

Revision of New World *Helava* Masner & Huggert (Platygasteridae, Sceliotrachelinae)

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Abstract

Nine new species of *Helava* are described: *H. acutiventris* sp. n., *H. allomera* sp. n., *H. aureipes* sp. n., *H. carinata* sp. n., *H. microptera* sp. n., *H. pygmaea* sp. n., *H. reducta* sp. n., *H. simplex* sp. n., and *H. samanthae* sp. n., and *Helava alticola* Masner & Huggert is redescribed. New characters are presented to supplement the generic description of Masner and Huggert (1989) and the genus is diagnosed from similar genera in Sceliotrachelinae: *Aphanomerus* Dodd and *Austromerus* Masner & Huggert.

Keywords

Parasitoid, taxonomy, Platygastroidea

Introduction

Helava was described by Masner and Huggert in their 1989 treatment of world genera of Sceliotrachelinae. Masner and Huggert separated *Helava* from *Austromerus* on the basis of “clavate” antennae in males. We here replace “clavate” with the term “clubbed” to describe the apically enlarged antennomeres in males to maintain strict use of terminology in which clavomeres are defined by the presence of basiconic sensilla. Our revision of *Helava* reveals that the male antenna is filiform in two species, *H. acutiventris* and *H. allomera*, and thus *Helava* and *Austromerus* are separable only by the form of

the clava in females: compact in *Helava* and with articulated clavomeres in *Austromerus* (compare Figures 2 and 12; see also figures 168–173 in Masner and Huggert (1989)). *Helava* is also morphologically very close to *Aphanomerus*, from which Masner and Huggert (1989) separated *Helava* by the dense setation on T1–T2 and presence of propodeal foamy structures (compare Figures 1 and 20). In the concept of Masner and Huggert (1989), *Helava* is found in South America, Tasmania and continental Australia, a distribution consistent with a Gondwanan origin. The limits of *Helava*, *Aphanomerus* and *Austromerus* have become blurred following this revision and testing hypotheses about the phylogeography of the genus will require a better understanding of relationships between these three genera. We refrain from describing the Australian species of *Helava* until species-level revision of *Aphanomerus* and *Austromerus* are conducted to provide a full grasp of the morphological diversity of their constituent species. Currently no host data are known for *Helava*.

Materials and methods

The numbers prefixed with “CNC” or “OSUC” are unique identifiers for the individual specimens (note the blank space after some acronyms). Details of the data associated with these specimens may be accessed at the following link: <http://purl.oclc.org/NET/hymenoptera/hol>, and entering the identifier in the form. Persistent URIs for each taxonomic concept were minted by xBio:D in accordance with best practices recommended by Hagedorn et al. (2013). Morphological terms were matched to concepts in the Hymenoptera Anatomy Ontology (Yoder et al. 2010) using the text analyzer function. A table of morphological terms and URI links is provided in Suppl. material 1.

Photographs were captured with a Z16 Leica lens with a JVC KY-F75U digital camera using Cartograph software. Single montage images were produced from image stacks with the program CombineZP. In some cases, multiple montage images were stitched together in Photoshop to produce larger images at high resolution and magnification. Full resolution images are archived at the image database at The Ohio State University (<http://purl.oclc.org/NET/hymenoptera/specimage>).

Scanning electron micrographs were produced with a Hitachi TM300 Tabletop Microscope. The specimen was disarticulated with a minuten probe and forceps and mounted on 12 mm slotted aluminum mounting stub (EMS Cat. #75220) using carbon adhesive tabs (EMS Cat. #77825-12) by means of a fine paint brush and sputter coated with approximately 70 nm of gold/palladium.

This work is based on specimens deposited in the following repositories with abbreviations used in the text:

- ANIC** Australian National Insect Collection, Canberra City, Australia
- CNCI** Canadian National Collection of Insects, Ottawa, Canada
- OSUC** C.A. Triplehorn Collection, The Ohio State University, USA
- USNM** Smithsonian National Museum of Natural History, Washington, DC, USA



Figure 1. *Aphanomerus* sp. female (USNMENT00916681), head, mesosoma, metasoma, lateral view. Scale bar in millimeters.



Figures 2–3. *Austromerus grandis*, female paratype (USNMENT00916679) **2** head, mesosoma, metasoma, lateral view **3** head, mesosoma, metasoma, ventral view. Scale bars in millimeters.

Abbreviations and characters annotated in the figures

apc	anterior pronotal patch (Figure 16, 50)
apS2	anterior setal patch on S2 (Figures 2, 17)
apT1	anterior setal patch on T2 (Figure 17)
fp	foamy structure on propodeum (Figures 16, 18, 25)
fS1	foamy structure on S1 (Figure 17)
hoc	hyperoccipital carina (Figures 34, 54)
mfp	mesofurcal pit (Figure 14)
mkT1	median keel on T1 (Figure 17)
mkT2	median keel on T2 (Figures 10, 25)
not	notaulus (Figures 10, 25)
ppc	posterior pronotal patch (Figure 9)
sss	scutoscutellar sulcus (Figure 36)
tel	transepisternal line (Figures 3, 35)

Diagnosis of *Helava*

In the process of coding characters for potential use in species delimitation we encountered a small number of new characters shared between all New World species of *Helava*. We here present a generic diagnosis based on these characters and those presented by Masner and Huggert (1989): Antennal formula 10-10. Clava compact in females. Epomium absent. Fore wing with tubular submarginal vein terminating in a truncate knob. Ventral rim of pronotum forming lamella flanking procoxa. Mesopleural carina absent. Setation of axillar area present. Setation of mesoscutellum along posterior and lateral margins dense. 1st trochanter longest, particularly on metatrochanter. Setation of coxae dense. Tibial spur formula 1-2-2. Setation of laterotergites present. Sculpture of tergites absent. T2 with narrow strip of dense setation along anterior margin. Sculpture of sternites absent. Felt fields on S2 present.

Key to species (males and females)

- 1 Foamy structures on lateral propodeum covering area larger than visible part of metapleuron (Figures 9, 16, 19, 29, 50) **2**
 - Foamy structures on lateral propodeum covering area distinctly smaller than hairy metapleuron (Figures 4, 24, 35, 40, 55) or foamy structures absent (Figure 45)..... **5**
 - 2 Lateral pronotum with dorsoventral strip of dense setation posteriorly (Figure 9); notaulus percurrent (Figure 10); male antenna filiform (Figure 13); female antennal clava 3-merous (Figure 2).....
- *H. allomera* Masner & Talamas, sp. n.

- Lateral pronotum without dense setation posteriorly (Figures 19, 29, 50); notaulus absent (Figures 20, 30, 51); male antenna clubbed (Figures 22, 33); female antennal clava 4-merous (Figures 23, 32)..... **3**
- 3 Upper frons densely setose (Figure 53).....
..... *H. samantha* Masner & Talamas, sp. n.
- Upper frons glabrous or with sparse setae only along inner orbits (Figures 14–15, 21, 32)..... **4**
- 4 Posterior vertex glabrous or only very sparsely setose (Figures 30, 34).....
..... *H. carinata* Masner & Talamas, sp. n.
- Posterior vertex densely setose (Figures 15, 20–21).....
..... *H. alticola* Masner & Huggert
- 5 Wings reduced to strips, reaching only to anterior T2, or absent (Figures 36, 46)..... **6**
- Wings fully developed, exceeding apex of metasoma..... **7**
- 6 Scutoscutellar sulcus absent (Figure 46); ocelli absent (Figure 46); mesopleuron without transepisternal line (Figure 45).....
..... *H. reducta* Masner & Talamas, sp. n.
- Scutoscutellar sulcus present (Figure 36); ocelli present (Figure 36); mesopleuron with transepisternal line (Figure 35).....
..... *H. microptera* Masner & Talamas, sp. n.
- 7 Medial S2 distinctly projecting in lateral view in both sexes (Figure 4); mesopleuron without transepisternal line (Figure 4); antenna in male filiform, with A9 and A10 approximated (Figure 8).....
..... *H. acutiventris* Masner & Talamas, sp. n.
- S2 evenly convex medially in lateral view (Figures 24, 40, 55); mesopleuron with transepisternal line (Figures 24, 40, 55); antenna clubbed in male (Figures 27, 43)..... **8**
- 8 Notaulus present (Figure 25)..... *H. aureipes* Masner & Talamas, sp. n.
- Notaulus absent (Figures 41, 56)..... **9**
- 9 Basal vein (Rs+M) in fore wing absent (Figure 60).....
..... *H. simplex* Masner & Talamas, sp. n.
- Basal vein (Rs+M) in fore wing nebulous (Figure 41).....
..... *H. pygmaea* Masner & Talamas, sp. n.

