

# Seven new Neotropical species of the genus *Ardistomis* PUTZEYS (Coleoptera: Carabidae: Scaritinae: Clivinini): notes about classification and a checklist of species names of that genus

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## Abstract

The ardistomine complex includes the genera *Ardistomis* Putzeys, 1846, *Semiardistomis* Kult, 1950 and *Aspidoglossa* Putzeys, 1846. Seven new species of the genus *Ardistomis* Putzeys are described and illustrated: *A. drumonti* n. sp. from French Guiana, *A. minutus* n. sp. from Bolivia, *A. samyni* n. sp. from Honduras, *A. dostali* n. sp. from Costa Rica and *A. onorei* n. sp., *A. bulirschi* n. sp., and *A. vergelae* n. sp. from Ecuador. Two monophyletic groups are defined: group *muelleri* and group *ovatus*, both with montane flightless species. A checklist includes valid names, new synonymies and distributional records for *Ardistomis*.

**Key words:** Coleoptera, Carabidae, Clivinini, Ardistomina, new species, Neotropic

## Introduction

This represents the first paper in a series of studies devoted to elucidation of the taxonomic structure of the ardistomine complex, which comprises three genera: *Ardistomis* PUTZEYS, 1846; *Semiardistomis* KULT, 1950; and *Aspidoglossa* PUTZEYS, 1846. The group is currently placed in the tribe Clivinini. Previously it was recognized as Ardistomides (PUTZEYS, 1866), Ardistomina (CSIKI, 1927) or Ardistomini (JEANNEL, 1946). This complex is confined to the Western Hemisphere, ranging through the Neotropical Region, including the West Indies northward to southeastern United States in the Nearctic Region.

PUTZEYS (1866) arranged the species of *Ardistomis* in three numbered groups. His first group was nominotypical; in his second and third groups he placed species now included in the genus *Semiardistomis* KULT 1950. The latter author (1950) "provisionally" placed the species in 13 groups, distributed among three subgenera: *Ardistomis* s. str. with 4 groups, *Semiardistomis* with 8 groups from which 3 are true *Ardistomis* and one group as *Ardistomiellus*. WHITEHEAD

(1977) proposed that *Semiardistomis* be ranked as a genus, in which he included *Ardistomiellus* (that name becoming thereby a junior subjective synonym of *Semiardistomis*). NICHOLS (1988a, 1988b), following Whitehead's proposals, formally ranked *Semiardistomis* as a genus, and included therein the species originally assigned to *Ardistomiellus*; members of the genus *Ardistomis* inhabit West Indies where arranged here in 3 "major" lineages.

In this paper I accept the Whitehead/ Nichols proposals for classification of the species of the ardistomine complex at the supraspecific level. For *Ardistomis*, I define just those monophyletic groups that include the new species described with a clear set of autapomorphies. The complete revision of the genus *Ardistomis* is under preparation. The major focus of this paper, however, is description and illustration of diagnostic features of new species of *Ardistomis* from Central and northern South America. Included also is a checklist of the specific names of the species of this genus, bringing up to date the list by LORENZ (2005).

## Material and Methods

More than 2200 specimens of the ardistomine complex were examined, representing 103 named species. Most specimens were borrowed, but some are represented in my personal collection (PVCC). Listed below, with acronyms used in the text, are names and addresses of the lending institutions (names of curators in parentheses) and owners of private collections

ADVA = Alexander Dostal Collection (includes Kult Collection), Vienna, Austria.

BMNH = The Natural History Museum. London, UK. (Max Barclay and Christine Taylor)

CMN = Canadian Museum of Nature, Aylmer, Québec, Canada (R.S. Anderson, F. Génier).

- HECO = Hope Entomological Collection, Oxford University, UK. (James Hogan.)
- IES = Instituto de Ecología y Sistemática, Ciudad de la Habana, Cuba. (A. Lozada)
- IRSNB = Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgique. (A. Drumont).
- MNHP = Muséum National d'Histoire Naturelle, Paris, France. (T. Deuve and A. Tagavian).
- MNHNCu = Museo Nacional de Historia Natural de Cuba, Ciudad de la Habana, Cuba. (E. Gutiérrez)
- PBPC = Petr Bulirsch Collection. Prague, Czech Republic.
- PMGT = Pier Mauro Giacchino Collection, Torino, Italy.
- UASM = Strickland Museum, University of Alberta, Edmonton, Alberta, Canada. (G. E. Ball and D. Shpeley).

Dissections of adults were made using standard techniques. The genitalia were preserved in glycerine in microvials pinned beneath the specimens. Mouthparts were glued on small cards pinned beneath the specimens. Observations were made under a stereobinocular microscope (50X) and a compound microscope (100X). All line drawings were made from digital microphotographs using Corel Draw 13X software.

The following measurements were made using an ocular micrometer: head length (HL): linear distance from apical margin of clypeus to posterior margin of right eye; length of pronotum (PL): linear distance from anterior to posterior margin along the midline; pronotal width (PW): greatest linear transverse distance; elytral length (EL): linear distance from basal ridge to apex along the suture; elytral width (EW): greatest linear transverse distance across both elytra. The standardized body length (SBL) is the sum of the lengths of head, pronotum and elytra.

Most terms used for structural features are found in previous works on Carabidae: ALLEN & BALL (1980) for adult microsculpture; ACORN & BALL (1991) for adult mandibles; LIEBHERR & WILL (1998) for female genitalia.

The phallus in genus *Ardistomis* (see Figs. 2, 8, 22) consists of three parts: (1) a basal bulb (Bb) defined at its distal end by the basal apophysis (ba) where the parameres are attached, which includes the basal opening (bo), its proximal end is usually developed in a canaliculated plate named basal projection (bp),

usually crowned by a basal crest (bc); (2) a median portion (Mp), on its dorsal side the ostium (o) can be opened from different levels of this portion or from the basal bulb to base of apical portion, and ventrally a median ridge (mr) along its axis can be developed or not; (3) the apical portion (Ap). Illustrations of the phallus are oriented to the left (sinistral) or to the right side (dextral).

The surface of the endophallus is either densely or sparsely covered by an armature of different kinds of spines, hairs and microtrichia in specific areas. Inside the endophallus a basal sclerite (bs) is present in males of some species.

One of the parameres (P1) is larger than the other one and has three apophyses: one lateral, one basal and one ventral. The second paramere (P2) is slender and acute apically. Both are setose apically or glabrous, the number of setae various.

#### Taxonomic treatment

##### Genus *Ardistomis* PUTZEYS, 1846

TYPE SPECIES: *A. fasciolatus* PUTZEYS, 1846

RECOGNITION: Most species with a submarginal band of microsculpture on proepisternum. Mandibles elongate, terebral ridges almost straight. Anterior margin of clypeus with lateral lobes indistinct. Antennomere 2 subequal in length to antennomere 3. Pronotal disc ovate to subglobose (Figs 1, 9), proepipleura visible from above or not. Elytral striae complete and impunctate. Protibia ventral surface with only one seta along midline. Abdominal sternum VII with a lateral projection that fits into preapical elytral plica. Union of abdominal sterna III and IV obliterated at middle. Abdominal sterna with or without accessory setae. Phallus (Figs 2, 8, 21) with a defined basal bulb which produces distally only one lamella with a median and an apical portions, the ostium is opened dorsally; parameres well differentiated each other, with reduced number of setae. Gonocoxae unsegmented, elongate with a distinctly differentiated wide basal portion.

