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ON THE OCCURENCE OF GIANT MALES IN NANNOTRIGONA (SCAPTOTRIGONA) POSTICA LATREILLE (HYMENOPTERA, APIDAE, MELIPONINAE)

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RESUMO - Machos normais e gigantes de *Nannotrigona (Scapto - trigona) postica* Latr. foram analisados, através de caracteres morfológicos e morfométricos. Os resultados demonstram que não há diferenças entre os mesmos, exceto em tamanho. A produção de machos gigantes nesta espécie é um fato raro, comparado com outras espécies de Meliponinae.

ABSTRACT - Morphological and morphometric characters of normal and giants males of *Nannotrigona (Scaptotrigona) postica* Latr. were analyzed. The results show that there are no differences between them, except in size. The production of giant males in this species is a rare event compared with other Meliponinae.

INTRODUCTION

Queens in most Trigonini species are produced when larvae are fed more larval food than workers (Camargo,1972) In Meliponini (*Melipona*) the system of caste determination is a result of an interaction of larval food and genetics (Kerr, 1950, 1966; Kerr & Nielson, 1966; Kerr, Akahira & Camargo, 1975)

Nevertheless, other mechanisms which control the male and queen production by normal colonies are still not understood (suitable conditions of the colonies, ethological factors, and so on)

This paper is a by-product of our studies on social regulation in *Nannotrigona (Scaptotrigona) postica*. In the course of our research we noticed the presence of giant males in normal and orphan colonies.

The aim is to report this fact based on morphometric and morphological characters, considering that this will be important for later studies on the biology of stingless bees.

MATERIAL AND METHODS

Several colonies of *N. (S.) postica* were used for experiments related to production of giant males "in vitro"

The methodology used is reported by Camargo (1972)

Other two colonies (normal and orphan) were kept in observation hives (Sakagami & Zucchi, 1963; Sakagami, 1966)

The morphometric characters were evalueted by some usual measures in Meliponinae bees: Eye length, maximal interorbital distance, Lower interorbital distance, Maximum head width, Mesoscutum length and width, length of fore wing - partial - (distance between M-Cu bifurcation and basal tip of marginal cell), hind tibia length.

The measurements of genitalia are shown in Fig. 2 which are: genitalia width (total - a - and partial - b -), maximal length of gonocoxite - c -, lower length of gonocoxite - d -, gonostylus length (partial) - e -, maximal valve width - f -.

From the mean of the measurements ($\bar{x}$) taken from sampled specimens (N), the standart deviation (SD), the range of variation (RV), and the coefficient of variation (CV), were calculated, and are given in Table 1.

RESULTS

Table 1 and Figs. 1 and 2 show the comparisons of normal and giant males, stressing only the difference in their sizes. There are no distinctions in their external and internal morphology.

Over two years of intensive observations inside normal colonies and at nest entrances it was possible to detect only one giant male. Another case was found in the course of experiments on social regulation made in an orphan colony.

After a long time of orphanage the workers built royal cells and laid eggs inside them. The usual behaviour of workers in such circunstance is to destroy the brood cell, and start a new one. So, to avoid this the royal cell was removed from the colony to an incubator at 28ºC, until emergence of the giant male.

DISCUSSION

Based upon the experiences acquired on behaviour of *N. (S.) postica* along many years, it was possible to verify that the occurence of giant males in this species is a extremely rare event, compared with some species of Meliponinae.

The production of giant males in stingless bees was first reported by Nogueira-Neto (1951) Juliani (1967) showed that colonies of *Plebeia julianii* were able to produce them. Imperatriz (1970) also observed the emergence of giant

Table 1 - Differences of gross body size and some structures of genitalia between normal (N) and giant (G) males of *N. (S.) postica* (in ocular dividions)

Characters	$\bar{X}$		S D		R V		C V		N	
	N	G	N	G	N	G	N	G	N	G
Eye lenght	40.84	44.30	0.55	0.95	40-42	43-46	1.35	2.14	25	10
Maximum interorbital distance	38.20	41.60	0.71	1.35	37-39	38-43	1.86	3.24	25	10
Lower interorbital distance	27.96	30.00	0.54	0.47	27-29	29-31	1.93	1.57	25	10
Maximum head width	62.52	68.50	0.51	1.18	62-63	66-70	0.81	1.72	25	10
Mesoscutum length	46.16	51.00	0.69	1.76	45-80	48-53	1.49	3.45	25	10
Mesoscutum width	51.24	57.30	1.09	1.42	50-53	55-59	2.12	2.47	25	10
Length of fore wing (partial)	35.32	38.29	0.56	2.14	34-36	35-41	1.58	5.59	25	7
Hind tibia length	38.56	41.80	0.92	2.20	37-40	39-45	2.38	5.26	25	10
Genitalia width	46.40	46.50	1.38	2.33	44-49	43-50	2.97	5.01	25	8
Genitalia width (partial)	35.44	35.13	1.53	1.81	33-39	33-38	4.32	5.15	25	8
Maximum length of gonocoxite	12.44	14.75	1.04	0.89	10-15	13-16	8.36	6.03	25	8
Ventral length of gonocoxite	5.76	7.00	0 78	1.41	4-7	5-9	13.54	20.14	25	8
Gonostylus length (partial)	46.68	50.88	1.31	1.25	45-49	50-53	2.81	2.46	25	8
Maximal valve width	11.12	10.25	1.05	0.46	10-15	10-11	9.44	4.48	25	8

