



## SHORT NOTE

### Resource Storage in the Neotropical Social Wasp *Mischocyttarus socialis* (Saussure, 1854) (Vespidae: Polistini)

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Food provisioning in social Hymenoptera colonies is described for honeybees, taking place in honeycombs (Seeley, 1989), and for many groups of ants who can store large quantities of vegetal material inside their nests (Taber, 1999). Social wasps (Vespidae: Polistinae) may also present food storage behaviors, although there are few reports and studies approaching this phenomenon for the group, especially when considering its diversity (Richards & Richards, 1951; Machado et al., 1977; Gobbi et al., 1984; Prezoto & Gobbi, 2003; Guimarães et al., 2008; Michleutti et al., 2017).

The wasps may store liquid resources, such as sugary substances (often called “wasp honey” or just “honey”) (García, 1978; Strassman, 1979; Guimarães et al., 2008) or solid prey fragments (Prezoto et al., 2005; Rocha, 2011; Michleutti et al., 2017), which are deposited inside cells in their nest; both types of resources may occasionally be stored together in

#### Abstract

Like other Hymenoptera, the social wasps may store both liquid and solid resources inside the cells of their nests as reserve for periods of food shortage. This study describes storage of honey in colonies of the neotropical independent-founding wasp *Mischocyttarus socialis*. During August 2016, in the dry season, 15 colonies in the post-emergence phase were recorded at the botanical garden of Universidade Federal de Juiz de Fora in southwestern of Brazil. Five of the colonies showed honey stored inside empty and immature (eggs) cells. The presence of these two patterns for this species suggests that the storage behavior may be a short-term strategy to feed larvae as soon as they emerge and also a long-term storage to complement population diet during food shortages.

the same cell. Resource storage in social wasps is seen as a reflex of the group’s opportunistic foraging habit in response to sporadically abundant food sources (Richards & Richards, 1951); stored food is an important complement to the colony’s diet, especially during dry seasons, when resources are usually scarce (Hunt et al., 1987).

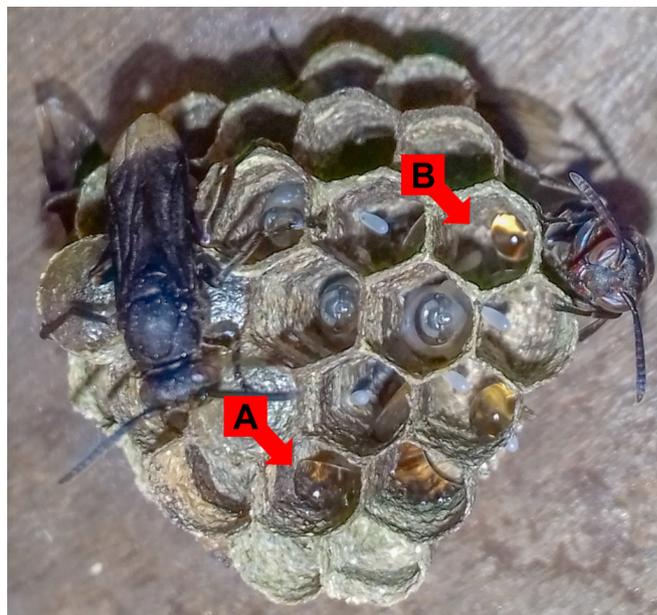
*Mischocyttarus socialis* (Saussure, 1854) is an independent-founding social wasp species whose nests consist of an exposed comb, attached to the surface through a peduncle (Jeanne, 1975). Despite the species’ reported presence in various diversity studies (Barbosa et al., 2016), there is almost no data on its behavior or basic biology, and it is unknown whether the species presents food storing behaviors such as other *Mischocyttarus* species (Guimarães et al., 2008). Aiming to fulfill this lack of information, our objective in this study was to report the storage of honey in *M. socialis* colonies.



The observations took place during August of 2016, in the dry season, at the botanical garden of Universidade Federal de Juiz de Fora in the municipality of Juiz de Fora, Minas Gerais state (21 ° 43'28 "S - 43 ° 16'47" W - 800m asl), southwestern of Brazil. The area's climate is classified as Cwa according to Köppen (Sá-Júnior et al., 2012) and its 84 hectares extension has a floristic heterogeneity, with presence of endangered species and a predominance of pioneer plant species. There is also a considerable presence of exotic plant species, making up a novel ecosystem (Santiago et al., 2014; Maciel & Barbosa, 2015).

We recorded 15 *M. socialis* colonies in post-emergence phase, from which five showed honey storage in the form of droplets deposited inside the nests' cells. We observed the two storage patterns described for *Mischocyttarus cassununga* (von Ihering) (Guimarães et al., 2008): honey was found both inside empty cells and in immature (eggs) cells (Fig 1; Table 1). We didn't find any storage in larvae cells, contrary to the observations gathered from other independent-founding species such as *Polistes simillimus* Zikan, 1951 and *M. cassununga* (Prezoto & Gobbi, 2003; Guimarães et al., 2008). The presence of both patterns for this species suggests that the storage behavior can be used for more than one end, since storing honey in immature cells is explained as a short-term strategy to feed larvae as soon as they emerge (Jeanne, 1972), while honey in empty cells suggests a long-term storage to complement population diet during food shortages (Strassman, 1979; Hunt et al., 1987).

Surveys carried out from February 2011 to February 2014, recorded 55 colonies in that area, but we did not observe resource storage in these nests. This period represents the transition from pre-implementation of the botanical garden, which by then meant a much smaller impact on the local vegetation due to anthropic disturbance, such as the traffic of people and vehicles. On the other hand, the botanical garden was at the final constructions stage in 2016, which was when resource storage was observed in *M. socialis* nests. These observations suggest that storing resources may not only be a response to the climatic season (Hunt et al., 1987), but also to a resource shortage related to vegetal loss caused by a long-term disturbance process, granting the colony's survival during harsh periods.



**Fig 1.** Honey storage inside the cells of a *Mischocyttarus socialis* nest in post-emergence phase: (A) storage in empty cells and (B) storage in egg cells.

Recording the storage behavior for *M. socialis* increases the number of species known to show this behavior and may reveal important information on its ecology, as well as for the whole genus. It may also help understanding how these groups react to different environmental pressure events such as food shortage in harsh periods given the asynchrony of the neotropical social wasps' colonial cycle.

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**Table 1.** Composition of the five colonies of *Mischocyttarus socialis* found with storage of honey at the botanical garden of Universidade Federal de Juiz de Fora and the percentage of cells used for the storage.

Colony	Total number of cells	Number of adults	Number of empty cells with storage	Number of egg cells with storage	Number of larvae/pupae cells with storage	Percentage of cells with storage
1	26	6	1	1	2	7.7
2	24	5	4	5	9	37.5
3	82	9	2	6	8	9.7
4	39	6	1	3	4	10.2
5	16	2	2	0	2	12.5
<b>Total</b>	<b>187</b>	<b>28</b>	<b>10</b>	<b>15</b>	<b>25</b>	<b>13.5</b>

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