

SYSTEMATICS

Description of a New Genus and Species of Eucoilinae (Hymenoptera: Cynipoidea: Figitidae) Parasitoid of Ephydriidae (Diptera)

N. B. DÍAZ,^{1,2} F. E. GALLARDO,¹ A. L. GADDI,¹ AND G. CABRERA WALSH³

Ann. Entomol. Soc. Am. 102(4): 603–607 (2009)

ABSTRACT *Hydrelliaeucoila egeria* (Hymenoptera: Cynipoidea: Figitidae), a new genus and species obtained from pupae of *Hydrellia* sp. (Diptera: Ephydriidae) mining in *Egeria densa* Planchon (Hydrocharitaceae), is described. Diagnostic photographs and data about the biology of this parasitoid are included.

KEY WORDS *Hydrelliaeucoila egeria*, Eucoilinae, *Hydrellia*, Ephydriidae, *Egeria densa*

The Eucoilinae are the best represented subfamily of Figitidae in the Neotropics (Díaz et al. 2008). Thirty-one species, belonging to 22 genera, have been thus far reported for Argentina. They are all parasitoids of Muscomorpha Diptera (Buffington and Ronquist 2006).

The objective of this work is to describe a new genus and species of Eucoilinae obtained from pupae of *Hydrellia* sp. (Diptera: Ephydriidae), collected during a study of natural enemies of Brazilian waterweed (*Egeria densa* Planchon: Hydrocharitaceae) carried out at the South American Biological Control Laboratory, USDA–ARS, in Argentina. This leafmining shore fly was found to attack *E. densa* throughout its distribution in Argentina.

Materials and Methods

Ninety-two specimens (87 females and five males) were studied. They are deposited in the collection of the División Entomología of the Museo de La Plata (MLP), Argentina. Descriptions follow the terminology used by Weld (1952), Nordlander (1982), and Fontal-Cazalla et al. (2002). Reported measurements are relative, except for the total length (from head to abdominal tip, without the antennae), which is expressed in millimeters. The photographs were taken with a scanning electron microscope (model JSM-6360 LM, MLP, JEOL, Tokyo, Japan).

Results and Discussion

Hydrelliaeucoila Díaz & Gallardo gen. nov.

Type Species. *Hydrelliaeucoila egeria* Díaz & Gallardo sp. nov., by present designation and monotypy.

Female and Male. Total length, female 1.4–1.8 mm, male 1.2–1.6 mm. Body shiny black; metasoma reddish brown antero-ventrally. Antennae, veins and legs yellowish brown; darker in male.

