COMUNICAÇÃO CIENTÍFICA

ABSCONDING IN THE BRAZILIAN STINGLESS BEE *Frieseomelitta silvestrii languida* MOURE (HYMENOPTERA: APIDAE: MELIPONINAE)

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RESUMO

Enxameagem de Abandono na Abelha Brasileira Sem Ferrão *Frieseomelitta silvestrii languida* Moure (Hymenoptera: Apidae: Meliponinae)

Existem poucos registros de "enxameagem de abandono" em Meliponinae. Dois casos foram observados em ninhos de *Frieseomelitta silvestrii languida* Moure, mantidos em laboratório em 1986 e 1987. Operárias de uma colônia enxamearam para outra da mesma espécie tendo sido aceitas. Entrentanto, as rainhas não foram vistas nas colônias receptoras. Embora, em um dos casos, o abdômen da rainha diminuiu de tamanho, não se sabe se esta foi capaz de reàlizar vôo.

PALAVRAS-CHAVE: Insecta, etologia, comportamento, abelhas, enxame, Apoidea.

In tropical areas it is common for a whole colony of *Apis* to abandon the nest. This special kind of "swarming" is called absconding (Michener 1974) and it seems to be induced by disturbance provoked by predators, parasites or manipulation by beekeepers, or even by lack of food resources and climatic alterations such as unfavourable periods of rain or high temperatures (Inoue *et al.* 1984). Therefore, the purpose of the swarming is not to multiply the colony, but to search for better conditions. This phenomenon in Meliponinae was first recorded by Portugal-Araújo (1963): all the workers left from a colony of *Meliplebeia tanganyikae medionigra* Cockerell, when they were forced to live in an artificial nest. But the queen remained in the original nest. Sakagami *et al.* (referred in Inoue *et al.* 1984) reported a similar event for *Trigona (Tetrigona) apicalis* Smith. Inoue *et al.* (1984) observed a case of successful absconding in *Trigona (Tetragonula) laeviceps* Smith. The present paper describes two cases of absconding in the Brazilian native bee, *Frieseomelitta silvestrii languida* Moure.

Fourteen colonies of *F. languida*, originally from Montes Claros (Minas Gerais, Brazil), were kept in observation hives (Sakagami 1966), with controlled temperature (30 - 31°C), at the Bee Laboratory of the General Ecology Department, Biosciences Institute, University of

Recebido em 31/05/93.

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São Paulo, in São Paulo, SP. They were observed from August, 1985 to January, 1989. Four of these colonies were involved in the absconding events.

First Case. In early May 1986, when the cold season was approaching and the temperature was around 15°C, cell construction and oviposition in colony one decreased and eventually stopped. This species is very sensitive to low temperatures and goes through an inactive period during the winter in São Paulo, as do some stingless bees of the genus *Plebeia* (Nogueira Neto 1970, Imperatriz-Fonseca & Oliveira 1976). On the 22nd of that month, several bees remained aggregated and motionless for hours in the plastic tube which serves as a passage to the outside of the laboratory. This behaviour lasted for several days. On June 9th most of the workers from the colony were in the tube and the queen was very agitated. Since June 4th the size of her abdomen had been getting gradually smaller and reached its maximum reduction just before the "absconding", which occurred between 10th and 12th June. On June 13th there were many more workers than normal in colony two and the hive previously occupied by colony one was almost empty.

Colony two had been without a fertilized queen for approximately three months. Therefore, it contained only a few workers all of them old, i.e., with very small and pigmented abdomens. However, by June 13th number of individuals had increased and most of them were young workers, with fairly large abdomens. Both colonies were only one meter apart, suggesting the bees simply moved from colony one to colony two. The queen of colony one was not seen again; the queen may have succumbed to predators. Before May 22nd the queen of colony one did not have worm wings and was laying eggs normally, which are generally indications of a good flying ability and physiological condition. However, it is possible that she was not able to fly, for other reasons. An alternative explanation is that she was not able to enter colony two. She presented a reduced abdomen, but it might not have been small enough to pass through the little hole (2 mm diameter) which forms the nest entrance in the genus *Frieseomelitta* (Sakagami 1982) and permits the passage of only one worker at a time. Therefore, in this case, it seems that the entrance hole was not enlarged. In the case of swarming colonies of *Frieseomelitta varia* (Lepeletier), the entrance holes are enlarged to facilitate the passage of the young queen (Terada 1974).

The reason for this absconding could not have been a lack of food, because colony one had an even larger number of pollen pots than colony two. It might have been caused by the excessive manipulation; on three occasions (twice in April and one in May), the colony was disturbed by the investigator, who rearranged the internal structures of the hive, introducing resin (which is a very important building material for this species) and food (pollen pots and sugar water solution). This disturbance could have provoked the subsequent abandonment of the nest.

Second Case. In 1987, on January 13th workers from one colony (6) moved to another (4). This was easily verified because before the absconding the conditions in the two colonies were different. Since January 5th there had been an unfertilized queen in colony 6, and a large number of young workers. Colony 4 was queenless, with only a few smaller, darker and older workers. But on January 13th colony 4 contained many bees with the characteristics of those from colony 6 and the latter colony was almost empty. The virgin queen was not seen in either of the nests. It was not possible to tell whether she had tried to make the nuptial flight and/or to move to the other hive. The behaviour described before (bees aggregated along the plastic tube) did not occur in this case. It is possible that this "preparation" behaviour is not essential for the

absconding, or still it is related to he environmental conditions (in the first case is was winter and in the other summer). Therefore, in the previous event the bees had to wait untill was possible to go out of the nest. The amount of food stored in each hive was about the same. Manipulation was probably the reason for the first case of absconding described. But it was certainly not the reason for the second one. Lack of food was not the explanation either. There is a possibility that laboratory conditions or climatic change (since the bees were forced to live in a region where they do not normally occur, induced absconding). However, if this is true, one would expect absconding to occur more frequently. Probably, there is an intrinsic reason, which makes abandonment of the nest not so uncommon as was thought. In the natural habitat of this species, which is mainly Cerrado (kind of savannah in Central Brazil), group of flying bees are often observed (F.A. Silva, personal communication). It is possible that some of these movements are "abscondings" and not normal swarmings. However, so far insufficient data are available and more research is necessary. One further point remains unclear: why are workers from one colony accepted by another, without any aggression? The general internal conditions of the colonies might play a role in this. For example, weak, stressed or queenless colonies would have a very low level of aggressiveness, offering no resistance to workers from other nests. Another remarkable fact is that in another group of Meliponinae the queen reduces the size of her abdomen under special conditions.

ACKNOWLEDGMENT

Special thanks are due to Dr. Vera L. Imperatriz-Fonseca, who encouraged our study and to Dr. Ronaldo Zucchi and Dr. Tamiji Inoue who read and commented on the manuscript. We are also grateful to Sheila McNab for the linguistic advice, and FAPESP, CAPES, ADEMA for financial support.

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