

CHOLEVINAE (COLEOPTERA, LEIODIDAE) FROM ECUADOR: NEW DATA AND TWO NEW SPECIES

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ABSTRACT

Two new taxa are described: *Dissochaetus napoensis* n. sp. and *Adelopsis tandapi* n. sp. Also, *Adelopsis coronaria* Gnaspini and Peck, 1996 and *Ptomaphagus (Adelops) bordoni* (Jeannel, 1964) are recorded from Ecuador for the first time and some of their morphological characters discussed. Finally, new data are given and the geographical distribution of another five species is extended.

Key words: Coleoptera, Leiodidae, Cholevinae, *Dissochaetus napoensis*, *Adelopsis tandapi*, new species, Ecuador.

RESUMEN

Cholevinae (Coleoptera, Leiodidae) ecuatorianos: nuevos datos y dos nuevas especies

Dos nuevos taxones son descritos: *Dissochaetus napoensis* n. sp. y *Adelopsis tandapi* n. sp. Se citan por vez primera para Ecuador *Adelopsis coronaria* Gnaspini y Peck, 1996 y *Ptomaphagus (Adelops) bordoni* (Jeannel, 1964) y de ellas se destacan algunas de sus características morfológicas. Por último, se aportan nuevos datos y se amplía la distribución geográfica de otras cinco especies.

Palabras clave: Coleoptera, Leiodidae, Cholevinae, *Dissochaetus napoensis*, *Adelopsis tandapi*, nuevas especies, Ecuador.

Introduction

There is still very little information on Leiodidae in Ecuador. Jeannel (1936) made the first contribution when he recorded *Dissochaetus ovalis* Kirsch, 1873 in Santa Inés (Ecuador). New data on *Dissochaetus carbonarius*, which he described as a *Nemadiopsis*, were later contributed by Szymczakowski (1961). Over twenty years later Peck (1984-1985) reported the presence of *Adelopsis* sp., and Zoia (1992) described *Adelopsis sciakvi*, transferred by Gnaspini (1996) to *Ptomaphagus*; all these data

were put together by Peck *et al.*, 1998. The most recent papers, all from this century, have been written by Salgado (2001), describing *Dissochaetus anseriformis* and recording *D. monilis* (Murray, 1856) and *D. curtus* Portevin, 1903 for the first time in Ecuador; Salgado (2002) in which 5 new species of *Adelopsis* are described; Salgado (2003) indicating the first record of the genus *Eucatops* in Ecuador and describing two new species; and finally, Salgado (2004, 2005—in press) containing the description of 7 new species of *Eucatops* and indicating the presence of another species of this genus in Ecuador.

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This paper contributes to the knowledge of various species of Leiodidae with new information on four genera, including: *Adelopsis*, with the description of a new species, the first record of and new data on the distribution of another two; *Eucatops* with new data on another four species; *Dissochaetus* with the description of a new species and *Ptomaphagus* with the first record of a species from Ecuador.

Material studied

The material used for this paper belongs to Dr. S. B. Peck's collection at the University of Carleton, Ottawa, Ontario (Canada), which will be deposited in the collection of the Canadian Museum of Nature (CMN), Aylmer, Quebec (Canada); and that of the Museo de la Pontificia Universidad de Quito, Ecuador (QCAZ-Museum).

Results and discussion

Tribe **Anemadini** Hatch, 1928

Dissochaetus napoensis n. sp.

TYPICAL SERIE: Holotype ♂: Ecuador, Napo province, 15 km NW Baeza, 2200 m, 2-6/III/1976, carrion-baited pitfall trap, S. Peck leg. Colection Canadian Museum of Nature (CMN), Aylmer, Quebec (Canada); Paratypes: 1♂ y 1♀. Ecuador, Napo province, 15 km NW Baeza, 2200 m, 2-6/III/1976, carrion-baited pitfall traps, S. Peck leg. CMN, Aylmer, Quebec (Canadá), 1♀, and Salgado Collection, Animal Biology Department, León University, 1♂.

DIAGNOSIS: 7th segment of antennae strongly robust and 8th asymmetrical. Aedeagus with robust parameres, longer than median lobe, curved inwards in slightly narrow apical region. Apical region of internal sac with two well-sclerotized symmetrical pieces; basal region with a small kidney-shaped piece at the bottom. Spermathecal lobes large and strongly sclerotized, long membranous joining duct.

DESCRIPTION OF THE HOLOTYPE. Length: 3.60 mm (length of paratypes: 3.70-3.80 mm). Generally elongate oval-shaped body (Fig. 1). Color uniform dark brown. Pubescence very fine, yellowish short and laid back, thicker on head than on pronotum and elytra. Numerous strong punctures on the head, with slightly uneven points, the separation between them being less than their diameter. Eyes highly developed, as are the metathoracic wings.

