

Revision of the South American Ceratognathini (Coleoptera: Lucanidae: Aesalinae) with the description of a new genus and a new species

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Abstract

We examine the taxonomic placement of the South American stag beetles of the tribe Ceratognathini Sharp, 1899 that were previously placed in the genus *Ceratognathus* Westwood. We compared the South American species with specimens from 13 species of Australasian Ceratognathini using morphological characters of the legs, mandibles, genitalia, and elytra. Based on generic limits proposed by Holloway for the Australasian Ceratognathini, the South American species differ from the three Australasian genera (*Ceratognathus*, *Mitophyllus* Parry, and *Holloceratognathus* Nikolajev) sufficiently to establish a new genus, *Hilophyllus* n. gen. The South American taxa are transferred to the new genus, resulting in two new combinations: *Hilophyllus argentinensis* (Martínez) and *H. penai* (Martínez). During our study of the Neotropical species we discovered a third species (*H. martinezi*, n. sp.), which is described here as new. To maintain nomenclatural stability we designate a neotype for *H. argentinensis*, the holotype of which is lost. The two previously known species of *Hilophyllus* are redescribed and a key to *Hilophyllus* species is provided.

Key words: Lucanidae, Aesalinae, Ceratognathini, *Ceratognathus*, *Hilophyllus*, Chile, Argentina, revision, new genus, new species

Resumen

En este estudio examinamos la ubicación taxonómica de los lucánidos sudamericanos pertenecientes a la tribu Ceratognathini Sharp, 1899 los que fueron colocados previamente en el género *Ceratognathus* Westwood. Comparamos las especies sudamericanas con especímenes de 13 especies de Ceratognathini de australasia usando los caracteres morfológicos de las patas, mandíbulas, órganos genitales, y élitros. De acuerdo con los límites genéricos establecidos por

Holloway para los Ceratognathini de Australasia, los Ceratognathini sudamericanos se distinguen claramente de los tres géneros de australasia (*Ceratognathus*, *Mitophyllus* Parry y *Holloceratognathus* Nikolajev), de esta manera se justifica la creación de un género nuevo, *Hilophyllus*, gen. nov. Los taxa sudamericanos se transfieren a este género nuevo, resultando en dos combinaciones nuevas: *Hilophyllus argentinensis* (Martínez) y *H. penai* (Martínez). Durante nuestro estudio de las especies Neotropicales descubrimos una tercera especie (*H. martinezi*, sp. nov.) la cual se describe aquí como nueva. Para promover estabilidad en la nomenclatura del grupo designamos un neotipo para *H. argentinensis*, debido a que el holotipo se encuentra extraviado. Se redescubren las dos especies previamente conocidas y se incluye una clave para las especies de *Hilophyllus*.

Introduction

The stag beetle subfamily Aesalinae MacLeay, 1819 is represented in the New World by four genera (Holloway 1960; 1998). Based on available family-group names, these genera may be best treated as forming three tribes: Aesalini, Nicagini, and Ceratognathini. Two genera form the tribe Aesalini MacLeay, 1819: *Aesalus* Fabricius, with 3 named Neotropical species found from Mexico to Panama (Blackwelder 1944, Howden & Lawrence 1974, Ratcliffe 2002) and an additional 16 Old World species (Krajcik 2001); and the monotypic *Lucanobium* Howden & Lawrence from Venezuela (Howden & Lawrence 1974). Another genus, *Nicagus* LeConte, is the only member of the tribe Nicagini LeConte, 1861 and includes two North American species as well as a single species from Japan (Blackwelder 1944; Howden & Lawrence 1974, Paulsen & Smith 2005).

The remaining tribe, the Ceratognathini Sharp, 1899, is predominantly Australasian but is represented in South America by two species of *Ceratognathus* Westwood (*C. argentinensis* Martínez and *C. penai* Martínez) from the forests of central Chile and adjacent areas of Argentina (Martínez 1976, 1981; Mondaca & Paulsen 2005). All species treated here as forming the tribe Ceratognathini were formerly placed in the genus *Ceratognathus* (Burmeister 1847; Benesh 1960; Holloway 1961). In an excellent paper on aesaline classification, Holloway (1998) reinstated one genus (*Mitophyllus* Parry, 9 species) and elevated a subgenus (*Holloceratognathus* Nikolajev, 3 species) to generic level to accommodate the New Zealand fauna, in effect leaving 14 Australian and two South American species in *Ceratognathus*. Holloway (1998) did not discuss the generic placement of the Neotropical species, nor did she explicitly redefine *Ceratognathus*. However, the South American species do not possess the characters given for that genus and do not belong in *Ceratognathus* (*sensu* Holloway 1998).

In this paper we propose a new generic placement for the South American Ceratognathini. We characterize the new genus using morphological characters of the legs, mandibles, genitalia, and elytra that were used by Holloway (1998) to differentiate the Australasian genera. We also describe as new a third species of ceratognathine from

Chile and provide a key to the South American species.

The life histories of these beetles are poorly known, which probably adds to their perceived rarity. In 2004 and 2006, we collected specimens of two species of the genus in Chile. Thus, we are able to supplement what little was known about the life histories of these species with our own observations. These beetles are rarely encountered, possibly due more to their small size and cryptic coloration than to actual rarity (Martínez 1981, Mondaca & Paulsen 2005). In addition to the small number of specimens present in collections, their unusual appearance (elongate antennal club and small mandibles) means that specimens may not be correctly placed with the Lucanidae; a single example from the Smithsonian collection (USNM) was discovered during curation of the scarab subfamily Melolonthinae (A.B.T. Smith, personal communication). In particular, specimens of these species may be confused with the genus *Sericoides* Guérin-Méneville (Scarabaeidae: Melolonthinae) because they superficially resemble them and are sympatric. The exposed mandibles and elytral scales present in the South American Ceratognathini quickly differentiate them from *Sericoides* species.

Material and methods

Acquisition of specimens

Specimens examined from several institutions and private collections were provided through the generous assistance of the following individuals: Field Museum of Natural History, Chicago, Illinois, U.S.A. (FMNH, Alfred Newton and Margaret Thayer); Museo Nacional de Historia Natural, Santiago, Chile (MNNC, Mario Elgueta); Canadian Museum of Nature, Ottawa, Canada (CMNC, François Génier); Illinois Natural History Survey, Urbana, Illinois, U.S.A. (INHS, Colin Favret); José Mondaca E. Collection, Santiago, Chile (JMEC); University of Kansas Snow Entomological Museum, Lawrence, Kansas, U.S.A. (Zachary Falin, KSEM); Alfredo Ugarte Peña Collection, Santiago, Chile (AUPC); U.S. National Museum of Natural History, Washington, D.C, U.S.A. (USNM, Gary Hevel); Marcos Beéche C. Collection, Santiago, Chile (CMBC); and the Sergio Rothmann T. Collection, Santiago, Chile (CSRT).

