



Revista Peruana de Biología

ISSN: 1561-0837

revistaperuana.biologia@unmsm.edu.pe

Universidad Nacional Mayor de San

Marcos

Perú

Johnson, Paul J.

A New Species of *Dodecacius* Schwarz (Coleoptera: Elateridae) from Madre de Dios,
Peru

Revista Peruana de Biología, vol. 24, núm. 3, octubre, 2017, pp. 243-248

Universidad Nacional Mayor de San Marcos

Lima, Perú

Available in: <http://www.redalyc.org/articulo.oa?id=195053390003>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative

TRABAJOS ORIGINALES

A New Species of *Dodecacius* Schwarz (Coleoptera: Elateridae) from Madre de Dios, Peru

Una nueva especie de *Dodecacius* Schwarz (Coleoptera: Elateridae) de Madre de Dios, Perú

Paul J. Johnson

Insect Biodiversity Lab, Box 2207A, South Dakota State University, Brookings, South Dakota 57007, U.S.A.
Email: paul.johnson@sdstate.edu

Abstract

Dodecacius Schwarz is reviewed, it includes two species known only from the eastern lower slopes of the Andes and adjacent Amazonia in southeastern Peru. *Dodecacius paititi* new species is described. *Dodecacius testaceus* Schwarz is treated as a new synonym of *D. nigricollis* Schwarz.

Keywords: taxonomy; endemic; Andes; Amazonia; species discovery.

Resumen

El género *Dodecacius* Schwarz es revisado, incluye dos especies conocidas solamente de las laderas orientales bajas de los Andes y la Amazonia adyacente en el sureste de Perú. Se describe la nueva especie *Dodecacius paititi* y *Dodecacius testaceus* Schwarz es considerado como un nuevo sinónimo de *D. nigricollis* Schwarz.

Palabras clave: taxonomía; endemismo; Andes; Amazonia; descubrimiento de especies.

Publicación registrada en Zoobank/ZooBank article registered:

urn:lsid:zoobank.org:pub:CF42CC9C-F496-4B4F-9C1A-FBB413A43E02

Acto nomenclatural/nomenclatural act:

urn:lsid:zoobank.org:act:84A545F1-FAF8-42C1-83DA-C9D90CA0CA39

Citation:

Johnson P.J. 2017. A New Species of *Dodecacius* Schwarz (Coleoptera: Elateridae) from Madre de Dios, Peru. *Revista peruana de biología* 24(3): 243 - 248 (octubre 2017). doi: <http://dx.doi.org/10.15381/rpb.v24i3.13903>

Presentado: 07/03/2017

Aceptado: 26/08/2017

Publicado online: 28/10/2017

Permisos de colecta:

Research permits No. 506-2011-AG-DGFFS-DGEFFS and No. 0159-2010-AG-DGFFS-DGEFFS

Journal home page: <http://revistasinvestigacion.unmsm.edu.pe/index.php/rpb/index>

© Los autores. Este artículo es publicado por la Revista Peruana de Biología de la Facultad de Ciencias Biológicas, Universidad Nacional Mayor de San Marcos. Este es un artículo de acceso abierto, distribuido bajo los términos de la Licencia Creative Commons Atribución-NoComercial-CompartirIgual 4.0 Internacional (<http://creativecommons.org/licenses/by-nc-sa/4.0/>), que permite el uso no comercial, distribución y reproducción en cualquier medio, siempre que la obra original sea debidamente citadas. Para uso comercial, por favor póngase en contacto con editor.revperubiol@gmail.com.

Introduction

Dodecaci Schwarz (1902) was originally described with two species, *D. nigricollis* Schwarz and *D. testaceus* Schwarz, and each apparently represented by a single specimen. These species were the only ones listed in the genus since their description. Hyslop (1921) designated *D. testaceus* as the type species, and reiterated Schwarz's (1902) suggestion that *D. nigricollis* may be the female and a color form of *D. testaceus*. Both specimens were collected at Chanchamayo, Peru. Since the original description of the genus and these two species, all of these taxa and specimens are rarely mentioned in the taxonomic literature, and generally remained unstudied. The recent discovery of an undescribed species attributable to *Dodecaci* allows this brief review.