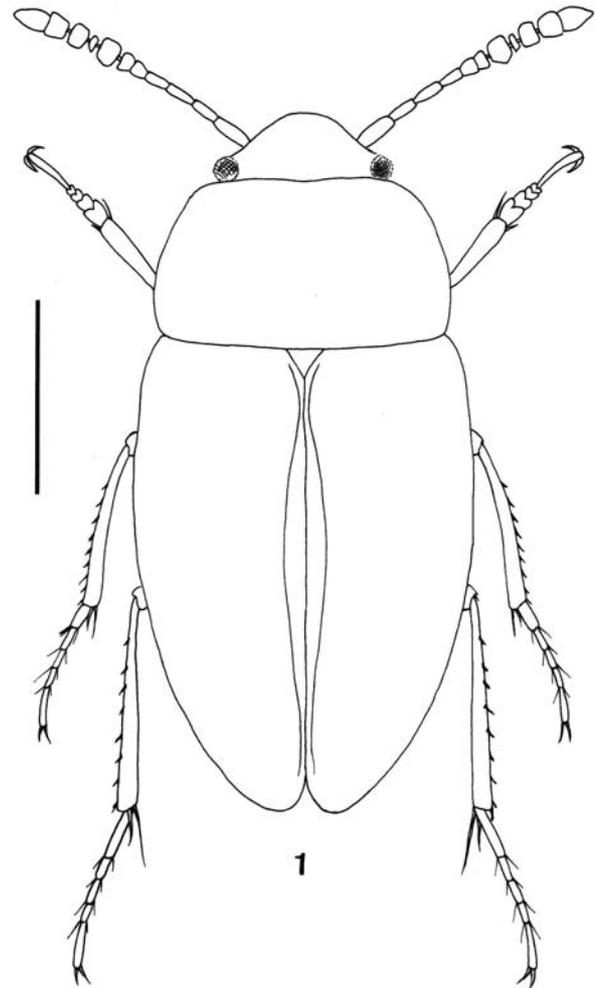
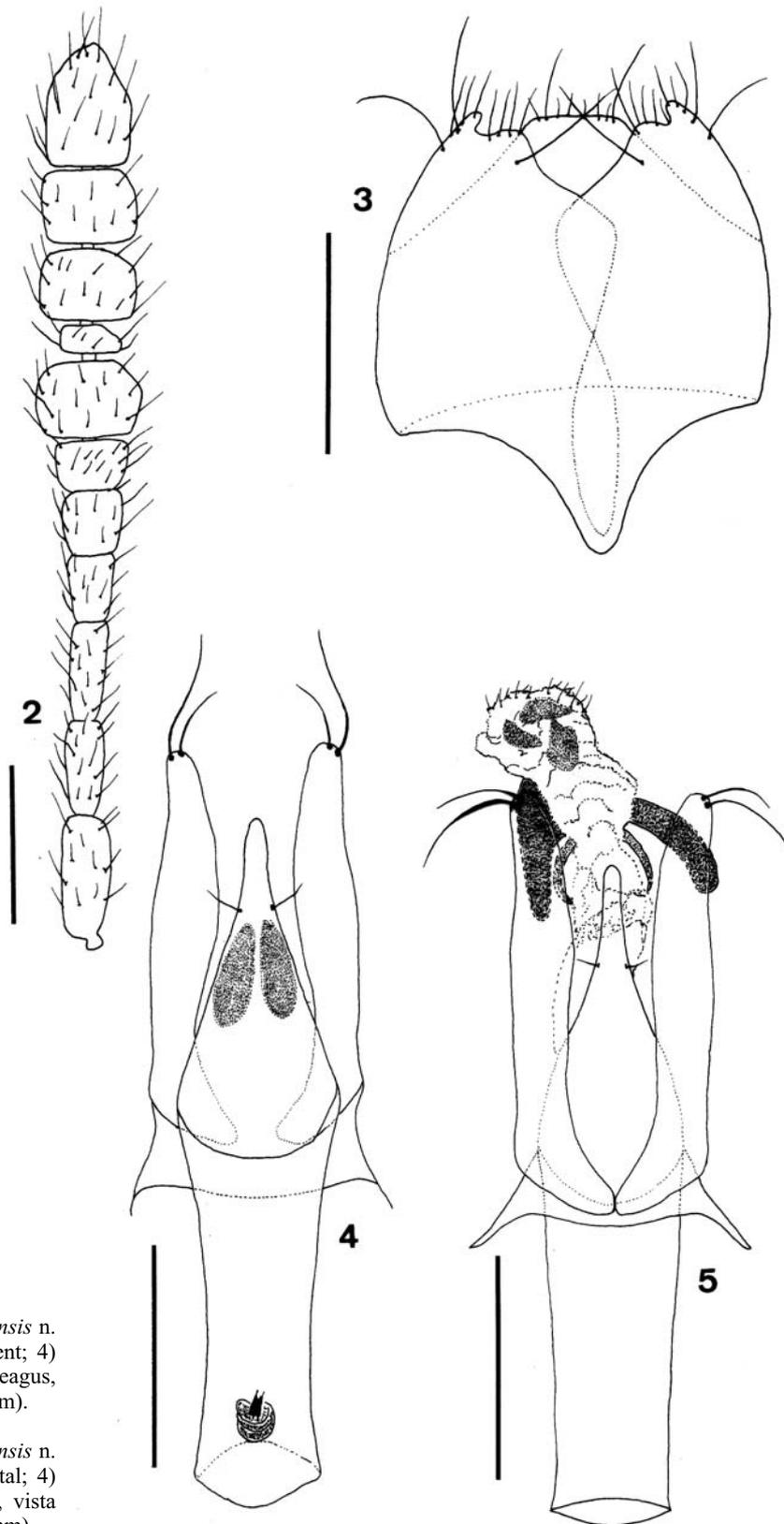


Fig. 1.— Habitus of *Dissochaetus napoensis* n. sp. (scale bar = 1 mm).