Specimens of *C. penai* examined include the holotype (FMNH) as well as two male paratypes (CMNC). A female specimen bears a Martínez “ALLOTYPE” label (FMNH), but this is in error because no female specimens were described in the original publication (Martínez 1976), and this specimen is not part of the type series. In 2004, we collected and examined five additional specimens (2 males and 3 females).

We examined the allotype of *C. argentinensis* (CMNC), because the holotype is lost (see below). Additionally, we examined 4 male and 3 female specimens of *C. argentinensis* (CMBC, CSRT, USNM, AUPC), and collected a single male specimen in 2004. In 2006, we collected five additional specimens, four males and one female. Another male specimen (MNNC) represents a third species that we describe here as new.

The following species of Australasian Ceratognathini were examined from the CMNC, FMNH, INHS, and KSEM (including the type of each genus indicated by an asterisk): *Ceratognathus bitumulosus* Carter, *C. frenchi* Blackburn, *C. froggatti* Blackburn (or near), *C. gilesi* Blackburn, *C. niger* Westwood*, *Holloceratognathus cylindricus* (Broun), *H. helotoides* (Thomson)*, *Mitophyllus dispar* (Broun), *M. foveolatus* (Broun), *M. gibbosus* (Broun), *M. irroratus* Parry*, *M. macrocerus* (Broun), and *M. parrianius* Westwood. Although our sampling of Australian species of *Ceratognathus* is adequate for addressing the generic limits of the genus relative to the South American taxa (as we include the type species of *Ceratognathus*, *C. niger*) and is more extensive than that used by Holloway (1998), we cannot provide an exhaustive treatment of the Australian species. Thus, the task of definitively characterizing *Ceratognathus* (*sensu stricto*) and verifying that the Australian taxa are congeneric remains and is part of ongoing research (MJP).

In this work we follow the most recent subfamilial placement, that of *Ceratognathus* in the Aesalinae (Holloway 1997, Paulsen & Smith 2005) and not in the Nicaginae LeConte (Howden & Lawrence 1974).

Morphological characters

The following conventions were used during the collection of morphological data. Specimens were viewed under a dissecting microscope at 6.3– 40.0x under fiber optic illumination.

Length was measured from the apex of the mandibles to the apex of the elytra. Width was measured at the widest point of the elytra. Color was determined under fiber optic illumination and magnification. The appearance of vestiture was described as seen under magnification and is defined as either possessing setae (simple, circular in cross section, hair-like) or scales (thickened, flattened). Puncture size was defined as either large, moderate, or fine. Under 40x magnification, large punctures appear as pits over 0.06 mm in diameter with a visible floor, usually containing a single scale or seta. Moderate punctures (0.03–0.06 mm) may contain a scale or seta visible at 40x. Fine punctures are small (less than 0.03 mm) and lack structure or vestiture at a magnification of 40x. Puncture density was defined as contiguous, dense (punctures separated by less than 2 puncture diameters), moderate (punctures separated by 2–4 puncture diameters), sparse (separated by more than 4 puncture diameters), or impunctate.

Species recognition

A phylogenetic species concept is applied in this study. Species are defined as the smallest aggregation of populations diagnosable by a unique combination of character states (Wheeler & Platnick 2000).

Generic comparison of the Ceratognathini

In order to place all genera of Ceratognathini within a character-based classification, we compared all specimens using Holloway's (1998) methods. The 19 characters used in that analysis were studied with two exceptions: 1) the spermathecal gland of the female genitalia was not located in dissections of *Hilophyllus argentinensis* or *H. penai* suggesting that it was possibly minute; and 2) the microscopic structure of the walls and floor of the elytral punctures was masked by the presence of exudates, Figs. 13–14). Although these characters were not analyzed, neither the form of the spermathecal gland nor the microscopic structure of the elytral punctures is of critical generic-level importance.

The South American species differ from the Australian *Ceratognathus* species in a number of important characters. The main characters used by Holloway (1998) to characterize *Ceratognathus* are not present in the South American taxa: 1) the head lacks frontal tubercles; 2) the ancillary protibial teeth are small and uniform, not differently sized; and 3) the male metatibia lacks a setiferous patch on the interior face. Additionally, in the South American species the galea of the maxilla is short and broad (not elongate and narrow) and the apex of the last abdominal ventrite of the male is truncate and not rounded or emarginate. The male genitalia differ from those of the Australian species in nearly every character used by Holloway (1998): the sclerotized plates of the ninth abdominal segment are triangular (not rectangular), the basal piece is sclerotized dorsally and not separated from the parameres by a membranous area, and the parameres lack median ribbing.

In several respects, the South American taxa are more similar to species of the New Zealand genera *Mitophyllus* and *Holloceratognathus*. They share with *Mitophyllus* the overall dentition of the protibiae of large apical and submedial teeth with numerous uniformly-sized ancillary teeth (Figs. 7–12). The South American species also share with *Mitophyllus* similar elongate antennal club segments and some characters of the female genitalia. However, the South American species differ from *Mitophyllus* in the form of the broad galea of the maxilla and in possessing at least an indication of a ventral tooth on the right mandible of the female. In addition, each elytral scale is elongate and acute (not oval and blunt as in *Mitophyllus* species) and arises in the center of a puncture, unlike in species of *Mitophyllus* or *Holloceratognathus*, where the scales arise anteriorly. Finally, the microscopic structure of the scales is longitudinally ribbed (Figs. 13–14) without the anastomosing cross-bars present on the scales of *Mitophyllus* species.

Other character states are unique to the South American species. The antennal scape (Fig. 17) lacks the longitudinal groove present in the Australasian species. The female genitalia have short, broad styli (Fig. 22). The male mandibles are not highly sexually dimorphic and are similar to the female mandibles in size and general shape, the only differences being that the dorsal tooth of the male mandible is slightly larger and the male mandibles are more abruptly curved inward (Figs. 4–6).

Based on these characters, we believe that *Ceratognathus* as currently characterized is not a natural group. The South American species do not belong to *Ceratognathus* and it is appropriate to remove them from that genus. Because the differences stated include characters that were previously considered to be of generic significance with respect to the Australasian genera (Holloway 1998), it is appropriate to create a new genus to accommodate the South American species.

Taxonomic treatment

Hilophyllus Paulsen and Mondaca, new genus.