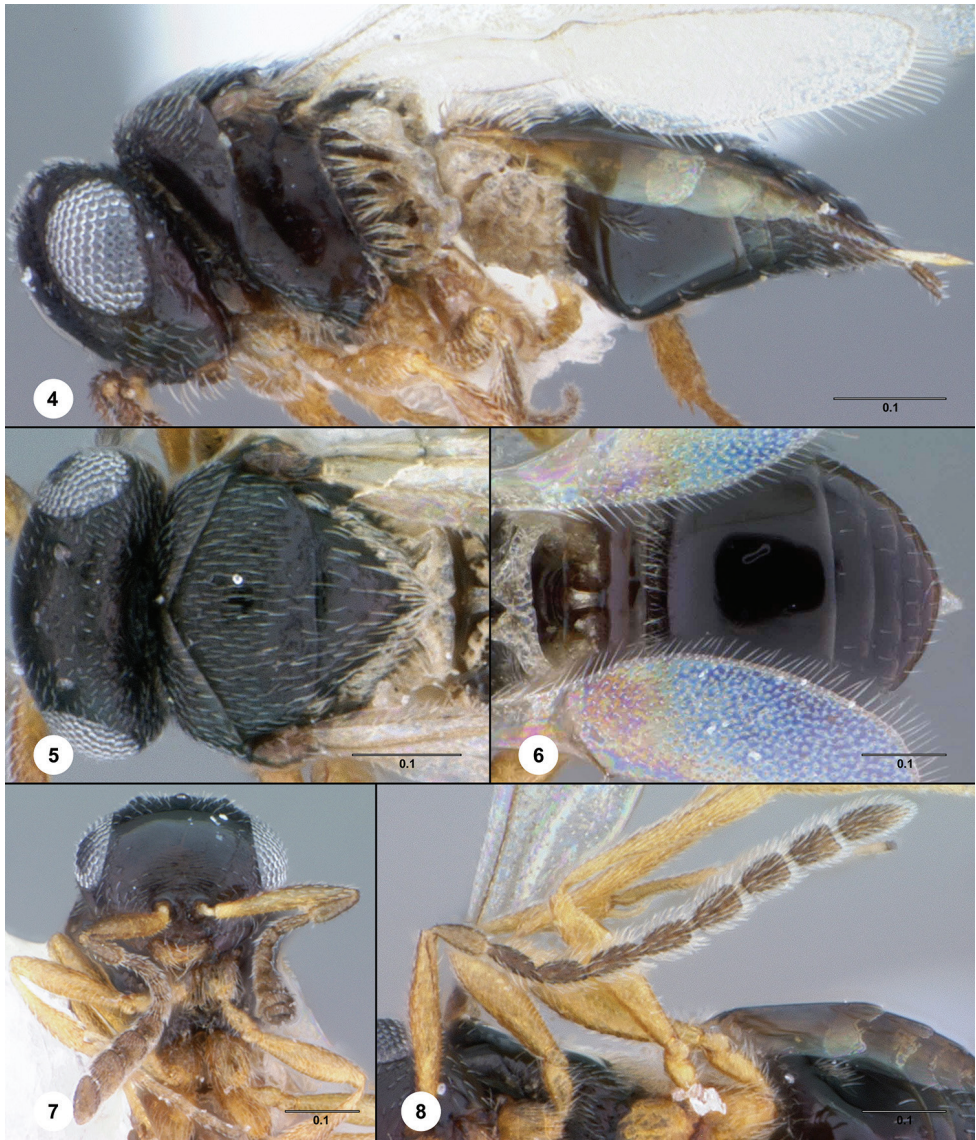
***Helava acutiventris* Masner & Talamas, sp. n.**

<http://zoobank.org/FFCC0883-2123-4A2E-BC69-4CCC679C47D5>

http://bioguid.osu.edu/xbioid_concepts/354388

Figures 4–8

Description. Female body length: 0.99–1.03 mm (n=10). Male body length: 0.90–0.85 mm (n=20). Male antenna: filiform. Number of female clavomeres: 3. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocel-



Figures 4–8. *Helava acutiventris* **4** female holotype (USNMENT0989201), head, mesosoma, metasoma, lateral view **5** female holotype (USNMENT00989201), head and mesosoma, dorsal view **6** male paratype (USNMENT00989201), metasoma, dorsal view **7** female holotype (USNMENT00989201), head, anterior view **8** male paratype (USNMENT00989202), antenna, ventral view. Scale bars in millimeters.

lus: dense. Hyperoccipital carina: absent. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: sparse to absent. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal

line: absent. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: yellow. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: absent. Setation of anterior T2: continuous across tergal midline. Lateral patch on T2: present. Foamy structures on S1: present at lateral margin of sternite. Transverse felt field on anterior S2: present as transverse strip. Shape of S2 in lateral view: distinctly bulging medially.

Diagnosis. The ventral protrusion of S2 in *H. acutiventris* separates this species from all other species in *Helava*. In addition to the shape S2, the absence of a transepisternal line on the mesopleuron is shared only with *H. reducta*, which is a starkly different species that can be separated by the absence of ocelli and a scutoscutellar sulcus.

Etymology. The epithet “acutiventris” is given to this species in reference to the sharp projection on S2 in both sexes.

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354388>

Material examined. Holotype, female: **CHILE:** Bío-Bío Reg., Ñuble Prov., Termas Rd., 60km SE Chillán, 1300m, 7.XII–19.XI.1985, flight intercept trap, S. Peck & J. Peck, USNMENT00989201 (deposited in CNCI). *Paratypes:* **CHILE:** 12 females, 25 males, CNC424698–424733, USNMENT00989202 (CNCI).

Comments. The diagnostic shape of S2 is found in both males and females, leading us to believe that this is not an adaptation for housing the retracted ovipositor system, as can be found in some species of *Synopeas* Förster and *Platygaster* Latreille.

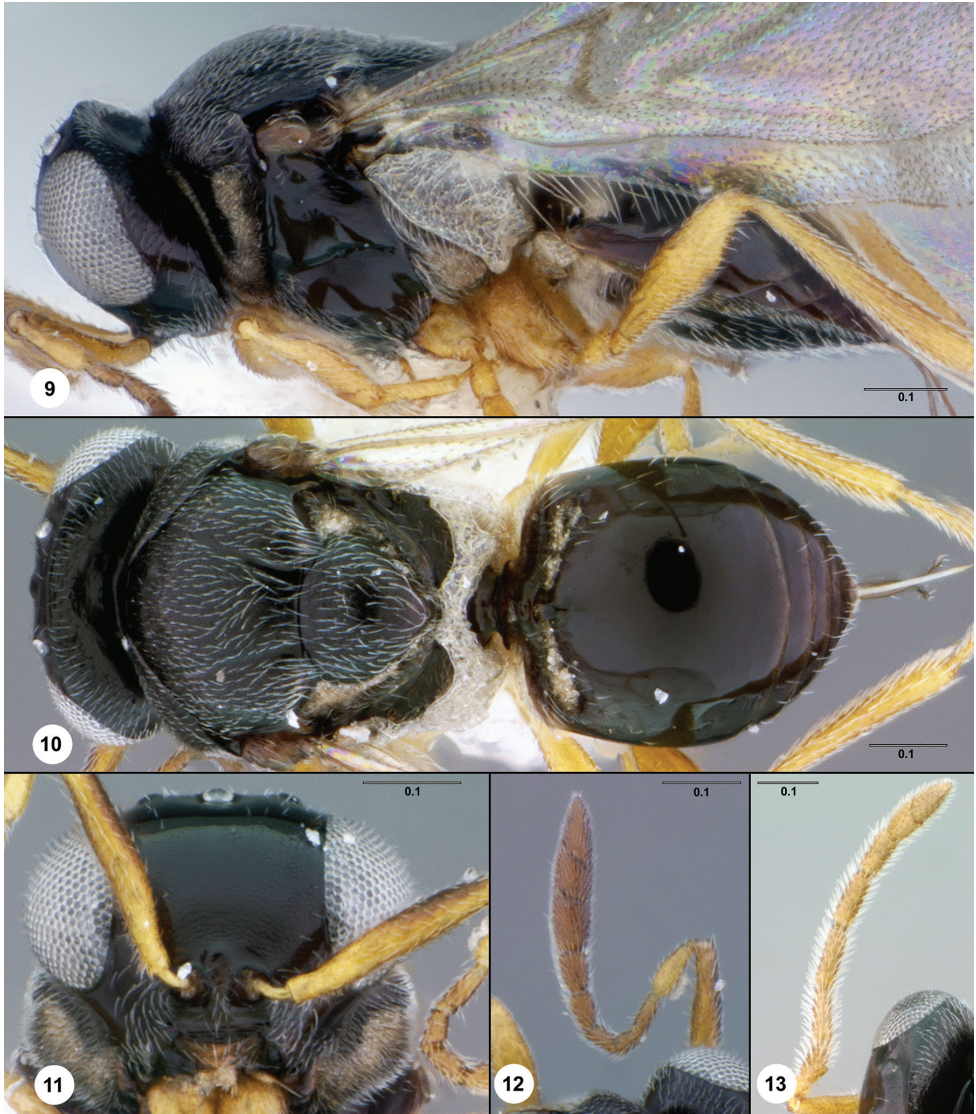
Helava allomera Masner & Talamas, sp. n.

