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A phylogenetic revision of the true bug genus *Heraeus* (Hemiptera: Rhyparochromidae: Myodochini), with the description of two new genera and 30 new species

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Prior to this study, the genus *Heraeus* Stål, 1862 included 14 species, all of which are restricted to the Western Hemisphere. Three species are known from the Nearctic Region, nine from the Neotropical Region, and two mainly tropical elements are distributed in both regions. In this contribution, we consider *Heraeus cincticornis* Stål, 1874 a junior synonym of *Heraeus elegans* (Walker, 1873), select a lectotype for *Heraeus coquilletti* Barber, 1914, and neotype for *Lygaeus triguttatus* Guérin-Méneville, 1857, and describe 28 new species. In addition, the two new genera, *Baranowskiobius* gen. nov., to include *H. elegans* (*Baranowskiobius elegans* comb. nov.) and two new species, and *Paraheraeus* gen. nov., to include *Heraeus eximius* Distant, 1882 (*Paraheraeus eximius* comb. nov.), are described. Previously described species and new taxa are (re)described and illustrated, including male genitalia. Scanning electron micrographs, general habitus photographs, and distribution maps are included for all species studied. A phylogenetic analysis comprising 46 terminal taxa and 50 morphological characters was performed, and five species groups were hypothesized, including the *coquilletti*, *caliginosus*, *guttatus*, *illitus*, and *plebejus* groups. All known species of *Heraeus* and the new genera are included in the phylogenetic analysis. The type species of the genera *Myodocha* Latreille, 1807, *Orthaea* Dallas, 1852, and *Paisana* Dellapé, 2008 are used as out-groups.

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INTRODUCTION

Members of the genus *Heraeus* Stål, 1862 belong to the true bug family Rhyparochromidae, containing two subfamilies, the Plinthisinae, with only the tribe Plinthisini, and the Rhyparochrominae, with 14 tribes (Henry, 1997). All of these, except the Cleradini (some of which feed on arthropod haemolymph and mammalian blood), are phytophagous taxa, mostly feeding on the seeds of a wide range of plants, especially grasses and sedges. The Myodochini are abundant in all major zoogeographical regions, sometimes occurring in high-latitude temperate areas. Some species appear to be extremely vagile, and have colonized many oceanic islands (Schuh & Slater, 1995). The Neotropical fauna of Myodochini, including the genus *Heraeus*, is particularly diverse. Slater (1986) mentioned that the Neotropical Rhyparochromidae are the most disharmonic of any of the major fauna regions, consisting almost entirely of Antillocorini, Lethaeini, Myodochini, Ozophorini, and a few Plinthisini and Udeocorini. He noted that the absence of many Old World tribes appears to have permitted the radiation and diversification of the Myodochini in the Western Hemisphere. This tribe, with 75 genera and more than 300

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species worldwide, is the most diverse group of rhyparochromids in the Neotropics, with 36 genera and about 117 known species (Henry, Dellapé & Silva de Paula, 2015). Many species remain undescribed, so the diversity of the tribe is expected to increase considerably in the future. Recently, the authors have added a number of Neotropical taxa to this group, with the description of new taxa (Dellapé, 2003, 2005a, b, 2008a, b, 2012; Dellapé & Melo, 2004, 2005, 2008; Dellapé & Coscarón, 2005; Dellapé & Montemayor, 2008, 2011a, b; Dellapé & Henry, 2010) and with new distribution records from Argentina (Melo *et al.*, 2004, 2011; Carpintero, Dellapé & Melo, 2006; Dellapé, Carpintero & Melo, 2010; Dellapé & Carpintero, 2012).

Members of the tribe feed on seeds and are generally found on the ground, living in the litter below plants. Some species climb vegetation when mature seeds are available, others habitually live above ground on weedy vegetation and others are arboreal (Henry, 2009; Dellapé & Henry, 2010).

Stål (1862), in his *Hemiptera Mexicana*, erected the genus *Heraeus* to include *Lygaeus (Plociomerus) triguttatus* Guérin-Méneville, 1857, and mentioned its affinity with the genus *Myodocha* Latreille, 1807. Harrington (1980), in her review of the Myodochini of the world, and Slater & Baranowski (1990) gave a diagnosis of the genus, and mentioned the distinctive pronotal collar extending forwards beneath the head ventrally, a diagnostic character of *Heraeus*.

In the cladistic analysis presented by Harrington (1980), *Heraeus* is shown to be related to *Myodocha*, *Orthaea* Dallas, 1852, and *Catenes* Distant, 1893, based on the incipient head elongation. She characterized them as large pruinose, long-legged, rapid running forms. Harrington's (1980) cladogram shows four lineages based on four types of male genitalia. *Heraeus* is placed in lineage type IV, characterized by a well-developed sperm reservoir, with lobes lacking spines or with only tiny spines. Following this scheme, and according to Dellapé & Melo (2008), the aedeagus with large spines on the conjunctiva of *Catenes australis* Dellapé & Melo, 2008 would take the genus *Catenes* out of this group (the aedeagus of the type species, *Catenes porrectus* Distant, 1893, shows similar characteristics). Although the analysis is preliminary, it is the only attempt to establish a phylogenetic scheme among all Myodochini genera.

Prior to this study, the genus *Heraeus* included 14 species found in the Western Hemisphere: three of them (*Heraeus cinnamomeus* Barber, 1948, *Heraeus coquilletti* Barber, 1914, and *Heraeus plebejus* Stål, 1874) from the Nearctic Region, nine [*Heraeus caliginosus* Slater & Baranowski, 1994, *Heraeus cincticornis* Stål, 1874, *Heraeus concolor* Slater & Baranowski, 1994, *Heraeus elegans* (Walker, 1873), *Heraeus guttatus* (Dallas, 1852), *Heraeus hollyae* Baranowski, 2005, *Heraeus illitus* Distant, 1882, *Heraeus pacificus* Barber, 1925, and *Heraeus pulchellus* Barber, 1954] from the Neotropics, and two [*Heraeus eximius* Distant, 1882 and *Heraeus triguttatus* (Guérin-Méneville, 1857)] representing mainly tropical elements distributed in both regions. In this contribution, we recognize five species groups, including *coquilletti*, *caliginosus*, *guttatus*, *illitus*, and *plebejus*, we describe 28 new *Heraeus* species, mainly from Central and South America, we consider *H. cincticornis* a junior synonym of *H. elegans*, and we designate a lectotype for *H. coquilletti* and a neotype for *L. triguttatus*. In addition, two new genera are described, *Baranowskiobius* gen. nov., to include *H. elegans* and two new species, and *Paraheraeus* gen. nov., to include *H. eximius*. With the description of these new taxa, the highly diverse genus *Heraeus* becomes the largest genus within the tribe worldwide.

MATERIAL AND METHODS

More than 3200 specimens were examined, including types, belonging to the following institutions: AMNH, American Museum of Natural History, New York, USA; BMNH, The Natural History Museum, London, UK; CAS, California Academy of Sciences, San Francisco, USA; CNC, Canadian National Collection of Insects, Ottawa, Ontario, Canada; CUIC, Cornell University Insect Collection, Ithaca, New York, USA; FSCA, Florida State Collection of Arthropods; IADIZA, Instituto Argentino de Investigaciones de Zonas Aridas, Mendoza, Argentina; IFML, Colección Instituto Fundación Miguel Lillo, Tucumán, Argentina; IRSN, Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; MACN, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina; MLP, Museo de La Plata, Buenos Aires, Argentina; MNHN, Muséum national d'Histoire naturelle, Paris, France; MZSP, Universidade de São Paulo, Museu de Zoologia, São Paulo, Brazil; OSUC, Ohio State University, Columbus, USA; PSUC, Pennsylvania State University, Frost Entomological Museum, State College, Pennsylvania, USA; SEMC, University of Kansas, Snow Entomological Museum, Lawrence, Kansas, USA; UCMS, University of Connecticut Entomological Collection, Storrs, USA; UMMZ, University of Michigan, Museum of Zoology, Ann Arbor, Michigan, USA; UNAM, Universidad Nacional Autónoma de México, D.F., México; USNM, National Museum of Natural History, Washington, D.C., USA.

The labels of examined specimens were transcribed in the section 'Type material', and the additional examined material was ordered alphabetically by country, omitting repeated information on each specimen. The maps were created using the program ArcMap 10 (ESRI, 2011), using data from specimens and the literature; localities were georeferenced using this program to place points on the maps. In the

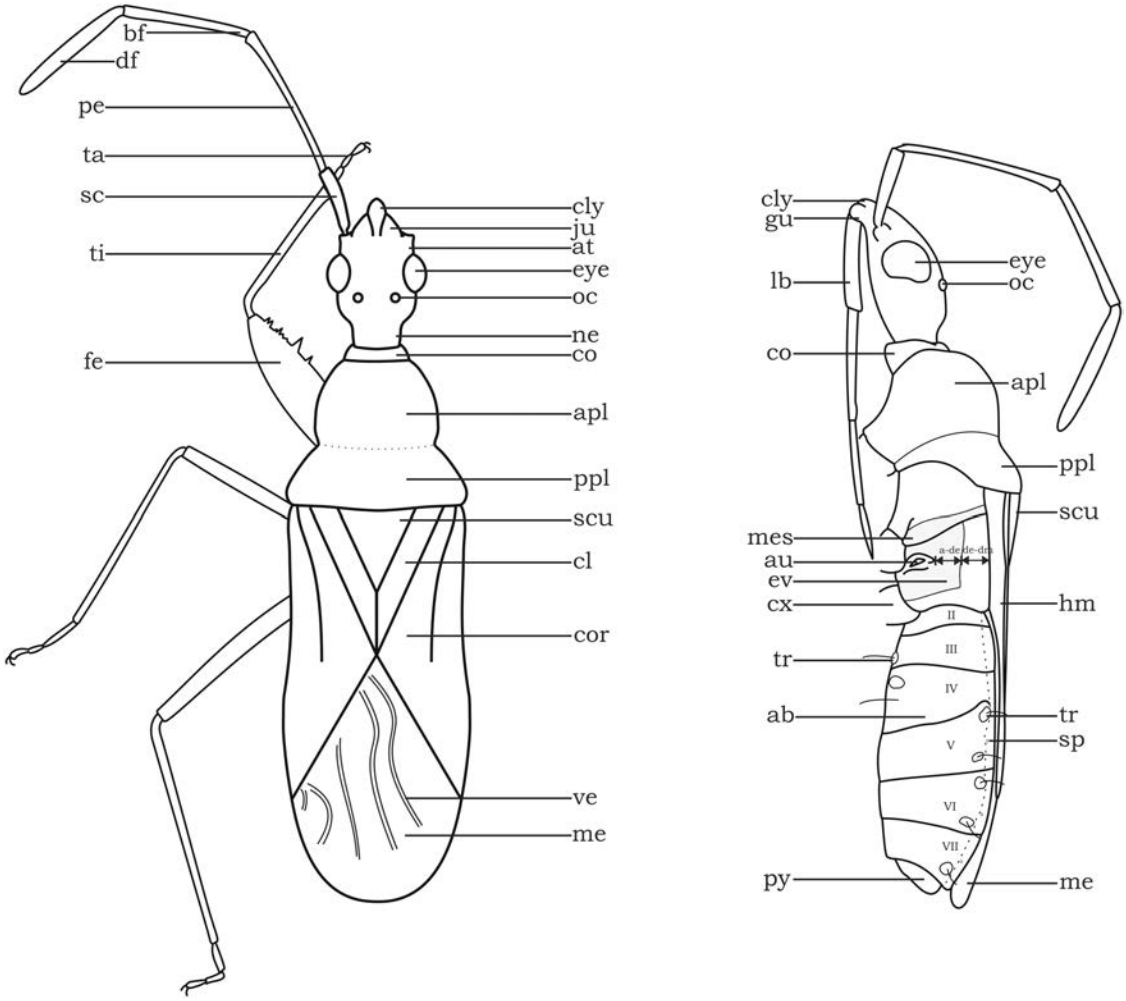

Figure 1. Schematic dorsal and lateral views. Abbreviations: ab, abdomen; apl, anterior pronotal lobe; at, antenniferous tubercle; au, auricle; bf, basiflagellomere; cl, clavus; cly, clypeous; co, collar; cor, corium; cx, coxa; df, distiflagellomere; ev, evaporative area; eye, eye; fe, femur; gu, gula; hm, hemelytra; ju, jugum; lb, labium; me, membrane; mes, mesepimeron; ne, neck; oc, ocellus; pe, pedicellum; ppl, posterior pronotal lobe; py, pygophore; sc, scapus; scu, scutellum; sp, spiracle; ta, tarsus; ti, tibia; tr, trichobothrium; ve, vein.

geographic distribution of *H. pacificus*, we used the official Ecuadorian names of the Galapagos Islands (Linsley, 1977).

Descriptions and illustrations of male genitalia are provided for all species. Redescriptions are given for species where the original descriptions or previous works were poor or incomplete, in the case of *H. caliginosus*, *H. concolor*, *H. hollyae*, and *H. plebejus*, only the characters analysed in the phylogenetic analysis are mentioned. Redescriptions were based on type material when available. Descriptions and illustrations of the new taxa are based on the holotype, with additional notes based on paratypes or other material added as necessary. The main structures of external morphology and male genitalia used in the descriptions are illustrated in Figures 1 and 2, scale line for pygophore illustrations is 1 mm, for parameres and aedeagus is 0.5 mm. Scanning electron micrographs were made from specimens mounted on a standard stub, sputter coated with a gold palladium alloy, and studied with a JEOL 6360 LV scanning electron microscope. The measurements are given in millimetres (Table 1). The data of photographed and dissected specimens are given in Appendix 1.

For the phylogenetic analysis, 46 terminals were considered: three as out-groups and 43 as the in-group. All known species of *Heraeus*, including the species newly described here, were included in the analysis. The type species of the genera *Myodocha*, *Orthaea*, and *Paisana* Dellapé, 2008 were used as out-groups, rooting on *Orthaea consuta* Dallas, 1852. Male genitalic characters and most of the external characters of *O. consuta* and *Paisana brachialis* (Stål, 1862) follow Dellapé &

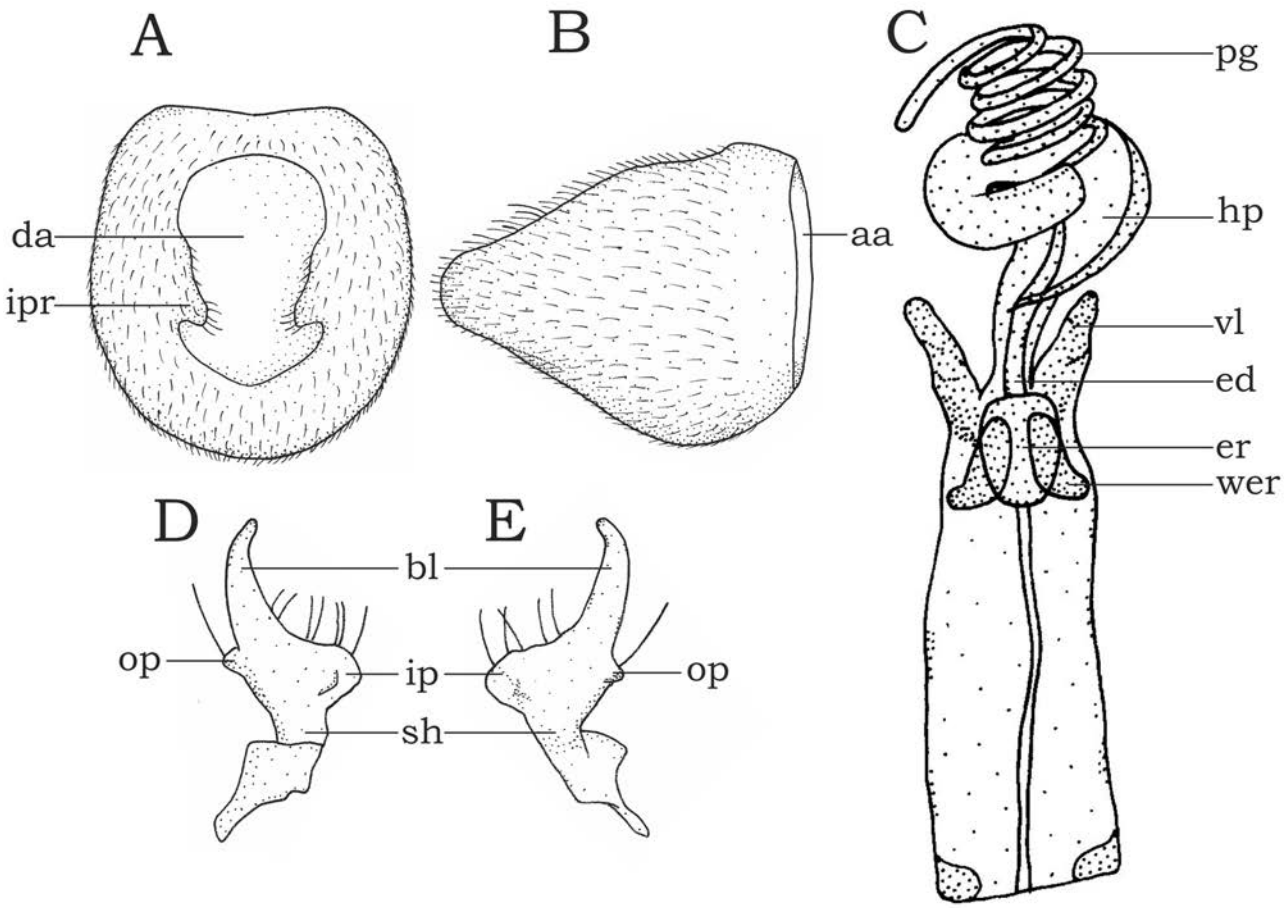

Figure 2. Male genitalia: A, pygophore, dorsal view; B, lateral view; C, aedeagus; D, right paramere, inner view; E, right paramere, external view. Abbreviations: aa, anterior aperture; da, dorsal aperture; bl, blade; ed, ejaculatory ductus; er, ejaculatory reservoir; hp, helicoidal process; ip, inner projection; ipr, inner projection of dorsal aperture; op, outer projection; pg, *processus gonopori*; sh, shank; vl, vesical lobe; wer, wing of ejaculatory reservoir.

Montemayor (2008) and Dellapé (2008b), whereas a few others are taken from specimens in this study; all characters of *Myodocha serripes* Olivier, 1811 are from specimens listed in Appendix 2. The total length and ratios of *O. consuta* and *P. brachialis* were calculated following the measurements used by Dellapé & Montemayor (2008) and Dellapé (2008b). Five specimens of each sex of *M. serripes* were measured.

Characters and character states were based on direct observation of the studied material. A morphological matrix (Appendix 3) consisting of 50 characters was constructed. Characters 0–8 are continuous, corresponding to total length and ranges of ratios between measurements, and were treated as such, avoiding the use of *ad hoc* methods to establish ranges (Goloboff, Mattoni & Quinteros, 2006; Goloboff, Farris & Nixon, 2008), and characters 9–49 are binary or multistate, and were treated as nonadditive. Parsimony was used as the optimality criterion. An analysis under implied weights (concavity constant $K = 3$) was performed using the program TNT 1.1 (Goloboff *et al*., 2008), where a heuristic search with five random seeds and 5000 random-addition sequences, using the Tree Bissection Reconnection algorithm for the most parsimonious trees, was applied, with ten trees held per replication. Clade support was assessed by means of Jackknife frequency differences using 1000 randomly resampled matrices, with a probability of character deletion of 36%. This article was registered in the Official Register of Zoological Nomenclature (ZooBank) as 8A961A76-E33C-4171-B401-0B516B62FA6D.

TAXONOMIC ACCOUNT

GENUS *HERAEUS* STÅL, 1862

Type species: Lygaeus (Plociomerus) triguttatus Guérin-Méneville, 1857, by monotypy.

Heraeus Stål, 1862: 314–315; Stål, 1874: 147; Distant, 1882: 204; Provancher, 1886: 80; Berg, 1892: 162;

Table 1. Measurements of the species studied

	TL	HL	POcL	HW	IOcW	IOclW	CL	APLL	PPLL	APLW	PPLW	R1	R2	R3	R4	SCL	PL	BFL	DFL	DFBL
Heraeus coquilletti																				
N = 10																				
min.	6.66	1.48	0.44	0.94	0.48	0.30	0.10	0.64	0.56	1.10	1.62	0.88	0.92	0.76	0.36	0.60	1.20	0.88	1.08	0
max.	7.83	1.64	0.56	1.02	0.60	0.38	0.12	0.94	0.70	1.28	1.90	1.08	1.20	1.00	0.40	0.76	1.52	1.20	1.36	0
mean	7.34	1.54	0.52	0.98	0.53	0.35	0.11	0.77	0.64	1.17	1.77	0.97	1.05	0.90	0.38	0.67	1.36	1.07	1.23	0
SD	0.35	0.05	0.04	0.03	0.03	0.03	0.01	0.09	0.05	0.06	0.09	0.06	0.10	0.09	0.02	0.05	0.09	0.10	0.08	0
***Heraeus costalis* sp. nov.**																				
N = 10																				
min.	5.99	1.30	0.43	0.88	0.40	0.27	0.07	0.65	0.48	0.98	1.50	0.88	0.96	0.85	0.32	0.53	1.15	0.94	1.28	0.64
max.	6.75	1.66	0.50	0.96	0.48	0.32	0.14	0.86	0.55	1.07	1.68	0.96	1.10	0.94	0.38	0.67	1.36	1.14	1.44	0.86
mean	6.42	1.41	0.48	0.93	0.47	0.29	0.10	0.71	0.52	1.02	1.57	0.90	1.03	0.89	0.35	0.63	1.26	1.07	1.36	0.77
SD	0.23	0.09	0.02	0.03	0.02	0.02	0.02	0.08	0.03	0.04	0.05	0.03	0.04	0.03	0.02	0.04	0.07	0.06	0.05	0.08
Heraeus cinnamomeus																				
N = 10																				
min.	6.37	1.32	0.48	0.86	0.37	0.26	0.11	0.64	0.50	0.99	1.65	0.80	0.91	0.72	0.32	0.56	1.17	0.93	1.17	0
max.	7.41	1.75	0.53	1.02	0.53	0.34	0.13	0.77	0.69	1.20	1.87	0.93	0.96	0.80	0.38	0.72	1.36	1.12	1.28	0
mean	6.87	1.46	0.49	0.96	0.48	0.31	0.12	0.71	0.58	1.08	1.71	0.86	0.94	0.76	0.36	0.67	1.28	1.03	1.23	0
SD	0.33	0.16	0.02	0.05	0.05	0.03	0.01	0.04	0.06	0.07	0.10	0.04	0.02	0.03	0.02	0.05	0.05	0.07	0.05	0
***Heraeus itzelae* sp. nov.**																				
N = 8																				
min.	6.08	1.03	0.38	0.91	0.43	0.27	0.08	0.61	0.48	0.99	1.20	0.78	0.88	0.72	0.35	0.56	1.07	0.85	0.98	0.48
max.	7.51	1.54	0.53	1.01	0.54	0.35	0.13	0.75	0.61	1.15	1.85	1.06	1.20	1.04	0.40	0.74	1.50	1.15	1.38	0.59
mean	6.79	1.30	0.46	0.96	0.49	0.31	0.10	0.68	0.56	1.07	1.61	0.93	1.02	0.87	0.38	0.65	1.29	1.01	1.20	0.54
SD	0.60	0.16	0.05	0.04	0.04	0.03	0.02	0.05	0.06	0.07	0.22	0.11	0.14	0.13	0.02	0.07	0.15	0.12	0.16	0.04
***Heraeus setosus* sp. nov.**																				
N = 7																				
min.	5.80	1.25	0.38	0.88	0.43	0.27	0.06	0.61	0.48	0.96	1.49	0.83	0.94	0.75	0.32	0.58	1.20	0.93	1.02	0
max.	6.46	1.34	0.46	1.07	0.48	0.32	0.10	0.82	0.54	1.14	1.68	1.04	1.06	1.02	0.38	0.62	1.60	0.96	1.09	0
mean	6.28	1.29	0.41	0.94	0.46	0.30	0.08	0.68	0.53	1.07	1.60	0.93	1.01	0.93	0.35	0.59	1.30	0.94	1.06	0
SD	0.23	0.04	0.02	0.06	0.02	0.02	0.01	0.07	0.02	0.06	0.06	0.07	0.04	0.10	0.03	0.02	0.20	0.02	0.05	0
Heraeus caliginosus																				
N = 5																				
min.	5.70	1.20	0.48	0.80	0.43	0.27	0.08	0.40	0.45	0.77	1.22	0.86	0.94	0.88	0.35	0.51	1.06	0.94	0.94	0.16
max.	6.46	1.42	0.50	0.91	0.48	0.29	0.08	0.56	0.64	1.01	1.57	0.99	1.17	0.96	0.37	0.61	1.23	1.12	1.20	0.16
mean	6.08	1.33	0.48	0.88	0.46	0.28	0.08	0.49	0.53	0.91	1.43	0.94	1.06	0.91	0.36	0.54	1.15	1.03	1.12	0.16
SD	0.34	0.09	0.01	0.05	0.02	0.01	0.00	0.06	0.08	0.09	0.15	0.05	0.08	0.04	0.01	0.04	0.07	0.08	0.10	0.00
***Heraeus dominicanus* sp. nov.**																				
N = 2																				
min.	6.65	1.55	0.54	0.99	0.50	0.26	0.10	0.61	0.51	0.96	1.55	0.94	1.04	0.80	0.24	0.64	1.42	1.18	1.38	0
max.	6.94	1.55	0.59	1.01	0.51	0.30	0.11	0.78	0.56	0.99	1.58	0.96	1.06	0.80	0.38	0.67	1.44	1.28	0.00	0
mean	6.79	1.55	0.57	1.00	0.50	0.28	0.10	0.70	0.54	0.98	1.57	0.95	1.05	0.80	0.31	0.66	1.43	1.23	0.00	0
SD	0.02	0.00	0.03	0.01	0.01	0.03	0.01	0.12	0.03	0.02	0.02	0.01	0.01	0.00	0.10	0.02	0.01	0.07	0.00	0
Heraeus guttatus																				
N = 10																				
min.	6.18	1.22	0.40	0.91	0.40	0.20	0.06	0.54	0.53	0.99	1.46	0.66	0.77	0.67	0.32	0.53	1.15	0.96	1.07	0.27
max.	6.94	1.37	0.48	1.04	0.46	0.32	0.10	0.82	0.67	1.20	2.45	0.94	0.96	0.88	0.37	0.62	1.44	1.25	1.38	0.48
mean	6.60	1.30	0.43	0.96	0.43	0.26	0.08	0.68	0.61	1.07	1.71	0.98	0.88	0.76	0.35	0.59	1.28	1.12	1.25	0.38
SD	0.27	0.04	0.03	0.04	0.02	0.03	0.01	0.08	0.05	0.07	0.28	0.08	0.06	0.07	0.02	0.04	0.09	0.10	0.09	0.06
Heraeus hollyae																				
N = 2																				
min.	5.80	1.15	0.40	0.91	0.46	0.29	0.08	0.54	0.50	1.04	1.49	0.70	0.80	0.64	0.37	0.48	0.99	0.96	1.10	0.24
max.	6.08	1.20	0.42	0.94	0.48	0.30	0.08	0.69	0.51	1.07	1.52	0.74	0.82	0.64	0.40	0.50	1.10	1.09	0.00	0
mean	5.94	1.18	0.41	0.93	0.47	0.30	0.08	0.62	0.50	1.06	1.50	0.72	0.81	0.64	0.38	0.49	1.05	1.02	0.00	0
SD	0.02	0.03	0.01	0.02	0.01	0.01	0.00	0.10	0.01	0.02	0.02	0.02	0.01	0.00	0.02	0.01	0.08	0.09	0.00	0
***Heraeus steineri* sp. nov.**																				
N = 8																				
min.	6.37	1.27	0.43	0.90	0.38	0.22	0.08	0.61	0.51	0.99	1.52	0.78	0.85	0.62	0.35	0.48	1.17	1.04	1.14	0.32
max.	6.94	1.37	0.58	0.98	0.45	0.32	0.08	0.88	0.64	1.15	1.66	0.82	0.91	0.69	0.42	0.64	1.36	1.22	1.28	0.48
mean	6.66	1.32	0.47	0.94	0.42	0.28	0.08	0.69	0.57	1.06	1.59	0.81	0.88	0.66	0.38	0.58	1.26	1.13	1.23	0.37
SD	0.20	0.03	0.04	0.02	0.02	0.03	0.00	0.10	0.04	0.05	0.07	0.03	0.02	0.02	0.03	0.05	0.07	0.05	0.06	0.05
Heraeus triguttatus																				
N = 8																				
min.	6.08	1.25	0.41	0.90	0.30	0.22	0.08	0.62	0.53	0.96	1.44	0.66	0.80	0.56	0.32	0.59	1.26	1.15	1.20	0.37
max.	7.13	1.44	0.50	1.01	0.45	0.32	0.10	0.85	0.66	1.14	1.68	0.83	0.91	0.72	0.40	0.64	1.47	1.26	1.36	0.48
mean	6.73	1.37	0.47	0.95	0.40	0.26	0.08	0.72	0.59	1.04	1.59	0.75	0.86	0.65	0.34	0.63	1.36	1.20	1.26	0.43
SD	0.31	0.06	0.03	0.04	0.06	0.03	0.01	0.09	0.04	0.06	0.07	0.06	0.04	0.05	0.03	0.02	0.07	0.04	0.07	0.05
***Heraeus annulatus* sp. nov.**																				
N = 10																				
min.	5.42	1.01	0.38	0.88	0.42	0.24	0.06	0.48	0.48	0.85	1.34	0.53	0.67	0.50	0.26	0.45	0.91	0.80	0.86	0.32
max.	5.89	1.27	0.43	0.94	0.48	0.29	0.08	0.56	0.53	0.96	1.57	0.64	0.72	0.61	0.35	0.48	1.04	1.04	1.07	0.40
mean	5.62	1.16	0.42	0.92	0.45	0.26	0.08	0.52	0.51	0.89	1.43	0.59	0.70	0.56	0.33	0.47	0.98	0.87	1.02	0.36
SD	0.17	0.17	0.02	0.03	0.03	0.02	0.01	0.03	0.02	0.03	0.07	0.04	0.02	0.03	0.03	0.01	0.05	0.07	0.06	0.03
***Heraeus antennalis* sp. nov.**																				
N = 1																				
	6.37	1.46	0.62	0.99	0.53	0.27	0.10	0.55	0.55	0.94	1.47	0.66	0.80	0.62	0.32	0.43	1.23	0.96	1.06	0.32
***Heraeus chamamecinus* sp. nov.**																				
N = 10																				
min.	5.89	1.18	0.43	0.91	0.46	0.27	0.06	0.51	0.48	0.93	1.42	0.72	0.82	0.77	0.29	0.43	1.02	0.67	1.01	0
max.	6.84	1.37	0.53	1.07	0.54	0.35	0.08	0.66	0.62	1.17	1.78	0.83	0.96	0.90	0.37	0.50	1.18	1.13	1.15	0
mean	6.18	1.26	0.47	1.01	0.51	0.31	0.08	0.58	0.54	1.03	1.58	0.78	0.87	0.82	0.33	0.48	1.11	0.90	1.07	0
SD	0.27	0.05	0.03	0.04	0.02	0.03	0.01	0.05	0.04	0.07	0.10	0.04	0.04	0.05	0.03	0.02	0.06	0.11	0.06	0
Heraeus illitus																				
N = 10																				
min.	5.99	1.25	0.46	0.96	0.48	0.24	0.08	0.53	0.48	0.96	1.42	0.88	1.02	1.07	0.35	0.46	1.12	1.04	1.07	0.35
max.	6.84	1.49	0.55	1.09	0.56	0.32	0.10	0.67	0.59	1.09	1.70	1.04	1.20	1.22	0.43	0.56	1.31	1.20	1.42	0.50
mean	6.55	1.40	0.49	1.00	0.52	0.29	0.90	0.60	0.54	1.02	1.56	0.97	1.11	1.17	0.39	0.51	1.20	1.10	1.21	0.41

Table 1. *Continued*

	TL	HL	POcL	HW	IOcW	IOclW	CL	APLL	PPLL	APLW	PPLW	R1	R2	R3	R4	SCL	PL	BFL	DFL	DFBL
SD	0.27	0.07	0.03	0.04	0.03	0.03	0.01	0.04	0.04	0.04	0.09	0.04	0.07	0.06	0.02	0.03	0.06	0.06	0.09	0.05
***Heraeus inca* sp. nov.**																				
N = 8																				
min.	5.51	0.94	0.53	0.85	0.46	0.26	0.08	0.51	0.51	0.85	1.28	0.70	0.77	0.64	0.29	0.46	1.25	1.04	1.20	0.24
max.	6.56	1.08	0.61	1.01	0.54	0.32	0.10	0.62	0.59	1.04	1.63	0.80	0.86	0.72	0.37	0.53	1.38	1.14	1.28	0.40
mean	6.23	1.02	0.57	0.94	0.50	0.27	0.08	0.59	0.55	0.97	1.50	0.78	0.83	0.67	0.35	0.50	1.30	1.08	1.23	0.34
SD	0.34	0.05	0.02	0.01	0.03	0.02	0.01	0.04	0.03	0.06	0.11	0.03	0.04	0.30	0.03	0.02	0.04	0.04	0.04	0.07
***Heraeus panamaensis* sp. nov.**																				
N = 1																				
	5.61	1.10	0.43	0.90	0.46	0.27	0.06	0.53	0.51	0.85	1.34	0.64	0.72	0.54	0.38	0.34	1.10	0.96	1.09	0.32
***Heraeus similis* sp. nov.**																				
N = 10																				
min.	6.46	1.34	0.53	0.96	0.46	0.27	0.06	0.61	0.51	0.98	1.50	0.86	0.99	1.04	0.32	0.42	1.28	1.14	1.12	0.29
max.	7.32	1.57	0.58	1.09	0.54	0.32	0.13	0.69	0.64	1.15	1.73	1.10	1.22	1.20	0.42	0.59	1.44	1.28	1.34	0.40
mean	6.77	1.45	0.56	1.00	0.50	0.30	0.09	0.65	0.56	1.04	1.58	1.00	1.11	1.11	0.39	0.53	1.35	1.21	1.25	0.34
SD	0.31	0.06	0.02	0.05	0.03	0.02	0.02	0.03	0.04	0.06	0.08	0.07	0.07	0.06	0.03	0.05	0.06	0.05	0.07	0.04
***Heraeus spinosus* sp. nov.**																				
N = 3																				
min.	5.80	1.27	0.43	0.91	0.48	0.22	0.08	0.48	0.51	0.85	1.31	0.64	0.75	0.58	0.35	0.48	1.07	0.98	1.09	0.48
max.	6.27	1.39	0.48	1.01	0.50	0.30	0.10	0.60	0.56	1.01	1.54	0.67	0.83	0.62	0.40	0.55	1.18	1.04	1.13	0.54
mean	6.11	1.34	0.46	0.96	0.49	0.26	0.09	0.53	0.54	0.93	1.45	0.66	0.78	0.60	0.38	0.52	1.14	1.01	1.11	0.51
SD	0.27	0.06	0.03	0.05	0.01	0.04	0.01	0.07	0.03	0.08	0.12	0.02	0.04	0.02	0.02	0.04	0.06	0.03	0.02	0.03
***Heraeus splendens* sp. nov.**																				
N = 3																				
min.	6.65	1.42	0.65	1.01	0.50	0.22	0.10	0.64	0.64	1.01	1.60	0.80	0.94	0.69	0.35	0.51	1.17	1.09	1.23	0.32
max.	7.22	1.66	0.67	1.10	0.53	0.24	0.11	0.69	0.69	1.04	1.66	0.88	0.99	0.70	0.40	0.53	1.39	1.23	1.28	0.38
mean	7.03	1.55	0.66	1.04	0.51	0.23	0.11	0.66	0.66	1.02	1.62	0.83	0.97	0.70	0.37	0.52	1.28	1.16	1.26	0.35
SD	0.33	0.12	0.01	0.06	0.02	0.01	0.01	0.03	0.02	0.02	0.03	0.04	0.02	0.01	0.02	0.01	0.16	0.10	0.03	0.05
***Heraeus tiputini* sp. nov.**																				
N = 10																				
min.	5.51	1.39	0.53	0.85	0.45	0.26	0.06	0.53	0.50	0.85	1.28	0.67	0.72	0.67	0.32	0.43	1.06	0.96	1.06	0.40
max.	6.84	1.70	0.62	1.04	0.53	0.30	0.10	0.61	0.64	1.06	1.62	0.82	0.90	0.88	0.37	0.50	1.22	1.14	1.17	0.51
mean	6.32	1.48	0.58	0.95	0.48	0.28	0.08	0.60	0.56	0.95	1.47	0.76	0.84	0.74	0.34	0.47	1.19	1.06	1.12	0.46
SD	0.39	0.11	0.03	0.05	0.02	0.02	0.01	0.04	0.05	0.06	0.10	0.05	0.06	0.06	0.02	0.02	0.06	0.05	0.03	0.03
***Heraeus alvarengai* sp. nov.**																				
N = 1																				
	4.75	1.06	0.37	0.82	0.26	0.08	0.61	0.37	0.80	1.14	0.72	0.83	0.72	0.42	0.93	0.78	0	0	0	0
***Heraeus apicalis* sp. nov.**																				
N = 2																				
min.	5.51	1.22	0.46	0.82	0.38	0.17	0.08	0.51	0.48	0.83	1.30	0.72	0.84	0.72	0.24	0.43	1.03	0.96	1.10	0.34
max.	5.99	1.30	0.48	0.86	0.43	0.19	0.10	0.56	0.58	0.89	1.42	0.79	0.91	0.72	0.29	0.43	1.13	1.01	1.15	0.34
mean	5.75	1.26	0.47	0.84	0.41	0.18	0.09	0.54	0.53	0.86	1.36	0.76	0.88	0.72	0.26	0.43	1.08	0.98	1.13	0.34
SD	0.34	0.06	0.02	0.03	0.03	0.02	0.01	0.03	0.07	0.04	0.08	0.05	0.05	0.00	0.03	0.00	0.07	0.03	0.03	0.0
***Heraeus bahiensis* sp. nov.**																				
N = 6																				
min.	5.61	1.12	0.37	0.88	0.38	0.22	0.06	0.48	0.45	0.90	1.44	0.78	0.85	0.64	0.32	0.40	0.96	0.88	0.96	0.24
max.	5.99	1.23	0.43	0.93	0.43	0.27	0.08	0.58	0.51	0.98	1.54	0.82	0.91	0.72	0.37	0.51	1.09	0.99	1.09	0.37
mean	5.78	1.19	0.41	0.89	0.42	0.25	0.08	0.52	0.49	0.94	1.46	0.80	0.87	0.69	0.35	0.45	1.03	0.93	1.02	0.30
SD	0.14	0.04	0.02	0.02	0.02	0.02	0.01	0.04	0.02	0.03	0.04	0.01	0.03	0.04	0.02	0.04	0.05	0.04	0.06	0.05
***Heraeus baranowskii* sp. nov.**																				
N = 10																				
min.	4.37	0.94	0.30	0.70	0.35	0.18	0.05	0.42	0.40	0.78	1.20	0.59	0.71	0.64	0.23	0.34	0.77	0.69	0.83	0.23
max.	5.23	1.10	0.40	0.85	0.40	0.26	0.08	0.66	0.58	0.86	1.54	0.78	0.89	0.72	0.35	0.43	0.90	0.91	0.94	0.34
mean	4.92	1.04	0.35	0.79	0.37	0.23	0.06	0.53	0.48	0.80	1.32	0.70	0.80	0.68	0.31	0.39	0.83	0.76	0.89	0.29
SD	0.26	0.06	0.03	0.04	0.02	0.02	0.01	0.08	0.05	0.05	0.12	0.07	0.07	0.04	0.06	0.03	0.04	0.07	0.04	0.03
***Heraeus bolivianus* sp. nov.**																				
N = 1																				
	5.23	1.08	0.43	0.85	0.4	0.26	0.08	0.51	0.48	0.86	1.34	0.77	0.77	0.62	0.29	0.48	1.01	0.84	1.03	0.22
***Heraeus brevirostris* sp. nov.**																				
N = 6																				
min.	5.32	1.15	0.42	0.82	0.43	0.26	0.06	0.51	0.45	0.91	1.39	0.75	0.88	0.70	0.34	0.45	0.98	0.85	0.96	0.19
max.	5.89	1.34	0.50	0.91	0.51	0.32	0.08	0.64	0.64	1.04	1.52	0.86	0.94	0.80	0.38	0.51	1.12	0.94	1.04	0.24
mean	5.70	1.25	0.44	0.88	0.45	0.28	0.08	0.56	0.51	0.96	1.46	0.81	0.91	0.75	0.36	0.47	1.06	0.92	1.01	0.21
SD	0.21	0.07	0.03	0.04	0.03	0.02	0.01	0.05	0.04	0.05	0.05	0.05	0.02	0.04	0.02	0.02	0.05	0.04	0.03	0.02
Heraeus concolor																				
N = 6																				
min.	4.37	0.94	0.29	0.72	0.35	0.19	0.06	0.40	0.37	0.75	1.10	0.56	0.64	0.64	0.24	0.38	0.78	0.62	0.78	0.13
max.	4.94	1.08	0.34	0.82	0.40	0.24	0.08	0.51	0.45	0.88	1.33	0.70	0.78	0.67	0.27	0.40	0.88	0.70	0.86	0.36
mean	4.72	1.00	0.30	0.77	0.38	0.23	0.07	0.46	0.42	0.84	1.26	0.65	0.72	0.65	0.25	0.39	0.83	0.66	0.82	0.22
SD	0.21	0.05	0.02	0.03	0.02	0.02	0.01	0.04	0.03	0.05	0.09	0.05	0.06	0.01	0.01	0.01	0.04	0.03	0.03	0.05
***Heraeus ecuatorianus* sp. nov.**																				
N = 9																				
min.	5.32	0.94	0.4	0.82	0.38	0.22	0.08	0.54	0.42	0.82	1.27	0.74	0.86	0.72	0.26	0.46	1.03	0.96	1.03	0.29
max.	6.46	1.37	0.48	0.93	0.48	0.29	0.10	0.64	0.53	1.03	1.56	0.86	0.96	0.82	0.34	0.55	1.32	1.20	1.20	0.48
mean	5.35	1.21	0.44	0.86	0.42	0.25	0.08	0.57	0.50	0.93	1.43	0.82	0.90	0.78	0.30	0.49	1.11	1.03	1.08	0.39
SD	0.39	0.12	0.02	0.04	0.03	0.02	0.01	0.03	0.05	0.07	0.08	0.04	0.04	0.03	0.03	0.03	0.09	0.07	0.05	0.06
***Heraeus loja* sp. nov.**																				
N = 1																				
	5.89	1.20	0.40	0.93	0.48	0.29	0.08	0.56	0.45	1.02	1.52	0.85	0.96	0.83	0.35	0.46	1.09	0.90	0.96	0.13
***Heraeus mesoamericanus* sp. nov.**																				
N = 11																				
min.	5.51	1.15	0.42	0.82	0.32	0.22	0.08	0.48	0.46	0.84	1.34	0.72	0.77	0.60	0.24	0.46	0.98	0.84	0.98	0.24
max.	6.08	1.25	0.46	0.88	0.46	0.27	0.10	0.53	0.61	0.98	1.58	0.82	0.89	0.67	0.34	0.50	1.08	0.98	1.08	0.43
mean	5.78	1.20	0.44	0.85	0.41	0.25	0.08	0.50	0.53	0.91	1.46	0.75	0.84	0.63	0.29	0.47	1.04	0.91	1.04	0.31
SD	0.18	0.03	0.01	0.02	0.04	0.02	0.00	0.02	0.04	0.04	0.07	0.03	0.03	0.03	0.03	0.02	0.04	0.04	0.03	0.06

Table 1. *Continued*

	TL	HL	POcL	HW	IOcW	IOclW	CL	APLL	PPLL	APLW	PPLW	R1	R2	R3	R4	SCL	PL	BFL	DFL	DFBL
***Heraeus mexicanus* sp. nov.**																				
N = 10																				
min.	4.94	1.04	0.22	0.77	0.37	0.22	0.06	0.43	0.37	0.75	1.23	0.67	0.78	0.64	0.30	0.38	0.88	0.75	0.80	0.16
max.	5.70	1.20	0.40	0.88	0.45	0.29	0.08	0.59	0.51	0.96	1.49	0.78	0.88	0.72	0.37	0.46	1.01	0.88	0.91	0.24
mean	5.37	1.12	0.37	0.84	0.42	0.25	0.07	0.50	0.45	0.88	1.33	0.74	0.83	0.68	0.34	0.42	0.96	0.80	0.87	0.21
SD	0.32	0.05	0.05	0.03	0.02	0.02	0.01	0.05	0.04	0.07	0.11	0.04	0.04	0.03	0.03	0.03	0.05	0.04	0.03	0.03
***Heraeus morganae* sp. nov.**																				
N = 10																				
min.	5.42	1.18	0.38	0.83	0.40	0.22	0.06	0.53	0.48	0.86	1.34	0.75	0.74	0.72	0.29	0.45	0.96	0.88	1.01	0.22
max.	6.37	1.30	0.46	0.93	0.48	0.26	0.08	0.61	0.56	1.09	1.54	0.83	0.94	0.88	0.38	0.51	1.15	1.04	1.12	0.34
mean	5.86	1.22	0.42	0.87	0.43	0.24	0.08	0.57	0.52	0.94	1.46	0.79	0.87	0.77	0.35	0.49	1.10	0.99	1.09	0.28
SD	0.29	0.04	0.02	0.03	0.02	0.01	0.01	0.03	0.03	0.06	0.08	0.03	0.05	0.05	0.03	0.03	0.05	0.05	0.05	0.05
***Heraeus nicaraguensis* sp. nov.**																				
N = 3																				
min.	5.23	1.10	0.43	0.83	0.38	0.22	0.08	0.54	0.46	0.86	1.28	0.70	0.75	0.48	0.29	0.42	0.99	0.80	1.04	0.40
max.	5.89	1.20	0.46	0.93	0.48	0.27	0.08	0.64	0.53	1.04	1.54	0.75	0.80	0.53	0.34	0.50	1.06	0.96	1.15	0.40
mean	5.54	1.16	0.45	0.86	0.42	0.25	0.08	0.59	0.49	0.95	1.41	0.74	0.78	0.50	0.32	0.45	1.03	0.88	1.09	0.40
SD	0.33	0.05	0.02	0.06	0.05	0.02	0.00	0.05	0.03	0.09	0.13	0.03	0.03	0.03	0.03	0.04	0.03	0.08	0.06	0.0
Heraeus pacificus																				
N = 10																				
min.	5.33	1.18	0.36	0.78	0.38	0.24	0.08	0.48	0.05	0.84	1.44	0.68	0.80	0.70	0.28	0.50	0.86	0.64	0.98	0
max.	6.25	1.26	0.40	0.88	0.44	0.30	0.10	0.58	0.58	1.00	1.70	0.82	0.88	0.80	0.40	0.52	1.00	0.80	1.10	0
mean	5.93	1.19	0.39	0.84	0.42	0.26	0.10	0.53	0.53	0.96	1.61	0.76	0.83	0.74	0.32	0.52	0.95	0.74	1.02	0
SD	0.26	0.05	0.01	0.04	0.02	0.02	0.01	0.04	0.02	0.06	0.09	0.04	0.03	0.03	0.05	0.02	0.04	0.04	0.06	0
***Heraeus pallidinervis* sp. nov.**																				
N = 8																				
min.	4.75	1.10	0.38	0.77	0.42	0.24	0.05	0.48	0.32	0.80	1.18	0.67	0.80	0.69	0.30	0.37	0.85	0.75	0.88	0.11
max.	5.61	1.15	0.40	0.86	0.46	0.30	0.08	0.56	0.48	1.10	1.44	0.83	0.96	0.75	0.34	0.46	0.98	0.85	1.02	0.27
mean	5.21	1.13	0.39	0.83	0.45	0.27	0.07	0.52	0.40	0.93	1.33	0.77	0.85	0.72	0.32	0.44	0.91	0.8	0.95	0.17
SD	0.31	0.02	0.01	0.03	0.02	0.02	0.01	0.03	0.05	0.09	0.10	0.05	0.06	0.02	0.01	0.03	0.05	0.03	0.05	0.05
***Heraeus penai* sp. nov.**																				
N = 10																				
min.	5.42	1.18	0.41	0.82	0.41	0.24	0.05	0.48	0.48	0.83	1.31	0.74	0.83	0.74	0.29	0.46	0.96	0.79	0.98	0.17
max.	5.89	1.26	0.46	0.89	0.48	0.29	0.07	0.55	0.53	0.99	1.49	0.83	0.90	0.80	0.35	0.5	1.08	0.91	1.03	0.24
mean	5.68	1.21	0.44	0.86	0.46	0.27	0.07	0.52	0.50	0.92	1.41	0.79	0.88	0.74	0.33	0.47	1.01	0.87	1.01	0.21
SD	0.18	0.03	0.02	0.03	0.03	0.02	0.01	0.03	0.02	0.05	0.07	0.04	0.05	0.03	0.02	0.02	0.04	0.04	0.02	0.03
Heraeus plebejus																				
N = 20																				
min.	4.47	0.96	0.34	0.77	0.37	0.22	0.05	0.43	0.37	0.77	1.10	0.50	0.64	0.46	0.24	0.37	0.77	0.60	0.80	0
max.	5.75	1.16	0.40	0.88	0.46	0.28	0.08	0.56	0.50	1.00	1.62	0.76	0.84	0.60	0.36	0.48	0.96	0.76	0.96	0
mean	5.01	1.06	0.35	0.82	0.40	0.25	0.06	0.49	0.42	0.87	1.33	0.63	0.71	0.51	0.28	0.41	0.85	0.70	0.87	0
SD	0.42	0.05	0.03	0.03	0.03	0.02	0.01	0.03	0.03	0.06	0.12	0.08	0.06	0.04	0.04	0.03	0.05	0.05	0.04	0
Heraeus pulchellus																				
N = 6																				
min.	4.32	0.89	0.26	0.72	0.35	0.21	0.05	0.32	0.35	0.80	1.15	0.56	0.64	0.54	0.19	0.32	0.72	0.58	0.74	0
max.	4.75	0.96	0.29	0.78	0.46	0.24	0.06	0.48	0.46	0.85	1.28	0.59	0.72	0.58	0.24	0.40	0.78	0.64	0.82	0
mean	4.50	0.94	0.28	0.76	0.38	0.23	0.06	0.43	0.40	0.82	1.21	0.58	0.66	0.57	0.23	0.37	0.75	0.62	0.79	0
SD	4.17	0.03	0.01	0.02	0.04	0.01	0.01	0.06	0.04	0.02	0.04	0.02	0.03	0.01	0.02	0.03	0.02	0.03	0.03	0
***Baranowskiobius elegans* comb. nov.**																				
N = 10																				
min.	7.13	1.37	0.38	0.88	0.46	0.21	0.13	0.69	0.58	0.96	1.54	0.69	0.86	0.82	0.45	0.72	1.58	1.39	1.27	0.58
max.	8.27	1.54	0.46	1.15	0.56	0.35	0.19	0.83	0.72	1.18	1.87	0.90	1.09	0.88	0.65	0.88	2.04	1.63	1.54	0.84
mean	7.75	1.44	0.42	1.05	0.50	0.29	0.15	0.74	0.65	1.07	1.70	0.76	0.97	0.86	0.50	0.80	1.72	1.53	1.40	0.68
SD	0.36	0.05	0.02	0.08	0.03	0.07	0.02	0.05	0.04	0.07	0.11	0.06	0.06	0.02	0.05	0.05	0.14	0.12	0.08	0.09
***Baranowskiobius bimaculatus* sp. nov.**																				
N = 10																				
min.	6.94	1.37	0.38	0.91	0.45	0.21	0.11	0.64	0.53	0.90	1.41	0.70	0.85	0.64	0.42	0.70	1.36	1.28	1.33	0.35
max.	8.08	1.90	0.48	1.20	0.61	0.27	0.14	0.88	0.64	1.14	1.75	0.86	0.99	0.77	0.48	0.83	1.62	1.49	1.52	0.64
mean	7.45	1.50	0.44	1.10	0.50	0.25	0.12	0.75	0.59	1.02	1.59	0.78	0.94	0.70	0.45	0.79	1.54	1.37	1.45	0.53
SD	0.37	0.16	0.03	0.08	0.05	0.02	0.01	0.08	0.03	0.08	0.12	0.05	0.06	0.04	0.02	0.04	0.14	0.06	0.07	0.11
***Baranowskiobius muticus* sp. nov.**																				
N = 3																				
min.	6.84	1.37	0.36	1.06	0.54	0.26	0.11	0.70	0.53	0.96	1.46	0.67	0.80	0.64	0.42	0.58	1.36	1.10	1.39	0
max.	7.22	1.39	0.41	1.10	0.51	0.30	0.13	0.77	0.61	1.01	1.57	0.80	0.88	0.67	0.45	0.61	1.47	1.26	1.39	0
mean	7.03	1.38	0.38	1.08	0.52	0.28	0.12	0.74	0.57	0.99	1.53	0.73	0.83	0.65	0.43	0.59	1.40	1.18	1.39	0
SD	0.19	0.01	0.02	0.02	0.02	0.02	0.01	0.03	0.04	0.02	0.06	0.06	0.04	0.02	0.02	0.02	0.06	0.08	0	0
***Paraheraeus eximius* comb. nov.**																				
N = 10																				
min.	7.60	1.66	0.53	1.22	0.56	0.38	0.11	0.85	0.67	1.07	1.66	0.85	1.04	0.99	0.42	0.77	1.75	1.58	1.60	0.60
max.	10.16	1.92	0.65	1.34	0.69	0.46	0.16	0.93	0.83	1.28	2.18	1.04	1.26	1.20	0.66	0.88	2.00	1.80	1.73	0.86
mean	8.78	1.79	0.56	1.27	0.62	0.40	0.14	0.89	0.74	1.22	1.92	0.92	1.13	1.07	0.57	0.82	1.87	1.66	1.67	0.76
SD	0.68	0.09	0.04	0.04	0.04	0.03	0.01	0.03	0.05	0.07	0.14	0.07	0.07	0.06	0.07	0.03	0.06	0.08	0.06	0.12

Abbreviations: APLL, anterior pronotal lobe length; APLW, anterior pronotal lobe width; BFL, basiflagellomere length; CL, collar length; DFL, distiflagellomere length; DFBL, distiflagellomere band length; HL, head length; HW, head width; IOcW, interocular width; IOclW, interocellar width; PL, pedicellus length; POcL, postocular length; PPLL, posterior pronotal lobe length; PPLW, posterior pronotal lobe width; R1, rostral segment-I length; R2, rostral segment-II length; R3, rostral segment-III length; R4, rostral segment-IV length; SCL, scapus length; TL, total length.

Lethierry & Severin, 1894: 191; Van Duzee, 1917: 178–179; Barber, 1918: 75; Blatchley, 1926: 389; Barber, 1928: 175; Barber, 1939: 349, 354; Froeschner, 1944: 640; Torre Bueno, 1946: 64, 69–70; Slater & Hurlbutt, 1957: 73; Scudder, 1957: 155; Sweet & Slater, 1961: 339; Slater, 1964: 1081–1082; Slater, 1972: 149; Slater, 1974: 167, 170; Sweet, 1967: 225; Brailovsky, 1979: 549; Harrington, 1980: 108; Brailovsky, 1981: 219; Froeschner, 1981: 43; Froeschner, 1985: 22; Harrington, 1987: 81; Ashlock & Slater, 1988: 227; Slater & Baranowski, 1990: 130; Baranowski & Slater, 1998: 79; Froeschner, 1999: 244; Baranowski & Slater, 2005: 136; Dellapé 2014: 428, 431; Henry *et al*. 2015: 488, 499.

Diagnosis

The species included in *Heraeus* are recognized by the anteriorly extended collar on the ventral region (Fig. 4A), which is a synapomorphy for the genus. All species have: an elongate head with a postocular region longer than the interocular space; the dorsally narrowed and ventrally broadened collar, extending forwards beneath the head (Figs 1, 4A); and the aedeagus with a bilobed vesica and a simple conjunctiva, showing relatively small spines in most of the species.

Redescription

Head elongate, postocular distance longer than interocular distance. Buccular juncture V-shaped. Juga rounded. Collar narrow dorsally and broadening ventrally, extending forwards beneath the head. Procoxa with a spine. Profemur with two rows of spines ventrally. Mesofemur with or without spines. Protibia without spines or with small denticles or spines. Tibiae with spiniform setae. Corial margin smooth. Clavus with more than three rows of punctures. Mesepimeron emergent. Evaporative area extensive, not restricted to a small portion of metapleuron surrounding the auricle. Male genitalia: aedeagus without spines or with relatively small spines, with two lobes on vesica lateral to the ejaculatory reservoir.

Distribution

The genus is widely distributed from Canada to Argentina, including the West Indies and the Galapagos Islands. Most of its 39 species are distributed on continental areas. *Heraeus plebejus*, *H. guttatus*, and *H. triguttatus* are also found on at least one island of the West Indies, and some species are known only from the West Indies. *Heraeus dominicanus* sp. nov. is only known from the Dominican Republic, *Heraeus steineri* sp. nov. is known from Turks and Caicos Islands, and the islands of the Bahamas, *H. caliginosus* is known from the Dominican Republic and Haiti, *H. hollyae* is known from the Dominican Republic, Haiti, and Antigua Island; *H. pulchellus* is recorded from the Bahamas, Cuba, and the Cayman Islands, and *H. concolor* is recorded from the Dominican Republic, Haiti, Jamaica, Antigua, Saba, and the Nevis islands. *Heraeus pacificus* is known only from the Galápagos islands.

Included species grouped according to external appearance and phylogenetic relationships

The coquilletti group

Heraeus cinnamomeus Barber, 1948
Heraeus coquilletti Barber, 1914
***Heraeus costalis* sp. nov.**
***Heraeus itzelae* sp. nov.**
***Heraeus setosus* sp. nov.**

The caliginosus group

Heraeus caliginosus Slater & Baranowski, 1994
***Heraeus dominicanus* sp. nov.**

The guttatus group

Heraeus guttatus (Dallas, 1852)
Heraeus hollyae Baranowski, 2005
***Heraeus steineri* sp. nov.**
Heraeus triguttatus (Guérin-Méneville, 1857)

The illitus group

***Heraeus annulatus* sp. nov.**
***Heraeus antennalis* sp. nov.**
***Heraeus chamamecinus* sp. nov.**
Heraeus illitus Distant, 1882
***Heraeus inca* sp. nov.**
***Heraeus panamaensis* sp. nov.**
***Heraeus similis* sp. nov.**
***Heraeus spinosus* sp. nov.**
***Heraeus splendens* sp. nov.**
***Heraeus tiputini* sp. nov.**

The plebejus group

***Heraeus alvarengai* sp. nov.**
***Heraeus apicalis* sp. nov.**
***Heraeus bahiensis* sp. nov.**
***Heraeus baranowskii* sp. nov.**
***Heraeus bolivianus* sp. nov.**
***Heraeus brevirostris* sp. nov.**
Heraeus concolor Slater & Baranowski, 1994
***Heraeus ecuatorianus* sp. nov.**
***Heraeus loja* sp. nov.**
***Heraeus mesoamericanus* sp. nov.**
***Heraeus mexicanus* sp. nov.**
***Heraeus morganae* sp. nov.**
***Heraeus nicaraguensis* sp. nov.**
Heraeus pacificus Barber, 1925

***Heraeus pallidinervis* sp. nov.**
***Heraeus penai* sp. nov.**
Heraeus plebejus Stål, 1874
Heraeus pulchellus Barber, 1954

THE *COQUILLETTI* GROUP

Included species: Heraeus cinnamomeus, *H. coquilletti*, *H. costalis* sp. nov., *H. itzelae* sp. nov., and *H. setosus* sp. nov.

Diagnosis
Sparsely pilose species, with head smooth and shiny (except *H. setosus* sp. nov.); ocelli located posteriorly to an imaginary line passing the posterior border of eyes; posterior pronotal lobe and clavus uniformly coloured; corium without pale spots, at most with a small spot restricted to costal margin; evaporative area short, distance from dorsal margin of auricle to dorsal margin of evaporative area shorter than distance from dorsal margin of evaporative area to dorsal margin of metapleura; males with strongly incrassate profemora with one ventral spine much larger than the others and protibiae with a row of small tubercles on inner surface.

HERAEUS CINNAMOMEUS BARBER, 1948
(FIGS 3A, 4A–C, 5A, 6A–D, 7)

Heraeus coquilletti Barber, 1914a: 165–166 (in part); Van Duzee, 1917: 179 (in part); Blatchley, 1934: 8 (in part); Torre Bueno, 1946: 70 (in part).
Heraeus cinnamomeus Barber, 1948: 67; Slater, 1964: 1082; Schaefer, 1972: 812; Harrington, 1980: 108; Ashlock & Slater, 1988: 227.

Diagnosis
Head shiny, contrasting with a dull pronotum and hemelytra. Pronotum and scutellum without erect setae. Distiflagellomere and hemelytra uniformly coloured cinnamon brown. Profemora pale yellowish brown.

Heraeus cinnamomeus and *H. costalis* sp. nov. are the only two species of the *coquilletti* group that have a shiny head, contrasting with a dull pronotum and hemelytra, and the scutellum lacking erect setae. The general colouration of *H. cinnamomeus* is cinnamon brown, with distiflagellomeres and hemelytra uniformly coloured, whereas *H. costalis* sp. nov. is dark brown with the distiflagellomere mostly white and with the apex darker.

Redescription (Fig. 3A)
Paratype ♂

Head: Strongly convex dorsally (Fig. 4A). Colour orange brown, shiny and smooth, with short recumbent and erect setae dorsally. Eyes slightly protruding, not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Labium pale brown with erect setae, extending to mesocoxae. Antennae pale brown, distiflagellomere slightly paler; with short recumbent, semi-erect, and erect setae.

Thorax: Pronotum dull brown, anterior lobe darker; pruinose, punctate (Fig. 4B); collar punctate, delimited posteriorly by a sulcus and a row of punctures, anterior pronotal lobe with punctures more conspicuous posteriorly, posterior pronotal lobe coarsely punctate; anterior and posterior lobes with minute setae. Pleurae brown. Evaporative area short. Scutellum brown, pruinose (Fig. 4C), punctate, with minute recumbent setae. Hemelytra pale brown, pruinose (Fig. 4C), with minute recumbent setae. Corium with a diffuse subapical pale spot; lateral margins slightly concave. Membrane pale brown, veins concolorous. Legs pale brown, coxae and apical third of metafemur, and apex of tibiae, darker (Fig. 5A); with sparse, short, recumbent and erect setae. Tibiae with spiniform setae. Profemur conspicuously incrassate in males; spines on profemur small, except for one much larger spine. Protibia with small tubercles bearing spiniform setae in a row along inner surface.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 6A, B) rounded, anterior margin of dorsal aperture slightly rounded, inner projections projecting posteriorly. Parameres: Figure 6(C, D). Aedeagus: Conjunctiva unspined, vesica with small spines, lobes of vesica strongly sclerotized at base; *processus gonopori* long and slender.

Distribution
Mexico (NEW RECORD) and USA (Fig. 7).

Type material examined
Holotype: ♂, **USA**, Texas, Brownsville, Los Borregos, 5-VI-[19]04, type #58494 (USNM).

Paratypes: 1♂, 1♀, *Tex.[as]*, Brownsville, 15-V-[19]36, J.N. Knull (OSUC); 1♂, Tex., Brownsville, 8-V-[19]36, J.N. Knull (OSUC); 3♀, Los Borregos, Brownsville, 5-VI-[19]04, H.S. Barber (USNM); 1♀, Brownsville, 29-II-[19]36, P.A. Glick (USNM); 1♂, 8–25-V-[19]35, J.N. Knull (USNM); 1♂, 15-V-[19]35, J.N. Knull (USNM); 1♀, 30-V-[19]04, H.S. Barber (USNM); 1♂, 2♀ (USNM); 1♀, Esper Ranch, Brownsville, Brooklyn Museum coll. (USNM); 1♂, 20-V-1030, J.C. Gaines (USNM).

