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**THE *ANCOGNATHA* ERICHSON (COLEOPTERA: SCARABAEIDAE: DYNASTINAE: CYCLOCEPHALINI) OF ECUADOR, WITH DESCRIPTION OF A NEW SPECIES**

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**ABSTRACT**

Descriptions, diagnoses, locality and temporal records, distributional maps, and illustrations of the 11 species of *Ancognatha* Erichson occurring in Ecuador are provided. Four **new country records** are reported for Ecuador, and a **new species** is described. A female lectotype at the Natural History Museum (London) for *Ancognatha jamesoni* Murray is designated. A key to the Ecuadorian species is included.

**RESUMEN**

Se proporcionan descripciones, diagnosis, localidades y meses de colecta, mapas de distribución e ilustraciones de las 11 especies de *Ancognatha* Erichson que se encuentran en Ecuador. Se reportan cuatro **registros nuevos para el país** y se describe una **especie nueva**. Se designa el lectotipo hembra de *Ancognatha jamesoni* Murray del Natural History Museum (Londres). Se incluye una clave para las especies ecuatorianas.

Key Words: taxonomy, lectotype, Neotropics, South America, scarab beetles

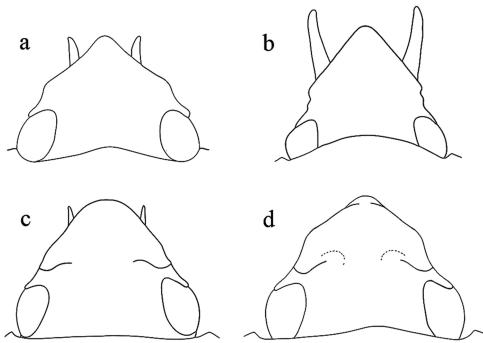
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*Ancognatha* Erichson is comprised of 23 species that are found from the southwestern USA (Arizona and New Mexico) to northern Argentina, Chile, and Bolivia (Endrödi 1966, 1985; Ratcliffe 1992; Pardo-Locarno *et al.* 2006; Gasca-Álvarez and Amat-García 2010; Ratcliffe *et al.* 2013; Mondaca 2016; Figueroa and Ratcliffe 2016; Ratcliffe and Cave 2017). Based on studies of *Ancognatha* species in Colombia, Peru, and Chile, most species occur only in highland areas (Pardo-Locarno *et al.* 2006; Figueroa and Ratcliffe 2016; Mondaca 2016). Endrödi (1966, 1985) provided the last comprehensive review of the species of *Ancognatha*. The present study is the first review of the *Ancognatha* of Ecuador.

The elongate, generally acuminate or parabolic form of the clypeus (Fig. 1a–d) has been used to distinguish *Ancognatha* from other genera of

Cyclocephalini. The clypeal apex in some species of *Ancognatha* is broadly parabolic, rounded, or subtriangular (Fig. 1a–d), and they share this character state with many species of *Cyclocephala* Dejean. Again, however, the form of the mentum in *Ancognatha* species (and their generally larger size) will separate them from *Cyclocephala* species. Bates (1888) noted that in *Ancognatha* species the labrum is detached and inclined from the roof of the mouth instead of being hidden as in *Cyclocephala*. The narrow, generally upwardly pointed mandibles are also characteristic of most species of *Ancognatha*. The frontoclypeal suture is obsolete medially in *Ancognatha* species, whereas it is more-or-less complete in most species of *Cyclocephala* and *Aspidolea* Bates. In some species of *Ancognatha*, the frontoclypeal suture is interrupted by small, weak tubercles. The antenna has 10 antennomeres



**Fig. 1.** *Ancognatha* species, clypeus and mandibles, dorsal view. a) *A. horrida*, b) *A. jamesoni* c) *A. lutea*, d) *A. scarabaeoides*.

and a club distinctly longer than antennomeres 2–7. The pronotal base lacks a marginal bead in front of the scutellum. The protarsus in the males is always enlarged, the large median claw is deeply cleft at its apex, and the protarsus and claw are simple in the female. The parameres of most species follow a general pattern of form and are not overly distinctive because of similarities, hence of lesser diagnostic value; accordingly, they are not described in words in each species treatment since reference to a figure is more informative.

The larval stage has been described for *Ancognatha manca* LeConte, *Ancognatha sellata* Arrow, *Ancognatha scarabaeoides* Erichson, and *Ancognatha ustulata* (Burmeister) (Ritcher 1966; Ramírez-Salinas *et al.* 2004; Vallejo and Morón 2008; Neita-Moreno and Morón 2008). Larvae of three *Ancognatha* species are reported as a food source in Ecuador: *Ancognatha castanea* Erichson, *Ancognatha jamesoni* Murray, and *Ancognatha vulgaris* Arrow (Onore 1997, 2005). Adults are attracted to lights at night, but little is known of their life history.

#### MATERIAL AND METHODS

This research was based on the study of 1,689 specimens from three sources: (1) field collecting expeditions by the authors and colleagues; (2) verified data recorded from the literature; and (3) specimens from museum and private collections listed below.

- BCRC** Brett C. Ratcliffe Collection, Lincoln, Nebraska, USA  
**BMNH** Natural History Museum, London, UK (Max Barclay)  
**CISEC** Colección de Invertebrados del Sur del Ecuador, Universidad Técnica Particular de Loja, Loja, Ecuador (Diego Marín)

- CMNH** Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA (John Rawlins, Robert Davidson)  
**CMNC** Canadian Museum of Nature, Ottawa, Ontario, Canada (François Génier, Robert Anderson)  
**CNCI** Canadian National Collection of Insects, Ottawa, Ontario, Canada (data courtesy of Andrew Smith)  
**DCCC** David C. Carlson Collection, Fair Oaks, California, USA  
**MACN** Museo Argentino de Ciencias Naturales ‘Bernardino Rivadavia’, Buenos Aires, Argentina (Axel Bachmann)  
**MAHC** Martin Hardy Collection, Québec City, Québec, Canada  
**MECN** Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador (Santiago Villamarín)  
**MEPN** Museo de la Escuela Politécnica Nacional, Quito, Ecuador (David Donoso, Miguel Pinto)  
**NHMB** Collection Museum G. Frey, formerly Tutzingen, Germany, now at Naturhistorisches Museum, Basel, Switzerland (Isabelle Zürcher-Pfänder)  
**QCAZ** Museo de la Pontificia Universidad Católica del Ecuador, Quito, Ecuador (Álvaro Barragán, Clifford Keil)  
**RDCC** Ronald D. Cave Collection, Port St. Lucie, Florida, USA  
**SLTC** Stéphane Le Tirant Collection, TerraBonne, Québec, Canada  
**SMTD** Staatliches Museum für Tierkunde, Dresden, Germany (Olaf Jäger)  
**UMSP** University of Minnesota, St. Paul, Minnesota, USA (Ralph W. Holzenthal)  
**UNSM** University of Nebraska State Museum, Lincoln, Nebraska, USA (Brett Ratcliffe)  
**USNM** US National Museum, Washington, DC (currently on long-term loan to University of Nebraska State Museum, Lincoln, Nebraska, USA; Brett Ratcliffe)  
**ZMHU** Museum für Naturkunde, Berlin, Germany (Bernd Jäger)

The collecting methods we used were light traps with mercury vapor and ultraviolet bulbs, foliage gleaning, excavating rotting logs and stumps, and manual collecting around public lights. Label data for type specimens are quoted verbatim; a single slash (/) indicates a break between lines on the same label, and a double slash (//) indicates a different label on the same specimen.

The species descriptions encompass the range of variation we observed in the specimens at hand. The descriptions were based on the following

characteristics: length from apex of the clypeus to the apex of the elytra; width across humeri; color and markings; interocular width (number of transverse eye diameters across the frons between the eyes); form and sculpturing of the head, pronotum, elytra, and pygidium; female epipleuron, form of the prosternal process; and form of the male parameres. Punctures are considered simple unless otherwise noted. Minute punctures are generally not seen with 12.5X magnification but are easily seen with 50X magnification. Small punctures are easily seen with 12.5X magnification and can be seen with the naked eye. Large punctures are easily seen without the aid of instruments. Sparse punctures are characterized by numerous puncture diameters between them. Punctures moderate in density have 3–5 puncture diameters between them. Dense punctures have only 1–2 puncture diameters between them or less.

We use the phylogenetic species concept as outlined by Wheeler and Platnick (2000). This concept defines species as the smallest aggregation of (sexual) populations diagnosable by a unique combination of character states.

## RESULTS

Eleven *Ancognatha* species occur in Ecuador: *A. atacazo* (Kirsch); *A. castanea*; *A. horrida* Endrödi; *A. humeralis* Burmeister; *A. hyltonscottae* Martínez; *A. jamesoni*; *A. lutea* Erichson; *A. scarabaeoides*; *A. uncinata* Paucar-Cabrera and Ratcliffe, **new species**, *A. ustulata*; and *A. vulgaris*. *Ancognatha jamesoni* and *A. uncinata* are known only from Ecuador. *Ancognatha quadripunctata* Bates listed by Endrödi (1985) for Ecuador was a misidentification. We examined the single specimen he identified as *A. quadripunctata* and found that it is actually *A. humeralis*. There are four new Ecuador country records: *A. hyltonscottae*; *A. lutea*; *A. uncinata*; and *A. scarabaeoides*. *Ancognatha* species have been collected in all mainland regions in Ecuador from coastal (lowest elevation of 9 m at Tonsupa, Esmeraldas Province) to Andean (highest elevation of 4,000 m at Chuquipogyio, Chimborazo Province) to Amazonian (lowest elevation of 217 m at Parque Nacional Yasuní, Orellana Province). The highest number of specimens were collected at 2,000–4,000 m (68% of the specimens, of which 5% were collected above a remarkable 3,500–4,000 m). The lowest number of individuals were collected at sea level–1,000 m (4%), and the remaining 28% were collected between 1,000–2,000 m. *Ancognatha* specimens have been collected in all the provinces of Ecuador, and yet we know (based on museum collections) that the coastal and southern provinces have been sampled less for most insects due, in part, to a probable collecting bias by

collectors for tropical, Andean habitats. The genus is not present in the Galápagos Islands. They have been collected in pristine natural areas such as páramo, premontane wet forest, rain forest, and cloud forest as well as from disturbed areas such as urban environments, pine forest, and potato crops. The species with the broadest distributions are *A. castanea*, *A. humeralis*, *A. scarabaeoides*, and *A. vulgaris* (Figs. 8, 14, 32 and 41, respectively). The species with restricted distributions are *A. horrida*, *A. hyltonscottae*, *A. uncinata*, and *A. ustulata* (Figs. 11, 18, 35, and 38, respectively).

Based on collecting data, *Ancognatha* individuals can be collected throughout the year, but there are two peaks of abundance annually, one from January to February when 371 individuals were collected (28%) and another peak during October and November when 384 individuals were collected (29%). However, these data may be biased since most collectors conduct field research during these times when adult scarabs are perceived to be most diverse and abundant. Two peaks of abundance in the temporal distributions seen for Rutelinae in Ecuador (Paucar-Cabrera 2005) overlap with those of *Ancognatha*, one from February to March and another from October to December. The Rutelinae show another peak from May to June, but this has not been seen in *Ancognatha* species.

## KEY TO THE SPECIES OF ADULT *ANCOGNATHA* OF ECUADOR

(Excluding the unknown females of *A. lutea* and *A. uncinata*)

(Males have enlarged protarsal claws, females do not)

1. Dorsal surface reddish brown, brown, or black ..... 2
- 1'. Dorsal surface testaceous with black markings ..... 4
2. Frons with low, median knob or elevated, transverse tubercle. Parameres as in Fig. 7 ..... *A. castanea* Erichson
- 2'. Frons lacking distinct median knob ..... 3
3. Pygidium setose. Clypeus broadly elliptical in male, semi-circular in female. Frontoclypeal region with transverse ridge interrupted at middle, giving impression of 2 closely adjacent, transversely elongate prominences. Parameres as in Fig. 4 ..... *A. atacazo* (Kirsch)
- 3'. Pygidium glabrous. Clypeus subtriangular with lateral margins rounded and apex narrowly rounded (subacute) in both sexes (Fig. 1d). Frontoclypeal region with 2 widely separated, small prominences next to inner

- margin of eye. Parameres as in Fig. 30 .....  
 ..... ***A. scarabaeoides* Erichson**
4. Pygidium with tuft of long setae on apex ....  
 ..... ***A. lutea* Erichson**
- 4'. Pygidium lacking tuft of long setae on  
 apex ..... 5
5. Mentum with apex deeply incised, incision  
 longer than base (Fig. 2b) ..... 6
- 5'. Mentum with short incision at apex, incision  
 shorter than base (Fig. 2a) ..... 8
6. Male pygidium sparsely punctate with  
 sparse, short setae. Female epipleuron  
 slightly expanded. Parameres as in Fig.  
 13 ..... ***A. humeralis* Burmeister**
- 6'. Male pygidium densely punctate with long  
 setae. Female epipleuron strongly thickened  
 into elongate knob in *A. vulgaris* (*A. uncinata*  
 female unknown) ..... 7
7. Male with large, flange-like hook at base of  
 parameres (Fig. 33). Female unknown .....  
 ..... ***A. uncinata* Paucar-Cabrera and  
 Ratcliffe, new species**
- 7'. Male without large, flange-like hook at base  
 of parameres (Fig. 39). Epipleuron (ventral  
 view) of female expanded into large lobe at  
 level of metacoxa/sternite 1 .....  
 ..... ***A. vulgaris* Arrow**
8. Clypeus of male subtriangular (Fig. 1a–b);  
 clypeus of females parabolic (Fig. 19) ...  
 ..... 9
- 8'. Clypeus of male and female parabolic (Fig.  
 1c–d) ..... 10
9. Clypeus much longer than frons. Male with  
 mandibles extending well past apex of  
 clypeus (Fig. 1b). Male protarsomere 5  
 with moderate to large, subtriangular tooth  
 or ridge at base on ventral side. Male  
 protarsal large claw usually distinctly  
 flared at about middle on ventral side.  
 Pronotum of male densely punctate or  
 finely scabrous, densely punctate in fe-  
 male. Female epipleuron (in ventral view)  
 simple. Parameres as in Fig. 21 .....  
 ..... ***A. jamesoni* Murray**
- 9'. Clypeus subequal in length to frons. Male  
 with mandibles extended to clypeal apex or  
 just slightly beyond. Male protarsomere 5  
 lacking ventral tooth or ridge. Male protarsal  
 large claw not flared at about middle on  
 ventral side. Pronotum, at most, sparsely  
 punctate. Female epipleuron (in ventral  
 view) relatively broad from its base and  
 abruptly constricted at level of sternite 1.  
 Parameres as in Fig. 10 .....  
 ..... ***A. horrida* Endrödi**
10. Sides of parameres weakly sinuate just be-  
 fore apex (Fig. 17). Epipleuron of female  
 testaceous, enlarged at level of coxa and

