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New Genera and Species of Weevils from the Galapagos Islands, Ecuador, and Cocos Island, Costa Rica (Coleoptera; Curculionidae; Entiminae; Entimini)

ROBERT S. ANDERSON[1] AND ANALIA A. LANTERI[2]

ABSTRACT

A new genus, *Galapagonotus* Anderson and Lanteri, is described to accommodate *Otiorhynchus cuneiformis* Waterhouse from the Galapagos Islands, Ecuador. *Galapagonotus cuneiformis* (Waterhouse) is redescribed and a neotype is designated. *Galapagonotus* is placed within the tribe Entimini, likely in or near the *Eustylus* group of genera. The species appears restricted to elevations from 300 to 790 m in native *Scalesia, Miconia,* and fern-sedge habitats in the archipelago. A second new genus, *Coconotus* Anderson and Lanteri, also is described to accommodate three new species from Cocos Island, Costa Rica. These species, described herein are *C. williamsi* Anderson and Lanteri, *C. kuscheli* Anderson and Lanteri, and *C. tuberculatus* Anderson and Lanteri. *Coconotus* is placed within the tribe Entimini, with tentative affinities with the *Lachnopus-Exophthalmus* group of genera. No details are known of the natural history of any *Coconotus* species.

INTRODUCTION

When Waterhouse (1845) described a new species of weevil from the Galapagos Islands, he placed it in the genus *Otiorhynchus* as *O. cuneiformis* Waterhouse. Subsequent publications continued to consider this species a member of *Otiorhynchus* (Waterhouse,

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1877; Linell, 1898) until Van Dyke (1953), in his review of the beetles of the Galapagos, questioned this placement and assigned the species to *Amphideritus* Schoenherr, a South American genus of Naupactini. Franz (1985), citing information passed on to him by Kuschel, suggested that *Amphideritus* sensu Van Dyke from the Galapagos actually belonged in Barynotini. Subsequently, Kuschel (1986: 67) placed the species name *cuneiformis* as incertae sedis within Barynotini and noted that it was not assignable to any described genus and that a new genus needed to be described to accommodate it.

We agree with the conclusions of Kuschel and here describe a new genus, *Galapagonotus* Anderson and Lanteri, to accommodate this species. In addition, in attempting to establish the phylogenetic relationships of *Galapagonotus,* we examined specimens of three undescribed species of an undescribed genus from Cocos Island, off the southwestern coast of Costa Rica. We here describe a second new genus, *Coconotus* Anderson and Lanteri, to accommodate them.

In addition to the description of the new taxa, we review what is known of their distribution and natural history and attempt to ascertain their phylogenetic relationships. Both *Galapagonotus* and *Coconotus* appear to be endemic to the Galapagos Islands and Cocos Island, respectively; however, despite their close proximity, they do not appear to be very closely related. That said however, the precise phylogenetic relationships of each genus are unclear.

CLASSIFICATION OF CURCULIONIDAE

As is well known, the higher classification of the Curculionoidea is in continuing flux (Kuschel, 1995; Marvaldi, 1997; Morrone, 1997; Thompson, 1992; Zimmerman, 1993, 1994a, 1994b). Unfortunately, most of these works emphasize classification and relationships at the subfamily and family-group levels and, as far as we are concerned, do not adequately address the tribal levels, particularly within the subfamilies of Curculionidae. Regardless, we here follow the consensus classification proposed by Morrone (1997), which with respect to broad-nosed weevils follows Marvaldi (1997, 1998) in recognizing the Entiminae as a large (1150 genera; 12,200 species) monophyletic subfamily of the Curculionidae accommodating the majority of taxa of the traditional Adelognatha. Marvaldi (1997) justified the monophyly of Entiminae by the presence of two character states in the larvae: (1) maxillary mala with four ventral setae, and, (2) antennal sensorium wider than long and cushionlike. Also based on characters of larvae, she further proposed a natural division of Entiminae into five tribes: Pachyrhynchini, Ectemnorhinini, Alophini, Sitonini, and Entimini (Marvaldi, 1997). In a second paper, she attempted to group taxa within the diverse Entimini into three informal, but possibly natural, subsets, which she called A, B, and C (Marvaldi, 1998). Unfortunately, the division of Entimini into these groups was based only on characters of the larvae and examination of only a very limited diversity of taxa. Clearly, as Marvaldi indicated, additional work needs to be done, especially using characters of the adult stage and incorporating a broader diversity of taxa, to see how well (or even if) these groupings hold. Nevertheless, this is the only recent study attempting to resolve relationships within Entimini, which otherwise is based on the artificial and outdated system of Lacordaire (1863, 1866). While it is beyond the scope of this paper to examine relationships among all Entimini, some comments can be made concerning characters of apparent use in the classification of this large and difficult group within the New World.

We examined a variety of taxa of New World Entimini in attempting to place the two new genera described herein. Unfortunately, despite the number of recent publications on the classification of Curculionidae (e.g., Kuschel, 1995; Morrone, 1997), none have attempted to place the New World genera within higher categories. Only the checklists of O'Brien and Wibmer (1982), Wibmer and O'Brien (1986), and supplements (O'Brien and Wibmer, 1984; Wibmer and O'Brien, 1989), which in general follow Lacordaire (1863, 1866), explicitly and comprehensively assign New World genera (and their included species) to higher categories. This lack of naturally defined subtribes (other than those of Lacordaire), and the lack of

clear relationships with other genera means that more detailed placements of both *Galapagonotus* and *Coconotus* remain tentative.

We know of no Entimini that appear similar to, or closely related to, *Galapagonotus.* *Galapagonotus* may prove related to the *Eustylus* group of genera based on similarities in the mandibular structure (multisetose, with a large prominent scar and a poorly developed interior cutting edge); similarly emarginate epistoma; metatibia with glabrous apical bevel; and similar female genitalia. Despite the fact that most other Galapagos weevils appear to have relationships directly with the South American mainland, we cannot establish such a relationship for *Galapagonotus* at present.

Relationships of *Coconotus* also are unclear. *Coconotus* may be related to *Lachnopus* Schoenherr from the West Indies (based on comparison of *Lachnopus floridanus* Horn) or *Exophthalmus* Schoenherr, both of which have similar mandibular structure (multisetose, small scar, well-developed interior cutting edge), lack of scales on the antennal scape, similar glabrous metatibial bevel, and similar form of the apex of the metatibia. However, other features, such as the presence of styli on the hemisternites, and the distinct form of most other species of *Lachnopus,* may suggest otherwise. On the other hand, a very different relationship with the genus *Rhyncogonus* Sharp from the islands of Polynesia is suggested by some features, particularly the somewhat flattened habitus of *C. williamsi.* Both sexes of *Rhyncogonus,* and *Coconotus* females, share a carinate or keeled lateral elytral margin (although in *Coconotus* this is restricted to the humeral region only). Other features, such as mandibular form, form of the apex of the metatibia, and lack of scales on the antennal scape, support a relationship with *Rhyncogonus*; however, *Coconotus* differs in the structure of the antennal scrobe (open posteriorly in *Rhyncogonus* but directed below the eye in *Coconotus*), lack of a stylus on the hemisternites (present in *Rhyncogonus*), and the metatibia with a broad glabrous apical bevel (absent in *Rhyncogonus*). We feel that these features shared with *Rhyncogonus* are likely the result of convergence and that the affinities of *Coconotus* lie somewhere within New World Entimini rather than with *Rhyncogonus.*

GALAPAGONOTUS ANDERSON AND LANTERI, NEW GENUS

Figures 1–9

TYPE SPECIES: *Otiorhynchus cuneiformis* Waterhouse, 1845: 38, here designated.

