September 2003

A new species of *Lomanoxia Martínez* from Costa Rica (Coleoptera: Scarabaeidae: Aphodiinae)

Paul E. Skelley
Florida State Collection of Arthropods, Florida Department of Agriculture and Consumer Services

Henry F. Howden
Canadian Museum of Nature

A new species of *Lomanoxia* Martínez from Costa Rica (Coleoptera: Scarabaeidae: Aphodiinae)

Paul E. Skelley
Florida State Collection of Arthropods
Florida Department of Agriculture and Consumer Services
P.O.Box 147100
Gainesville, FL 32614-7100, USA
skellep@doacs.state.fl.us

Henry F. Howden
Canadian Museum of Nature
P.O. Box 3443, Station "D"
Ottawa, Ontario K1P 6P4, Canada

Abstract. A new species of *Lomanoxia* Martínez is described from Costa Rica: *L. canthonopsis* Skelley and Howden. This represents the first member of the genus reported from Central America. The status of the tribe Lomanoxini Stebnicka is evaluated and is here synonymized under Eupariini LePeletier and Serville.

Introduction

Collecting efforts in specialized niches (*eg*. leaf-cutter ant nests) continually produce new aphodiines. Some of these species are aberrant and not readily placed in the correct taxon. A recent study in the undetermined Scarabaeinae dung beetles at INBio revealed a series of an undescribed species of *Lomanoxia* Martínez. The genus *Lomanoxia* contains six previously described species, all from South America, which appear to be associated with leaf cutter ants. Attempts to identify these Costa Rican specimens prompted the following study and species description.

Materials studied are deposited in the following collections: **FSCA** - Florida State Collection of Arthropods, Gainesville, FL, USA; **HAHC** - H. and A. Howden Collection (containing the A. Martínez scarab collection), Canadian Museum of Nature, Ottawa, Canada; **INBio** - Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica; **ISEA** - Institute of Systematics and Experimental Zoology, PAS, Krakow, Poland; **PESC** - Paul E. Skelley Collection, Gainesville, FL, USA.

EUPARIINI LePeletier and Serville 1928
= Lomanoxiini Stebnicka 1999, **new synonymy**

Discussion. Stebnicka (1999) created the tribe Lomanoxiini for the genus *Lomanoxia* Martínez based on several characters, with an emphasis on the mesothoracic sclerites being supposedly similar to some Tenebrionoidea, with a narrowed, cotyloid-shaped coxal opening.

Stebnicka's interpretation of these structures was based on an earlier interpretation made by Martínez (1951) which was also followed by Krikken (1972). However, Martínez overlooked the suture between the mesepisternum and mesepimeron and considered the strengthening groove around the posterior margin of the mesocoxa to be a suture.

Recent dissections of several *Lomanoxia* species, showed that the mesepisternum and mesepimeron are in the usual position and arrangement, not differing from any other aphodiine scarab (Figs. 1-2, 4). But, they are always hidden under the elytral epipleural fold and prothorax (as in Fig. 3). The specimen on which Martínez (1951) based his interpretation and illustrated in his paper was studied (HAHC, Figs. 1-2, 4). This new interpretation eliminates the major supporting characters for the tribe Lomanoxiini.

It should be noted that the elongated mesocoxa and lateral sclerites of the mesothorax being hidden (or mostly hidden, Fig. 3) is an unusual character, present in only four eupariine genera: *Euparixia* Brown, *Euparixoides* Hinton, *Cartwrightia* Islas and *Lomanoxia*. The expanded meso- and metasternum to cover part of the mesocoxa, causing the opening to be cotyloid (Fig. 1-2), is present in *Lomanoxia* and several members of the genus *Euparixia*. In species with these expansions, the strengthening groove behind, and frequently in front of, the mesocoxa is well developed. Thus, *Lomanoxia* appears to express nothing more than an extreme case of character development within this group of genera. Whether these characters are apomorphic for this group or convergences based on their inquiline life styles with ants or

termites remains to be supported by further study and correlating characters.

Recognition of *Lomanoxia* or this group of genera at a tribal level based on the remaining characters outlined by Stebnicka (1999) is premature. A more extensive and detailed analysis must be done before such a nomenclatural designation is made. Thus, the tribe Lomanoxiini is here placed in synonymy with Eupariini.

