



## Description of three new species of *Helconichia* Sharkey & Wharton (Hymenoptera: Braconidae: Ichneutinae) with a revised key to all species

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### Abstract

Three new species of *Helconichia* Sharkey & Wharton are described: *H. sarria* Sharanowski and Sharkey, **sp. nov.** and *H. reina* Sharanowski and Sharkey, **sp. nov.** from Colombia, and *H. brenesi* Sharanowski and Sharkey, **sp. nov.** from Costa Rica. These species double the number of described species of *Helconichia*, bringing the total number to six. The key of Sharkey and Wharton (1994) is revised to include the new species. Lateral habitus images of all six holotypes of the species of *Helconichia* are included, in addition to images of character states used in the identification key.

**Key words:** Ichneutinae, *Helconichia*, Neotropical region, identification key

### Introduction

Ichneutinae is a small braconid subfamily with only 10 genera worldwide and 83 described species (Yu 2005). Ichneutinae is unique in that it is one of only a few subfamilies of Braconidae with species known to parasitize larval Hymenoptera. Most members are koinobiont endoparasitoids of sawflies, with the majority of host records from larval tenthredinids (Shaw & Huddleston 1991). Sharkey and Wharton (1994) proposed *Helconichia* to accommodate three newly discovered species collected in lowland regions of the Neotropics: *Helconichia areolata* Sharkey & Wharton from Ecuador, *H. trichiops* Sharkey & Wharton from Brazil, and *H. trichopteryx* Sharkey & Wharton from Brazil.

A cladistic analysis demonstrated that the three aforementioned species share a synapomorphic feature of hind wing with vein R curved sharply posteriorly (Sharkey & Wharton 1994). Interestingly, all three species also possess a complete occipital carina, a plesiomorphic state not present in other ichneutines (Sharkey 1997). Based on an analysis of ground-plan coding of 36 morphological characters, Sharkey and Wharton (1994) recovered *Helconichia* as sister to the remaining genera of Ichneutinae (see Sharkey 1996 for a corrected morphological dataset). Unfortunately, nothing is known about the biology of any species of *Helconichia*.

Recent arthropod diversity surveys in the Neotropical region<sup>1,2</sup> led to the discovery of three new species of *Helconichia*. The new species described herein increase the distribution range for *Helconichia* and double the number of described species to six. Interestingly, two of the new species (*H. sarria* Sharanowski and Sharkey, **sp. nov.** (Fig. 1A) and *H. reina* Sharanowski and Sharkey, **sp. nov.** (Fig. 1B)) were collected from regions of

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1. Insect Survey of a Megadiverse Country:  
Colombia: <http://www.sharkeylab.org/biodiversity/static.php?app=colombia&&page=index>
  2. Arthropods of La Selva (ALAS): <http://viceroy.eeb.uconn.edu/ALAS/2005.html>

high elevation in Colombia, and the third species (*H. brenesi* Sharanowski and Sharkey, **sp. nov.** (Fig. 2A)) is from a high elevation site in Costa Rica.

## Methods

General morphological terminology follows Sharkey and Wharton (1997). Photographs were taken with a JVC KY-F75 3CCD digital camera and prepared with the Archimed™ software program by Microvision Instruments. Measurements were taken with a digital micrometer using a Leica MZ12-5 stereoscope. Each measurement was taken three times and the mean reported as the final measurement. A range is reported to represent intraspecific variation among the holotype and all paratypes. If there is allotypic variation, it is reported separately. The three species described herein were all collected in Malaise traps as part of large arthropod diversity surveys as mentioned above. All species were compared with type specimens of *H. areolata* (Fig. 2B), *H. trichiops* (Fig. 3A), and *H. trichopteryx* (Fig. 3B) from the Canadian National Collection of Insects, Arachnids, and Nematodes (CNC) of Agriculture and Agri-Food Canada.

## Descriptions

### *Helconichia sarria* Sharanowski and Sharkey, **sp. nov.**

**Diagnosis.** *Helconichia sarria* can be distinguished from all other species of *Helconichia* by the following combination of characteristics: mesosoma melanic in color and forewing vein (RS+M)b present.