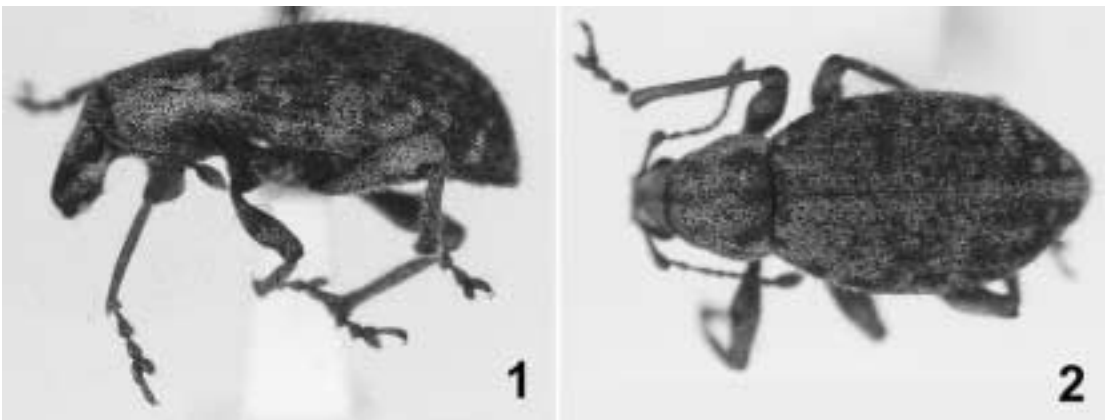
ETYMOLOGY: This genus is named for the Galapagos Islands.

DIAGNOSIS: Body length 4.8–7.5 mm. Vestiture of flat scales and fine erect setae, setae longest on elytra. Mandibles with interior cutting edge lacking or very slightly developed basally, with numerous setae around periphery of scar and along ventral surface. Antennal scape with dense, round appressed scales; in repose, passing over middle of eye. Metepisternal suture present; metepisternum broad. Femora simple, lacking tooth. Metatibia with apical bevel broad, glabrous; apical comb of setae slightly ascended along outer margin of tibia; mucro single, apical margin of tibia not excised adjacent to base of mucro; tarsal groove squamose. Tarsal claws free, lacking basal tooth. Male with aedeagus cylindrical, apex not reflexed, apical setae lacking. Female with sternite 8 flat, not keeled, subtriangular in shape; hemisternites in dorsal view separate throughout length; styli present.

IDENTIFICATION: We know of no similar genus with which *Galapagonotus* could be confused. Within the weevil fauna of the Galapagos, this genus is easily identified by the short, broad rostrum lacking a median sulcus; mandible with prominent scar; and antennal scape in repose lying over the middle of the eye.

DISTRIBUTION AND DIVERSITY: This genus is endemic to the Galapagos Islands of Ecuador. Although Franz (1985) noted the presence of two species on the Galapagos Islands, one of which was found on San Cristobal Island, the other on Santa Cruz Island, we recognize only one species, *Galapagonotus cuneiformis* (Waterhouse), as present on the archipelago. We have not been able to recognize patterns of variation among islands that warrant recognition of more than one species.

DESCRIPTION: Body length male 4.8–6.5



Figs. 1–2. *Galapagonotus cuneiformis* (Waterhouse), female. **1,** Lateral habitus; **2,** dorsal habitus.

mm, female 5.5–7.5 mm. Cuticle dark reddish brown to black. Vestiture of round to tear-drop shaped scales with slight metallic reflection; scales moderately dense to dense dorsally and sparser ventrally on legs. Dorsally and ventrally also with scattered, elongate fine setae; setae longest on elytral disk.

Head with rostrum short, broad; flattened dorsally, widest at apex. Pterygia (throughout length) and scrobes (at apex) visible in dorsal view. Scrobes well defined at point of antennal insertion, vaguely defined and open posteriorly immediately in front of eye. Epistoma with raised anterior margin, moderately emarginate medially. Mandible with large prominent scar (indicating point of attachment of cusp) and numerous long, curved setae surrounding scar and along ventral margin; interior cutting edge lacking or slightly developed basally. Prementum trapezoidal, broad, widest at apex, with single pair of elongate setae at anterolateral angle; labial palpi not visible in ventral view. Eyes laterally to very slightly dorsolaterally situated, rounded to slightly elongate-oval, very convex and prominent. Head not constricted behind eyes. Antenna with scape elongate, reaching anterior margin of pronotum, in repose passing over middle of eye; with dense, rounded appressed scales and erect hairlike scales. Antennal funicle of seven articles; article 1 elongate, slightly shorter than, to subequal in length to, article 2; articles 3–7 much shorter, each about ½ length of article 2, very slightly longer than wide; articles 1–7 with elongate appressed, hairlike scales in addition to sparse, erect hairlike scales; appressed hairlike scales densest on article 1 and 2. Antennal club elongate-oval, setose, composed of three articles.

Pronotum cylindrical, in dorsal view widest at middle, with dense round appressed scales obscuring underlying cuticle, and scattered fine erect setae. Postocular lobes absent, anterolateral margin of pronotum more or less straight.

Elytra as wide as pronotum at base, humeri rounded; striae (1–9 complete, 10 short) not deeply impressed, punctures of striae moderately large and moderately deep. Vestiture of moderately dense, appressed, teardrop shaped scales; also of scattered, elongate fine, erect setae; spacing of scales exposing underlying cuticle. Scutellum visible, triangular, glabrous. Hind wings lacking.