MATERIAL EXAMINED: Most currently recognized species (see checklist, below) except: *A. alticola* DARLINGTON, *A. annona* PUTZEYS, *A. hispaniolensis* Nichols (manuscript name), *A. profundestriatus* PUTZEYS, *A. rufoclarus* DARLINGTON, *A. tropicalis* PUTZEYS and *A. unicolor* PUTZEYS.

*Group fasciolatus*

This group is composed of different monophyletic units united by having labial palpomere 3 subequal in length to palpomere 2, abdominal sterna without accessory setae and endophallus usually with abundant and varied armature. (Figs. 2, 3)

*Ardistomis drumonti* n. sp.

(Figs 1, 2)

TYPE MATERIAL: HOLOTYPE male labelled: "Leprieuri Buquet Cayenne (C. Chd.)" [handwritten on green paper]; "Soc. Ent. Belg. Coll. PUTZEYS" [printed]; "Syntype" [printed]; "Paralectotype *Dyschirius leprieuri* Chd. Des. S. W. Nichols 1984" [handwritten]. Holotype deposited in IRSNB.

ETYMOLOGY: Specific epithet a Latinized noun, masculine genitive case, based on the surname of Dr. Alain Drumont, curator of the insect collection of the Royal Belgian Institute of Natural Sciences, to whom this species is dedicated.

RECOGNITION: This specimen was misidentified since PUTZEYS (1846) as *Ardistomis leprieuri* (CHD.) (Fig. 3). From other members of this group it is readily distinguished by less prominent eyes, anterior margin of

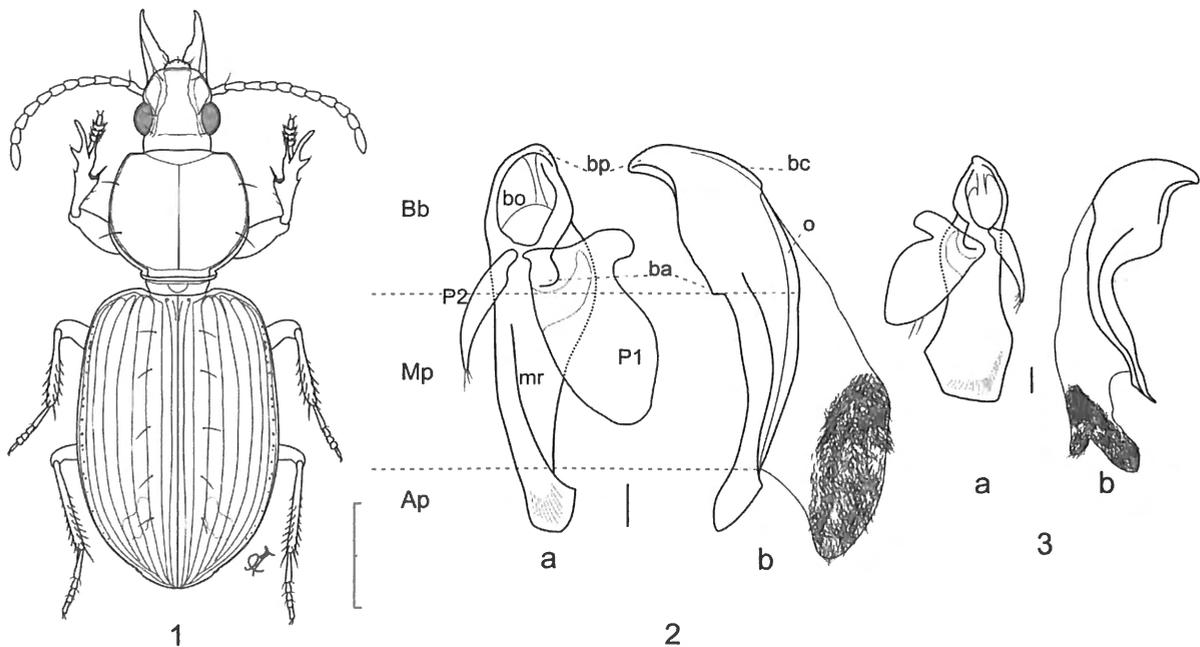
clypeus emarginate, pronotal disc subglobose and elytra with humeri rounded and preapical elytral spot smaller.

DESCRIPTION: Habitus as in Fig. 1. For measurements see Table I.

*Color.* Body color mostly piceous; antennae testaceous, legs and mouthparts ferruginous; pronotum and elytra with slight greenish luster, elytra preapically spotted, spots testaceous.

*Microsculpture.* Frontoclypeus with most of surface smooth, mesh pattern isodiametric laterally; supraantennal lobes smooth; vertex with mesh pattern isodiametric; gena with mesh pattern isodiametric; gula with mesh pattern transverse. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc in anterior two thirds with mesh pattern isodiametric, transverse in posterior third; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Elytra with shallow longitudinal microlines; epipleuron with longitudinal microlines. Abdominal sterna with mesh pattern transverse.

*Chaetotaxy.* Anterior marginal setae on pronotal disc closer to anterior angle than to posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII without accessory setae near base; preapical setae equidistant from each other.



Figs 1-3. — 1. *Ardistomis drumonti* n. sp., habitus (dorsal view), scale bar 1 mm. 2—3 Male genitalia (a) ventral view, (b) right lateral view, scale bar 0,1 mm. 2. *Ardistomis drumonti* n. sp. Ap, apical portion; ba, basal apophysis; Bb, basal bulb; bc, basal crest; bo, basal opening; bp, basal projection; Mp, median portion; mr, median ridge; o, ostium; P, parameres. 3. *Ardistomis leprieuri* (CHAUDOIR).

*Head.* Clypeus with anterior margin emarginate. Vertex with transverse groove between posterior supraorbital setae. Eyes normal. Antennomeres 4–10 about 1.6 X longer than wide.

*Mouthparts.* Labrum with anterior margin projected medially. Mandibles with basal portion about 4/5 length of terebra. Labium with palpomere 3 subequal in length to palpomere 2.

*Thorax.* Pronotum subglobose; anterior transverse and median longitudinal impressions distinct. Proepipleura visible from above. Metasternum posteriad mesocoxa longer than metacoxa.

*Elytra.* Oval, humeri somewhat rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings:* Fully developed.

*Male genitalia:* (Fig. 2) Phallus dextral, slender in frontal view (Fig. 2a), curved in lateral view (Fig. 2b); basal bulb distinct, basal orifice (bo) oval; basal projection (bp) developed, sclerotized, apical margin rounded; basal crest (bc) present; basal apophysis (ba) moderate, sclerotized; ostium (o) opened from half of ventral basal portion to base of apical portion; median ridge (mr) pronounced; apical portion (ap) plate like, moderate, projected rightward, margin rounded, micro canaliculated. Endophallus normal in length; armature on apical area covered with microtrichia; basal sclerite absent. Paramere 1 (P1) about 2 times longer than wide, asetose; lateral apophysis normal, blunt; basal apophysis acute; ventral apophysis developed. Paramere 2 (P2) slender, 7/10 length of paramere 1, apex acute, 3 apical setae.

