



SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 107

Washington : 1957

No. 3380

FORMOSAN COSSONINE WEEVILS OF BAMBOO¹
(COLEOPTERA: CURCULIONIDAE: COSSONINAE)

By ELWOOD C. ZIMMERMAN²

Miss Rose Ella Warner, of the U. S. Department of Agriculture, Entomology Research Branch, Washington, D. C., has asked me to study and report upon a collection of weevils assembled by K. S. Kung, of the College of Agriculture, Taichung, Taiwan (Formosa). Mr. Kung reports that these weevils are "pests of the sheath of bamboo (*Bambusa stenostachyta* Hackel) which is usually used to pack the banana for export. . . ."

In the collection sent for study there are five species, two of them new to science. Some of these insects have become widely distributed, and they are all liable to be spread far and wide by commerce and may become pests in various localities. The specimens on which this paper is based are in the U. S. National Museum (USNM), except as noted.

¹ Research for this paper was completed at the British Museum (Natural History) during the tenure of a grant from the National Science Foundation. The author expresses gratitude to the Foundation and to the Museum.

² British Museum (Natural History), London, England.

The five species sent from Formosa are *Rhinanisis bambusae* Zimmerman, *Pseudostenotrupis orientalis* Zimmerman, *Pseudocossonus planatus* (Marshall), *Conarthrus ferrugineus* (Wollaston), and *C. cylindricus* Wollaston. These species may be distinguished by the following key:

1. Antennal funicle 5-segmented (length, excluding head and rostrum, 2-2.5 mm.)
***Rhinanisis bambusae* Zimmerman, new species**
 Antennal funicle 7-segmented (length, less than 2 mm. to more than 4 mm.) . . . 2
2. Very small, slender species, length (excluding head and rostrum) less than 2 mm.; antennal scape reaching only to about middle of eye; postocular constriction of head strongly marked on sides, head narrowed behind and in front of the constriction; fore tibiae rather evenly arcuate on dorsal edge.
***Pseudostenotrupis orientalis*, new species**
 Medium sized species, longer than 4 mm.; antennal scape reaching to or passing hind margins of eyes; postocular constriction of head moderate or slight, head broader behind the constriction than in front of it; dorsal margin of fore tibia sinuous 3
3. Dorsally flattened species; fourth tarsal segment transversely convex beneath and broadest distad; rostrum comparatively slender, obviously longer than head, lateral outlines as viewed from above obviously sinuous.
***Pseudocossonus planatus* (Marshall)**
 Subtubular species, convex above; fourth tarsal segment transversely flattened or concave basad beneath and wider basad than distad; rostrum heavy, stout, nearly straight on sides, only about as long as head 4
4. A bicolored species, basically reddish brown, with elytra darker apically and head and rostrum darker; scutellum only slightly tilted; striae 9 and 10 above fifth ventrite appearing to occupy the same depression, the interval between them rather indistinct or not well formed.
***Conarthrus ferrugineus* (Wollaston)**
 A black or nearly black species; scutellum slanting strongly downward and forward; striae 9 and 10 remaining distinct and separate above fifth ventrite, the interval between them distinct, convex and well formed.
***Conarthrus cylindricus* Wollaston**

Genus *Rhinanisis* Broun, 1833

Rhinanisis Broun, New Zealand Journ. Sci., vol. 1, p. 489, 1833.

Fifteen or more species of this genus have been reported from New Zealand, and about six species are listed from Central and South America. It remains to be determined if the two groups of species are congeneric.

Rhinanisis bambusae, new species

FIGURES 1,b; 2,b

Color: Reddish chestnut brown, variably somewhat darker apically on pronotum, eyes black; derm moderately shiny (when clean).

Head with all setae minute and inconspicuous; length from fore edge of pronotum to front of an eye (measured from side, not from above) not as long as distance across eyes (ratio, measured from front, 11:12 or 11:13); postocular constriction subcontiguous to

posteroventro corner of eye, but rapidly diverging from eye dorsad and rather broadly and distinctly impressed across dorsum; area posterior to the constriction reticulate, almost impunctate and contrasting with the closely punctured interocular area, the sculpture of which is continuous with that of rostrum, the punctures mostly slightly closer to each other than distances between them; interocular area subequal in breadth to length of an eye; eyes not round, the posterodorsal contour flattened; underside transversely wrinkled.