Additional material studied
MEXICO: 1♀, *Mexico*, intercepted at Br. Tex. in plane, #69209, 1-27-50-2072 (USNM); 1♀, Mexico, intercepted at Laredo, Tx., 30-I-[19]43, with tomatoes, #31333 (USNM); 1♀, Mexico, 7-VII-[19]44, tomato fruit, inter-

KEY TO THE SPECIES OF *HERAEUS*

1. Hemelytra nearly uniformly coloured, without a large pale spot at apex of corium (or with a small, pale subapical corial spot, with apex darker; Fig. 3A–E); head smooth (*coquilletti* group)..... 2
– Hemelytra more heterogeneously coloured, often with a large pale spot at apex of corium (Fig. 3F, K); head rugose. 6
2. Pronotum and scutellum with long erect setae..... 3
– Pronotum and scutellum without long erect setae..... 4
3. Distiflagellomere pale brown, with a pale band; hemelytra with only short, recumbent setae (Mexico; Fig. 3D)... ..... ***Heraeus itzelae* sp. nov.**
– Distiflagellomere yellowish brown, without a pale band; hemelytra with long, erect setae (Honduras and Mexico; Fig. 3E)..... ***Heraeus setosus* sp. nov.**
4. Head, pronotum, and hemelytra shiny (Mexico and USA; Fig. 3B)..... *Heraeus coquilletti* Barber, 1914
– Head shiny, contrasting with a dull pronotum and hemelytra..... 5
5. General colouration dark brown; distiflagellomere mostly white, with the apex dark; profemur mostly dark brown (Costa Rica, Honduras, and Nicaragua; Fig. 3C)..... ***Heraeus costalis* sp. nov.**
– General colouration cinnamon brown; distiflagellomere uniformly brown; profemur pale yellowish brown (Mexico and USA; Fig. 3A)..... *Heraeus cinnamomeus* Barber, 1948
6. Hemelytron with a distinct, white, subapical spot on corium and a white mark on apex of membrane; species usually glabrous (*guttatus* and *caliginosus* groups; Fig. 3F–K)..... 7
– Hemelytron with different combination of spots; if subapical corial spot present, shape is irregular and the colour pattern is more complex; species often setose (Figs 15, 25, 36)..... 12
7. Labium extending beyond metacoxae; posterior pronotal lobe with four small pale spots strongly contrasting with dark background (Dominican Republic and Haiti; Fig. 3J)..... *Heraeus caliginosus* Slater & Baranowski, 1994
– Labium extending only to mesocoxae, at most reaching metacoxae; posterior pronotal lobe without four distinct spots..... 8
8. Apical third of metafemur contrastingly dark brown (Fig. 11A, B)..... 9
– Metafemur uniformly pale or brown, if paler basally, not strongly contrasting..... 10
9. Posterior pronotal lobe brown, mottled with paler areas, sometimes forming irregular lines; profemur dark brown with apex usually paler (Central America and Colombia; Figs 3F, 11A)..... *Heraeus guttatus* (Dallas, 1852)
– Posterior pronotal lobe uniformly dark, with two short yellow lines; profemur uniformly dark brown (Antigua, Dominican Republic, and Haiti; Figs 3G, 11B)..... *Heraeus hollyae* Baranowski, 2005
10. Metafemur reddish brown; head smooth; distiflagellomere uniformly brown; males without small spines on protibia and mesofemur (Dominican Republic; Fig. 3K)..... ***Heraeus dominicanus* sp. nov.**
– Metafemur pale; head rugose; distiflagellomere with pale band; males with small spines on protibia and mesofemur. 11
11. Head, pronotum, and most of hemelytra anterior to distal white spot reddish or cinnamon brown; legs brownish yellow (USA and West Indies; Fig. 3H)..... *Heraeus triguttatus* (Guérin-Méneville, 1857)
– Head and anterior pronotal lobe dark brown, posterior pronotal lobe and hemelytra brown anterior to distal spot, mottled with yellow; legs uniformly pale, almost white (Dominican Republic; Fig. 3I)..... ..... ***Heraeus steineri* sp. nov.**
12. Profemur pale brown with dark-brown spots, if predominantly dark brown, the dorsal region clearly pale (*illitus* group; Figs 16, 21)..... 13
– Profemur uniformly dark brown, some species with apex paler (*plebejus* group; Figs 26, 33, 39)..... 22
13. Labium long, extending to metacoxae or beyond..... 14
– Labium shorter, not extending beyond mesocoxae..... 15
14. Strongly setose; metatibiae densely setose, with setae two times the diameter of the segment; labium long, surpassing metacoxae, usually extending to abdominal segment II (Central and South America; Fig. 15D)..... ..... *Heraeus illitus* Distant, 1882
– Less setose; metatibial setae less abundant and shorter; labium shorter, usually extending only to posterior margin of metasternum (Argentina, Bolivia, Brazil, French Guiana, and Peru; Fig. 15G)..... ***Heraeus similis* sp. nov.**
15. Basiflagellomere thickened distally, diameter subequal to or greater than diameter of scape..... 16
– Basiflagellomere slender, diameter less than diameter of scape..... 17
16. Pronotum with a pale inverted V-shaped mark; outer margin of clavus pale (Panama; Fig. 15I)..... ..... ***Heraeus splendens* sp. nov.**
– Pronotum and hemelytra uniformly pale brown, with evenly scattered brown-stained punctures, except for distal white marks (Ecuador; Fig. 15B)..... ***Heraeus antennalis* sp. nov.**

17. Distiflagellomere uniformly brown (Argentina and Brazil; Fig. 15C) ..... ***Heraeus chamamecinus* sp. nov.**
– Distiflagellomere with a distinct white band sub-basally 18
18. Profemur with a distinct subapical brown band (Figs 16A, 21B) 19
– Profemur without a subapical brown band 20
19. Brown dark band on profemur narrow and contrasting (Fig. 16A); apex of pygophore (Fig. 17A–D) rounded, without a small dorsally directed protuberance; aedeagus with lobes sclerotized with a few spines distally (Central America, from Mexico to Panama; Fig. 15A) ..... ***Heraeus annulatus* sp. nov.**
– Brown band on profemur broader and diffuse (Fig. 21B); pygophore with a small dorsally directed protuberance near apex (Fig. 20N); aedeagus with spines on lobes and laterally to the ejaculatory reservoir (Brazil and Ecuador; Fig. 15H) ..... ***Heraeus spinosus* sp. nov.**
20. Profemur irregularly pigmented with brown, metafemoral band subapical, *processus gonopori* long and slender (Panama; Figs 15F, 16F) ..... ***Heraeus panamaensis* sp. nov.**
– Profemur paler dorsally, metafemoral band apical (a few specimens of *H. inca* sp. nov. show a dark band on metafemur instead of being darker distally), *processus gonopori* long, widening towards apex (Fig. 21D) 21
21. Pronotum usually without contrasting dark areas laterally; dorsal anterior margin of aperture of pygophore rounded (Fig. 23E); aedeagus with spines restricted to unsclerotized lobes (Fig. 8I) (Ecuador; Fig. 15J) ..... ***Heraeus tiputini* sp. nov.**
– Pronotum usually with contrasting dark areas laterally; dorsal anterior margin of aperture of pygophore subquadrangular (Fig. 20A); aedeagus with two pairs of lobes, the anterior lobe short, not sclerotized, and with spines; the posterior lobe large, strongly sclerotized posteriorly, with a row of spines (Peru; Fig. 15E) ..... ***Heraeus inca* sp. nov.**
22. Distiflagellomere without a pale band 23
– Distiflagellomere with a pale band 25
23. Antenna uniformly brown; dorsal margin of pygophore in lateral view almost straight and slightly declivent posteriorly (Fig. 40F) (Galapagos Islands; Fig. 36E) ..... *Heraeus pacificus* Barber, 1925
– Antenna brown with apex of basiflagellomere and distiflagellomere darkened; dorsal margin of pygophore in lateral view sinuate and more declivent posteriorly (Fig. 41B, F) 24
24. Small species, less than 5.00 mm; subapical pale spot on corium well defined (West Indies; Fig. 36I) ..... *Heraeus pulchellus* Barber, 1954
– Larger species, over 5.25 mm; subapical pale spot irregular, not well defined (USA and Central America; Fig. 36H). *Heraeus plebejus* Stål, 1874
25. Labial segment IV extending only to mesocoxae 26
– Labial segment IV extending to at least metacoxae 32
26. Metafemoral band apical (Figs 25B, 26B) ..... ***Heraeus apicalis* sp. nov.**
– Metafemoral band subapical 27
27. Pale band on distiflagellomere short, about one-quarter of segment length (Argentina and Bolivia; Fig. 25F) ..... ***Heraeus brevirostris* sp. nov.**
– Pale band on distiflagellomere longer, occupying at least one-third of segment length 28
28. Membranae with whitish apical spot 29
– Membranae without whitish apical spot 31
29. Anterior margin of dorsal aperture of pygophore rounded (Fig. 34I) (Costa Rica and Mexico; Fig. 36B) ..... ***Heraeus mexicanus* sp. nov.**
– Anterior margin of dorsal aperture of pygophore almost straight (Figs 27I, 40A) 30
30. Dark species; head blackish; posterior lobe of pronotum dark brown, with four longitudinal pale stripes (Nicaragua and Costa Rica; Fig. 36D) ..... ***Heraeus nicaraguensis* sp. nov.**
– Pale species; head dark reddish brown; posterior lobe of pronotum pale brown with four difuse longitudinal pale stripes (Brazil; Fig. 25C) ..... ***Heraeus bahiensis* sp. nov.**
31. Apex of pygophore broadly rounded posteriorly in dorsal view (Fig. 32A); outer projection of paramere not conspicuous (Fig. 32C, D) (Bolivia; Fig. 25E) ..... ***Heraeus bolivianus* sp. nov.**
– Apex of pygophore acutely rounded posteriorly in dorsal view (Fig. 34E); outer projection of paramere conspicuous (Fig. 34G, H) (Central America; Fig. 36A) ..... ***Heraeus mesoamericanus* sp. nov.**
32. Ocelli located anterior to an imaginary line passing through posterior margin of eyes; pygophore with a conspicuous protuberance at posterior margin pointed dorsally (Fig. 27B) (Brazil; Fig. 25A) ..... ***Heraeus alvarengai* sp. nov.**
– Ocelli located at level of an imaginary line passing through the posterior margin of eyes; pygophore without a dorsally directed protuberance at posterior margin, but if present, smaller and indistinct 33
33. Pale band on distiflagellomere narrow, less than one-third length of segment 34
– Pale band on distiflagellomere broader, more than one-third length of segment 36

34. Metafemur with a broad, subapical, dark band (Fig. 39C); pygophore in lateral view abruptly declivent posteriorly (Fig. 40J) (Bolivia and Brazil; Fig. 36F)……***Heraeus pallidinervis* sp. nov.**
– Metafemur with a narrower subapical and well-defined dark band (Figs 33C, 39D); pygophore in lateral view slightly declivent posteriorly (Figs 34B, 40N)……35
35. Inner projections of pygophore subquadrangular and slightly projecting posteriorly (Fig. 40M) (Argentina, Bolivia, and Paraguay; Fig. 36G)……***Heraeus penai* sp. nov.**
– Inner projections of pygophore narrow, elongate, and strongly projecting posteriorly (Fig. 34A) (Ecuador; Fig. 25I)……***Heraeus loja* sp. nov.**
36. Metafemur with a narrow subapical dark band (Fig. 26D); pygophore projecting posteriorly and dorsally directed (Fig. 27N) (Belize and Mexico; Fig. 25D)……***Heraeus baranowski* sp. nov.**
– Metafemur with a broader subapical dark band (Fig. 33A, B, F); pygophore not projecting posteriorly nor pointed dorsally (Figs 32J, N, 34N)……37
37. Small species, less than 5 mm long; pygophore with inner projections of dorsal aperture subquadrangular (Fig. 32I) (Dominican Republic and Haiti; Fig. 25G)……*Heraeus concolor* Slater & Baranowski, 1994
– Larger species, over 5 mm long; pygophore with inner projections of dorsal aperture elongate, not subquadrangular (Figs 32M, 34M)……38
38. Pygophore rounded; with inner projections of dorsal aperture subtriangular, not well delimited anteriorly (Fig. 32M); parameres with inner projection narrow (Fig. 32O, P) (Ecuador; Fig. 25H)……***Heraeus ecuatorianus* sp. nov.**
– Pygophore declivent and truncate posteriorly in lateral view (Fig. 34N); inner projections of dorsal aperture elongate, well delimited anteriorly (Fig. 34M); parameres with inner projection broad (Fig. 34O, P) (Panama; Fig. 36C)……***Heraeus morganae* sp. nov.**

cepted at Brownsville #59250 (USNM); 1♂, Mexico, in plane, 28-X-[19]41, intercepted at Brownsville, Tx (USNM). *Chihuahua*: 1♀ Salaices, 5200 ft, 20-VIII-1947, G.M. Bradt (AMNH); *San Luis Potosi*: 1♂, Tamazunchales, intercepted at Laredo, Tx., 10-X-1957, with orchid plants (USNM); 2♂, El Salto Falls, 2000–2500 ft, 22-IV-[19]65, in blacklight trap, H.V. Weems (USNM); *Sinaloa*: 1♀, 43 mi. N Mazatlan, 27-VII-1952, J. Lattin (AMNH); Tamaulipas, 1♂, paratype [this is not a paratype], C[iudad] Victoria, 31-III-1951, J. Lattin (AMNH); 1♀, Guemes, 28-VI-1965, collected at blacklight, P.J. Spangler (USNM); 1♂, El Salto Falls, 26 mi. W Antiguo Morelos, 2000 ft, 11/14-VII-1963, Duckworth & Davis (USNM); 1♀, Victoria, intercepted at Br. TX #68098, 14-VI-[19]49, avocado budwood (USNM); Nuevo Leon, 35♂, 31♀, two without abdomen, anegade arroya, 16 mi. S Linares, N.L., 1250 ft, 9-VII-1963, Duckworth & Davis (USNM); 1♀, Linares, Rio Camacho, 21/22-VI-1965, O.S. Flint (USNM); 5♂, 4♀, 31 mi. E Galeana, 5000 ft, 7/9-VIII-1963, Duckworth & Davis (USNM); *Jalisco*: 1♀, Chamela, Station UNAM, 6/7-IX-1984, D. & B. Sigwalt (MNHN).

USA: *Texas*: 9♂, 11♀, Brownsville, X-[19]42, E.S. Ross (CAS); 4♂, 7♀, X-[19]42, E.S. Ross, at light (CAS); 6♂, 14♀, 16-IX-[19]42, T.M. Burns (CAS); 1♀, Hidalgo Co., 24-III-[19]54, D.J. & J.N. Knull (OSUC); 3♂, 2♀, Weslaco, 11-X-1930, S.W. Clark (CNC); 1♂, 1♀, Brazos Co., N. Banks (AMNH); 1♂, Brownsville, 11/16-VI-[19]33, Darlington (AMNH); 1♀, SE Hidalgo Co., 28-IV/4-V-[19]46, at light, G.B. Vogt (USNM); 1♀, 26/31-VII-[19]46 (USNM); 1♀, 29-VIII-[19]47 (USNM); 1♀, 1/5-X-[19]47 (USNM); 1♀, 6-IV-[19]46, beating flwrs and foliage of *Prosopis juliflora* Swartz de Candolle (USNM). 1♂, Canal Z. **[PANAMA]** or **GUATEMALA**, 7-IX-[19]42, intercepted at Brownsville, Tx. (USNM).

Heraeus coquilletti Barber, 1914
(Figs 3B, 4D–E, 5B, 6E–H, 7, 8A)

Heraeus coquilletti Barber, 1914a: 165–166 (in part); Van Duzee, 1916: 21 (in part); Van Duzee, 1917: 179 (in part); Blatchley, 1934: 8 (in part); Torre Bueno, 1946: 70 (in part); Slater, 1964: 1082; Harrington, 1980: 108; Ashlock & Slater, 1988: 227–228; Slater & Brailovsky, 2000: 332.

Heraeus nitens Van Duzee, 1914: 8–9 (synonymized by Van Duzee, 1916).

Diagnosis

Heraeus coquilletti can be easily distinguished from all other species of the genus by the shiny head, pronotum, and hemelytra with minute setae. In addition, the distiflagellomeres and hemelytra are uniformly brown and the aedeagus has minute spines on conjunctiva and vesica.

Redescription

Body shiny, with minute setae on head, pronotum, scutellum and hemelytra (Fig. 3B).

Head: Strongly convex dorsally, orange–brown, smooth, with sparse short recumbent setae. Head transversely rugose ventrally. Eyes slightly protruding, small (larger in specimens from Mexico), not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing through posterior border

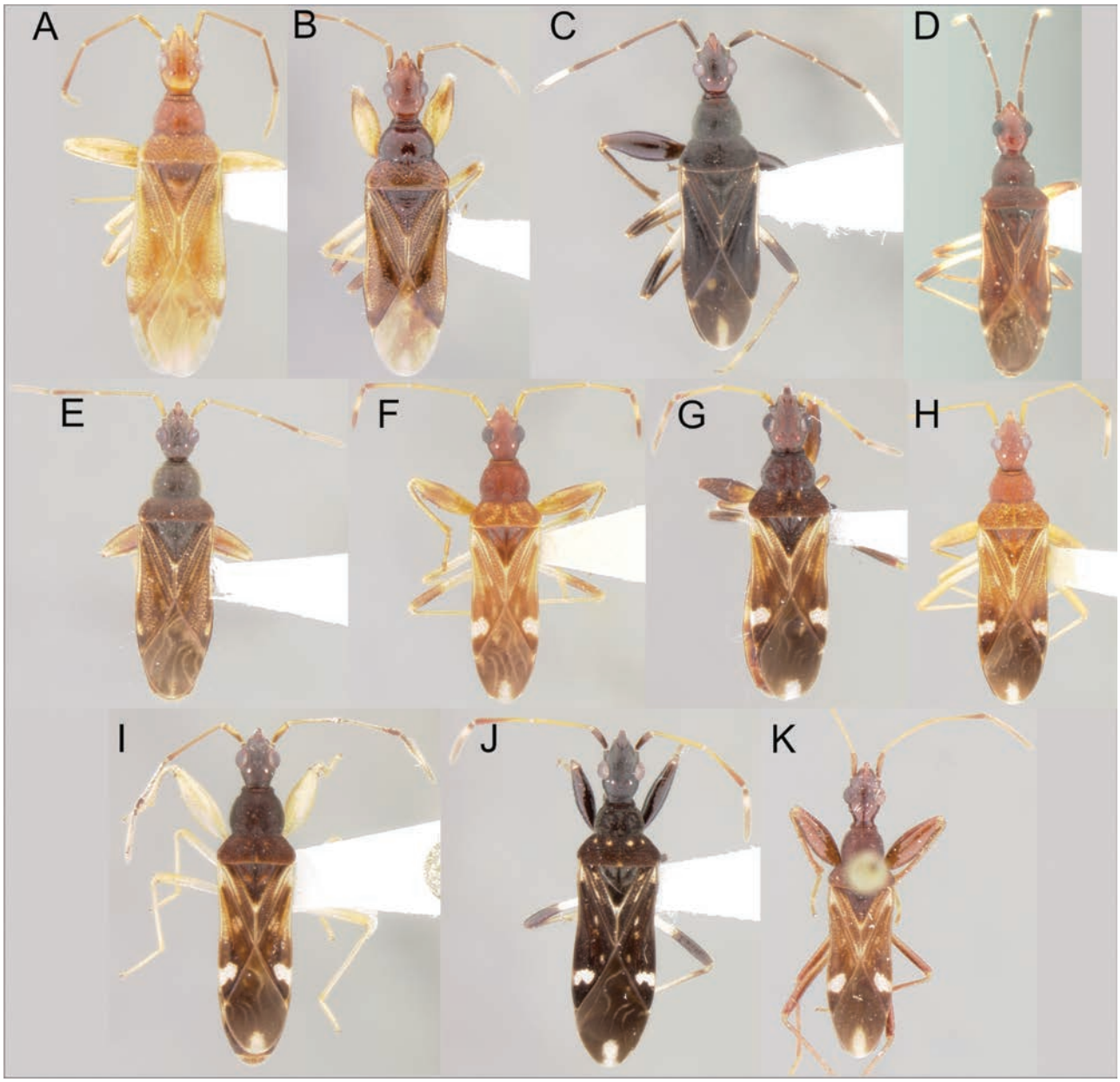

Figure 3. Habitus dorsal: A, *Heraeus cinnamomeus* Barber, 1948; B, *Heraeus coquilletti* Barber, 1914; C, ***Heraeus costalis* sp. nov.**; D, ***Heraeus itzelae* sp. nov.**; E, ***Heraeus setosus* sp. nov.**; F, *Heraeus guttatus* (Dallas, 1852). G, *Heraeus hollyae* Baranowski, 2005. H, *Heraeus triguttatus* (Guérin-Méneville, 1857); I, ***Heraeus steineri* sp. nov.**; J, *Heraeus caliginosus* Slater & Baranowski, 1994; K, ***Heraeus dominicanus* sp. nov.**

of eyes. Labium pale brown with short erect setae, extending to mesocoxae. Antennal tubercles divergent. Antennae pale brown, with short recumbent and scattered erect setae, basiflagellomere and distiflagellomere darker, with more abundant setae.

Thorax: Pronotum dark orange–brown, smooth (Fig. 4D); posterior lobe paler than anterior lobe; punctate, punctures more conspicuous and abundant on posterior lobe; anterior lobe with sparse, minute, erect setae. Pleurae orange–brown. Evaporative area short. Scutellum orange–brown, punctate. Hemelytra shiny, smooth (Fig. 4E), pale brown, with abundant punctures. Membrane smoky pale brown. Legs: Coxae orange–brown, femora, tibiae, and tarsi pale brown, except apex of each tibia darker, meso- and metafemur slightly darkened apically (Fig. 5B). Male profemur strongly enlarged with two rows of spines along ventral region, four spines from the apex on posterior row longer and

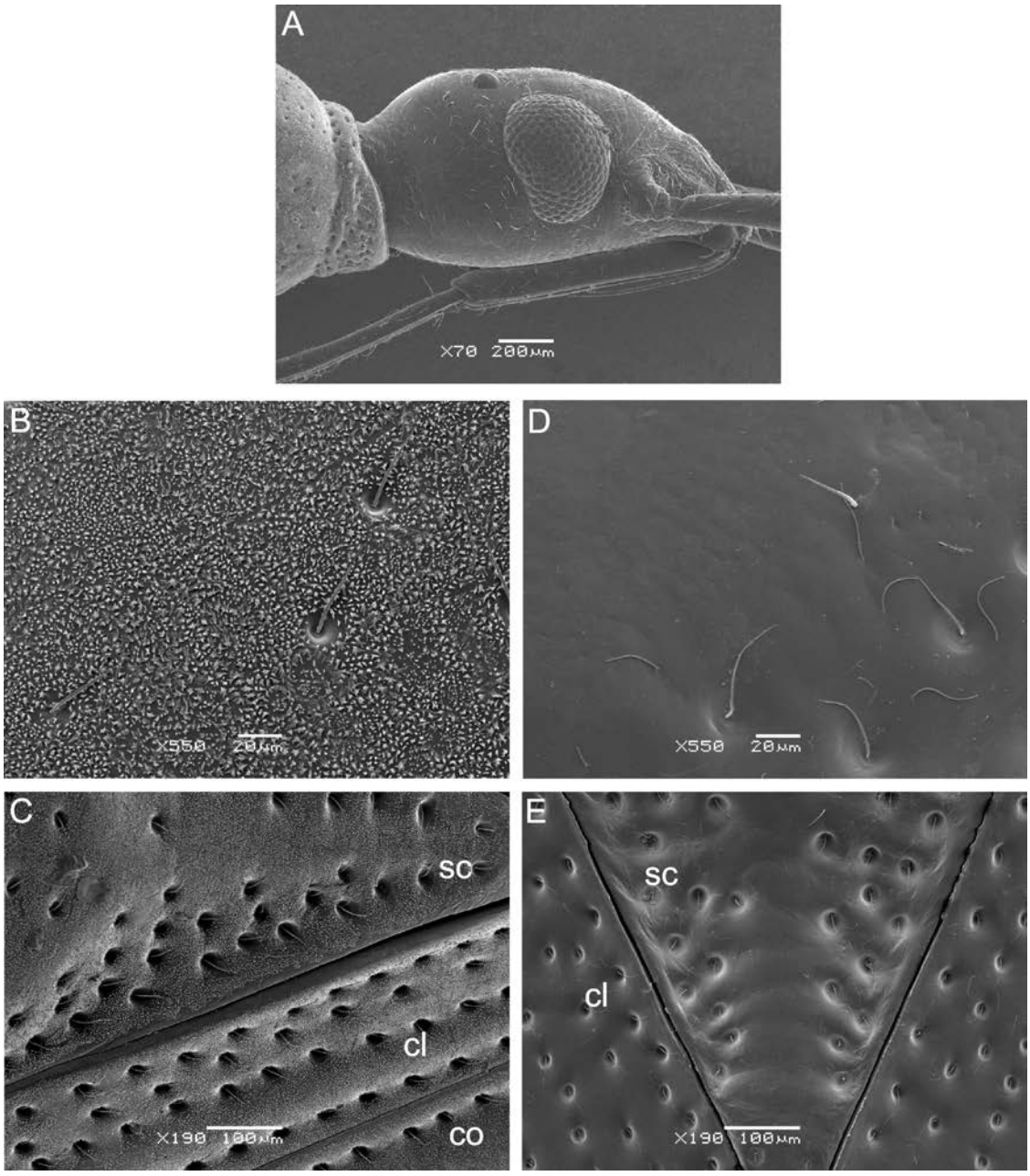

Figure 4. *Heraeus cinnamomeus* Barber, 1948: A, head and pronotal collar, lateral view; B, detail of pruinosity on anterior pronotal lobe; C, detail of pruinosity of part of scutellum and clavus. *Heraeus coquilletti* Barber, 1914: D, detail of texture of anterior pronotal; E, detail of texture of part of scutellum and clavus. Abbreviations: cl, clavus, co, corium; sc, scutellum.

curved anteriorly, with short and sparse setae. Protibia with numerous small tubercles, metatibia with spiniform setae.

Abdomen: Orange–brown with short sparse recumbent setae. Male genitalia: Pygophore (Fig. 6E, F) rounded, anterior margin of dorsal aperture rounded, inner projections subrectangular. Parameres: Figure 6(G, H). Aedeagus (Fig. 8A): conjunctiva with a few minute spines laterally; lobes of vesica slightly sclerotized, with a few minute spines laterally and distally; *processus gonopori* long and slender.

Distribution

Mexico and USA (Fig. 7).

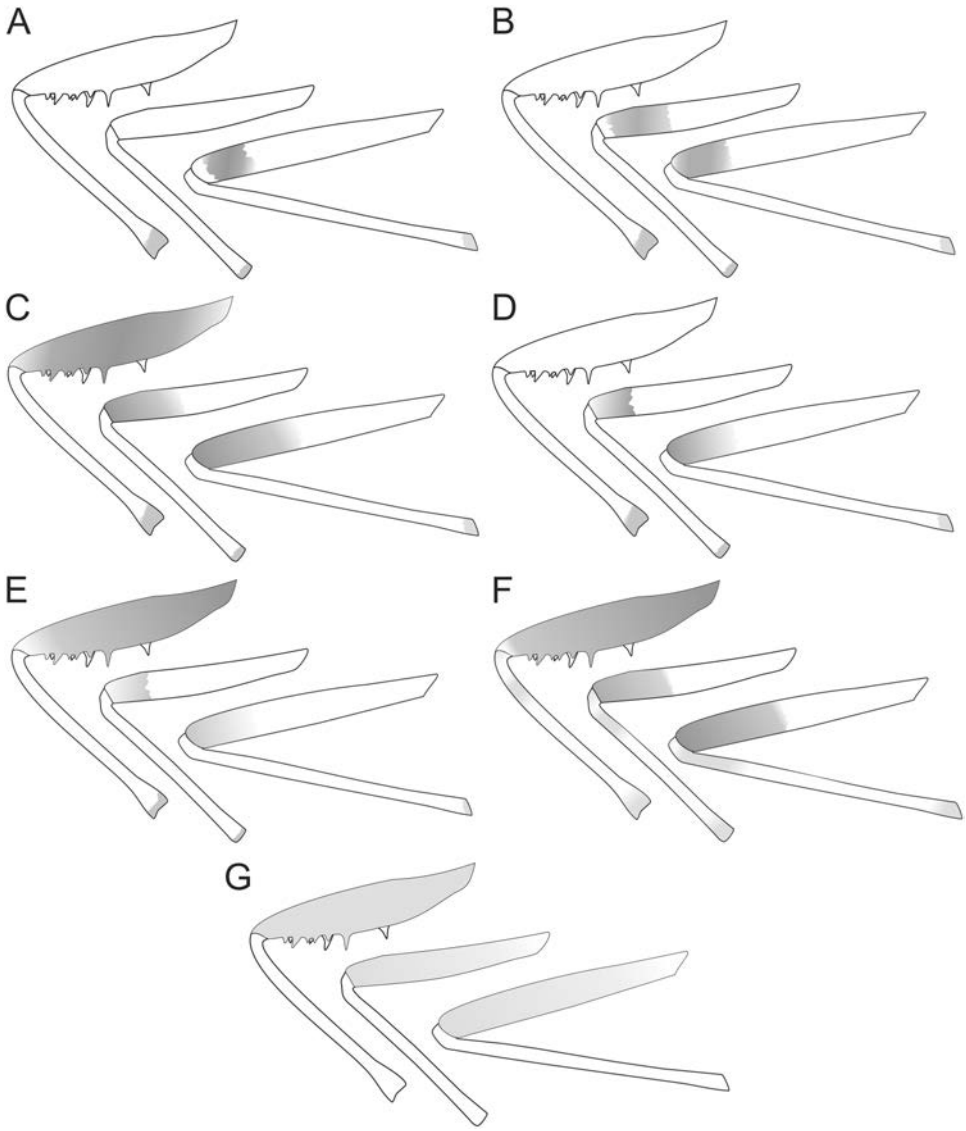

Figure 5. Legs: A, *Heraeus cinnamomeus* Barber, 1948; B, *Heraeus coquilletti* Barber, 1914; C, ***Heraeus costalis* sp. nov.**; D, ***Heraeus itzelae* sp. nov.**; E, ***Heraeus setosus* sp. nov.**; F, *Heraeus caliginosus* Slater & Baranowski, 1994; G, ***Heraeus dominicanus* sp. nov.**

Remarks

Barber (1914a) based his original description on two males and two females from Standford University, California (Nathan Banks Collection), and a female from Brownsville, Texas, USA, that was referred to as *H. cinnamomeus* by Barber (1948).

Type material examined

To ensure nomenclatural stability, we select a male syntype in the USNM collection with the following labels as the lectotype of *H. coquilletti*: Label 1, 'Stan[ford] U[.], Cal[.], 24 Dec 1909'; 2 (red) 'Cotype'; 3, 'H.G. Barber Collection'; 4 (handwritten), '*Heraeus coquilletti* Barber[,]♂[,] Cotype'; 5 (red, here added), Lectotype: ♂, *Heraeus coquilletti* Barber, desig. by Dellapé, Melo, & Henry'. A female labelled as co-type, also in the USNM collection, and a male (missing the head) in the AMNH collection with the same locality data are considered paralectotypes.

Additional material studied

MEXICO: *Baja California*: 1♀, Santo Tomás, 8-VII-1953, W.J. & J.W. Gertsch (AMNH); 1♀, Mexico, *Brassica* sp., 18-II-2003, San Diego 030359, Miami Port, March 2007 (USNM); *Sinaloa*: 1♂, 40 mi. N Mazatlan, 27-VII-1952, at light, J.D. Lattin (AMNH); 8♂, 10♀, 26 mi. N Pericos, 13-VIII-1960, P.H. Arnaud Jr, E.S. Ross & D.C. Reutz (CAS); 1♂, 1♀, Mazatlan, 27-VI-1918, Venedio, J.A. Kusche, pres. by B. Preston Clark (CAS); 1♂, 2♀, 1-VI-1918, J.A. Kusche, pres. by B. Preston

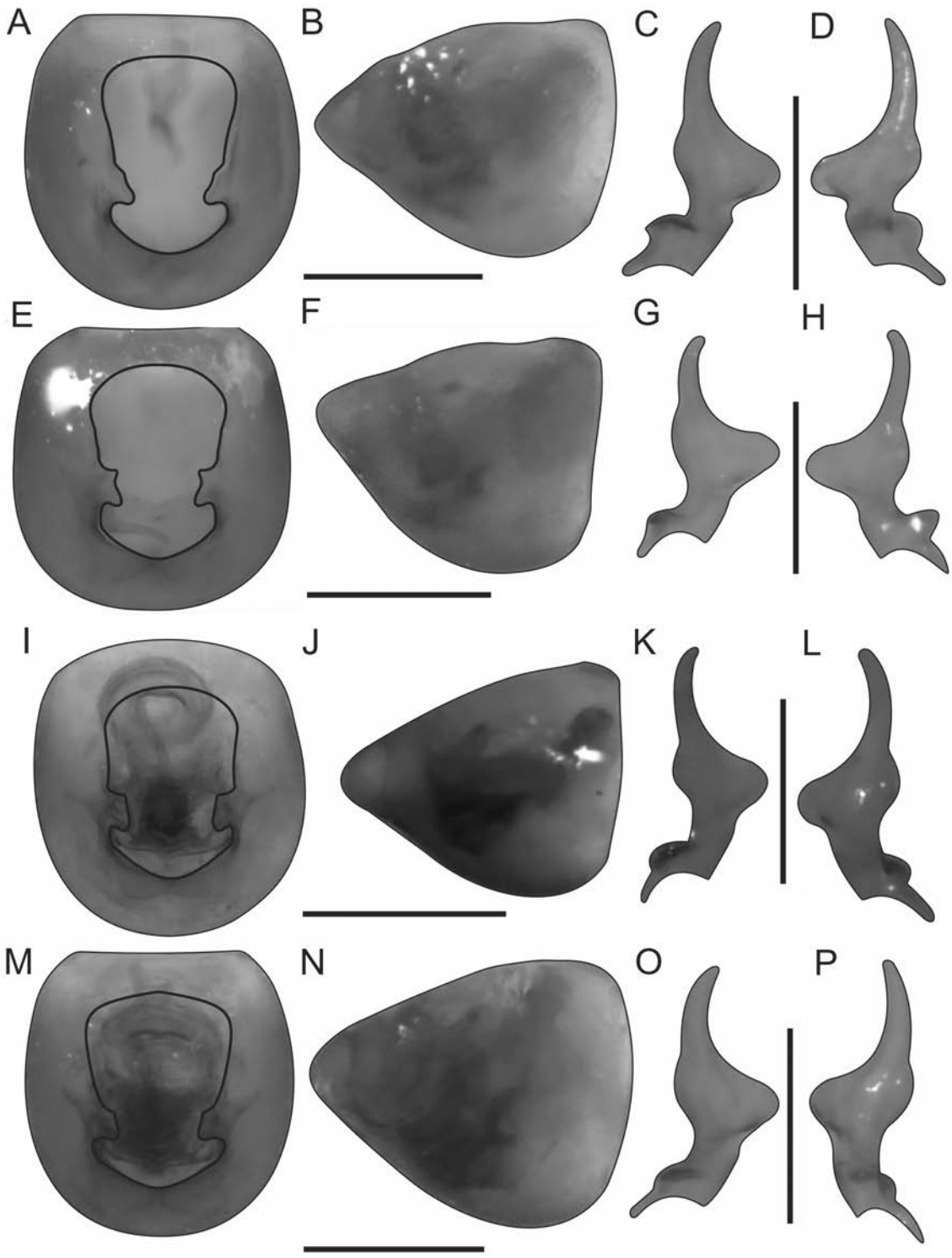

Figure 6. Male genitalia. *Heraeus cinnamomeus* Barber, 1948: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. *Heraeus coquilletti* Barber, 1914: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus costalis* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus itzelae* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

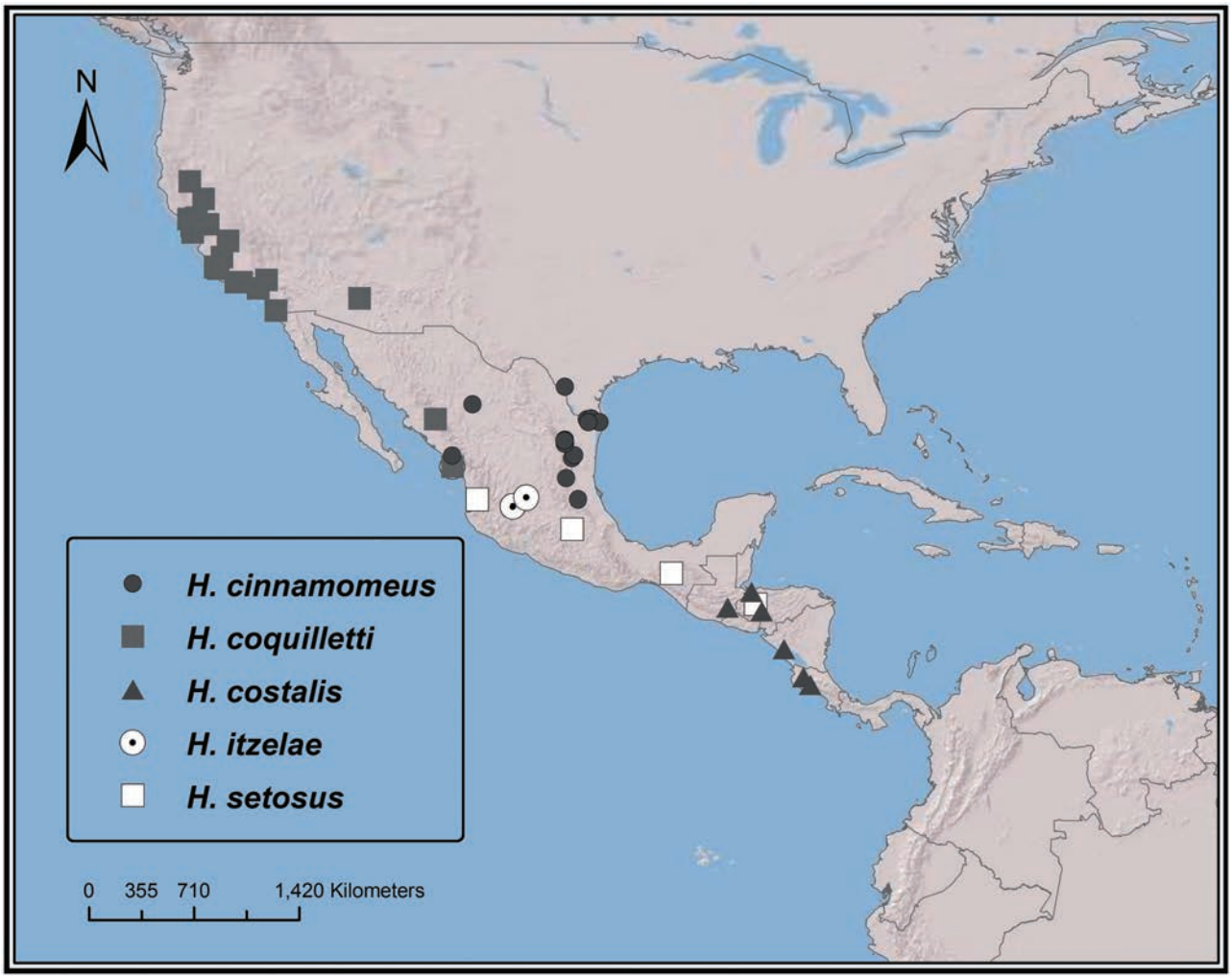

Figure 7. Distributional map of *Heraeus cinnamomeus* Barber, 1948, *Heraeus coquilletti* Barber, 1914, ***Heraeus costalis* sp. nov.**, ***Heraeus itzelae* sp. nov.**, and ***Heraeus setosus* sp. nov.**

Clark (CAS); 1♂, 5-VI-1918, J.A. Kusche, pres. by B. Preston Clark (CAS); 2♂, Presidio Riv., 26-IX-[19]18, J.A. Kusche (USNM).

USA: *Arizona*: one without abdomen, Phoenix (USNM); *California*: 2♂, Claremont, Baker (CAS); 1♀, San Joaquin Co., 9 mi. E Stockton, 10-VIII-1971, *Chenopodium*, D. Shepard, (AMNH); 1♂, 2♀, Oakland, Alameda Co., 25-II-1906, van Dyke (CAS); 1♀, Alameda Co., van Dyke (CAS); 1♀, van Dyke (CAS); 1♂, Burbank, 22-II-1930, C.H. Hicks, (USNM); 1♀, 24-VIII-1930 (USNM); 1♀, Leona Hgts, Alameda, Aug., J.C. Bradley (CAS); 1♂, Alameda, Nov., Koebele (CAS); 1♂, 1♀, S Sonoma Co., 18-II-1911, van Dyke (CAS); 1♀, Sonoma Co., VI-1919, J.R. de la Torre Bueno (CAS); 1♂, 1♀, Sonoma Co., C. Olsen (AMNH); 2♂, Berkeley, 15-I-1922, pres. by E.C. van Dyke (CAS); 1♀, Redwood City, 1-I-1943, P.H. Arnaud (CAS); 1♂, 1♀, San Mateo Co., 8-I-1944, P.H. Arnaud, 20–161 (CAS); 1♂, 8-I-1944, P.H. Arnaud, 20–161 (USNM); 1♀, Oroville, 13-VII-1926, H.H. Kelfer (CAS); 1♀, Fairfax, 9-III-1919, E.P. Van Duzee (CAS); 1♂, Redding, Shasta Co., 31-VII-1947, elev. 500, H.P. Chandler (CAS); 6♂, 3♀, San Luis Obispo, 28-IV-1919, E.P. van Duzee (CAS); 1♂, Morro beach, 6-IV-1928, pres. by E.R. Lesch (CAS); 1♂, 2♀, Morro, S.L. Ob. Co., 20-XII-1928, pres. by E.C. van Dyke (CAS); 2♀, Romero Canyon, San Ysidro, 3-I-[19]11, W.M. Wheeler & H.M. Parshley (CAS); 1♀, 3-I-[19]11, W.M. Wheeler & H.M. Parshley, V.D. no. 529 (CAS); 1♂, Ojai, Ventura Co., 16-VI-1957, W.E. Simonds, (AMNH); 1♀ Madera, VI-22-[19]59, C.A. Toschi (AMNH); 2♂, 1♀ Sonoma Co., C.E. Olsen (AMNH); 1♂, H.G. Barber (USNM); 1♀, Vacaville, 6-IX-[19]47, A.T. McClay (USNM); 1♀ Monterrey Co., 4.5 mi. N Parkfield, el. abt 2000 ft, IV-2-1977, K.W. Brown, R.E. Somerby (AMNH); 4♂, 5♀, Los Angeles, Coquillett (USNM); 3♂, Los Angeles, P.R. Uhler (USNM); 3♂, 5♀, San Diego, 30-I, Hubbard

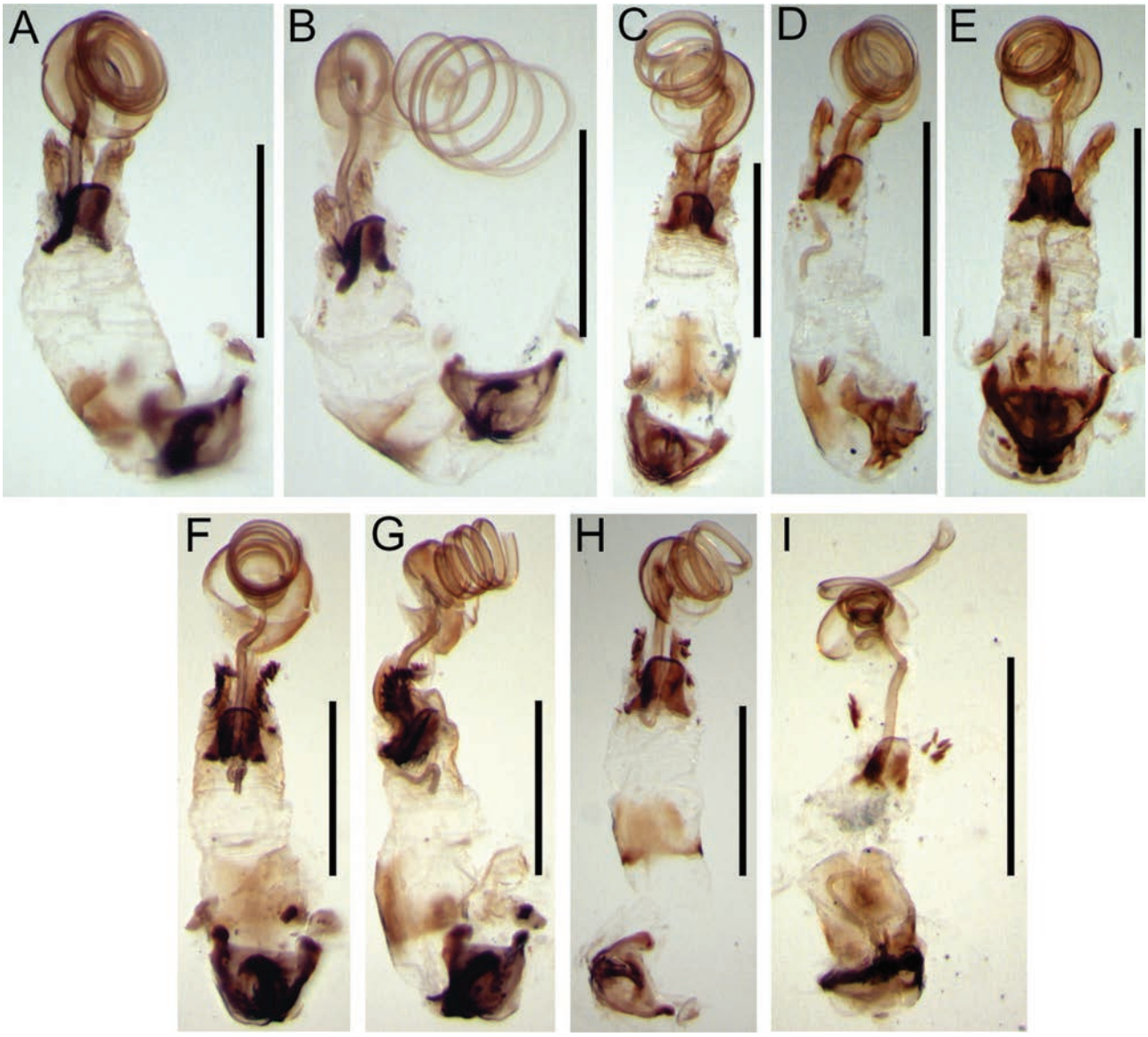

Figure 8. Aedeagus. A, *Heraeus coquilletti* Barber, 1914; B, ***Heraeus costalis* sp. nov.**; C, ***Heraeus setosus* sp. nov.**; D, *Heraeus caliginosus* Slater & Baranowski, 1994; E, *Heraeus guttatus* (Dallas, 1852); F, ***Heraeus chamamecinus* sp. nov.**, anterior view; G, ***Heraeus chamamecinus* sp. nov.**, lateral view; H, *Heraeus illitus* Distant, 1882; I, ***Heraeus tiputini* sp. nov.**

(USNM); 1♀, 11-III-[19]14, E.P. Van Duzee (USNM); *New Mexico*: 1♂, Sandoval Co., San Ysidero, IX-1967, Wilton Ivie (AMNH).

HERAEUS COSTALIS SP. NOV.

(FIGS 3C, 5C, 6I–L, 7, 8B)

Diagnosis

Head shiny, contrasting with dull pronotum and hemelytra. Distiflagellomeres mostly white, with apex darker. Scutellum without erect setae. Profemur mostly dark brown.

Heraeus costalis sp. nov. and *H. cinnamomeus* are the only species of the *coquilletti* group that have a shiny head, contrasting with a dull pronotum and hemelytra, and the scutellum lacking erect setae. The general colouration of *H. costalis* sp. nov. is dark brown, with the distiflagellomere mostly white with the apex darker, whereas the general colouration of *H. cinnamomeus* is cinnamon brown, with distiflagellomere and hemelytra uniformly coloured.

Description

Total length 6.27 (Fig. 3C).

Head: Convex dorsally, dark reddish brown, shiny, smooth, with short recumbent and long, erect setae.

Head length 1.34, width 0.91. Postocular length 0.48. Eyes with setae between ommatidea; not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Interocular width 0.46, interocellar width 0.27. Labium pale brown with erect setae, extending to mesocoxae. Labial segment lengths: I 0.93, II 0.96, III 0.88, and IV 0.37. Antennae brown, except scapus darker and distiflagellomere paler with a broad diffuse subbasal yellowish band, and abundant short recumbent and sparse erect setae. Antennal lengths: scape 0.62, pedicel 1.26, basiflagellomere 0.94, and distiflagellomere 1.30. Length of pale band on distiflagellomere 0.72.

Thorax: Pronotum pruinose, with sparse, short, recumbent, and erect setae. Pronotum dark brown; anterior lobe darker; humeral angles with a small pale spot. Pronotum more conspicuously punctate on posterior lobe. Collar length 0.07, anterior lobe length 0.86, posterior lobe length 0.48; anterior lobe width 0.98, posterior lobe width 1.50. Pleurae dark brown, acetabular areas reddish brown; punctate, with short recumbent setae. Evaporative area short. Scutellum dark brown, pruinose, punctate, with short recumbent setae. Hemelytra pruinose, with short recumbent setae. Hemelytron brown, claval commisure and about apical half of inner margin of clavus, base of corium, anterior three-quarters of lateral margins, and a small subapical spot yellowish; apex of corium and adjacent area of membrane pale, membrane pale brown with a diffuse pale apical spot, veins concolorous. Legs: Coxae and protrochanters reddish brown; profemur reddish brown, except base and apex paler; meso- and metafemur bicoloured, base yellowish and apex brown; tibiae and tarsi pale brown, apex of tibiae darker (Fig. 5C). With sparse, short, semi-erect setae. Profemur conspicuously incrassate, spines on profemur small except for one spine contrastingly larger. Protibia with small tubercles bearing spiniform setae on inner surface.

Abdomen: Reddish brown; with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 6I, J) rounded, anterior margin of dorsal aperture slightly rounded, inner projections subquadrangular; declivent posteriorly in lateral view. Parameres: Figure 6(K, L). Aedeagus (Fig. 8B): conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with a few minute spines laterally and two sclerotized lobes with a few minute spines distally; *processus gonopori* long and slender.

Distribution

Costa Rica, Guatemala, Honduras, and Nicaragua (Fig. 7).

Etymology

This species is named '*costalis*' to denote the pale costal margin of the hemelytra.

Type material

Holotype: ♂, **COSTA RICA**, Las Canas, 13-VII-1965, P.J. Spangler (USNM).

Paratypes: 10♂, 20♀, same data as for holotype (USNM); 1♂, 1♀, same data as for holotype (MLP); 1♀, same data as for holotype (UKANS); 1♀, 9 mi. NW Esparta, 22-VII-1965, P.J. Spangler (USNM). **GUATEMALA:** 1♂, Los Amates, J.S. Hine (OSUC). **HONDURAS:** 1♀, intercepted at Atlanta (Georgia) from Honduras, 5-III-1999, on *Cucurbita moschata* (USNM); 1♂, intercepted at Miami (Florida) from Honduras, 3-I-2005, on *Cucumis sativus* (USNM); 1♀, intercepted at West Palm Beach (Florida) from Honduras, 19-IV-1993, on *Cucurbita* sp. (USNM); *Comayagua*: 2♀, 6-VI-[19]66, J.M. Matta (USNM); 1♂, 13-IV-[19]66, mosquito trap (USNM); 1♂, Tegucigalpa, M. Mojica, 62–6225 (USNM). **NICARAGUA:** 1♂, intercepted at Ft. Lauderdale (Florida) from Nicaragua, 21-II-1996 on *Citrullus lanatus* (USNM); one without abdomen, intercepted at Ft. Lauderdale (Florida) from Nicaragua, 28-III-1994 on *Allium cepa* (USNM); 1♀, Altamira, Managua, IX-1970, E. Moore (USNM).

HERAEUS ITZELAE SP. NOV.

(FIGS 3D, 5D, 6M–P, 7)

Diagnosis

Antenna with a pale band on distiflagellomere, pronotum with long, erect setae on anterior lobe, and hemelytra with only short recumbent setae.

Heraeus itzelae sp. nov. and *H. setosus* sp. nov. have long erect setae on pronotum and scutellum. The distiflagellomere of *H. itzelae* sp. nov. has a pale band, and the hemelytra have only short recumbent setae; the distiflagellomere of *H. setosus* sp. nov. lacks a pale band and the hemelytra possess erect setae similar to those on the pronotum and scutellum.

Description

Total length 7.03 (Fig. 3D).

Head: Strongly convex dorsally, orange brown, shiny, smooth, with long erect and short recumbent setae. Head length 1.03, width 0.96. Postocular length 0.38. Eyes slightly protruding, not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Interocular width 0.51, interocellar width 0.30. Labium pale brown with short erect setae, extending to mesocoxae. Labial segment lengths: I 0.98, II 1.04, III 0.88, and IV 0.40. Antennal tubercles slightly divergent. Antenna pale brown, except for darker scapus, with abundant semi-erect and sparse erect setae; distiflagellomere with a wide pale band. Antennal

lengths: scape 0.67, pedicel 1.33, basiflagellomere 1.04, and distiflagellomere 1.28. Length of pale band on distiflagellomere 0.53.

Thorax: Pronotum pruinose, brown, punctate, posterior lobe with more abundant and larger punctures, and sparse short, recumbent setae; anterior lobe with long erect setae. Collar length 0.13, anterior lobe length 0.75, posterior lobe length 0.58; anterior lobe width 1.07, posterior lobe width 1.70. Pleurae dark brown. Evaporative area short. Scutellum brown, pruinose, punctate with long erect and short recumbent setae. Hemelytra pruinose, with short recumbent setae. Colour uniformly pale brown, costal margin on proximal three-quarters, small inner corial spot, and a small subapical spot hardly paler; membrane greyish brown, veins concolorous. Legs: Coxae brown, shiny, remainder of legs pale brown except protrochanter, meso- and metafemur darker distally, tibiae darker apically (Fig. 5D), setose, with short semi-erect setae, longest on profemur. Profemur with two rows of small spines on ventral surface, one spine larger. Protibia with small tubercles bearing spiniform setae on inner surface.

Abdomen: Brown with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 6M, N) rounded, anterior margin of dorsal aperture rounded, inner projections quadrangular. Parameres: Figure 6(O, P). Aedeagus: Conjunctiva not spined, vesica with a few minute spines laterally and on sclerotized lobes; *processus gonopori* long and slender.

Variability observed in paratypes

Similar to holotype in all aspects. Hemelytra varying from almost uniformly pigmented to having a well-differentiated pattern.

Distribution

Mexico (Fig. 7).

Etymology

This species is named after our friend and colleague Sara Itzel Montemayor (Museo de La Plata).

Type material

Holotype: ♂, **MEXICO**, intercepted at Nogales Arizona, 28-XI-2011, on *Brassica* sp. APHIS port no. 035394 (USNM).

Paratypes: 1♀, same data as for holotype, 23-XI-2011; 1♀, 30-I-2011, APHIS port no. 035412; 1♂, intercepted at Nogales Arizona, from Mexico, 1-XII-2011, on *Brassica chinensis*; 1♀, intercepted at Nogales (Arizona) from Mexico, 18-X-2011, with *Vigna unguiculata*, Aphis Port, no. 035304 (USNM); 1♀, intercepted at Nogales (Arizona) from Mexico, 16-XI-2011, with *Brassica oleracea*, Aphis Port, no. 035376 (MLP); 1♂, 3♀, Jalisco, Tepatitlan, 20 mi. SW, 5500 ft, 19-VIII-1954, J.G. Chillcott (CNC); 1♀, Lagos de Moreno, 6400 m a.s.l., 19-VIII-1954, J.G. Chillcott (CNC); *Sinaloa*: 1♂, Mazatlan, 27-VI-1918, Venedio, J.A. Kusche, pres. by B. Preston Clark (CAS).

HERAEUS SETOSUS SP. NOV.

(FIGS 3E, 5E, 7, 8C, 9A–D)

Diagnosis

Antennae uniformly coloured; pronotum, scutellum, and hemelytra with erect setae; labium extending to or slightly beyond metacoxae.

Heraeus setosus sp. nov. and *H. itzelae* sp. nov. have long erect setae on pronotum and scutellum. In *H. setosus* sp. nov., the hemelytra also have erect setae, the distiflagellomere lacks a pale band, and the labium extends to the metacoxae, whereas in *H. itzelae* sp. nov., the distiflagellomere has a pale band, the hemelytra have only scattered, short, recumbent setae, and the labium is shorter, extending to mesocoxae.

Description

Total length 6.46 (Fig. 3E). Strongly setose species.

Head: Strongly convex dorsally, brown, coriaceous with abundant recumbent and erect setae. Head length 1.27, width 0.88. Postocular length 0.41. Eyes slightly protruding, not surpassing dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Interocular width 0.45, interocellar width 0.30. Labium light brown with erect setae, extending to metacoxae. Labial segment lengths: I 0.90, II 0.99, III 0.90, and IV 0.37. Antennal colouration yellowish brown. Pedicel with abundant erect setae, equal to or longer than diameter of segment. Antennal lengths: scape 0.62, pedicel 1.60, basiflagellomere, and distiflagellomere missing.

Thorax: Pronotum pruinose; punctate, those of anterior lobe shallow; dark brown, posterior lobe and humeral angles paler; pruinose, with abundant, long, erect setae. Collar length 0.08, anterior lobe length 0.82, posterior lobe length 0.54; anterior lobe width 1.14, posterior lobe width 1.68. Pleurae brown. Evaporative area short. Scutellum brown, pruinose, punctate, with abundant long erect setae. Hemelytra pruinose, brown, with abundant erect setae shorter than those on scutellum; clavus unicolorous; costal margin pale on proximal three-quarters. Inner corial spot well defined. Membrane brown, veins paler. Legs: Coxae and protrochanter brown; profemur brown with apex paler, rest of legs pale brown; meso- and metafemur slightly darkened distally, tibiae darker at apices (Fig. 5E). Strongly setose, with long erect and semi-erect setae. Protibia with small tubercles bearing spiniform setae on inner surface.

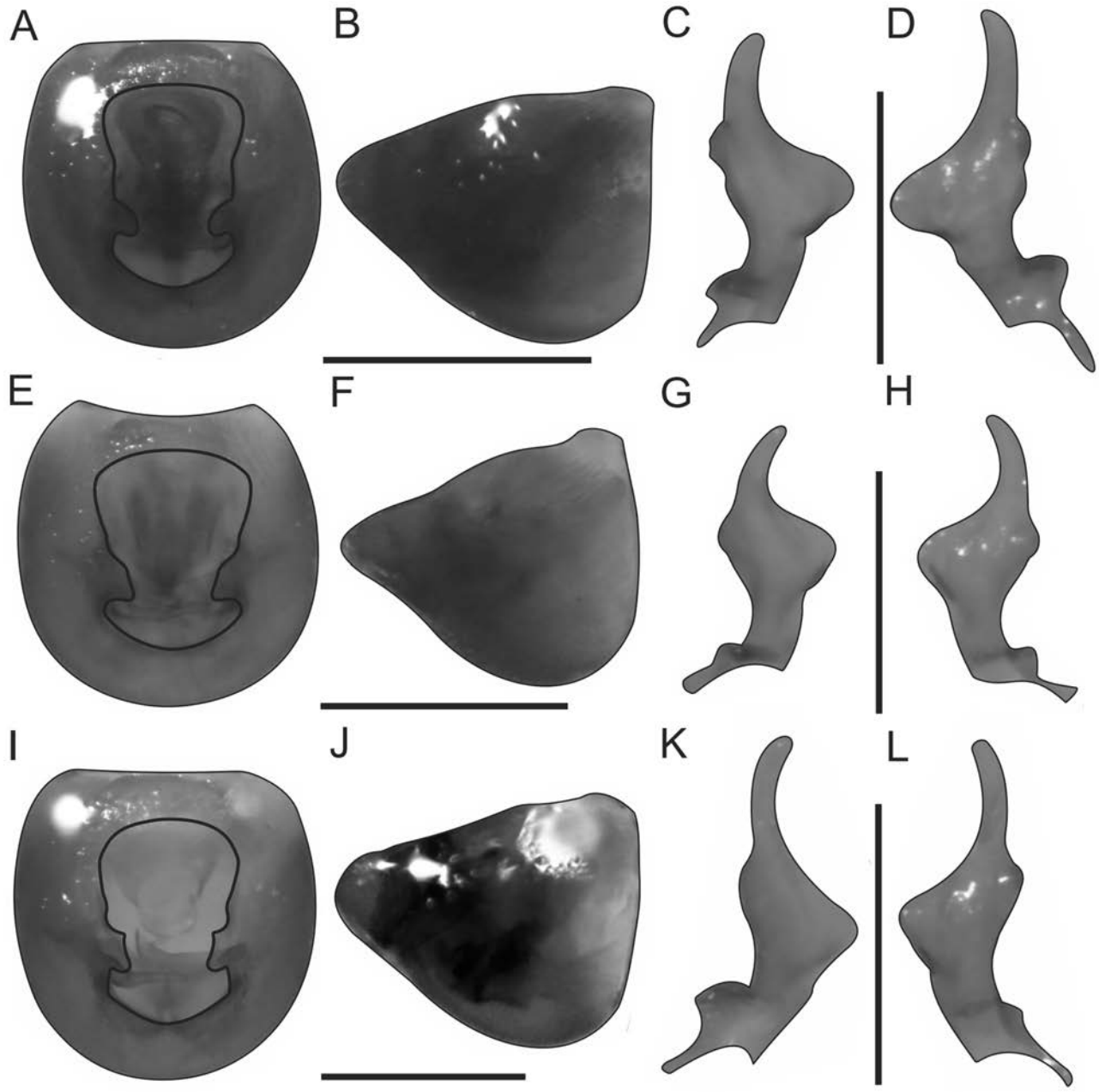

Figure 9. Male genitalia. ***Heraeus setosus* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. *Heraeus caliginosus* Slater & Baranowski, 1994: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus dominicanus* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view.

Abdomen: Brown with abundant short recumbent setae. Male genitalia: Pygophore rounded, anterior margin of dorsal aperture slightly rounded (Fig. 9A, B). Parameres: Figure (9C, D). Aedeagus with minute spines; vesical lobes sclerotized; *processus gonopori* long and slender (Fig. 8C).

Variability observed in paratypes
All antennal segments yellowish brown.

Distribution
Honduras and Mexico (Fig. 7).

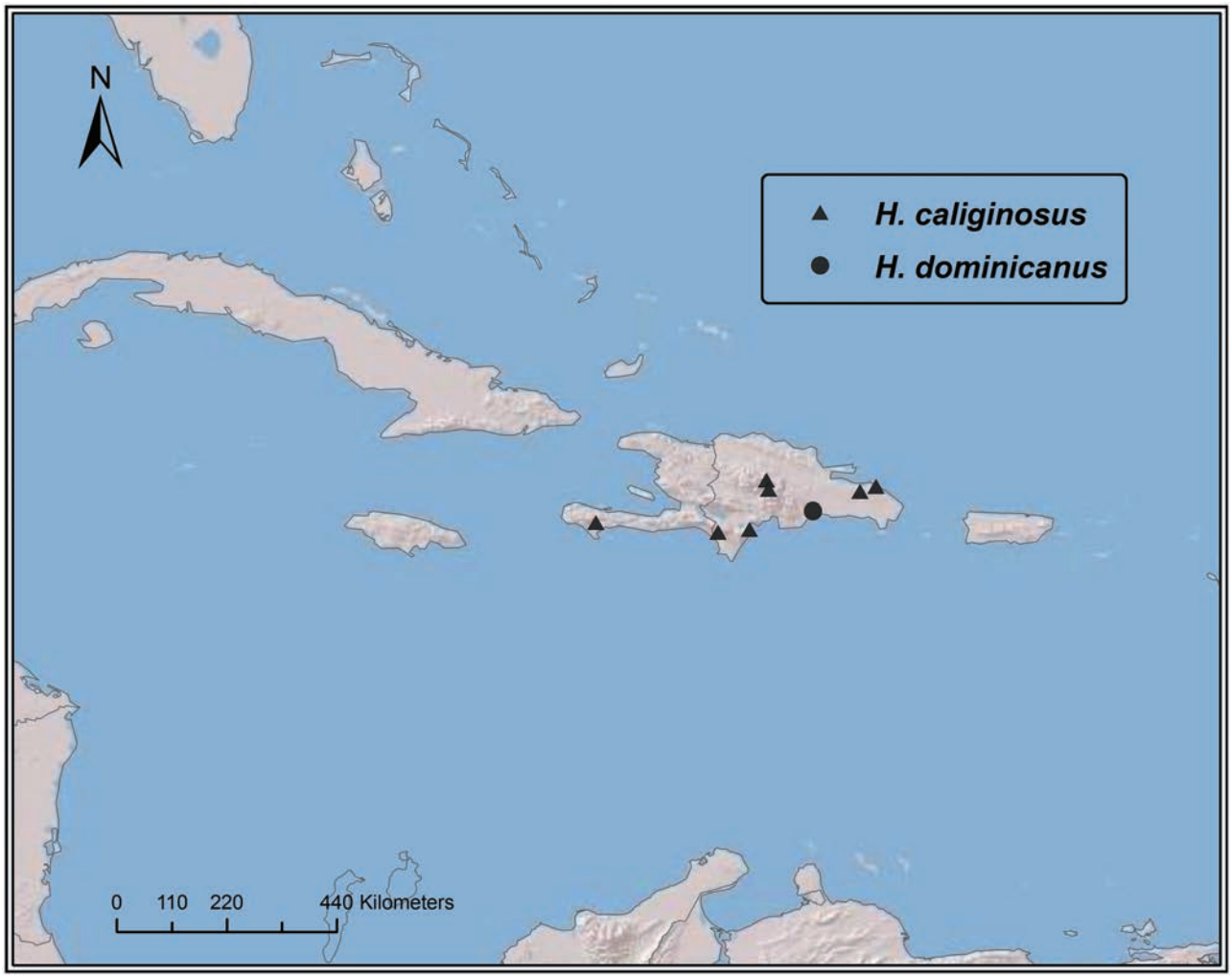

Figure 10. Distributional map of *Heraeus caliginosus* Slater & Baranowski, 1994 and ***Heraeus dominicanus* sp. nov.**

Etymology
This species is named '*setosus*', Latin for bristly, to denote the long, erect dorsal setae.

Type material
Holotype: ♂, **HONDURAS**, Dept Cortes, Lk. Yooa, Agua Azul, U.F. Co., 1-VI-[19]64, F.S. Blanton, A.B. Brose & R.E. Woodruff, blacklight trap (USNM).

Paratypes: **MEXICO:** 2♀, Mexico Aircraft, 26-IX-2003 (USNM); Nayarit, 1♀, *Nayarit*: 18 km SW Compostela, 20-VII-1974, blacklight, M.E. & P.D. Perkins (USNM); 1♀, 20-VII-1974, blacklight, M.E. & P.D. Perkins (MLP); *Chiapas*: 1♀, 25 mi. E of Tuxtla Gutiérrez, 22-VII-1964, P.J. Spangler (USNM).

THE *CALIGINOSUS* GROUP

Included species: Heraeus caliginosus and *H. dominicanus* sp. nov.

Diagnosis
Evaporative area short, distance from dorsal margin of auricle to dorsal margin of evaporative area shorter than distance from dorsal margin of evaporative area to dorsal margin of metapleura; posterior half of hemelytra darkened, with a subquadrangular whitish spot on apical region of corium and apex of membrane. Labium long, extending to or surpassing metacoxae.

HERAEUS CALIGINOSUS SLATER & BARANOWSKI, 1994

(FIGS 3J, 5F, 8D, 9E–H, 10)

Heraeus caliginosus Slater & Baranowski, 1994: 491–493; Slater & O'Donnell, 1995: 147; Baranowski & Slater, 2005: 137.

Diagnosis
General colour dark brown, with four small pale spots on posterior pronotal lobe, basal half of meso- and

metafemur whitish; labium long, usually extending to abdominal sternum II.

Heraeus caliginosus and *H. illitus* are the only species of the genus that have a long labium exceeding the metacoxae. *Heraeus caliginosus* can be distinguished from *H. dominicanus* sp. nov. by the four pale spots on the posterior pronotal lobe, a small pale spot at each humeral angle, and the longer labium, exceeding the metacoxae.

Description based on character used for phylogenetic analysis (Fig. 3J)

Head: Coriaceous. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Distiflagellomere with a pale band. Labium extending to metacoxae or beyond.

Thorax: Posterior pronotal lobe with four pale spots and a small pale spot on humeral angles. Anterior pronotal lobe with long erect setae. Evaporative area short. Scutellum with erect setae. Hemelytra brown, darkened on apical half, with a subapical corial spot; inner corial spot diffuse or well defined. Membrane brown with veins paler and an apical pale spot. Legs: Profemur dark with apices paler, apical half of metafemur darker (Fig. 5F). Male mesofemur and protibia without spines. Profemur with short sparse setae.

Abdomen, male genitalia: Pygophore (Fig. 9E, F) rounded, anterior margin of dorsal aperture rounded. Parameres: Figure (9G, H). Aedeagus (Fig. 8D) with minute spines, vesical lobes sclerotized; *processus gonopori* long and slender.

Distribution

Dominican Republic and Haiti (NEW RECORD) (Fig. 10).

Type material examined

Holotype: ♀, **DOMINICAN REPUBLIC**, Pedernales Prov., 21 km N Cabo Rojo, 19-VI-1976, R.E. Woodruff, blacklight trap (FSCA).

Additional material studied

DOMINICAN REPUBLIC: *Monseñor Noel*: 1♀, 12 km NW Jct. Rt 1 on Rd to Constanza, 30-VI-1999, on *Baccharis*, R.E. Woodruff & R.M. Baranowski (USNM); *La Vega*: 2♂, 1♀, 5 km W Manabao, 19/23-IV-2000, Finca Eladio Fernández 'Paso La Perra' along Rio Yaque del Norte, 3050 ft, blacklight, R.E. Woodruff & T.J. Henry (USNM); 1♂, 4♀, 4 km E of la cienaga de Manabao, 19°04′47″N 70°49′29″W, 3050 ft, 19-IV-2000, blacklight, T.J. Henry & R.E. Woodruff (USNM); *Barahona*: 1♂, nr. Filipinas, Larimar Mine, 26-VI/7-VII-1992, at light, Woodruff & Skelley (USNM); *El Seibo*: 1♂, 7 mi. N Pedro Sanchez, cloud forest, 20-VI-[19]98, blacklight trap, R.E. Woodruff (USNM); 1♂, 1♀, 7 km N Pdero Sanchez, Loma de Chivo, 5000 ft, 20-VI-[19]98, blacklight trap, R.E. Woodruff & P.H. Freytag (USNM); *La Altagracia*: 1♀, Nisibon, Finca Papagallo, 17-VI-1999, blacklight trap, abandoned house, R.E. Woodruff & R.M. Baranowski (USNM); 1♀, 4 km W Laguna, P.H. Freytag (USNM); 1♀, 33 km N Cabo Rojo, Bauxite Road, 4200 ft, 29-VI-[19]98, blacklight trap, R.M. Baranowski & R.E. Woodruff (USNM).

HAITI: 1♀, Étang Lachaux, 26/27-X-1934, Garlington (AMNH).

HERAEUS DOMINICANUS SP. NOV.

(FIGS 3K, 5G, 9I–L, 10)

Diagnosis

Posterior pronotal lobe uniformly brown; meso- and metafemora reddish, pale basally; labium long, extending to metacoxae.

The uniformly brown posterior pronotal lobe easily distinguishes *H. dominicanus* sp. nov. from *H. caliginosus*. Also, *H. dominicanus* sp. nov. has a shorter rostrum that extends only to the metacoxae.

Description

Total length 6.64 (Fig. 3K).

Head: Strongly convex dorsally, brown, smooth, and shiny, with short recumbent and long erect setae dorsally. Head length 1.55, width 0.99. Postocular length 0.59. Eyes slightly protruding, not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing posterior border of eyes. Interocular width 0.50, interocellar width 0.26. Labium light brown with erect setae, extending to meso- or metacoxae (pinned through posterior pronotal lobe). Labial segment lengths: I 0.94, II 1.04, III 0.80, and IV 0.24. Antenna light brown, scapus darker, basiflagellomere reddish distally; with abundant short recumbent and sparse, short, erect setae. Antennal lengths: scape 0.67, pedicel 1.44, basiflagellomere 1.28, and distiflagellomere missing.

Thorax: Pronotum dull, pruinose, uniformly brown, punctate, punctures more conspicuous on posterior lobe; setae short and recumbent, anterior pronotal lobe with long erect setae. Collar length 0.11, anterior lobe length 0.78, posterior lobe length 0.56; anterior lobe width 0.99, posterior lobe width 1.55. Pleurae brown. Evaporative area short. Scutellum brown, punctate, pruinose, with long erect setae. Hemelytra pruinose, with short recumbent setae; general colour brown, darkened on posterior half, with a large whitish subapical corial spot. Membrane brown, with an elongate pale apical spot, veins concolorous. Legs: Femora reddish brown, meso- and metafemur paler basally, tibiae pale reddish brown,

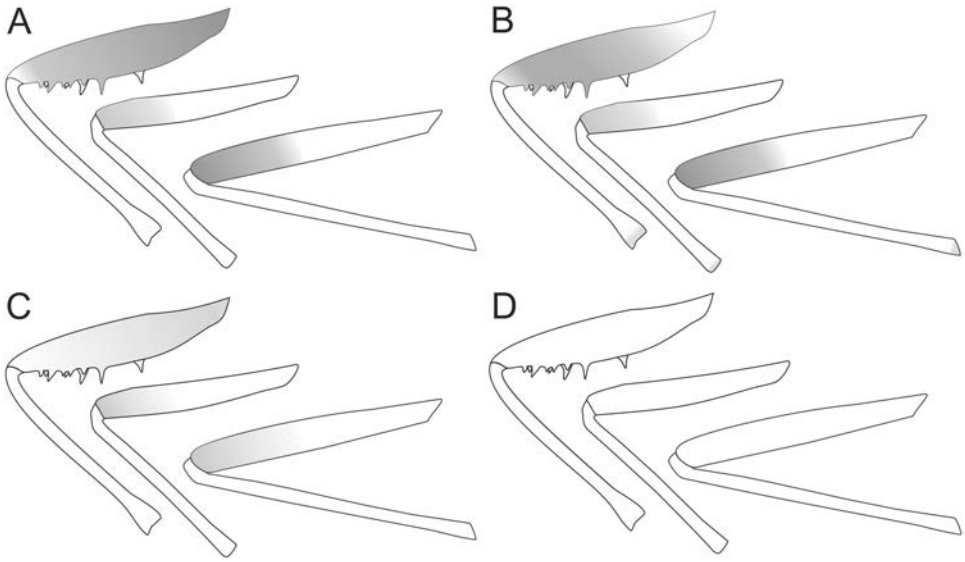

Figure 11. Legs: A, *Heraeus guttatus* (Dallas, 1852); B, *Heraeus hollyae* Baranowski, 2005; C, ***Heraeus steineri* sp. nov.**; D, *Heraeus triguttatus* (Guérin-Méneville, 1857).

tarsi pale brown (Fig. 5G). Legs with semi-erect and erect setae; protibia with small spines on inner surface.