#### Group *venustulus*

This group includes several monophyletic units that share labial palpomere 3 longer than palpomere 2, abdominal sterna with accessory setae and endophallus small, usually with reduced armature.

#### *Ardistomis minutus* n. sp. (Figs. 4, 5)

TYPE MATERIAL: HOLOTYPE female labeled: "Bolivia. 24-27. IX. 1996, Dpto Santa Cruz, Perseverancia, leg. W. Rossi" [printed]. Holotype deposited in PBPC.

ETYMOLOGY: Specific epithet a Latinized masculine adjective, referring to the small size of this species.

RECOGNITION: This species is close to *Ardistomis venustulus* PUTZEYS (Fig. 6) from which it is recognized

by smaller size and subglobose pronotal disc.

DESCRIPTION: Habitus as in Fig. 4. For measurements see Table I.

*Color.* Body ferruginous; elytra unspotted; antennae, mouthparts and legs testaceous.

*Microsculpture.* Frontoclypeus with most of surface smooth; supraantennal lobes smooth; vertex with mesh pattern isodiametric; gena with transverse microlines; gula with transverse microlines. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with mesh pattern transverse; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Abdominal sterna with transverse microlines. Elytra smooth.

*Chaetotaxy.* Anterior marginal setae on pronotal disc closer to anterior angle than to posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, one on each side; preapical setae equidistant each others.

*Head.* Clypeus with anterior margin slightly arcuate. Vertex with transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions. Eyes prominent, hemispherical. Antennomeres 4–10 about 1.7 X longer than wide.

*Mouthparts.* Labrum with anterior margin slightly projected medially. Mandibles with basal portion about 7/10 length of terebra. Labium with palpomere 3 longer than palpomere 2.

*Thorax.* Pronotum subglobose; anterior transverse impression distinctly impressed and median longitudinal impression distinct. Proepipleura hardly visible from above. Metasternum posteriad mesocoxa subequal in length to metacoxa.

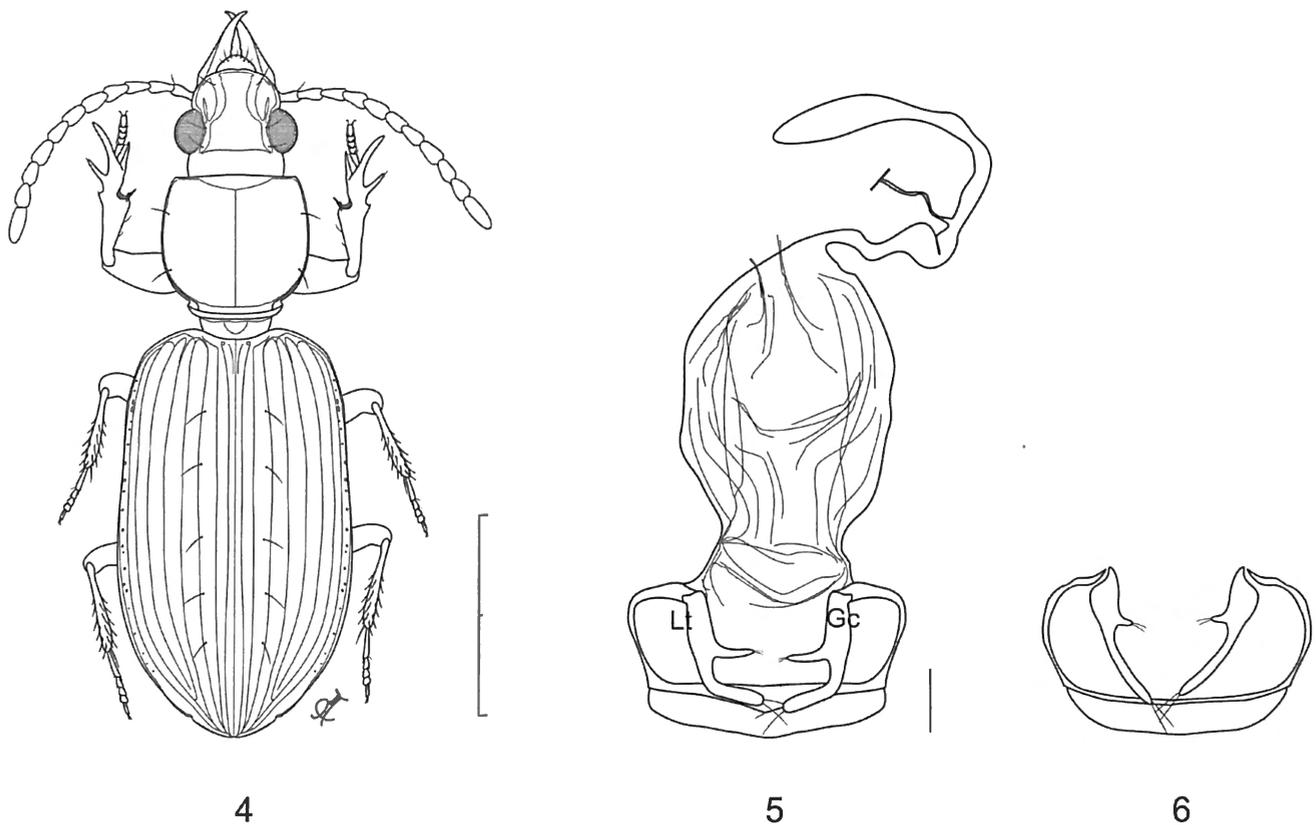
*Elytra.* Oval, humeri distinct; striae distinct throughout their length; intervals convex.

*Metathoracic wings.* Fully developed

*Female genitalia.* Gonocoxa (Gc) (Fig. 5), slender; apical portion 1/2 of total gonocoxite length, folded medially, two apical setae; basal portion ends in a notable perpendicular prolongation with two small seta apically. Laterotergite (Lt) rectangular in outline. Spermathecal duct moderate in length, reservoir distinct; spermathecal gland insert in half portion of spermathecal duct.

#### Group *muelleri*

This is a monophyletic group including species that share the following autapomorphies: abdominal