The Coleoptera of the Andean eastern slopes, foothills and adjacent lowlands in southeastern Peru were sampled in the Beetles of Peru project (Chaboo 2015, Chaboo and Catenazzi 2015). The specimens reported below were collected at the Centro de Investigación y Capacitación Rio Los Amigos (CICRA), or Los Amigos Biological Station, along the Rio Madre de Dios, approximately 100 air kilometers west of Puerto Maldonado. The biological station is located adjacent to the Los Amigos Conservation Concession and the Manu-Tambopata Corridor between Manu National Park and Tambopata National Reserve. The area is an example of lowland Amazon rainforest with low topographic relief and high water tables near to the eastern foothills of the Andes. The new Interoceanic Highway traverses the region from Brazil to Puerto Maldonado, then to Cusco and three Pacific ports, and enables increased incursions and alterations to forest and riverine habitats.

A number of elateriform beetles were collected during the Beetles of Peru project. Many new country records, validations of original records, and undescribed species of Elateridae were obtained. A preliminary checklist of taxa for the country was produced (Johnson and Chaboo 2015) as a part of this work. Specimens representing undescribed species and new country records of Cerophytidae and Throscidae were also reported (Chaboo and Johnson 2015, Johnson and Chaboo 2016).

Here, reporting on these discoveries continues with the taxonomic treatment of unusual specimens. A new species of *Dodecaci* is described and a new synonymy is given.

Materials and Methods

All specimens of the new species described below are derived from sampling that was part of the Beetles of Peru project and are held at the Snow Entomological Museum (SEMC), University of Kansas, Lawrence, and were collected under Peru research permits No. 506-2011-AG-DGFFS-DGEFFS and No. 0159-2010-AG-DGFFS-DGEFFS to C.S. Chaboo. The holotype and half of the paratypes, plus unique specimens, will be repatriated to the Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Peru (MUSM) by the SEMC under the permit agreement. Remaining duplicate specimens will be at the SEMC, except six paratypes retained by the author (PJJC).

The holotype of *D. nigricollis* was studied at the Senckenberg Deutsches Entomologisches Institut, Müncheberg, which contains the Otto Schwarz collection. The holotype of *D. testaceus* was not found and remains lost. No other specimens of either *D. nigricollis* or *D. testaceus* are known.

Morphological terms and concepts generally follow Calder (1996) and Lawrence et al. (2010). Integument color terms are based on Nichols and Schuh (1989). Measurements were made with an ocular micrometer at 0.1 and 0.01 mm increments between 10–50 magnifications. Body length was measured from the anterior margin of the frons to the elytral apices, and width was measured across the elytral humeri. The ocular index of Campbell and Marshall (1964) and Fender (1972), a ratio of frons width and head width inclusive of the eyes, was calculated to two decimal places. Antennomere length ratios were calculated for flagellomeres 2–12 as measured along the lateral midline from antennomere base to apex, and values were rounded to one decimal place. Ramus length was measured from the oblique basal angle to apex. Pronotal length is along the midline from anterior margin to the posterior margin at the antescutellar emargination, and width is at the widest point at midlength. Tarsomere lengths were measured from base to apex, values rounded to two decimal places, and given as a ratio string. Label data are generally presented verbatim, except dates are standardized to the dd.mm.yyyy format, with the month in lower case Roman type.

Systematics

FAMILY ELATERIDAE LEACH, 1815

GENUS *DODECACIUS* SCHWARZ, 1902

Dodecaci Schwarz

Dodecaci Schwarz 1902: 153, 1907: 2; Hyslop 1921: 641, 1923: 157; Schenkling 1927: 3; Stibick 1979: 176; Gaedike 1985: 90

Type species: *Dodecaci testaceus* Schwarz 1902: 154, designated by Hyslop 1921: 641

Dodecanius Blackwelder 1944: 280 (misspelling)

