



## Taxonomy of Central American water beetles in the genus *Hydrochus* Leach, 1817 (Coleoptera: Hydrochidae)

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### Abstract

The taxonomy of Central American water beetles in the genus *Hydrochus* Leach, 1817 is presented, including the Mexican fauna. The known fauna now consists of 26 species, nine of which are described as new species. The new species are diagnosed, and high-resolution images of the habitus and male genitalia of each species, and detailed descriptions of the male genitalia are given. Geographical distribution maps are given for all species. The following new species are described: *H. aeruginosus* n. sp. (Mexico), *H. argutoides* n. sp. (Costa Rica), *H. biexcavatus* n. sp. (Belize, Costa Rica), Honduras, Mexico, Nicaragua), *H. laevigatus* n. sp. (Mexico), *H. lubricus* n. sp. (Mexico), *H. mesoamericanus*

**n. sp.** (Belize, Mexico), *H. nayaritensis* **n. sp.** (Mexico), *H. panamensis* **n. sp.** (Panama), and *H. perpunctatus* **n. sp.** (Mexico), Images of the habitus and male genitalia, and detailed descriptions of the male genitalia are also provided for the following previously described species: *H. beeneni* Makhan 1992, *H. bernardi* Makhan 1994, *H. brianbrowni* Makhan 2005, *H. elineae* Makhan 1994, *H. foveatus* Haldeman 1852, *H. vagus* LeConte 1852, *H. vanvondeli* Makhan 1994, and *H. variolatus* LeConte 1852. New locality data are provided for 17 species: *H. beeneni* Makhan 1992, *H. bernardi* Makhan 1994, *H. brianbrowni* Makhan 2005, *H. debilis* Sharp 1882, *H. directus* Perkins 2020, *H. elineae* Makhan 1994, *H. foveatus* Haldeman 1852, *H. leei* Perkins 2019, *H. obscurus* Sharp 1882, *H. pertuberculatus* Perkins 2020, *H. piroei* Makhan 1992, *H. sagittarius* Perkins 2019c, *H. soekhnandanae* Makhan 1992, *H. steineri* Perkins 2020, *H. vagus* LeConte 1852, *H. vanvondeli* Makhan 1994, and *H. variolatus* LeConte 1852. Lectotypes are designated for *H. vagus* LeConte 1852. *H. otvosi* Makhan 1993 is a **new synonym** of *H. variolatus* LeConte 1852.

**Key words:** Central America, Belize, **Costa Rica**, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, water beetles, Hydrochidae, new species, new distribution records

## Introduction

This is the seventh contribution in a series of papers revising the Neotropical species of the genus *Hydrochus* Leach, 1817. Previous papers have designated lectotypes (Perkins, 2019a, 2020a), described a remarkable new species from Brazil, Guyana and Suriname (Perkins, 2019b), and revised the species of Venezuela (Perkins 2019c), Guatemala (Perkins, 2020a), Ecuador (Perkins, 2020b), and Peru (Perkins, 2020c). Revisions of *Hydrochus* from other Neotropical countries are in progress.

One of the goals of the revisions is the correction of errors made in the works of Makhan (1994, 1995a, b, 1996, 1998, 2000, 2001, 2004a, 2004b, 2005) and Oliva (1992, 1996). These errors include inaccurate and/or oversimplified male genitalia drawings, and inaccurate synonymies made by both authors (against each other), and the resulting incorrect distribution records. The taxonomic and nomenclatural problems caused by D. Makhan are comprehensively discussed in Oliva (2000), Jäch (2006), Short & Hebauer (2006), Worthington *et al.* (2016), and Perkins (2019a, c, 2020a, b). Additional taxonomic difficulties result from the inaccurate male genitalia illustrations of Neotropical *Hydrochus* by Oliva (1992, 1996) (Perkins 2019a, 2019c). When doing revisionary studies it is necessary to be informed about all species of *Hydrochus* described from the Neotropical Region, before describing any new species, because some described species have very wide distributions.

Here, knowledge of the *Hydrochus* fauna of Central America is increased, based on the examination and study of more than 1,500 specimens. The known fauna now consists of 26 species, nine of which are described as new species. New locality data are provided for 17 previously described species of *Hydrochus*.

Several of the species have wide distributions in Central America, whereas a few are currently only known from one country (Fig. 45). Twenty-two of the 26 Central American species are found in Mexico, ten of which are only known from Mexico; three of these ten species are also known from the southern USA. Four Central American species are only known from Panama; three of these species are also known from South America. Two species, *H. obscurus* and *H. beeneni* have been collected in all eight Central American countries.

The materials and methods used for specimen preparation and specimen imaging follow those of Perkins (2019c), except that a few images were captured using a Dino-Eye ocular camera. In some cases the resolution of imaging was insufficient to capture very thin, membranous pseudoparameres. In these cases, the outlines of the pseudoparameres have been added to the images, based on study of the genitalia in slide mounts, using a compound microscope.

## Depositories

CAS	California Academy of Sciences, San Francisco, California, USA (C. Grinter).
CMN	Canadian Museum of Nature, Ottawa, Canada (R. Anderson, F. Génier)
CNC	Canadian National Collection, Ottawa, Canada (P. Bouchard)
FSCA	Florida State Collection of Arthropods, Gainesville, Florida, USA (K. E. Schnepf)
HNHM	Hungarian Natural History Museum, Budapest, Hungary (G. Makranczy)
IEXA	Entomological Collection of the Instituto de Ecología, A.C, Veracruz, Mexico (Roberto Arce Pérez)
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA (P. D. Perkins)

LANHM	Natural History Museum of Los Angeles County, Los Angeles, CA USA (B. V. Brown, G-A Kung)
NMNH	National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (C. J. Micheli)
NMW	Naturhistorisches Museum, Wien, Austria (M. A. Jäch)
RBINS	Institut royal des Sciences naturelles de Belgique, Brussels, Belgium (P. Limbourg)
SEMC	Snow Entomological Museum, University of Kansas, Lawrence, Kansas, USA (A. E. Z. Short, Z. Falin)
TAMU	Texas A. & M. University collection, College Station, Texas, USA (E. Riley)
UKNHM	The Natural History Museum, London, UK (M. V. L. Barclay)
UNAM	Universidad Nacional Autónoma de México, Mexico City, Mexico (S. Santiago Fragoso)
UMRM	Enns Entomology Museum, University of Missouri, Columbia, Missouri, USA (R. W. Sites, K. B. Simpson)
WSU	M. T. James Entomological Museum, Washington State University, Pullman, Washington, USA (R. S. Zack)
ZMHB	Museum für Naturkunde, Zoological Museum, Humboldt University, Berlin, Germany (B. Jaeger)

### Abbreviations for characters on male genitalia figures

The following abbreviations are used for male genitalia characters on the figures. More context concerning these and other *Hydrochus* genitalia characters are present in Perkins (2019c). One of the taxonomically important characteristics of *Hydrochus* male genitalia is the structure of the aedeagus, its shape and the positions of the dorsal and ventral transition lines. These lines are formed where the relatively heavily sclerotized parts transition to the lightly sclerotized, membranous parts of the endophallus. The membranous areas are retracted in almost all specimens, whether dry or still in alcohol. One very unusual specimen of *H. obscurus*, which was received in alcohol, had the endophallus completely everted (Fig. 44). Since there is great variation in the shapes and sizes of the membranous parts on the dorsal and ventral surfaces, this suggests that the shape of the endophallus, when everted, could differ greatly from species to species. Unfortunately, this taxonomically useful character is not available in 99+% of specimens.

#### Aedeagus characters:

adbl: aedeagus dorsal basal lobe  
 adm: aedeagus dorsal margin  
 adtl: aedeagus dorsal transition line (dorsal area where sclerotized and membranous parts  
 agw: aedeagus greatest width  
 alm: aedeagus lateral margin  
 asgw: aedeagus shaft greatest width (shaft = part of aedeagus distal to adbl)  
 avm: aedeagus ventral margin  
 avtl: aedeagus ventral transition line (ventral area where sclerotized and membranous parts  
 of the aedeagus meet)  
 gp: gonopore

#### Paramere characters:

pdmm: paramere dorsal medial margin  
 pdm: paramere dorsal margin  
 plsa: paramere lateral subapical angle  
 pmsm: paramere medial sclerotized margin  
 pseu: pseudoparamere  
 pvm: paramere ventral margin  
 pvmm: paramere ventral medial margin  
 pwsa: paramere weakly sclerotized area

### Abbreviations used in species descriptions

E elytra  
 HW maximum width of head, at eyes

P	pronotum
PA	width of anterior margin of pronotum
PB	width of posterior margin of pronotum

### Intraspecific Variation

There is considerable intraspecific variation in some characters of *Hydrochus*. Color is especially problematic because of differences in the degree of iridescence, and other color differences related to the age of the specimens. Teneral specimens will always appear more lightly colored and less iridescent than older specimens. In addition to this, the color depicted in images varies depending upon the type of equipment used. An example of these color differences are the images of *H. laevigatus* (Figs. 7, 8), depicting the teneral holotype and a non-teneral specimen, using two different imaging systems. An example of the differences in appearance due to very different iridescence are the images of *H. vagus* (Figs. 13, 14).

Sometimes there is also notable intraspecific variation in the dorsal sculpture and body shape. An example of these differences are the images of *H. beeneri* (Figs. 21, 22), showing the Mexican specimen with much denser pronotal punctation, and a slightly different body outline than the specimen from Panama. These figures also demonstrate the sometimes considerable variation of the sizes and distributions of the black spots on the elytra.

Because of these intraspecific variations, it is essential that males are dissected and the male genitalia carefully examined, using both a stereomicroscope and a compound microscope. Even with male genitalia, there will be slight variation in form resulting from the teneral condition, which usually results in the genitalia being narrower and the parameres more tightly pressed against the aedeagus. Also, images of male genitalia internal structure will appear differently depending upon the imaging method; an example of these variations is *H. laevigatus* (Figs. 7, 8).

Intraspecific variation makes it very difficult to construct a useful, accurate key to species. A more realistic approach is for students of *Hydrochus* to first dissect males, and then to become familiar with all of the habitus and male genitalia images before making identifications. To help facilitate the identification process, a pictorial aid to species identification of Central American *Hydrochus* is provided (Fig. 45), using only the distal parts of the male genitalia, in dorsal view. Hopefully this will be a useful first-step in the identification process, which should include all aspects of the habitus and male genitalia.

### New species descriptions

#### *Hydrochus aeruginosus*, new species

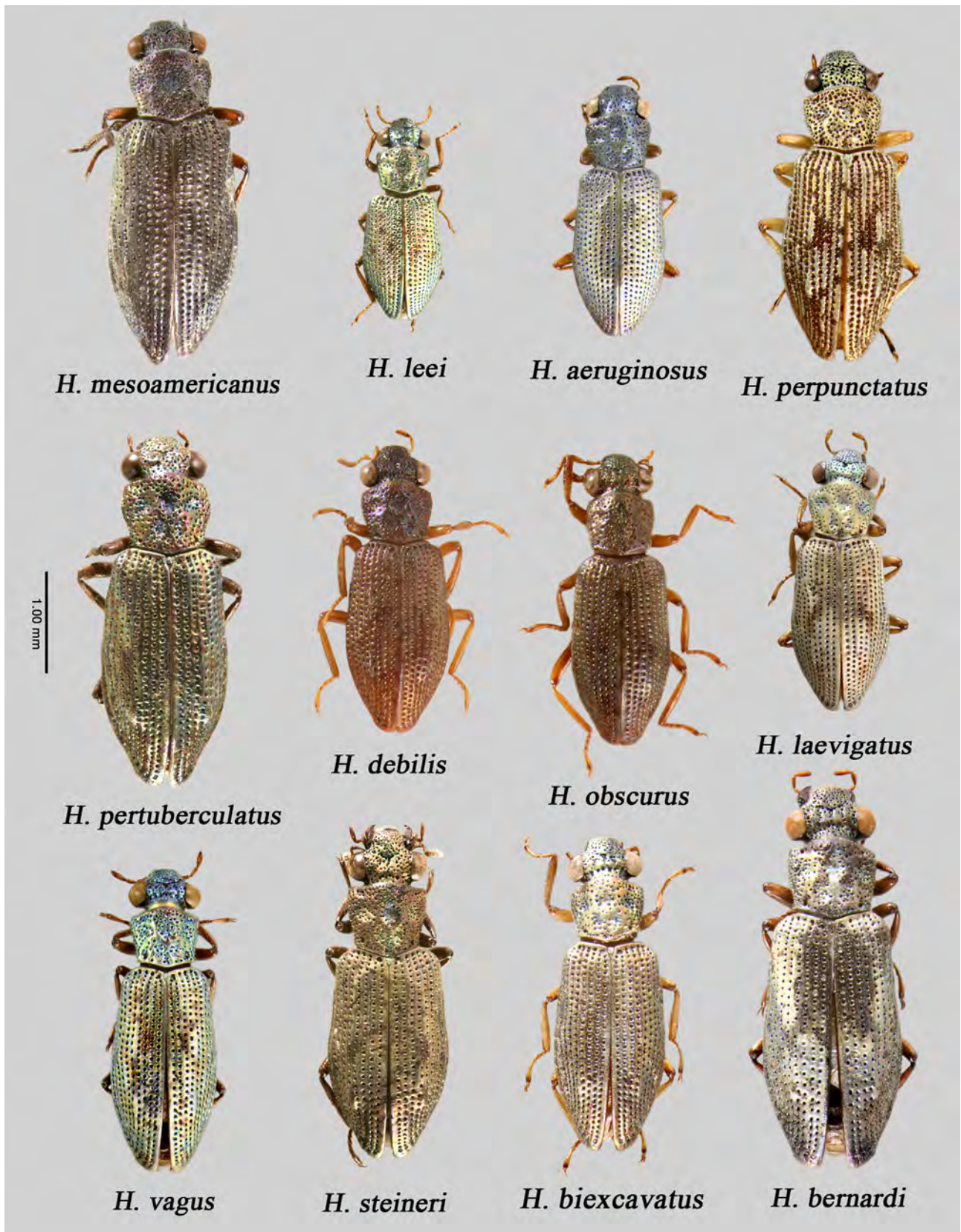
Figs. 1, 26, 29

**Type material.** Holotype (male): “MEXICO: Sonora, Rio Cuchuajqui, 7 mi. SE Alamos, (26°57’N, 108°51’W), black lite, 25-x-1972, E. M. Fisher” (MCZ). **Paratypes (27):** Same data as holotype (21 MCZ); Mexico: Jalisco, Agua Caliente, unnamed stream, (20°23’N, 105°26’W), 15.i.2005, leg. W. D. Shepard (WDS-A-1624) (5 SEMC); Nayarit, Acaponeta, 15.viii.1960, leg. E. S. Ross, D. C. Rentz, P. H. Arnaud Jr. (1 CAS).

**Differential diagnosis.** Among Central American species, recognized by the combination of small size (ca. 2.50 mm), the smooth dorsum with relatively sparse pronotal punctation, the lack of a callus on the 5<sup>th</sup> elytral interstria, the greenish-blue dorsal color, and the male genitalia (Fig. 26; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia are readily recognized by the paramere tips which arc over the aedeagus, the latter being widest near the distal end, an unusual condition; also the shape of the basal piece orifice is unusual.

**Description.** Habitus as illustrated (Fig. 3). Size: holotype (length/width, mm): body (length to elytral apices) 2.50/0.92; head width 0.65; pronotum l/w 0.58/0.65; PA 0.62; PB 0.52; elytra 1.63/0.92. Habitus as illustrated (Fig. 26). Body size moderate (ca. 2.50 mm). Dorsum greenish blue, with strong to moderately strong iridescence, elytra without black spots. Punctation on elytra ca. 3–5x that of pronotum. Elytra interstriae ca. 0.5–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> very weakly raised, if at all.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides arcuate, smooth; anterior margin slightly bisinuate; reliefs very sparsely punctate, depressions more densely punctate; depressions deep.



**FIGURE 1.** Dorsal habitus of Central American *Hydrochus* species.

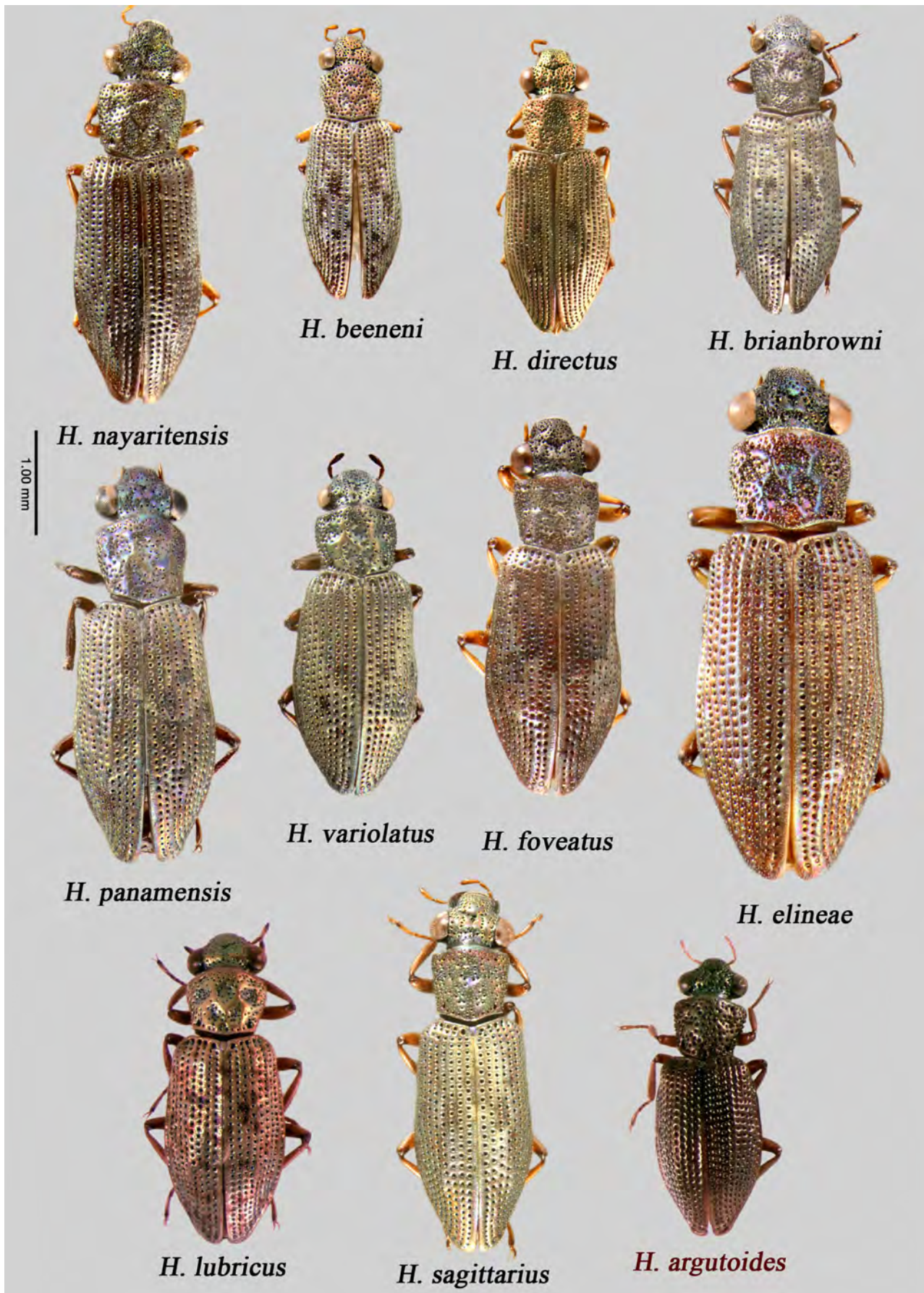


FIGURE 2. Dorsal habitus of Central American *Hydrochus* species.

Elytra with spaces between strial punctures narrow walls to ca. 1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with very slight angulation.

Ventral characters: Mentum coarsely moderately densely punctate, with large median fovea. Submentum with two large foveae. Legs dark brown, tibiofemoral joints slightly darker.

Male genitalia (Fig. 26) general characters: paramere tips only moderately slender, without plsa, with pmsm, slightly narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with distal tips meeting, medial margins arcuate around distal end of aedeagus; pseudoparameres attaining ca. midlength of parameres, tapering distally; aedeagus in dorsal/ventral views widest subapically, tapering from widest point to base; in lateral view wider, especially basally; lateral margins of aedeagus sclerotized; basal piece shorter than parameres, parallel-sided or nearly so in dorsal/ventral views, orifice sclerotized and produced in semi-cup shape.

Dorsal surface: pdmm wide at adtl, then very narrowly separated; adbl small; adtl at about distal 1/5.

Ventral surface: pvmm much more widely separated than pdmm, approximating lateral margin of aedeagus; avtl at ca. midlength of aedeagus.

**Etymology.** Named in reference to the greenish-blue dorsal color.

### *Hydrochus argutoides*, new species

Figs. 2, 4, 38

**Type material. Holotype (male):** "COSTA RICA: Guanacaste Prv., Rio Animas @ Rt. 4; 210 m elv, detrital pools & backwater, 13.i.2004, AS-04-040, A.E.Z. Short & D. J. Lebbin" (SEMC).

**Differential diagnosis.** Among Central American species, recognized by the combination of small size (ca. 2.65 mm), the pronotum with shallow, densely punctate depressions, the pronotal shape, with strongly denticulate lateral margins, the elytral disc with very large and deep punctures, the large punctures of the elytral apices, and the male genitalia (Fig. 4; described below). Differentiation from other similarly small sized species with similarly shaped pronotum should include dissection of males. This species is a member of the *H. argutus* species group. Other members of the group include *H. argutus* Knisch (Bolivia, southern Brazil, Paraguay), *H. argutissimus* Perkins (Venezuela), and an undescribed species from Bolivia (Perkins, in prep.). All members have the characteristic general shape of the male genitalia, which has a markedly arcuate basal piece, in lateral view.

**Description.** Habitus as illustrated (Fig. 4). Size: holotype (length/width, mm): body (length to elytral apices) 2.67 /1.01; head width 0.67; pronotum l/w 0.63/0.70; PA 0.66; PB 0.50; elytra 1.68 /1.01. Body size small (ca. 2.67 mm). Dorsum dark brown to reddish brown, with slight iridescence, elytra without black spots. Punctuation on elytra deep, ca. 2–4x that of pronotum. Elytra interstriae ca. 0.5–1x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> not raised.

Pronotum wider than long (ratio ca. 70/63), widest slightly behind anterior margin, markedly narrowed at base, sides straight, strongly denticulate; anterior margin bisinuate; depressions very shallow, densely punctate; reliefs very low, generally punctate.