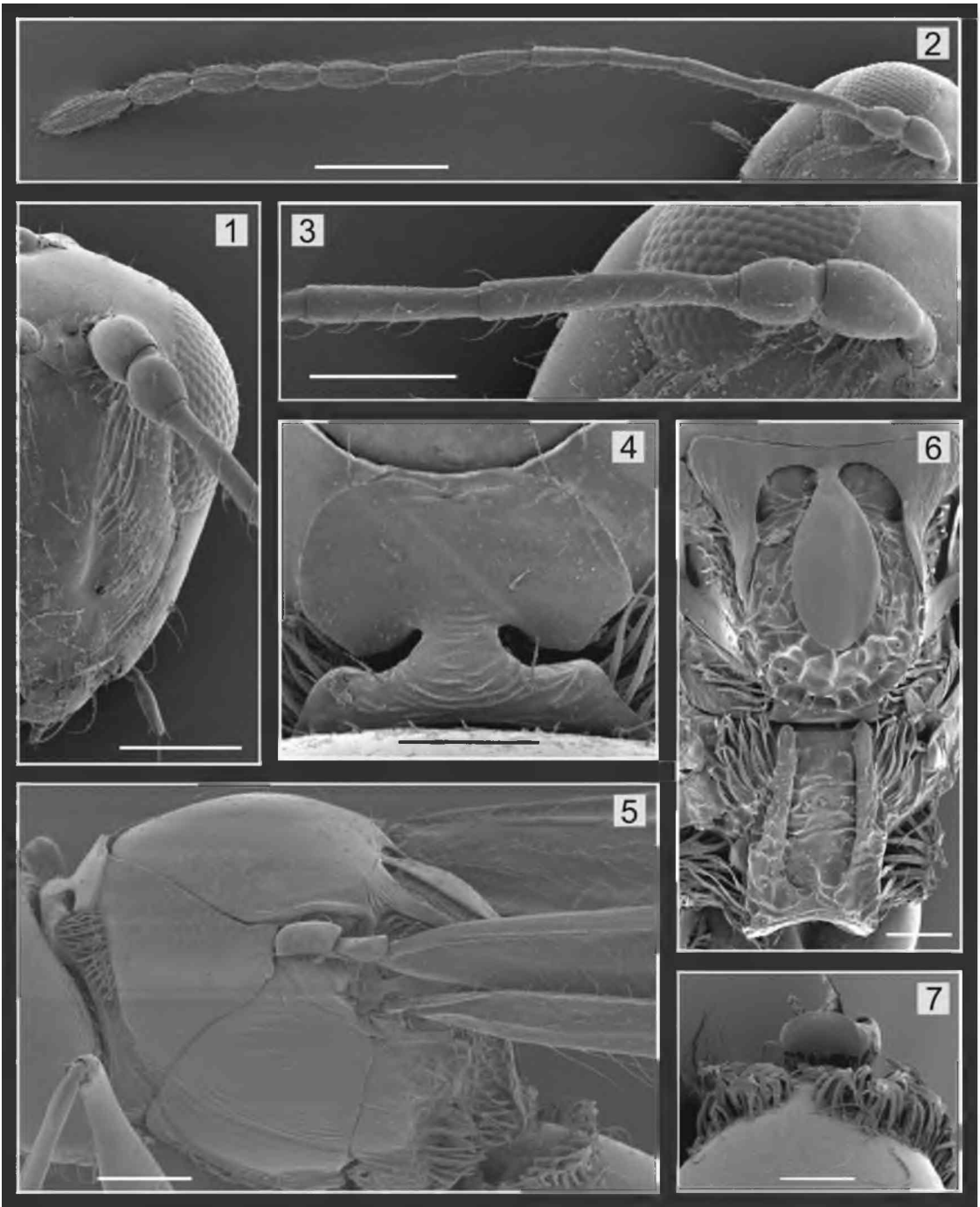
Head in anterior view slightly higher than broad. Vertex smooth with a few short hairs. Internal ocular furrows straight, originated at the height of antennal sockets. Malar ridge present. Face pubescent, area between internal ocular furrow, internal ocular margin, and malar ridge, striated. Compound eyes small, scarcely protruding. Genae rounded. Occiput striated. Female antennae 13-segmented, article 3 straight and distinctly longer than 4, club inconspicuous consisting of seven articles. Male antennae 15-segmented, filiform, article three strongly curved and distally swollen, longer than the following articles; article four straight, similar to the ensuing flagellar articles.

Mesosoma, in lateral view, longer than high. Pronotal plate with a broad median bridge, lateral cavities open; angle between the posterior and anterior parts of pronotal plate $\approx 90^\circ$ in lateral view. No ridges behind the sides of posterior part of pronotal plate. Sides of pronotum convex, with a pubescent area on the upper half of the ventral margin (beneath pronotal plate), sparse hairs scattered over the side of pronotum; inferior part striated. Mesoscutum convex in profile, in dorsal view as long as wide, smooth; shallow traces of parapsidal furrows and antero-admedian lines present; notauli absent; suprategular furrows narrow and deep. Lateral bars relatively long, longitudinally striate. Scutellar foveae slightly sculptured, oval, shorter than wide, with a rather small circular window under lateral bar. Lateral depression of scutellum

¹ División Entomología, Museo de La Plata, Paseo del Bosque, 1900 La Plata, Argentina