Females (Figs. 1A; 4H). **Length:** 3.08–3.44 mm.

**Color:** Melanic except as follows: clypeus, mandible, labial and maxillary palpi, ovipositor, metasomal lateral tergites 1–3, and metasomal sterna 1–2 testaceous; all legs testaceous except hind tibia and tarsus and apical tarsomeres of foreleg and midleg brown; wings lightly infusate.

**Head:** Antenna with 23–24 flagellomeres; setae of eye long, at least 3X diameter of one ommatidium; head without Y-shaped, lamellate carina between antennal sockets; vertex smooth and uniformly setose, most setae longer than diameter of one ommatidium.

**Mesosoma:** notaulus deeply crenulate; median areola of metanotum not bifurcated with horizontal carina; propodeum without posterior median longitudinal carina; propodeal areola wide, ratio of areola width (at widest point):length 0.71.

**Wings:** forewing (RS+M)b present, ratio of 2RS:3RSa length approximately 1:1 (range = 0.95–1.03), anal region uniformly setose (Fig. 4H); hind wing with 3 hamuli, anal region uniformly setose, subbasal cell uniformly setose.

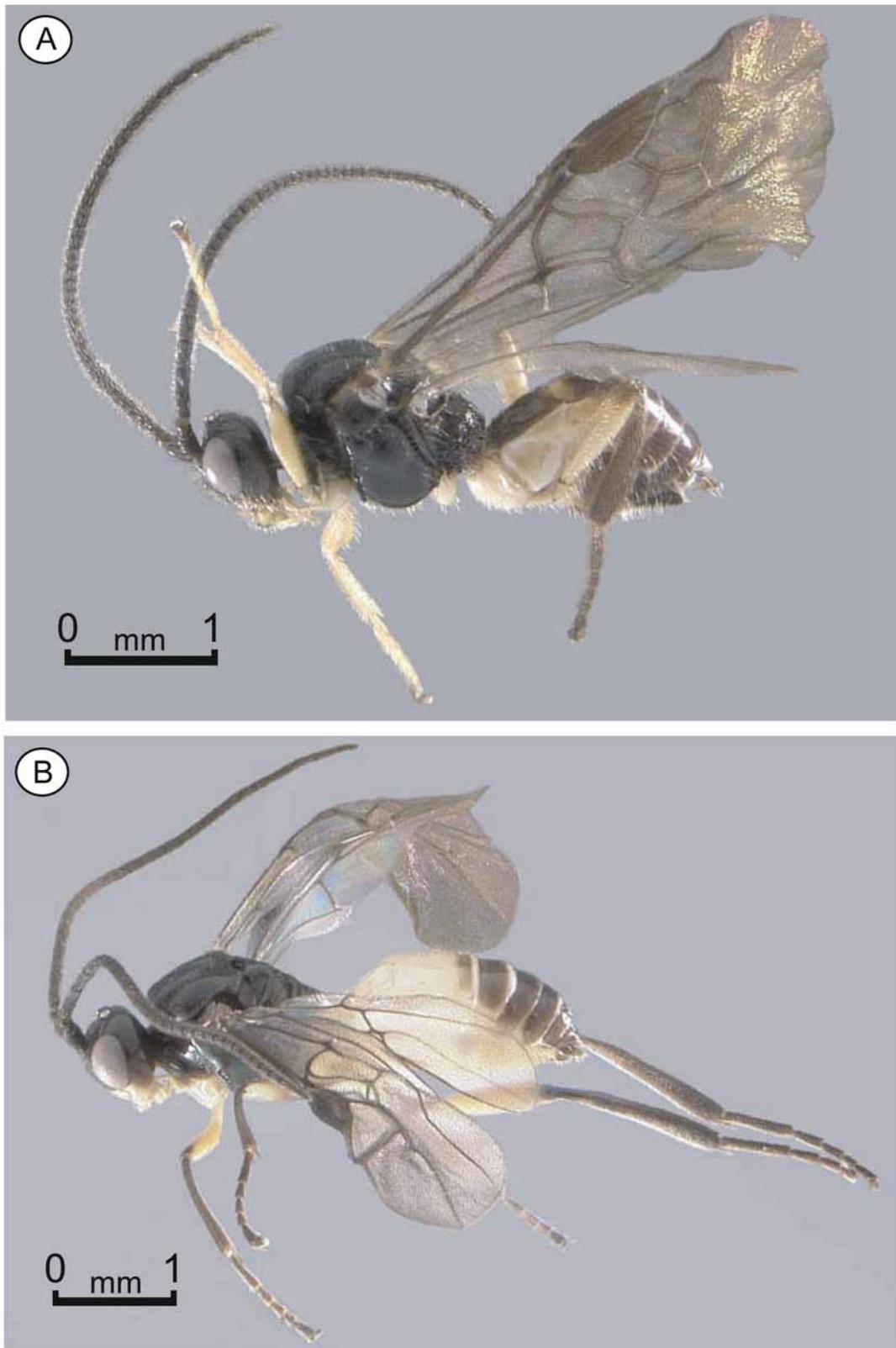
**Metasoma:** median tergite 1 with length (from base of dorsal carina) to apical width ratio approximately 1:1 (range = 0.95–1.00); dorsal carinae of median tergite 1 almost meeting medially to form rugulose protuberance, distance between carinae at narrowest point much smaller than distance from carinae to lateral margin of tergite.