Abdomen: Brown, shiny, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 9I, J) rounded. Anterior margin of dorsal aperture slightly rounded. Parameres: Figure 9 (K, L). Aedeagus with minute spines, vesical lobes sclerotized; *processus gonopori* long and slender.

Variability observed in a female paratype
Distiflagellomeres uniformly light brown, without a pale band. Spines of profemur small and restricted to apical half.

Distribution
Dominican Republic (Fig. 10).

Etymology
The specific epithet '*dominicanus*' is an adjective referring to the country where all of the specimens of this species were collected.

Type material
Holotype: ♂, **DOMINICAN REPUBLIC:** S. Frncsco Mts. [*sic*], St. Domingo, W.I., IX-[20]05, Aug. Busck (USNM).

Paratype: 1♀, same data as for holotype (USNM).

THE *GUTTATUS* GROUP

Included species: Heraeus guttatus, *H. hollyae*, *H. steineri* sp. nov., *H. triguttatus*.

Diagnosis
Ocelli located posteriorly; posterior half of hemelytra darkened, with a subquadrangular whitish spot on apical region of corium and apex of membrane. Male generally with a larger and more globose anterior pronotal lobe, and with small spines on protibia and mesofemur.

HERAEUS GUTTATUS DALLAS, 1852
(FIGS 3F, 8E, 11A, 12A–D, 14)

Orthaea? guttata Dallas, 1852: 580–581; Dohrn, 1859: 34; Walker, 1872: 121; Stål, 1874: 166.
Heraeus guttatus: Distant, 1882: 205; Lethierry & Severin, 1894: 191; Distant, 1903: 254, 255 (synonym of *Nabis elegans* Walker, 1873); Barber, 1939: 354; Ramos, 1946: 27; Wolcott, 1948: 205; Anonymous, 1958: 906; Scudder, 1967: 267–268 (lectotype designation); Slater, 1964: 1083; Scudder, 1970: 100 (raised from synonymy with *N. elegans*); Slater & O'Donnell 1995: 147; Harrington 1980: 109; Slater 1988: 50; Froeschner 1999: 244; Baranowski, 2005: 139.

Diagnosis
This species can be separated from the other species of the group by the conspicuous pale band on distiflagellomere, the contrastingly darkened apical third of the metafemur, and the pale spots on the posterior pronotal lobe.

Redescription (Fig. 3F)
♀ lectotype.

Head: Convex dorsally. Colour dark brown, shiny, coriaceous, with short recumbent setae. Eyes protruding, not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Labium pale brown with short

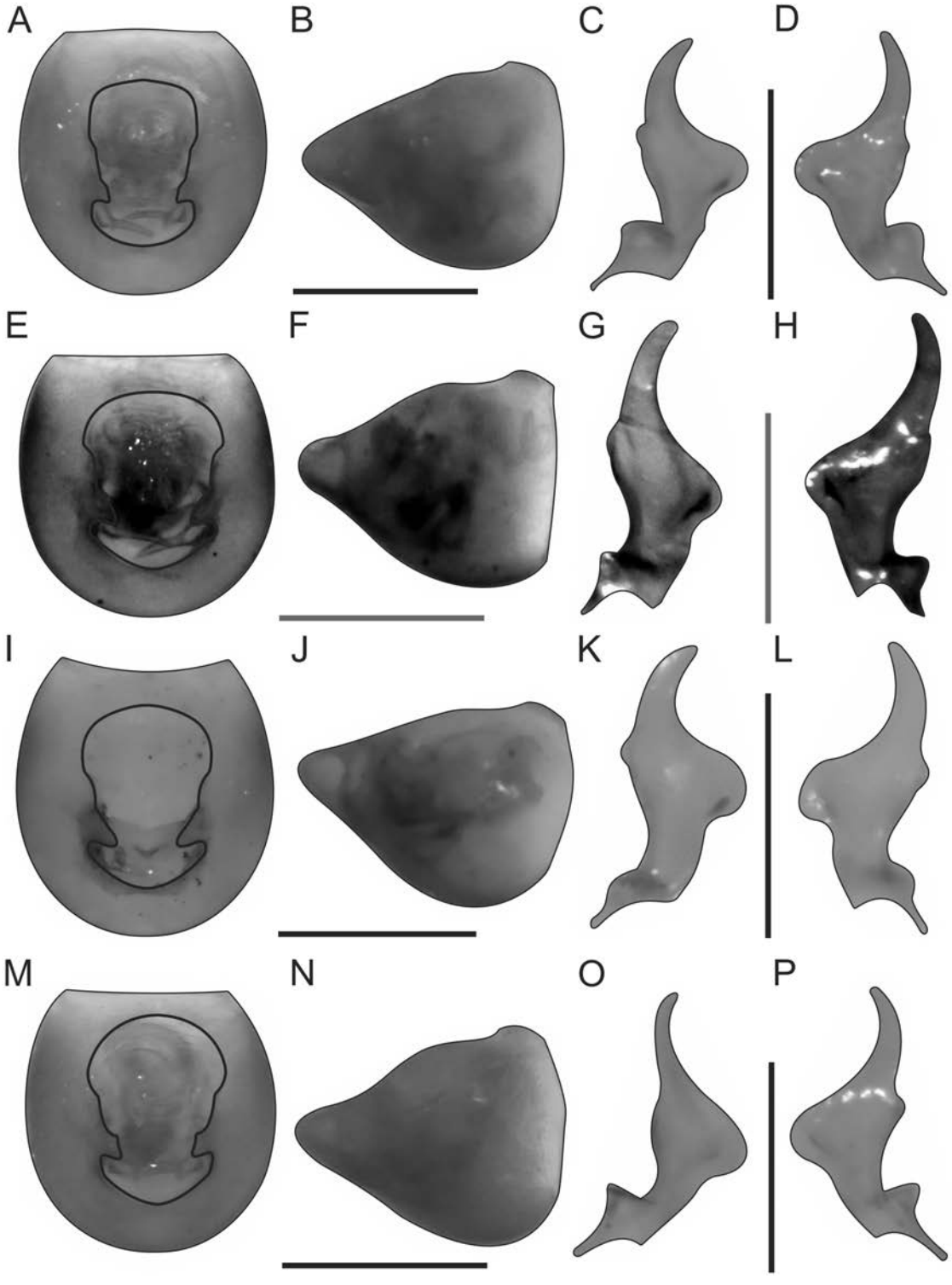

Figure 12. Male genitalia. *Heraeus guttatus* (Dallas, 1852): A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus hollyae*** **sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus steineri*** **sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. *Heraeus triguttatus* (Guérin-Méneville, 1857): M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

erect setae, extending to mesocoxae. Antenna (with only scape of right antenna) pale brown with short recumbent setae.

Thorax: Pronotum dark brown, dull, posterior lobe paler, with five incomplete longitudinal pale stripes and a small pale spot on humeral angles; collar delimited posteriorly by a sulcus; anterior and posterior lobes with short recumbent setae. Pronotum punctate, punctures more conspicuous on posterior lobe. Pleurae brown. Scutellum dark brown, dull, punctate, with short recumbent setae. Hemelytra (without corium and membrane of right hemelytron) dull, with short recumbent setae. Clavus brown, anterior one-third between median and external rows of punctures pale brown. Corium with lateral margins slightly concave, general colour brown, with a subapical pale brown spot, costal margin pale on proximal three-quarters. Membrane fuscous, veins paler, with a round pale spot at apex. Posterior half of hemelytra dark, with the subapical corial spot and apical spot on membrane conspicuously pale. Legs (only coxa and anterior right leg): Profemur with sparse, short, erect setae, and with spines restricted to apical half. Protibia with short erect setae and small tubercles bearing spiniform setae on apical half.

Abdomen: Brown, with abundant, short, recumbent setae.

Variability observed in other material studied

Pedicellus and basiflagellomere pale brown, basiflagellomere reddish brown at apex; distiflagellomere brown with a pale band; all segments with abundant, short, recumbent and scattered erect setae. Legs: Brown, meso- and metafemur with basal two-thirds yellowish and apical third brown, meso- and metatrochanter, tibiae, and tarsi paler (Fig. 11A). Males generally with a strongly globose anterior pronotal lobe. Male mesofemur with a row of small spines. Male genitalia: Pygophore (Fig. 12A, B) rounded, anterior margin of dorsal aperture rounded, posterior lobe more protuberant. Parameres as shown in Figure 12(C, D). Aedeagus (Fig. 8E): conjunctiva and vesica lacking spines, lobes of vesica weakly sclerotized; *processus gonopori* long and slender.

Distribution

Belize, Colombia, Dominican Republic, Haiti, Honduras, Jamaica, Mexico (NEW RECORD), Panama, and Puerto Rico (Fig. 14).

Comments

Dallas described this species from female(s?) from Jamaica. Distant (1882) reported this species from Guatemala and Jamaica. According to Scudder (1967), the Guatemalan specimens mentioned by Distant are not conspecific with the type, but he did not give additional clarification, and we were unable to examine these specimens.

Type material examined

Lectotype: ♀, **JAM[AICA]**, Hope, Saunders, 66-13 (BMNH).

Additional material studied

BELIZE: 1♀, British Honduras, San Antonio, VI-1931, J.J. White (USNM); 1♀, J.J. White, III-1931 (USNM); 1♀, IV-1934, J.J. White (AMNH); 8♂, 8♀, Orange Walk Dist., Chan Chich Lodge, 1-VI-[20]09, BLT, E. Flota (USNM); 1♀, 25-VII-[20]04, BLT, E. Flota (USNM); 1♀, 19-X-[20]03, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 22-X-[20]03, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 25-X-[20]03, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 28-X-[20]03, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 26-VI-[20]08, BLT, H.V. & R.M. Baranowski (USNM); 1♂, 27-VI-[20]08, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 2-VII-[20]09, BLT, H.V. & R.M. Baranowski (USNM); 2♀, 3-VIII-[20]09, BLT, H.V. & R.M. Baranowski (USNM); 1♀, 5-VII-[20]09, BLT, H.V. & R.M. Baranowski (USNM); 2♀, 7-IX-[20]06, BLT, C. Sanabria (USNM); 3♂, 1♀, 13-XI-[20]04, BLT, C. Sanabria (USNM); 2♀, Orange Walk Dist., Gallion Jug, BLT, 31-I-[20]04, B. Miller (USNM); 1♂, 17-VII-[20]04, BLT, B. Miller (USNM); 1♂, 13-IV-[20]05, BLT, B. Miller (USNM); 4♂, 19-VI-[20]05, BLT, B. Miller (USNM); 2♂, 11-X-[20]05, BLT, B. Miller (USNM); 1♀, 9-XI-[20]05, BLT, B. Miller (USNM); 1♀, Cayo District, Benque Viejo del Carmen, riverside N, Mopan River resort, BLT, 27-VI-[20]06, A. Trujillo (USNM); 2♀, 14-V-[20]07, BLT, P. Picon (USNM); 1♂, 12-I-[20]08, BLT, M. Chrysler (USNM); 1♀, 17-X-2009, M. Chrysler (USNM); 1♀, 22-IX-2009, M. Chrysler (USNM); 1♀, 23-IX-2009, M. Chrysler (USNM).

COLOMBIA: 1♂, Isla de Providencia, Santa Isabel, 10/27-VIII-[19]69, C.R. Gilbert (USNM).

DOMINICAN REPUBLIC: *Pedernales*: 1♂, Cabo Rojo, Alcoa (Cafetería), 9/13-IV-2000, black light, R.E. Woodruff & T.J. Henry (USNM); *Altagracia*: 1♂, Nisibón, 9-VI-1976, R.E. Woodruff, blacklight trap (USNM); 1♀, R.E. Woodruff, blacklight trap, 8-VI-1976, Baranowski (USNM); 2♂, 2♀, La Romana Prov., La Romana, 13-IX-[19]76, blacklight trap, E. Folch (USNM); 2♂, 18-IX-[19]76, blacklight trap, E. Folch (USNM); 2♂, 1♀, 22-VIII-[19]77, blacklight trap, R.E. Woodruff col. (USNM); 2♀, La Romana Prov., Higueral, 15-VIII-[19]77, blacklight trap, R.E. Woodruff & E. Folch (USNM); 2♀, 17-VIII-[19]77, blacklight trap, R.E. Woodruff & E. Folch (USNM); 1♀, 18-VII-[19]77, blacklight trap, R.E. Woodruff & E. Folch (USNM).

HAITI: 1♂, 1♀, Trou Caiman, 4-IX-1934, M. Bates (AMNH).

HONDURAS: 1♀, Dept. Cortes, Puerto Cortes beach, 3-VI-[19]64, BL trap, Blanton & Broce (USNM).

JAMAICA: 1♀, Kingston Institute, XI-1956, ex. electric light bulb shade, T.H. Farr (USNM); one without abdomen, St. Andrew, Beverly Hills, 5-VIII-1961, R.P. Bengry (USNM); 1♀, Parish of St. Ann, Kellits Mason R. Field Sta. 22-VIII-[19]69, R.E. Woodruff (USNM); 1♀, Parish of St. Ann, 3 mi. W Ocho Rios, 4-VII-1971, under *Ficus*, Slater, Baranowski & Harrington (USNM); 1♀, Parish of St. Andrew, Hardwar Gap, Hollywell Cabins, 21-V-[19]69, blacklight trap, R.E. Woodruff, (USNM); 1♀, 22-V-[19]69, at light, R.E. Woodruff & P.C. Drummond (USNM); 1♂, St. Andrew, Hardwar Gap, 19-IV-1959, T.H. Farr (USNM); 1♂, 1♀, Parish of St Andrew, Kingston, Mona, 17-X-1971, blacklight trap, R.M. Baranowski (USNM); 2♂, blacklight trap, R.M. Baranowski, 19-X-1971 (USNM); 1♀, 16-X-1971, blacklight trap, R.M. Baranowski (USNM); 1♂, 1♀, Hardwar Gap, 4000 ft, 8-VII-1966, Howden & Becker (CNC); 3♂, Pt. Antonio, A.E. Wigte (AMNH); 1♂, Parish of St. Andrew, Irishtown, 7-VII-1971, black light trap., J.A. Slater, R.M. Baranowski & J.E. Harrington, *H. gutattus* det. J. Slater 1978 comp. type (AMNH); one without abdomen, 5-VII-1971, black light trap., J.A. Slater, R.M. Baranowski & J.E. Harrington (USNM); 1♀, Parish of St. Catherine, Worthy Park, 11-V-[19]69, blacklight trap, R.E. Woodruff, compared with broken lectotype of *H. guttatus* (Dallas) T. Henry det. (USNM); 2♂, blacklight trap, R.E. Woodruff (USNM); 1♀, 17-V-[19]69, blacklight trap, R.E. Woodruff (USNM); 1♀, Parish of St. Catherine, Worthy Park, 10-VI-[19]75, blacklight trap, R.E. Woodruff, compared with lectotype of *H. guttatus* (Dallas) T. Henry det. (USNM); 3♂, 1♀, 24-VIII-[19]69, blacklight trap, R.E. Woodruff (USNM); 1♂, 1♀, 9-V-[19]69, blacklight trap, R.E. Woodruff (USNM); 5♂, 2♀, blacklight trap, R.E. Woodruff (USNM); 4♂, 1♀, 11-V-[19]69, blacklight trap, R.E. Woodruff (USNM); 1♂, 2♀, 13-V-[19]69, blacklight trap, R.E. Woodruff (USNM); 1♂, Parish Manchester De Carteret College Mandeville, 12-V-[19]69, blacklight trap, K. Stanton (USNM); 1♂, 18-V-[19]69, blacklight trap, K. Stanton (USNM); 11♂, 4♀, Parish of St. Andrew, Bamboo Lodge, near Irishtown, 23-VI-1972, blacklight trap, 2500 ft, R.M. Baranowski (USNM); 3♂, 3♀, 19-VI-1972, blacklight trap, 2500 ft, R.M. Baranowski (USNM); 1♂, 1♀, VII-1972, R.M. Baranowski (USNM); 1♂, Balaclava, 15-IV-1909, A.E. Wigte (AMNH); 1♂, 1♀ one without abdomen, 24-IV-1909, A.E. Wigte (AMNH); 1♀, 20-IV-1909, A.E. Wigte (AMNH); 2♂, 1♀, Baron Hill, Trelawney, 16/30-III-[19]31, E.L. Bell (USNM); 1♀, one nymph, Trelawny, Windsor Estate, 12-II-1960, T.H. Farr (USNM); 1♂, Mandeville, Oct., Cockerell (USNM).

MEXICO: 1♀, Cozumel Island, Celerain Pt., Sta. 20, 21-IV-1960, J.F.G. Clarke (USNM); 4♀, one without abdomen, Camp. 16 mi. N Champoton, 9-VIII-1974, C.W. & L.B. O'Brien & G.B. Marshall (USNM).

PANAMA: 2♂, 3♀, C[anal] Z[one], Coco Solo Hospital, 14-V-1975, D. Engleman (AMNH); 1♀, D. Engleman, 13-VI-[19]72, LT (USNM).

Heraeus hollyae Baranowski, 2005
(Figs 3G, 11B, 12E–H, 13)

Heraeus hollyae Baranowski, 2005: 141 (in Baranowski & Slater, 2005).

Diagnosis

Posterior pronotal lobe nearly uniformly dark, with two short yellow lines. Meso- and metafemur bicoloured, with basal two-thirds yellowish and apical third brown.

Specimens of *H. hollyae* share with *H. guttatus* the contrastingly darkened apical third of metafemur, but differ in having the posterior pronotal lobe nearly uniformly dark, with only two short yellowish lines.

Description of characters used in phylogenetic analysis (Fig. 3G)

Head: Coriaceous. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing the posterior border of eyes. Labium extending to mesocoxae. Distiflagellomere with a pale band.

Thorax: Anterior and posterior pronotal lobe without long setae. Posterior pronotal lobe nearly uniformly dark, with two short yellow lines. Males generally with a strongly globose anterior pronotal lobe. Scutellum without erect setae. Inner corial spot present. Costal margin pale on proximal three-quarters, with a subapical corial spot. Veins of membrane paler and with a pale apical spot. Posterior half of hemelytra dark with the subapical corial spot and apical spot of membrane conspicuously pale. Legs: Profemur dark with apices paler, apical half of metafemur darker (Fig. 11B). Profemur with sparse short setae. Mesofemur and protibia spinose.

Abdomen, male genitalia: Pygophore (Fig. 12E, F) rounded. Anterior margin of dorsal aperture rounded. Parameres: Figure 12(G, H). Aedeagus: conjunctiva and vesica unspined, lobes of vesica weakly sclerotized, without spines; *processus gonopori* long and slender.

Distribution

Antigua, Dominican Republic (NEW RECORD), and Haiti (NEW RECORD) (Fig. 13).

Type material examined

Holotype: ♂, **ANTIGUA B.**, W.I., Collins, 20-VIII-[19]95 (under *Bucida* sp.), R.M. & H.V. Baranowski, J.A. Slater (FSCA).

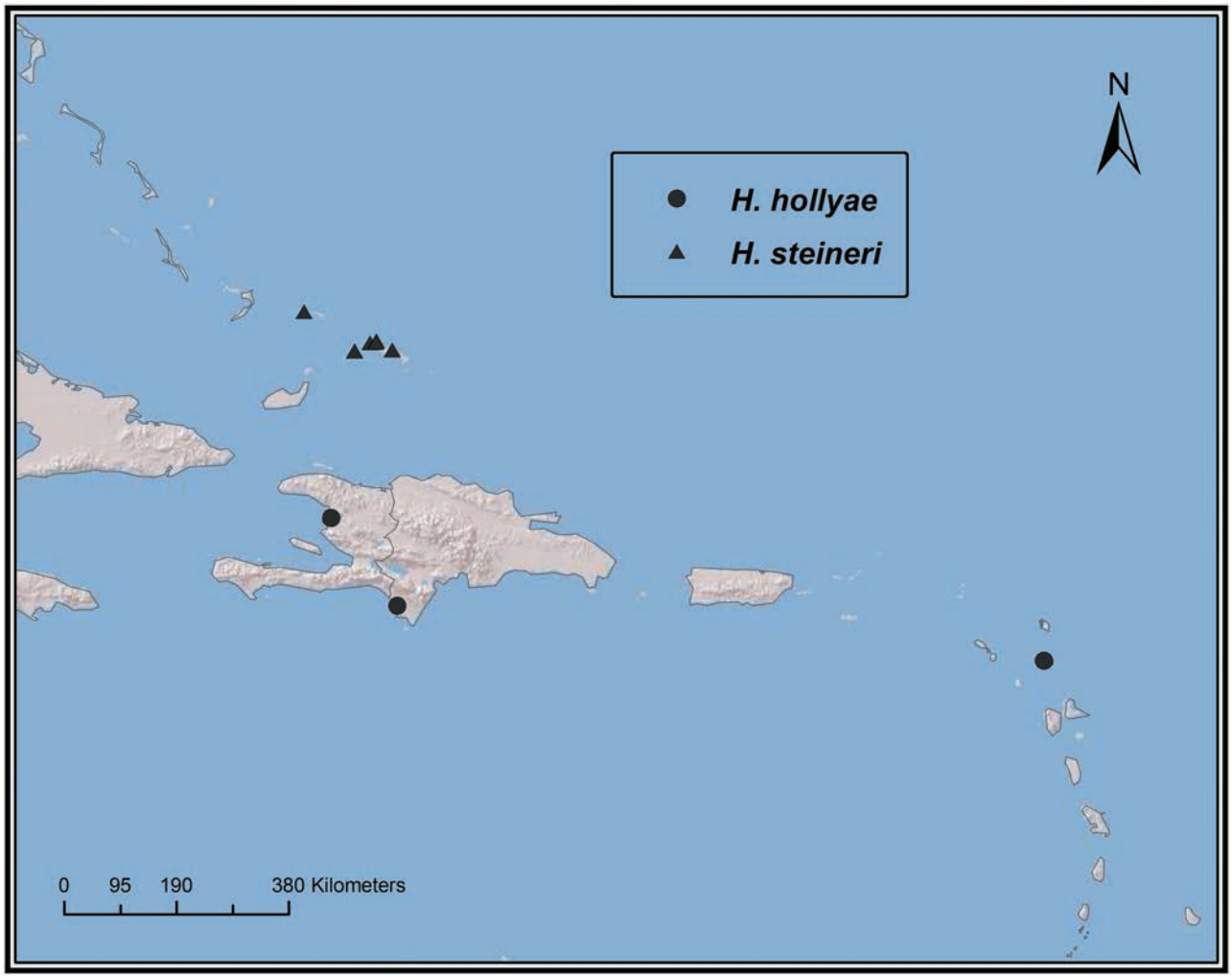

Figure 13. Distributional map of *Heraeus hollyae* Baranowski, 2005 and ***Heraeus steineri* sp. nov.**

Paratypes: 7♂, 7♀ same data as for holotype (2♂, 4♀, AMNH; 5♂, 3♀ USNM).

Additional material studied

HAITI: 1♂, 1♀, Trou Cayman, 4-IX-1934, M. Bates (AMNH).

DOMINICAN REPUBLIC: *Pedernales:* 1♀, Cabo Rojo, Alcoa (cafetería), 9/13-IV-2000, blacklight, R.E. Woodruff & T.J. Henry (USNM).

HERAEUS STEINERI SP. NOV.

(FIGS 3I, 11C, 12I–L, 13)

Diagnosis

Legs whitish, coxa pale brown; posterior pronotal lobe mottled with yellow; hemelytra brown, mottled with yellow at base.

The uniformly whitish legs easily distinguish this species from the others in the group.

Description

Total length 6.56 (Fig. 3I).

Head: Slightly convex dorsally, brown, shiny, coriaceous, with short recumbent and scattered erect setae. Head length 1.30, width 0.93. Postocular length 0.46. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed posterior to an imaginary line passing the posterior border of eyes. Interocular width 0.34, interocellar width 0.22. Labium pale brown with short erect setae, nearly extending to mesocoxae. Labial segment lengths: I 0.80, II 0.88, III 0.64, and IV 0.35. Antennae pale brown, except apices of pedicel and basiflagellomere slightly darker, with short recumbent and scattered erect setae, distiflagellomere brown, with a medial pale band.

Antennal lengths: scape 0.48, pedicel 1.31, basiflagellomere 1.18, and distiflagellomere 1.28. Length of pale band on distiflagellomere 0.38.

Thorax: Pronotum brown, posterior lobe paler with four incomplete longitudinal pale stripes; anterior and posterior lobe with short recumbent setae. Pronotum pruinose, anterior lobe impunctate, posterior lobe punctate. Collar length 0.08, anterior lobe length 0.77, posterior lobe length 0.51; anterior lobe width 1.04, posterior lobe width 1.52. Pleurae brown, acetabular areas reddish brown; punctate, with short recumbent setae. Scutellum brown, except two medial pale spots and apex yellowish; pruinose, punctate, with short recumbent setae. Hemelytra pruinose, with short recumbent setae; posterior half dark with the subapical corial spot and apical spot of membrane conspicuously pale. Clavus brown, with anterior one-third between median and external rows of punctures pale brown. Corium brown with a subapical whitish spot, costal margin pale on proximal three-quarters. Membrane fuscous, veins paler with an apical rounded whitish spot. Legs: Coxae pale brown, remainder of legs whitish (Fig. 11C), with sparse short erect setae. Profemur with spines on apical two-thirds. Protibia slightly curved at base, with small tubercles bearing spiniform setae on apical half. Mesofemur with three or four spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 12I–J) rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more produced posteriorly; slightly declivent posteriorly in lateral view. Parameres: (Fig. 12K, L). Aedeagus without spines, and with two sclerotized lobes; *processus gonopori* long and slender.

Variability observed in paratypes

The posterior pronotal lobe varies from having four longitudinal pale stripes to only irregular pale areas, but it is never homogeneously or evenly coloured.

Distribution

Turks and Caicos Islands and the Bahamas (Fig. 13).

Etymology

This species is named in honour of Warren E. Steiner, one of the collectors of this species.

Type material

Holotype: ♂, **TURKS AND CAICOS ISLANDS**, Providenciales, King's Town, 21°48′N, 72°14′W, 30-I-1998, at black light in sandy scrub forest, W.E. Steiner & J.M. Swearingen (USNM).

Paratypes: 1♀, same data as for holotype (USNM); 1♂, 4♀, Providenciales Grace Bay Hills, 21°48′N, 72°13′W, 27-I-1998, at blacklight in sandy scrub forest, W.E. Steiner & J.M. Swearingen (USNM); 1♀, at blacklight in sandy scrub forest, W.E. Steiner & J.M. Swearingen (MLP); 1♂, 5♀, Providenciales Isl., 23-XI-[19]94, R.M. & H.V. Baranowski (USNM); 1♀, 22-XI-[19]94, R.M. & H.V. Baranowski (USNM); 1♀, Providenciales Isl., Grace Bay, 20-X-93, R.M. & H.V. Baranowski (USNM); 2♀, North Caicos Island, 20-VII-[19]93, B.L.T., A. Swan (USNM); 1♂, 3♀, Whitby, North Caicos Island, 23-X-[19]93, B.L.T., R.M. & H.V. Baranowski (USNM); 1♂, 26-XI-[9]94, B.L.T., R.M. & H.V. Baranowski (USNM); 1♂, 21-X-[9]93, B.L.T., R.M. & H.V. Baranowski (USNM); 1♀, North Caicos Island, Pelican Beach Hotel, 31-V-[19]91, BL Trap, H.V. & R.M. Baranowski (USNM); 3♂, 10♀, Bambarra, North Caicos Island, 12-XII-[19]93, B.L.T., B.M. Riggs (USNM); 2♂, 2♀, B.L.T., B.M. Riggs (MLP). **BAHAMAS ISLANDS:** 1♂, Mayaguana Isl. 1-VIII-1963, blacklight trap, C. Murvosh (USNM); 1♀, 25-VIII-1967, blacklight trap, C. Murvosh (USNM); 1♀, 26-VIII-1963, blacklight trap, C. Murvosh (USNM); 1♂, 3♀, 3-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♀, 20-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♂, 2♀, 24-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♀, 25-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♂, 5♀, 26-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♂, 4♀, 27-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 3♂, 1♀, 28-VIII-[19]63, blacklight trap, C. Murvosh (USNM); 1♂, 1♀, 30-VIII-[19]63, blacklight trap, C. Murvosh (USNM).

Heraeus triguttatus Guérin-Méneville, 1857

(Figs 3H, 11D, 12M–P, 14)

Lygaeus (Plociomerus) triguttatus Guérin-Méneville, 1857: 400.

Heraeus triguttata: Stål, 1862: 315; Stål, 1874: 147; Uhler, 1886: 15; Lethierry & Severin, 1894: 191.

Plociomerus triguttatus: Walker, 1873b: 52.

Heracus [*sic*] *trigutatus* [*sic*]: Valdés Ragués, 1914: 98.

Heraeus triguttatus: Barber, 1914b: 514; Van Duzee, 1916: 21; Van Duzee, 1917: 179; Blatchley, 1926: 389–390; Torre Bueno, 1946: 70; Barber, 1954a: 4; Barber, 1954b: 342; Scudder, 1958: 146–147; Barber & Ashlock, 1960: 121; Frost, 1964: 135; Slater, 1964: 1084–1085; Harrington, 1980: 109; Slater, 1988: 40–41, 52, 59; Ashlock & Slater, 1988: 228; Slater & Baranowski, 1990: 130, 132–134; Baranowski & Slater, 1998: 79, 87; Baranowski, 2005: 144; Cervantes Peredo, 2005: 371, 381.

Diagnosis

Distiflagellomere with a diffuse pale band, the legs yellowish brown, with the distal third of meso- and metafemur slightly darkened, the posterior pronotal lobe uniformly coloured, and the hemelytra reddish brown, with the apex of corium and most of the membrane darker.

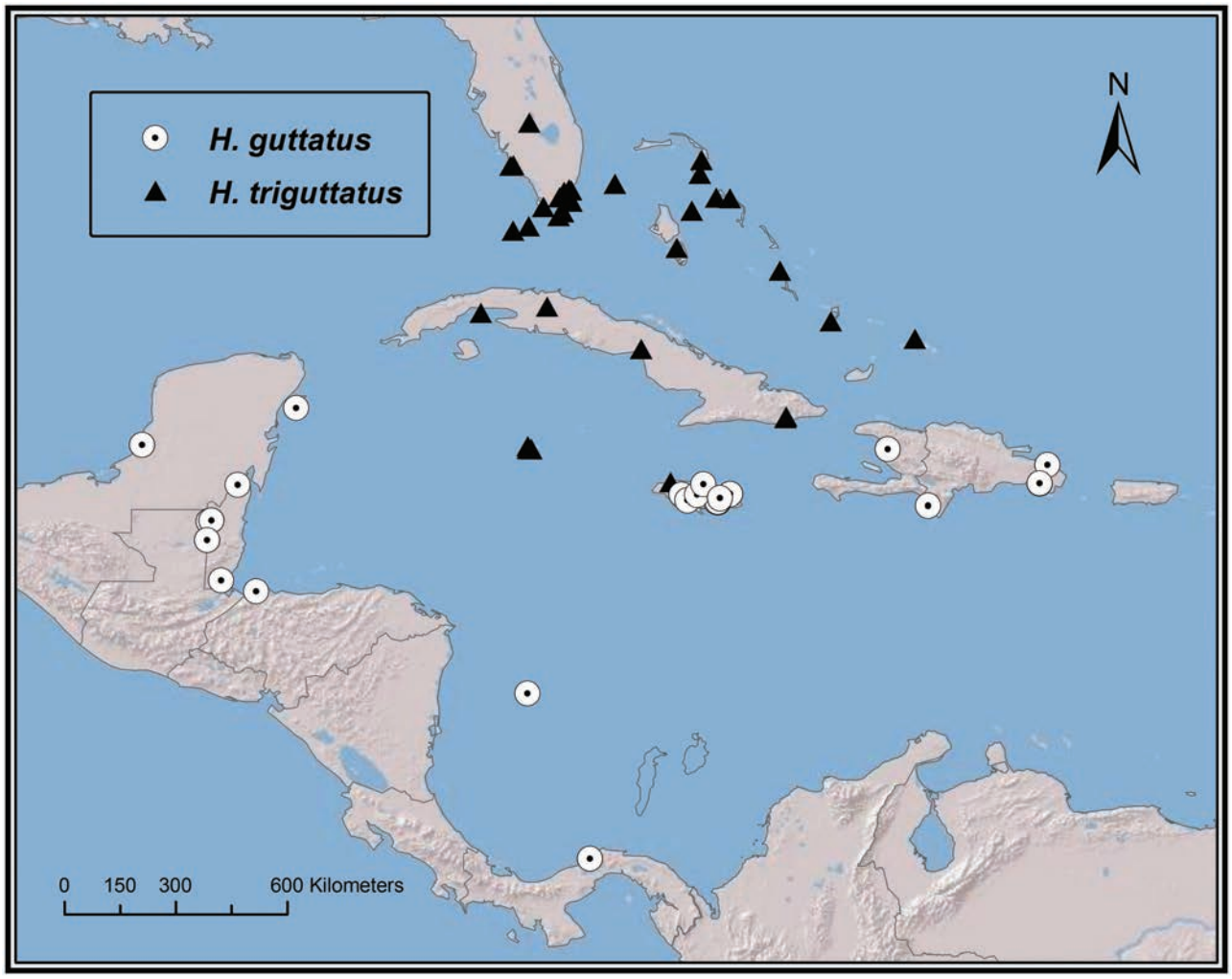

Figure 14. Distributional map of *Heraeus guttatus* (Dallas, 1852) and *Heraeus triguttatus* (Guérin-Méneville, 1857).

Heraeus triguttatus is most closely related to *H. steineri* sp. nov., whereas this last species has uniformly whitish legs, the posterior pronotal lobe is mottled with yellow, and the hemelytra are mottled brown with yellow basally.

Redescription (Fig. 3H)

Head: Convex dorsally, postocular region elongate; brown, shiny, coriaceous, with short recumbent and erect setae dorsally. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed posterior to an imaginary line passing the posterior border of eyes. Labium pale brown, with erect setae, extending to mesocoxae. Antennae pale brown, with abundant recumbent and scattered short erect setae. Distiflagellomere with a pale band, diffuse in some specimens.

Thorax: Pronotum brown, posterior pronotal lobe paler; dull, with scattered short recumbent and long erect setae, shorter on posterior lobe. Males generally with a strongly globose anterior pronotal lobe. Scutellum brown, pruinose, with long erect setae. Pleurae brown. Hemelytra pruinose, dull, with short recumbent setae; posterior half of hemelytra dark with the subapical corial spot and apical spot of membrane conspicuously pale. Membrane fuscous, veins concolorous. Legs: Coxae brown, profemur pale brown, rest of legs yellowish brown, meso- and metafemur slightly darkened distally (Fig. 11D). Profemur with sparse short setae. Protibia and male mesofemur spinose.

Abdomen: Pale reddish brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 12M, N) rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more pronounced posteriorly. Parameres with a tubercle at base of blade on outer surface (Fig. 12O, P). Aedeagus without spines; vesical lobes sclerotized; *processus gonopori* long and slender.

Distribution

Cuba, Dominican Republic, Jamaica, USA, and the West Indies (Bahamas, South Bimini Island, Grand Cayman Island, and Turks & Caicos Islands; Fig. 14).

Type material

According to the original description, the type series consists of three specimens from Cuba. After an unsuccessful search of the Muséum National d'Histoire Naturelle in Paris by Dr Eric Guilbert, we have concluded that the specimens of *Lygaeus (Plociomerus) triguttatus* are lost. To ensure nomenclatural stability, we are designating the following female neotype (in good condition with only the right antenna missing) deposited in the USNM collection: label 1, 'Baraguá, Cuba, X-24-26'; label 2, 'T P R F Ent. No. 188'; label 3, 'at light'; label 4, 'C.F. Stahl collector'; label 5 (red, here added), 'Neotype ♀: *Lygaeus triguttatus* Guérin-Méneville, desig. by Dellapé, Melo, & Henry'. There is also a male (in good condition, but with both distiflagellomeres missing) in the USNM with the same label data, except for the date X-19-25.

Additional material studied

CUBA: 1♀ (abdomen on separate label) (CAS); 1♂, (CAS); 1♂, Baraguá, XII-13, 29, Grasses, L.D. Christenson (AMNH); 1♂, Baraguá, X-24-[19]26, TPRF ent. N°188, at light, C.F. Stahl (AMNH); 1♀, Baraguá, 5-X-[19]25, TPRF ent. N°188, at light, C.F. Stahl (AMNH); 1♀, one without abdomen (USNM); 2♂, one without abdomen, Cuba (USNM); 1♂, at light, TPRF Ent. #188, 10-X-[19]25, C.F. Stahl (USNM); 1♀, Cayamas, 5–6 m, E.A. Schwarz (USNM); 1♂, Colon, Mat., 15-XI-1922, A. Comas (USNM); 1♀, Guantamano Bay, 14-XI-[19]72, blacklight trap, S. Calhoun (USNM); 1♂, blacklight trap, 16-XI-[19]72, S. Calhoun (USNM); 1♀, Navy Base, Caravella Pt., blacklight trap, 17-XI-[19]72, S. Calhoun (USNM); one without abdomen, blacklight trap, 10-I-[19]73, S. Calhoun (USNM); 1♂, 1♀, Guantanamo, La Fa, Imiaz, VII-[19]90, a la luz, L.F. Farmas (USNM); 1♂, Cayo Sabina, Pinares de Mayari, 645 m a.s.l., VII-[19]90, a la luz, L.F. Armas & V. Becker (USNM); 1♀, Holguin, Pinares de Mayari, Loma de la Mensura, 780 m a.s.l., 7-VII-[19]90, L.F. Armas & V. Becker (USNM).

BAHAMAS: 14♂, 13♀, Great Abaco, Pinewoods Nursery, Marsh Harbor, 17-X-[19]90, BL trap, R. Keys (USNM); 2♂, 2♀, 22-XII-[19]90, BL trap, R. Keys (USNM); 1♂, 11-X-[19]90, BL trap, R. Keys (USNM); 2♂, Long Island, Stella Maris Resort, 30-VI-[19]94, B.L.T., R.M. & H.V. Baranowski (USNM); 1♀, Eleuthera Rainbow Bay, 18-XII-[19]75, blacklight trap, J. Wiley (USNM); 1♀, N. Eleuthera, Current Club, 10-I-[19]77, blacklight trap, R.M. Baranowski (USNM); 2♂, 3♀, New Providence, Isl. Nassau, 5-IV-1953, Van Voast–AMNH Bahama Islands Exped., E.B. Hayden (AMNH); 2♀, Abaco Cays/Allans Cay, 9-V-1953, Van Voast–AMNH Bahama Islands Exped., E.B. Hayden & G.B. Rabb (AMNH); 1♂, Crooked Island, Landrail Point, 5-III-1953, Van Voast–AMNH Bahama Islands Exped., E.B. Hayden & L. Giovannoli (AMNH); 2♀, South Bimini Island, B.W.I., V-1951, Cazier & Gertsch (AMNH); 1♂, South Bimini Island, 18-VIII-1951, C. & P. Vaurie (USNM); 1♀, Mangrove Cay, Andros Island, V/VI-1917, Wm. M. Mann (AMNH).

GRAND CAYMAN ISLAND: 1♂, 22-I-[19]89, BL trap, P. Fitzgerald (USNM); 1♂, 17-I-[19]89, BL trap, P. Fitzgerald (USNM); 1♀, 30-X-[19]89, BL trap, P. Fitzgerald (USNM); 1♂, 28-V-[19]89, BL trap, P. Fitzgerald (USNM); 1♂, 10-VI-[19]90, BL trap, P. Fitzgerald (USNM); 1♀, 23-I-[19]93, BL trap, P. Fitzgerald (USNM); 1♀, 31-I-[19]93, BL trap, P. Fitzgerald (USNM); 1♂, 19-I-[19]92, BL trap, P. Fitzgerald (USNM); 2♂, 23-I-[19]88, BL trap, P. Fitzgerald (USNM); 1♀, 13-XII-[19]87, BL trap, P. Fitzgerald (USNM); 1♂, 5-VIII-[19]88, BL trap, P. Fitzgerald (USNM); 1♂, 12-III-[19]88, BL trap, P. Fitzgerald (USNM); 1♂, 23-V-[19]88, BL trap, P. Fitzgerald (USNM); 2♂, 1♀, South Sound, 2-VIII-[19]86, BL trap, F. Fitzgerald (USNM); 2♀, 12-II-[19]86, BL trap, F. Fitzgerald (USNM); 1♀, 16-XI-[19]86, BL trap, F. Fitzgerald (USNM); 1♀, Savannah, 12-XII-[19]89, R.M. Baranowski (USNM); 1♀, Pine Villa Hotel, 1-XI-[19]96, BLT, H.V. & R.M. Baranowski (USNM); 2♂, 2-XI-[19]96, BLT, H.V. & R.M. Baranowski (USNM).

JAMAICA: 1♂, St. James, Montego Bay, 23-IV-1960, Baranowski (USNM).

TURKS & CAICOS ISLANDS: 1♀, Cays, 3.5 m SW of North Caicos Island, 28-II-1953, Van Voast–AMNH Bahama Island Exped., E.B. Hayden & L. Giovannoli (AMNH).

USA: *Florida*: 1♂, Archbold Biol. Stn., Highlands Co., 27-I-[19]59, S.W. Frost (PSUC); 1♂, Isla Morada, upper Matecumba Key, 15-IV-1963, J.G. & B.L. Rozen (AMNH); 1♂, Naples, 19-X-1979, Museum Paris 1994 coll., G. Perrault (MNHN); 1♂, 1♀, Paradise Key, III-[19]19, H. Barber (USNM); 1♀, 3-III-[19]19, Schwartz & Barber (USNM); 2♂, 3-III-[19]19, H.G. Barber (USNM); 1♀, Naranja, 24-IX-1960, R.M. Baranowski (USNM); 1♂, Dade Co., Ross & Castello Ham., 4-X-[19]70, R.M. Baranowski (USNM); 1♂, Prinston, 5-I-[19]70, black light trap, R.M. Baranowski (USNM); 1♂, Miami Dade Co., Black Point Marina Buttonwood, 25°32.4′N, 80°19.7′W, 26-IX-2006, T. Dobbs (USNM); 1♀, T. Dobbs (USNM); 3♀, Dade Co., Agr. Res. & Ed. Ctr., Homestead, 21-X-[19]76, blacklight trap, R.M. Baranowski (USNM); one without abdomen, blacklight trap, R.M. Baranowski, 21-IV-[19]69 (USNM); 2♂, 2♀, Homestead, 26-XI-[19]69, R.M. Baranowski (USNM); 7♂, 4♀, 7-X-[19]69, R.M. Baranowski (USNM); 2♀,

2-IV-[19]70, R.M. Baranowski (USNM); 1♂, 1♀, 11-IV-[19]69, R.M. Baranowski (USNM); 2♂, 2♀, 18-XI-[19]69, R.M. Baranowski (USNM); 1♀, 15-X-[19]69, R.M. Baranowski (USNM); 1♂, 18-XI-[19]68, R.M. Baranowski (USNM); 1♀, Dade Co., 11 km SW Florida city, 30-IV-1986, W. Steiner & D. Bogar (USNM); 2♂, 1♀, Goulds, 24-I-[19]41, in light trap, O.D. Link (USNM); 7♂, 7♀, Monroe Co., Everglades National Park, Flamingo Praire, 8-IV-[19]72, blacklight trap, R.M. Baranowski (USNM); 11♂, 6♀, 23-III-[19]70, blacklight trap, R.M. Baranowski, (USNM); 2♂, 1♀, 4-V-[19]70, blacklight trap, R.M. Baranowski (USNM); 9♂, 22♀, 28-III-[19]70, blacklight trap, R.M. Baranowski (USNM); 2♀, 27-II[19]72, blacklight trap, R.M. Baranowski (USNM); 1♂, 5-IV-[19]58, R.E. Woodruff (USNM); 2♂, 2♀, Monroe Co., Tavernier, Indian Mound Trail, MM89, 30-Xi-[19]87, BL Trap, S. Jewel (USNM); 12♂, 10♀, Monroe Co., North Key Largo Key, 5-III-[19]82, J.A. Slater & R.M. Baranowski (USNM); 1♀, Monroe Co., Stock Island, 23-XII-[19]65, blacklight trap, F.A. Buchanan (USNM); 1♂, 1♀, 28-V-[19]68, blacklight trap, F.A. Buchanan (USNM); one without abdomen, 5-VIII-[19]62, blacklight trap, F.A. Buchanan (USNM); 1♂, 25-X-[19]84, blacklight trap, F.A. Buchanan, (USNM); 2♂, 1♀, Mosq. Control Hdqrs., 10-XI-[19]71, W.H. Pierce (USNM); 21♂, 10♀, Monroe Co., Big Pine Key, Key Deer Refuge, 5-XI-[19]82, blacklight trap, S. Klett (USNM); 13♂, 11♀, 15-XI-[19]82, blacklight trap, S. Klett (USNM); 1♂, 10-XI-[19]82, blacklight trap, S. Klett (USNM).

THE *ILLITUS* GROUP

Included species: Heraeus annulatus sp. nov., *H. antennalis* sp. nov., *H. chamamecinus* sp. nov., *H. illitus*, *H. inca* sp. nov., *H. panamaensis* sp. nov., *H. similis* sp. nov., *H. spinosus* sp. nov., *H. splendens* sp. nov., and *H. tiputini* sp. nov.

Diagnosis

Often setose species; head coriaceous, setose; collar without a well-developed furrow posteriorly (except *H. annulatus* sp. nov.); evaporative area extended, distance from dorsal margin of auricle to dorsal margin of evaporative area subequal to or longer than distance from dorsal margin of evaporative area to dorsal margin of metapleura; hemelytra with heterogeneous colouration pattern; profemur pale brown with dark-brown spots, if predominantly dark, the dorsal region clearly pale; male mesofemur without spines; meso- and metatibia generally with a subproximal dark band; aedeagus with well-developed spines.

HERAEUS ANNULATUS SP. NOV.

(FIGS 15A, 16A, 17A–D, 18)

Diagnosis

Labium extending to mesocoxae. Pedicel with abundant erect setae, equal to or longer than diameter of segment; distiflagellomere with a pale band subbasally. Collar delimited by a furrow; with long erect setae only on anterior pronotal lobe; profemur mottled, with the base and a subapical band darker; metatibia yellowish. The combination of these last four characters allows us to separate *H. annulatus* sp. nov. from the other species of the genus.

Description (Fig. 15A)

Total length 5.80. Strongly setose species.

Head: Flattened dorsally, dark brown clypeus paler, shiny, with abundant short recumbent and long erect setae. Head length 1.15, width 0.93. Postocular length 0.41. Eyes not surpassing the dorsal margin of head in lateral view; with long erect setae between ommatidea. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.45, interocellar width 0.27. Labium pale brown with short erect setae, almost extending to mesocoxae. Labial segment lengths: I 0.53, II 0.72, III 0.61, and IV 0.35. Antennae pale brown except apex of basiflagellomere and distiflagellomere darker, distiflagellomere with a pale band sub-basally; setae short recumbent and semi-erect, pedicel with abundant erect setae, equal to or longer than diameter of segment; basiflagellomere slightly clavate. Antennal lengths: scape 0.48, pedicel 1.04, basiflagellomere 0.86, distiflagellomere 1.04. Length of pale band on distiflagellomere 0.40.

Thorax: Anterior pronotal lobe dark brown, posterior lobe reddish brown with irregular pale areas, humeral angles yellowish; pruinose, with short recumbent and long erect setae, longer on anterior lobe. Pronotum punctate, punctures more conspicuous on posterior lobe. Collar delimited by a furrow, length 0.08, anterior lobe length 0.53, posterior lobe length 0.50; anterior lobe width 0.91, posterior lobe width 1.41. Pleurae brown, acetabular areas reddish brown; punctate, with abundant, short, recumbent setae. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with short recumbent and long erect setae, as on the anterior lobe. Hemelytra pruinose, with short semi-erect setae. General colour pale brown, costal margin pale on proximal three-quarters, corium darker distally with a subapical whitish spot and a rounded pale spot internally. Membrane fuscous, with an apical pale spot, veins paler (Fig. 15A). Legs: Coxae and protrochanter brown, rest of leg whitish, profemur mottled, with base and a subapical band brown; meso- and metafemur with a subapical brown band; tibiae

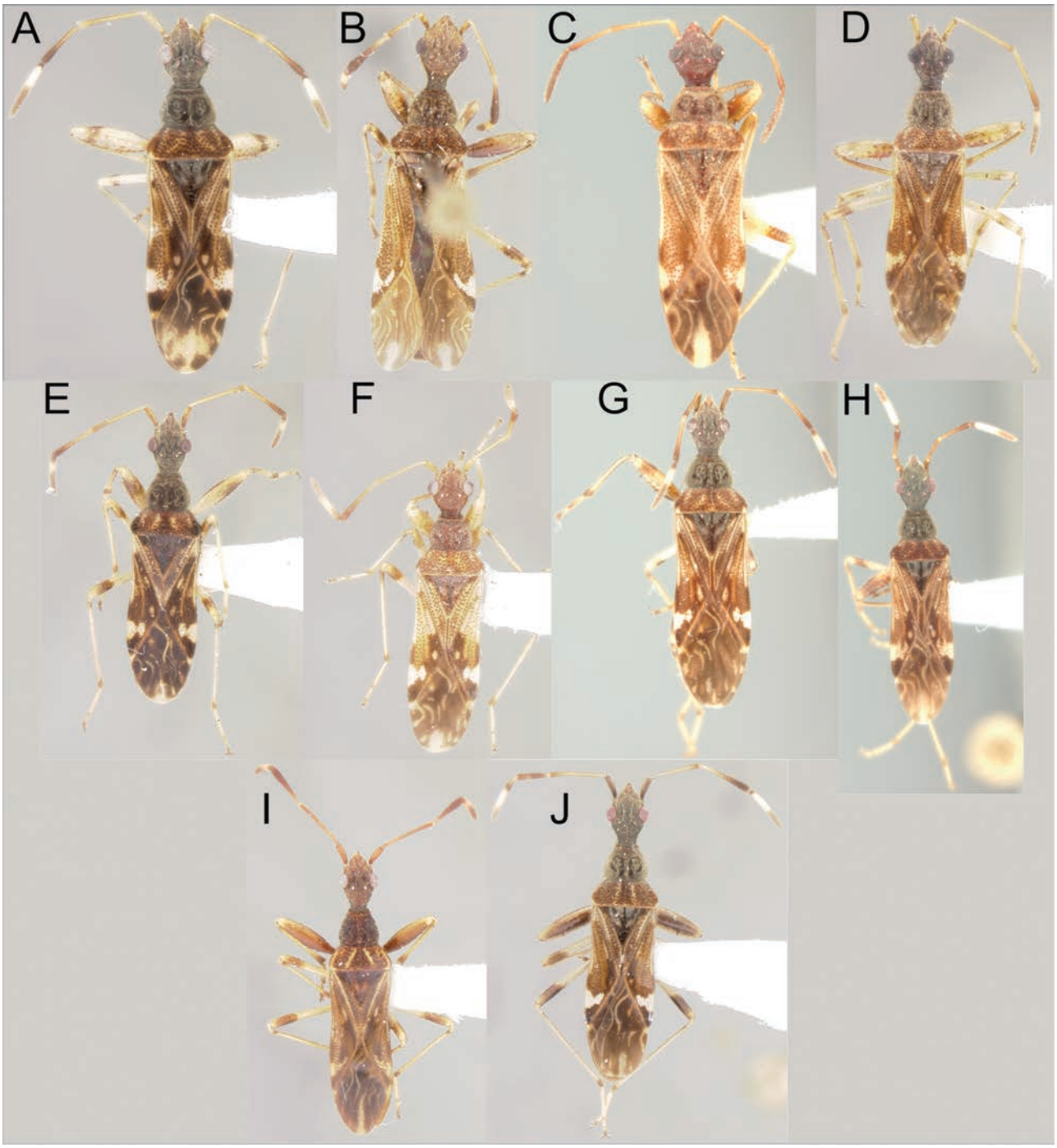

Figure 15. Habitus dorsal: A, ***Heraeus annulatus* sp. nov.**; B, ***Heraeus antennalis* sp. nov.**; C, ***Heraeus chamamecinus* sp. nov.**; D, *Heraeus illitus* Distant, 1882; E, ***Heraeus inca* sp. nov.**; F, ***Heraeus panamaensis*** sp. nov.; G, ***Heraeus similis* sp. nov.**; H, ***Heraeus spinosus* sp. nov.** I, ***Heraeus splendens* sp. nov.**; J, ***Heraeus tiputini* sp. nov.**

brown apically (Fig. 16A); setae long and erect, longer on profemur. Profemur with spines restricted to apical two-thirds.

Abdomen: Brown, with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 17A, B) rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more produced posteriorly; slightly declivent posteriorly in lateral view. Parameres: Figure 17(C, D). Aedeagus: conjunctiva with spines laterally, beneath the ejaculatory reservoir; two

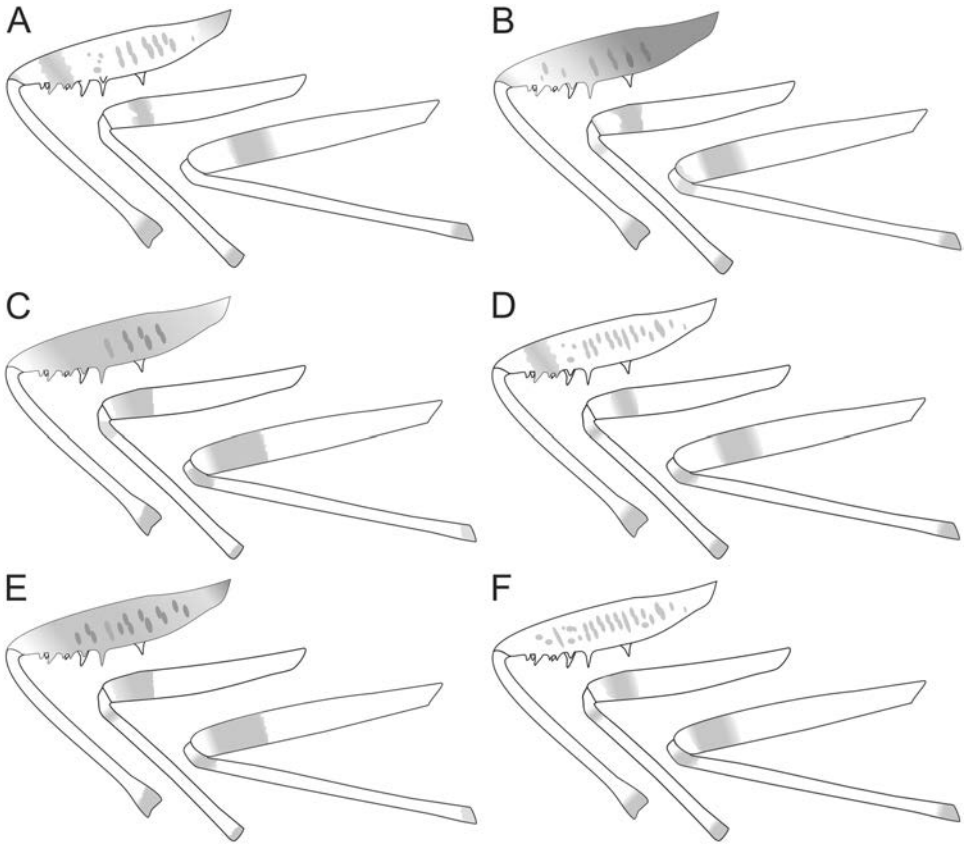

Figure 16. Legs: A, ***Heraeus annulatus* sp. nov.**; B, ***Heraeus antennalis* sp. nov.**; C, ***Heraeus chamamecinus* sp. nov.**; D, *Heraeus illitus* Distant, 1882; E, ***Heraeus inca* sp. nov.**; F, ***Heraeus panamaensis* sp. nov.**

lobes sclerotized with a few spines distally; *processus gonopori* long and slender.

Distribution
Belize, Costa Rica, Honduras, Mexico, and Panama (Fig. 18).

Etymology
The specific ephitet '*annulatus*' is a Latin adjective meaning ringed, and refers to the presence of a subapical band on the profemur.

Type material
Holotype: ♂, **BELIZE:** Cayo District, Benque Viejo, riverside N, Mopan R. Resort, 21-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM).

Paratypes: 3♂, 2♀, same data as for holotype (USNM); 1♂, 1♀, same data as for holotype, 25-VI-[20]08 (MLP); 2♀, San Antonio, VI-1931, J.J. White (USNM); 1♂, Orange Walk, Dist. Gallion Jug, BLT, 17-VII-[20]04, B. Miller (USNM); 1♂, 18-XII-[20]04, BLT, B. Miller (USNM); 2♂, 2♀, 19-VI-[20]05, BLT, B. Miller (USNM); 1♂, 3-V-[20]05, BLT, B. Miller (USNM); 1♀, 27-VI-[20]08, BLT, B. Miller (USNM); 1♂, Orange Walk, Rio Bravo, Cons. Area, well Trail, 9-VII-1996, C.W. & L.B. O'Brien (USNM); 1♂, C.W. & L.B. O'Brien, Lagunitas Trail, 15-VII-1996 (USNM); 1♂, Texas Camp., 21-VII-1996, C.W. & L.B. O'Brien (USNM); 8♂, 10♀, Orange Walk Dist., Chan Chich Lodge, 1-VI-[20]09, BLT, E. Flota (USNM); 2♂, 2♀, BLT, E. Flota (MLP); 1♂, 18-X-[20]09, BLT, E. Flota (USNM); 1♀, 30-X-[20]09, BLT, E. Flota (USNM); 1♂, 1♀, 1-VII-[20]09, BLT, E. Flota (USNM); 1♀, 30-IV-[20]05, C. Sanabria (USNM); 3♀, Cayo District, Benque Viejo, riverside N, Mopan R. Resort, 22-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 3♂, one without abdomen, 23-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 1♀, 24-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 22-IX-[20]09, M. Chrysler (USNM); 1♂, 8-X-2009, M. Chrysler (USNM); 1♀, 10-X-[20]09, M. Chrysler (USNM); 1♂, 12-X-2009, M. Chrysler (USNM); 1♂, 16-X-2009, M. Chrysler (USNM); 1♂, 1♀, 25-X-2009, M. Chrysler (USNM); 1♂, 22-X-[20]06, A. Trujillo (USNM); 1♀, 25-X-[20]06, A. Trujillo (USNM); 1♂, 16-I-[20]07, P. Picon (USNM).

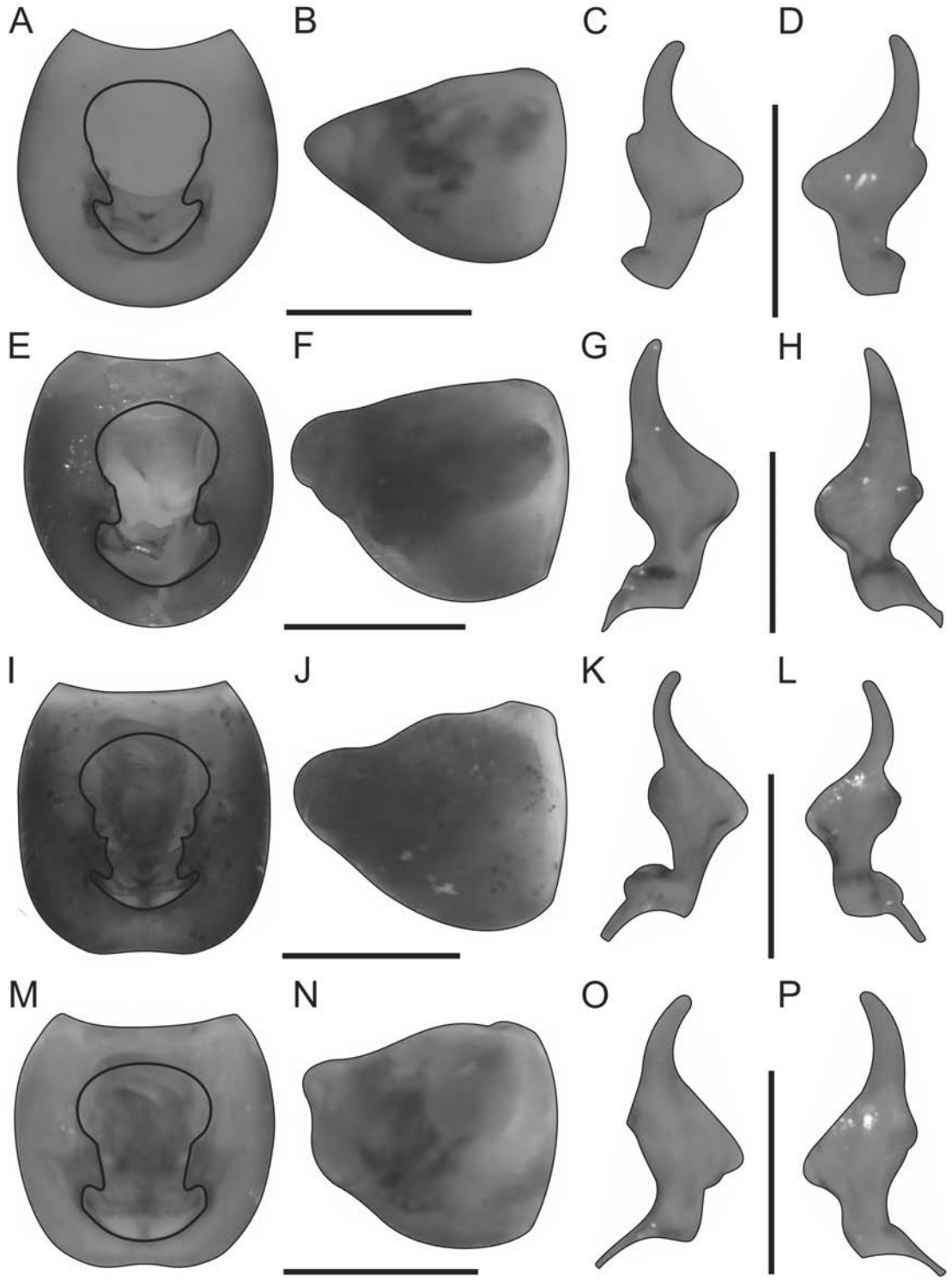

Figure 17. Male genitalia. ***Heraeus annulatus* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus antennalis* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus chamamecinus* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. *Heraeus illitus* Distant, 1882: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

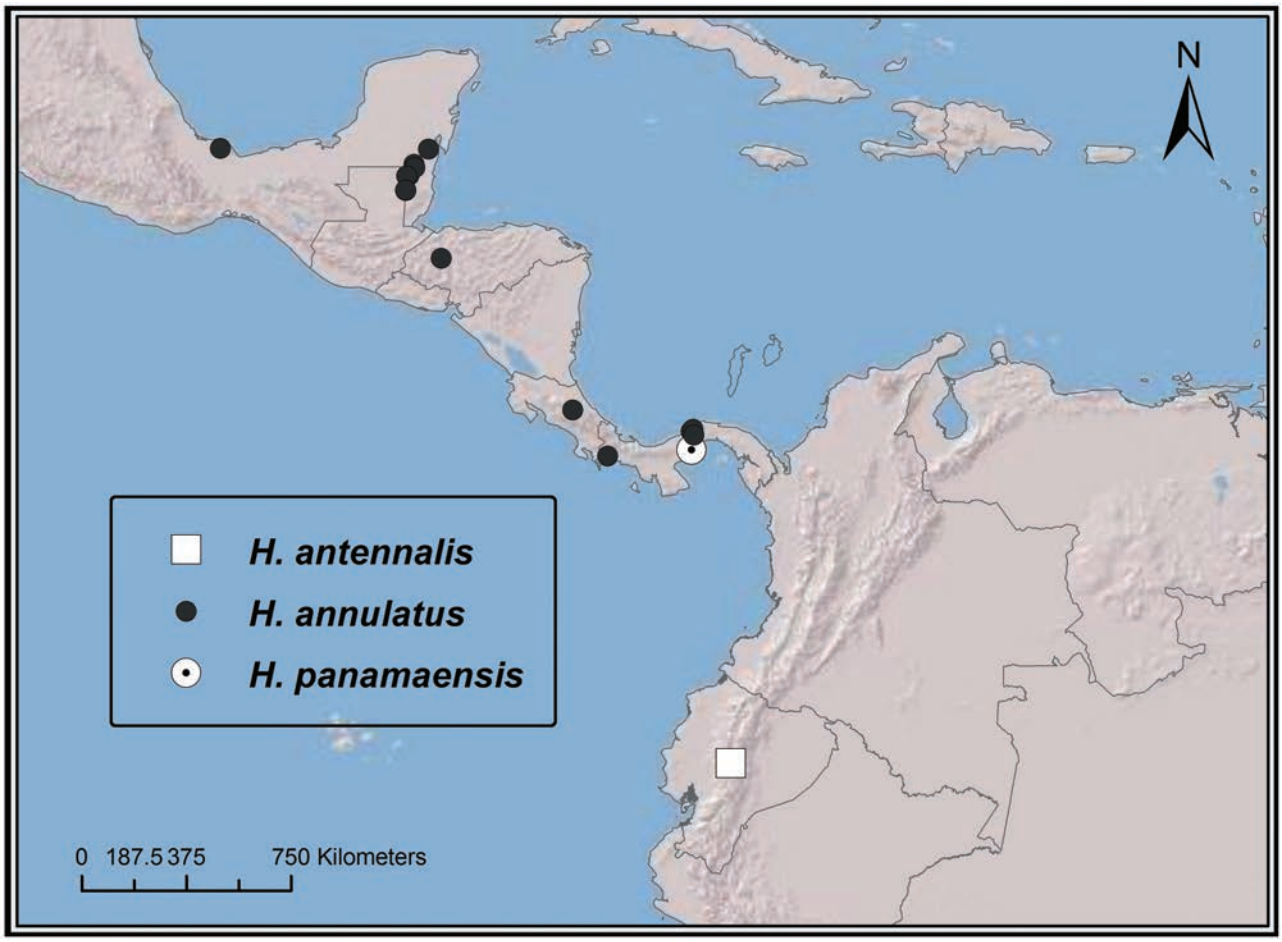

Figure 18. Distributional map of ***Heraeus antennalis* sp. nov.**, ***Heraeus annulatus* sp. nov.,** and ***Heraeus panamaensis* sp. nov.**

Additional material studied

COSTA RICA: 1♀, intercepted at Dover (Delaware, USA) from Costa Rica, 17-I-2000, on *Musa paradisiaca* (USNM); 1♀, La Selva OTS Station, 19-V-1988, J.E. O'Donnell, UVL (UCMS); 1♀, 22/23-V-1988, blacklight, J.E. O'Donnell (UCMS); 1♂, Guanacaste Prov., Palo Verde OTS Station, 22/23-VI-[1]988, blacklight, J.E. O'Donnell (UCMS).

HONDURAS: 1♂, 1♀, S.C.Y., Lago Yojoa, 21-VII-1974, C.W. & L. O'Brien & Marshall (AMNH); 1♂, Dept. Cortes, Puerto Cortes, 3-VI-[19]69, blacklight trap, Blanton *et al*. (USNM); 2♀, Com., 5 km NW Taulabe, Rio Jaitique, 2-VIII-[19]77, O'Brien & Marshall (USNM).

MEXICO: *Veracruz*: 1♀, UNAM, Los Tuxtlas Stac. Biol., N. Catemaco, 16/19-IX-1989, E. Barrera, T.J. Henry & I.M. Kerzhner (USNM).

PANAMA: *C[anal] Z[one]*: 1♀, Gatun, III-1930, Tres Rios Plantation, T.O. Zschokke (CAS); 1♂, Coco Solo Hosp., 14-V-1975, D. Engleman, light trap (AMNH); 1♂, Barro Colorado, XI-1934, M. Bates (AMNH); 1♀, Barro Colorado Island, 30-IV-1962, H. Ruckes (AMNH); 3♀, 24/28-V-[19]64, W.D. & S.S. Duckworth (USNM); 1♂, IV-1941, J. Zetek, lots 41–7231 (USNM); 1♀, Cano Saddle, Gatun L., 3-V-[19]23, R.C. Shannon (USNM); 1♂, 12-V-[19]23, R.C. Shannon, close's Pltn (USNM); *Chiriqui*: 1♀, Bugaba, Champion, from coll. Biol. C. Am. (USNM).

HERAEUS ANTENNALIS SP. NOV.

(FIGS 15B, 16B, 17E–H, 18)

Diagnosis

Strongly setose. Labium extending to mesocoxae. Basiflagellomere clavate. Anterior pronotal lobe dark brown, posterior lobe paler with humeral angles concolorous. Profemur pale brown, mottled with brown. Hemelytra uniformly pale brown, with a white subapical corial spot. Aedeagus spinose, with spines forming an arc on sclerotized vesical lobes.

Heraeus antennalis sp. nov. and *H. splendens* sp. nov. are the only two species in the genus with the

basiflagellomere clavate. *Heraeus antennalis* sp. nov. is strongly setose, with mottled profemora, and the posterior pronotal lobe uniformly pale brown, whereas *H. splendens* sp. nov. is less setose, with a pale inverted V-shaped mark on the posterior pronotal lobe, the profemora are dark but paler dorsally, and the outer margin of clavus is pale.

Description (Fig. 15B)
Total length 6.36. Strongly setose.