Legs elongate, with vestiture of rounded appressed scales and scattered fine erect setae; setae primarily arranged along inner margin of femora and tibiae. Femora clavate, widest at apical ⅓ simple, lacking tooth. All tibiae more or less straight; inner margins with small to minute rounded asperities in apical ½; mucro moderately large, curved, smaller on meso- and metatibiae. Metatibia with apical bevel broad, glabrous; apical comb of setae slightly ascended along outer margin of tibia; mucro single, apical margin of tibia not excised adjacent to base of mucro; mucro larger on male than on female. Tarsal groove squamose, with from one to a few large appressed scales. Tarsi elongate, article 1 slightly longer than 2, article 2

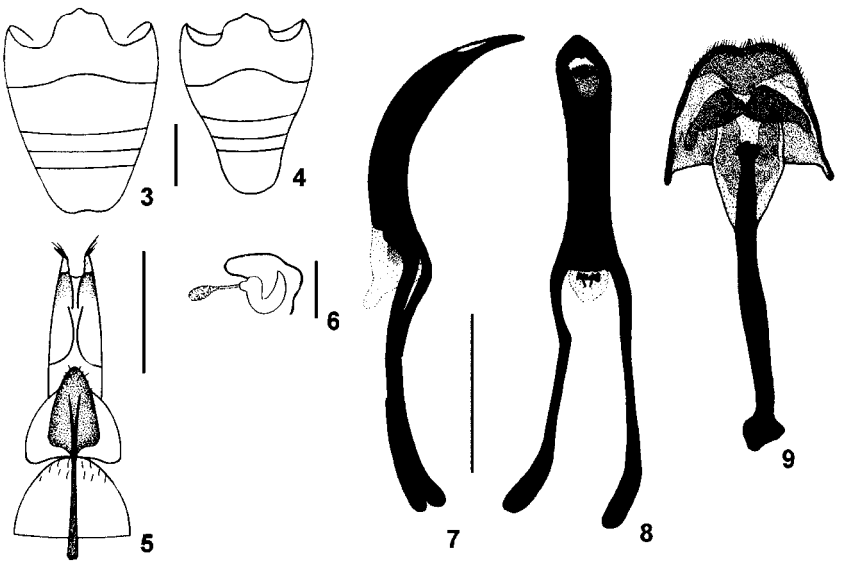


Fig. 3–9. *Galapagonotus cuneiformis* (Waterhouse). **3,** Male abdomen, ventral view; **4,** female abdomen, ventral view; **5,** ovipositor, sternite 8, tergites 7 and 8; **6,** spermatheca; **7,** aedeagus, lateral view; **8,** aedeagus, dorsal view; **9,** sternites 8 and 9, tergite 8. Scale line = 1 mm, except spermatheca, = 0.25 mm.

slightly longer than 3, article 3 bilobed, article 4 elongate, extended beyond apices of 3 by slightly greater than length of article 3; ventrally with elongate, moderately dense, fine, wispy vestiture on articles 1 and 2, vestiture slightly denser on article 3; claws simple, divergent, free.

Prosternum with procoxae contiguous, situated slightly closer to anterior margin than to posterior margin. Mesocoxae proximate, separated by more or less ¼ diameter of mesocoxa. Mesosternum sparsely punctate, with scattered sparse rounded scales. Mesepimeron short-trapezoidal, anterior margin directed to elytra then turned anteriorly such that mesepisternum contacts elytron in a strip near extreme base of elytron. Metasternum short, concave medially; vestiture of moderately dense, appressed, tear-drop shaped scales and sparse fine erect setae. Metepisternal suture present, distinct and deep in anterior ½, indistinct, not impressed in posterior ½; metepisternum broad, 5–6 times as long as wide. Metacoxae widely separated by about ⅔ diameter of a metacoxa.

Abdomen with scattered appressed teardrop shaped scales and sparse, fine erect setae. Visible sternite 1 very slightly longer than 2; 3 and 4 subequal in length, short, their combined length slightly less than ⅔ length of visible sternite 2; visible sternite 5 longer than length of 3 and 4 combined. Base of visible sternite 1 concave in male, flat to slightly convex in female. Apex of visible sternite 5 very slightly emarginate at middle in male; rounded in female. Tergite 7 transverse in male, with posterior margin broadly emarginate at middle, posterolateral angles projected; elongate in female, with posterior margin narrowly truncate.

Male genitalia. Sternite 8 large, trapezoidal, posterior margin broadly emarginate, not cleft; sternite 9 long, broad; Tegmen lightly sclerotized, parameres developed, directed anteriad, very lightly sclerotized. Aedeagus cylindrical, sclerotized throughout; apex not reflexed, apical setae lacking. Apodemes subequal in length to aedeagus.

Female genitalia. Sternite 8 small, flat, subtriangular, longer than wide, widest at base; with pair of more heavily sclerotized, slightly divergent lines from base to midlength; apical ⅓ with elongate, erect setae; apodeme approximately 1.33 times length sternite. Ovipositor relatively short, less than ½ length of abdomen, lacking setae; baculi

absent; hemisternites sclerotized, short, subdivided into apical and basal portions, apical portion less than ½ length of basal portion; in dorsal view separate throughout length; styli distinct, elongate. Spermatheca subcylindrical, point of insertion of duct not developed, point of insertion of gland globose, proximal.

Galapagonotus cuneiformis (Waterhouse), new combination

Figures 1–9

Otiorhynchus cuneiformis Waterhouse, 1845: 38. Waterhouse, 1877: 82. Linell, 1898: 267.
Amphideritus cuneiformis; Van Dyke, 1953: 142.
[no assigned genus] *cuneiformis*; Kuschel, 1986: 67 (Barynotini, incertae sedis).

TYPES: As noted by Franz (1985) the type of *Otiorhynchus cuneiformis* Waterhouse is missing and a neotype must be designated. Neotype male, dissected, here designated, labeled. ''ECU: Galapagos/Puntudo, *Scalesia*/650m, 1–8.iv.89/FIT, S.Peck, 89-199,'' with genitalia vial and our designation label (BMNH).

DESCRIPTION: Body length male 4.8–6.5 mm, female 5.5–7.5 mm; body width male 2.3–3.0 mm, female 2.4–3.2 mm. Scales white, light to dark brown or green, usually with slight metallic reflection, not forming distinct elytral pattern. Head with rostrum irregularly, densely punctate to distinctly rugose in basal ½ to ⅔; very sparsely and finely punctate in apical ½ to ⅓. Epistoma emarginate medially in broad V shape, laterally with three long, curved setae per side. Pronotum with surface sculpture slightly irregular, distinct punctures visible, fine and deep, irregularly spaced. Elytra gradually expanded posteriorly to posterior ⅔ then attenuate to apex; intervals flat except for bases of intervals 3 and 5, which are slightly elevated; erect setae of intervals arranged irregularly in multiple rows. Aedeagus moderately curved; apex slightly produced into narrowly subacuminate tip; apical and basal regions slightly expanded in dorsal view, slightly wider than intervening length. Internal sac visible at base of aedeagus, slightly protruded, with transverse apical sclerite complex.

