

**Behavioural and biological notes on Crabronidae
(Hymenoptera: Apoidea) and new geographic records to the
Espírito Santo State (Southeast Brazil)**

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ABSTRACT: The following species of crabronid wasps are added to the list of Hymenoptera of Espírito Santo State: *Stictia maccus* (Handlirsch, 1895), *Hoplisoides vespoides* (F. Smith, 1873), *Trachypus fulvipennis* (Tachenberg, 1875), *Trachypus romandi* (Saussure, 1854). Notes on nesting behaviour of *H. vespoides*, *S. maccus* and *T. fulvipennis* in the Biological Station of Santa Lúcia (city of Santa Teresa) are presented. *Hoplisoides vespoides* used as prey *Umbonia spinosa* (Fabricius, 1775) (Hemiptera: Membracidae) and *T. fulvipennis* used as prey three species of stingless bees (Hymenoptera: Apidae: Meliponinae): *Plebeia remota* (Holmberg, 1903), *Partamona aff. cupira* (Smith, 1863), *Schwarziana quadripunctata* (Lepeletier, 1836).

Key-words: *Trachypus*, *Stictia*, *Hoplisoides*, Meliponinae bee, solitary wasps, Atlantic Forest.

RESUMO: Notas biológicas e comportamentais sobre Crabronidae (Hymenoptera: Apoidea) e novos registros geográficos para o Estado do Espírito Santo (Sudeste do Brasil). As seguintes espécies de vespas crabronídeas são adicionadas à lista de Hymenoptera do Estado do Espírito Santo: *Stictia maccus* (Handlirsch, 1895), *Hoplisoides vespoides* (F. Smith, 1873), *Trachypus fulvipennis* (Tachenberg, 1875), *Trachypus romandi* (Saussure, 1854). Notas sobre comportamento de nidificação de *Hoplisoides vespoides*, *S. maccus* e *T. fulvipennis* na Estação Biológica de Santa Lúcia (Santa Teresa) são apresentadas. *Hoplisoides vespoides* usou como presa *Umbonia spinosa* (Fabricius, 1775) (Hemiptera: Membracidae) e *T. fulvipennis* usou como presa três espécies de abelhas meliponíneas (Hymenoptera: Apidae: Meliponinae): *Plebeia remota* (Holmberg, 1903), *Partamona aff. cupira* (Smith, 1863), *Schwarziana quadripunctata* (Lepeletier, 1836).

Palavras-chave: *Trachypus*, *Stictia*, *Hoplisoides*, abelha Meliponinae, vespas solitárias, Mata Atlântica.

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Introduction

Crabronidae is a large and diversified family of primarily solitary wasps worldwide distributed (Bohart & Menke, 1976). There are almost 9,000 species currently recognized around the world (Pulawski, 2013), being the occurrence of about 1,750 species known in Neotropical Region and about 550 in Brazilian fauna (Amarante, 2005). Studies on taxonomy and biology of crabronids are still scarce in Brazil. Aiming to contribute to the faunistic knowledge of the Atlantic Forest of the Espírito Santo State (Southeast Brazil), biological and behavioural notes and new geographic records of crabronid wasps are provided in the present paper.

Material and methods

Observations on behaviour were carried out in the Estação Biológica de Santa Lúcia, city of Santa Teresa, in the Central Mountain Region of Espírito Santo State. Field work expeditions, with duration of five days each, were done in the summer 2008 and 2009 to this site. Previously determined sites were observed in search for nesting wasps from about 10:00 am to 17:00 pm. Geographical and historical aspects, as well as other general information about this biological station, were summarized by Mendes & Padovan (2000). The Entomological Collection of the Instituto Oswaldo Cruz (CEIOC) (Rio de Janeiro, RJ, Brazil) was examined in search of new geographic records of crabronid wasps to the Espírito Santo State. All the specimens sampled during the field work mentioned above were deposited as voucher in the Santa Teresa Collection of the CEIOC.

Results

***Hoplisoides vespoides* (F. Smith, 1873)**

Distribution. *Hoplisoides vespoides* is widely distributed in South America and in Brazil its occurrence was recorded to the following states (Amarante 2002): Maranhão, Pará, Rio de Janeiro and Santa Catarina. Herein this species is cited to Espírito Santo State, city of Santa Teresa.

Examined material. Brasil: Espírito Santo: Santa Teresa (Estação Biológica de Santa Lúcia), 3 females, Buys, S.C. col., III.2009.

Taxonomic remarks. The specimens examined match with description by Bohart (1997).

