

## Scientific Note

**Nesting of jumping spiders (Araneae, Salticidae) inside abandoned wasps nests (Hymenoptera, Aculeata)****Diego Pitta de Araujo<sup>1,2</sup> & Mário De Maria<sup>3</sup>**<sup>1</sup> *Laboratório de Ecologia e Comportamento de Insetos, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais. E-mail: gasteracantha2@yahoo.com.br*<sup>2</sup> *Programa de Pós-Graduação em Ecologia Conservação e Manejo da Vida Silvestre, Universidade Federal de Minas Gerais*<sup>3</sup> *Laboratório de Aracnologia, Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais. E-mail: demaria@icb.ufmg.br*

**Abstract.** Synantropic jumping spiders, *Menemerus bivittatus* Dufour 1831, *Hasarius adansoni* Audouin, 1826, and *Corythalia* sp. occupied abandoned nests of aculeate wasps and built their silken nests inside the structures (cells and space between cells and nest walls) provided by wasps at the campus of the Universidade Federal de Minas Gerais, Minas Gerais, Brazil.

**Key words:** Salticidae, Crabronidae, Vespidae, wasps nests, microhabitat.

**Resumo:** Nidificação de aranhas saltadoras (Araneae, Salticidae) no interior de ninhos de vespas abandonados (Hymenoptera, Aculeata). Aranhas saltadoras sinantrópicas *Menemerus bivittatus* Dufour 1831, *Hasarius adansoni* Audouin, 1826, e *Corythalia* sp. ocuparam ninhos abandonados de vespas aculeata e construíram seus ninhos de teia dentro dessas estruturas (células, espaço entre células e paredes do ninho) fornecidas por vespas no campus da Universidade Federal de Minas Gerais, Minas Gerais, Brasil.

**Palavras-chave:** Salticidae, Crabronidae, Vespidae, ninhos de vespa, microhabitat.

Salticidae is the most diverse and speciose spider family, with more than 5000 described species (PLATNICK, 2006). Members of this family are diurnal predators that hunt their prey by using several visually guided tactics (BARTOS, 2000; BEAR & HASSON, 1997; JACKSON, 2002, JACKSON & CARTER 2001).

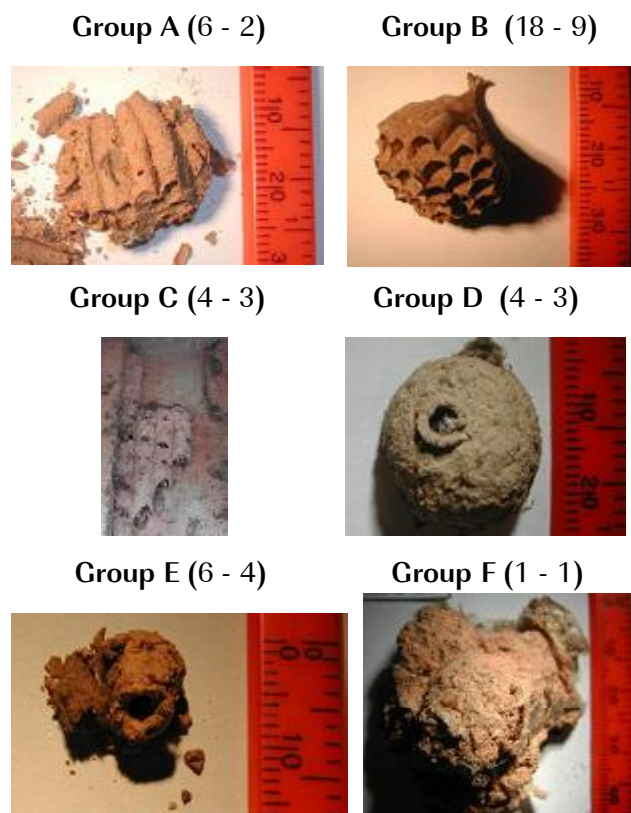
In the end of daylight these spiders rest, normally inside of silken nests constructed by themselves, which are also used to molting, mating and oviposition (JACKSON, 1979). Jumping spiders use several structures found in their microhabitats to construct their nests, usually rocks and wood furrows, under tree barks, leaves and flowers of several plants species (JACKSON, 1979; LIM & LI, 2004; REISKIND, 1986).