#### Male

Essentially as in female except length 3.34 mm, 25 flagellomeres, hind wing with 4 hamuli, and ratio of 2RS:3RSa length 1.06.

**Biology:** Unknown

**Type material:** HOLOTYPE, ♀: “COLOMBIA Valle del Cauca PNN [National Natural Park] Farallones de Cali Cgto. [Corregimiento] La Meseta, 3°34′N 76°40′W 2200m Malaise 27/08/2003 10/09/2003 S. Sarria & M. Losso Leg. M.4570”. Deposited in the Alexander von Humboldt Biological Resources Research Institute, Colombia.



**FIGURE 1.** A. Lateral habitus of female holotype of *Helconichia sarria* Sharanowski & Sharkey, **sp. nov.** B. Lateral habitus of female holotype of *H. reina* Sharanowski & Sharkey, **sp. nov.**

ALLOTYPE, ♂: same as holotype except: “10–24.xii.2003” and “M.4565.”

PARATYPE, 1 ♀, same as holotype except: “27.i.10.ii.2004” and “M.4563.” Deposited at the Hymenoptera Institute, Department of Entomology, University of Kentucky.

**Etymology:** This species is named in honor of the collector, Stella Sarria from Farallones Colombia. Stella was one of the collaborators with the Colombian Arthropod Project. Collecting during a time of political instability, she was often exposed to dangerous situations in the field.

***Helconichia reina* Sharanowski and Sharkey, sp. nov.**

**Diagnosis.** *Helconichia reina* can be distinguished from all other species of *Helconichia* by the following combination of characteristics: Y-shaped inter-antennal carina present, mesosoma melanic in color, and forewing vein (RS+M)b absent. The only other species of *Helconichia* lacking forewing vein (RS+M)b is *H. areolata*, which is primarily orange in color.

Female (Figs. 1B; 4A, B, D, G). **Length:** 4.03 mm.

**Color:** Head melanic except as follows: clypeus, mandible, lower portion of gena, and labial and maxillary palpi all testaceous; all legs from base of coxae to apex of femora testaceous except hind trochanter and trochantellus brown; all tibiae and tarsi brown; mesonotum melanic; anterior region of propodeum melanic, posterior region off-white; metasomal terga 1–2 and all metasomal sterna off-white; metasomal tergum 3 off-white with subapical brown horizontal band, metasomal tergum 4 brown with apical off-white horizontal band, remaining terga brown; wings lightly infuscate.

