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The genus *Gromphas* Brullé, 1837 in Peru
(Coleoptera: Scarabaeidae: Scarabaeinae: Phanaeini)

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Abstract. The genus *Gromphas* Brullé (Coleoptera: Scarabaeidae) comprises four species, of which *G. aeruginosa* (Perty) and *G. amazonica* Bates are known to occur in Peru. This paper presents a revised description of *Gromphas* as well as illustrated diagnoses and distributional and ecological data on the Peruvian species.

Introduction

Early studies of the Peruvian scarabaeine fauna are surprisingly few. Erichson's (1847) pioneering study cited 19 species (no *Gromphas* Brullé, Coleoptera: Scarabaeidae). Nearly 100 years later, Balthasar (1941) listed 101 species, including *G. aeruginosa*; Blackwelder's (1944) checklist does not cite any *Gromphas* from Peru. In recent years the Peruvian fauna has received serious scrutiny in a new body of field-based studies that includes Larsen (2004), Larsen et al. (2006), Larsen and Génier (2008a, 2008b), Ramirez (2009), Grados et al. (2010), and Figueroa and Alvarado (2011). The dung beetle fauna of Peru is now known to number over 200 species (Larsen et al. 2006). The purpose of this paper is to review the taxonomy and distribution of the species of *Gromphas* known to inhabit Peru. It is a contribution to an ongoing study of the Peruvian scarabaeine dung beetle fauna based at the Museo de Historia de la Natural Universidad Nacional Mayor de San Marcos in Lima. Two *Gromphas* species have been discovered so far within the territorial limits of the country. The genus was reviewed by Barattini and Saenz (1960, 1964) and is currently the subject of a revisionary study by Mario Cupello of the Museu Nacional, Rio de Janeiro (MNRJ).

Materials and methods

This study is based on data and examination of approximately 100 (80 *Gromphas aeruginosa* and 20 *G. amazonica*) specimens from the Peruvian localities specified in the Geographical Distribution section for each species. The following codons reference their location: **AFIC** = Adrian Forsyth Insect Collection at the United States National Museum of Natural History, Washington, D.C.; **CMNC** = Canadian Museum of Nature, Ottawa; **MNRJ** = Museu Nacional, Rio de Janeiro; **MUSM** = Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos, Lima; **WDEC** = private collection of W. D. Edmonds, Marfa, Texas.

Genus *Gromphas* Brullé 1837 (not 1834)

Gromphas Brullé, 1837: 304 (as a “subgenus” of *Copris*). Type species: not designated (see below)

Brullé’s description of *Gromphas* states “Ce sous-genre se compose d’une seule espèce ...”, but he neglects to mention its name. His only basis is a vague reference to Dej[ean] (presumably Dejean, 1836-1837), who cites “*Lacordairei* Dej.” as the only included species of “GROMPHAS Dejean.” But “*Gromphas lacordairei*”, also attributed to Brullé, is nowhere described as far as we know. Resolution of these nomenclatural puzzles is far beyond the scope of this paper and is currently under consideration by Mario Cupello (pers. comm.). For present purposes we use the names *Gromphas* and *G. lacordairei* as currently understood in common usage. Heretofore the date of publication of Brullé’s description of *Gromphas* has been cited as 1834. We here correct the date to 1837, the date of publication of his third volume on Coleoptera in the *Histoire Naturelle des Insectes* series in which *Gromphas* is formally established (see Musgrave 1932: 8). The following description of the genus does not thoroughly consider *G. dichroa* Blanchard, which we know only from photographs and published descriptions as well as observations graciously supplied by Mario Cupello.