- abdominal sternite 1 and then tapered, ex-  
 pansion wider than width of epipleuron at its  
 base (Fig. 15a) .....  
 ..... ***A. hyltonscottae* Martínez**
- 10'. Sides of parameres deeply emarginate just  
 before apex (Fig. 36). Epipleuron of female  
 black, broad from base to level of abdominal  
 sternites 1–2 where slightly flared and then  
 constricted (Fig. 15b) .....  
 ..... ***A. ustulata* (Burmeister)**

**CLAVE PARA LOS ADULTOS DE LAS ESPECIES  
 DE ANCOGNATHA DE ECUADOR**

(Excluyendo las hembras desconocidas de *A. lutea* y  
*A. uncinata*)

(Machos tienen garras del protarso agrandadas;  
 hembras no las tienen así)

1. Superficie dorsal color café rojizo, café o ne-  
 gro ..... 2
- 1'. Superficie dorsal color amarillo pajizo con  
 marcas negras o café oscuras ..... 4
2. Frente con prominencia poco elevada o con  
 tubérculo medio bien definido, elevado y  
 transverso. Parámetros como en la Fig. 7 .....  
 ..... ***A. castanea* Erichson**
- 2'. Frente sin tubérculo o prominencia media ....  
 ..... 3
3. Pigidio setoso. Clípeo ampliamente elíptico en  
 el macho, semicircular en la hembra. Región  
 frontoclipeal con cresta transversal inter-  
 rumpida en la mitad, dando la impresión de 2  
 prominencias o tubérculos adyacentes y alar-  
 gados. Parámetros como en la Fig. 4 .....  
 ..... ***A. atacazo* (Kirsch)**
- 3'. Pigidio glabro. Clípeo subtriangular con  
 los márgenes laterales redondeados y el  
 ápice redondeado estrechamente (subagudo)  
 en ambos sexos (Fig. 1d). Región fronto-  
 clipeal con 2 prominencias o tubérculos  
 pequeños, ampliamente separados. Parámetros  
 como en la Fig. 30 .....  
 ..... ***A. scarabaeoides* Erichson**
4. Pigidio con una agrupación densa de setas  
 largas (penacho de setas) en la mitad del  
 ápice ..... ***A. lutea* Erichson**
- 4'. Pigidio glabro sin agrupación densa de setas en  
 la mitad del ápice ..... 5
5. Mentum con ápice profundamente hendido, la  
 hendidura más larga que la base del mentum  
 (Fig. 2b) ..... 6
- 5'. Mentum con una hendidura corta en el ápice, la  
 hendidura más corta que la base del mentum  
 (Fig. 2a) ..... 8
6. Pigidio del macho con puntuación esparcida,  
 con setas cortas. Epipleura de la hembra  
 ligeramente expandida. Parámetros como en la  
 Fig. 13 ..... ***A. humeralis* Burmeister**

- 6'. Pigidio del macho con puntuación densa, con setas largas. Epipleura de la hembra fuertemente engrosada a manera de una perilla alargada en *A. vulgaris* (no se conoce la hembra de *A. uncinata*) ..... 7
7. Macho con la base de los parámetros con un gancho grande y saliente (Fig. 33). No se conoce la hembra .....  
... *A. uncinata* Paucar-Cabrera y Ratcliffe, especie nueva
- 7'. Macho con la base de los parámetros sin gancho grande y saliente (Fig. 39). Epipleura (en vista ventral) de la hembra expandida como un lóbulo o perilla alargada al nivel de la metacoxa/esternito 1 ..... *A. vulgaris* Arrow
8. Clípeo del macho subtriangular (Fig. 1a–b); clípeo de la hembra parabólico (Fig. 19) ..... 9
- 8'. Clípeo de ambos sexos parabólico (Fig. 1c–d) ..... 10
9. Clípeo mucho más largo que la frente. Mandíbulas del macho extendiéndose más allá del ápice del clípeo (Fig. 1b). Base del protarsómero 5 en el macho con diente subtriangular (moderado o grande) o con cresta. Macho con uña protarsal grande y distintamente ensanchada cerca de la mitad del lado ventral. Pronoto del macho densamente punteado o finamente escabroso, densamente punteado en la hembra. Hembra con la epipleura simple (en vista ventral). Parámetros como en la Fig. 21 .....  
..... *A. jamesoni* Murray
- 9'. Clípeo casi igual al largo de la frente (1a). Mandíbulas del macho extendiéndose hasta el ápice del clípeo o ligeramente más largas. Base del protarsómero 5 en el macho sin diente o cresta ventral. Macho con uña protarsal grande y no ensanchada cerca de la mitad del lado ventral. Pronoto, en su mayoría, esparcidamente punteado. Hembra con la epipleura relativamente ensanchado desde su base y abruptamente contraída al nivel del esternito 1 (en vista ventral). Parámetros como en la Fig. 10 ..... *A. horrida* Endrödi
10. Borde lateral de los parámetros en el área subapical débilmente sinuado (Fig. 17). Epipleura de la hembra de color amarillo pajizo, expandida al nivel de la coxa y esternito abdominal 1 y luego se vuelve estrecha, expansión más ancha que el ancho de la base de la epipleura (Fig. 15a) .....  
..... *A. hyltonscottae* Martínez
- 10'. Borde lateral de los parámetros en el área subapical profundamente emarginado (Fig. 36). Epipleura en hembras de color negro, expandida desde su base hasta los esternitos abdominales 1–2 donde está débilmente ensanchada y luego contraída (Fig. 15b) .....  
..... *A. ustulata* (Burmeister)

### *Ancognatha* Erichson, 1847

*Ancognatha* Erichson 1847: 97.

*Barotheus* Bates 1891: 30 (synonym).

*Pseudancognatha* Otoyá 1945: 275 (synonym).

### *Ancognatha atacazo* (Kirsch, 1885)

(Figs. 2a, 3–5)

*Cyclocephala atacazo* Kirsch 1885: 223 (original combination). Lectotype female at SMTD (Moore *et al.* 2018).

**Redescription.** Length 17.1–24.5 mm; width 9.4–12.6 mm. Color black, occasional specimen on elytra with reddish yellow at base and on sides (Fig. 3). **Head:** Frons and clypeus minutely shagreened with small, moderately dense punctures. Frontoclypeal line elevated into low carina, carina interrupted at middle (giving impression of 2 adjacent, low tubercles); frons immediately behind carina with shallow, semi-oval depression. Clypeus broadly elliptical in male, nearly semi-circularly rounded in female; apex narrowly, weakly reflexed. Interocular width equals 2.8–3.0 transverse eye diameters. Mentum with apex distinctly but not deeply emarginate (Fig. 2a). **Pronotum:** Surface similar to that of frons. **Elytra:** Surface minutely shagreened, moderately densely punctate, punctures minute; striae 1–3 weakly impressed, barely evident. Epipleuron (ventral view) in female slightly expanded at juncture of 1<sup>st</sup> and 2<sup>nd</sup> sternite. **Pygidium:** Surface shagreened with small, moderately dense punctures and short setae; setae tawny, reduced on central third. In lateral view, male with surface evenly rounded, female with surface nearly flat. **Legs:** Protibia tridentate, teeth subequally spaced. **Venter:** Protosomal process long, stout, apex bulbous, nearly circular. **Parameres:** Fig. 4.

**Distribution.** *Ancognatha atacazo* was previously known only from Ecuador (Endrödi 1966, 1985) but was subsequently reported from Costa Rica (Ratcliffe 2003) and Colombia (Pardo-Locarno *et al.* 2006).

The locality of Sebundoi, Ecuador for the four specimens from the BCRC collection and collected

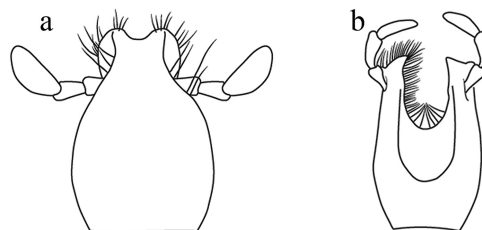
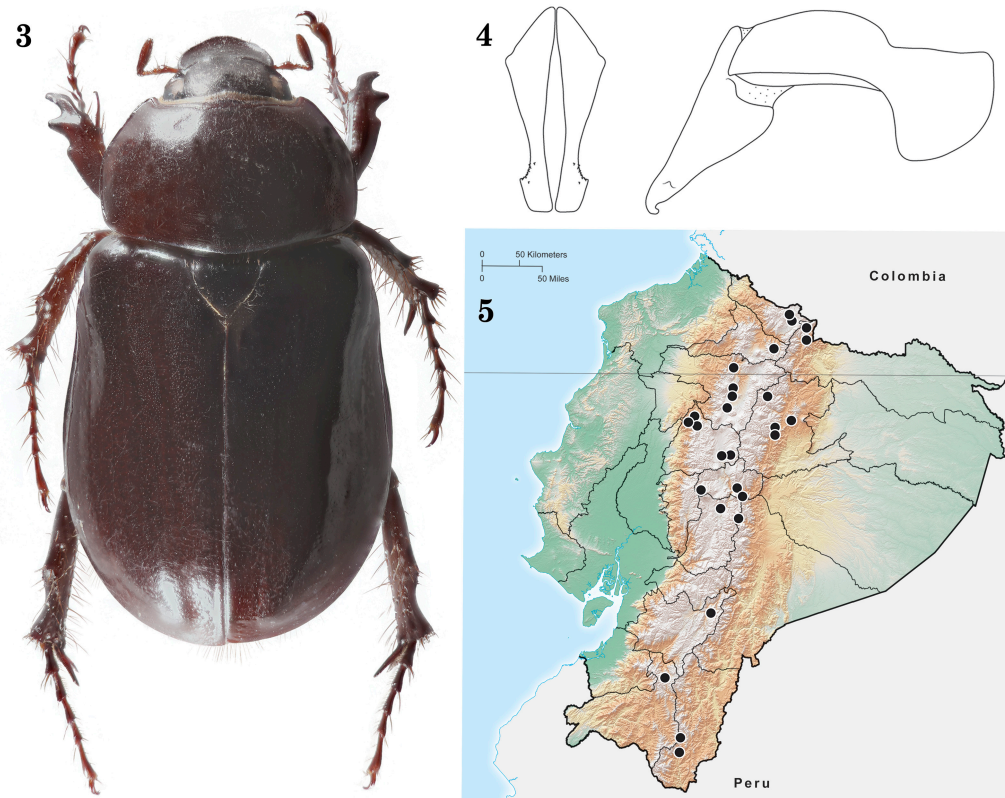


Fig. 2. *Ancognatha* species, mentum, ventral view. a) *A. atacazo*, b) *A. vulgaris*.



Figs. 3–5. *Ancognatha atacazo*. 3) Habitus; 4) Parameres; 5) Distribution in Ecuador.

in 1977 at an elevation of 2,600–3,000 m was not found in gazetteers. The collector, L. Peña, wrote two provinces for this locality: Carchi and Napo. Breure and Borrero (2008) indicated that there is a locality in Putumayo (Colombia) called Sibunday that has been often referred to as an Ecuadorian locality spelled Sebundoi. Sibunday, at 2,104 m in elevation, is close in distance to Napo and Carchi provinces and was possibly mistakenly placed in those northern Ecuadorian provinces in the case of these four specimens.

**Locality Records** (Fig. 5). 103 specimens from BCRC, DCCC, NMPC, MECN, MEPN, QCAZ, USNM, Endrödi (1966).

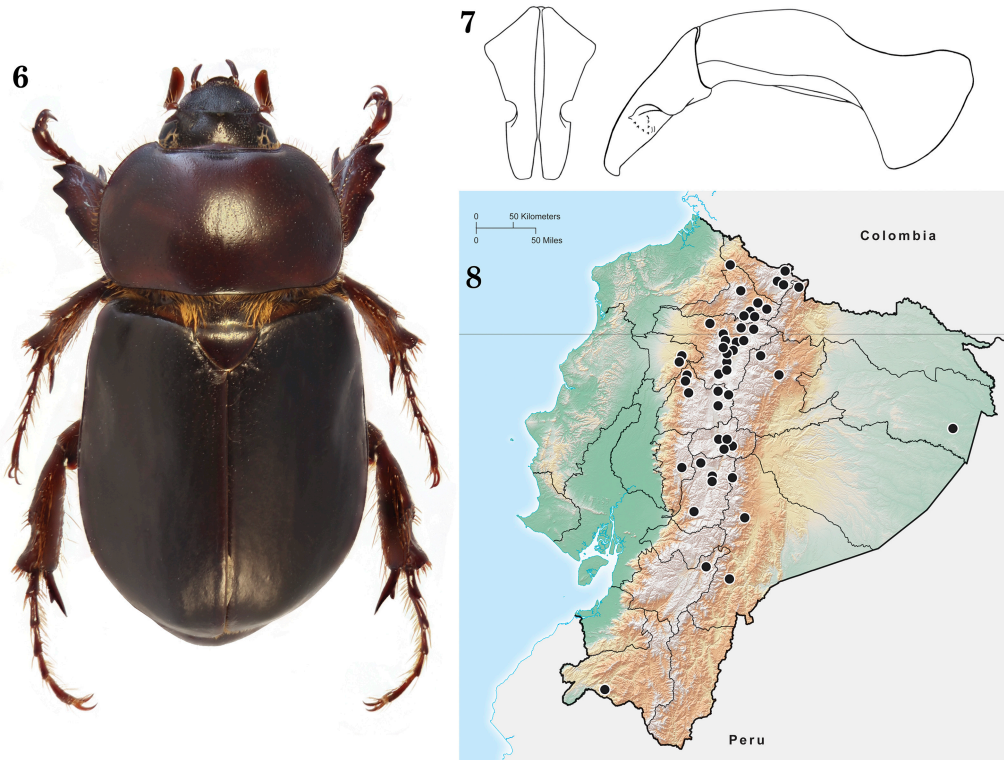
AZUAY (1): Gualaceo (34 km SE). CARCHI (21): Cantón Bolívar Río Apaqui, Hacienda La Bretaña (Cantón Huaca, Parroquia Mariscal Sucre), Tulcán (La Alegría). CHIMBORAZO (1): Guano. COTOPAXI (24): Saguambi, Sigchos, Triunfo Bajo, via Liptos–Sigchos. IMBABURA (1): km 4 via M. Acosta–Ibarra. LOJA (3): Rocafuerte, Saraguro (11 km S). MORONA SANTIAGO (1): Parque Nacional Sangay (Parroquia Zuñac). NAPO (11): Cosanga, Estación Biológica Yanayacu, Oyacachi,

Papallacta, Salcedo–Tena road, Sierrazul. PICHINCHA (10): Atacazo, Los Laureles, Perucho, Quito, Río Alambi (Sector Guarumos). SUCUMBIÓS (5): Santa Bárbara, via Santa Bárbara–La Bonita (km 23). TUNGURAHUA (3): Baños, Chimborazo (7 km NW). ZAMORA CHINCHIPE (1): Reserva Tapi-chalaca. PROVINCE UNKNOWN (21): Sebundoi.