<http://zoobank.org/F786DD15-F5B5-41CB-8910-479F75142D03>

http://bioguid.osu.edu/xbiod_concepts/354395

Figures 9–13

Description. Female body length: 0.89–1.33 mm (n=20). Male body length: 0.99–1.33 mm (n=20). Male antenna: filiform. Number of female clavomeres: 3. Setation of frons anterior to ocellar triangle: absent or sparsely present only along inner orbit of eye. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: continuous across vertex. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: present. Setation of pronotal cervical sulcus: dense. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: present. Notaulus: percurrent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: bright orange yellow. Setation of coxae: dense. Foamy structures of lateral propodeum: larger than hairy metapleuron. Median tubercule on T2: present. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: present at lateral margin of sternite. Transverse felt field on anterior S2: present. Shape of S2 in lateral view: broadly convex.



Figures 9–12. *Helava allomera* **9** female holotype (USNMENT00989217), head, mesosoma, metasoma, lateral view **10** female holotype (USNMENT00989217), head, mesosoma, metasoma, dorsal view **11** female holotype (USNMENT00989217), head, anterior view **12** female holotype (USNMENT00989217), antenna, dorsal view **13** male paratype (USNMENT00989218), antenna, dorsal view. Scale bars in millimeters.

Diagnosis. *Helava allomera* can be differentiated from other species in the genus by the combination of the well-developed hyperoccipital carina, percurrent notauli, and foamy structures on the propodeum that are larger than the visible part of the metapleuron in lateral view. Within *Helava*, this is the only species with a dorsoventral band of dense setae along the posterior margin of the lateral pronotum (Figure 9).

Etymology. The epithet “allomera” is given to this species in reference to the unusual form and segmentation of antennae in both sexes.

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354395>

Material examined. Holotype, female: **CHILE:** Araucanía Reg., Malleco Prov., 1200m, 37.809°S 73.016°W, Nahuelbuta National Park, 9.I–12.I.2000, Malaise trap, D. Webb & D. Yeates, USNMENT00989217 (deposited in CNCI). *Paratypes:* (58 females, 30 males) **ARGENTINA:** 7 females, 2 males, CNC424981–424985, 424993–424994, 425022, 425031 (CNCI). **CHILE:** 51 females, 28 males, CNC424946–424980, 424986–424992, 424995–425021, 425023–425030, 425032, 494556, USNMENT00989218 (CNCI).

***Helava alticola* Masner & Huggert**

http://bioguid.osu.edu/xbiod_concepts/12334

Figures 14–23

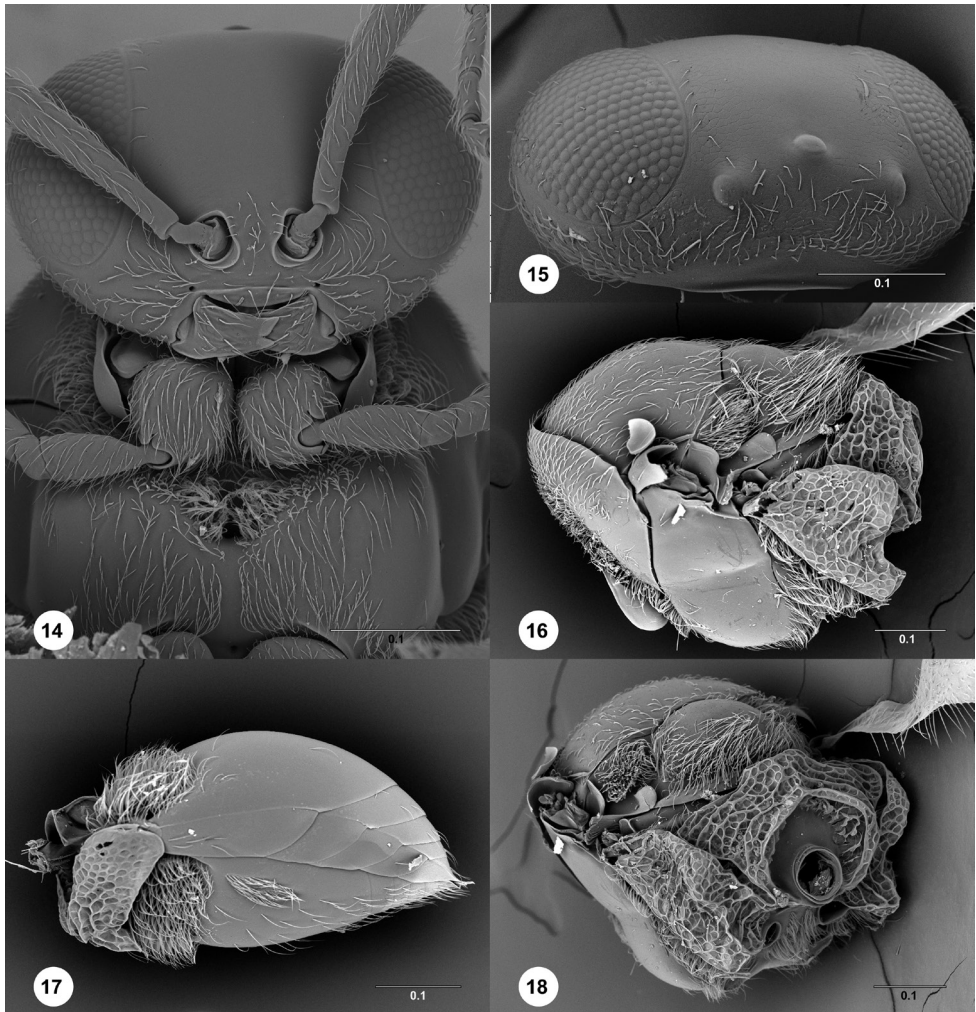
Helava alticola Masner & Huggert, 1989: 72 (original description. Species list); Vlug 1995: 26 (cataloged, type information).

Description. Female body length: 1.00–1.29 mm (n=20). Male body length: 0.91–1.32 mm (n=21). Male antenna: apically clubbed. Number of antennomeres in male club: 4. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: absent or sparsely present only along inner orbit of eye. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent; continuous across vertex; indicated by lateral tubercles. Pronotum in dorsal view: present mostly as lateral shoulders; slightly collarlike. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: dense. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: brownish, yellowish brown. Foamy structures of lateral propodeum: larger than hairy metapleuron. Median tubercule on T2: absent. Setation of anterior T2: continuous across tergal midline. Lateral patch on T2: present. Foamy structures on S1: present at lateral margin of sternite. Transverse felt field on anterior S2: present. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava alticola* can be separated from species with large propodeal foamy structures by the evenly rounded form of S2 and the pattern of setation on the dorsal head: posterior to the ocelli the posterior vertex is densely setose, and anterior to the ocelli the upper frons is glabrous or with sparse setae only along the inner orbit of the eye.

