A CONTRIBUTION TO THE KNOWLEDGE OF BURROWS AND REPRODUCTIVE BIOLOGY OF *STENOTEROMMATA PLATENSIS* HOLMBERG (MYGALOMORPHAE: NEMESIIDAE)

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ABSTRACT: *Stenoterommata platensis* is a medium-sized nemesiid spider that lives in open burrows. The biology of the Nemesiidae is almost unknown. We describe the courtship and mating of *S. platensis* for the first time based on two observed matings and add some notes about their burrows in the wild on Martín García Island, Argentina. All males initiated courtship by beating with the first pair of legs when contacted with the female silk from the entrance of the burrow. The copulation position achieved was similar to that of most mygalomorphs. This work constitutes preliminary observations and more data are needed to a better understanding of the reproductive biology of this species.

KEY WORDS: Courtship and mating, natural history, spider, Argentina.

Because of the lack in diversity of mygalomorph species studied, it is imperative to develop an understanding of their reproductive biology (Ferretti et al., 2012). The family Nemesiidae has up to now 43 genera and 364 described species, distributed worldwide (Platnick, 2013). These spiders are found across the tropical and subtropical regions of South America, but their biology is almost unknown, with only notes available on a few species mainly distributed throughout Argentina, Chile, Peru and Uruguay (Costa, as cited by Pérez-Miles & Capocasale, 1982; Capocasale & Pérez-Miles, 1990; Goloboff, 1995; Ferretti et al., 2011).

Stenoterommata platensis is a medium-sized nemesiid spider that lives in open burrows, lined with abundant white silk; the burrow mouth is slightly widened, with the silk attached to fallen leaves or branches (Goloboff, 1995). This species is distributed in Argentina (Buenos Aires, Catamarca, Entre Ríos, Misiones and Santa Fé provinces) and Uruguay (Goloboff, 1995; Montes de Oca & Pérez-Miles, 2009; Ferretti et al., 2010). However, no specific data about natural history and reproductive biology have been published about this species.

The aim of this paper is to present for the first time the sexual behavior of *S. platensis*, adding some notes about their burrows in the wild on Martín García Island, Argentina.

MATERIAL AND METHODS

Study area and field work

The study area is located in the upper La Plata River, at the outlet of the Uruguay River, northeastern Buenos Aires Province, Argentina (34°11'25"S - 58°15'38"W). Martín García Island is 37.5 km from the Argentinean coast, 3.5 km from the Uruguayan coast, and 46 km in a straight line from the city of Buenos Aires. The island comprises an area of 168 ha and constitutes the most elevated portion of the deltaic environment in the La Plata River (25 m above sea level)

(Dalla Salda, 1981). The most elevated zone of the island is completely urbanized (Lahitte & Hurrell, 1997). Five different ecological areas are recognized on the basis of physiognomic aspects of the vegetation (Lahitte & Hurrell, 1997): jungle, shore forest, sandy xerophilous forest, airport xerophilous forest and sandy.

The field study took place during September 2009 (spring in Southern Hemisphere) corresponding to the prevailing sexual activity of this species on the island (Ferretti et al., 2010). The burrows found were excavated and measured with a digital caliper. Individuals were sexing (when possible) and collected.

Courtship and mating experiences

For experiences we used three adult males and three adult females from Martín García Island, Buenos Aires, Argentina, captured in September 2011. Voucher specimens are deposited in the collection of the Zoología de Invertebrados II, Universidad Nacional del Sur, Buenos Aires, Argentina. All the females molted before we made observations, so they did not have stored sperm. In the laboratory we kept them individually in plastic Petri dishes (9 cm diameter and 1.5 cm high), with soil as substrate and wet cotton wool moistened daily. These containers allowed us to follow their behavior as they constructed their burrows. We fed all individuals weekly with cockroaches (*Blattella germanica*) of approximately 10 mm length. We used a 12 hours light/dark cycle, and the room temperature during breeding and observations was 26.7°C ± 1.52 SD. In order to observe mating, we placed each female dish inside a larger glass cylindrical container (19 cm diameter and 10 cm high) with a layer of soil approximately 6 cm deep. A depression excavated in the center of the larger container for the female's Petri dish avoided the destruction of the female's shelter during the transfer. The mating arena was illuminated with artificial fluorescent light. For each encounter, we removed the male from his Petri dish and carefully introduced him into the larger container housing the female's dish, and at quite a distance from the female. Encounters were directly observed, recorded with notes and videotaped using a Panasonic SDR-S7. Durations and frequencies are given as averages ± standard deviations.

