

First record of *Vitalius roseus* (Mello-Leitão, 1923) (Araneae: Theraphosidae: Theraphosinae) in Argentina: distribution map, natural history, and sexual behaviour

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Summary

This is the first record for the species *Vitalius roseus* (Mello-Leitão, 1923) in Argentina. The present study expands the known geographic distribution of the species to western Uruguay River. Data on natural history and sexual behaviour of the species is provided.

Introduction

Theraphosidae comprise the commonly called tarantulas and are most of the largest living spiders. It is one of the richest spider families, with almost 1000 species described (Platnick 2014). The genus *Vitalius* was established by Lucas *et al.* (1993) by transferring the Brazilian species of *Pamphobeteus* Pocock, 1901. They diagnosed the genus by the male palpal bulb and spermathecal shape, and by the way the metatarsus closes over the tibial apophyses. Bertani (2001) revised and presented a cladogram for the relationships of the *Vitalius* species, and also commented on the zoogeography of the species. Many specimens of theraphosids housed in scientific collections are rare, perhaps because of the difficulty in collecting cryptic animals that live mainly in burrows or under rocks or logs, and only under special conditions it is possible to collect more than a few individuals (Bertani 2001). Arguably, reports on geographic distribution have only very fragmented information and, in the majority of works, only the type localities are provided. In addition, some wide distributions cited for some species are based on a few misidentified individuals or on erroneous published records. *Vitalius* species occupy mainly forested regions and are distributed in southeastern Brazil; only one species is cited for northeastern Argentina: *V. paranaensis* Bertani, 2001 (Lucas *et al.* 1993; Bertani 2001). This species is reported for central, north and west in the State of Paraná, Brazil. In northeastern Argentina, this species is reported for the locality of Iguazú in northwestern Misiones province (Bertani 2001).

Based on the collection of individuals of *Vitalius roseus* (Mello-Leitão, 1923), in this note we report the first record for Argentina. In addition, we present some data on natural history and sexual behaviour.

Methods

In a recent collecting campaign to the Atlantic forest of northeastern Argentina, during 21 April–5 May 2014, we collected specimens of *V. roseus* by hand collection, during day and at night, using head lamps. The individuals were collected at the “Refugio de Selva y Centro de Investigaciones Antonia Ramos” (27°26'39.8"S 54°56'23.2"W) in Oberá department, Misiones province, Argentina. This natural reserve covers approximately 500 ha of native forests located about 150 m a.s.l. We deposited voucher specimens in the arachnological collection of the Laboratorio de Zoología de Invertebrados II, Universidad Nacional del Sur, Bahía Blanca, Argentina. Additional specimens were examined *in situ* at laboratory installations of the “Centro de Investigaciones Antonia Ramos” and then released into their natural environment. We identified the individuals as *V. roseus* by the presence of diagnostic characters indicated by Bertani (2001): presence of a small, almost vestigial, male spur (Fig. 1C), more than five spines closely arranged on the prolateral male palpal tibia, by the male palpal bulb shape (Fig. 1A, B) and the shape of the female spermathecae (Fig. 1D) together with the presence of long hairs ventrally on femora and many long hairs on the coxae, the abdomen being black ventrally, and patellae and metatarsi dorso-laterally slightly pinkish (Fig. 2A, B).

We carried out 22 experiments between nine males and five females under laboratory conditions. All interactions took place in cages measuring 40 × 30 and 25 cm high with soil as substrate and a burrow artificially constructed in the soil. Males were carefully deposited on the soil on the opposite side of the burrow. Additionally, we made four encounters in the open field by locating two females in their own burrows. Four males were exposed to each female, one every day. The events took place during sunset and at night.

Results and discussion

Distribution and natural history

Based in the collection of individuals of *Vitalius roseus*, we confirm this species for Argentina, also distributed in southwestern Brazil. The occurrence of this species in southeastern Misiones province, Argentina, is near to its distribution in Brazil (Fig. 3). Previous literature records of the species reported its distribution in many localities only in the State of Rio Grande do Sul, inhabiting subtropical subcaducifolius forest (Bertani 2001).

We collected 35 specimens: 12 males, seven females and 16 juveniles. Males were located walking at sunset between 18:00 and 00:00. One male was found at sunset living under a big stone. The body size variation of males (n = 12) was (measurements are given in millimetres): total length: 33.46 ± 2.12; carapace length: 15.36 ± 1.46;

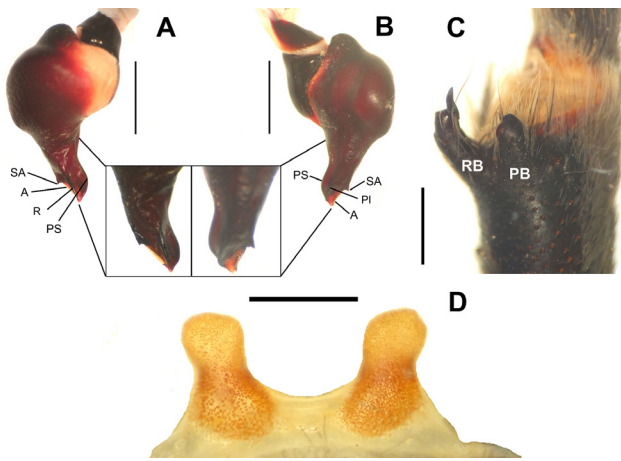


Fig. 1: *Vitalius roseus*. **A** right male palpal bulb, retrolateral; **B** right male palpal bulb, prolateral; **C** male spur; **D** female spermathecae, dorsal view. Keels: A = apical; PI = prolateral inferior; PS = prolateral superior; R = retrolateral; SA = subapical. Male spur: PB = prolateral branch; RB = retrolateral branch. Scale bar = 1 mm.

