

ARACHNIDA

Rivista Aracnologica Italiana

Anno I, Volume III

ISSN 2421-2091

19 Agosto 2015



Intraguild predation of *Euscorpium concinnus* (Scorpiones: Euscorpiidae) by *Parasteatoda tepidariorum* (Araneae: Theridiidae)

Predazione intraguild di *Euscorpium concinnus* (Scorpiones: Euscorpiidae) da *Parasteatoda tepidariorum* (Araneae: Theridiidae)

Alireza Zamani

School of Biology, Center of Excellence in Phylogeny of Living Organisms in Iran, College of Sciences, University of Tehran, Tehran, Iran. E-mail: zamani.alireza5@gmail.com

&

Andrea Rossi

Gruppo Entomologico Toscano, Museo di Storia Naturale dell'Università degli Studi di Firenze, Sezione di Zoologia "La Specola", via Romana 17, I-50125 Florence, Italy. e-mail: andrea.rossi@arachnida.eu

Abstract

We report a case of intraguild predation by the spider *Parasteatoda tepidariorum* (Theridiidae) on the scorpion *Euscorpium concinnus* (Euscorpiidae) from Tuscany, Italy. The most interesting aspect is the impressive difference in size between the predator and the prey.

Key-words: *Parasteatoda tepidariorum*, *Euscorpium concinnus*, intraguild predation, Italy.

Riassunto

Noi riportiamo un caso di predazione intraguild da parte del ragno *Parasteatoda tepidariorum* (Theridiidae) sullo scorpione *Euscorpium concinnus* (Euscorpiidae) dalla Toscana, Italia. L'aspetto più interessante è l'impressionante differenza in dimensioni tra il predatore e la preda.

Parole-chiave: *Parasteatoda tepidariorum*, *Euscorpium concinnus*, predazione intraguild, Italia.

Scorpions are prey for both vertebrates and invertebrates (Polis *et al.* 1981; McCormick & Polis, 1990; Lourenço *et al.* 2006; Žagar *et al.* 2011; Lira & Costa, 2014; Jablonski *et al.* 2015). Polis *et al.* (1981) provided an exhaustive list of an approximate number of 150 taxa (mostly vertebrates) that have been known to prey upon scorpions. Regarding spiders, considering their high abundance in both natural and agricultural habitats and the high variability of their food composition, their predation upon scorpions is a rather common occurrence, especially by the web-dwelling species, which are more capable of subduing the venom-injecting telson of the scorpion with threads of silk before it can cause any harm to the spider. However, records of these specific interactions are scarce, especially regarding Theridiidae, which is a large, globally-distributed family of small to medium-sized araneomorph, entelegyne, ecribellate spiders that usually build a three-dimensional space-web known as cobweb or tangle-web (Benjamin & Zschokke, 2003). These spiders are characterized by the presence of a row of lightly-curved, serrated bristles on their tarsi IV, used for “combing out” strands of silk, especially during the prey capturing (Jocqué & Dippenaar-Schoeman, 2006). Reviewing the literature, only a few reports have been made regarding theridiids preying upon scorpions, and most of them are related to the Widow spiders of the genus *Latrodectus* Walckenaer, 1805 (e.g. Vellard (1936) recorded a high frequency of captured scorpions by *L. geometricus* C. L. Koch, 1841 in Paraguay; Shulov (1940) recorded the presence of a small buthid scorpion in the web of *L. pallidus* O. P.-Cambridge, 1872 from Palestine; Melic (2000) reported the remains of *Buthus occitanus* (Amoreux, 1789) (Buthidae) in the web of *L. lillianae* Melic, 2000 from the Iberian Peninsula; Lira & Costa, (2014) reported a case of predation of *L. geometricus* upon *Bothriurus* sp. (Bothriuridae) in Brazil; personal observation regarding the predation of *L. pallidus* upon *Orthochirus* sp. (Buthidae) in Iran); in none of the mentioned cases the size differences between the two organisms were dramatic. In the present note, we are reporting predation of a female *Parasteatoda tepidariorum* (C. L. Koch, 1841) upon *Euscorpis concinnus* (C.L. Koch, 1837) (Fig. 1). *Parasteatoda tepidariorum* is a species of South American origin, but has been successful in establishing introduced populations in around the world, and is now considered as having a cosmopolitan distribution; in Europe, it is common in and around human dwellings and it's both sexes are adult from June to October (Nentwig *et al.*, 2015). The prey was identified as *E. concinnus*, a species occurring in both Italy mainland and in some small islands of the Tyrrhenian Sea (Tropea, 2012), usually in natural habitats. The observation was documented on 20 July 2015, during afternoon at around 4 P.M., near human dwellings in Massa, Parco del Monte di Pasta (44°02' N, 18°08' E), Tuscany, Italy, by the second author. The 'Parco del Monte di Pasta' is a civic park of 24040 mq, located in the center of Massa, Italy. It represents the major part of a hill, covered by woods. In the remaining part of the hill there are the civic hospital and several private buildings. The scorpion was identified as a mature male (measuring about 35 mm), and observed motionless in the web (at about 175 cm above the ground) (Fig. 1b), while the much smaller spider (body length about 5-5.5 mm) was sitting on a higher portion of the web next to an egg sac (Fig. 1a). Most probably, the scorpion was captured while it was foraging on the wall and accidentally touched the sticky end of the vertical threads, causing it to become suspended in the air. In contrast with the previously mentioned cases of *Latrodectus*-scorpion predations, the captured scorpion of this case was much larger and heavier than the spider; according to Nentwig & Wissel (1986) the maximum prey size for solitary web-dwelling spiders is about 500% of their

