus restraining their occurrence to south and north Brazil (Buriticupu region in the case of *Euglossa pleosticta* and *Euglossa truncata*). As the four above-mentioned species, *Euglossa augaspis, Euglossa bidentata,* and *Euglossa viridis* are found for the first time in Maranhão State. The three latter bess are Amazonian species without records to sub-amazonian areas in Brazil, which a drier weather is characteristically found, forcing them to have a limited occurrence in the amazon basin. The others species have a large distribution in Brazil.

Attention is given to the occurrence in Buriticupu of *Euglossa* sp. 1, *Euglossa* sp.2, *Euglossa* sp.3, *Euglossa* sp.4 and *Euglossa* sp.5, which apparently represent undescribed species. Interestingly, as the field works are intensified new species and a increasing distribution of the known species may be found. Therefore, a frequent and extensive census work should be done so that the richness and distribution of male euglossine bees can be accurately predicted.

Several *Eufriesea* species have already been found in Maranhão, such as *E. surinamensis, E. pulchra* and *E. ornata*. The former is a panneotropical, occurring in Alcântara, setentrional zone of Maranhão State (Gonçalves *et al.*, 1996). The second occurs in Panama (Ackerman, 1983; Roubik & Ackerman, 1987) and Amazonia (Braga, 1976; Oliveira & Campos, 1995). The latter species has been recorded only in the Amazon Basin (Braga, 1976; Oliveira & Campos, 1995), Atlantic Forest in south Brazil (Kimsey, 1982) and in Barreirinhas, coastal zone of Maranhão State (Rebêlo & Cabral, 1997). The following amazonian species have been recorded for the first time in Maranhão: *E.* aff. *macroglossa, E. eburneocincta, E. elegans, E. nigrescens*. Only *Eufriesea nigrescens* ranges beyond the amazonian domain, going as far as Paraguay.

The others species studied in this paper (Tab. 1) were found in different ecosystems in Maranhão State (see Rebêlo & Cabral, 1997). Curiously, *Eulaema nigrita* was one of the most frequent species sampled in CVRD Forest Reserve, the entrance area to the Amazonian Forest. Thus far, no record regarding this species was registered for this kind of environment, since *Eulaema nigrita* has been characterized as a typical species of open and relatively dry areas (Ducke, 1902; Zucchi *et al.*, 1969), that is why it is not recorded in the census works performed in the central Amazonia using scent baits (Braga, 1976; Powell & Powell, 1987; Becker *et al.*, 1991; Morato *et al.*, 1992; Oliveira & Campos, 1995). However, in the sub-amazonian areas *E. nigrita* is frequently found associated with northeastern dry areas, as well as in the wet forests of São Luís (Gomes, pers. inf.), Bahia (Raw, 1989) and semidecidual forests of São Paulo State (Rebêlo & Garófalo, 1991). The occurrence of *Eulaema nigrita* in the CVRD Forest Reserve is related likely to the fact that Buriticupu stays in a transitional zone

placed between the Cerrado areas and the Amazonian Forest. The remaining species of the genus *Eulaema* sampled in this survey, such as *E. meriana, E. mocsaryi* and *E. cingulata,* are common in south America. *Eulaema meriana* belongs to a mimetic complex encountered in the Amazon basin, in such a group are included *E. bombiformis* and *E. seabrai*, not studied in this paper. *Eulaema meriana* occurs in the Amazonian region and in the coastal forests from Pernambuco down to Paraná, Brazil, but completely absent in the northeastern drought area named "sertão nordestino".

Regarding the *Exaerete* species, *E. smaragdina* and females of *E. dentata* have been found in Barreirinhas-MA (Rebêlo & Cabral, 1997). The former are common in the north State. *E. frontalis,* as well as the others *Exaerete* are pan-neotropical species.

Cineole was the most visited scent bait at the CVRD Forest Reserve, corroborating the numerous works carried out with this chemical compound in Maranhão State and in several regions of Brazil (Raw, 1989; Rebêlo & Garófalo, 1991; Morato *et al.*, 1992). Vanillin also attracted a large number of individuals being the second most visited bait by euglossine species. The others utilized compounds were less attractive.

The highest abundance of euglossine bees was detected during the rainy season. The occurrence of bees in a given season is influenced by either nesting and emerging periods which in turn are influenced by temperature and moisture (Ackerman, 1983; 1989).

The species of *Eufriesea* exhibited a rigorous seasonal distribution appearing either in the wet season or in the dry season, depending on the involved species, according to the observations of others researchers in distinct areas of the Neotropics (Pearson & Dressler, 1985; Roubik & Ackerman, 1987; Wittman *et al.*, 1988; Rebêlo & Garófalo, 1991, 1997). *Eufriesea pulchra* was more frequent in the wet season with a sole individual in the dry period. Ackerman (1983) also verified the presence of this species in similar seasonal periods.

In August, the driest month of the study year, a low humidity, high temperature weather was detected and a low number of individuals and species visited the scent baits within this month. The captured species in this period were as follow: *Euglossa cordata, Euglossa fimbriata, Euglossa securigera, Euglossa truncata, Euglossa violaceifrons* and *Eulaema nigrita.* Such species visited the baits during all the year exhibiting a fluctuation only in the abundance of individuals.

In conclusion, the Buriticupu region is represented by a diversified and overlaid euglossine bees fauna which is formed by species commonly found either in the Amazonian basin and in distinct ecological Brazilian areas.

AKNOWLEDGEMENTS

We acknowledge the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and the Companhia Vale do Rio Doce-

CVRD for supporting this research.

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Aceito para publicação em 17/11/1999