Head: Reddish brown, with an elongate neck and short recumbent and long erect setae. Head length 1.46, width 0.99. Postocular length 0.62. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.53, interocellar width 0.27. Labium brown, with erect setae, extending to mesocoxae. Labial segment lengths: I 0.66, II 0.80, III 0.62, and IV 0.32. Antenna brown, pedicel and base of basiflagellomere paler, with short recumbent and sparse short erect setae, distiflagellomere with a narrow sub-basal whitish band. Basiflagellomere clavate. Antennal lengths: scape 0.43, pedicel 1.23, basiflagellomere 0.96, and distiflagellomere 1.06. Length of pale band on distiflagellomere 0.32.

Thorax: Anterior pronotal lobe dark brown, posterior lobe paler, humeral angles concolorous; collar impunctate, delimited posteriorly by a sulcus; anterior and posterior lobes with long erect setae, posterior lobe with short recumbent setae. Pronotum pruinose, posterior lobe punctate. Collar length 0.10, anterior lobe length 0.55, posterior lobe length 0.55; anterior lobe width 0.94, posterior lobe width 1.47. Pleurae dark brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown darker at base and along a longitudinal line to the apex, with long erect setae. Hemelytra pale brown, pattern as in Figure 15(B); inner corial spot diffuse, subapical corial spot present. Membrane brown, with veins paler and with a pale apical spot. Legs: Pale brown except mottled profemur, metafemur with a subapical dark band; and meso- and metatibia with a subproximal dark band, apex of tibiae darker (Fig. 16B). Profemur with long erect setae.

Abdomen: Dark brown to reddish brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 17E, F) rounded, anterior margin of dorsal aperture rounded. Parameres: Figure 17(G, H). Aedeagus spinose, with spines forming an arc on sclerotized vesical lobes; *processus gonopori* long and slender.

Distribution
Ecuador (Fig. 18).

Etymology
The specific ephitet is a noun and refers to the clavate basiflagellomere of the antenna.

Type material
Holotype: ♂, **ECUADOR:** Yanayacu, 400 m a.s.l., IX/X-1977, L.E. Peña G. (USNM).

HERAEUS CHAMAMECINUS SP. NOV.

(FIGS 8F–G, 15C, 16C, 17I–L, 19)

Diagnosis
Strongly setose. Ocelli located posteriorly. Distiflagellomere without or with only a weakly developed pale band. Profemur irregularly pigmented. Metafemur with a conspicuous dark apical band. Posterior margin of pygophore in dorsal view weakly bilobed; aedeagus with spines laterally to the ejaculatory reservoir and on the sclerotized vesical lobes forming an arc.

Heraeus chamamecinus sp. nov. shares with *H. illitus* and *H. similis* sp. nov. a highly setose body, and the presence of a slightly bilobed posterior margin of pygophore, but it can be distinguished by the absence of a well-defined pale band on distiflagellomere, and the short labium not surpassing the mesocoxae.

Description (Fig. 15C)
Total length 6.18. Strongly setose.

Head: Convex dorsally, dark brown, shiny, coriaceus, with short recumbent and long erect setae. Head length 1.25, width 1.01, postocular length 0.46. Eyes protruding, not surpassing dorsal margin of head in lateral view. Ocelli placed posterior to an imaginary line passing posterior border of eyes. Interocular width 0.51, interocellar width 0.34. Labium pale brown, apex of article IV darker; with erect setae, extending to mesocoxae. Labial segment lengths: I 0.80, II 0.88, III 0.78, and IV 0.32. Antennal tubercles parallel. Antennae pale brown, except distal third of basiflagellomere and distiflagellomere darker; distiflagellomere without pale band; all segments with short recumbent and long erect setae, pedicel with abundant erect setae, equal to or longer than diameter of segment. Antennal lengths: scape 0.48, pedicel 1.18, basiflagellomere 0.96, distiflagellomere 1.02.

Thorax: Pronotum pruinose; dark brown, posterior lobe with irregular pale areas, and humeral angles dark brown with a small pale spot. Surface punctate, more conspicuous on posterior lobe. Anterior lobe with long erect and short recumbent setae, posterior lobe with erect setae shorter than setae of anterior lobe. Collar length 0.08, anterior lobe length 0.62, posterior lobe length 0.54; anterior lobe width 0.99, posterior lobe width 1.57. Pleurae brown. Evaporative area extended. Scutellum brown, pruinose, punctate, setae

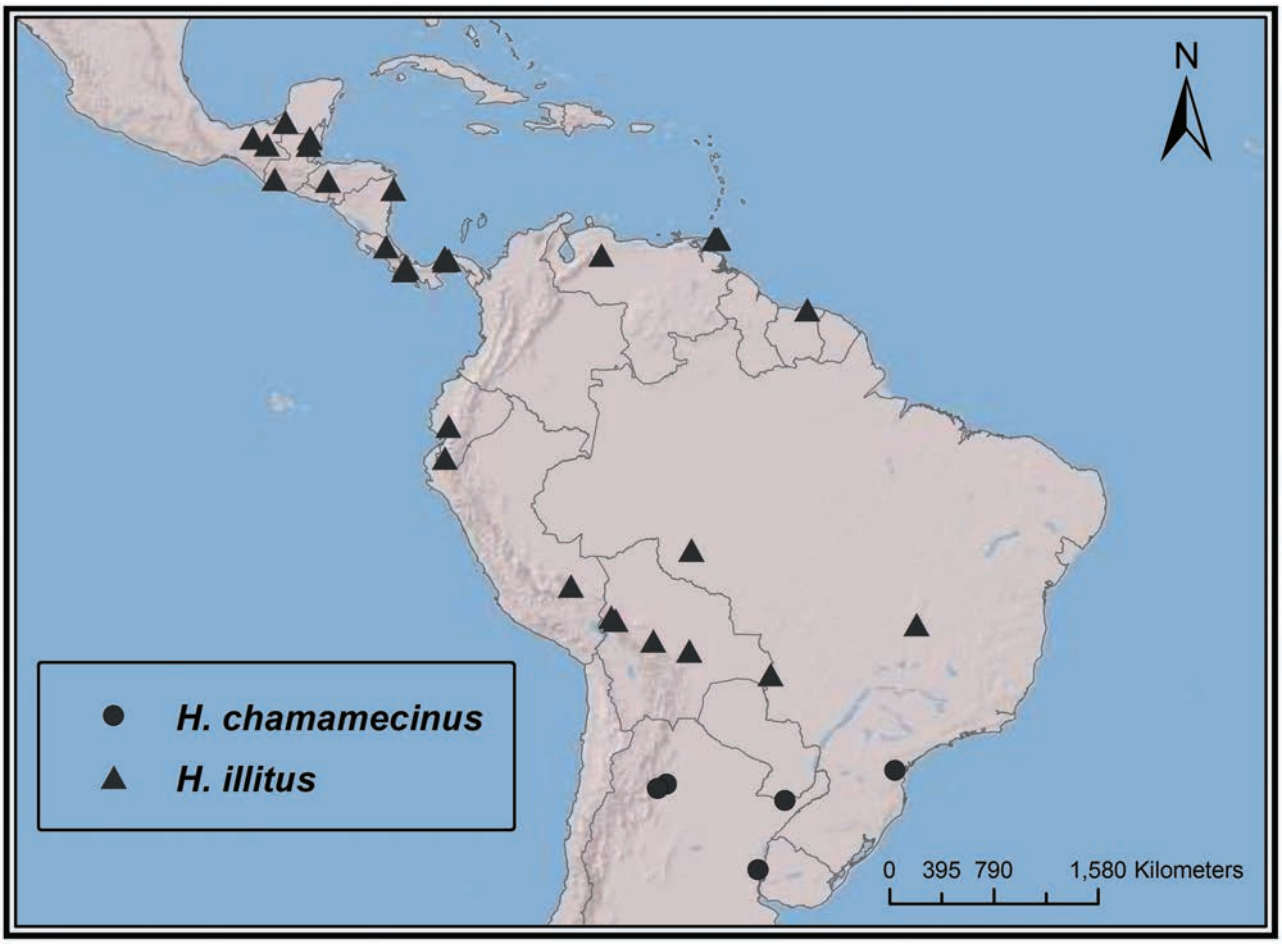

Figure 19. Distributional map of ***Heraeus chamamecinus* sp. nov.** and *Heraeus illitus* Distant, 1882.

similar to setae on anterior lobe. Hemelytra pruinose, with erect and semi-erect setae. Colour pale brown, costal margin pale on proximal three-quarters, with a subapical corial spot, dark pattern as in Figure 15(C); membrane with a pale, ovoid, apical spot, veins pale. Legs: Pale brown, coxae, profemur, and pretarsus darker; profemur irregularly pigmented; metafemur with a conspicuous dark band apically, less evident on mesofemur. Meso- and metatibia with a subproximal dark band, apex of tibiae darker (Fig. 16C). Legs with abundant erect setae, longest on profemur. Profemur with spines restricted to apical two-thirds. Protibia slightly curved.

Abdomen: Brown with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 17I, J) subquadrangular, with posterior margin slightly bilobed and depressed towards aperture, anterior margin of dorsal aperture rounded, inner projections subquadrangular. Parameres: Figure 17(K, L). Aedeagus (Fig. 8F, G): conjunctiva with an anterior lobe basal to ejaculatory reservoir; vesica with spines lateral to ejaculatory reservoir, forming an arc on the sclerotized vesical lobes; *processus gonopori* long and slender.

Variability observed in paratypes
Some specimens show a weakly developed pale band on distiflagellomere.

Distribution
Argentina and Brazil (Fig. 19).

Etymology
The specific epithet is a noun in aposition and refers to the typical music style (Chamamé) from the Argentinian province of Corrientes.

Type material
Holotype: ♂, **ARGENTINA**, *Corrientes*: Ituzaingo, Reserva Santa María, 30-X-2003, T. luz, M.C. Melo (MLP).

Paratypes: 22♂, 14♀, same data as for holotype (MLP); 6♂, 8♀, same data as for holotype (USNM); 1♀, same data as for holotype, P.M. Dellapé (MLP); 2♂, 4♀, same data as for holotype, M. Chayle (MLP); 1♂, 31-X-2003, M.C. Coscarón col. (MLP); 2♂, 3♀, 29-X-2003, P.M. Dellapé col. (AMNH); 2♂, 1♀, 29-X-2003, P. Dellapé col. (USNM); 6♂, 7♀, 29-X-2003, P.M. Dellapé col. (MLP); 1♂, 1♀, 27-IV-2003, M.C. Melo col. (MLP); 3♂, P.M. Dellapé col. (MLP); *Tucumán*: 1♂, Ciudad Universitaria, 800 m a.s.l., 18-II-[19]59, J.F.G. Clarke (USNM); 1♀, Depto Burruyacú, Rio Salas, 12-II-1982, R. Golbach (IFML); 1♀, Horco Molle, 1/18-IX-1966, L. Stange (IFML); *Entre Rios*: 5♂, X-1994 (USNM); 1♀, X-[19]93, E. Foerster (USNM); 1♂, 1♀, X-[19]93, Peña & Ugarte (USNM). **BRAZIL:** 1♀, Banhado Purane, 14-II-[19]02, E.G. & E.A. Monroe (CNC); *Paraná*: 1♂, 58 km S Curitiba, Sao Jose dos Pinhais, 24-XI-1985, T.J. Henry (USNM).

HERAEUS ILLITUS DISTANT, 1882
(FIGS 8H, 15D, 16D, 17M–P, 19)

Heraeus illitus Distant, 1882: 205; Distant, 1893: 397; Lethierry & Severin, 1894: 191; Scudder, 1967: 268 (lectotype designation); Slater, 1964: 1083; Slater & O'Donnell, 1995: 147; Harrington, 1980: 109; Froeschner, 1999: 244; Slater & Brailovsky, 2000: 332; Baranowski & Slater, 2005: 142.

Diagnosis

Strongly setose. Ocelli located posteriorly. Distiflagellomere with a pale band. Labium extending to abdominal sternum II. Profemur irregularly pigmented; metafemur with a darker subapical band. Posterior margin of pygophore in dorsal view slightly bilobed; aedeagus with conjunctiva and vesica with a few spines laterally, and lobes sclerotized posteriorly, with spines forming an arc.

Heraeus illitus shares with *H. chamamecinus* sp. nov. and *H. similis* sp. nov. a strongly setose body and a slightly bilobed posterior margin of pygophore. *Heraeus illitus* and *H. caliginosus* are the only species of the genus that have a long labium exceeding the metacoxae.

Redescription (Fig. 15D)

Strongly setose.

Head: Convex dorsally, dark brown, clypeus paler, shiny, with short recumbent setae. Eyes protruding, not surpassing the dorsal margin of head in lateral view. Ocelli placed posteriorly to an imaginary line passing the posterior border of eyes. Labium pale brown, extending to base of abdomen, with short erect setae. Antennal tubercles parallel. Antennae pale brown except apex of pedicel, basiflagellomere and distiflagellomere darker, distiflagellomere with a pale band subbasally; all segments with short recumbent and semi-erect setae, pedicel with abundant erect setae, equal to or longer than diameter of segment.

Thorax: Pronotum brown, pruinose, posterior lobe with irregular pale areas and a pale spot on humeral angles, anterior and posterior lobes with short recumbent and long erect setae. Pronotum punctate, punctures more conspicuous on posterior lobe. Pleurae brown, with semi-erect setae. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with short recumbent, and long erect setae. Hemelytra pruinose, with abundant erect setae. General colour pale brown, costal margin pale on proximal three-quarters. Corium darker distally, with a subapical whitish spot and a rounded pale spot internally. Membrane testaceous, with an apical rounded pale spot, veins paler. Legs pale brown, coxae darker, profemur darker and irregularly pigmented; metafemur with a subapical darker band, only slightly evident on mesofemur. Meso- and metatibiae with a subproximal dark band, apices darker (Fig. 16D), with long erect setae, longest on profemur. Profemur with spines restricted to apical three-quarters.

Abdomen: Brown, with abundant, short, recumbent, and longer erect setae. Male genitalia: Pygophore subquadrangular (Fig. 17M, N), posterior margin slightly bilobed; anterior margin of dorsal aperture rounded, inner projections large and subrectangular. Parameres as shown in Figure 17(O, P). Aedeagus (Fig. 8H): conjunctiva and vesica with spines laterally; lobes sclerotized posteriorly, with spines forming an arc; *processus gonopori* long.

Distribution

Guatemala, Mexico, Panama, Trinidad; Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, French Guiana, Guatemala, Honduras, Nicaragua, Peru, Suriname, and Venezuela (NEW RECORDS) (Fig. 19).

Type material examined

The type series of this species consists of specimens from Guatemala and Panama; Scudder (1967) designated a male from San Juan, Verapaz, Guatemala, as the lectotype. Lectotype ♂, San Juan, Vera Paz, Champion (BMNH).

Additional material studied

BELIZE: 1♂, Cayo District, Benque Viejo, riverside N, Mopan R. Resort, 16-I-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 21-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 3♂, 22-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 7♂, 6♀, 22-VI-[20]06, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 3♀, 23-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 24-VI-[20]08, BLT, R.M. & H.V. Baranowski

(USNM); 1♀, 1-X-2009, M. Chrysler (USNM); 1♂, 4-X-2009, M. Chrysler (USNM); 1♀, 7-X-2009, M. Chrysler (USNM); 1♀, Orange Walk Dist., Chan Chich Lodge, 12-IV-[20]04, BLT, R.M. & H.V. Baranowski (USNM); 1♀, 13-XI-[20]04, C. Sanabria (USNM); 1♂, 21-IV-[20]04, E. Flota (USNM); 2♀, 1-VI-[20]09, E. Flota (USNM); 1♂, Orange Walk Dist., Gallon Jung., BLT, 7-IV-[20]04, B. Miller (USNM).

BOLIVIA: *Cochabamba*: 1♀, Chapare Prov., Cristal-Mayu, 14-X-1950, L.E. Pena (USNM); *La Paz*: 2♂, 1♀, Rio Coroico, 1200 m a.s.l., 24/26-XI-[19]84, L.E. Pena (USNM); 2♀, Mapiri, N La Paz, 10/16-VIII-[19]89, L.E. Peña (USNM); 1♂, 1♀, Yungas, Pte. Mururata, 1200–1600 m a.s.l., 24/26-XII-1984, L.E. Pena (USNM); *Santa Cruz*: 1♂, San Esteban Prov., Muyurina, 49 km N Santa Cruz, 1120 ft, 12-X-[19]59, blacklight trap, R.B. Cumming (USNM); 1♂, 2♀, 5-X-[19]59, blacklight trap, R.B. Cumming (USNM); 2♀, 26-X-[19]59, blacklight trap, R.B. Cumming (USNM).

BRAZIL: 1♀, Monat. IV-1935, P. Sandig (USNM); 1♀, DF, 35 km N Brasilia, nr Planaltina, 15°35′S, 47°42′W, 1000 m a.s.l., 17-XI-1997, T.J. Henry (USNM); *Mato Grosso*: 1♀, Corumba, H.G. Barber (USNM); *Rondonia*: 1♂, 62 km S Ariquemes, Faz. Rancho Grande, 10°32′S, 62°48′W, 11/22-XI-1991, B.C. Ratcliffe (USNM); 1♂, 30-III/10-IV-1992, collected with mercury vapour & blacklight, J.E. Eger (USNM); 20♂, 23♀, 62 km SW Ariquemes, nr Fzda. Rancho Grande, 5/17-X-1993, blacklight trap, J.E. Eger (USNM).

COLOMBIA: 1♀, Apiay, Meta, 14-VII-1965, J.A. Ramos (USNM).

COSTA RICA: 1♀, intercepted on fruit of from Costa Rica.

ECUADOR: 1♀, Guay., Olon, 29-II-1976, blacklight, J. Cohen, Ecuador Peace Corps, Smithsonian Institution Aquatic Insect Survey (USNM); 1♀, Catacocha, Macara, 400–650 m a.s.l., 14/15-VIII-1977, L.E. Pena G. (USNM).

GUATEMALA: 1♂, Cerro Zunil, 4000 ft, Champion, BCA, Hem. 1, *H. illitus* (BMNH).

HONDURAS: 1♂, Com., 21 km NW Siquatepeque Ch., 5 Rd, 1-VIII-1977, O'Brians & Marshall (AMNH).

MEXICO: *Tabasco*: 1♂, Teapa, Feb., H.H.S., BCA, Hem. 1, *H. illitus*. (BMNH); *Campeche*: 1♀, 19 mi. SW Esparcedga, 4-VIII-1974, C.W. & L.B. O'Briens & G.B. Marshall (AMNH); 1♀, Esparcedga, 25-IV-1962, trap light, F. Islas S. (USNM); *Chiapas*: 1♂, Rio Tulija, 48 km S Palenque, 17-V-1981, C.M. & O.S. Flint Jr. (USNM).

NICARAGUA: 1♀, Puerto Cabezas, VII-1971, J. Maldonado C. (USNM).

PANAMA: 1♂, Panama aircraft, 6-II-[20]02 (USNM); 3♂, 1♀, V. de Chiriqui, 25–4000 ft Champion, BCA, Hem. 1, *H. illitus* (BMNH); *Chiriqui*: 1♀, Rovira, 5-VII-[19]64, 2500 ft, mosquito light trap, A. Bruse (USNM); 1♂, Bugaba, Champion (USNM); *Canal Zone*: 1♀, Madden Dam, 7-VI-[19]73, light trap, D. Engleman (USNM); 1♂, Coco Solo Hospital, 9°21′N, 79°51′W, 23-V-[19]72, D. Engleman (USNM); 1♀, Barro Colorado Island, IV-1941, at light, J. Zetek (USNM); 1♀, Puerto Bello, 19-II-[19]12, A. Busck (USNM); 1♂, Trinidad Riv., 4-V-[19]11, A. Busck (USNM).

PERU: 1♂, 2♀, Cuzco, Pilcopata, 600 m a.s.l., 8/10-XII-1979, premontane moist forest, J.B. Heppner (USNM).

SURINAME: 1♀, 40 km E Paramaribo, 22/30-VII-[19]75, D. Engleman (AMNH); 1♀, 22/30-VII-[19]75, D. Engleman (USNM).

TRINIDAD: 1♂, Curepé, Santa Margarita circular Rd, 7-VII-1971, blacklight trap, F.D. Bennett (USNM); 1♂, 6-VII-[19]71, black light trap, F.D. Bennett (USNM); 1♀, 23-VII-1971, blacklight trap, F.D. Bennett (USNM); 2♀, 9-VI-[19]75, blacklight trap, F.D. Bennett (USNM); 1♂, 15-XI-[19]71, black light trap, F.D. Bennett (USNM); 1♂, 1♀, 28-VII-[19]75, blacklight trap, F.D. Bennett (USNM); 1♀, 29-VI-[19]75, blacklight trap, F.D. Bennett (USNM); 1♂, 1♀, Maracas Valley, 1 mi. N St Joseph, 3-IV-[19]79, blacklight trap, L. Du Bruijn (USNM); 1♀, 8-IV-[19]79, blacklight trap, L. Du Bruijn (USNM); 1♂, 1♀, B.W.I., Arima Valley, 3-V-1952 (AMNH), 1♂, Curepé, Santa Margarita Circular Rd., 23-VII-1971, blacklight trap, F.D. Bennett (AMNH); 1♀, 15-VI-[19]75, blacklight trap, F.D. Bennett (AMNH); 3♂, 2♀, Simla Biol. Sta. Trinidad, at light, M. Emsley (AMNH); 1♀, Port of Spain, R.J. Crew (USNM); 3♀, Trinidad, IV/V-1976, J. Carayon (MNHN).

VENEZUELA: 1♀, Acarigua Est. Portuguesa, VI-[19]81 (USNM).

HERAEUS INCA SP. NOV.

(FIGS 15E, 16E, 20A–D, 22)

Diagnosis

Ocelli posterior. Postocular region subequal to twice the length of an eye. Labium extending to mesocoxae. Distiflagellomere with a pale band. Pronotum with long erect setae only on anterior pronotal lobe. Profemur darker on distal half, paler dorsally; meso- and metafemur with a subapical dark band; meso- and metatibia with a narrow band on basal region. Aedeagus with two pairs of lobes on vesica, with the posterior lobe large and strongly sclerotized posteriorly. *Processus gonopori* long, widening towards apex.

Heraeus inca sp. nov. is similar to *H. tiputini* sp. nov. in having the ocelli placed posteriorly, the profemur paler dorsally, the metafemur darker apically (with a dark band instead of darker distally in a few

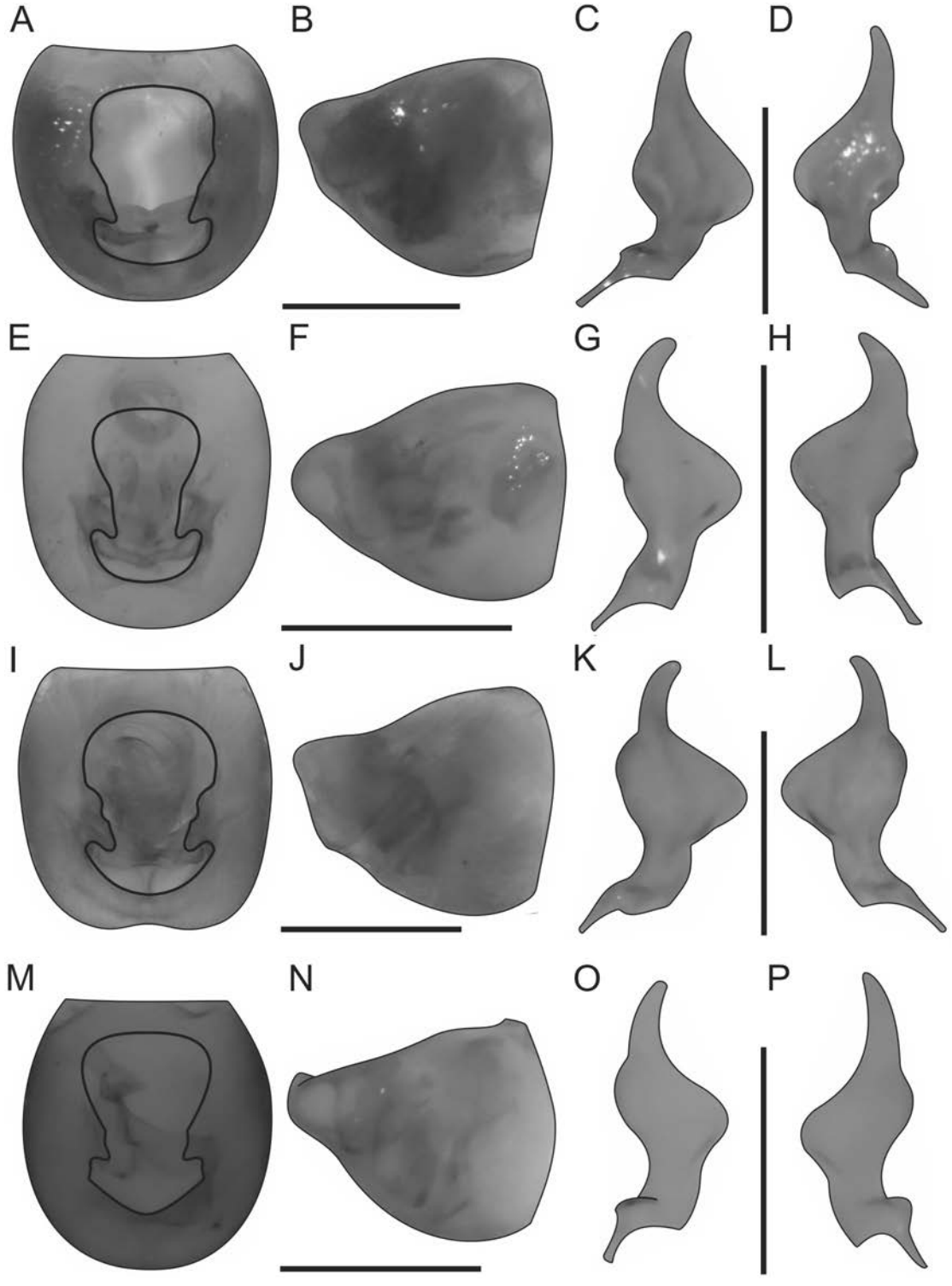

Figure 20. Male genitalia. ***Heraeus inca* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus panamaensis* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus similis* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus spinosus* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

specimens of *H. inca* sp. nov.), and the *processus gonopori* long and widening towards apex. *Heraeus inca* sp. nov. shows a narrow band on basal region of metatibia that is absent in *H. tiputini* sp. nov., in which the metatibia is uniformly yellowish. In *H. inca* sp. nov., the anterior margin of dorsal aperture of pygophore is slightly rounded with lateral regions angulate, and the posterior vesical lobe is large and strongly sclerotized posteriorly, whereas in *H. tiputini* sp. nov., the anterior margin of dorsal aperture of pygophore is rounded, and the vesical lobes are not sclerotized.

Description (Fig. 15E)

Total length 6.18. Setose species.

Head: Convex dorsally, dark brown, dull, with short recumbent and long erect setae. Head length 1.02, width 0.93, postocular length 0.56. Eyes protruding, not surpassing the dorsal margin of head in lateral view. Ocelli posterior to an imaginary line passing posterior border of eyes. Interocular width 0.46, interocellar width 0.26. Labium pale brown, segments III and IV darker, with short erect setae; nearly extending to mesocoxae. Labial segment lengths: I 0.80, II 0.83, III 0.64, and IV 0.37. Antennal tubercles parallel. Antennae pale brown, except for dark-brown scape and distal half of basiflagellomere; distiflagellomere with a pale band; setae short and recumbent. Antennal lengths: scape 0.50, pedicel 1.38, basiflagellomere 1.14, and distiflagellomere missing.

Thorax: Pronotum pruinose, anterior lobe dark brown, posterior lobe brown with two longitudinal incomplete stripes medially and two diffuse lateral pale stripes. Anterior lobe of pronotum with long erect and short recumbent setae, posterior lobe with short recumbent and semi-erect setae, longest on lateral margins. Collar length 0.08, anterior lobe length 0.62, posterior lobe length 0.56; anterior lobe width 0.93, posterior lobe width 1.42. Pleurae dark brown. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with long erect and short recumbent setae. Hemelytra pruinose, with erect and semi-erect setae; pale brown, costal margin pale on proximal three-quarters, with a subapical corial spot; colour pattern as in Figure 15E. Membrane fuscous with an apical pale spot, veins paler. Legs: Legs pale brown, profemur darker on distal half and paler dorsally; meso- and metafemur with an apical dark band; meso- and metatibia with a thin dark band on basal region, apex of tibiae darker (Fig. 16E) tarsus I missing. Profemur elongate, slightly incrassate, with spines restricted to distal two-thirds. Legs with erect setae, longest on profemora.

Abdomen: Brown, with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 20A, B) rounded, anterior margin of dorsal aperture slightly rounded with lateral regions angulate, inner projections more pronounced posteriorly. Parameres: Figure 17(C, D). Aedeagus: conjunctiva unspined. Vesica with two pairs of lobes, the anterior lobe short, not sclerotized, and with spines, and the posterior lobe large, strongly sclerotized posteriorly, and with a row of spines. *Processus gonopori* long, widening towards apex.

Variability observed in paratypes

Most of the paratypes have a dark apical band on the metafemur, but in a few specimens the band is reduced and appears subapical; even the apical bands sometimes have a narrowly pale apex. Both apical and subapical metafemoral bands occur in specimens from the same series.

Distribution

Bolivia, Brazil, Ecuador, and Peru (Fig. 22).

Etymology

The specific epithet is a noun in aposition and refers to the Inca people from Ecuador and Peru.

Type material

Holotype: ♂, **PERU:** Avispas, X-1952, L.E. Peña (USNM).

Paratypes: **BOLIVIA:** *La Paz*: 1♂, 3♀, Guanay, X/XI-1993, L.E. Peña (USNM); 2♂, 4♀, Guanay, Tres Esteros, 19/25-VIII-[19]89, L.E. Peña (USNM); 1♂, 1♀, L.E. Peña (MLP); 1♂, 1♀, Guanay, Uyapi, X-1994, G. Castillo (USNM); 1♂, 1♀, G. Castillo (MLP). **BRAZIL:** *Mato Grosso*: 1♀, NE Caceres, 21-VII-[19]88 (USNM). **ECUADOR:** *Napo*: 1♂, Limoncocha, 15-VI-1977, collected in Malaise trap, P.J. Spangler & D.R. Givens (USNM); *Zamora-Chinchipe*: 1♂, Yanzaza, 16-VI-1976, A. Langley *et al*., Ecuador Peace Corps, Smithsonian Institution Aquatic Insect Survey (USNM); *Tungurahua*: 1♂, ~29 km N of Puyo, 22-I-1974, 3800 ft, R.M. King, on *Austroeupatorium inulaefolium*, compositae at USNM coll. (USNM); 1♂, 2♀ 1, Gualaquiza, 1000 m a.s.l., 25/28-VIII-1977, L.E. Pena G. (USNM). **PERU:** 3♀, Madre de Dios, Avispas, 10/30-IX-1962, L.E. Peña (AMNH); 1♀, L.E. Peña (MLP); 1♂, 2♀, Sinchono, VII-[19]28, J.G. Sanders (OSUC); 2♀, Cueva de los Pavos, 15 km S Tingo María, 15-VII-1968, C.W. & L. O'Brien (AMNH); 1♀, Bella Durmiente near Tingo María, 12-VII-1968, C.W. & L. O'Brien (AMNH); 1♂, 24 km W Aguaytia between Pucallpa y Tingo María, C.W. & L. O'Brien (AMNH); 1♀, Satipo, 10-VIII-1941, P. Paprzycki (USNM); 1♀, 17-VIII-1941, P. Paprzycki (USNM).

HERAEUS PANAMAENSIS SP. NOV.

(FIGS 15F, 16F, 18, 20E–H)

Diagnosis

Strongly setose. Ocelli placed at level of an imaginary line passing posterior border of eyes. Labium

extending to mesocoxae. Distiflagellomere with a pale band sub-basally. Profemur irregularly pigmented with brown; meso- and metatibia with a sub-basal brown band. Vesica with two sclerotized lobes bearing a few spines anteriorly near apices.

Description (Fig. 15F)
Total length 5.65. Strongly setose.

Head: Brown, clypeus paler, shiny, coriaceous, with abundant, short, recumbent, and long erect setae. Head length 1.10, width 0.90. Postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view, with long erect setae between ommatidea. Ocelli at level of an imaginary line passing posterior border of eyes. Interocular width 0.46, interocellar width 0.27. Labium pale brown, with short erect setae, extending to mesocoxae. Labial segment lengths: I 0.64, II 0.72, III 0.54, and IV 0.38. Antennae pale brown, except basiflagellomere distally and distiflagellomere darker, distiflagellomere with a pale band sub-basally; all segments with short, recumbent, and erect setae, pedicel with abundant erect setae, equal to or longer than diameter of segment; basiflagellomere weakly clavate. Antennal lengths: scape 0.34, pedicel 1.10, basiflagellomere 0.96, distiflagellomere 1.09. Length of pale band on distiflagellomere 0.32.

Thorax: Pronotum with anterior lobe brown, collar and posterior lobe paler; posterior lobe with irregular pale areas, humeral angle with a whitish spot surrounded by a darker area; pruinose; with short recumbent and long erect setae, longest on anterior lobe. Collar delimited posteriorly by a punctate sulcus. Pronotum punctate, punctures larger on posterior lobe. Collar length 0.06, anterior lobe length 0.53, posterior lobe length 0.51; anterior lobe width 0.85, posterior lobe width 1.34. Pleurae brown, punctate, pruinose, with semi-erect setae. Evaporative area extended. Scutellum brown, pruinose, punctate, with short recumbent and long erect setae, as on anterior lobe. Hemelytra pruinose, with abundant, short, semi-erect setae; pale brown, costal margin pale on proximal three-quarters, corium darker distally, with a subapical whitish spot and a rounded pale spot internally. Membrane dark brown, with an apical whitish spot, veins paler (Fig. 15F). Lateral margins slightly concave. Legs: Coxae brown, remainder of legs whitish, except profemur irregularly pigmented with brown; femora and tibiae yellowish brown, with subapical band on meso- and metafemur, and sub-basal band on meso- and metatibia darker, tibiae and tarsi apically and pretarsi darker brown (Fig. 16F); setae long and erect, longest on profemur. Profemur with spines restricted to apical half; protibia straight, with minute tubercles. Protibiae and mesofemur without spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 20E, F) rounded, elongate, anterior margin of dorsal aperture rounded, inner projections elongate, more produced posteriorly; declivent posteriorly in lateral view. Parameres: Figure 20(G, H). Aedeagus: vesica with two sclerotized lobes and a few spines anteriorly near apices; *processus gonopori* long and slender.

Distribution
Panama (Fig. 18).

Etymology
The specific epithet '*panamaensis*' is an adjective referring to the country where the holotype was collected.

Type material
Holotype: ♂, **PANAMA:** Cerro Campana, Dist. Chame, 2-V-1976, D. Engleman (AMNH).

HERAEUS SIMILIS SP. NOV.

(FIGS 15G, 20I–L, 21A, 22)

Diagnosis
Ocelli located posteriorly. Distiflagellomere with a subbasal pale band. Labium extending to metacoxae. Profemur irregularly pigmented; metafemur with a subapical dark band. Posterior margin of pygophore slightly bilobed.

Heraeus similis sp. nov. shares with *H. chamamecinus* sp. nov. and *H. illitus* a highly setose body and the presence of a weakly bilobed posterior margin of pygophore, but it can be distinguished by the length of the labium extending to the metacoxae (whereas it attains abdominal segment II in *H. illitus* and extends to the mesocoxae in *H. chamamecinus* sp. nov.).

Description (Fig. 15G)
Total length 6.56. Strongly setose.

Head: Convex dorsally, dark brown, shiny, with short recumbent and long erect setae. Head length 1.44, width 0.96. Postocular length 0.54. Eyes protruding, not surpassing the dorsal margin of head in lateral view. Ocelli placed posterior to an imaginary line passing the posterior border of eyes. Interocular width 0.48, interocellar width 0.29. Labium pale brown with long erect setae, extending to metacoxae. Labial segment lengths: I 1.01, II 1.12, III 1.12, and IV 0.40. Antennal tubercles parallel. Antennae: Scape brown, pedicel and basiflagellomere light brown, darkened apically, distiflagellomere brown with a sub-basal pale brown band; all segments with short semi-erect and erect setae, pedicel with abundant erect setae, equal to or longer than diameter of segment. Antennal lengths: scape 0.53, pedicel 1.36, basiflagellomere 1.15, distiflagellomere 1.28. Length of pale band on distiflagellomere 0.38.

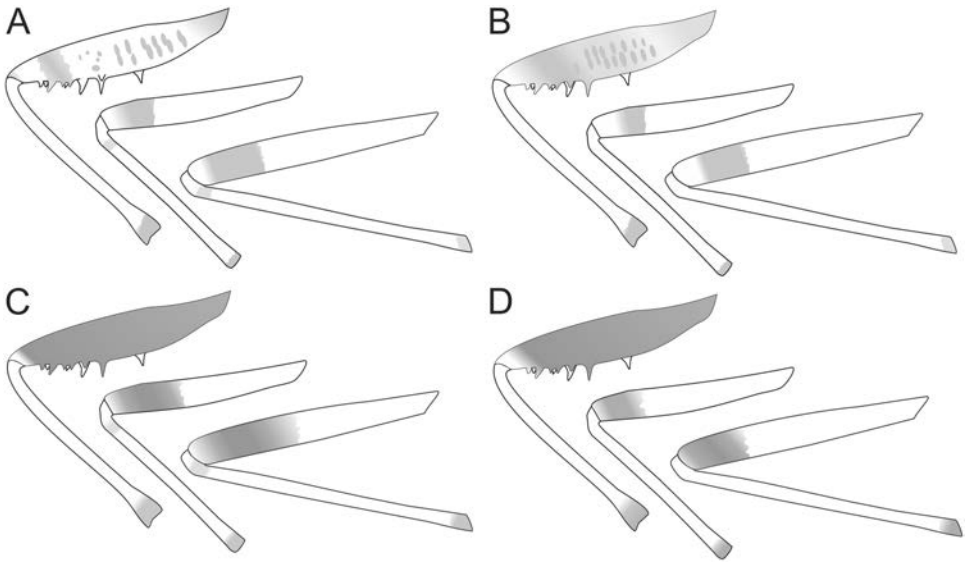

Figure 21. Legs: A, ***Heraeus similis* sp. nov.**; B, ***Heraeus spinosus* sp. nov.**; C, ***Heraeus splendens* sp. nov.**; D, ***Heraeus tiputini* sp. nov.**

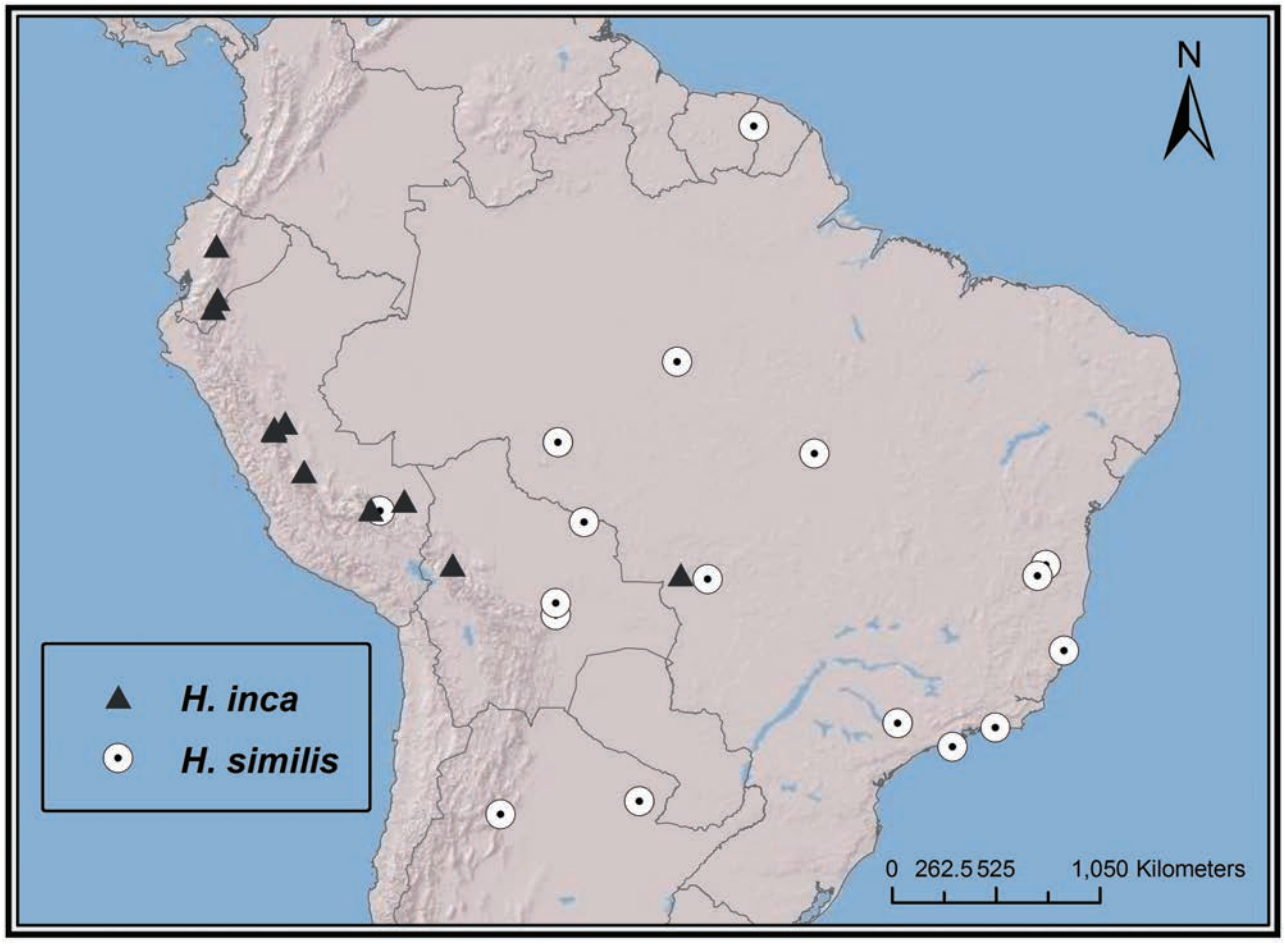

Figure 22. Distributional map of ***Heraeus inca* sp. nov.** and ***Heraeus similis* sp. nov.**

Thorax: Pronotum pruinose, anterior lobe dark brown, posterior lobe brown with pale areas, each humeral angle with a small pale spot. Anterior and posterior lobes with short recumbent and long erect setae, posterior lobe with shorter setae. Pronotum punctate, punctures more conspicuous on posterior lobe. Collar length 0.10, anterior lobe length 0.69, posterior lobe length 0.54; anterior lobe width 1.01, posterior lobe width 1.52. Pleurae dark brown. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with setae similar to pronotal setae. Hemelytra pruinose, with erect setae, costal margin pale on proximal three-quarters, with a subapical corial spot, and an inner corial spot, colour pattern as in Figure 15(G). Membrane dark, veins paler, with a pale apical spot. Legs: Coxae and protrochanter reddish brown, remainder of legs pale brown, profemur spotted with brown and with a subapical brown band; meso- and metafemur with a sub-basal brown band, meso- and metatibia with a pale-brown band subbasally, apex of tibiae, distal half of tarsus I, and pretarsus darker (Fig. 21A). Setae long and erect, longer on profemur.

Abdomen: Brown with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 20I, J) subquadrangular, with posterior margin weakly bilobed, anterior margin of dorsal aperture rounded. Parameres: Figure 20(K, L). Aedeagus: conjunctiva spined; lobes strongly sclerotized and with many spines; *processus gonopori* long and slender.

Distribution

Argentina, Bolivia, Brazil, French Guiana, and Peru (Fig. 22).

Etymology

The specific epithet '*similis*', Latin for like, refers to the strongly setose body that is similar to and shared with *H. chamamecinus* sp. nov. and *H. illitus*.

Type material

Holotype: ♂, **BRAZIL:** Rondonia, 62 km SW Ariquemes nr. F[a]zenda, Rancho Grande, 20-X-1994, BLT, U. Schmitz (USNM).

Paratypes: 16♂, 22♀, same data as for holotype (USNM); 3♂, 2♀, same data as for holotype (MLP).

Additional material studied

ARGENTINA: *Formosa*: 2♂, Ea. La Marcela, 35 km E El Colorado, VIII-2003, light trap, J. Williams col. (MLP); *Tucumán*: one without abdomen, Tafi del Valle, Quebrada de la Angostura, 1800 m a.s.l., 26-II-[19]53, T. Ramirez (USNM).

BOLIVIA: *Beni*: 1♀, Romansos, 1 km. N junction Rio Itenez and Rio Paragua, 30-VII-1964 (AMNH); *Santa Cruz*: 1♀, Prov. San Esteban Muyurina, 49 km N Santa Cruz, 1120 ft, 26-X-[19]59, blacklight trap, R.B. Cumming (USNM); 1♀, Saavedra Res. Sta., 27-III-1978, UV trap, C.R. Ward & C.W. O'Brien (USNM).

BRAZIL: *Bahia*: 3♂, Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH); *Espirito Santo*: 1♀, Linhares, XI-1967, M. Alvarenga (AMNH); *Estado do Rio*: 1♀, Guanabara, Represa Rio Grande, III-IV-1972, F.M. Oliveira (AMNH); *Mato Grosso*: 1♀, Barra do Tapirape, 14-XII-1964, B. Malkin (MZSP); 1♂, Campo Grande, 1941, A. Maller, F. Johnson (AMNH); *Minas Gerais*: 2♀, Pedra Azul, 900 m a.s.l., XI-1972, M. Alvarenga (AMNH); *Para*: 1♀, Jacareacanga, XII-1968, M. Alvarenga (AMNH); *Sao Paulo*: 1♂, Ilha dos Buzios, 16-X/4-XI-[1]963, Exp. Dep. Zool. (MZSP); 3♂, 2♀, Piracicaba, 12-X-1965, C.A. Triplehorn, black light (AMNH); *Rondonia*: 3♂, 6♀, 62 km SW Ariquemes nr Fzenda, Rancho Grande, 25-X-1994, BLT, U. Schmitz (USNM); 2♀, 28-X-1994, BLT, U. Schmitz (USNM); 2♀, 16-18-X-1996, BLT, U. Schmitz (USNM); 1♂, 1♀, 7-X-1994, BLT, U. Schmitz (USNM); 1♀, 12/26-IV-1992, BLT, U. Schmitz (USNM); 5♂, 9♀, 8/20-XI-1994, J.E. Eger (USNM); 2♂, 6♀, 4–16-XI-1997, J.E. Eger (USNM); 2♂, 5♀, 5/17-X-1993, J.E. Eger (USNM); 1♂, 1♀, 10-XI-1994, C. O'Brien (USNM); 1♂, 14-XI-1994, C. O'Brien (USNM); 1♀, 9-XI-1994, UV and mercury vapor light, C.W. & L.B. O'Brien (USNM); 1♂, 1♀, 13-XI-1994, UV and merc. vap light, C.W. & L.B. O'Brien (USNM); 1♀, 15-XI-1994, UV and merc. vap light, C.W. & L.B. O'Brien (USNM); 1♀, 16-XI-1994, UV and merc. vap light, C.W. & L.B. O'Brien (USNM); 1♀, 18-XI-1994, UV and mercury vapor light, C.W. & L.B. O'Brien (USNM).

FRENCH GUIANA: 1♂, 2♀, Grand Santi, 23-IX-2000, A. Matocq (MNHN).

PERU: *Cuzco*: 1♀, Pilcopata, 600 m a.s.l., 8/10-VII-1979, premontane moist forest, J.B. Heppner (USNM).

HERAEUS SPINOSUS SP. NOV.

(FIGS 15H, 20M–P, 21B, 24)

Diagnosis

Distiflagellomere with a wide sub-basal whitish band. Labium extending to mesocoxae. Profemur spotted, darker subapically, forming a band. Pygophore rounded, apex with a dorsally directed protuberance.

Description (Fig. 15H)

Total length 6.27.

Head: Dark brown, shiny; with abundant short recumbent and long erect setae. Head length 1.34, width 0.96. Postocular length 0.48. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.48, interocellar width 0.24. Labium pale brown with long erect setae, almost

extending to mesocoxae. Labial segment lengths: I 0.67, II 0.77, III 0.58, and IV 0.35. Antennae pale brown, except distal half of basiflagellomere and distiflagellomere darker, distiflagellomere with a wide sub-basal whitish band; all segments with abundant, short, semi-erect, and sparse erect setae. Antennal lengths: scape 0.55, pedicel 1.15, basiflagellomere 0.98, and distiflagellomere 1.13. Length of pale band on distiflagellomere 0.48.

Thorax: Anterior pronotal lobe dark brown, posterior lobe paler with irregular pale areas (Fig. 15H), each humeral angle with a small whitish spot; collar delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent and long erect setae, longest on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.10, anterior lobe length 0.60, posterior lobe length 0.55; anterior lobe width 0.94, posterior lobe width 1.51. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum basally and a longitudinal median stripe dark brown, remainder paler brown, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra brown, costal margin pale on proximal three-quarters, apical half of corium darker, with a subapical whitish spot and a small pale rounded spot internally (Fig. 15H); setae short, semi-erect; membrane brown with a diffuse subapical pale spot, veins paler. Legs: Pale brown; profemur darker, mottled laterally and darker subapically forming a band, apex paler; coxae, protrochanter, a subapical band on meso- and metafemur, apex of tibiae, apex of tarsi, and pretarsi brown (Fig. 21B); setae abundant and erect, longest on profemur. Profemur with spines restricted to apical two-thirds.

Abdomen: Brown, with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 20M, N) rounded, apex with a dorsally directed protuberance; slightly declivent posteriorly in lateral view. Anterior margin of dorsal aperture slightly rounded, inner projections quadrangular. Parameres: Figure 20(O, P). Aedeagus: conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with a few spines laterally and two sclerotized lobes with a few spines distally; *processus gonopori* long and slender.

Distribution
Brazil and Ecuador (Fig. 24).

Etymology
The specific epithet '*spinosus*', Latin for spiny, refers to the spined aedeagus.

Type material
Holotype: ♂, **BRAZIL:** Rondonia, 62 km SW Ariquenes, near Fazenda Rancho Grande, 16/18-III-1996, BLT, U. Schmitz (USNM).

Paratypes: 1♂, same locality as for holotype, 5–17-X-1993, J.E. Eger, BLT (USNM). **BRAZIL:** 1♂, *Bahia*: Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH). **ECUADOR:** *Napo*: 1♀, vic. Puerto Misahuali, 1°2′4.2″S, 77°39′49.2″W, 1650–1900 ft, 6/19-IX-1998, mercury vapor and ultraviolet light, J.E. Eger (USNM).

HERAEUS SPLENDENS SP. NOV.

(FIGS 15I, 21C, 23A–D, 24)

Diagnosis
Basiflagellomere clavate. Labium extending to mesocoxae. Anterior pronotal lobe with long erect setae; posterior pronotal lobe and hemelytra with short setae. Posterior pronotal lobe with a pale inverted V-shaped mark. Outer margin of clavus pale. Profemur brown, paler dorsally.

Heraeus splendens sp. nov. and *H. antennalis* sp. nov. are the only two species in the genus with the basiflagellomere clavate; whereas *H. antennalis* sp. nov. is strongly setose, with the profemora mottled, and the posterior pronotal lobe and clavus are uniformly pale brown.

Description (Fig. 15I)
Total length 6.65.

Head: Reddish brown, shiny, coriaceous, with short and erect setae. Head length 1.42, width 1.01. Postocular length 0.65. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.53, interocellar width 0.24. Labium pale brown with short erect setae, extending to mesocoxae. Labial segment lengths: I 0.88, II 0.96, III 0.69, IV 0.35. Antennae reddish brown, distiflagellomere with a pale reddish-brown band. Basiflagellomere clavate. Antennal lengths: scape 0.53, pedicel 1.39, basiflagellomere 1.23, and distiflagellomere 1.28. Length of pale band on distiflagellomere 0.38.

Thorax: Pronotum pruinose, punctate; dark brown, posterior pronotal lobe brown with a pale inverted V-shaped mark and a pale submarginal line along lateral margin. Anterior pronotal lobe with long erect setae, posterior pronotal lobe with shorter setae. Collar length 0.10, anterior lobe length 0.69, posterior lobe length 0.60; anterior lobe width 1.01, posterior lobe width 1.60. Pleurae brown. Evaporative area extended. Scutellum brown with erect setae. Hemelytra: costal margin pale on proximal three-quarters, with a subapical corial spot. Membrane dark brown, with veins paler and a slender, pale apical spot. Legs: coxae, protrochanter, and profemur reddish brown, profemur paler dorsally; meso- and metafemur with a subapical dark band; meso- and metatibia with a sub-basal dark band, tibiae

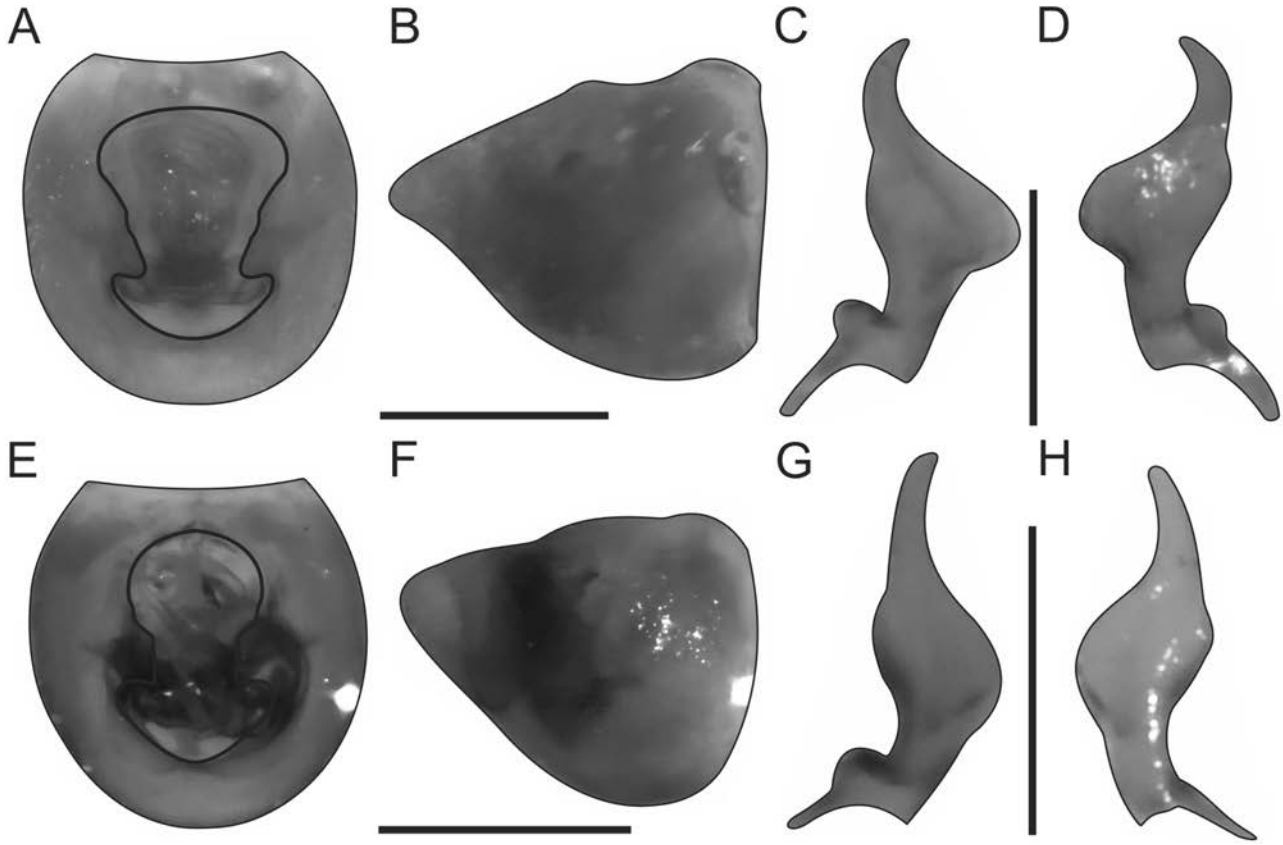

Figure 23. Male genitalia. ***Heraeus splendens* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus tiputini* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view.

darkened apically (Fig. 21C). Legs with semi-erect and erect setae, longest on profemora.

Abdomen: Brown, with abundant, short, recumbent setae. Male genitalia: Pygophore (Fig. 23A, B) rounded, anterior margin of dorsal aperture rounded. Parameres: Figure 23(C, D). Aedeagus: vesical lobes sclerotized posteriorly, with spines distally; *processus gonopori* long and slender.

Distribution
Panama (Fig. 24).

Etymology
The specific epithet '*splendens*', Latin for beauty, refers to the attractive dorsal markings and colouration.

Type material
Holotype: ♂, **PANAMA:** Cerro Campana, 800 m a.s.l., Dist. Chame, 2-V-1976, D. Engleman (AMNH).

Paratypes: **PANAMA:** *Panama*: 1♀, Cerro Campana, 850 m a.s.l., 8°40′N, 79°56′W, 24-XII-[19]73, Stockwell (USNM); *Chiriqui*: 1♀, Res. For. La Fortuna, cont. divide Tr., 20-VII-1995, C.W. & L.B. O'Brien (USNM).

HERAEUS TIPUTINI SP. NOV.

(FIGS 8I, 15J, 21D, 23E–H, 24)

Diagnosis
Ocelli posteriorly. Distiflagellomere with a pale band sub-basally. Labium extending to mesocoxae. Profemur brown, paler dorsally; metafemur pale brown, darker apically; metatibia yellowish. Aedeagus: vesica with two unsclerotized lobes; *processus gonopori* long, widening towards apex.

Heraeus tiputini sp. nov. is similar to *H. inca* sp. nov. in having: the ocelli placed posteriorly behind the eyes; the profemur paler dorsally; the metafemur darker apically (a few specimens of *H. inca* sp. nov. show a dark band with a narrowly pale apex on the metafemur instead of being entirely dark distally); and the *processus gonopori* long, widening towards apex. In *H. tiputini* sp. nov. the metatibia is yellowish; the anterior margin of dorsal aperture of pygophore is rounded; and the aedeagus has a vesica with two unsclerotized

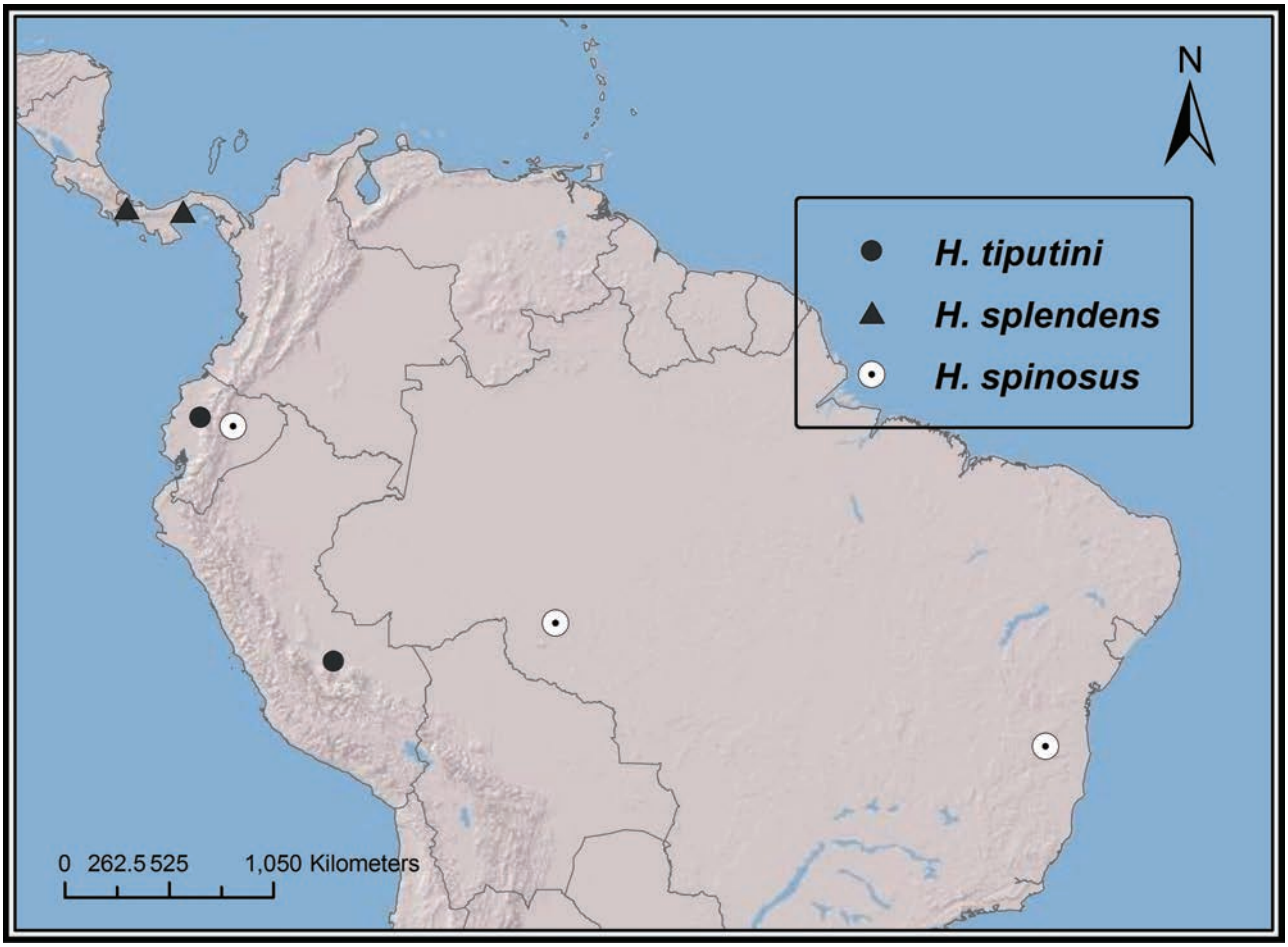

Figure 24. Distributional map of ***Heraeus tiputini* sp. nov.**, ***Heraeus splendens* sp. nov.**, and ***Heraeus spinosus* sp. nov.**

lobes. *Heraeus inca* sp. nov. has a thin band on the basal region of the metatibia; the anterior margin of dorsal aperture of pygophore is slightly rounded with the lateral regions angulate; and the vesica has two pairs of lobes, the posterior lobe large and strongly sclerotized posteriorly.

Description (Fig. 15J)
Total length 6.27.

Head: Elongate, postocular region longer than preocular region; flattened dorsally; shiny, dark brown, clypeus paler; with short recumbent and long erect setae. Head length 1.46, width 0.93. Postocular length 0.60. Eyes with setae between ommatidea; not surpassing dorsal margin of head in lateral view. Ocelli posterior of an imaginary line passing the posterior border of eyes. Interocular width 0.48, interocellar width 0.30. Labium pale brown with erect setae, extending to mesocoxae. Labial segment lengths: I 0.75, II 0.85, III 0.75, IV 0.32. Antennae brown; scapus, apical region of pedicel, and basiflagellomere darker, distiflagellomere brown, with a pale band sub-basally; all segments with abundant, short, semi-erect setae and sparse erect setae, more abundant on distiflagellomere. Basiflagellomere slightly incrassate apically. Antennal lengths: scape 0.45, pedicel 1.22, basiflagellomere 1.09, distiflagellomere 1.12. Length of pale band on distiflagellomere 0.48.

Thorax: Pronotum pruinose; anterior lobe dark brown, posterior lobe brown with two pale longitudinal stripes, with short recumbent and long erect setae, longest on anterior lobe. Collar delimited posteriorly by a row of punctures. Pronotum punctate, punctures more conspicuous on posterior lobe. Collar length 0.08, anterior lobe length 0.59, posterior lobe length 0.54; anterior lobe width 0.93, posterior lobe width 1.41. Pleurae dark brown, punctate, with short recumbent setae. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with short recumbent and long erect setae. Hemelytra pruinose, with short semi-erect setae. General colour brown, costal margin pale on proximal three-quarters, corium darker distally, with a subapical whitish spot and a small rounded pale spot internally; membrane brown, with veins paler and an apical pale spot (Fig. 15J). Legs: Coxae brown; protrochanter,

profemur laterally, and meso- and metafemur apically brown, remainder of legs pale brown; apex of tibiae, tarsi, and pretarsi darker (Fig. 21D). Legs with long semi-erect setae, longest on profemur. Profemur with two rows of spines on apical two-thirds.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 23E, F) rounded, anterior margin of dorsal aperture rounded, inner projections subquadrangular; slightly declivent posteriorly in lateral view. Parameres: Figure 23(G, H); shank with inner and outer projections indistinguishable. Aedeagus (Fig. 8I): unsclerotized lobes of vesica with a group of strong spines near apex; *processus gonopori* long, widening towards apex.

Distribution
Ecuador and Peru (Fig. 24).

Etymology
The specific epithet '*tiputini*' is a noun in aposition referring to 'Tiputini Biodiversity Station', in Orellana Province, Ecuador, where most of the material was collected.

Type material
Holotype: ♂, **ECUADOR:** *Orellana Prov.* [Napo Prov. on label in error], Tiputini Biodiversity Station, 216 m a.s.l., 0°37′55′S, 76°8′39′W, 5-II-1999, T.L. Erwin *et al*., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants, lot 2082, transect T-9 (USNM).

Paratypes: 3♂, 3♀, same data as for holotype (USNM); 1♂, same data as for holotype, 22-X-1998, lot 1978, transect T-8 (MLP); 1♀, same data as for holotype, 22-X-1998, lot 1973, transect T-8 (MLP); 1♀, same data as for holotype, 6-II-1999, lot 2082, transect T-9 (USNM); 1♂, same data as for holotype, 8-II-1999, lot 2026, transect T-3 (USNM); 1♂, 1♀, same data as for holotype, 22-X-1998, lot 1972, transect T-8 (USNM); 1♀, same data as for holotype, lot 1962, transect T-7 (USNM); 1♂, same data as for holotype, 26-X-1998, lot 1941, transect T-5 (USNM); 3♂, same data as for holotype, 26-X-1998, lot 1942, transect T-5 (USNM); 1♂, 1♀, Reserva Ethnica Waorani, 1 km S Onkone Gare Camp., Trans. Ent., 4-X-1996, 220 m a.s.l., 0°39′10″S, 76°26′0″W, T.L. Erwin *et al*., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terra firme forest, lot 1744, transect T-9 (USNM); 2♂, 2♀, lot 1743, transect T-9 (USNM); 1♀, 25-VI-1994, lot 731 (USNM); 1♀, 29-VI-1994, at 6 x-trans, 81 m mark Proj. Maxus, lot 759 (USNM); 1♀, Reserva Ethnica Waorani, Onkone Gare Camp., 38 km S of Pompeya, 220 m a.s.l., 0°39′10″S, 76°26′W, 2–14-II-1996, T.J. Henry (USNM). **PERU:** *Ucayali*: 1♀, Kirigueti, 11°38′13″S, 73°7′8″W, luz, VII-[20]04, J. Williams (MLP).

THE *PLEBEJUS* GROUP

Included species: Heraeus alvarengai sp. nov., *H. apicalis* sp. nov., *H. bahiensis* sp. nov., *H. baranowskii* sp. nov., *H. bolivianus* sp. nov., *H. brevirostris* sp. nov., *H. concolor*, *H. ecuatorianus* sp. nov., *H. loja* sp. nov., *H. mesoamericanus* sp. nov., *H. mexicanus* sp. nov., *H. morganae* sp. nov., *H. nicaraguensis* sp. nov., *H. pacificus*, *H. pallidinervis* sp. nov., *H. penai* sp. nov., *H. plebejus*, and *H. pulchellus*.

Diagnosis
Head rugose, setose; collar with a well-developed posterior furrow; evaporative area extended, distance from dorsal margin of auricle to dorsal margin of evaporative area subequal to or longer than distance from dorsal margin of evaporative area to dorsal margin of metapleura (except *H. alvarengai* sp. nov. and *H. mesoamericanus* sp. nov.); hemelytra with a heterogeneous colouration pattern; profemur uniformly dark brown, although in some species the apex is paler; male mesofemora without spines; and aedeagus spined.

Although this group is paraphyletic in our analysis, we are keeping it as a group for identification purposes because the relationships among the species are not well supported and additional characters are needed for better resolution.

HERAEUS ALVARENGAI SP. NOV.

(FIGS 25A, 26A, 27A–D, 28)

Diagnosis
Ocelli placed anterior to an imaginary line passing the posterior border of eyes. Labium extending to metacoxae. Evaporative area short, distance from dorsal margin of auricle to dorsal margin of evaporative area shorter than distance from dorsal margin of evaporative area to dorsal margin of metapleura. Membrane with a diffuse, apical whitish spot. Meso- and metafemur with a subapical brown band. Apex of pygophore pointed dorsally in lateral view.

This is the only species with the ocelli placed anterior to an imaginary line passing the posterior border of eyes.

Description (Fig. 25A)
Total length 4.75.