body length. The current report should be considered as an example of "intraguild predation", as it involved killing and eating of another species that used similar resources in the same habitat, thus being a possible competitor to the predator (Polis *et al.* 1989). Regarding this case, the intraguild predation is asymmetrical, as it is assumed that at any possible, natural encounters between the two species, one species (*P. tepidariorum*) is always the predator on the other (*E. concinnus*); also, the age structure seems relatively unimportant, as the prey was a fully adult individual, and the predation was not influenced by the ontogenetic changes in its size or vulnerability. Although predation by *P. tepidariorum* on much larger insects [e.g. *Anoplophora glabripennis* (Motschulsky, 1853) (Coleoptera: Cerambycidae), body length 20-30 mm] (Morewood *et al.* 2003), scorpions (Edwards, 1985) and even vertebrates (Gertsch, 1979) have already been recorded, considering the generalistic feeding preference of this spider, the current case should probably be considered as accidental, although further records are needed to clarify the exact frequency of such encounters.

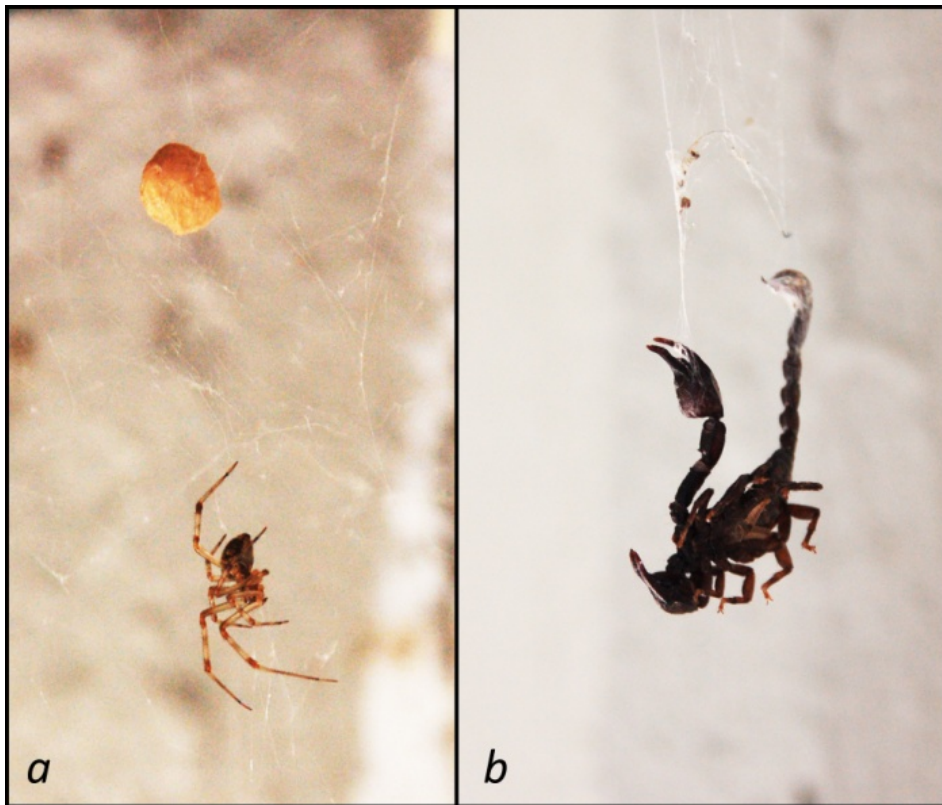


Fig. 1. The predator, *Parasteatoda tepidariorum* (a); the prey, *Euscorpium concinnus* (b).