Rostrum evenly arcuate with contour flattened basad to interocular area, three-fifths as long as pronotum (measured from side), sides as seen from above, narrowed from eyes to a point above the "false scrobe" behind point of antennal insertions, thence slightly roundly expanded above antennal insertions, thence evenly expanded to apex which is a little broader than interocular area; antennae inserted at one-third the length from base, scrobe strongly formed, the upper margin abrupt and strong, its posterior end contiguous with lower margin of eye, a short "false scrobe" above and behind antennal insertion; ventral surface strongly bisulcate and further substrigate; two long, stiff setae at base of oral cavity, but setae short behind that point.

Antenna with scape strongly clavate, extending back to middle of eye, about as long as funicle plus nearly one-third of club; first funicular segment as long as third plus fourth, second about as broad as long, a little longer than third, the third, fourth, and fifth each somewhat shorter and broader; club about as long as the preceding four funicular segments combined.

Prothorax shaped as illustrated, four-fifths as broad as long, broadest at about basal third; subapical constriction well marked on sides, shallowly continued across dorsum; setae not evident; reticulate microsculpture conspicuous, rather coarse; punctures on disc medium sized, mostly closer to each other than diameters of punctures.

Scutellum well developed; bare; microsculpture fine.

Elytra shaped as illustrated, more than twice (60:25) as long as pronotum; setae, except for some short ones on declivity, not, or hardly, discernible; outer (tenth) stria complete, striae 1-3 continued to elytral apex, 4 and 5 ending on the declivital callus, 6-8 coalescing at the apex of the callus and thence running as a common stria to apex; intervals 1-4 and 9 moderately costate on declivity and running to apex, the others not reaching elytral apical margin; striae evidently mostly as broad or broader than intervals on disc, their punctures close, somewhat larger than those on pronotum; intervals each with a row of small punctures.

Legs with fore femora when extended forward reaching to a point below anterior edges of eyes, middle femora when extended backward

reaching a point midway between middle parts of midcoxa and hind coxa, hind femora reaching to two-thirds the length of second ventrite; tibiae rather rapidly expanding from base to apex, uncus well developed, mucro moderate but conspicuous in adequate light; third tarsal segment (as seen with fourth removed) deeply emarginate and bilobed, ventral setae very long.

Sternum with prosternum twice as long in front of coxae as behind coxae; distance between fore coxae subequal to breadth of a coxa;

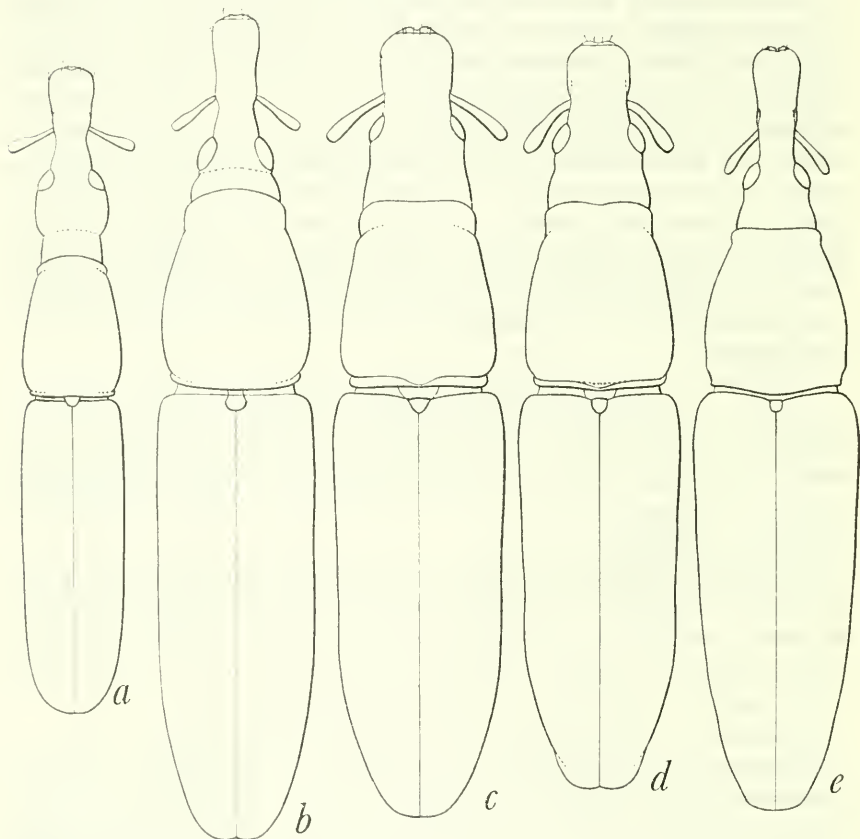


FIGURE 1.—Outlines of some Formosan Cossoninae. Length, excluding head: *a*, *Pseudo-stenotrupis orientalis* Zimmerman, holotype male, 1.5 mm.; *b*, *Rhinanisus bambusae* Zimmerman, allotype female, 2.2 mm.; *c*, *Conarthrus cylindricus* Wollaston, female, 4.5 mm.; *d*, *Conarthrus ferrugineus* (Wollaston), male 4.2 mm.; *e*, *Pseudocossonus planatus* (Marshall), male, 4.3 mm. Not to same scale.

