

1 **Mermithid nematodes parasitizing leafhoppers for the first time in South America**

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3 Nematodos mermítidos parasitando chicharritas por primera vez en Sudamérica

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23 **Abstract**

24 Nematodes of the family Mermithidae were found parasitizing adults and nymphs of the
25 species *Hortensia similis* (Walker, 1851) (Auchenorrhyncha: Cicadellidae). The host specimens
26 were collected from weeds associated to citrus orchards located in Corrientes, Argentinean
27 province, during a biodiversity study in 2015. As far as we know, this is the first
28 Southamerican example of leafhoppers parasitized by mermithids.

29 **Key words.** Mermithidae, Hemiptera, parasitism, Argentina.

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31 **Resumen**

32 Se encontraron nematodos de la familia Mermithidae parasitando ninfas y adultos de
33 *Hortensia similis* (Walker, 1851) (Auchenorrhyncha: Cicadellidae). Los especímenes
34 hospedadores fueron recolectados en malezas asociadas a huertos de cítricos ubicados en la
35 provincia de Corrientes, Argentina, durante un estudio de biodiversidad en 2015. Hasta
36 donde sabemos, este es el primer ejemplo de chicharritas parasitadas por un mermítido en
37 Sudamérica.

38 **Palabras clave.** Mermithidae, Hemiptera, parasitismo, Argentina.

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40 Mermithids are obligate parasites of invertebrates and most of them have been found to be
41 parasites of insects (Poinar 1975, Poinar and Stockwell 1988, Poinar and Curčić, 1992). Poinar
42 (1975) found that most of mermithid parasitisms in Hemiptera are probably accidental infections,
43 however, high mortality levels due to infections of the genus *Hexameris* (Steiner 1924) by
44 mermithids were recorded in Asian delphacid pests (Auchenorrhyncha: Delphacidae) (Waloff and
45 Jervis 1987). Helden (2008) cited the first extant nematode parasitizing adults of two other

46 species of Auchenorrhyncha in Europe, the leafhopper *Macustus grisescens* (Zetterstedt 1828)
47 (Cicadellidae), and the planthopper *Javesella dubia* (Kirschbaum 1868) (Delphacidae). In North
48 America mermithids have already been recorded parasitizing three species of Delphacidae and
49 26 species of Cicadellidae from Kentucky, USA (Sperka and Freytag 1975). In this work, we
50 present the first example of mermithid infection in adults and larvae of Cicadellidae for South
51 America.

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53 Sampling was carried out at the Estación Experimental Agropecuaria, INTA Bella Vista
54 (28° 28' 00" S - 59° 03' 00" W) located in Corrientes, Argentinean province during 2013-
55 2015. Insect hosts were collected from weeds around a *Citrus sinensis* (L.) Osbeck orchard using
56 an entomological sweep net. The collected specimens were preserved almost
57 immediately in tubes with 70% ethanol. Due this preservation method, it
58 has not been possible to identify the mermithids to species level,
59 as they could not reach the adult stage.

60 Host species were identified based on Young (1977) and prepared following the
61 technique proposed by Mejdalani (1998). The parasitized specimens were deposited in the
62 Entomological Collection of Museo de La Plata, Buenos Aires, Argentina.

63
64 Adults and larvae of the species *Hortensia similis* (Hemiptera: Cicadellidae) were
65 detected carrying mermithid nematodes (Fig. 1). The parasites were found partially emerged
66 from the host, mainly from the ventral side of the body (Fig. 1b). Of the 2.133 captured
67 specimens of *H. similis* only 6 nymphs of fifth instar and one adult female presented parasitism.
68 This low rate of parasitism (0.33%), agrees with that presented by Sperka and Freytag (1975)
69 who found a mermithid parasitism rate of only 0.3% from 60.000 Auchenorrhyncha specimens

70 collected. We believe that this low rate of parasitism is due to the vegetation physiognomy,
71 along with the climatic and soil conditions (e.g. heavy rains, deluge) of the sampling site.

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74 **AUTHOR'S CONTRIBUTIONS**

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77 **CONFLICT OF INTEREST**

78 The authors declare that they have not conflict of interest.

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100 World Cicadellini and the genus Cicadella. Tech. bul. 239: 1-1135.
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- 104 **Figure 1. a.** Nymph of *Hortensia similis* with a partially emerged mermithid. **b.** Adult of
105 *Hortensia similis* with a partially emerged mermithid (ventral view). **c.** Post-parasitic juvenile
106 manually removed from the host. Scale bar a and b: 3 mm, c: 5mm.



