

***Lomanoxia* MARTINEZ, 1951, and a new tribe Lomanoxiini with notes on comparative morphology (Coleoptera: Scarabaeoidea: Aphodiinae)**

Zdzisława STEBNICKA

Received: 25 April 1999

Accepted for publication: 30 June 1999

STEBNICKA Z. 1999. *Lomanoxia* MARTINEZ, 1951, and a new tribe Lomanoxiini with notes on comparative morphology (Coleoptera: Scarabaeoidea: Aphodiinae). Acta zool. cracov., 42: 279-286.

Abstract. The Neotropical genus *Lomanoxia* MARTINEZ is reviewed and transferred from Eupariini to a new tribe Lomanoxiini. A comparative study of the mesocoxal structures in Lomanoxiini, Eupariini, and in the heteromeran Tenebrionoidea is presented. Two new species from Brazil are described: *Lomanoxia ituensis* sp. n. and *L. melloi* sp. n. Comments on the affinities and a key to the species are included.

Key words: Coleoptera, Scarabaeoidea, Aphodiinae, *Lomanoxia*, morphology, new taxa, South America.

Zdzisława STEBNICKA, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Sławkowska 17, 31-016 Kraków, Poland.

e-mail: stebnicka@isez.pan.krakow.pl

INTRODUCTION

The genus *Lomanoxia* is a small group of myrmecophilous scarabs, presently consisting of six species, including two species described herein as new. It was proposed by MARTINEZ (1951) for *Euparia costulata* HAROLD, 1867 from Brazil and *Euparia ovalis* SCHMIDT, 1911 from Argentina. MARTINEZ considered this genus remarkable for a number of unusual character states, mostly the mesocoxal characters found in *Lomanoxia* and in the heteromeran Colydiidae. The last consideration of the genus was that by KRIKKEN (1972), in which he described two new species from Suriname and Argentina and revised the type material of *costulata* and *ovalis*. He further indicated that the specimens discussed and illustrated by MARTINEZ (1951) were apparently misidentified with undescribed species.

Examination of the specimens identified by MARTINEZ as "*costulata*" and "*ovalis*", and accumulation of additional material allowed to clarify the taxonomic status of these names. With adequate material it now appears that at least six species form a closely similar group sharing the same general characters and habitat, and ranging from Suriname to Argentina. Biological data on a minority of the species indicate that they are associated with ants of the genus *Atta* FABRICIUS. The species are unique in the Aphodiinae in several characters such as the overgrowth of the mesopleural sclerites and the heteromeroid coxal structures. This condition coincides with the distinctive semieliptic body and the ventral elytral inflexion forming pseudepipleuron. A comparative morphology of the fore and hind legs of species representing many families of Coleoptera has been

published in numerous papers (LARSEN 1966; CROWSON 1967; EVANS 1977). The mesocoxal articulations also show a wide range of variations, and since they have been little studied, a brief description of the modifications involved will be given here. In proposing a new tribe I take the occasion to compare the mesothoracic structures in *Lomanoxia*, in the heteromeran *Aglenus brunneus* (GYLLENHAL) (Tenebrionoidea, Colydiidae, Agleninae), and in the Eupariini represented by *Ataenius platensis* (BLANCHARD). The functional significance of the mesocoxal structures in *Lomanoxia* is unknown, however, this character will prove to be of considerable value in considering the adaptive parallels between various groups of beetles.

Acronyms for depositories of the material upon which this study is based are as follows: CMN – Canadian Museum of Nature, Ottawa; FMLT – Fundacion Miguel Lillo, Tucuman; FVMC – Fernando Vaz-de-Mello Colletion; ISEA – Institute of Systematics and Experimental Zoology, PAS, Krakow; MHNG – Museum d'histoire naturelle, Genève; MZSP – Museu de Zoologia, Universidade de Sao Paulo; NMW – Naturhistorisches Museum, Wien; NRS – Naturhistoriska Riksmuseet, Stockholm; RVNH – Rijksmuseum van Natuurlijke Histoire, Leiden; SMTD – Staatliches Museum für Tierkunde, Dresden.

I greatly acknowledge the assistance of those institutions and individuals who lent material used in this study.