Notes on biology. Females were observed nesting on the margin of an unpaved road, in a site with clay soil mixture with sand, exposed to the sun. A wasp transporting an adult female of *Umbonia spinosa* (Fabricius, 1775) (Hemiptera: Membracidae) as prey was observed. The carrying-prey behaviour was similar to that described by Buys (2008) and Jacobi (2008). Buys (2008) studied several nests of *H. vespoides* in a site of Atlantic Forest in the Rio de Janeiro State and found exclusively *U. spinosa* as prey, in the same way as observed by Callan (1976) in Trinidad. This fact suggests a somewhat specialized relationship among these two species in some environments. On the other hand, Jacobi (2008) found *Umbonia crassicornis* (Amyot & Serville, 1843) as prey in Costa Rica.

***Stictia maccus* (Handlirsch, 1895)**

Distribution. Occurrence of *S. maccus* was cited to French Guiana, Argentina and Brazil, to the states of Goiás, Mato Grosso, Mato Grosso do Sul and São Paulo (Amarante, 2002). Herein this species is cited to the Espírito Santo State, cities of Alegre and Santa Teresa.

Examined material. Brasil: Espírito Santo: Alegre (Fazenda Jerusalém), 1 female, Zikán, J.F., 1.XI.1914; Santa Teresa (Estação Biológica de Santa Lúcia), 1 females, Buys, S.C. col., 21-22.II.2008.



Figure 1. A female *Stictia maccus* starting to dig her nest in an exposed and bare site (Biological Station of Santa Lúcia, Santa Teresa, ES, Brazil).

Taxonomic remarks. The specimens examined are in accordance with the description by Parker (1929) and Willink (1947) of *Stictia lineata* (= *Stictia maccus*) and both seem to be indistinguishable from specimens identified as *S. lineata* by A. Willink that are deposited at the entomological collection of the Instituto Oswaldo Cruz.

Biological notes. A solitary female was observed digging a burrow in a mound of clay soil mixtures with sand, in an exposed site on the margin of an unpaved road (Fig. 1). During the day several other species of solitary wasps were nesting in this place, as for example, *Trachypus fulvipennis*, *Bembecinus agilis* and *Tachysphex* sp. However, the female *S. maccus* female appeared in the nesting site later, at 05:25 pm, when no other species were in nesting activity.



Figures 2-5. Nesting of *Trachypus fulvipennis* (Biological Station of Santa Lúcia, Santa Teresa, ES, Brazil). (2) An excavated nest in profile (burrow 11cm deep); (3-4) females digging the nests and external structure of the nests; (5) female partially inside a nest in vigilant guard position.

***Trachypus fulvipennis* (Tachenberg, 1875)**

Distribution. *Trachypus fulvipennis* is distributed in south of South America and in Brazil is distributed in the States of Minas Gerais, Paraná, São Paulo, Santa Catarina and Rio de Janeiro (Rubio, 1975; Amarante, 2002). Herein this species is cited to Espírito Santo State, city of Santa Teresa.

Examined material. Brasil: Espírito Santo: Santa Teresa (Estação Biológica de Santa Lúcia), 3 females, 1 male, Buys, S.C. col., 12.XI.2007; idem, 1 female, 16.XII.2007; idem, 3 females, 1 male, 21-21.II.2008; idem, 1 female, VIII.2008.

Taxonomic remarks. The specimens examined fit with the description by Rubio (1975).

Biological notes. Females were observed gregariously nesting in an unpaved road, digging in portions more compacted at the middle of the road, as well as on the margins, where the soil was more friable and with major percentage of sand. One excavated nest had 11 cm deep and its general structure is depicted in the figure 2; secondary tunnels and prey items were found inside this nest. As the females dig the nest, a characteristic mound of earth was formed around the entrance (Figs 3-5). Sometimes during the nesting cycle the females remained in the nest entrance with the head and part of the body out of the nest, apparently in a vigilant guard position (Fig. 5). Three species of stingless bees (Hymenoptera: Apidae: Meliponinae) were found as prey inside excavated nests: *Plebeia remota* (Holmberg, 1903), *Partamona aff. cupira* (Smith, 1863), *Schwarziana quadripunctata* (Lepeletier, 1836). There are not previous published notes on biology of this species.

***Trachypus romandi* (Saussure, 1854)**

Distribution. Amarante (2002) cited *T. romandi* to Argentina and Brazil, including the following Brazilian States: Rio Grande do Sul, São Paulo and Minas Gerais. Herein the distribution is extended to the State of Espírito Santo, city of Santa Teresa.

Examined material. Espírito Santo: Santa Teresa (Estação Biológica de Santa Lúcia), 1 female, Buys, S. B., 17-23.IV.2008.

Taxonomic remarks. The specimens examined fit with the description by Rubio (1975).

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