**Temporal Distribution.** January (9), February (1), March (26), April (4), May (1), June (1), July (2), August (4), September (40), October (11), November (6).

**Diagnosis.** *Ancognatha atacazo* can be distinguished from *A. castanea* and *A. scarabaeoides*, the other two black or brown species in the study area, by its broadly rounded clypeus; frontoclypeal ridge interrupted in the middle giving the impression of two low, adjacent tubercles; setose pygidium; prosternal process bulbous apically, nearly circular; and form of the parameres (Fig. 4).

**Natural History.** Adults are attracted to lights. They have been collected at elevations of 1,800–3,800 m on the eastern slopes of the Andes. The highest collecting elevation (3,800 m) was reported by Endrödi (1966) in his description of the lectotype.



Figs. 6–8. *Ancognatha castanea*. 6) Habitus; 7) Parameres; 8) Distribution in Ecuador.

***Ancognatha castanea* Erichson, 1847**  
(Figs. 6–8)

*Ancognata castanea* Erichson 1847: 98 (original combination). Lectotype female at ZMHU (Moore *et al.* 2018).

*Barotherus peruanus* Harold 1869: 124 (synonym). Type deposition unknown.

*Barotherus andinus* Bates 1891: 30 (synonym). Type at BMNH (Moore *et al.* 2018).

*Lissodon argodi* Paulian 1954: 1154 (synonym). Holotype at MNHN (Moore *et al.* 2018).

**Redescription.** Length 17.2–24.5 mm; width 8.5–12.0 mm. Color of clypeus black or castaneous. Pronotum black, castaneous, or light reddish brown, with or without dark blotches on mid-base or mid-apex towards disc or on both sides of disc; scutellum black or castaneous, or elytra castaneous with pronotum and scutellum dark brown (Fig. 6). Legs castaneous to black. **Head:** Frons and clypeus moderately punctate to densely rugopunctate; punctures moderate in size. Anterior margin of frons with small to well-developed, median tubercle, tubercle often crescent-shaped. Clypeus parabolic, apex weakly reflexed. Interocular width equals 6.8 transverse eye diameters. **Pronotum:** Surface

strongly convex in male, moderately convex in female. Punctures moderate in size and density. **Elytra:** Surface with punctures moderate in size and density, 1 weak to moderate stria mesad of humerus. Epipleuron (ventral view) of females simple, not enlarged, smooth. **Pygidium:** Surface finely punctate to finely roughened, punctures small, moderate in density, with weak, elongated depression either side of middle towards apex. **Legs:** Protibia tridentate, teeth subequally spaced. **Venter:** Prosternal process moderately long, columnar, apex round, obscured by dense, long, tawny to reddish setae. **Parameres:** Fig. 7.

**Distribution.** *Ancognatha castanea* occurs in Colombia, Ecuador, and Peru (Endrödi 1985; Pardo-Locarno *et al.* 2006; Figueroa and Ratcliffe 2016).

**Locality Records** (Fig. 8). 277 specimens from BCR, BMNH, CISEC, CMNC, DCCC, MECN, QCAZ, SLTC, UNSM, USNM.

AZUAY (1): Guachapala. BOLÍVAR (1): Guaranda (1 km NE). CARACHI (25): La Libertad, Montúfar, Tulcán. CHIMBORAZO (18): Alausí, Chuquipogyio, Palmira Atapo Farm, Riobamba, Yanarrumi Riobamba. COTOPAXI (58): El Boliche, Parque Nacional Cotopaxi (Caspi entrance, 12 km NE Mulaló), Cotopaxi volcano (NW side),



Latacunga, Sigchos, via Liptos–Sigchos. IMBABURA (17): Acosta–Ibarra road (km 4), Cascada de Peguche, Chachimbiro, El Tejar, Lita, Otavalo, San Pablo del Lago. LOJA (1): Vala (Macará). MORONA SANTIAGO (3): Limón Indanza, Macas. NAPO (6): Baeza, Oyacachi, Sacha. ORELLANA (2): Estación Científica Yasuni. PICHINCHA (107): Calacalí, Calderón, Cayambe, Cochasquí, Conocoto, Guayllabamba, Machachi, Nanegal, Nayón, Paschoa, Pifo, Pomasqui, Pululahua, Quito, Quito (25 km S), Río Bobonaza (near Quito), Sangolquí, Tabacundo, Tambillo. SANTO DOMINGO DE LOS TSÁCHILAS (3): Alluriquín, Río Toachi. SUCUMBÍOS (1): Santa Bárbara. TUNGURAHUA (29): Ambato, Baños, Picaigua, Podoa. NO DATA (5).

**Temporal Distribution.** January (7), February (21), March (25), April (25), May (5), June (26), July (49), August (3), September (10), October (18), November (25), December (8).

**Diagnosis.** *Ancognatha castanea* is distinguished from *A. atacazo* and *A. scarabaeoides*, the other two black or brown species of *Ancognatha* in the study area, by its parabolic clypeus; anterior margin of the frons with a conspicuous, median tubercle in both sexes; and form of the parameres (Fig. 7).

**Nomenclature.** Paulian (1954) described *Lissonodon argodi* from Sudan in North Africa. Endrödi (1985) listed it as a synonym of *A. castanea*. Paulian's original description and illustrations were studied, and we concur that *L. argodi* is conspecific with *A. castanea*. We surmise that the holotype specimen of *L. argodi* was labeled incorrectly since species of *Ancognatha* do not occur in Africa.

**Natural History.** Based on label data, *A. castanea* has been recorded from páramo but also in disturbed areas like pine forest and potato crops. Specimens have been taken at 450 to 4,000 m. *Ancognatha castanea* larvae are reported as a food item of the Cañari, Otavalo, Pilahuine, Quichua, Salazaca, and Saraguro people in Ecuador (Onore 1997, 2005).

### *Ancognatha horrida* Endrödi, 1967

(Figs. 1a, 9–11)

*Ancognatha horrida* Endrödi 1967: 409 (original combination). Holotype male at NHMB (Frey Collection) (Moore *et al.* 2018).

**Redescription.** Length 26.0–27.5 mm (males) and 25.3–27.0 mm (females); width 11.5–11.7 mm (males) and 11.2–12.1 mm (females). Color in both sexes testaceous with variable brown, piceous or black markings (Fig. 9) as follows: Frons black, clypeus occasionally black; pronotum with or without large macula on disc, macula usually emarginate at center apex; scutellum partially or

completely piceous; elytra on lateral margins black and with small, black spot on humeral and apical umbones, macula on disc behind scutellum varying from small and elongate to covering almost entire disc. Tarsi brown or black, femora and tibiae brown or black on bases and apices. **Head:** Frons and clypeus of male finely scabrous, female similar or more commonly with small, dense punctures. Clypeus of male narrowly parabolic, weakly reflexed (Fig. 1a), clypeus of female similar or more broadly parabolic. Interocular width equals 3.0 transverse eye diameters in male, slightly less in female. Mandibles elongate, slender, projecting slightly beyond clypeal apex in males; extending to clypeal apex in female. **Pronotum:** Surface of male nearly smooth or with small, sparse punctures, female with small, sparse punctures. **Elytra:** Disc of male with punctate striae; punctures small, shallow, double rows indistinct; female with punctures more distinct. First broad interval with wide, irregular field of punctures. Epipleuron of female (ventral view) broad from its base and then abruptly constricted at level of sternites 1–2. **Pygidium:** Surface of male glabrous, vaguely roughened with small, sparse punctures; surface of female smoother and with small, moderately dense punctures. In lateral view, surface of male weakly convex, nearly flat in female. **Legs:** Protibia tridentate, basal tooth slightly removed from apical 2 teeth. **Venter:** Prosternal process long, columnar, apex obliquely flattened into transversely oval disc with elevated “button”, posterior margin of process with long, dense, tawny setae. **Parameres:** Fig. 10.

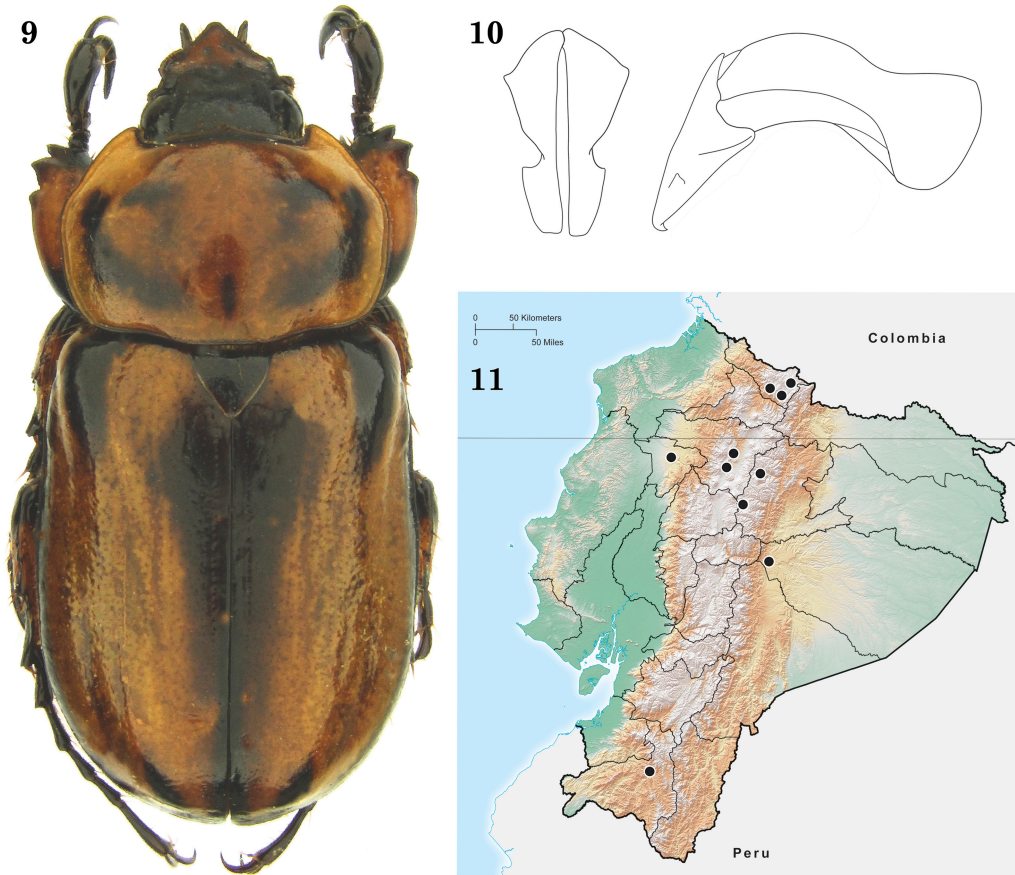
**Distribution.** *Ancognatha horrida* is found in Colombia (Pardo-Locarno *et al.* 2006) and Ecuador (Endrödi 1985). Endrödi's (1967) holotype is from a locality called “El Tambo”, which could be referring to a locality in Pichincha near Quito or a locality near Catamayo in Loja, but it cannot be determined which province was meant.

**Locality Records** (Fig. 11). 27 specimens from BCRC, MAHC, MEPN, QCAZ, Endrödi (1967).

CARCHI (3): El Rosario, Palo Blanco, Hacienda La Bretaña (Cantón Huaca, Parroquia Mariscal Sucre). LOJA (2): San Pedro-Catamayo. NAPO (13): Papallacta, via Salcedo. PASTAZA (1): Puyo. PICHINCHA (2): Río Alambi (Sector Guarumos), Quito. SANTO DOMINGO DE LOS TSÁCHILAS (5): Santo Domingo de los Colorados. NO DATA (1): El Tambo.

**Temporal Distribution.** February (8), March (3), April (2), June (7), August (1), September (1), October (2), November (1), December (1).

**Diagnosis.** *Ancognatha horrida* most closely resembles *A. jamesoni* but can be distinguished by the shorter clypeus and mandibles in the male; male protarsomere 5 lacking a ventral tooth or ridge



Figs. 9–11. *Ancognatha horrida*. 9) Habitus; 10) Parameres; 11) Distribution in Ecuador.

(tooth present in *A. jamesoni*); male protarsal large claw not flared at about the middle on the ventral side (claw ventrally flared in *A. jamesoni*); pronotum smooth or sparsely punctate (densely punctate to finely shagreened in *A. jamesoni*); female epipleuron, in ventral view, relatively broad from its base and abruptly constricted at the level of sternites 1–2 (epipleuron simple in *A. jamesoni*); and the form of the parameres (compare Figs. 10 and 21). In caudal view, the flared base of the parameres of *A. horrida* is only slightly wider than the subapical, angulate expansion, while in *A. jamesoni* the flared base is distinctly wider, although not nearly as wide as illustrated in Endrödi (1985).