Tribe *Lomanoxiini* nov.

Type genus *Lomanoxia* MARTINEZ, 1951

D i a g n o s i s. Body medium-sized, colour usually reddish brown to dark brown. Head moderate in size, deflexed, slightly gibbose medially, gena prominent. Eye small, concealed under pronotal margin. Antenna 9-segmented, hidden under clypeus, club elongate oval, 3-segmented. Mouthparts adapted for soft food. Pronotum unevenly convex, disc usually gibbose medially, basal and lateral area deplanate, margins fringed with setae of equal or unequal length. Scutellum narrow, triangular, relatively long. Elytra moderately convex above, sides strongly inflexed with carina at middle of 8-th interval forming pseudepipleuron; humeral umbone invisible from above, humeral denticle acutely terminating 9-th interval; elytral intervals alternately differentiated or not, subcostate, granulate or tuberculate with single row of setae. Metathoracic wings functional. Ventral surface convex; prothorax concave on each side of gular area to receive fore legs; prosternal process large, triangular; mesosternum (Fig. 1) long, two slightly concave areas separated by long mesometasternal carina; metasternum elevated, shorter than mesosternum; abdomen elevated longitudinally at middle with 6 visible coalesced sternites; sternite 5 or sternites 3-5 or 4-5 with long costulae. Legs relatively long; profemur wide, protochanter large, protibia relatively small, tridentate; mesocoxal structures (Figs 2, 3) of heteromeroid type; meso- and metafemora slender, sublinear, metatrochanters long; tibiae slender with two apical spurs; tarsi slender, claws small. Phallobase of male aedeagus (Fig. 5) short without dorsal hump; phallobase and parameres fused, their juncture with distinct suture; apical portion of internal sac elongate, furnished with fine spicules.

C o m p a r a t i v e n o t e s. The mesocoxal structures in *Lomanoxia costulata* (HAROLD) (*Lomanoxiini*) and *Aglenus brunneus* (GYLLENHAL) (Colydiidae, Agleninae) are compared with those in *Ataenius platensis* (BLANCHARD) (Eupariini). A differentiation of the structures is considered as follows:

Lomanoxia costulata (Figs 1-2a-i) – mesothoracic elements similar to those in *Aglenus brunneus* (Fig. 2); mesosternum (a) large; mesocoxa (b) with outer parts hidden by overgrowth of pleural sclerites; epimeron (c) and episternum (d) separate by mesopleural fossa (e) running along coxa from its proximal end to cavity (f); epimeron narrowly elongate, reaches coxal cavity; distal coxal condyle (g) exposed, clearly visible around cavity; articulation coxa-trochanter slightly elevated; articulation trochanter-femur (h) strongly oblique, trochanter (i) excised dorsally, proximal femoral condyle surrounds trochanter dorsally and comes into contact with distal coxal condyle; trochantin absent.

Ataenius platensis (Fig. 3a-d, f,h,i) – mesothoracic elements similar to those in the other *Ataenius*-species; metasternum (a) medium-sized; mesocoxa (b) with the entire exposed face in the plane of epimeron (c), episternum (d) and metasternum; epimeron rounded, situated at proximal end of coxa; articulation coxa-trochanter not elevated, distal coxal condyle not exposed in cavity (f); articulation coxa-trochanter flattened; articulation trochanter-femur (h) straight (normal), trochanter (i) not excised dorsally, femur articulates with trochanter at its proximal end; trochantin absent.

R e m a r k s. There are two main types of the mesocoxal structure, one more generalized and fundamental for all tribes of the Aphodiinae, and one highly modified and complicated, hitherto found in *Lomanoxia* and in various species of the heteromeran Tenebrionoidea. Between and within both types appear a number of intermediate forms disclosing a successive adaptation to a more specialized mode of life. A similar condition of the middle legs or fore legs is seen not only in *Aglenus brunneus* but also in the European species of the genus *Myrmexichenus* CHEVROLAT (Tenebrionidae, Diaperinae), e.g. in *M. subterraneus* CHEVROLAT and *M. vaporariorum* GUÉRIN-MÉNEVILLE. All these species live in the nests of ants and birds, in burrows of various rodents, in compost heaps and in the caves. While exhibiting some unusual characters, Lomanoxiini are closely related to the Eupariini, mostly to the genera that are known to occur with ants or termites.