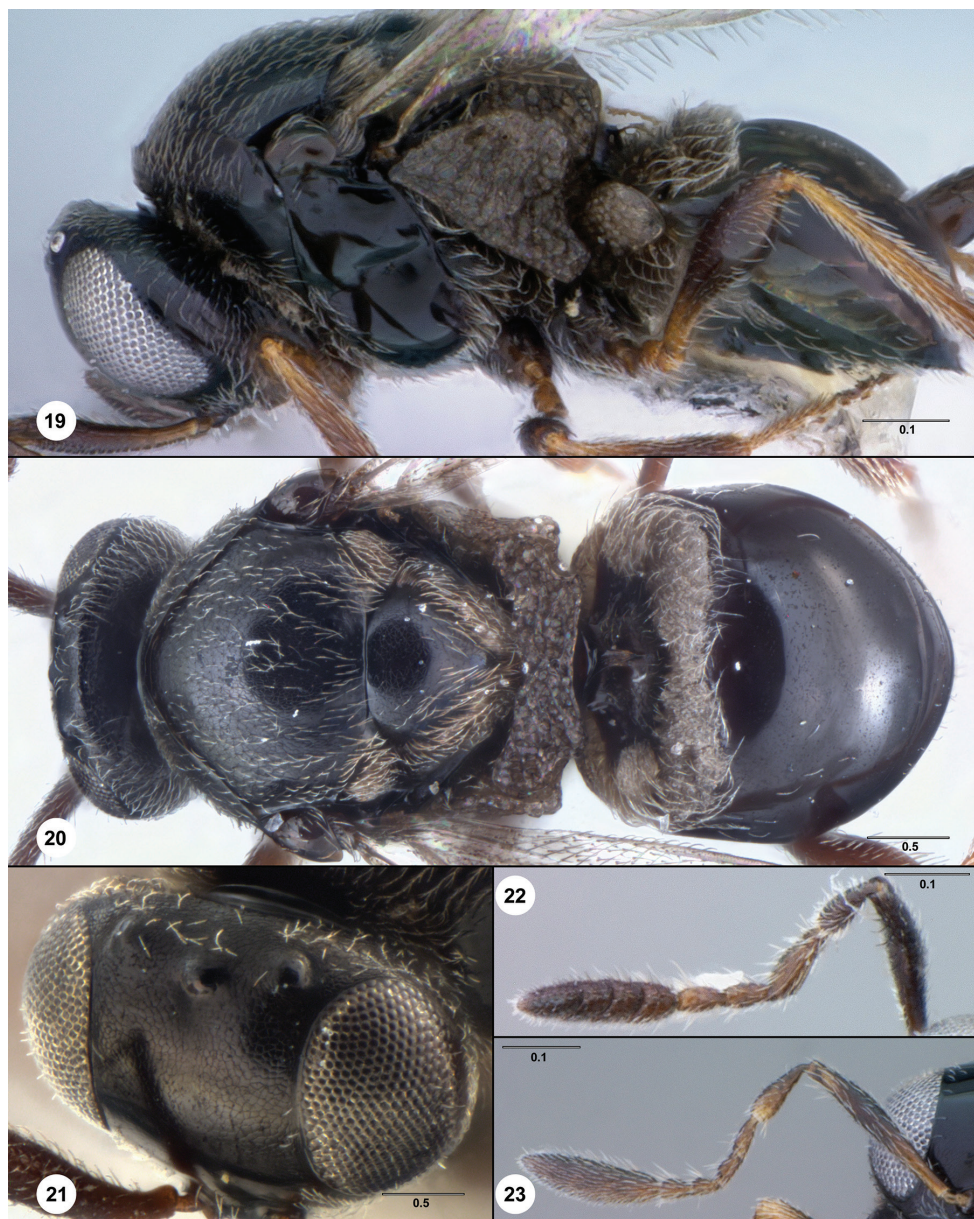
Link to distribution map. <http://hol.osu.edu/map-large.html?id=12334>

Material examined. Holotype, female: **COLOMBIA:** Colombia, Caldas, 5.IV.1973, CNC494814 (deposited in CNCI). *Paratypes:* (56 females, 33 males, 1 unsexed) **COLOMBIA:** 17 females, 15 males, CNC494557–494566, 494622–



Figures 14–18. *Helave alticola*, female (USNMENT00989211) **14** head and mesosoma, ventral view **15** head, dorsal view **16** mesosoma, lateral view **17** metasoma, lateral view **18** mesosoma, posterolateral view. Scale bars in millimeters.

494633, 494663–494671, USNMENT00989213–00989214 (CNCI); USNMENT00989943 (USNM). **ECUADOR:** 37 females, 17 males, CNC494567–494568, 494571–494592, 494594–494621, 494672–494673 (CNCI). **PERU:** 2 females, CNC494569–494570 (CNCI). *Other material:* (115 females, 100 males) **BOLIVIA:** 1 female, 1 male, CNC494753, 494785 (CNCI). **CHILE:** 1 female, CNC424908 (CNCI). **COLOMBIA:** 92 females, 50 males, CNC424852–424894, 494506, 494634–494662, 494674, 494675–494703, 494705, 494727–494728, 494754–494765, 494767–494771, 494773–494781, 494784, 494794–494795, 494800–494803, 494806, 494807, 494809, 494810, USNMENT00989211 (CNCI). **ECUADOR:** 10 females, 35 males, CNC494593, 494704, 494706–494724,



Figures 19–23. *Helava alticola* **19** female (USNMENT989211), head, mesosoma, metasoma, lateral view **20** female holotype (CNC494814), head, mesosoma, metasoma, dorsal view **21** female holotype (CNC494814), head, anterodorsal view **22** male (USNMENT00989212), antenna, dorsal view **23** female (USNMENT00989211), antenna, anterior view. Scale bars in millimeters.

494726, 494749–494752, 494766, 494772, 494778, 494783, 494786, 494788–494793, 494796–494799, 494804, 494805, 494808, 494811 (CNCI). **VENEZUELA:** 11 females, 14 males, CNC494725, 494729–494748, 494779, 494782, 494787, USNMENT00989212 (CNCI).

***Helava aureipes* Masner & Talamas, sp. n.**

<http://zoobank.org/96D177A2-D794-49FF-9B6C-54CBAAF05BCA>

http://bioguid.osu.edu/xbiod_concepts/354390

Figures 24–28

Description. Female body length: 0.95–1.36 mm (n=20). Male body length: 0.98–1.10 mm (n=20). Male antenna: apically clubbed. Number of antennomeres in male club: uncertain, 3. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: sparse to absent. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: present. Transepisternal line: present. Mesofurcal pit: present. Notaulus: percurrent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: yellow. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: present. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: absent. Transverse felt field on anterior S2: present. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava aureipes* and *H. allomera* are the only two South American species with notauli. They can be separated from each other by the transepisternal line, which is absent in *H. allomera* and present as a distinct groove in *H. aureipes*.

Etymology. The epithet “aureipes” is given to this species in reference to the golden colour of the legs.

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354390>

Material examined. Holotype, female: **CHILE:** Araucanía Reg., Malleco Prov., 1200m, 37.809°S 73.016°W, Nahuelbuta National Park, 9.I–12.I.2000, Malaise trap, D. Webb & D. Yeates, USNMENT00989205 (deposited in CNCI). *Paratypes:* **CHILE:** 25 females, 88 males, CNC424741, 425033–425101, 494411–494451, 494813, USNMENT00989206 (CNCI).

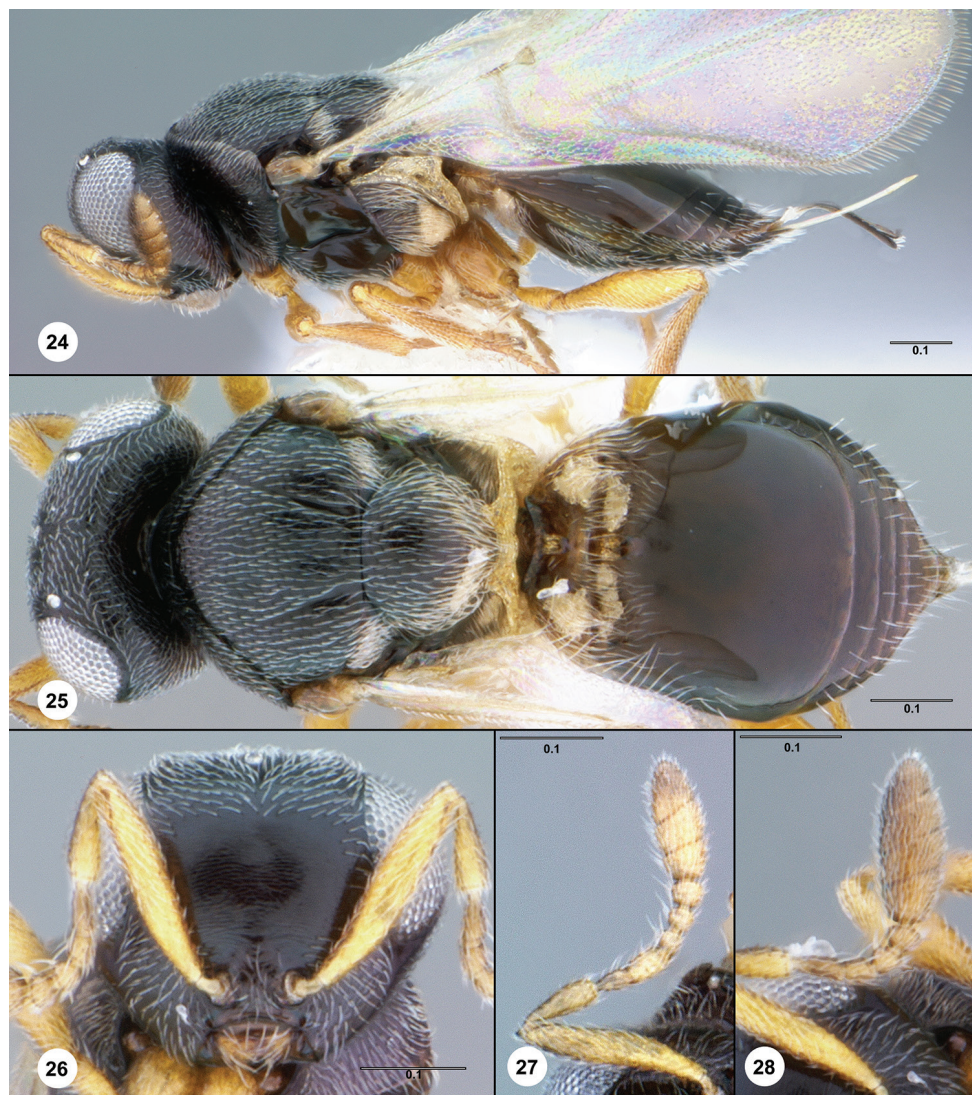
***Helava carinata* Masner & Talamas, sp. n.**