Type species: *Ceratognathus penai* Martínez, 1976: 101, here designated.

Description

Length: 8–9.5 mm. **Color/Surface:** Reddish-brown to dark brown, weakly shining. Dorsum covered with large punctures (integumental pits *sensu* Holloway 1998), many with a single, elongate, apically acute scale arising at center (Figs. 13–14); scales longitudinally ribbed, lacking anastomosing cross-bars. Ventral surface coarsely punctate, setose. **Head:** Frons lacking tubercles. Eyes lacking canthus, enlarged in males. Mandibles small in both sexes, interlocking when closed, not longer than 1/2 length of head, tridentate (larger acute apical tooth with dorsal and ventral teeth); apical tooth strongly curved inward at middle in male, gradually curved in female; dorsal tooth broader in male; ventral tooth of right mandible generally strong, occasionally reduced to barely indicated angulation. Antennae 10-segmented, non-geniculate. Scape (Fig. 17) more than 3x longer than second segment, curved, with dorsal carina dividing the anterior and posterior faces (less noticeable on female); anterior face of scape alutaceous with several stout, erect bristles; posterodorsal face glabrous, shining, lacking longitudinal groove. Club three-segmented, sexually dimorphic (male club segments elongate, slender, as long as or longer than length of head, female club segments subequal in length to 1/2 length of head, Figs. 1–4), segments subcylindrical, slightly increasing in diameter distally, densely pubescent except at base; pubescence long, golden, longer in male than in female. **Pronotum:** Sides explanate to strongly explanate, more strongly explanate in males. Anterior angle produced or truncate, converging strongly to head in female. Lateral margin broadly rounded, widest at middle. **Elytra:** Shape elongate, slightly broader in female, widest at basal third. **Legs:** Anterior tibiae with apical tooth and one prominent median tooth (teeth stronger in females), remaining teeth smaller and uniform (more or less serrate, Figs. 7–9). Mesotibiae with or without external tooth. Metatibiae elongate, cylindrical in cross-section, lacking larger teeth or spines, with regular, longitudinal rows of setae. **Abdomen:** Apex of 5th ventrite truncate in males, convex in females. **Male genitalia:** Internal sac eversible. Basal piece large, median lobe bulbous basally and narrowing to apex, contiguous with parameres, sclerotized dorsally, undivided ventrally.

Parameres symmetrical and elongate, lacking longitudinal ribbing, apex simple, bidentate, or hooked. Paired plates on dorsum of 9th abdominal segment (genital capsule) triangular. **Female genitalia:** (Fig. 22, *H. penai* examined) Hemisternite laterally emarginate, emargination receiving apex of 9th hemisternite. Bursa copulatrix bilobed. Spermathecal duct much shorter than spermatheca (spermathecal gland not located on dissected specimen).

Distribution

South America: Central Chile and adjacent areas of Argentina.

Etymology

The name *Hilophyllus* is created from the Spanish *hilo* (thread) and Greek φύλλον (*phyllon*), latinized *phyllus* (leaves), in reference to the long, threadlike segments of the antennal club. The name is constructed to be similar to *Mitophyllus* (Greek *mitos*, thread), to indicate a closer affinity between the two genera than of either with *Ceratognathus*. *Hilophyllus* is masculine in gender.

Diagnosis

Head unarmed, lacking tubercles on frons. Antennal scape with anterior face alutaceous, posterodorsal face shining, without longitudinal groove. Hind tibiae of male with regular longitudinal rows of setae, lacking setiferous patch. Male mandibles small, similar in shape and size to female mandibles, not highly sexually dimorphic. Elytral scales elongate, apically acute. Female genitalia with short, broad styli.

Key to *Hilophyllus* species

- 1 Mesotibia with external tooth. Elytra not uniformly scaled, instead with pattern consisting of irregular patches of uniformly testaceous scales contrasting with glabrous patches..... *Hilophyllus penai* (Martínez)
- Mesotibia without external tooth. Elytra uniformly scaled, pattern composed of patches of dark and light colored scales, glabrous patches lacking 2
- 2 Anterior pronotal angles not produced, instead subcontiguous with anterior margin of pronotum (Fig. 23). Male genitalia (Fig. 20) with a strong hook at apex of each paramere; median lobe strongly, laterally compressed
..... *Hilophyllus argentinensis* (Martínez)
- Anterior pronotal angles produced, not contiguous with anterior margin of pronotum (Fig. 24). Male genitalia (Fig. 21) with 2 small teeth at apex of each paramere and with median lobe subcylindrical, not strongly flattened
..... *Hilophyllus martinezi* Paulsen & Mondaca, **n.sp.**

Clave para las especies de *Hilophyllus*

- 1 Mesotibia con diente externo. Élitro con escamación irregular, el patrón de cobertura consiste en parches irregulares de escamas testáceas que contrastan con los parches glabros *Hilophyllus penai* (Martínez)
- Mesotibia sin el diente externo. Élitro con escamación uniforme, el patrón de cobertura se compone de parches de escamas de coloración oscura y clara (testácea y rojiza), sin parches glabros..... 2
- 2 Ángulos pronotales anteriores no producidos, contiguos con el margen anterior del pronoto (Fig. 23). Órganos genitales masculinos (Fig. 20) con un gancho curvo en el ápice de cada parámero y con el lóbulo medio fuertemente comprimido lateralmente *Hilophyllus argentinensis* (Martínez)
- Ángulos pronotales anteriores producidos, no contiguos con el margen anterior del pronoto (Fig. 24). Órganos genitales masculinos (Fig. 21), con dos dientes pequeños en el ápice de cada parámero y con el lóbulo medio subcilíndrico, no fuertemente aplanado *Hilophyllus martinezi* Paulsen & Mondaca, **n.sp.**

***Hilophyllus penai* (Martínez, 1976), new combination**

(Fig. 1, 4–5, 7, 16, 22, 25)

Ceratognathus penai Martínez, 1976: 101.*Type specimens*

Holotype male (FMNH) labeled: a) “CARAMAVIDA / Nahuelbuta (W)”;

b) “(Arauco) 750 m / 25–31 Dic. 53 / Coll : L.E. Pena”;

c) on pink paper, “HOLOTYPUS”;

d) on red paper, “*Ceratognathus / penai* (male symbol) / sp. nov.” / (typeset) “A. MARTÍNEZ – DET. 19__”, (handwritten) “75”;

