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GANDOLFO, Raquel; REGUILÓN, Carmen

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Nuevos registros de *Asthenochrysa viridula* (Neuroptera: Chrysopidae) en la provincia de Tucumán (Argentina) y en el departamento de Santa Cruz (Bolivia)

Raquel GANDOLFO raquelgandolfo@gmail.com
Unidad Ejecutora Lillo, CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) – Fundación Miguel Lillo., Argentina
Carmen REGUILÓN
Fundación Miguel Lillo, Instituto de Entomología., Argentina

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Abstract: *Asthenochrysa viridula* Adams, 1978 (Chrysopidae: Nothochrysinae) is a neotropical species. Until now, this species was known from only a few specimens: the holotype female from Misiones, a province in northeastern Argentina and a male and two females from the states of Minas Gerais and Espírito Santo in Brazil. In this contribution, *A. viridula* is reported for the first time from Tucumán, a province located in northwestern Argentina and also from Santa Cruz, an eastern department in Bolivia.

Keywords: Green lacewing, Neotropical, New record, Nothochrysinae.

Resumen: *Asthenochrysa viridula* Adams, 1978 (Chrysopidae: Nothochrysinae) es una especie neotropical. Hasta el momento, esta especie era conocida por unos pocos ejemplares: el holotipo hembra de Misiones, provincia ubicada al noreste de Argentina, y un macho y dos hembras de los estados de Minas Gerais y Espírito Santo en Brasil. En esta contribución se reporta por primera vez la presencia de *A. viridula* en la provincia de Tucumán, localizada al noroeste de Argentina y en el departamento de Santa Cruz al este de Bolivia.

Palabras clave: Crisopa, Neotropical, Nothochrysinae, Nuevo registro.

Chrysopidae, with approximately 1,400 species in 82 genera, is the second most species-rich family in Order Neuroptera. Commonly known as “green lacewings” or “chrysopids”, it is distributed worldwide (Garzón-Orduña et al., 2019). Because of their predaceous habits, in particular during the larval stages, chrysopids can be important natural enemies of aphids, whiteflies, thrips, and other soft-bodied insects. For this reason, some species have been successfully used in integrated pest control programs (Tauber et al., 2000; Pappas et al., 2011).

Traditionally the family Chrysopidae is divided into three subfamilies: Apochrysinae, Nothochrysinae and Chrysopinae (Brooks & Barnard, 1990; more recently by Garzón-Orduña et al., 2019; Winterton et al., 2019). Nothochrysinae is a small group with just over 20 extant species in 9 genera, distributed almost exclusively in temperate regions. This

subfamily is of particular interest because of its potential phylogenetic basal position within Chrysopidae. The long evolutionary history of Nothochrysinæ is probably reflected in its substantial fossil record, mostly in deposits of the Cenozoic and the disjunct relictual distributions of its extant species (Adams, 1967). The monophyly of this subfamily is well supported by molecular data (Garzón-Orduña et al., 2019, Winterton et al., 2019), several synapomorphies in the larvae (Tauber et al., 2014) and also the retention of presumed plesiomorphic characters in the adult (Adams, 1967; Brooks & Barnard, 1990; Breitzkreuz et al., 2017). Nothochrysinæ species can be recognized by an evident jugal lobe and the lack of a tympanal organ in the forewings. Also, Adams & Penny (1992) suggested that the presence of five or six rings of flagellar setae could be a possible synapomorphy for the subfamily.

In the Neotropical region, Nothochrysinæ is represented by three species, two of which belong to monotypic endemic genera: *Asthenochrysa viridula* Adams, present in Argentina and Brazil, and *Leptochrysa prisca* Adams & Penny from Perú (Tauber, 2019b). The third species, *Nothochrysa ehrenbergi* Tauber from Chile, was recently described (Tauber, 2019a).

