Notes on the nesting and prey capture habits of *Corythalia conferta* (Araneae: Salticidae) in urban area

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Abstract

This study adds data on nesting habits and confirms the tendency of myrmecophagy of the newly described Salticidae spider species, *Corythalia conferta*. One spider was observed living inside a pot built by the wasp *Zeta argillacea* (Hymenoptera: Vespidae: Eumeninae). Another used one of the chambers of a tubular clay nest ("organ tube"), of a *Trypoxylon* sp. wasp (Hymenoptera: Crabronidae). It can also take shelter in any available cavity.

Keywords: Salticidae, *Zeta argillacea*, *Trypoxylon* sp., Hymenoptera.

Resumo

Este estudo acrescenta dados referentes aos hábitos de nidificação e confirma a tendência de mirmecofagia da espécie de aranha Salticidae recém descrita, *Corythalia conferta*. Uma aranha foi observada vivendo no interior de um pote construído pela vespa *Zeta argillacea* (Hymenoptera: Vespidae: Eumeninae). Uma outra utilizou uma câmara de um ninho tubular ("tubo de órgão") da vespa *Trypoxylon* sp. (Hymenoptera: Crabronidae). Ela também pode se abrigar em qualquer cavidade disponível.

Palavras-chave: Salticidae, *Zeta argillacea*, *Trypoxylon* sp., Himenópteros.

Resumen

Este estudio agrega datos sobre los hábitos de anidación y confirma la tendencia de myrmecofagia de la especie de araña Salticidae recientemente descrita, *Corythalia conferta*. Se observó una araña viviendo dentro de una maceta construida por la avispa *Zeta argillacea* (Hymenoptera: Vespidae: Eumeninae). Otra usó una cámara de un nido tubular ("tubo de órgano") de la avispa *Trypoxylon* sp. (Hymenoptera: Crabronidae). También puede refugiarse en cualquier cavidad disponible.

Palabras clave: Salticidae, *Zeta argillacea*, *Trypoxylon* sp., Himenópteros.

1. Introduction

The family Salticidae has the largest number of genera (664) and species (more than 6,000) within the order Araneae (13% of the all known spider taxa) according to the World Spider Catalog. Jumping spiders characteristically possess a robust body, distinctively large and flashy antero-median eyes, with excellent vision (Harland & Jackson, 2000) and they are mainly of daytime habits, taking advantage of their vision developed for multiple activities, including detecting their potential prey, unlike other spiders that guide themselves using chemical and tactile receptors (Richman & Jackson, 1992; Foelix, 2011).

Corythalia conferta (Figure 1) was recently described from Brazil by Bayer et al. (2020), with a distribution in the states of São Paulo and Mato Grosso do Sul. They are small spiders: females are on average 6.5 mm in total body length and males 5.5 mm. Baigorria et al. (2021) expanded the knowledge of this species regarding geographic distribution, reporting its occurrence in the State of Santa Catarina (Brazil) and Argentina (Missiones, Chaco and Corrientes), with the prediction that it will occur throughout southern Brazil and newly to the country of Uruguay. More recently, Pett et al. (2021) reported its presence also in Paraguay.

In regard of the life habits of this species Baigorria et al. (2021) observed that they build a tubular seed shelter with two circular or oval entrances, which they use to ambush their prey (97.4% of their prey was ants of 11 different species). The spiders chased the ants, capturing them. Its venom immobilized the ants in less than a minute. After capture, the spiders carried the prey into their shelter, where they consumed them.

2. Materials and Methods

The present study was carried out in the urban region of the city of Monte Alegre do Sul, State of São Paulo, southeastern Brazil (22º40'55" S; 46º40'51" W) from January to June 2022. Fifteen individuals of *Corythalia conferta* were observed in an area of 650m^2. Ten individuals of this species were observed living in shelters on the walls of a residence. The prey captured by these spiders and their behavior were recorded after capture.

Figure 1. *Corythalia conferta* in latero-frontal and dorsal view. Source: Giannotti (2022).

3. Results and Discussion

3.1. Nesting habits

Corythalia conferta uses any depression or crack in the wall to build its shelters, being on irregular walls (wrinkled walls) or in the space between one brick and another, always coating it with silk. The silk shelters can have one or two entrance holes (Figure 2).