**Head:** Antenna with 29 flagellomeres; setae of eye short, about equal to diameter of one ommatidium; head with Y-shaped, lamellate carina between antennal sockets (Fig. 4A); vertex smooth and uniformly setose, most setae shorter than diameter of one ommatidium.

**Mesosoma:** notaulus weakly crenulate; median areola of metanotum bifurcated with longitudinal carina; propodeum without posterior median longitudinal carina (Fig 4D); propodeal areola narrow, approximately 2X longer than wide, ratio of areola width (at widest point):length 0.53 (Fig. 4D).

**Wings:** forewing (RS+M)b absent (Fig 4B), ratio of 2RS:3RSa length 1.66, anal region glabrous basally (Fig 4G); hind wing with 3 hamuli, anal region virtually glabrous basally, subbasal cell with sparse, irregular arrangement of setae.

**Metasoma:** median tergite 1 with length (from base of dorsal carina) to apical width ratio 0.81; dorsal carinae of median tergite 1 widely separated medially, distance between carinae at narrowest point about equidistant from carinae to lateral margin of tergite.

Male: Unknown

**Biology:** Unknown

**Type material:** HOLOTYPE, ♀: “COLUMBIA Valle del Cauca PNN [National Natural Park] Farallones de Cali Cgto. [Corregimiento] La Meseta 3°34’N 76°40’W, 2080m Malaise 10/02/2004 25/02/2004 S. Sarria & M. Losso Leg. 4555”. Deposited in the Alexander von Humboldt Biological Resources Research Institute, Colombia.

**Etymology:** This species is named in honor of Pedro Reina from Iguaque National Park, Colombia. Pedro was one of the collaborators with the Colombian Arthropod Project. Collecting during a time of political instability, he was often exposed to dangerous situations in the field.

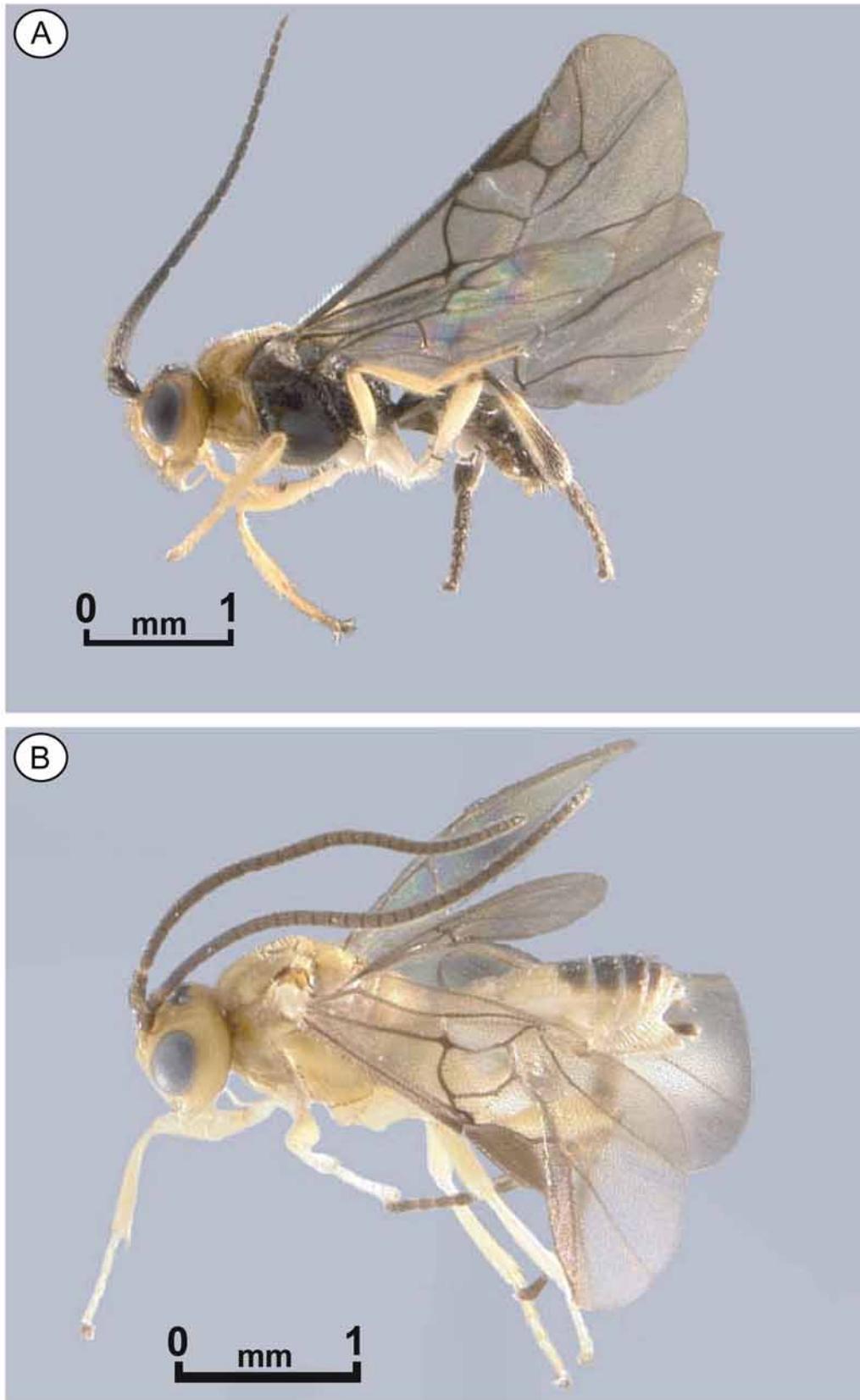
***Helconichia brenesi* Sharanowski and Sharkey, sp. nov.**