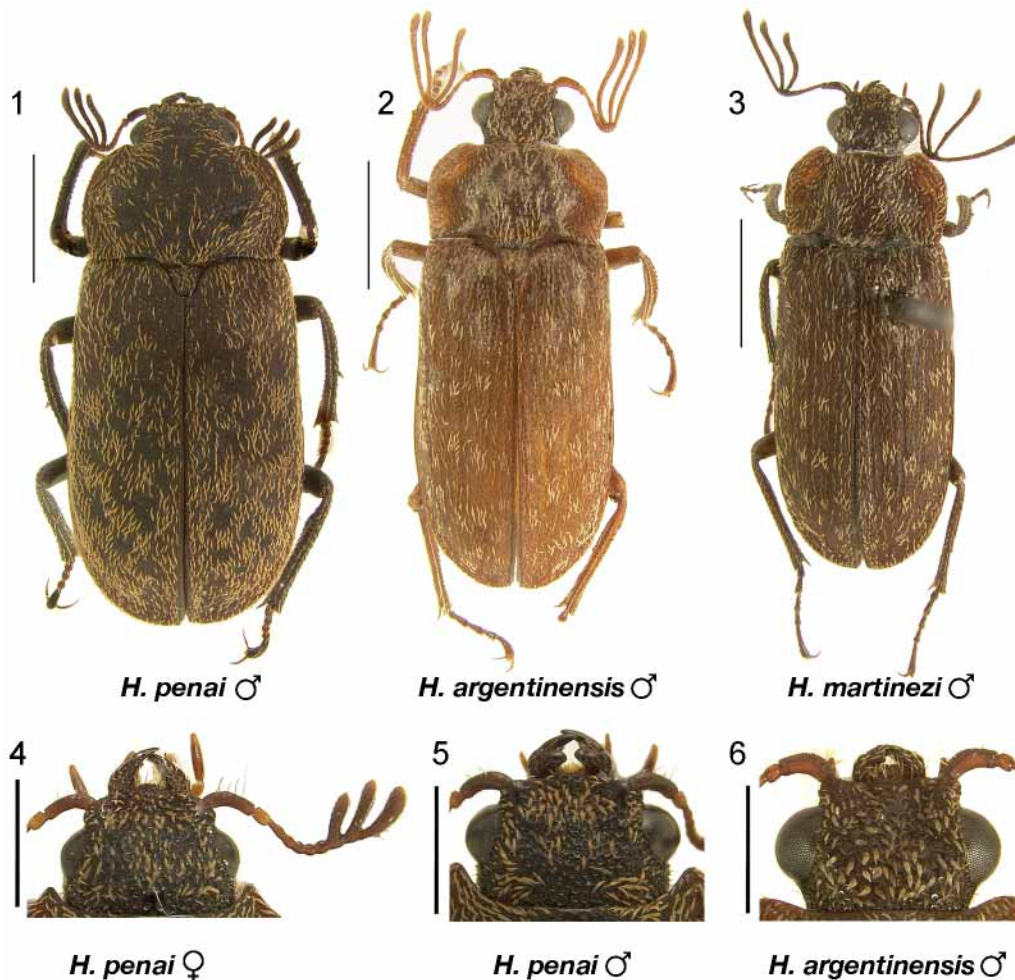
e) “FMNH, 1986 / L.E. Pena Coll. / Acc. “17-422”. One paratype male (CMNC) labeled: a, b as holotype; c) on yellow paper, “PARATYPUS”;

d) as holotype but on yellow paper; e) “H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll.” One paratype male (CMNC) labeled exactly as other paratype, except date of collection “1–10 Enero 54”. A female specimen subsequently labeled as “ALLOTYPE” by Martínez (FMNH) was not listed in the original description and is not part of the type series.

