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Systematic revision of the genus *Orodaliscoides* Schmidt, 1913
(Coleoptera: Scarabaeidae: Aphodiinae)

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Systematic revision of the genus *Orodaliscoides* Schmidt, 1913
(Coleoptera: Scarabaeidae: Aphodiinae)

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Abstract. The species belonging to the genus *Orodaliscoides* Schmidt (Coleoptera: Scarabaeidae: Aphodiinae) are redescribed and figured. The following **new combinations** are proposed: *Orodaliscoides fimbripes* (Brown, 1928) and *Orodaliscoides giulianii* (Gordon, 1977).

Key words. Systematics, new combinations, *Orodaliscoides*, American Aphodiinae.

Introduction

This work is part of a series of papers revising the Mexican Aphodiinae. Adolf Schmidt (1913) created *Orodaliscoides* as a subgenus of the large genus *Aphodius* Illiger, 1798 and included two species, namely *Aphodius rugosiceps* Harold, 1859 from Chile and Peru, and *Aphodius reflexus* Schmidt, 1910 from Argentina. M. Dellacasa (1988) designated *Aphodius rugosiceps* Harold, 1859 as its type species, and Dellacasa et al. (2001) upgraded *Orodaliscoides* to genus level.

Aphodius fimbripes Brown, 1928 and *Aphodius giulianii* Gordon, 1977 are considered unusual members of the genus *Tetraclipeoides* Schmidt, 1913 in Gordon and Skelley (2007). Instead of creating a new genus for these, we recognized the shape of the clypeus, aedeagus and epipharynx show a basal relationship with species of *Orodaliscoides*. We deem it best to transfer them, for now, to *Orodaliscoides* even if they have an extremely disjunct geographical distribution. Obviously more studies are needed to investigate other characters (e.g. DNA, life history, etc.) as well as new discoveries of species with intermediate distribution between *A. fimbripes*/*A. giulianii* (USA, Mexico) and *A. reflexus*/*A. rugosiceps* (Argentina, Chile). Based on a complex of morpho-anatomical characters, we herein create two **new combinations**: *Orodaliscoides fimbripes* (Brown) and *Orodaliscoides giulianii* (Gordon).

The main characteristics of the genus *Orodaliscoides* are:

- scutellum small, triangular;
- hind tibiae apically fimbriate with unequal spinules;
- basal margin of pronotum bordered;
- clypeus round at sides of median sinuosity;
- frontal suture not tuberculate;
- epipharynx with corypha usually strongly protruding from the anterior margin.

Materials and methods

Types of the critical taxa were examined. Geographical distributions based on reliable literature records are reported. Terminology used to describe morpho-anatomical features follows that of Dellacasa et al. (2001).

Specimens studied are in the following collections:

CNCI — Canadian National Collection, Ottawa, Canada

CSCA — California State Collection of Arthropods, California Department of Food & Agriculture, Sacramento, California, U.S.A.

DCGI — Dellacasa Collection, Genoa, Italy

MNHN — Muséum National d'Histoire Naturelle, Paris, France

NHRS — Naturhistoriska Riksmuseet, Stockholm, Sweden

USNM — United States National Museum, Washington, D. C., U.S.A.

Genus *Orodaliscoides* Schmidt, 1913

Aphodius (*Orodaliscoides*) Schmidt, 1913: 145; 1922: 195; Dellacasa 1988: 388; Dellacasa and Gordon 1997: 368.

Orodaliscoides; Dellacasa et al. 2001: 215; Smith and Skelley 2007: 27

Type species. *Aphodius rugosiceps* Harold, 1859 (subsequent designation of Dellacasa 1988: 388).