The genus was described as new with *D. nigricollis* and *D. testaceus* included. It was originally assigned to Campylides of Candèze (1863, 1891) and compared to *Euthysanius* LeConte due to the strongly arched prosternal process and a pectinate antenna of 12 antennomeres. Schwarz (1907) listed only these original two species and reassigned the genus to Plastoceridae. Hyslop (1923), Schenkling (1928) and Blackwelder (1944) also placed the genus in Plastoceridae. Crowson (1955) recognized the structural inconsistencies within Plastoceridae and subsequently (Crowson 1972) restricted the family to include only *Plastocerus* Schaum, based on *P. angulosus* (Schaum) without remarking on the disposition of other genera formerly assigned to the family. Stibick (1979) reassigned *Dodecaci* to his Aplastini in Aplastinae. Lawrence (1981) had Plastoceridae, in part, in Elateridae, and in part equated the family with Cebriionidae. Gaedike (1985) incorrectly listed *D. nigricollis* in the previously re-organized Phylloceridae. Neither Lawrence and Newton (1995) or Costa et al. (2010) noted *Dodecaci* while placing associated genera in Cebriioninae, but not in a tribal arrangement. Johnson (2002) divided the American cebriionines between Cebriionini and Aplastini. *Dodecaci* and *Octinodes* Candèze are the only genera of Aplastini from South America, as the other described cebriionine genera *Musopsis* Chevrolat and *Stenocebrion* Solervicens are assigned to Cebriionini.

Schwarz (1907) defined Plastoceridae as having “6-7 Seg-menten” in the males and “5 oder 6” in the female. These “Seg-menten” are ventrites in the modern terminology. These ventrite

counts were repeated by Costa et al. (2010). Historical ventrite counts of seven are undoubtedly based on misinterpretations of extruded sternites 8 and 9 that are normally recessed, but may become extruded depending on the specimen killing and preservation methods used. Both *D. nigricollis* and a new species have five ventrites as is typical of other Elateridae, which is also the case in both males and females of Neotropical *Octinodes*. In contrast, the males of *Aplastus*, *Euthysanius*, and Californian *Octinodes* have small lateral ventrite remnants beneath the metacoxae. If these remnants are counted then there are six ventrites observable on male Californian applastines. The brachypterous females of *Euthysanius* species clearly have six ventrites, with the basal ventrite forming a complete sclerite across the abdomen. There are five ventrites on species of the cembrine *Scaptolenus* LeConte and *Selonodon* Latreille. The basal ventrite (sternite 2) remnants on Californian applastines can be seen due to the relatively flexible abdomen with a flexible and extensible thoraco-abdominal membrane and the first ventrite loosely fitted against the metaventrite. In *Dodecacius* and Neotropical *Octinodes* species the ventrite 1 is rigid and tightly fitted to the posterior margin of the metaventrite and metacoxae, and does not expose a large basal membrane or sternite 2 remnant.

Male *Dodecacius* species are immediately recognizable in the Andean and Amazonian faunas with their pectinate antennae having 12 antennomeres, while the antennae of *Octinodes* species have 11 antennomeres. Female specimens of either genus have not been seen or reported, but by analogy with other applastines they may be expected to have serrate antennae.

Dodecacius nigricollis Schwarz

Dodecacius nigricollis Schwarz 1902: 154; Schwarz 1907: 2; Hyslop 1921: 641; Schenkling 1927: 3; Gaedike 1985: 90
Dodecanius nigricollis, of Blackwelder 1944: 280

Dodecacius testaceus Schwarz 1902: 154 **new synonym**

Specimen studied. HOLOTYPE, labeled: "Chancham[a]yo / Peru K. Lange / Schwarz det. / nigricollis Schw. / Coll. Schwarz / Holotypus" (SDEI).

Taxonomic Notes. Otto Schwarz obtained his specimens of *D. nigricollis* (Figs. 4–5) and *D. testaceus* from Carl (or Karl) Friedrich Lange, a German industrialist and insect collector in Annaberg, presently Annaberg-Buchholz, Germany. No evidence was found to indicate that Lange visited or collected in Peru (Lamas 1980; G. Lamas *in litt.* to D. Silva). It is probable that Lange purchased these specimens from the O. Staudinger & A. Bang-Hass natural history dealership in Dresden. One of their collectors was Carl Oswald Schunke, a resident collector in La Merced, Chanchamayo, who supplied specimens from throughout the Chanchamayo Valley and other nearby localities.