Lomanoxia Martínez 1951

Diagnosis. Within the Aphodiinae, *Lomanoxia* is unique in having the following set of characters: body shape oval and often flattened; elongate mesocoxa touching elytral epipleuron (mesepisternum and mesepimeron hidden, as in Fig. 3); lateral portions of the meso- and metasternum expanded to partially enclose the proximal part of the mesocoxa (Figs. 1-2); elytra sharply inflexed at interval VIII, forming a broad false epipleural fold (Figs. 6-7); pronotal margin, elytral intervals and elytral margins with distinct rows of setae (Figs. 5-7).

Lomanoxia canthonopsis Skelley and Howden, n.sp

(Figures 5-10)

Description. Holotype male, length 4.8 mm, width 3.0 mm. Body broadly oval (Fig. 5), flattened (Fig. 7); color reddish-brown, shiny; recurved setae golden.

Head with surface slightly convex, shiny, apparently lacking punctures (Fig. 6); clypeus slightly emarginate at middle, sides broadly rounded to genae, anterior edge slightly reflexed, no notable margin; genae angled at 90°; clypeal surface with sparse, minute setae gradually increasing in size to those of frons; fronto-clypeal suture indistinct; frons with notable recurved setae.

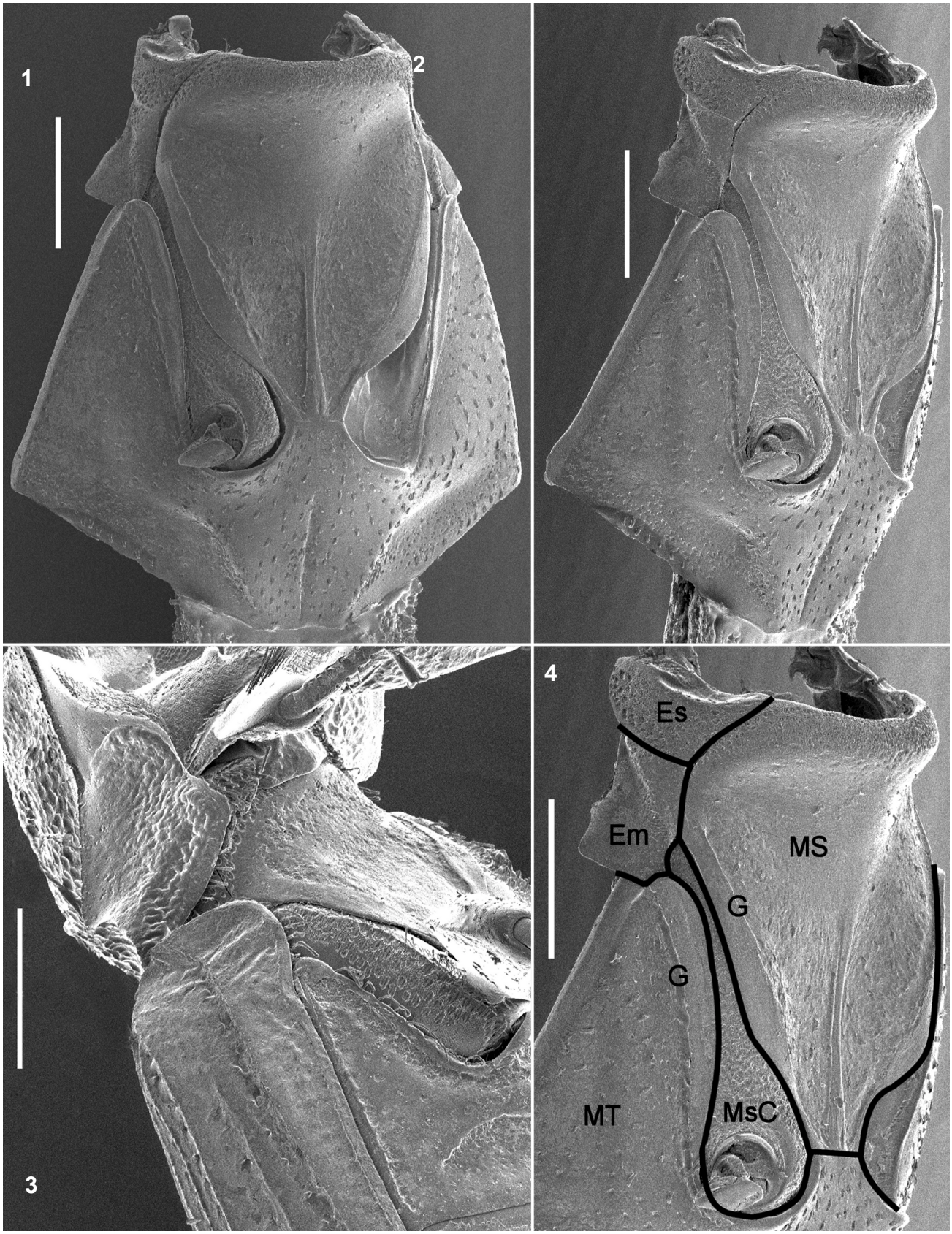
Pronotum broad, with disc strongly convex, lateral edges reflexed; disc with anterior-lateral and medio-lateral depressions; anterior angles produced and sharply rounded, posterior angles indistinct, broadly rounded; middle of pronotal base slightly produced over scutellum, slightly upturned. Pronotal lateral margin and base to median projection fringed with close recurved bristles, shortest on apical half of lateral margin, becoming longer to posterior margin, and dense over latero-basal margin; surface covered with scattered, but distinct recurved setae, becoming longer and denser along posterior lateral margin. Scutellum long, slender, acutely triangular, shiny.