Genus *Lomanoxia* MARTINEZ

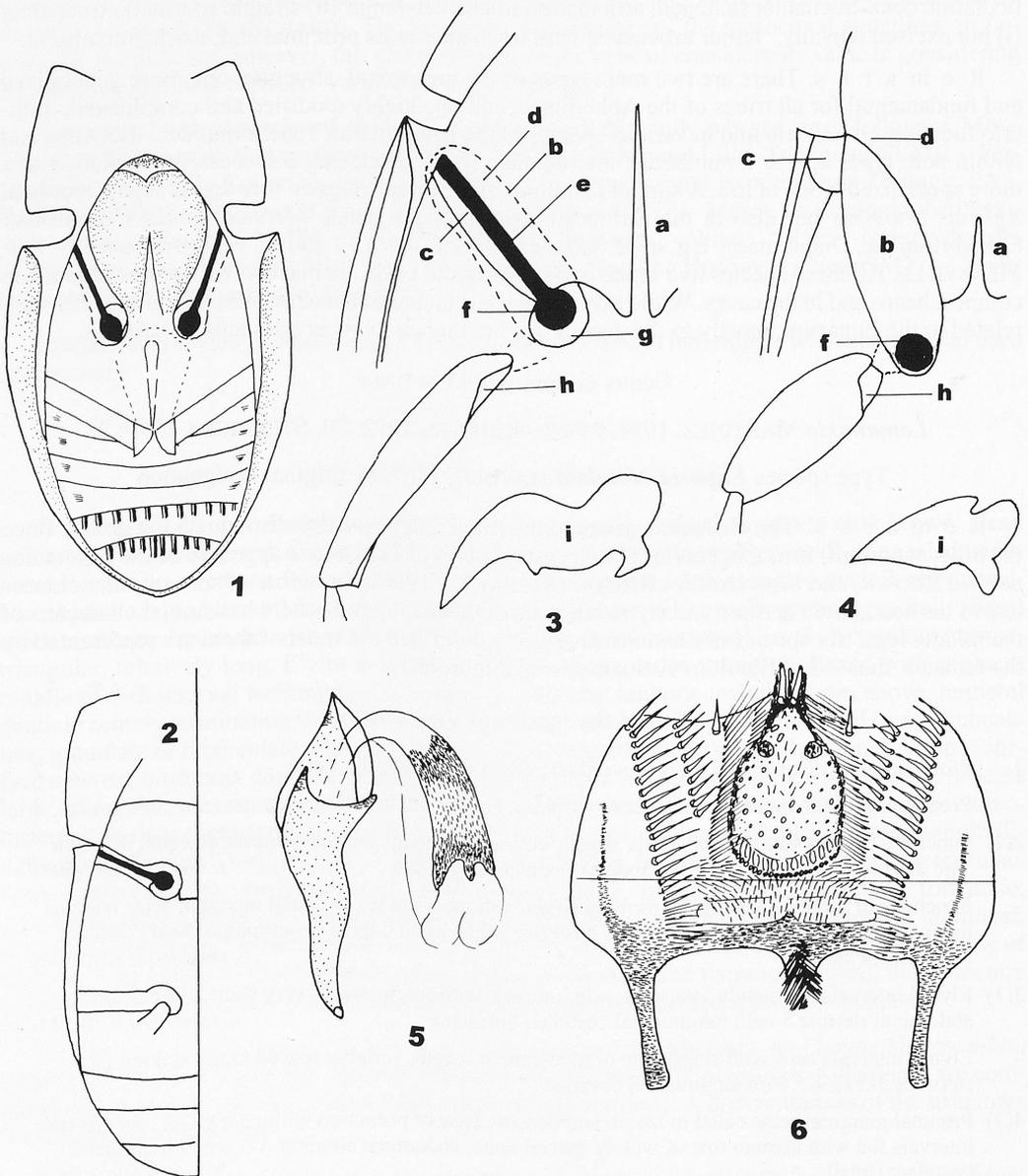
Lomanoxia MARTINEZ, 1951: 29-33.- KRIKKEN 1972: 70; STEBNICKA 1999: 2