Elytra with punctures large and deep, spaces between strial punctures narrow ridges to ca. 0.5 puncture diameter; apices slightly widened, with submarginal groove having large translucent punctures and, apically, each elytron one large elongate puncture.

Ventral characters: Mentum densely punctate, with median fovea. Submentum with two foveae.

Male genitalia (Fig. 4) general characters: paramere tips appearing sagittate, *but only in lateral view*; in dorsal/ventral views tips have medial margins separated, except meeting at distal end, tips extend well beyond distal end of aedeagus; basal piece long, in lateral view proximal 1/2 strongly arcuate ventrad, with terminal sclerotization.

Dorsal surface: adtl and adbl lacking; pdmm slightly overlapping alm.

Ventral surface: pvmm closer to one another than are pdmm.

**Etymology.** Named in reference to the relationship with *H. argutus*.

## *Hydrochus biexcavatus*, new species

Figs. 1, 5, 29

**Type material.** Holotype (male): “**Mexico:** Prov. Campeche, 10 km S Campeche, 50 m, 13.7.2008, leg. Wewalka (Mex 10)” (NMW). **Paratypes (123): Belize:** Cayo District, San Igmacio (8 km S); stock pond, 23.v.1986, leg. Paul J Spangler & Robiin A. Faitoute (16) (29 NMNH). **Costa Rica:** 10 mi. NW Liberia, 25.vii.1965, leg. Paul J. Spangler (1 NMNH); 16 m. S. La Cruz, 13.vii.1965, leg. Paul J. Spangler (1 NMNH); 5 mi. SW Liberia, 24.vii.1965, leg. Paul J. Spangler (17 NMNH); Santa Cruz, 21.vii.1962, leg. no collector on label (24 NMNH); Alajuela, Cano Negro, 24.viii.1998, leg. Drechsel (1 NMW); Guanacaste, 15 km SE Canas, Hacienda Tagoba, 23.iii.1965, leg. P. Cook (1 CAS); 18.7 km NW Bagaces, Hwy 1, Rio Carana, (10°39’N, 85°22’W), 4.vi.1973, leg. Erwin & Hevel (1 NMNH); F.N. Barra Honda, pond and outflow stream, elev. 61 m, 27.xi.2002, leg. W. Shepard (3 SEMC); Nandayure; Barra Honda N.P., Lake at trailhead, elev. 61 m (10°10’51’’N, 85°19’47’’W), 27.vi.2002, leg. W. Shepard & R. Roughley (6 SEMC); **Palo Verde Biol. Station**, ex. blacklite, 4.vi.1993, leg. Steve Lingafelter (2 SEMC); **Palo Verde N.P.:** nr. Birding tower; lagoon margin, 11.i.2004, leg. AEZShort & DJLebbin (AS-04-030a) (1 SEMC); Rd to **Palo Verde**; 11.4 km past Rt. 1; roadside ditch, elev. 35 m, 11.i.2004, leg. AEZShort & DJLebbin (AS-04-027) (2 SEMC); Heredia, **La Selva** (3 km S Puerto Viejo), at UV blacklight in station nr. 2nd forest, elev. 80 m (10°25’N, 84°0’W), 1.vi.1996, leg. R. S. Hanley (RSHCR012) (1 NMW); Puntarenas, Qu. Negra, ca. 8 km NW Golfito nr. La Gamba (vill.), at Field Station La Gamba, elev. 90 m (8°42’6’’N, 83°12’7’’W), 1-3.iii.2009, leg. M. Brojer (1 NMW). **Honduras:** Casas Viejas, 20.v.1966, leg. J. M. Matta (1 FSCA). **Mexico:** Campeche, 10 km S Campeche, elev. 50 m, 13.vii.2008, leg. Wewalka (Mex 10) (7 NMW); Michoacan, Patzcuaro, 7.vii.1964, leg. P.J. Spangler (6 NMNH); San Luis Potosi, 14 miles East C. del Maiz, 19.xi.1948, leg. H. B. Leech (1 CAS); El Naranjo, 3.i.1950, leg. L. D. Beamer (3 SEMC); Tamazunchale, (21°16’N, 98°48’W), 2.i.1985, leg. James Adams (1 SEMC); Veracruz, 9 mi. W. Poza Rica, 27.viii.1965, leg. Paul J. Spangler (6 NMNH); Sayula de Alemán, Almagres, 2.xii.1998, A. Gómez col. (1 IEXA). **Nicaragua:** Puerto Cabezas, 1-30.vii.1971, leg. J. Maldonado C. (2 NMNH); Rio San Juan, Rio San Juan, Refugio Bartola, (10°59’N, 84°20’W), 5-10.viii.2002, leg. W. D. Shepard (2 SEMC); Rivas, Rio Ochomogo, in Ochomogo at Paso Real de Ochomogo, elev. 60 m (11°39’25.69’’N, 85°58’15.01’’W), 13.ii.2013, leg. M. Brojer (2 NMW).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.20 mm), the moderately low and relatively impunctate pronotal reliefs, the dull, minutely roughened dorsum, and the male genitalia (Fig. 5; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. Differences of the male genitalia from that of the somewhat superficially similar *H. vagus* include, in *H. biexcavatus*, the wider aedeagus with a much larger distal membranous area, the differently shaped dorsal margin of the aedeagus, the larger and differently shaped adbl, the more widely separated pdmm, and the differently shaped paramere tips, each with excavate dorsal surface (Figs. 5, 16). Differences of the male genitalia from that of the somewhat superficially similar *H. vanvondeli* include, in *H. biexcavatus*, the wider aedeagus with a larger distal membranous area and having the agw nearer the aedeagal base, the longer aedeagus, compared to the length of the parameres, the aedeagus tip extending beyond the level of the plsa (in *H. vanvondeli* the tip only attains the same level as the plsa), the larger and differently shaped adbl, and the differently shaped paramere tips, each with excavate dorsal surface (Figs. 5, 23).

**Description.** Habitus as illustrated (Fig. 5). Size: holotype (length/width, mm): body (length to elytral apices) 3.17/1.10; head width 0.73; pronotum l/w 0.83/0.73; PA 0.68; PB 0.61; elytra 2.05/1.10. Body size moderately large (ca. 3.17 mm). Dorsum golden brown, with very little iridescence, cuticle minutely roughened, dull, elytra without black spots. Punctuation on elytra ca. 2–3x that of pronotum. Elytra interstriae ca. 0.5–1x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> moderately raised, moderately elongate, ca. 5 punctures in row on each side.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides arcuate, minutely denticulate; anterior margin bisinuate; densely moderately coarsely punctate, except less dense on reliefs; depressions deep.

Elytra with spaces between strial punctures ca. 0.5–1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with slight angulation.

Ventral characters: Mentum coarsely densely punctate, with large median fovea. Submentum with two small foveae. Legs testaceous, femora and tibiofemoral joints slightly darker than tibiae.

Male genitalia (Fig. 5) general characters: paramere tips slender and pointed, narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, immediately proximal to *plsa* with dorsal surface excavate; aedeagus in dorsal/ventral views lanceolate, widest slightly proximal to midlength; in lateral view slightly narrower in distal 1/2, and wider in proximal 1/2, with dorsal margin slightly undulating; lateral margins of aedeagus sclerotized; basal piece length equal to or very slightly shorter than parameres, tapering slightly from distal to proximal, orifice strongly sclerotized.

Dorsal surface: *pdmm* widely separated, overlapping aedeagus only near base; *adbl* large; *adtl* at about midlength; each paramere with small excavation just proximal to *plsa*, paramere tips without sclerotized ridge.

Ventral surface: *pvmm* approximating lateral margin of aedeagus, except overlapping basally; *avtl* very near base of aedeagus.

**Etymology.** Named in reference to the excavations of the male genitalia paramere tips.

### *Hydrochus laevigatus*, new species

Figs. 1, 7, 28

**Type material.** Holotype (male): “Mexico: Oaxaca Toltepec 2.xi.1987 F. Arias R. Barba E. Barrera” (UNAM).

**Paratypes (4): Honduras:** Francisco Morazan, 15km N. Zamorano, San Juan del Rancho, 14.0090° N, 86.9899° W, (14°0'32.4"N, 86°59'23.64"W), 26.v.1994, leg. H. & A. Howden (2 CMN); Ocotepeque, 11 mi. S. Nueva Ocotepeque, small stream, mostly bedrock, in pine forest, 14.4345° N, 89.1837° W, (14°26'4.2"N, 89°11'1.32"W), 17.vi.1974, leg. M. E. & P. D. Perkins (1 MCZ); **Mexico:** Same data as holotype (1 UNAM); Veracruz, 30 mi. south Acayucan, 21.iv.1962, leg. F. D. Parker, L. A. Stange (1 MCZ).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 2.60 mm), the very smooth and relatively impunctate pronotal reliefs, the deep pronotal depressions, the mentum and submentum without foveae, and the male genitalia (Fig. 7; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia are somewhat similar to that of *H. beeneni*, but differ in the shape of the paramere tips and lack the paramere dorsal ridge present in *H. beeneni* (Figs. 7, 21).

**Description.** Size: holotype (length/width, mm): body (length to elytral apices) 2.60/0.96; head width 0.65; pronotum l/w 0.60/0.67; PA 0.65; PB 0.52; elytra 1.65/0.96. Habitus as illustrated (Fig. 7). Size moderate (ca. 2.60 mm). Dorsum grey to bluish grey, with strong to moderately strong iridescence, elytra with black spots. Pronotal punctation fine, moderately dense in foveae, much sparser on very smooth reliefs. Punctation on elytra ca. 3–5x that of pronotum. Elytra interstriae ca. 1–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> weakly raised.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides sinuate, smooth; anterior margin bisinuate; depressions deep.

Elytra with spaces between strial punctures ca. 0.5–1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with very slight angulation.

Ventral characters: Mentum coarsely densely punctate, without median fovea. Submentum punctate, without foveae. Legs testaceous.

Male genitalia (Fig. 7) general characters: genitalia very narrow; paramere tips slender and pointed, very slightly longer than aedeagus, at apex narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, narrow proximal to weak *plsa*; aedeagus in dorsal/ventral views very slender; in lateral view slightly wider, with no emargination where *adbl* and shaft meet; lateral margins of aedeagus weakly sclerotized; basal piece shorter than parameres, orifice sclerotized.

Dorsal surface: *pdmm* narrowly separated, overlapping aedeagus; *adtl* at about distal 1/5; *adbl* moderately large; paramere tips without sclerotized ridge.

Ventral surface: *pvmm* approximating lateral margin of aedeagus; *avtl* not apparent.

**Etymology.** Named in reference to the smooth pronotal reliefs.

### *Hydrochus lubricus*, new species

Figs. 2, 3, 39

**Type material. Holotype (male):** “MEXICO: Jalisco State, Las Juntas Verano, 17.i.2005, W. D. Shepard leg., Rio Guapinole” (SEMC).

**Differential diagnosis.** Among Mexican species, recognized by the combination of moderate size (ca. 2.30 mm), the deep pronotal impressions, the well raised and very smooth reliefs, and the distinctive male genitalia (Fig. 3; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The distinctive parameres, which are well sclerotized and widened in the proximal ½, are similar in some respects to those of *H. armatus* Perkins, an Ecuadorian species, but the aedeagal form is very different in the two species.

**Description.** Size: holotype (length/width, mm): body (length to elytral apices) 2.98/1.14; head width 0.76; pronotum l/w 0.66/0.76; PA 0.75; PB 0.55; elytra 1.93/1.14. Body size moderate (ca. 2.98 mm). Habitus as illustrated (Fig. 3). Dorsum black with grey to greenish grey strong iridescence, elytra with black spots. Punctuation on elytra ca. 1–2x that of pronotum. Elytra interstriae ca. 1–2x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> moderately raised, moderately elongate, ca. 5 punctures in row on each side.

Pronotum wider than long, widest slightly behind anterior margin, narrowed at base, sides sinuate, microdenticulate; anterior margin slightly bisinuate; pronotal depressions, reliefs strongly raised, rounded, very smooth, almost impunctate.

Elytra with spaces between strial punctures ca. 1x their diameter; apices conjointly rounded in dorsal view, in lateral view outer margin with very slight angulation.

Ventral characters: Mentum densely coarsely punctate, disc slightly depressed. Submentum finely punctate, without foveae. Legs brown to dark brown.

Male genitalia (Fig. 3) general characters: Genitalia very large, strongly sclerotized, with margins between strongly sclerotized areas and weakly or non-sclerotized areas very distinct; parameres longer than aedeagus, tips truncate and slightly angled outward, pls small, rounded; parameres in dorsal/ventral views with middle 1/3 widened and strongly sclerotized, in lateral view parameres much wider, pointed and recurved apically, with two moderately large pwsa; aedeagus narrow, with alsm, apex pointed; basal piece ca. same length as parameres, moderately arcuate in lateral view, orifice sclerotized.

Dorsal surface: adbl large; adtl at about distal 1/4.

Ventral surface: avtl not apparent.

**Etymology.** Named in reference to the raised, rounded, and very smooth pronotal reliefs.

### *Hydrochus mesoamericanus*, new species

Figs. 1, 6, 36

**Type material. Holotype (male):** “MEX. Aguascalientes Sierra Fria about 40 mi. SW Rincon de Romos, iii .9.1953, #54 8200' I.J. Cantrall” (FSCA). **Paratype: Belize:** Cayo District, nr Teakettle Bank, Pook's Hill, (17°13'N, 88°51'W), 6.i.2003, leg. C. R. Bartlett (1 SEMC).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.44 mm), the rather uniformly densely punctate pronotum, except less dense on reliefs, with deep depressions, the distinctly denticulate pronotum lateral margins, and the male genitalia (Fig. 6; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia are differentiated from other Central American species by the combination of nearly straight paramere tips and the large dorsal membranous area of the aedeagus.

**Description.** Habitus as illustrated (Fig. 6). Size: holotype (length/width, mm): body (length to elytral apices) 3.44/1.53; head width 0.78; pronotum l/w 0.73/0.82; PA 0.78; PB 0.69; elytra 2.38/1.53. Body size moderately large (ca. 3.44 mm). Dorsum dark brown, with very little iridescence, elytra without black spots. Punctuation on elytra ca. 2–3x that of pronotum. Elytra interstriae ca. 1–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> weakly raised, moderately elongate, ca. 5 punctures in row on each side.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides sinuate, minutely but distinctly denticulate; anterior margin bisinuate; rather uniformly densely punctate, except less dense on reliefs; depressions deep.

Elytra with spaces between strial punctures ca. 0.5–1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with moderate angulation.

Ventral characters: Mentum coarsely densely punctate, with large median fovea. Submentum punctate, without foveae. Legs brown.

Male genitalia (Fig. 6) general characters: paramere tips slender and pointed, in lateral view narrower than in dorsal/ventral views and sharply pointed, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, narrow proximal to *plsa*; aedeagus in dorsal/ventral views wide in distal ½, only slightly wider in proximal ½, greatest width as ca. midlength; in lateral view slightly wider in proximal ½, and much wider in membranous distal 1/2; lateral margins of aedeagus sclerotized; basal piece slightly shorter than parameres, tapering proximally, orifice strongly sclerotized.

Dorsal surface: *pdmm* widely separated, sinuate; *adbl* large; *adtl* as about distal 1/3; paramere tips without dorsal sclerotized ridge.

Ventral surface: *pvm* approximating lateral margin of aedeagus; *avtl* near base.

**Etymology.** Named in reference to the geographical distribution.

### ***Hydrochus nayaritensis*, new species**

Figs. 2, 10, 28

**Type material.** Holotype (male): **Mexico:** Nayarit, “25 km. S. Tepic, Nayarit MEX. IX-24-1953, B. Malkin” (NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.68 mm), the narrow body form, the rather uniformly densely punctate pronotum, and the male genitalia (Fig. 10; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The very narrow aedeagus, in dorsal/ventral views, could only be compared to that of *H. brianbrowni*. However, the shapes of the parameres, shape of the aedeagus in lateral view, shape of the *adbl*, and shape of the basal piece distinctly differ in the two species. The habitus of the two species also distinctly differ (Figs. 9, 10).

**Description.** Habitus as illustrated (Fig. 10). Size: holotype (length/width, mm): body (length to elytral apices) 3.68/1.23; head width 0.83; pronotum l/w 0.75/0.85; PA 0.78; PB 0.73; elytra 2.33/1.23. Size moderately large (ca. 3.70 mm), form narrow. Dorsum dark brown, with very little iridescence, elytra without black spots. Punctuation on elytra ca. 2–3x that of pronotum. Elytra interstriae ca. 1–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> weakly raised, moderately elongate, ca. 6 punctures in row on each side.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides weakly sinuate, smooth; anterior margin slightly bisinuate; rather uniformly densely punctate, except less dense on reliefs; depressions moderately deep

Elytra with spaces between strial punctures ca. 1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with moderate angulation.

Ventral characters: Mentum coarsely moderately densely punctate, with median fovea. Submentum with two foveae. Legs testaceous, femora and tibiofemoral joints slightly darker than tibiae.

Male genitalia (Fig. 10) general characters: paramere tips very slender and pointed, wider in lateral view than in dorsal/ventral views, except for sharply pointed tips in lateral view; in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, without *plsa*; aedeagus in dorsal/ventral views very slender, slightly wider in distal ½, widest at *adbl*, apex pointed, lateral margins of aedeagus sclerotized; in lateral view sinuate, much wider in proximal ½, only slightly wider in distal 1/2; basal piece length equal to or only very slightly shorter than parameres, wider in proximal ½ than distal ½, in both dorsal/ventral and lateral views, orifice strongly sclerotized.

Dorsal surface: *pdmm* widely separated, sinuate; *adbl* large; *adtl* as about distal 1/5; paramere tips without sclerotized ridge.

Ventral surface: pvmm approximating lateral margin of aedeagus, except overlapping basally; avtl not apparent.

**Etymology.** Named in reference to the geographical distribution.

### *Hydrochus panamensis*, new species

Figs. 2, 12, 28

**Type material.** Holotype (male): “Trinidad Riv, Pan. May.21.11, August Busck” (NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of large size (ca. 3.95 mm), the deep pronotal impressions, the relatively impunctate pronotal reliefs, the elytra with prominent callus on 5<sup>th</sup> interval and raised area of 4<sup>th</sup> interval, and the male genitalia (Fig. 12; described below). The male genitalia have a narrow, parallel-sided basal piece, which is narrower than the width of the genitalia at the proximal part of the parameres; these characters plus the shape of the paramere tips serve to differentiate the form from that of other Central American species. This is the largest known Panamanian species of *Hydrochus*.

**Description.** Habitus as illustrated (Fig. 12). Size: holotype (length/width, mm): body (length to elytral apices) 3.94/1.42; head width 0.94; pronotum l/w 0.90/0.90; PA 0.87; PB 0.81; elytra 2.52/1.42. Dorsum dark grey, with slight to moderately strong iridescence on head and pronotum, elytra with indistinct black areas. Punctuation on elytra ca. 2–3x that of pronotum. Elytra interstriae ca. 1–1.5× strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> strongly raised, moderately elongate, ca. 5 punctures in row on each side.

Pronotum length and width equal, widest at anterior margin, narrowed at base, sides arcuate, each with unilinear row of minute granules; anterior margin slightly bisinuate; depressions deep, much more densely punctate than distinct reliefs between depressions, latter almost entirely impunctate.

Elytra with spaces between strial punctures ca. 0.5–1x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin without subapical angulation. 4<sup>th</sup> interval notably raised from about elytra midlength to level of anterior part of callus on 5<sup>th</sup> interval.

Ventral characters: Mentum moderately coarsely punctate, with large, deep median fovea. Submentum with two very shallow foveae. Legs dark brown.

Male genitalia (Fig. 12) general characters: paramere tips slender and pointed, much narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline; aedeagus lanceolate, moderately slender in dorsal/ventral views; in lateral view slightly wider basally; lateral margins of aedeagus sclerotized; basal piece slightly shorter than parameres, narrow, much narrower than greatest width of distal pieces, in dorsal/ventral views almost parallel sided, slightly arcuate in lateral view, orifice moderately strongly sclerotized.

Dorsal surface: pdmm sinuate, medial part slightly overlapping aedeagus; adbl moderately large; adtl slightly past midlength.

Ventral surface: pvmm more widely separated than pdmm, approximating lateral margin of aedeagus; avtl very near base; gp large.

**Etymology.** Named in reference to the geographical distribution.

### *Hydrochus perpunctatus*, new species

Figs. 1, 11, 28

**Type material.** Holotype (male): “Mexico: Veracruz, Jalapa, 24-V-1984, J. Pena” (UNAM).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.10 mm), the densely coarsely punctate pronotum, the large and closely spaced strial punctures of the elytra, the three callosities of each elytron, and the male genitalia (Fig. 11; described below). The male genitalia can be differentiated from others by the aedeagus greatest width being near the base, and tapering toward the apex, plus the shape of the paramere tips.

**Description.** Habitus as illustrated (Fig. 11). Size: holotype (length/width, mm): body (length to elytral apices)

3.10/1.22; head width 0.76; pronotum l/w 0.67/0.76; PA 0.73; PB 0.61; elytra 2.04/1.22. Body size moderate (ca. 3.10 mm). Dorsum grey to greenish grey, with moderately strong iridescence, elytra with large black spots. Punctuation on elytra ca. 3–5x that of pronotum. Elytra interstriae ca. 1–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Elytra with three calluses: usual area of callus on 5<sup>th</sup> strongly raised, elongate, ca. 7 punctures in row on each side; additional callus of about same size on 5<sup>th</sup>, located slightly before midlength; third callus, smaller than others, on 7<sup>th</sup> interstria, ca. opposite gap between calluses on 5<sup>th</sup> interstria.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides arcuate, very minutely denticulate; anterior margin bisinuate; pronotum densely coarsely punctate; depressions large and deep; reliefs very narrow.

Elytral punctures large and deep, spaces between strial punctures narrow walls to ca. 0.5x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with very slight angulation.

Ventral characters: Mentum coarsely moderately densely punctate, with large median fovea. Submentum with two foveae. Legs testaceous, femora and tibiofemoral joints slightly darker than tibiae.

Male genitalia (Fig. 11) general characters: paramere tips slender and pointed, narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, plsa very slight; parameres distinctly sinuate in lateral view; aedeagus in dorsal/ventral views much wider in proximal ½ than distal ½, agw very near base; in lateral view narrower, without emargination where adbl and shaft meet; basal piece shorter than parameres.

Dorsal surface: pdmm separated slightly at adtl, then overlapping one another in ca. middle ½, then separating before adbl; adbl large; adtl at about distal 1/6; paramere tips without sclerotized ridge.

Ventral surface: pvmm widely separated in proximal ½, but overlapping alm; avtl not apparent.