² Corresponding author, e-mail: ndiaz@museo.fcnym.unlp.edu.ar

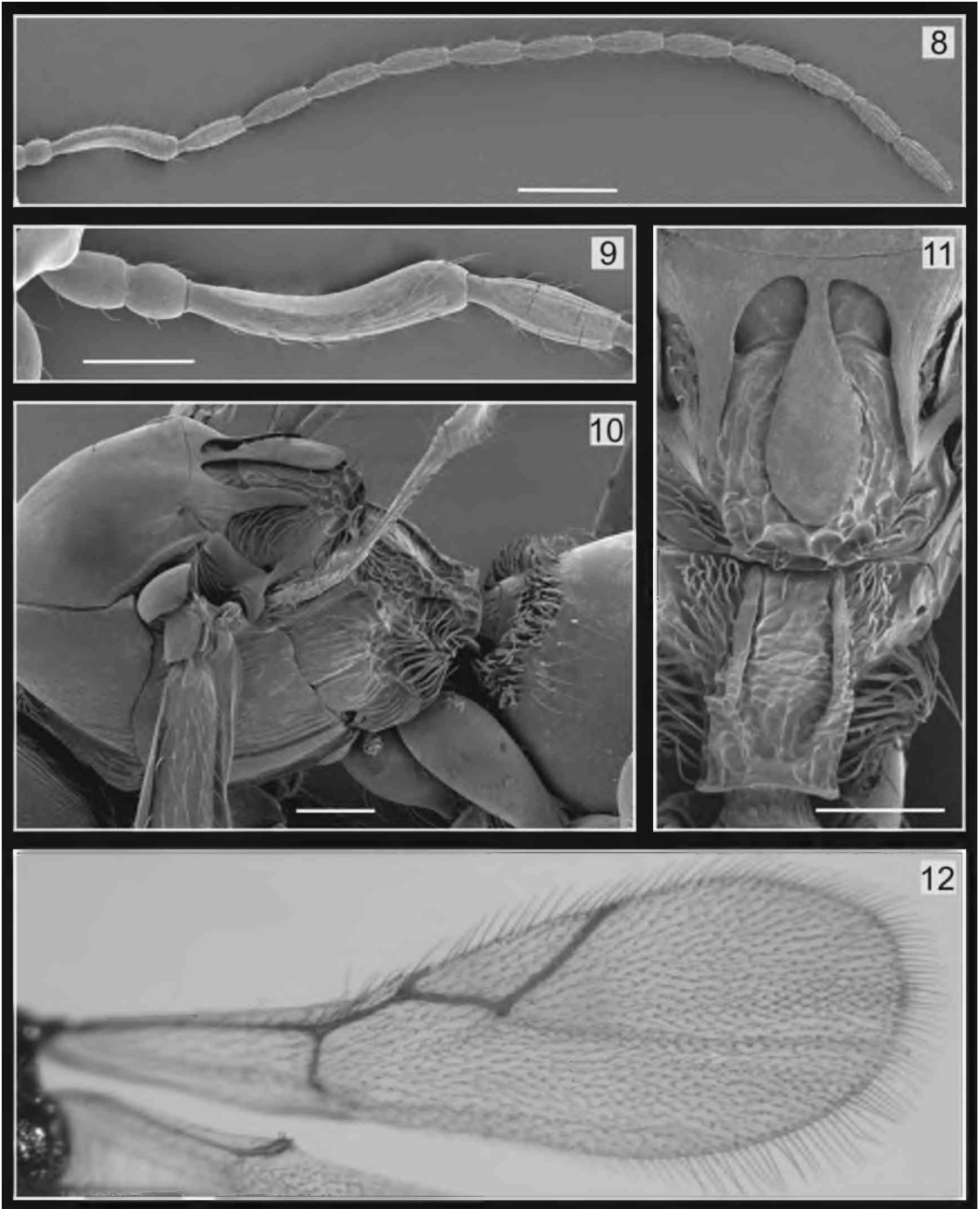
³ South American Biological Control Laboratory, USDA–ARS, Bolarivar 1559, 1686 Hurlingham, Argentina



Figs. 1-7. *Hydrelliaeucoila egeria* Diaz & Gallardo, female. 1. head (in front view) (180 \times); 2. antenna (80 \times); 3. antennal articles 1-4 (180 \times); 4. pronotal plate (50 \times); 5. mesosoma (in lateral view) (190 \times); 6. scutellum and propodeum (dorsal view) (270 \times); 7. base of the large tergite of metasoma (400 \times). Scale bars = 100 μ m (1, 3, and 5), 200 μ m (2), and 50 μ m (4, 6, and 7).

indistinctly delineated posteriorly. Scutellum disk coarsely sculptured, reticulate-rugose; posterior margin rounded. Scutellar plate flat, not elevated above the disk, drop-shaped, longer than wide; surface

smooth without glandular release pit. Anterodorsal part of mesopleuron depressed; middle and ventral part, above mesopleural carina with strias; subalar pit absent. Metapleuron high and subrectangular, sculp-



Figs. 8–12. *Hydrelliaeucoila egeria* Diaz & Gallardo. male. 8. antenna (70 \times); 9. antennal articles 1–4 (220 \times); 10. mesosoma (in lateral view) (150 \times); 11. scutellum and propodeum (dorsal view) (170 \times); 12. forewing (80 \times). Scale bars = 200 μm (8), 100 μm (9–11).

tured, anteroventral cavity conspicuous and pubescent, hind margin indistinct. Forewings apically rounded; completely hyaline, densely pubescent and with long ciliation along margins; marginal cell not deep, anteriorly open. Mid coxae with a hairy

patch dorsolaterally, hind coxae with a hairy patch posterodorsally. Propodeal carinae straight and subparallel, enlarged posteriorly (lyre-shape). Propodeum hairy except on the carinae, area between them, and on the nuca. Metasoma sessile; distally

smooth. Hairy ring on base of the large tergite complete except for a very short interruption dorsally, broad and dense; with a row of hairs on each side behind the hairy ring.