Fig. 1.— Habitus de *Dissochaetus napoensis* n. sp. (barra de escala = 1 mm).

Antennae long, twice the length of the pronotum (Fig. 2), the 7th, 9th and 10th segments of which are slightly asymmetrical, the 8th being clearly asymmetrical; 2nd and 3rd segments equal, 6th segment shorter than 5th; finally, 6th to 10th segments transverse, the 7th being the most robust. Antennal club highly developed. Using the length of the 9th segment as a basis, relative length of each segment from 1st to 11th: 1.67, 1.37, 1.37, 0.93, 0.86, 0.70, 1.10, 0.40, 1.00, 1.04, 1.76; ratios of length to width of each segment, respectively: 2.50, 2.20, 2.15, 1.44, 1.04, 0.70, 0.75, 0.50, 0.76, 0.80, 1.50.



Figs. 2-5.— *Dissochaetus napoensis* n. sp. 2) antenna; 3) genital segment; 4) aedeagus, dorsal view; 5) aedeagus, ventral view. (scale bar = 0.25 mm).

Figs. 2-5.— *Dissochaetus napoensis* n. sp. 2) antena; 3) segmento genital; 4) edeago, vista dorsal; 5) edeago, vista ventral. (barra de escala = 0.25 mm).

Pronotum narrower than elytra, 1.80 times wider than long; sides uniformly arched, maximum width at basal two thirds; posterior angles weakly acute and weakly protruding; punctures strongly granulose. Elytra weakly convex, with uniformly rounded sides, and 1.40 times longer than wide; transverse striolae well marked and spaced out, formed by easily discernible, very close together granules. Sutural stria complete. Low but clearly distinguished mesosternal carina. Anterior tarsi dilated, with first segment as wide as maximum width of tibiae. First segment of intermediate tarsi weakly dilated. Internal spur of posterior tibiae longer than first metatarsomere. Genital segment complete and almost as long as wide, with posterior apophysis well-developed and the tip weakly pointed (Fig. 3).

Aedeagus with basal region of median lobe expanded and rounded, then progressively narrowing into an arch in apical region to form a long pointed tip with a rounded apex, and with two marginal setae inserted in apical third (Fig. 4). Parameres long and robust, expanded above median region and clearly surpassing the tip of the median lobe; both with apical region slightly curved inwards, with two setae of unequal length and insertion pores very close together. Internal sac lacking discernible flagellum, but bearing two robust sclerotized pieces in apical position which are symmetrical when the sac is invaginated; also, a weakly sclerotized kidney-shaped structure at the bottom of the sac. When the sac is evaginated, the base of each sclerotized piece exhibits a narrow horn-shaped prolongation and the apical region is covered in small spines (Fig. 5). Basal lamina as long as median lobe and narrower than basal region of lobe. Ventral lamina of tegmen weakly discernible, very short and somewhat wider than basal region of median lobe.

DESCRIPTION OF THE FEMALE. The shape of the body and antennal segments very similar to those of the male, though the 2nd segment is slightly shorter than the 3rd. The clearest difference is observed in the protarsi which are narrower and not dilated.

8th abdominal sternite bearing conspicuous distinguished spiculum ventrale, which reaches the median region of the sternite (Fig. 6). Spermathecal complex with both lobes of the spermatheca strongly sclerotized and a long, fragile, very fine spermathecal duct. In the spermatheca the apical lobe is almost spherical and much smaller than the basal lobe which is more oval-shaped; the joining duct between both lobes is almost membranous,

Table 1.— Characters differentiating *Dissochaetus maculatus* (Dma); *D. monilis* (Dmo); *D. ovalis* (Dov); *D. sokolowskii* (Dso); *D. villosus* (Dvi); *D. napoensis* (Dna).

Tabla 1.— Caracteres de diferenciación entre *Dissochaetus maculatus* (Dma); *D. monilis* (Dmo); *D. ovalis* (Dov); *D. sokolowskii* (Dso); *D. villosus* (Dvi); *D. napoensis* (Dna).

	Dma	Dmo	Dov	Dso	Dvi	Dna
1	yes	yes	no	no	no	yes
2	yes	no	yes	no	yes	no
3	no	yes	no	yes	no	yes
4	no	no	no	yes	yes	yes
5	yes	no	yes	yes	no	yes
6	yes	no	yes	no	no	yes
7	yes	no	no	*	yes	no
8	no	no	yes	no	yes	yes
9	yes	no	no	*	yes	no
10	no	yes	no	no	yes	yes
11	no	yes	no	no	no	yes
12	*	*	*	*	no	yes

narrow and as long as the diameter of the apical lobe when seen in longitudinal position (Fig. 7).