Schwarz (1902) noted that his single specimen of *D. nigricollis* may be a female of *D. testaceus*, but did not indicate the sex of the latter. Schwarz's suggestion was noted by Hyslop (1921), without correction. The holotype of *D. nigricollis* held in the SDEI was examined, dissected, and is male. *Dodecacius testaceus* was not listed by Gaedike (1985) and the species was absent from the SDEI collection in 2016. No information was found in collection records about it being lent, exchanged, or otherwise relocated (L. Behne, pers. comm.). Additional specimens potentially representing these two nominal species were not seen in

other collections. Based on these two specimens being collected at the same locality, Chanchamayo, Peru, and the essentially identical descriptions separating the nominal species on variable color traits, *D. testaceus* is here treated as a **new synonym** of *D. nigricollis*. The choice of priority is based on the apparent loss of the *D. testaceus* holotype and is proposed in accordance with ICZN (1999) Art. 24.2.2 and Recommendation 24A.

Dodecacius paititi Johnson, new species

Figures 1 – 3 and 6

Diagnosis. This species of *Dodecacius* is immediately recognized by its pectinate antenna with 12 antennomeres with short rami on a hypognathous head, and slender legs with filiform tarsi. It differs from *D. nigricollis* by a smaller size, a shorter and proportionately wider pronotum, more coarsely punctured elytral striae, and aedeagal morphology.

Description. Genus characters as given by Schwarz (1902, 1907). Body (Figs. 1–3) 8.1–9.9 mm long, 2.4–2.9 mm wide across humeri; elongate, subparallel, dorsum shallowly to moderately convex. Integument of body and elytra variably testaceous, rufotestaceous, to partially to entirely dark infusate. Pubescence testaceous to dark, matching the integumental ground color. Head and pronotum densely, subumbilicately to umbilicately punctured, separated by <0.2X own diameter; elytral striae with large serial punctures.

Head hypognathous, evenly convex on vertex, shallowly convex between eyes, becoming depressed anteriorly. Frontal margin truncate, coplanar with labrum. Ocular index 70–80. Antenna with 12 antennomeres, pectinate; antennomere 2 short, subglobular; antennomeres 3–11 ramate; antennomere 12 elongate-oval, slightly compressed; antennomere 2–4, 7, 12 length ratio 1.0:2.2:3.0, 3.4, 4.2. Antennomeres 6–11 subequal in length to antennomere 5. Antennomere 3–5, 10 ramus length ratio 0.9:1.0:1.3, 1.2.