C. conferta can also use pre-existing structures as shelter. One spider was observed living inside a pot built by the wasp *Zeta argillacea* (Hymenoptera: Vespidae: Eumeninae). Another used one of the chambers of a tubular clay nest ("organ tube"), of a *Trypoxylon* sp. wasp (Hymenoptera: Crabronidae), and also inside a plastic plug of an electrical outlet, which had a crack between the two parts (Figure 3).

It is known that salticids use silk for nest and egg sac construction, in addition to leaving a guide wire as they move around, which serves to guide them back to their shelter (Richman & Jackson, 1992). The use of nests of solitary wasps has few reports in the literature, such as Mattews & Gonzales (2004) who report that spiders (unidentified) use the pots of the wasp *Z. argillacea* as shelter. Obin (1982) estudied three species of mud-daubing wasps: *Sceliphron caementarium*, *Chalybion californicum* and *Trypoxylon politum*, which are spider hunters. On the other hand, he also observed that there were spiders that were living in their mud nests: *Filistata hibernalis*, *Oecobius annulipes*, *Lycosa punctulata*, *Dolomedes albineus*, *D. okefinokensis*, and *Plexippus paykulli*. So there is a tendency for spiders to use mud nests of solitary wasps as shelter. However, this behavior is being described for the first time for *C. conferta*.

Because *C. conferta* is a spider with daytime habits, it was observed that, during the night, these spiders build a silk cap in the entrance hole of their shelters. An example of this can be seen in Figure 3C.

Figure 2. Shelters of *C. conferta*: A and D. opening of the shelter in the gap between two bricks (in D, the spider is visible in the opening); B, C, E and F. shelters built in wall depressions and coated with silk (in E, the spider is visible in the opening). Source: Giannotti (2022).

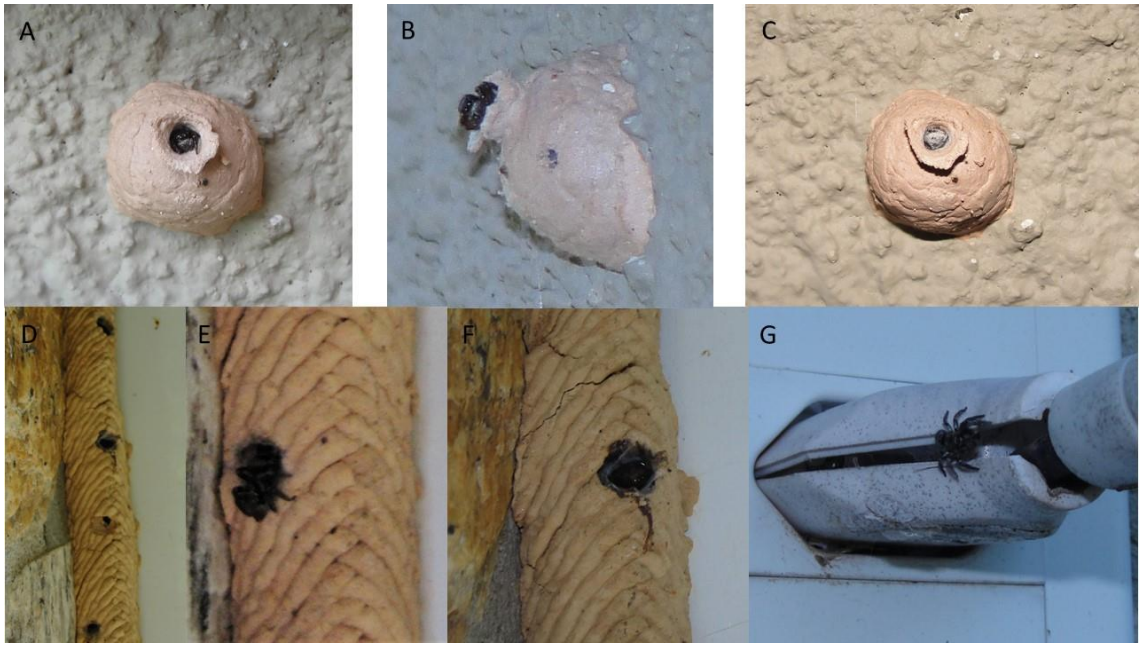

Figure 3. A-C. *C. conferta* sheltering inside a clay pot built by the wasp *Zeta argillacea*. In C, showing that at night, the spider builds a silk cap in the hole of the shelter. D-F. *C. conferta* sheltering inside a chamber of a tubular clay nest built by the wasp *Trypoxylon* sp. G. Spider sheltering inside a plastic plug in an electrical outlet. Source: Giannotti (2022).