COMMENTS: According to the morphological characters defined by Jeannel (1936), *Dissochaetus napoensis* n. sp. should be included in the *ovalis* group and based on both the morphological characters and the shape of the aedeagus as well as structures enclosing the internal sac, the closest species are undoubtedly: *Dissochaetus maculatus* Portevin, 1903, *D. monilis* (Murray, 1856), *D. ovalis* (Kirsch, 1873), *D. sokolowskii* Szymczakowski, 1961 and *D. villosus* Szymczakowski, 1961. Table 1 contains the characters differentiating this new taxon from those previously mentioned.

Characters:

- 1.- Body at least 3.50 mm length.
- 2.- 2nd antennal segment shorter than third.
- 3.- 7th segment has these two characteristics: it is weakly or strongly asymmetrical and is the widest of the antennal segments.
- 4.- Protarsi as wide as or wider than maximum width of anterior tibiae.
- 5.- Median lobe of aedeagus as long or almost as long as basal lamina (prolongation of the lamina excluded).

- 6.- Median lobe of aedeagus with one marginal seta.
- 7.- Basal lamina of aedeagus with long posterior prolongation.
- 8.- Parameres of aedeagus clearly surpassing tip of median lobe.
- 9.- Internal sac of aedeagus with fine long flagellum.
- 10.- Internal sac bearing symmetrical sclerotized pieces.
- 11.- Each sclerotized piece with posterior prolongation.
- 12.- Joining duct of spermatheca longer than diameter of apical lobe.

NOTE: The characters of the species not mentioned in the original description or in later works by Szymczakowski (1961, 1968), Gnaspini (1991) and Salgado (2001) are indicated by an asterisk (*) in the table.

A comparative analysis of the species (Table 1) shows that *Dissochaetus monilis* and *D. ovalis* have most characters in common with *D. napoensis* n. sp. However, the differences amongst them are very evident when observing the sclerotized structures that enclose the internal sacs of the aedeagus and the length and shape of the parameres in comparison with the median lobe.

ETYMOLOGY: The specific name comes from the province of Napo in Ecuador, where the specimens of this new taxon were collected.

Key to species of the genus *Dissochaetus* from Ecuador

- 1. Posterior metatibial spur shorter or as long as the first metatarsomere. Basal lamina of aedeagus with a long, narrow pointed posterior prolongation 2
- 1'. Posterior metatibial spur clearly longer than the first metatarsomere. Basal lamina of aedeagus without posterior prolongation or with short arcuate one 4
- 2. Male protarsi narrower than maximum width of anterior tibiae. Apical region of median lobe of aedeagus narrow and sharp. Basal zone of the internal sac of aedeagus without symmetrical sclerotized pieces. Apical lobe of spermatheca clearly narrower than basal lobe and weakly developed *D. curtus* Portevin, 1903
- 2'. Male protarsi wider than maximum width of anterior tibiae. Apical region of median lobe of aedeagus wide and rounded. Basal zone of the internal sac of aedeagus with symmetrical sclerotized pieces. Apical lobe of spermatheca nearly as wide as basal lobe and well-developed 3

- 3. Points on head shallow. Antennal segments 5th, 6th and 7th a little longer than wide. Apical region of median lobe of aedeagus slightly enlarged. Basal zone of internal sac of aedeagus with weakly developed pieces *D. anseriformis* Salgado, 2001
- 3'. Points on head deeper. Antennal segments 5th, 6th and 7th transverse. Apical region of median lobe of aedeagus very enlarged. Basal zone of internal sac of aedeagus with more developed pieces *D. carbonarius* (Szymczakowski, 1961)
- 4. Body length smaller than 3.50 mm. Second antennal segment shorter than third. Internal sac of aedeagus without sclerotized pieces *D. ovalis* (Kirsch, 1813)
- 4'. Body length over 3,50 mm. Second antennal segment at least as long as third. Internal sac of aedeagus with sclerotized pieces 5
- 5. Male protarsi as wide as maximum width of anterior tibiae zone. Median lobe of aedeagus as long as basal lamina and with one marginal seta. Parameres of aedeagus clearly surpassing tip of median lobe *D. napoensis* n. sp.
- 5'. Male protarsi narrower than maximum width of anterior tibiae zone. Median lobe of aedeagus shorter than basal lamina and without marginal seta. Parameres of aedeagus as long as median lobe *D. monilis* (Murray, 1856)

Tribe **Eucatopini** Jeannel, 1921

***Eucatops (Eucatops) incognitus* Salgado, 2003**

MATERIAL STUDIED: 1 ♀, Pichincha province, 45 km NNW Quito, Macquipucuna Station, 1650 m, 3-18/IV/1996, flight interception trap, P. Hibbs leg. QCAZ-Museum.

DISTRIBUTION. This species was first recorded in the provinces of Cotopaxi and Imbabura (Salgado, 2003); the present record for Pichincha confirms that the dispersion area of this species is connected to the western foothills of the Andes in Ecuador.