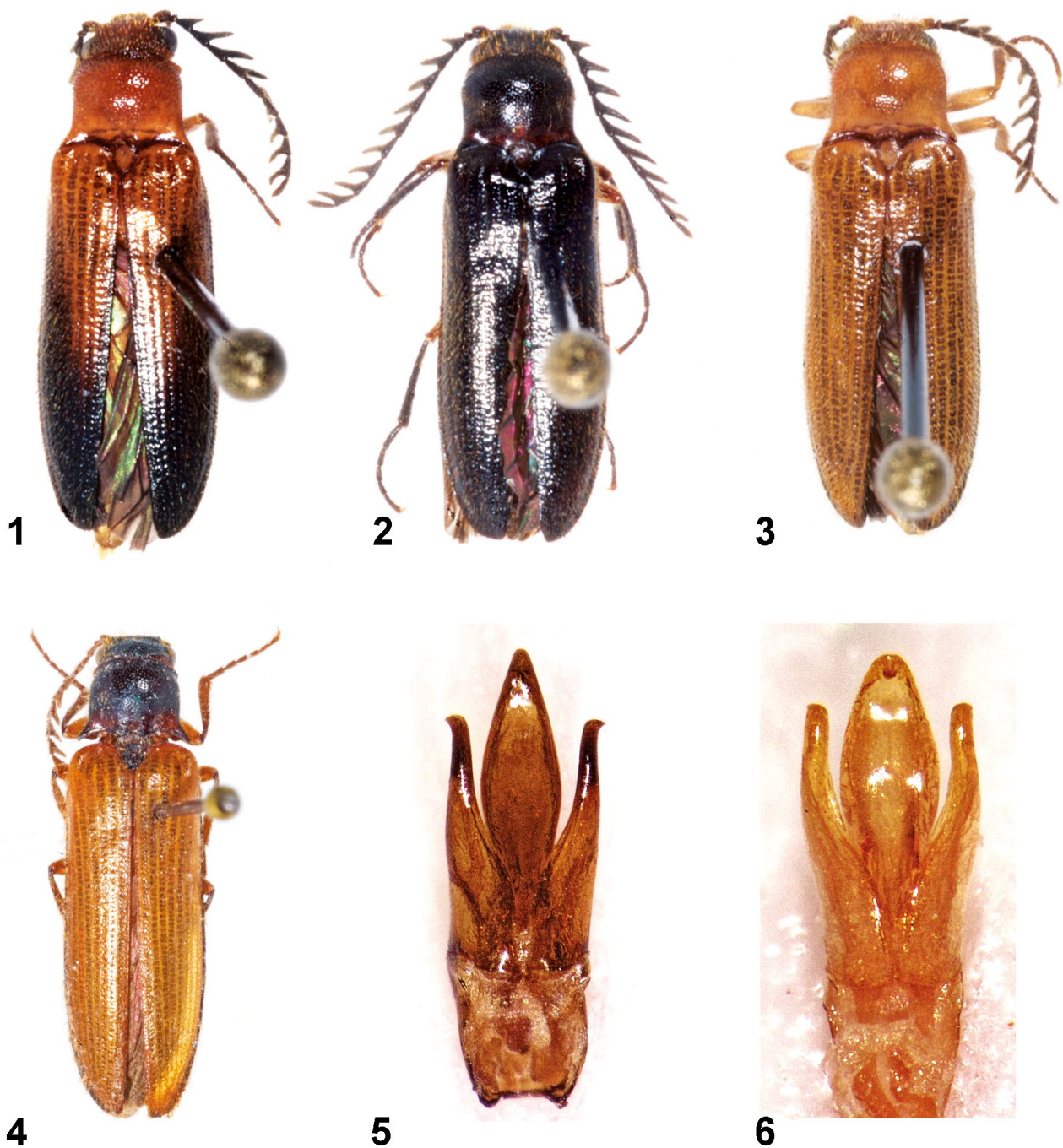
Pronotum transverse, length 0.74X width, anterior margin shallowly arcuate; disc moderately convex, densely umbilicately punctured, punctures becoming smaller and denser laterally and posteriorly. Lateral margins ecarinate, evenly rounded. Hind angle strongly divergent, ecarinate dorsally, evenly rounded laterally. Prosternum short, anterior margin truncate, intercoxal process strongly arched, disc between coxae depressed to shallowly impressed. Legs slender, segments narrow; tarsi filiform, densely set with stout setae; metatarsomere length ratio 1.00:0.57:0.43:0.39:1.26.

Elytral striae of large, shallow serial punctures. Intervals very narrow, irregularly sinuate around striae punctures. Apices divergent, separately rounded.

Abdominal ventrites 5, subequally densely and shallowly punctured; ventrite 5 broadly rounded apically, with oblique and elongate sublateral shallow impressions.

Aedeagus (Fig. 6) with median lobe broadly elliptical, narrowing apical, apex strongly deflexed, broadly rounded. Paramere shallowly sinuate laterally, strongly sinuate against median lobe; apices broadly rounded, ventrolaterally denticulate. Basal piece trapezoidal.

Female unknown.



Figures 1–6. *Dodecacius* species. (1) *D. paititi* bicolored form, dorsal habitus. (2) *D. paititi* dark form, dorsal habitus. (3) *D. paititi* pale form, dorsal habitus. (4) *D. nigricollis* male holotype, dorsal habitus. (5) *D. nigricollis*, aedeagus, dorsal aspect; (6) *D. paititi* aedeagus, dorsal aspect.