The recently described *Ancognatha corcuera* Figueroa and Ratcliffe (Figueroa and Ratcliffe 2016) from Peru is similar in color and pattern to that of *A. horrida* but can be distinguished by its smaller size (22–25 mm versus 26–27 mm in *A. horrida*), the punctate frons and clypeus in the male (finely scabrous in *A. horrida*); nearly smooth,

polished pronotum in the female (pronotum with small, sparse punctures in *A. horrida*); and form of the parameres of *A. corcuera* that have a noticeably long, subrectangular apex (elongate but apices rounded and not subrectangular in *A. horrida*).

**Natural History.** Nothing is known about the natural history of this uncommon species.

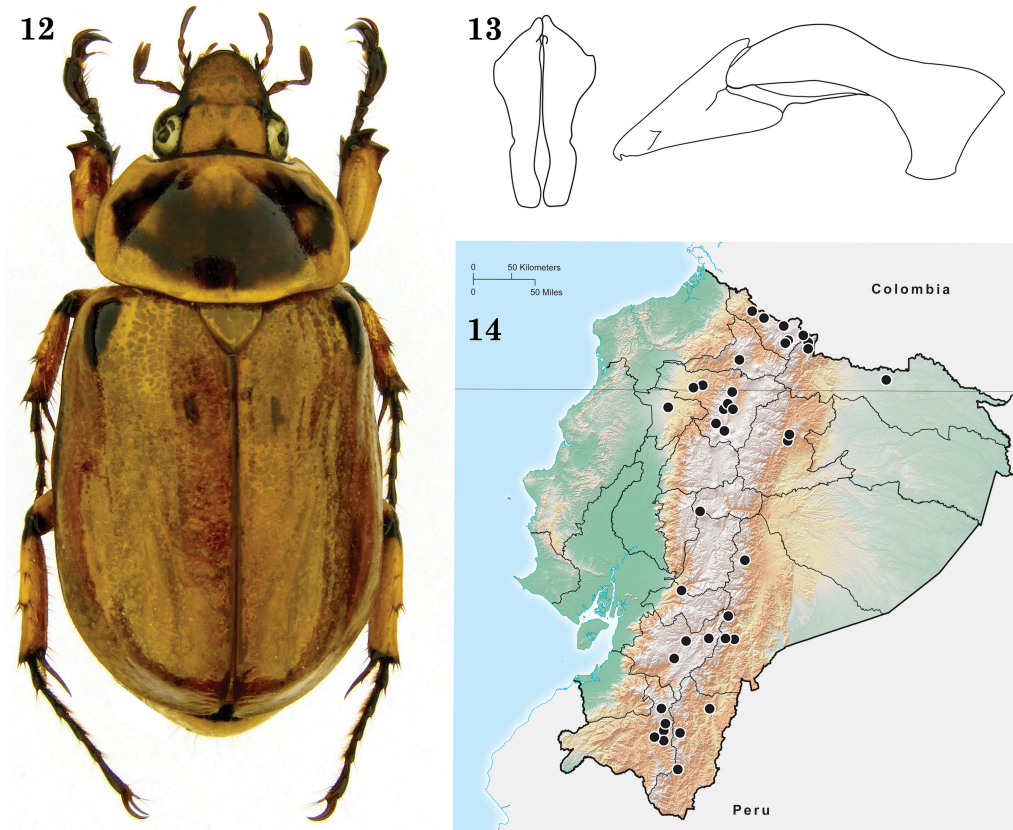
#### *Ancognatha humeralis* Burmeister, 1847

(Figs. 12–14, 25a)

*Ancognatha humeralis* Burmeister 1847: 40 (original combination). Lectotype male at MLUH (Moore *et al.* 2018).

*Ancognatha longiceps* Kirsch 1871: 354 (synonym). Holotype at SMTD (Olaf Jäger, personal communication, July 2018).

**Redescription.** Length 20.5–27.4 mm; width 9.6–11.3 mm. Color testaceous with piceous or black markings (Fig. 12) as follows: Pronotum with



Figs. 12–14. *Ancognatha humeralis*. 9) Habitus; 13) Parameres; 14) Distribution in Ecuador.

small to large, entire to variably divided vitta on disc; elytra with elongate, black or piceous vitta on humeral umbone and behind scutellum; some specimens (females) with extensive dark stripes from base to near apex; lateral margin testaceous or piceous or black. Femora and tibiae black on bases and apices, tarsi black or brown. Abdominal sternites 1–4 black. **Head:** Frons rugulopunctate, clypeus moderately rugopunctate; punctures moderate in size and density. Clypeus narrowly parabolic, apex weakly reflexed. Mentum with apex deeply furrowed (about half length of mentum) (Fig. 2b). Interocular width equals 3.6 transverse eye diameters. **Pronotum:** Surface with punctures moderate in size and density. **Elytra:** Surface with 8 punctate striae. Intervals between striae 1–2, 3–4, 5–6, and 8–lateral margin densely punctate, punctures moderate in size. Epipleuron of female, in ventral view, slightly widened at level of metacoxa to middle of abdominal sternite 2. **Pygidium:** Surface finely punctate, punctures small, setigerous, moderate in density; setae tawny, short. In lateral view, surface weakly convex in male, nearly flat in

female. **Legs:** Protibia tridentate, teeth subequally spaced (Fig. 25a). **Venter:** Prosternal process moderately long, columnar, apex densely setose, flattened, and with large, raised, round “button” covering most of apex; setae long, tawny. **Parameres:** Fig. 13.

**Distribution.** *Ancognatha humeralis* occurs in Colombia, Ecuador, and Peru. Endrödi (1966) recorded *A. quadripunctata* from Mexico and Ecuador (Loja, 2,200 m). We examined the Ecuador specimen listed by Endrödi at the BMNH and believe the specimen is actually *A. humeralis* and not *A. quadripunctata*. We believe that *A. quadripunctata* does not occur in Ecuador, especially since additional specimens from Ecuador have never been collected or seen in collections.

**Locality Records** (Fig. 14). 202 specimens from BCRC, CMNC, CMNH, DCCC, MECN, NMPC, QCAZ, USNM.

AZUAY (23): Amaluza, Cuenca, General Plaza, Girón (8 km NE), Lentag, Valle Yunguilla. CAÑAR (1): Shical. CARCHI (22): Los Laureles, San Gabriel Bosque Arrayanes, Tuffiño (35 km W). COTOPAXI (16): Saguambi, Sigchos, Triunfo Bajo. IMBABURA

(8): Otavalo-Apuela. LOJA (85): Argelia (Loja), Estación Agroecológica Zamora Huayco de la Universidad Técnica Particular de Loja, Loja, Loja-Zamora road (km 12), Los Laureles, Paso Lateral (Loja city limits), Parque Nacional Podocarpus, Rocafuerte, San Cayetano Bajo, San Lucas, Saraguro, Uritusinga, Zamora micro-watershed. MORONA SANTIAGO (4): Parroquia Zuñac PN Sangay Lingüichaca. NAPO (18): Cosanga, Cosanga (Cabañas San Isidro, 2 km NW), Dureno, Estación Biológica Yanayacu, Santa Bárbara. PICHINCHA (9): Aloag-Santo Domingo road, Los Bancos, La Virgen, Los Laureles, Quito, Reserva Calacalí El Cedral. SANTO DOMINGO DE LOS TSÁCHILAS (2): Santo Domingo de los Colorados. SUCUMBÍOS (4): El Calvario, La Bonita, Santa Bárbara, via Santa Bárbara-La Bonita (km 23). TUNGURAHUA (1): Chimborazo (7 km NW). ZAMORA CHINCHIPE (8): Estación Científica San Francisco, Reserva Tapichalaca, Yanzatza. NO DATA (1).

**Temporal Distribution.** January (35), February (5), March (8), April (16), May (1), July (3), October (9), November (63), December (1).

**Diagnosis.** *Ancognatha humeralis* resembles several species but mostly *A. vulgaris*. It can be easily distinguished from all congeneric species except *A. uncinata* and *A. vulgaris* by the presence of a long furrow at the apex of the mentum that is longer than its base (compare a and b of Fig. 2). *Ancognatha humeralis*, *A. uncinata*, and *A. vulgaris* share the long furrow on the mentum, but the male can usually be distinguished by the form of the parameres. *Ancognatha humeralis* has simple parameres (Fig. 13), while *A. uncinata* has a hook-like flange at the base of the parameres (Fig. 34), and *A. vulgaris* has subapical, short teeth (Fig. 40). In the male, the pygidium of *A. humeralis* has short, sparse setae, while in *A. vulgaris* the setae are long and dense. Females of *A. humeralis* and *A. vulgaris* can be separated by the form of the epipleuron that is slightly expanded in *A. humeralis* but strongly thickened into an elongate knob in *A. vulgaris* (Fig. 39).

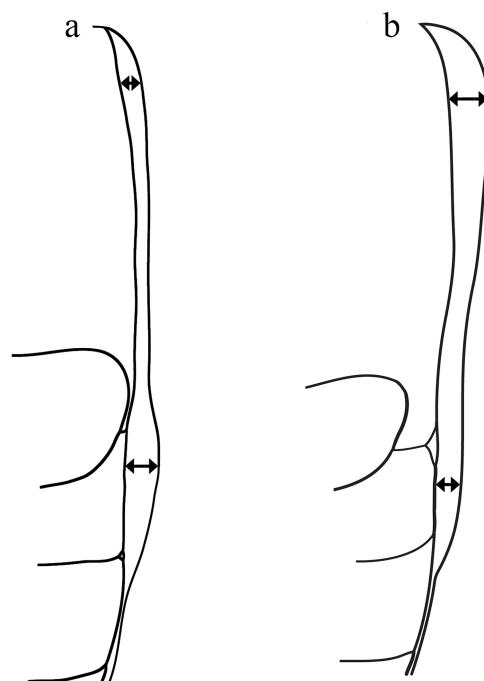
**Natural History.** *Ancognatha humeralis* has been collected at lights at elevations of 1,800–3,120 m.

#### *Ancognatha hyltonscottae* Martínez, 1965

(Figs. 15a, 16–18)

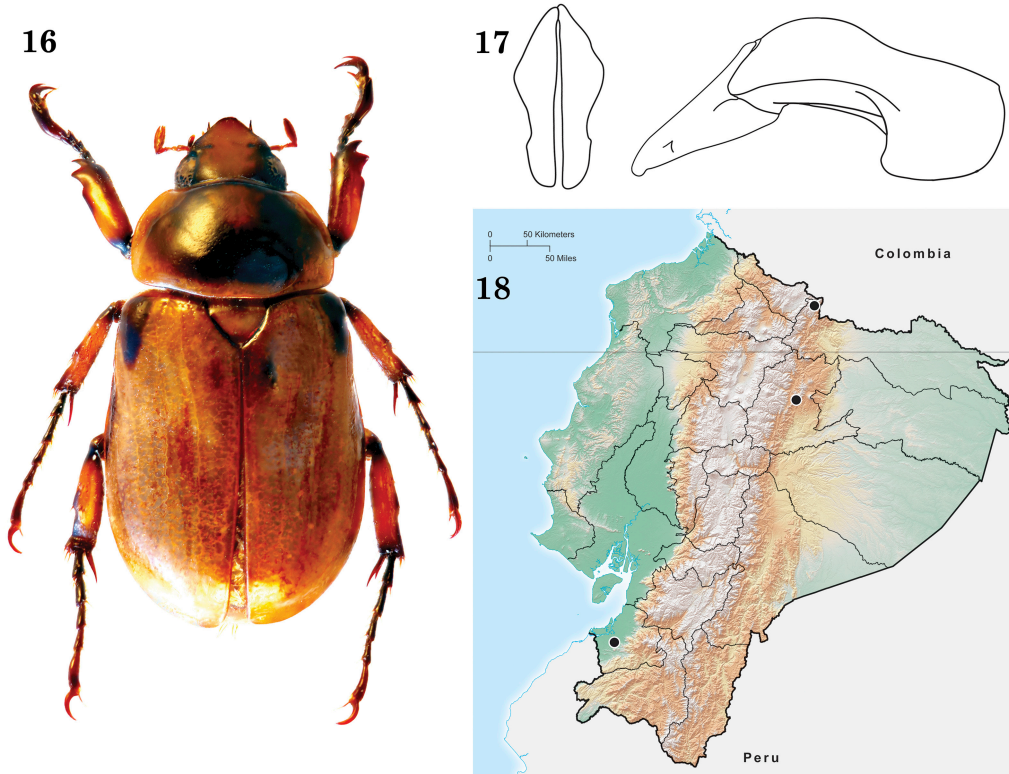
*Ancognatha hyltonscottae* Martínez 1965: 64 (original combination). Holotype male at MACN (Antonio Martínez Collection) (Moore *et al.* 2018).

**Redescription.** Length 16.0–19.5 mm; width 8.6–9.7 mm. Color testaceous or light testaceous with piceous or black markings (Fig. 16) as follows: Frons on base and margin of clypeus piceous; pronotum with or without piceous to black vitta on



**Fig. 15.** Epipleura of a) *Ancognatha hyltonscottae* and b) *Ancognatha ustulata*.

center (vitta small or nearly completely covering surface); elytral lateral margin with partial dark stripe; humeral and apical umbones usually with small, black spot; disc with small to large, black macula extending from 1<sup>st</sup> interval (behind scutellum) to lateral margin (some specimens lacking macula behind scutellum); surface lustrous. Femora and tibiae black on apices, tarsi brown. Pygidium brown at base. Metathorax on venter with large, brown mark on middle; abdominal sternites 1–4 piceous or black. **Head:** Frons rugulopunctate, clypeus moderately rugopunctate; punctures moderate in size, dense. Clypeus narrowly parabolic, apex moderately reflexed. Interocular width equals 4.0 transverse eye diameters. Mandibles elongate, slender, projecting slightly beyond clypeal apex in both sexes. **Pronotum:** Surface with punctures moderate in size, dense. **Elytra:** Surface rugopunctate-striate, punctures shallow, moderate in size, dense. Epipleuron of female (in ventral view) slightly widened at level of metacoxa and 1<sup>st</sup> abdominal segment (Fig. 15a). **Pygidium:** Surface punctate; punctures small, moderate in density, setigerous; setae fulvous, short. In lateral view, surface weakly convex in male, nearly flat in female. **Legs:** Protibia tridentate, teeth subequally spaced. **Venter:** Prosternal process moderately long, columnar, apex densely setose, flat, and with



**Figs. 16–18.** *Ancognatha hyltonscottae*. 16) Habitus; 17) Parameres; 18) Distribution in Ecuador.

large, raised, round “button” covering most of apex; setae long, tawny. **Parameres:** Fig. 17.