Type species *Euparia costulata* HAROLD, 1867, by original designation

R e m a r k s. The characters given in the tribal diagnosis also distinguish the genus, since the tribe, at present, is monogeneric. The closest relatives of *Lomanoxia* appear to be the genera *Euparixia* BROWN, and *Euparixoides* HINTON (STEBNICKA 1998), by virtue of some similar characters of the head, mesosternum and elytra but none of the mentioned genera has similar characters of the middle legs. Six species of *Lomanoxia* are now described but most of them are represented by the females, thus it is difficult to evaluate sexual dimorphism.

Key to the species of *Lomanoxia*

- 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(1) 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) Elytral intervals alternately setaceous, odd intervals with single row of very short, close setae; abdominal sternite 5 with longitudinal costulae; Suriname *L. alternata* KRIKKEN
- Elytral intervals each with single row of moderate in length, variably spaced setae; abdominal sternites 3-5 or 4-5 with longitudinal costulae 4
- 4(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 longitudinal costulae; Brazil *L. ituensis* sp. n.
- 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 5
- 5(4) Sides of pronotum contiguously rounded toward 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* sp. n.



Figs 1-6. 1-2 - Body surface, ventral view: 1 - *Lomanoxia costulata* (HAROLD); 2 - *Aglenus brunneus* (GYLLENHAL). 3-4 - right half of mesothorax, ventral view: 3 - *L. costulata* (HAROLD); 4 - *Ataenius platensis* (BLANCHARD); a - metasternum; b - mesocoxa; c - epimeron; d - episternum; e - mesopleural fossa; f - coxal cavity; g - coxal condyle; h - trochanterofemoral articulation; i - mesotrochanter. 5-6 - *L. melloi* sp. n. : 5 - male genitalia, lateral view; 6 - epipharynx.

Lomanoxia costulata (HAROLD)

(Figs 2-3)

Euparia costulata HAROLD, 1867: 82.- 1870: 23; SCHMIDT 1922: 392; EIDMANN 1936: 432, fig.9.*Lomanoxia costulata*: MARTINEZ 1951: 33 (nec HAROLD, 1867; misidentification of *L. chacocola*); KRIKKEN 1972: 72-75, figs 48-50; DELLACASA 1988: 116 (catalogue).

M a t e r i a l e x a m i n e d. Lectotype (Brazil) designated by KRIKKEN (1972) in NMW. Syntype (abdomen lost), labelled '*Euparia costulata* Type HAROLD', with green labels 'Brasilien', 'Coll. C. FELSCH Kauf. 20, 1918' in SMTD. Other specimens (7). Argentina – (1) Misiones, L.N. Afem, xii.1961, coll. MARTINEZ (CMN). Brazil – (1) MG, Unai, Faz. Bolivia, 22-24.x.1964, Exp. Dep. Zoologia (MHNG); (2) MG, Cordisburgo, Faz. Pontinha, xii.1997, VAZ-DE-MELLO (FVMC, ISEA); (1) BA, Encruzilhada, xii.1980, coll. MARTINEZ; (1) SC, Nova Teutonia, Santa Catarina, xi.1971, F. PLAUMANN (CMN, ISEA); (1) MS, Campo Grande, 10.xi.1994, col. KOLLER (ISEA). Paraguay – (1) Misiones, Panchito Lopez, 22.x.1982, Exp. Mus. Genève (MHNG).

R e m a r k s. *L. costulata* belongs to the group of four species having a smooth, impunctate pronotum and it is most close to *alternata* and *ituensis* sp. n. Apart from the characters given in the key, it differs from *alternata* by its distinctly convex elytral intervals and from *ituensis* by the pronotal fringe of unequal setae. The species was taken from detritus-cavities in the nest of *Atta sexdens* (L.) (KRIKKEN 1972).

Lomanoxia chacocola KRIKKEN*Lomanoxia chacocola* KRIKKEN, 1972: 77-80, figs 54-56.- DELLACASA 1988: 285 (catalogue).