<http://zoobank.org/1047FBEA-5089-4F07-87FE-E18A1C5BE9E1>

http://bioguid.osu.edu/xbiod_concepts/354394

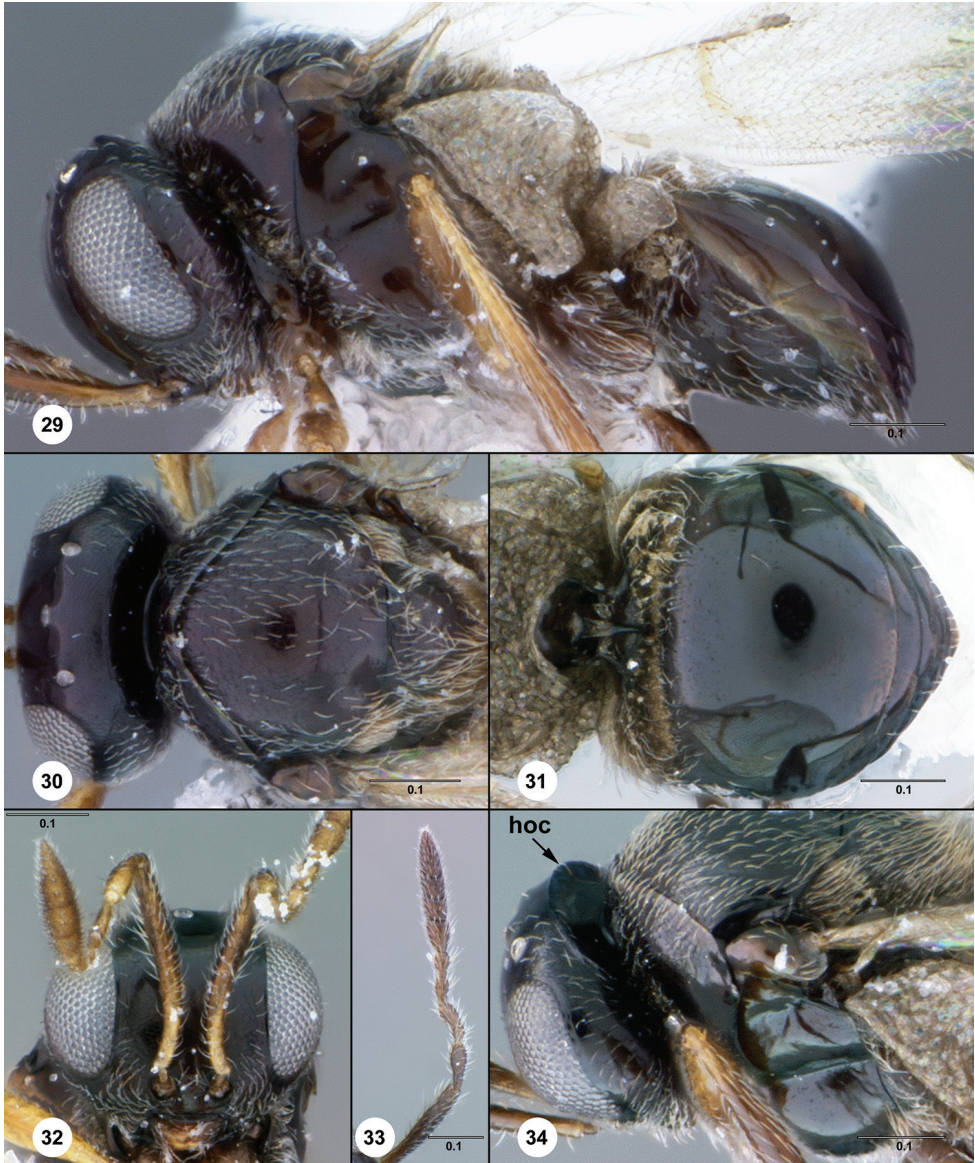
Figures 29–34

Description. Female body length: 1.00–1.15 mm (n=19). Male body length: 0.94–1.12 mm (n=20). Male antenna: apically clubbed. Number of antennomeres in male club: 4. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: absent or sparsely present only along inner orbit of eye. Setation of vertex posterior to lateral ocellus: very sparse or absent. Hyperoccipital carina: continuous across vertex. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cer-



Figures 24–28. *Helava aureipes* **24** female holotype (USNMENT00989205), head, mesosoma, metasoma, lateral view **25** female holotype (USNMENT00989205), head, mesosoma, metasoma, dorsal view **26** female holotype (USNMENT00989205), head, anterior view **27** male paratype (USNMENT00989206), antenna, anterior view **28** female holotype (USNMENT00989205), antenna, anterior view. Scale bars in millimeters.

vical sulcus: dense. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: brownish. Foamy structures of lateral propodeum: larger than hairy metapleuron. Median tubercule on T2: absent. Setation of anterior T2: continuous



Figures 29–34. *Helava carinata* **29** female holotype (USNMENT00989215), head, mesosoma, metasoma lateral view **30** female holotype (USNMENT00989215), head and mesosoma, dorsal view **31** male paratype (USNMENT00989216), propodeum and metasoma, dorsal view **32** female holotype (USNMENT00989215), head, anterior view **33** male paratype (USNMENT00989216), antenna, dorsal view **34** male paratype (USNMENT00989216), head and mesosoma, dorsolateral view. Scale bars in millimeters.

across tergal midline. Lateral patch on T2: present. Foamy structures on S1: present at lateral margin of sternite. Transverse felt field on anterior S2: present. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava carinata* belongs to the cluster of species with large propodeal foamy structures that includes *H. alticola*, *H. allomera*, and *H. samanthae*. It can be separated from *H. alticola* and *H. samanthae* by the setation of the upper frons and posterior vertex, which is either absent or very sparse. In *H. alticola* the upper frons is glabrous or nearly so, and then abruptly setose posterior to the ocelli; the dorsal head in *H. samanthae* is setose throughout. *Helava carinata* can be separated from *H. allomera* by the absence of dense setation on the posterior part of the lateral pronotum (compare Figures 9 and 29).

Etymology. The Latin adjectival epithet “carinata” refers carinate vertex of the head.

Link to distribution map. [<http://hol.osu.edu/map-large.html?id=354394>]

Material examined. Holotype, female: **COLOMBIA:** Cundinamarca Dept., Tena Mpio., Laguna Pedro Pala, 2100m, 26.I.1992, Malaise trap, E. E. Palacio, USNMENT00989215 (deposited in CNCI). *Paratypes:* (48 females, 56 males) **COLOMBIA:** 22 females, 25 males, CNC494452–494462, 494481–494485, 494491–494495, 494501, 494504–494505, 494519–494534, 494537–494541, 494555, USNMENT00989216 (CNCI). **ECUADOR:** 26 females, 31 males, CNC494463–494480, 494486–494490, 494496–494500, 494502–494503, 494507–494518, 494535–494536, 494542–494554 (CNCI).