Type Material. HOLOTYPE, male labeled: PERU, Madre de Dios, CICRA Field Stn, garden, 12.56940°N, 70.10100°W, 260 m, 2-9.ix.2010, MJ Endara, malaise trap, PER 10-09-MAT-014 / SEMC1096871 (MUSM via SEMC).

Paratypes labeled as holotype, except as noted: SEMC 1096856, 1096857, 1096858, 1096859, 1096863, 1096864, 1096865, 1096866, 1096873, 1096875 (10, MUSM); 1096877, 1096878, 1096880, 1096881, 1096883, 1096948, 1096951, 1096952, 1096954, 1096956 (10, SEMC), 1096958, 1096960, 1096966, 1096987 (4, PJJC); 9-16.ix.2010, PER10-09-MAT-015 / SEMC 1097850, 1097854, 1097856 (3, MUSM), 1097859, 1097862 (2, SEMC); 16-23.ix.2010, PER10-09-MAT-016 / SEMC 1097461, 1097467, 1097485, 1097487, 1097496 (5, MUSM), 1097888, 1097891, 1097893, 1097902, 1097912 (5, SEMC), 1097920 (1, PJJC); 18-25.x.2010, PER10-10-MAT-020 / SEMC 1061787 (1, MUSM); 25.x-1.xi.2010, PER10-10-MAT-021 / SEMC 1097073, 1097074, 1097075, 1097078, 1097080 (5, MUSM), 1097082, 1097085, 1097089, 1097090 (4, SEMC), 1097091 (1, PJJC).

Etymology. The species epithet “*paititi*” is after the mythical lost Incan city of Paititi that was supposedly located in south-eastern Peru or adjacent northeastern Bolivia. The name is here treated as a noun in apposition.

Taxonomic notes. There is considerable variation in integumental color of *D. paititi*. Of 52 specimens examined 27 (52%) are entirely testaceous, nine (17%) are entirely dark infusate, and 16 (31%) have varying degrees of both colors. Of the total specimens, two (4%) have bicolored pronota, four (8%) have the apical quarter of the elytra infusate, and 10 (19%) have about one-third to two-thirds of the elytra infusate.

The 12-“segmented” pectinate antenna of *Dodecacius* species is unique for click beetles in South America. Species of *Octinodes* that also occur in the region have pectinate antennae, but with 11 antennomeres. The species of *Euthysanius* from California, Arizona and Utah, are the only other elaterids in the Americas with 12 antennomeres. Species of *Aplastus* LeConte, also in the Californian region, have 11 antennomeres.

Distribution. *Dodecacius paititi* new species is presently known only from the type locality in Madre de Dios, at 12.56940°N, 70.10100°W.

Acknowledgements

My thanks to Caroline S. Chaboo for inviting me to review the elateroid beetles from her Beetles of Peru project, and to the Amazon Conservation Association (ACA) and their staff at the Centro de Investigación y Capacitación Rio Los Amigos (CICRA) for support and assistance to Chaboo. Zack Falin, University of Kansas Biodiversity Institute and Natural History Museum, is thanked for loans of specimens obtained under Peru research permits No. 506-2011-AG-DGFFS-DGEFFS and No. 0159-2010-AG-DGFFS-DGEFFS issued to Chaboo. Gratitude is extended to Stephan Blank and Lutz Behne for hosting my visit to the Senckenberg Deutsches Entomologisches Institut (SDEI), Müncheberg, and generously allowing me free access to the beetle collection and other facilities. Andrew Liston, Marko Prous, Andreas Teager, Grit May, Eckhard Groll, and Editha Schubert of the SDEI are each thanked for their generous assistance and friendship during my visit. Editha Schubert is also

thanked for her assistance in seeking biographical information on Carl Lange. Diana Silva and Gerardo Lamas, MUSM, generously shared historical information on Chanchamayo, and two anonymous reviewers provided helpful corrections and additions to a late manuscript draft. The author is grateful to the Ernst Mayr Grant Committee, Museum of Comparative Zoology, Harvard University for generously supporting travel to the SDEI. This publication is a product of the Insect Biodiversity Lab at South Dakota State University.