DISTRIBUTION: ECUADOR. **Galapagos Islands. Floreana Island.** 300 m, 15.II.1964, G. Kuschel (NZAC, 1). **Santiago Island.** Aguacate Camp. 550 m, mossy forest, FIT, 7–13.IV.1992, S. Peck (AMNH, 2; CMNC, 4). Aguacate (1 km NE), 600 m, 4–9.VI.1991, humid forest FIT, S. Peck (CMNC, 1). **San Cristobal Island.** [as Chatham Island]. July 1906, F.X. Williams (CASC, 1); January 24–30, 1906, F.X. Williams (CASC, 1). Poza Colorada, 550 m, sweeping, 19.III.1996, S. Peck (CMNC, 1). Gebirge b. Progreso, V.–VI.1975, H. Franz (NZAC, 2). **Santa Cruz Island.** Cerro Crocker subtop, 790 m, fern sedge formol traps, 10–30.IV.1996, S. Peck (CMNC, 1). Puntudo, 700 m, pampa zone shrub litter, 2.II.1989, S. Peck (CMNC, 1). Puntudo, 650 m, *Scalesia* forest FIT, 1–29.II.1989, S. Peck & B. Sinclair (CMNC, 4). Puntudo (1 km N), 650 m, *Scalesia* forest FIT, 1–8.IV.1989, S. Peck (CMNC, 2). Wald über Santa Rosa, V.–VI., 1975, H. Franz (NZAC, 1).

NATURAL HISTORY: As far as is known, this species is native and endemic to the Galapagos Islands. Specimens have been collected on four islands and generally at upper elevations from 300 to 790 m in native *Scalesia*, *Miconia*, and fern-sedge habitats (see Peck and Kukalova-Peck, 1990: 1620 for discussion of habitats). Adults lack functional hind wings. No details are known of food habits; most broad-nosed weevils are general foliage feeders as adults, and root feeders as larvae.

COCONOTUS ANDERSON AND LANTERI, NEW GENUS

Figures 10–41

TYPE SPECIES: *Coconotus williamsi* Anderson and Lanteri, by present designation.

ETYMOLOGY: This genus is named for Cocos Island.

DIAGNOSIS: Body length 5.5–8.1 mm. Vestiture of flat, round, often metallic scales; fine setae present only on elytral declivity. Mandibles with inner cutting edge well developed, bladelike, with prominent inwardly directed tooth, with numerous setae around periphery of scar and along ventral surface. Antennal scape with only fine appressed setae, in repose, passing over extreme lower portion of eye or under eye. Metepisternal suture present: metepisternum extremely nar-

row. Humeri with short, distinct ridgelike keel in female, evenly rounded in male. Metatibia with apical bevel broad, glabrous; apical comb of setae not ascended along outer margin of tibia; mucro single, but apical margin of metatibia excised adjacent to base of mucro such that a second tooth is evident on the margin at the apex of the excision; tarsal groove squamose. Tarsal claws free, lacking basal tooth. Male with aedeagus cylindrical, apex reflexed, apical setae lacking. Female with sternite 8 flat, not keeled, subrhomboidal in shape; hemisternites in dorsal view fused at apex, styli absent.

IDENTIFICATION: *Coconotus* keys to couplet 34 in the Barynotini portion of the key to world Brachyderinae of Emden (1944). *Coconotus* is easily distinguished from other taxa that key to this point by the absence of scales on the antennal scape and by the keeled humeri in females.

DISTRIBUTION AND DIVERSITY: This genus is endemic to Cocos Island of Costa Rica. Three species, *Coconotus williamsi* Anderson and Lanteri, *C. kuscheli* Anderson and Lanteri, and *C. tuberculatus* Anderson and Lanteri are described herein. Hogue and Miller (1981) noted a taxon ''genus near *Epicaerus*,'' which is likely *Coconotus*; however, we have been unable to locate representative specimens.

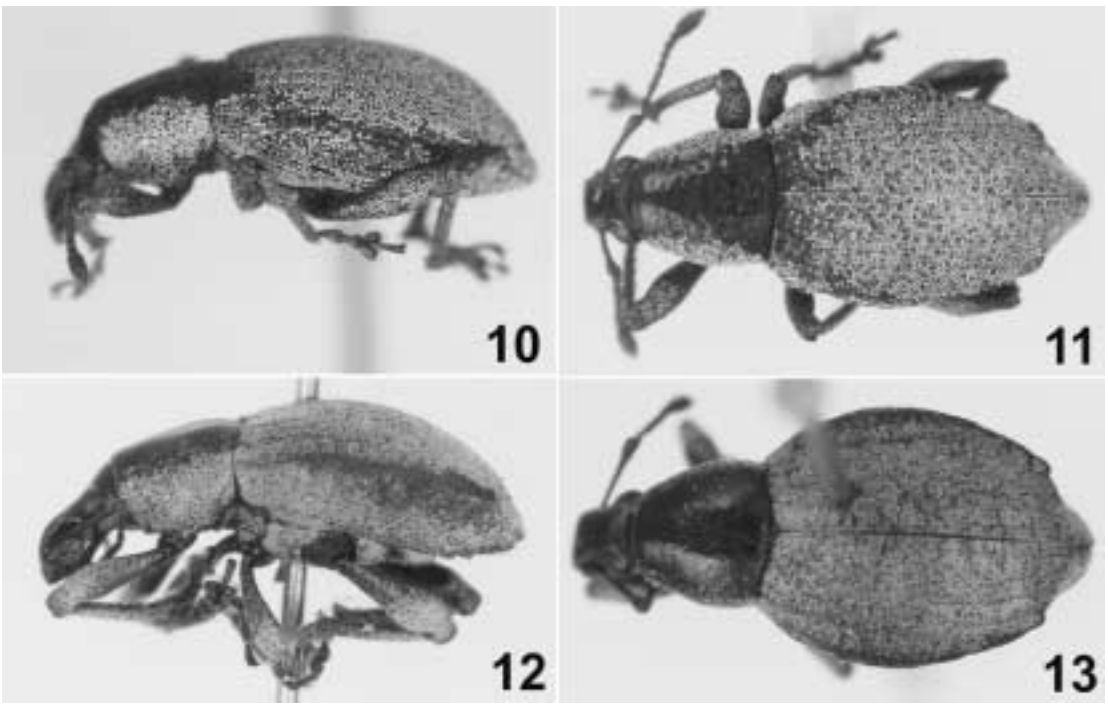
DESCRIPTION: Body length male 5.5–8.1 mm, female 6.1–6.8 mm; width male 2.4–4.0 mm, female 2.8–3.0 mm. Cuticle dark reddish brown to black. Vestiture of round scales, each with some degree of metallic reflection (scales may be greasy and appear black in some specimens), not forming distinct pattern; moderately dense to dense dorsally and on legs, sparser ventrally. Ventrally and dorsally on apical declivity of elytra also with scattered, elongate, fine setae.