**Diagnosis.** *Helconichia brenesi* can be distinguished from all other species of *Helconichia* by the following combination of characteristics: forewing vein (RS+M)b present, anal region of forewing uniformly setose, and pronotum and mesoscutum orange in color.

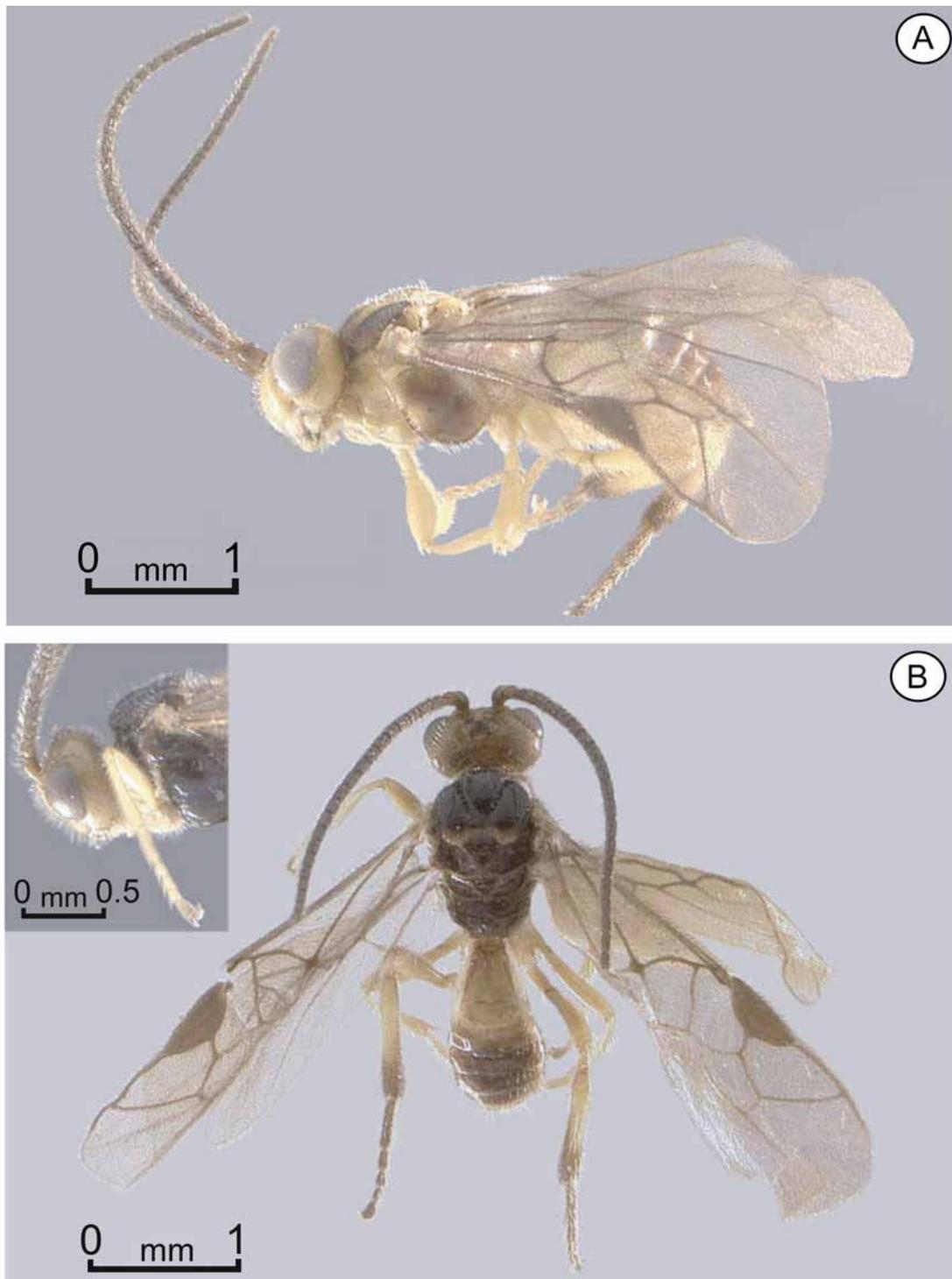
Male (Fig. 2A). **Length:** 2.80–2.90 mm.