**Etymology.** Named in reference to the densely and deeply punctate dorsum.

## New distribution records

### *Hydrochus beeneni* Makhan, new status

Figs. 2, 21, 22, 24, 40

*Hydrochus beeneni* Makhan 1992: 100

*Hydrochus piroei* Makhan 1992; Oliva (1996) misidentification (see remarks)

Originally described from the Cayman Islands. This is a very commonly collected Central American species; all eight countries are represented in the specimen locality data records given below.

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 2.76 mm), the densely punctate pronotum, the large and deep anteromedian pronotal fovea, the closely spaced serial elytral punctures, and the male genitalia (Figs. 10–12; described below). This very common species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. Refer also to the differential diagnosis of *H. biexcavatus* **n. sp.**

**Redescription.** Habitus as illustrated (Figs. 21, 22). Size: Ca. (length/width, mm): body (length to elytral apices) 2.76/1.04; head width 0.64; pronotum l/w 0.62/0.64; PA 0.64; PB 0.56; elytra 1.76/1.04. Body size moderate (ca. 2.76 mm). Dorsum grey to greenish bronze, with strong to moderately strong iridescence, especially in anteromedian fovea of pronotum, elytra with large black spots. Punctuation on elytra ca. 2–3x that of pronotum. Elytra interstriae ca. 1–1.5x strial puncture diameter. Interstria 9<sup>th</sup> more convex than others, overhanging 10<sup>th</sup> interstria. Usual area of callus on 5<sup>th</sup> weakly raised, moderately elongate, ca. 7 punctures in row on each side.

Pronotum slightly wider than long, widest slightly behind anterior margin, narrowed at base, sides arcuate, smooth; anterior margin slightly bisinuate; rather uniformly densely punctate, except less dense in anteromedian fovea; depressions moderately deep, anteromedian deepest.

Elytra with spaces between strial punctures narrow walls to ca. 0.5x their diameter; apices rather sharply conjointly rounded in dorsal view, in lateral view outer margin with slight angulation.

Ventral characters: Mentum densely punctate, with median fovea. Submentum with two foveae. Legs testaceous, femora darker than tibiae.

Male genitalia (Figs. 21, 22, 24) general characters: paramere tips slender and pointed, much narrower in lateral

view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline; aedeagus slender in dorsal and ventral views; in lateral view slightly wider; lateral margins of aedeagus sclerotized; basal piece shorter than parameres, orifice strongly sclerotized.

Dorsal surface: pdmm proximal to paramere tips parallel or nearly so, overlapping margin of aedeagus; adbl large; adtl near distal end; each paramere with sclerotized ridge as illustrated (Figs. 10, 11).

Ventral surface: pvmm more widely separated than pdmm, approximating lateral margin of aedeagus.

**Material examined (258): Belize:** Stann Creek, Kendal; ex side pool of Sittee River at bridge, 1.v.1987, leg. Spangler & Faitoute (7 NMNH); Stann Creek, Sittee Point; Possum Point Biol. Sta., 23.iv.1987, leg. P. J. Spangler & R. A. Faitoute (25 NMNH); same locality, 24.iv.1987, leg. P. J. Spangler & R. A. Faitoute (10 NMNH); same locality, 25.iv.1987, leg. P. J. Spangler & R. A. Faitoute (2 NMNH); Stann Creek, Sittee Point; Sittee River, 8 km upstream from Possum Point Biol. Sta., 22.iv.1987, leg. Spangler & Faitoute (54 NMNH); Belize Dist., Hattieville, 7-8.vii.1968, leg. W. L. Hasse (1 CNC, 2 NMNH); Cayo, Western Highway Mile 66, 5.vii.1969, leg. W. & D. Hasse (6 NMNH); Orange Walk Dist., Rio Bravo Pres., black lights, 1.i.1996, leg. W. D. Shepard (3 NMW).

**Costa Rica:** Port Limon, 9.v.1929, leg. Darlington (1 MCZ); Alajuela, Cano Negro, 24.viii.1998, leg. Drechsel (2 NMW); Puntarenas, Roadside pools; 7.9 km SE of La Palma; Osa Pensla., elev. 34 m (8°36.07'N, 83°25.95'W), 18.vi.2003, leg. A. E. Z. Short (1 SEMC). **El Salvador:** Zacatecoluca, 1.viii.1965, leg. Paul J. Spangler (1 NMNH). **Guatemala:** Izabal, Finca Bello Horizonte ca 8 km SE of Rio Dulce, elev. 43 m (15°35'33.07"N, 88°56'37.18"W), 11.iii.2017, leg. R. S. Zack (5 WSU); Peten, Parque National Ixpanpajul, Rt. CA-13, near Santa Ana, elev. 188 m (16°52.439'N, 89°48.652'), 11.ix.2009, leg. R. S. Zack (3 WSU); Parque National Yaxha, ENE El Remate, elev. 167 m (17°4'1.99"N, 89°24'.72"W), 13.iii.2017, leg. R. S. Zack (13 WSU). **Honduras:** Corozal Town, 29.viii.1967, leg. G. & R. Lacy (2 NMNH); San Marcus Colon, 28.vii.1965, leg. Paul J. Spangler (1 NMNH); Cortes, 24 mi. S. San Pedro Sula, 19.vi.1974, leg. M. E. and P. D. Perkins (1 MCZ); La Lima, 3.vi.1964, leg. Blanton, Broce, & Woodruff (23 NMNH). **Mexico:** Campeche, 21 mi. E. Campeche, 27.vii.1964, leg. Paul J. Spangler (5 NMNH); Escarcega, 18.v.1962, leg. F. Islas S. (4 NMNH); Chiapas, 3 mi. N. Tapilula, 27.v.1974, leg. M. E. & P. D. Perkins (1 SEMC); Nayarit, San Blas, 12-14.vii.1960, leg. R. B. Loomis, J. Maris (5 CAS); same locality, 14.vii.1960, leg. R. B. Loomis, J. Maris (1 MCZ); Oaxaca, Tapanatepec, 23.viii.1965, leg. P. J. Spangler (1 NMNH); Quintana Roo, Km 146 carr Chetumal - Cancun, 3.v.1982, leg. V. Melendez (1 UNAM); Sonora, Cd. Obregon, 9.viii.1960, leg. W. W. Gibson (2 MCZ); Tabasco, 23 mi. N. Villahermosa, 6.viii.1964, leg. Paul J. Spangler (34 NMNH); Frontera, 23.vi.1969, leg. Bright & Campbell (1 NMNH); Mpio. Cdentla Rio Gonzalez Est. 4 Lagura Juliva, (18°20.757'N, 92°58.213'W), 27.iii.1998, leg. Bueno, Barba (1 UNAM); Rio Carrizal 2nd Secc. Rancheria Platanos (Estanque), 10.vi.1996, leg. J. Bueno, A. Contreras, R. Barba (1 UNAM); Rio Carrizal Desv. Reforma Km 234, 8.vi.1996, leg. J. Bueno, A. Contreras, R. Barba (7 UNAM); Rio Carrizal Est. No. 5, (17°58.21'N, 93°8.65'W), 10.vi.1996, leg. J. Bueno, A. Contreras, R. Barba (1 UNAM); Rio Samaria, Est. 4 (estanque), (18°.78'N, 93°4.75'W), 13.vi.1996, leg. Bueno, Santiago, Barba, Contreras (1 UNAM); Teapa, 25.v.1974, leg. M. E. & P. D. Perkins (12 MCZ); Villahermosa, 25.vii.1964, leg. Paul J. Spangler (1 NMNH); Veracruz, 25 mi. S. Acayucan, 4.vii.1965, leg. Paul J. Spangler (1 NMNH); 8 Mi. NE Panuco, 28.viii.1965, leg. P. J. Spangler (2 NMNH); Acayucan, 4.vii.1965, leg. Paul J. Spangler (1 NMNH); Sn. Jose Las Choapas Est. 7 Rio Tonalá (vias del tren), (17°52.288'N, 94°5.042'), 24.iii.1998, leg. J. Bueno, R. Barba (1 UNAM). **Nicaragua:** Carazo, Rio Casares, elev. 110 m (11°42'57.3"N, 86°13'6.97"W), 12.i.2013, leg. M. Brojer (1 NMW); Matagalpa, Matagalpa, km 77.6 Panam Highway, Rdside pool, elev. 393 m, 4.viii.2002, leg. W. D. Shepard (2 SEMC); Rio San Juan, 60 km SE San Carlos, Refugio Bartola, ex. mercury vapor/UV light, elev. 100 m (10°58.4'N, 84°20.3'W), 30.v.2002, leg. R. Brooks, Z. Falin, S. Chatzimanolis (5 SEMC); Rivas, Res Sil Pr Domitila, UV lights, elev. 122 m, 5-9.vi.2005, leg. W. D. Shepard (1 SEMC). **Panama:** Bocas del Toro, nr. Miramar, car-net between -82.30/+8.95 -81.19/+9.04, 24.vii.2014, leg. T. Struyve (1 HMNH).

Male genitalia (Figs. 21, 22). General characters: paramere tips slender and pointed, much narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline; aedeagus slender in dorsal and ventral views; in lateral view slightly wider, dorsal surface with angulation where adbl and shaft join; lateral margins of aedeagus sclerotized; basal piece shorter than parameres, orifice strongly sclerotized.

Dorsal surface: pdmm proximal to paramere tips parallel or nearly so, overlapping margin of aedeagus; adbl large; adtl near distal end; each paramere with sclerotized ridge as illustrated (Fig. 10).

Ventral surface: pvmm more widely separated than pdmm, approximating lateral margin of aedeagus.

**Remarks.** Oliva (1996) synonymized *H. beeneni* Makhan with *H. piroei* Makhan. This proposed synonymy is

incorrect. I have examined the holotype, including the holotype male genitalia of *H. beeneni* (RBINS). The male genitalia of the two species distinctly differ; see figure and detailed description of *H. piroei* male genitalia in Perkins (2019c). When the holotype specimen of *H. beeneni* was received, the male genitalia was in multiple pieces; these pieces are illustrated herein (Fig. 24), and the dorsal habitus of the holotype is also illustrated. The male genitalia illustration in Makhan (1992) is oversimplified, only in one view, misleading, and of little diagnostic value. The specimens imaged herein have the following locality data: (Fig. 21) Veracruz, 25 mi. S. Acayucan, 4.vii.1965, leg. Paul J. Spangler; (Fig. 22) Bocas del Toro, nr. Miramar, car-net between -82.30/+8.95 -81.19/+9.04, 24.vii.2014, leg. T. Struyve.

### ***Hydrochus bernardi* Makhan**

Figs. 1, 20, 41

*Hydrochus bernardi* Makhan 1994: 42.

Originally described from Mexico. The following are new locality data records from **Costa Rica** and Mexico.

**Material examined (44):** **Costa Rica:** 16 m. S. La Cruz, 13.vii.1965, leg. Paul J. Spangler (21 NMNH). **Mexico:** Chiapas, Mpio, Ángel Albino Corzo, Jaltenango, 16-Jan-2012, 15°52'15"N, 92°43'26" W, Trampa Luz, D. Reynoso col. (1 IEXA); Guerrero, 3.7 mi. E. Marquelia, 10.vii.1974, leg. Clark, Murray, Ashe, Schaffner (1 TAMU); 7 KM DE IXTAPA-PTO. LA SALITRERA, 28.vi.1986, leg. J. Bueno, S. Santiago (2 UNAM); Nayarit, Acaponeta, 15.viii.1960, leg. E. S. Ross, D. C. Rentz, P. H. Arnaud Jr. (1 CAS); San Blas, 17-21.ix.1953, leg. B. Malkin (1 CAS); Sinaloa, 7 mi. N. Rosario, 24.vii.1963, leg. Paul J. Spangler (17 NMNH).

**Differential Diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.60 mm), the moderately densely punctate pronotum, and the male genitalia (Fig. 20; described below). This species has a generalized *Hydrochus* habitus (Fig. 20); reliable determinations will require dissection of males.

Male genitalia (Fig. 20). General characters: paramere tips sagittate, pls moderately prominent, narrower at very tip end in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex arcuate toward midline, then arcuate away from midline; aedeagus in dorsal/ventral views lanceolate, moderately wide at agw, at ca. midlength; in lateral view slightly narrower, without emargination where adbl and shaft meet; lateral margins of aedeagus sclerotized; basal piece slightly shorter than parameres, in dorsal/ventral views tapering from distal to proximal, in lateral view dorsal surface arcuate, ventral surface straight, orifice strongly sclerotized.

Dorsal surface: pdmm widely separated, overlapping aedeagus; adbl moderately large; adtl subapical.

Ventral surface: pvmm approximating lateral margin of aedeagus; avtl not apparent; pseudoparameres cylindrical in cross section, ca. ½ as long as parameres.

**Remarks.** I have examined the holotype, including the male genitalia, of *H. bernardi* (ZMHB) (Fig. 20).

### ***Hydrochus brianbrowni* Makhan**

Figs. 2, 9, 31

*Hydrochus brianbrowni* Makhan 2005: 63.

Originally described from southern Arizona. New locality data records for Mexico are given below

**Material examined (52):** **Mexico:** Baja California, Arroyo Saltito nr. Las Cruces, E. of La Paz, 23.i.1959, leg. H. B. Leech (1 CAS); Baja California Sur, 9 mi. up Canyon San Bernardo fr. Boca de la Sierra (Potrero), elev. 457 m (23°23'N, 109°57'W), 2.viii.1971, leg. H. G. Real & R. E. Main (1 FSCA, 37 CAS); Sa. Victoria, 7 mi. W Santiago, (23°28'N, 109°50'W), 30-31.x.1968, leg. E. L. Sleeper & F. J. Moore (1 CAS); Jalisco, Mpio. Tomatlán, Cajón de Peñas, 120 m, 15.vi.1994, G. Nogueira col. (1 IEXA); Quintana Roo, Pto. Morelos, 29.iv.1982, leg. O. Comul (1 UNAM); San Luis Potosi, 2 mi. S. San Luis Potosi, 21.xi.1948, leg. H. B. Leech (1 CAS); Sinaloa, Los Mochis, 8.vii.1922, leg. C.T. Dodds (1 CAS); Sonora, 20 mi. W. Moctezuma, 28.ix.1980, leg. no collector on label (2 NMNH); 7 mi. SE Alamos, 27.xi.1971, leg. K. Stephan (2 NMNH); La Pintada, 6.xi.1986, leg. F. Arias (3 UNAM); Zacatecas, Teul de Gonzalez Ortega, Huitzila; borde arroyo, elev. 1718 m (21°36'46.1"N, 103°36'22.2"W), 31.i.2004, leg. V.Gomez & J.L. Navarrete-Heredia (1 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 2.94 mm), the deep pronotal depressions, and the male genitalia (Fig. 9; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The aedeagus is very narrow, for comparison refer to the diagnosis of *H. nayaritensis* n. sp.

Male genitalia (Fig. 9). General characters: paramere tips slender and pointed, narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, slightly narrowed proximal to plsa; aedeagus in dorsal/ventral views very slender, parallel-sided or nearly so for entire length, apex pointed; in lateral view wider at base and slightly wider for remainder of length; lateral margins of aedeagus sclerotized; basal piece in dorsal/ventral views tapering from distal to proximal, in lateral view slightly wider proximally than distally, shorter than parameres, orifice strongly sclerotized.

Dorsal surface: pdmm widely separated, overlapping aedeagus only very slightly at base; adbl moderately large; adtl at about distal 1/6; each paramere with prominent pwsa; paramere tips without sclerotized ridge.

Ventral surface: pvmm well separated, except narrowly separated where overlapping aedeagus basally; avtl not apparent.

**Remarks.** I have examined the holotype, including the male genitalia (LANHM). The specimen imaged (Fig. 9) was collected at this locality: Baja California Sur, 9 mi. up Canyon San Bernardo fr. Boca de la Sierra (Potrero).

### *Hydrochus debilis* Sharp

Fig. 1, 39

*Hydrochus debilis* Sharp 1882: 89.

Originally described from Guatemala. New locality data records are given below. Images of the habitus and male genitalia, and detailed description of the male genitalia of the lectotype are given in Perkins (2020a).

**Material examined (16): Belize:** Blue Creek Village, 30.vi.1981, leg. W. E. Steiner (1 NMNH); Belize, 48 km SW Belize City, 5.vii.1981, leg. W. E. Steiner (1 NMNH); Belize Dist., Hattievill, 7-8.vii.1968, leg. W. L. Hasse (6 NMNH). **Costa Rica:** Guanacaste, Naciente de la Qu. Centeno Pocosol, elev. 200 m, 25.i.1997, leg. T. Goldschmidt (2 NMW). **Guatemala:** Peten, Parque Nacional El Rosario, E of Sayaxche, elev. 145 m (16°31'26.9"N, 90°9'36.32"W), 16.x.2017, leg. R. S. Zack (4 WSU); Parque Nacional Yaxha, ENE El Remate, elev. 167 m (17°4'1.99"N, 89°24'.72"W), 13.iii.2017, leg. R. S. Zack (1 WSU). **Mexico:** Veracruz, Los Tuxtlas area below La Palma, 15.v.1981, leg. Paul J. Spangler (2 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 2.69–3.08 mm), the densely punctate pronotum with deep foveae, the elytral sculpture, each elytron having four raised interstriae: 3<sup>rd</sup> slightly raised over basal ¼, 4<sup>th</sup> raised in area anterior to large callus of 5<sup>th</sup>, 5<sup>th</sup> raised from about anterior ¼ to midlength, plus the usual callus of 5<sup>th</sup>, and the male genitalia. The male genitalia are distinctively different from that of other Central American *Hydrochus*.

### *Hydrochus directus* Perkins

Fig. 2, 32

*Hydrochus directus* Perkins 2020a: 295.

Originally described from Guatemala. Following are new locality records for Mexico. Images of the habitus and male genitalia of the holotype, and detailed description of the male genitalia, are given in Perkins (2020a).

**Material examined (3): Mexico:** Cotaxtla, Cotaxtla Exp. Sta., 28.vi.1962, leg. D. H. Janzen (1 CNC); Oaxaca, Tuxtepec (31km S), Bethania, Ao. Chopan, 24.v.1981, leg. Paul J. Spangler (1 NMNH); Veracruz, 9 mi. W. Poza Rica, 27.viii.1965, leg. Paul J. Spangler (1 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.00 mm), the densely punctate pronotum with the reliefs slightly less punctate than the depressions, and the male genitalia. This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia of *H. directus* is very slender, therefore superficially somewhat similar to that of *H. aeruginosus*

**n. sp.;** however, details of the two distinctly differ, including shape and size of the parameres, size and shape of the basal piece, and form of the adbl. The habitus of the two species also distinctively differ.

### ***Hydrochus elineae* Makhan**

Figs. 2, 19, 33

*Hydrochus elineae* Makhan 1994: 41.

Originally described from Mexico. New locality data records from Mexico are given below.

**Material examined (20): Mexico:** Nayarit, 18 mi. N.W. Tepic, 27.xi.1948, leg. H. B. Leech (2 CAS); 21 mi. S. Acaponeta, 11.viii.1963, leg. E. L. Sleeper (12 CAS); 8.7 mi. E. San Blas, 1.vii.1962, leg. E. Sleeper, R. Anderson, A. Hardy, R. Somerby (1 CAS); Acaponeta, 15.viii.1960, leg. E. S. Ross, D. C. Rentz, P. H. Arnaud Jr. (5 CAS).

**Differential diagnosis.** Among Central American species, recognized by the combination of large size, the largest species in Mexico (ca. 5.00 mm), the deep pronotal depressions, the relatively small prothorax, and the male genitalia (Fig. 19; described below). The male genitalia are characterized by a big basal piece, a wide aedeagus which, in lateral view, has the dorsal surface concave just distal to the adbl.

Male genitalia (Fig. 19). General characters: paramere tips slender and pointed, extending well beyond aedeagus apex, in lateral view parameres abruptly narrowing at tips, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, pls absent or nearly so; aedeagus in dorsal/ventral views wide, agw slightly distal to midlength, margins in proximal ½ slightly sinuate; dorsal margin in lateral view with deep indentation at ca. basal 1/3, otherwise aedeagus wider; lateral margins of aedeagus sclerotized; basal piece distinctly longer than parameres, widened from distal to proximal, width at widest part wider than width at paramere base.

Dorsal surface: pdmm widely separated distally, very narrowly separated at adbl; adbl moderately large; adtl at about distal 1/5.

Ventral surface: pvmm approximating lateral margin of aedeagus in distal ½, overlapping in proximal 1/2; avtl not apparent.

**Remarks.** I have examined the holotype, including the male genitalia, of *H. elineae* (ZMHB). The specimen imaged (Fig. 19) has this locality data: Nayarit, 21 mi. S. Acaponeta, 11.viii.1963, leg. E. L. Sleeper.

### ***Hydrochus foveatus* Haldeman**

Figs. 2, 15, 16, 36

*Hydrochus foveatus* Haldeman, 1852: 375; lectotype designation Worthington *et al.* 2016.

*Hydrochus monishi* Makhan, 1995. Syn. Worthington *et al.* 2016.

Originally described from Texas; the following are new locality records from Mexico.

**Material examined (17): Mexico:** Nuevo Leon, 10 km N Linares; ex. mercury vapor lite, elev. 430 m, 22.iii.1991, leg. R. Brooks, R. Leschen (3 SEMC); Nuevo Leon, Rio Ramos, 19.vii.1968, leg. F. N. Young (#2304) (1 NMNH); Rio Ramos near Allende, 18.viii.1954, leg. F. N. Young (1106) (1 NMNH); Siesta Motel, 6 mi. S. of Monterrey, 28.vi.1966, leg. R. E. Woodruff (2 NMNH); San Luis Potosi, Ciudad Valles, 22.viii.1964, leg. Paul J. Spangler (1 NMNH); Clear stream at Palitla, 5 mi. N. of Tamazunchale, 22.xii.1948, leg. Hugh B. Leech (1 CAS); Huichihuayan, 25.ix.1938, leg. L. J. Lipovsky (1 SEMC); Tamaulipas, 5 miles sse. of Gomez Farias, 19.vii.1970, leg. Shaffner, Hart, Murray, Phelps (1 NMNH); Gomez Farias, 3 mi. W. El Encino, 16.iii.1983, leg. M. S. Davis (2 UMRM); Veracruz, 9 mi. W. Poza Rica, 27.viii.1965, leg. Paul J. Spangler (4 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.50–3.56 mm), the deep pronotal foveae, the large elytral tubercle of the 5<sup>th</sup> interstria, and the male genitalia (Figs. 15, 16; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia are distinct from other Central American species by virtue of the following combinations of characters: genitalia large, paramere tips sagittate, adtl very near apex of aedeagus, aedeagus wide, pseudoparameres large.