***Helava microptera* Masner & Talamas, sp. n.**

<http://zoobank.org/71FA4BB9-FE32-41AF-8ABF-366AA39BC82A>

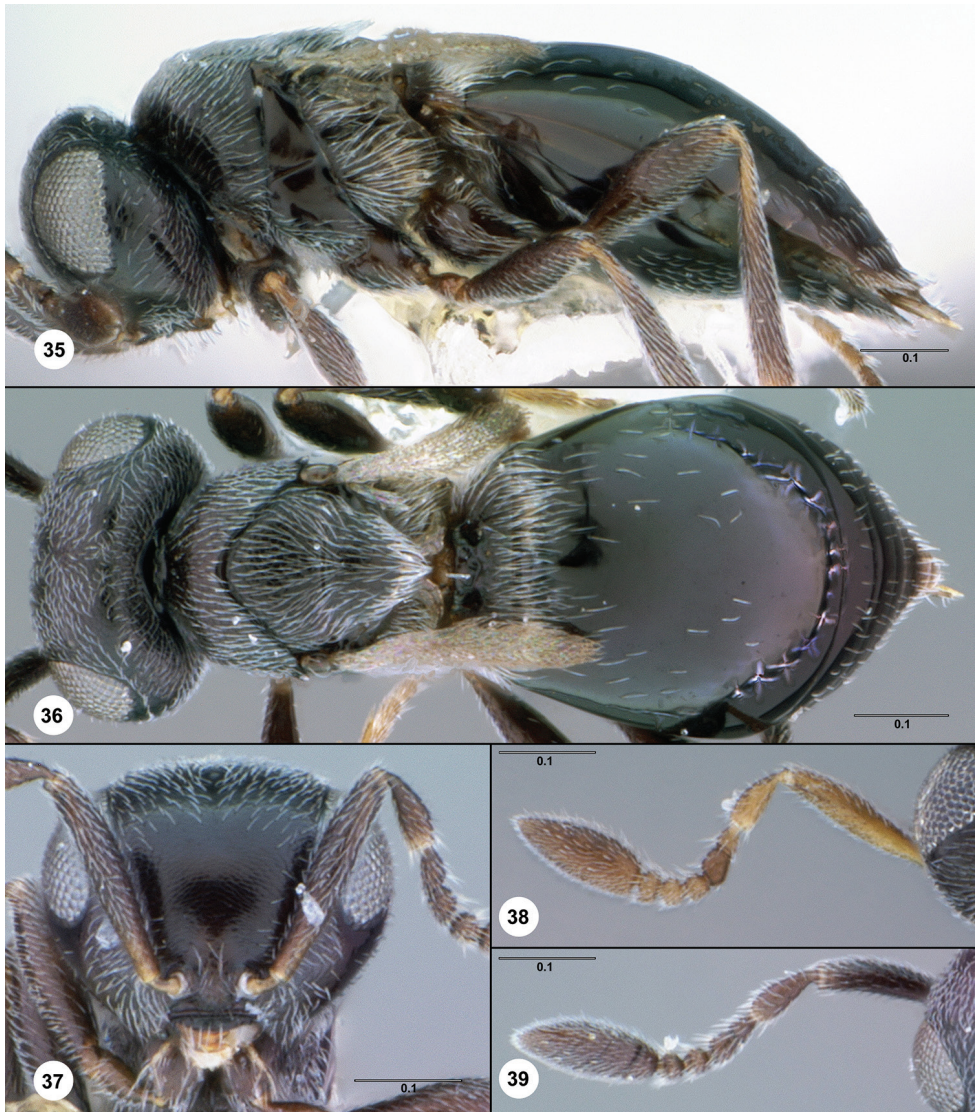
http://bioguid.osu.edu/xbiod_concepts/354386

Figures 35–39

Description. Female body length: 0.98–1.31 mm (n=9). Male body length: 1.11 mm (n=1). Male antenna: apically clubbed. Number of antennomeres in male club: 3. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent. Pronotum in dorsal view: large, collarlike. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: sparse to absent. Width of dorsal mesopleuron in lateral view: half as wide dorsally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: uncertain, present. Notaulus: absent. Wings: brachypterous. Color of legs: yellowish brown. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: present. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: absent. Transverse felt field on anterior S2: present as transverse strip. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava microptera* and *H. reducta* are the only species without fully developed wings. They are easily separable by the presence of ocelli, a transepisternal line, and a scutoscuteellar sulcus in *H. microptera*, all of which are absent in *H. reducta*.

Etymology. The Greek name “microptera” refers to the small size of the wings in males and females of this species.



Figures 35–39. *Helava microptera* **35** female holotype (USNMENT00989197), head, mesosoma, metasoma, lateral view **36** female holotype (USNMENT00989197), head, mesosoma, metasoma, dorsal view **37** female holotype (USNMENT00989197), head, anterior view **38** male paratype (USNMENT00989198), antenna, dorsal view **39** female holotype (USNMENT00989197), antenna, dorsal view. Scale bars in millimeters.

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354386>

Material examined. Holotype, female: **ECUADOR:** Napo Prov., paramo, Quito-Baeza Rd., 4200m, 2.III.1979, pan trap, W. R. M. Mason, USNMENT00989197 (deposited in CNCI). *Paratypes:* **ECUADOR:** 9 females, 2 males, CNC424772, 424774–424782, USNMENT00989198 (CNCI).

***Helava pygmea* Masner & Talamas, sp. n.**<http://zoobank.org/A11DC0E8-4C75-4A4C-B4BD-FC67D0374CFC>http://bioguid.osu.edu/xbiod_concepts/354391

Figures 40–44

Description. Female body length: 0.94–1.54 mm (n=18). Male body length: 0.85–1.07 mm (n=7). Male antenna: apically clubbed. Number of antennomeres in male club: 3. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: uncertain, dense. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: brownish, yellowish brown. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: present. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: absent. Transverse felt field on anterior S2: present as transverse strip. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava pygmea* is closest to *H. simplex*, with which it shares the presence of small propodeal foamy structures, fully developed wings, and a mesoscutum without notauli. The only character that reliably separates these species is the form of the basal vein (Rs+M) in the fore wing: darkly pigmented in *H. pygmea* and absent in *H. simplex*.

Etymology. The species name “pygmea” refers to the small size of the body in this species.

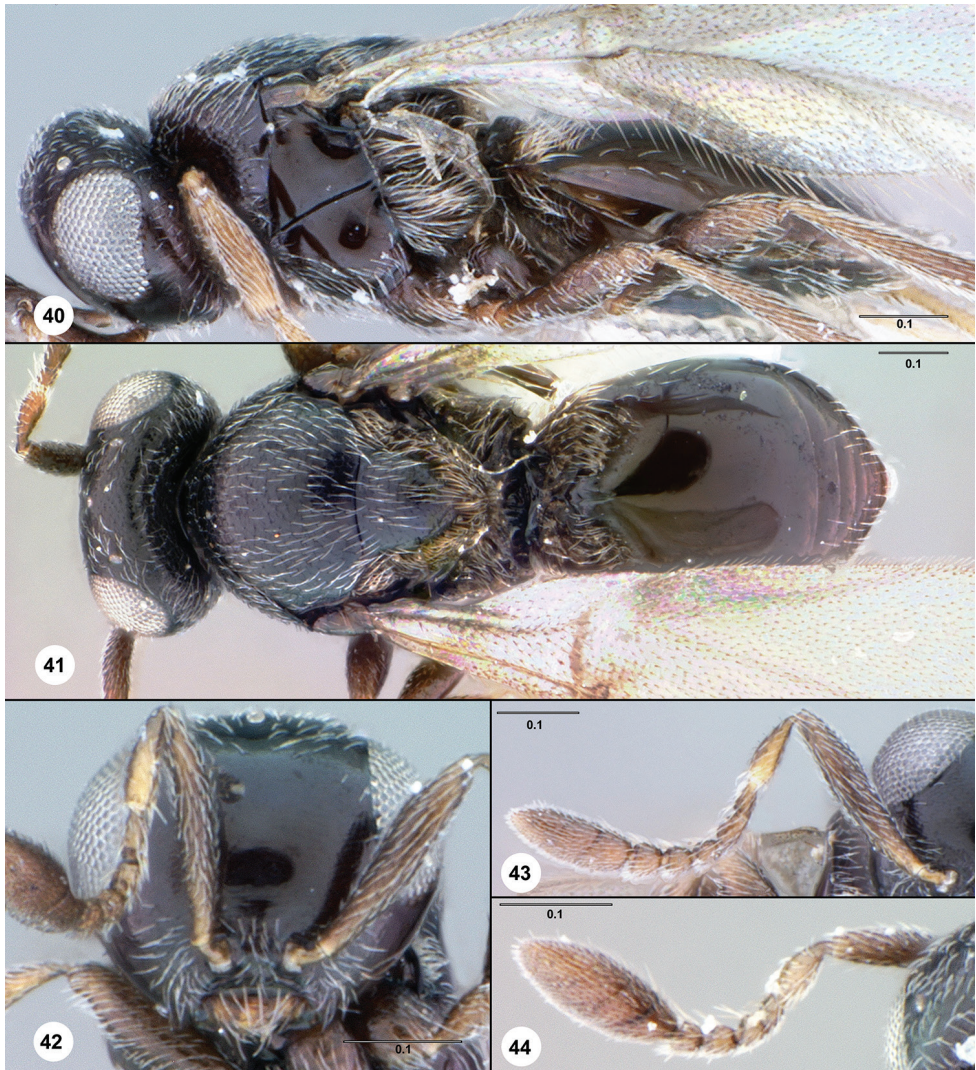
Link to distribution map. <http://hol.osu.edu/map-large.html?id=354391>

Material examined. Holotype, female: **ECUADOR:** Napo Prov., below Papalacta, 3000m, 17.II.1983, L. Masner, USNMENT00989208 (deposited in CNCI). *Paratypes:* (20 females, 9 males) **CHILE:** 1 male, USNMENT00989196 (CNCI). **COLOMBIA:** 11 females, 4 males, CNC424746, 424748, 424754–424756, 424758–424763, 424768–424771 (CNCI). **ECUADOR:** 5 females, 3 males, CNC424747, 424749–424751, 424764, 424766–424767, USNMENT00989207 (CNCI). **VENEZUELA:** 4 females, 1 male, CNC424752–424753, 424757, 424765, 424942 (CNCI).