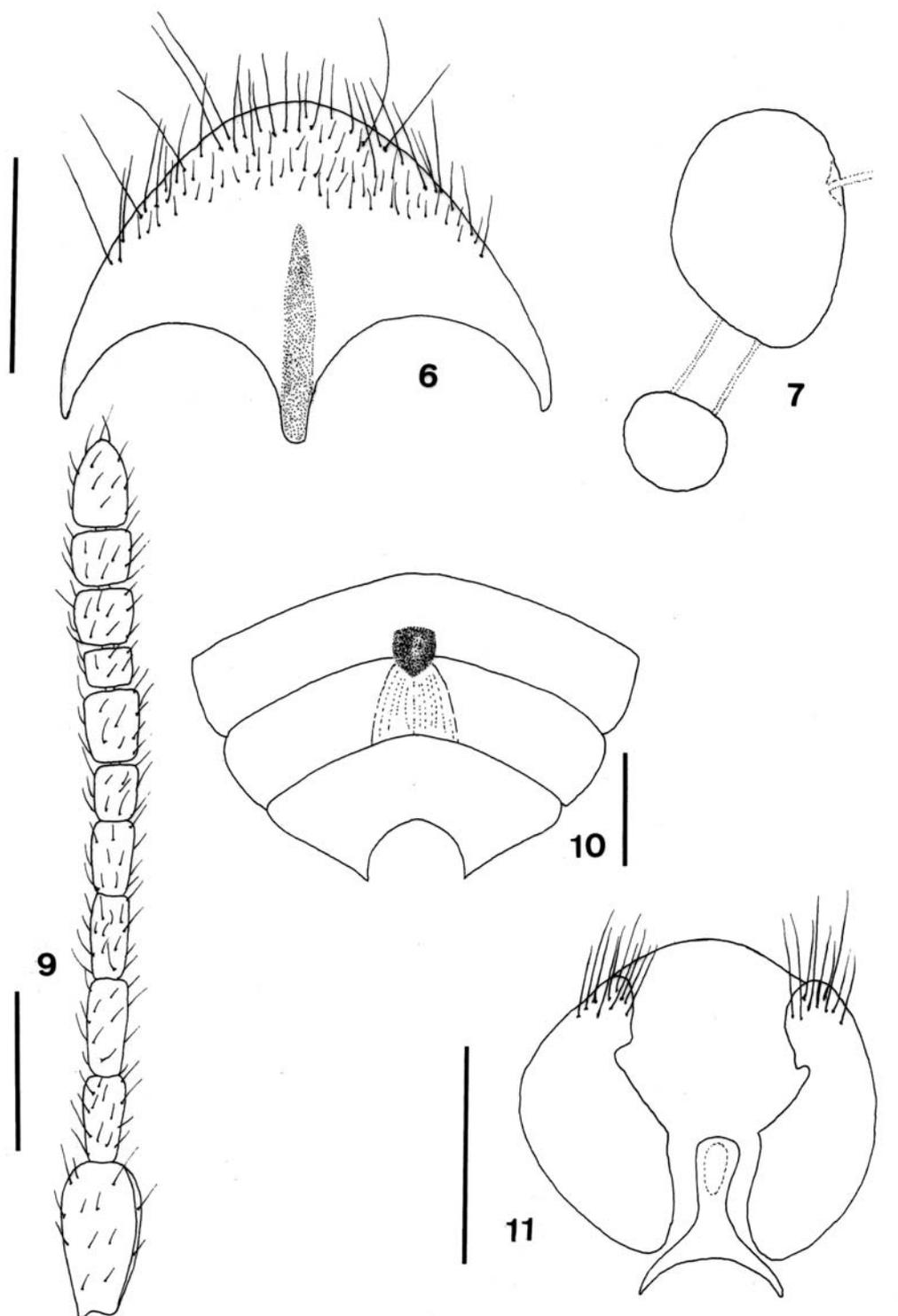
***Eucatops (Eucatops) obtusus* Gnaspini, 1994**

MATERIAL STUDIED: 1 ♂, Napo province, Orellana, Apaika Sur, 40° 62' 20" S – 98° 88' 858" W, 13/XI/2001, F. Salazar leg. QCAZ-Museum.

DISTRIBUTION. This species was described from specimens captured by Gnaspini (1994) in the Amazon river basin, in Manaos (Brazil); the new record at Orellana and different data for the Napo river basin (Salgado, 2004) indicate that the dispersion area of this species is related to the upper basin of the Amazon.

***Eucatops (Sphaerocatops) granuliformis* Salgado, 2003**

MATERIAL STUDIED: 3 ♂-1 ♀, Napo province, Orellana, Apaika Sur, 40° 62' 20" S – 98° 88' 858" W, 13-14/XI/2001, F. Salazar



Figs. 6-7; 9-11.— *Dissochaetus napoensis* n. sp. 6) 8th abdominal sternite female; 7) spermatheca. *Adelopsis tendapi* n. sp. 9) antenna; 10) abdominal sternites 4th, 5th and 6th. 11) genital segment. (scale bar = 0.25 mm).

Figs. 6-7; 9-11.— *Dissochaetus napoensis* n. sp. 6) 8^o esternito abdominal femenino; 7) espermateca. *Adelopsis tendapi* n. sp. 9) antena; 10) esternitos abdominales 4^o, 5^o y 6^o. 11) segmento genital. (barra de escala = 0.25 mm).

leg.; 1 ♀, Napo province, Natural Park of Yasuni, 250 m, 70° 40' 25" S- 76° 23' 56" W, 25/XI/2001, M. Moreno leg. QCAZ-Museum and Salgado Collection, Animal Biology Department, León University.