**Distribution.** *Ancognatha hyltonscottae* is known from Bolivia (Martínez 1965; Endrödi 1985) and Ecuador (**New Country Record**).

**Locality Records** (Fig. 18). 5 specimens from BCRC, MEPN, QCAZ.

EL ORO (1): Reserva Biológica Buenaventura. NAPO (3): Cosanga. SUCUMBIÓS (1): El Calvario.

**Temporal Distribution.** April/May (1).

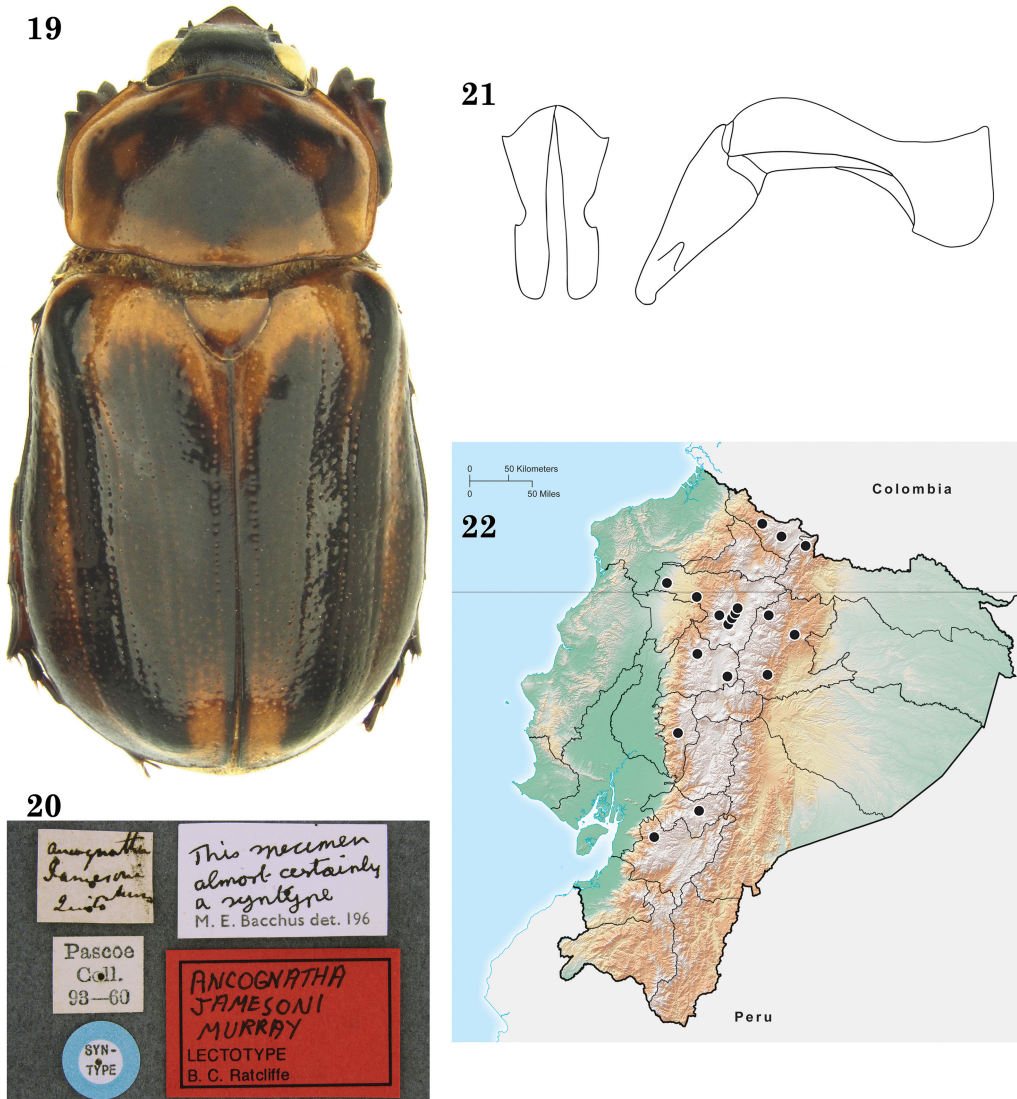
**Diagnosis.** The parameres of *A. hyltonscottae* (Fig. 17) are, along with those of *A. atacazo* (Fig. 3), the simplest in form and lack the deeper emargination at mid-shaft that is seen in most other species. The form of the parameres, the usually lustrous dorsal surface, and key characters should serve to identify this species. Females are distinctive because of the narrow, needle-like mandibles, the body’s lustrous dorsal surface, and the form of the epipleuron that is expanded into a large lobe at the level of the coxa and sternite 1 (Fig. 15a). In *A. ustulata*, the epipleuron is thick from its base to the level of abdominal sternite 2, where it is then abruptly constricted (Fig. 15b). We have seen some individuals

with 8–10 antennomeres (variable in the same individuals).

**Natural History.** Adults have been collected at elevations of 100–1,900 m on each side of the Andes.

***Ancognatha jamesoni* Murray, 1857**  
(Figs. 1b, 19–22)

*Ancognatha jamesoni* Murray 1857: 230 (original combination). Lectotype female (Fig. 19) at BMNH, here designated, labeled as in Fig. 20. One female paralectotype at BMNH, here designated, labeled: “Cyclocephala / ns Quito [handwritten] // Bowring. / 63.47\* [printed] // Syn- / type [typed on round label with blue border] // jamesonii Murray [handwritten] // This specimen / almost certainly / a syntype [handwritten] / M. E. Bacchus det 1969 [printed]” and with BCR yellow paralectotype label. One female paralectotype at BMNH, here designated, labeled: “Quito [handwritten on pink paper] // Pascoe / Coll. / 93-60 [printed] // Syn- / type [typed on round label with blue border] // This specimen / almost certainly / a syntype



**Figs. 19–22.** *Ancognatha jamesoni*. **19)** Lectotype, female, habitus; **20)** Lectotype labels; **21)** Parameres; **22)** Distribution in Ecuador.

[handwritten] / M. E. Bacchus det 1969 [printed]” and with BCR yellow paralectotype label. An additional female specimen that is **not** part of the type series is labeled: “Ecuador / Quito [handwritten] // 24315 [handwritten] // Fry Coll. / 1905-100 [printed] // Syn- / type [typed on round label with blue border] // This specimen / almost certainly / a syntype [handwritten] / M. E. Bacchus det 1969 [printed]”.

*Ancognatha crassimanus* Murray 1857: 232 (synonym). Holotype male (Fig. 23) at BMNH, examined, labeled as in Fig. 24.

**Redescription.** Length 25.5–32.1 mm (males) and 25.0–26.7 (females); width 11.5–12.1 mm (males) and 11.3–12.0 (females). Color testaceous with piceous or black markings (Fig. 19) as follows: Frons partially or completely piceous or black; pronotum with variably small to moderate size markings on sides and/or with large, dark macula on disc; scutellum testaceous to piceous; elytra of male testaceous with black lateral margins and black vitta behind humeral and apical umbones; elytra of female similar but discal area moderately to extensively black. Tarsi black and apices of femora and

23



24



Figs. 23–24. *Ancognatha crassimanus*, holotype, male. 23) Habitus; 24) Labels.

tibiae piceous to black. **Head:** Frons and clypeus of male finely scabrous, female similar but with dense punctures also visible. Clypeus of male greatly elongate, distinctly longer than frons, moderately reflexed, lateral margin weakly concave (Fig. 1b). Interocular width equals 3.3 (male) or 3.0 (female) transverse eye diameters. Mandibles of male elongate, slender, projecting well beyond clypeal apex (Fig. 1b); mandibles of female similar but shorter, projecting to apex of clypeus. **Pronotum:** Surface finely shagreened and/or with small, moderate to dense punctures in both sexes. **Elytra:** Disc with

punctate striae; punctures small, shallow, double rows indistinct. First broad interval with wide, irregular field of punctures. Epipleuron of female (in ventral view) simple. **Pygidium:** Surface glabrous, vaguely roughened, and with small, sparse punctures. In lateral view, surface of male regularly convex, of female nearly flat. **Legs:** Protibia tridentate, teeth subequally spaced. **Venter:** Prosternal process long, columnar, apex obliquely flattened into rectangular or transversely oval disc with elevated “button”, posterior margin of process with long, dense, tawny setae. **Parameres:** Fig. 21.

**Distribution.** *Ancognatha jamesoni* is known from Ecuador (Endrödi 1966, 1985).

**Locality Records** (Fig. 22). 68 specimens from BCRC, BMNH, CMNC, CNCI, DCCC, MAHC, QCAZ, SLTC, USNM.

AZUAY (1): Molleturo. BOLÍVAR (25): Cashca–Totoras, Totoras. CAÑAR (2): El Tambo. CARCHI (2): Cantón Espejo – Parroquia Libertad, El Calvario. COTOPAXI (4): Salcedo–Tena road km 50, Sigchos, No Data. NAPO (9): Baeza, Oyacachi, Salcedo–Tena road (km 139). PICHINCHA (23): Aloag, La Cocha, La Palma, Los Laureles, Palma Texaco, Paschocha, Puerto Quito, Puerto Quito–Chiriboga road, Quito, San Juan. SUCUMBÍOS (1): Las Minas. PROVINCE UNKNOWN (1): El Tambo.

**Temporal Distribution.** February (23), March (4), April (3), May (2), June (1), July (1), August (1), September (2), October (1), November (9), December (5).

**Diagnosis.** *Ancognatha jamesoni* can be separated from other *Ancognatha* species in Ecuador by the following characters: clypeus in male greatly elongate, distinctly longer than frons, strongly acuminate (Fig. 1b); mandibles in male elongate, slender, clearly projecting beyond clypeal apex (Fig. 1b); mandibles in female similar but shorter, projecting to just beyond apex of clypeus. *Ancognatha humeralis*, *A. horrida*, and *A. ustulata* also have elongate mandibles projecting to or slightly beyond the clypeal apex. *Ancognatha jamesoni* most closely resembles *A. horrida* but can be distinguished by the shorter clypeus and mandibles, male protarsomere 5 with moderate to large, subtriangular tooth or ridge at base on ventral side (tooth/ridge absent in *A. horrida*); large claw of male protarsus flared on ventral side at about the middle (large protarsal claw of *A. horrida* not flared ventrally); female epipleuron, in ventral view, simple, whereas the epipleuron of *A. horrida* is broad from its base and then abruptly constricted at the level of sternites 1–2; and the form of the parameres (Fig. 21). In caudal view, the flared base of the parameres of *A. jamesoni* is distinctly wider than the subapical, angulate expansion, although not nearly as wide as illustrated in Endrödi (1985), while in *A. horrida* the flared base is only slightly wider.

**Nomenclature.** Murray (1857) described both *A. jamesoni* and *A. crassimanus* in the same paper without realizing that the specimens he designated as *A. jamesoni* were all females and the single *A. crassimanus* was a male. Endrödi (1966) placed *A. crassimanus* in junior synonymy with *A. jamesoni*.

Murray (1857), in describing the only male specimen of *A. crassimanus* (Fig. 23) then in his possession, indicated that the pygidium “has a number of longitudinal grooves or striae.” *Ancognatha* species do not normally have this kind of sculpturing, and so we conclude that these grooves are an aberration of the normal surface texture. What is important, however, is that it identifies exactly the specimen that we are considering the type. An additional male specimen at the BMNH was labeled as almost certainly a syntype, but it cannot be since Murray said he had only one specimen.

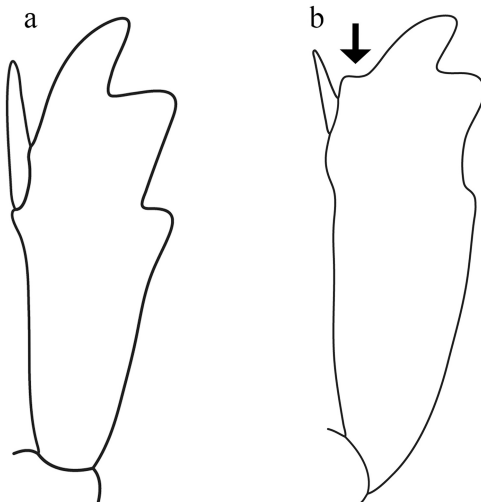
**Natural History.** *Ancognatha jamesoni* larvae are used as food by the Quichua people in Ecuador (Onore 1997, 2005). Adults have been collected at elevations of 1,000–3,750 m on both sides of the Andes.

#### *Ancognatha lutea* Erichson, 1847

(Figs. 25b–28)

*Ancognatha lutea* Erichson 1847: 97 (original combination). Lectotype male at ZMHU (Moore *et al.* 2018).

**Redescription.** Males (females unknown). Length 18.7–23.7 mm; width 9.3–11.2 mm. Color testaceous with brown or black markings (Fig. 26)



**Fig. 25.** Dorsal view of protibiae of a) *Ancognatha humeralis* and b) *Ancognatha lutea* (arrow indicates angulation of inner apical margin).

as follows: Frons on base with or without black area; pronotum with elongated, black vitta on humeral umbone, apical umbone occasionally with small, black spot, and small, black vitta usually present behind scutellum; scutellum testaceous, with or without brown mark on base at center; elytra testaceous with brown or piceous lateral margins. Tarsi and apices of femora and tibiae testaceous or brown.