Male genitalia (Figs. 15, 16). General characters: paramere tips sagittate, pls prominent, narrower at very tip

end in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline; aedeagus in dorsal/ventral views lanceolate, very wide at agw, at ca. midlength; in lateral view slightly narrower, without emargination where adbl and shaft meet; lateral margins of aedeagus sclerotized; basal piece slightly shorter than parameres, in dorsal/ventral views tapering from distal to proximal, in lateral view dorsal surface arcuate, ventral surface straight, orifice strongly sclerotized.

Dorsal surface: pdmm moderately widely separated, slightly sinuate, overlapping aedeagus; adbl very small; adtl subapical.

Ventral surface: pvmm approximating lateral margin of aedeagus; avtl at ca. proximal 1/3.

**Remarks.** The one specimen in the LeConte collection at the MCZ, a female, was designated lectotype by Worthington *et al.* (2016). Images of the habitus and labels of this specimen are given herein (Fig. 16). The specimen imaged (Fig. 15) has this locality data: Nuevo Leon, Rio Ramos near Allende, 18.viii.1954, leg. F. N. Young.

### ***Hydrochus leei* Perkins**

Figs. 1, 38

*Hydrochus leei* Perkins 2019c: 50.

Originally described from Venezuela; locality data records also published for Peru (Perkins, 2020c). New locality data records for Central America are given below. Habitus and male genitalia images of the holotype, and detailed description of the male genitalia are given in Perkins (2019c).

**Material examined (247): Belize:** Stann Creek, Sittée Point; Possum Point Biol. Sta., 24.iv.1987, leg. P. J. Spangler & R. A. Faitoute (1 NMNH); Belize, 48 km SW Belize City, 5.vii.1981, leg. W. E. Steiner (2 NMNH); Belize Dist., Hattieville, 7-8.vii.1968, leg. W. L. Hasse (3 NMNH); Western Hwy nr. Zoo, pine grassland, light trap, 7.i.2003, leg. C. R. Bartlett (1 SEMC); Cayo, Western Highway Mile 66, 5.vii.1969, leg. W. & D. Hasse (20 NMNH); Cayo District, San Igmacio (8 km S); stock pond, 23.v.1986, leg. Paul J Spangler & Robin A. Faitoute (11 NMNH); Western Hwy, ca. 1 mi. E of Belize Zoo; at lights in pine savanna, (17°21'26.9"N, 88°33'4.2"W), 4.vii.2003, leg. C. R. Bartlett (1 SEMC); Orange Walk Dist., Rio Bravo Conserv. Area, pond at end Orchard Trail, water edge litter, (17°50'48"N, 89°2'43"W), 28.iv.1996, leg. C. Carlton (72) (5 SEMC); Rio Bravo Pres., black lights, 1.i.1996, leg. W. D. Shepard (1 NMW); Stann Creek District, Dangriga, 29.iii.1988, leg. R. A. Faitoute (colln #35) (1 NMNH). **Guatemala:** Peten, Parque National El Rosario, E of Sayaxche, (16°31'26.9"N, 90°9'36.32"W), 2-3.x.2013, leg. R. S. Zack (4 WSU); same locality, 30.vi.2014, leg. R. S. Zack (11 WSU); same locality, 16.x.2017, leg. R. S. Zack (6 WSU); Parque National Yaxha, ENE El Remate, elev. 167 m (17°4'1.99"N, 89°24'.72"W), 13.iii.2017, leg. R. S. Zack (12 WSU); Tikal, 28.vi.1974, leg. W. E. Steiner (2 NMNH). **Mexico:** Campeche, 21 mi. E. Campeche, 27.vii.1964, leg. Paul J. Spangler (5 NMNH); Chicanna, 10 km W Xpujil, elev. 300 m, 13.vii.1983, leg. S. & J. Peck (1 CMN); Escarcega, 18.v.1962, leg. F. Islas S. (11 NMNH); same locality, 24.v.1962, leg. F. Islas S. (1 NMNH); same locality, 1-5.vi.1962, leg. F. Islas S. (6 NMNH); Veracruz, Acayucan, Rd. 185, 10.vii.1962, leg. J. M. Campbell (1 CNC); Cervecería Moctezma, 28.vi.1963, leg. R. E. Woodruff (1 FSCA); Córdoba, 6-9.xi.1966, leg. A. B. Lau (1 NMNH); Cuitlahuac, 10-12.viii.1964, leg. Paul J. Spangler (6 NMNH); Fortín de las Flores, 26-30.vi.1963, leg. D. R. Whitehead (2 NMNH). **Panama:** La Chorrera, 13.v.1912, leg. August Busck (1 NMNH); Cocle, Nata, 26.xi.1952, leg. Blanton (42 NMNH); Penonome (13km SW), Rio Cocle Auxiliar, 28.v.1983, leg. P. J. Spangler & R. A. Faitoute (10 NMNH); same locality, 6.vi.1983, leg. P. J. & P. M. Spangler, R. A. Faitoute, W. E. Steiner (5 NMNH); Colon, 2 km S Sabanitas, (9°19'19"N, 79°47'54"W), 27-29.vi.1999, leg. A. Gillogly (6 TAMU); Los Santos, La Playa, 1.5 km N Pedasi, sea level, (7°33'N, 80°1'W), 21.vi.1973, leg. T. L. Erwin & G. Hevel (2 NMNH); Panama, Tocumen, 6.i.1953, leg. F. S. Blanton (6 NMNH); same locality, 28.i.1953, leg. F. S. Blanton (2 NMNH); same locality, 1-5.vi.1970, leg. Diego Navas (1 NMNH); same locality, 16-19.vi.1970, leg. Diego Navas (4 NMNH); same locality, 13-17.vii.1970, leg. Diego Navas (1 CNC, 1 NMNH); same locality, 7-11.ix.1970, leg. Diego Navas (34 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of small size (ca. 1.92–2.31 mm), the dorsum sometimes bright silver metallic, sometimes black, the pronotum with shallow depressions with moderately dense punctation, the pronotal shape, and the male genitalia. This is the smallest known Mexican species of *Hydrochus*. Differentiation from other similarly small sized species, if any exist in Mexico, will require dissection of males.

## *Hydrochus obscurus* Sharp

Figs. 1, 37

*Hydrochus obscurus* Sharp 1882: 90.

*Hydrochus bakkeri* Makhan, 1995. Syn. Worthington, et al. 2016.

*Hydrochus vanbergehenegouweni* Makhan, 1992. Syn. Oliva 1996; confirmed Perkins 2020a.

Originally described from Guatemala. This is one of the most commonly collected and widespread species of Neotropical *Hydrochus*. Locality data records are also published for Guatemala, Peru, and Venezuela (Perkins 2020a, 2020c, 2019c, respectively). Images of the habitus and male genitalia, and detailed descriptions of the male genitalia are given in Perkins (2019c, 2020a). The following new locality data records are for Central America.

**Material examined (334):** **Belize:** Stann Creek, Kendal; ex side pool of Sittée River at bridge, 1.v.1987, leg. Spangler & Faitoute (9 NMNH); Cayo District, Western Highway - 1km E of Belize Zoo, blacklight, (17°24.4'N, 88°29.11'W), 4.vii.2003, leg. N. H. Nazdrowicz (1 SEMC); Orange Walk Dist., Rio Bravo Pres., 1 mi. S. HQ, 2.ii.1996, leg. W. D. Shepard (11 NMW). **Costa Rica:** 10 mi. NW Liberia, 25.vii.1965, leg. Paul J. Spangler (1 NMNH); Umg. Gollita, 5.vi.1992, leg. Seifert (6) (1 NMW); Alajuela, Cano Negro, 24.viii.1998, leg. Drechsel (5 NMW); Ditch beside Rio Frio nr. Los Chiles, elev. 59 m (11°2'19"N, 84°43'55"W), 26.ii.2009, leg. M. Brojer (2 NMW); Guanacaste, 15 km SE Canas, Hacienda Tagoba, 23.iii.1965, leg. P. Cook (1 CAS); 18.7 km NW Bagaces, Hwy 1, Rio Carana, (10°39'N, 85°22'W), 4.vi.1973, leg. Erwin & Hevel (2 NMNH); **Palo Verge Nat. Park.** 1.6 km after Ranger Station; cattleponds, 12.i.2004, leg. AEZShort & DJLebbin (5 SEMC); Taboga Agric. Exper. Sta., 28.vi.1967, leg. Paul J. Spangler (14 NMNH). **El Salvador:** Zacatecoluca, 1.viii.1965, leg. Paul J. Spangler (14 NMNH). **Guatemala:** Peten, Parque National El Rosario, E of Sayaxche, elev. 145 m (16°31'26.9"N, 90°9'36.32"W), 30.vi.2014, leg. R. S. Zack (1 WSU); Parque National Ixpanpajul, Rt. CA-13, near Santa Ana, elev. 206 m (16°52'24.28"N, 89°48'53.86"W), 6.vi.2016, leg. R. S. Zack (2 WSU). **Honduras:** Jicaro Galan Jct., 5 mi W., 9.vii.1965, leg. Paul J. Spangler (1 NMNH); Cortes, 24 mi. S. San Pedro Sula, 19.vi.1974, leg. M. E. and P. D. Perkins (1 MCZ); La Lima, 3.vi.1964, leg. Blanton, Broce, & Woodruff (7 NMNH); Nacaome, 17.4 km W Jicaro Galan Jct. Hwy CA1, elev. 100 m (13°32'N, 87°36'W), 2.vi.1973, leg. Erwin & Hevel (7 NMNH). **Mexico:** Campeche, 21 mi. E. Campeche, 27.vii.1964, leg. Paul J. Spangler (37 NMNH, 6 CAS); Chiapas, Ocosingo Chajul Reserva Montes Azules, 28.iv.-5.v.1986, leg. F. Arias, R. Barba, L. Cervantes (1 UNAM); Oaxaca, Jaltepec Isth., 21.v.1964, leg. F. S. Blanton (7 NMNH); Tapanatepec, 22.vii.1964, leg. P. J. Spangler (11 NMNH); same locality, 23.viii.1965, leg. P. J. Spangler (23 NMNH); Tehuantepec (17km NW), stream at Rancho San Pablo, 23.v.1981, leg. Paul J. Spangler (1 NMNH); San Luis Potosi, El Salto, 19.vi.1952, leg. no collector on label (1 SEMC); Mpio. Tantalajas, Rancho El Nacimiento, Nacimiento Río Coy, 46 m, 8.vi.2013, 21°43'54.1" N, 98° 58' 35.4" W, D. Reynoso col. (1 IEXA); Sinaloa, Mazatlan, (23°14'N, 106°24'W), 1-2.vii.1964, leg. P. J. Spangler (1 NMNH); Tabasco, Laguna Limon, El Carmen, Est. No. 3, (17°53.62'N, 93°9.73'W), 14.vi.1996, leg. Bueno, Santiago, Barba, Contreras (1 UNAM); Teapa, 25.v.1974, leg. M. E. & P. D. Perkins (4 MCZ); Tamaulipas, 2 mi. SW Ciudad Victoria, 27.vii.1974, leg. M. E. and P. D. Perkins (2 MCZ); 8 miles west of El Limon, 20.vii.1970, leg. Murray, Phelps, Hart, Schaffner (1 TAMU); Veracruz, 25 mi. S. Acayucan, 4.vii.1965, leg. Paul J. Spangler (16 NMNH); 8 Mi. NE Panuco, 28.viii.1965, leg. P. J. Spangler (4 NMNH); Acayucan, Rd. 185, 10.vii.1962, leg. J. M. Campbell (1 NMNH); Catemaco, 7-9.viii.1964, leg. Paul J. Spangler (1 NMNH). **Nicaragua:** 13 mi. N. Sn. Benito, 11.vii.1965, leg. Paul J. Spangler (17 NMNH); La Trinidad, 27.vii.1965, leg. P. J. Spangler (1 NMNH); Matagalpa, Matagalpa, km 77.6 Panam Highway, Rdside pool, elev. 393 m, 4.viii.2002, leg. W. D. Shepard (2 SEMC); Rio San Juan, 60 km SE San Carlos, Refugio Bartola, ex. mercury vapor/UV light, elev. 100 m (10°58.4'N, 84°20.3'W), 30.v.2002, leg. R. Brooks, Z. Falin, S. Chatzimanolis (1 SEMC); Rio San Juan, Refugio Bartola, (10°58'N, 84°20'W), 15-20.vi.2007, leg. O. Merkl, N. Balint, T. Nemeth (1 HNHM); Rivas, Res Sil Pr Domitila, UV lights, elev. 122 m, 5-9.vi.2005, leg. W. D. Shepard (1 SEMC). **Panama:** Canal Zone, Barro Colorado Island, 1.v.1941, leg. Jas Zetek (1 NMNH); Barro Colorado Island, 1.vi.1939, leg. Jas Zetek (1 NMNH); Chiriqui, 1km NE El Valle, ca +8.43854 / -82.32400, 2.v.2014, leg. T. Struyve (1 HMNH); Las Lajas (8km S), elev. 10 m, 5.vi.1983, leg. Paul J. Spangler (4 NMNH); Cocolé, Nata, 26.xi.1952, leg. Blanton (2 NMNH); Penonome (13km SW), Rio Cocolé Auxiliar, 6.vi.1983, leg. P. J. & P. M. Spangler, R. A. Faitoute, W. E. Steiner (4 NMNH); Los Santos, La Playa, 1.5 km N Pedasi, sea level, (7°33'N, 80°1'W), 21.vi.1973, leg. T. L. Erwin & G. Hevel (2 NMNH); Panama, Soberania - Gamboa, car-net bw -79.687/+9.110 and -79.650/+9.064, 14.vii.2014, leg. T. Struyve (1 HMNH); Tocumen, 6.i.1953, leg. F. S. Blanton (10 NMNH); same locality, 7.i.1953, leg. F. S. Blanton (2 NMNH); same locality, 29.i.1953, leg. F. S. Blanton - 13

s (13 NMNH); same locality, 16-19.vi.1970, leg. Diego Navas - 7 s (7 NMNH); same locality, 7-11.ix.1970, leg. Diego Navas (5 NMNH); Vrgs, 6 mi. W. Jorones, 5.vii.1967, leg. Paul J. Spangler (3 NMNH).

**Differential Diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 2.92–3.66 mm), the moderately low and relatively impunctate pronotal reliefs, and the male genitalia. This very common species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males.

### *Hydrochus pertuberculatus* Perkins

Figs. 1, 35

*Hydrochus pertuberculatus* Perkins 2020a: 297.

Originally described from Guatemala. Following are new locality data records for Guatemala and Mexico. Images of the habitus and male genitalia of the holotype, and detailed description of the male genitalia are given in Perkins (2020a).

**Material examined (10): Guatemala:** Peten, Parque National El Rosario, E of Sayaxche, (16°31'26.9"N, 90°9'36.32"W), 2-3.x.2013, leg. R. S. Zack (1 WSU). **Mexico:** Cotaxtla, Cotaxtla Exp. Sta., 1.vii.1962, leg. D. H. Janzen (1 NMNH); Chiapas, 5 Mi. S. Las Cruces, 23.viii.1965, leg. Paul J. Spangler (3 NMNH); Veracruz, 20 mi. NW Rt. 144 Huatusco, 28.vi.1963, leg. Robt. E. Woodruff (4 NMNH); Cordoba, 19 mi. NE, 1.vii.1952, leg. collector unknown (1 SEMC).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderately large size (ca. 3.56 mm), the moderately low and relatively impunctate pronotal reliefs, the large tubercle of the 5<sup>th</sup> interstria, and the male genitalia. This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia are superficially somewhat similar to that of *H. nayaritensis* n. sp., in being slender and having a very narrow aedeagus; however, the parameres, especially the sagittate tips, the basal piece shape, and the adbl shape and size are very different in *H. pertuberculatus*.

### *Hydrochus piroei* Makhan

Fig. 33

*Hydrochus piroei* Makhan, 1992: 97.

Originally described from Suriname, and recently reported from Venezuela (Perkins, 2019c) and Ecuador (Perkins, 2020b), the following specimen records are from Panama. Images of the habitus and male genitalia, and detailed description of the male genitalia of a specimen from Venezuela are given in Perkins (2019c).

**Material examined (13): Panama:** Barro Colorado Island, 24.v.1964, leg. WD & SS Duckworth (1 NMNH); Trinidad River, 21.v.1911, leg. August Busck (1 NMNH); Canal Zone, Barro Colorado Island, 5.vi.1977, leg. Nivel (1 NMNH); Panama, Tocumen, 16-19.vi.1970, leg. Diego Navas (2 NMNH); same locality, 13-17.vii.1970, leg. Diego Navas (1 CNC); same locality, 7-11.ix.1970, leg. Diego Navas (7 NMNH).

**Remarks.** I have examined the holotype, including the male genitalia, of *H. piroei*.

### *Hydrochus sagittarius* Perkins

Figs. 2, 32

*Hydrochus sagittarius* Perkins 2019: 20.

Originally described from Venezuela. Additional locality data records reported from Peru (Perkins, 2020c). The following specimen records are from Panama. Images of the habitus and male genitalia of the holotype are given in Perkins (2019c).

**Material examined (106): Panama:** Agua dulce, 12.iv.1941, leg. not given on label (1 MCZ); Rio Hato, 22.v.1960, leg. V. J. Tipton (1 CNC); Cocle, 5.3 mi. E. Anton, 6.vii.1967, leg. Paul J. Spangler (4 NMNH); Nata,

26.xi.1952, leg. Blanton (14 NMNH); Penonome (13km SW), Rio Cocle Auxiliar, 28.v.1983, leg. P. J. Spangler & R. A. Faitoute (22 NMNH); same locality, 6.vi.1983, leg. P. J. & P. M. Spangler, R. A. Faitoute, W. E. Steiner (10 NMNH); Los Santos, La Playa, 1.5 km N Pedasi, sea level, (7°33'N, 80°1'W), 21.vi.1973, leg. T. L. Erwin & G. Hevel (30 NMNH); Panama, Tocumen, 4.xii.1952, leg. F. S. Blanton (1 NMNH); same locality, 7.i.1953, leg. F. S. Blanton (3 NMNH); same locality, 29.i.1953, leg. F. S. Blanton (9 NMNH); same locality, 13-17.vii.1970, leg. Diego Navas (1 CNC, 2 NMNH); same locality, 7-11.ix.1970, leg. Diego Navas (2 NMNH).

### ***Hydrochus soekhnandanae* Makhan**

Fig. 31

*Hydrochus soekhnandanae* Makhan 1992: 98.

*Hydrochus pupillus* Orchymont: Oliva (1996: 331), misidentification; corrected by Perkins (2019c).

Originally described from Suriname; locality data records have also been published for Venezuela (Perkins, 2019c). Images of the habitus and male genitalia, and detailed description of the male genitalia are given in Perkins (2019c). One record is now known for Panama.

**Material examined (1): Panama:** Canal Zone, Barro Colorado Isl., 9.v.1946, leg. P. V. Mook (1 NMNH).

### ***Hydrochus steineri* Perkins**

Figs. 1, 30

*Hydrochus steineri* Perkins 2020a: 300.

Originally described from Guatemala. Following are new locality data records for Belize, Guatemala and Mexico. Images of the habitus and male genitalia of the holotype, and detailed description of the male genitalia are given in Perkins (2020a).

**Material examined (5): Belize:** Stann Creek, Kendal; ex side pool of Sittie River at bridge, 1.v.1987, leg. Spangler & Faitoute (1 NMNH). **Guatemala:** Peten, Parque National El Rosario, E of Sayaxche, elev. 145 m (16°31'26.9"N, 90°9'36.32"W), 30.vi.2014, leg. R. S. Zack (3 WSU). **Mexico:** Tabasco, Teapa, 25.v.1974, leg. M. E. & P. D. Perkins (1 MCZ).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.29 mm), the densely punctate pronotum with deep foveae, the elytra with stria punctures smaller than interstriae, and the male genitalia. This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. Among the diagnostic features of the male genitalia are the shape of the adbl, the markedly arcuate dorsal surface of the aedeagus where the adbl and shaft meet, the sinuate aedeagus in lateral view, and especially the markedly sinuate ventral margin of the parameres, in lateral view.

### ***Hydrochus vagus* LeConte**

Figs. 1, 13, 14, 27, 30

*Hydrochus vagus* LeConte 1852: 211.

*Hydrochus daviniaae* Makhan 1995. Syn. Worthington *et al.* 2016.

**Lectotype designation:** There are three syntypes in the LeConte collection at the MCZ, consisting of one female and two males. Both males have been dissected, and are conspecific. The male labeled “vagus 3” is hereby selected as lectotype, and images of the habitus, male genitalia, and labels of this specimen given herein (Figs. 14, 27). The female and the second male (“vagus 2”) have been labeled paralectotypes. Originally described from California [“(Desert of) Colorado”], the following locality records are from Mexico.

**Material examined (76): Mexico:** Campeche, 21 mi. E. Campeche, 27.vii.1964, leg. Paul J. Spangler (1 NMNH); Nayarit, 18 mi. N.W. Tepic, 27.xi.1948, leg. H. B. Leech (3 CAS); Nuevo Leon, 10 km N Linares; ex.

mercury vapor lite, elev. 430 m, 22.iii.1991, leg. R. Brooks, R. Leschen (7 SEMC); San Luis Potosi, 5 mi. N. Tama-  
zunchale, 21.v.1974, leg. P. D. Perkins (5 MCZ); Ciudad Valles, 22.viii.1964, leg. Paul J. Spangler (4 NMNH);  
El Salto, 19.vi.1952, leg. no collector on label (5 SEMC); Mpio. Tanlajas, Rancho El Nacimiento, Nacimiento  
Río Coy, 46 m, 8.vi.2013, 21°43'54.1" N, 98° 58' 35.4" W, D. Reynoso col. (3 IEXA); Sinaloa, Los Mochis,  
20.vii.1922, leg. C.T. Dodds (2 CAS); Mazatlan, 12 mi. S., 17.xii.1963, leg. L. & C. W. O'Brien (1 NMNH); same  
locality, 17.xii.1963, leg. M. J. Tauber, C. A. Toschi (5 NMNH); Tamaulipas, 2 mi. SW Ciudad Victoria, stream in  
desert, 27.vii.1974, leg. M. E. and P. D. Perkins (14 MCZ); 8 miles west of El Limon, 20.vii.1970, leg. Murray,  
Phelps, Hart, Schaffner (4 TAMU); Bocatoma, 7 Km SSE Gomez Farias, 25-30.iii.1978, leg. E. G. Riley (1 TAMU);  
Ciudad Mante, 24.viii.1964, leg. P. J. Spangler (1 FSCA, 8 NMNH); Nuevo Morelos, 28.viii.1965, leg. P. J. Span-  
gler (7 NMNH); Veracruz, 15 Mi. SE Tantoyuca, 28.viii.1965, leg. Paul J. Spangler (1 NMNH); 8 Mi. NE Panuco,  
28.viii.1965, leg. P. J. Spangler (3 NMNH); Cervecería Moctezma, 3.viii.1965, leg. Rabago (2 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca.  
2.88 mm), the deep pronotal depressions, the well raised and relatively impunctate pronotal reliefs, and the male  
genitalia (Figs. 13, 14; described below). This species has a generalized *Hydrochus* habitus; reliable determinations  
will require dissection of males. The male genitalia are somewhat superficially similar to that of *H. scintillatus*;  
however, in *H. scintillatus* the pdmm are much more widely separated, the adbl is larger, the dorsal margin of the  
aedeagus, in lateral view, is not concave, and the avtl is located farther from the aedeagus base.