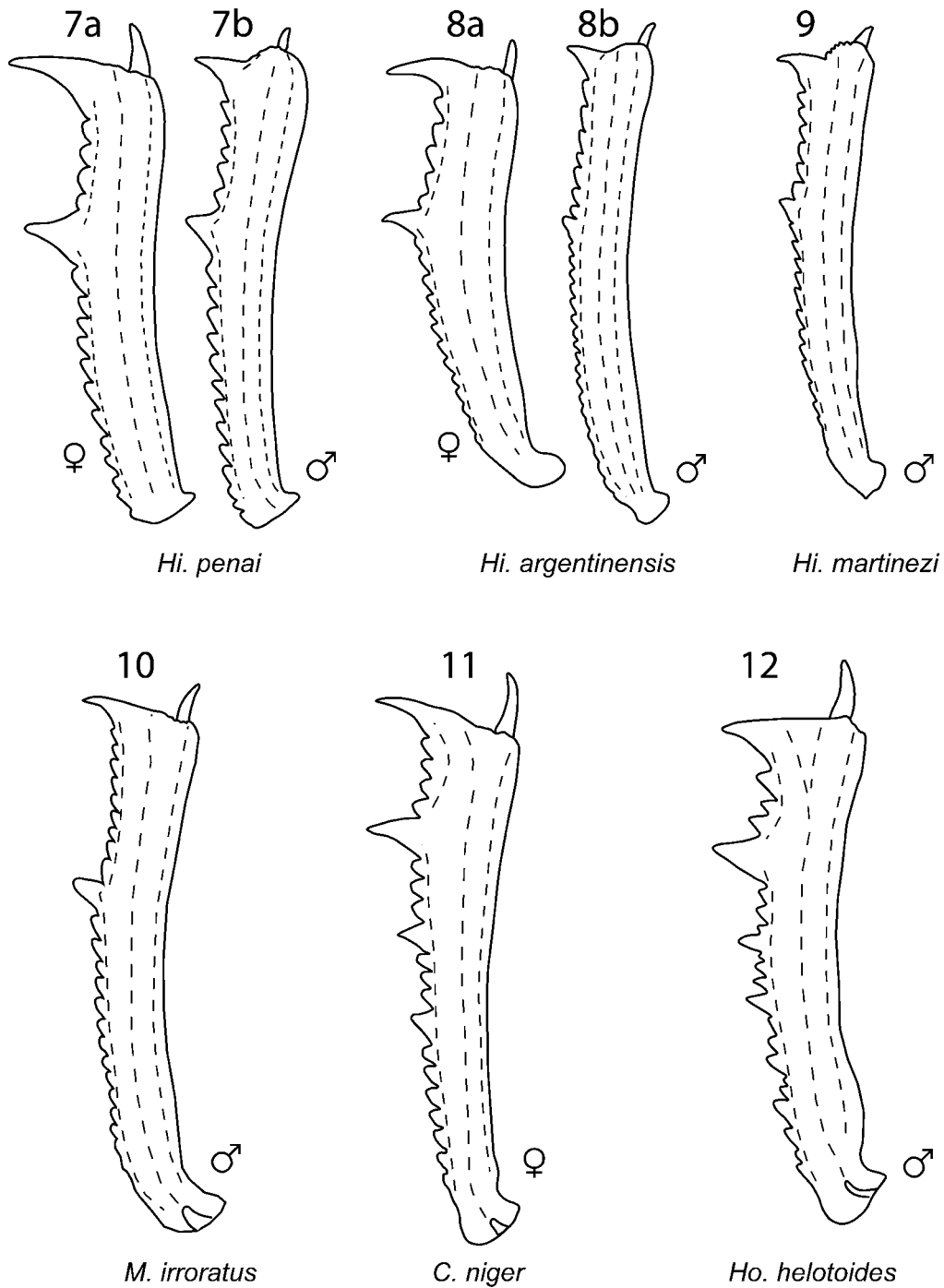
Redescription

Male (n = 5). **Length:** 8.4–8.9 mm. **Width:** 3.4–3.5 mm. **Color/Surface:** Reddish-brown to dark brown, weakly shining. Dorsum (Fig. 1) covered with large punctures, many with a single elongate, apically acute scale; scales unicolored, testaceous or golden yellow. **Head:** Interocular width more than 2x width of eye in dorsal view. Mandibles (Fig. 5) small, interlocking when closed, not longer than 1/2 length of head, apical tooth

curved inward at middle in male; dorsal tooth broad, obtuse; ventral tooth of right mandible present, variably developed, weak or reduced to angulation. Antennal club segments elongate, as long as length of head. **Pronotum:** Sides narrowly explanate. Anterior angle slightly produced, not constricted toward head. Lateral margin broadly rounded, widest at middle. **Elytra:** Punctures lacking scales distributed in irregular patches. **Legs:** Mesotibiae with external tooth. **Male genitalia:** Parameres elongate, simple at apex (Fig. 19).



FIGURES 1–6. 1, dorsal habitus of male *Hilophyllus penai*. 2, dorsal habitus of male *H. argentinensis*. 3, dorsal habitus of male holotype *H. martinezi*, *n.sp.* 4, dorsal view of head of female *H. penai* showing smaller antennal club, eyes, and mandibles. 5, dorsal view of head of male *H. penai* showing eyes and mandibles. 6, dorsal view of head of male *H. argentinensis* showing large eyes and bent, interlocking mandibles. Scale bar = 2 mm (Figs. 1–3) or 1 mm (Figs. 4–6).



FIGURES 7–12. 7, right protibiae of *Hilophyllus penai*, female (a) and male (b). 8, right protibiae of *H. argentinensis* female (a) and male (b). 9, right protibia of *H. martinezi* holotype male. 10, right protibia of *Mitophyllus irroratus* male. 11, right protibia of *Ceratognathus niger* female. 12, right protibia of *Holloceratognathus helotoides* male.

Female (n = 4). Differing from male in following characters: **Length:** 9.0–9.5 mm. **Width:** 3.9–4.0 mm. **Head:** Width of eyes together in dorsal view subequal to 1/3 interocular width. Mandibles small, not strongly curved inward at middle (Fig. 4); dorsal tooth small, acute; ventral tooth of right mandible reduced to barely perceptible angulation. Antennal club segments short, as long as 1/2 length of head (Fig. 4). **Pronotum:** Sides more narrowly explanate. Anterior angles constricted toward head. Lateral margin not uniformly rounded, pinched inward anteriorly. **Genitalia:** See Fig. 22.

Diagnosis

This species is distinguished by the presence of an external tooth on the mesotibia. In addition, the elytral scale pattern is formed with irregular patches of unicolored, light golden yellow scales that contrast with irregular patches that lack scales. The club segments of the male antennae are much shorter than in males of the other species, being only subequal in length to the head and mandibles combined.

Distribution (Fig. 25)

CHILE: VIII Región. This species is apparently restricted to the forests on the west slope of the Nahuelbuta Cordillera (see Remarks).

Locality Data. 9 specimens examined.

CHILE (9). VIII Región: Contulmo (1), west of P.N. Nahuelbuta (8).

Temporal Data. September (1), December (7), January (1).

Remarks

Hilophyllus penai was previously known from only four specimens. Lack of knowledge of the species' natural history probably added to its perceived rarity. In 2004, we first collected a male and female of this species west of Parque Nacional Nahuelbuta by splitting a fallen branch with an approximate diameter of 10 cm. Subsequently, JME observed a male specimen sitting on a partially buried log. The log (possibly *Nothofagus*, Nothofagaceae) contained termite galleries of the species *Porotermes quadricollis* (Rambur) (Termopsidae), and dissection of the log resulted in the collection of two female specimens of *H. penai* among the galleries. Because of this, we hypothesize that species of *Hilophyllus* may be termitophilous. However, there are no apparent morphological adaptations to termitophily in this species such as those found in other inquiline lucanids (e.g. *Penichrolucanus* Deyrolle). It is interesting to note that at least one New Zealand ceratognathine, *Holloceratognathus passaliformis* (Holloway), is myrmecophilous, residing in the galleries of the ant *Prolasius advena* (Smith) (Holloway 1962, 1998).

Based on the material available we hypothesize that this species is restricted to the western side of the Cordillera Nahuelbuta (Fig. 25). Label data on one specimen indicates that it was collected on the lower portion of the slope in Monumento Natural Contulmo, which is at an approximate elevation of 300 m. We collected specimens from 985 to 1085

m. While Parque Nacional Nahuelbuta is adjacent to the range of this beetle, the park contains little of the western slope of the Cordillera. None of our specimens from 2004 were collected inside the park. Moreover, the western slope near P. N. Nahuelbuta is being vigorously deforested and the natural vegetation replaced with pine plantations. Unless the Parque Nacional Nahuelbuta is expanded westward to include habitat from the western slopes, only the tiny M. N. Contulmo (82 hectares, or 0.82 km²) provides protected habitat for the survival of this and other species restricted to the area, including other stag beetles (e.g., *Pycnosiphorus franzae* Weinreich).

***Hilophyllus argentinensis* (Martínez, 1981), new combination**

(Figs. 2, 6, 8, 13, 15, 20, 23, 25)

Ceratognathus argentinensis Martínez, 1981: 13.