Prey capture

It was observed that *C. conferta* preferentially captures ants (three species of *Camponotus*, two of *Pseudomyrmex* and one of *Odontomachus*), although on one occasion, a spider captured a *Cerastipsocus* sp. (Psocoptera: Psocidae) (Table 1 and Figure 4). This proves that, although they are considered myrmecophagous,

they can also capture other groups of prey. Baigorria et al. (2021) reported that the vast majority of their prey are ants, however, noted that they also captured two species of dipterans.

Table 1. Prey captured by *Corythalia conferta*. Source: Giannotti (2022).

Date	Species	Taxonomic group
04/14/2022	*Pseudomyrmex* sp.	Hymenoptera: Formicidae
04/19/2022	*Odontomachus* sp.	Hymenoptera: Formicidae
05/21/2022	*Camponotus rufipes*	Hymenoptera: Formicidae
05/28/2022	*Camponotus* sp.	Hymenoptera: Formicidae
05/24/2022	*Pseudomyrmex* sp.	Hymenoptera: Formicidae
06/01/2022	*Camponotus atriceps*	Hymenoptera: Formicidae
06/24/2022	*Cerastipsocus* sp.	Psocoptera: Psocidae

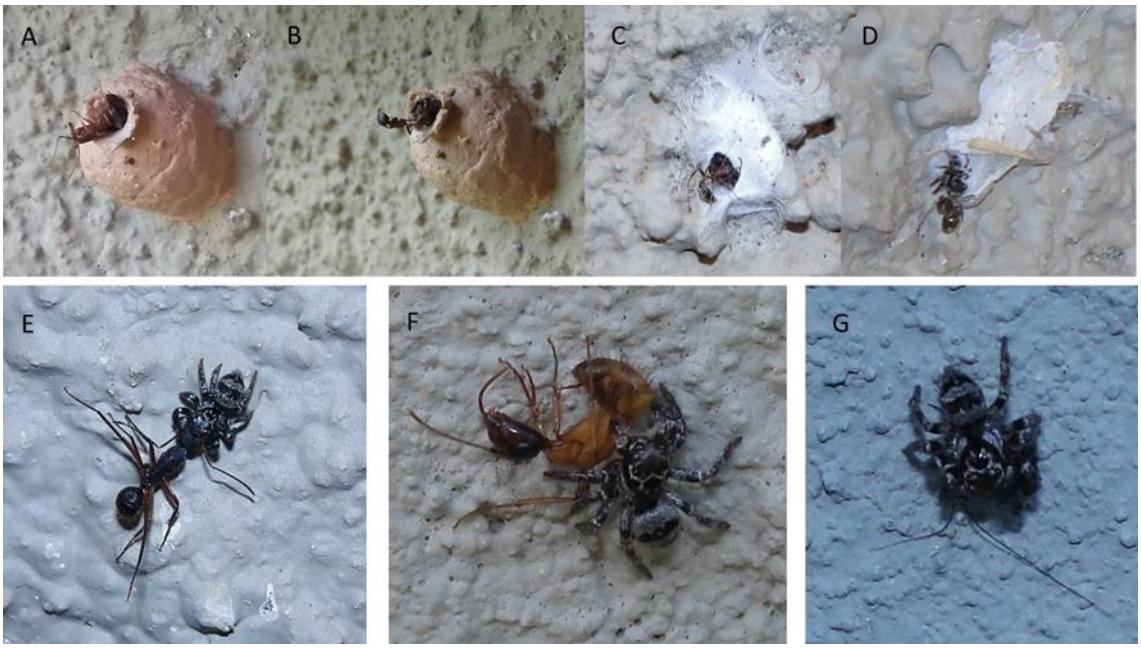

Figure 4. Prey captured by C. conferta: A. Odontomachus sp.; B and C. Pseudomyrmex sp.; D. Camponotus sp. E. Camponotus rufipes; F. Camponotus atriceps; G. Cerastipsocus sp. (the spider is on the insect, showing only its long antennae). Source: Giannotti (2022).