Here we report for the first time the use of abandoned wasp nests by jumping spiders to construct their nests.

During a natural history study of a synantropic jumping spider, *Menemerus bivittatus* Dufour, 1831, 39 nests of aculeate wasps were collected at the Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Minas Gerais state, Brazil, from June to October of 2005 .

Vespidae (n = 18) and Crabronidae (n = 21) abandoned nests were collected. Nine Vespidae and 13 Crabronidae nests were observed been occupied by jumping spiders or had vestiges of their presence. Jumping spiders were inside nests opened cells or on the external walls of the nest.

Wasp nests were grouped according their shape (Fig. 1) and some of them also contained dead wasps. A total of 29 dead wasps were found inside 7 nests. From these, 19 were inside closed cells, 1 inside a nest of an unidentified spider and the remaining were inside opened cells or on the external walls of the nest.



**Figure 1.** Types of wasp nests collected at the campus Pampulha of the Federal University of Minas Gerais. Numbers in parenthesis indicate total number of wasps nests collected and number of nests occupied by jumping spiders, respectively.

The jumping spiders encountered using wasps nests were *M. bivittatus*, *H. adansoni* and *Corythalia sp.* We also encountered several vestiges of the presence of other jumping spiders that couldn't be identified. These included molting remains, nests and egg sacs, and dead spiders (Table 1).

Salticidae empty nests could be identified because of their tube shape and lip-like entrance (Fig. 2), which is very common to several jumping spiders (JACKSON, 1978; 1982; LI *et al.*, 2002; LIM & LI, 2004; RIENKS, 2000) and was also the kind of nest built by the jumping spiders observed on the UFMG campus (Senior author observations).

Egg sacs were attributed to jumping spiders only when the presence of the spider or remains of their carapace were found associated to it.

Voucher specimens were deposited in Coleção de Crustáceos e Aracnídeos of Laboratório de

**Table 1:** Wasps nests occupied and number of individuals, activities or vestiges made by jumping spiders found in each nest type. Numbers in parenthesis indicate total number of wasps' nests collected and number of nests occupied by jumping spiders, respectively. A, B, C, D, E, F refers to wasp nest groups from figure 1.

Nest Group/ Contents	A (6 - 2)	B (18 - 9)	C (4 - 3)	D (4 - 3)	E (6 - 4)	F (1 - 1)	Total
<b>Salticidae</b>							
<b>Spp unidentified.</b>							
Dead	0	-	-	-	1	-	1
Preyed	-	-	4	-	1	-	5
Molting remains	1	-	-	-	2	-	3
Empty Nests	-	16	-	-	-	-	16
Nests with	-	20	3	2	1	1	27
<b>Molting remains</b>							
Egg Sacs	-	-	-	-	-	1	1
<b><i>M. bivittatus</i></b>							
Dead	-	1	-	-	-	-	1
Molting remains	2	3	-	-	-	-	5
Nests with	-	3	2	2	-	-	7
<b>Molting remains</b>							
Egg Sacs	-	-	-	-	-	1	1
<b><i>H. adansoni</i></b>							
Living	-	-	-	-	-	1	1
<b><i>Corythalia sp</i></b>							
Living	-	-	-	1	-	-	1



**Figure 2.** A nest of a jumping spider within a vespidae wasp cell. The lip-like entrance of the spider nest is indicated by arrow.

Aracnologia (M. De Maria) and Coleção de Insetos of Laboratório de Ecologia e Comportamento de Insetos (R. P. Martins), Universidade Federal de Minas Gerais, Belo Horizonte, Brazil.