Head with rostrum short, broad; flattened dorsally, widest at apex. Pterygia (throughout length) and scrobes (at apex) visible in dorsal view. Scrobes well defined at point of antennal insertion, poorly defined dorsally, but well-defined ventrally; somewhat open dorsally, but with deeper channel directed below eye. Epistoma with flat to very slightly raised anterior margin, very slightly emarginate medially, laterally with two long, curved setae per side. Mandible with small scar (indicating point of attachment of cusp), with numerous setae around periphery of scar and along ventral surface; interior cutting edge well developed, bladelike, with prominent inwardly directed tooth. Prementum trapezoidal, broad, widest at apex, with single pair of elongate setae at anterolateral angle; labial palpi visible in ventral view. Antenna with scape having dense, fine setae only; elongate, reaching anterior margin of pronotum; in repose passing over extreme lower portion of eye or under eye. Antennal funicle of seven articles: article 1 elongate, subequal in length to article 2; articles 3–7 much shorter, each about ½ length of article 2, very slightly longer than wide; articles 1–7 with elongate, appressed hairlike scales in addition to sparse erect vestiture. Antennal club elongate-oval, setose, composed of three articles. Frons slightly concave. Eyes large, laterally to very slightly dorsolaterally situated, rounded, convex, and prominent. Head not constricted behind eyes.

Pronotum cylindrical, in dorsal view widest at middle, with dense, round appressed scales. Postocular lobes lacking, anterolateral margin of pronotum more or less straight.

Elytra as wide as pronotum at base, gradually expanded posteriorly to midlength then attenuate to apex, broadly flattened in male, less so in female; striae (1–9 complete, 10 short) not, to moderately impressed, punctures of striae moderately large and moderately deep, serially arranged or scattered. Humeri rounded, with short, distinct ridgelike keel in female, lacking in male. Vestiture of moderately dense, appressed, round scales; scales in most places obscuring underlying cuticle; fine, erect setae only visible on elytral declivity. Scutellum visible; small, triangular, glabrous. Hind wings lacking.

Legs elongate, with vestiture of rounded appressed scales and scattered fine erect setae; setae primarily arranged along inner margin of femora and tibiae. Femora clavate, widest at apical ⅓, simple, lacking tooth. All tibiae more or less straight in female, slightly inwardly arcuate in male; inner margin with small to minute rounded asperites in apical ½ in female, with numerous large teeth throughout length in male; mucro large, curved, smaller on meso- and metatibia. Metatibia with apical bevel broad, glabrous; api-



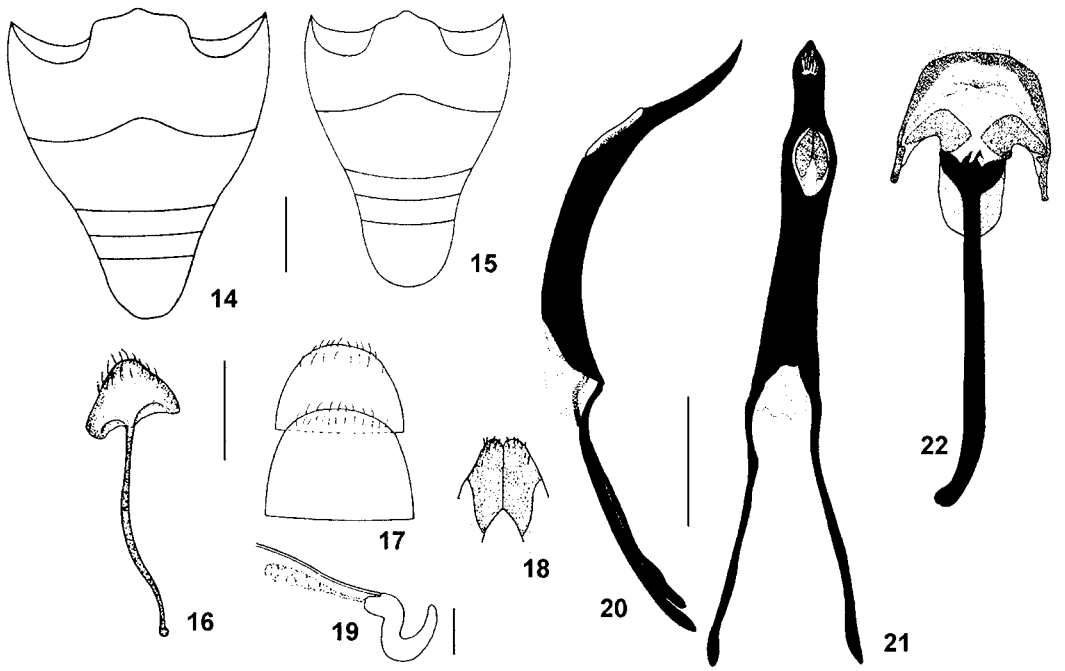
Figs. 10–13. *Coconotus williamsi* Anderson and Lanteri. **10,** Lateral habitus, female; **11,** dorsal habitus, female; **12,** lateral habitus, male; **13,** dorsal habitus, male.

cal comb of setae not ascended along outer margin of tibia; mucro small, apical margin of metatibia excised adjacent to base of mucro such that a second tooth is evident on the margin at the apex of the excision. Tarsal groove squamose (scales may be abraded), with only one or two large appressed scales. Tarsi elongate, article 1 slightly longer than article 2, article 2 slightly longer than article 3; article 3 bilobed, article 4 elongate, extended beyond apices of 3 by slightly greater than length of article 3; ventrally with elongate, moderately dense, fine, wispy vestiture on articles 1 and 2, very dense and pilose on article 3; claws simple, divergent, free.

Prosternum with procoxae contiguous, situated slightly closer to anterior margin than to posterior margin. Mesocoxae proximate, separated by more or less ¼ diameter of mesocoxa. Mesosternum sparsely punctate, lacking scales. Mesepimeron short-trapezoidal, anterior margin directed to elytra then turned anteriorly so that mesepisternum contacts elytron in a strip near extreme base of elytron. Metasternum short, concave medially; round scales present only laterally. Metepisternal suture present, distinct; metepisternum extremely narrow, about 10 times as long as wide. Metacoxae widely separated by about diameter of a metacoxa.

Abdomen with sparse, rounded scales laterally and very sparse, very fine erect setae throughout. Visible sternite 1 subequal in length to 2; 3 and 4 subequal in length, short, their combined length slightly shorter than length of visible sternite 2; visible sternite 5 longer than length of 3 and 4 combined. Base of visible sternite 1 concave in male, flat to slightly convex in female. Apex of visible sternite 5 rounded in male and female. Tergite 7 transverse in both male and female, with apical margin shallowly medially emarginate or not; posterolateral angles rounded, not projected.