Description. Medium size species (length 5.0-8.0 mm); elongate, convex, shiny, glabrous or nearly glabrous. Brownish-red or brownish-yellow with paler elytra. Head with epistome gibbous, coarsely punctured; clypeus anteriorly subtruncate or feebly sinuate at middle, round at sides, rather thickly bordered, edge upturned, glabrous or ciliate; genae obtusely round, elongately ciliate, protruding from the eyes; frontal suture distinct, not tuberculate. Pronotum transverse, strongly convex, regularly rather densely punctured; lateral margins arcuate, bordered, edge elongately ciliate; hind angles round or obtusely round; base distinctly bordered. Scutellum small, triangular. Elytra elongate, convex; epipleural carina elongately ciliate; striae deep, not or feebly crenulate; interstriae moderately convex; sparsely but distinctly punctured, sometimes sparsely pubescent laterally and toward apex. Fore tibiae with four or three distal teeth and proximally faintly serrulate on outer margin; upper side smooth. Middle and hind tibiae with many long yellowish setae on outer face and inner margin, and with strong transverse carinae on outer face; fimbriate with apical spinules rather stout, irregularly or alternately unequal. Middle and hind tarsi with many very elongate setae on apex of each segment. Pygidium finely, irregularly and sparsely granulose, each granule with a recumbent and irregularly elongate seta; its apical margin with few, dense and moderately elongate cilia. Sexual dimorphism shown in males by fore tibiae spur stouter and obtusely truncate apically; by relatively more sparse punctation of pronotum; sometimes by inferior spur of middle tibiae apically truncate, as well as by apical margin of hind tibiae denticulate before inferior spur; by metasternal plate more distinctly grooved. Aedeagus with paramera strongly curved and acuminate apically. Epipharynx widely transverse; anterior margin inwardly arcuate and with a belt of strong spinules; epitorma conical and elongate, basally widened; corypha more or less strongly prominent, with two median spiculae, sometimes lacking, and with an apical clump of short celtetes; pedia pubescent with rather elongate spines immixed; chaetopariae rather dense and elongate.

Distribution. Nearctic and Neotropical regions.

Key to species of *Orodaliscoides*

1. Lateral margins of clypeus glabrous; inferior spur of middle tibiae regularly acuminate in both sexes **2**
- Lateral margins of clypeus elongately ciliate; inferior spur of middle tibiae, in males, apically truncate (Fig. 3, 13) **3**

- 2(1). Elytra sparsely pubescent laterally and toward apex; fore tibiae with four teeth on outer margin (Fig. 27); hind tibiae, in males, not denticulate on apical margin before inferior spur; epistome rather irregularly, coarsely densely, subrugosely punctured; elytral interstriae finely alutaceous, distinctly punctured. Brownish-red. Length 5.0-7.0 mm. Chile, Peru? ***O. rugosiceps* (Harold)**
- Elytra glabrous; fore tibiae with three teeth on outer margin (Fig. 17); hind tibiae, in males, with a distinct denticle on apical margin before inferior spur (Fig. 18); epistome almost evenly, sparsely, minutely subgranulosely punctured; elytral interstriae strongly alutaceous, superficially punctured. Brownish-yellow. Length 5.0-6.0 mm. Argentina ***O. reflexus* (Schmidt)**
- 3(1). Elytral interstriae microscopically alutaceous, almost shiny; striae relatively deeper, more coarsely punctured, feebly crenulate; interstriae shortly sparsely pubescent on preapical declivity only; males with inferior spur of middle tibiae squarely truncate apically and slightly hooked laterally on each side (Fig. 3). Dark reddish-brown. Length 6.0-8.0 mm. U.S.A. (California, Nevada, Utah) ***O. fimbripes* (Brown)**
- Elytral interstriae strongly alutaceous, almost dull; striae relatively more superficial, less coarsely punctured, not crenulate; lateral interstriae shortly and sparsely pubescent, pubescence becoming longer and denser on preapical declivity; males with inferior spur of middle tibiae obliquely truncate apically, slightly hooked on inner side only (Fig. 13). Pale brownish-yellow. Length 5.5-6.5 mm. Mexico (Chihuahua), U.S.A. (Texas) ***O. giulianii* (Gordon)**

***Orodaliscoides fimbripes* (Brown, 1928) new combination**

(Fig. 1-7)

Aphodius fimbripes Brown, 1928: 305.

Aphodius (Platyderides) fimbripes; Dellacasa 1988: 252.

Tetraclipeoides fimbripes; Gordon and Skelley 2007: 301.

Type locality. Milford, Utah [U.S.A.].

Type repository. Canadian National Collection, Ottawa (type not examined).

