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Authors: Angelica Plata-Rueda, Luis C. Martínez, José C. Zanuncio, and José E. Serrao

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Dicyphus agilis (Hemiptera: Miridae), a new record as predator of aphids in tobacco crops in Colombia

*Angelica Plata-Rueda[1], Luis C. Martínez[2], José C. Zanuncio[1], and José E. Serrao[2]**

Miridae include several predatory species in *Dicyphus*, *Lygus* and *Macrolophus*, which have been used successfully in integrated pest management programs (Hatfield et al. 1983; Fauvel et al. 1987; Gabarra et al. 1988). These species are zoophytophagous, and they feed on whiteflies, aphids, thrips, mites and eggs of noctuid moths (Hatfield et al. 1983; Fauvel et al. 1987; Barnadas et al. 1998). The relationship between the abundance of zoophytophagous Miridae and levels of damage is not simple, so each species should be assessed separately in relation to damage in a given crop (Gillespie & McGregor 2000).

Miridae have been poorly studied in Colombia, and data are lacking on the number of species and morphological differences between harmful and beneficial species (Carvalho 1946; López-Ávila et al. 2001). Various species of mirids have been found simultaneously on leaves and flowers of Solanaceae of agricultural importance in Colombia (Valderrama et al. 2007). Species of the genus *Dicyphus* Fieber are generalist predators reported in South America to be associated with Bromeliaceae, Solanaceae and Aracaceae in urban and rural areas (Carvalho 1946).

The objective of this study was to redescribe the external structures and genitalia of adult *D. agilis*, in order to contribute to the correct identification and reporting of this predator in Colombia, and to avoid confusion with sympatric phytophagous species.

In the field, adults of *D. agilis* were hand-collected on tobacco crops in the Municipality of San Gil, Santander, Colombia (N 06°33' W 73°08'), with average conditions of 24.32 °C, 67 ± 82% RH, 1,550-2,239 h of sunshine/year and 1,319 mm annual rainfall. The insects were captured preying on *Myzus persicae* Sulzer (Hemiptera: Aphididae) nymphs. The insects were killed in 70% ethanol and transferred to the Laboratory of Entomology, National University of Colombia in Bogotá-DC.

A detailed morphological description of the most important characters of *D. agilis* was made by cladistics analysis (Jung & Lee 2012) and by comparison with taxonomic keys of Miridae (Carvalho 1947). For study of the genitalia, specimens were dried with the abdomen separated from the body, and then the abdomen was heated in 10% NaOH. After the structure became soft and transparent it was transferred to glycerin. Abdominal segment IX including the genital styles was drawn in the dorsal, left lateral and caudal views using a digital camera under stereomicroscope.

Males and females have an oblong-elongated and symmetrical body (Figs. 1 and 2). Opisthorhynchous head, small, convex, sloping and black with setae on the vertex. Base of the clypeus front sloping, clypeus separated by a deep groove and base marked on the middle line of the eyes. Antennae filiform, yellow with 4 segments and bristles on all segments. Compound eyes, oblong-reniform, red, separated from the anterior margin of pronotum. Sucking mouthparts yellow, extending among the middle and posterior coxae.

Thorax strongly punctate, slightly narrower towards the abdomen (Fig. 3). Pronotum extended to the middle of the thorax, slightly away from mesoscutum, black with a central green spot. Black collar with setae directed towards the vertex. Hemelytron with humeral angle rounded, yellow, translucent, finely dotted and slightly rough (Fig. 4). Membranous wing white and translucent, with two cells, veins pale. Legs yellow and long (Fig. 5). Coxae conical; trochanter with coxotrochanteral articulation, front and back visible. Femora large, robust, widened in the proximal part, with setae and six spots. Tibiae enlarged with dark spines. Tarsus with 2 tarsomeres and posterior tarsus slender with curved claws. Pseudopulvilli with short lines in the distal margin.

Hologastric abdomen with 10 abdominal segments; laterally compressed and transversely compressed (Figs. 1, 2). Terminal ventrites reduced, not extending to the distal margin of the wings. Males with brown ventrites, females with green ventrites.

Male genitalia composed of ectosome with phallus inside; seminal duct with endosome and conjunctiva containing the ejaculatory reservoir, seminal vesicle, and testes (Fig. 6). Parameres asymmetrical. Left paramere hooked; sickle sharp with long setae on the margin of the alveoli.

Dicyphus agilis shares characteristics with Bryocorinae, whose bodies are elongated, fragile and agile because of their long legs and antennae (Carvalho 1946; Schuh 1984). The color in Bryocorinae species is inconspicuous but there is a pronotal collar (Gabarra et al. 1988). Unlike other species in Colombian Bryocorinae, *D. agilis* is yellow-brown with dark spots on the head, hemelytra and legs. The pilosity is abundant on antennae and legs; the thorax is black with black spots. Some areas of the body such as head, callosities of pronotum and venter of thorax, are glossy. This relationship allows the insect to run and to avoid plant structures on the leaves of Solanaceae, and to easily reach its prey.

The genus *Dicyphus* has a Holarctic and Neotropical dispersion; genera such as *Macrophagus* and *Nesidiocoris* were found in Colombia to have several species not yet identified (Carvalho 1947; Valderrama et al. 2007). Under natural conditions, *D. agilis* was found in Bogotá at 2,650 m asl (Colombia), associated with *Sparmannia africana* L. (Malvales: Malvaceae) and *Nicotiana tabacum* L. (Solanales: Solanaceae), as predator of *Aphis gossypii* and *Myzus persicae* (Hemiptera: Aphididae).

The study of external morphology and genitalia of *D. agilis* contributes to the knowledge of this species, its relationship to other species of Bryocorinae, its status as a predator and may be incorporated into biological control programs in Colombia.