Literature cited

- Blackwelder R.E. 1944. Checklist of the coleopterous insects of Mexico, Central America, The West Indies, and South America. United States National Museum Bulletin, Part 2, 185: 189–341. DOI: <http://dx.doi.org/10.5479/si.03629236.185.2>
- Calder A.A. 1996. Click beetles: Genera of Australian Elateridae (Coleoptera). Collingwood, Australia: CSIRO Publishing.
- Candèze E.C.A. 1863. Monographie des Élatérides, tome quatrième. Mémoires de la Société royale des sciences de Liège 17: 1–534, 6 pls. DOI: <http://dx.doi.org/10.5962/bhl.title.47120>
- Candèze E.C.A. 1891. Catalogue Méthodique des Élatérides connus en 1890. Liège, Belgium: H. Vaillant-Carmanne. DOI: <http://dx.doi.org/10.5962/bhl.title.47119>
- Campbell J.M. & J.D. Marshall. 1964. The ocular index and its application to the taxonomy of the Alleculidae (Coleoptera). The Coleopterists Bulletin 18: 42. DOI: <http://dx.doi.org/10.1649/829.1>
- Chaboo C.S. 2015. Beetles (Coleoptera) of Peru: A survey of the families. Part I. Overview. Journal of the Kansas Entomological Society 88 (2): 135–139. DOI: <http://dx.doi.org/10.2317/0022-8567-88.2.135>
- Chaboo C.S. & A. Catenazzi. 2015. Beetles of Peru: Biogeography. Journal of the Kansas Entomological Society 88 (2): 140–143. DOI: <http://dx.doi.org/10.2317/kent-88-02-140-143.1>
- Chaboo C.S. & P.J. Johnson. 2015. Beetles (Coleoptera) of Peru: A survey of the families. Cerophytidae Latreille, 1834. Journal of the Kansas Entomological Society 88 (2): 273. DOI: <http://dx.doi.org/10.2317/kent-88-02-273-273.1>
- Costa C., J.F. Lawrence & S. Policena Rosa. 2010. Elateridae Leach, 1815, pp. 75–103. In Leschen, R.A.B., R.G. Beutel, J.F. Lawrence (editors), Coleoptera, Beetles. Vol. 2: Morphology and Systematics (Elateroidea, Bostrichiformia, Cucujiformia partim). Kristensen, N.P. and R.G. Beutel (eds), Handbook of Zoology. Arthropoda: Insecta. De Gruyter, Berlin, Germany. DOI: <http://dx.doi.org/10.1515/9783110911213.75>
- Crowson R.A. 1955. The Natural Classification of the Families of Coleoptera. Nathaniel Lloyd, London, UK.
- Crowson R.A. 1972. A review of the classification of Cantharoidea (Coleoptera), with the definition of two new families, Cneoglossidae and Omethidae. Revista de la Universidad de Madrid 21 (82): 35–77.
- Fender K.M. 1972. Some new and little known species of Malthini from the southwestern United States (Coleoptera: Cantharidae). The Coleopterists Bulletin 26 (2): 43–52. DOI: <http://dx.doi.org/10.2307/2421804>
- Gaedike H. 1985. Katalog der in den Sammlungen der Abteilung Taxonomie der Insekten des Institutes für Pflanzenschutzforschung, Bereich Eberswalde (ehemals Deutsches Entomologisches Institut), aufbewahrten Typen – XXIII (Coleoptera: Rhipiceridae, Cebrionidae, Elateridae, Eucnemidae, Throscidae, Chelonariidae, Buprestidae, Phylloceridae, Dicronychidae, Dascillidae, Helodidae, Dryopidae, Georyssidae, Heteroceridae, Dermestidae, Byrrhidae). Beiträge zur Entomologie 35 (1): 13–96. DOI: <http://dx.doi.org/10.1002/mmnd.4810350423>
- Hyslop J.A. 1921. Genotypes of the elaterid beetles of the world. Proceedings of the U.S. National Museum 58 (2353): 621–680. DOI: [10.5479/si.00963801.2353.621](http://dx.doi.org/10.5479/si.00963801.2353.621)
- Hyslop J.A. 1923. Present status of the coleopterous family Plastoceridae. Proceedings of the Entomological Society of Washington 25 (7–8): 156–160. DOI: <http://dx.doi.org/10.1093/besa/17.3.160>