Myrmecophagy is relatively uncommom in jumping spiders because many ants have formidable defense mechanisms, such as the use of jaws and stinger, or even make a spray of formic acid when they are captured (Zhang & Maddison (2013). To avoid these defense mechanisms by the ants Baigorria et al. (2021) reported that *C. conferta* specialized in a technique of capturing the ant by attacking it on the head (shown in Figure 4.E), poking it for immobilization and holding it in the chest near the pedicel, so that the head and end of the ant's abdomen are out of reach of the spider's face, thus avoiding its jaws, stinger or formic acid spray (they called it a "safe position"). This is exactly the position shown in Figure 4.F.

Obin (1982) argues that although many spiders are prey to Sphecidae wasps (including *Trypoxylon*, now classified as Crabronidae, but formerly as Sphecidae), the fact that spiders manage to lodge in their clay nests is a favorable factor for spiders because they offer a good refuge for adults and their offspring. Furthermore, because it decreases the risk of being preyed on by the wasps themselves and may also favor being able to prey on some arthropods that would try to enter the nest to feed on the wasp's larva and prey, including ants. Obin (1982) also mentions that Psocoptera can live in clay nests of wasps and predation of a psocopteran was also observed in this study.

4. Conclusions

This note confirms, therefore, the preference of myrmecophagy as the main form of feeding of *C. conferta*. In relation to nesting habits, it was observed that, in addition to the usual construction of seed nests, this species can also use pre-existing structures as shelter, including cracks in general and abandoned clay nests of wasps.

5. References

Baigorria, J. E., Rubio, G. D., Stolar, C. E. & Oklander, L. (2021). Notes on the jumping spider *Corythalia conferta* (Araneae: Salticidae), a possible myrmecophagous specialist in Argentina. *Peckhamia* 230(1), 1-12.

Bayer, S., Höfer, H. & Metzner, H. (2020). Revision of the genus *Corythalia* C.L. Koch, 1850, part 1: Diagnosis and new species from South America (Araneae: Salticidae: Salticinae: Euophryini). *Zootaxa*, 4806(1), 1-144. https://doi.org/10.11646/zootaxa.4806.1.1

Foelix, R. F. (2011). Biology of Spiders, 3ra. ed. Oxford University Press, New York: pp. 3-16.

Harland, D. & Jackson, R. R. (2000). 'Eight-legged cats' and how they see – a review of recent research on jumping spiders (Araneae, Salticidae). *Cimbebasia*, 16, 231-240.

Matthews, R.W. & Gonzalez, J.M. (2004). Nesting biology of *Zeta argillaceum* (Hymenoptera: Vespidae: Eumeninae) in southern Florida, U.S. Florida Entomologist, 87(1), 37-4

Obin, M.S. (1982). Spiders living at wasp nesting sites: What constrains predation by mud-daubers? Psyche, 89, 321-335. https://doi.org/10.1155/1982/76031

Pett, B.L., Rubio, G.D. & Stolar, C.E. (2021). A first baseline for the salticid (Araneae: Salticidae) fauna of Paraguay, with thirty-two new records and description of a new species from Paraguay and Argentina. *Arachnology*, 18(8), 922-935. https://doi.org/10.13156/arac.2021.18.8.922

Richman, D. B. & Jackson, R. R. (1992). A Review of the ethology of jumping spiders (Araneae, Salticidae). *Bulletin of the British Arachnological Society*, 2, 33-37

World Spider Catalog (2022) Version 23.5. Available online: https://wsc.nmbe.ch/ (accessed on 10 July 2022).

Zhang, J. X. & Maddison, W. P. (2013). Molecular phylogeny, divergence times and biogeography of spiders of the subfamily Euophryinae (Araneae: Salticidae). *Molecular Phylogenetics and Evolution*, 68, 81-92. https://doi.org/ 10.1016/j.ympev.2013.03.017

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