Head: Brown, shiny, with short recumbent and scattered erect setae. Head length 1.06, width 0.82. Postocular length 0.37. Eyes not surpassing dorsal margin of head in lateral view. Ocelli placed anterior to an imaginary line passing the posterior border of

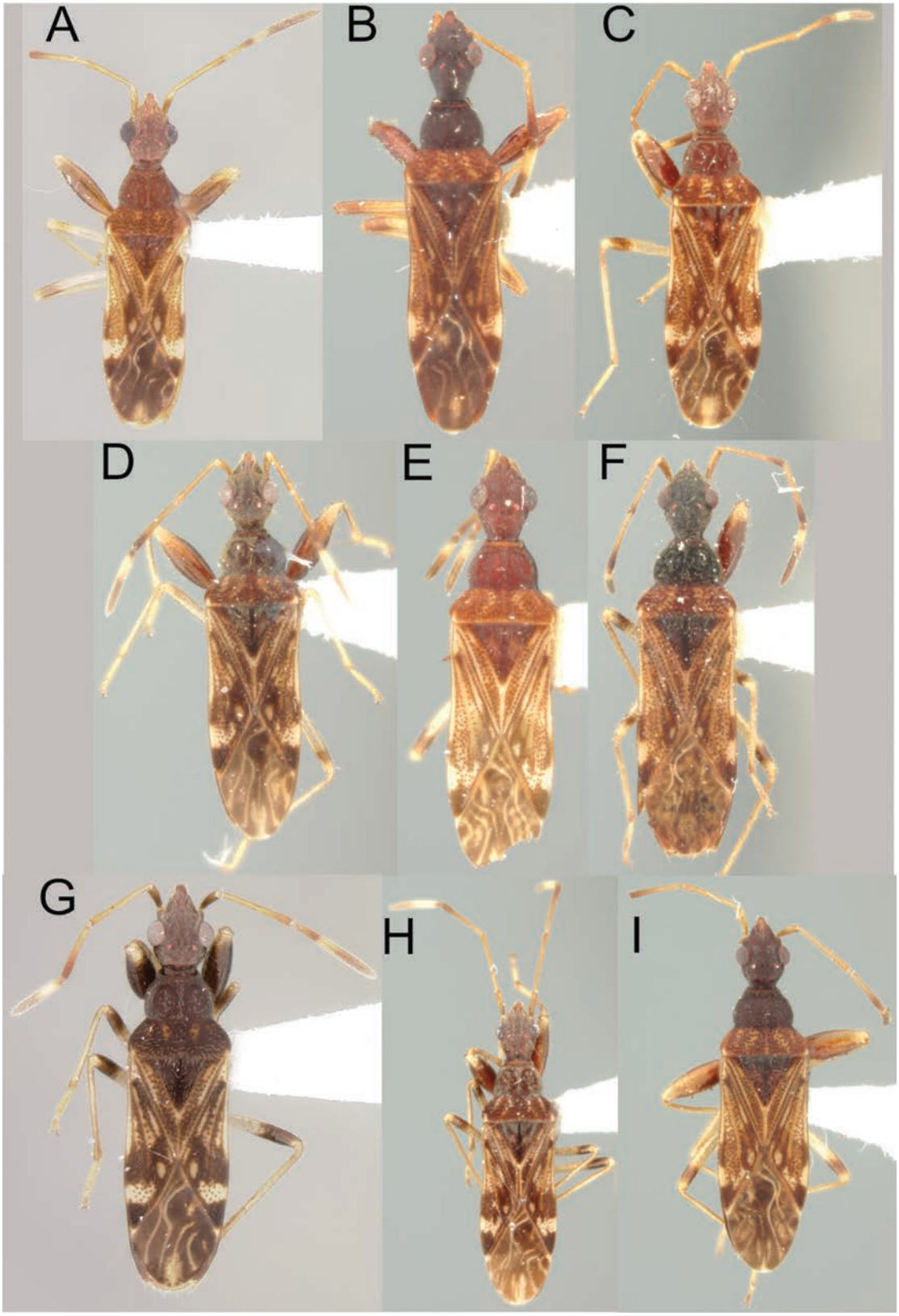

Figure 25. Habitus dorsal: A, ***Heraeus alvarengai* sp. nov.**; B, ***Heraeus apicalis* sp. nov.**; C, ***Heraeus bahiensis*** sp. nov.; D, ***Heraeus baranowskii* sp. nov.**; E, ***Heraeus bolivianus* sp. nov.**; F, ***Heraeus brevirostris* sp. nov.**; G, *Heraeus concolor* Slater & Baranowski, 1994; H, ***Heraeus ecuatorianus* sp. nov.**; I, ***Heraeus loja* sp. nov.**

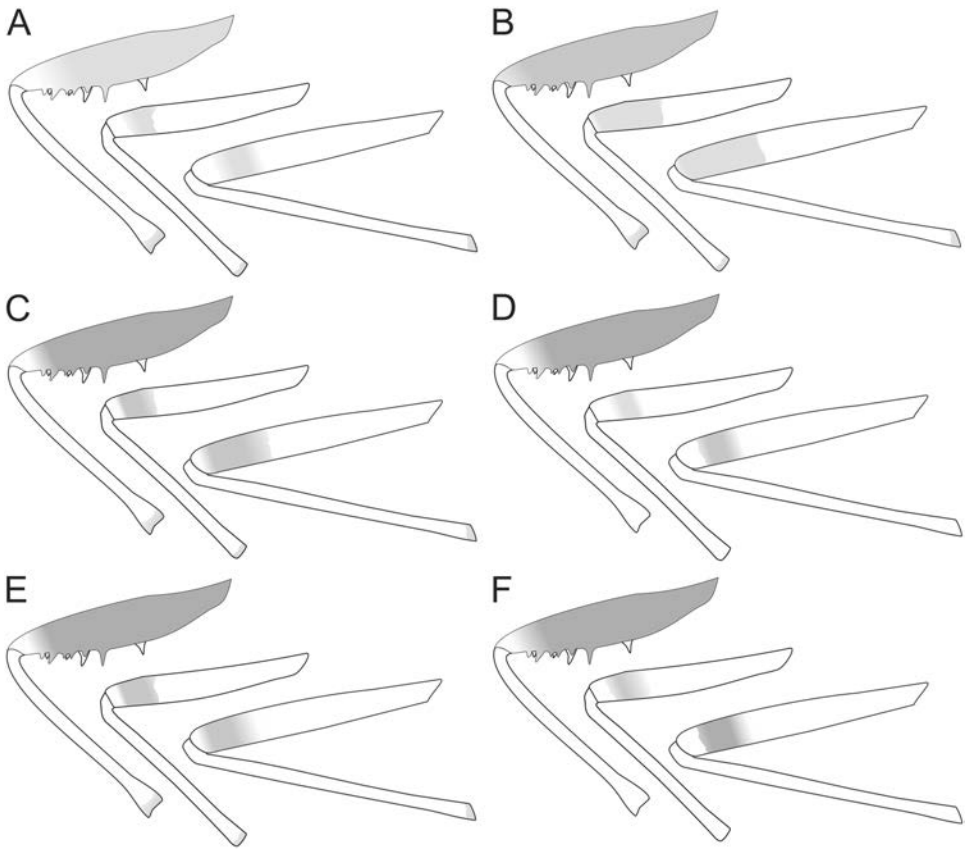

Figure 26. Legs: A, ***Heraeus alvarengai* sp. nov.**; B, ***Heraeus apicalis* sp. nov.**; C, ***Heraeus bahiensis* sp. nov.**; D, ***Heraeus baranowskii* sp. nov.**; E, ***Heraeus bolivianus* sp. nov.**; F, ***Heraeus brevirostris* sp. nov.**

eyes. Interocular width 0.42, interocellar width 0.26. Labium pale brown, with short erect setae; extending to metacoxae. Labial segment lengths: I 0.72, II 0.83, III 0.72, and IV 0.34. Antennae (right antenna with three segments, last segment darker with a diffuse pale band) pale brown, apex of basiflagellomere darker; distiflagellomere absent; with abundant, short, recumbent setae. Antennal lengths: scape 0.42, pedicel 0.93, and basiflagellomere 0.78.

Thorax: Pronotum brown, posterior lobe paler, with two irregular pale spots, each humeral angle with a pale spot; anterior and posterior lobes with short recumbent setae, with long scattered setae on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.08, anterior lobe length 0.61, posterior lobe length 0.37; anterior lobe width 0.80, posterior lobe width 1.14. Pleurae brown, punctate, with short recumbent setae. Evaporative area short. Scutellum brown, with a longitudinal, dark, median stripe, pruinose, punctate, with short recumbent and sparse long erect setae. Hemelytra with short recumbent setae. Costal margin pale on proximal three-quarters, corium darker distally, with a subapical whitish spot and a rounded pale spot internally (Fig. 25A); membrane dark brown, veins paler, with a diffuse apical whitish spot. Legs: Coxae, protrochanter, and profemur brown, remainder of legs whitish, except for a darker subapical band on meso- and metafemur, tibiae darker apically (Fig. 26A); setae short and semi-erect. Profemur with spines on apical two-thirds. Protibia straight.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 27A, B) rounded, anterior margin of dorsal aperture slightly rounded, apex with a dorsally directed protuberance; declivent posteriorly in lateral view. Inner projections elongate, more produced posteriorly. Parameres: Figure 27(C, D). Aedeagus: vesica with a few spines laterally and with two sclerotized lobes bearing spines anteriorly; *processus gonopori* long and slender.

Distribution
Brazil (Fig. 28).

Etymology
This species is named after the late Brazilian entomologist Moacyr Alvarenga, who collected the holotype.

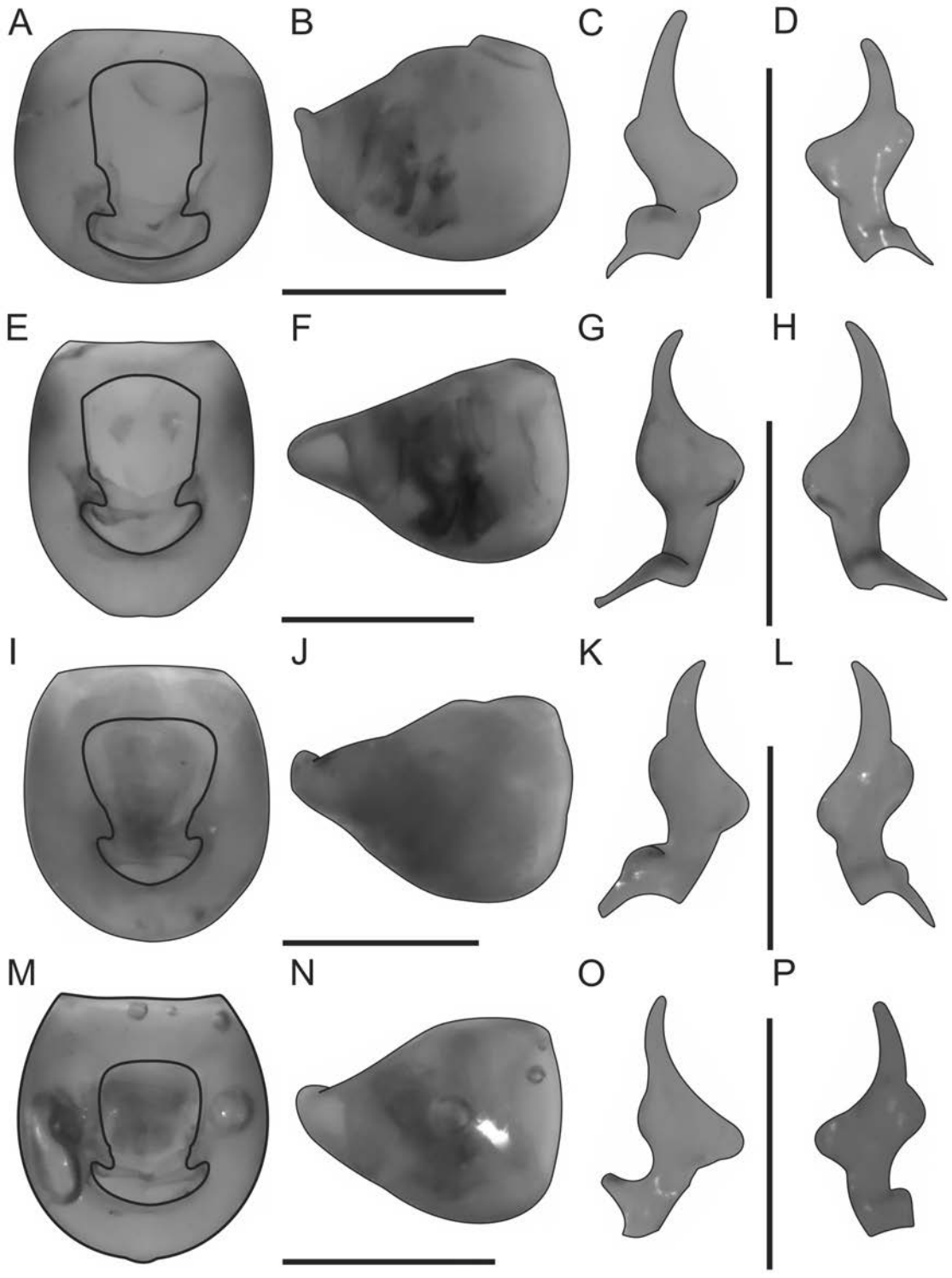

Figure 27. Male genitalia. ***Heraeus alvarengai* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus apicalis* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus bahiensis* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus baranowskii* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

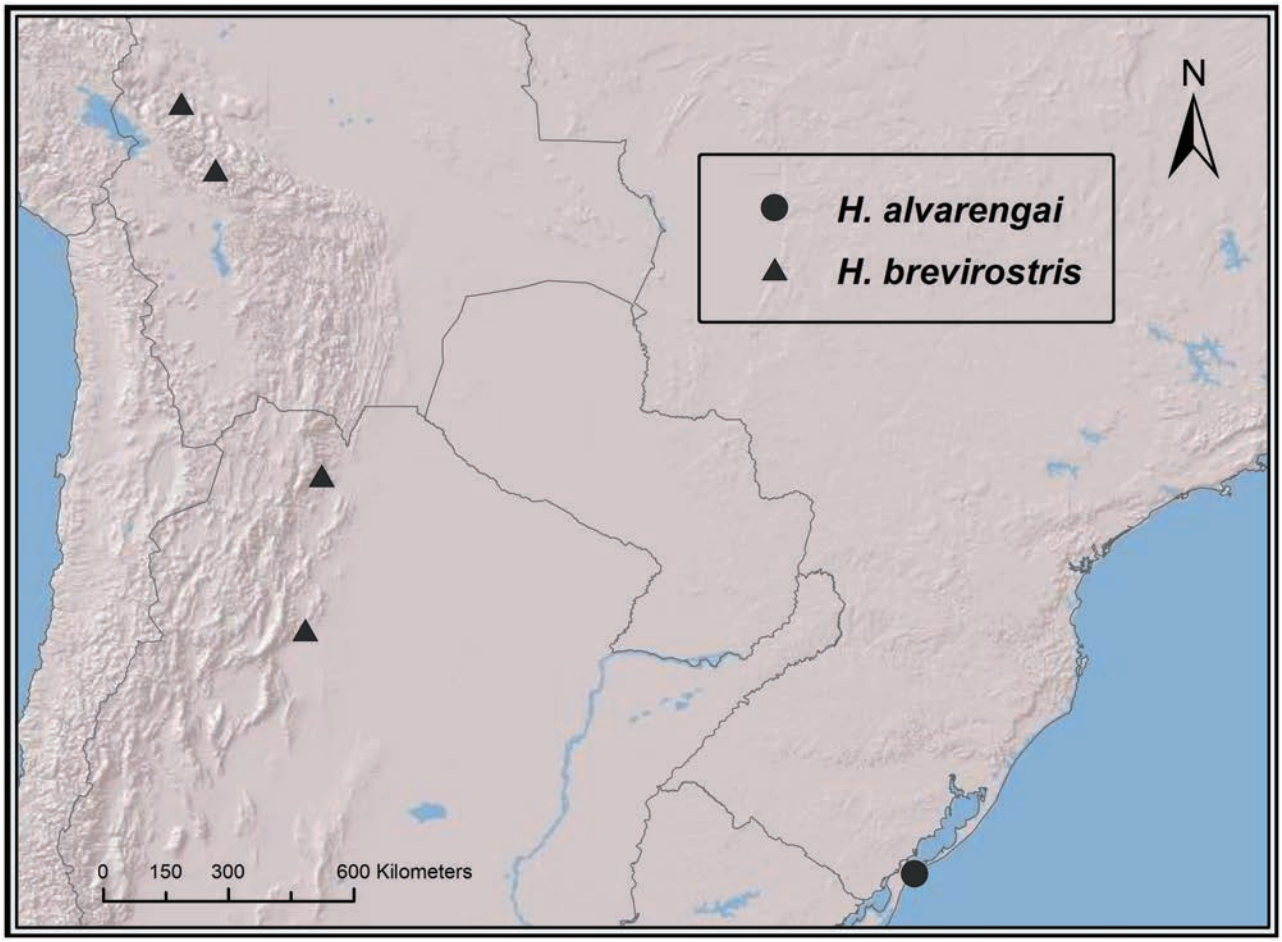

Figure 28. Distributional map of ***Heraeus alvarengai*** **sp. nov.** and ***Heraeus brevirostris*** **sp. nov.**

Type material
Holotype: ♂, **BRAZIL**, [*Río Grande do Sul*], Guanabara, Represa Rio Grande, VI-1972, M. Alvarenga (AMNH).

HERAEUS APICALIS SP. NOV.

(FIGS 25B, 26, 27E–H, 29)

Diagnosis
Labium extending to mesocoxae. Distiflagellomere with a sub-basal yellowish band. Membrane with a subapical pale spot. Metafemur darker on apical one-quarter. *Processus gonopori* widening towards apex.

Description (Fig. 25B)
Total length 5.51.

Head: Dark reddish brown, clypeus paler, shiny; with abundant short recumbent and long erect setae dorsally. Head length 1.22, width 0.82. Postocular length 0.38. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.38, interocellar width 0.17. Labium pale brown, with erect setae; extending to mesocoxae. Labial segment lengths: I 0.72, II 0.91, III 0.72, and IV 0.24. Antennae: Scapus brown, pedicel and base of basiflagellomere pale brown, basiflagellomere distally reddish brown, distiflagellomere brown with a sub-basal yellowish band; all segments with abundant short recumbent setae and short semi-erect setae; basiflagellomere weakly clavate. Antennal lengths: scape 0.43, pedicel 1.03, basiflagellomere 0.96, and distiflagellomere 1.10. Length of pale band on distiflagellomere 0.34.

Thorax: Pronotum: pruinose, punctate, punctures larger on posterior lobe; anterior pronotal lobe reddish brown; collar paler, delimited posteriorly by a punctate sulcus, posterior lobe brown with irregular paler areas, each humeral angle with a pale spot; anterior and posterior lobes with short recumbent and erect setae, and long erect setae on anterior lobe. Collar length 0.08, anterior lobe length 0.51, posterior lobe length 0.48; anterior lobe width 0.83, posterior lobe width 1.30. Pleurae reddish brown, punctate, with short recumbent setae. Evaporative area extended. Scutellum

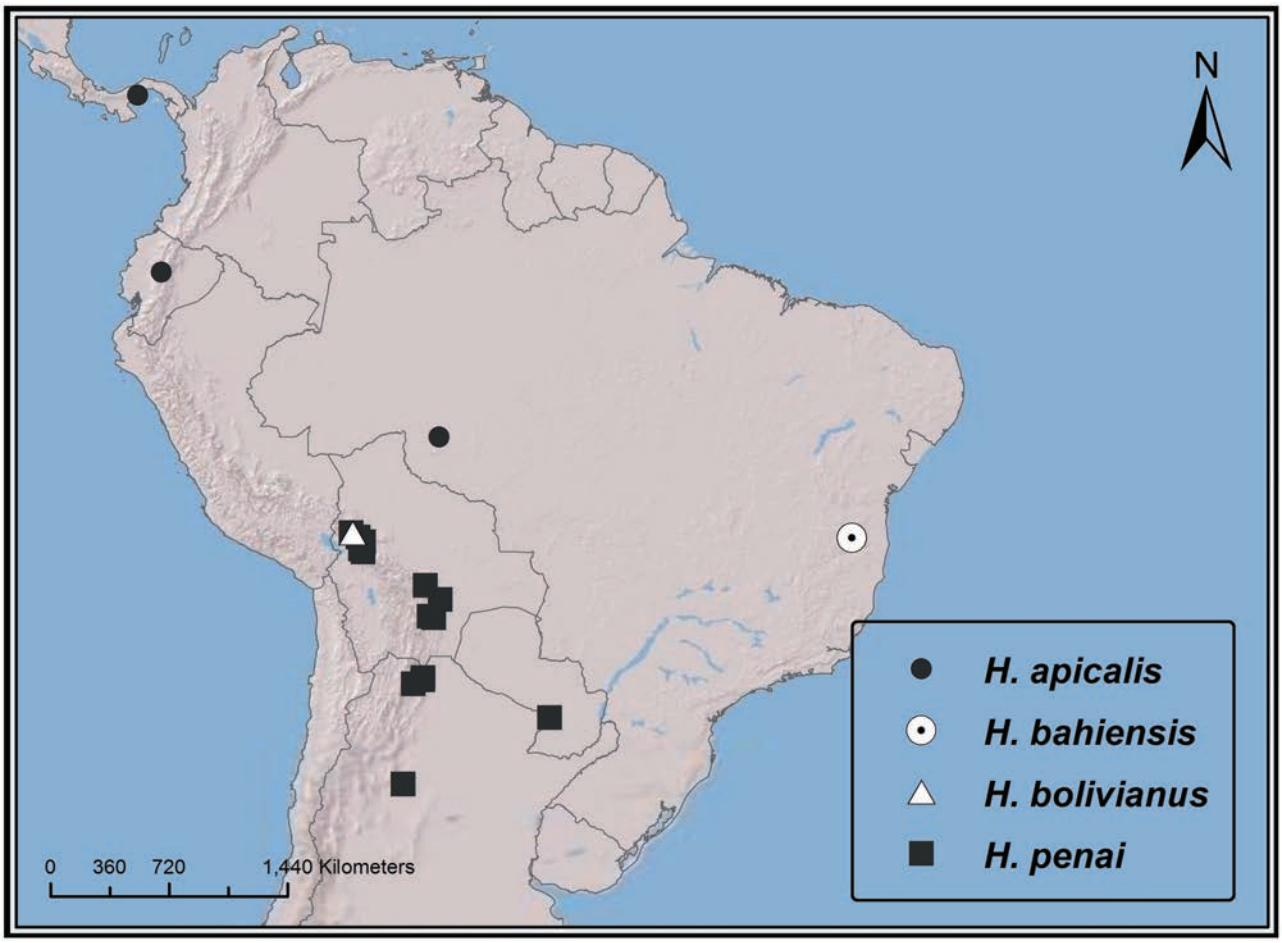

Figure 29. Distributional map of ***Heraeus apicalis* sp. nov.**, ***Heraeus bahiensis* sp. nov.**, ***Heraeus bolivianus* sp. nov.**, and ***Heraeus penai* sp. nov.**

reddish brown, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra brown, with short recumbent setae, costal margin pale on proximal three-quarters, corium darker distally, with a subapical whitish spot and a pale spot internally (Fig. 25B); membrane brown, veins paler, with a small subapical pale spot. Legs: Coxae, protrochanter, profemur, and meso- and metafemur distally brown, remainder of legs pale brown, tibiae darker apically (Fig. 26B); with short recumbent and semi-erect setae, longer on profemur. Profemur with spines restricted to apical two-thirds. Protibia with minute denticles. Protibiae and mesofemur without spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 27E, F) rounded, elongate, with a straight posterior margin; slightly declivent posteriorly in lateral view; anterior margin of dorsal aperture rounded, inner projections subquadrangular. Parameres (Fig. 27G, H) with outer projection not differentiated. Aedeagus: sclerotized lobes of vesica with a few spines; *processus gonopori* widening towards apex.

Distribution

Brazil, Ecuador, and Panama (Fig. 29).

Etymology

The specific ephitet '*apicalis*', from the Latin apex, is an adjective, and refers to the distinct apical band on the metafemur.

Type material

Holotype: ♂, **PANAMA:** Distrito Chame, Cerro Campana, 800 m a.s.l., 22-II-[19]75, H.D. Engleman (USNM).

Paratypes: 1♂, **ECUADOR**, *Tung.[urahua]*: ~29 km N Puyo, 22-I-1974, 3800 ft, on *Austroeupatorium*

inulaefolium, R.M. King (USNM). **BRAZIL:** *Rondonia*: 1♀, 62 km SW Ariquemes, nr Fza. Rancho Grande, 4/16-XI-1997, blacklight trap, J.E. Eger (USNM); 1♂, 5–17-X-1993, blacklight trap, J.E. Eger (MLP); 1♂, 18-IX-199?, BL trap, U. Schmitz (USNM).

HERAEUS BAHIENSIS SP. NOV.

(FIGS 25C, 26C, 27I–L, 29, 30A)

Diagnosis

Distiflagellomere with a sub-basal whitish band. Labium extending to mesocoxae. Membrane brown with an apical pale spot. Meso- and metafemur with a subapical brown band. Pygophore with the apex pointed dorsally in lateral view.

The diagnostic characters relate this new species to *H. nicaraguensis* sp. nov., but they can be distinguished by the paler general colouration of *H. bahiensis* sp. nov., with the head dark reddish brown and the posterior pronotal lobe brown with diffuse longitudinal stripes, whereas in *H. nicaraguensis* sp. nov. the head is blackish and the posterior pronotal lobe is dark brown with four longitudinal pale stripes.

Description (Fig. 25C)

Total length 5.61.

Head: Brown, shiny, with short recumbent and long erect setae dorsally. Head length 1.12, width 0.88. Postocular length 0.37. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.42, interocellar width 0.24. Labium pale brown, with erect setae; extending to mesocoxae. Labial segment lengths: I 0.80, II 0.85, III 0.66, and IV 0.35. Antennae pale brown, scape externally, basiflagellomere distally, and distiflagellomere darker, distiflagellomere with a sub-basal whitish band occupying about one-third of segment length; all segments with abundant short recumbent and sparse short erect setae. Antennal lengths: scape 0.43, pedicel 1.04, basiflagellomere 0.91, and distiflagellomere 0.96. Length of pale band on distiflagellomere 0.37.

Thorax: Anterior pronotal lobe brown, posterior lobe paler with mottled pale areas, humeral angles yellowish; collar punctate, delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent setae, with longer erect setae on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.08, anterior lobe length 0.48, posterior lobe length 0.48; anterior lobe width 0.90, posterior lobe width 1.44. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, with a longitudinal median dark stripe, apex paler, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, irregularly pigmented, with short recumbent setae. Costal margin pale on proximal three-quarters, apex of corium darker with a subapical whitish spot and an inner small pale spot; membrane brown, veins paler with an apical pale spot (Fig. 25C). Legs: Coxae, protrochanter, profemur, except distally, and a subapical band on meso- and metafemur brown; remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 26C); with semi-erect setae longer on profemur. Profemur with spines restricted to apical two-thirds.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 27I, J) rounded, anterior margin of dorsal aperture slightly rounded, apex with a small protuberance; declivent posteriorly in lateral view. Inner projections elongate, more pronounced posteriorly. Parameres: Figure 27(K, L). Aedeagus (Fig. 30A): vesica with a row of spines laterally and with two sclerotizated spined lobes; *processus gonopori* long and slender.

Distribution

Brazil (Fig. 29).

Etymology

The specific epithet '*bahiensis*' is an adjective that refers to the state of Bahia, Brazil, where all specimens were collected.

Type material

Holotype: ♂, **BRAZIL**, *Bahia*, Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH).

Paratypes: 1♂, 2♀, same data as for holotype (AMNH); 1♂, same data as holotype (MLP); 1♀, same data as for holotype (USNM).

HERAEUS BARANOWSKII SP. NOV.

(FIGS 25D, 26D, 27M–P, 31)

Diagnosis

Labium extending to metacoxae. Distiflagellomere with a sub-basal whitish band. Membrane with an elongate apical pale spot. Mesofemur with a diffuse band and metafemur with a narrow subapical brown band. Pygophore apex pointed dorsally in lateral view.

Description (Fig. 25D)

Total length 4.66.

Head: Brown, shiny, coriaceus; with short recumbent and long erect setae dorsally. Head length 1.01, width 0.77. Postocular length 0.34. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.35, interocellar width 0.24. Labium pale brown, with erect setae, extending to metacoxae. Labial segment lengths: I 0.59, II 72.

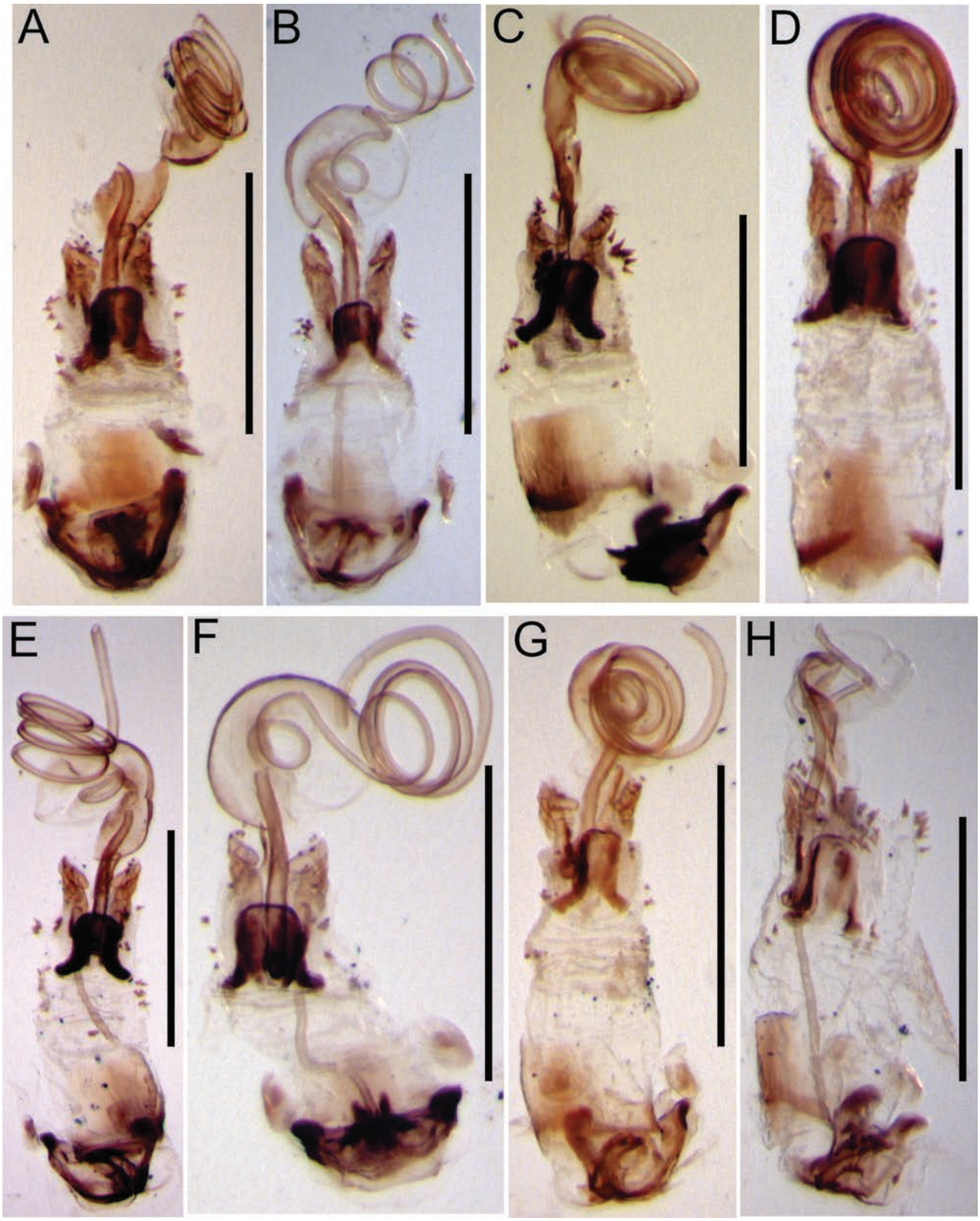

Figure 30. Aedeagus. A, ***Heraeus bahiensis* sp. nov.**; B, ***Heraeus bolivianus* sp. nov.**; C, ***Heraeus brevirostris* sp. nov.**; D, *Heraeus concolor* Slater & Baranowski, 1994; E, ***Heraeus ecuatorianus* sp. nov.**; F, ***Heraeus mesoamericanus* sp. nov.**; G, ***Heraeus mexicanus* sp. nov.**; H, ***Heraeus penai* sp. nov.**

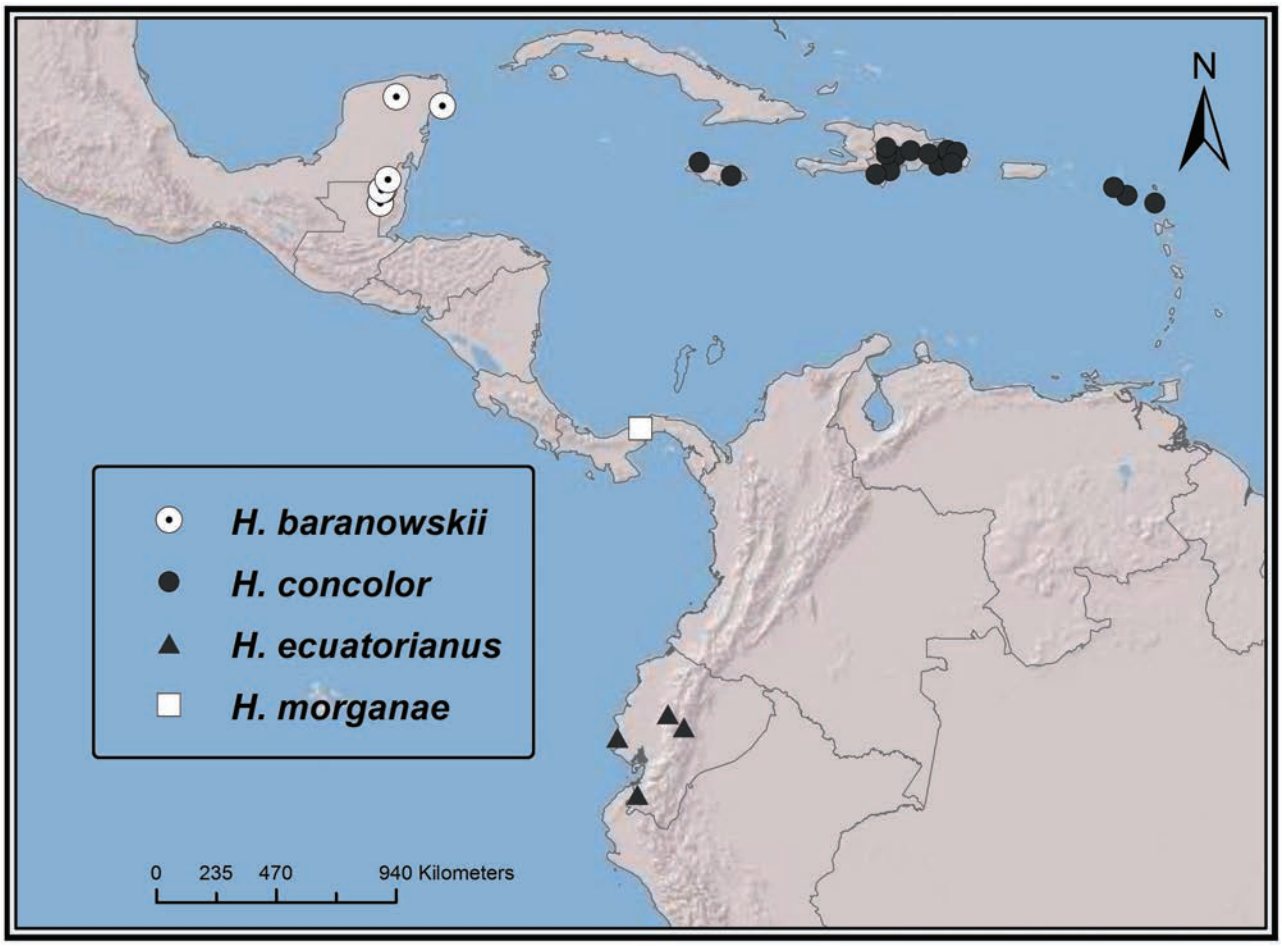

Figure 31. Distributional map of ***Heraeus baranowskii* sp. nov.**, *Heraeus concolor* Slater & Baranowski, 1994, ***Heraeus ecuatorianus* sp. nov.**, and ***Heraeus morganae* sp. nov.**

Antennae pale brown, basiflagellomere distally and distiflagellomere darker, distiflagellomere with a subbasal whitish band; all segments with abundant short recumbent and sparse short erect setae. Antennal lengths: scape 0.34, pedicel 0.84, basiflagellomere 0.72, and distiflagellomere 0.90. Length of pale band on distiflagellomere 0.30.

Thorax: Pronotum brown, anterior pronotal lobe darker, posterior lobe with irregular pale areas, humeral angles with a whitish spot; collar with scattered punctures delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent and long erect setae, longer on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.06, anterior lobe length 0.54, posterior lobe length 0.51; anterior lobe width 0.74, posterior lobe width 1.50. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, apex paler; pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, irregularly pigmented, with short recumbent setae. Costal margin pale on proximal two-thirds, apex of corium darker with a subapical whitish spot and an inner small pale spot; membrane brown, veins paler, with an elongate apical pale spot and diffuse paler spots between veins (Fig. 25D). Legs: Coxae, protrochanter, profemur, except distally, a diffuse subapical band on mesofemur, and a subapical narrow band on metafemur brown, remainder of legs pale brown (Fig. 26D); with semi-erect setae, longest on profemur. Profemur with spines restricted to apical half. Protibia slightly curved.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 27M, N) rounded, with pointed posterior margin; apex with a dorsally directed protuberance; declivent posteriorly in lateral view; anterior margin of dorsal aperture weakly rounded, inner projections elongate, more pronounced posteriorly. Parameres: Figure 27(O, P). Aedeagus: vesica with minute spines laterally and two sclerotizated lobes with

minute spines distally; *processus gonopori* long and slender.

Distribution
Belize and Mexico (Fig. 31).

Etymology
This species is named in honour of our friend and colleague Richard M. Baranowski for his many contributions, and who collected most of the specimens of this new species.

Type material
Holotype: ♂, **BELIZE**, Cayo Dist., Benque Viejo, Riverside N, Mopan R. Resort, 22-VI-[20]06, BLT, R.M. & H.V. Baranowski (USNM).

Paratypes: 2♂, same data as for holotype, 23-VI-[20]06 (USNM); 1♂, same data as for holotype, 24-VI-[20]06 (USNM); 1♂, same data as for holotype, 25-VI-[20]06 (USNM); 2♀, BLT, 1-X-2009, M. Chrysler (USNM); 1♀, 12-X-2009, M. Chrysler (USNM); 1♂, 7-XI-2009, M. Chrysler (USNM); 1♂, 23-XI-2009, M. Chrysler (MLP); 1♂, 25-X-[20]06, BLT, A. Trujillo (MLP); 1♂, Orange Walk District, Gallon Jug, 11-X-[20]05, BLT, B. Miller (USNM); 1♂, 19-VI-[20]05, BLT, B. Miller (USNM); 2♂, 31-IV-[20]05, BLT, B. Miller (USNM); one without abdomen, 14-I-[20]05, BLT, B. Miller (USNM); 1♂, Orange Walk Distr., Chan Chich Ldge., 25-X-[20]03, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 18-IV-[20]04, BL trap, E. Flota (USNM); 2♂, 1♀, 13-XI-[20]04, BL trap, C. Sanabria (USNM); 1♂, 1-IX-[20]05, BL trap, C. Sanabria (USNM); 1♂, O.W. Dist., Rio Bravo Cons. Area, Mahogany Tr, 10-VII-1996, C.W. & L.B. O'Brien (USNM).

Additional material studied
MEXICO: *Yucatan*: 1♂, Kiuick, 13-XI-1974, J. Reddell (USNM); *Quintana Roo*: 1♀, Miguel Cozumel, VII-1959, N.L.H. Kraus (USNM).

HERAEUS BOLIVIANUS SP. NOV.

(FIGS 25E, 26E, 29, 30B, 32A–D)

Diagnosis
Labium extending to mesocoxae. Distiflagellomere with a sub-basal whitish band. Membrane brown, with veins paler. Meso- and metafemur with a subapical brown band. Pygophore rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more pronounced posteriorly.

Description (Fig. 25E)
Total length 5.22.

Head: Brown, clypeus paler, shiny, coriaceous, with short recumbent and long erect setae dorsally. Head length 1.08, width 0.85. Postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.40, interocellar width 0.26. Labium pale brown, extending to mesocoxae, with erect setae. Labial segment lengths: I 0.77, II 0.77, III 0.62, and IV 0.29. Antennae pale brown, basiflagellomere distally and distiflagellomere darker, distiflagellomere with a sub-basal whitish band; all segments with abundant short recumbent and sparse short erect setae. Antennal lengths: scape 0.48, pedicel 1.01, basiflagellomere 0.84, and distiflagellomere 1.03. Length of pale band on distiflagellomere 0.22.

Thorax: Anterior pronotal lobe brown, collar and posterior lobe paler, with irregular paler areas, humeral angles with a small whitish spot; collar with punctures delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent setae and long erect setae on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.08, anterior lobe length 0.51, posterior lobe length 0.48; anterior lobe width 0.86, posterior lobe width 1.34. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, apex paler, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, irregularly pigmented. Costal margin pale on proximal three-quarters, apex of corium darker with a subapical whitish spot and an inner small pale spot; with short recumbent setae; membrane brown with small paler spots between veins, veins paler (Fig. 25E). Legs (left profemur, tibia, and tarsi missing): Coxae, protrochanter, profemur, except distally, and a subapical band on meso- and metafemur brown, remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 26E); semi-erect setae longer on profemur. Profemur with spines restricted to apical two-thirds.

Abdomen (glued on card): Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 32A, B) rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more pronounced posteriorly; slightly declivent posteriorly in lateral view. Parameres: Figure 32(C, D). Aedeagus (Fig. 30B): vesica with a patch of spines laterally and with two sclerotizated lobes; *processus gonopori* long and slender.

Distribution
Bolivia (Fig. 29).

Etymology
The specific epithet '*bolivianus*' is an adjective, and refers to Bolivia, the country where the only known specimen was collected.

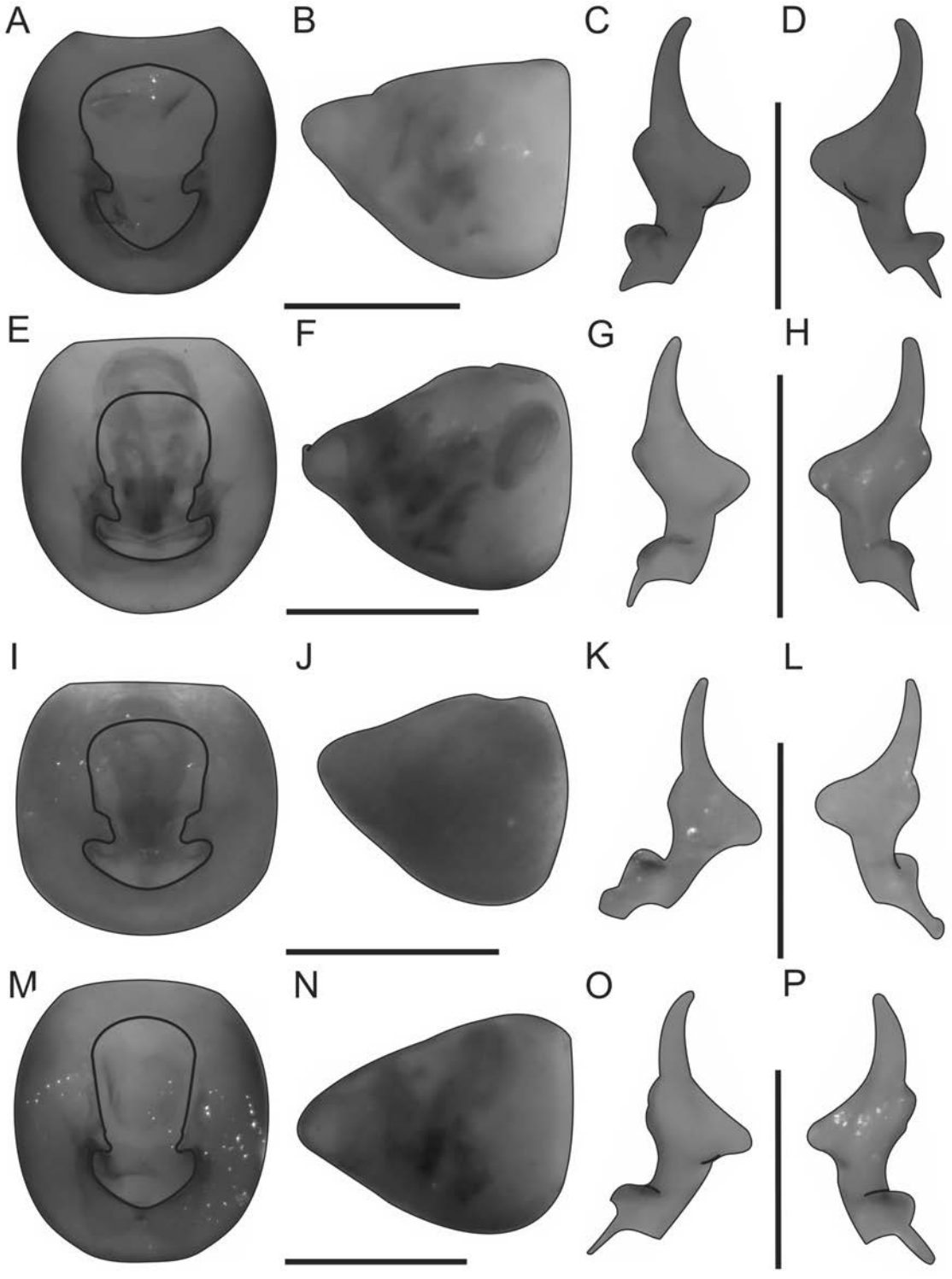

Figure 32. Male genitalia. ***Heraeus bolivianus* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus brevirostris* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. *Heraeus concolor* Slater & Baranowski, 1994: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus ecuatorianus* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

Type material
Holotype: ♂, **BOLIVIA**, N La Paz, Mapiri, 10/16-VIII-[19]89, L.E. Peña (USNM).

HERAEUS BREVIROSTRIS SP. NOV.

(FIGS 25F, 26F, 28, 30C, 32E–H)

Diagnosis
Labium extending to mesocoxae. Distiflagellomere with a narrow sub-basal pale band. Membrane with an apical pale spot. Meso- and metafemur with a narrow subapical brown band. Apex of pygophore with a small protuberance pointed dorsally.

Heraeus brevirostris sp. nov., *H. pallidinervis* sp. nov., *H. penai* sp. nov., and *H. loja* sp. nov. have a narrow pale band on the distiflagellomere, occupying about one-quarter of the segment length; *H. brevirostris* sp. nov., however, can be distinguished by the shorter labium extending only to mesocoxae, whereas the other species have a longer labium, extending to metacoxae.

Description (Fig. 25F)
Total length 5.61.

Head: Dark brown, shiny, coriaceous; with short recumbent setae and erect setae dorsally. Head length 1.15, width 0.85. Postocular length 0.42. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.45, interocellar width 0.29. Labium pale brown with short erect setae, extending to mesocoxae. Labial segment lengths: I 0.78, II 0.88, III 0.72, and IV 0.35. Antennae pale brown, apex of basiflagellomere and distiflagellomere darker, distiflagellomere with a narrow sub-basal pale band; all segments with abundant short recumbent and sparse erect setae. Antennal lengths: scape 0.45, pedicel 1.04, basiflagellomere 0.93, and distiflagellomere 1.02. Length of pale band on distiflagellomere 0.19.

Thorax: Pronotum dark brown, collar and posterior lobe paler, with irregular pale spots, humeral angles with a pale spot; pruinose, punctate, punctures larger on posterior lobe; anterior and posterior lobes with short recumbent and erect setae, longer on anterior lobe. Collar punctate, delimited by a punctate sulcus. Collar length 0.08, anterior lobe length 0.51, posterior lobe length 0.51; anterior lobe width 0.91, posterior lobe width 1.41. Pleurae dark reddish brown, punctate, with short recumbent setae. Evaporative area extended. Scutellum dark brown with a longitudinal darker median stripe, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra: costal margin pale on proximal two-thirds, with a subapical corial spot, membrane brown with veins paler and a pale apical spot, colouration pattern complex (Fig. 25F); with short recumbent setae. Legs: Coxae, protrochanter, and profemur dark brown, except apex of profemur and remainder of legs yellowish, with a subapical narrow brown band on meso- and metafemur (Fig. 26F); setae short and semi-erect, longer on profemur. Profemur with spines on apical two-thirds. Protibia slightly curved.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 32E, F) rounded, anterior margin of dorsal aperture rounded, apex with a small protuberance pointed dorsally; declivent posteriorly in lateral view; inner projections elongate, more produced posteriorly. Parameres: Figure 32(G, H). Aedeagus (Fig. 30C) with strong spines, conjunctiva with a few spines laterally; vesica with two spined sclerotized lobes and small unsclerotized lobes anteriorly with a patch of spines; *processus gonopori* long and slender.

Distribution
Argentina and Bolivia (Fig. 28).

Etymology
The specific epithet '*brevirostris*' is an adjective meaning short-beaked, and refers to the relatively short labium that extends only to the mesocoxae.

Type material
Holotype: ♂, **ARGENTINA**, *Salta*, Orán, Abra Grande, 10-I/1-X-[19]67, R. Golbach (IFML).

Paratypes: 2♂, 1♀, same data as for holotype (IFML); *Salta*: 1♂, 1♀, XII-2012, L. Alvarez col. (MLP); *Tucumán*: 1♂, (MLP). **BOLIVIA:** *La Paz*: 1♂, Yungas, Inquisivi, 5-XII-1984, L.E. Peña (USNM); 1♂, Guanay, Tres Esteros, 19/25-VIII-[19]89, L.E. Peña (USNM). *Cochabamba*: 2♂, Chapare Prov., Villa Tunari, Hotel de Selva El Puente, 340 m a.s.l., 16°59.04′S 65°24.53′W, 10-12-XII-2013, T.J. Henry (USNM); 1♀, Chapare Prov., Highway 4 at Rio Antahuacana bridge, 38 km SW of Villa Tunari, 850 m a.s.l., 17°05.35′S, 65°40.62′W, 12-XII-2013, T.J. Henry (USNM).

HERAEUS CONCOLOR SLATER & BARANOWSKI, 1994

(FIGS 25G, 30D, 31, 32I–L, 33A)

Heraeus concolor Slater & Baranowski, 1994: 493–494; Slater & O'Donnell, 1995: 147; Baranowski & Slater, 2005: 137.

Diagnosis
Small species, total length less than 5 mm. Pedicel with abundant erect setae, equal to or longer than diameter of segment. Distiflagellomere with a pale band. Labium extending to metacoxae. Membrane with an apical pale spot. Metafemur darker on apical one-quarter.

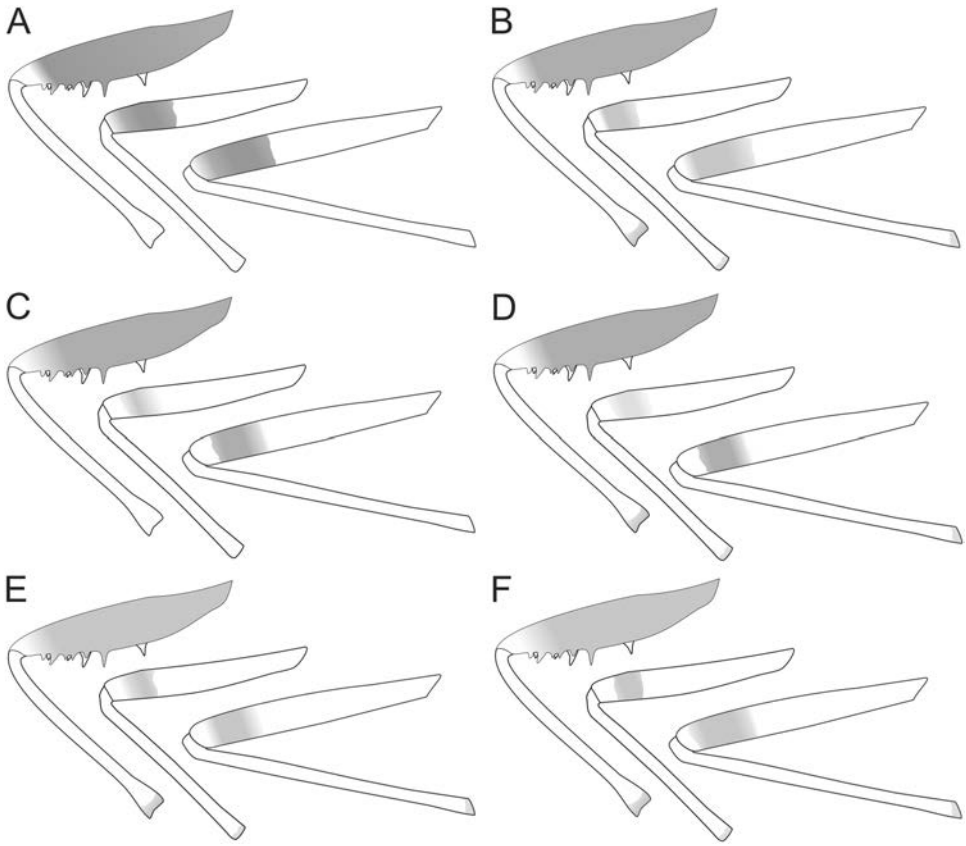

Figure 33. Legs: A, *Heraeus concolor* Slater & Baranowski, 1994; B, ***Heraeus ecuatorianus* sp. nov.**; C, ***Heraeus loja* sp. nov.**; D, ***Heraeus mesoamericanus* sp. nov.**; E, ***Heraeus mexicanus* sp. nov.**; F, ***Heraeus morganae* sp. nov.**

Heraeus concolor is similar in external appearance to *H. pulchellus*. Both are small species with a long labium extending to or near metacoxae; *H. concolor* can be differentiated by the dark-brown distiflagellomere with a conspicuous pale sub-basal band, whereas in *H. pulchellus* it is uniformly dark brown. These two species are known from the West Indies, and probably derived from ancestral stock related to *H. plebejus* that reached the islands from Florida (USA).

Description (Fig. 25G)

Head: Coriaceous. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Labium extending to metacoxae. Distiflagellomere with a pale band. Pedicel with abundant erect setae, equal to or longer than diameter of segment.

Thorax: Posterior pronotal lobe with pale spots and a pale spot on humeral angles. Anterior pronotal lobe with long erect setae. Evaporative area extended. Scutellum with erect setae. Inner corial spot diffuse. Costal margin pale on proximal three-quarters. Corium with a subapical corial spot. Membrane with an apical pale spot, veins pale. Profemur dark, at most with apex paler, meso- and metafemur darker apically (Fig. 33A); setae on profemur long and erect; protibia and mesofemur without spines.

Abdomen, male genitalia: Pygophore (Fig. 32I, J) rounded, anterior margin of dorsal aperture rounded. Parameres: Figure 32(K, L). Aedeagus (Fig. 30D): conjunctiva with a few minute spines laterally, vesica with lobes weakly sclerotized and spined apically; *processus gonopori* long and slender.

Distribution

Antigua, Dominican Republic, Jamaica, Nevis, and Saba; Haiti (NEW RECORD) (Fig. 31).

Type material examined

Holotype ♀, **DOMINICAN REPUBLIC**, Bayaguana, 4-IX-[19]91, BL Trap, D. Brown, Holotype *Heraeus concolor* J. A. Slater and R. M. Baranowski (USNM).

Additional material studied

ANTIGUA: 1♀, Christian Valley, 14-X-1961, blacklight trap, FAO Insect Survey, Baranowski (USNM).

DOMINICAN REPUBLIC: 1♂, Finca Goya, 5-IV-[19]89, Bl trap, G. Anzerro (USNM); *Azua*: 1♂, 8 km NE Padre Las Casas, Rio Las Cuevas, 18°46′N, 70°53′W, 580 m a.s.l., 7-VIII-1990, J. Rawlins & S. Thompson (AMNH); *Barahona*: 1♂, 5 km NW Barahona, Agr. Exp. Sta., B.L.T., 29/30-IV-[19]78, Woodruff, Fairchild & Mercado (USNM); *El Seibo*: 5♂, 5♀, Pedro Sanchez, 10-VI-6, blacklight trap at shallow stream, R.E. Woodruff; 2♀, 7 km N Pedro Sanchez, Loma de Chivo, 25-VI-[19]98, blacklight trap, R.M. Baranowski & R.E. Woodruff (USNM); 1♀, 20-VI-[19]98, blacklight trap, R.M. Baranowski & R.E. Woodruff (USNM); 1♀, 5000 ft, R.E. Woodruff & P.H. Freytag (USNM); *La Altagracia*: 2♂, 7♀, one without abdomen, Nisibon, finca 'Papagallo', 17-VI-1999, blacklight trap, abandoned building, R.E. Woodruff & R.M. Baranowski (USNM); 2♂, 2♀, Nisibon, Papagallo, 26-VI-[19]98, blacklight trap, R.M. Baranowski & R.E. Woodruff (USNM); 1♂, 4♀, Nisibon, 5 mi. W Las Lagunas, 16-VI-1999, blacklight trap, R.E. Woodruff & R.M. Baranowski (USNM); 1♀, 19-VI-1999, abandoned house (USNM); 1♂, 18-VI-1999 (USNM); 3♂, 1♀, Rio Maimon, near La Guama, 18-VI-[19]98, black light trap, P.H. Freytag & R.E. Woodruff (USNM); 1♀, Rio Maimon, La Laguna, Nisibon, 18-Vi-[19]98, black light trap, R.E. Woodruff (USNM); *La Romana*: 1♀, Higueral, 15-VIII-[19]77, blacklight trap, R.E. Woodruff & E. Folch (USNM); 1♂, 17-VIII-[19]77, blacklight trap, R.E. Woodruff & E. Folch (USNM); *Monseñor Novel*: 1♀, Bonao, Jacaranda Hotel, 28-VI-[19]98, blacklight trap, R.M. & R.E. Woodruff (USNM); *Monte Plata*: 1♀, NE Sierra de la Agua, 1-V-[19]78, blacklight trap, R.E. Woodruff, G. Fairchild & E. Mercado (USNM); *Pedernales*: 1♀, 19-VI-[19]76, blacklight trap, R.E. Woodruff (AMNH); 1♀, 24 km N Cabo Rojo, 11-VI-[19]98, blacklight trap, P.H. Freytag, B.K. Dezier & R.E. Woodruff (USNM); 1♀, 26 km N Cabo Rojo, 10-VI-[19]98, blacklight trap, P.H. Freytag, B.K. Dezier & R.E. Woodruff (USNM); *San Juan*: 1♀, 6 km W San Juan, 7-VIII-1979, UV light, O'Brien & Marshall (USNM); *San Pedro de Macoris*: 1♂, 1♀, 0.8 mi. W Juan Dolio, 22-VI-1998, black light trap, R.M. Baranowski & R.E. Woodruff (USNM).

HAITI: 1♂, III-[19]28, A.J. Poole (USNM).

JAMAICA: 1♂, Parish of St Andrew, 4000 ft, Holywell For. Camp, 18-X-1971, R.M. Baranowski (USNM); 1♀, Parish of St James, 4 mi. E of Montego Bay, Ironshore, 30-V-[19]70, U.V. light trap, E.G. Farnworth (USNM).

NEVIS ISLAND: 1♂, 1♀, Hurricane Cove, 22-VII-[19]91, BL trap, H.V. & R.M. Baranowski (USNM); 1♀, 18-IX-[19]92, B. Brandy (USNM); 3♂, 8-IX-[19]92, B. Brandy (USNM); 1♂, 1♀, Butler Village, 29-IX-[19]92, B.L. trap, B. Brandy (USNM); 1♀, 22-IX-[19]92, B.L. trap, B. Brandy (USNM).

SABA ISLAND: 2♂, 3♀, Mt Scenery, 26-IX-[19]90, H.V. & R.M. Baranowski (USNM); 4♂, 1♀, 19-VIII-[19]92, H.V. & R.M. Baranowski (USNM); 1♂, 20-VII-[19]91, H.V. & R.M. Baranowski (USNM); 1♂, N.A. Booby Hill, 19-IX-[19]93, B.L.T., T. van Oosteren, Baranowski coll. (USNM).

HERAEUS ECUATORIANUS SP. NOV.

(FIGS 25H, 30E, 31, 32M–P, 33B)

Diagnosis

Labium extending to metacoxae. Distiflagellomere with a sub-basal whitish band. Membrane with an apical pale spot. Meso- and metafemur with a subapical brown band. Pygophore rounded, inner projections elongate, more pronounced posteriorly; declivent posteriorly in lateral view. Parameres with inner projections narrow and elongate.

Description (Fig. 25H)

Total length 5.70.

Head: Brown, shiny, coriaceus; with abundant short recumbent and sparse long erect setae dorsally. Head length 1.22, width 0.83. Postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.42, interocellar width 0.26. Labium pale brown with erect setae, extending to metacoxae. Labial segment lengths: I 0.82, II 0.86, III 0.82, and IV 0.34. Antennae pale brown, scape externally, pedicel, basiflagellomere distally, and distiflagellomere darker, distiflagellomere with a sub-basal whitish band; with abundant, short recumbent and sparse semi-erect setae more abundant on distiflagellomere. Antennal lengths: scape 0.48, pedicel 1.08, basiflagellomere 1.01, and distiflagellomere 1.06. Length of pale band on distiflagellomere 0.29.

Thorax: Pronotum: anterior pronotal lobe brown, collar and posterior lobe paler, with irregular pale areas, each humeral angle with a whitish spot; collar punctate, delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent setae and sparse long erect setae on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.08, anterior lobe length 0.56, posterior lobe length 0.51; anterior lobe width 0.89, posterior lobe width 1.39. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, darker basally, with a darker longitudinal median stripe, apex paler, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra brown, irregularly pigmented, costal margin pale on proximal three-quarters; apex of corium darker, with a subapical whitish spot and an inner pale spot; setae short and semi-erect; membrane brown, with an apical pale spot,

veins paler (Fig. 25H). Legs: Coxae, protrochanter, profemur, except apex, and a subapical band on meso- and metafemur brown, remainder of legs pale brown, apex of tibiae, apex of tarsi, and pretarsi darker (Fig. 33B); setae semi-erect, longer on profemur. Profemur with spines restricted to apical half.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 32M, N) rounded, anterior margin of dorsal aperture rounded, inner projections elongate, more pronounced posteriorly; declivent posteriorly in lateral view. Parameres: Figure 32(O, P). Inner projections narrow and elongate. Aedeagus (Fig. 30E): conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with two pairs of lobes, the anterior lobe short, not sclerotized, and with spines; the posterior lobe larger, strongly sclerotized, with a few spines distally; *processus gonopori* long and slender.

Distribution
Ecuador (Fig. 31).

Etymology
The specific epithet '*ecuatorianus*' is an adjective and refers to Ecuador, the country where the known specimens were collected.

Type material
Holotype: ♂, **ECUADOR**, Guay, Olon, 29-II-1976, blacklight, J. Cohen (USNM).

Paratypes: 2♂, 1♀, same data as for holotype (USNM); 1♂, 2♀, **ECUADOR**, Victoria, Arenillas, 150 m a.s.l., 18/19-VIII-1977, L. Peña G. (USNM); 1♂, 1♀, 18/19-VIII-1977, L. Peña G. (MLP); 1♂, 1♀, Pilalo (W), 9/10-X-1977, L. Peña G. (USNM).

HERAEUS LOJA SP. NOV.

(FIGS 25I, 33C, 34A–D, 35)

Diagnosis
Labium extending to metacoxae. Distiflagellomere with a narrow sub-basal pale band. Membrane brown, with veins paler. Metafemur with a subapical dark band.

Heraeus loja sp. nov. shares with *H. pallidinervis* sp. nov. and *H. penai* sp. nov. a narrow pale band on the distiflagellomere, occupying at most one-quarter of the segment length, and a long labium extending to the metacoxae. These three species, however, are readily distinguished by the male genitalia, with *H. loja* sp. nov. having a slightly declivent pygophore with narrow, elongate inner projections.

Description (Fig. 25I)
Total length 5.89.

Head: Dark brown, shiny; setae long and erect dorsally. Head length 1.20, width 0.93. Postocular length 0.40. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.48, interocellar width 0.29. Labium pale brown with erect setae, extending to at least metacoxae. Labial segment lengths: I 0.85, II 0.96, III 0.83, and IV 0.35. Antennae pale brown, distiflagellomere with a narrow sub-basal pale band; setae abundant, short, and semi-erect. Antennal lengths: scape 0.46, pedicel 1.09, basiflagellomere 0.90, and distiflagellomere 0.96. Length of pale band on distiflagellomere 0.13.

Thorax: Anterior pronotal lobe and scutellum dark brown, posterior pronotal lobe paler, with pale spots and with a pale spot on humeral angles. Anterior pronotal lobe with long erect setae, posterior lobe with short erect setae. Collar with scattered punctures, delimited posteriorly by a punctate sulcus. Collar length 0.08, anterior lobe length 0.56, posterior lobe length 0.45; anterior lobe width 1.02, posterior lobe width 1.52. Pleurae dark brown, except acetabular areas reddish brown; punctate, with short recumbent setae. Evaporative area extended. Scutellum dark brown, with a median darker longitudinal stripe, apex paler, pruinose, punctate; with erect setae. Hemelytra mostly pale brown, with irregular darker spots, pattern complex (Fig. 25I). Inner corial spot diffuse; costal margin pale on proximal three-quarters; with a subapical corial spot; membrane brown with veins paler and pale spots between them. Legs: Profemur dark, at most, with apices paler, remainder of legs paler, except metafemur with a subapical dark band (Fig. 33C); setae on profemur long and erect. Protibia curved, protibia and mesofemur without spines.

Abdomen: Dark brown, with abundant short recumbent setae. Male genitalia: Posterior margin of pygophore flattened in dorsal view (Fig. 34A, B), anterior margin of dorsal aperture slightly rounded, with inner projections narrow, elongate, strongly projecting posteriorly. Parameres: Figure 34(C, D). Aedeagus: spinose; conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with sclerotized lobes and spines distally and anteriorly; *processus gonopori* long and slender.

Distribution
Ecuador (Fig. 35).

Etymology
The specific epithet is a noun in aposition and refers to Loja Province in Ecuador, where the holotype was collected.

Type material
Holotype: ♂, **ECUADOR**, *Loja*, 26 km W of Loja, along road to Catamayo, 2350 m a.s.l., 18-II-2002, 3°59′71″S, 79°18′41″W, T.J. Henry & P.S.F. Ferriera (USNM).

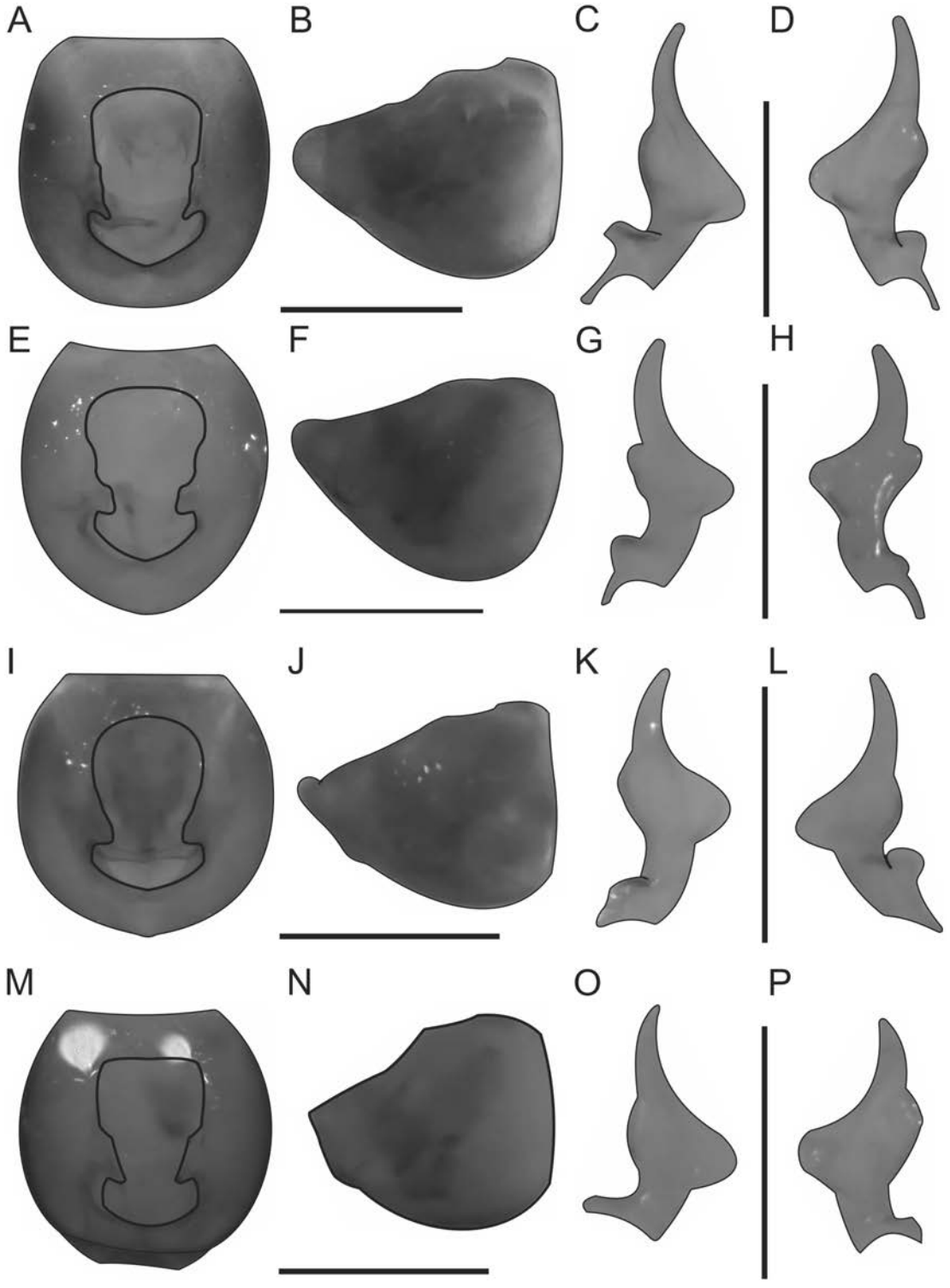

Figure 34. Male genitalia. ***Heraeus loja* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Heraeus mesoamericanus* sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus mexicanus* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus morganae* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

Figure 35. Distributional map of ***Heraeus loja* sp. nov.** and ***Heraeus pallidinervis* sp. nov.**

HERAEUS MESOAMERICANUS SP. NOV.