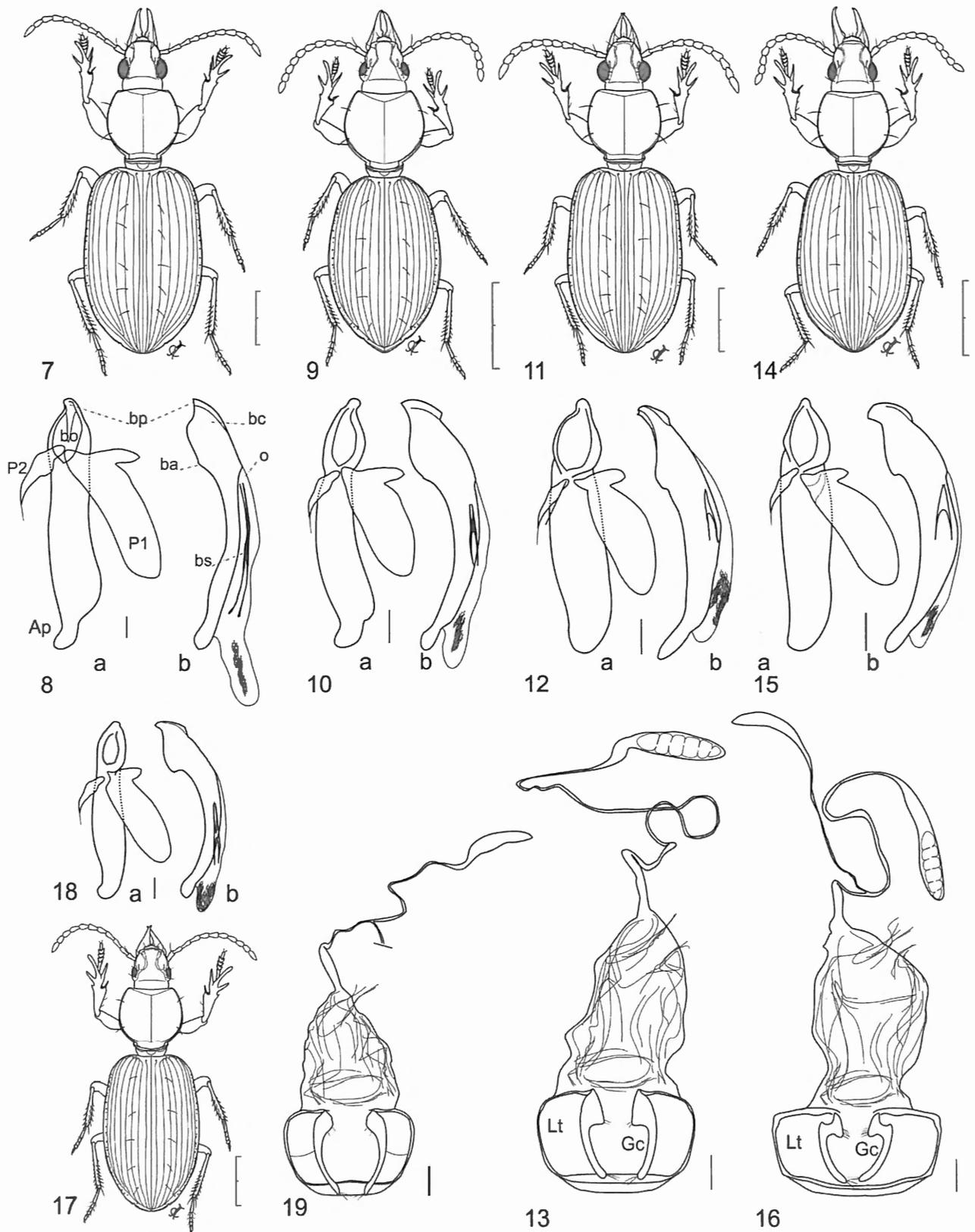
Figs 4-6. — 4. *Ardistomis minutus* n. sp., habitus (dorsal view), scale bar 1 mm. 5—6 Female genitalia (dorsal view), scale bar 0,1 mm. Gc, gonocoxae; Lt, laterotergites. 5. *Ardistomis minutus* n. sp. 6. *Ardistomis venustulus*.

sternum VII with an irregular row of accessory setae near base, and phallus elongate, tubular, with reduced and blunt apical portion, reduced endophallus with few sparse microtrichia and distinctly developed basal sclerite. Other characters like color fuscous to ferruginous, elytra unspotted or labial palpomere 3 longer than palpomere 2 suggest close relationship with members of the *venustulus* clade. KULT (1950) described for *A. muelleri* (Figs 17-19) "proepisterna without submarginal furrow". I examined the Kult types of *muelleri* (2 paratypes teneral), as well 6 additional specimens from UASM collection. All exhibit a band of proepisternal microsculpture, but it is indistinct. The members of the *muelleri* group that inhabit montane wet forest habitats show a tendency to metathoracic wing and eye reduction. Some West Indian montane flightless species probably share a common ancestor with this mainland group.

*Geographical distribution:* see Fig. 20

Key for identification of adults of the *muelleri* group from the Neotropical mainland.

- 1 Eyes normal, elytral humeri slightly rounded, metathoracic wings full ..... 2
- Eyes small, humeri rounded, metathoracic wings vestigial ..... 3
- 2 Total length more than 5 mm, anterior margin of clypeus arcuate. Costa Rica ..... *A. dostali* n. sp.
- Total length less than 4,6 mm. anterior margin of clypeus emarginate. Ecuador ..... *A. bulirschii* n. sp.
- 3 Eyes hemispherical, temples not developed. Ecuador ..... *A. onorei* n. sp.
- Eyes flat, temples developed overall behind eyes ..... 4
- 4 Total length more than 4,5 mm. Pronotal disc ovate. Mexico ..... *A. muelleri* KULT
- Total length less than 3,5 mm. Pronotal disc globose. Honduras ..... *A. samyni* n. sp.



Figs 7-19. – 7, 9, 11, 14, 17. Habitus (dorsal view), scale bar 1 mm. 8, 10, 12, 15, 18. Male genitalia (a) ventral view, (b) right lateral view, scale bar 0,1 mm. 13, 16, 19. Female genitalia (dorsal view), scale bar 0,1 mm. Gc, gonocoxae; Lt, laterotergites 7–8 *Ardistomis dostali* n. sp. Ap, apical portion; ba, basal apophysis; bc, basal crest; bo, basal opening; bp, basal projection; bs, basal sclerite; o, ostium; P, parameres. 9–10. *Ardistomis samyni* n. sp. 11–13. *Ardistomis bulirschi* n. sp. 14–16. *Ardistomis onorei* n. sp. 17–19. *Ardistomis muelleri* KULT.

*Ardistomis dostali* n. sp.

(Figs. 7,8)

TYPE MATERIAL. HOLOTYPE male labelled: "Costa Rica, Cartago, Tapanti N P, Road Rio Orosi, 1200- 1500m 9°42- 44'N, 83°46'W, 13- 15. 5. 2006, leg. Barries, Cate & Nagy" [printed]. PARATYPE (1) labeled: "6/ Costa Rica, Puntarenas, Est. Tres Colinas, 1800-2000m, La Amistad N. P., 21- 23. 4. 2005, 9°07'11»N, 83°04'06»W, leg. Barries, Cate & Nagy» [printed]. Holotype deposited in INBIO Collection: Apdo. Postal 22-3100 Sto. Domingo de Heredia, Costa Rica; Paratypes deposited in ADVA.

ETYMOLOGY: Specific epithet a Latinized noun, masculine genitive case, based on the surname of Dr. Alexander Dostal from Vienna Austria, specialist in Carabidae, to whom this species is dedicated.

RECOGNITION: See the key to species of the *muelleri* group, above.

DESCRIPTION: Habitus as in Fig. 7. For measurements see Table I.

*Color.* Body fuscous; elytra bicolored, posterior third ferruginous, unspotted; antennae, mouthparts and legs ferruginous.

*Microsculpture.* Frontoclypeus with most of surface smooth; supraantennal lobes smooth; vertex with mesh pattern transverse; gena with mesh pattern transverse; gula with transverse microlines. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with faint mesh pattern slightly transverse, microlines very shallow; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Elytra with microlines longitudinally oriented. Abdominal sterna with mesh pattern transverse.