Redescription. Length 6.0-8.0 mm; elongate, moderately convex, shiny; all margins and elytral preapical declivity fimbriate with pale setae. Head and pronotum very dark reddish-brown; clypeal margin and pronotal sides shadowy paler; elytra reddish-brown; legs reddish-brown with paler tarsi; antennal club yellowish. Head with epistome feebly convex on disc, evenly finely and sparsely punctured; clypeus broadly feebly sinuate at middle, widely round at sides, thinly bordered, edge somewhat upturned, lateral margins conspicuously fimbriate with moderately elongate, rather dense yellowish setae; genae obtuse, elongately densely ciliate, protruding from the eyes; frontal suture cariniform, somewhat raised medially and laterally; front more densely punctured than epistome. Pronotum transverse, dually punctured; large punctures, four to five times larger than small ones, irregularly sparse, denser on sides, lacking medially; small punctures slightly unequal, more distinct and less sparse on sides, finer and less close on disc; lateral margins feebly arcuate, thickly bordered, edge conspicuously fimbriate, setae near anterior angles similar to those on genae, shorter posteriorly; hind angles obtusely round; base distinctly bisinuate, strongly bordered. Scutellum finely alutaceous, sparsely punctured on basal half. Elytra faintly widened posteriorly; epipleural margin fimbriate, except apically, with moderately elongate yellowish setae, denser and more elongate at shoulder; striae rather deep, distinctly punctured, slightly crenulate; interstriae feebly convex, microscopically alutaceous on disc, more strongly alutaceous near apex, with two irregular rows of fine punctures near striae and shortly sparsely pubescent on preapical declivity. Fore tibiae fimbriate on inner margin. Hind tibiae superior spur as long as first tarsal segment; latter as long as following three segments combined. Male: pronotum broadly transverse, somewhat explanate on sides; fore tibiae spur stout, thick and feebly curved; middle tibiae inferior spur stout, less than half as long as superior spur, squarely truncate apically, each angle slightly hooked laterally (Fig. 3); aedeagus Fig. 6-7.

Female: pronotum relatively narrower, evenly convex; fore tibiae spur slender and straight; middle tibiae inferior spur almost as long as superior spur, slender and acuminate.

Material examined. U.S.A.: California: 15 mi N, 12 mi W Eureka dunes, Eureka Valley, Inyo Co., 27.IV.1985, flight at dusk, leg. D. Giuliani (1 ex., DCGI); **Utah:** Milford, VII.1907, leg. Wickham (1 ex., DCGI); 10 mi N of Parowan, Iron Co., 12.V.1974, leg. A. Rulien (1 ex., DCGI).

Distribution. U.S.A. (California, Nevada, Utah).

Bionomics. Almost unknown; most specimens were taken at light in Spring and early Summer on sand dunes.

***Orodaliscoides giulianii* (Gordon, 1977) new combination**
(Fig. 8-15)

Aphodius giulianii Gordon, 1977: 232.

Aphodius (*Trichonotulus*) *giulianii*; Dellacasa 1988: 261.

Tetraclipeoides giulianii; Gordon and Skelley 2007: 303.

Type locality. "Sand dunes" 48 km S Juarez, Chihuahua, Mexico.

Type repository. United States National Museum, Washington (paratype examined).

Redescription. Length 5.5-6.5 mm, elongate, convex, moderately shiny, elytra distinctly pubescent laterally and preapically. Pale brownish-yellow; head, pronotum and juxtasutural interstria of elytra yellowish-red; legs brownish-red; antennal club testaceous. Head with epistome feebly convex, faintly alutaceous, very sparsely, finely punctured; clypeus feebly sinuate medially, broadly round at sides, distinctly bordered, edge upturned and elongately ciliate laterally; genae obtusely round, elongately densely ciliate, distinctly protruding from the eyes; frontal suture subcariniform, not tuberculate; front with few fine punctures on sides. Pronotum transverse, convex, faintly alutaceous thus rather shiny, dually punctured, punctures irregularly spaced, more denser and coarser on sides; large punctures, three to four times larger than small ones, lacking on disc; lateral margins feebly arcuate, thickly bordered, edge elongately ciliate; hind angles obtusely round; base slightly bisinuate, thinly bordered, evenly rather shortly ciliate. Scutellum somewhat elongate, distinctly alutaceous, with few small punctures irregularly sparse on basal half. Elytra subparallel-sided, epipleura elongately fimbriate; striae feebly impressed, superficially punctured, faintly crenulate; interstriae slightly convex, strongly alutaceous thus almost dull, irregularly almost imperceptibly punctured near striae, the lateral ones shortly and sparsely pubescent, the pubescence becoming longer and denser on preapical declivity. Hind tibiae superior spur somewhat longer than first tarsal segment; latter as long as following three segments combined. Male: pronotum relatively more broadly transverse; fore tibiae spur narrowed and bent inward at apex (Fig. 12); middle tibiae inferior spur nearly straight, truncate and sharply hooked only inwardly at apex (Fig. 13); metasternal plate deeply excavate, coarsely irregularly punctured and with distinct longitudinal groove medially; aedeagus Fig. 14-15. Female: pronotum relatively narrower; spur of fore tibiae and inferior spur of middle tibiae regularly acuminate; metasternal plate nearly flat.