derm rather irregularly roughened or wrinkled and punctures not, or only a few, individually evident; anterior margin truncate, subapical constriction impressed across venter, posterior margin arcuate, area in front of coxae with short setae; mesosternum continuous with

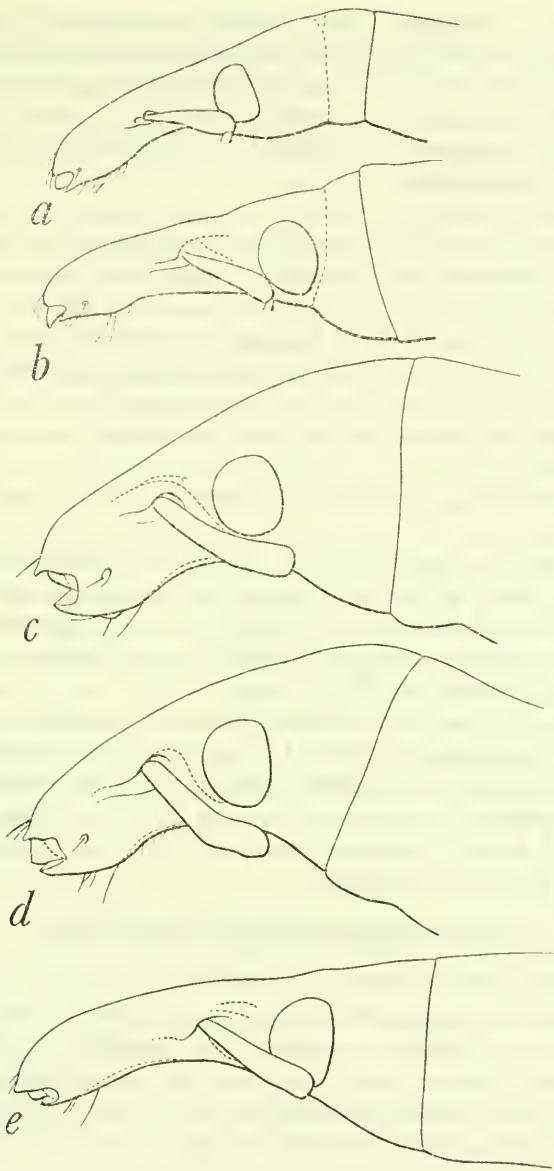


FIGURE 2.—Outlines of lateral views of head of: *a*, *Pseudostenotrupis orientalis* Zimmerman; *b*, *Rhinaninus bambusae* Zimmerman; *c*, *Conarthrus cylindricus* Wollaston; *d*, *Conarthrus ferrugineus* (Wollaston); *e*, *Pseudocossonus planatus* (Marshall). Drawings are from same specimens used in figure 1. Not to same scale. All drawings by Arthur Smith.

metasternum, mesocoxae a little farther apart than fore coxae, and equal in separation to hind coxae; metasternum subequal to length of prosternum along median line, a little longer along median line than length of ventrites 1 plus 2, broadly, shallowly concave on sides to accommodate movement of midfemora; with scattered small punctures bearing small setae.

Venter with ventrites 1 and 2 strongly coalesced, the suture hardly evident in middle, the combined length along median line equal to length of ventrites 3-5 plus 4 and 5 again, sculpture and vestiture as on metasternum, and broadly impressed on sides at middle to accommodate action of hind femora; ventrites 3 and 4 together as long as 5, each with a basal row of strong punctures and a subapical row of setae; ventrite 5 with a similar basal row of strong punctures and the apical half or more with long, erect setae arising from punctures.

Length (excluding head and rostrum), 2.1-2.5 mm.; breadth, 0.5-0.6 mm.