Male genitalia. Sternite 8 large, trapezoidal, posterior margin moderately emarginate and deeply cleft; sternite 9 long, broad. Tegmen well sclerotized, parameres developed, directed anteriad, very lightly sclerotized. Aedeagus cylindrical, elongate, sclerotized



Figs. 14–22. *Coconotus williamsi* Anderson and Lanteri. **14,** Male abdomen, ventral view; **15,** female abdomen, ventral view; **16,** sternite 8; **17,** tergites 7 and 8; **18,** hemisternites; **19,**spermatheca; **20,** aedeagus, lateral view; **21,** aedeagus, dorsal view; **22,** sternites 8 and 9, tergite 8. Scale lines = 1 mm, except spermatheca = 0.25 mm.

throughout; apex produced, slightly reflexed, no apical setae present. Apodemes slightly shorter than length of aedeagus.

Female genitalia. Sternite 8 small, flat, subrhomboidal, as wide as long, widest at base; very lightly sclerotized; apical ⅓ with elongate, erect setae; apodeme very narrow, from 4 to 8 times length sternite. Ovipositor (very pale and indistinct in some specimens) ¼ length abdomen or less, setae present, short, sparse, apical; baculi absent; hemisternites (where apparent) short or long, subequal in length, not apparently subdivided into basal and apical portions; in dorsal view fused at apex; styli absent. Spermatheca subcylindrical, point of insertion of duct not developed, point of insertion of gland globose, proximal.

KEY TO SPECIES OF *COCONOTUS*

1 Pronotum widest at or near base (figs. 11, 13). Elytra flattened and broadly oval in dorsal view, especially so in males (figs. 11, 13). Female with humeral carina short, distinct, and sharp . . . . . *C. williamsi* Anderson and Lanteri

1′ Pronotum widest from anterior ⅓ to middle (figs. 24, 26, 36). Elytra more convex and elongate-oval in dorsal view (figs. 24, 26, 36). Female with humeral carina short, low, rounded or short, very distinct, laterally produced, acute 2

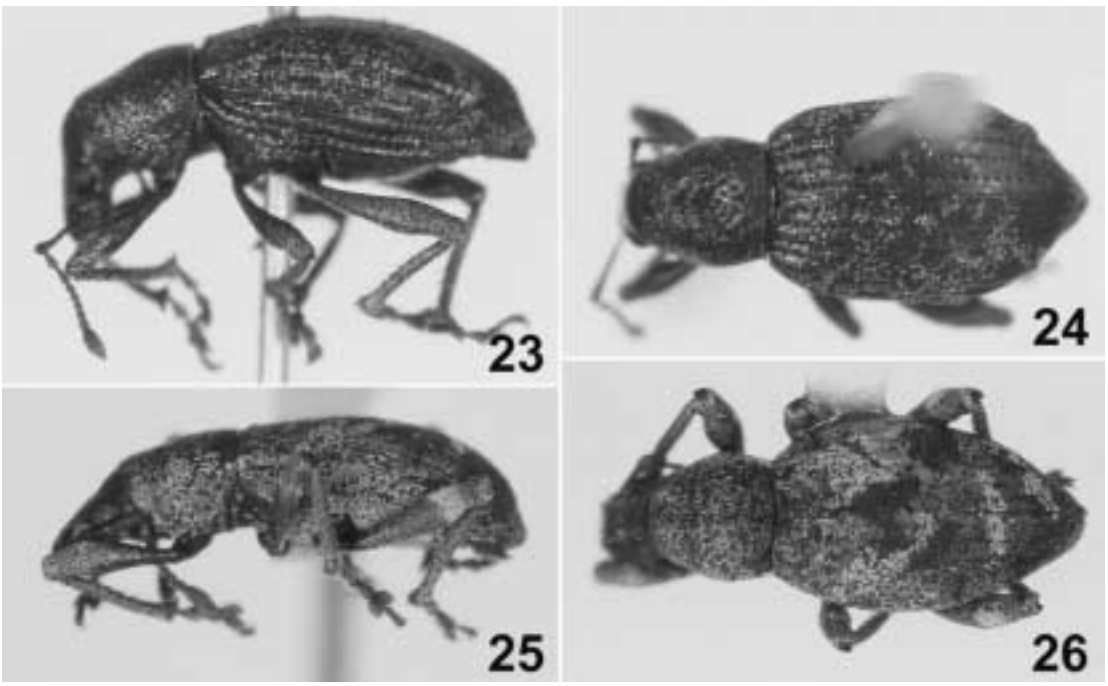
2 Female with humeral carina short, low, rounded (fig. 24). Male with subapical callus lacking . . . . *C. kuscheli* Anderson and Lanteri

2′ Female with humeral carina short, very distinct, laterally produced, acute (fig. 36). Male not known . . . . . *C. tuberculatus* Anderson and Lanteri

Coconotus williamsi Anderson and Lanteri, new species

Figures 10–22

TYPES: Holotype male labeled ‘‘COSTA RICA. Prov. Puntarenas./P.N. Isla del Coco. Bahía Wafer./1 m. Oct.1994. J.F. Quesada./ Long:-87:03:30 Lat:5:32:45 #3314,’’ with INBio barcode label 2544747 (INBio). Allotype female labeled ‘‘Bahía Chatan, P.N.



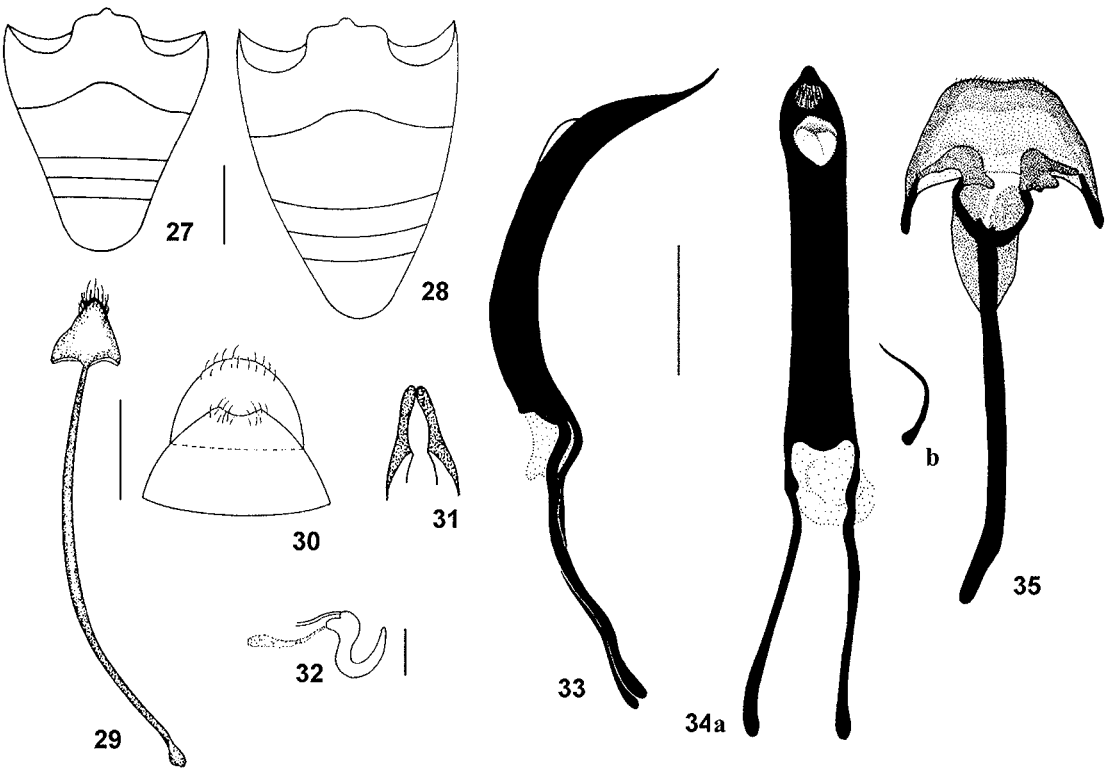
Figs. 23–26. *Coconotus kuscheli* Anderson and Lanteri. **23,** Lateral habitus, female; **24,** dorsal habitus, female; **25,** lateral habitus, male; **26,** dorsal habitus, male.