Material examined. MEXICO: Chihuahua: 48 km S Juarez, 28.IV.1974, sand dunes, leg. D. Giuliani (2 paratypes, CSCA, DCGI).

Distribution. Mexico (Chihuahua), U.S.A. (Texas).

Bionomics. Almost unknown: perhaps detritus feeder species restricted to sandy areas or attracted to light. The specimens of the type series were collected in April.

***Orodaliscoides reflexus* (Schmidt, 1910)**

(Fig. 16-22)

Aphodius reflexus Schmidt, 1910: 357; Blackwelder 1944: 213.

Aphodius (Orodaliscoides) reflexus; Schmidt 1913: 145; 1922: 196; Dellacasa 1988: 188.

Orodaliscoides reflexus; Smith and Skelley 2007: 28 (lectotype designation).

Type locality. Prov. Chubut; [Patagonia] Argentina.

Type repository. Naturhistoriska Riksmuseet, Stockholm (lectotype examined).

Redescription. Length 5.0-6.0 mm; very elongate, convex, rather dull, glabrous. Yellowish-brown; elytra with sutural margin dark brown; legs yellowish-brown; antennal club yellowish. Head with epistome gibbous, almost evenly, sparsely, minutely punctured; punctures subgranulose; clypeus subtruncate anteriorly, widely round at sides, thinly bordered, edge strongly upturned, glabrous; genae widely round, elongately ciliate, moderately protruding from the eyes; frontal suture cariniform, not tuberculate; front finely, not closely punctured toward frontal suture only. Pronotum moderately transverse, strongly convex, simply, subregularly, not closely, moderately coarsely punctured, with a postero-medial longitudinal areola impunctate, somewhat depressed; lateral margins strongly arcuate, rather thickly bordered, edge elongately densely ciliate; hind angles broadly round; base faintly bisinuate, rather thickly bordered. Scutellum superficially alutaceous, finely punctured almost throughout. Elytra elongate, subparallel-sided; epipleural carina densely elongately ciliate; striae rather fine, superficially punctured, feebly crenulate; interstriae slightly convex, finely alutaceous, glabrous, superficially sparsely irregularly punctured. Hind tibiae superior spur somewhat longer than first tarsal segment, latter as long as following two segments combined. Male: pronotum not narrowed anteriorly; fore tibiae spur stout and downward bent (Fig. 17); apical margin of hind tibiae denticulate before inferior spur (Fig. 18); aedeagus Fig. 21-22. Female: pronotum subquadrate, weakly narrowed anteriorly; fore tibiae spur slender and nearly straight.

Remarks. The shape of epipharynx (Fig. 16) differs somewhat from that of the other *Orodaliscoides* species but the complex of morpho-anatomical characters indicate that, with some doubt, it belongs to this genus.

Material examined. ARGENTINA: Prov. Chubut, leg. M. Richter (lectotype, NHRS); Camarones, Gob. Chubut, leg. J. Wiederrecht (1 paralectotype, NHRS); Prov. Mendoza, leg. M. Richter (1 paralectotype, NHRS); Bañadera, Prov. Neuquen, 11.XII.1972 (1 ex., DCGI).