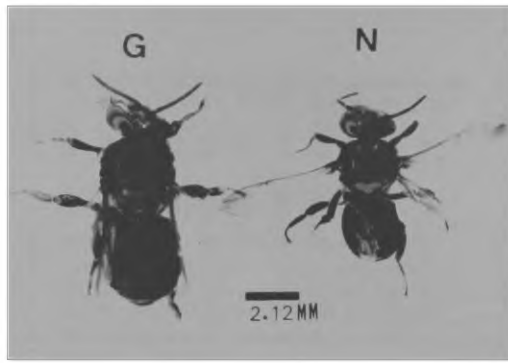

Figure 1 - General morphology of normal (N) and giant(G) males of *N. (S.) postica*.

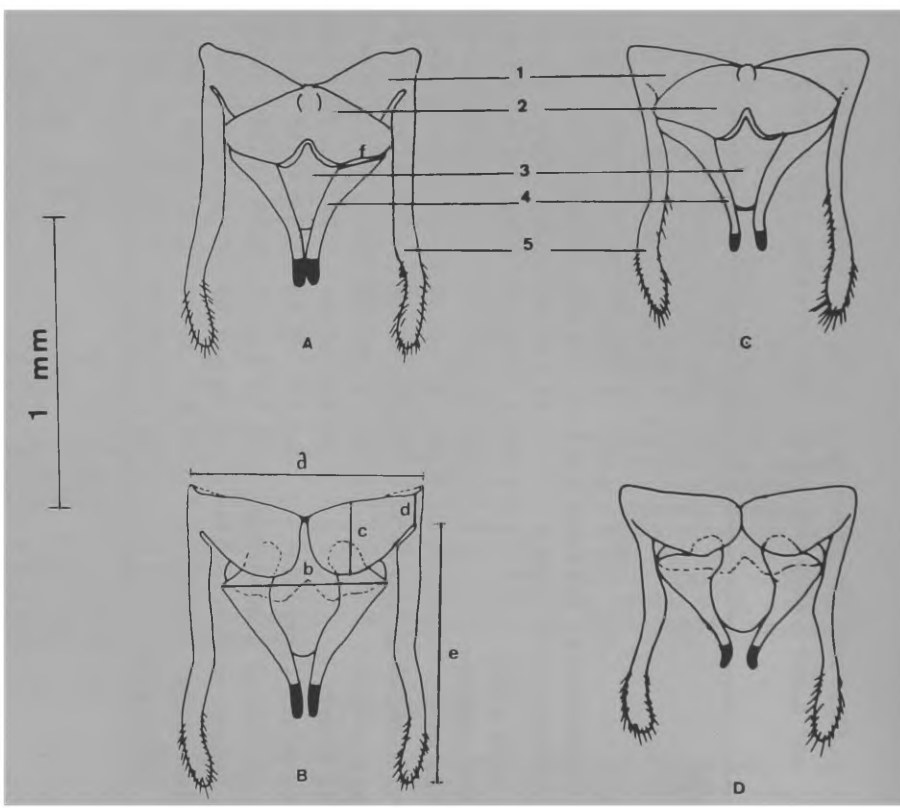

Figure 2 - Genitalia of giant (A,B) and normal (C,D) males of *N. (S.) postica*. (Dorsal and Ventral view) 1 - gonocoxites; 2 - spatha; 3 - penis; 4 - valve; 5 - gonostylus. a,b, c,d,e,f = measures used

males from atypical brood cells in orphan colonies of *Plebeia (Friesella) schrottkyi* and royal cells in *Paratrigona subnuda.*

In colonies of *Geotrigona* (Zucchi, personal informa - tion), *Nannotrigona (N.) testaceicornis* (Silva, 1973) and *Plebeia remota, Plebeia emerina* and *Plebeia droryana,* giant males are frequently produced (Imperatriz-Fonseca, 1976).

Camillo (1971) evidenced the usual presence of giant males in normal colonies of *Plebeia (Friesella) schrottkyi* They appear in high frequencies when high densities of nor - mal males also occur.

Imperatriz Fonseca (1976) expressed the possibility that giant males have an important biologycal role in the co lonies, since they can avoid a high production of queens which damage the colonies. Otherwise, Zucchi (personal infor mation) has suggested that giant males are produced as a re- sult of normal males' production. The workers would not be able to distinguish royal from normal cells. As a consequen- ce, giant males would take the place of queens. According to the same author, giant males would not have an important ro- le in colonies of stingless bees.

Bego (1977) observed that in *N. (S.) postica,* in spi- te of colonies always producing royal cells along the year the number of royal cells increases at the same period as that of male production, probably as a result of high popula tional density. The maximal number of royal and normal cells found were respectively 5 and 6570.

It is possible that in *N. (S.) postica* giant males are rare, because of a low probability of workers laying eggs inside royal cells; thus they probably do not have any special role in the colony, being produced as an accidental event.

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