Male genitalia (Figs. 13, 14). General characters: paramere tips slender and pointed, apex narrower in lateral  
view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then  
arcuate away from midline, narrow proximal to plsa; aedeagus in dorsal/ventral views slender in distal ½, wider in  
proximal ½, agw at ca. proximal 13, in lateral view wider basally, with no emargination where adbl and shaft meet;  
lateral margins of aedeagus sclerotized; basal piece shorter than parameres, orifice strongly sclerotized.

Dorsal surface: pdmm narrowly separated, overlapping aedeagus; adbl large; adtl at ca. distal 1/3; paramere tips  
without sclerotized ridge.

Ventral surface: pvmm approximating lateral margin of aedeagus; avtl near base.

**Remarks.** The non-type specimen imaged (Fig. 13) has the following locality data: Tamaulipas, 2 mi. SW Ciu-  
dad Victoria, stream in desert, 27.vii.1974, leg. M. E. and P. D. Perkins.

### *Hydrochus vanvondeli* Makhan

Figs. 23, 42

*Hydrochus vanvondeli* Makhan 1994: 41.

Originally described from Mexico. The following are new locality data records for Central America.

**Material examined (124):** **Costa Rica:** 10 mi. NW Liberia, 25.vii.1965, leg. Paul J. Spangler (1 NMNH); 16  
m. S. La Cruz, 13.vii.1965, leg. Paul J. Spangler (67 NMNH). **Honduras:** Casas Viejas, 20.v.1966, leg. J. M. Matta  
(4 FSCA); Cortes, 24 mi. S. San Pedro Sula, 19.vi.1974, leg. M. E. and P. D. Perkins (3 MCZ); Ocotepeque, 11  
mi. S. Nueva Ocotepeque, 17.vi.1974, leg. M. E. & P. D. Perkins (3 MCZ). **Mexico:** Cotaxtla, Cotaxtla Exp. Sta.,  
28.vi.1962, leg. D. H. Janzen (3 NMNH); Campeche, 21 mi. E. Campeche, 27.vii.1964, leg. Paul J. Spangler (1  
NMNH); Escarcega, 18.v.1962, leg. F. Islas S. (14 NMNH); Oaxaca, Zanatepec, 22.vii.1964, leg. Paul J. Spangler  
(3 NMNH); Zanatepec (8 km E), 23.v.1981, leg. P. J. Spangler (10 NMNH); San Luis Potosi, El Salto Falls, elev.  
610–762 m, 22.iv.1965, leg. H. V. Weems, Jr. (2 FSCA); Sinaloa, 7 mi. N. Rosario, 24.vii.1963, leg. Paul J. Span-  
gler (1 FSCA); Sonora, 3 mi. W. of Yecora, 20.iv.1988, leg. D. A. Polhemus (3 NMNH); Veracruz, 20 mi. NW Rt.  
144 Huatusco, 28.vi.1963, leg. Robt. E. Woodruff (3 FSCA); Cuitlahuac, 10-12.viii.1964, leg. Paul J. Spangler (1  
NMNH); Mpio. Misantla, ca. 2 km E of Libertad, 14.vi.2013, 56 m, 20°03'59.5" N, 96° 57' 22.5" W, D. Reynoso  
col. (1 IEXA). **Nicaragua:** Rivas, Belen Rivas, 18.vii.1957, leg. D. R. Lauck (4 NMNH).

**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca.  
3.00 mm), the moderately densely punctate pronotum with moderately deep foveae, and the male genitalia (Fig. 23;  
described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection  
of males. The male genitalia have the paramere tips extending well beyond aedeagus apex, such that the tip of the  
aedeagus is usually on the same transverse level as the very weakly developed plsa, and the paramere tips do not  
have excavations.

Male genitalia (Fig. 23). General characters: paramere tips slender and pointed, extending well beyond aedeagus apex, narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then arcuate away from midline, narrow proximal to very small plsa; aedeagus in dorsal/ventral views lanceolate, moderately wide at agw, slender in distal ½, wider in proximal 1/2; in lateral view slightly wider, with dorsal margin weakly sinuate; lateral margins of aedeagus sclerotized; basal piece shorter than parameres, tapering from distal to proximal, orifice strongly sclerotized.

Dorsal surface: pdmm widely separated, except narrowly separated and overlapping aedeagus basally; adbl moderately large; adtl slightly distal to midlength; paramere tips without sclerotized ridge.

Ventral surface: pvmm approximating lateral margin of aedeagus; avtl at ca. proximal 1/4.

**Remarks.** I have examined the holotype, including the male genitalia, of *H. vanvondeli* (ZMHB) (Fig. 23).

### ***Hydrochus variolatus* LeConte**

Figs. 2, 17, 18, 26, 34

*Hydrochus variolatus* LeConte 1852: 211.

*Hydrochus otvosi* Makhan 1993: 67. **New Synonymy.**

**Type material.** There is only one specimen of *Hydrochus variolatus* LeConte, a male, in the LeConte collection at the MCZ. It is therefore the holotype, by monotypy. Images of the habitus, male genitalia, and labels of this specimen given herein (Figs. 18, 26). Originally described from San Diego, California, the following new records are from Mexico.

**Material examined (19): Mexico:** Baja California, 17 mi. S. of Ensenada, 14.vi.1938, leg. Michelbacher & Ross (9 CAS); Norte, Arr. Santo Domingo, 5.7 mi. E. Hamilton Ranch, 23.iv.1963, leg. H. B. Leech, P.H. Arnaud, Jr. (4 CAS); Norte, Sa. Juarez, 1 mi. S. Laguna Hanson, elev. 5000 ft, 19.vii.1970, leg. P. D. Perkins (1 MCZ); San Jose del Castillo, 15.vi.1961, leg. E. L. Sleeper - 1 male (1 TAMU); Campeche, Escarcega, 18.v.1962, leg. F. Islas S. (1 NMNH); Jalisco, Chamela, Rio Chamela, 4.vi.1989, leg. G. Ortega (1 UNAM); Veracruz, 9 mi. W. Poza Rica, 27.viii.1965, leg. Paul J. Spangler (1 NMNH); Rio Metlao nr. El Fortin, 17.xii.1948, leg. H. B. Leech (1 CAS).

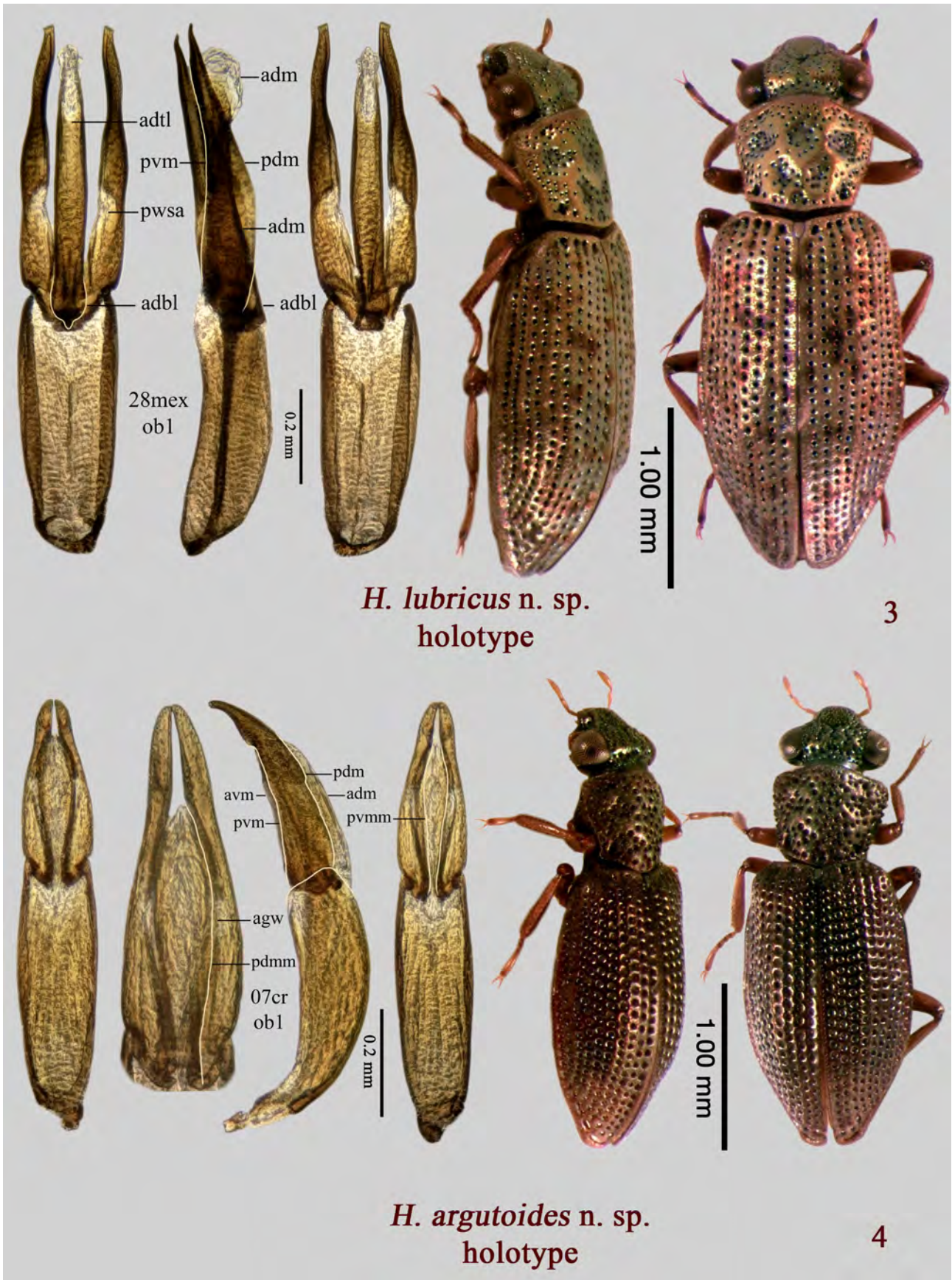
**Differential diagnosis.** Among Central American species, recognized by the combination of moderate size (ca. 3.10–3.46 mm), the deep pronotal depressions, the well raised and relatively impunctate pronotal reliefs, and the male genitalia (Figs. 17, 18; described below). This species has a generalized *Hydrochus* habitus; reliable determinations will require dissection of males. The male genitalia have a very large adbl, and a unique character: the adbl and the continuing shaft of the aedeagus are on the same plane for about 1/3 the length of the aedeagus; this is best seen in lateral view.

Male genitalia (Figs. 17, 18). General characters: paramere tips slender and pointed, narrower in lateral view than in dorsal/ventral views, in dorsal/ventral views with medial margins at apex parallel or nearly so, then weakly arcuate away from midline, plsa absent or very slight; aedeagus in dorsal/ventral views moderately wide, parallel-sided or nearly so; in lateral view wider, especially basally, adbl and continuing shaft of aedeagus on same plane for about 1/3 length of aedeagus, after which shaft dorsal margin is sinuate; lateral margins of aedeagus sclerotized; basal piece shorter than parameres, orifice strongly sclerotized.

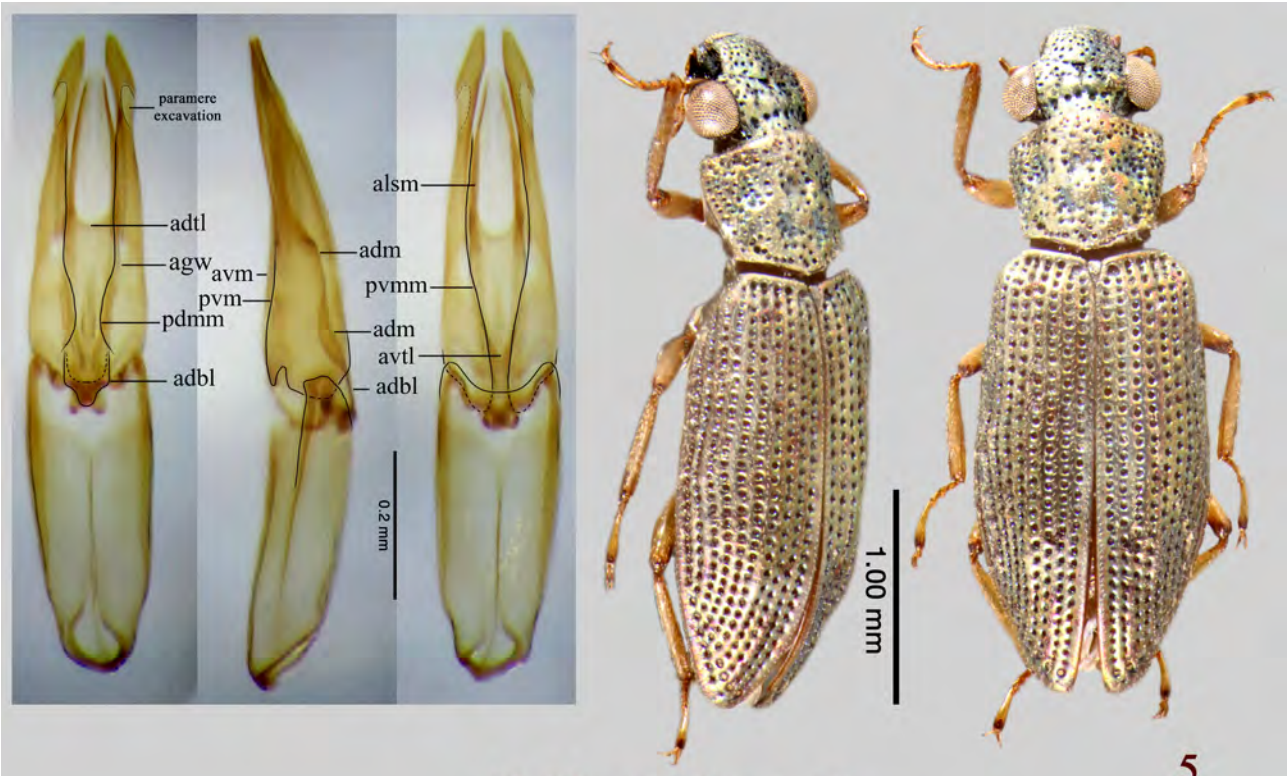
Dorsal surface: pdmm sinuate, slightly overlapping aedeagus; adbl very large, ca. ½ as wide as total genitalia width at that level; adtl at about midlength of shaft; paramere tips without sclerotized ridge.

Ventral surface: pvmm approximating lateral margin of aedeagus; avtl near base.

**Remarks.** I have examined the holotype of *Hydrochus otvosi* Makhan (HNHM), including the male genitalia, and have determined that it is a synonym of *Hydrochus variolatus* LeConte. The *H. otvosi* holotype specimen is supposedly from **Costa Rica**. The non-type specimen of *H. variolatus* imaged (Fig. 17) has this locality data: Baja California, Norte, Sa. Juarez, 1 mi. S. Laguna Hanson, elev. 5000 ft, 19.vii.1970, leg. P. D. Perkins.

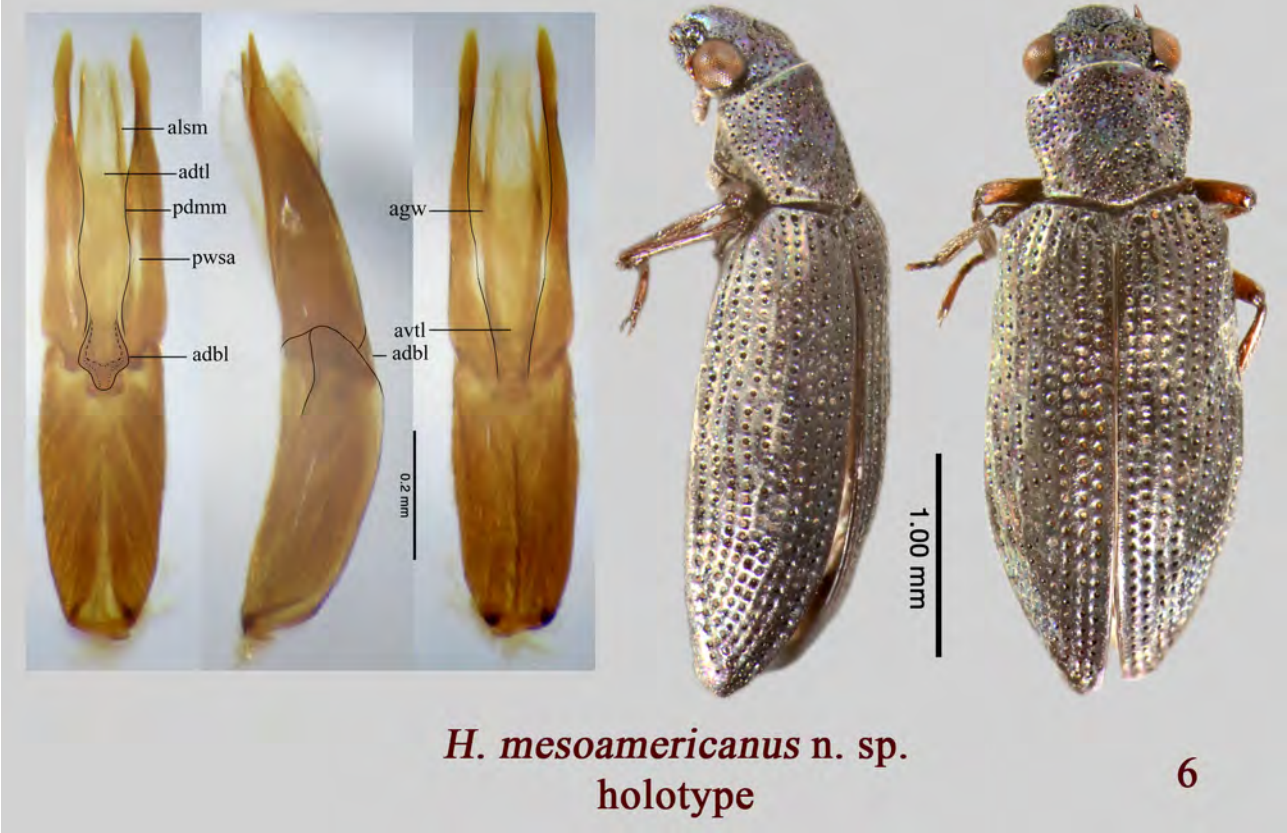


FIGURES 3–4. Habitus and male genitalia of holotypes. 3. *Hydrochus lubricus* n. sp. 4. *Hydrochus argutoides* n. sp.