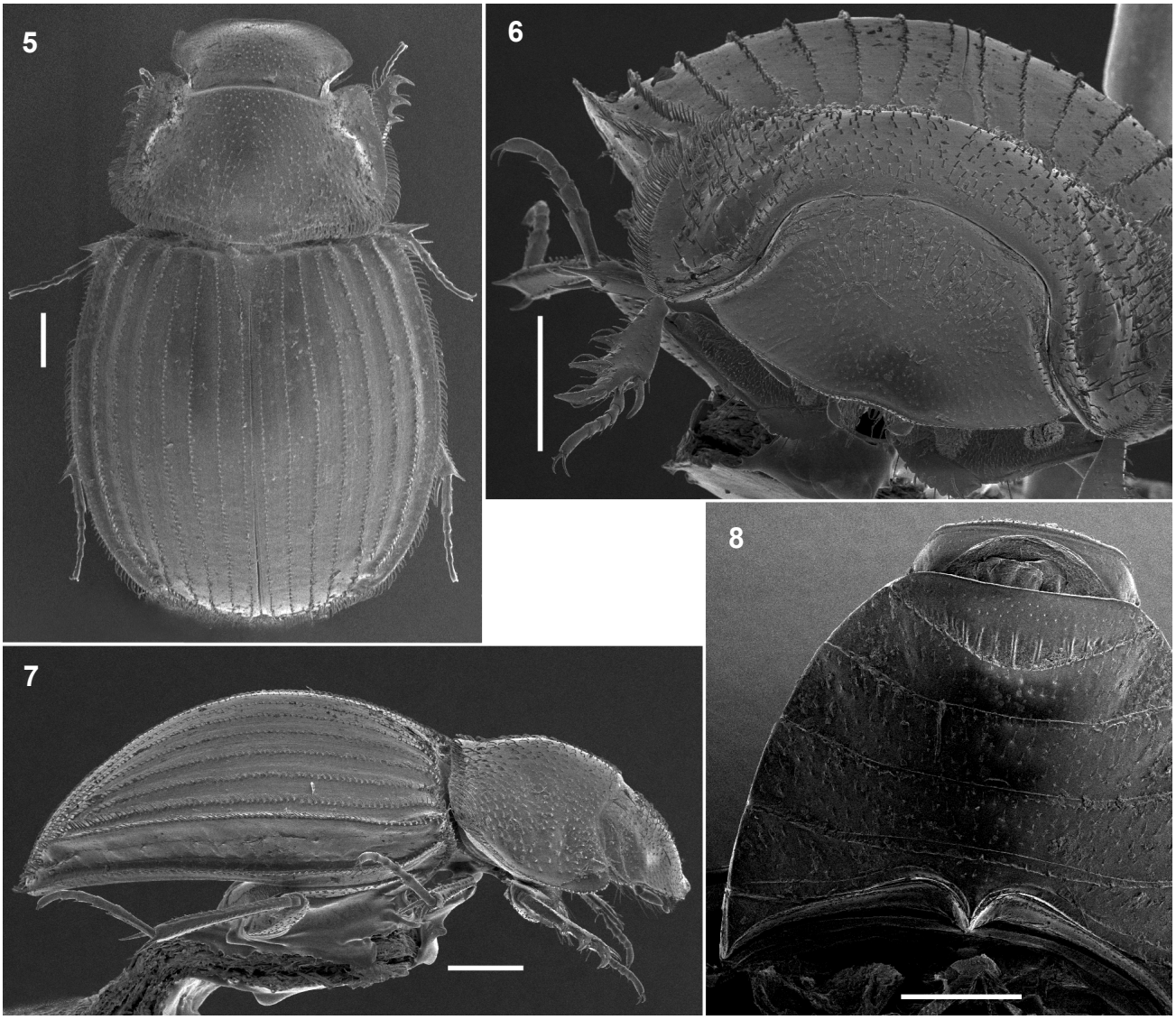
Elytra broadly rounded and convex dorsally to row of setae on interval VII, interval VIII forming sharp carina with false lateral margin and false epipleural fold (Fig. 6); striae shallow and barely visible, finely edged, flat and lacking punctures, width of striae = length of interval seta; intervals of disc flat, each with a distinct row of short, recurved setae, distance between setal bases less than length of setae; setal row of interval VIII (false margin) longer than other interval setae (broken off in some places), forming distinct fringe; setal rows of intervals I-V complete from base to elytral apex; setal rows of intervals I-VIII separated equally on disc; setal row of interval IX (on false epipleural fold) with widely scattered setae and indistinct most of length, except at apex; striae X forming a deep groove next to true lateral margin (Fig. 7), with widely placed coarse punctures; true lateral margin with fringe of setae as on interval VIII; base of interval VIII over humerus with minute tooth.