**Color:** Head orange except vertex near ocelli melanic; antenna melanic; pronotum, propleuron, and mesonotum orange; metanotum, mesopleuron, propodeum, metapleuron, and metasoma melanic; all coxae,

trochanters, and trochantelli off-white, remaining segments of fore and midleg testaceous except tarsal claws brown; hind femur testaceous, hind tibia testaceous ventrally and brown dorsally, hind tarsus brown, becoming melanic apically; wings infusate.



**FIGURE 2.** A. Lateral habitus of male holotype of *Helconichia brenesi* Sharanowski & Sharkey, **sp. nov.** B. Lateral habitus of female holotype of *H. areolata* Sharkey & Wharton.



**FIGURE 3.** A. Lateral habitus of female holotype of *Helconichia trichiops* Sharkey & Wharton. B. Dorsal habitus of female holotype of *H. trichopteryx* Sharkey & Wharton. Inset is lateral view of head, pronotum, and mesopleuron.

**Head:** Antenna with 23 flagellomeres; setae of eye long, at least 3X diameter of one ommatidium; head without Y-shaped, lamellate carina between antennal sockets; vertex punctate and sparsely setiferous.

**Mesosoma:** notaulus deeply crenulate; median areola of metanotum partially bifurcated posteriorly with longitudinal carina; propodeum with posterior median longitudinal carina (as in Fig. 4F); propodeal areola wide, ratio of areola width (at widest point):length 0.98; propodeal areola innervated with several rugulae.

**Wings:** forewing (RS+M)b present, ratio of 2RS:3RSa length 1.22; anal region uniformly setose (as in Fig. 4H); hind wing with 3 hamuli, anal region uniformly setose, subbasal cell uniformly setose.

**Metasoma:** median tergite 1 with length (from base of dorsal carina) to apical width ratio 0.87; dorsal carinae of median tergite 1 almost meeting medially to form rugulose protuberance, distance between carinae at narrowest point much smaller than distance from carinae to lateral margin of tergite.