Type specimens

Holotype male lost. Both the holotype and allotype of *C. argentinensis* were present in the Martínez collection in 1994 as evidenced by a photograph taken at that time by Gerardo Arriagada (Las Cruces, Chile). Approximately one week after the photo was taken, Henry Howden purchased the Martínez collection, including non-primary types. The specimens purchased by Howden were subsequently donated to the CMNC, including the allotype of *C. argentinensis*. The holotype was deposited in the collection of Museo Argentino de Ciencias Naturales, Buenos Aires, the depository of the majority of Martínez primary types. The first of three boxes of Martínez types was later stolen from the MACN (F. Ocampo, UNSM, personal communication). The specimens in each box were arranged alphabetically by genus, and as the second box begins with “*Chaetodus*”, the holotype of *Ceratognathus argentinensis* was in the box that was stolen and is lost. We designate a neotype to maintain stability in the nomenclature. Because the allotype is in poor condition with the abdomen missing we are choosing a recently collected male as the neotype. The specimen chosen matches the original description of the holotype in all characters and is from approximately 45 km northeast of the type locality in similar habitat. **NEOTYPE HERE DESIGNATED**: deposited at MNNC, labeled: a) “CHILE: Región IX (Araucanía) / P.N. Villarrica; Puesto, 732 m / S 39°31'59.6” W 71°33'19.6” / BL/MV light; M.J. Paulsen / & J. Mondaca; 8 DEC 2004”; b) on red paper “*Ceratognathus / argentinensis* Martínez / NEOTYPE / det. Paulsen & Mondaca 2006”; c) “*Hilophyllus / argentinensis* (Martínez) / det. M.J. Paulsen 2005”. Allotype (CMNC) labeled: a) “ARGENTINA / NEUQUEN / Lago Curruhe / Grande, s/tronco / J.P.R., H., A. y A. Martínez / Coll. Martínez / Ene. “967”; b) on pink paper, “ALLOTYPUS”; c) on red paper: “*Ceratognathus / argentinensis* (female symbol) / sp. nov.” / (typeset) “A. MARTÍNEZ–DET. 19__” (handwritten year illegible); d) “H. & A. HOWDEN / COLLECTION / ex. A. Martinez coll”; e) “*Hilophyllus / argentinensis* (Martínez) / det. M.J.

Redescription

Male (n = 9). **Length:** 8.1–8.5 mm. **Width:** 3.2–3.4 mm. **Color/Surface:** Reddish-brown, weakly shining. Dorsum (Fig. 2) almost uniformly covered with large punctures; most with a single elongate, apically acute scale. **Head:** Eyes large, width of eyes together in dorsal view greater than narrowest interocular width. Mandibles (Fig. 6) small, abruptly curved inward at middle; dorsal tooth acute; ventral tooth of right mandible acute or reduced to angulation. Antennal club segments elongate, longer than 1.5 times length of head (Fig. 15). **Pronotum:** Sides strongly explanate, explanate margin subequal to eye in width. Anterior angle not produced anteriorly (Fig. 23), broadly rounded, appearing nearly contiguous and parallel with anterior margin. Lateral margin broadly rounded, widest at middle. **Elytra:** Shape elongate. Surface almost uniformly punctate, most punctures with scales, punctures without scales forming longitudinal rows (not patches). Scales usually of two colors, brown and light testaceous (scales of greased specimens appearing unicolored). Sutural interval and lateral margin elevated at apex. Surface between punctures smooth (Fig. 13), notably shining at 40x. **Legs:** Mesotibiae lacking external tooth. **Abdomen:** Apex of last ventrite truncate. **Male genitalia:** Parameres with exteriorly curved tooth at apex (Fig. 20).

Female (n = 5). Differing from male in following characters: **Length:** 8.9–9.1 mm. **Width:** 3.6–3.9 mm. **Head:** Width of eyes together in dorsal view subequal to 1/3 interocular width. Mandibles small, not strongly curved inward at middle; dorsal tooth of each mandible reduced, ventral tooth of right mandible acute. Antennal club segments short, as long as 1/2 length of head. **Pronotum:** Sides more narrowly explanate. Anterior angles constricted toward head. Lateral margin not uniformly rounded, pinched inward anteriorly.

Diagnosis

This species is distinguished from *H. penai* by the unarmed mesotibiae. Also, it differs from *H. penai* by the elytral scale pattern (*H. argentinensis* with patches of contrasting lighter and darker scales, whereas *H. penai* has patches of light-colored scales contrasting with glabrous areas). Males of *H. argentinensis* can be distinguished from either of the remaining species because they possess exceptionally long antennal club segments that are much longer than the head and mandibles together. In addition, they have a distinct genitalic form with hooked parameres and a laterally compressed median lobe (Fig. 20).

Distribution (Fig. 25)

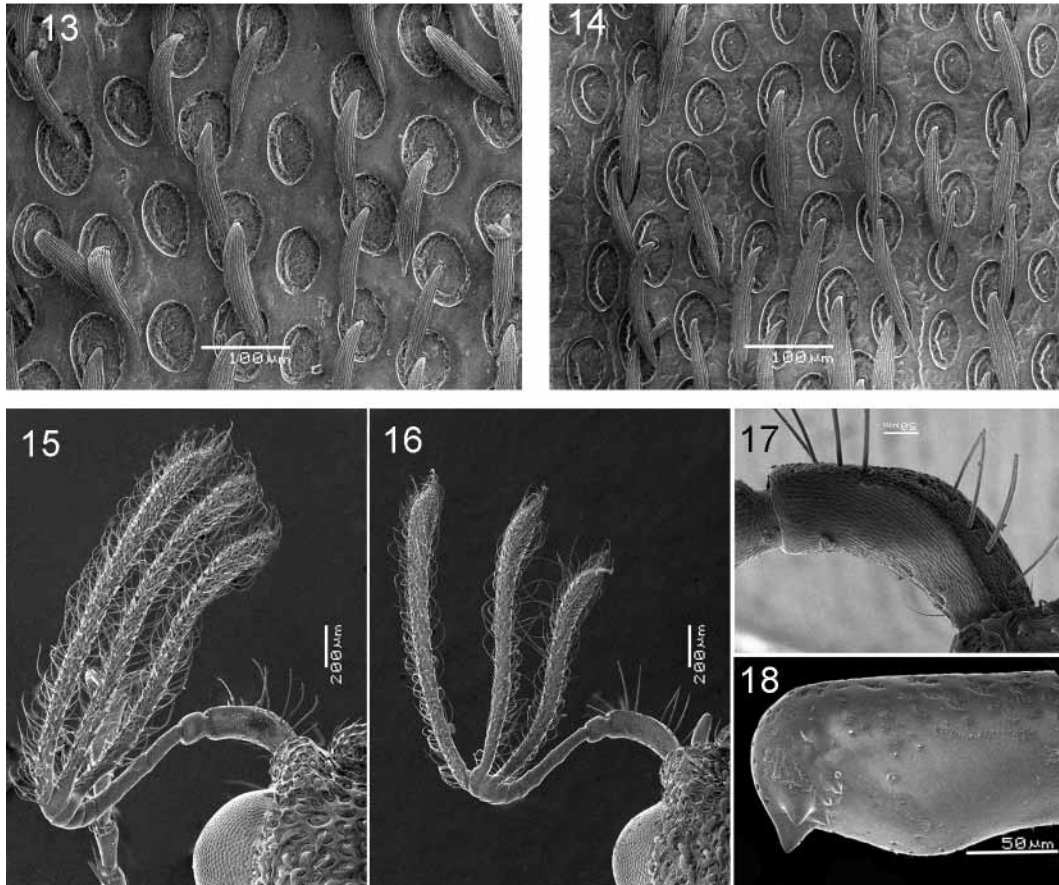
Argentina, Chile. The species is distributed widely in central Chile and extends into neighboring areas with similar habitats in Argentina.