Prosternum not projecting behind coxae, vertical, triangular. Mesosternum elongate, wide in front, slightly concave, with medial ridge; meso-metasternal suture length equal to width of mesofemur at base; mesosternal margin, near proximal part of mesocoxae, with strengthening groove and flange extending over part of coxae. Metasternal disc weakly convex at middle, flattened laterally, with shallow impressions in front of metacoxa; surface finely and sparsely punctate, with short setae; anterior edge near mesocoxae with strong groove and thickened flange covering part of mesocoxa. Flight wings well-developed. Abdominal ventrites I-IV with sutures indistinct medially, surface sparsely covered with fine punctures each with short seta, setae longer than those of metasternum, punctures evenly distributed; ventrite V with basal area depressed and bearing longitudinal costae (Fig. 8), apex glossy. Pygidium with sharp transverse carina at apical fourth, enclosing a depressed opaque area.

Meso- and metafemora slender, with scattered fine punctures bearing short setae; posterior marginal groove visible only at extreme apex; apex not visible in dorsal view. Meso- and metatibiae same length as femur with vague longitudinal ridges bearing rows of

Figures 1-4. Mesothorax, scale line = 0.5 mm. 1-2) *Lomanoxia chacocola* Krikken, specimen illustrated by Martínez (1951): 1) Ventral, 2) Lateral; 3) *Euparixia duncani* Brown, lateral; 4) *Lomanoxia chacocola*, same image as figure 2 with sutures marked in black: Em - mesepimeron, Es - mesepisternum, G - strengthening groove, MS - mesosternum, MsC - mesocoxa, MT - metasternum (metepisternum and metepimeron missing).


1
2
3
4
Es
Em
MS
G
G
MT
MsC



Figures 5-8. *Lomanoxia canthonopsis*, n.sp., scale line = 0.5 mm. 5) Dorsal; 6) Anterior; 7) Lateral; 8) Ventral view of abdominal sternites.