Isla del Coco,/Prov. Punt., COSTA RICA. 5 a 9/feb 1993. F. Quesada, L-S-0 0,'' with INBio barcode label 1851622 (INBio). Paratypes as follows: Costa Rica. Cocos Island. 3–13.IX.1905, F.X. Williams (1♀; CASC). 8.III.1964, G. Kuschel (2♂; NZAC). Bahía Chatan, 5–9.II.1993, F. Quesada (4♂, 3♀; INBio, CMNC, MZLP; 1851918, 1851621, 1366654, 1851623, 1851624, 1851626, 1851625, 1851627). Bahía Chatan, 5–9.II.1993, P. Rios (1♀; CMNC; 1850791). Bahía Wafer, 1♂, X.1994, J.F. Quesada (1♂, 1♀; INBio, CMNC; 2544771, 2544746). Bahia Yglesias a la Catarata, 20 m, 21.XII.1997, C. Flores, E. Ulate (4♂, 1♀, AMNH, CMNC, INBio; 3033085, 3033086, 3033087, 3033088, 3033089, Cuesta el Gallinero, sendero a Cerro Yglesias, 200 m, 28.XII.1997, 19.XII.1997, C. Flores, E. Ulate (2♀; AMNH, INBio; 3033002, 3033151). El Guarumal, sendero Wafer a Chatan, 30 m, C. Flores, E. Ulate (1♂; INBio; 3033022). Los Llanos, 260 m, 24.XII.1997, C. Flores, E. Ulate (2 ♂; INBio; 3033066, 3033067). Orilla del Rio Genio, 10 m, 17.XII.1997, C. Flores, E. Ulate (2♂, 2♀; CMNC; 3033075, 3033076, 3033078, 3033079). Sendero Las Cuevas, 20 m, 16.XII.1997, C. Flores, E. Ulate (1♂, 1♀; INBio; 3033013, 3033014). Total paratypes, 13♀, 18♂.

ETYMOLOGY: This species is named after Francis X. Williams of the California Academy of Sciences, who collected the first known specimen during fieldwork on Cocos Island (and the Galapagos) in 1905–6.

DIAGNOSIS: This species is easily distinguished by the form of the pronotum, which is widest at the base, the flattened and broadly oval elytra, and the presence of metallic blue or green scales.

DESCRIPTION: Male, length 7.8–8.1 mm, width 3.8–4.0 mm. Female, length 6.1–6.6 mm, width 2.8–3.2 mm. Scales green, blue, or gold, with metallic reflection (greasy and appearing black in some specimens); dense along lateral margins pronotal disk and pronotal flanks, entire elytra, and laterally on metasternum and metepisternum, otherwise very sparse or absent; not forming distinct elytral pattern. Rostrum regularly, finely punctate in basal ⅔; very sparsely and finely punctate in apical ⅓; distinctly deflexed api-



Figs. 27–35. *Coconotus kuscheli* Anderson and Lanteri. **27,** Male abdomen, ventral view; **28,** female abdomen, ventral view; **29,** sternite 8; **30,** tergites 7 and 8; **31,** hemisternites; **32,** spermatheca; **33,** aedeagus, lateral view; **34,** aedeagus, dorsal view (inset shows large curved sclerite of internal sac at base of aedeagus); **35,** sternites 8 and 9, tergite 8. Scale line = 1 mm, except spermatheca = 0.25 mm.

cally. Frons with shallow but distinct fovea between eyes. Pronotum widest at or near base; disk finely indistinctly punctate, punctures larger and more irregular laterally. Elytra widest at or near midlength. Elytral disk moderately inflated in female; very flat, broadly flattened with distinct deflexed lateral margins in male. Elytral punctures confused, distinct intervals not evident except medially on disk; intervals uniformly flat; base of interval 7 with short, distinct, sharp humeral carina in female. Subapical callus present, low, at apex of deflexed lateral margin. Apical declivity with erect setae short, indistinct. Visible sternite 5 of female flat; lateral margins more or less convergent from base to apex.

Male genitalia. Aedeagus in lateral view moderately curved; in dorsal view with apex moderately produced, tip sharply acuminate; apical ⅓ (at median orifice) and basal regions expanded, distinctly wider than intervening length and apical region. Internal sac visible at base of aedeagus, with no visible internal sclerotization.

Female genitalia. Tergite 7 with posterior margin rounded. Sternite 8 with apodemes about four times length sternite. Ovipositor with hemisternites short, about ½ total length of sternite 8 (including apodemes).

DISTRIBUTION: COSTA RICA. **Cocos Island.** Bahía Chatan, Bahía Wafer, Bahia Yglesias, Cuesta el Gallinero, El Guarumal, Los Llanos, Orilla del Rio Genio, Sendero Las Cuevas.

NATURAL HISTORY: As far as known, this species is native and endemic to Cocos Island. No details are known of habitat association or of food habits. Specimens have been collected at or very near sea level, apparently along the coast (''bahía'' = bay).

Fig. 36. *Coconotus tuberculatus* Anderson and Lanteri, dorsal habitus, female.