Etymology. In allusion to host species, *Hydrellia* sp.

Distribution. The geographical range of the genus is probably extensive in the Neotropics, but at present it is known from Argentina only.

Remarks. Forshage et al. (2008), Forshage and Nordlander (2008), and Buffington (2009) provide a tribal classification to genera of Eucilinae and recognize the following tribes: Diglyphosemini Belizin, Kleidotomini Hellén, Ganaspini Belizin, Trichoplastini Kovalev, Glauraspidiini Belizin, Eucilini Thomson, and Zaeucoilini Buffington.

Ganaspini largely coincides with the "Zamischus group" of Buffington et al. (2007), thus uniting the "Ganaspis group" and the "Neotropical grade" plus the majority of the "Chrestosema group" from the analysis of Fontal-Cazalla et al. (2002). *Hydrelliaeucoila* gen. nov. is here included tentatively in this tribe, based on the following combination of characters (some of them phylogenetically important sensu Forshage and Nordlander (2008): smaller wasps. Third antennal article of male antennae modified (elongated and curved), fourth antennal article cylindrical. Mesosoma not much longer than high, without subalar pits; pronotal plate without lateral bridges, thus with laterally open lateral pits; mesoscutum without notauli; scutellum with reticulate structure. Wings rounded apically. Mid- and hind coxae with a hairy patch dorsolateral and posterodorsal respectively. Hairy ring on metasomal base shortly interrupted dorsally.

Hydrelliaeucoila differs from Ganaspini genera by scutellar plate without glandular release pit (autapomorphy?); a phylogenetic analysis will be necessary to investigate the phylogenetic position and monophyly of this new genus.

***Hydrelliaeucoila egeria* Díaz & Gallardo n. sp.**
(Figs. 1–12)

Etymology. In allusion to *E. densa*, waterweed in which the host develops.

Female. Body length 1.4.

Head (Figs. 1–3). Height to width is 7.0:5.5. Antennae yellowish, with the scape, pedicel and last articles of the flagellum darker; article 3 longer than 4 (3.0: 2.0); 7–13 with rhinaria. Relative length of antennal articles 1.5:1.0:3.0:2.0:1.9:1.9:1.9:1.8:1.7:1.6:1.6:2.5.

Mesosoma (Figs. 4–6). Length to height of mesosoma is 20: 16. Pronotal plate with very few hairs; viewed anterodorsally with transversal striae on anterior part; posterior part smooth; dorsal margin of posterior part convex. Width to length of mesoscutum is 14.0: 13.5. Inferior part of pronotum side slightly striated. Scutellar plate twice as long as wide (8.0: 4.0). Middle and ventral part of mesopleuron, above mesopleural carina with few striae. Metapleuron slightly sculptured. Radial cell of forewings more than three times long as wide (2.8: 0.8), first radial abscissa shorter than second (1.2: 2.0).

Metasoma (Fig. 7). Large tergite ending in a deep concavity.

Male. Similar to female. Body length 1.2 mm.

Head (Figs. 8 and 9). Antennae brown; first, second and proximal portion of third article clearer, article 3 longer than 4 (3.8: 2.0); 3–15 with rhinaria. Relative length of antennal articles 1.5:0.8:3.8:2.0:2.0:2.0:2.0:2.0:2.0:1.9:1.9:1.9:2.2.

Mesosoma (Figs. 10–12). Width to length of mesoscutum is 12.0: 9.0. Inferior part of pronotum side strongly striate. Scutellar plate more than twice as long as wide (6.5:2.5). Middle and ventral part of mesopleuron, above mesopleural carina and metapleuron strongly striate.

Metasoma. Large tergite ending in a cuadrangular concavity.

Distribution. Argentina.

Type Locality. Buenos Aires: Otamendi.

Biology. *Hydrelliaeucoila egeria* Díaz & Gallardo sp. nov. parasitizes pupae of *Hydrellia* sp. These pupae are found fixed by the caudal spiracles in the stems of *E. densa* at the leaf axils of the last leaf the fly larva fed in. The gravid female parasitoid flies or skids on the water surface until it locates *E. densa* leaves or flowers breaking the water surface. It then goes underwater walking down the stem, enveloped in an air bubble, until it locates a host pupa. After it lays an egg in it, the female continues exploring the stem for more pupae. During the warm season, the parasitoid takes around one month to develop. Parasitoids that have not emerged by the end of fall diapause as larvae in the host puparium until the spring. The adult parasitoid ruptures the puparium along the circular fissure at the anterior end of the puparium, as the host fly would, and floats to the surface enveloped in a gas bubble from the puparium. Laboratory observations in microcosms reveal that the female parasitoid sometimes explores branches devoid of fly pupae, so apparently it selects *E. densa* branches at random, and not by detecting the host fly. Alternatively, it may detect damaged plant tissues, which may or may not host *Hydrellia* pupae, because the larvae often drop out of the host leaf to search for undamaged verticils (Cabrera Walsh and Mattioli 2007, 2008).