**Head:** Frons moderately punctate, clypeal base moderately punctate, becoming shagreened towards apex and margins, punctures moderate in size. Clypeus parabolic, apex moderately reflexed. Interocular width equals 3.7 transverse eye diameters. Mandibles slender, extended to clypeal apex, or hidden beneath clypeus. Mentum with apex deeply furrowed. **Pronotum:** Surface evenly convex, sparsely punctate on disc, sparsely to moderately punctate on anterior angles, punctures moderate in size. **Elytra:** Disc with 4 punctate striae. Intervals punctate to shagreened, 1<sup>st</sup> interval twice as wide as other intervals; punctures moderate in size, dense. **Pygidium:** Surface sparsely punctate, punctures moderate in size. Disc sparsely setose, setae moderate in length; apical margins densely setose; setae long; mid-apex with distinctive tuft of long, tawny setae. **Legs:** Protibia tridentate, teeth subequally spaced from one another, inner apical margin angulate (Fig. 25b). **Venter:** Prosternal process moderately long, columnar, apex densely setose, flat, and with large, raised, round “button” covering most of apex; setae long, tawny. **Parameres:** Fig. 27.

**Distribution.** *Ancognatha lutea* is recorded from Bolivia, Colombia, Peru (Endrödi 1966, 1988), and Ecuador (**New Country Record**).

**Locality Records** (Fig. 28). 22 specimens from QCAZ.

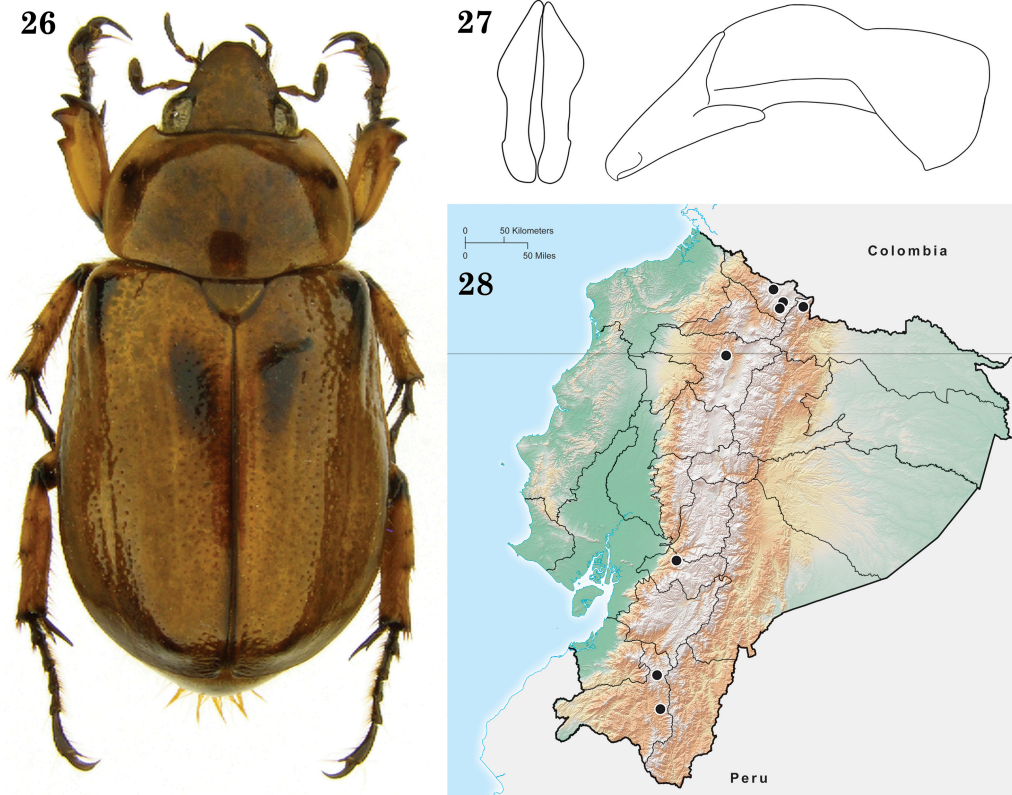
CANAR (1): Shical. CARCHI (9): Bosque Arrayanes (San Gabriel), Los Laureles, Tufiño (50 km W). LOJA (10): Loja, San Lucas. PICHINCHA (1): Reserva Privada El Cedral (Calacalí). SUCUMBÍOS (1): Santa Bárbara.

**Temporal Distribution.** January (7), February (1), April (8), August (2), November (4).

**Diagnosis.** Male *A. lutea* can be separated from other *Ancognatha* species in the study area by the distinctive tuft of long setae on the apex of the pygidium. The female is unknown but may resemble the females of *A. humeralis* or *A. hyltonscottae* and may not have the distinctive pygidial tuft of setae. We hypothesize that the female of *A. lutea* may differ from that of *A. humeralis* in the shape of the protibia (Fig. 25b) and from the female of *A. hyltonscottae* by the furrow of the mentum (deep in *A. lutea*, short in *A. hyltonscottae*).

**Natural History.** *Ancognatha lutea* has been collected at lights at elevations of 800–2,800 m on both sides of the Andes.





Figs. 26–28. *Ancognatha lutea*. 26) Habitus; 27) Parameres; 28) Distribution in Ecuador.

***Ancognatha scarabaeoides* Erichson, 1847**  
(Figs. 1d, 29–31)

*Ancognatha scarabaeoides* Erichson 1847: 97 (original combination). Lectotype male at ZMHU (Moore *et al.* 2018).

*Chalepides unduavicus* Prokofiev 2012: 3 (synonym). Holotype male at IEE (Moore *et al.* 2018).  
*Ancognatha scarabaeoides unduavica* Prokofiev 2013: 1 (synonym).

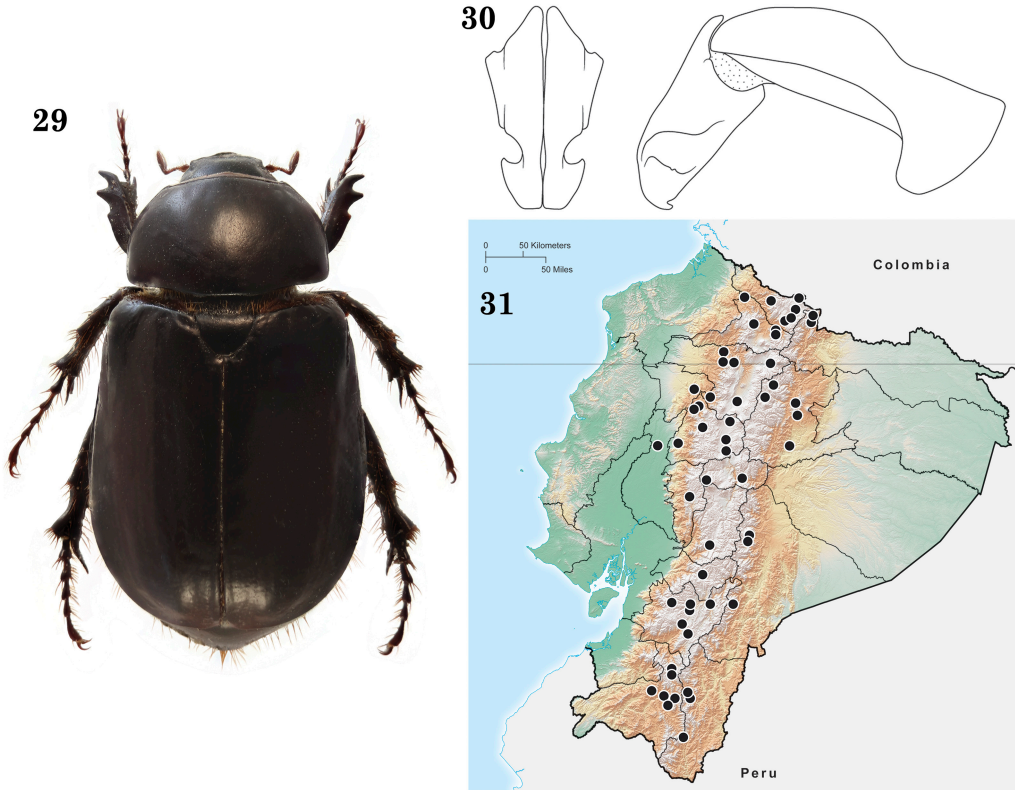
**Redescription.** Length 18.8–29.2 mm; width 8.7–14.8 mm. Color of elytra reddish brown or black, pronotum variably colored reddish brown or brown with reddish brown spots on each side of midline. **Head:** Frons and clypeus minutely shagreened, punctures small and moderate in density or with clypeus slightly more densely punctate. Frontoclypeal line with 2 low, rounded or transverse tubercles mesad of eye canthus. Clypeus subtriangular, sides arcuate (more so in female), apex narrowly rounded and reflexed. Interocular width equals 2.2–2.4 transverse eye diameters. Mentum with apex distinctly, but not deeply, emarginate. **Pronotum:** Surface similar to that of frons. **Elytra:**

Surface minutely shagreened, moderately densely punctate, punctures small, usually in rows on disc; weakly impressed striae or transverse wrinkling sometimes evident. Epipleuron of female (in ventral view) slightly expanded at level of sternites 1–2. **Pygidium:** Surface vaguely shagreened, with small, moderately dense punctures (less evident in males). In lateral view, surface in male evenly convex, surface in female almost flat. **Legs:** Protibia tridentate, teeth subequally spaced. **Venter:** Prosternal process long, apex flattened and with distinct, round, raised “button”; posterior surface near base with distinct tooth; process covered with dense, long setae. **Parameres:** Fig. 30.

**Distribution.** *Ancognatha scarabaeoides* is known from Panama, Colombia, Ecuador, Peru, and Bolivia (Endrödi 1966, 1985; Ratcliffe 2003).

**Locality Records** (Fig. 31). 303 specimens examined from BCRC, CISEC, CMNC, CMNH, CNCI, DCCC, MECN, MEPN, QCAZ, SLTC, UNSM, USNM.

AZUAY (71): Bosque Protector Aguarongo, Cuenca, Parque Nacional El Cajas, Girón (8 km NE), Las Nieves (13 km NE), Rancho Alegre. BOLÍVAR (2): Cashca Totoras, Totoras. CAÑAR



Figs. 29–31. *Ancognatha scarabaeoides*. 29) Habitus; 30) Parameres; 31) Distribution in Ecuador.

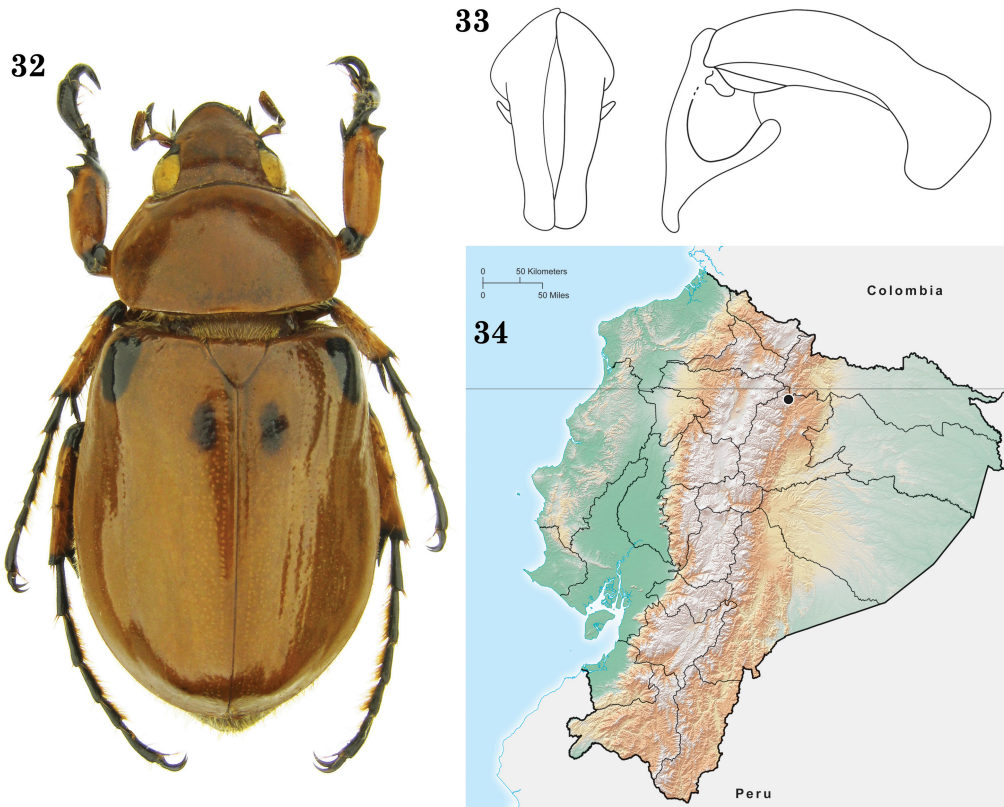
(8): Cantón Huaca (Parroquia Mariscal Sucre, Hacienda La Breñaña), El Calvario, Naranjapata. CARCHI (11): El Rosario, El Tambo, La Paz, Palo Blanco, San Gabriel (Bosque Arrayanes), Tufiño (35 km W), Tulcán (La Alegría). CHIMBORAZO (2): Alausí, Huigra. COTOPAXI (23): Parque Nacional Cotopaxi (Caspi entrance, 12 km NE Mulaló), El Boliche, La Maná, Saguambi, Salcedo via Tena (km 50), Sigchos, Triunfo Bajo. EL ORO (1): Guanazón (6 km ESE). IMBABURA (15): Ambuqua, Chachimbiro, El Tejar, Lita, M. Acosta-Ibarra road (km 4), Zuleta. LOJA (37): Cordillera Cordoncillo Saraguro (11 km S), La Toma, El Capulí, Jipiro Alto, Loja, Loja (La Argelia), Loja (10 km NW), Rocafuerte, Saraguro, Uritusinga, Villonaco, Zambi. LOS RÍOS (1): Quevedo. MORONA SANTIAGO (19): Gualaceo (21 km SE), Gualaceo (34 km SE), Parque Nacional Sangay (Parroquia Zuñac, Lingüichaca), Río Culebrillas Gualaceo (34 km). NAPO (27): Baeza, Cabañas de San Isidro (2 km W of Cosanga), Coca, Lumbaqui, Oyacachi, Papallacta, Salcedo Tena road. PICHINCHA (37): Calacalí–Mindo road, Cochasquí, Hacienda La Esperie, Hacienda Niebli de Monjas, Los Laureles, Palmeras, Palma Texaco, Pasochoa,

Perucho, Puerto Quito, Quito, Pululahua, Río Alambi (sector Guarumos OCP), San Miguel de los Bancos, Tandayapa. SANTO DOMINGO DE LOS TSÁCHILAS (3) Hacienda Palmeras, Río Toachi, Toachi. SUCUMBÍOS (27): La Bonita, Oyacachi, Santa Bárbara. TUNGURAHUA (14): Baños, Chimborazo (7 km NW). ZAMORA CHINCHIPE (3): Chumusquin, Estación Científica San Francisco, Reserva Tapichalaca. PROVINCE UNKNOWN (2): Sebundoí.