Distribution. Argentina (Chubut, Mendoza, Neuquén, Río Negro).

Bionomics. Almost unknown. Specimens were collected from December to January.

***Orodaliscoides rugosiceps* (Harold, 1859)**

(Fig. 23-29)

Aphodius rugosiceps Harold, 1859: 213; 1866: 97; Blackwelder 1944: 213.

Aphodius (Orodaliscoides) rugosiceps; Schmidt 1913: 145; 1922: 196; Dellacasa 1988: 192; Dellacasa and Gordon 1997: 370 (lectotype designation).

Orodaliscoides rugosiceps; Dellacasa et al. 2001: 215; Smith and Skelley 2007: 28.

Type locality. “Chili” [Chile].

Type depository. Muséum National d’Histoire Naturelle, Paris (lectotype examined).

Redescription. Length 5.0-7.0 mm; very elongate, convex, moderately shiny; nearly glabrous, elytra sparsely pubescent laterally and toward apex. Brownish-red; elytra, except sutural margin, and legs paler; antennal club yellowish. Head with epistome gibbous, rather irregularly, coarsely, densely, subrugosely punctured, alutaceous; clypeus feebly sinuate at middle, round at sides; rather thinly bordered, edge distinctly upturned, glabrous; genae elongately ciliate, obtusely round, protruding from the eyes; frontal suture cariniform, not tuberculate; front densely rather coarsely evenly punctured toward frontal suture only. Pronotum transverse, strongly convex, simply, rather densely and subregularly punctured, punctation denser on sides, and with a narrow postero-medial longitudinal areola impunctate; lateral margins arcuate, rather thickly bordered, edge elongately ciliate; hind angles obtusely round; base bordered. Scutellum wide, with curved sides and few sparse and superficial punctures. Elytra very elongate, strongly convex, epipleural carina elongately sparsely ciliate; striae deep, distinctly punctured, subcrenulate; interstriae moderately convex, finely alutaceous, distinctly and sparsely punctured, the lateral ones and toward apex sparsely but distinctly pubescent. Outer margin of fore tibiae with four teeth, the distal two very close, the third broadly separated, the fourth smaller than others (Fig. 27). Hind tibiae superior spur slightly longer than first tarsal segment. Male: fore tibiae spur stout, obtusely truncate apically, inferior carina with a distinct tooth distally; pronotum regularly transverse, relatively more convex and more sparsely punctured on disc; metasternal plate with deep median longitudinal groove; first segment of hind tarsi as long as following three segments combined; aedeagus Fig. 28-29. Female: fore tibiae spur slender and regularly acuminate, inferior carina without distal tooth; pronotum narrowed anteriorly, relatively less convex and more densely punctured on disc; metasternal plate superficially grooved at middle; first segment of hind tarsi shorter than following three segments combined.

Material examined. CHILE: "Chili", ex Musaeo Harold (8 exx., lectotype and paralectotypes, MNHN); La Campana, Valparaíso, XII.1984, leg. L. E. Peña (3 exx., DCGI).

Distribution. Chile (V Región de Valparaíso, Región Metropolitana, VII Región del Maule), Peru?. Harold (1866: 97) added "Peru" to the locality of the original description. No specimens from Peru are known, which places doubt on this record.

Bionomics. Almost unknown. Specimens were collected from November to February.