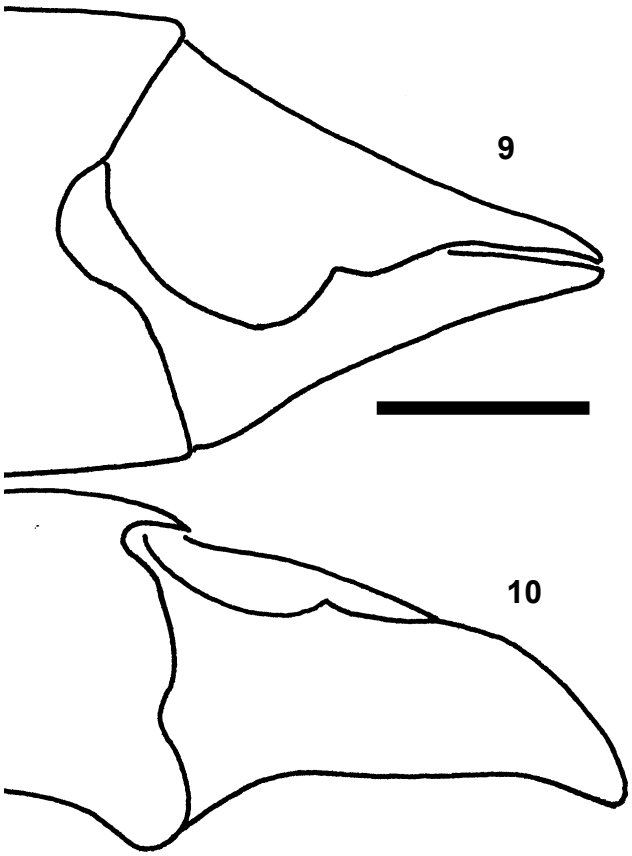
short setae; apex with two interior spurs and a long exterior spine; exterior spine almost same length as lower interior spur; upper spur longer than lower spur; apical fringe of spinules lacking. Meso- and metatarsi shorter than tibia. Metatarsus slender and cylindrical, with few short setae; basal tarsomere longer than upper spur, subequal in length to next three tarsomeres combined.

Parameres of genitalia (Figs. 9-10) short, slightly shorter than basal piece; abruptly pointed in dorsal view; arched to point in lateral view.

Allotype female, length 4.8 mm, width 3.8 mm. Similar to male holotype as described above except pygidium lacks sharp transverse groove and depressed opaque area. Instead, apex of pygidium is slightly raised and shiny.

Variations. Length 4.3-5.0 mm, width 2.6-3.0 mm. Head punctures in many specimens visible as fine annulations at base of setae, these appearing tuberculate under poor lighting or on dirty specimens. Elytra with row of setae indicating interval IX on false epipleural fold, lacking for most of length in many specimens, but always present at the apex.

Material Examined. Holotype male (INBio): "/COSTA RICA: Guanacaste, A. C. Guanacaste, Estacion Pitilla, 700m, 10.I.1998, 329950-380450, P. Rios, 98-Rios-025, ex. Excavando colonia Atta / [bar code label]



Figures 9-10. *Lomanoxia canthonopsis*, n.sp., male genitalia, scale line = 0.2 mm. 9) Dorsal; 10) Lateral.

INBIO CR1002 153329/." Allotype female (INBio), same data as holotype except for bar code label "... CR1002 153316/". These and the type series were collected in the refuse pile of a leaf-cutter ant, *Atta cephalotes* (Linnaeus).

Paratypes (58 total) with same data as holotype except different bar code numbers (INBio, HAHC, PESC, ISEA). One paratype with label data: COSTA RICA: Heredia, La Selva Biol. Sta., 3 km S Pto. Viejo, 10°26'N 84°01'W, 30.VIII-1.IX.[20]03 Lt [at light] (HAHC).

Other specimens studied varied from the type series in lacking a reduced humeral tooth and other subtle differences. We presently consider them *L. canthonopsis*, but they are not designated as paratypes. Their label data are: TRINIDAD, nr Arima, Blanchissiuse Rd., 4.VII.1977, J. Boos, Atta rubbish pile (5- PESC, FSCA); same data except 18-VI-1977 (1-FSCA); BOLIVIA: Cochabamba, Pcia. Chapata, Chimora, 250m, I-1971, A. Martínez (1-HAHC).

Etymology. "Canthon" + "-opsis", Greek, meaning "having the appearance of". The specific name is based on an overall similarity of this species to small members of the tribe Canthonini Péringuey (Scarabaeinae), like *Cryptocanthon* Balthasar or related genera.