(FIGS 30F, 33D, 34E–H, 36A, 37)

Diagnosis

Labium extending to mesocoxae. Distiflagellomere with a sub-basal whitish band. Evaporative area short, distance from dorsal margin of auricle to dorsal margin of evaporative area shorter than distance from dorsal margin of evaporative area to dorsal margin of metapleura. Membrane brown, veins paler, without an apical pale spot. Meso- and metafemur with a subapical narrow brown band. Pygophore apex pointed dorsally in lateral view.

Description (Fig. 36A)

Total length 5.61.

Head: Brown, shiny, coriaceous, with short recumbent and long erect setae dorsally. Head length 1.18, width 0.85, postocular length 0.43. Eyes not surpassing dorsal margin of head in lateral view. Ocelli posterior of an imaginary line passing the posterior border of eyes. Interocular width 0.42, interocellar width 0.22. Labium pale brown with abundant erect setae, extending to mesocoxae. Labial segment lengths: I 0.72, II 0.82, III 0.60, and IV 0.24. Antennae pale brown, apical half of basiflagellomere and distiflagellomere darker, distiflagellomere with a subbasal whitish band; all segments with abundant short recumbent and sparse short erect setae. Antennal lengths: scape 0.46, pedicel 1.03, basiflagellomere 0.91, and distiflagellomere 1.03. Length of pale band on distiflagellomere 0.24.

Thorax: Anterior pronotal lobe brown, collar and posterior lobe paler, with four longitudinal pale stripes, humeral angles yellowish; collar delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent and long erect setae, longer on anterior lobe. Pronotum pruinose, punctate, punctures larger on posterior lobe. Collar length 0.08, anterior lobe length 0.51, posterior lobe length 0.54; anterior lobe width 0.89, posterior lobe width 1.42. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area short. Scutellum brown, with a longitudinal median dark stripe, apex paler;

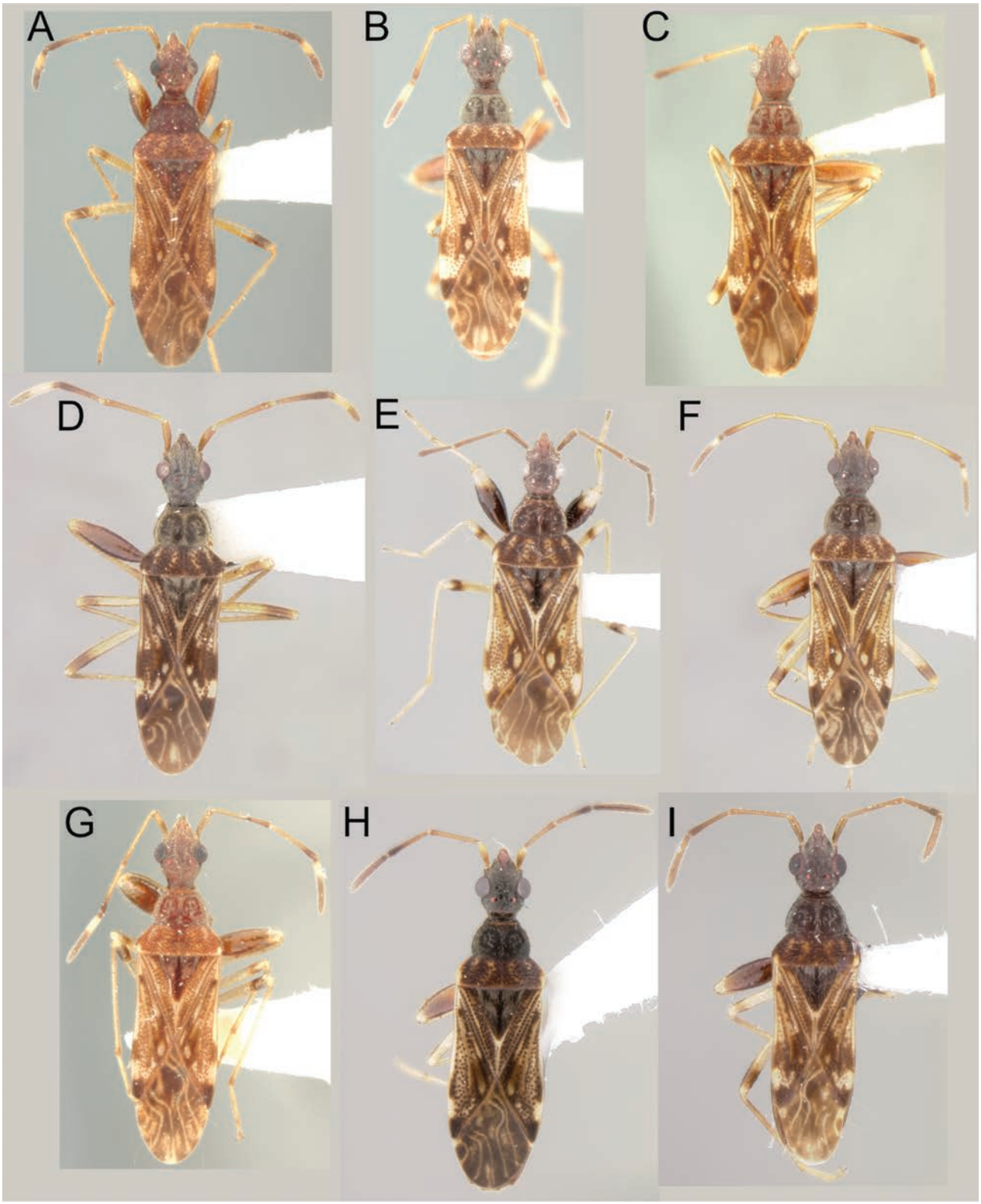

Figure 36. Habitus dorsal: A, ***Heraeus mesoamericanus* sp. nov.**; B, ***Heraeus mexicanus* sp. nov.**; C, ***Heraeus morganae* sp. nov.**; D, ***Heraeus nicaraguensis* sp. nov.**; E, *Heraeus pacificus* Barber, 1925; F, ***Heraeus pallidinervis* sp. nov.**; G, ***Heraeus penai* sp. nov.**; H, *Heraeus plebejus* Stål, 1874; I, *Heraeus pulchellus* Barber, 1954.

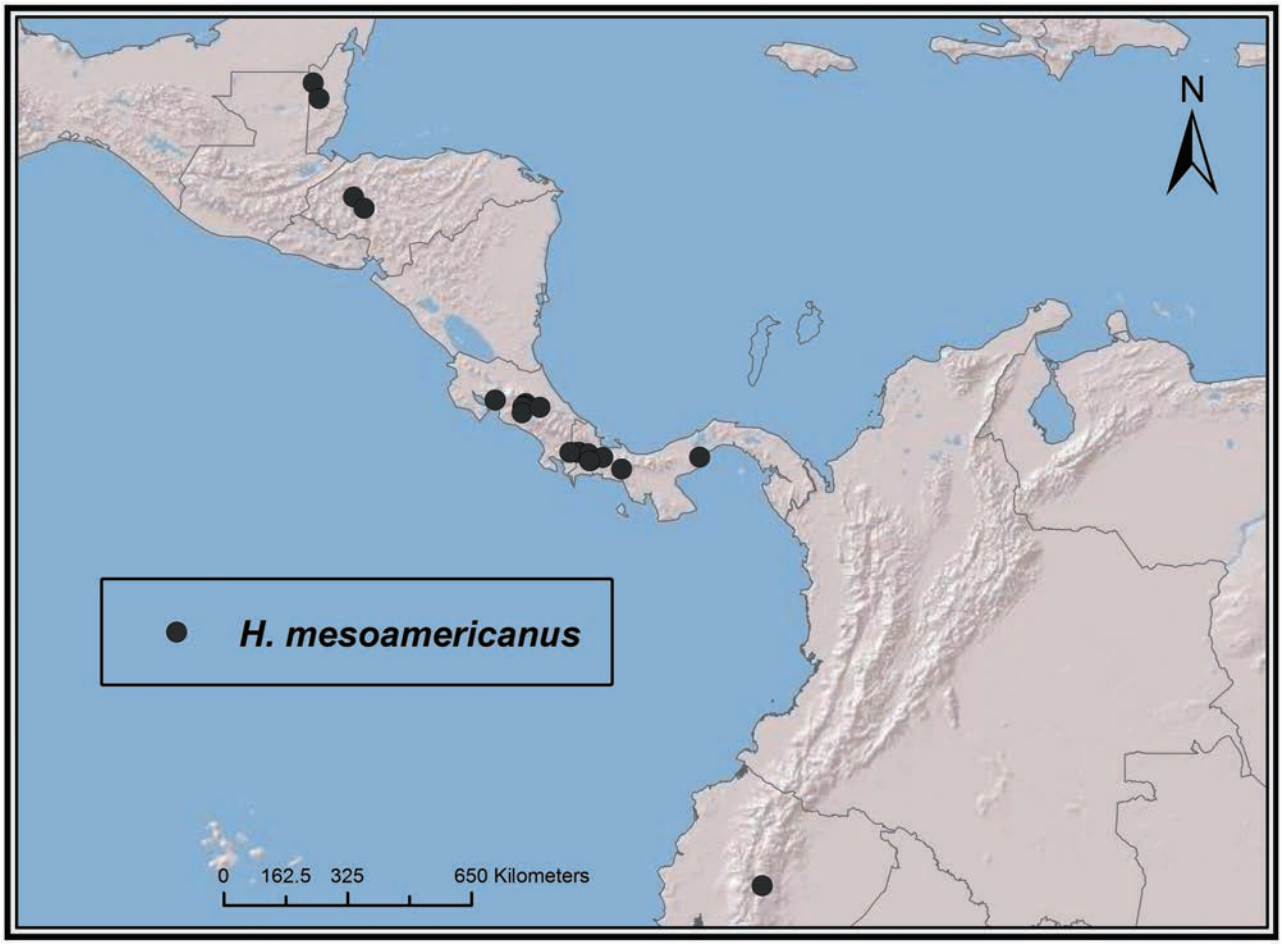

Figure 37. Distributional map of ***Heraeus mesoamericanus*** **sp. nov.**

pruinose, punctate; with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, irregularly pigmented. Costal margin pale on proximal three-quarters, apex of corium darker with a subapical whitish spot and an small pale inner spot; setae short and recumbent; membrane brown with veins paler (Fig. 36A). Legs: Coxae, protrochanter, profemur, except distally, and a subapical narrow band on meso- and metafemur brown, remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 33D); setae semi-erect, longest on profemur. Profemur with spines restricted to apical half.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 34E, F) rounded, elongate, with pointed posterior margin, apex with a dorsally directed protuberance, declivent posteriorly in lateral view; anterior margin of dorsal aperture rounded. Inner projections subquadrangular. Parameres: Figure 34(G, H). Aedeagus: conjunctiva and vesica with a few sparse spines laterally, vesica with two sclerotized lobes; *processus gonopori* long and slender (Fig. 30F).

Variability observed in other material studied
In the specimens from Belize, the labium is slightly longer, barely extending to metacoxae.

Distribution
Belize, Costa Rica, Ecuador, Honduras, and Panama (Fig. 37).

Etymology
The specific epithet '*mesoamericanus*' is an adjective meaning Central American, and refers to the known geographic distribution of the species.

Type material
Holotype: ♂, **COSTA RICA**, *San Jose*, San Isidro de Coronado, 550 ft, 11/12-VI-[19]67, BL trap, E.B. Fogar (USNM).

Paratypes: 5♂, 11♀, same data as for holotype (USNM); 1♂, 2♀, San Isidro de Coronado, Finca Joseph Smids, 5500 ft, 31-V/2-VI-[19]67, blacklight trap, E.B. Fagan

(USNM); 1♂, 1♀, 31-V/2-VI-[19]67, blacklight trap, E.B. Fagan (MLP); *Puntarenas*: 7♂, 7♀, finca Las Cruces, 6 km S San Vito de Java, 4200 ft, 28-IX/2-X-1986, J.E. Eger (USNM); 1♂, 1♀, 28-IX/2-X-1986, J.E. Eger (MLP).

Additional material studied

BELIZE: 2♂, 3♀, Orange Walk Dist., Chan Chich Lodge, 1-IV-[20]09, BLT, E. Flota (USNM); 1♂, Cayo Dist., Chiquibul Forest Res., 27-III-[20]08, BL Trap, 27-III-[20]08, B. Miller (USNM); 1♂, Cayo Dist., Benque Viejo del Carmen, Riverside N, Mopan River Resort, 20-XI-[20]07, BL Trap, M. Chrysler (USNM); 1♂, 13-XII-[20]07, BL Trap, M. Chrysler (USNM).

COSTA RICA: 1♂, Torrazu, 20-VIII-[19]36, on *Coffee arabica*, E. Marin (USNM); *Cartago*: 1♀, Turrialba, Int. Amer. Inst. Agr. Sci., blacklight trap, 18/20-VIII-[19]64, R.E. Woodruff (USNM); *Puntarenas*: 1♂, Turrialba, 27-I-1965, J.A. Slater & N.T. Davis (AMNH); 1♀, on *Chrysanthemum*, V-[19]87 (USNM).

ECUADOR: *Tungurahua*: 2♂, Baños, 6200 ft, 24-I-1976, Spangler *et al*. (USNM); 2♂, 3♀, Finca Las Cruces, 6 km S San Vito de Java, 4200 ft, 28-IX/2-X-1986, J.E. Eger (USNM).

HONDURAS: 1♂, 1♀, Comayagua, Siguatepeque, 25-VIII-[19]66, mosquito trap, R.E. Woodruff (USNM); 1♂, 21 km NW Siguatepeque, Ch. 5 rd., 1-VIII-1977, O'Brien & Marshall (AMNH); 1♀, Sta. B., 13 km SE El Mochito, 22-VII-1977, C.W. & L. O'Brien & Marshall (AMNH).

PANAMA: *Chiriqui*, 3♂, 15♀, Dist. Renacimiento, Santa Clara, 4000 ft, 28/29-V-[19]76, at light, Engleman & Thurman (AMNH); 1♂, 1♀, 28/29-V-[19]76, at light, Engleman & Thurman (MLP); 2♂, 1♀, 20/22-V-[19]77, Engleman (AMNH); 1♂, 3♀, 29-V-[19]76, D. Engleman (AMNH); 1♂, Rovira, Elvira Farm, 15-VIII-[19]64, 220 ft, blacklight trap, A.B. Broce (USNM); 3♂, Rovira, 5-VII-[19]64, 2500 ft, mosquito light trap, A. Bruse (USNM); 1♂, 9-V-[19]64, mosquito light trap, A. Bruse (USNM); 1♀, Rovira, 4-VII-[19]64, blacklight trap, A.B. Brose (USNM); 1♂, 1♀, Volcan Chiriqui, 3500 ft, 4-XI-[19]73, D. Engleman (AMNH); 1♂, 1♀, Volcan Aria, 4500 ft, 25-V-[19]73, lagos, D. Engleman (USNM); 1♂, 11-IV-[19]73, D. Engleman (USNM); 1♀, 2.5 mi. W El Volcan, 4400 ft, Las Lagunas, 9-VII-1974, O'Briens & Marshall (AMNH); 1♂, 2♀, Res. For. La Fortuna, El Vivero, 20-VII-1995, UV-HG lights, L.B. O'Brien (USNM); *Panama*, 1♂, Cerro Campana, 29-VII-1995, C.W. & L.B. O'Brien (USNM); 1♀, Interamerican Hwy. 3 km E of Ipeli, 3-V-1992, UV and HG vapour light, A. Gillogly (USNM).

HERAEUS MEXICANUS SP. NOV.

(FIGS 30G, 33E, 34I–L, 36B, 38)

Diagnosis

Labium extending to mesocoxae. Distiflagellomere with a pale band. Membrane with an apical pale spot. Metafemur with a subapical dark band. Apex of pygophore pointed posteriorly in lateral view.

Description (Fig. 36B)

Total length 5.32.

Head: Brown, shiny, coriaceous; with short recumbent and long erect setae dorsally. Head length 1.10, width 0.82. Postocular length 0.38. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.40, interocellar width 0.22. Labium pale brown, with short erect setae; extending to mesocoxae. Labial segment lengths: I 0.72, II 0.78, III 0.64, and IV 0.32. Antennae pale brown, apex of basiflagellomere and distiflagellomere darker, distiflagellomere with a sub-basal whitish band; all segments with abundant short recumbent and sparse short erect setae. Antennal lengths: scape 0.43, pedicel 1.01, basiflagellomere 0.80, and distiflagellomere 0.88. Length of pale band on distiflagellomere 0.24.

Thorax: Pronotum pruinose, punctate, punctures larger on posterior lobe. Anterior pronotal lobe brown, collar and posterior lobe paler, with four longitudinal pale stripes, humeral angles yellowish; collar delimited posteriorly by a punctate sulcus; anterior and posterior lobes with short recumbent setae and long erect setae, longer on anterior lobe. Collar length 0.06, anterior lobe length 0.53, posterior lobe length 0.43; anterior lobe width 0.85, posterior lobe width 1.31. Evaporative area extended. Scutellum brown, with a longitudinal median dark stripe, apex paler; pruinose, punctate; with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, irregularly pigmented. Costal margin pale on proximal three-quarters, apex of corium darker with a subapical whitish spot and an inner small pale spot; setae short and recumbent; membrane irregularly brown, veins paler, with a pale apical spot. (Fig. 36A). Legs: Coxae, protrochanter, and profemur brown, at most with apices paler, meso- and metafemur with a subapical narrow dark band; remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 33E); setae long and erect, longer on profemur.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 34I, J) rounded, with a pointed posterior margin; apex with a small protuberance pointing posteriorly in lateral view; anterior margin of dorsal aperture rounded. Parameres: Figure 34(K, L). Aedeagus (Fig. 30G) with minute spines

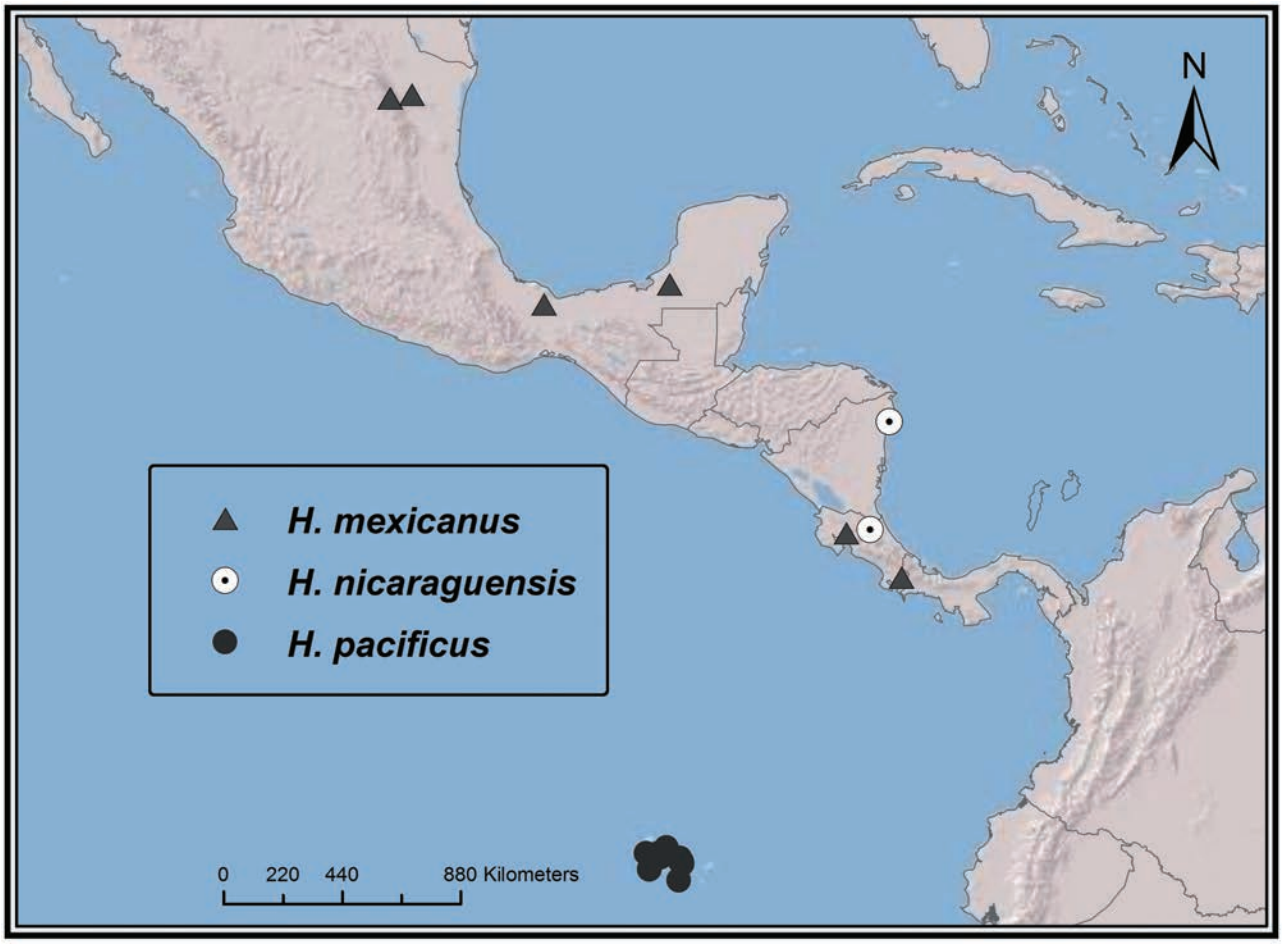

Figure 38. Distributional map of ***Heraeus mexicanus* sp. nov.**, ***Heraeus nicaraguensis* sp. nov.**, and *Heraeus pacificus* Barber, 1925.

on conjunctiva and sclerotized vesical lobes; *processus gonopori* long and slender.

Distribution
Costa Rica and Mexico (Fig. 38).

Etymology
The specific epithet '*mexicanus*' is an adjective referring to Mexico, the country where most of the type series was collected.

Type material
Holotype: ♂, **MEXICO**, *N[uevo] L[eon]*, Anegade Arroya, 16 mi. S Linares, 1250 ft, 9-VII-1963, Duckworth & Davis (USNM).

Paratypes: 1♂, 2♀, same data as for holotype (USNM); **MEXICO:** *Nuevo Leon*: 1♂, 3♀, 3 mi. E Galeana, 5000 ft, 7/9-VIII-1963, Duckworth & Davis (USNM); 1♀, 7/9-VIII-1963, Duckworth & Davis (UNAM); 1♂, 7/9-VIII-1963, Duckworth & Davis (MLP); *Campeche*: 1♀, Escarcega, 3-VI-1962, light trap, F. Islas S. (USNM); 1♂, 28-IV-1962, light trap, F. Islas S. (USNM); *Veracruz*: 1♂, 25 mi. S Acayucan, 4-VII-1965, collected at blacklight trap, P.J. Spangler (USNM); **COSTA RICA:** 1♂, *Puntarenas*, San Vito, Darryl Coles Farm, Loma Linda, 30-VII-1986, D.V. Bennett (UCMS); 1♀, Puntarenas, nr Monteverde, 31-V-1988, blacklight, J.E. O'Donnell (UCMS).

HERAEUS MORGANAE SP. NOV.

(FIGS 31, 33F, 34M–P, 36C)

Diagnosis
Labium extending to metacoxae. Distiflagellomere with a wide sub-basal yellowish band. Membrane with an apical pale spot. Meso- and metafemur with a subapical brown band. Pygophore rounded, declivent, and truncate posteriorly in lateral view; anterior margin of dorsal

aperture subquadrangular, inner projections elongate, more pronounced posteriorly. Inner projections of parameres broad.

Description (Fig. 36C)
Total length 5.51.

Head: Brown, shiny, coriaceous, with short recumbent and long erect setae dorsally. Head length 1.18, width 0.83. Postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli placed at level of an imaginary line passing the posterior border of eyes. Interocular width 0.40, interocellar width 0.24. Labium pale brown with erect setae, extending to metacoxae. Labial segment lengths: I 0.77, II 0.74, III 0.72, and IV 0.34. Antenna pale brown, distiflagellomere with a wide sub-basal yellowish band; setae abundant, short, and recumbent. Antennal lengths: scape 0.46, pedicel 1.08, basiflagellomere 0.96, and distiflagellomere 1.01. Length of pale band on distiflagellomere 0.34.

Thorax: Pronotum brown, anterior pronotal lobe darker, posterior lobe with irregular longitudinal pale stripes, each humeral angle with a whitish spot; collar with scattered punctures, delimited posteriorly by a punctate sulcus, punctures larger on posterior lobe; anterior and posterior lobes with short recumbent setae, and anterior lobe with long erect setae. Collar length 0.08, anterior lobe length 0.53, posterior lobe length 0.48; anterior lobe width 0.86, posterior lobe width 1.34. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, apex paler, pruinose, punctate, with short recumbent and long erect setae, as on anterior pronotal lobe. Hemelytra pale brown, costal margin pale on proximal three-quarters, apex of corium darker, with a subapical whitish spot and an inner pale spot; setae short and recumbent; membrane irregularly brown, with an apical pale spot, veins paler (Fig. 36C). Legs: Coxae, protrochanter, profemur, except distally, and a subapical band on meso- and metafemur brown, remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 33F); setae semi-erect, longer on profemur. Profemur with spines restricted to apical two-thirds. Protibia slightly curved.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 34M, N) rounded, declivent and truncate posteriorly in lateral view; anterior margin of dorsal aperture subquadrangular, inner projections elongate, more pronounced posteriorly. Parameres: inner projections broad (Fig. 34O, P). Aedeagus: vesica with spines laterally, and with two sclerotized lobes with many spines anteriorly; *processus gonopori* long and slender.

Distribution
Panama (Fig. 31).

Etymology
Named after our friend and colleague Cecilia C. Morgan (MLP).

Type material
Holotype: ♂, **PANAMA**, Cano Saddle, Gatun Lake, close's Plta, 12-V-[19]23, B.C. Shannon (USNM).

Paratypes: 2♂, 3♀, same data as for holotype (USNM); **PANAMA**, 1♂, 4♀, Cano Saddle, Gatun Lake, 12-V-[19]23, B.C. Shannon (USNM); 1♂, 12-V-[19]23, B.C. Shannon (MLP); 1♀, 27-IV-[19]23, B.C. Shannon (MLP); 1♂, CC, 28-IV-1973, H. Hespenheide (AMNH).

HERAEUS NICARAGUENSIS SP. NOV.

(FIGS 36D, 38, 39A, 40A–D)

Diagnosis
Labium extending to mesocoxae. Distiflagellomere with a pale band. Membrane with an apical pale spot. Metafemur with a subapical dark band. Apex of pygophore pointed dorsally in lateral view.

The diagnostic characters relate *H. nicaraguensis* sp. nov. to *H. bahiensis* sp. nov. They can be distinguished by the darker general colouration of *H. nicaraguensis* sp. nov., with a blackish head and a dark posterior pronotal lobe with four longitudinal pale stripes, whereas in *H. bahiensis* sp. nov., the head is dark reddish brown and the posterior pronotal lobe is brown, with diffuse longitudinal stripes.

Description (Fig. 36D)
Total length 5.32. Dark brown species.

Head: Dark brown, shiny, coriaceous, with short recumbent and long erect setae dorsally. Head length 1.10, width 0.83, postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.40, interocellar width 0.24. Labium pale brown, with erect setae; extending to mesocoxae. Labial segment lengths: I 0.70, II 0.75, III 0.48, and IV 0.29. Antennae brown, basal half of basiflagellomere and base of distiflagellomere darkened, distiflagellomere with a wide sub-basal yellowish band; setae abundant, short, and recumbent. Antennal lengths: scape 0.42, pedicel 0.99, basiflagellomere 0.80, and distiflagellomere 1.04. Length of pale band on distiflagellomere 0.40.

Thorax: Pronotum dark brown, posterior pronotal lobe slightly paler, with four longitudinal pale bands and a pale spot on each humeral angle. Anterior and posterior lobes with short recumbent setae and long erect setae, longer on anterior lobe. Collar length 0.08, anterior lobe length 0.54, posterior lobe length 0.46; anterior lobe width 0.86, posterior lobe width 1.28. Scutellum dark brown, apex paler, pruinose, punctate, with short

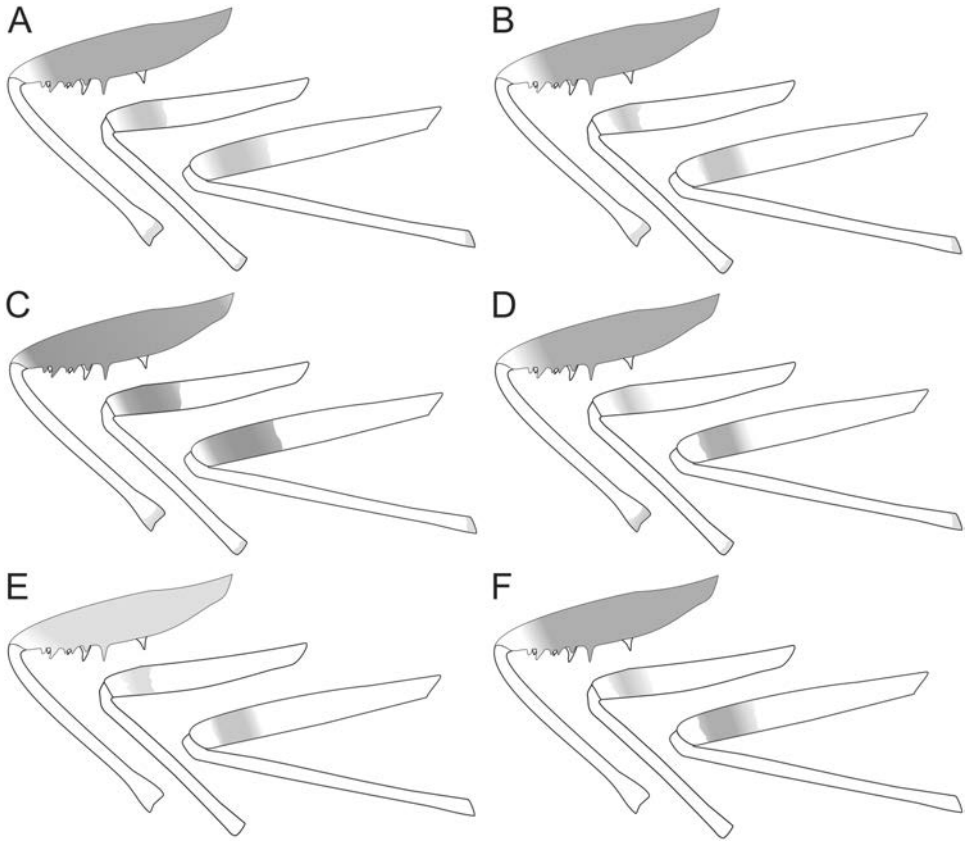

Figure 39. Legs: A, ***Heraeus nicaraguensis* sp. nov.**; B, *Heraeus pacificus* Barber, 1925; C, ***Heraeus pallidinervis* sp. nov.**; D, ***Heraeus penai* sp. nov.**; E, *Heraeus plebejus* Stål, 1874; F, *Heraeus pulchellus* Barber, 1954.

recumbent and erect setae, as on anterior lobe. Pleurae dark brown, punctate, with short recumbent setae. Evaporative area extended. Hemelytra dark brown, with a pale inner corial spot and a subapical corial spot; costal margin pale on proximal three-quarters; membrane brown, with veins paler and an elongate apical pale spot (Fig. 36D). Legs: Coxae, protrochanter, and profemur dark brown, at most with apices paler, meso- and metafemur with a subapical dark band; remainder of legs pale brown, apex of tibiae, tarsi, and pretarsi darker (Fig. 39A); setae long and erect, longest on profemur.

Abdomen: Dark brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 40A, B) rounded, apex with a dorsally directed protuberance, anterior margin of dorsal aperture slightly rounded. Parameres: Figure 40(C, D). Aedeagus: spinose; conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with spines laterally and sclerotized lobes with spines distally; *processus gonopori* long and slender.

Distribution
Costa Rica and Nicaragua (Fig. 38).

Etymology
The specific epithet '*nicaraguensis*' is an adjective referring to Nicaragua, the Central American country where the holotype was collected.

Type material
Holotype: ♂, **NICARAGUA**, Puerto Cabezas, VII-1971, J. Maldonado C. (USNM).

Paratypes: 1♂, 1♀, same data as for holotype (USNM); **COSTA RICA:** *Heredia*: 1♀, La Selva OTS Station, 22/23-V-1988, blacklight, J. O'Donnell (UCMS); 1♀, 24/25-V-1988, blacklight, J. O'Donnell (UCMS).

HERAEUS PACIFICUS BARBER, 1925
(FIGS 36E, 38, 39B, 40E–H)

Heraeus pacificus Barber, 1925: 244–246; Barber, 1934: 286; Slater, 1964: 1083; Linsley & Usinger, 1966: 134; Ashlock, 1972: 101; Parkin *et al*., 1972: 102; Linsley, 1977: 11; Harrington, 1980: 109; Schaefer *et al*., 1980: 46; Froeschner, 1981: 43; Froeschner, 1985: 22; Peck, 2001: 258.

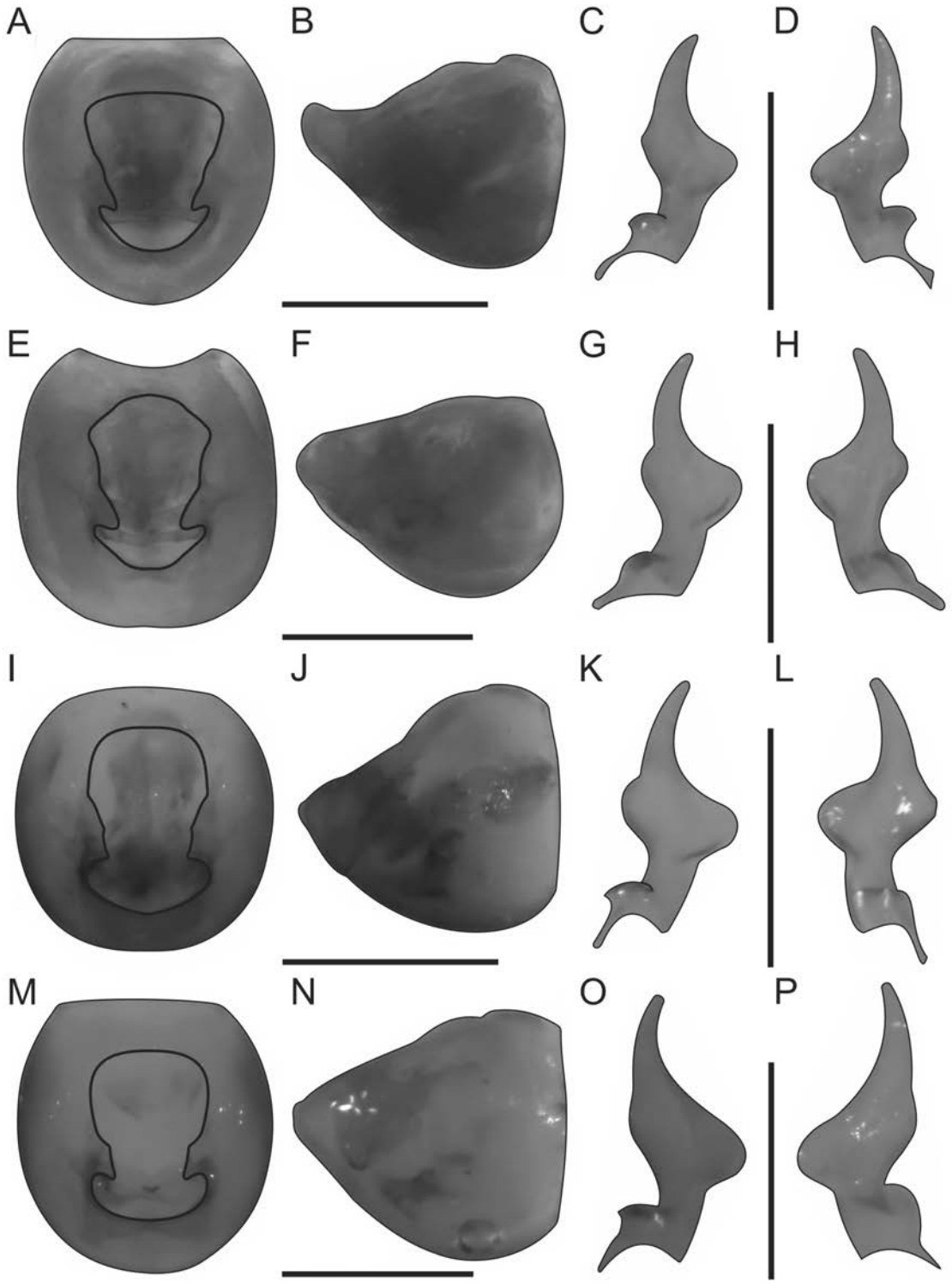

Figure 40. Male genitalia. ***Heraeus nicaraguensis* sp. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. *Heraeus pacificus* Barber, 1925: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Heraeus pallidinervis* sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Heraeus penai* sp. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

Diagnosis

Ocelli posterior to an imaginary line passing the posterior border of eyes. Labium extending to or slightly surpassing mesocoxae. Antennae uniformly dark brown. Pronotum with long erect setae only on anterior pronotal lobe. Membrane brown, without an apical corial spot. Metafemur with a dark subapical band. Anterior margin of dorsal aperture of pygophore slightly rounded with lateral regions angulate.

Heraeus pacificus together with *H. pulchellus* and *H. plebejus* are the only species in the group that lack a pale band on the distiflagellomere (although in some specimens of *H. pulchellus* a pale band is slightly evident). *Heraeus pacificus* can be distinguished by the uniformly coloured dark-brown antenna and the ocelli placed posterior of an imaginary line passing the posterior border of eyes; *H. pulchellus* and *H. plebejus* have the antennae pale brown to brown with the apex of basiflagellomere and distiflagellomere darker, and the ocelli are placed at the level of an imaginary line passing the posterior border of eyes.

Redescription (Fig. 36E)

Head: Brown, shiny, coriaceous, with short recumbent and long erect setae dorsally. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli posterior of an imaginary line passing the posterior border of eyes. Labium pale brown, with short erect setae; extending to or slightly surpassing mesocoxae. Antenna uniformly dark brown, with short recumbent and long erect setae.

Thorax: Pronotum brown, pruinose, punctate. Posterior pronotal lobe with pale spots and with a pale spot on each humeral angle. Anterior and posterior lobes with short recumbent setae, and erect longer setae on anterior lobe. Scutellum brown, with long erect setae. Evaporative area extended. Hemelytra: irregularly brown, costal margin pale on proximal three-quarters; inner corial spot well developed; membrane brown, with veins paler; setae short and recumbent. Legs: coxae, protrochanter, and profemur dark, at most with apices paler, meso- and metafemur with a narrow subapical dark band; apex of tibiae, tarsi, and pretarsi darker (Fig. 39B); setae long and erect, longest on profemur.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 40E, F) rounded, with posterior margin straight, anterior margin of dorsal aperture almost straight, inner projections long, slightly bilobed. Parameres: Figure 40(G, H). Aedeagus: conjunctiva unspined, with an anterior lobe at base of the ejaculatory reservoir; vesica with minute spines lateral to the ejaculatory reservoir and on the lobes; *processus gonopori* long and slender.

Variability observed

We have examined specimens from Santa Cruz Island that differ from Barber's (1925) original description. These specimens are paler; the head is slightly narrower than the anterior lobe of the pronotum; all antennal segments have abundant setae; the labium is shorter, extending to mesocoxae, and in some specimens the labium surpasses the mesocoxae, extending to the anterior region of the metacoxae; and the hemelytra have short recumbent setae. In addition, we have observed some characters not mentioned in the original description: the scutellum has setae longer than on the anterior lobe of pronotum; the legs have short semi-erect setae; and the anterior tibiae bear small denticles ventrally that are more conspicuous in the males.

Distribution

Galapagos: Santa María Island, San Salvador Island, and Santa Cruz Island; Fernandina Island, Floreana Island, Santiago Island (NEW RECORDS) (Fig. 38).

Type material

This species was described based on a male holotype, and two female and one male paratypes from James Island, deposited in AMNH.

Material studied

GALAPAGOS: *Santa Cruz Island*: 2♀, Indefatigable Island, Puerto Azora, XII-1971/III-[19]72, at light, J. Vagvolgyi (CAS); 23♂, 32♀, Hornemann Ranch, 8-II-1964, I.L. Wiggins (CAS); 1♂, 1♀, Hornemann Farm, 220 m a.s.l. 5-IV-1964, D.Q. Cavagnaro (CAS); 1♂, 1♀, D.Q. Cavagnaro (MLP); 1♀, 7-V-1964, D.Q. Cavagnaro (CAS); 1♂, grassland, 750 m a.s.l., 10-IV-1964, D.Q. Cavagnaro (CAS); 1♂, 4♀, Academy Bay, Darwin Research Station, 8-II-1964, R.O. Schuster (CAS); 1♀, 12-II-1964, D.Q. Cavagnaro & R.O. Schuster (CAS); 1♂, 1♀, vic. Media Luna, 4-VI-[19]70, 600 m a.s.l., at light, *Miconia* 'Belt', R. Silverglied & T.J. de Vries (USNM); 2♂, vic. Media Luna, 4-VI-[19]70, 600 m a.s.l., at light, *Miconia* 'Belt', R. Silverglied (USNM); 2♂, 2♀, Cerro Crocker, 800 m a.s.l., 19-VI-[19]85, volcano crater, ferns & *Psychotria* litter, S. & J. Peck (USNM); 9♂, 19♀, Los Gemelos, 31 km N Sta. Ro[sa], 15-VII-[19]85, *Scalesia* forest, 570 m a.s.l., FIT & Malaise, S. &. J. Peck (USNM); 17♂, 34♀, 13-VI/15-VII-[19]85, FIT & Malaise, S. &. J. Peck (USNM); 1♂, 2♀, *Scalesia* forest litter, FIT & Malaise, S. &. J. Peck (USNM); 1♀, 9 km N Los Gemelos, 330 m a.s.l., 17-V-[19]91, up. trans. for UV light, J. Heraty & S. Peck (USNM); 1♂, El Granillo, 9 km N Los Gemelos, 15-VI-[19]91, trans. for UV light, S. Peck (USNM); 8♂, 12♀, 4 km NE St Rosa, 28-VI-[19]85, *Scalesia* forest litter N of Cerro Banderas, S. & J. Peck (USNM); 1♂, 1♀, 4 km N Bellavista Medialuna, 620 m a.s.l., 14-V/13-VII-[19]85, *Miconia* zone, FIT, S. & J. Peck (USNM); 1♀, Media Luna, 600 m a.s.l., 29-V-[19]91, wet *Miconia* litter, S. Peck

(USNM); 1♂, 35 km W Bellavista, Finca Vilema, 210 m a.s.l., *Scalesia* pasture, FIT, 1/30-V-[19]92, S. Peck (USNM); *Isabella Island*: 7♂, 12♀, Alcedo, 20/24-VI-[19]91, Crater rim, UV light, 1100 m, S. Peck (USNM); 1♀, Volcan Alcedo crater rim, 1100 m a.s.l., 21/23-VI-1991, CVALC-09–017, C. Vogel (USNM); 1♀, Volcan Alcedo, 21/26-VI-[19]91, C. Vogel (USNM); 1♂, 3♀, NE rim Alcedo, 1100 m a.s.l., 21/25-VI-[19]91, pit & bottle tps under shrubs, S. Peck (USNM); 1♀, Alcedo SE crater rim, 23-VI-[19]91, 1150 m a.s.l., Bermoss & epiphytes on trees, S. Peck (USNM); 1♂, Alcedo, 10 km SW NE Playa, 1100 m a.s.l., 24-VI-[19]91, Heraty, scrub for. H91-114 (USNM); 1♀, Cerro Azul, 7 km NE Caleta Iguana, 700 m a.s.l., pampas, 23-V-[19]91, leaf litter sifting, S. Peck (USNM); 1♀, Cerro Azul, 2 km NE Caleta Iguana, FIT, 19/25-V-[19]91, 155 m a.s.l., S. Peck (USNM); 1♀, Cerro Azul, 300 m a.s.l., 18/26-C-1991, C. Vogel (USNM); 3♀, 350 m a.s.l., 22/25-V-1991, C. Vogel (USNM); 1♀, Cerro Azul, 8 km W Cal. Iguana, 850 m a.s.l., 22-V-[19]91, crater/grass, J. Heraty (USNM); *Fernandina Island*: 1♀, 10 km NE Cabo Hammond, 400 m a.s.l., 6/9-V-[19]91, open meadow, UV, S. & J. Peck (USNM); *Santiago Island*: 1♂, 1♀, Pla. Espumilla, 2 m, arid zone opening, 3/10-VI-[19]91, UV light, S. Peck (USNM); 1♂, 1♀, Aguacate Camp., 550 m a.s.l., 4-7/8-VI-[19]91, humid forest, UV light, S. Peck (USNM); *Floreana Island*: 1♀, base Cerro Pajas, 300 m a.s.l., 28-III/23-IV-[19]96, *Scalesia* forest, Malaise, S. Peck (USNM).

HERAEUS PALLIDINERVIS SP. NOV.

(FIGS 35, 36F, 39C, 40I–L)

Diagnosis

Labium extending to metacoxae. Distiflagellomere with a narrow pale band sub-basally. Membrane brown, with veins paler and without an apical corial spot. Meso- and metafemur with a wide subapical brown band.

In addition to *Heraeus pallidinervis* sp. nov., *H. penai* sp. nov. and *H. loja* sp. nov. have a narrow pale band on the distiflagellomere, occupying about one-quarter of the segment length, and a long labium extending to the metacoxae; but *H. pallidinervis* sp. nov. has a broader pale band on the metafemur than the other two species. The male genitalic characters also differentiate these species.

Description (Fig. 36F)

Total length 4.80.

Head: Convex dorsally, dark brown, shiny, coriaceous, with short recumbent and long erect setae. Head length 1.15, width 0.77, postocular length 0.40. Eyes with setae between ommatidea; not surpassing dorsal margin of head in lateral view. Ocelli small, at level of an imaginary line passing the posterior border of eyes. Interocular width 0.45, interocellar width 0.24. Labium pale brown, with erect setae; extending to metacoxae. Labial segment lengths: I 0.77, II 0.80, III 0.72, and IV 0.34. Antennae pale brown, scapus, apical region of pedicel and basiflagellomere darker, distiflagellomere brown with a narrow pale band sub-basally; all segments with abundant short recumbent and sparse semi-erect setae. Antennal lengths: scape 0.43, pedicel 0.88, basiflagellomere 0.75, and distiflagellomere 0.99. Length of pale band on distiflagellomere 0.27.

Thorax: Pronotum pruinose; dark brown, except collar and four longitudinal stripes on posterior lobe paler, humeral angles with a pale spot; punctate, more conspicuous on posterior lobe; anterior lobe with short recumbent and long erect setae. Collar length 0.08, anterior lobe length 0.48, posterior lobe length 0.32; anterior lobe width 0.80, posterior lobe width 1.18. Pleurae dark brown, punctate, with short recumbent setae. Evaporative area extended. Scutellum dark brown, pruinose, punctate, with short recumbent and long erect setae. Hemelytra pruinose, with short recumbent setae, costal margin pale on proximal three-quarters, with a subapical corial spot, colouration pattern as Figure 36(F). Membrane brown with pale spots between veins, veins pale. Legs: Coxae and protrochanter brown; profemur brown, except apical region paler; meso- and metafemur yellowish with a wide subapical brown band; tibiae and tarsi pale brown, tibiae darker at apex (Fig. 39C); setae short and semi-erect. Profemur with two rows of spines on apical two-thirds.

Abdomen: Dark brown, with abundant short recumbent setae. Pygophore (Fig. 40I, J) rounded, slightly quadrangular, anterior margin of dorsal aperture rounded, inner projections elongate, more produced posteriorly; strongly declivent posteriorly in lateral view. Parameres: Figure 40(K, L). Aedeagus: spinose, spines relatively larger than in most species; conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with spines laterally and two pairs of lobes, the posterior pair sclerotized and without spines, and the anterior pair with spines; *processus gonopori* long and slender.

Distribution

Bolivia and Brazil (Fig. 35).

Etymology

The specific epithet '*pallidinervis*' is an adjective referring to the contrasting pale colouration of the veins on a darker brown membrane.

Type material

Holotype: ♂, **BOLIVIA**, La Paz, (SE) Coroico, 1800–2100 m a.s.l., 30-XI/2-XII-[19]84, L.E. Peña G. (USNM).

Paratypes: **BOLIVIA:** *La Paz*: 3♂, 2♀, Yungas, Inquisivi, 5-XII-1984, L.E. Peña (USNM); 1♂, 5-XII-

1984, L.E. Peña (MLP); **BRAZIL:** *Minas Gerais*: 1♀, Varginha, II-1972, M. Alvarenga (AMNH).

HERAEUS PENAI SP. NOV.

(FIGS 29, 30H, 36G, 39D, 40M–P)

Diagnosis

Labium almost extending to metacoxae. Distiflagellomere with a narrow pale band sub-basally. Membrane brown, with veins paler. Metafemur with a narrow subapical brown band.

In addition to *Heraeus penai* sp. nov., only *H. pallidinervis* sp. nov. and *H. loja* sp. nov. have a narrow pale band on distiflagellomere, occupying about one-quarter of segment length, and a long labium extending to metacoxae. The male genitalic characters, however, will differentiate these species.

Description (Fig. 36G)

Total length 5.61.

Head: Brown, shiny, coriaceous, with abundant short recumbent and sparse long erect setae. Head length 1.22, width 0.84. Postocular length 0.43. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.43, interocellar width 0.26. Labium pale brown with erect setae, almost extending to metacoxae. Labial segment lengths: I 0.83, II 0.96, III 0.80, and IV 0.32. Antennae pale brown, except apex of scapus, pedicel, and basiflagellomere; distiflagellomere darker, with a narrow pale band subbasally; all segments with abundant short semi-erect and sparse longer erect setae. Antennal lengths: scape 0.46, pedicel 0.96, basiflagellomere 0.86, and distiflagellomere 0.98. Length of pale band on distiflagellomere 0.24.

Thorax: Anterior pronotal lobe brown, collar and posterior lobe paler, with irregular paler areas, humeral angles with a whitish spot; collar delimited posteriorly by a punctuate sulcus; punctate, punctures larger on posterior lobe; anterior and posterior lobes with short recumbent and erect setae, longer erect setae on anterior lobe. Collar length 0.07, anterior lobe length 0.53, posterior lobe length 0.50; anterior lobe width 0.90, posterior lobe width 1.39. Pleurae brown, acetabular areas paler, punctate, with short recumbent setae. Evaporative area extended. Scutellum brown, with a darker longitudinal median stripe, pruinose, punctate, with short recumbent and long erect setae, as for anterior pronotal lobe. Hemelytra brown, costal margin pale on proximal three-quarters, apical half of corium darker, with a subapical whitish spot and a small pale rounded spot internally (Fig. 36G); setae short and semi-erect; membrane brown with pale areas, veins paler. Legs: Coxae, protrochanter, profemur, except distally, and a subapical narrow band on metafemur brown, remainder of legs pale brown; mesofemur with a narrow band subapically and apex of tibiae darker (Fig. 39D); setae abundant and semi-erect, longest on profemur. Profemur with spines restricted to apical two-thirds.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 40M, N) rounded, anterior margin of dorsal aperture slightly rounded, inner projections subquadrangular; declivent posteriorly in lateral view. Outer projection of parameres not developed (Fig. 40O, P). Aedeagus (Fig. 30H): conjunctiva with spines laterally beneath the ejaculatory reservoir; vesica with two pairs of lobes, the anterior lobe short, unsclerotized, and with many spines, and the posterior lobe larger and sclerotized, with a few spines distally; *processus gonopori* long and slender.

Distribution

Argentina, Bolivia, and Paraguay (Fig. 29).

Etymology

This species is named after the late Luiz E. Peña, who collected the holotype and some of the paratypes.

Type material

Holotype: ♂, **BOLIVIA**, Mataral (N), V. Grande, 1800–2000 m a.s.l., 15/17-XII-1984, L.E. Peña (USNM).

Paratypes: 2♂, 1♀, same data as for holotype (USNM); 2♂, 1♀, Chuquisaca, Monteagudo, 24-XII-[19]84, L.E. Peña (USNM); 1♂, 1♀, 24-XII-[19]84, L.E. Peña (MLP); 4♂, 1♀, (E) Muyupampa, 1600 m a.s.l., 21/25-XII-[19]84, L.E. Peña G. (USNM); *La Paz*: 3♀, Rio Coroico, 1200 m a.s.l., 24/26-XI-[19]84, L.E. Peña (USNM); 7♀, Tres Esteros, Guanay, 19/25-VIII-[19]89, L.E. Peña (USNM); 1♀, Yungas, Coripata, 1700 m a.s.l., 1-XII-1984, L.E. Peña (USNM); 1♀, N La Paz, Mapiri, 10/16-VIII-[19]89, L.E. Peña (USNM); 2♀, Yungas, Pte. Mururata, 1200–1600 m a.s.l., 24/26-XII-1984, L.E. Peña (USNM); *Santa Cruz*: 1♀, Pto. Camacho (S), 20-XII-[19]84, L.E. Peña (USNM). **ARGENTINA:** *Salta*: 1♂, Orán, Abra Grande, 10-I/1-III-[19]67, R. Golbach (IFML); 1♀, Orán, 5 R.N., 12-VII-1971, Porter-Stange (IFML); 1♀, 15 km S Orán, 13-VI-[19]95, Flores & Roig (IADIZA); *Catamarca*: 4♂, 2♀, El Arenal, 29°4′48.95″S, 65°30′51.9″W, 1106 m a.s.l., XII-[20]03, S. Roig (IADIZA). *Paraguay*: 1♂, Capiata, XI-1993 (USNM).

HERAEUS PLEBEJUS STÅL, 1874

(FIGS 36H, 39E, 41A–D, 42)

Heraeus plebejus Stål, 1874: 147; Uhler, 1886: 15; Van Duzee, 1894: 174; Lethierry & Severin, 1894: 191; Torre Bueno, 1908: 231; Banks, 1910: 65; Torre Bueno, 1910: 30; Barber, 1914b: 514; Osborn & Drake,

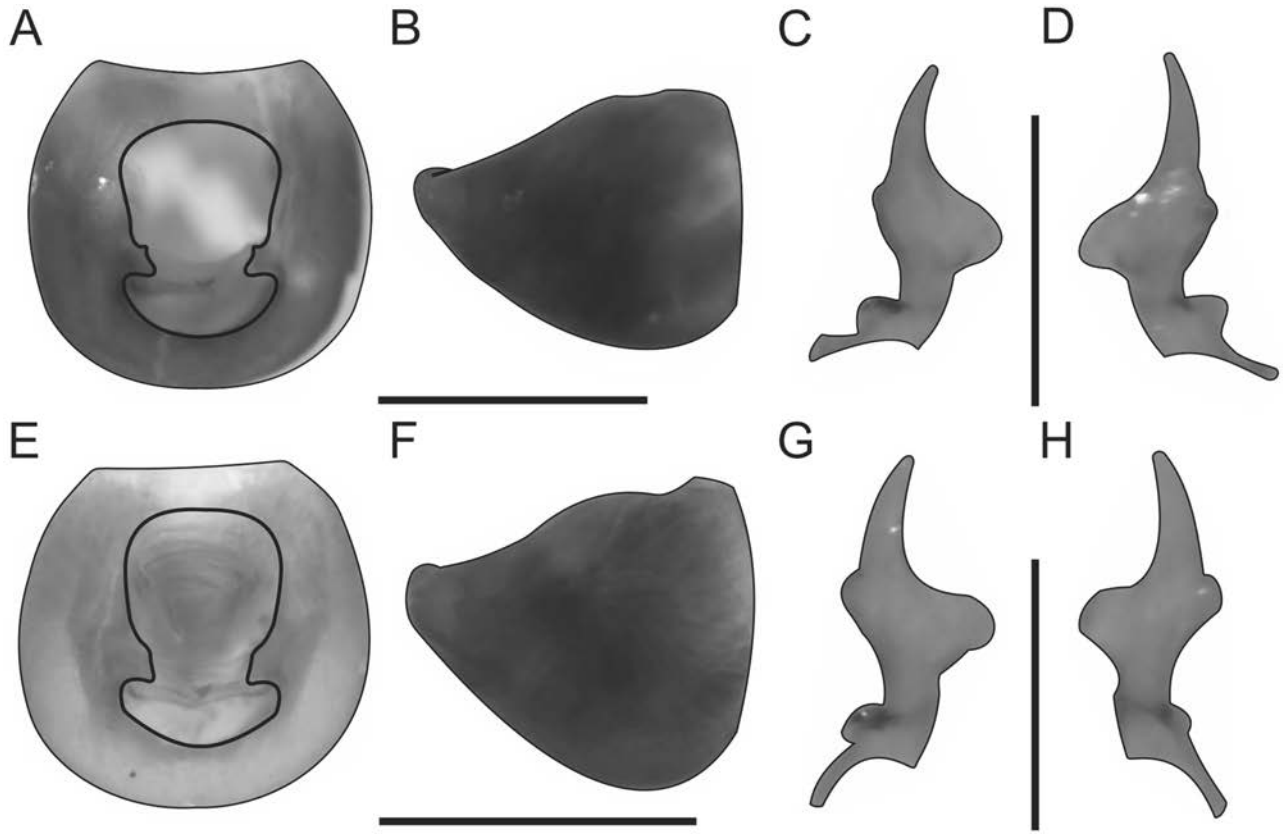

Figure 41. Male genitalia. *Heraeus plebejus* Stål, 1874: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. *Heraeus pulchellus* Barber, 1954: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view.

1915a: 506; Weiss, 1916: 10; Van Duzee, 1916: 21; Van Duzee, 1917: 179; Hussey, 1922: 21; Barber, 1923: 725; Torre Bueno, 1924: 50; Torre Bueno, 1925: 70; Blatchley, 1926: 390; Torre Bueno, 1930: 101; Glick, 1939: 23, 134; Froeschner, 1944: 643, 662; Torre Bueno, 1946: 69; Slater, 1952: 532, Barber, 1954a: 4; Ashlock, 1957: 422; Sweet & Slater, 1961: 339; Frost, 1964: 135; Slater, 1964: 1083–1084; Schaefer, 1972: 812; Slater, 1974: 158; Scudder, 1977: 34; Harrington, 1980: 109; Ashlock & Slater, 1988: 228; Slater & Baranowski, 1990: 130–132; Slater & O'Donnell, 1995: 147; Lago & Testa, 2000: 192; Slater & Brailovsky, 2000: 332; Baranowski & Slater, 2005: 142.

Diagnosis

Apex of basiflagellomere and distiflagellomere darker, the latter without a pale band. Pedicel with abundant erect setae, equal to or longer than diameter of segment. Labium extending to mesocoxae. Membrane without an apical corial spot. Metafemur with a subapical dark band. Pygophore apex pointed dorsally in lateral view.

Heraeus plebejus, together with *H. pulchellus* and *H. pacificus*, are the only species in the group that lack a pale band on distiflagellomere (although in some specimens of *H. pulchellus* a narrow pale band is apparent). *Heraeus plebejus* and *H. pulchellus* have pale brown to brown antennae, with the apex of basiflagellomere and distiflagellomere darker, and the ocelli are placed at the level of an imaginary line passing the posterior border of the eyes, whereas in *H. pacificus* the antenna is uniformly coloured dark brown and the ocelli are placed posterior of an imaginary line passing the posterior border of the eyes. *Heraeus plebejus* can be distinguished from *H. pulchellus* based mainly on body size (*H. plebejus* over 5.25 mm long and *H. pulchellus* less than 5 mm long) and characters of the male genitalia.

Redescription (Fig. 36H)

Head: Coriaceous. Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Labium extending to mesocoxae. Antennae pale brown to brown,

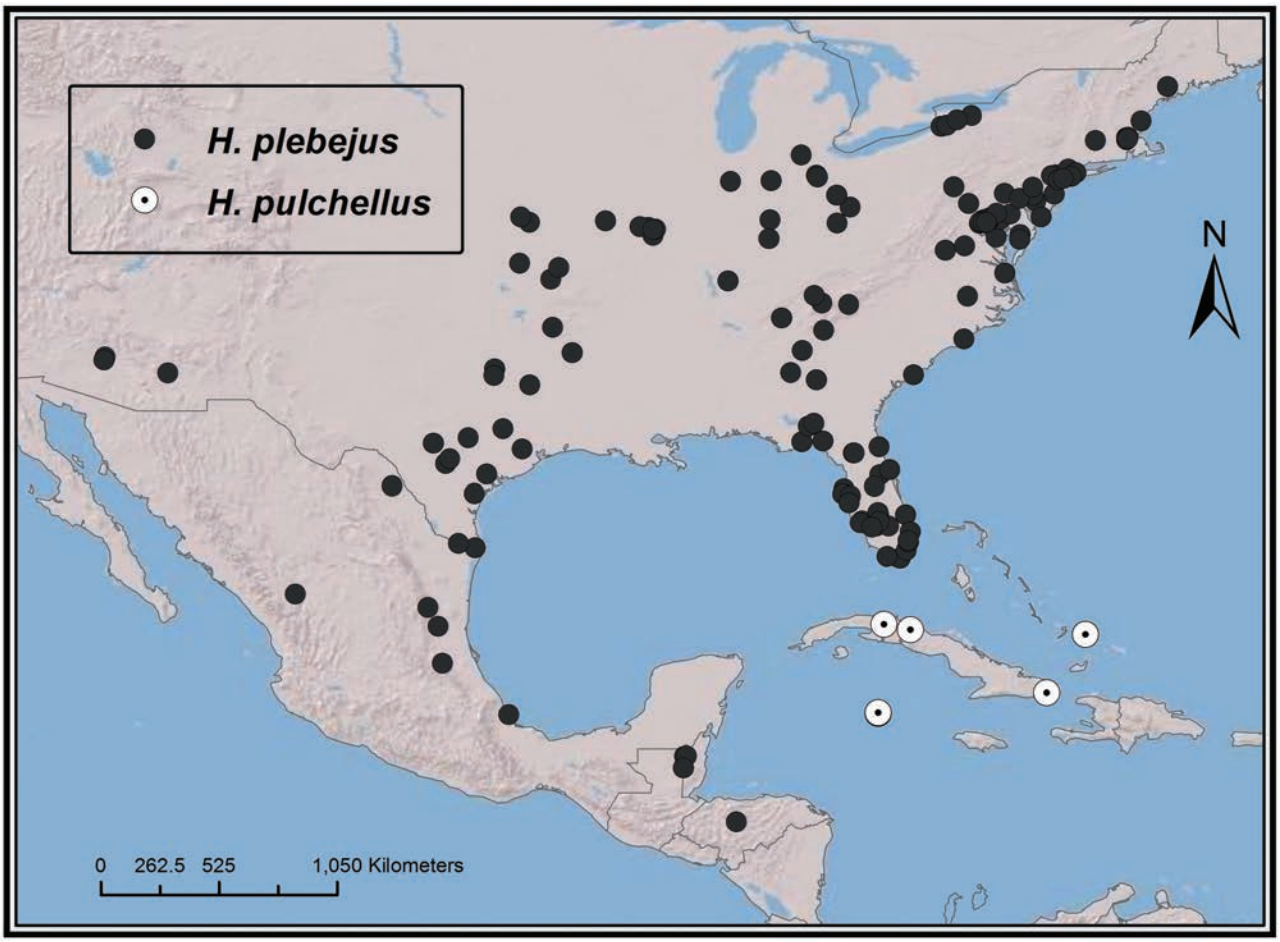

Figure 42. Distributional map of *Heraeus plebejus* Stål, 1874 and *Heraeus pulchellus* Barber, 1954.

with the apex of basiflagellomere and distiflagellomere darker. Distiflagellomere without a pale band. Pedicel with abundant erect setae, equal to or longer than diameter of segment.

Thorax: Posterior pronotal lobe with pale spots and with a pale spot on humeral angles. Anterior pronotal lobe with long erect setae. Scutellum with erect setae. Evaporative area extended. Inner corial spot diffuse. Costal margin pale on proximal three-quarters, with a subapical corial spot. Membrane brown, with veins paler. Legs: Profemur dark, at most with apices paler and long erect setae; metafemur with a subapical dark band (Fig. 39E). Protibiae and mesofemur without spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 41A, B) rounded, apex with a protuberance pointed dorsally; anterior margin of dorsal aperture slightly rounded, inner projections more pronounced posteriorly. Parameres: Figure 41(C, D). Aedeagus: conjunctiva with some minute spines laterally, lobes of vesica slightly sclerotized, with a few minute spines distally; *processus gonopori* long and slender.

Variability observed

The specimens from Tamaulipas and Nueva León (Mexico) differ from the other specimens examined by the short pale band on the basal region of distiflagellomere.

Distribution

Canada, Mexico, and the USA; the Bahamas, South Bimini Island, Haiti, Belize, and Honduras (NEW RECORDS) (Fig. 42).

This species has a broad distribution in North and Central America, probably originating from an ancestral stock that reached the West Indies and Galapagos Islands where it differentiated into other species: *H. pacificus* in the Galapagos Islands and *H. pulchellus* and *H. concolor* in Cuba, the Cayman Islands, and the Dominican Republic.

Type material

The type series is deposited in SMNH and is from Texas and New Jersey (USA); Scudder (1977) designated a female lectotype and paralectotypes.

Material studied

BELIZE: 3♂, 2♀, Orange Walk Dist., Chan Chich Lodge, 14-IV-[20]04, BLT, R.M. & H.V. Baranowski (USNM); 4♂, 2♀, 30-X-[20]09, BLT, R.M. & H.V. Baranowski (USNM); 1♂, 1♀, 1-VI-[20]09, E. Flota (MLP); 1♂, 15-X-[20]03, E. Flota (USNM); 3♀, 12-IV-[20]04, E. Flota (USNM); 2♂, 4♀, 13-IV-[20]04, E. Flota (USNM); 1♂, 5-VII-[20]09, E. Flota (USNM); 1♂, 21-IV-[20]04, BLT, E. Flota (USNM); 1♂, 1♀, 4-V-[20]04, BLT, E. Flota (USNM); 16♂, 20♀, 1-VI-[20]09, BLT, E. Flota (USNM); 1♀, 18-X-[20]09, BLT, E. Flota (USNM); 1♂, 1♀, 23-X-[20]09, BLT, E. Flota (USNM); 1♂, 24-X-[20]09, BLT, E. Flota (USNM); 2♂, 3♀, 25-X-[20]09, BLT, E. Flota (USNM); 1♂, 27-X-[20]09, BLT, E. Flota (USNM); 2♂, 1♀, 28-X-[20]09, BLT, E. Flota (USNM); 2♂, 2♀, 29-X-[20]09, BLT, E. Flota (USNM); 3♂, 1♀, 31-X-[20]09, BLT, E. Flota (USNM); 2♂, 3♀, 1-XI-[20]09, BLT, E. Flota (USNM); 2♂, 2-XI-[20]09, BLT, E. Flota (USNM); 1♀, 13-XI-[20]04, BL trap, C. Sanabria (USNM); 3♂, 2-I-[20]05, BL trap, C. Sanabria (USNM); 1♀, 27-I-[20]05, BL trap, C. Sanabria (USNM); 2♂, 30-IV-[20]05, BL trap, C. Sanabria (USNM); 2♂, 7-XII-[20]04, BL trap, C. Sanabria (USNM); 1♂, 4♀, 2-VII-[20]04, BL trap, C. Sanabria (USNM); 1♂, Cayo Dist., Benque del Carmen, Riverside N., Mopan River Resort, 25-V-[20]07, blacklight trap, P. Picon (USNM); 1♂, 30-V-[20]07, blacklight trap, P. Picon (USNM); 1♂, 1♀, Mopan R. Resort, Riverside N., Benque Viejo del Carmen, Cayo, BLT, 27-VI-[20]06, A. Trujillo (USNM); 1♂, 2♀, Cayo District, Benque Viejo, Riverside N. Mopan R. Resort, 22-IX-[20]09, BLT, M. Chrysler (USNM); 2♂, 29-IX-[20]09, BLT, M. Chrysler (USNM); 1♂, 4-X-[20]09, BLT, M. Chrysler (USNM); 1♂, 7-X-[20]09, BLT, M. Chrysler (USNM); 1♀, 15-X-[20]09, BLT, M. Chrysler (USNM); 1♀, 6-XI-[20]09, BLT, M. Chrysler (USNM); 2♂, Orange Walk District, Gallon Jug, 7-IV-[20]04, BLT, B. Miller (USNM); 1♂, 13-IV-[20]05, BLT, B. Miller (USNM); 1♀, 11-X-[20]05, BLT, B. Miller (USNM); 1♀, Cayo District, Central farms, mile 67, Western Highway, 29-VI-[19]68, blacklight trap, W.L. Hasse (USNM); 2♂, O.[range] W.[alk] Dist., Rio Bravo, Area hdqtrs., 11-VII-1996, UV trap, P. Shuey (USNM); 2♂, 13-VII-1996, UV trap, P. Shuey (USNM); 5♂, 8-VII-1996, UV trap, P. Shuey (USNM); 3♂, Rio Bravo Cons. Area, Mahogany Trail, 10-VII-1996, Uv & Hg vapor light, C.W. & L.B. O'Brien (USNM).