- ICZN 1999. International Code of Zoological Nomenclature, 4th Edition. The International Trust for Zoological Nomenclature, London, UK. DOI: <http://dx.doi.org/10.5962/bhl.title.50608>
- Johnson P.J. 2002. Elateridae Leach 1815, pp. 160-173. In Arnett, R. H., Jr., Thomas, M. C., Skelley, P. E. & Frank, J. H. (eds.), *American Beetles*, volume 2. Polyphaga: Scarabaeoidea through Curculionoidea. Boca Raton, Florida: CRC Press. DOI: <http://dx.doi.org/10.1201/9781420041231>
- Johnson P.J. & C.S. Chaboo. 2015. Beetles (Coleoptera) of Peru: A survey of the families. Elateridae Leach, 1815. *Journal of the Kansas Entomological Society* 88 (2): 269–272. DOI: <http://dx.doi.org/10.2317/kent-88-02-269-272.1>
- Johnson P.J. & C.S. Chaboo. 2016. First record of the beetle family Throscidae (Insecta: Coleoptera), a new species of *Aulonothroscus* Horn, and new species records to the fauna of Peru / Primer registro de la familia de escarabajos Throscidae (Insecta: Coleoptera), una nueva especie de *Aulonothroscus* Horn y tres nuevos registros de especies para la fauna de Perú. *Revista Peruana de Biología* 23 (3): 237–242. DOI: <http://dx.doi.org/10.15381/rpb.v23i3.12858>
- Lamas G. 1980. Introduccion a la historia de la entomología en el Peru. II. Periodo de los viajeros, colectores y estudiosos especializados. *Revista Peruana de Entomología* 23 (1): 25–31.
- Lawrence J.F. 1981. Coleoptera, pp. 482–553, 1107. In Parker, S.P. (ed.), *Synopsis and Classification of Living Organisms*. New York, New York: McGraw-Hill Book Company
- Lawrence J.F., R.G. Beutel, R.A.B. Leschen, & A. Ślipiński. 2010. Glossary of morphological terms, pp. 9-20. In Leschen, R.A.B., R. G. Beutel, and J. F. Lawrence (volume eds.), *Coleoptera, Beetles, Volume 2: Morphology and systematics* (Elateroidea, Bostrichiformia, Cucujiformia partim). In Kristensen, N.P., and R.G. Beutel (eds.) *Handbook of Zoology, Arthropoda: Insecta*. Berlin/New York: Walter de Gruyter.
- Lawrence J.F. & A.F. Newton Jr. 1995. Families and subfamilies of Coleoptera (with selected genera, notes and references, and data on family-group names), pp.779–1006. In Pakaluk, J. and S. A. Ślipiński (eds.). *Biology, Phylogeny, and Classification of Coleoptera: Papers Celebrating the 80th Birthday of Roy A. Crowson*. Muzeum i Instytut Zoologii Polska Akademia Nauk, Warszawa.
- Nichols, S.W., & R.T. Schuh. 1989. *The Torre-Bueno glossary of entomology*. New York, New York: The New York Entomological Society. DOI: <http://dx.doi.org/10.1017/s0007485300046022>
- Schenkling S. 1927. *Plastoceridae. Pars 93. Coleopterorum Catalogus*. Vol. 11. Berlin, Germany: W. Junk 7 p.
- Schwarz O. 1902. *Dodecaciis nov. gen Elateridarum aus Peru*. *Deutsche Entomologische Zeitschrift*, 1902 (Heft 1): 153–155. Schwarz O. 1907. *Coleoptera. Fam. Plastoceridae*, Fasc. 50, pp. 1–10, 1 pl. In: P. Wytman, *Genera Insectorum*. Bruxelles, Belgium: V. Verteneuil & L. Desmet.
- Stibick J.N.L. 1979. Classification of the Elateridae (Coleoptera): Relationships and classification of the subfamilies and tribes. *Pacific Insects* 20 (2–3): 145–186.