Relationships. In body shape and general setal pattern, *L. canthonopsis* is most like *L. alternata* Krikken and *L. chacocola* Krikken. The new species appears most closely related to *L. alternata* (unique type not available for study), with which it shares many characters, differing most notably in that *L. alternata* has only odd elytral intervals bearing setae and notable punctures on the head; *L. canthonopsis* has all intervals bearing rows of setae and no notable punctures on the head. To identify *L. canthonopsis*, the key to species from Stebnicka (1999) is modified below.

1. Pronotum with distinct punctures or wrinkles; elytra with scale-like setae 2
— Pronotum smooth, lacking punctures or wrinkles; elytra with hair-like setae 3

2. Punctures of pronotum circular, deep, sharply defined; pronotal marginal setae short, equal in length and density; basal edge with longitudinal costulae; Argentina ..... *L. ovalis* (Schmidt)
— Punctures of pronotum elongate, forming slight, oblique wrinkles; pronotal marginal setae unequal in length, longest and closest at arcuate posterior angle; basal edge without longitudinal costulae; Argentina, Paraguay .... *L. chacocola* Krikken

3(1). Only abdominal sternite 5 with longitudinal costulae (Fig. 8); rows of elytral setae on intervals dense and closely placed (Fig. 5, 7), distance between bases less than setal length 4
— Abdominal sternites 3-5 or 4-5 with longitudinal costulae; rows of elytral setae on intervals sparse and widely spaced, distance between bases greater than setal length 5

4(3). Odd elytral intervals with row of setae; head with notable punctures on vertex .... *L. alternata* Krikken
— All elytral intervals on disc with row of setae (Fig. 5); head lacking notable punctures (Fig. 6) .... *L. canthonopsis*, n.sp.

5(3). Pronotal marginal setae equal in length and density; base of pronotum without median lobe; elytral intervals flat with median row of widely spaced setae; abdominal sternites 3-5 with lon-

gitudinal costulae; Brazil .... *L. ituensis* Stebnicka

— Pronotal marginal setae unequal in length and density; base of pronotum lobed at middle; elytral intervals convex to slightly tectiform with median row of moderately close setae 6

6(5). Sides of pronotum contiguously rounded towards base, longest marginal setae located along arcuate posterior angle; elytral intervals slightly tectiform with median row of fine seta-bearing granules; Argentina, Brazil, Paraguay, Suriname ..... *L. costulata* (Harold)

— Sides of pronotum narrowly emarginate before base, longest marginal setae located at emargination; elytral intervals convex with median row of seta-bearing tubercles and swellings; Brazil ... . *L. melloi* Stebnicka

Acknowledgments

We thank Robert Anderson, Canadian Museum of Nature (CMN), Ottawa, for recognizing these interesting beetles in the collection at INBio and arranging monetary support for PES to study materials in the CMN; Angel Solis, INBio, Costa Rica, for making specimens of the new species available for study; Z. T. Stebnicka, ISEA-PAS, for all of her work on New World Eupariini, without which this work would not have been possible; and F. Génier, Canadian Museum of Nature, Ottawa, for providing the line drawing of the genitalia.

For reviews, we thank R. D. Gordon, Willow City, ND; W. B. Warner, Chandler, AZ; A. Howden, CMN, Ottawa; and M. C. Thomas and W. Dixon, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

This work was partially funded by an NSF/PEET grant (DEB-0118669) to M. L. Jameson and B. C. Ratcliffe, University of Nebraska State Museum, Lincoln. This is Florida Department of Agriculture and Consumer Services, Entomology Contribution No. 985.

Literature Cited

Krikken, J. 1972. Species of the South American genus *Lomanoxia* (Coleoptera: Aphodiidae). Studies on the Fauna of Suriname and other Guyanas 13: 68-83.

Martínez, A. 1951. Scarabaeidae nuevos o poco conocidos. II. Publicaciones Misión de Estudios de Patalogía Regional Argentina 22: 23-36.

Stebnicka, Z. T. 1999. *Lomanoxia* Martínez, 1951, and a new tribe Lomanoxiini with notes on comparative morphology (Coleoptera, Scarabaeoidea: Aphodiinae). Acta Zoologica Cracoviensia 42: 279-286.