Female: Unknown

**Biology:** Unknown

**Type material:** HOLOTYPE, ♂: “COSTA RICA: Prov. Heredia 9km NE Vara Blanca 10°14'N 84°06'W 1450–1550m 15/M/02/052, 20.iii.2005 INBio-OET-transect”. Deposited in the National Biodiversity Institute (INBio), Costa Rica.

PARATYPE, 1 ♂: same as holotype except “15/M/04/079” and “05.iv.2005.” Deposited at the Hymenoptera Institute, Department of Entomology, University of Kentucky.

**Etymology:** This species is named in honor of Danilo Brenes, one of the several hard-working collectors with the ALAS Project in Costa Rica.

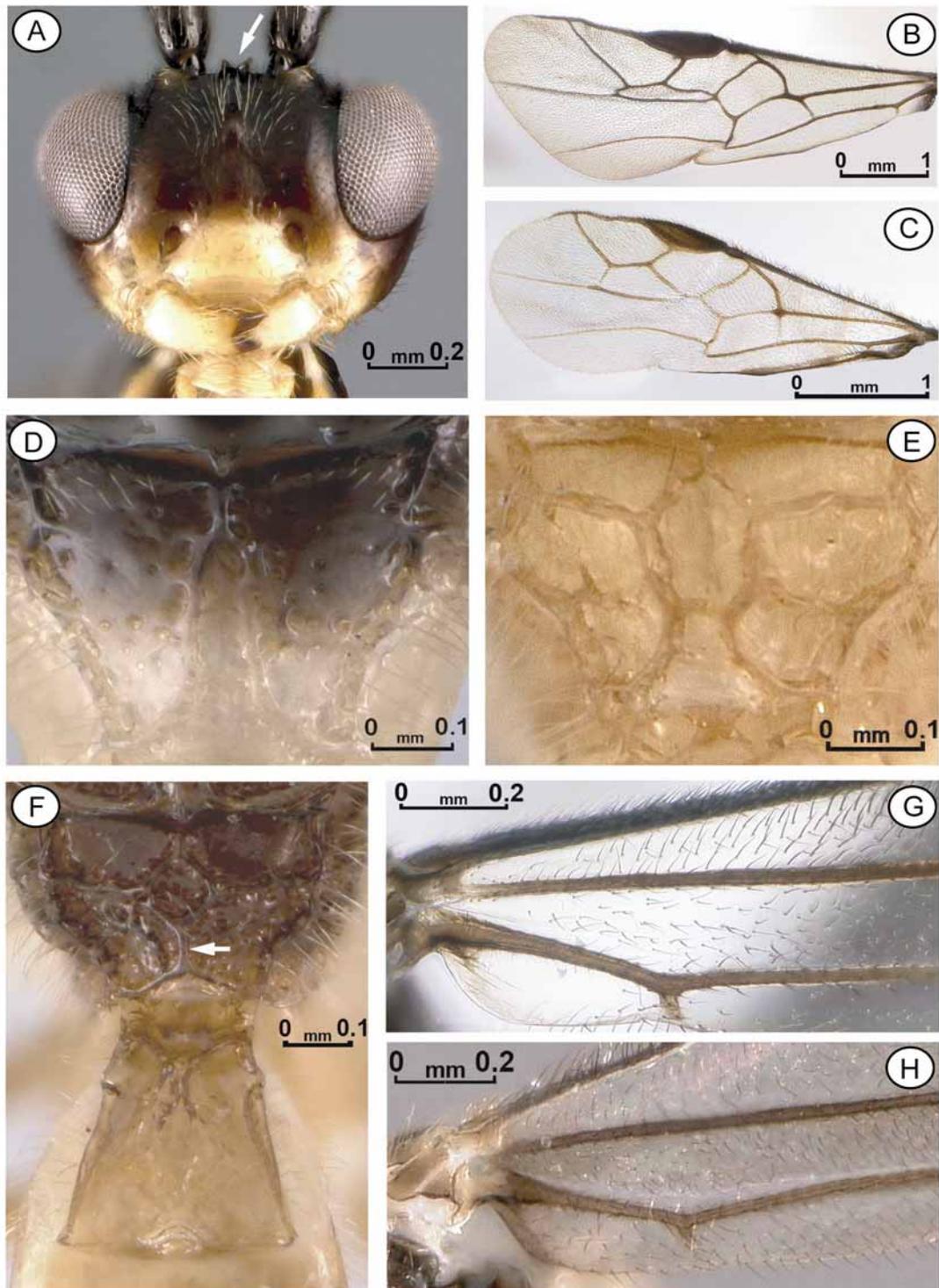
### Key to the species of *Helconichia*

- 1 Inter-antennal carinae present (Fig. 4A); (RS+M)b of forewing absent (Fig. 4B)..... 2
- Inter-antennal carinae absent; (RS+M)b of forewing present (Fig. 4C)..... 3
- 2 Propodeal areolet pentagonal, less than 2X longer than wide (Fig. 4E) *H. areolata* Sharkey and Wharton.
- Propodeal areolet not pentagonal, 2X longer than wide (Fig. 4D).....  
..... *H. reina* Sharanowski and Sharkey, **sp. nov.**
- 3 Posterior longitudinal median carina of propodeum present (Fig. 4F) ..... 4
- Posterior longitudinal median carina of propodeum absent ...*H. sarria* Sharanowski and Sharkey, **sp. nov.**
- 4 Anal region of forewing sparsely and irregularly setiferous (Fig. 4G) *H. trichiops* Sharkey and Wharton.
- Anal region of forewing uniformly setose (Fig. 4H)..... 5
- 5 Pronotum and mesoscutum orange (Fig. 2A) ..... *H. brenesi* Sharanowski and Sharkey, **sp. nov.**
- Pronotum and mesoscutum melanic (Fig. 3B) ..... *H. trichopteryx* Sharkey and Wharton.