One reason for jumping spiders being using wasps nests is that paper nests and mud nests evolved in such a fashion that they provide protection against several wasps predators and parasites (O'DONNELL & JEANNE, 2002; SMITH *et al*, 2001; O'NEILL,

2001; WENZEL, 1991). If the nest is naturally avoided by a generalist predator, so jumping spiders can gain protection by using a wasp nest.

Nevertheless, our data suggest that jumping spiders are using abandoned wasps nests in the same way they use other structures of their habitat so the nests can also being used just as another structure in their habitats.

Additional studies are needed to assess the defensive function of nests for spiders and the microhabitat preferences by these spiders, not only comparing wasps nests and other structures used by jumping spiders, but also by comparing different kinds of wasps nests to their distribution.

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#### REFERENCES

- BARTOS, M. 2000. Distance of approach the prey is adjusted to the prey's ability to escape in *Yllenus arenarius* Menge (Araneae, Salticidae). **European Arachnology** 33-38.
- BEAR, A. & HASSON, O. 1997. The predatory response of a stalking spider, *Plexippus paykulli*, to camouflage and prey type. **Animal Behaviour** 54: 993-998.
- JACKSON, R.R. 1978. The life history of *Phidippus johnsoni* (Araneae: Salticidae). **The Journal of Arachnology** 6: 1-29.
- JACKSON, R.R. 1982. The biology of ant-like jumping spiders: intraspecific interactions of *Myrmarachne lupata* (Araneae, Salticidae). **Zoological Journal of the Linnean Society** 726: 293-319.
- JACKSON, R. R. 2002. Trial-and-error derivation of aggressive-mimicry signals by *Brettus* and *Cyrtba*, sparteinae jumping spiders (Araneae: Salticidae) from Israel, Kenya and Sri Lanka. **New Zealand Journal of Zoology** 29: 95-117.
- JACKSON, R.R. & CARTER, C.M. 2001. Geographic variation in reliance on trial-and-error signal derivation by *Portia labiata*, an araneophagic jumping spider from the Philippines. **Journal of Insect Behavior** 14: 799-827.
- LI, D.; YIP, S.H. & SEAH, W.K. 2002. Rivet-like nest-building and agonistic behaviour of *Thiania bhamoensis*, an iridescent jumping spider (Araneae: Salticidae) from Singapore. **Raffles Bulletin of Zoology** 50: 143-151.
- LIM, M.L.M. & LI, D. 2004. Courtship and male-male agonistic behaviour of *Cosmophasis umbratica* Simon, an ornate jumping spider (Araneae: Salticidae) from Singapore. **The Raffles Bulletin of Zoology** 52(2): 435-448.
- O'DONNELL, S. & JEANNE, R.L. 2002. The nest as fortress: defensive behavior of *Ploybia emaciate*, a mud-nesting eusocial wasp. **Journal of Insect Science** 2(3): 1-5. Online at: < <http://www.insectscience.org/2.3/>>. Access in: 11 out 2007
- O'NEILL, K.M. 2001. **Solitary wasps: behavior and natural history**. Cornell University Press. 406p.
- PLATNICK, N. I. 2006. The world spider catalog, version 7.0. American Museum of Natural History, online at: <<http://research.amnh.org/entomology/spiders/catalog/index.html>>. Access in: 10 out. 2006.
- REISKIND, J. 1986. *Uluella formosa*, a salticid architect in the Neotropics. **Proceedings of the 9<sup>th</sup> International Congresso of Arachnology**. pp 229-231.
- RIENKS, J.H. 2000. Extended nest residence and cannibalism in a jumping spider (Araneae, Salticidae). **The Journal of Arachnology** 28: 123-127.
- SMITH, A.R.; O'DONNELL, S. & JEANNE, R.L. 2001. Correlated evolution of colony defense and social structure: a comparative analysis in eusocial wasps (Hymenoptera: Vespidae). **Evolutionary Ecology Research** 3: 331-344.
- WENZEL, J. W. 1991. Evolution of Nest Architecture, pp 480-519. In: ROSS, K.G. & MATTHEWS, R.W. (eds). **The social biology of wasps**. Cornell University Press. 678p.

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