*Chaetotaxy.* Anterior marginal setae on pronotal disc equidistant between anterior angle and posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, 5 on each side in an irregular row; inner pair of preapical setae separated 2 times distance between inner and outer seta.

*Head.* Clypeus with anterior margin arcuate. Vertex with deep transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions. Eyes normal. Antennomere 2 subequal in length to antennomere 3; antennomeres 4-10 about 1.6 X longer than wide.

*Mouthparts.* Labrum with anterior margin projected

medially. Mandibles with basal portion about 3/5 length of terebra. Labium with palpomere 3 longer than palpomere 2.

*Thorax.* Pronotum subovate; anterior transverse and median longitudinal impressions distinct. Proepipleura visible from above. Metasternum posteriad mesocoxa longer than metacoxa.

*Elytra.* Elongate- oval, humeri rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings.* Fully developed.

*Male genitalia.* (Fig. 8) Phallus dextral, notably elongate, somewhat tubular, slender in frontal view (Fig. 8a), slightly curved in lateral view (Fig. 8b); basal bulb indistinctly defined from medial part, basal orifice (bo) fusiform; basal projection (bp) distinct, sclerotized, apical margin blunt; basal crest developed; basal apophysis (ba) moderate; ostium (o) wide, opened from basal beginning of ventral median portion to base of apical portion; median ridge absent; apical portion (ap) short, projected leftward, margin blunt. Endophallus short; armature consist on one small apical area covered with micro setae; basal sclerite (bs) present, very elongate, almost the same length as median portion, length of apical prolongations about 2/5 of total sclerite length. Paramere 1 (P1) about 3,2 times longer than wide, asetose; lateral apophysis acute; basal apophysis blunt; ventral apophysis normal. Paramere 2 (P2) slender, about 1/2 length of paramere 1, apex acute, one apical seta.

*Ardistomis samyni* n. sp.

(Figs. 9, 10)

TYPE MATERIAL: HOLOTYPE male labelled: "Honduras, Olancho, La Muralla N. Pk., 14 km. N. La Union, 1450m, 17. VIII. 1994, S. Peck, 94- 39, wet mont. for litter" [printed]. Holotype deposited in CMN.

ETYMOLOGY: Specific epithet a Latinized noun, masculine genitive case, based on the surname of Dr. Yves Samyn, specialist on holothurian echinoderms, at the Royal Belgian Institute of Natural Sciences to whom this species is dedicated.

RECOGNITION: See the key to the species of the *muelleri* group, above.

DESCRIPTION: Habitus as in Fig. 9. For measurements see Table I.

*Color.* Body fuscous; elytra bicolored, posterior third ferruginous, unspotted; antennae testaceous,

mouthparts and legs ferruginous.

*Microsculpture.* Frontoclypeus with most of surface smooth; supraantennal lobes smooth; vertex with mesh pattern isodiametric; gena with mesh pattern transverse; gula with transverse microlines. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with mesh pattern transverse, microlines shallow; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Elytra with longitudinal microlines. Abdominal sterna with mesh pattern transverse.

*Chaetotaxy.* Anterior marginal setae on pronotal disc equidistant between anterior angle and posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, 5 on each side in an irregular row; inner pair of preapical setae separated 1.5 times distance between inner and outer seta.

*Head.* Clypeus with anterior margin arcuate. Vertex with deep transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions. Eyes small, temple moderate. Antennomere 2 subequal in length to antennomere 3; antennomeres 4–10 about 1.6 X longer than wide.

*Mouthparts.* Labrum with anterior margin projected medially. Mandibles with basal portion about 3/5 length of terebra. Labium with palpomere 3 longer than palpomere 2.

*Thorax.* Pronotum subglobose; anterior transverse and median longitudinal impressions distinct.

Proepipleura visible from above. Metasternum posteriad mesocoxa subequal in length to metacoxa.

*Elytra.* Oval, humeri rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings.* Vestigial.

*Male genitalia.* (Fig. 10) Phallus dextral, elongate, somewhat tubular, slender in frontal view (Fig. 10a), curved in lateral view (Fig. 10b); basal bulb defined from medial part, basal orifice fusiform; basal projection distinct, sclerotized, apical margin blunt; basal crest developed; basal apophysis moderate; ostium wide, opened from 1/10 of ventral median portion to base of apical portion; median ridge absent; apical portion short, projected leftward, margin blunt. Endophallus short; armature consist on one small apical area covered with micro setae; basal sclerite present, elongate, length of apical prolongations about 1/2 of total sclerite length. Paramere 1 about 2.1 times longer than wide, asetose; lateral apophysis acute; basal apophysis blunt; ventral apophysis normal. Paramere 2 slender, about 1/2 length of paramere 1, apex acute, one visible apical seta.

*Ardistomis bulirshi* n. sp.

(Figs. 11-13)

TYPE MATERIAL: HOLOTYPE male labelled: "Ecuador, Pichincha, Alluriquin, Rio Toachi, 9- 11.III.1999. lgt. Šebela, Prouza, Bašta" [printed]. PARATYPE (1), female labeled: "Ecuador, Guayas, Milagro, 14- 17.III.2000, lgt. Šebela, Prouza ." [printed] Holotype deposited in PBPC, Paratype deposited in PVCC

ETYMOLOGY: Specific epithet a Latinized noun, masculine genitive case, based on the surname of Dr. Petr Bulirsch from Prague, Czech Republic, specialist on Carabidae, to whom this species is dedicated.

RECOGNITION: See the key to the species of the *muelleri* group, above.

DESCRIPTION: Habitus as in Fig. 11. For measurements see Table I.

*Color.* Body fuscous; elytra bicolored, posterior third ferruginous, unspotted;; antennae testaceous, mouthparts and legs ferruginous.

*Microsculpture.* Frontoclypeus with surface smooth; supraantennal lobes smooth; vertex with mesh pattern isodiametric; gena with mesh pattern isodiametric; gula with transverse microlines. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with faith mesh pattern transverse; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Abdominal sterna with mesh pattern transverse. Elytra with longitudinal microlines.

*Chaetotaxy.* Anterior marginal setae on pronotal disc closer to anterior angle than to posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, 6 on each side in an irregular row; preapical setae equidistant from each other.

*Head.* Clypeus with anterior margin emarginate. Vertex with deep transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions pronounced. Eyes normal. Antennomere 2 subequal in length to antennomere 3; antennomeres 4–10 about 1.6 X longer than wide.

*Mouthparts.* Labrum with anterior margin projected medially. Mandibles with basal portion about 3/5 length of terebra. Labium with palpomere 3 longer than palpomere 2.

*Thorax.* Pronotum subovate; anterior transverse and median longitudinal impressions distinct.

Proepipleura visible from above. Metasternum posteriad mesocoxa longer than metacoxa.

*Elytra*. Elongate-oval, humeri rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings*. Fully developed.

*Male genitalia*. (Fig. 12) Phallus dextral, elongate, somewhat tubular, slender in frontal view (Fig. 12a), curved in lateral view (Figs. 12b); basal bulb poorly defined from medial part, basal orifice fusiform; basal projection distinct, apical margin blunt; basal crest developed; basal apophysis moderate; ostium wide, opened from begin of ventral basal portion to base of apical portion; median ridge absent; apical portion plate like, projected leftward, margin rounded. Endophallus short; armature consist on one small apical area covered with micro setae; basal sclerite about 2/5 length of median portion, length of apical prolongations about 1/2 of total sclerite length, almost without basal prolongations. Paramere1 about 2,5 times longer than wide, asetose; lateral apophysis acute; basal apophysis blunt; ventral apophysis normal. Paramere 2 slender, about 2/5 length of paramere1, apex acute, one visible apical seta.