Locality data: 14 specimens examined.

ARGENTINA (1). Neuquén (1): Lago Curruhué Grande.

CHILE (13). VIII Región (1): W. of P.N. Nahuelbuta. IX Región (2): P.N. Villarrica (Puesco, Vol. Villarrica). X Región (10): Cordillera Pelada, M. N. Alerce Costero, P. N. Mocho-Choshuenco, R. N. Valdiviana.

Temporal distribution. December (2), January (8), February (4).



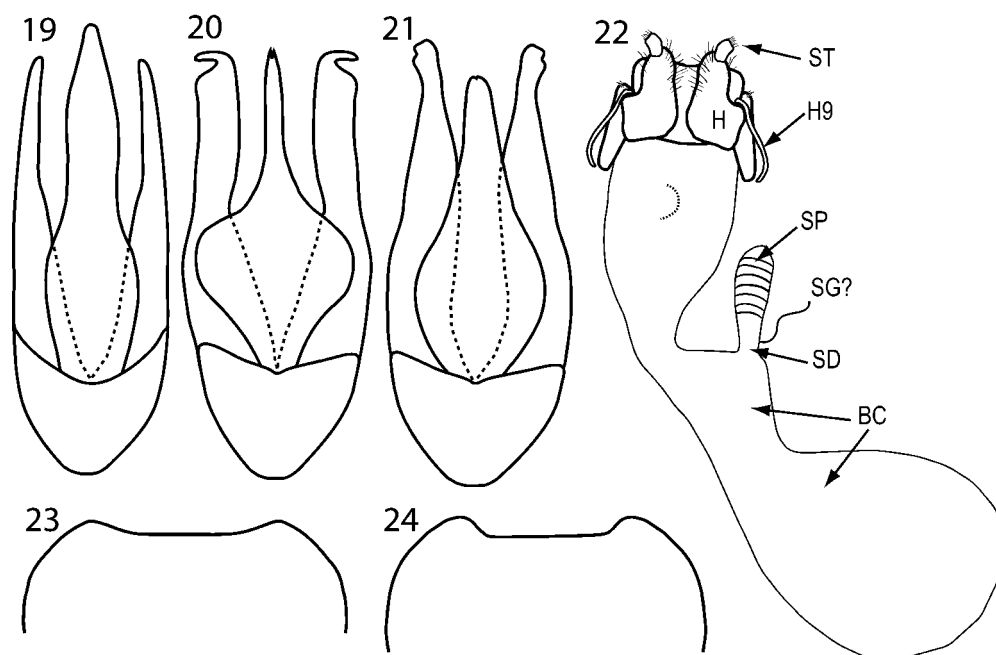
FIGURES 13–18. 13, detail of elytral surface of *H. argentinensis* showing scale, puncture, and smooth surface structure. Scale bar = 100 μm . 14, detail of elytral surface of *H. martinezi* showing scale, puncture, and minutely-wrinkled surface structure. Scale bar = 100 μm . 15, right antenna of male *H. argentinensis*. Scale bar = 200 μm . 16, right antenna of male *H. martinezi*. Scale bar = 200 μm . 17, scape of right antenna of male *H. martinezi*. Scale bar = 50 μm . 18, external surface of apex of right paramere of male *H. martinezi* showing two minute teeth. Scale bar = 50 μm .

Remarks

Martínez (1981) indicated that the type series was collected on a tree trunk, possibly of *Nothofagus* sp., in an advanced state of decomposition in the province of Neuquén, Argentina. More recently, adult and immature specimens of *H. argentinensis* were found

in the lower branches of a decomposing coigüe, *Nothofagus dombeyi* (Mirbel) Blume (Mondaca & Paulsen 2005). However, if this species is termitophilous, it is probable that its distribution is limited more by the presence or absence of termites than the range of a specific host tree. In 2006, MJP collected an additional specimen flying in late afternoon at a height of approximately three meters around the trunk of a partially decomposed lenga, *N. pumilio* (Poepfig & Endlicher) Krasser. Furthermore, one specimen was collected by Dr. Elizabeth Arias (University of California–Berkeley) during insecticidal fogging of *Araucaria araucana* (Molina) K. Koch (Araucariaceae) west of Parque Nacional Nahuelbuta, suggesting that the species may not be restricted to *Nothofagus*.

In 2004, we collected a single male specimen of *H. argentinensis* at mercury vapor light in Parque Nacional Villarrica. In 2006, we collected three male specimens at Reserva Nacional Valdiviana and one male specimen at Parque Nacional Mocho-Choshuenco, all at mercury vapor lights. Previously, there was only anecdotal evidence that this species was attracted to light. It may be relevant that males of this species possess proportionately the largest eyes in the genus; large eyes suggest nocturnal activity, making collection at light traps less surprising although still infrequent.



FIGURES 19–24. 19, ventral view of male genitalia, *H. penai*. 20, ventral view of male genitalia, *H. argentinensis*. 21, ventral view of male genitalia, *H. martinezi*. 22, female genitalia of *H. penai*. Terminology as in Holloway (1998): BC = bursa copulatrix, H = hemisternite, H9 = ninth hemisternite, SD = spermathecal duct, SG? = spermathecal gland (not seen), SP = spermatheca, ST = stylus. 23, outline of anterior portion of pronotum of *H. argentinensis*, showing lack of produced anterior angles. 24, outline of anterior portion of pronotum of *H. martinezi*, showing produced anterior angles.