Acknowledgments

We are grateful toward Antonio Melic (Spain) for providing literature and Dr. Ersen Aydın Yağmur (Turkey) for valuable comments on an earlier draft of the manuscript.

References

- BENJAMIN S. P. & ZSCHOKKE S. (2003). Webs of theridiid spiders: construction, structure and evolution. **Biological Journal of the Linnean Society**. 78: 293-305.
- EDWARDS G. B. (1985). The common house spider *Achaearanea tepidariorum* (C. L. Koch) (Araneae: Theridiidae). **Entomology Circular**. 279: 1-2.
- GERTSCH W. J. (1979). **American Spiders** (2nd Edition). Van Nostrand Reinhold Co., New York. 274 pp.
- JABLONSKI D., ZERZÁN D. & ÇIÇEK K. (2015). Scorpions as a prey for Ottoman viper, *Montivipera xanthina*: the first record from southwestern Anatolia, Turkey. **Biharean Biologist**. 9 (1): 78-79.
- JOCQUÉ R. & DIPPENAAR-SCHOEMAN A. S. (2006). **Spider Families of the World**. Musée Royal de l'Afrique Central, Tervuren. 336 pp.
- LIRA A. F. A. & COSTA A. A. (2014). First record of a brown widow spider *Latrodectus geometricus* Koch, 1841 (Araneae, Theridiidae) feeding scorpion (Scorpiones, Bothriuridae) in a Brazilian Atlantic forest. **Brazilian Journal of Biology**. 74 (4): 1011.
- LOURENÇO W. R., BRESCOVIT A. D., RHEIMS C. A. & CLOUDSLEY-THOMPSON J. L. (2006). First record of a crab spider (Thomisidae) preying on a scorpion. **Boletín Sociedad Entomológica Aragonesa**. 39: 404-405.
- MCCORMIC S. J. & POLIS G. A. (1990). Prey, predators, and parasites (pp. 294-320). In: Polis, G. A. (Editor). **The Biology of Scorpions**. Stanford University Press, Stanford, CA.
- MELIC A. (2000). El género *Latrodectus* Walckenaer, 1805 en la península Ibérica (Araneae, Theridiidae). **Revista Ibérica de Aracnología**. 1: 13-30.
- MOREWOOD W. D., HOOVER K. & SELLMER J. C. (2003). Predation by *Achaearanea tepidariorum* (Araneae: Theridiidae) on *Anoplophora glabripennis* (Coleoptera: Cerambycidae). **The Great Lakes Entomologist**. 36: 33-36.
- NENTWIG W., BLICK T., GLOOR D., HÄNGGI A. & KROPF C. (2015). **Spiders of Europe**. www.araneae.unibe.ch. Version 08.2015.
- NENTWIG W. & WISSEL C. (1986). A comparison of prey lengths among spiders. **Oecologia**. 68: 595-600.
- POLIS G. A., MYERS C. A. & HOLT R. D. (1989). The ecology and evolution of intraguild predation: potential competitors that eat each other. **Annual Review of Ecology and Systematics**. 20: 297-330.
- POLIS G. A., SISSOM W. D. & MCCORMICK S. J. (1981). Predators of scorpions: field data and a review. **Journal of Arid Environments**. 4: 309-326.
- SHULOV A. (1940). On the biology of two *Latrodectus* spiders in Palestine. **Proceedings of the Linnean Society of London**. 152: 309-328.
- TROPEA G. (2012). A new species of *Euscorpius* Thorell, 1876 (Scorpiones, Euscorpiidae) from Italy. **Bulletin of the British Arachnological Society**. 15 (8): 253-259.
- VELLARD J. (1936). **Le venin des araignées**. Paris, Masson, 311 pp.
- ŽAGAR A., TRILAR T. & CARRETERO M. A. (2011). Horvath's rock lizard, *Iberolacerta horvathi* (Méhely, 1904), feeding on a scorpion in Slovenia. **Herpetology Notes**. 4: 307-309.