***Helava reducta* Masner & Talamas, sp. n.**<http://zoobank.org/908D245E-2CF2-495B-B711-87CB4D6AB3EE>http://bioguid.osu.edu/xbiod_concepts/354389

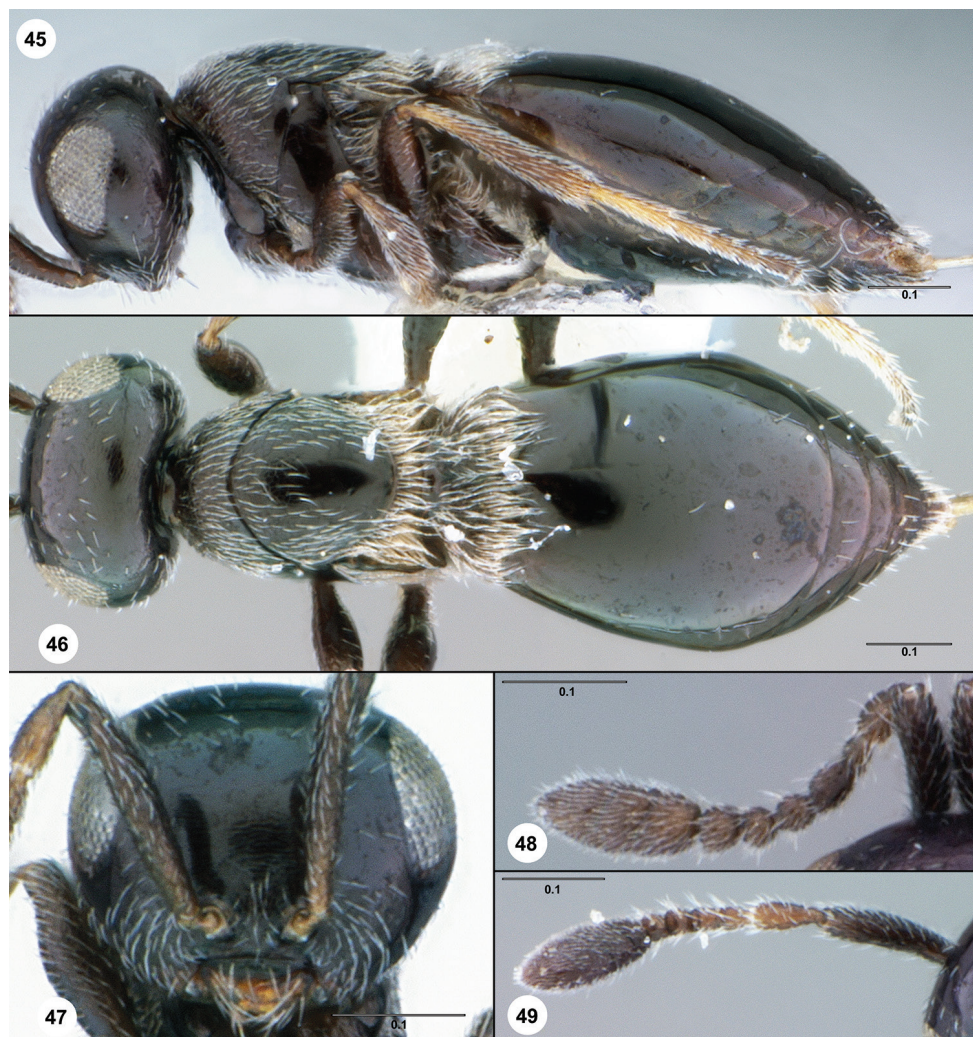
Figures 45–49

Description. Female body length: 1.01 mm (n=1). Male body length: 1.04 mm (n=1). Male antenna: apically clubbed. Number of antennomeres in male club: 3. Number of



Figures 40–44. *Helava pygmaea* **40** female holotype (USNMENT00989207), head, mesosoma, metasoma, lateral view **41** male paratype (USNMENT00989208), head, mesosoma, metasoma, dorsal view **42** female holotype (USNMENT00989207), head, anterior view **43** male paratype (USNMENT00989208), antenna, dorsal view **44** female holotype (USNMENT00989207), antenna, dorsal view. Scale bars in millimeters.

female clavomeres: 4. Setation of frons anterior to ocellar triangle: sparse throughout. Setation of vertex posterior to lateral ocellus: very sparse or absent. Hyperoccipital carina: absent. Pronotum in dorsal view: large, collarlike. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: sparse to absent. Width of dorsal mesopleuron in lateral view: half as wide dorsally. Longitudi-



Figures 45–49. *Helava reducta* **45** female holotype (USNMENT00989203), head, mesosoma, metasoma, lateral view **46** female holotype (USNMENT00989203), head, mesosoma, metasoma, dorsal view **47** female holotype (USNMENT00989203), head, anterior view **48** male paratype (USNMENT00989204), antenna, dorsal view **49** female holotype (USNMENT00989203), antenna dorsal view. Scale bars in millimeters.

nal striation on dorsal mesopleuron: absent. Transepisternal line: absent. Mesofurcal pit: present. Notaulus: absent. Wings: brachypterous. Color of legs: yellowish brown. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: absent. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: absent. Transverse felt field on anterior S2: present as transverse strip. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava reducta* can easily be identified by severe microptery, the absence of a scutoscutellar sulcus, and the absence of transepisternal line.

Etymology. The Latin adjectival epithet “reducta” is applied to this species for the reduced segmentation of the mesosoma,

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354389>

Material examined. Holotype, female: **VENEZUELA:** Mérida St., Black Lagoon, Sierra Nevada National Park, 3500m, 29.IV.1981, sweeping, L. Masner, USNM-00989203 (deposited in CNCI). *Paratypes:* **VENEZUELA:** 1 female, 2 males, CNC424744–424745, USNM-00989204 (CNCI).

***Helava samanthae* Masner & Talamas, sp. n.**

<http://zoobank.org/33DE4823-9B71-4510-A64E-6E2C2A549E9A>

http://bioguid.osu.edu/xbiod_concepts/354387

Figures 50–54

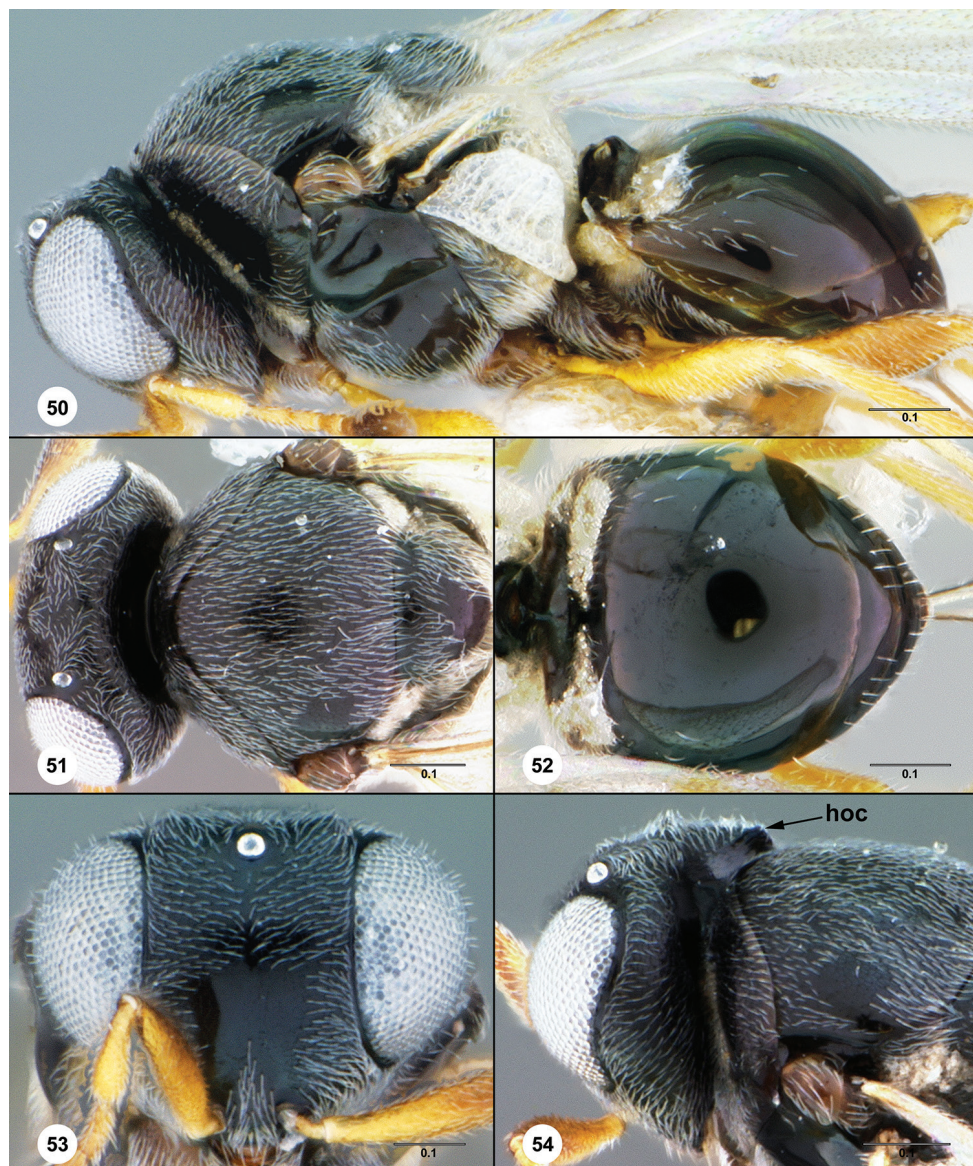
Description. Female body length: 0.98–1.26 mm (n=19). Male body length: 0.82–1.32 mm (n=21). Male antenna: apically clubbed. Number of antennomeres in male club: 4. Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent; indicated by lateral tubercles. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: dense. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: absent. Transepisternal line: present. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: nebulous. Wings: macropterous. Rs+M in hind wing: nebulous. Color of legs: coxae yellow to brown, remaining segments yellow. Foamy structures of lateral propodeum: larger than hairy metapleuron. Median tubercule on T2: absent. Setation of anterior T2: interrupted medially. Lateral patch on T2: present. Foamy structures on S1: present at lateral margin of sternite. Transverse felt field on anterior S2: present. Shape of S2 in lateral view: broadly convex.