RESULTS

We captured 16 females and three males of *S. platensis* (Figs. 1a, b) inhabiting the jungle on Martín García Island. All the specimens were found living in short burrows under stones or logs constructed on soils with high values of moisture. The burrows mouths were slightly widened and usually the silk attached with fallen leaves or branches (Fig. 2). The dimensions of burrows are presented in Table 1.

We obtained two matings of *S. platensis* under laboratory conditions during November 2011. All males initiated courtship by beating with the first pair of legs when contacted with the female silk from the entrance of the burrow. After 1 minute of courtship away from the entrance of burrow, the male entered into the shelter and contacted the female with their forelegs. One male made beats with the second pair of legs (in 6 cases) over the female cephalothorax with a mean duration of 12.5 seconds ± 7.72 SD. Then, the male clasped with the first pair of legs between the palp base and chelicerae of female and elevated her to reach the genital opening. After that, males made palpal insertion attempts making 5 and 7 insertions respectively, with a mean duration of 27.7 seconds ± 24.9 SD. The mean duration of copulation was 1.5 and 5.21 minutes respectively. After mating, female retreated deeper into the burrow and male escaped safely.

The copulated females made an egg sac during December 2011. From one egg sac, 18 spiderlings emerged successfully (Figs. 3a, b) on January 20, 2012 and 7 spiderlings emerged from the other egg sac on January 23, 2012.

DISCUSSION

The courtship of males away from the burrow entrance could be indicating the existence of female contact sex pheromones on silk threads that elicited the male courtship, as was proposed for other mygalomorph spider (Ferretti & Ferrero, 2008; Costa & Pérez-Miles, 2002). The beating behavior of males *S. platensis* beating could be similar to that reported for another nemesiid, *Acanthogonatus centralis* Goloboff (Ferretti et al., 2011) and may serve as long-distance male-female communication.

The copulation position achieved was similar to that of most mygalomorphs (Costa & Pérez-Miles, 2002; Ferretti et al., 2011). The number of palpal insertions and the mean duration of copulation by *S. platensis* were similar to that recorded for *A. tacuariensis* Pérez-Miles & Capocasale (Costa, as cited by Pérez-Miles & Capocasale, 1982) and *A. centralis* (Ferretti et al., 2011) but *S. platensis* shows longer durations.

The present study gives a descriptive overview of the mating behavior in *S. platensis* for the first time, but obviously this work constitutes preliminary observations and more data are needed to a better understanding of the reproductive biology of this species.

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LITERATURE CITED

Capocasale, M. R. & Pérez-Miles, F. 1990. Behavioural ecology of *Acanthogonatus tacuariensis* (Pérez & Capocasale) (Araneae, Nemesiidae). Studies of Neotropical Fauna and Environment, 25: 41-47.

Costa, F. G. & Pérez-Miles, F. 2002. Reproductive biology of Uruguayan theraphosids (Araneae, Theraphosidae). Journal of Arachnology, 30: 571-587.

Dalla Salda, L. H. 1981. El basamento de la isla Martín García, Río de la Plata. Revista de la Asociación Geológica Argentina, 36: 29-43.

Ferretti, N. & Ferrero, A. 2008. Courtship and mating behavior of *Grammostola schulzei* (Schmidt 1994) (Araneae, Theraphosidae), a burrowing tarantula from Argentina. The Journal of Arachnology, 36: 480-483.