Material Examined. HOLOTYPE, 1 ♀, ARGENTINA: Buenos Aires, Otamendi, I-2007, obtained from puparium of *Hydrellia* sp. on *Egeria densa*, Cabrera col., (MLP). PARATYPES, 3 ♀♀, same data as holotype; 3 ♂♂ same date as holotype except, V-2008 (MLP).

Other Material Examined. ARGENTINA: Buenos Aires, 15 ♀♀, Otamendi, I-2007; 68 ♀♀ and 2 ♂♂, Otamendi, V-2008, obtained from puparium of *Hydrellia* sp. on *Egeria densa*, Cabrera col. (MLP).

Acknowledgments

We thank Cecilia Gorretta (Comisión de Investigaciones Científicas [CIC]), E. Paulina Hernandez (CIC), and Federico Mattioli (Monsanto Argentina) for technical support; the editor and an anonymous referee for improving the manuscript; and the Consejo Nacional de Investigaciones Científicas y Técnicas, Universidad Nacional de La Plata, and

the South American Biological Control Laboratory, USDA-ARS., for constant support.

References Cited

- Buffington, M.** 2009. Description, circumscription and phylogenetics of the new tribe Zaeucoilini (Hymenoptera: Figitidae: Eucoilinae), including a description of a new genus. *Syst. Entomol.* 34: 162–187.
- Buffington, M., and F. Ronquist.** 2006. Familia Figitidae, pp. 829–838. *In* F. Fernández and M. Sharkey [eds.], *Introducción a los Hymenoptera de la región Neotropical*. Sociedad Colombiana de Entomología y Universidad Nacional de Colombia. Bogotá D.C.
- Buffington, M., J.A.A. Nylander, and J. M. Heraty.** 2007. The phylogeny and evolution of Figitidae (Hymenoptera: Cynipoidea). *Cladistics* 23: 403–431.
- Cabrera Walsh, G., and F. Mattioli.** 2007. Brazilian waterweed. (<http://www.usda-sabcl.org>).
- Cabrera Walsh, G., and F. Mattioli.** 2008. Brazilian waterweed. (<http://www.usda-sabcl.org>).
- Díaz, N. B., F. E. Gallardo, A. L. Gaddi, M. Jiménez, P. Ros-Farré, J. Paretas-Martínez, and J. Pujade-Villar.** 2008. Avances en el conocimiento de la Figitidae neotropicales (Hymenoptera, Cynipoidea), pp. 141–158. *In* J. Llorente Bousquets and A. Lanteri [eds.], *Contribuciones taxonómicas en órdenes de insectos hiperdiversos*. Las Prensas de Ciencias, Universidad Nacional Autónoma de México, México D.F.
- Fontal-Cazalla, F., M. Buffington, G. Nordlander, J. Liljeblad, P. Ros-Farré, J. L. Nieves-Aldrey, J. Pujade-Villar, and F. Ronquist.** 2002. Phylogeny of the Eucoilinae (Hymenoptera: Cynipoidea: Figitidae). *Cladistics* 18: 154–199.
- Forshage, M., and G. Nordlander.** 2008. Identification key to European genera of Eucoilinae (Hymenoptera, Cynipoidea, Figitidae). *Insect Syst. Evol.* 39: 341–359.
- Forshage, M., G. Nordlander, and F. Ronquist.** 2008. *Quasimodoana*, a new Holarctic genus of eucoiline wasps (Hymenoptera, Cynipoidea, Figitidae), with a phylogenetic analysis of related genera. *Syst. Entomol.* 33: 301–318.
- Nordlander, G.** 1982. Systematics and phylogeny of an interrelated group of genera within the family Eucoilidae (Insecta: Hymenoptera: Cynipoidea). Ph.D. dissertation, University of Stockholm, Stockholm, Sweden.
- Weld, L.** 1952. Cynipoidea (Hym.) 1905–1950. Privately printed. Ann Arbor, MI.

Received 27 November 2008; accepted 15 April 2009.