M a t e r i a l e x a m i n e d. Holotype female, labelled 'Chaco de Santiago del Estero', 'Bords du Rio Salado, Env. d'Icano, E. R. WAGNER 1904' [Argentina], '*Lomanoxia chacocola* KRIKKEN', in MNHN. Other specimens (7). Argentina – (1) Chaco de Santiago del Estero, La Palisa near Rio Salado, WAGNER Brothers 1904 (MHNG); (2) Misiones, Alto Parana, Puerto Rico, xi.1946, coll. MARTINEZ; (2) Misiones, Pindapol, xi.1945, Finca "Bovino", coll. MARTINEZ "*Lomanoxia costulata*, MARTINEZ det. 1951" (CMN, ISEA). Paraguay – (2) Dep. Boqueron, Puerto Casado, Aerodromo, 18.xi.1950, "*Lomanoxia costulata* MARTINEZ det. 1951" (CMN, ISEA).

R e m a r k s. *L. chacocola* is most closely related to *L. ovalis* from which it may be easily distinguished by the pronotal base without longitudinal costulae and pronotal surface with slight oblique wrinkles. Host unknown.

Lomanoxia ovalis (SCHMIDT)*Euparia ovalis* SCHMIDT, 1911: 55.- 1922: 392-393.*Lomanoxia ovalis*: MARTINEZ 1951: 33 (nec SCHMIDT, 1911; misidentification of *L. costulata*); KRIKKEN 1972: 80-82, figs 57-60; DELLACASA 1988: 285 (catalogue).

M a t e r i a l e x a m i n e d. Holotype (sex undetermined), labelled 'Typus', 'R.L. Argentina', 'Prov. Tucuman 190, C. BRUCH', '*E. ovalis* SCHM. 390/70', in NRS. Other female specimen: Argentina – (1) Prov. Tucuman, Dep. Burreuyacen, Chilcas, 5.vi.1975, R. GOLBACH (FMLT).

R e m a r k s. The species seems to be very rarely collected. Host unknown.

Lomanoxia alternata KRIKKEN*Lomanoxia alternata* KRIKKEN, 1972: 75-77, figs 51-53.- DELLACASA 1988: 285 (catalogue).

T y p e d a t a. Holotype male (?) labelled 'Paramaribo-Charlesburg, in afvalruimte *Atta cephalotes* 5.ix.'38, GEIJSKES', in RNHL.

D i a g n o s t i c c h a r a c t e r s (according to KRIKKEN (1972). Length approx. 5.0 mm, greatest width approx. 3.0 mm. Pronotum with median basal lobe, longest bristles of marginal fringe situated along lateral posterior edge, surface covered with short semierect setae, lacking punctures between setae. Elytra shining, widely arcuate toward apex, discal intervals flat, alternately setigerous, odd intervals 1,3,5,7 with median row of very short, close, semierect setae.

R e m a r k s. The species is hitherto known from the unique type the sex of which is not established. It is most similar to *L. costulata* (see Remarks under that species). The specimen has been taken from detritus-cavities in the nest of *Atta cephalotes* (L.).

***Lomanoxia ituensis* sp. nov.**

Holotype female : Brazil SP, Itu, Faz. Pau d'Alho, 27.xii.1957, U. MARTINS, in CMN.

Paratypes females (4). 1, same data as holotype (CMN); 1, (SP) Barueri, xi.1966, K. LENKO (ISEA); 1, (MS) Campo Grande, 10.vii.1995, pitfall trap, W. KOLLER (MZSP); 1, (RJ) Rio de Janeiro, Padre do Rio, 13.xi.1991, col. BELLO (ISEA).