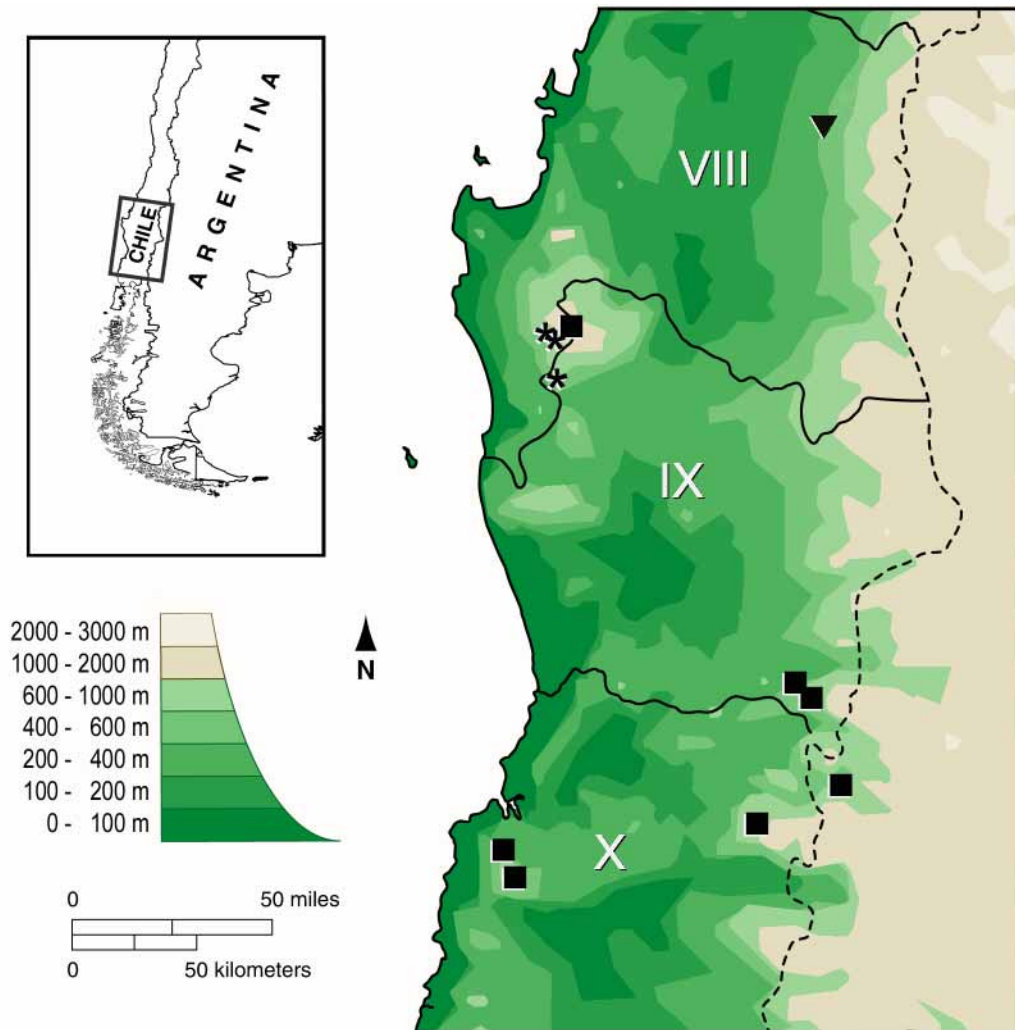


FIGURE 25. Localities from which *Hilophyllus* specimens were examined: *H. penai* (asterisks), *H. argentinensis* (squares), and *H. martinezi* (triangle).

***Hilophyllus martinezi* Paulsen & Mondaca, new species**

(Figs. 3, 14, 18, 21, 24–25)

Type material

Holotype male (MNNC) labeled: a) “CHILE ÑUBLE / Los Lleuques / 29-XI-1988 / Colección MNHN” [=MNNC, S. Roitman collector]; b) on red paper, “*Hilophyllus / martinezi* (male symbol) / Paulsen & Mondaca / HOLOTYPE”.

Description

Holotype male. **Length:** 8.0 mm. **Width:** 2.9 mm. **Color/Surface:** Dark reddish-brown, weakly shining. Dorsum (Fig. 3) almost uniformly covered with large punctures, most with a single elongate, apically acute scale (Fig. 14). **Head:** Eyes large, width of eyes together in dorsal view greater than narrowest interocular width. Mandibles small, externally rounded, not abruptly curved inward at middle; dorsal tooth acute; ventral tooth of right mandible minute (apex of right mandible broken). Antennal club segments elongate, longer than 1.5 times length of head (Fig. 16). **Pronotum:** Sides strongly explanate, explanate margin subequal to eye in width. Anterior angle produced beyond anterior margin (Fig. 24). Lateral margin broadly rounded, widest before middle. **Elytra:** Shape elongate. Almost uniformly punctate, most punctures with scales, punctures without scales forming longitudinal rows (not patches), scales brown and testaceous. Sutural interval and lateral margin elevated apically. Surface between punctures roughened (Fig. 14), appearing wrinkled at 40x. **Legs:** Mesotibiae lacking external tooth. **Male genitalia:** See Fig. 21. Parameres with 2 small, external teeth at apex (Fig. 18), median lobe cylindrical toward apex, not laterally compressed.

Female unknown.

Diagnosis

This species is distinguished from *H. penai* by its unarmed mesotibiae. It is, however, externally quite similar to *H. argentinensis*. The most notable external difference between these two species is in the anterior angles of the pronotum, which are produced beyond the anterior pronotal margin in *H. martinezi* but more or less contiguous with the anterior margin of the pronotum in *H. argentinensis* (Fig. 23). This gives the overall impression of a smaller pronotum in *H. martinezi*. Ideally we would prefer more material upon which to base a new species. However, the form of the male genitalia (Figs. 20–21) in *H. argentinensis* and *H. martinezi* are vastly different. Based on the constancy of male genitalic form (*i.e.*, lack of variation) observed in *H. penai* ($n = 4$), as well as in *H. argentinensis* ($n = 9$) across its range, we believe that the unique male genitalic form of *H. martinezi* is compelling evidence that this is a distinct species.

Distribution (Fig. 25)

CHILE. The species is known from central Chile.

Locality data: 1 specimen examined.

CHILE (1). VIII Región (1): Los Lleuques.

Temporal distribution. November (1).

Etymology

The species is named *martinezi* in honor of Antonio Martínez and his contributions to the knowledge of South American Coleoptera.

Remarks

This single specimen from Los Lleuques, Ñuble, is similar externally to *H. argentinensis*. However, the male genitalia (Fig. 21) are distinct. The apex of each paramere bears two minute, external teeth (Fig. 18) rather than the large external tooth present on *H. argentinensis*. Furthermore, the parameres are strongly narrowed before the apex and the median lobe is broad and subcylindrical to the apex, not strongly laterally compressed. Nothing is known about the biology of this species.

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