*Female genitalia*. (Fig. 13) Gonocoxa (Gc) slender; apical portion elongate and curved with two apical setae; basal portion 2/5 of total gonocoxite length, 2 small seta in inner curvature. Laterotergite (Lt) wide, rectangular in outline. Spermathecal duct long, reservoir distinct; spermathecal gland indistinct.

***Ardistomis onorei* n. sp.**

(Figs. 14-16)

TYPE MATERIAL: HOLOTYPE male labelled: "Ecuador, Napo, via Jondachi- Loreto km 59, ex cave m 700, 13.VIII.2006, G. Onore leg." [printed] PARATYPE (1), female labeled as the holotype. Holotype deposited in PMGT, Paratype deposited in PBPC.

ETYMOLOGY: Specific epithet a Latinized noun, masculine genitive case, based on the surname of Dr. Giovanni Onore, from Quito Ecuador, agronomist, entomologist and Catholic missionary of the Marianistas Congregation, collector of this species, which is dedicated to him

RECOGNITION: See the key for the *muelleri* species group, above.

DESCRIPTION: Habitus as in Fig. 14. For measurements see Table I.

*Color*. Body fuscous; elytra ferruginous, unspotted; antennae testaceous, mouthparts and legs ferruginous.

*Microsculpture*. Frontoclypeus with most of surface smooth; supraantennal lobes smooth; vertex with mesh pattern isodiametric; gena with mesh pattern transverse; gula with mesh pattern transverse. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with mesh pattern transverse; proepisternum with mesh pattern isodiametric, smooth near prosternum, submarginal band of microsculpture present; prosternum with mesh pattern transverse. Metasternum with mesh pattern transverse. Abdominal sterna with mesh pattern transverse. Elytra with longitudinal microlines.

*Chaetotaxy*. Anterior marginal setae on pronotal disc closer to anterior angle than to posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, 5 on each side in an irregular row; preapical setae equidistant from each other.

*Head*. Clypeus with anterior margin arcuate, slightly emarginate. Vertex with deep transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions pronounced. Eyes moderately reduced, temple short. Antennomere 2 subequal in length to antennomere 3; antennomeres 4–10 about 1.6 X longer than wide.

*Mouthparts*. Labrum with anterior margin projected medially. Mandibles with basal portion about 3/5 length of terebra. Labium with palpomere 3 longer than palpomere 2.

*Thorax*. Pronotum subovate; anterior transverse and median longitudinal impressions distinct. Proepipleura visible from above. Metasternum posteriad mesocoxa longer than metacoxa.

*Elytra*. Moderately oval, humeri rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings*. Vestigial.

*Male genitalia*. (Fig. 15) Phallus dextral, elongate, somewhat tubular, slender in frontal view (Fig. 15a), curved in lateral view (Fig. 15b); basal bulb poorly defined from medial part, basal orifice fusiform; basal projection distinct, apical margin blunt; basal crest developed; basal apophysis moderate; ostium wide, opened from 1/10 of ventral median portion to base of apical portion; median ridge absent; apical portion plate like, projected leftward, margin rounded. Endophallus short; armature of one small apical area covered with micro setae; basal sclerite about 4/10 length of median portion, length of apical prolongations about 1/2 of total sclerite length, almost without basal prolongations. Paramere1 about 3 times longer than wide, asetose;

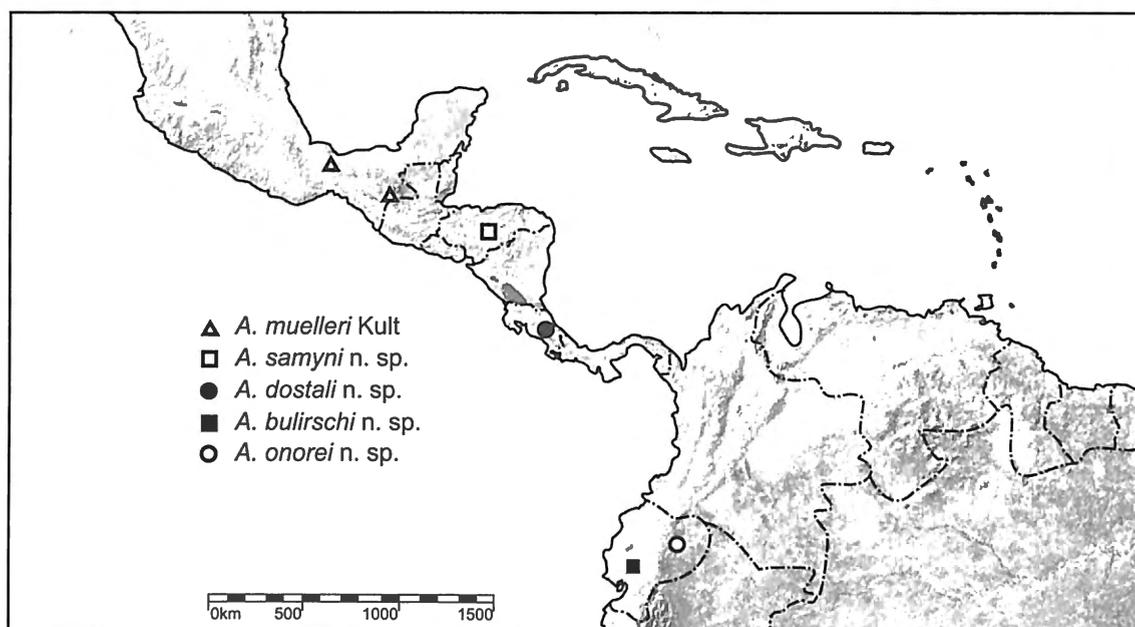


Fig. 20. – Map of Middle America and northern part of South America showing positions of known localities for the species of the *muelleri* group.

lateral apophysis acute; basal apophysis blunt; ventral apophysis normal. Paramere 2 slender, about 4/10 length of paramere 1, apex acute, one apical seta.

**Female genitalia.** (Fig.16) Gonocoxa (Gc), slender; apical portion elongate and curved with two apical setae; basal portion 2/5 of total gonocoxite length, 5 small seta in inner curvature. Laterotergite (Lt) wide, subquadrate in outline. Spermathecal duct long, reservoir distinct; spermathecal gland inserted in basal portion of spermathecal duct.

#### Group *ovatus*

*Ardistomis ovatus* PUTZEYS forms, together with *A. vergelae* n. sp. a monophyletic unit defined by the absence of proepisternal submarginal band of microsculpture, pronotal disc transversely ovate, proepipleura not visible from above and phallus with ostium open from about 1/3 to 2/3 of ventral median portion. *A. rotundipennis* PUTZEYS probably shares a common ancestor with the former species. All three species have eyes and metathoracic wings reduced.