D e s c r i p t i o n o f f e m a l e s. Length 5.0-5.2 mm, greatest width 2.5-2.6 mm. Body moderately shining, surface microreticulate, colour dark brown. Head weakly convex medially, clypeal margin rounded on each side of moderate median emargination, sides arcuate toward acutely produced gena; surface microreticulate with minute granules separated by 2-3 their diameters. Pronotum strongly convex at middle, converging to base, depressed at anterior angles on sides and along base; anterior angles obtuse, produced forward, sides widely arcuate and slightly excised before base; base straight without trace of lobe; pronotal margins fringed with rather short, equal in length, curly setae separated by less than their length; surface shining with short scattered setae, lacking punctures between setae, microreticulation less visible than that on elytra. Scutellum narrow, convex. Elytra moderately arcuate, lobed apically, humeral denticle small acute; striae very shallow, superficial, impunctate or only lateral striae with trace of punctures; intervals flat on disc, slightly convex at apex, each with median row of small granules bearing short pale seta, setae separated by 3-5 their lengths; median carina of 8-th interval obtuse with fringe of closer setae; cuticular

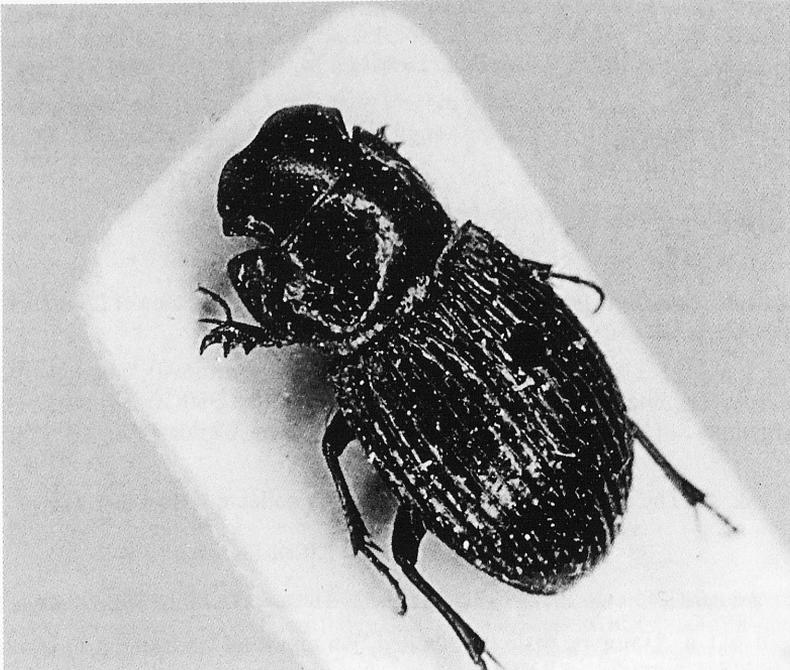


Fig. 7. *Lomanoxia melloi* sp. n.: habitus.

structure of each interval between striae consists of rectangular cells visible when abdomen is removed and elytra transparent. Ventral surface glabrous; prothorax concave on each side of gular area to receive fore legs; mesosternum long, strongly sclerified, divided into two symmetrical areas by longitudinal carina; metasternum convex, disc relatively small with deep midline; abdomen convex medially, sternites 4-5 with long costulae, surface impunctate; apical lip of pygidium shining. Profemora wide, protrochanter large with crenate margins and long clavate setae; meso- and metafemora narrow, parallel-sided, impunctate; tibiae slender; basal segment of metatarsus subequal in length to upper tibial spur and shorter than following three tarsal segments combined.

Male unknown.

R e m a r k s. The species is distinguished from others in the genus by its unlobed, straight and smooth base of the pronotum, the pronotal marginal fringe of equal setae, the elytral intervals flattened and the protrochanters distinctly crenate and setigerous. Host unknown.

Lomanoxia melloi sp. nov.

(Figs 5-7)

Holotype male: Brazil MG, Cordisburgo, Faz. Pontinha, xii.1997, VAZ-DE-MELLO, in MZSP.

Paratypes females (5). 2, (MG) Cordisburgo, i. 1999, VAZ-DE-MELLO (ISEA, MZSP); 1, (RJ) Rio de Janeiro, Padre do Rio, 1.x.1993, col. BELLO (ISEA); 1, (MS) Campo Grande, 10.x.1994, black light trap, W. KOLLER (MZSP); 1, (ES) Espirito Santo, leg. FRUHSTORFER (MHNG).