Diagnosis. The form of the hyperoccipital carina as two lateral tubercles on the posterior vertex separates *H. samanthae* from all species except *H. alticola*, in which the form of the hyperoccipital carina is highly variable. These two species can be separated from each other by the setation of the upper frons, which in *H. samanthae* is densely present, and is sparsely present only along the inner orbits of the eye, or entirely absent, in *H. alticola*.

Etymology. This species is named for Samantha Fitzsimmons Schoenberger to thank her for excellent work performed as part of the Smithsonian Internship Program, including most of the photographs presented in this monograph.

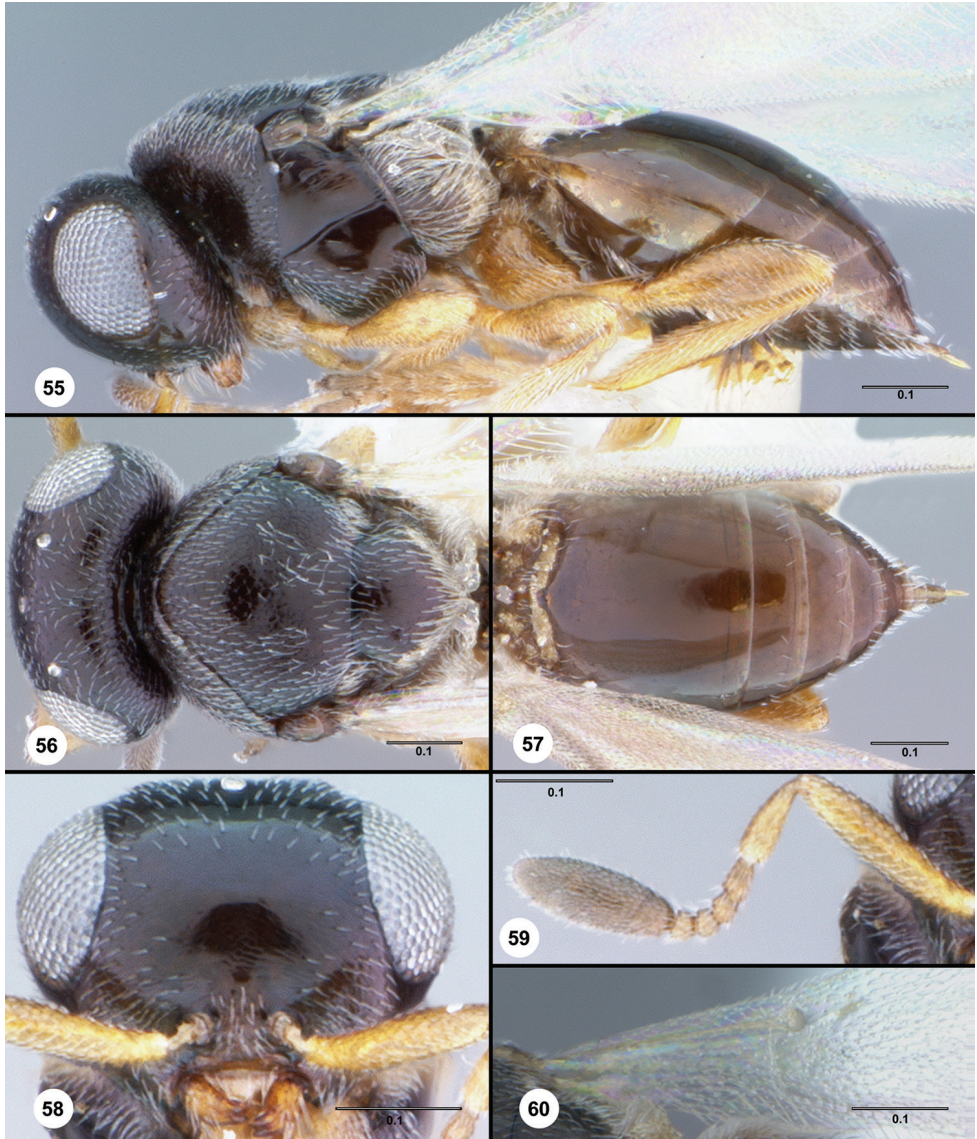
Link to distribution map. <http://hol.osu.edu/map-large.html?id=354387>

Material examined. Holotype, female: **CHILE:** Bío-Bío Reg., Nuble Prov., Las Trancas Valley, 1300m–1650m, 14.XII–17.XII.1976, S. Peck & H. Howden, USN-



Figures 50–54. *Helava samantha*, female holotype (USNMENT00989199) **50** head, mesosoma, metasoma, lateral view **51** head and mesosoma, dorsal view **52** metasoma, dorsal view **53** head, anterior view **54** head and mesosoma, posterolateral view. Scale bars in millimeters.

MENT00989199 (deposited in CNCI). *Paratypes*: (86 females, 25 males) **ARGENTINA**: 4 females, 3 males, CNC424909–424913, 424930–424931 (CNCI). **CHILE**: 82 females, 22 males, CNC424783–424851, 424895–424906, 424914–424929, 424932–424937, USNMENT00989200 (CNCI).



Figures 55–60. *Helava simplex* **55** female holotype (USNMENT00989195) head, mesosoma, metasoma, lateral view **56** female holotype (USNMENT00989195) head and mesosoma, dorsal view **57** female holotype (USNMENT00989195) metasoma, dorsal view **58** female holotype (USNMENT00989195) head, anterior view **59** female holotype (USNMENT00989195) antenna, dorsal view **60** female paratype (USNMENT00989190) fore wing, dorsal view. Scale bars in millimeters.

***Helava simplex* Masner & Talamas, sp. n.**<http://zoobank.org/0B8E8E62-CE4F-4652-9C39-AD31F276E659>http://bioguid.osu.edu/xbirod_concepts/354385

Figures 55–60

Description. Female body length: 0.94–1.24 mm (n=12). Number of female clavomeres: 4. Setation of frons anterior to ocellar triangle: present. Setation of vertex posterior to lateral ocellus: dense. Hyperoccipital carina: absent. Pronotum in dorsal view: present mostly as lateral shoulders. Dorsoventral band of dense setation on posterior part of lateral pronotum: absent. Setation of pronotal cervical sulcus: sparse to absent. Width of dorsal mesopleuron in lateral view: about equal ventrally and dorsally to 1.5 times as wide ventrally. Longitudinal striation on dorsal mesopleuron: present. Transepisternal line: present. Mesofurcal pit: present. Notaulus: absent. Rs+M in fore wing: absent. Wings: macropterous. Rs+M in hind wing: absent. Color of legs: yellow; yellowish brown. Foamy structures of lateral propodeum: smaller than hairy metapleuron. Median tubercule on T2: present. Setation of anterior T2: interrupted medially. Lateral patch on T2: absent. Foamy structures on S1: absent. Transverse felt field on anterior S2: present as transverse strip. Shape of S2 in lateral view: broadly convex.

Diagnosis. *Helava simplex* is the only macropterous species in the genus without a pigmented basal vein in the fore wing (Figure 60).

Etymology. The epithet “simplex” is given to this species in reference to the absence of several character states (notaulus, foamy structures).

Link to distribution map. <http://hol.osu.edu/map-large.html?id=354385>

Material examined. Holotype, female: **CHILE:** Araucanía Reg., Malleco Prov., site 649, 14km E Malalcahuello National Reserve, 1570m, 13.IX–31.XII.1982, trap, A. Newton & M. Thayer, USNMENT00989195 (deposited in CNCI). *Paratypes:* **CHILE:** 14 females, CNC424734–424740, 424742–424743, 424943–424945, 494812, USNMENT00989190 (CNCI).

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