[1]Departamento de Entomologia, Universidade Federal de Viçosa, 36570-000, Viçosa, Minas Gerais, Brazil
[2]Departamento de Biologia Geral, Universidade Federal de Viçosa, 36570-000, Viçosa, Minas Gerais, Brazil
*Corresponding author; E-mail: jeserrao@ufv.br

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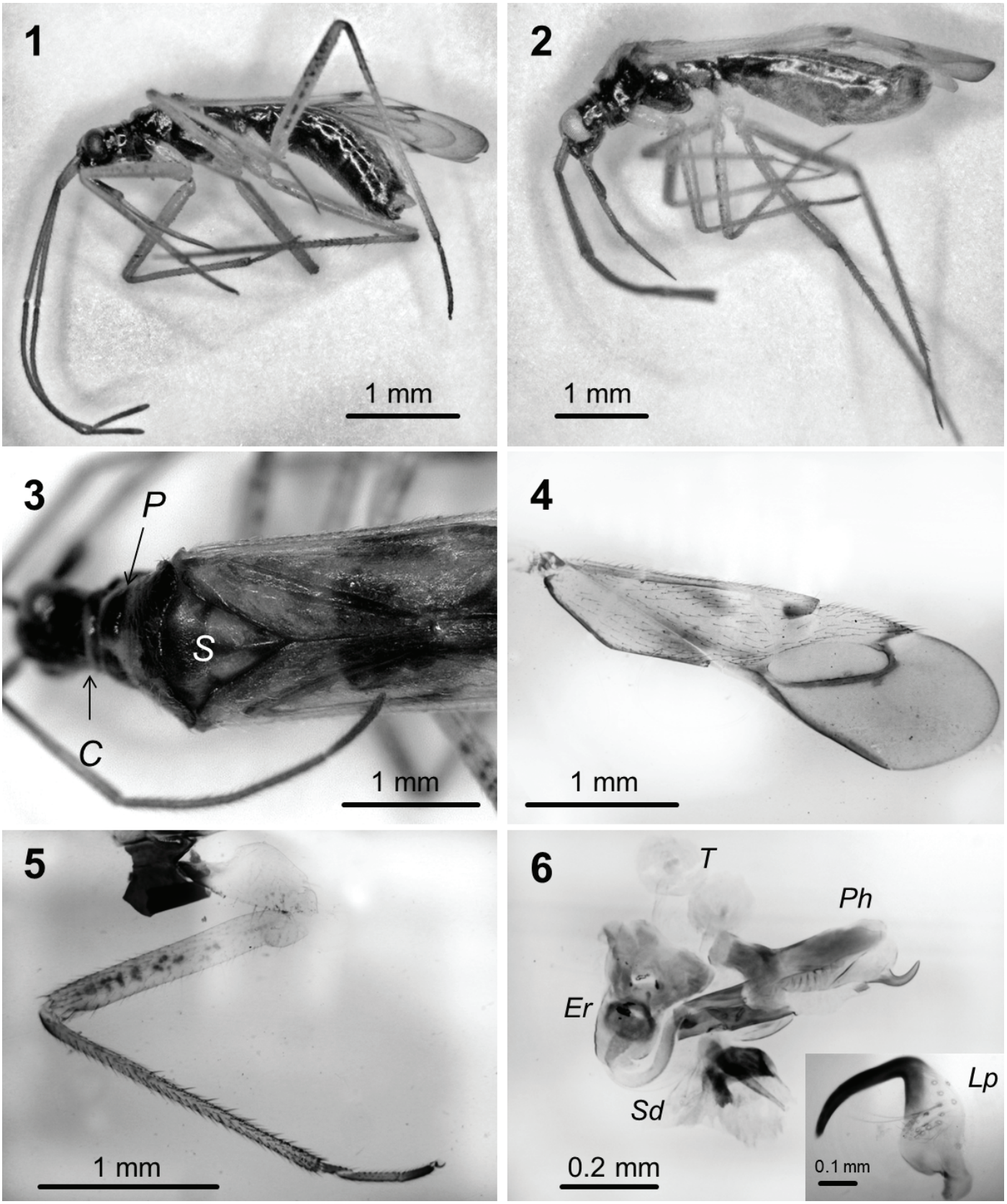

Figs. 1-6. *Dicyphus agilis* (Hemiptera: Miridae) habitus. 1) Male with larger antennae and brown ventrites. 2) Female with short antennae and green ventrites. 3) Thorax, collar *C*, pronotum *P* and scutellum *S*. 4) Hemelytra. 5) Hindleg. 6) Male genitalia, phallus *Ph*, seminal duct *Sd*, ejaculatory reservoir *Er* and testes *T* and left paramere *Lp*.

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Summary

Dicyphus agilis Uhler (Hemiptera: Miridae) is reported for the first time in Colombia as a predator of aphids. This study describes the external morphology and genitalia of the most prominent structures of males and females of *D. agilis,* which are necessary to differentiate this species from others with phytophagous habits in Colombia.

Key Words: biological control; genitalia; sexual dimorphism; Solanaceae; stink bug predator

Sumario

Dicyphus agilis Uhler (Hemiptera: Miridae) es reportado por primera vez en Colombia como depredador de pulgones. Este estudio describe la morfología externa y genitalia basada en las estructuras más prominentes entre machos y hembras de *D. agilis*. Las características morfológicas de *D. agilis* son necesarias para diferenciar esta especie de otras con hábitos fitófagos en cultivos en Colombia.

Palabras Clave**:** Control biológico; chinche depredador; dimorfismo sexual; genitalia; Solanaceae

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