Ferretti, N., Pérez-Miles, F. & González, A. 2010. Mygalomorph spiders of the Natural and Historical Reserve of Martín García Island, Río de La Plata River, Argentina. Zoological Studies, 49: 481-491.

Ferretti, N., Pompozzi, G. & Pérez-Miles, F. 2011. Sexual behavior of *Acanthogonatus centralis* (Araneae: Mygalomorphae: Nemesiidae) from Argentina, with some notes on their burrows. The Journal of Arachnology, 39: 533-536.

Ferretti, N., Pompozzi, G., Copperi, S., Pérez-Miles, F. & González, A. 2012. Copulatory behavior of Microstigmatidae (Araneae: Mygalomorphae): a study with *Xenonemesia platensis* from Argentina. The Journal of Arachnology, 40: 252-255.

Goloboff, P. A. 1995. A revision of the South American spiders of the family Nemesiidae (Araneae, Mygalomorphae). Part I: species from Peru, Chile, Argentina, and Uruguay. Bulletin of the American Museum of Natural History, 224: 1-189.

Lahitte, H. B. & Hurrell, J. A. 1997. Plantas de la Costa. Literature of Latin America (L.O.L.A.), Buenos Aires, 200 pp.

Montes de Oca, L. & Pérez-Miles, F. 2009. Las arañas Mygalomorphae del Uruguay: clave para familias, géneros y especies. Revista del Laboratorio Tecnológico del Uruguay, 4: 1-9.

Pérez-Miles, F. & Capocasale, R. 1982. Hallazgo de una tercera especie del género *Pycnothelopsis*: *Pycnothelopsis tacuariensis* sp. nov. (Araneae, Pycnothelidae). Comunicaciones Zoológicas del Museo de Historia Natural de Montevideo, 9: 1-7.

Platnick, N. I. 2013. The world spider catalog, version 14.0. American Museum of Natural History. Available from: http://research.amnh.org/entomology/spiders/catalog/index.html DOI: 10.5531/db.iz.0001 (Accessed on 15 May 2013).

Table 1. Burrows dimensions of the individuals captured on Martín García Island, Argentina.

Burrow	Individual	Burrow entrance diameter (mm)	Burrow length (mm)
1	-	9.8	-
2	Female	16.3	43.3
3	-	9.5	-
4	-	8.9	-
5	Female	9.4	41.6
6	-	10.9	-
7	Female	7.6	18.6
8	Female	10.8	-
9	Female	7	19.7
10	Female	7	-
11	Female	13.5	-
12	Female	9.7	39.7
13	Female	9.9	37.3
14	Female	6.9	37.2
15	Female	10.4	-
16	Female	12.2	-

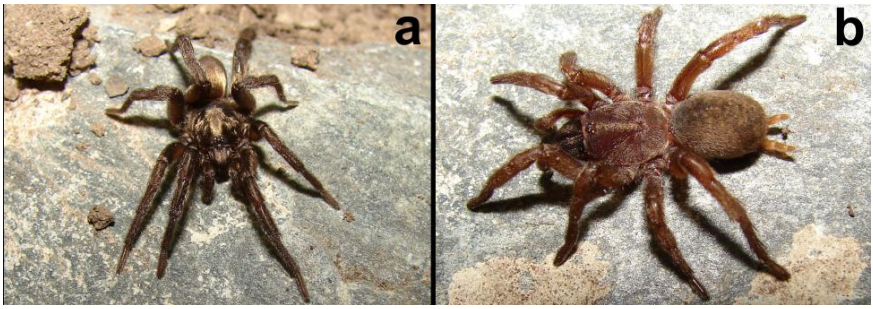

Figure 1. *Stenoterommata platensis*, live habitus, from Martín García Island, Argentina. a. Adult male. b. Adult female.

Figure 2. Burrow entrance (yellow arrow) of *S. platensis* in jungle habitat on Martín García Island. Note the fallen leaves attached with silk.

Figure 3. Adult female *S. platensis* with spiderlings. a. Spiderlings beginning emergence. b. The mother finished opening the egg sac and spiderlings are fully emerged.