carapace width: 14.03 ± 0.99 . All females were located inhabiting open burrows with a mean entrance diameter of 31.8 ± 7.12 ($n = 7$), burrow length of 139.75 ± 49.85 ($n = 7$). No evidence of silk lining the burrow or closing the entrances were observed (Fig. 4). The temperature inside the female's burrows was about 23°C and soil pH was 7.5. The body size variation of females ($n = 4$) was: total length: 33.76 ± 3.32 ; carapace length: 14.26 ± 2.95 ; carapace width: 13.00 ± 3.00 . Juveniles were always found occupying crevices or short burrows under stones, fallen logs, or even inside decomposed logs.

Sexual behaviour

The presence of walking males in the field is indicative of the reproductive period of the species (Costa and Pérez-Miles 2002; Pérez-Miles *et al.* 2005) and, in *V. roseus*, males are active during April and May (autumn in the southern hemisphere). The occurrence of some males in April and May was also reported in the examined material from Bertani (2001), and is similar to the results found in our work.

From the laboratory experiments, we observed that most males courted after they made contact with the female silk

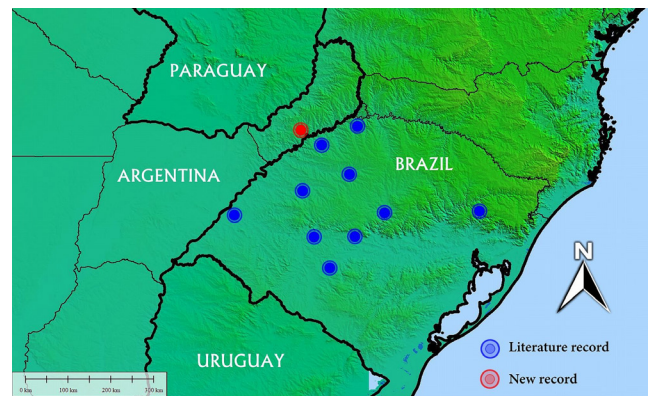


Fig. 3: Map of the known distribution of *Vitalius roseus*.

or after they made contact with her. The courtship behaviour was similar to that reported for other theraphosids (Costa & Pérez-Miles 2002, see Ferretti *et al.* 2013 for a review) involving body vibration caused by leg III movements, palpal drumming, tapping the female with extended forelegs and palpal drumming over the female's genital zone. Palpal drumming was less frequent than body vibrations. Females refused to mate during all trials; instead they escaped or remained inside the burrow. Only one female bit the male carapace and cannibalized him, after the male courted, elevated, and tried to make the first palpal insertion.

In the field, we observed male courtship behaviour after contact with female silk around the burrow (Fig. 5A). Male courtship involved corporal vibration and palpal drumming. During the first interaction, the female emerged from her burrow and responded to male courtship. The female calling involved vigorous tapping with the first and second pair of legs against the substrate at the entrance of the burrow. This is the first time this behaviour has been recorded for the genus and could be similar to that of species in other genera. Arguably, female response to male courtship was first observed by Prentice (1992) for *Aphonopelma* species. Quirici & Costa (2005) and Copperi *et al.* (2012) found that *Eupalaestrus weijenberghi*, *Acanthoscurria suina* and *Grammostola vachoni* respond to male courtship, suggesting that such action would not only inform the male about her willingness to copulate, but also help the male orient himself towards the burrow entrance.

When spiders made contact, the female elevated her body to an angle of almost 90° with the substrate, with her first



Fig. 2: *Vitalius roseus*, habitus. **A** female; **B** male.



Fig. 4: Burrow entrance of an adult female *Vitalius roseus*.

pair of legs elevated and legs III and IV over the substrate (Fig. 5B). Then the male pushed the female, raising her, clasp the female's fangs and palpal drumming her genital zone. No insertion was observed, and the spiders separated. The male again pushed the female, but the couple lost their equilibrium, separated, and the female immediately retreated into her burrow. During the other three encounters, the males courted but the females never responded to male courtship. No attacks were observed.

Although we made a considerable amount of mating trials during the reproductive period of the species, we were unable to observe a successful copulation of these spiders. A possible situation may be that we found mated females that actively rejected males or refused to copulate. Therefore, this preliminary result matches that found for another species, *E. weijenberghi* (Pérez-Miles *et al.* 2007), in which the mating system has monogamous females and polygamous males. However, this hypothesis needs to be elucidated with more data.

Acknowledgments

This work was supported by the Rufford Small Grants Foundation to the project Conserving Tarantulas in the Atlantic Forest awarded to N. Ferretti. Thanks to the Ministerio de Ecología y Recursos Naturales Renovables de la

Provincia de Misiones for the collection permits. Also thanks to Horacio and Nahuel Schenone for allowing us to develop this study at the Centro de Investigaciones Antonia Ramos and thanks are due to Javier and Mariana for their hospitality and services during accommodation. N. Ferretti is a researcher of CONICET.

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Fig. 5: Pairs of adult male (left) and female (right) of *Vitalius roseus*. **A** male courting and female at burrow entrance; **B** male clasp the female chelicerae.