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

Elijah J. Talamas¹, Lubomír Masner²

¹ Systematic Entomology Laboratory, USDA/ARS c/o USNM, Smithsonian Institution, Washington, D.C. 20560, U.S.A. ² Agriculture and Agri-Food Canada, K.W. Neatby Building, Ottawa, Ontario K1A 0C6, Canada

Corresponding author: Elijah J. Talamas (elijah.talamas@ars.usda.gov)

Academic editor: M. Yoder | Received 17 August 2016 | Accepted 31 October 2016 | Published 19 December 2016

http://zoobank.org/13184D63-2047-4F62-A987-B844E6386BCD


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. micropera* sp. n., *H. pygmea* 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 antenniferomes in males to maintain strict use of terminology in which clavomers 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
Revision of New World Helava Masner & Huggert (Platygastridae, Sceliotrachelinae)

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


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

5 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. samanthae 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) ................................................................. 8

– 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) ...................................................

H. acutiventris Masner & Talamas, sp. n.

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. pygmea Masner & Talamas, sp. n.

Helava acutiventris Masner & Talamas, sp. n.
http://zoobank.org/FFCC0883-2123-4A2E-BC69-4CCC679C47D5
http://bioguid.osu.edu/xbiod_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.


**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


**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 *Platygastrer* 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

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)

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.
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


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).


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

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.

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

Figures 19–23. *Helava alticola* 19 female (USNMENT00989211), 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.


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

http://zoobank.org/96D177A2-D794-49FF-9B6C-54CBAAF05BCA
http://bioguid.osu.edu/xbiod_concepts/354390

Figures 24–28


**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


*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, meta-
soma, lateral view 25 female holotype (USNMENT00989205), head, mesosoma, metasoma, dor-
sal view 26 female holotype (USNMENT00989205), head, anterior view 27 male paratype (USN-
MENT00989206), 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 mesopleu-
Color of legs: brownish. Foamy structures of lateral propodeum: larger than hairy
metapleuron. Median tubercle 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 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](http://hol.osu.edu/map-large.html?id=354394)


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

http://zoobank.org/71FA4BB9-FE32-41AF-8ABF-366A39BC82A
http://bioguid.osu.edu/xbiod_concepts/354386
Figures 35–39


**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 scutoscutellar 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](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


**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


**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 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.

Diagnosis. *Helava reducta* can easily be identified by severe microptery, the absence of a scutocutellar 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, USNM00989203 (deposited in CNCI). Paratypes: VENEZUELA: 1 female, 2 males, CNC424744–424745, USNM00989204 (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**


Diagnosis. The form of the hyperoccipital carina as two lateral tubercules 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 samanthae*, 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.

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/xbiod_concepts/354385
Figures 55–60


**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


**Acknowledgments**

We thank Smithsonian interns Samantha Fitzsimmons Schoenberger and Collin Schwantes for producing photographs and scanning electron micrographs, respectively, and Norman Johnson (OSUC) for developing and maintaining the Hymenoptera Online Database, Specimage, and vSysLab, which underlie the cybertaxonomy conducted here. This work was made possible by funding from the Systematic Entomology Laboratory and the National Institute of Food and Agriculture–Specialty Crop Research Initiative (USDA–NIFA–SCRI) #2011-51181-30937. The USDA does not endorse any commercial product mentioned in this research. USDA is an equal opportunity provider and employer.
References