DISTRIBUTION. These two new data and those contributed by Salgado (2003, 2004) are from the plains of the Amazon river basin in Ecuador.

Eucatops (Napocatops) giganteus Salgado (*in press*)

MATERIAL STUDIED: 2♂-2♀, Napo province, Hollín river, 1068 m, 77° 43' 842 S – 00° 41' 702 W, 9/XII/2001, Malaise trap, I.G. Tapia leg. QCAZ-Museum.

DISTRIBUTION. All the records for this species are related to the Amazon river basin close to the western foothills of the Andes in Ecuador.

Tribu **Ptomaphagini** Jeannel, 1911

Adelopsis tandapi n. sp.

TYPICAL SERIE: Holotipo 1♂: Ecuador, Pichincha province, 21,7 km E Tandapi (= Cornejo Astorga), 2500 m, 24-29/VI/1975, moss forest with dung-baited pitfall trap, S. Peck leg. Collection of Canadian Museum of Nature (CMN), Aylmer, Quebec (Canadá).

DIAGNOSIS: 2nd antennal segment very long and thick, with a slight dorsal carina dorsally. Sternites of 4th abdominal segment exhibiting protuberance on posterior median margin and those of 5th with a slight median fovea. Right lobe of aedeagus lamina-shaped and bearing a sigmoid sclerotized structure with three setae inserted; the left lobe is a small tubercle with three setae.

DESCRIPTION OF THE HOLOTYPE. Length, 4.15 mm. Body oval-shaped, weakly convex (Fig. 8). Color light brown. Short, golden laid back pubescence. Head bearing very diffused striae. Eyes fully developed. Winged.

Antennae quite long, reaching one third of body length, with first eight segments dark in colour and last three slightly pale (Fig. 9); first segment very long and thick, almost twice the length of 2nd, with carina easily discernible dorsally; 2nd shorter than 3rd, 4th to 6th progressively decreasing in length; 9th and 10th the same and 11th one and a half times the length of 10th. Using the length of the 9th segment as a basis, relative length of each segment from 1st to 11th: 2.75, 1.70, 1.95, 1.50, 1.32, 1.03, 1.30, 0.75, 1.00, 1.00, 1.56; ratios of length to width of each segment, respectively: 2.00, 2.18, 2.60, 2.00, 1.75, 1.25, 1.27, 0.85, 1.00, 1.00, 1.50.

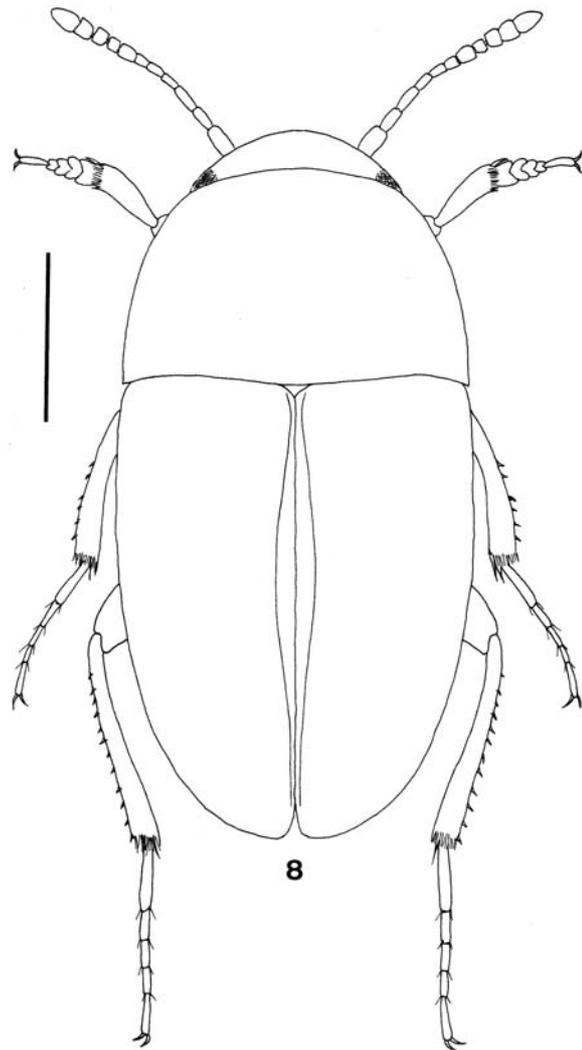


Fig. 8.— Habitus of *Adelopsis tandapi* n. sp. (scale bar = 1 mm).

Fig. 8.— Habitus de *Adelopsis tandapi* n. sp. (barra de escala = 1 mm).