### Discussion

*Helconichia reina* and *H. areolata* are hypothesized as sister taxa, sharing several morphological features including: Y-shaped inter-antennal carina (Fig. 4A), absence of forewing vein (RS+M)b (Fig. 4B), anal region of hind wing glabrous basally, more than 26 antennal flagellomeres, short setae on eye (length of setae about equal to diameter of one ommatidium), and metasomal median tergite 1 with distance between longitudinal carinae about equal to distance from carinae to lateral margin of tergite. The Y-shaped inter-antennal carina is unique within Ichneutinae and is not found in other braconids that we are aware of. The remaining four species, *H. sarria*, *H. brenesi*, *H. trichiops*, and *H. trichopteryx*, all have long eye setation (at least 3X the diameter of one ommatidium), less than 26 antennal flagellomeres, longitudinal carinae on median tergite 1 of metasoma closer to each other than either carinae is to lateral margin of tergite (Fig. 4F), and forewing vein (RS+M)b present (Fig. 4C).

The relationships among *H. sarria*, *H. brenesi*, *H. trichiops*, and *H. trichopteryx* are unclear. *Helconichia trichiops* may be sister to *H. reina* and *H. areolata*, as all three species have the anal region of the forewing glabrous basally (Fig. 4G). Further resolution of the relationships of these species will probably require molecular phylogenetic analyses.



**FIGURE 4.** A. Head of *Helconichia reina* Sharanowski & Sharkey, **sp. nov.**, anterior view. Arrow showing Y-shaped lamellate inter-antennal carina. B. Forewing of *H. reina*. C. Forewing of *H. trichiops* Sharkey & Wharton. Arrow pointing to forewing vein (RS+M). D. Propodeum of *H. reina*, dorsal view. E. Propodeum of *H. areolata* Sharkey & Wharton, dorsal view. F. Propodeum and first metasomal tergum of *H. trichopteryx* Sharkey & Wharton, dorsal view. Arrow showing posterior longitudinal median carina of propodeum. G. Basal region of forewing of *H. reina*. H. Basal region of forewing of *H. sarria* Sharanowski & Sharkey, **sp. nov.**

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