Types: Holotype male (USNM 63219) and allotype female are in the U. S. National Museum; paratypes are in the same museum and in the British Museum (Natural History). Described from a series of 13 specimens collected in 1955 from *Bambusa stenostachyta* at Taichung, Formosa, by K. S. Kung.

This is the first species of *Rhinanisus* to be recorded in the Pacific outside of New Zealand, where the genus is well developed. The absence of long, fine, decumbent hairs at the sides of the pronotum will alone separate the new species from the New Zealand species. The external sexual characters are poorly defined, and the determination of the sexes is difficult.

Genus *Pseudostenotrupis* Voss, 1939

Pseudostenotrupis Voss, Rev. Zool. Bot. Africaines, vol. 32, No. 1, p. 75, 1939.

Voss erected this genus to include *Proëces macer* Boheman, 1838, from Madagascar, and *Leurostenus filum* Marshall, 1933, from the Belgian Congo. Later in 1939, Voss described a third species, *parrulus*, from East Africa. He did not designate a type for the genus. *Leurostenus filum* Marshall may be taken as type.

Pseudostenotrupis orientalis, new species

FIGURES 1,a; 2,a

Color: Reddish chestnut brown, darker across front of head, base of rostrum, sternum, and first ventrite; eyes black; derm moderately shiny; all setae on dorsum very small and inconspicuous.

Head subequal in length from anterior edge of pronotum to front of an eye (measured from side) as breadth across eyes; postocular

constriction very strong on sides, but only slightly or not impressed across dorsum (when viewed from side), distinctly impressed across underside, the constriction about twice the length of an eye behind the eyes, and two-thirds the distance from hind edges of eyes to pronotum (as viewed from above); area posterior of constriction coarsely reticulate but not punctate, head otherwise reticulate and with moderately large punctures which are mostly closer to each other than the diameters of the punctures; eyes moderately interrupting lateral outline of head, distance across them slightly less than maximum breadth of crown which is at about two-thirds length from eyes to postocular constriction, interocular area one-half as broad as greatest postocular breadth of crown.

Rostrum with sculpture similar to that of interocular area, length (measured from side from anterior edge of an eye) about one-fifth longer than side of head in female, slightly less in male, gently arcuate, contour between front of head to before antennae gently, slightly concave; sides strongly narrowed from eyes to antennal insertions, over which the sides are arcuately expanded, thence rapidly expanded to apex, this expansion less strong in female, greatest subapical breadth about equal to interocular distance plus breadth of one eye in male, but only slightly broader than interocular area in female; ventrolateral apical corners drawn out into prominent processes which project beneath mandibles; ventral surface with numerous erect setae, the pre-oral ones longer than the breadth of apex of antennal scape; margins of scrobes well defined, upper margin apically contiguous with lower ocular margin; ventromedian line cariniform behind antennae.

Antennae inserted slightly behind middle of rostrum; scape reaching middle of eye, as long as funicle plus nearly one-half of club; first funicular segment as long as next three segments combined, subequal in breadth to segment 7, and appearing nearly twice as broad as segment 2; segment 2 hardly or not longer than segment 3; segments 2-7 each successively broader; club as long as preceding five funicular segments combined.

Prothorax shaped as illustrated, somewhat more than five-sevenths as broad as long, broadest just before basal third; subapical constriction, although conspicuous, not very strong, subequal in development to subbasal constriction, not impressed across dorsum; longitudinal dorsal contour, as viewed from side, nearly straight from base to apex; microsculpture of dorsum fine; punctures medium-sized, ovate, mostly separated from each other by more than their diameters on disc.

Scutellum bare, shiny.

Elytra shaped as illustrated, a little more than twice as long as pronotum to nearly $2\frac{1}{2}$ times as long; outer (tenth) stria complete, but

Key to the species of *Pseudocossus*

1. Basal margin of elytra slightly elevated to form a basal carina from scutellum to fourth or fifth intervals (scutellum in unique holotype concave). Japan.
brachypus Wollaston
Base of elytra without such a carina (scutellum convex on all examples seen) 2
2. Dorsum transversely convex or very slightly flattened and/or punctures on sides of prothorax not or hardly larger and not much if any denser than those on disc of pronotum 3
Dorsum obviously somewhat flattened and punctures on sides of prothorax obviously much larger and denser than those on disc of pronotum (examine area above and behind coxae, especially) 4
3. Microsculpture of pronotum obvious, the reticulations regular and distinct under moderate magnification; lateral outline of prothorax obviously arcuate from base to apex and no part of contour straight; subapical constriction of prothorax broad and shallow on sides. Japan.
brevitarsis Wollaston
Microsculpture of pronotum extremely fine, visible only under high magnification and even then it is vague and indefinite on disc; lateral margins of pronotum with contour nearly straight in middle region, although gently converging cephalad, the subapical constriction strong and sharply indented on sides. New Guinea **dimidiatus** Wollaston
4. Hind angles of pronotum strongly, conspicuously, abruptly, angulately emarginate, thus forming a shoulder which fits under elytra; subapical constriction of pronotum strongly formed and sharply indenting sides of pronotum; "East Indies" **nigripes** (Wollaston)
Subbasal constriction of pronotum feeble and shallow; subapical constriction, although strong, roundly instead of sharply indenting sides of pronotum; Formosa, Japan. **planatus** (Marshall)