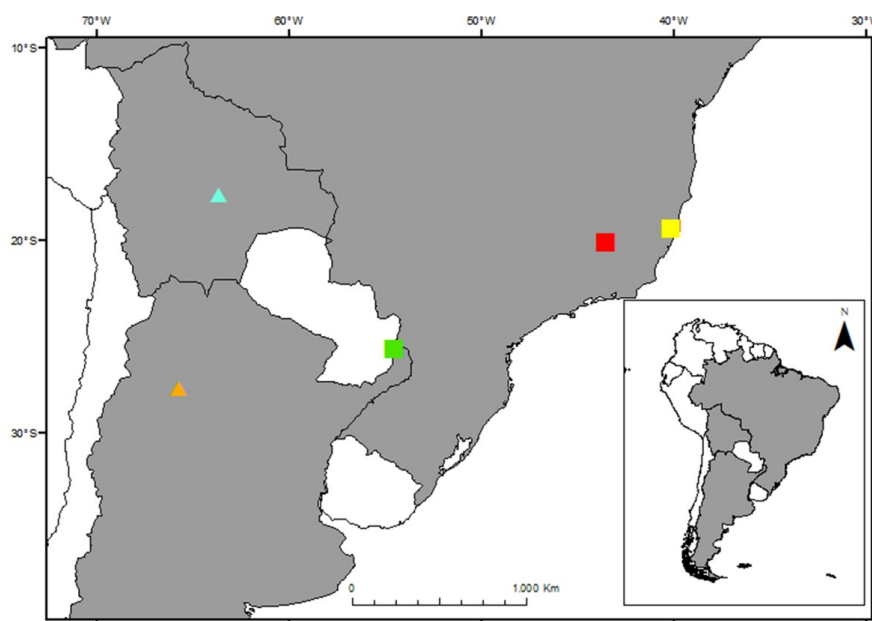


Fig. 1. Distribution of *Asthenochrysa viridula*.

Triangles = new records. Orange: Escaba (Tucumán, Argentina); Turquoise: Buena Vista (Santa Cruz, Bolivia). Squares = previously known records. Green: Iguazú (Misiones, Argentina); Yellow: Linhares Parque Sooretam (Espírito Santo, Brazil); Red: Serra de Caraça (Minas Gerais, Brazil).

The first record of Nothochrysinæ in South America was represented by a single female of *A. viridula*. This specimen was collected in Misiones, a province situated in the extreme northeast of Argentina, in 1927. In the original description of *A. viridula*, it was identified as a new species of *Hypochrysa* Hagen (Adams, 1978). Years later, the male of *A. viridula* was described and also its distributional range was extended based on three specimens found in Brazil. In the male genitalia, the finding of a characteristic heavily sclerotized plate with robust posteriorly directed

spines lead to the recognition of *Asthenochrysa* as a new monotypic genus (Adams & Penny, 1992).

In the present study, seven chrysopids specimens (5 females and 2 males) from the community of Escaba (Tucumán: Alberdi) were identified as *A. viridula* (Fig. 2a). The individuals were collected with light traps in October 2013 and 2017 in two sampling points: 27°30'43.6" S, 65°45'41.1" W and 27°39'36.6" S, 65°45'35.6" W (Fig. 1). To identify the specimens, the descriptions of *A. viridula* of Adams (1978) and Adams & Penny (1992) were used. The last abdominal segments were cleared with KOH 10% and dissected for the examination of male and female genitalia. All the structures of taxonomic interest were observed under stereoscopic microscope and photographed. The specimens were deposited in the Entomological Collection of the "Instituto Fundación Miguel Lillo" (IFML), Tucumán, Argentina. In addition, nine specimens (5 females, 2 males, 2 without abdomen) that were discovered in the Florida State Collection of Arthropods were identified as *A. viridula*. This information was provided by C.A. Tauber, University of California, Davis. These specimens had been collected at incandescent, black and mercury vapor lights on October 10th, 2004 by J.E. Eger at 5 km SSE of Buena Vista, Hotel Flora & Fauna, 440 m (17°29.925' S, 63°39.128' W) (Fig. 1).

The new reports here present an extension of the reported range of *A. viridula* in Argentina (the first record from the province of Tucumán), and also the first country record from Bolivia, in the department of Santa Cruz.

In the specimens studied from Tucuman, five rings of flagellar setae were observed (Fig. 2b) also evident in the forewings was a jugal lobe, a bifurcation of the Media (M) apical to the 2m-cua crossvein, and a triangular intramedian cell, *im* (Fig. 2c).

The females present a suture between the T9 and the ectoproct and a system of eversible secondary sclerites that articulate with the subgenitale (Fig. 2d). The subgenitale is broad and piriform, with two apical lobes slightly separated by a shallow middle notch (Fig. 2f). The spermatheca is conical with a digitiform ventral impression and a sclerotized duct with two curves (Fig. 2e).