**Temporal Distribution.** January (24), February (18), March (17), April (23), May (6), June (6), July (3), August (9), September (19), October (47), November (71), December (10).

**Diagnosis.** *Ancognatha scarabaeoides* is distinguished from *A. atacazo* and *A. castanea*, the other two black or brown species in the study area, by its more triangular clypeus, broadly separated frontal tubercles, glabrous pygidium, and form of the parameres (Fig. 30).

**Natural History.** Adults are attracted to lights. Pardo-Locarno (1994) reported larvae feeding on the roots of alfalfa, tomatoes, potatoes, wheat, barley, berries, and pasture grasses in Colombia where this species is abundant. In Ecuador, it is an



Figs. 32–34. *Ancognatha uncinata*. 32) Habitus; 33) Parameres; 34) Distribution.

abundant species, while in Panama Ratcliffe (2003) reported this species is rare and has been collected only in the montane wet forests of Chiriquí at an elevation of 2,100 m. The larval stage was described by Vallejo and Morón (2008).

***Ancognatha uncinata* Paucar-Cabrera and Ratcliffe, new species**

(Figs. 32–34)

Zoobank.org/urn:lsid:zoobank.org:act:  
5DE258AB-467F-43C6-94A0-07DB31ACD7A5

**Type Material.** Holotype male labeled “ECUADOR / NAPO / Fall San Rafael / 15-Feb-1990 / Legit: S. Sandoval // 3545 // QCAZ I / 224571” and with our red holotype label. Holotype deposited at QCAZ.

**Description.** Holotype male (Fig. 32). Length 24.3 mm; width across humeri 10.3 mm. Color dark testaceous with black, elongate spot on each humerus and behind scutellum either side of sutural line; tarsi, apices of femora, and tibiae black; pygidium and abdominal sternites piceous. **Head:** Frons and clypeus with small, moderately dense

punctures. Clypeal shape parabolic, apex narrowly rounded and slightly reflexed. Interocular width equals 3.0 transverse eye diameters. Antennae with 10 antennomeres, club slightly longer than antennomeres 2–7. Mentum with apex deeply emarginated (about half length of mentum). **Pronotum:** Surface with small, moderately dense punctures similar to those on head. Base lacking marginal bead. **Elytra:** Surface weakly punctate-striate, striae shallow, indistinct; punctures moderate in size, weakly ocellate. **Pygidium:** Surface with moderately large, moderately dense, setigerous punctures; setae long, dense, pale. In lateral view, surface convex, especially on apical half. **Legs:** Protibia tridentate, teeth subequally spaced from each other. Protarsus enlarged, median large claw narrowly split at apex. **Venter:** Prosternal process long, apex flattened into transverse oval surrounded by fringe of long, pale setae and with raised, transversely oval “button” on anterior half; posterior margin of shaft near base with weak swelling. **Parameres:** With long, flange-like tooth at base [best seen in anterolateral and lateral views] (Fig. 33).

**Distribution.** *Ancognatha uncinata* is known from the area of the Cascada San Rafael (the highest waterfall in Ecuador) in Napo province (Fig. 34).

**Etymology.** The adjectival epithet *uncinata* is from the Latin *uncus*, meaning a hook, barb, or angle, in reference to the unique hook-like flange at the base of the parameres (Fig. 33).

**Diagnosis.** *Ancognatha uncinata* is identical to *A. vulgaris* in form, color, and sculpturing (including the densely setose pygidium) except for the different parameres (compare Figs. 33 and 39). The large, flange-like hook at the base of the parameres of *A. uncinata* is unique among *Ancognatha* species. Like *A. vulgaris* and *A. humeralis*, the mentum is deeply cleft at its apex for at least half of its length. In Endrödi's (1985) key, this species will go as far as couplet 19 based upon the character of the deeply cleft mentum. The form of the parameres will then distinguish it from *A. vulgaris* and *A. humeralis* in the following couplets.

**Natural History.** Based upon only a single specimen, nothing is known about the natural history of this species.

*Ancognatha ustulata* (Burmeister, 1847)

(Figs. 15b, 35–37)

*Cyclocephala ustulata* Burmeister 1847: 39 (original combination). Lectotype male at MLUH (Moore *et al.* 2018).

*Ancognatha ustulatoides* Höhne 1922: 373 (synonym?). See Nomenclature. Lectotype male at ZMHB (Moore *et al.* 2018).

**Redescription.** Length 17.3–24.5 mm; width 8.2–11.3 mm. Color testaceous with brown, piceous, or black markings (Fig. 35) as follows: Frons black or not; pronotum with large macula covering most of disc; scutellum partially or completely black; elytra with sutural, lateral, and usually basal margins piceous or black; humeral and often apical umbones black; disc variably covered with elongate, small to large, black macula. Tarsomeres testaceous or piceous, femora and tibiae piceous on bases and apices. Metasternum and abdominal sternites usually piceous or black. **Head:** Frons densely punctate, punctures moderate in size. Clypeus parabolic to narrowly parabolic, apex weakly reflexed. Interocular width equals 3.0 transverse eye diameters. Mandibles elongate, slender, slightly projecting beyond clypeus apex in both sexes. **Pronotum:** Surface finely punctate; punctures small, moderately dense. **Elytra:** Surface punctate-striate, punctures moderate in size, dense. Epipleuron of female (in ventral view) black, broad from base to level of abdominal sternites 1–2 where slightly flared and then constricted (Fig. 15b). **Pygidium:** Surface relatively smooth, with small,

sparse punctures. In lateral view, surface weakly convex in both sexes. **Legs:** Protibia tridentate, teeth subequally spaced from each other. Protarsus of male enlarged, median large claw narrowly split at apex. **Venter:** Prosternal process moderately long, columnar, apex densely setose, flat, and with large, raised, round “button” covering most of apex; setae long, tawny. **Parameres:** Fig. 36.

**Distribution.** *Ancognatha ustulata* is known from Colombia, Ecuador, Peru, and Venezuela (Endrödi 1966, 1985; Figueroa and Ratcliffe 2016).

**Locality Records** (Fig. 37). 5 specimens from CISEC, USNM, Endrödi (1966).

MANABÍ (1). Portoviejo. LOJA (2): Parque Nacional Podocarpus. NO DATA (2).

**Temporal Distribution.** October (2), November (1).

**Nomenclature.** Both Arrow (1937) and Endrödi (1985), without explanation, revised *A. ustulatoides* to infrasubspecific status with *A. ustulata*. *Ancognatha ustulatoides* is similar to *A. ustulata* but differs in having a setose pygidium. This is normally a species-level difference, and more research is needed to clarify the status of *A. ustulatoides*. We have no specimens of *A. ustulatoides* from Ecuador.

**Diagnosis.** *Ancognatha ustulata*, although smaller, resembles *A. horrida* in color and pattern. The male of *A. ustulata* has a broader parabolic clypeus than the male of *A. horrida* whose clypeus is more elongate and attenuate. The parameres of both species are very similar (Figs. 10, 36). The female of *A. ustulata* has the epipleuron distinctly flared at the level of abdominal sternites 1–2 (Fig. 15b), whereas in *A. horrida* the epipleuron is only slightly flared.

**Natural History.** *Ancognatha ustulata* has been collected at elevations of 10–2,400 m. The larval stage was described by Neita-Moreno and Morón (2008).

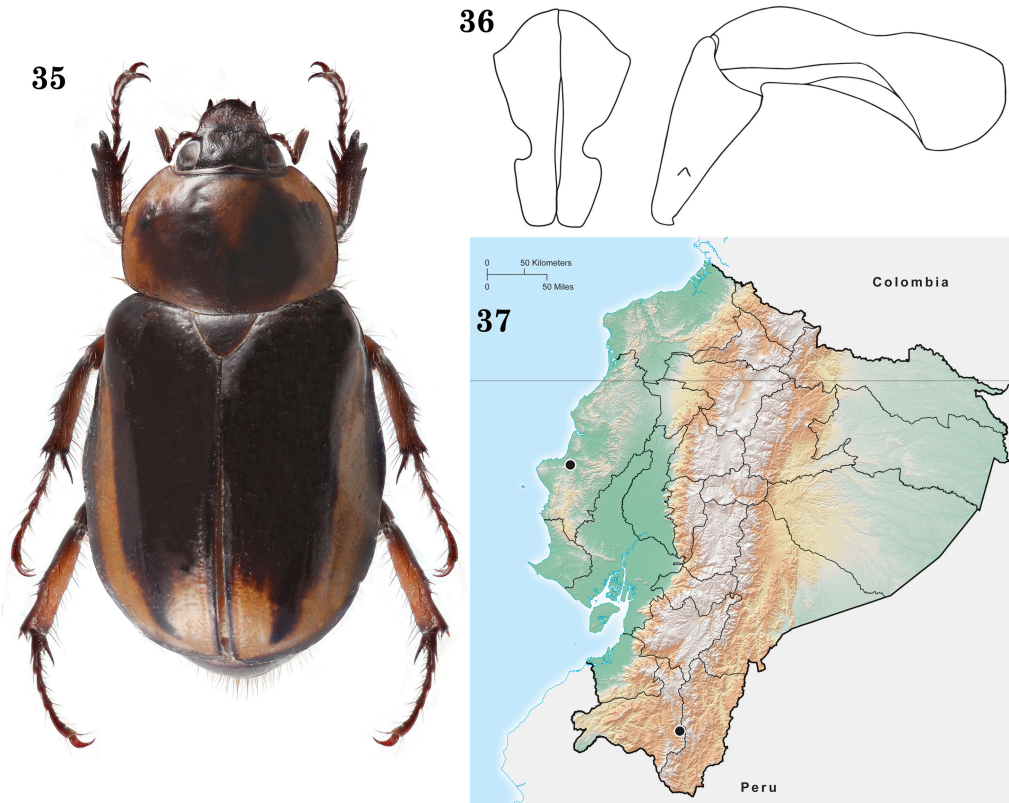
*Ancognatha vulgaris* Arrow, 1911

(Figs. 2b, 38–40)

*Ancognatha vulgaris* Arrow 1911: 169 (original combination). Type male at BMNH (Moore *et al.* 2018).

*Ancognatha (Pseudoancognatha) nigriventris* Otoyá 1945: 275 (original combination). Holotype male at Universidad Nacional de Colombia, Instituto de Ciencias Naturales de la Universidad Nacional, Bogotá, Colombia (Otoyá 1945).

**Redescription.** Length 18.9–26.5 mm; width 10.2–13.0 mm. Color testaceous with black, elongate spots on humerus, usually on apical umbone, immediately behind flange on lateral margin of elytra in female, and behind scutellum either side of sutural line (Fig. 38); often with narrow, elongate



**Figs. 35–37.** *Ancognatha ustulata*. **35)** Habitus; **36)** Parameres; **37)** Distribution in Ecuador.

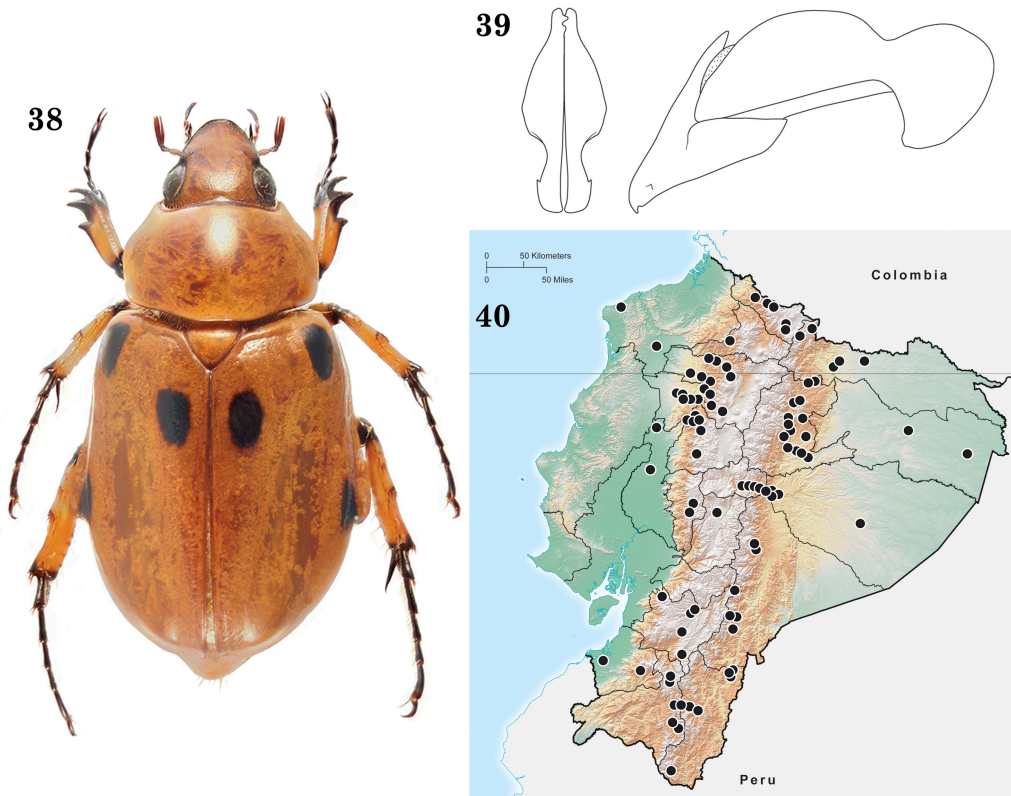
mark on lateral margin of elytra, and female (rarely male) with extensive black streaks covering elytra; bases and apices of tibiae black as well as tarsi and 1<sup>st</sup> 4 abdominal sternites in male. **Head:** Frons with surface moderately punctate, punctures minute to small. Clypeus with surface moderately densely punctate, punctures small to moderate in size and becoming rugopunctate on sides; sides arcuate, apex narrowly parabolic and slightly reflexed. Interocular width equals 2.8–3.0 transverse eye diameters. Mentum with apex deeply furrowed (about half length of mentum) (Fig. 2b). **Pronotum:** Surface sparsely punctate; punctures minute on disc, becoming small in anterior and posterior angles. **Elytra:** Surface punctate-striate, double rows distinct; punctures moderate to mostly large, weakly ocellate. Epipleuron of female (in ventral view) expanded into large lobe at level of metacoxa/sternite 1. **Pygidium:** Surface sparsely punctate, punctures small to moderate in size, setigerous; setae long, pale. In lateral view, surface strongly convex in male, nearly flat in female. **Legs:** Protibia tridentate, teeth equidistant from each other. **Venter:** Prosternal process long, apex flattened into

transverse oval and with raised, transversely oval “button”; posterior margin of shaft near base with weak swelling; process with long setae. **Parameres:** Fig. 39.