Genus *Conarthrus* Wollaston, 1873

- Conarthrus* Wollaston, Trans. Ent. Soc. London, pp. 491, 577, 1873; Zimmerman, The Entomologist, vol. 89, p. 56, 1956 (synonymy).
Eutonius Wollaston, Trans. Ent. Soc. London, pp. 492, 578, 1873; not Clark, Catalogue of Halticidae in the . . . British Museum . . . , pt. 1, p. 64, 1860.
Eutonius Marshall, Ann. Mag. Nat. Hist., vol. 13, No. 98, p. 97, 1946.

Two species of *Conarthrus* are represented in the Formosan collection now at hand, but it is probable that other species occur on Formosa.

Conarthrus ferrugineus (Wollaston)

FIGURES 1,*d*; 2,*d*

- Eutonius ferrugineus* Wollaston, Trans. Ent. Soc. London, p. 638, 1873.
Conarthrus ferrugineus (Wollaston) Zimmerman, The Entomologist, vol. 89, p. 58, 1956.
Eutonius congener Wollaston, Cist. Ent., vol. 1, p. 206, 1874; Zimmerman, The Entomologist, vol. 89, p. 58, 1956 (synonymy).

In addition to the numerous specimens in the present collection from Formosa, I have examined material in the British Museum from

Burma, Assam, Tonkin, Sumatra, Java, Borneo, Malacca, Makian, Gilolo, Tondano, Morty, and New Guinea.

Conarthrus cylindricus Wollaston

FIGURES 1,c; 2,c

Conarthrus cylindricus Wollaston, Trans. Ent. Soc. London, p. 637, 1873; Zimmerman, The Entomologist, vol. 89, p. 57, 1956 (synonymy).

Conarthrus vicinus Wollaston, Trans. Ent. Soc. London, p. 637, 1873.

Eutornus jansoni Wollaston, Trans. Ent. Soc. London, p. 637, 1873.

In addition to the few Formosan specimens collected by Mr. Kung, there are others in the British Museum that were taken from bamboo in Cochin China and others that were intercepted at Gisborne, New Zealand, in "bamboo strips used for packing jute mats imported from India." The species is known also from Ceylon and from Bachan in the Moluccus. It is variable and widespread.



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U. S. NATIONAL MUSEUM

Vol. 107

Washington : 1957

No. 3381

SOME LITTORAL BARNACLES FROM THE TUAMOTU,
MARSHALL, AND CAROLINE ISLANDS¹

By DORA PRIAULX HENRY

A small number of barnacles collected by the Pacific Science Board expeditions at three localities—Ngarumaoa Island, Tuamotu Islands; South Loi Island, Marshall Islands; and Ifaluk Atoll, Caroline Islands—was sent to the author for identification. In all, there are seven species: three from the Caroline Islands, one from the Marshall Islands, and four, including one new species, from the Tuamotu Islands. In addition, a few barnacles collected by the *Albatross* at Makemo, Tuamotu Islands, were borrowed from the U. S. National Museum (USNM) to compare with the new material. Although the collection is small, it is of considerable interest as nothing is known of the barnacles of these islands except for *Lithotrya nicobarica* Reinhardt, which was reported from Makemo as *Lithotrya pacifica* Borradaile by Pilsbry (1907). The collection from Ngarumaoa Island contains *Lithotrya nicobarica* Reinhardt, *Lithotrya valentiana* (Gray), *Verruca cookei* Pilsbry, previously known from the Hawaiian Islands, and a new species of *Chthamalus*, which is of special interest as it is the first member of the genus to possess a true calcareous basis. A few small specimens of this species were also found on *Lithotrya nicobarica* from

¹Contribution No. 210 from the Department of Oceanography, University of Washington, Seattle, Wash.