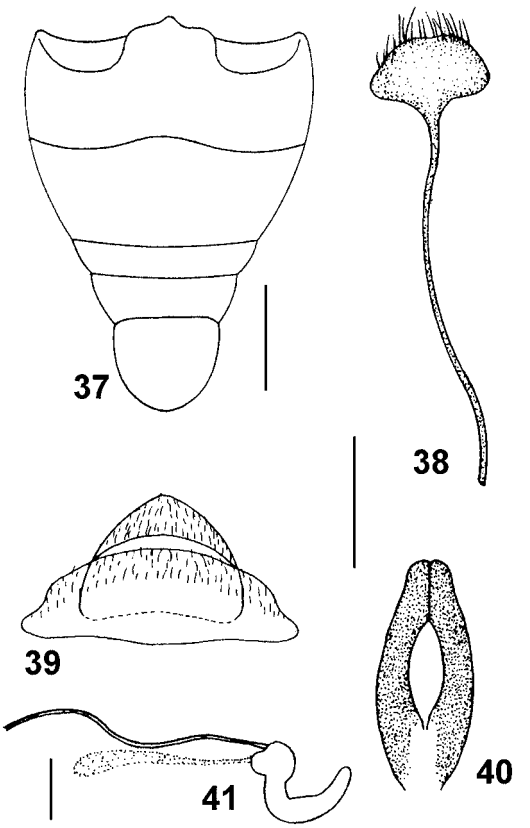
Coconotus kuscheli Anderson and Lanteri, new species
Figures 23–35

TYPES: Holotype male labeled ''Bahía Chatan, P.N. Isla del Coco,/Prov. Punt., COSTA RICA. 5 a 9/feb 1993. F. Quesada, L-S-0 0'', with INBio barcode label 1851721 (INBio). Allotype female labeled as holotype, with INBio barcode label 1851628 (INBio). Paratypes as follows: Costa Rica. Cocos Island. 8–9.III.1964, G. Kuschel (3♂, 2♀; CMNC, NZAC). Bahía Chatan, 5–9.II.1993, F.A. Quesada (3♂; INBio, CMNC, MZLP; 1851722, 1851720, 1851913). Bahía Wafer, 1♂, X.1994, J.F. Quesada (1♀; CMNC; 2544744). Los Llanos, 260 m, 24.XII.1997, C. Flores, E. Ulate (1♂, 1♀; CMNC, INBio; 3033059, 3033060). Total paratypes, 4♀, 7♂.

ETYMOLOGY: This species is named after Guillermo (Willy) Kuschel of New Zealand, who collected the first known specimens of this species while conducting field work on Cocos Island (and the Galapagos) in 1964.

DIAGNOSIS: This species can be recognized by the form of the pronotum, which is widest from the midlength to the anterior ⅓, by males lacking a subapical callus, and by females with the humeral carina short, low, and rounded.

DESCRIPTION: Body length male 5.5–5.7 mm, width 2.3–2.4 mm. Body length female 6.2–6.8 mm, width 2.8–3.0 mm. Scales tan, dark brown, or golden, with indistinct metallic reflection (greasy and appearing black in some specimens); dense on pronotal disk and flanks, elytra, metasternum, laterally on abdominal sternites 1 and 2 and sternite 5, otherwise very sparse or absent; not forming distinct elytral pattern. Rostrum regularly, finely punctate in basal ⅔; very sparsely and finely punctate in apical ⅓; very slightly deflexed at apex. Frons with short, moderately deep basal sulcus terminated basally in shallow fovea. Pronotum widest at or near midlength; disk distinctly, irregularly punctate. Elytra widest at or behind midlength. Elytral disk not distinctly inflated or flattened. Elytral punctures regularly, serially arranged; intervals distinct throughout; intervals flat (sutural interval 6) or uniformly convex (intervals 7–10), except extreme bases of intervals 3 and 5 that are slightly swollen in male,



Figs. 37–41. *Coconotus tuberculatus* Anderson and Lanteri. **37,** female abdomen, ventral view; **38,** sternite 8; **39,** tergites 7 and 8; **40,** hemisternites, **41,** spermatheca. Scale line = 1 mm, except spermatheca = 0.25 mm.

extreme base of interval 5 markedly swollen, tumescent in female; base of interval 7 with short, low, rounded humeral carina in female, carina grading into apical portion of interval 7. Subapical callus absent. Apical declivity with erect setae long, distinct. Visible sternite 5 in female slightly impressed at apex; lateral margins more or less convergent from base to apex.

Male genitalia. Aedeagus in lateral view moderately curved; in dorsal view with apex produced, tip narrowly rounded; subapical (at median orifice) and basal regions very slightly expanded, very slightly wider than intervening length. Internal sac visible at base of aedeagus, slightly protruded, with large, arcuate subapical sclerite (clearly visible through aedeagus).

Female genitalia. Tergite 7 with posterior margin emarginate at middle. Sternite 8 with apodemes about eight times length sternite. Ovipositor with hemisternites short, about ⅓ total length of sternite 8 (including apodemes).

DISTRIBUTION: COSTA RICA. **Cocos Island.** Bahía Chatan, Bahía Wafer, Los Llanos.

NATURAL HISTORY: As for *C. williamsi.*

Coconotus tuberculatus
Anderson and Lanteri, new species
Figures 36–41

TYPE: Holotype female labeled ''COSTA RICA. Prov. Puntarenas./P.N. Isla del Coco. Bahía Wafer/1♂. Oct 1994. J.F. Quesada./ Long:-87:03:30 Lat:5:32:45 #3314,'' with INBio barcode label 2544745 (INBio). Only the female holotype is known.

ETYMOLOGY: This species is named for the distinctly tuberculate form of the elytra, which has large humeral ridges and tuberculate subapical calli.

DIAGNOSIS: This species can be recognized by the form of the pronotum, which is widest from midlength to the anterior ⅓, and by females with the humeral carina short, but very distinct, acute, and laterally produced.

DESCRIPTION: Female, length 7.3 mm, width 3.1 mm. Scales green, brown, or golden, with distinct metallic reflection; dense along lateral margins of pronotal disk, entire elytra, anterolateral portion of metasternum, laterally on abdominal sternites 1, 2, and 5; otherwise very sparse or absent; not forming distinct elytral pattern. Rostrum regularly, finely punctate in basal ⅔; very sparsely and finely punctate in apical ⅓; distinctly deflexed apically. Frons with shallow but distinct fovea between eyes. Pronotum widest at or near anterior ⅓; disk distinctly, irregularly punctate. Elytra widest at or in front of midlength. Elytral disk not distinctly inflated or flattened. Elytral punctures confused, especially basally on disk, not serially arranged; intervals flat, except extreme base of interval 3, which is slightly swollen; base of interval 7 with short, very distinct, laterally produced, acute humeral ridge. Subapical callus well developed, tuberculate. Apical declivity with erect setae long, distinct on sutural in-

terval, shorter and less distinct on other intervals. Visible sternite 5 in female flat; lateral margins subparallel basally, convergent apically.

Male not known.

Female genitalia. Tergite 7 very broad, with posterior margin rounded. Sternite 8 with apodemes about five times length sternite. Ovipositor with hemisternites long, subequal in length to sternite 8 (including apodemes).

DISTRIBUTION: COSTA RICA. **Cocos Island.** Bahía Wafer.

NATURAL HISTORY: As for *C. williamsi*.

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