HONDURAS: 1♂, intercepted at Miami, 21-V-[19]54, A.S. Mills (USNM).

MEXICO: *Coahuila*: 1♀, 10 mi. S Allende, 11-VIII-1958, H.F. Howden (CNC); *Durango*: 1♂, 23 mi. W Durango, 7500 ft, 13-VI-1964, L.A. Kelton (CNC); *Oaxaca*: 1♀, Rio Jatepec, Isthmus of Tehuantepec, blacklight trap, 21-V-[20]09, Blanton *et al*. (USNM); *Tamaulipas*: 1♀, Tamps, Galeana Canyon, 19-VI-1975, L.E. Watrous (OSUC); 1♀, Antiguo Morelos 5 mi. W, 1400 ft, 20-VII-1954, J.G. Chillcott (CNC); 1♂, CD, Mante, 27-VII-[19]60, at light, H. Howden (CNC); *San Luis Potosí*: 1♀, Tamazunchale, 19-IV-1963, W.J. Gertsch & W. Ivie (AMNH). *Veracruz*: 1♂, 5 mi. S Veracruz, 30-VI-1975, at light, C.A., W.E., B.W. Triplehorn (OSUC).

USA: *Alabama*: 1♀, C.F. Parker (USNM); *Arizona*: one without abdomen, Phoenix, 4-VI-1928, A.A. Nichol (USNM); 2♀, one without abdomen, #90 (USNM); 1♂, 2♀, Salt Riv. Valley, 16-II-1933, rubbish nr. cotton field, C.J. King (USNM); 1♀, Thatcher, 20-VI-1951, E.J. Taylor (USNM); *Arkansas*: 1♀, Hope, 11-VI-1954, J.W. Green (CAS); 1♂, 1-VII-1931, light trap, L. Knobel (USNM); 1♀, 14-VI-[19]25, light trap, L. Knobel (USNM); 1♀, 5-X-[19]25, light trap, L. Knobel (USNM); 1♂, 23-VI-[19]25 (USNM); one without abdomen, 25-V-[19]25, light trap, L. Knobel (USNM); 1♂, Queen Wilhelmina State Park, 4-IV-1987, G.F. & J.F. Hevel (USNM); *Connecticut*: 1♂, Storrs, 29-VII-1954, F.B. Levi (USNM); 1♀, 26-VIII-1954, J.A. Slater (USNM); *District of Columbia*: 1♀, Washington D.C., 15-V-[18]92 (CUIC); 1♂, 8-VI-[19]03, Heidemann (CUIC); 1♂, V-[19]08, Van Duzee (CAS); 1♂, 2♀, Washington, 13-III-[19]10, B.M. (USNM); 5♂, 1♀, 22-II-[19]06, D.H. Clemons (USNM); 1♂, 4-VII-[19]14, H.H.T. Jackson (USNM); 1♂, 1♀, 24-VII-[19]07, W.L. McAtee (USNM); 1♂, 15-VII-[19]14, W.L. McAtee (USNM); 1♀, 6-V-[19]13, at light, W.L. McAtee (USNM); 1♂, J.D. Hood (USNM); 1♀, 6-VII-[19]07, J.D. Hood (USNM); 1♀, DC, 2-XII-[19]88 (USNM); 1♂, DC, 3-XI-[19]38, C.V. Riley (USNM); 1♀, Woodbridge, 4-VII-1913, A. Wetmore (USNM); 1♂, Receiving Reservoir, 22-II-1913, W.D. Appel (USNM); 1♂, 13-IV-1913, W.D. Appel (USNM); *Florida*: 3♂, 2♀, Lake Alfred, 24-VI-[19]63, on *Eremochloa ophiuroides*, C.D. Risk (USNM); 1♂, 1♀, Volusia Co., 4-VIII-[19]56, at light, H.A. Denmark (USNM); 2♀, 6-VIII-[19]56, at light, H.A. Denmark (USNM); 1♂, Cleveland, IV-[19]25, D.M. DeLong (PSUC); 2♂, 1♀, Archbold Biological Station, Highlands Co., 17-III-[19]62, S.W. Frost (PSUC); 1♂, 1♀, one without abdomen, 24-IV-[19]67, D.E. Bright (CNC); 1♂, 3♀, 23-IV-[19]67, D.E. Bright (CNC); 1♀, 23-IV-[19]67, D.E. Bright (PSUC); 1♀, 7-IV-[19]62, S.W. Frost (PSUC); 1♀, IX-1975, W. Rosenberg (USNM); 1♀, 13 km S lake Placid, 4-V-1986, W. Steiner (USNM); 1♀, Lake Placid, Archbold Biological Sta., 4-V-1969 (CNC); 1♂, 9-V-1964, R.W. Hodges (USNM); 1♂, 1♀, 18-V-1964,

R.W. Hodges (USNM); 1♂, Highlands Co., 2-V-1983, UV light trap, M. Deyrup (USNM); 1♂, 1♀, 6-IV-1983, UV light trap, M. Deyrup (USNM); 1♀, Putnam Co., 2 mi. NW Orange Springs, 1/3-VIII-[19]75, D. Bowman (USNM); 3♂, 1♀, Washington Co., 5 mi. E Chipley, 31-VIII-[19]60, blacklight trap, W.C. Rhodes (USNM); 1♀, Hendry Co., LaBelle, 10/11-III-1974, UV in oak groove, J. Reynolds (AMNH); 1♀, Clewiston, 30-IV-[19]61, L.A. Kelton (CNC); one without abdomen, 6-II-[19]41, M. Wrigth (USNM); 1♀, Gainesville, 24-IV-1952, O. Peck (CNC); 1♀, Alachua Co., Gainesville, 29°36.916′N, 82°23.102′W, 12-IV-2007, at light, C.L. Staines (USNM); 2♂, 3♀, Doyle Connor Bldg, 2/4-V-[19]75, BLT, F.W. Mead (USNM); 3♂, 1♀, 23/25-V-[19]75, BLT, F.W. Mead (USNM); 1♂, 1♀, 2/4-V-[19]75, BLT, F.W. Mead (USNM); 2♂, 12-V-[19]75, BLT, F.W. Mead (USNM); 1♀, Punta Gorda, 11-IV-[19]52, J.R. Vockeroth (CNC); 3♂, 3♀, Dade Co., Homestead, 11-IV-[19]69, blacklight trap, R.M. Baranowski (USNM); 2♀, Homestead, 1-IV-1962, at light, S.S. Waley (CNC); 2♂, 3♀, Dade Co., Agr. Res. & Ed. Ctr., Homestead, 12-IV-[19]69, blacklight trap, R.M. Baranowski (USNM); 5♂, 4♀, Dade Co., Grossman Hammock Sta. Pk., 24-V-[19]72, blacklight trap, R.M. Baranowski (USNM); 2♀, 2-V-[19]72, blacklight trap, R.M. Baranowski (USNM); 1♂, Elfers, 14-IV-1952, O. Peck (CNC); 3♂, 51–55, Stuart, 25-VI-1951, O. Bryant (CAS); 3♀, Dunedin, 4-II-[19]26, W.S. Blatchley (CAS); 1♀, Monroe Co., Everglades Natl Park, Flamingo Praire, 4-XII-1970, sea level, P.H. & M. Arnaud (CAS); 7♂, 19♀, 28-III-[19]70, R.M. Baranowski (USNM); 33♂, 36♀, 4-V-[19]70, R.M. Baranowski (USNM); 1♂, St Augustine, 7-III-[19]40, S. VanDyke (CAS); 1♂, Sanford, 5-VI-[20]08 (CAS); 1♂, 5-V-[19]28, E.D. Ball (USNM); 2♂, 15-V-[19]26, E.D. Ball. (USNM); 1♂, Palmdale, Fisheating Cr., 10-V-1964, R.W. Hodges (USNM); 3♂, 2♀, Boynton Beach, 12-VI-1968, collected at blacklight, F.E. Wood & J.A. Davidson (USNM); 4♂, 9♀, Marion Co., Sharpes Ferry Fld. Sta., 30-IV-[19]75, blacklight trap, N. Holler (USNM); 2♂, 5♀, 15-V-[19]75, blacklight trap, N. Holler (USNM); 3♂, 1♀, 30-X-[19]75, blacklight trap, N. Holler (USNM); 1♂, Marion Co., Lake Eaton, 8-IV-[19]75, blacklight trap, P.C. Drummond (USNM); 1♀, 22-V-[18]75, blacklight trap, P.C. Drummond (USNM); 2♂, 1♀, Marion Co., 14 mi. SW Ocala, Ross Praire, 12-VI-[19]75, blacklight trap, P.C. Drummond (USNM); 3♀, Taylor Co., Williams Landing, 21/30-VI-1967, R. Smith (USNM); 1♂, Miami, 7-VII-1920 (USNM); 1♀, Tampa, 5-II-1946, R.C. Froeschner (USNM); 1♀, Paradise Key, 3-III-[19]19, H. Barber (USNM); 2♀, 28-II-[19]19, H. Barber (USNM); 1♂, VI-1919, C.A. Mosier (USNM); 1♂, Ft. Lauderdale, 24-IV-1928, D.M. Bates (USNM); 1♀, 26-III-1928, D.M. Bates (USNM); 1♀, Ducal Co. (USNM); 3♂, 2♀, Baker Co., Olustee, 30-V-[19]63, blacklight trap, E.P. Merkel (USNM); 6♂, 3♀, 12-VII-[19]63, blacklight trap, E.P. Merkel (USNM); 1♂, 5♀, 2/4-VII-[19]66, blacklight trap, E.P. Merkel (USNM); 1♀, Alva, 3-IV-1919, A.A. Hardisty (USNM); 2♂, 1♀, Edgewater, 28-II-[19]39, C.A. Frost (USNM); 1♀, Royal Palm Pk., 20-VII-1948, E.L. Todd (USNM); 1♀, 22-VII-1948, E.L. Todd (USNM); 1♀, Old Town, 11-VII-1939, Oman (USNM); 1♂, Orange Co., 2-VII-[19]29, Florida Fruit Fly Surv., E.T. Bates (USNM); 1♂, 2♀, Wakulla Co., Surf Panacea, 5/15-VII-1967, C. Hilfiker (USNM); *Georgia*: 1♀, P.R. Uhler (USNM); 1♂, Atlanta, 12-VIII-1973 (CUIC); 1♂, Pine Mountain, Rabun Co., 1400 ft, 14-V-1957, J.R. Vockeroth (CNC); 1♂, Grady Co., Beachton, 18/24-V-1967, E.V. Komarek Sr. (USNM); 2♀, 19/26-VI-1967, E.V. Komarek Sr. (USNM); 1♂, Thomasville, 13-III-[19]03, H.G. Barber (USNM); 1♂, Demorest, 14-VIII-[19]39, Valentine (USNM); 4♂, 2♀, Peach Co., 18-V-[19]43, light trap, Turner (USNM); *Illinois*: 1♂, P.R. Uhler (USNM); *Indiana*: 1♂, Oxford, VIII-[19]13, Mrs. W.L. McAtee (USNM); 1♀, Marion Co., W.S.B., 6-X-[19]21, H.G. Barber (USNM); 1♂, 20-VI-[19]20, H.G. Barber (USNM); 1♂, Jennings Co., 15-X-1912, H.O. Deay (USNM); *Kansas*: 1♂, Orange, E.P. Van Duzee (CAS); 1♀, Bourbon Co., 1 mi. N Redfield, 13-VII-1966, J. & W. Ivie (AMNH); 1♂, 1♀, Douglas Co., Breidenthal Reserve, 15 mi. SE Lawrence, 29-VI-1979, R.J. McGinley (USNM); 1♂, Independence, 25-VIII-1950, R.I. Sailer (USNM); 1♀, Topeka, 8-VII (USNM); *Kentucky*: 3♀, Louisville, 23-VII-[19]40, D.R. Young (USNM); *Louisiana*: 1♀, 30-XII-[19]31, J.H. Moreland (USNM); *Maine*: 4♀, Augusta, 28-III-[19]62, in pkg. Chicory, A.E. Brower (USNM); *Massachusetts*: 1♀, Chicopee, 29-X-[18]96, C.F. Baker (USNM); 1♀, Holliston, 27-IX, N. Banks (USNM); 1♀, Framingham, 1-XII-1932, C.A. Frost (USNM); 1♂, 21-VI-[19]49, C.A. Frost (USNM); 1♂, 19-X-[19]35, C.A. Frost (USNM); 1♀, Natick, 27-IV-[19]35, C.A. Frost (USNM); 1♀, Sherbon, thru sifting, 7-X-[19]33, C.A. Frost (USNM); *Maryland*: 1♂, P.R. Uhler (USNM); 1♂, Forest Gln., 9-X-[19]25, electric light, Heidemann (USNM); 1♀, KabJohn Br., April 1, Heidemann (CUIC); 1♀, Montgomery Co., Plummers Island, 38°58′N, 77°10′W, 27-VI/11-VII-2005, Malaise trap, lower trap, D. Smith & J. Brown (USNM); 16♂, 26♀, Plummers, 30-III-1913, in drift, W.L. McAtee (USNM); 1♂, 18-VI-[19]14, on mullen, W.L. McAtee (USNM); 2♂, 1♀, 12-IV-[19]14, R.C. Shannon (USNM); 1♀, 7-IX-[19]12 (USNM); 3♀, 8-II-[19]05, D.H. Clemons (USNM); 2♂, 28-X-[19]13, R.C. Shannon (USNM); 1♀, 13-VIII-[19]14, at light, R.C. Shannon (USNM); 1♂, at light, R.C. Shannon 8-VIII-[19]14 (USNM); 1♀, 4-VII-[19]14, W.L. McAtee (USNM); 1♂, 23-IX-[19]15, W.L. McAtee (USNM); 1♂, 28-IX-[19]14,

W.L. McAtee (USNM); 1♂, 25-I-[19]14, W.L. McAtee (USNM); 1♀, 18-I-[19]14, W.L. McAtee (USNM); 1♂, 30-VIII-[19]14, W.L. McAtee (USNM); 1♂, 24-V-[19]14, W.L. McAtee (USNM); 1♀, 1-V-[19]14, W.L. McAtee (USNM); 1♂, 7-VI-[19]14, W.L. McAtee (USNM); 1♀, 4-X-[19]14, W.L. McAtee (USNM); 2♂, 5-X-[19]13, W.L. McAtee (USNM); 1♂, 16-VIII-[19]12, W.L. McAtee (USNM); 1♂, 13-X-[19]07, W.L. McAtee (USNM); 1♀, 17-V-[19]08, W.L. McAtee (USNM); 1♀, 11-IV-[19]11, H.G. Barber (USNM); 1♂, 29-V-[19]09, Brooklyn Museum (USNM); 4♂, 5♀, Maryland near Plummers Island, 14-II-1915, W.L. McAtee (USNM); 1♂, 28-III-1915, W.L. McAtee (USNM); 1♂, Prince George Co., Patuxent Res. Refuge, Central tract nr Jct. River Road & Beech Tree Road, 39°2′57.06″N, 76°47′54.38″W, 5/8-V-2006, Malaise trap, S.J. Scheffer (USNM); 1♂, 1♀, Pr. Geo. Co., Cheverly, 38°56′N, 76°55′W, 10-VIII-1993, W.E. Steiner & J.M. Swearingen (USNM); 1♂, A. Arun. Co., 6 km S Edgewater (SERC), 38°53′N, 76°33′W, 15-VI-1976, J.H. Falk (USNM); 1♂, 3 mi. S Beltsville, 23-VI-1969, Druckenbrod (USNM); 1♂, Beltsville, 17-V-[19]14, W.L. McAtee (USNM); 1♂, College Park, VII-1941, at light, L.P. Ditman (USNM); 1♀, Breton Bay, Potomac Riv., R. Budlong, 13-VII[19]23, H.S. Barber (USNM); 1♂, 1♀, Wicomico Co., Bivalve, 8-VI-1990, M.J. Rothschild (USNM); 2♂, 4♀, 18-VII-1990, M.J. Rothschild (USNM); 1♀, 11-IX-1990, M.J. Rothschild (USNM); 1♀, 13-IX-1990, M.J. Rothschild (USNM); 1♀, 17-VII-1990, M.J. Rothschild (USNM); 1♀, Cabin John, 16-X-[19]61, R.I. Sailer (USNM); 1♂, 1♀, 8-III-[19]08, H.O. Marsh (USNM); 1♂, C.H. Popenoe (USNM); 1♂, Minnie L., nr Cabin John, 5-VI-[19]31, E.E. Myers (USNM); 1♂, Annapolis, 8-VII-[19]32, mosquito trap, F.C. Bishop (USNM); 1♂, Chestertown, 8-IX-[19]32, mosquito trap, F.C. Bishop (USNM); 1♂, Princess Anne, 28-VII-[19]32, mosquito trap, F.C. Bishop (USNM); 3♂, 1♀, one nymph, Glen Echo, summer 1922, J.C. Bridwell (USNM); 1♀, 10-VI-[19]23, J.R. Malloch (USNM); 1♂, Plum Point, 20-VI-[19]14, W.L. McAtee (USNM); 1♂, 1♀, nr Bladesburg, 23-III-1913, W.L. McAtee (USNM); 1♂, Paint Branch, 2 mi. W of Beltsville, 31-X-[19]31, H.G. Barber (USNM); 1♂, Jacksons Id., 22-V-[19]13, Shannon & Barber (USNM); 1♂, Contee, 7-V-[19]14, A. Wetmore (USNM); 1♂, Hagerstown, 2-IX-[19]14, H.L. Parker (USNM); 1♂, 6-V-[19]15, H.L. Parker (USNM); 1♂, 12-VII-[19]15, H.L. Parker (USNM); 1♀, Ch. Chase Lk., 24-X-[19]16, B.P. Currie (USNM); *Mississippi*: 1♀, Gulfport, 10/30-VI-[19]38, R.E. Blackwelder (USNM); *Missouri*: 1♀, McDonald Co., Elk River at Hwy. 59, 3 mi. N Noel, 8-VIII-1967, at light combined blacklight and Coleman lantern, H.B. Leech (CAS); 1♂, Columbia, 27-VIII-1968, Malaise, F.D. Parker (USNM); 1♂, 1-VII-1941, R. Froeschner (USNM); 1♂, Lanagan, 18-IX-1942, R. Froeschner (USNM); 1♂, Howard Bend, 6-IX-1938, R. Froeschner (USNM); 1♂, Sarcoxie, 25-VII-1943, R.C. Froeschner (USNM); 1♂, Kimaswick, 17-X-1943, R.C. Froeschner (USNM); 1♂, Newmelle, 28-XI-1946, R.C. Froeschner (USNM); 1♂, 2 km W St Louis, 23-V-[19]04, W.V. Warner (USNM); 1♂, Webster Groves, 21-VII-[19]20, at light, V.R. Stones (USNM); *New Hampshire*: 1♀, Hampton, S. Alberto Shaw, 3-IV-1932, A.E. Brower (USNM); *New Jersey*: 1♂, Parshley (CAS); 1♀, Arlington, Parshley (CAS); 1♂, 9-III-1902, Joutell (USNM; 1♂, Orange, elect. light, Chittenden (USNM); 2♂, Roselle Pk., V-[19]25, collected by sifting, H.G. Barber (USNM); 1♂, 30-II-[19]07, collected by sifting, H.G. Barber (USNM); 1♂, 1♀, 16-II-[19]07, collected by sifting, H.G. Barber (USNM); 1♂, 28-II-[19]09, H.G. Barber (USNM); 2♂, 1♀, Madison, 29-VII-[18]97, P.R. Uhler (USNM); 1♂, 15-X-[18]97, P.R. Uhler (USNM); 1♀, 15-VIII-[18]98, P.R. Uhler (USNM); 1♂, 10-IV-[18]98, P.R. Uhler (USNM); 1♀, Cape May Co., Cold Springs, 12-IV-[19]11, under dead leaves, H.G. Barber (USNM); 1♂, 1♀, 12-IV-[19]11, H.G. Barber, under board (USNM); 1♀, Cape May Co., nr. Town Bank, 10-IV-[19]11, under board, H.G. Barber (USNM); 1♂, Lakehurst, collected by sifting, H.G. Barber (USNM); 1♂, 3♀, IX-[19]26, H.G. Barber (USNM); 1♀, 1-IV-1916, beneath board, H.G. Barber (USNM); *New York*: 1♂, Pinelawn, 4-V-[19]11, G.P. Engelhardt (CUIC); 1♂, Hamburg, 31-VI-[19]02, Van Duzee (CAS); 1♂, 12-IV-[19]01, Van Duzee (CAS); 1♀, White Plains, 28-V-[19]09, Parshley (CAS); 1♀, 4-IV-[19]09, Parshley (CAS); 1♀, 11-IV-[19]09, Parshley (CAS); 2♀, 2-IV-[19]25, H.G. Barber (USNM); 1♀, 29-IX-[19]25, H.G. Barber (USNM); 1♀, Rochester, R.M. Moore (CAS); 1♀, Ithaca, 10-XI-[19]17, E.C. Van Dyke (CAS); 1♀, East Aurora, 30-X-[19]21, M.C. Van Duzee (CAS); 1♀, Batavia, 26-VIII-1914, H.H. Knight (USNM); 1♂, Staten Island, 6-XI-[19]09, salt meadow, collected by sifting on edge, H.G. Barber (USNM); 1♀, 2–22, collected by sifting, H.G. Barber (USNM); 2♂, 3♀, Long Island, Cold Spring Harbor, 25-VIII-1900, H.G. Barber (USNM); 1♀, 27-VIII-1900, H.G. Barber (USNM); 1♂, L.[ong] I.[sland], near Brighton, 14-IX-[19]09, collected by sifting, H.G. Barber (USNM); 1♀, L.[ong] I.[sland], Flatbush, 14-X-1892, Jlzabriskic (USNM); *North Carolina*: 1♀, Rocky Mt, Edgecombe Co., 4-VII-1973, R. Schrammel (AMNH); 1♀, Black Mts, 13-III-1912, Beutenmuller (CNC); 2♀, X-1966, J. & W. Irvie (AMNH); 1♀, Wilmington, 7-IV-[19]14, H.G. Barber (USNM); 1♀, Asheville, 12-V-[19]44, W.E. Hoffman (USNM); *South Carolina*: 1♂, Charleston, 26-III-[19]32, Adams & Gay (USNM); *Ohio*: 1♂, Ada, 6–41, C.R. Neiswander (OSUC); 1♀, McGuffey, 7–41, C.R. Neiswander (OSUC); 1♀, W. Unity., 6–41, C.R. Neiswander (OSUC); 1♀, Hocking Co., 5–20, D.J.

& J.N. Knull (OSUC); 1♀, Scioto Co., 10-VI-[19]44, D.J. & J.N. Knull (OSUC); 7♂, 10♀, Columbus, 7-VII-1930, C.H. Hicks (USNM); 1♀, Athens, City Park, 3-II-[19]50, P.J. Spangler (USNM); *Pennsylvania*: 3♂, Philadelphia, VIII-[19]37, J.O. Pepper (PSUC); 2♀, Martinsburg, 12-VII-[19]48, S.W. Frost (PSUC); 1♂, 13-VII-[19]48, S.W. Frost (PSUC); 1♂, 6-VII-[19]48, S.W. Frost (PSUC); one without abdomen, 6-VII-[19]48, S.W. Frost (PSUC); 7♂, 1♀, Phila., Chestnut Hill, 25-III-[19]39, E. Endy (USNM); 1♀, Phila.[delphia], 24-VII-1928, J.C. Lutz (USNM); 1♀, Lancaster, 6-I-[19]48, B.F. Coon (PSUC); 2♂, 1♀, 14-I-[19]48, B.F. Coon (PSUC); 1♀, Kennett sq., 26-VIII-[19]47, C.A. Thomas (PSUC); 1♀, State College Center Co., 29-VII-[19]83, Verda Haas (PSUC); 1♂, 1♀, Bucks Co., NE Jamison, Horseshoe Bend, Neshaminy Creek, I/II-1954, W. Ivie (AMNH); 1♂, Bucks Co., Neshaminy Creek, E of Jamison, 3-VII-1966, J. & W. Ivie (AMNH); 1♀, Bucks Co., Neshaminy Creek, 2 mi. E of Jamison, VI-29–1966, J. & W. Ivie (AMNH); *Tennessee*: 1♀, Gr. Smoky Mt., Nat. Pk., 2-VII-1957, J.R. Vockeroth (CNC); 1♂, P.R. Uhler (USNM); 1♀, Clarksville, 5-III-[19]09, hibernating Tob, field, C. Morgan (USNM); 1♂, 1♀, hiberbating in leaves, C. Morgan (USNM); 1♂, 15-IV-[19]09, C. Morgan (USNM); 1♂, 3♀, Hamilton Co., 15-VII-[19]42, collected at light, peach orchard, Turner (USNM); 6♂, 6♀, 24-VI-[19]43, light trap edge peach orchard (USNM); 1♂, 3♀, 23-VIII-[19]43 (USNM); one without abdomen, 12-VIII-[19]42 (USNM); 1♂, Knoxville, 15-V-[19]17, sweep from sedges, Geo. G. Ainslie (USNM); Texas, 1♀, P.R. Uhler (USNM); 1♂, 1♀, C.V. Riley (USNM); 2♂, 2♀, P.R. Uhler (USNM); 1♂, Belfrage, C.V. Riley (USNM); 1♂, 2♀, Sommerset, 27-XII-1942, E.S. Ross (CAS); 1♀, Austin, 20-VI-[19]30, G. Linsley (CAS); 1♂, San Antonio, 5-X-[19]47, E.S. Ross (CAS); 2♀, Brownsville, X-[19]42, E.S. Ross (CAS); 1♂, at light (CAS); 6♂, 6♀, 16-IX-[19]42, T.M. Burnst, (CAS); 5♀, L.R. Joyce (USNM); 1♀, on weeds deputy, 11-V-[19]38 (USNM); 1♀, 23-I-[19]43, from pink bollworm, I. Shiller (USNM); 1♀, Hidalgo Co., Santa Ana Refuge, 15/16-II-1971, A. & M.E. Blanchard (USNM); 1♀, Hidalgo Co., 29-VII-[19]47, at light, G.B. Vogt (USNM); 1♂, 12/20-IX-[19]47, at light, G.B. Vogt (USNM); 3♀, Plano, VII-[19]07, taken at trap light, E.S. Tucker (USNM); 2♂, one without abdomen, July at night, E.S. Tucker (USNM); 1♂, Houston, Harris Co., 1/4-VI-1967, A. & M.E. Blanchard (USNM); 1♀, Sinton, Welder Wildlife Foundation, 3-V-1967, A. & M.E. Blanchard (USNM); 1♂, 1♀, Victoria, Sept[ember] (USNM); 1♀, Dallas, 25-IV-[19]07, F.C. Pratt (USNM); 2♂, 1♀, Kerrville, 31-V-[19]06, at light, F.C. Pratt (USNM); 1♀, College Station, 29-V-1933, J.R. Reinhard (USNM); 1♀, Tyler, 15-II-[19]39 (USNM); *Virginia*: 1♂, 1♀, Fairfax Co., Turkey Run (West), 38°57.9′N- 77°09.4′W, 29-VI/12-VII-2007, Malaise trap, D. Smith (USNM); 2♂, 7♀, 3/17-VII-2008, Malaise trap, D. Smith (USNM); 1♀, 5/19-VI-2008, Malaise trap, D. Smith (USNM); 1♂, 14/28-VI-2007, Malaise trap, D. Smith (USNM); 1♂, 2♀, Fairfax Co., 1 km E Fairfax city, 26/27-VII-2005, blacklight, J. Brown (USNM); 1♂, Louisa Co., 4 mi. S Cuckoo, 1-VI-1985, Malaise trap, J. Kloke & D.R. Smith (USNM); 1♀, Giles Co., Mtn. L. Scenic Area, 3800 ft, 14-VII-1971, A.B. Gurney (USNM); 1♂, Clarke Co., U. Va. Blandy Exp. Farm, 2 mi. S Boyce, 39°5′N, 78°10′W, 19-IX/25-X-1993, Malaise trap, D.R. Smith (USNM); 1♂, Scotts Run, Stubblefield Falls, 23-X-1921, on *Pinus virginiana*, J.R. Malloch (USNM; 1♀, Falls Ch., 7-VI-[19]14, R.C. Shannon (USNM); 1♂, 29-XII, H. Barber (USNM); 1♀, 21-IX, H.G. Barber (USNM); 1♀, Vienna, 21-V-[19]32, H.G. Barber (USNM); 1♂, 1♀, 7-VI-[19]28, H.G. Barber (USNM); 1♂, 3-VI-[19]28, H.G. Barber (USNM); 1♂, 5-VI-[19]28, H.G. Barber (USNM); 1♀, VIII-[19]18, H.G. Barber (USNM); 2♀, 31-VIII-[19]32, J.C. Bridwell (USNM); 2♂, 22-X-[19]32, at light, J.C. Bridwell (USNM); 2♀, 1-IX-1932, at light, J.C. Bridwell (USNM); 1♀, 22-IX-1932, at light, J.C. Bridwell (USNM); one without abdomen, 31-V-[19]32, at light, J.C. Bridwell (USNM); 2♂, 1♀, Norfolk, 3-VII-[19]63, B/L Ser. x22 (USNM); 1♂, Four Mile Run, 23-V-[19]14, A. Wetmore (USNM).

Heraeus pulchellus Barber, 1954

(Figs 36I, 39F, 41E–H, 42)

Heraeus pulchellus Barber, 1954b: 342–343; Slater, 1964: 1084; Harrington, 1980: 109; Slater, 1988: 50, 59; Baranowski & Slater, 1998: 79, 87; Baranowski & Slater, 2005: 143.

Diagnosis

Small species, total length less than 5 mm. Labium extending to mesocoxae or metacoxae. Antennae pale brown to brown, with the apex of basiflagellomere and distiflagellomere darker. Distiflagellomere without a pale band. Membrane with an apical pale spot. Metafemur with a subapical dark band. Anterior margin of dorsal aperture of pygophore straight. Pygophore apex pointed dorsally in lateral view. Aedeagus unspined.

Heraeus pulchellus, together with *H. plebejus* and *H. pacificus*, are the only species in the group that lack a pale band on distiflagellomere (although in some specimens of *H. pulchellus* a band is vaguely apparent). In *H. plebejus* and *H. pulchellus*, the antenna is pale brown to brown, with the apex of basiflagellomere and distiflagellomere darker, and the ocelli are placed at the level of an imaginary line passing the posterior border of the eyes, whereas in *Heraeus pacificus* the antenna is uniformly dark brown and the ocelli are

placed posterior of an imaginary line passing the posterior border of the eyes. *Heraeus pulchellus* can be distinguished from *H. plebejus* based mainly on body size (*H. plebejus* over 5.25 mm long and *H. pulchellus* less than 5 mm long) and the male genitalia.

Redescription (Fig. 36I)

Head: Eyes not surpassing the dorsal margin of head in lateral view. Ocelli at level of an imaginary line passing the posterior border of eyes. Labium extending to mesocoxae or metacoxae. Antennae pale brown to brown, with the apex of basiflagellomere and distiflagellomere darker. Distiflagellomere without a pale band.

Thorax: Posterior pronotal lobe with pale spots and a pale spot on each humeral angle. Anterior pronotal lobe with long erect setae. Evaporative area extended. Scutellum with erect setae. Hemelytra: inner corial spot diffuse and with a subapical corial spot; costal margin pale on proximal three-quarters. Membrane brown, with veins paler and an apical pale spot. Legs: Profemur dark, at most with apices paler, metafemur with a subapical dark band (Fig. 39F). Profemur with long erect setae. Protibiae and mesofemur without spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 41E, F) rounded, apex with a protuberance pointed dorsally; anterior margin of dorsal aperture rounded, inner projections quadrangular, more pronounced posteriorly. Parameres: Figure 41(G, H). Aedeagus with minute spines on conjunctiva and sclerotized vesical lobes; *processus gonopori* long and slender.

Distribution

Bahamas, Cayman Island, Cuba, and Saba Island (Fig. 42).

Type material examined

Holotype: ♂, **CUBA**, 'Capitolio', Rio Yara, May 15–19 [19]48, Elev. 1150 ft appr., J. Ferrás, type #61922 (USNM).

Additional material studied

BAHAMAS: 1♂, Mayaguana Isl., 28-VIII-[19]63, blacklight trap, C. Murvosh (AMNH); 1♀, 26-VIII-[19]63, blacklight trap, C. Murvosh (USNM).

CUBA: 1♀, Soledad, Santa Clara Prov., 24/30-V-1939, C.T. Parsons (AMNH); 1♀, Central Soledad, 1-VII-1932, B.B. Leavitt (AMNH); 1♂, Guantanamo, Imias, 10 m.s.n.m., 16-VII-[19]90, a la luz, L.F. Armas & V. Becker (USNM).

GRAND CAYMAN ISLAND: 1♂, 1-XI-[19]92, BLT, P. Fitzgerald (USNM); 1♂, South Sound, 23-VIII-1987, BL trap, P. Fitzgerald (USNM); 1♀, 2-VIII-1987, BL trap, P. Fitzgerald (USNM); 1♀, 30-XI-1987, BL trap, P. Fitzgerald (USNM); 1♀, Grand Cayman, 17-V-[19]92, B.L.T., P. Fitzgerald (USNM); 1♀, 8-V-[19]92, B.L.T., P. Fitzgerald (USNM); 1♂, 1♀, VI-[19]86, R.M. Baranowski (USNM); 1♀, Savannah, 12/13-XI[19]85, R.M. Baranowski (USNM).

CAYMAN BRAC ISLAND: One without abdomen, The Creek, 5-VI-[19]96, blacklight trap, E.A. Dilbert (USNM); 1♀, 8-V-[19]97, blacklight trap, E.A. Dilbert (USNM).

BARANOWSKIOBIUS GEN. NOV.

Type species: Nabis elegans Walker, 1873a: 144. HERE DESIGNATED.

Diagnosis

Postocular region elongate, longer than interocellar distance. Jugal ridge present. Mesepimeron emergent. Evaporative area extensive. Clavus with three complete rows of punctures and additional incomplete rows between inner and median row. Procoxa with a spine. Protrochanters without spines. Aedeagus unspined, vesica with two lobes weakly sclerotized laterally; ejaculatory ductus wide; *processus gonopori* broadened towards apex.

Description

Relatively large and elongate. Pruinose dorsally.

Head: Elongate, vertex rounded. Postocular region elongate, longer than interocellar distance, slightly narrowing, forming a neck. Eyes surpassing dorsal margin of head. Jugal ridge present. Buccular juncture V-shaped, near insertion of labium.

Thorax: Pronotum punctate, more conspicuous on collar and posterior lobe. Mesepimeron emergent. Evaporative area extensive, covering a thin fringe on mesopleura and all of metapleural area, except on dorsal quarter. Clavus with three complete rows of punctures and filled with two additional incomplete rows on distal three-quarters between inner and median rows. Procoxa with a small spine in both sexes. Profemur incrassate, elongate, with spines on apical half arranged in two rows. Protibia straight, with spiniferous tubercles, with or without spines in males. Protrochanter and mesofemur without spines in both sexes. Meso- and metatibiae with spiniform setae.

Abdomen, male genitalia: Aedeagus unspined, vesica with two lobes weakly sclerotized laterally, ejaculatory ductus wide; *processus gonopori* broadened towards apex.

Etymology

This new genus is named in honor of our friend and colleague Dr Richard Baranowski, who has published numerous important papers on the Lygaeoidea, including the 'Lygaeidae of Florida' (Slater &

KEY TO SPECIES OF ***BARANOWSKIOBIUS*** **GEN. NOV.**

1. Male anterior tibia spined; corial margin serrate 2
1′. Male anterior tibia unspined; corial margin smooth ..... ***Baranowskiobius muticus*** **sp. nov.**
2. Hemelytra dark brown, with a conspicuous pale pattern and a large whitish subapical spot (Fig. 43B); male protibia with five spiniferous tubercles on ventral region, the basal one largest ..... ***Baranowskiobius bimaculatus*** **sp. nov.**
2′. Hemelytra pale brown, without a conspicuous pale pattern and with a small pale subapical spot (Fig. 43A); male protibia with four or five spiniferous tubercles on ventral region, all of the same size. ***Baranowskiobius elegans*** **comb. nov.**

Baranowski, 1990) and the 'Lygaeidae of the West Indies' (Baranowski & Slater, 2005). The gender is masculine.

This new genus is created to accommodate *Heraeus elegans* (Walker, 1873) and two new species. These are the largest species that previously would have been included in the genus *Heraeus*, but they lack the characteristic anteriorly protruding collar found on all members of that genus. Their general appearance and the male genitalia, with an unspined aedeagus with two basally sclerotized lobes, resemble species of the Neotropical genus *Paisana* Dellapé, 2008, including five species distributed in southern South America (Argentina and Brazil), but the species included in *Baranowskiobius* gen. nov. are larger and more slender, the juga is angulate, the aedeagus has a wide ejaculatory ductus, and the *processus gonopori* is broadened towards the apex. As in *Paisana*, the presence or absence of tubercles or spines on the male protibia and the serrated corial margin are considered intrageneric variation.

BARANOWSKIOBIUS ELEGANS (WALKER, 1873) **COMB. NOV.**

(FIGS 43A, 44A, 45A–D, 46A, 47)

Nabis elegans Walker, 1873a: 144.

Heraeus cincticornis Stål, 1874: 147; Berg, 1892: 162; Lethierry & Severin, 1894: 191; Osborn, 1904: 201; Osborn & Drake, 1915b: 537; Pennington, 1921: 19; Slater, 1964: 1082; Scudder, 1977: 30; Harrington, 1980: 108; Melo *et al*., 2004: 67 (misidentification); Dellape, 2014: 438. (NEW SYNONYMY).

Heraeus guttatus: Distant, 1903: 254, 255; Slater, 1964: 1083.

Heraeus elegans: Scudder, 1967: 264; Scudder, 1970: 100 (raised from syn with *H. guttatus*); Harrington, 1980: 108; Slater & O'Donnell, 1995: 147.

Redescription (Fig. 43A)

Lectotype: ♂. Total length 7.79.

Head: Porrect, convex dorsally, brown, shiny, coriaceous, with abundant short recumbent and long semi-erect and erect setae dorsally. Postocular region longer than preocular length. Head length 1.44, width 1.09. Postocular length 0.42. Eyes with setae between ommatidea. Ocelli large, placed just behind an imaginary line across the posterior margin of eyes. Interocular width 0.53, interocellar width 0.35. Labium pale brown, surpassing procoxae, almost extending to mesocoxae, with sparse short erect setae. Labial segment lengths: I 0.69, II 0.99, III 0.83, and IV 0.50. Antennal tubercles slightly divergent. Antennae pale brown, apical region of basiflagellomere and distiflagellomere darker, distiflagellomere with a wide pale stripe sub-basally; setae abundant, short, and recumbent. Antennal lengths: scape 0.80, pedicel 1.68, basiflagellomere 1.63, and distiflagellomere 1.49. Length of pale band on distiflagellomere 0.58.

Thorax: Pronotum with short recumbent adpressed setae, anterior lobe with sparse long erect setae; anterior pronotal lobe brown, posterior pronotal lobe paler, with irregular pale spots. Maximum width of anterior pronotal lobe behind middle. Collar length 0.14, anterior lobe length 0.74, posterior lobe length 0.64; anterior lobe width 1.09, posterior lobe width 1.68. Pleurae brown, with acetabular areas paler; setae short and recumbent. Scutellum brown, punctate, with setae similar to those on anterior lobe of pronotum. Hemelytra with short recumbent setae, general colour pale brown, except for anterior three-quarters of corial margins and a small subapical spot paler (Fig. 43A). Corial margins slightly concave and serrate. Membrane brown, veins paler. Legs: Coxa yellowish brown, remainder of legs pale brown, except apical two-thirds of profemur, about distal half of meso- and metafemora, subproximal dark band of meso- and metatibia, apex of tibia and tarsus, and pretarsus darker. Darker region of profemora weakly mottled (Fig. 44A). Femora with short semi-erect setae. Protibia with small denticles and four spiniferous tubercles, each bearing a spiniform seta on distal half.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 45A, B) rounded, elongate, anterior margin of dorsal aperture rounded, inner projections produced posteriorly. Parameres: Figure 45(C, D). Aedeagus (Fig. 46A) unspined, vesica with two lobes weakly sclerotized laterally; ejaculatory ductus wide; *processus gonopori* slightly broadened towards apex.

Figure 43. Habitus dorsal: A, ***Baranowskiobius elegans* comb. nov.**; B, ***Baranowskiobius bimaculatus* sp. nov.**; C, ***Baranowskiobius muticus* sp. nov.**; D, ***Paraheraeus eximius* comb. nov.**

Variability observed in females
Similar to males in all respects, except labium extending to mesocoxae, and without or barely apparent spiniform tubercles on protibia; some specimens with all tibiae having a sub-basal dark band.

Variability observed in other material studied
General colour darker and more contrasting than in lectotype; hemelytra with a small pale spot on middle inner corial margin.

Distribution
Argentina, Bolivia, Brazil, Colombia, Guatemala; and Ecuador, Paraguay, Peru, Uruguay, Venezuela (NEW RECORDS) (Fig. 47).

In his world catalogue, Slater (1964) erroneously credited Osborn (1904) with a record of this species from British Guiana and Berg (1892) with a record from Uruguay. Osborn (1904) actually mentioned only Cochabamba, Bolivia, and Berg (1892) recorded this species only from Chacabuco, Buenos Aires, Argentina. All previous records of this species (as *Heraeus cincticornis*) from Argentina are erroneous, and here we record *B. elegans* only from Misiones Province. Berg's (1892) record from Buenos Aires is uncertain; his description is vague, so we are not convinced the record is accurate. Melo *et al*. (2004) recorded *H. cincticornis* from Corrientes (Argentina), but we have concluded that the specimens they examined were misidentified and should be referred to *H. chamamecinus* sp. nov.

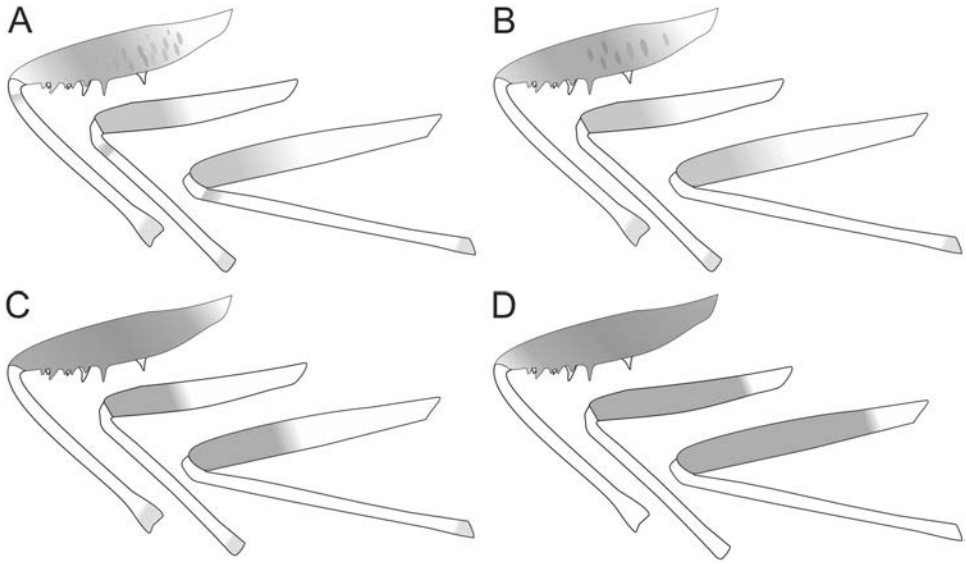

Figure 44. Legs: A, ***Baranowskiobius elegans* comb. nov.**; B, ***Baranowskiobius bimaculatus* sp. nov.**; C, ***Baranowskiobius muticus* sp. nov.**; D, ***Paraheraeus eximius* comb. nov.**

Taxonomy

Distant (1903) synonymized *H. elegans* under *H. guttatus*. Scudder (1967) designated a lectotype for *Nabis elegans* Walker, 1873 and determined the correct generic combination for this species as: '*Heraeus elegans* (Walker)'. Slater & O'Donnell (1995) misinterpreted Scudder's treatment as raising *H. elegans* from synonymy under *H. guttatus*; Scudder (1970) later formally made this systematic change.

According to Stål's original description of *H. cincticornis*, the specimen (or specimens) examined should be at the Naturhistoriska Riksmuseet, Stockholm (NHRS), as indicated after the geographic distribution '(Mus. Holm.)'. Scudder (1977) mentioned that the type material is not present at NHRS. We also confirm that Stål's type material is apparently lost. Also because Stål did not give the number of specimens he examined when describing species, it is not certain how many specimens he used to describe *H. cincticornis* (he reported the sex: a female, and single measurements). But the listing of a single sex, single measurements, and a single museum does not necessarily mean he had only one specimen.

Most of Stål's collection was deposited in the NHRS, but he also described some species from Signoret's collection deposited in the International Research Institute of Entomology, Natural History Museum Vienna, Austria (NHMW), and a few from Dohrn's collection, which should now be in the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland (ZMPA). We checked with the curators of these two museums, and in addition with the Museum für Naturkunde Humboldt-Universität zu Berlin, Germany (ZMHB), without success, indicating that the type material of *H. cincticornis* is lost. Thus, Scudder's (1967) lectotype and interpretation of *H. elegans* is followed.

Type material examined

Lectotype: ♂, **BRAZIL**, Petropolis, Feb. 1857, J. Gray, 31. *Nabis elegans*, Walker's catal. *Nabis elegans* Distant, 1873, G.G.E. Scudder, 1965 (BMNH).

Additional material studied

ARGENTINA: *Misiones*: 1♂, PN Iguazú, X-1980, luz, D.J. Carpintero (MACN) ; 1♀, Puerto Iguazú, 12/13-II-2007, E. Lestani (MLP); 3♂, 2♀, Apartado, XI-[19]80 (USNM); 1♂, without head, Iguazú, XI-[19]88, Drake (USNM); 3♂, 2♀, XI-[19]86, Drake (USNM).

BOLIVIA: *Cochabamba*: 1♀, Cochabamba, VIII/IX-[18]99 (OSUC); La Paz: 3♂, Rio Zongo, 1400 m a.s.l., 24/30-X-[19]84, L.E. Peña (USNM).

BRAZIL: 1♂, Monat, IV-1935, P. Sandig (USNM); *Minas Gerais*: 1♂, Carmo do R. Claro, 15-VI-[19]43, Carvalho (USNM); 1♂, Viçosa, 25-IV-[19]33; E.J. Hambleton (USNM); 1♂, 1♀, 13-X/1-XI-1985, T.J. Henry & S.P. Fiuza F. (USNM); 2♀, Viçosa, Corrego da Paraiso (Mata do Prefeitura), 10-III-1993, T.J. Henry (USNM); 6♂, 6♀, 26/27-III-1993, T.J. Henry (USNM); *Santa Catarina*: 1♂, 2♀, Corupa, Hansa Humbolt, I-1945, A. Maller, Frank Johnson donor (AMNH); 1♀, XI-1944, A. Maller, Frank Johnson donor (AMNH); 1♀, XII-1944 (AMNH); *Sao Paulo*: 1♀, Santos, S.A., 23-V-1919 (AMNH); *Roraima*: 1♂, Mt Roraina, alt. 6000 ft, Glycon Swamp, 10-XI-

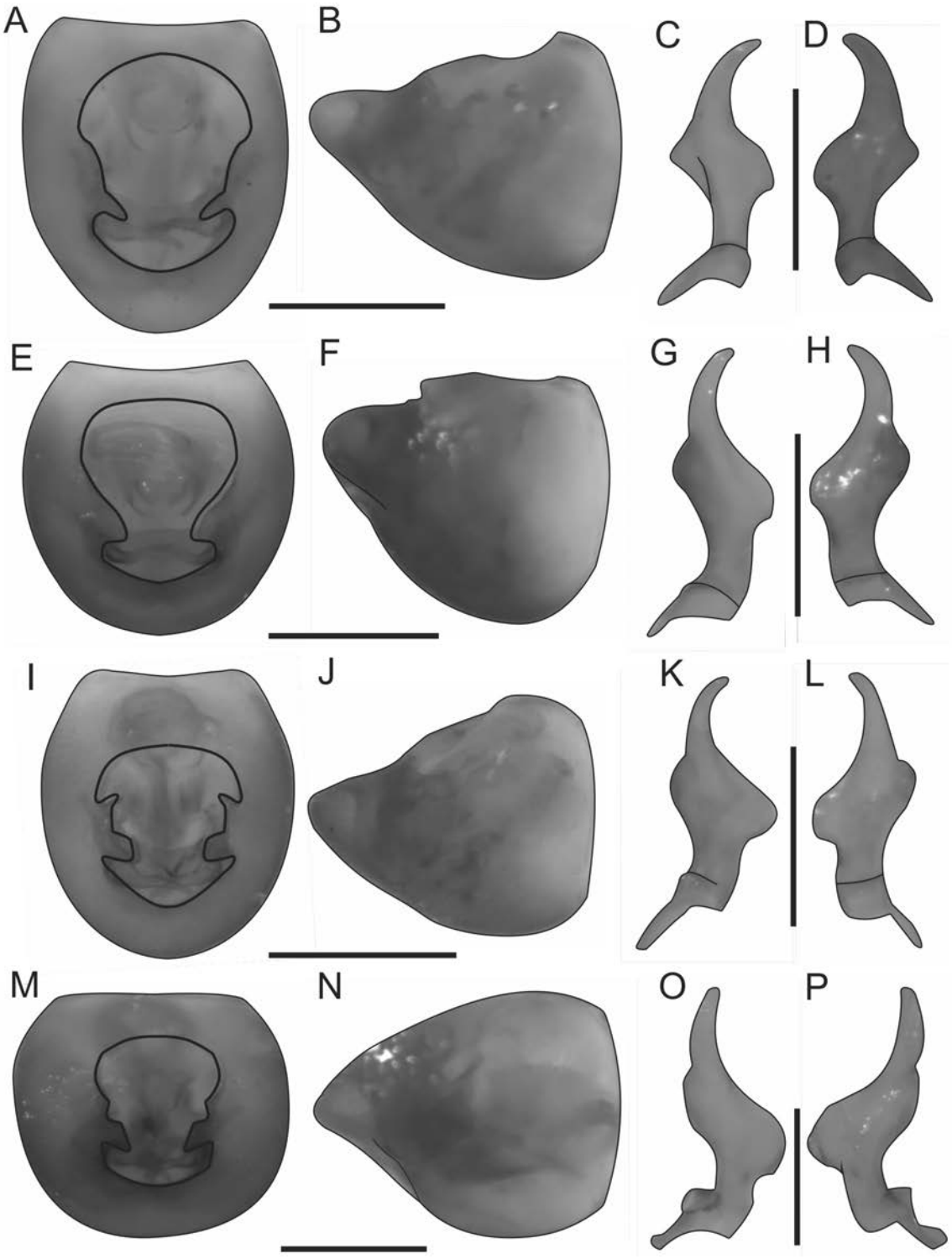

Figure 45. Male genitalia. ***Baranowskiobius elegans*** (Walker, 1873) **comb. nov.**: A, pygophore, dorsal view; B, pygophore, lateral view; C, right paramere, inner view; D, right paramere, external view. ***Baranowskiobius bimaculatus*** **sp. nov.**: E, pygophore, dorsal view; F, pygophore, lateral view; G, right paramere, inner view; H, right paramere, external view. ***Baranowskiobius muticus*** **sp. nov.**: I, pygophore, dorsal view; J, pygophore, lateral view; K, right paramere, inner view; L, right paramere, external view. ***Paraheraeus eximius*** (Distant, 1882) **comb. nov.**: M, pygophore, dorsal view; N, pygophore, lateral view; O, right paramere, inner view; P, right paramere, external view.

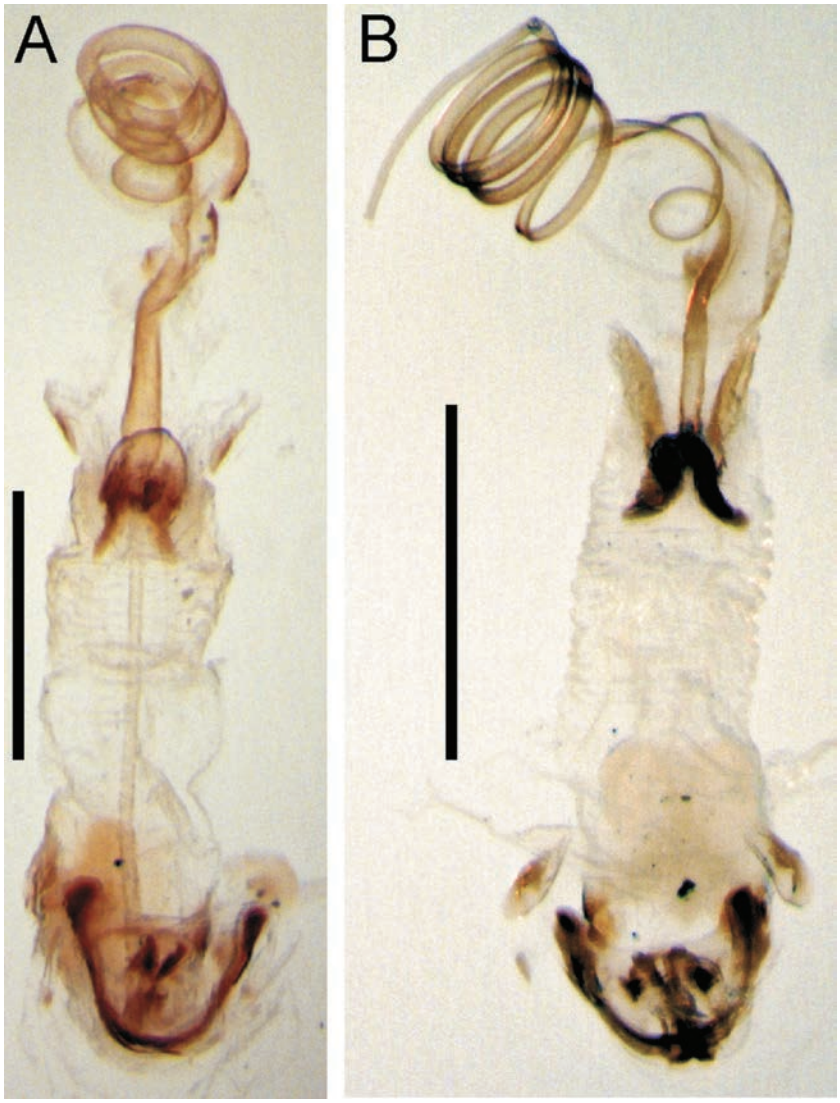

Figure 46. Aedeagus. A, ***Baranowskiobius elegans*** (Walker, 1873) **comb. nov.**; B, ***Paraheraeus eximius*** (Distant, 1882) **comb. nov.**

1927 (AMNH); *Estado do Rio*: 1♂, Mendés, 92 km Rio de Janeiro, De Moldt (MNHN); *Espirito Santo*: 1♀, Espirito Santo (MNHN).

COLOMBIA: *Cundinamarca*: 1♀, La Mesa, 14-VIII-1965, J.A. Ramos (USNM); *Magdalena*: 1♀, Socorpa Mission, Sierra de Perija, 5/25-VIII-1968, B. Malkin (AMNH).

ECUADOR: *Loja*: 1♀, Celica, 2200 m a.s.l., 16/18-VIII-1977, L.E. Peña G. (USNM); *Napo*: 1♀, Sierrazul, 2200 m a.s.l., SW of Baeza, 0°40′S, 77°5′W, 2/30-I-1996, T.J. Henry (USNM); 1♀, Yanayacu, 400 m a.s.l., IX/X-1977, L.E. Peña G. (USNM); *Tungurahua*: 1♂, 1♀, Baños, 30 km E, 25-I-1976, 4200 ft, blacklight, Spangler *et al*. Ecuador Peace Corps, Smithsonian Institution Aquatic Insect Survey (USNM); 2♂, (one without head), Baños, 12 km E, 1570 m a.s.l., 1°24′S, 78°20′W, seepage, 15-IX-1990, P.J. Spangler, #22 (USNM).

PARAGUAY: *Alto Paraná*: 1♂, 2♀, Itabó Res., 19-VI-1984, st. 105, L. Baert & J.P. Maelfait (IRSN); 1♀, Itabó Res., 19-VI-1984, st. 105, L. Baert & J.P. Maelfait (IRSN); *Caaguazú*: 1♂, Pastoreo, 3/5-I-1972, L.E. Peña (USNM).

PERU: *Huánuco*: 1♀, Tingo Maria, Turista Hotel, 2500 ft, 11/17-IV-1987, J.E. Eger (USNM); 1♀, Avispas, X-1962, L.A. Peña (USNM); Cuzco, 2♂, 1♀, Santa Isabel, valley of river Cosñipata, 16-XI-1951, F. Woytkowski (USNM); 1♀, 30-XI-1951, F. Woytkowski (USNM); 1♂, 22-XI-1951, F. Woytkowski (USNM).

VENEZUELA: *Bolivar*: 1♀, 26 km N Rio Yuruani, Gn. Sabana, 29-VI/10-VIII-[19]87, forest grassland

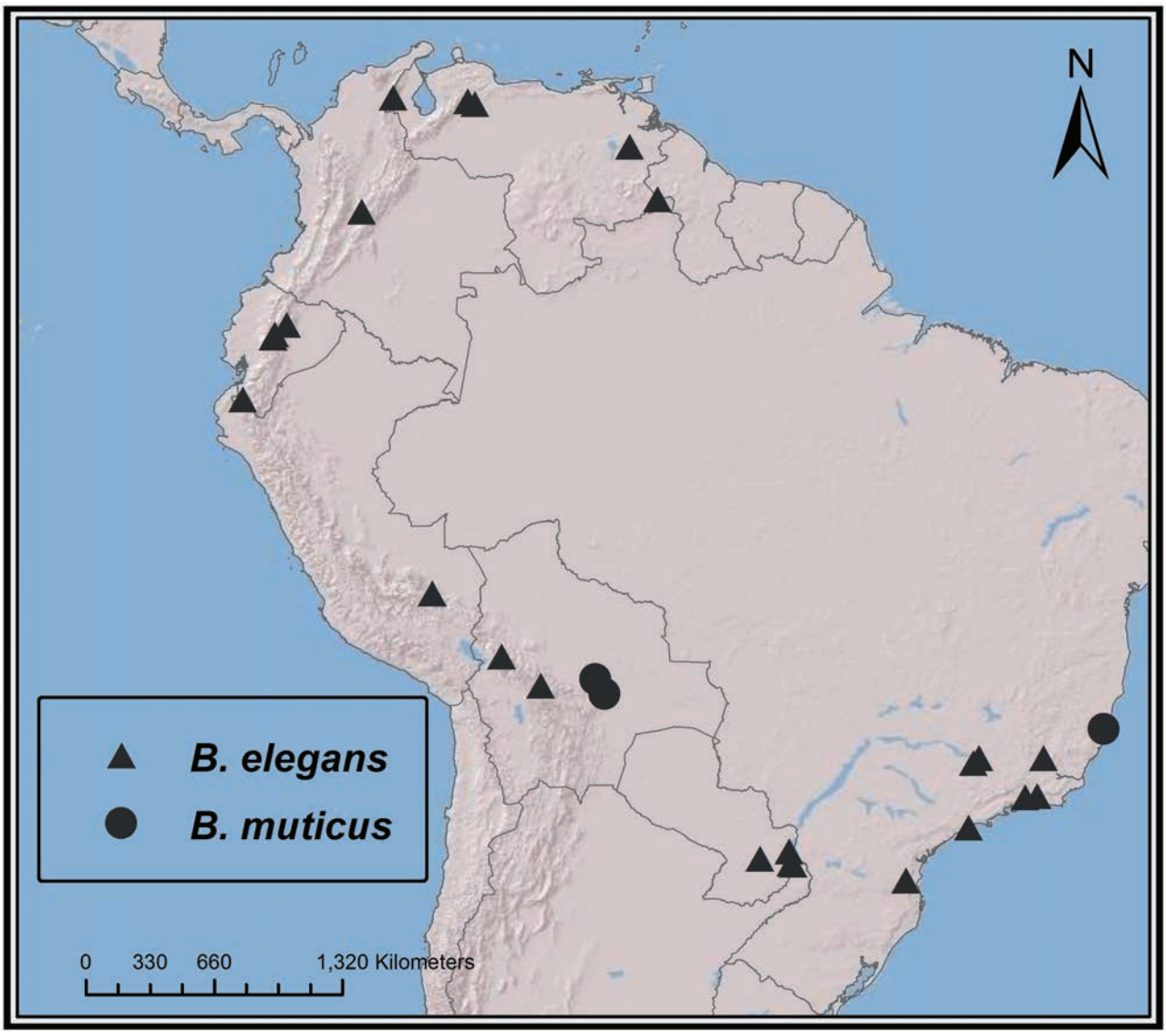

Figure 47. Distributional map of ***Baranowskiobius elegans*** (Walker, 1873) **comb. nov.** and ***B. muticus*** **sp. nov.**

edge, S. & J. Peck (AMNH); *Lara*: 1♀, Yacambu National Park, 13 km SE Sanare, 4800 ft, 4/7-III-1978, blacklight, cloud forest, J.B. Heppner (USNM); *Portuguesa*: 1♀, Acarigua, VI-[19]81, Drake (USNM).

BARANOWSKIOBIUS BIMACULATUS SP. NOV.

(FIGS 43B, 44B, 45E–H, 48)

Diagnosis

Without or with a few long erect setae on pronotum and scutellum. Hemelytra with the corial margin serrate and a large whitish subapical spot. Male protibia with five spiniferous tubercles, each bearing a seta on the distal half, the proximal seta large, forming a strong spine.

Description (Fig. 43B)

Holotype: ♂. Total length 7.60.

Head: Convex dorsally, coriaceous, dark brown, shiny, with abundant short recumbent semi-erect and erect setae dorsally. Head length 1.51, width 1.12. Postocular length 0.67. Ocelli large, placed posterior of an imaginary line passing the posterior border of eyes. Interocular width 0.48, interocellar width 0.24. Labium brown, segment II paler, with short erect setae; surpassing procoxae, almost extending to mesocoxae. Labial segment lengths: I 0.80, II 0.99, III 0.72, and IV 0.45. Antennal tubercles slightly divergent. Antenna pale brown, apical region of basiflagellomere and distiflagellomere darker, distiflagellomere with a wide pale band sub-basally; all segments with abundant

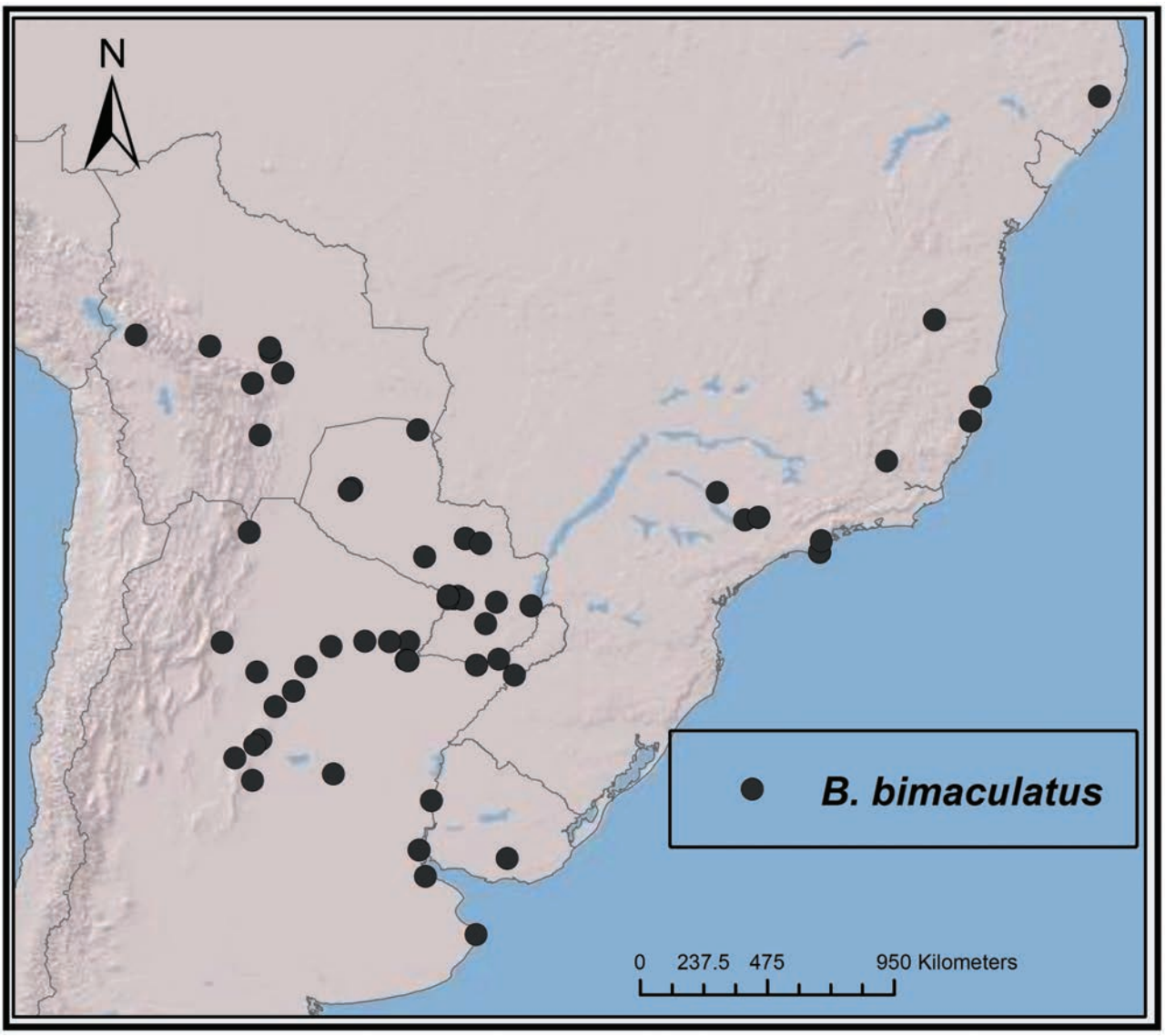

Figure 48. Distributional map of ***Baranowskiobius bimaculatus* sp. nov.**

short recumbent setae. Antennal lengths: scape 0.83, pedicel 1.62, basiflagellomere 1.49, and distiflagellomere 1.52. Length of pale band on distiflagellomere 0.40.

Thorax: Pronotum with very short adpressed setae; anterior pronotal lobe dark brown, collar and posterior pronotal lobe paler, posterior lobe with four irregular longitudinal pale stripes. Maximum width of anterior pronotal lobe behind middle. Collar length 0.13, anterior lobe length 0.88, posterior lobe length 0.58; anterior lobe width 1.01, posterior lobe width 1.55. Pleurae dark brown, acetabular areas paler, with short recumbent adpressed setae. Scutellum dark brown, punctate, with setae as on anterior lobe of pronotum. Hemelytra with short recumbent setae. General colour dark brown (Fig. 43B); costal margin on proximal three-quarters and a subapical inner corial spot pale. Membrane brown, with veins and an apical spot paler. Corial margin serrated. Legs: Coxae yellowish brown; femora creamy basally, apical two-thirds of profemur and distal half (approximately) of meso- and metafemur brown; tibiae and tarsi pale brown, except apex of tibiae and pretarsus darker (Fig. 44B); darker region of profemur weakly mottled. Femora with sparse short erect setae. Protibia with five spiniferous tubercles, each bearing a spiniform seta on distal half, the proximal seta large, forming a strong spine.

Abdomen: Dark brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 45E, F) rounded; anterior margin of dorsal aperture rounded. Parameres: Figure 45(G, H). Aedeagus unspined, vesica

with two slightly sclerotized lobes basally and laterally; ejaculatory ductus thickened before coil; *processus gonopori* long, slightly broadened towards apex.

Variability observed in other material studied

Some specimens have the apical region of basiflagellomere reddish brown. In addition, the colour pattern of the posterior pronotal lobe and hemelytra varies in some details. Some specimens, such as the holotype, have only very short setae on the anterior pronotal lobe and scutellum, whereas other specimens in both sexes have a few long erect setae on the anterior pronotal lobe and scutellum. It is probable that these long setae are very fragile and are broken in the specimens appearing not to have them. In general, females have a shorter anterior pronotal lobe and, as a result, the labium reaches the mesocoxae, and lack spiniform tubercles on protibia.

Distribution

Argentina, Bolivia, Brazil, Paraguay, and Uruguay (Fig. 48).

This species is common within its range and is frequently taken at lights.

Etymology

The specific epithet '*bimaculatus*' is an adjective referring to the two distinct white spots on the apical third of the corium.

Type material

Holotype: ♂, **ARGENTINA**, P.N. Chaco, 26°48′25″S, 59°36′26″W, 26-IX-2009, Trampa de luz, P.M. Dellapé & M.C. Melo (MLP).

Paratypes: **ARGENTINA**, *Chaco*: 3♂, 5♀, same data as for holotype (MLP); 1♂, 4♀, P.N. Chaco, entrance, 26°48′34,1″S, 59°36′21,9″W, 27-IX-2009, P. Dellapé & M.C. Melo (MLP); 1♀, P.N. Chaco, 26°48′25″S, 59°26′36.5″W, 17/28-X-2009, Trampa de luz, R. Pfoh (MLP); 4♂, 1♀, Resistencia, III-1988, Mitre (USNM); *Corrientes*: 2♂, Ituzaingó, Reserva Santa María, 30-X-2003, light, P.M. Dellapé (MLP); *Santiago del Estero*: 2♂, 4♀, Quimili, 12-III-[19]92, L.E. Peña (USNM). **BOLIVIA:** *Santa Cruz*: 2♂, Saavedra, Res. Sta., 22-III-1978, UVtrap, C.R. Ward & C.W. O'Brien (USNM). Brazil, Sao Paulo, 1♀, Cosmópolis, 22-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 1♂, 25-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 2♂, 2♀, Linhares, IX-1972, M. Alvarenga (AMNH). **PARAGUAY:** *Central*: 1♂, 2♀, Cord. San Bernardino, Lago Ypacarai, 6/7-XI-1987, black light trap, J. Kochalka (USNM); 4♂, 4♀, 7/8-XI-[19]87, black light trap, J. Kochalka (USNM).