Generic Description. *General* - Medium size, overall length usually no more than 20 mm. Dorsum usually shining and with some metallic reflections (Fig. 1-4); sexual dimorphism subtle, expressed mainly by characters of prolegs. *Head* - Clypeal margin (seen from above, Fig. 6, 12) broadly bidentate medially, teeth rounded; junction of clypeal and genal margins strongly notched (Fig. 6, arrow). Clypeal process a transverse, marginally curved ridge (Fig. 15). Frontoclypeal carina (seen from above) strongly bowed anteriorly, usually interrupted medially by an emarginate tubercle or conical horn (Fig. 6, 12). Antennal club (Fig. 10) rounded, three lamellae exposed (basal lamella not hollowed apically to receive apical segments). *Prothorax* - Pronotum usually evenly convex and lacking prominent surface features (except *G. aeruginosa*). Pronotum densely, finely granulate (Fig. 11), granulation becoming weaker, sometimes obsolete posteromedially. Posterior pronotal margin distinctly, finely carinate or carina largely obliterated. Posterior pronotal fossae shallow, sometimes indistinct (Fig. 2-3, 9). *Pterothorax* - Intercostal portion of metasternum angulate anteromedially; apex (seen from side) rounded, with flattened, declivitous sides (Fig. 13). Dorsal margin of metepisternum curved downward posteriorly, not produced as rounded tab that engages edge of elytron (Fig. 14). *Legs* - Male lacking protarsi (Fig. 16, 17); female with four-segmented protarsi (Fig. 18, 19). Meso- and metatarsi five-segmented, clawless. Inner apical protibial angle of male with conspicuous pencil of long setae (Fig. 17, arrow) sometimes accompanied by an inwardly directed, acute spine (Fig. 20, arrow); females often possessing setal pencil above insertion of tarsus. Protibial spurs acute, gently bent medially (Fig. 17, 20-21), sometimes angulate along outer margin. Protibiae quadridentate in both sexes (Fig. 16-17); all but basal tooth carinate on outer (dorsal) surface (Fig. 16). *Elytra* - Combined width at humeral angles clearly greater than length along suture (Fig. 2-3). Anterior ends of striae not fossate (Fig. 9). Striae fine, superficial, sometimes carinate, puncturing usually obsolete; eighth stria effaced anteriorly. Interstriae flat or weakly convex. *Pygidium* - Basal piece (propygidium) not separated from pygidium by transverse carina (Fig. 7; except *G. dichroa*). *Aedeagus* - Ventral margin of phallobase narrowly grooved medially (Fig. 23, arrow), groove embracing fissure (most easily viewed submerged in alcohol, Fig. 22). Coprophagous species.

Generic Diagnosis. Species of *Gromphas* can be distinguished from other Peruvian dung beetles by the following combination of characters: Prominent notch separating clypeal and genal margins (Fig. 6, arrow); evenly convex and shining pronotum (except *G. aeruginosa*); the bluntly acuminate metasternum (Fig. 13); four-segmented protarsi in female (Fig. 18-19, protarsi absent in male); propygidium and pygidium not separated by transverse carina (Fig. 7). They will key to couplet 54 in Vaz-de-Mello et al. (2011).

Geographical distribution. South America east of the Andes.

Included Species. Four species are currently assigned to *Gromphas*: *G. lacordairei* Brullé, *G. amazonica* Bates, *G. dichroa* Blanchard, and *G. aeruginosa* (Perty). Only *G. aeruginosa* and *G. amazonica* are known from Peru.

Species Diagnoses. The Peruvian species are very distinct from each other and can be distinguished easily as follows:

***Gromphas aeruginosa* (Perty, 1830)**

(Fig. 1-2, 6-11, 14-18)

Diagnosis. Length 13 - 20 mm. Dorsum metallic green with coppery highlights (Fig. 1-2). Clypeal margin more-or-less evenly curved between notch and median teeth (Fig. 6). Head of both sexes with prominent conical, apically emarginate horn (Fig. 1-2, 6). Pronotum of both sexes with a large median prominence drawn out on each side into an acute, conical process (Fig. 1-2, 8). (Head horn and pronotal prominence attenuated, but usually evident in smaller specimens.) Pronotum densely granulate (Fig. 11); granulation becoming weaker but remaining distinct posteromedially. Inner apical angle of male protibia with a pencil of long setae (Fig. 17, arrow), lacking spine; outer edge of protibial spur of both sexes not expanded subapically (Fig. 17). Apical protarsal segment rounded basally, not strongly prolonged apically (Fig. 18).