Pronotum 1.60 times wider than long, convex, with maximum width at base which is slightly narrower than elytra; sides weakly arcuate, slightly sinuate in lateral view; posterior angles projecting backwards, basal edge slightly undulate; shiny surface covered in well-defined and very close together transverse striolae. Mesosternal carina quite elevated, in widely rounded arc ventrally. Elytra together 1.50 times longer than wide, weakly convex and weakly narrow towards the back, with rounded api-

cal edge; transverse striolae stronger and more separated than those on pronotum. Anterior tarsi dilated, almost as wide as maximum width of tibiae. Sutural striae discernible and complete.

Abdominal segments with the following characters on posterior margin of sternites (Fig. 10): 4th with rounded protuberance in median region; 5th with small median fovea, shallow and triangular-shaped with slightly arched sides; and 6th arcuate with marginal tips pointed. Genital segment as long as wide, ventral spine with short curved branches, and anterior region slightly dilated with ovoid mid apical orifice (Fig. 11).

Aedeagus long, thick, 3.5 times longer than wide, with basal orifice in ventral position (length: 0.56 mm). In dorsal view (Fig. 12), right lobe fully developed, in pointed oval-shaped lamina, delimiting a triangular-shaped apical orifice; left lobe very weakly developed, forming a small protuberance with three setae inserted. Also, sigmoid reinforcing structure on the lamina of the right lobe, resembling the Greek letter "lambda": In right lateral view (Fig. 13), in anterior region, a short pointed tip, a lobe and the sigmoid structure with three setae inserted, also, the right paramere is shorter than the right lobe and three setae inserted equidistantly. In left lateral view (Fig. 14), in anterior region, slightly oval-shaped apical orifice, sclerotized sigmoid structure, small peak-shaped protuberance pointing towards ventral face, three apical setae of left lobe with insertion pores close together, and left paramere slightly shorter than left lobe, with weakly dilated tip and three clearly separated setae of similar length. Internal sac with stylet or short flagellum, quite robust and undulate apically, the base of which rests on a sclerotized structure in irregular-shaped plate.

Female unknown.

COMMENTS: *Adelopsis tandapi* n. sp. is related to *A. bioforestae* Salgado, 2002 and *A. brasiliensis* Jeannel, 1936, as they have a series of characters in common, including the body length of 3.50 mm, oval elongate shape, protarsi almost as wide as maximum width of tibiae, aedeagus long with apical region of right lobe somewhat laminar and left lobe weakly developed or atrophied, with 3 setae in the apical region of the parameres and the genital segment with a similar ventral spine.

In the list of groups indicated by Gnaspini & Peck (2001) the new species does not have any of these characters; however, *A. tandapi* has a number of well-defined characters which when analysed as a whole clearly distinguish it from any other

Adelopsis. Firstly, it has the unique character of a tubercle in the posterior median region of the 4th abdominal sternite and a small fovea in the 5th, also, the aedeagus although globose, is very long and has different structures in the apical region, especially the sigmoid structure, as well as the different number and insertion of the setae. Finally, although some species of neotropical *Adelopsis* measure over 3.50 mm, *A. tandapi* is the only species known that surpasses 4.00 mm.

ETYMOLOGY: The specific name is in apposition and refers to the type locality.

Adelopsis bioforestae Salgado, 2003

MATERIAL STUDIED: 1♂, Pichincha province, 28 km E Alluriquín, Chiriboga road, 1800 m, 19-27/VI/1975, moss forest with dung-baited pitfall trap, S. & J. Peck leg. Salgado Collection, Animal Biology Department, León University.

DISTRIBUTION. All the data known on this species are from Cotopaxi province (Salgado, 2003). The most recent information extends its dispersion area northwards.