**Distribution.** *Ancognatha vulgaris* is one of the most widely distributed and common species in the genus. It occurs from Costa Rica to Brazil, and in Bolivia (Endrödi 1966, 1985; Ratcliffe 2003).

**Locality Records** (Fig. 40). 695 specimens examined from AUEM, BCRC, CISEC, CMNC, CMNH, CNCI, DCCC, MECN, MEPN, NMPC, QCAZ, RDCC, UMSP, UNSM, USNM.

AZUAY (48): Amaluza, Cuenca, Jesús María (18 km SE), Girón (8 km NE), Oña (6 km N), Río Amarillo. BOLÍVAR (6): Guaranda (23 km NE), no data. CAÑAR (4): Cochancay. CARCHI (15): El Ángel, Chical, Los Laureles, Maldonado, Maldonado (18 km SE), San Gabriel (Bosque Arrayanes), Tuffiño (35 km W). CHIMBORAZO (1): Riobamba. COTOPAXI (152): Bosque Integral Otonga, Los Libres, Pilaló, Saguambi, San Francisco de las Pampas, Sigchos, Triunfo Bajo. EL ORO (6): Atahualpa (9 km NW), Chilia (6 km N), Reserva



Figs. 38–40. *Ancognatha vulgaris*. 38) Habitus; 39) Parameres; 40) Distribution in Ecuador.

Biológica Buenaventura. ESMERALDAS (2): Quinindé, Tonsupa. IMBABURA (20): Carmen de Sta. Cecilia, Seis de Julio de Cuellaje. LOJA (19): Parque Nacional Podocarpus, San Lucas, Saraguro, Saraguro (11 km S), Vilcabamba, Zamora Huayco. LOS RÍOS (1): Río Palenque. MORONA SANTIAGO (9): Cantón Limón, Cantón San Juan Bosco, Gualaceo (34 km SE), Macas, San Isidro Cordillera de Domono Alto. NAPO (202): Archidona, Archidona (Chiyacu), Baeza, Baeza (7 km S, 24 km S), Baeza–Tena road (Cordillera de los Guacamayos), Cabañas San Isidro (2 km NW Cosanga), Cosanga, El Chaco, El Reventador, Lumbaqui, Misahuallí, Quijos Valley (Estación Biológica San Isidro), Río Hollín, San Francisco de Borja, San Rafael, Sarayacu–Loreto road, Sierrazul, Tena, Tres Cruces Hacienda La Cabaña km 140, Yanayacu (Cosanga), no data. ORELLANA (9): Estación Biológica Tiputini, Estación Científica Yasuní, Parque Nacional Yasuní. PASTAZA (16): Mera, Puyo, Puyo (16 km W), Puyo (22 km W), Río Verde, Shell Mera. PICHINCHA (26): Aloag–Santo Domingo road (km 40), Hacienda Faisanes, La Palma, La Virgen (Aloag–Santo Domingo road),

Los Bancos, Los Laureles, Mindo, Nanegal, Pacto, Puerto Quito (km 11), Quito–Las Palmas road (km 79), Río Palenque, Tandapi, Tandayapa. SANTO DOMINGO DE LOS TSÁCHILAS (65): Alluriquín, Chiriboga, Estación Científica Guajalito, Estación Científica Palmeras, La Florida, Río Guajalito, Santo Domingo, Santo Domingo–Quito road (km 33), Tinalandia, Toachi. SUCUMBÍOS (13): Cantón Gonzalo Pizarro–Río Reventado, El Salado, La Bonita. TUNGURAHUA (61): Baños, Baños (13 km E), Baños (17 km E), Río Blanco, Río Pastaza, Río Machay, Río Verde, Topo, Viscaya. ZAMORA CHINCHIPE (20): Cordillera del Cóndor (Consección Colibrí, Consección Sachavaca, Fruta del Norte), Estación Científica San Francisco, San Andrés (5 km N), Sabanilla (3 km E), Zamora.

**Temporal Distribution.** January (46), February (94), March (90), April (45), May (101), June (26), July (72), August (23), September (9), October (62), November (64), December (53).

**Diagnosis.** *Ancognatha vulgaris* most closely resembles *A. humeralis* because of the shared color and pattern as well as the deeply cleft mentum.

Males can be recognized by the shape of the paramer: *A. vulgaris* has subapical, short teeth, whereas teeth are lacking in *A. humeralis* (compare Figs. 39 and 13). Females can be separated by the form of the epipleuron: strongly thickened into an elongate lobe in *A. vulgaris* (Fig. 38) and only slightly expanded in *A. humeralis*.

**Natural History.** Adults are readily attracted to lights. Based on collecting data, two specimens were captured in a pitfall trap with pig dung as bait, which probably represents accidental captures. They have been collected in premontane wet forest, lower montane rain forests, montane rain forests, cloud forest, and disturbed habitats from sea level to 3,100 m in elevation. Larvae are reported to be a human food source in Ecuador (Onore 1997).

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#### REFERENCES CITED

- Arrow, G. J. 1911.** Notes on the coleopterous subfamily Dynastinae, with descriptions of new genera and species. *Annals and Magazine of Natural History (series 8)* 8: 151–176.
- Arrow, G. J. 1937.** *Coleopterorum Catalogus, pars 156. Scarabaeidae: Dynastinae.* W. Junk, Berlin, Germany.
- Bates, H. W. 1888.** Pectinicornia and Lamellicornia, Family Dynastidae [pp. 296–342]. *In: Biología Centrali-Americana.* Insecta, Coleoptera, Volume 2, Part 2 (F. D. Godman and O. Salvin, editors). London, UK.
- Bates, H. W. 1891.** Coleoptera [pp. 7–39]. *In: Supplementary Appendix to Travels Amongst the Great Andes of the Equator* (E. Whymper). John Murray, London, UK.
- Breure, S. H., and F. J. Borrero. 2008.** An annotated checklist of the land snail family Orthalicidae (Gastropoda: Pulmonata: Orthalicoidea) in Ecuador, with notes on the distribution of the mainland species. *Zootaxa* 1768: 1–40.
- Burmeister, H. 1847.** *Handbuch der Entomologie, Volume 5.* T. C. F. Enslin, Berlin, Germany.
- Endrödi, S. 1966.** Monographie der Dynastinae (Coleoptera, Lamellicornia). I. Teil. *Entomologische Abhandlungen* 33: 1–460.
- Endrödi, S. 1967.** Ergänzungen zur Kenntnis der Cyclocephalini (Col. Dynastinae). *Entomologischen Arbeiten aus dem Museum G. Frey* 18: 406–411.
- Endrödi, S. 1985.** *The Dynastinae of the World.* Dr. W. Junk, Dordrecht, The Netherlands.
- Erichson, W. F. 1847.** *Conspectus insectorum coleopterorum quae in Republica Peruana observata sunt.* *Archiv für Naturgeschichte* 13: 67–185.
- Figuerola, L., and B. C. Ratcliffe. 2016.** A new species of *Ancognatha* Erichson (Coleoptera: Scarabaeidae):

- Dynastinae: Cyclocephalini) from Peru, with distributions of Peruvian *Ancognatha* species. The Coleopterists Bulletin 70: 65–72.
- Gasca-Álvarez, H. J., and G. Amat-García. 2010.** Synopsis and key to the genera of Dynastinae (Coleoptera: Scarabaeoidea, Scarabaeidae) of Colombia. ZooKeys 34: 153–192.
- Harold, E. 1869.** Abänderungen vergebener Namen. Coleopterologische Hefte 5: 122–125.
- Höhne, W. 1922.** *Ancognatha ustulata* Burm. n. subsp. *ustulatooides* (Col. Dyn.). Deutsche Entomologische Zeitschrift 1922: 373–374.
- Kirsch, T. F. W. 1871.** Beiträge zur Käferfauna von Bogotá. Berliner Entomologische Zeitschrift 14 (1870): 337–378. [pages misnumbered, first one as 353]
- Kirsch, T. F. W. 1885.** Neue südamerikanische Käfer. Berliner Entomologische Zeitschrift 29: 207–224.
- Martínez, A. 1965.** Dos nuevas especies de Cyclocephalini Neotropicales (Dynastinae). Annales de la Sociedad Científica Argentina 179: 63–74.
- Mondaca, J. 2016.** A new, high-elevation species of the genus *Ancognatha* Erichson (Coleoptera: Scarabaeidae: Dynastinae) from Chile. The Coleopterists Bulletin 70: 59–64.
- Moore, M. R., R. D. Cave, and M. A. Branham. 2018.** Annotated catalog and bibliography of the cyclocephaline scarab beetles (Coleoptera, Scarabaeidae, Dynastinae, Cyclocephalini). ZooKeys 745: 101–378.
- Murray, A. 1857.** Description of new Coleoptera from the West Andes and the neighbourhood of Quito. Edinburgh New Philosophical Journal 5: 220–234.
- Neita-Moreno, J. C., and M. A. Morón. 2008.** Estados inmaduros de *Ancognatha ustulata* Coleoptera: Melolonthidae: Cyclocephalini). Revista Mexicana de Biodiversidad 79: 355–361.
- Onore, G. 1997.** A brief note on edible insects in Ecuador. Ecology of Food and Nutrition 36: 277–285.
- Onore G. 2005.** Edible insects in Ecuador [pp. 343–352]. In: Ecological Implications of Minilivestock: Potential of Insects, Rodents, Frogs and Snails (M. G. Paoletti, editor). Science Publisher, Enfield, NH.
- Otoya, F. 1945.** Anotaciones sobre el género *Ancognatha* y descripción de una nueva especie (Scarabaeidae). Caldasia 13: 273–282.
- Pardo-Locarno, L. C. 1994.** Escarabajos (Coleoptera: Melolonthidae) de importancia agrícola en Colombia. Simposio Plagas Rizófagas. Congreso de la Sociedad Colombiana de Entomología, Memorias 21: 159–176.
- Pardo-Locarno, L. C., R. Gonzalez, and J. Montoya-Lerma. 2006.** Description of a new species and new country records of *Ancognatha* Erichson (Coleoptera: Scarabaeidae: Dynastinae) from Colombia. Zootaxa 1139: 63–68.
- Paucar-Cabrera, A. 2005.** A catalog and distributional analysis of the Rutelinae of Ecuador. Zootaxa 948: 1–92.
- Paulian, R. 1954.** Coléoptères Dynastides, Chironides et Dynamopodides de l’Afrique noire française. Bulletin de l’Institut Français d’Afrique Noire 16: 1119–1215.
- Prokofiev, A. M. 2012.** New and noteworthy pleurostict scarab beetles (Coleoptera: Scarabaeidae). Calodema 220: 1–33.
- Prokofiev, A. M. 2013.** New synonyms in Dynastinae (Coleoptera: Scarabaeidae). Actual Problems of Modern Science 1: 131.
- Ramírez-Salinas, C., M. A. Morón, and A. E. Castro-Ramírez. 2004.** Descripción de los estados inmaduros de tres especies de *Anomala*, *Ancognatha* y *Ligyryus* (Coleoptera: Melolonthidae: Rutelinae y Dynastinae) con observaciones de su biología. Acta Zoológica Mexicana (N.S.) 20: 67–82.
- Ratcliffe, B. C. 1992.** A new species of *Ancognatha* from Panama (Coleoptera: Scarabaeidae: Dynastinae). The Coleopterists Bulletin 46: 256–259.
- Ratcliffe, B. C. 2003.** The dynastine scarab beetles of Costa Rica and Panama. Bulletin of the University of Nebraska State Museum 16: 1–506.
- Ratcliffe, B. C., and R. D. Cave. 2017.** The dynastine scarab beetles of the United States and Canada (Coleoptera: Scarabaeidae: Dynastinae). Bulletin of the University of Nebraska State Museum 30: 1–298.
- Ratcliffe, B. C., R. D. Cave, and E. B. Cano. 2013.** The dynastine scarab beetles of Mexico, Guatemala, and Belize (Coleoptera: Scarabaeidae: Dynastinae). Bulletin of the University of Nebraska State Museum 27: 1–666.
- Ritcher, P. O. 1966.** White Grubs and Their Allies. Oregon State University Press, Corvallis, OR.
- Vallejo, F., and M. A. Morón. 2008.** Description of the immature stages and redescription of the adults of *Ancognatha scarabaeoides* Erichson (Coleoptera: Scarabaeidae: Dynastinae), a member of the soil white grub assemblage in Colombia. The Coleopterists Bulletin 62: 154–164.
- Wheeler, Q. D., and N. I. Platnick. 2000.** The phylogenetic species concept (*sensu* Wheeler and Platnick) [pp. 55–69]. In: Species Concepts and Phylogenetic Theory. A Debate (Q. D. Wheeler and R. Meier, editors). Columbia University Press, New York, NY.

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