Geographical Distribution. (Fig. 5) Recorded from Colombia, Venezuela, Peru, Bolivia and Brazil. In Peru widely distributed in Amazonian lowlands in Cuzco, Huánuco, Madre de Dios, San Martín, Ucayali and Loreto. Peruvian collecting data: **CUZCO: *Prov. Quispicanchi***, ~8 km E Quince Mil (13°12' S 70°40' W) 550 m AFIC. **HUÁNUCO: *Prov. Leoncio Prado***, Tingo María (9°10'S, 76°0'W) 600 m [May] MNRJ. **LORETO: *Prov. Maynas***, 3 km S. Yanamono Island (3°23'S, 72°45'W) 140 m [Sep] MUSM, CMNC. **MADRE DE DIOS: *Prov. Tahuamanu***, Distr. Iñapari (10°57'S, 69°34'W) 400 m [May] MUSM. ***Prov. Tambopata***, Puerto Maldonado (12°41'S, 69°06'W) 190 m MNRJ; [no loc.] (12°65'S, 69°11'W) AFIC, (12°39'S, 69°07') AFIC, (12°57'S, 70°10'W) AFIC, (12°36'S, 69°10'W) AFIC, MUSM. **SAN MARTÍN: *Prov. El Porvenir***, Bosque El Pelejo (6°16'S, 75°50'W) 161 m [May] MUSM. **UCAYALI: *Distr. Yarinacocha***, Río Ucayali (8°19'S, 74°35'W) [Oct-Nov] MNRJ. ***Distr. Pucallpa***, Nesuya (8°25'S, 74°28'W) 250 m [Dec]; San Lorenzo (8°22'S, 74°33'W) [Jul] WDEC; Distr. Iparia, Río Pachitea (9°18'S, 74°25'W) 160 m [Dec] MUSM. ***Prov. Coronel Portillo***, Río Tamaya, CCNN Nueva Yarina (8°47'S, 74°12'W) 162 m [Mar] MUSM; Santa Sofia, Río Utoquini (8°06' S 74°35'W) 85 m [Aug] MUSM; Pucallpa (8°25'S, 74°28'W) [Aug] MUSM, MNRJ, WDEC.

Ecology. Common in open areas, pasturelands and other disturbed settings, savannas and river banks (“playas”). Frequently collected from cow dung and pitfall traps baited with human feces.

***Gromphas amazonica* Bates, 1870**

(Fig. 3-4, 12-13, 19-23)

Diagnosis. Length 12-18 mm. Dorsum shining black with weak dark green to blue highlights (Fig. 3-4). Clypeal margin slightly expanded and upturned near notch (Fig. 12, arrow), not evenly curved. Head of both sexes with a weakly bituberculate, median gibbosity, never with a conical horn (Fig. 12). Pronotum of both sexes evenly convex, lacking any trace of a median prominence (Fig. 3-4). Pronotum densely and finely granulate, granulation becoming almost effaced posteromedially. Inner apical angle of male protibia drawn out into an acute spine (Fig. 20, arrow); outer edge of protibial spur of both sexes strongly expanded subapically (Fig. 20-21). Apical protarsal segment prolonged apically (Fig. 19).

Geographical Distribution. (Fig. 5) Recorded from Brazil, Colombia and Peru. In Peru known from isolated localities in Amazonian lowlands of Loreto, San Martín and Ucayali. Peruvian collecting data: **LORETO: *Prov. Ucayali***, Distr. Padre Marquez, CCNN Santa Ana (7°52'S, 75°31' W) 224 m [Oct] MUSM; Contamana (7°21'S, 75°01'W) 134 m [Dec] MUSM, WDEC. **SAN MARTÍN: *Prov. El Porvenir***,

Bosque El Pelejo (6°16'S, 75°50'W) 161 m [May] MUSM. UCAYALI: *Prov. Coronel Portillo*, Pucallpa (8°25'S, 74°28'W) [Aug] MUSM, (8°22'S, 74°34'W) [Jul-Aug, Dec] CMNC.

Ecology. The ecology of this species is not understood. Specimens examined with precise data were collected with pitfall traps baited with human feces in forest habitats; in one case, several individuals were found in secondary growth associated with mandioca cultivation (cassava, “yuca”; *Manihot esculenta* Crantz). Trond Larsen (pers. comm.) points out the possibility that it may be a narrow ecological specialist; he has not collected *G. amazonica* during several years of intensive collection and ecological monitoring of the dung beetle fauna in Madre de Dios (southeastern Peru).