D e s c r i p t i o n. Length 4.8-5.0 mm, greatest width 2.3-2.4 mm. Body (Fig. 7) shining, colour reddish brown. Head moderately convex medially, clypeal margin rounded on each side of rather deep median emargination, sides arcuate and slightly emarginate before acutely produced gena; surface minutely granulate, granules separated by one diameter or slightly more. Pronotum strongly convex at middle, depressed at anterior angles, on sides and at base; anterior angles obtuse, produced forward, sides widely arcuate and slightly excised before base; base lobed at middle; lateral pronotal margins fringed with short clavate setae, posterior emargination and basal angle with clump of longer, close, yellowish setae; surface without trace of punctures, setae short, widely scattered. Scutellum narrow, convex. Elytra moderately arcuate laterally, lobed apically; humeral denticle small, acute; striae fine, weakly impressed, impunctate; intervals convex mostly at base, each interval with median row of tubercles or swellings bearing pale seta, setae separated by about 2 their lengths; median carina of 8-th interval with fringe of closer setae; cuticular structure of each interval between striae consists of rectangular cells visible when abdomen is removed and elytra transparent. Ventral surface glabrous; prothorax concave on each side of gular area to receive fore legs; mesosternum long, strongly sclerified, divided into two symmetrical areas by longitudinal carina; metasternum convex, disc relatively small with deep midline; abdomen convex medially, sternites 3-5 with increasingly longer costulae, surface impunctate; apical lip of pygidium shining. Profemora wide, protrochanter large, finely crenate ventrally; meso- and metafemora narrow, parallel-sided, impunctate; tibiae slender; basal segment of metatarsus equal in length to upper tibial spur and subequal to following two tarsal segments combined. Male genitalia as in Fig. 5. Epipharynx as in Fig. 6.

Except for slight differences in the length of penultimate abdominal sternite, there is apparently no obvious sexual dimorphism.

R e m a r k s. The species shows some variation, particularly in the shape of pronotum and elytra, and these characters vary between localities. Externally, *L. melloi* is closest to *L. costulata* but it differs from that species by having the pronotal side emarginate before base and the elytral intervals with tubercles and swellings. Host unknown.

E t y m o l o g y. The species is named in honour of its young collector, Fernando VAZ-DE-MELLO (University of Viçosa, Brazil).

REFERENCES

- CROWSON R. A. 1967. (Reprint). The natural classification of the families of Coleoptera. E.W. Classey Ltd. Middlesex. 214 pp.
- DELLACASA M. 1988. Contribution to a world-wide catalogue of Aegialiidae, Aphodiidae, Aulonocnemidae, Termitotrogidae (Coleoptera, Scarabaeoidea). Mem. Soc. ent. Ital., **67**: 3-455.
- EIDMAN H. 1937. Die Gäste und Gastverhältnisse der Blattschneider-ameise *Atta sexdens* L. Ztschr. Morph. Oekol. Tiere, **32**: 391-462.
- EVANS N. E. G. 1977. Locomotion in the Coleoptera Adephaga, especially Carabidae. J. Zool. Lond., **181**: 189-226.
- HAROLD E. 1867. Diagnosen neuer Coprophagen. Col. Hefte, **1**: 76-83.
- KRIKKEN J. 1972. Species of the South American genus *Lomanoxia* (Coleoptera: Aphodiidae). Studies on the fauna of Suriname and other Guyanas, **13**: 68-83.
- LARSEN O. 1966. On the morphology and function of the locomotor organs of the Gyrinidae and other Coleoptera. Opusc. Entom. Suppl., **30**: 1-242.
- MARTINEZ A. 1951. Scarabaeidae nuevos o poco conocidos. II. Mis. Est. Pat. r. ar., **22**: 23-36.
- SCHMIDT A. 1911. Neue Aphodiinen und eine synonymische Bemerkung. Societas ent., **24**: 35-36, 47-48, 52, 55-56.
- SCHMIDT A. 1922. Coleoptera Aphodiinae. Das Tierreich, **45**: 1-614.
- STEBNICKA Z. 1998. A second species of *Euparixoides* HINTON from Brazil (Coleoptera: Scarabaeoidea: Aphodiinae). Acta zool. cracov., **41**: 195-198.
- STEBNICKA Z. 1999. Neotropical Eupariini: New and little known genera and species (Coleoptera: Scarabaeoidea: Aphodiinae). Revue suisse Zool., **106**(2): 285-300.