*H. biexcavatus* n. sp.  
holotype

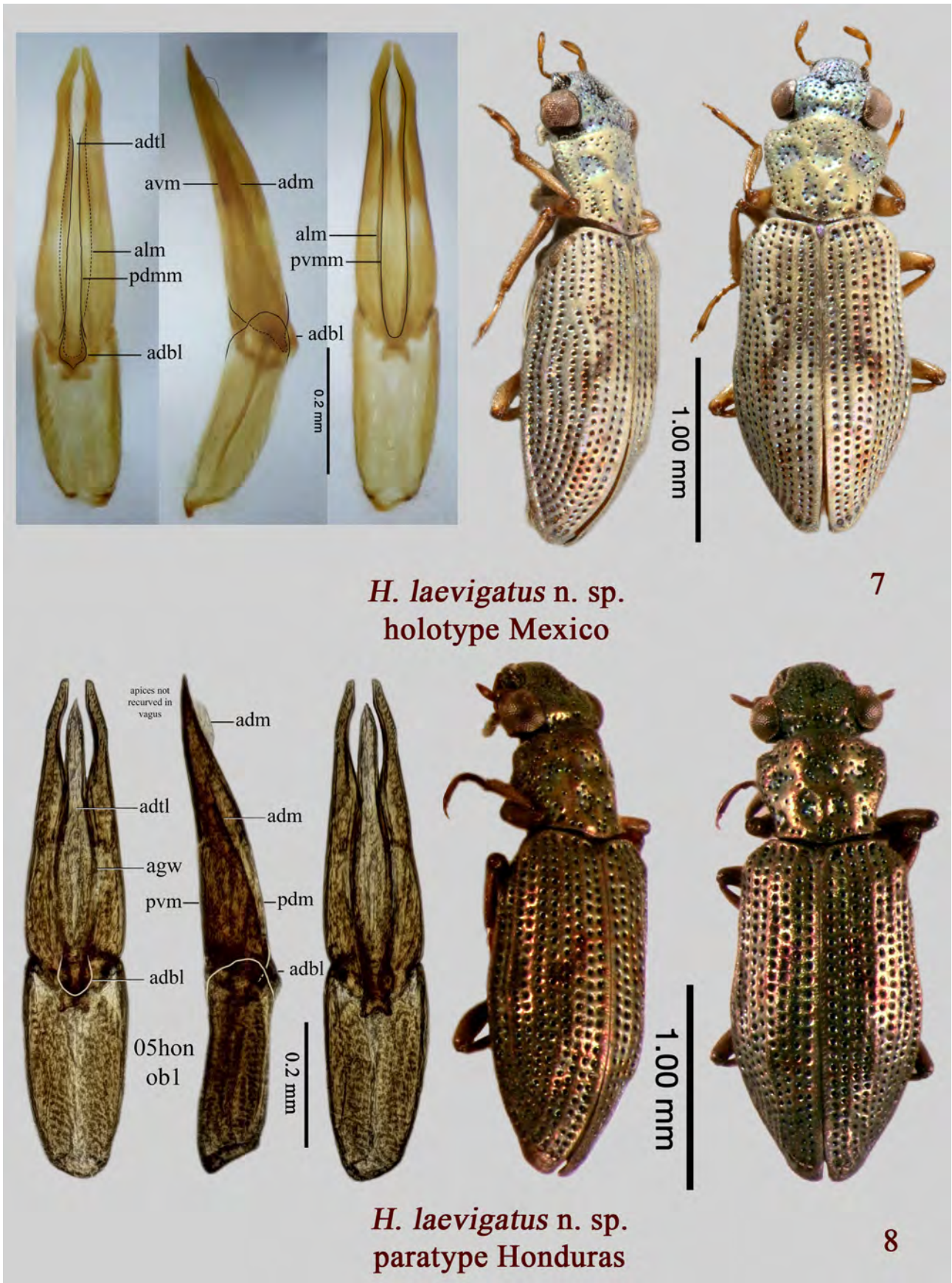
5



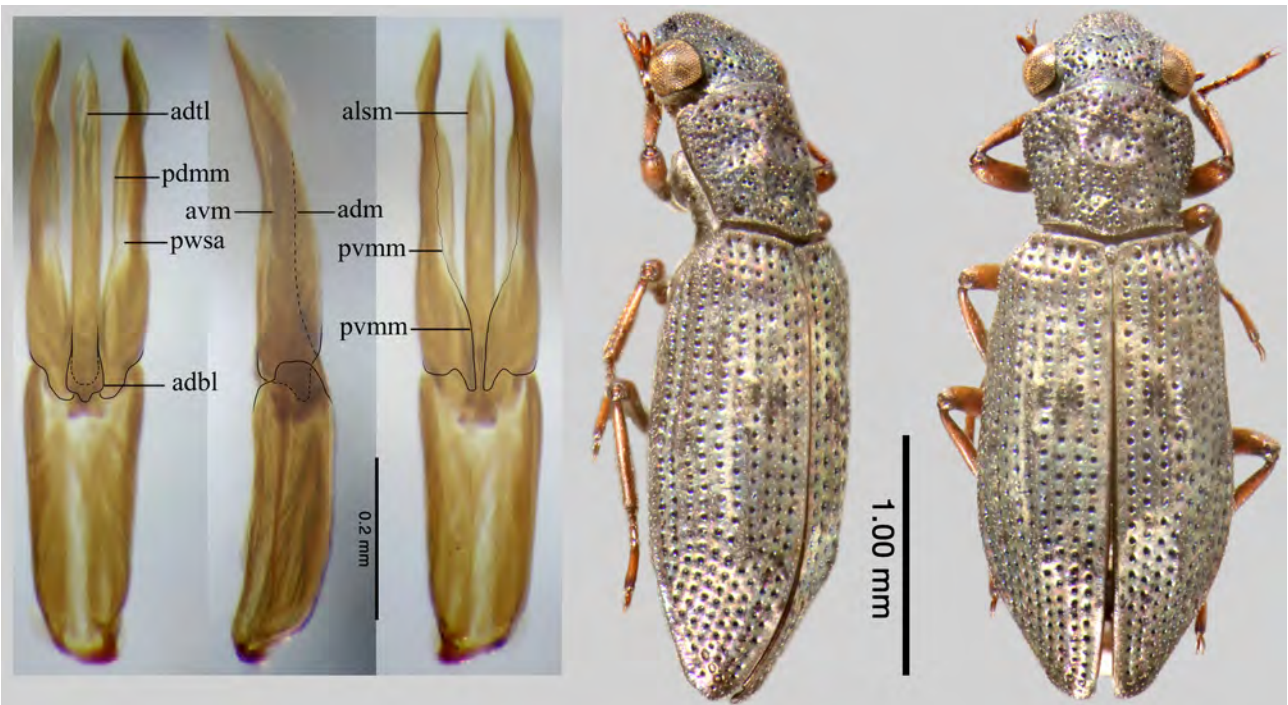
*H. mesoamericanus* n. sp.  
holotype

6

FIGURES 5–6. Habitus and male genitalia of holotypes. 5. *Hydrochus biexcavatus* n. sp. 6. *Hydrochus mesoamericanus* n. sp.

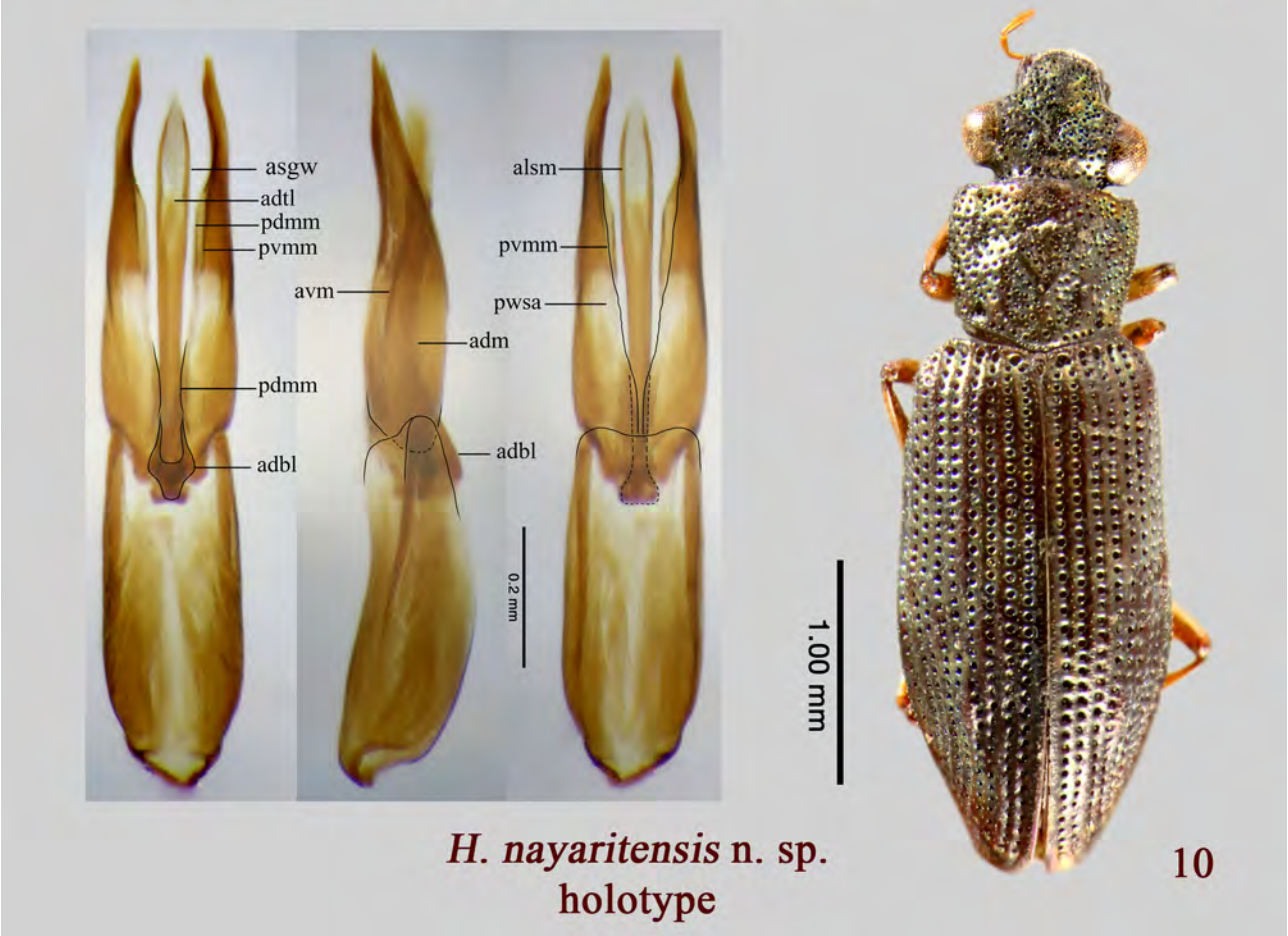


FIGURES 7–8. Habitus and male genitalia. 7. *Hydrochus laevigatus* n. sp. holotype. 8. *Hydrochus laevigatus* n. sp. paratype.



*H. brianbrowni* Makhan

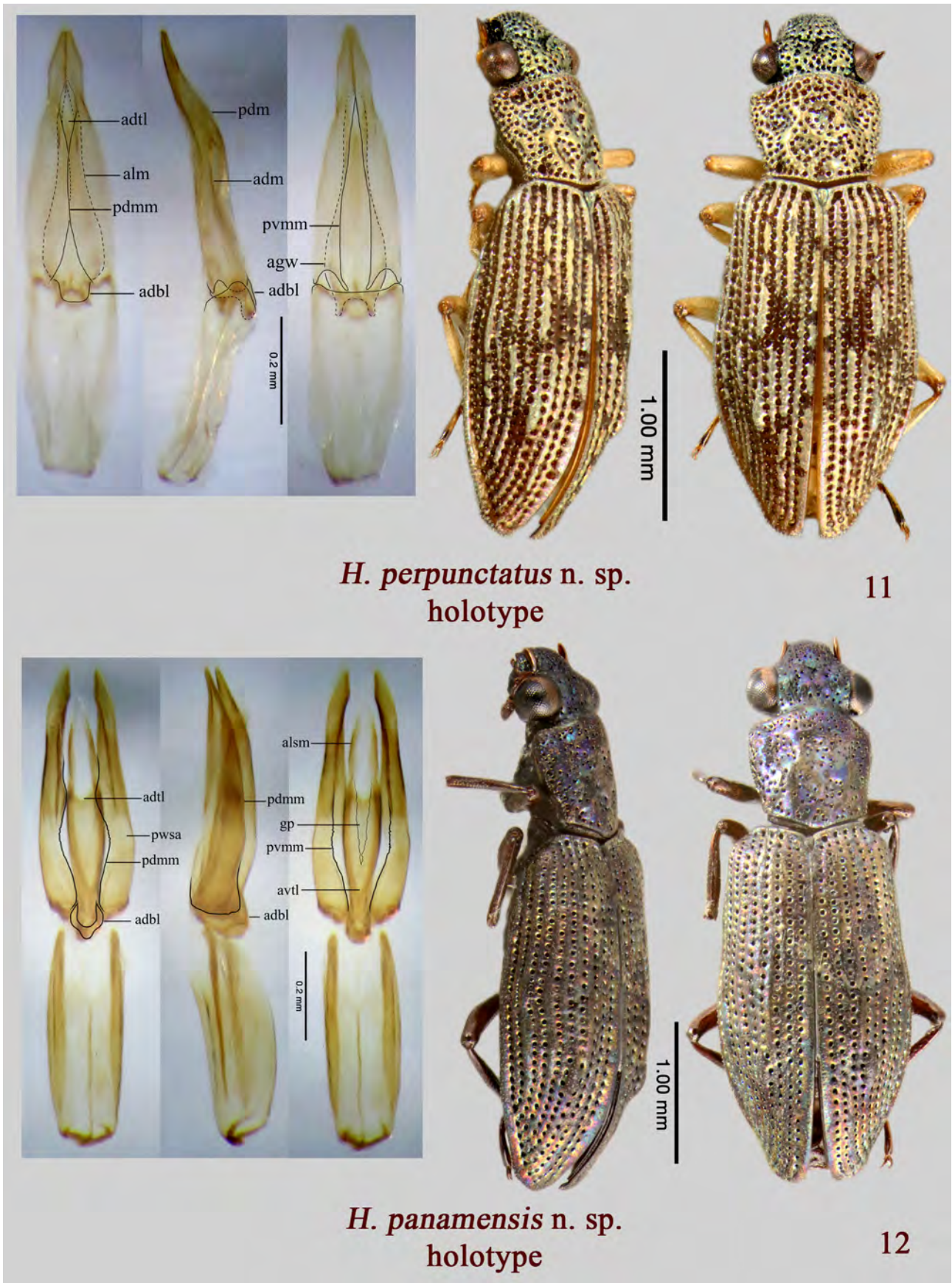
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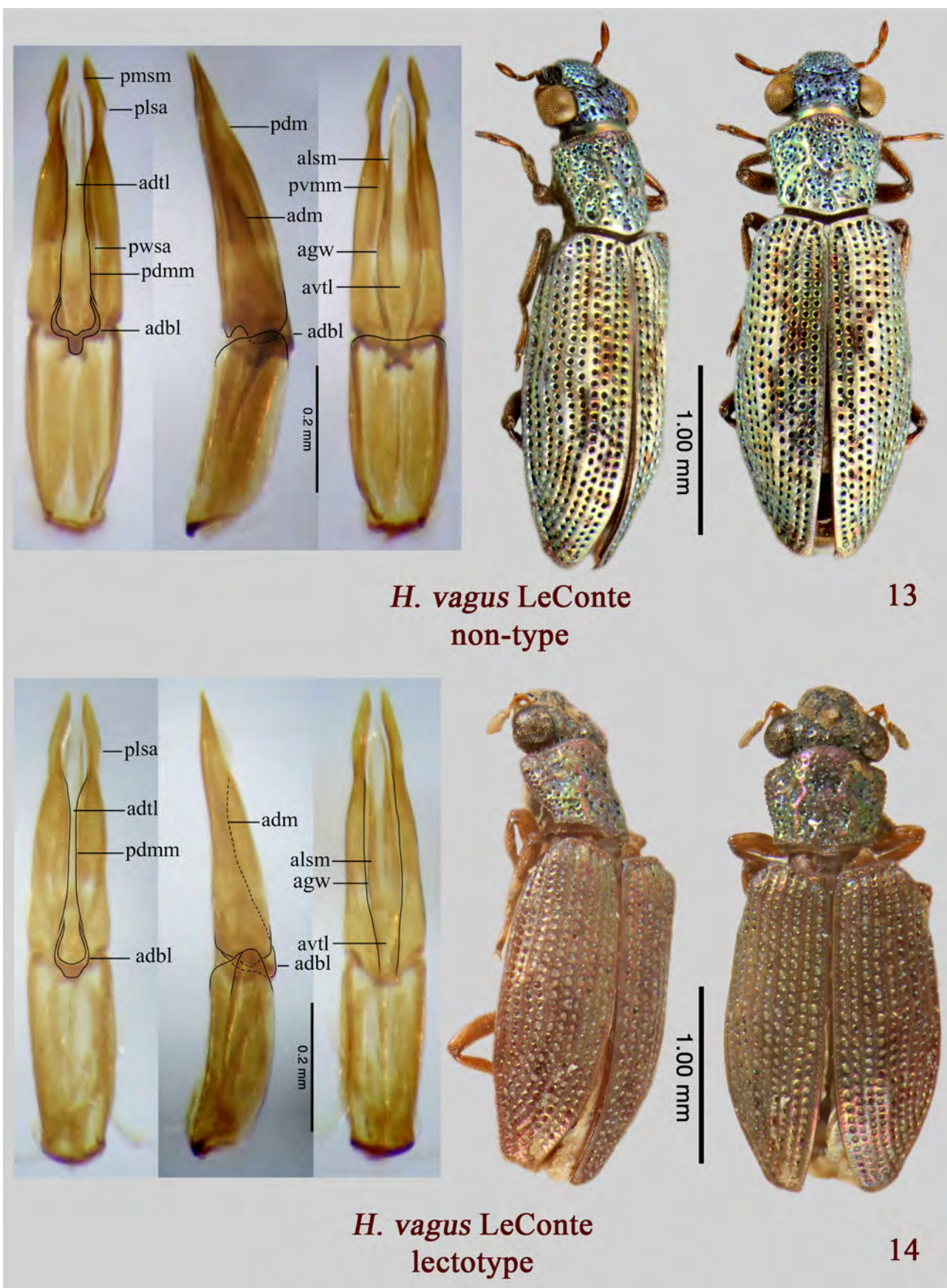
*H. nayaritensis* n. sp.  
holotype

10

FIGURES 9–10. Habitus and male genitalia. 9. *Hydrochus brianbrowni* Makhan. 10. *Hydrochus nayaritensis* n. sp. holotype.



**FIGURES 11–12.** Habitus and male genitalia of holotypes. 11. *Hydrochus perpunctatus* n. sp. 12. *Hydrochus panamensis* n. sp.



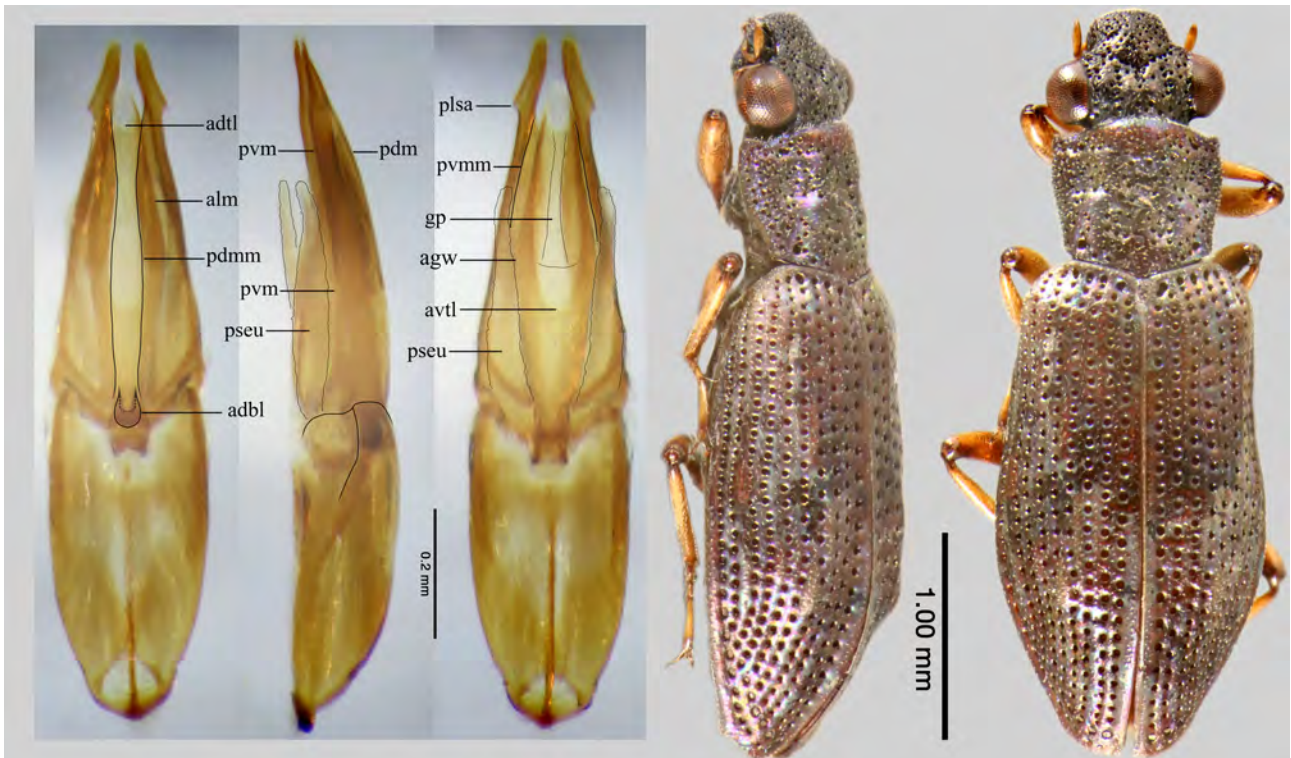
*H. vagus* LeConte  
non-type

13

*H. vagus* LeConte  
lectotype

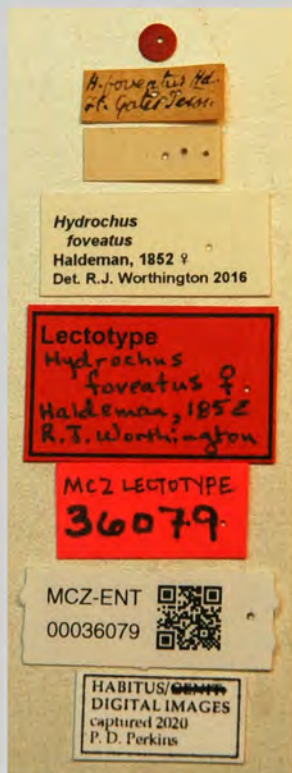
14

**FIGURES 13–14.** Habitus and male genitalia. 13. *Hydrochus vagus* LeConte, non-type. 14. *Hydrochus vagus* LeConte, lectotype.



*H. foveatus* Haldeman  
non-type

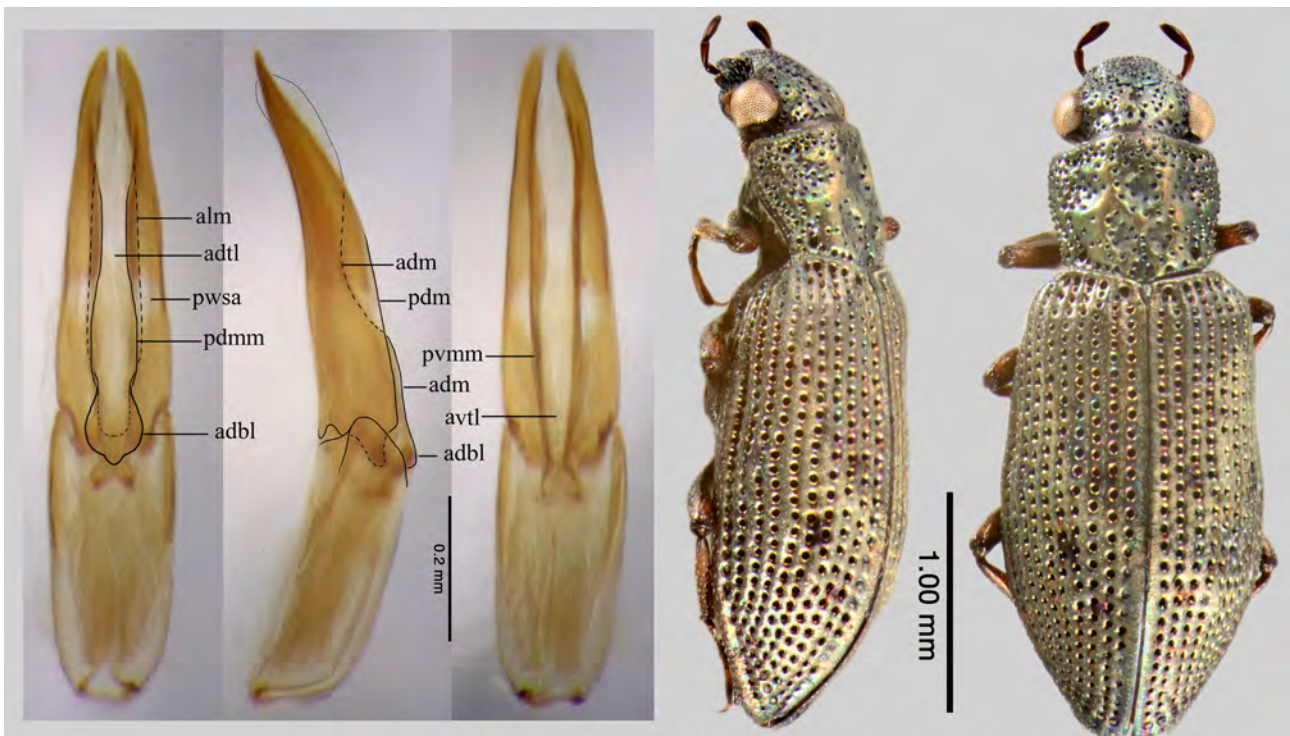
15



*H. foveatus* Haldeman  
lectotype

16

FIGURES 15–16. Habitus and male genitalia. 15. *Hydrochus foveatus* Haldeman, non-type. 16. *Hydrochus foveatus* Haldeman, lectotype.