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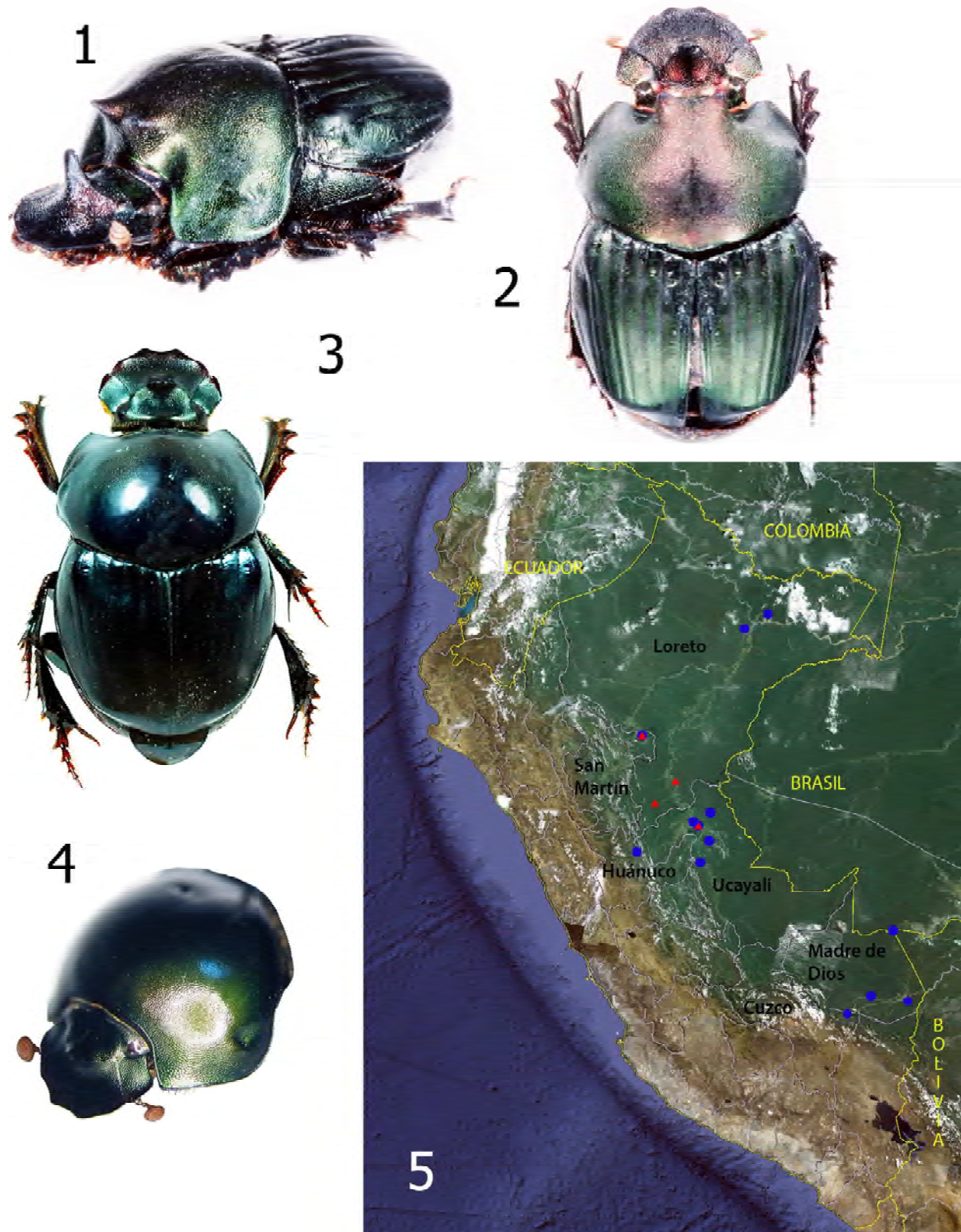
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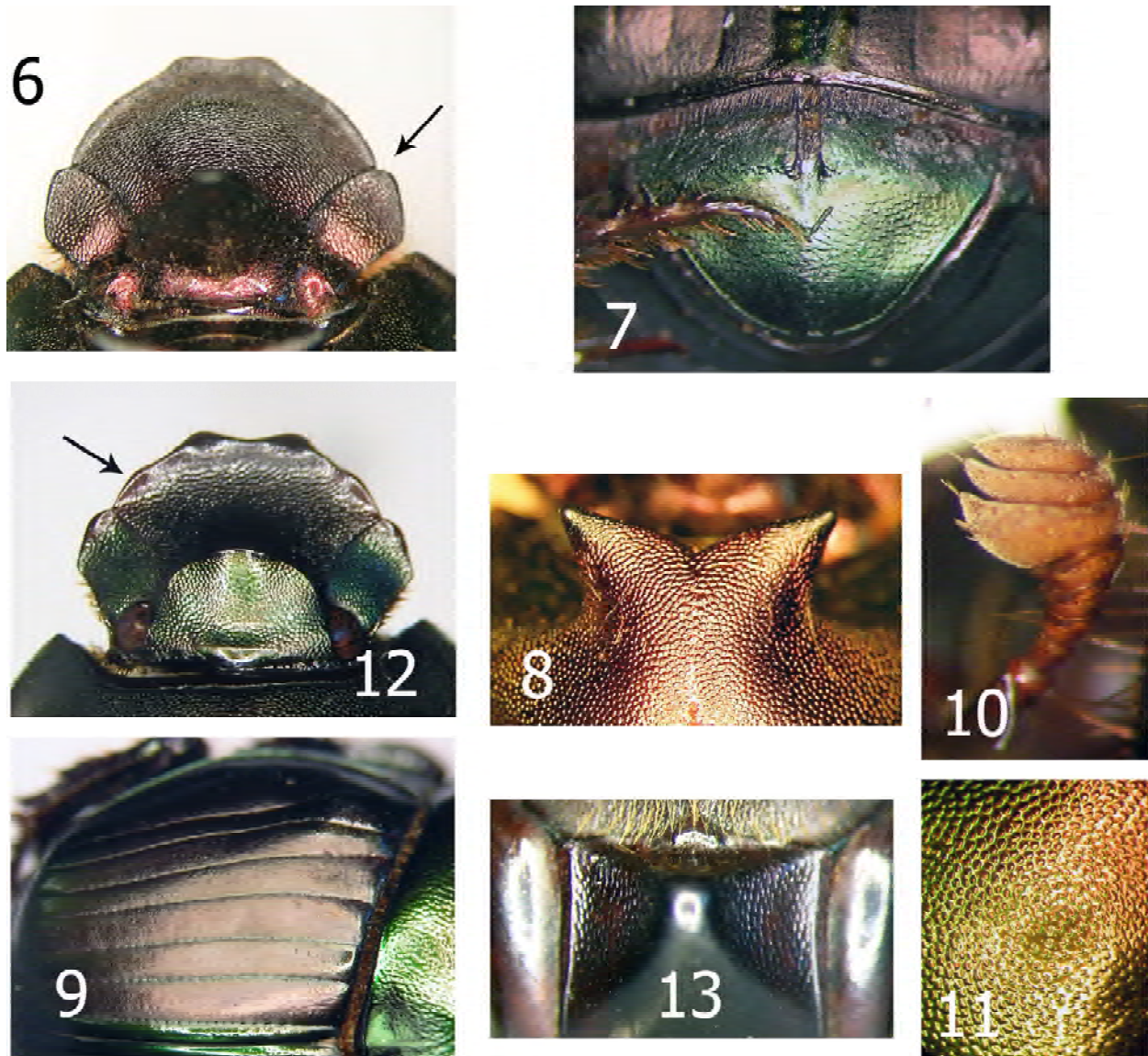
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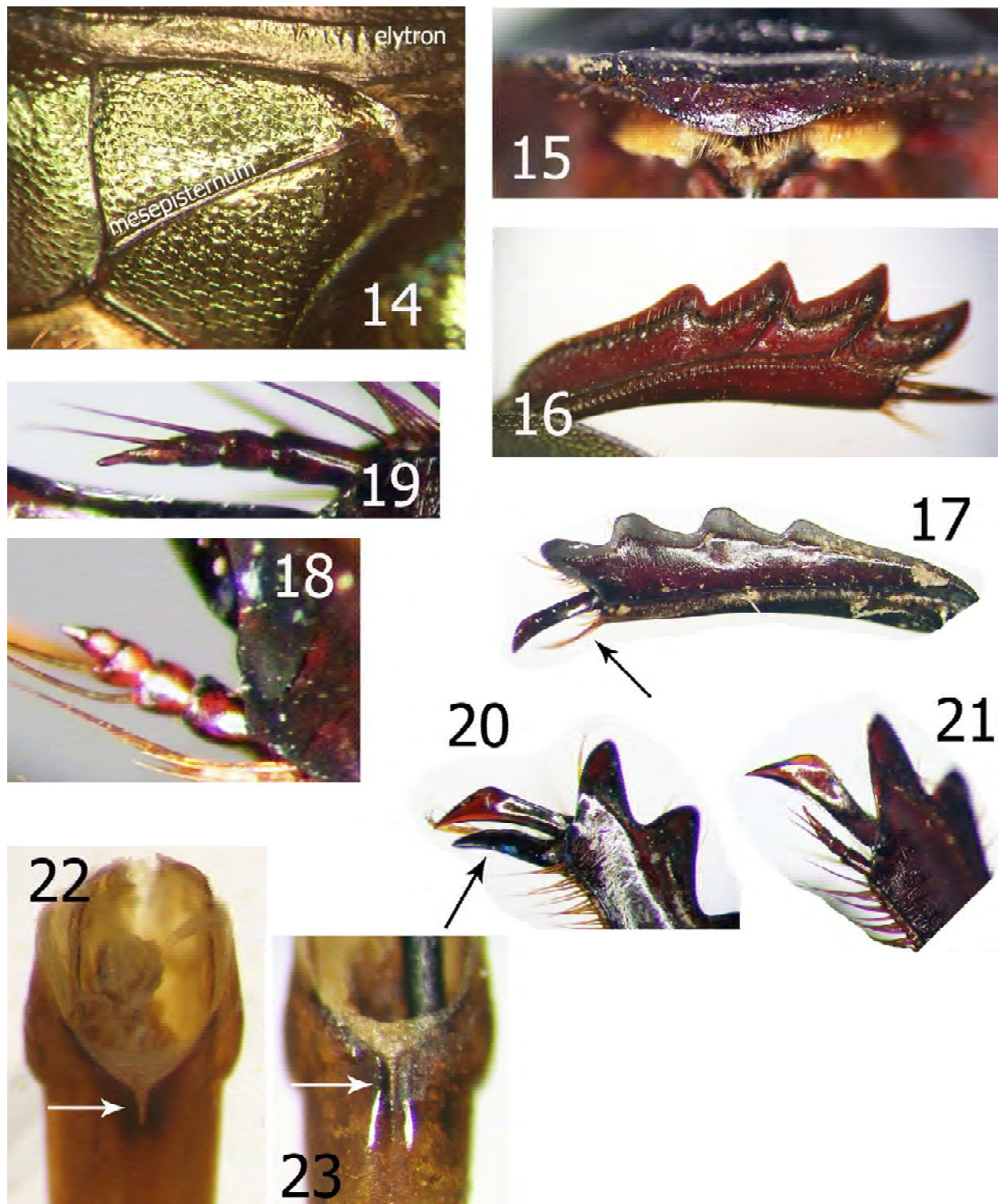
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Figures 1-5. *Gromphas* sp. 1-2. *Gromphas aeruginosa*, male habitus: 1) Lateral view; 2) Dorsal view. 3-4. *Gromphas amazonica*, female: 3) Dorsal habitus; 4) Head and pronotum. 5. Distribution of *Gromphas* in Peru (red triangles = *G. amazonica*; blue circles = *G. aeruginosa*).



Figures 6-13. *Gromphas* spp. **6-11.** *Gromphas aeruginosa*: **6)** Dorsal view head (arrow indicates notch at junction of clypeus and gena); **7)** Pygidium; **8)** Well developed pronotal prominence; **9)** Elytron; **10)** Antenna; **11)** Pronotal sculpturing. **12-13.** *Gromphas amazonica*: **12)** Dorsal view of head; **13)** Ventral view of anterior portion of metasternum.



Figures 14-23. *Gromphas* spp. **14-18.** *Gromphas aeruginosa*: **14**) Left side of pterothorax; **15**) Clypeal process; **16**) Left tibia of male, anterior surface; **17**) Same, posterior surface (arrow indicates pencil of setae); **18**) Female protarsus. **19-23.** *Gromphas amazonica*: **19**) Female protarsus; **20**) Ventral view of apex of male protibia (arrow indicates spine); **21**) Ventral view of apex of female protibia; **22**) Ventral view of basal portion of phallobase submerged in alcohol (arrow indicates fissure); **23**) Same, air dried (arrow indicates fissure and groove).