Adelopsis coronaria Gnaspini & Peck, 1996

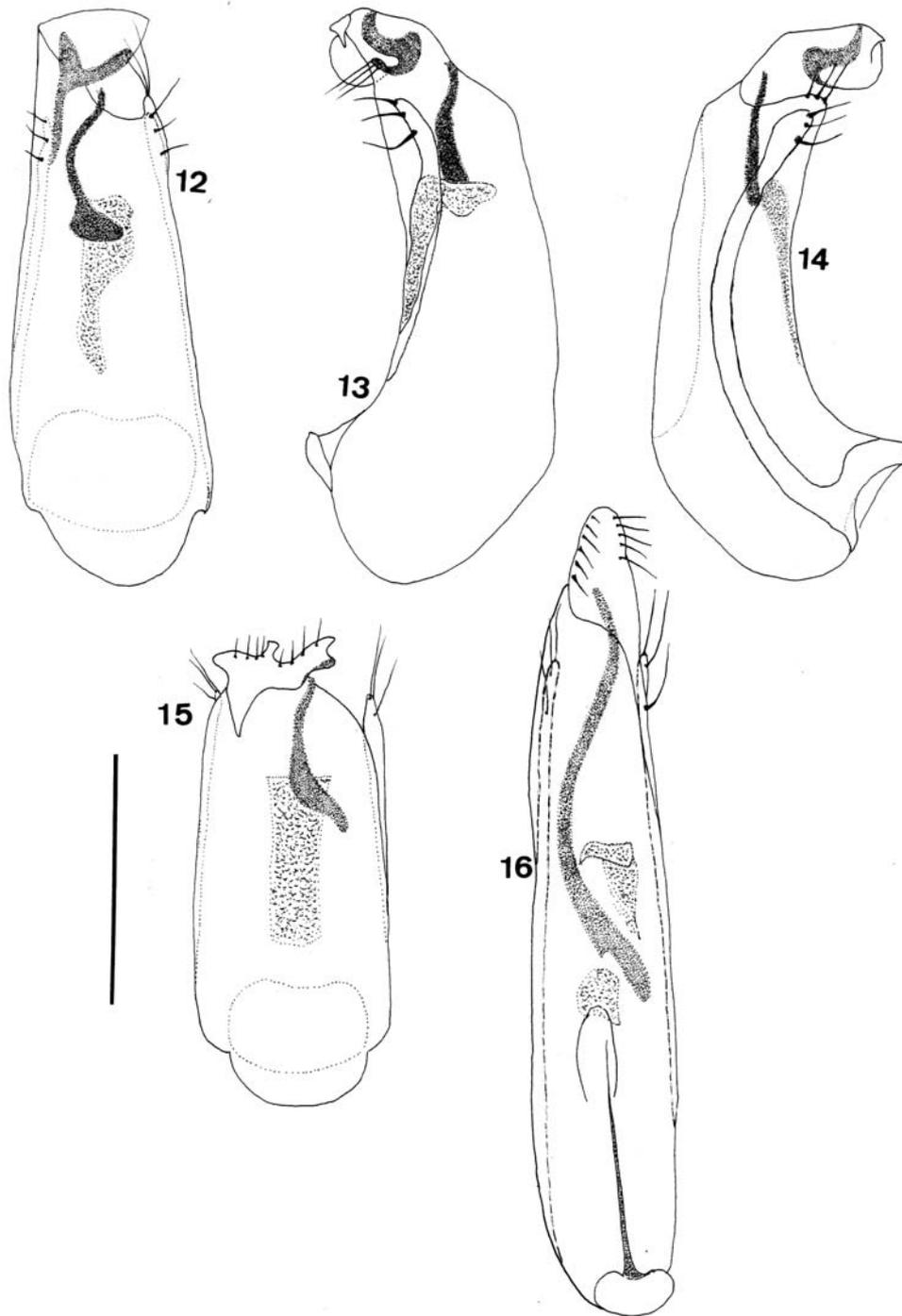
MATERIAL STUDIED: 3♂♂-3♀♀, Pichincha province, 16 km SE Santo Domingo-Tinalandia, 680 m, 19-20/VI/1975, dung-baited pitfall trap, S. Peck leg. CMN, Aylmer, Quebec and Salgado Collection, Animal Biology Department, León University.

BRIEF DESCRIPTION. The shape of the antennae, genital segment, aedeagus and spermatheca indicate that the specimens examined in this study belong to *Adelopsis coronaria*. However, in relation to the information in the description of the species Gnaspini & Peck (1996), some small differences have been observed and should be indicated, for example, some specimens measure 2.40 mm, the last three antennal segments are pale and 8-10 setae can be seen on the anterior edge of the right lobe (Fig. 15). However, these differences are not important enough to establish a new specific category.

DISTRIBUTION. This species was first captured in Costa Rica and Panama (Gnaspini & Peck, 1996) and later in Colombia (Gnaspini & Peck, 2001). The new information extends its distribution area towards the south and contains the first record for Ecuador.

Ptomaphagus (Adelops) bordoni (Jeannel, 1964)

MATERIAL STUDIED: 1♂, Esmeraldas province, 11 km SE San Lorenzo-La Chiquita, 5 m, 6-7/VI/1975, dung-baited and



Figs. 12-16.— *Adelopsis tandapi* n. sp. 12-14) aedeagus dorsal, right lateral and left lateral view; 15) *Adelopsis coronaria*, aedeagus, ventral view; 16) *Ptomaphagus (Adelops) bordoni*, aedeagus, ventral view. (scale bar = 0.25 mm).

Figs. 12-16.— *Adelopsis tandapi* n. sp. 12-14) edeago, visión dorsal, lateral derecha y lateral izquierda; 15) *Adelopsis coronaria*, edeago, visión ventral; 16) *Ptomaphagus (Adelops) bordoni*, edeago, visión ventral. (barra de escala = 0.25 mm).

carrion-baited pitfall traps, S. Peck leg. Salgado Collection, Animal Biology Department, León University.

BRIEF DESCRIPTION. The most striking character and best trait for differentiating the species is found in the apical region of the median lobe of the aedeagus which is strongly rounded. Here the aedeagus is figured (Fig. 16) and a carina weakly discernible along the basal third is also observed in the median region. Jeannel (1964) and Gnaspini (1996) reported a detailed description and figures that may be consulted for further study of this species.

DISTRIBUTION. This species was described from Venezuela by Jeannel (1964) as *Adelopsis bordoni*. Gnaspini (1996) correctly transferred it to the genus *Ptomaphagus*. This new reference greatly extends the dispersion area of the species. It is the first record for Ecuador and the second reference for a species of *Ptomaphagus*, as only *P. (Adelops) sciakyi* (Zoia, 1992) had been recorded till now. This species was described as *Adelopsis*, but was also transferred to *Ptomaphagus* by Gnaspini (1996).

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