*H. variolatus* LeConte  
non-type

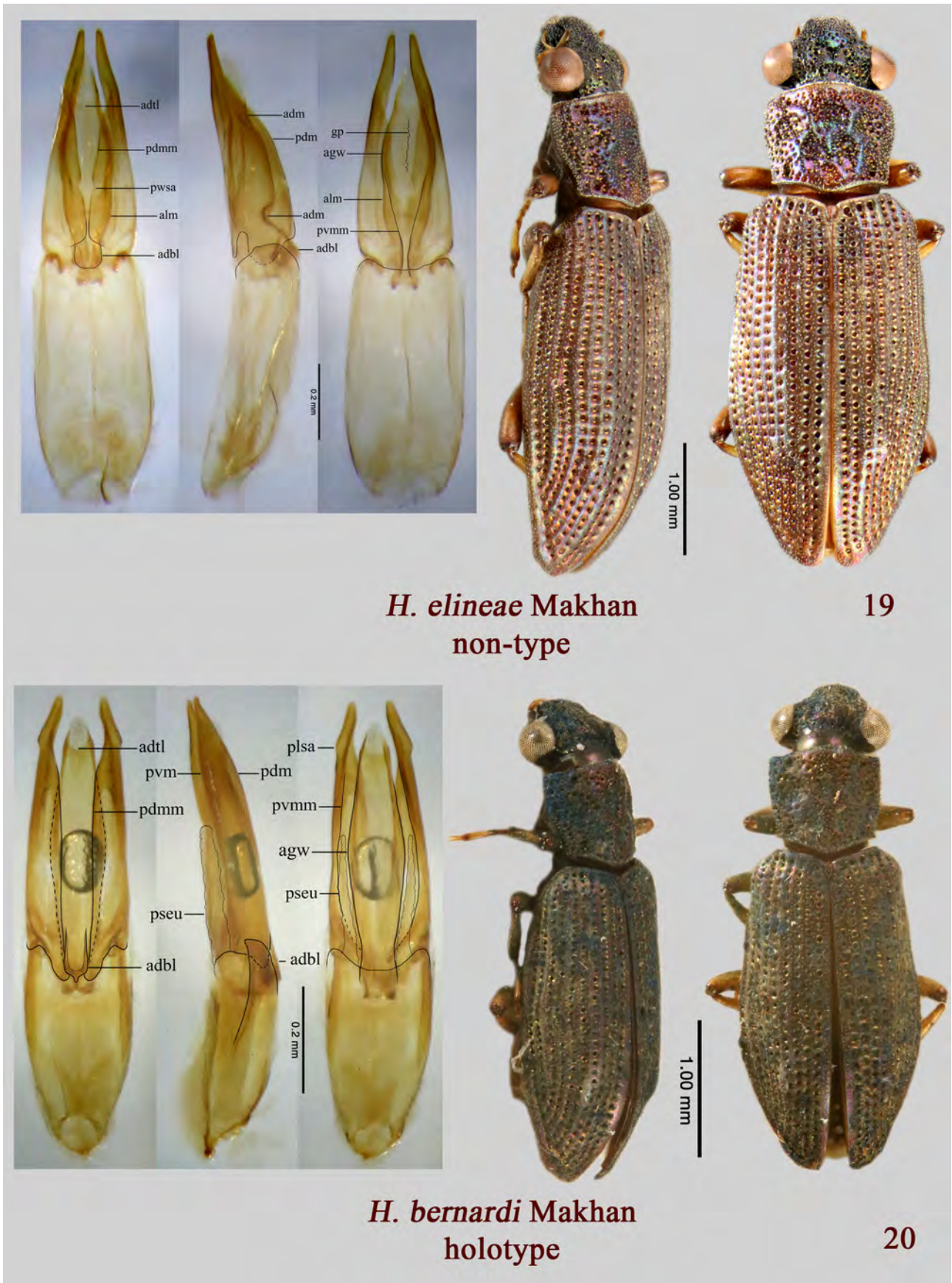
17



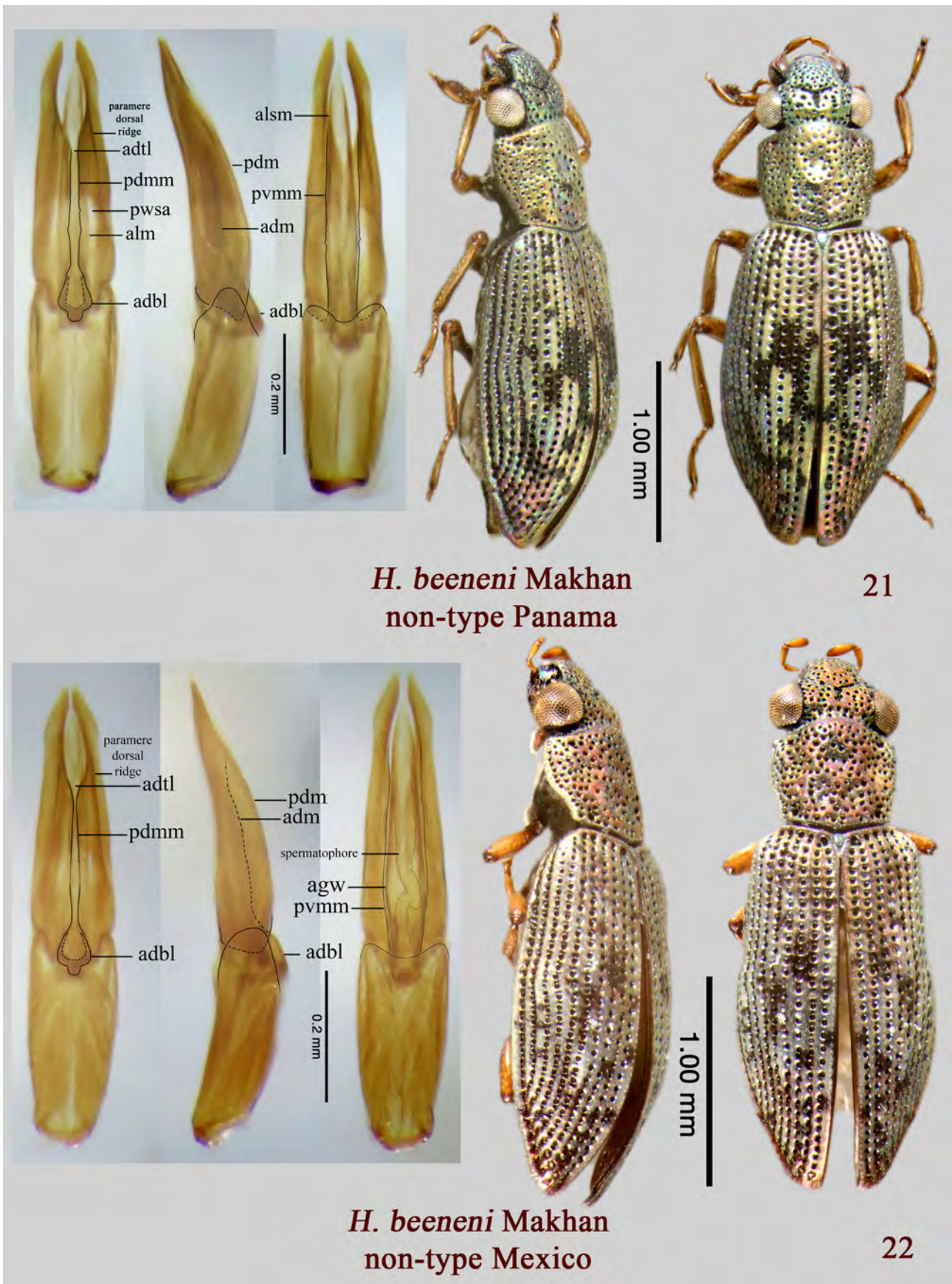
*H. variolatus* LeConte  
holotype

18

**FIGURES 17–18.** Habitus and male genitalia. 17. *Hydrochus variolatus* LeConte, non-type. 18. *Hydrochus variolatus* LeConte, holotype.



**FIGURES 19–20.** Habitus and male genitalia of holotypes. 19. *Hydrochus elineae* Makhan, non-type. 20. *Hydrochus bernardi* Makhan, holotype.



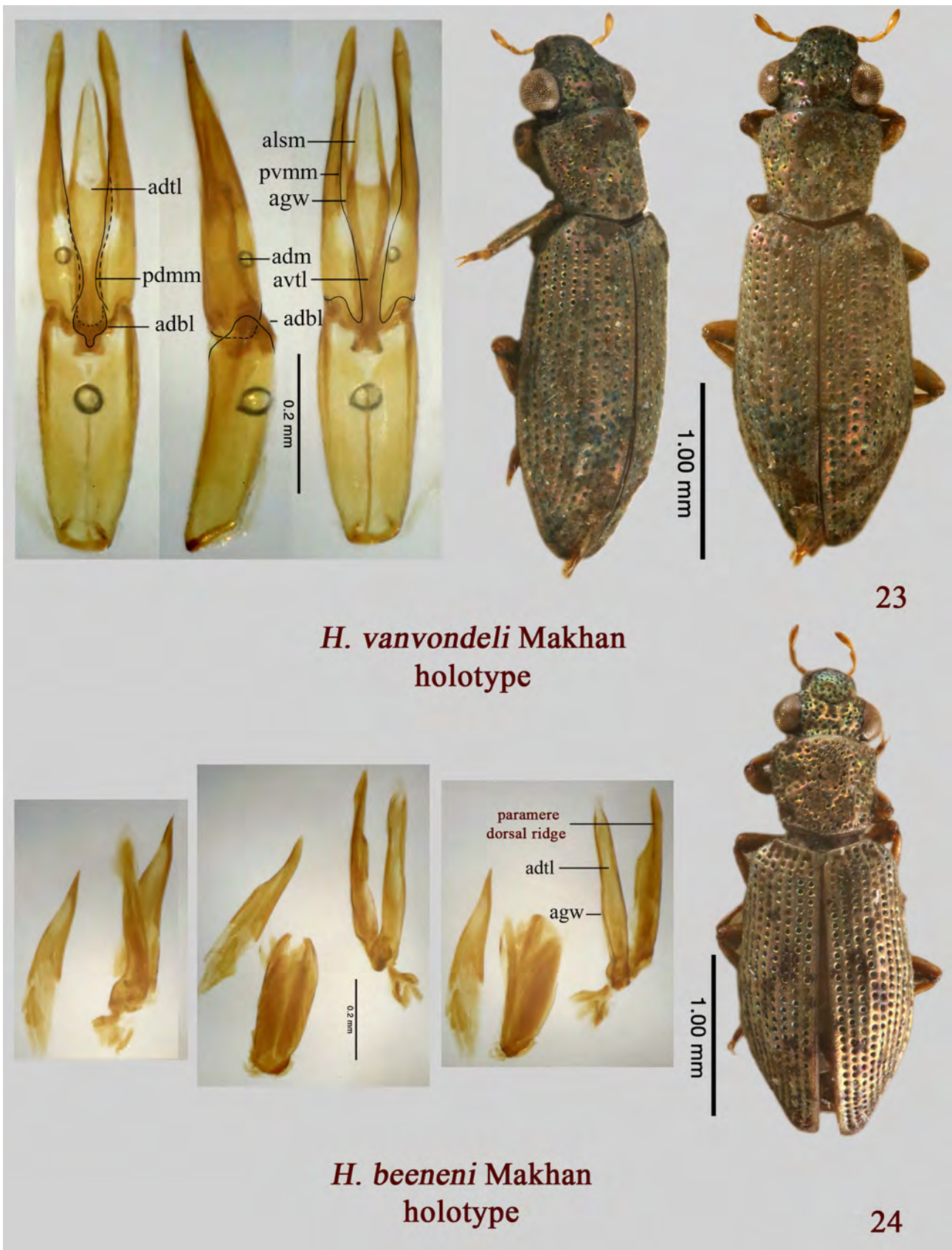
*H. beeneni* Makhan  
non-type Panama

21

*H. beeneni* Makhan  
non-type Mexico

22

FIGURES 21–22. Habitus and male genitalia. 21. *Hydrochus beeneni* Makhan, non-type Panama. 22. *Hydrochus beeneni* Makhan, non-type Mexico.



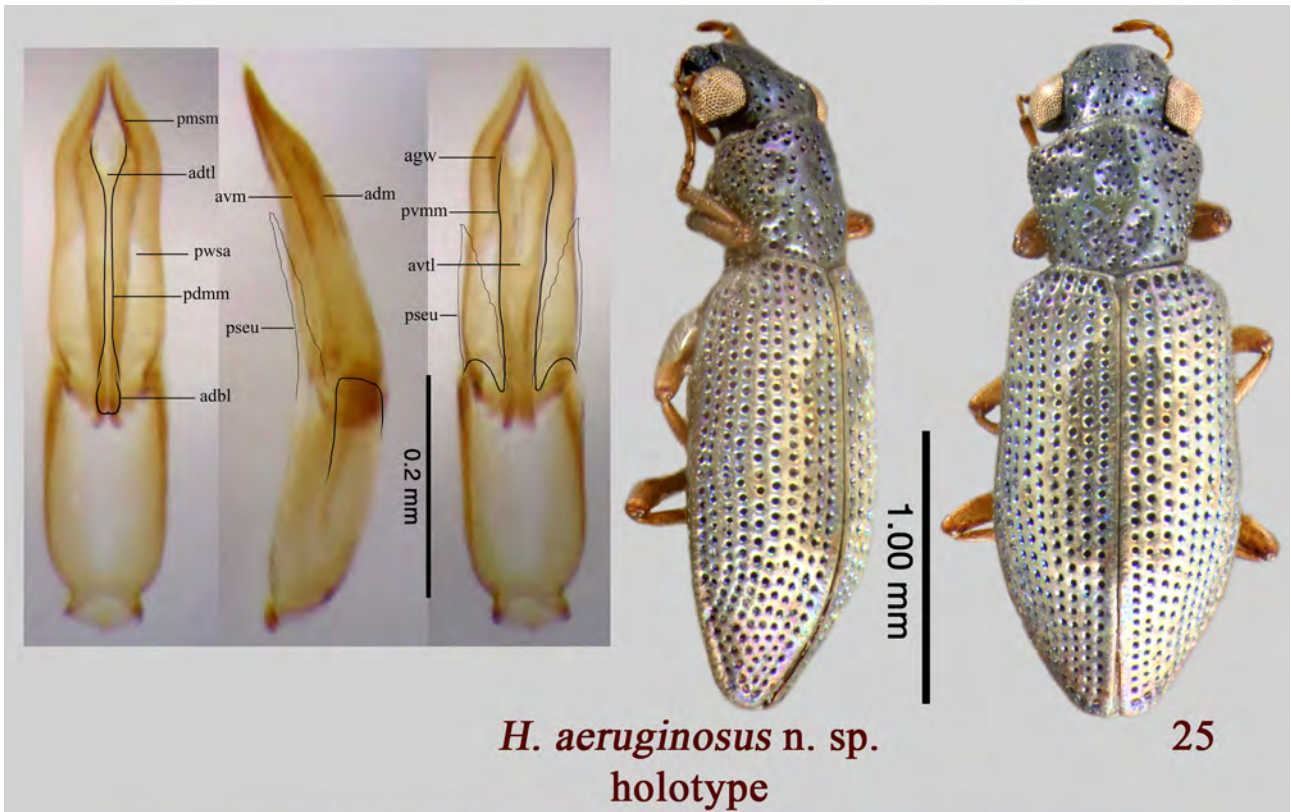
*H. vanvondeli* Makhan  
holotype

*H. beeneni* Makhan  
holotype

23

24

FIGURES 23–24. Habitus and male genitalia of holotypes. 23. *Hydrochus vanvondeli* Makhan. 24. *Hydrochus beeneni* Makhan.