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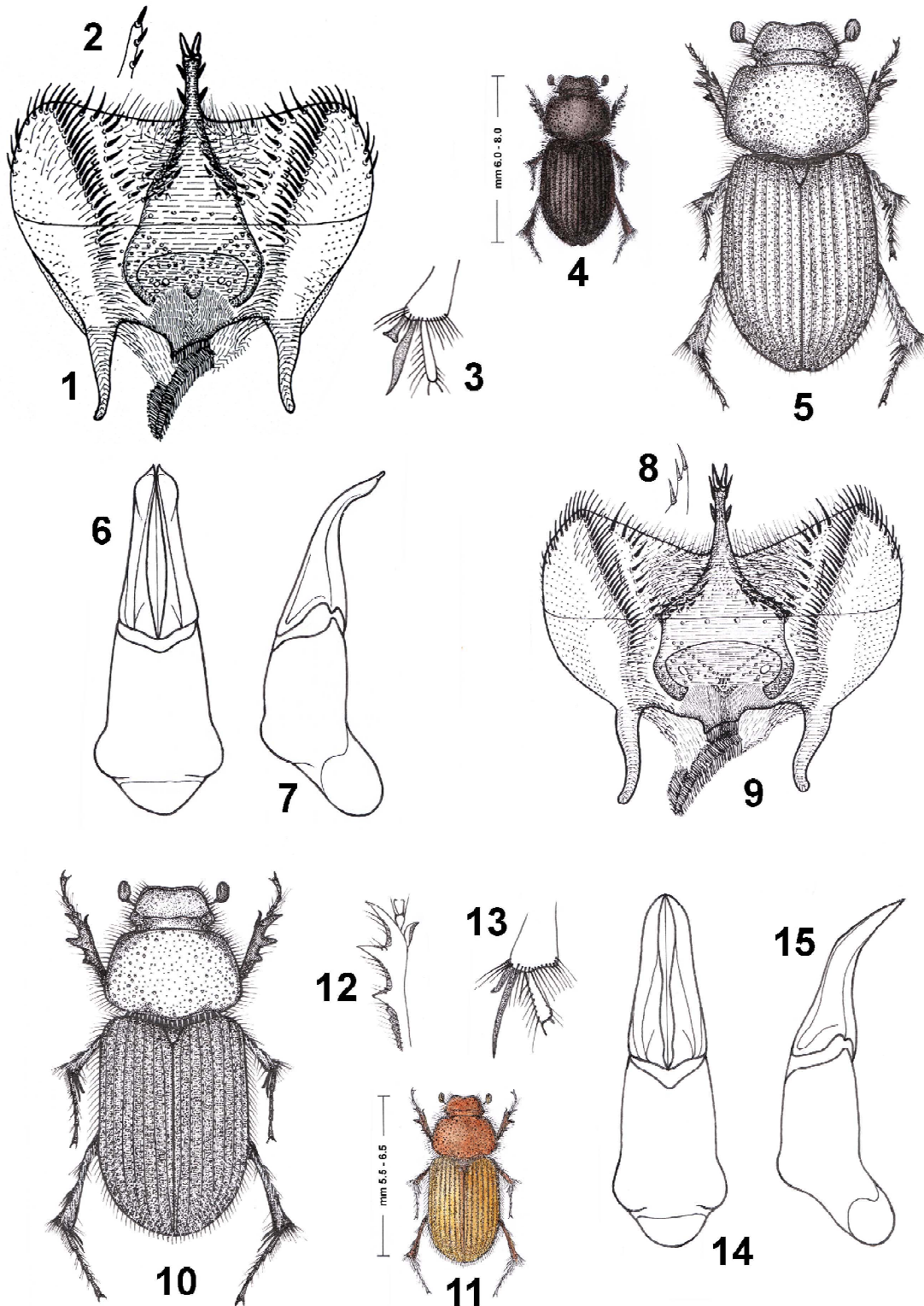
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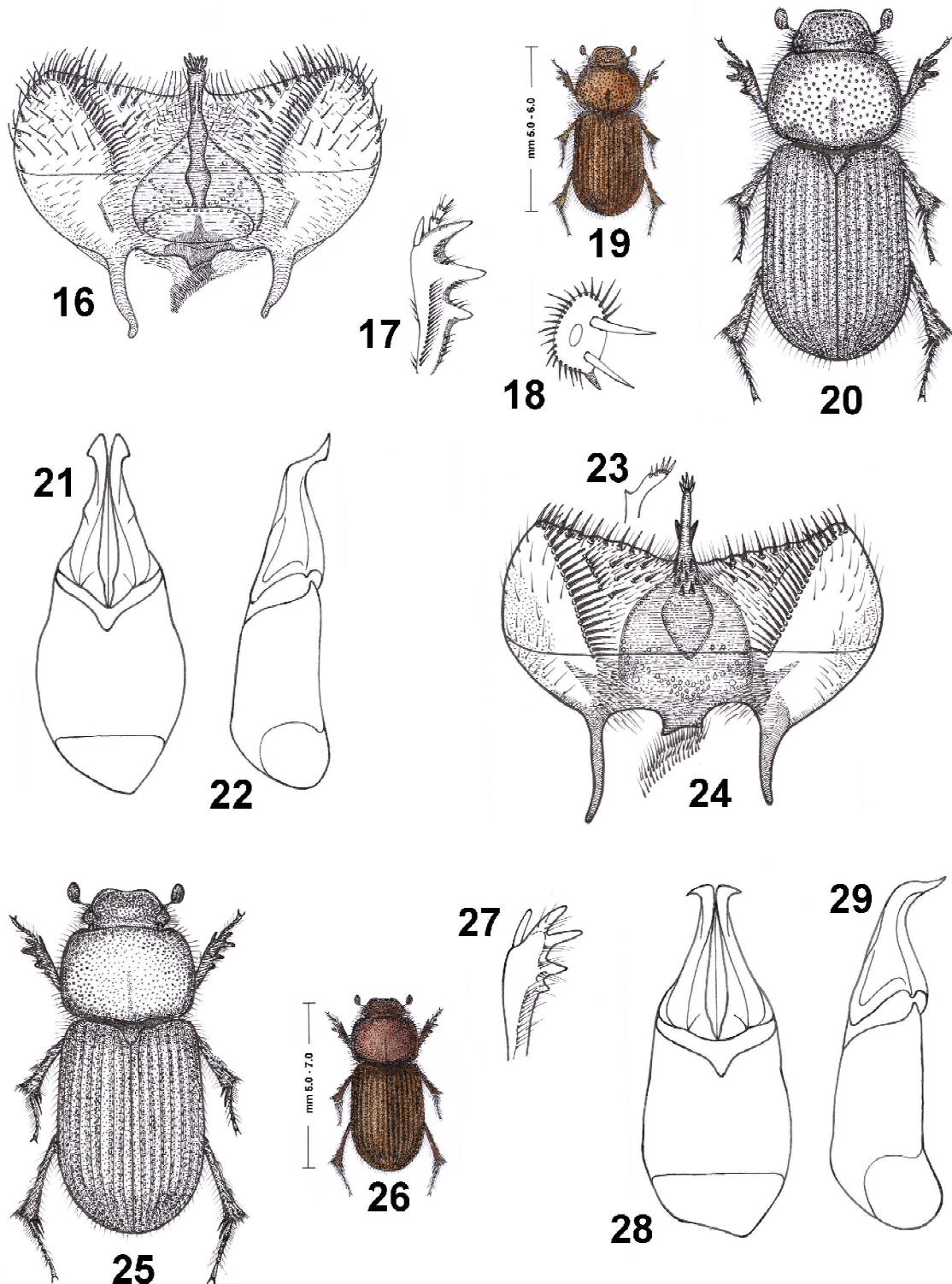
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Figures 1-15. *Orodaliscoides fimbripes* (Brown, 1928) (Milford, Utah, U.S.A.). 1) Epipharynx. 2) Apex of corypha (lateral view). 3) Apex of male left middle tibia (dorsal view). 4-5) Habitus (length ideogram and morphological details). 6-7) Aedeagus (dorsal and lateral views). *Orodaliscoides giulianii* (Gordon, 1977) (Sand dunes 48 Km S Juarez, Chihuahua, Mexico). 8) Apex of corypha (lateral view). 9) Epipharynx. 10-11) Habitus (morphological details and length ideogram). 12) Male left fore tibia (dorsal view). 13) Apex of male left middle tibia (dorsal view). 14-15) Aedeagus (dorsal and lateral views).



Figures 16-29. *Orodaliscoides reflexus* (Schmidt, 1910) (Prov. Chubut, Argentina). **16**) Epipharynx. **17**) Male right fore tibia (dorsal view). **18**) Apex of male left hind tibia. **19-20**) Habitus (length ideogram and morphological details). **21-22**) Aedeagus (dorsal and lateral views). *Orodaliscoides rugosiceps* (Harold, 1859) (La Campana, Valparaiso, Chile). **23**) Apex of corypha (lateral view). **24**) Epipharynx. **25-26**) Habitus (morphological details and length ideogram). **27**) Right fore tibia (dorsal view). **28-29**) Aedeagus (dorsal and lateral views).