*A. ovatus* and *A. rotundipennis* were included in *Semiardistomis* by KULT (1950) and BOUSQUET (2006). The difference in classification is based on interpretation of one character state: the absence from the *ovatus* group species of the proepisternal submarginal band of microsculpture. When present, this feature is regarded as apomorphic for the genus

*Ardistomis*. Because the *ovatus* group is closely related to members of the *venustus* clade, the two sharing many apomorphic features, I prefer to consider these groups as congeneric. Thus, I consider absence of the proepisternal submarginal band of microsculpture from the *ovatus* group as a loss rather than retention of a plesiomorphic state.

#### *Ardistomis vergelae* n. sp.

(Figs. 21-23)

**TYPE MATERIAL:** HOLOTYPE male labelled “Ecuador: Napo, Antisana Reserve road, 4.2kmSW. Cosanga, 2150m, 00°37'19''S, 77°50'01''W, 5.XI.1999-229e, R.Anderson, montane evergreen forest litter” [printed]. 1st PARATYPE (teneral) labeled “Ecuador: Napo, 2.5km W. Cosanga, 2150m 00°35'24''S, 77°53'19''W, 5.XI.1999- 228a, R.Anderson, montane evergreen forest litter” [printed]. 2nd PARATYPE male and female labeled “Ecuador. Napo, Sierra Azul, 15.0 km. W. Cosanga, 2350 m, 00°40'55''S 77°56'09''W, 5.XI.1999- 227b, R. Anderson, montane evergreen forest litter” [printed]. The holotype and one paratype are deposited in CMN, one paratype is in PBPC, and one paratype is in PVCC.

**ETYMOLOGY:** Specific epithet a Latinized feminine noun, genitive case, based on the surname of my wife, Marydena Vergel, to whom this species is dedicated.

**RECOGNITION:** This species is readily distinguished from its relatives, *A. ovatus* PUTZEYS (Fig. 23) and *A. rotundipennis* PUTZEYS by its piceous color with bluish luster.

**DESCRIPTION:** Habitus as in Fig. 21. For measurements see Table I.

**Color.** Body piceous with a bluish luster; elytra unspotted; antennae testaceous, legs and mouthparts ferruginous.

**Microsculpture.** Frontoclypeus surface with mesh pattern isodiametric; supraantennal lobes mostly smooth; vertex with mesh pattern isodiametric; gena with mesh pattern isodiametric; gula with transverse microlines. Mandibles smooth; submentum and mentum with mesh pattern isodiametric. Pronotal disc with mesh pattern isodiametric, microlines shallowly impressed; proepisternum with mesh pattern isodiametric, submarginal band of microsculpture absent; prosternum with mesh pattern transverse. Metasternum smooth. Elytra smooth. Abdominal sterna with mesh pattern

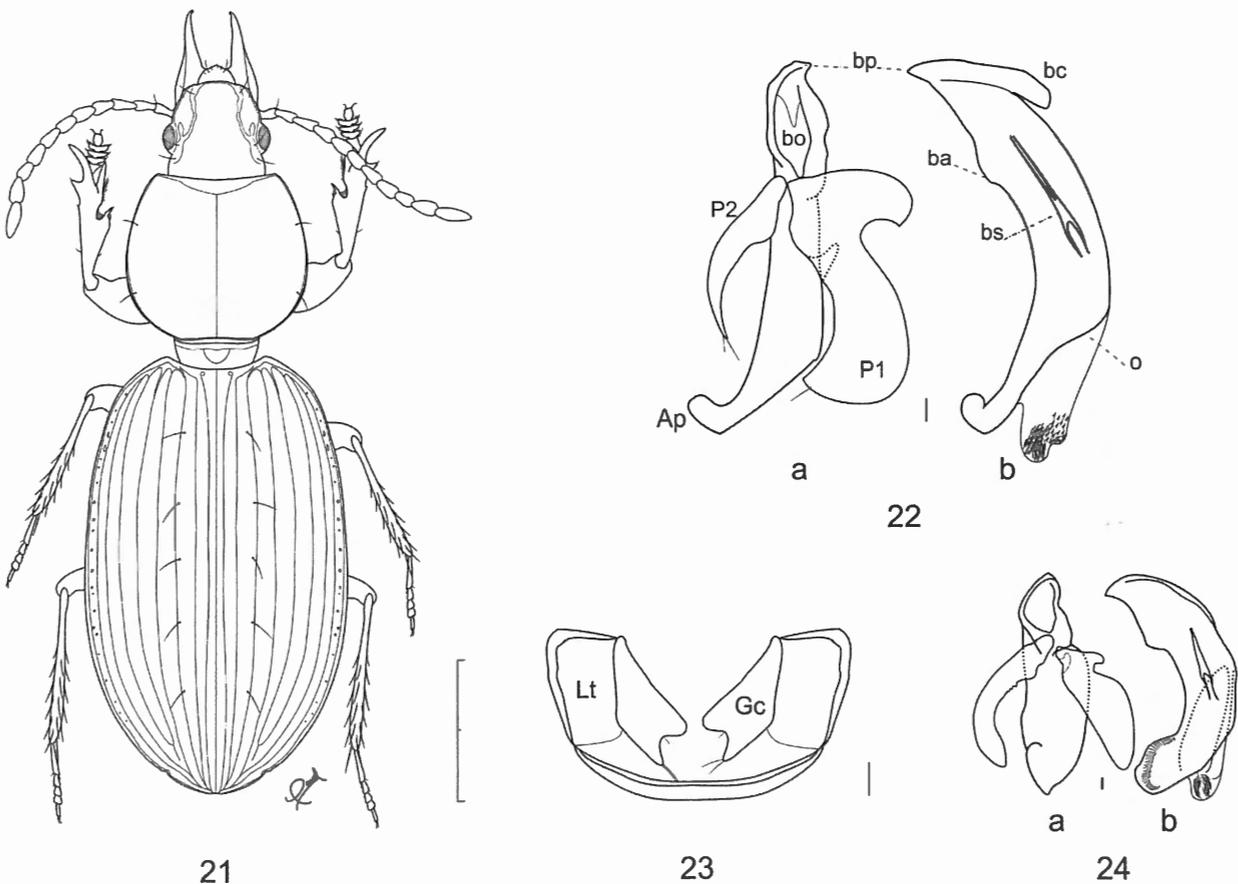
transverse.

**Chaetotaxy.** Anterior marginal setae on pronotal disc equidistant between anterior angle and posterior setae. Elytral disc with 5 setae in interval 3. Abdominal sternum VII with ambulatory setae near base, one on each side; preapical setae equidistant each others.

**Head.** Clypeus with anterior margin straight. Vertex without transverse groove between posterior supraorbital setae. Supraantennal lobes with basal median depressions. Eyes reduced, temple moderate. Antennomere 2 subequal in length to antennomere 3; antennomeres 4–10 about 1.5 X longer than wide.

**Mouthparts.** Labrum with anterior margin projected medially. Mandibles with basal portion about 3/5 length of terebra. Labium with palpomere 3 longer than palpomere 2.

**Thorax.** Pronotum transversely ovate; anterior transverse impression moderate and median longitudinal impression distinct. Proepipleura not visible from above. Metasternum posteriad mesocoxa shorter than metacoxa.