25

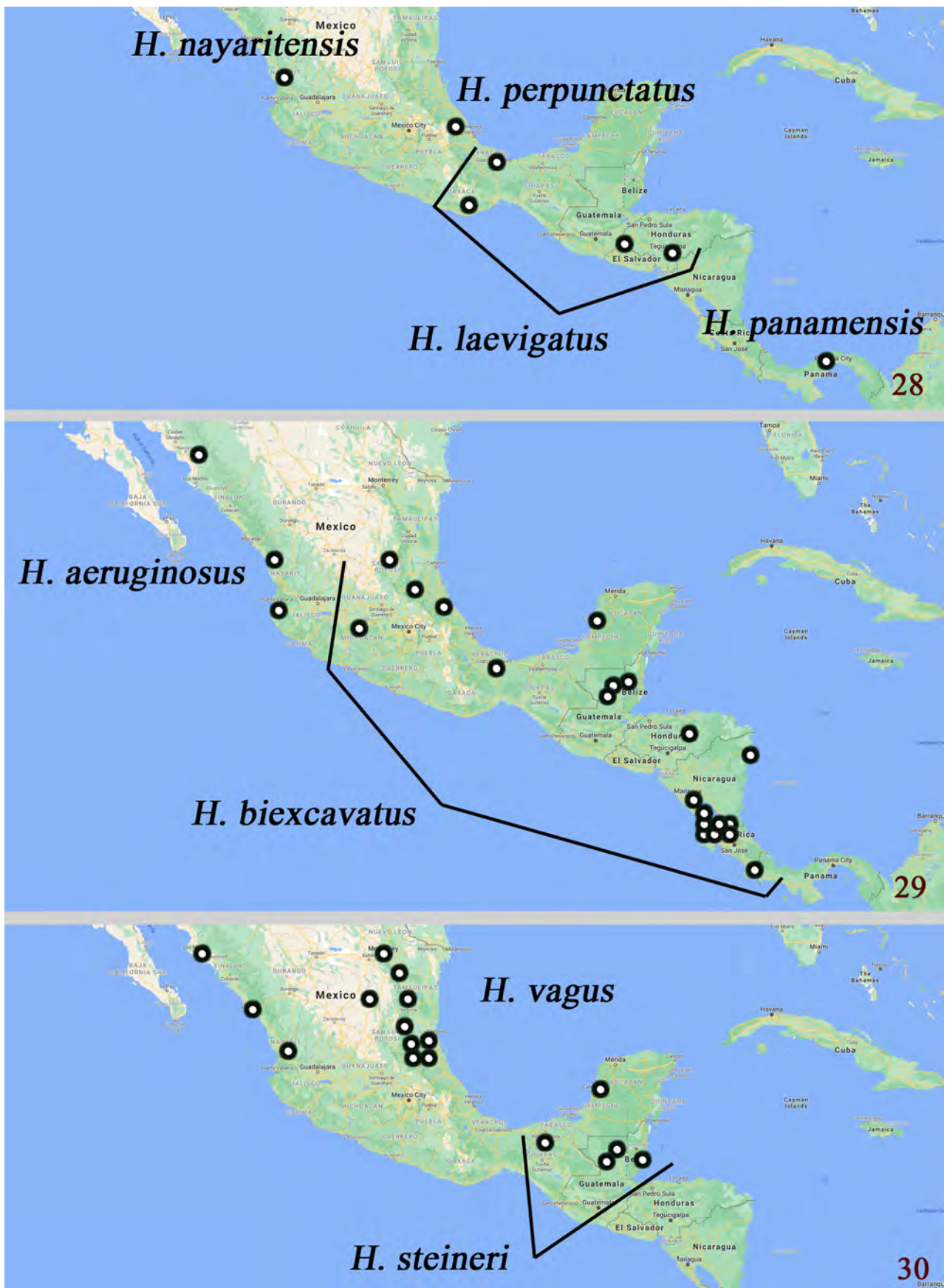


26

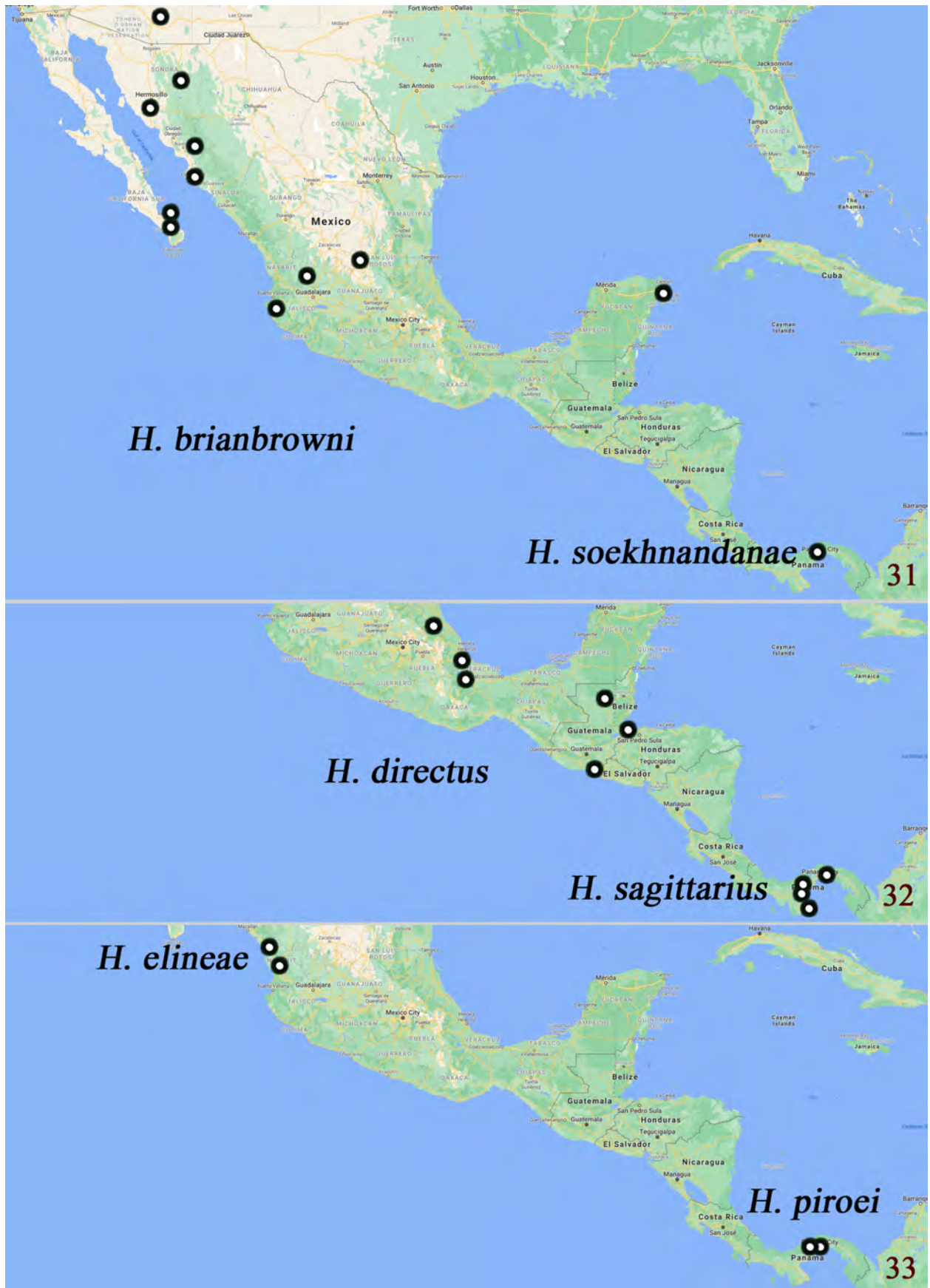


27

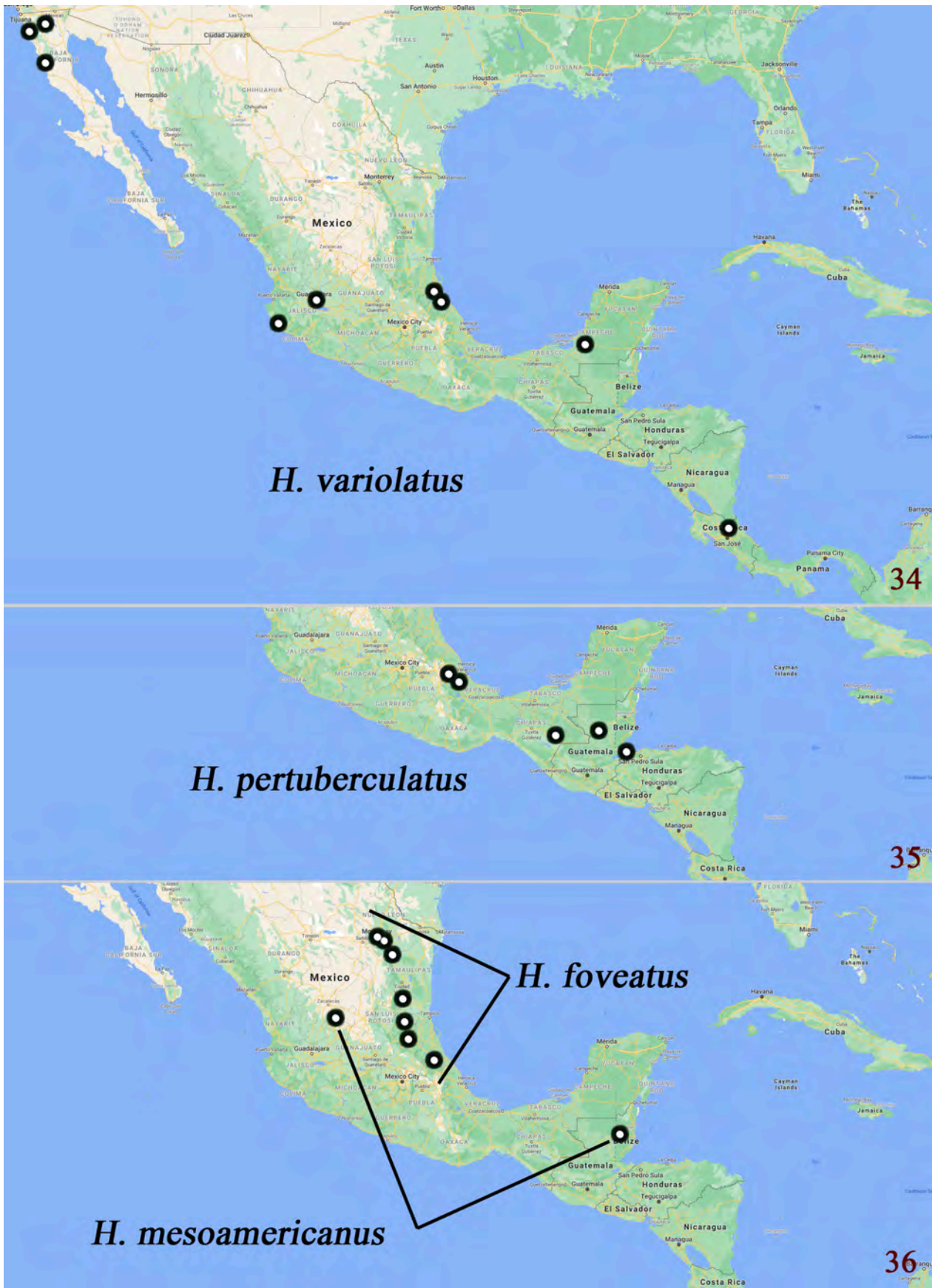
FIGURES 25–27. 25. *Hydrochus aeruginosus* n. sp., holotype. 26. *Hydrochus variolatus* LeConte, type labels. 27. *Hydrochus vagus* LeConte, type labels



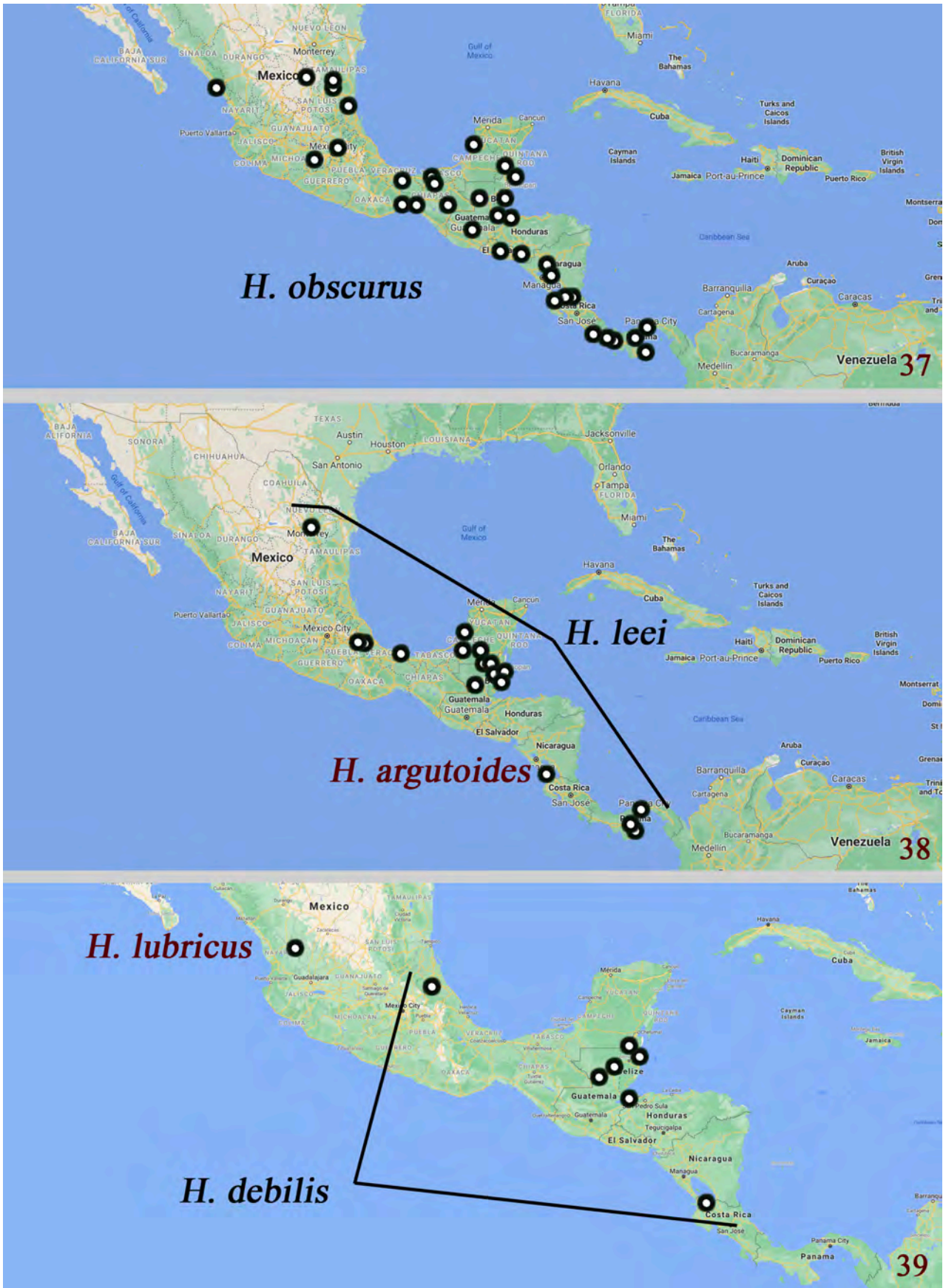
FIGURES 28–30. Geographical distribution maps.



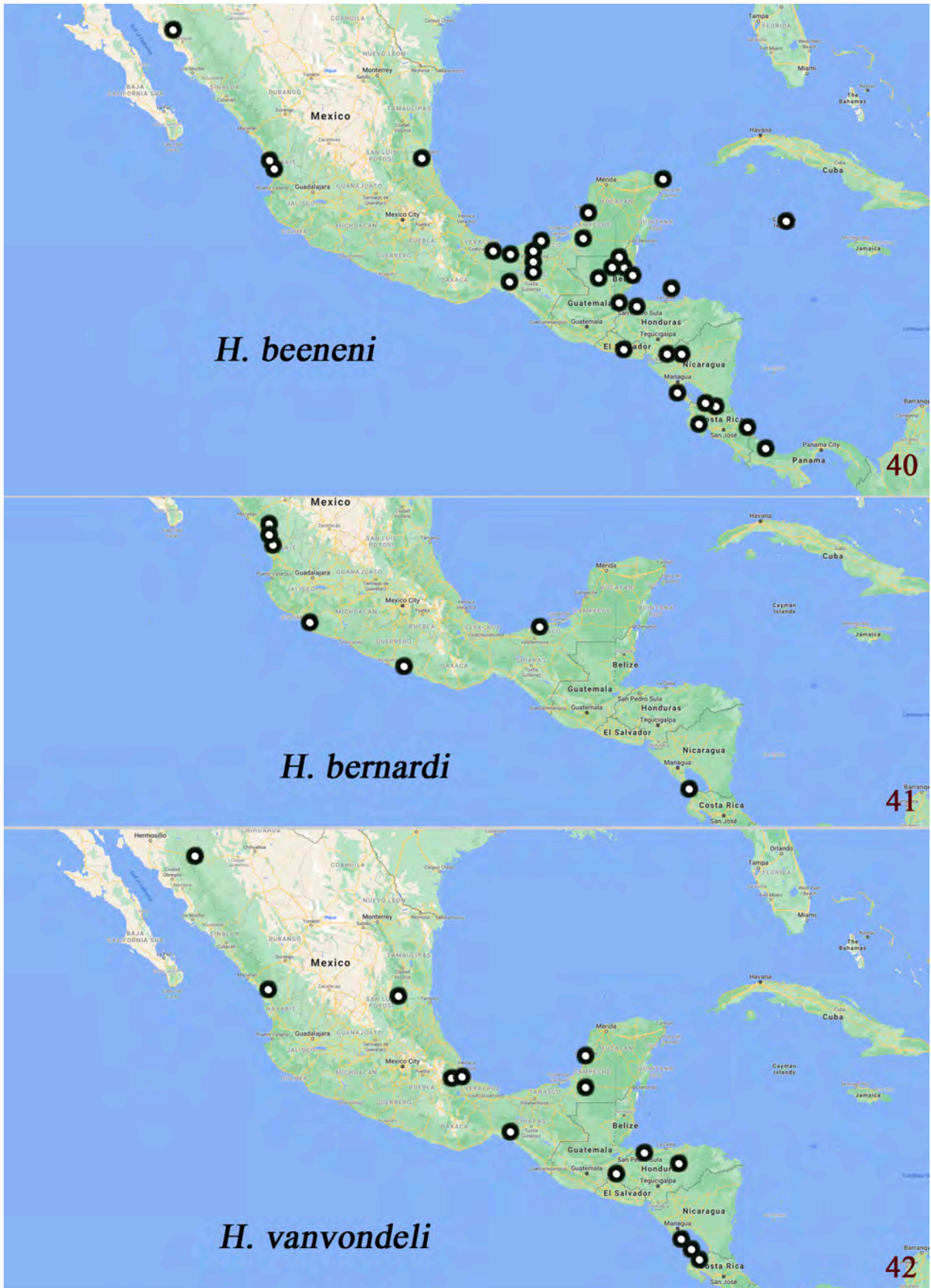
FIGURES 31–33. Geographical distribution maps.



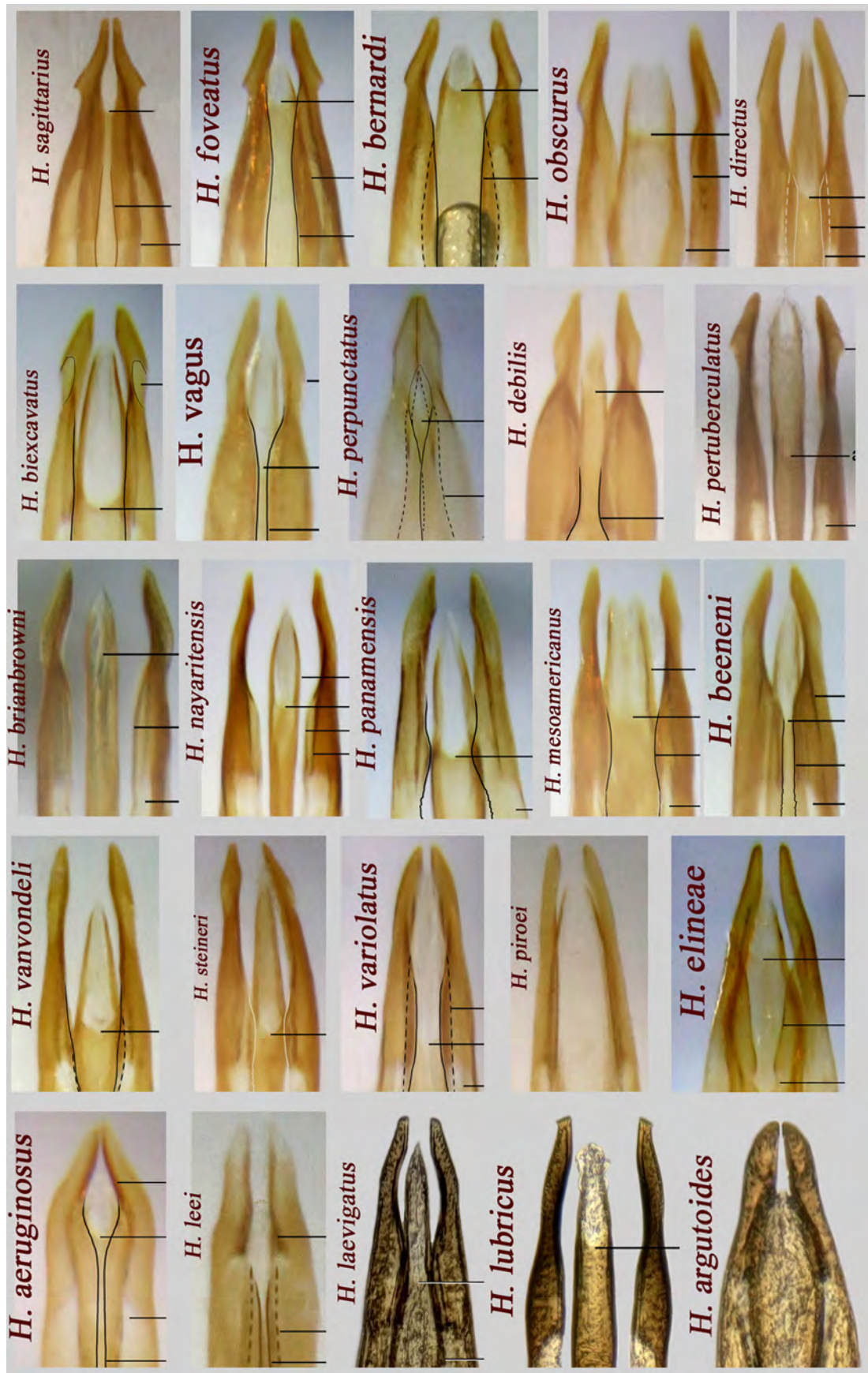
FIGURES 34–36. Geographical distribution maps.



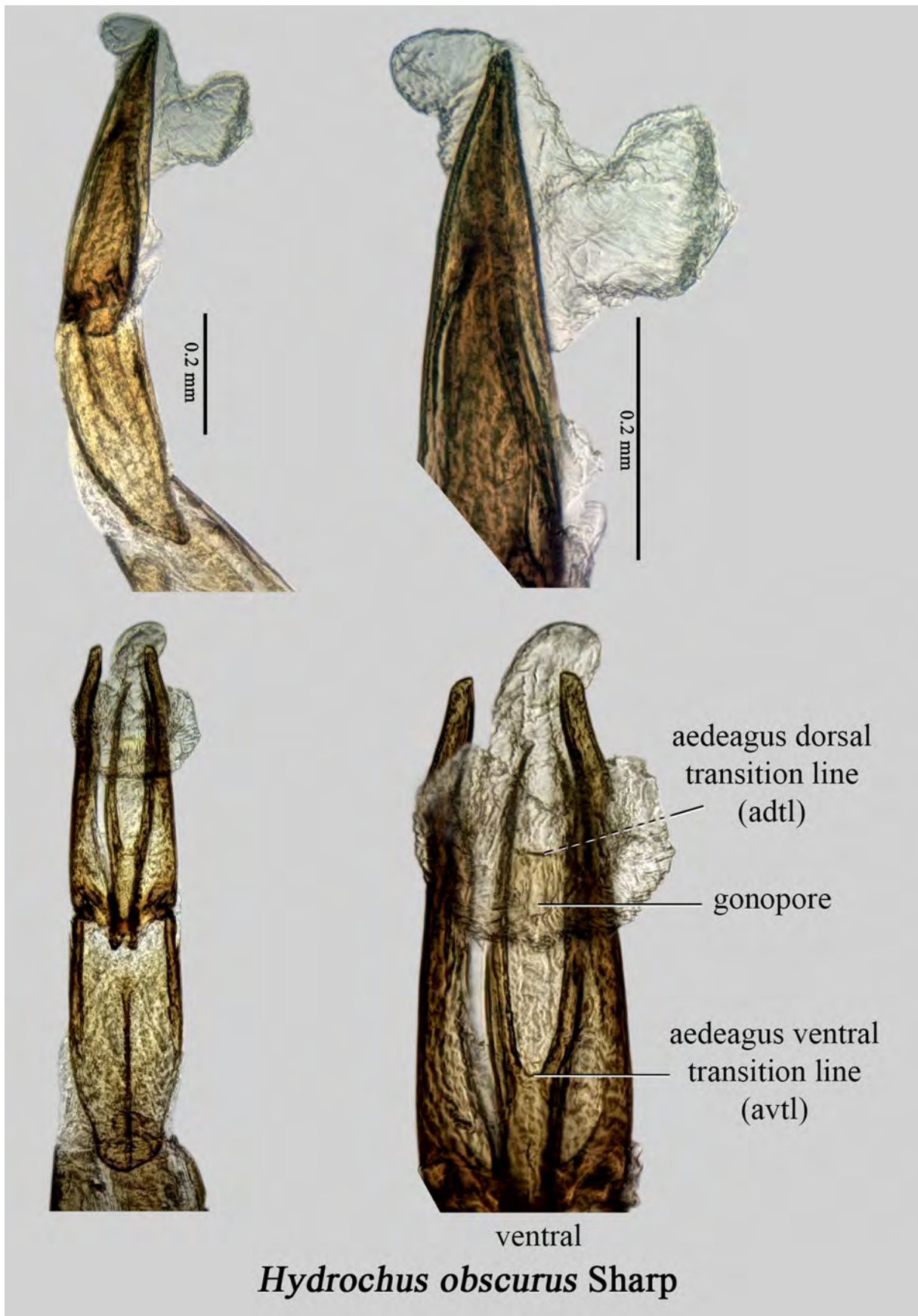
FIGURES 37–39. Geographical distribution maps.



FIGURES 40–42. Geographical distribution maps.



**FIGURE 43.** Pictorial aid to species identification of Central American *Hydrochus*, using male genitalia. Not to same scale.



**FIGURE 44.** *H. obscurus* male genitalia with everted endophallus.

CENTRAL AMERICAN <i>HYDROCHUS</i>	Belize	Costa Rica	El Salvador	Guatemala	Honduras	Mexico	Nicaragua	Panama
<i>Hydrochus aeruginosus</i> , n. sp.						X		
<i>Hydrochus beeneni</i> Makhan	X	X	X	X	X	X	X	X
<i>Hydrochus bernardi</i> Makhan		X				X		
<i>Hydrochus biexcavatus</i> , n. sp.	X	X			X	X	X	
<i>Hydrochus brianbrowni</i> Makhan						X		
<i>Hydrochus debilis</i> Sharp	X	X		X		X		
<i>Hydrochus directus</i> Perkins				X		X		
<i>Hydrochus elineae</i> Makhan						X		
<i>Hydrochus foveatus</i> Haldeman						X		
<i>Hydrochus laevigatus</i> , n. sp.						X		
<i>Hydrochus leei</i> Perkins	X			X		X		X
<i>Hydrochus mesoamericanus</i> , n. sp.	X					X		
<i>Hydrochus nayaritensis</i> , n. sp.						X		
<i>Hydrochus obscurus</i> Sharp	X	X	X	X	X	X	X	X
<i>Hydrochus panamensis</i> , n. sp.								X
<i>Hydrochus perpunctatus</i> , n. sp.						X		
<i>Hydrochus pertuberculatus</i> Perkins				X		X		
<i>Hydrochus piroei</i> Makhan								X
<i>Hydrochus sagittarius</i> Perkins								X
<i>Hydrochus soekhnandanae</i> Makhan								X
<i>Hydrochus steineri</i> Perkins	X			X		X		
<i>Hydrochus vagus</i> LeConte						X		
<i>Hydrochus vanvondeli</i> Makhan		X			X	X	X	
<i>Hydrochus variolatus</i> LeConte		X				X		

FIGURE 45. Table of *Hydrochus* distributions in Central America.

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