Additional material studied

ARGENTINA: *Buenos Aires*: 1♀, La Lucila del Mar, I-1999, luz, D.L. Carpintero (MLP); 1♂, Lanús, I-1979, D.L. Carpintero (MACN); *Chaco*: 1♀, Reserva del Loro Hablador, XI-2006, light, G. Marti (MLP); 1♂, Resistencia, XI-[19]52 (MLP); 2♀, R.S. Peña, VII-1971 (MLP); 1♀, Río de Oro, IX-1962 (MLP); 4♂, 8♀, Fontana (MLP); 1♀, 40 km Tres Estacas, 27°4′58.8″S-61°31′38.4″W, 20/30-XI-2008, Marti & Pelliza (MLP); *Córdoba*: 1♀, Depto. Tulumba, Cerro Colorado, XI-1998, A. Cicchino (MACN); 1♀, Cruz del Eje, 5-II-1999, J.E. Barriga (MACN); *Corrientes*: 1♂, Manantiales (MLP); 1♂, Manantiales, Colonia Inés Apostol, 1960 (MLP); 1♂, Paso de La Patria, 28-VIII-1963 (MLP); 1♂, San Roque, 2003, luz, M.C. Melo (MLP); 1♂, I-1921, De Carlo (MLP); 5♂, 5♀, Ituzaingó, Reserva Santa María, 30-X-2003, light, P.M. Dellapé (MLP); 1♀, Reserva Santa María, 27-IV-2003, luz, P.M. Dellapé (MLP); 1♀, 29-IV-2003, light, P.M. Dellapé (MLP); 1♀, Pellegrini, 6-XII-2001, light, P.M. Dellapé (MLP); *Entre Ríos*: 1♀, Liebig, I-2003, light L. Caire (MLP); 2♂, Brazo Largo, II-[19]39 (MLP); 1♀, X-[19]93, Peña & Ugarte (USNM); *Formosa*: 7♂, 5♀, Ea. (Estancia) 'La Marcela', 35 km E de El Colorado, VIII-2003, light, J. Williams (MLP); 1♂, VIII-2003, light, F. Brusa (MLP); *Misiones*: 1♂, Departamento Concepción, Santa María, XII-1947, M. Viana (MLP); 1♂, Posadas, D.L. Carpintero (MACN); *Neuquén*: 1♂, Catandil, 25-II-1942, M. Biraben (MLP); *Rio Negro*: 1♀, Rio Limay, 25-XI-[19]90, L.E. Peña (USNM); *Salta*: 1♂, Orán (MLP); 1♂, 1♀, Rio Sauzal, 16-X-[19]33 (MLP); *Santa Fe*: 1♂, Rafaela, 8-XI-[19]32 (MLP); 1♂, 2♀, Santa Fe (MLP); *Santiago del Estero*: 10♀, Añatuya, II-1999, light, D.L. Carpintero (MACN); 4♂, 5♀, XII-1998, light, D.L. Carpintero (MACN); 1♂, Cuestas del Salado, desvío 511, 4-XII-1928 (MLP); 1♂, Beltrán, 28-XII-[19]92, L.E. Peña (USNM); 1♂, 2♀, Telares, 3-III-[19]92, L.E. Peña (USNM); *Tucumán*: 1♀, Tucumán, 450 m a.s.l. (USNM).

BOLIVIA: 1♀, (MLP); 1♂, 1♀, 1962 (MLP); *Cochabamba*: 1♂, Chapare, Cristal Mayu, 1300 m a.s.l., 9/10-XII-[19]84, L.E. Peña (USNM); *Chuquisaca*: 1♀, Monteagudo, 24-XII-[19]84, L.E. Peña (USNM); 1♂, aircraft, 31-III-[20]02, Miami 230415 (USNM); La Paz, 1♀, La Paz, X-1956, L.E. Peña (USNM); *Santa Cruz*: 2♂, 1♀, Prov. Sara, 2 km NW Santa Rosa, 21-II-[19]69, black light trap, A. Martinez & R.E. Woodruff (USNM); 1♀, San Esteban, Mushurina, 40 km N Santa Cruz, 1120 ft (USNM); 1♂, 1♀, Prov. Sara, Steinbach (AMNH); 1♀, 25-III-1978, UV trap, O'Brien & Serrate (USNM); 3♂,

Mataral (N), V. Grande, 1800–2000 m a.s.l., 15/17-XII-1984, L.E. Peña (USNM).

BRAZIL: *Sao Paulo*: one without abdomen, Nova Europa, Faz. Itaquere, XII-1964, K. Lenko (MZSP); 4♂, 3♀ one without abdomen, Ilha Dos Buzios, 16-X/4-XI [1]963, Exp. Dep. Zool. (MZSP); 1♂, Ulatula, 22-X-1962, J. Malik (USNM); 1♀, Piracicaba, 12-X-1965, blacklight, C.A. Triplehorn (AMNH); 1♀, 3-II-1966, blacklight, C.A. Triplehorn (AMNH); 1♂, 20-I-1966, blacklight, C.A. Triplehorn (AMNH); 1♀, ESALQ, 5-III-[19]89, BL Trap, R.M. Baranowski (USNM); 1♀, Cosmopolis, 22-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 1♂, 23-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 2♂, 2♀, 25-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 1♂, 1♀, 26-I-1974, J.G. Rozen, F.C. Thomson & J.S. Moure (AMNH); 1♀, Gramadinha, 6-II-[19]89, R.M. Baranowski (USNM); *Espirito Santo*: 1♂, Concenção da Barra, X-1972, M. Alvarenga (AMNH); 11♂, 8♀, Linhares, IX-1972, M. Alvarenga (AMNH); *Pernambuco*: 1♀, Bnito Prov. (USNM); *Minas Gerais*: 1♀, Viçosa, 13-X/1-XII-1985, T.J. Henry & S.P. Fiuza Ferreira (USNM); 1♂, Pedra Azul, 900 m a.s.l., XI-1972, M. Alvarenga (AMNH).

PARAGUAY: 1♀, Paraguay, XI-1989, Drake (USNM); *Alto Paraguay*: 1♂, 1♀, Caacupé, 15/19-XI-[19]90, G. Arriagada (USNM); *Alto Paraná*: 1♂, Alto Paraná, 4/12-XII-[19]90, G. Arriagada (USNM); 2♂, 1♀, 12/16-XI-[19]90, G. Arriagada (USNM); *Boquerón*: 2♀, Boquerón, 30-XI-[19]92, Drake (USNM); 1♀ one without abdomen, Boq. New Land, 14-X-90, Drake (USNM); *Caaguazú*: 1♂, Estancia Primera, 3-I-1932, taken at light, R.F. Hussey (USNM); 1♂, Villa Rica, II-1934, F. Schade (USNM); 1♂, 19-VII-1937, F. Schade (USNM); 1♂, 1♀, IX-1934, F. Schade (USNM); *Caazapá*: 1♀, Caazapá, 19-XI-[19]91, Arriagada (USNM); *Central*: 1♀, Capiatá, II-1995, Drake (USNM); 1♀, XI-1993, Drake (USNM); 1♂, 1♀, 2-X-[19]93, Drake (USNM); 2♂, Capiata, II-[19]95, L.E. Peña (USNM); *Concepcion*: 1♀, Horqueta, 23°24′N, 57°10′W, 44 km E Paraguay river, 27-I-1936, A. Schulze (USNM); 1♀, 8-XI-1934, A. Schulze (USNM); 1♂, 1♀, Horqueta, 1938, A. Schulze (USNM); 1♂, 17-XI-1933, A. Schulze (USNM); 1♀, 9-VI-1934, A. Schulze (USNM); 1♂, 1♀, 14-VII-1935, A. Schulze (USNM); *Cordillera*: 1♀, Caacupé, Inst. Agr. Nac., 12-XII-[19]80, R.D. Cave (USNM); 1♀, 9-XII-[19]80, R.D. Cave (USNM); 1♂, 2-XII-[19]80, R.D. Cave (USNM); *Distrito Capital*: 2♀, Cerro Lambare, 10-XI-[19]90, Arriagada (USNM); 3♂, 2♀, Tati, 14-XI-[19]90, Arriagada (USNM); 1♀, Asunción, XI/XII-1944, A. Schulze (USNM); 1♂, Asunción, J. Botánico, XI-[19]90, G. Arriagada (USNM); 1♂, Asunción, 16-III-[19]32 (MLP); *San Pedro*: 1♂, 1♀, Cororó, 23-II-[19]93, L.E. Peña (USNM); *Presidente Hayes*: 1♂, Monte Lindo, 13-XI-[19]93 (USNM); 1♂, Orquidaceae, 15-V-[20]02 (USNM).

URUGUAY: 1♀, Casupá, Fda., 9-III-1961, C.S. Carbonel, A. Mesa & L. Zollesi (MLP).

BARANOWSKIOBIUS MUTICUS SP. NOV.

(FIGS 43C, 44C, 45I–L, 47)

Diagnosis

Highly setose species, with long erect setae on anterior and posterior pronotal lobes. Hemelytra with the corial margin smooth; clavus unicolorous, without a large subapical corial spot. Male protibia without spines.

Description (Fig. 43C)

Holotype: ♂. Total length 6.84. Strongly setose.

Head: Brown, shiny, coriaceous, with abundant short recumbent, semi-erect, and erect setae. Eyes with many long setae between ommatidea. Head length 1.39, width 1.09, postocular length 0.41. Ocelli at level of an imaginary line passing the posterior border of eyes. Interocular width 0.51, interocellar width 0.27. Labium pale brown, with long erect setae; extending to mesocoxae. Labial segment lengths: I 0.72, II 0.82, III 0.64, and IV 0.45. Antennal tubercles slightly divergent. Antennae with abundant semi-erect and erect setae; pedicel with erect setae, equal or longer than diameter of segment; antenna pale brown, distiflagellomere without a pale band. Antennal lengths: scape 0.59, pedicel 1.36, basiflagellomere 1.18, and distiflagellomere 1.39.

Thorax: Anterior and posterior pronotal lobes with short and long erect setae. Anterior pronotal lobe brown; posterior pronotal lobe pale brown, with paler areas and with humeral angles pale. Maximum width of anterior pronotal lobe behind middle. Collar length 0.11, anterior lobe length 0.75, posterior lobe length 0.53; anterior lobe width 0.96, posterior lobe width 1.46. Pleurae brown, with short recumbent setae. Scutellum brown, punctate, with setae as on anterior lobe of pronotum. Hemelytra with abundant short erect setae; general colour pale brown, except anterior three-quarters of corial margins and a small subapical corial spot paler, clavus unicolorous (Fig. 43C). Corial margin smooth. Membrane pale brown, veins concolorous. Legs: Coxae yellowish brown, profemur except base, one-third of meso- and metafemur, apex of tibiae, tarsus, and pretarsus brown, rest of legs pale brown (Fig. 44C); legs setose, with abundant long erect setae. Protibiae without spines.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 45I, J) rounded; anterior margin of dorsal aperture rounded; inner projections subquadrangular, with an anterior digitiform projection. Parameres: Figure 45(K, L). Aedeagus: unspined, vesica with two lobes weakly sclerotized

laterally, ejaculatory ductus thickened before coil; *processus gonopori* broadened towards apex.

Distribution
Bolivia and Brazil (Fig. 47).

Etymology
The specific epithet '*muticus*' is an adjective referring to the lack of spines on the protibiae.

Type material
Holotype: ♂, **BOLIVIA**, *Santa Cruz*: Prov. Sara, 2 km NW Santa Rosa, 21-II-1969, blacklight trap, A. Martinez & R.E. Woodruff (USNM).

Paratypes: **BOLIVIA**, 1♀, Saavedra, Agr. Exp. Sta., 27-XII-1959, blacklight trap, R.B. Cuming (USNM); **BRAZIL**, 1♂, Espiritu Santo, Linhares, IX-1972, M. Alvarenga (AMNH).

PARAHERAEUS GEN. NOV.

Type species
Heraeus eximius Distant, 1882. HERE DESIGNATED.

Diagnosis
Postocular region elongate, longer than interocellar distance, subequal to interocular distance. Juga rounded. Mesepimeron emergent. Evaporative area extensive. Clavus with three complete rows of punctures and a fourth incomplete row on distal two-thirds between median and internal row. Procoxa with a spine. Protrochanters without spines. Aedeagus unspined, vesica with two slightly sclerotized lobes, and *processus gonopori* long and slender.

Description
Relatively large and elongate.

Head: Elongate, vertex convex, preocular region longer than postocular. Postocular region elongate, longer than interocellar distance, subequal to interocular distance. Juga rounded. Buccular juncture V-shaped, near insertion of labium. Eyes relatively small, not surpassing the dorsal margin of head in lateral view.

Thorax: Anterior pronotal lobe almost impunctate, except on collar delimited posteriorly by a sulcus and with a row of punctures; sulci and posterior pronotal lobe punctate. Mesepimeron emergent. Evaporative area extensive, covering a thin fringe on mesopleura and approximately half of metapleural area. Clavus with three complete rows of punctures and a fourth incomplete row on distal two-thirds between median and internal row. Procoxa with a spine in both sexes. Protibia straight and without spines. Profemur incrassate, elongate, with two rows of spines. Protrochanters without spines. Mesofemur without spines.

Abdomen, male genitalia: Aedeagus unspined, vesica with two slightly sclerotized lobes; *processus gonopori* long and slender.

Etymology
This new generic name is based on the Greek prefix 'para', meaning near, and the generic name *Heraeus*, to denote the general similarity of these two taxa. The gender is masculine.

This new genus is created to accommodate *Heraeus eximius* Distant, 1882, a species that does not fit into any other known myodochine genus. The relative large size, shiny head, with postocular length subequal to the interocular width, a rounded vertex and bucculae, and the subshiny anterior pronotal lobe, together with the characters from the diagnosis, distinguish *Paraheraeus* from all other genera.

Paraheraeus eximius runs to the couplet 33 in Harrington's (1980) key to the Myodochini of the world, and the genera *Catenes* Distant, 1893 and *Heraeus* Stål, 1862. The species of *Catenes* have a distinctive flattened head and an aedeagus with large spines on conjunctiva (Dellapé & Melo, 2008). Species of *Heraeus* have an elongated head, similar to that of *P. eximius*; however, the diagnostic pronotal collar in *Heraeus* species, which narrows dorsally and broadens ventrally to extend forwards beneath the head, is absent in *P. eximius*.

PARAHERAEUS EXIMIUS (DISTANT, 1882) COMB. NOV.

(FIGS 43D, 44D, 45M–P, 46B, 49)

Heraeus eximius Distant, 1882: 204–205; Lethierry & Severin, 1894: 191; Van Duzee, 1916: 21; Van Duzee, 1917: 179; Torre Bueno, 1946: 69–70; Scudder, 1967: 265 (lectotype designation); Slater, 1964: 1082–1083; Schaefer, 1972: 812; Harrington, 1980: 109; Ashlock & Slater, 1988: 228; Slater & O'Donnell, 1995: 147; Slater & Brailovsky, 2000: 332; Cervantes Peredo & Brailovsky, 2004: 97.

Redescription (Fig. 43D)
Paralectotype ♂.

Head: Porrect, brown, shiny, coriaceous, with short recumbent, long semi-erect, and erect setae dorsally; elongate, convex dorsally, preocular length longer than postocular length. Eyes relatively small, not surpassing the dorsal margin of head in lateral view. Ocelli small, posterior to an imaginary line passing the posterior border of eyes. Labium pale brown, with short erect setae; almost extending to mesocoxae. Antennae brown, apex of basiflagellomere reddish brown,

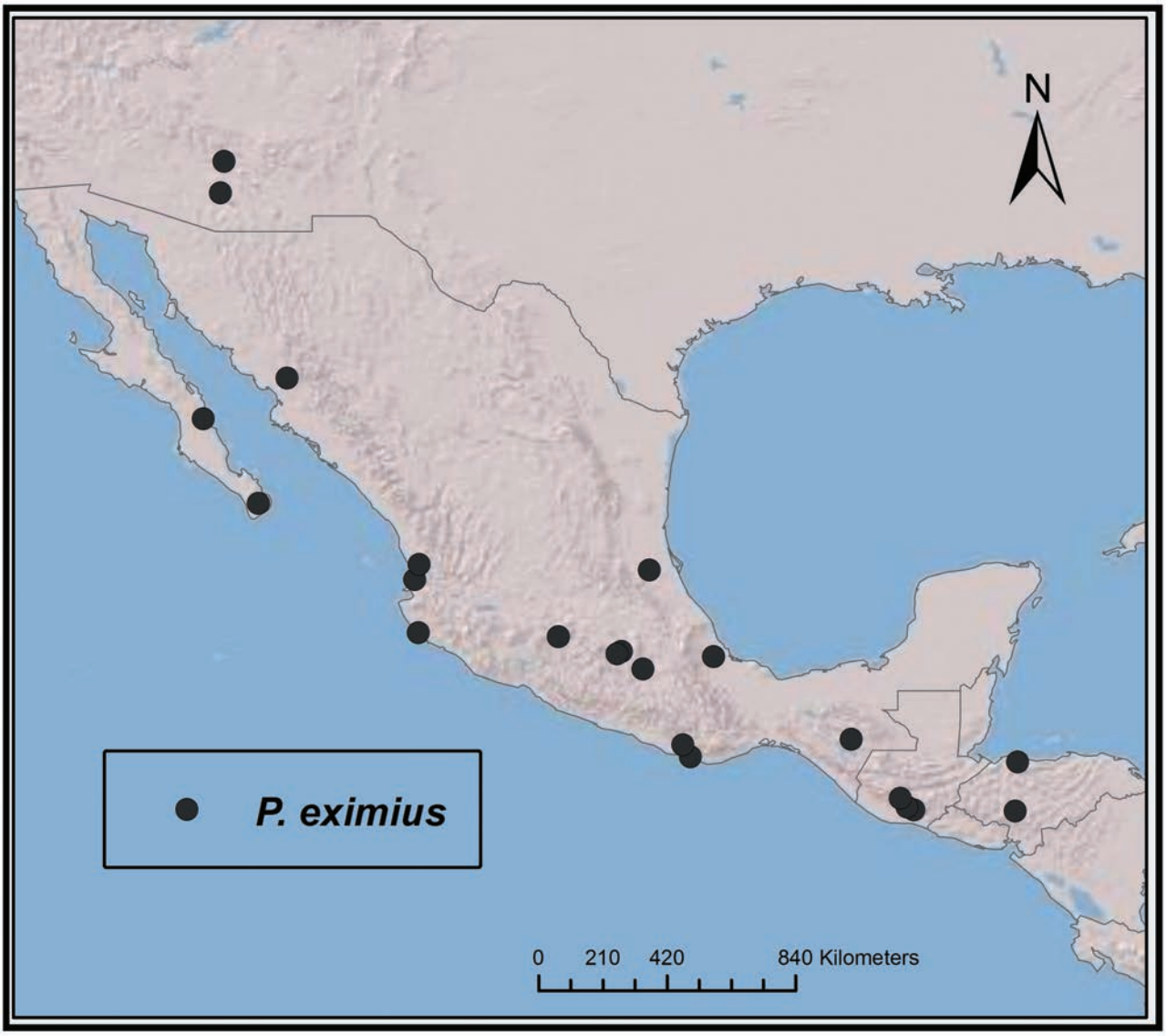

Figure 49. Distributional map of ***Paraheraeus eximius*** (Distant, 1882) **comb. nov.**

distiflagellomere with a wide pale band sub-basally; all segments with abundant short recumbent setae.

Thorax: Pronotum pale brown to brown, pruinose, anterior lobe subshiny, collar well delimited posteriorly by a sulcus and with a row of punctures, anterior and posterior lobes with short recumbent and long erect setae. Posterior pronotal lobe and sulci punctate. Maximum width of anterior pronotal lobe behind middle. Pleurae brown. Scutellum brown, dull, basal half darker, punctate, with short recumbent and long erect setae. Hemelytra: clavus brown with a pale stripe between outer and inner row of punctures on basal half; corium with lateral margins slightly concave, smooth, general colour brown, costal margin pale on proximal three-quarters, with a large subapical pale brown spot (Fig. 43D); with short recumbent and semi-erect setae. Membrane brown, veins concolourous, with a diffuse apical pale spot. Legs: Brown, meso- and metatrochanter and meso- and metafemur pale brown basally (Fig. 44D); with abundant erect setae, longer on profemur. Mesofemur with long erect setae ventrally only; metafemur with long erect setae ventrally and restricted to apical third dorsally. Profemur with two rows of spines on apical half. Protibia without spines. Tibiae with spiniform setae.

Abdomen: Brown, with abundant short recumbent setae. Male genitalia: Pygophore (Fig. 45M, N) rounded, anterior margin of dorsal aperture almost straight, inner projections subrectangular, more produced posteriorly. Parameres with outer projection bearing long setae

and a prominence basally on inner projection (Fig. 45O, P). Aedeagus (Fig. 46B) unspined, vesica with two weakly sclerotized lobes, wings of the ejaculatory reservoir large and bent apically, apex directed backwards; *processus gonopori* long and slender.

Distribution
Guatemala, Mexico, and USA; Honduras (NEW RECORD) (Fig. 49).

Variability observed
Distant described this species based on specimens from San Geronimo, Capetillo, and Las Mercedes in Guatemala; Scudder (1967) designated a female from Las Merdeces as the lectotype. Some specimens differ from the paralectotype by the smaller size, the longer labium extending to mesocoxae, the presence of long erect setae on posterior pronotal lobe, the generally darker colouration, and the more contrasting colour pattern of the hemelytra. In some specimens, the darker basal half of the scutellum is not quite evident and males generally have a more strongly globose anterior pronotal lobe than females.

Type material examined
Paralectotype: ♂, [**GUATEMALA**], Las Mercedes, 3000 ft, Champion, Distant coll. 1911, 383 (BMNH).

Additional material studied
GUATEMALA: *Escuintla*: one without abdomen, Palin, V-1924, W.M. Mann (USNM); *Chimaltenango*: 1♀, Agua Caliente, Kelerman (AMNH).

HONDURAS: 1♂, 2♀, Dept. Comayagua, Rancho Chiquito, km 62, 29-V-[19]64, blacklight trap, F.S. Blanton, A.B. Broce & R.E. Woodruff (USNM); 1♂, Dept. Atlantida, Lancetilla, U.F. Co., 4-VI-[19]64, blacklight trap, F.S. Blanton, A.B. Broce (USNM); 1♀, on *Cucurbita* sp., 15-V-2005, Miami, 283412, compared with lectotype female of *H. eximius* T.J. Henry 2008 (USNM).

MEXICO: 1♂, intercepted at Nogales (Arizona) from Mexico, 3-XI-2010, on *Physalis philadelphica* (USNM); *Baja California*: 2♂, 1♀, 5 mi. S Miraflores, 10-VII-[19]38, Michelbacher & Ross (CAS); 1♀, Baja California Sur, 12 mi. S Loreto, Rancho de Parras, 29-I-[19]65, V. Roth (AMNH); *Chiapas*: 1♂, 17 mi. SE Teopisca, Rt. 24, 3/4-VI-1969, J.E.H. Martin (CNC); *Jalisco*: 1♀, Estación de Biología, Chamela, noct., 7-II-[19]75, H. Brailovsky (CAS); 1♂, Plan de Barrancas, SE Ixtlan, 8-IX-1966, J. & W. Ivie (AMNH); *Michoacan*: 2♂, 12 mi. S Tzitzio, on Ehuetamo rd., 1050 m a.s.l., 19°20′N, 100°50′W, 10-VII-1947, 91, T.H. Hubbell (UMMZ); *Morelos*: 1♂, Tepoztlan, 5-V-1963, W.J. Gertsch & W. Ivie (AMNH); 1♂, Cuernavaca, 1959, N. Krauss (USNM); *Nayarit*: 1♀, Puerta de La Lima, 10-XI-1950, R.F. Smith (AMNH); one without abdomen, Nayarit, 15 mi. E of San Blas, CL1026, 21-IV-1964, J.T. & M.S. Polhemus (AMNH); *Oaxaca*: 1♂, 5 mi. W El Camarón, 20-V-1969, J.E.H. Martin (CNC); one without abdomen, Juquilla, III-[19]64, W. Miller (CNC); *Puebla*: 1♀, 8 mi. S Izucar de Matamoros, 10-XII-[19]48, E.S. Ross (CAS); *Sonora*: 1♀, Alamos, 27-II-1963, P.H. Arnaud Jr. (CAS); 1♀, Bakachaka, Rio Mayo, 4-VII-[19]35, L.G. Gentner (CAS); *Veracruz*: 1♂, 1♀ Cotaxtla Exp. Sta., Cotaxtla, 26-VI-1962, D.H. Janzen (AMNH); 1♀, Palma Sola, 15-VII-1972, P. Reyes (MLP).

USA: *Arizona*: 1♂, Parker Ranch, Sixshooter Cn. Globe, Gila Co., 22-VIII-[19]52, H.B. Leech & J.W. Green (CAS); 1♀, Pima Co., 1 mi. SE Catalina, VII-10-1977, blacklight sheet, S. Kuba (AMNH); 1♂, Arizona, C.U. lot 34., P.R. Uhler (USNM); 1♀, C.F. Baker, C.U. lot 34., P.R. Uhler (USNM).

PHYLOGENETIC ACCOUNT

Characters and character states

0. Total length: the range of lengths analysed are from less than 5 mm to more than 8 mm; most of the species are between 6 and 7 mm, with females being larger. The smallest species are *H. pulchellus* and *H. concolor*, and the largest are *B. elegans* and *P. eximius*.
1. Ratio of scape length/body length.
2. Ratio of pedicel/basiflagellomere.
3. Ratio of anterior pronotal lobe length/posterior pronotal lobe length.
4. Ratio of anterior pronotal lobe width/posterior pronotal lobe width.
5. Ratio of postocular head length/head width.
6. Ratio of head width/interocular width.
7. Ratio of length pale band on distiflagellomere/length distiflagellomere.
8. Ratio of body length/posterior pronotal lobe width.
9. Strongly setose species (long erect setae on most parts of body): absent (0); present (1).
10. Head: pilose, coriaceous (0); sparsely pilose, smooth, and shiny (1).
11. Basiflagellomere clavate: absent (0); present (1).
12. Pedicel pilosity: without erect setae, or with scattered erect setae shorter than diameter of segment (0); with abundant erect setae, equal to or longer than diameter of segment (1).
13. Pale band on distiflagellomere: occupying at least one-third of the distiflagellomere length (0); narrow, occupying at most one-quarter of the distiflagellomere length (1); absent (2).
14. Jugum: rounded (0); angulate (1).
15. Labial length: article IV not surpassing mesocoxae (0); article IV at least extending to metacoxae (1).
16. Position of ocelli: ocelli placed at level of an imaginary line passing the posterior border of eyes

(0); ocelli placed posteriorly to an imaginary line passing the posterior border of eyes (1); ocelli located anterior to an imaginary line passing through posterior margin of eyes (2).
17. Position of eyes: surpassing dorsal margin of head in lateral view (0); not surpassing dorsal margin of head in lateral view (1).
18. Pronotum pilosity: without long erect setae (0); with long erect setae on anterior lobe (1); with long erect setae on anterior and posterior lobe (2).
19. Collar extending forwards beneath the head ventrally: absent (0); present (1).
20. Collar shape: ringlike collar delimited by a furrow, generally with punctures, located at a lower plane of anterior pronotal lobe (0); with a distinct collar but not with a furrow delimiting the posterior margin (1).
21. Anterior pronotal lobe shape: males generally with a strongly globose anterior pronotal lobe (0); males with a slightly globose anterior pronotal lobe (1).
22. Colouration of posterior pronotal lobe: uniform, at most with posterolateral angles paler (0); with pale spots on a darker background (1).
23. Pale spot on humeral angles: absent (0); present (1).
24. Scutellum pilosity: without long erect setae (0); with long erect setae (1).
25. Unicolorous clavus: absent (0); present (1).
26. Costal margin pale on proximal three-quarters: absent (0); present (1).
27. Costal margin: smooth (0); serrate (1).
28. Inner corial spot: absent (0); diffuse (1); well defined (2).
29. Subapical pale corial spot: absent (0); small, restricted to costal margin (1); large, extended internally (2).
30. Colouration of veins of membrane: concolorous (0); paler than background, at least in part (1).
31. Apical pale spot on membrane: absent (0); present (1).
32. Posterior half of hemelytra dark, with the subapical corial spot and apical spot of membrane conspicuously pale: absent (0); present (1).
33. Evaporative area: short, distance from dorsal margin of auricle to dorsal margin of evaporative area shorter than distance from dorsal margin of evaporative area to dorsal margin of metapleura (0); extended, distance from dorsal margin of auricle to dorsal margin of evaporative area subequal or longer than distance from dorsal margin of evaporative area to dorsal margin of metapleura (1).
34. Pilosity on profemur: short and sparse (0); long or short, semi-erect, and/or erect (1).
35. Colouration pattern of profemur: all dark, at most, paler at apices (0); all pale yellow (1); mottled (2); darker laterally (3).
36. Profemur with a subapical darker band: absent (0); present (1).
37. Spines on male protibia: without spines (0); spined (1).
38. Spines on male mesofemur: without spines (0); spined (1).
39. Meso- and metatibiae colouration: with a subproximal dark band (1); with a proximal dark band (2); both conditions absent (0).
40. Colour pattern of metafemur: with a subapical dark band (0); apical half darker (1); apical three-quarters darker (2); uniformly dark (3); darkened at apex (4); apical one-quarter dark (5).
41. Pygophore (shape of posterior margin in dorsal view): not bilobed (0); slightly bilobed (1).
42. Pygophore (anterior margin of dorsal aperture): broadly rounded (0); slightly rounded or straight with lateral regions angulate (1).
43. Pygophore, position of the posterior apex in lateral view: over the middle (0); at the middle (1); below the middle (2).
44. Pygophore apex pointed dorsally in lateral view: absent (0); present (1).
45. Spines on aedeagus: absent (0); with very small spines (1); with spines well developed (2).
46. Vesical lobes: well sclerotized or at least posteriorly (0); partially sclerotized laterally (1); irregularly or not sclerotized (2).
47. Many large spines on anterior region of vesical lobes forming an arc: absent (0), present (1).
48. Ejaculatory ductus thickened before coil: absent (0); present (1).
49. Ejaculatory ductus widening towards apex: absent (0), present (1).

RESULTS AND DISCUSSION

The analysis using implied weights yielded one most-parsimonious tree, with 227.334 steps, with 29.76 fit and adjusted homoplasy of 20.24, consistency index (CI) of 0.298, and retention index (RI) of 0.588. The low value of CI points to a high degree of homoplasy, but the RI of 0.59 indicates a moderately strong phylogenetic signal. This tree is presented in Figure 50, mapping discrete characters, synapomorphic (black circles) and homoplasic characters (open circles), and jackknife values.

Support values for most nodes are weak. The *caliginosus*, *coquilletti*, *guttatus*, and *illitus* groups are recovered from the analysis, whereas in the speciose *plebejus* group, the relationships are complex and the group is paraphyletic in our analysis, forming a clade with the species of the *illitus* group.

The morphology-based phylogeny presented here should be considered tentative because of the limited

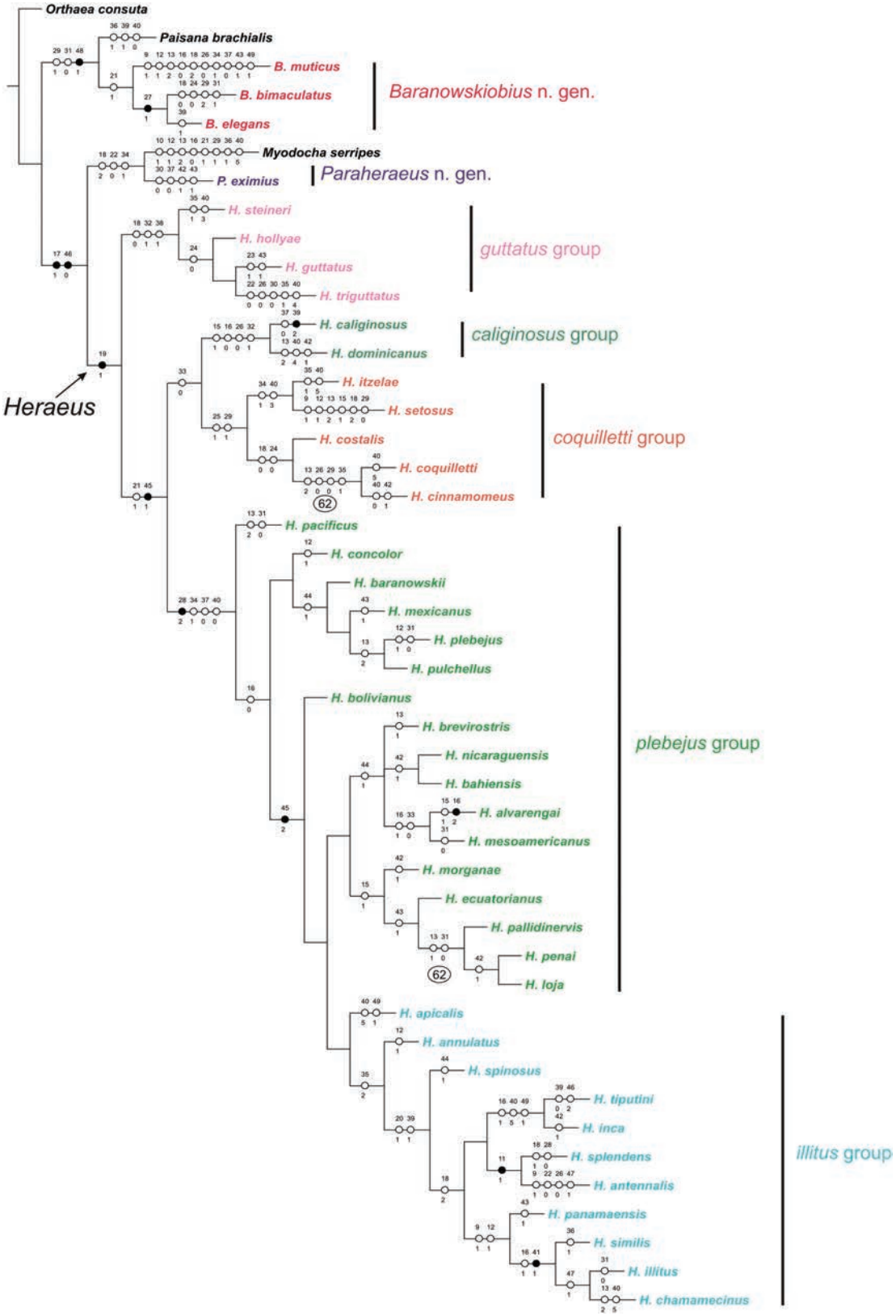

Figure 50. Cladogram depicting the relationships of the species of the genus *Heraeus*. Synapomorphies (black circles), homoplasic characters (open circles), Jackknife values (in bold), and discrete characters with unambiguous optimization only are mapped.

number of informative characters available to infer relationships. Although most species possess distinctions that allow separation, characters such as antennal characters, hemelytral characters, and leg colouration are very homoplastic, and did not offer much resolution. The characters from the male genitalia are distinctive among the species, but again show high homoplasy.

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APPENDIX 1

DATA OF PHOTOGRAPHED AND DISSECTED SPECIMENS

HERAEUS CINNAMOMEUS BARBER, 1948

Data of dorsal habitus specimen: ♀, USA, Texas, SE Hidalgo Co., 28-IV/ 4-V-[19]46, at light, G.B. Vogt (USNM).

Data of male genitalia specimen: USA, Texas, Brownsville, 16-IX-[19]42, T.M. Burns (CAS).

HERAEUS COQUILLETTI BARBER, 1914

Data of dorsal habitus specimen: ♀, Mexico, 18-II-2003, San Diego 030359, *Brassica* sp., borrow Miami Port coll., III-2007 (USNM).

Data of male genitalia specimen: USA, California, Oakland, Alameda Co., 25-II-1906, van Dyke (CAS).

HERAEUS COSTALIS SP. NOV.

Data of dorsal habitus specimen: ♂, paratype, intercepted at Miami, Florida, from Honduras, 3-I-2005, on *Cucumis sativus* (USNM).

Data of male genitalia specimen: holotype, Costa Rica, Las Canas, 13-VII-1965, P.J. Spangler (USNM).

HERAEUS ITZELAE SP. NOV.

Data of dorsal habitus specimen: ♀ paratype, intercepted at Nogales, Arizona from MEXICO on *Brassica oleracea*, 16-XI-2011, APHIS Port #35376 (MLP).

Data of male genitalia specimen: paratype, Mexico, Sinaloa, Mazatlan, 27-VI-[19]18, Venedio, J.A. Kusche, pres. by B. Preston Clark (CAS).

Heraeus setosus sp. nov.

Data of dorsal habitus specimen: ♀ paratype, Mexico, Nayarit, 18 km SW Compostela, 20-VII-1974, blacklight, M.E. & P.D. Perkins (USNM).

Data of male genitalia specimen: holotype, Honduras, dept. Cortes, Lk. Yooa, Agua Azul, U.F. Co., 1-VI-[19]64, F.S. Blanton, A.B. Brose & R.E. Woodruff, blacklight trap (USNM).

Heraeus caliginosus Slater & Baranowski, 1994

Data of dorsal habitus specimen: ♂, Dominican Republic, Prov. La Vega, 5 km W Manabao, 19/23-IV-2000, Finca Eladio Fernandez 'Paso La Perra' along rio Yaque del Norte, 3050 ft elev., blacklight, R.E. Woodruff & T.J. Henry (USNM).

Data of male genitalia specimen: Dominican Republic, Prov. El Seibo, 7 mi. N Pedro Sanchez, cloud forest, 20-VI-[19]98, black light trap, R.E. Woodruff (USNM).

Heraeus dominicanus sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Dominican Republic, S. Frncsco Mts, St Domingo, W.I., IX-[20]05, Aug. Busck (USNM).

Heraeus guttatus (Dallas, 1852)

Data of dorsal habitus specimen: ♂, Panama, C.Z., Coco Solo Hosp., 5-V-[19]74, light trap, D. Engleman (USNM).

Data of male genitalia specimen: Jamaica, Balaclava, 15-IV-1909, A.E. Wigte (AMNH).

Heraeus hollyae Baranowski, 2005

Data of dorsal habitus specimen: ♀ paratype, B.W.I., Antigua, Collins, 20-VII-[19]95, under *Bucidea*, R.M. & H.V. Baranowski (USNM).

Data of male genitalia specimen: paratype, B.W.I., Antigua, Collins, 20-VII-[19]95, under *Bucidea*, R.M. & H.V. Baranowski (USNM).

Heraeus steineri sp. nov.

Data of dorsal habitus specimen: ♂, holotype, Turks and Caicos Islands, Providenciales, King's Town, 21°48′N, 72°14′W, 30-I-1998, at black light in sandy scrub forest, W.E. Steiner & J.M. Swearingen (USNM).

Data of male genitalia specimen: holotype, Turks and Caicos Islands, Providenciales Grace Bay Hills, 21°48′N, 72°13′W, 27-I-1998, at black light in sandy scrub forest, W.E. Steiner & J.M. Swearingen (USNM).

Heraeus triguttatus (Guérin-Méneville, 1857)

Data of dorsal habitus specimen: ♀, USA, Florida, Paradise Key, 3-III-[19]19, Schwarz & Barber (USNM).

Data of male genitalia specimen: USA, Miami Dade Co., Black Point Marina Buttonwood, 25°32.4′N, 80°19.7′W, 26-IX-2006, T. Dobbs (USNM).

Heraeus annulatus sp. nov.

Data of dorsal habitus specimen: ♂, paratype, Belize, Cayo District, Benque Viejo, riverside N, Mopan R. Resort, 21-VI-[20]08, BLT, R.M. & H.V. Baranowski (USNM).

Data of male genitalia specimen: Panama, C[anal] Z[one], Coco Solo Hosp., 14-V-1975, light trap, D. Engleman (AMNH).

Heraeus antennalis sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Ecuador, Yanayacu, 400 m a.s.l., IX/X-1977, L.E. Peña G. (USNM).

Heraeus chamamecinus sp. nov.

Data of dorsal habitus specimen: ♀ paratype, Argentina, Corrientes, Ituzaingo, Res. Santa María, 30-X-2003, T. luz, M.C. Melo (USNM).

Data of male genitalia specimen: paratype, Argentina, Corrientes, Ituzaingo, Reserva Santa María, T. luz, 31-X-2003, M.C. Coscarón (MLP).

Heraeus illitus Distant, 1882

Data of dorsal habitus specimen: ♂, Bolivia, La Paz, Rio Coroico, 1200 m a.s.l., 24/26-XI-[19]84, L.E. Peña (USNM).

Data of male genitalia specimen: Belize, Cayo District, Benque Viejo, riverside N, Mopan R. resort, BLT, 24-VI-[20]08, R.M. & H.V. Baranowski (USNM).

Heraeus inca sp. nov.

Data of dorsal habitus specimen: ♀ paratype, Bolivia, Guanay, Tres Esteros, 19/25-VIII-[19]89, L.E. Peña (USNM).

Data of male genitalia specimen: holotype, Peru, Avispas, X-1952, L.E. Peña (USNM).

Heraeus panamaensis sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Panama, Cerro Campana, Dist. Chame, 2-V-1976, D. Engleman (AMNH).

Heraeus similis sp. nov.

Data of dorsal habitus specimen: ♀ paratype, Brazil, Rondonia, 62 km SW Ariquemes nr Fzda. Rancho Grande, 20-X-1994, B.L.T., U. Schmitz (USNM).

Data of male genitalia specimen: holotype, Brazil, Rondonia, 62 km SW Ariquemes nr. Fzenda, Rancho Grande, 20-X-1994, BLT, U. Schmitz (USNM).

Heraeus spinosus sp. nov.

Data of dorsal habitus specimen: ♂, holotype, Brazil, Rondonia, 62 km SW Ariquermes, nr Fzda. Rancho Grande, 16/18-III-1996, BLT, U. Schmitz (USNM).

Data of male genitalia specimen: paratype, Brazil, Bahia, Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH).

Heraeus splendens sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Panama, Dist. Chame, Cerro Campana, 800 m a.s.l., 2-V-1976, D. Engleman (AMNH).

Heraeus tiputini sp. nov.

Data of dorsal habitus specimen: ♂, Ecuador, Napo, Tiputini Biodiversity Station, 216 m a.s.l., 0°37′55″S, 76°8′39″W, 22-X-1998, T.L. Erwin *et al*., insecticidal fogging of mostly bare green leaves, same with covering of lichenous or bryophytic plants, lot 1978, transect T-8 (MLP).

Data of male genitalia specimen: holotype, Ecuador, Napo, Tiputini Biodiversity Station, 216 m a.s.l., 0°37′55″S, 76°8′39″W, 5-II-1999, T.L. Erwin *et al*., insecticidal fogging of mostly bare green leaves, same with covering of lichenous or bryophytic plants, lot 2082, transect T-9 (USNM).

Heraeus alvarengai sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Brazil, [Río Grande do Sul], Guanabara, Represa Rio Grande, VI-1972, M. Alvarenga (AMNH).

Heraeus apicalis sp. nov.

Data of dorsal habitus specimen: ♂, holotype, Panama, Distr. Chame, Cerro Campana, 800 m a.s.l., 22-II-[19]75, H.D. Englemann (USNM).

Data of male genitalia specimen: paratype, Ecuador, Tung, ~29 km N Puyo, 22-I-1974, 3800 ft, on *Austroeupatorium inulaefolium*, R.M. King (USNM).

Heraeus bahiensis sp. nov.

Data of dorsal habitus specimen: ♀ paratype, Brazil, Bahia, Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH).

Data of male genitalia specimen: paratype, Brazil, Bahia, Encruzilhada, 960 m a.s.l., XI-1972, M. Alvarenga (AMNH).

Heraeus baranowskii sp. nov.

Data of dorsal habitus specimen: ♂, paratype, Belize, Orange Walk Dist., Chan Chich Ldge., 13-XI-[20]04, Bl. Trap, C. Sanabria (USNM).

Data of male genitalia specimen: Mexico, Yucatan, Kiuick, 13-XI-1974, J. Reddell (USNM).

Heraeus bolivianus sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Bolivia, N La Paz, Mapiri, 10/16-VIII-[19]89, L.E. Peña (USNM).

Heraeus brevirostris sp. nov.

Data of dorsal habitus specimen: ♂, paratype, Bolivia, Guanay, Tres Esteros, 19/25-VIII-[19]89, L.E. Peña (USNM).

Data of male genitalia specimen: paratype, Bolivia, La Paz, Yungas, Inquisivi, 5-XII-1984, L.E. Peña (USNM).

Heraeus concolor Slater & Baranowski, 1994

Data of dorsal habitus specimen: ♂, Dominican Republic, Prov. La Altagracia, Nisibon, Finca Papagallos, 17-VI-1999, blacklight trap, abandoned building, R.E. Woodruff & R.M. Baranowski (USNM).

Data of male genitalia specimen: Dominican Republic, Azua, 8 km NE Padre Las Casas, rio Las Cuevas, 18°46′N, 70°53′W, 580 m a.s.l., 7-VIII-1990, J. Rawlins & S. Thompson (AMNH).

Heraeus ecuatorianus sp. nov.

Data of dorsal habitus specimen: ♂, paratype, Ecuador, Guay., Olon, 29-II-1976, blacklight, J. Cohen (USNM).

Data of male genitalia specimen: paratype, Ecuador, Victoria, Arenillas, 150 m a.s.l., 18/19-VIII-1977, L. Peña G. (USNM).

Heraeus loja sp. nov.

Data of dorsal habitus and male genitalia specimen: holotype, Ecuador, Loja Province, 26 km W of Loja, along road to Catamayo, 2350 m a.s.l., 18-II-2002, 3°59′71″S, 79°18′41″W, T.J. Henry & P.S.F. Ferriera (USNM).

Heraeus mesoamericanus sp. nov.

Data of dorsal habitus specimen: ♀, Panama, Prov. Chiriqui, Volcan Area, Lagos, 4500 ft, 25-V-[19]73, D. Engleman (USNM).

Data of male genitalia specimen: Honduras, Comayagua, Siguatepeque, 25-VIII-[19]66, mosquito trap, R.E. Woodruff (USNM).

HERAEUS MEXICANUS SP. NOV.

Data of dorsal habitus specimen: ♂, paratype, Mexico, N[uevo] L[eon], 3 mi. E Galeana, 5000 ft, 7/9-VIII-1963, Duckworth & Davis (USNM).

Data of male genitalia specimen: Holotype, Mexico, N[uevo] L[eon], Anegade Arroya, 16 mi. S Linares, 1250 ft, 9-VII-1963, Duckworth & Davis (USNM).

HERAEUS MORGANAE SP. NOV.

Data of dorsal habitus specimen: ♂, holotype, Pan.[ama], Gatun Lake, Cano Saddle, 12-V-[19]23, R.C. Shannon (USNM).

Data of male genitalia specimen: paratype, Panama, CC, 28-IV-1973, H. Hespenheide (AMNH).

HERAEUS NICARAGUENSIS SP. NOV.

Data of dorsal habitus and male genitalia specimen: holotype, Nicaragua, Puerto Cabezas, VII-1971, J. Maldonado C. (USNM).

HERAEUS PACIFICUS BARBER, 1925

Data of dorsal habitus specimen: ♀, Ecuador, Galapagos, St Cruz, Los Gemelos, 31 km N Sta. Ro[sa], 15-VII-[19]85. Scalesia forest, 570 m a.s.l., FIT and malaise, S. & J. Peck (USNM).

Data of male genitalia specimen: Ecuador, Galapagos, Santa Cruz Island, Hornemann Ranch, 8-II-1964, I.L. Wiggins (CAS).

HERAEUS PALLIDINERVIS SP. NOV.

Data of dorsal habitus specimens: ♂, holotype, Bol.[ivia], La Paz, (SE) Coroico, 1800–2100 m a.s.l., 30-XI/2-XII-[19]84, L.E. Peña (USNM).

Data of male genitalia specimens: paratype, Bolivia, La Paz, Yungas, Inquisivi, 5-XII-1984, L.E. Peña (MLP).

HERAEUS PENAI SP. NOV.

Data of dorsal habitus specimen: ♂, holotype, Bol.[ivia], Mataral, (N) V. Grande, 1800–2000 m a.s.l., 15/17-XII-1984, L.E. Peña (USNM).

Data of male genitalia specimen: paratype, Paraguay, Capiata, XI-1993, Drake (USNM).

HERAEUS PLEBEJUS STÅL, 1874

Data of dorsal habitus specimen: ♀, USA, Florida, Alachua County, Gainesville, 29°36916′N, 82°23102′W, 12-IV-2007, at light, C.L. Staines (USNM).

Data of male genitalia specimen: USA, Florida, (51–55), Stuart, 25-VI-1951, O. Bryant (CAS).

HERAEUS PULCHELLUS BARBER, 1954

Data of dorsal habitus specimen: ♂, West Indies, Grand Cayman Islands, 1-XI-[19]92, BLT, P. Fitzgerald (USNM).

Data of male genitalia specimen: West Indies, Bahamas, Mayaguana Isl., 28-VIII-[19]63, blacklight trap, C. Murvosh (AMNH).

BARANOWSKIOBIUS ELEGANS (WALKER, 1873) **COMB. NOV.**

Data of dorsal habitus specimen: ♂, Paraguay, Pastoreo3/5-I-1972, L.E. Pena (USNM).

Data of male genitalia specimen: Ecuador, Tungurahua, Baños (12 km E), 1570 m a.s.l., 1°24′S, 78°20′W, seepage, 15-X-1990, P.J. Spangler, #22 (USNM).

BARANOWSKIOBIUS BIMACULATUS SP. NOV.

Data of dorsal habitus specimen: ♂, Paraguay, Tati, 14-XI-[19]90, Arriagada (USNM).

Data of male genitalia specimen: paratype, Bolivia, Saavedra, Res. Sta., 22-III-1978, UV trap, C.R. Ward & C.W. O'Brien (USNM).

BARANOWSKIOBIUS MUTICUS SP. NOV.

Data of dorsal habitus specimen: ♂, holotype, Bolivia, Dept. of Santa Cruz, Prov. Sara, 2 km NW of Santa Rosa, 21-II-[19]69, blacklight trap, A. Martinez & R.E. Woodruff (USNM).

Data of male genitalia specimen: paratype, Brazil, Espiritu Santo, Linhares, IX-1972, M. Alvarenga (AMNH).

PARAHERAEUS EXIMIUS (DISTANT, 1882) **COMB. NOV.**

Data of dorsal habitus specimen: ♀, Honduras, on *Cucurbita* sp., 15-V-2005, Miami 283412, borrowed Miami Port coll., compared with lectotype *Heraeus eximius* Distant, 1882 by T.J. Henry 2008 (USNM).

Data of male genitalia specimen: Mexico, Cuernavaca, 1959, N. Krauss (USNM).

APPENDIX 2

MATERIAL STUDIED FOR PHYLOGENETIC ANALYSIS OUT-GROUPS

MYODOCHA SERRIPES OLIVIER, 1811

USA: Maryland, 1♂, Hagerstown, 27-IV-[19]15, at light, H.L. Parker (CAS); 1♂, Univ. Woods, 31-X-[19]21, under leaves, Parshley (CAS); Texas, 1♂, Austin, G.T. Bruen

(CAS); 1♀, Austin, 29-VIII-[19]05, Van Duzee (CAS); 2♀, Bastrop, 31-VI-[19]29, J.O. Martle (CAS); New York, 1♂, 1♀, White Plains 18-IV-[19]09, Van Duzee (CAS); Maine, 1♂, Orono, 24/30-V-1914, H.M. Parshley (CAS); 1♀, Columbus, 29-VIII-[19]05, Van Duzee (CAS).

ORTHAEA CONSUTA DALLAS, 1852

Colombia: 1♀, Cundinamarca, 5 mi. E El Colegio, 1370 m, 9-III-1975, E.I. Schlinger & E.S. Ross (CAS); 1♀, 18 mi. SE Mocoa, Narino, 510 m a.s.l., 2-III-1955, E.I. Schlinger & E.S. Ross (CAS); 1♀, 3 mi. W Villavicencio, Meta, 920 m a.s.l., 11-III-1955, R.I. Schlinger & E.S. Ross (CAS).

PAISANA BRACHIALIS (STÅL, 1862)

Argentina: Buenos Aires, 2♂, 1♀, La Plata, Estación Pereyra, 9-XI-2000, P. Dellapé (MLP); 1♀, Tandil, Parque Independencia, 14-IV-2003, pitfall, Carpintero-Dellapé (MLP); 1♀, same locality, 22/24-XI-2002, D.L. Carpintero (MLP); Córdoba, 2♂, Capilla del Monte, 380 m a.s.l., 6-III-2006, a la luz, Dellapé-Carpintero (MLP).

APPENDIX 3

CHARACTER MATRIX OF THE *HERAEUS* SPECIES

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&[cont]

Orthaea.consuta 9.760–10.426 0.114–0.136 1.053–1.158 0.739–0.957 0.619–0.654 0.144–0.158 2.114–2.221 0.273–0.407 4.149–4.450

Myodocha serripes 8.777–9.735 0.055–0.060 1.205–1.282 1.129–1.335 0.621–0.656 1.455–1.550 1.882–2.174 0 4.894–5.244

Paisana brachialis 6.487–6.943 0.078–0.087 1.214–1.257 1.247–1.502 0.673–0.731 0.231–0.279 1.885–1.949 0.361–0.428 3.847–4.172

B. bimaculatus 7.081–7.815 0.100–0.112 1.051–1.199 1.120–1.423 0.625–0.655 0.352–0.489 2.044–2.363 0.296–0.430 4.494–4.902

B. muticus 6.840–7.220 0.082–0.087 1.138–1.226 1.220–1.410 0.631–0.658 0.337–0.377 2.024–2.121 0 4.488–4.703

H. coquiletti 6.993–7.684 0.087–0.096 1.214–1.325 1.089–1.316 0.619–0.698 0.489–0.563 1.764–1.962 0 4.050–4.226

H. cinnamomeus 6.536–7.201 0.093–0.102 1.190–1.291 1.086–1.378 0.625–0.645 0.489–0.533 1.715–2.269 0 3.912–4.137

***H. itzelae* sp. nov.** 6.192–7.393 0.050–0.118 1.243–1.290 1.105–1.354 0.564–0.795 0.436–0.526 1.864–2.104 0.404–0.513 3.593–4.990

***H. costalis* sp. nov.** 6.193–6.651 0.091–0.106 1.109–1.245 1.183–1.575 0.636–0.661 0.486–0.544 1.878–2.140 0.517–0.612 4.004–4.197

***H. setosus* sp. nov.** 6.055–6.513 0.091–0.101 1.238–1.323 1.195–1.402 0.652–0.682 0.426–0.456 1.942–2.159 0 3.853–4.009

H. plebejus 4.583–5.428 0.076–0.088 1.160–1.279 1.086–1.205 0.637–0.674 0.406–0.456 1.955–2.113 0 3.517–4.006

H. pacificus 5.663–6.190 0.084–0.091 1.243–1.335 0.863–1.082 0.578–0.619 0.446–0.487 1.940–2.069 1.320–1.460 3.613–3.763

H. concolor 4.504–4.932 0.078–0.088 1.202–1.289 1.035–1.170 0.661–0.681 0.357–0.420 1.983–2.102 0.205–0.339 3.644–3.881

H. pulchellus 4.334–4.674 0.077–0.088 1.192–1.260 0.948–1.216 0.665–0.688 0.350–0.379 1.816–2.221 0 3.647–3.794

***H. pallidinervis* sp. nov.** 4.894–5.522 0.080–0.087 1.091–1.191 1.135–1.450 0.669–0.729 0.451–0.499 1.784–1.922 0.132–0.229 3.855–4.008

***H. alvarengai* sp. nov.** 4.752 0.088 1.184 1.652 0.704 0.451 1.962 ? 4.183

***H. nicaraguensis* sp. nov.** 5.208–5.875 0.081 1.104–1.244 1.175–1.237 0.674 0.500–0.538 1.942–2.178 0.339–0.392 3.817–4.070

***H. brevirostris* sp. nov.** 5.492–5.908 0.078–0.088 1.126–1.182 1.007–1.221 0.630–0.690 0.474–0.530 1.807–2.074 0.189–0.234 3.830–3.986

***H. apicalis* sp. nov.** 5.412–6.083 0.071–0.080 1.066–1.128 0.953–1.086 0.624–0.645 0.555–0.560 1.974–2.151 0.289–0.307 4.222–4.257

***H. penai* sp. nov.** 5.503–5.859 0.081–0.085 1.097–1.201 0.983–1.074 0.639–0.665 0.499–0.523 1.810–1.966 0.178–0.237 3.943–4.106

***H. ecuatorianus* sp. nov.** 5.562–6.345 0.076–0.088 1.054–1.100 1.011–1.279 0.618–0.682 0.486–0.536 1.946–2.165 0.311–0.404 3.996–4.321

***H. morganae* sp. nov.** 5.568–6.155 0.078–0.089 1.063–1.113 1.050–1.136 0.635–0.658 0.454–0.505 1.951–2.107 0.199–0.316 3.933–4.13

***H. baranowskii* sp. nov.** 4.664–5.178 0.039–0.123 0.988–1.187 1.045–1.157 0.539–0.687 0.437–0.461 2.016–2.206 0.300–0.356 3.327–4.163

***H. bolivianus* sp. nov.** 5.225 0.092 1.2 1.067 0.643 0.509 2.120 0.209 3.888

***H. mesoamericanus* sp. nov.** 5.593–5.962 0.080–0.084 1.073–1.265 0.876–1.030 0.608–0.629 0.506–0.538 1.851–2.265 0.247–0.370 3.852–4.047

***H. bahiensis* sp. nov.** 5.639–5.919 0.071–0.084 1.081–1.138 0.976–1.159 0.631–0.658 0.433–0.477 2.036–2.225 0.237–0.362 3.816–4.098

***H. loja* sp. nov.** 5.89 0.907 0.933 0.438 1.792 0.431 1.933 0.133 3.875

***H. mexicanus* sp. nov.** 5.050–5.685 0.076–0.082 1.145–1.254 1.031–1.178 0.648–0.674 0.385–0.490 1.944–2.060 0.215–0.279 3.911–4.184

H. illitus 6.275–6.816 0.073–0.083 1.064–1.133 1.045–1.164 0.641–0.664 0.469–0.516 1.873–2.013 0.311–0.366 4.094–4.284

***H. annulatus* sp. nov.** 5.458–5.790 0.082–0.085 1.056–1.200 0.964–1.062 0.600–0.654 0.436–0.482 1.970–2.108 0.330–0.377 3.729–4.160

***H. splendens* sp. nov.** 6.701–7.359 0.069–0.081 1.062–1.142 0.933–1.053 0.628–0.630 0.612–0.651 1.909–2.156 0.251–0.308 4.164–4.522

***H. antennalis* sp. nov.** 6.365 0.068 1.283 1.000 0.641 0.629 1.879 0.303 4.324

***H. tiputini* sp. nov.** 5.924–6.711 0.071–0.077 1.092–1.147 1.011–1.106 0.638–0.664 0.583–0.632 1.935–2.004 0.385–0.432 4.215–4.411

***H. panamaensis* sp. nov.** 5.605 0.06 1.15 1.031 0.631 0.482 1.931 0.294 4.170

***H. inca* sp. nov.** 5.890–6.579 0.079–0.083 1.178–1.232 0.986–1.141 0.640–0.658 0.588–0.627 1.813–1.967 0.210–0.331 4.050–4.298

***H. chamamecinus* sp. nov.** 5.919–6.455 0.074–0.080 1.121–1.371 1.017–1.112 0.643–0.661 0.446–0.476 1.938–2.045 0 3.794–4.042

***H. similis* sp. nov.** 6.466–7.081 0.072–0.085 1.087–1.147 1.078–1.236 0.648–0.668 0.535–0.582 1.933–2.032 0.243–0.295 4.215–4.375

***H. spinosus* sp. nov.** 5.837–6.386 0.082–0.088 1.084–1.176 0.856–1.086 0.621–0.660 0.469–0.498 1.908–2.046 0.424–0.498 4.038–4.393

H. guttatus 6.329–6.874 0.083–0.095 1.106–1.187 1.003–1.261 0.568–0.709 0.418–0.472 2.116–2.405 0.265–0.351 3.484–4.368

H. triguttatus 6.418–7.048 0.088–0.100 1.098–1.180 1.053–1.396 0.643–0.672 0.466–0.522 2.117–2.755 0.302–0.382 4.184–4.297

H. hollyae 5.736–6.139 0.078–0.087 0.862–1.199 1.046–1.395 0.677–0.728 0.438–0.441 1.965–1.967 0.22 3.756–4.143

***H. steineri* sp. nov.** 6.453–6.847 0.080–0.094 1.078–1.153 1.026–1.417 0.647–0.682 0.447–0.561 2.058–2.478 0.253–0.357 4.101–4.274

H. caliginosus 5.744–6.416 0.084–0.094 1.040–1.089 0.861–1.013 0.621–0.652 0.520–0.580 1.859–2.002 0.134–0.141 4.034–4.535

***H. dominicanus* sp. nov.** 6.591–6.994 0.090–0.103 1.109–1.219 1.143–1.444 0.599–0.646 0.528–0.609 1.962–2.006 0 4.265–4.397

P. eximius 8.096–9.460 0.089–0.097 1.100–1.150 1.122–1.300 0.609–0.661 0.420–0.470 1.942–2.149 0.388–0.518 4.507–4.637

B. elegans 7.388–8.116 0.096–0.109 1.087–1.164 1.064–1.194 0.617–0.644 0.377–0.419 1.964–2.219 0.416–0.552 4.484–4.661

& [num]

Orthaea consuta 0 0 0 0 0 1 0 1 0 0 0 0 0 1 0 0 1 1 0 0 2 0 1 0 1 0 - 0 1 1 0 4 0 0 0 0 0 2 0 0 1

Myodocha serripes 0 1 0 1 2 0 0 0 1 2 0 0 1 0 0 1 1 1 0 0 1 1 1 0 1 1 - 1 1 0 0 5 0 0 0 0 0 0 0 0 0

Paisana brachialis 0 0 0 0 0 0 0 1 0 1 0 0 0 1 1 1 0 1 0 0 1 1 0 0 1 0 2 1 1 0 1 0 0 0 0 0 0 2 0 1 0

B. bimaculatus 0 0 0 0 0 1 0 1 0 0 0 0 1 1 0 0 0 1 1 [1–2] 2 1 1 0 1 0 2 0 1 0 0 1 0 0 0 0 0 1 0 1 0

B. muticus 1 0 0 1 2 1 0 0 0 2 0 1 1 1 1 1 1 0 0 0 1 1 0 0 1 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 1

H. coquiletti 0 1 0 0 2 0 0 1 1 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 1 0 0 5 0 0 1 0 1 0 0 0 0

H. cinnamomeus 0 1 0 0 2 0 0 1 1 0 1 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 1 1 0 1 0 0 0 0

***H. itzelae* sp. nov.** 0 1 0 0 0 0 0 1 1 1 1 0 1 0 0 1 1 1 0 1 1 0 0 0 0 1 1 0 1 0 0 5 0 0 1 0 1 0 0 0 0

***H. costalis* sp. nov.** 0 1 0 0 0 0 0 1 1 0 1 0 1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0 1 0 0 1 0 0 1 0 1 0 0 0 0

***H. setosus* sp. nov.** 1 0 0 1 2 0 1 1 1 2 1 0 1 0 1 1 1 0 1 0 1 0 0 0 1 0 0 1 0 0 3 0 0 0 0 1 0 0 0 0

H. plebejus 0 0 0 1 2 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 1 1 0 0 0 0 0 0 0 1 0 1 1 0 0 0 0

H. pacificus 0 0 0 0 2 0 0 1 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 1 1 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0

H. concolor 0 0 0 1 0 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 1 0 0 1 0 0 0 0

H. pulchellus 0 0 0 0 2 0 [0–1] 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0

***H. pallidinervis* sp. nov.** 0 0 0 0 1 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 1 1 0 0 0 0 0 0 0 0 0 1 0 2 0 0 0 0

***H. alvarengai* sp. nov.** 0 0 0 0 0 0 1 2 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 0 1 0 0 0 0 0 0 0 0 0 1 2 0 0 0 0

***H. nicaraguensis* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0

***H. brevirostris* sp. nov.** 0 0 0 0 1 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 0 1 2 0 0 0 0

***H. apicalis* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 0 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 5 0 0 1 0 2 0 0 0 1

***H. penai* sp. nov.** 0 0 0 0 1 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 1 1 0 0 0 0 0 0 0 1 1 0 2 0 0 0 0

***H. ecuatorianus* sp. nov.** 0 0 0 0 0 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 0 1 0 2 0 0 0 0

***H. morganae* sp. nov.** 0 0 0 0 0 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 1 0 0 2 0 0 0 0

***H. baranowskii* sp. nov.** 0 0 0 0 0 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 1 0 1 1 0 0 0 0

***H. bolivianus* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 ? 0 1 1 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0

***H. mesoamericanus* sp. nov.** 0 0 0 0 0 0 0 1 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 0 1 0 0 0 0 0 0 0 0 0 1 2 0 0 0 0

***H. bahiensis* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 1 0 1 2 0 0 0 0

***H. loja* sp. nov.** 0 0 0 0 1 0 1 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 0 0 1 1 0 0 0 0 0 0 0 1 1 0 2 0 0 0 0

***H. mexicanus* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0

H. illitus 1 0 0 1 0 0 1 1 1 2 1 1 1 1 1 1 0 1 0 2 2 1 0 0 1 1 2 0 0 0 1 0 1 0 0 0 2 0 1 0 0

***H. annulatus* sp. nov.** 0 0 0 1 0 0 0 0 1 1 1 0 1 1 1 1 0 1 0 2 2 1 1 0 1 1 2 1 0 0 0 0 0 0 1 0 2 0 0 0 0

***H. splendens* sp. nov.** 0 0 1 0 0 0 0 0 1 1 1 1 1 1 1 1 1 0 1 0 0 2 1 1 0 1 1 3 0 0 0 1 0 0 0 0 0 0 2 0 0 0 0

***H. antennalis* sp. nov.** 1 0 1 0 0 0 0 0 1 2 1 1 1 0 0 1 0 0 0 2 2 1 1 0 1 1 2 0 0 0 1 0 0 0 0 0 0 2 0 1 0 0

***H. tiputini* sp. nov.** 0 0 0 0 0 0 0 0 1 1 2 1 1 1 1 0 1 0 1 0 2 2 1 1 0 1 1 3 0 0 0 0 5 0 0 0 0 0 2 2 0 0 1

***H. panamaensis* sp. nov.** 1 0 0 1 0 0 0 0 0 1 2 1 1 1 1 1 1 1 0 1 0 2 2 1 1 0 1 1 2 0 0 0 1 0 0 0 1 0 2 0 0 0 0

***H. inca* sp. nov.** 0 0 0 0 0 0 0 0 1 1 2 1 1 1 1 0 1 0 1 0 2 2 1 1 0 1 1 3 0 0 0 1 5 0 1 0 0 2 0 0 0 1

***H. chamamecinus* sp. nov.** 1 0 0 1 2 0 0 1 1 2 1 1 1 1 1 1 0 1 0 2 2 1 1 0 1 1 [2–3] 0 0 0 1 5 1 0 0 0 2 0 1 0 0

***H. similis* sp. nov.** 1 0 0 1 0 0 1 1 1 2 1 1 1 1 1 1 0 1 0 2 2 1 1 0 1 1 2 1 0 0 1 0 1 0 0 0 2 0 0 0 0

***H. spinosus* sp. nov.** 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 0 1 0 2 2 1 1 0 1 1 2 1 0 0 1 0 0 0 0 1 2 0 0 0 0

H. guttatus 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 1 0 0 1 0 [0–1] 2 1 1 1 1 0 0 0 1 1 0 1 0 0 1 0 0 0 0 0 0

H. triguttatus 0 0 0 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0 2 0 1 1 1 0 1 0 1 1 0 4 0 0 0 0 0 0 0 0 0

H. hollyae 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 0 0 1 0 [1–2] 2 1 1 1 1 0 0 0 1 1 0 1 0 0 0 0 0 0 0 0 0

***H. steineri* sp. nov.** 0 0 0 0 0 0 0 0 1 1 0 1 0 0 1 0 1 0 1 0 0 2 1 1 1 1 0 1 0 1 1 0 3 0 0 0 0 0 0 0 0 0

H. caliginosus 0 0 0 0 0 0 0 1 0 1 1 1 0 1 1 1 1 0 0 0 [1–2] 2 1 1 1 0 0 0 0 0 0 0 2 1 0 0 0 0 1 0 0 0 0

***H. dominicanus* sp. nov.** 0 1 0 0 2 0 1 0 1 1 1 0 1 0 0 1 0 0 0 [0–1] 2 0 1 1 0 0 0 0 1 0 0 4 0 1 1 0 1 0 0 0 0

P. eximius 0 0 0 0 0 0 0 0 1 1 2 0 0 0 0 0 1 0 1 0 0 2 0 1 0 1 1 0 0 0 0 0 2 0 1 1 0 0 0 0 0 0

B. elegans 0 0 0 0 0 1 0 1 0 1 0 1 1 1 0 1 1 1 1 0 1 1 0 0 1 0 2 0 1 0 1 1 0 0 0 0 0 1