Figs 21-24. – 21–23. *Ardistomis vergelae* n. sp. 21. habitus (dorsal view), scale bar 1 mm. 22. Male genitalia (a) ventral view, (b) right lateral view, scale bar 0,1 mm. Ap, apical portion; ba, basal apophysis; bc, basal crest; bo, basal opening; bp, basal projection; bs, basal sclerite; o, ostium; P, parameres. 23. Female genitalia (dorsal view), scale bar 0,1 mm. Gc, gonocoxae; Lt, laterotergites. 24. *Ardistomis ovatus* PUTZEYS Male genitalia (a) ventral view, (b) right lateral view, scale bar 0,1 mm.

Species	N	HL	PL	PW	EL	EW	SBL	PW/PL	PW/EW	PL/EL
<i>A. drumonti</i> n. sp.	1	0,67	1,15	1,31	2,72	1,92	4,54	1,14	0,68	0,42
<i>A. vergelae</i> n. sp.	4	0,60-0,65	1,15-1,30	1,33-1,50	2,75-3,10	1,75-2,00	4,50-5,05	1,12-1,15	0,75-0,80	0,41-0,42
<i>A. minutus</i> n. sp.	1	0,42	0,73	0,74	2,05	1,17	3,20	1,01	0,63	0,36
<i>A. samyni</i> n. sp.	1	0,47	0,90	0,95	2,10	1,32	3,47	1,06	0,72	0,43
<i>A. dostali</i> n. sp.	2	0,63-0,68	1,15-1,28	1,20-1,25	3,25	1,94-2,19	5,03-5,20	0,98-1,04	0,57-0,62	0,35-0,39
<i>A. onorei</i> n. sp.	2	0,55-0,62	0,95-1,06	0,97-1,05	2,45-2,65	1,55-1,60	3,95-4,33	0,99-1,02	0,63-0,66	0,39-0,40
<i>A. bulirschi</i> n. sp.	1	0,65	1,11	1,16	2,90	1,80	4,66	1,05	0,64	0,38

Table 1. – Variation of measurements (mm) and ratios for the specimens used in descriptions.

*Elytra.* Oval, humeri rounded; striae distinct throughout their length; intervals convex.

*Metathoracic wings.* Vestigial.

*Male genitalia.* (Fig. 22) Phallus dextral, slender in frontal view (Fig. 22a), curved in lateral view (Fig. 22b); basal bulb undefined from medial part, basal orifice (bo) fusiform; basal projection (bp) distinct, notably sclerotized, apical margin sharp; basal crest notably developed; basal apophysis (ba) moderate, markedly sclerotized; ostium (o) small, opened from 2/3 of ventral median portion to base of apical portion; median ridge moderate; apical portion (ap) slender, projected leftward, margin rounded. Endophallus short; armature consist on one small apical area covered with micro setae follow by a small area covered by microtrichia; basal sclerite (bs) present, elongate, length of basal prolongations about 1/2 of total sclerite length. Paramere 1 (P1) with about the same length of phallus median and apical portion together, its median portion slender, its apical portion wide and hook like, one seta apically; lateral apophysis prominent, hook like; basal apophysis blunt; ventral apophysis normal. Paramere 2 (P2) slender, 4/5 length of paramere 1, apex acute, two apical setae.

*Female genitalia.* Gonocoxa (Gc) (Fig. 23) robust, trapezoidal in outline; apical portion short with two setae; basal portion 4/5 of total gonocoxite length, one small seta in inner curvature. Laterotergite (Lt) rectangular in outline.

#### Checklist of the species of the genus *Ardistomis* PUTZEYS

Names are given in alphabetical order. For some names, a question mark indicates they are possible junior

synonyms. Known junior synonyms are in small type.

#### Genus *Ardistomis* PUTZEYS 1846

*Ardistomus* CSIKI 1927

*alticola* DARLINGTON 1935- 173 (Haiti)

*annona* PUTZEYS 1846-639 (French Guiana)

*arechavaletae* PUTZEYS 1866- 204

*curtus* PUTZEYS 1866- 205 (Argentina, Brazil, Uruguay)

*atripennis* PUTZEYS 1866- 202 (Guadalupe)

*batesi* PUTZEYS 1866- 209 (Brazil)

*brevis* PUTZEYS 1866- 204 (Brazil)

*bulirschi* n.sp. (Ecuador)

*convexus* PUTZEYS 1866- 202 (Mexico)

*dostali* n.sp. (Costa Rica)

*drumonti* n.sp. (French Guiana)

*dyschirioides* PUTZEYS 1846- 644 (Colombia, Nicaragua, Panama)

*eductus* BATES 1881- 34 (Guatemala, Mexico)

*elongatulus* PUTZEYS 1866- 208 (Cuba)

*fasciolatus* PUTZEYS 1846- 638 (Argentina, Bolivia, Brazil, Chile, Paraguay)

*franki* NICHOLS 1988a-79 (manuscript name) (Jamaica)

*guadeloupensis* KULT 1950- 307 (Guadeloupe)

*haemorrhoeus* PUTZEYS 1866- 207 (Brazil)

*hispaniolensis* NICHOLS 1988a- 83 (manuscript name) (Dominican Republic, Haiti, Jamaica)

*leprieuri* (CHAUDOIR) 1843- 740 (Bolivia, French Guiana, Venezuela)

*lindrothi* KULT 1950- 306 (Brazil)

*mannerheimi* PUTZEYS 1846- 645 (Puerto Rico, Virgin Islands)

*marquardtii* KULT 1950- 305

*minutus* n.sp. (Bolivia)

*muelleri* KULT 1950- 308 (Mexico)  
*nigroclarus* DARLINGTON 1939- 83 (Dominican Republic)  
*nitidipennis* DARLINGTON 1934- 70 (Cuba)  
*obliquatus* PUTZEYS 1846- 638 (USA)  
*ogloblini* KULT 1950- 303 (Brazil)  
*onorei* n. sp. (Ecuador)  
*ovatus* PUTZEYS 1846- 644 (Colombia)  
*oxygnathus* CHAUDOIR 1843- 738 (Brazil, French Guiana)  
*posticalis* PUTZEYS 1866- 203 ( Brazil, Ecuador)  
*profundestriatus* PUTZEYS 1866- 201 (Brazil)  
*quadripunctatus* KULT 1950- 304 (Brazil)  
*quixotei* VALDÉS 2007- 26 (Cuba, Mexico)  
*ramsdeni* DARLINGTON 1937- 120 (Cuba)  
*rotundipennis* PUTZEYS 1866- 206 (St. Vincent and Grenadines)  
*rufoclarus* DARLINGTON 1939- 82 (Dominican Republic)  
*samyni* n.sp. (Honduras)  
*schaumi* LECONTE 1857- 80 (Mexico, USA)  
*seriepunctatus* BRULLÉ 1838- 41  
*brasiliensis* PUTZEYS 1846- 643  
*constrictus* PUTZEYS 1846- 643  
*dubius* PUTZEYS 1846- 643  
ssp. *soror* PUTZEYS 1846- 642 (Argentina, Brasil, Colombia, Panama)  
*tropicalis* PUTZEYS 1846- 642 (?) (French Guiana)  
*unicolor* PUTZEYS 1846- 640 (?) (French Guiana)  
*venustulus* PUTZEYS 1866- 207 (Brazil, French Guiana, Venezuela)  
*vergelae* n. sp. (Ecuador)

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