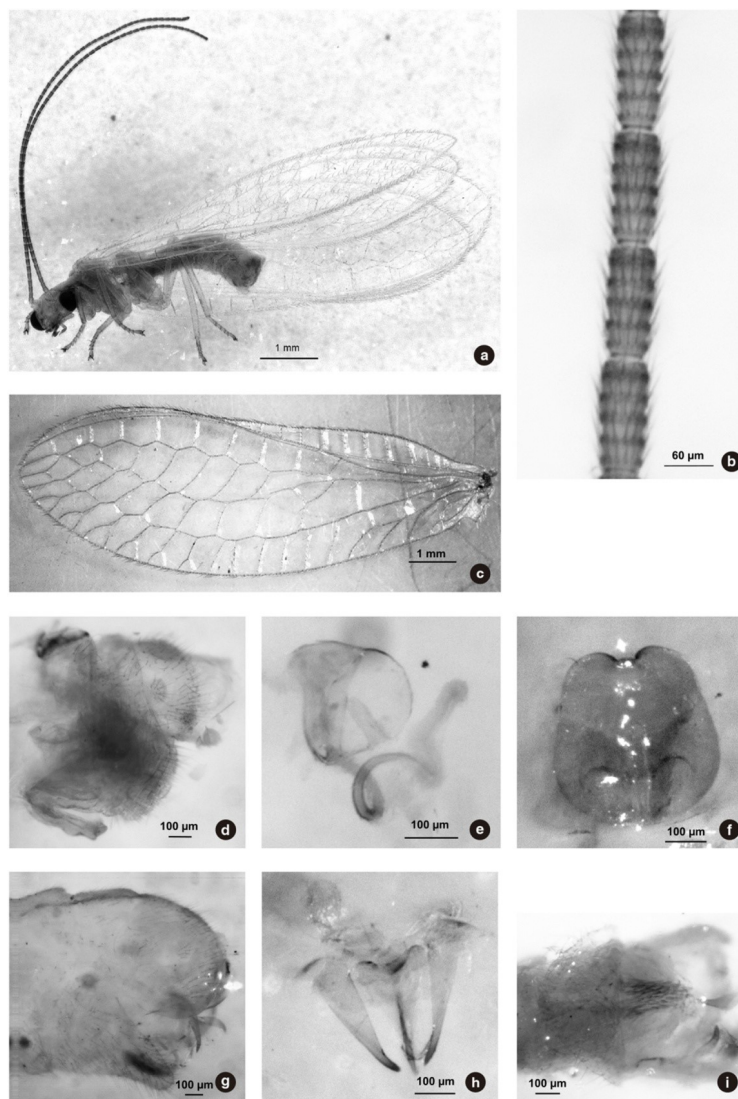


Fig. 2. *Asthenochrysa viridula*. a. General aspect. b. Flagellar segments. c. Forewing. d. Female abdominal apex, lateral. e. Spermatheca. f. Subgenitale. g. Male abdominal apex, lateral. h. Gonarcual complex, dorsal. i. Gonosaccal plate, ventral.

In the males, T9 and ectoproct are fused and rounded (Fig. 2g). Tignum and gonapsis are absent. The gonarcus is arcuate, the lateral arms are flattened dorsoventrally and extended posteriorly as sharp horns. The gonarcual bridge is narrow and arcuate. The arcessus is broad basally and pointed and down-curved apically (Fig. 2h). Between the gonosaccus and genital pore is a distinctive, heavily sclerotized plate bearing posteriorly directed spines (Fig. 2i).

Until now *A. viridula* has been reported in Argentina only in Misiones, in the northeast of the country, and in Brazil from Minas Gerais and Espírito Santo. The finding of this species in Tucumán extends its known distributional range by ~1,158 km towards the northwest of Argentina. Also, we report for the first time the presence of this very rare and systematically important species in Bolivia (Fig. 1).

We follow Morrone (2014) to characterize biogeographically the known distribution of *A. viridula*. In accordance with this recent

biogeographic scheme of the Neotropical region, all the records of *A. viridula* fall within the Chacoan subregion. Regarding the subdivisions of this subregion, the two new records in Argentina and Bolivia belong to the Chacoan dominion and Chaco province. On the other hand, all the previously known records are situated in the Parana dominion but in different provinces. The one of Espírito Santo (Brazil), is located in the Atlantic province, while the records of Minas Gerais (Brazil) and Misiones (Argentina) fall within the Parana province. These three provinces are adjacent, so the occurrence of *A. viridula* is not an unusual fact. Finally, we would like to add, as it was already noticed by Adams & Penny (1992), some doubts about the conspecificity between the Brazilian and Argentinian material. Our observed female specimens present a subgenitale slightly different from the previously known ones, also the male gonosaccal plate is narrower and longer than the one drawn in Adams & Penny (1992). Taking these observations into account, we would like to point out that a future detailed taxonomic revision of *Asthenochrysa* is needed.

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Notas de autor

raquelgandolfo@gmail.com