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(Coleoptera: Scarabaeidae): Descriptions of the Third Instar and  
Pupa**

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## **CANTHON (*PSEUDEPILISSUS*) *MUTICUS MUTICUS* HAROLD, 1868 (COLEOPTERA: SCARABAEIDAE): DESCRIPTIONS OF THE THIRD INSTAR AND PUPA**

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### **ABSTRACT**

The third instar and pupa of *Canthon muticus muticus* Harold are described and illustrated. The larvae were reared from eggs laid by adults under laboratory conditions. Morphology of the two stages is analyzed based on characters at the generic level. Larval morphology is compared with that of other species of *Canthon* Hoffmansegg. Species can be distinguished by a combination of head chaetotaxy and stridulatory teeth. The pupae of *Canthon* vary only by the pronotal projections.

Key Words: morphology, immature stages, larva, dung beetle, Canthonini

### **RESUMEN**

Se describen e ilustran el tercer estadio y la pupa de *Canthon muticus muticus* Harold. Las larvas fueron criadas a partir de huevos puestos por adultos en condiciones de laboratorio. La morfología de las dos etapas es analizada sobre la base de los caracteres propios del género. La morfología de la larva se compara con la de otras especies de *Canthon* Hoffmansegg. Las especies se pueden distinguir por la combinación de la chaetotaxia cefálica y los dientes estridulatorios. Las pupas de *Canthon* se diferencian solamente por las proyecciones del pronoto.

*Canthon* Hoffmansegg is the most species-rich genus of the New World Canthonini, with 174 currently described species distributed from southern Canada to Argentina (Medina *et al.* 2003). The taxonomic history of *Canthon* reveals important difficulties in the definition of the genus and its species-groups (Medina *et al.* 2003). Moreover, studies of the morphology of the immature stages in support of taxonomic analysis of *Canthon* have been scarce. Edmonds and Halfpter (1978), in a taxonomic review of immature Scarabaeinae, described the genus *Canthon* using both larval and pupal characters. Larvae of the following five species of *Canthon* have been described: *Canthon pilularius* (L.) (Ritcher 1966), *Canthon humectus humectus* Say (Edmonds and Halfpter 1972), *Canthon indigaceus chevrolati* Harold (Edmonds and Halfpter 1978), *Canthon edentulus* Harold (Palestrini and Barbero 1993), and *Canthon cyanellus cyanellus* LeConte (Hernández-Martínez and Martínez 2003).

*Canthon (Pseudepilissus) muticus muticus* Harold is a coprophagous species common in cow dung in Brazil, Paraguay, Argentina, and Uruguay (Halfpter and Martínez 1968; Medina *et al.* 2003). Halfpter and Martínez (1968) recognized two distinct morphs within the subspecies: a green form and a blue one. The green morph predominates in São Paulo, Paraná, Santa Catarina, and northern Rio Grande do Sul in Brazil, as well as southeastern Paraguay and

Misiones in Argentina. The blue morph is common in the pampas of Argentina, Uruguay, and in south-eastern Brazil.

The purpose of the present study is to describe the third instar and pupa of *C. muticus muticus* from Uruguay and to compare their morphology with that of the corresponding immature stages which have been described for other species of the genus.

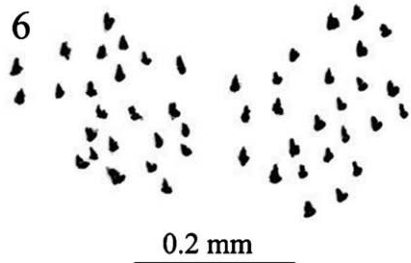
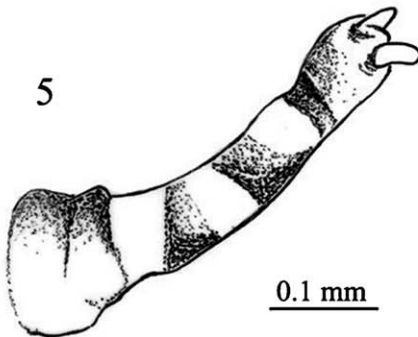
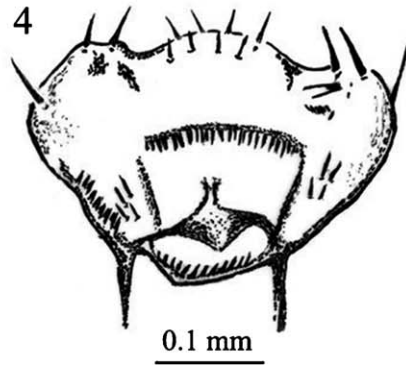
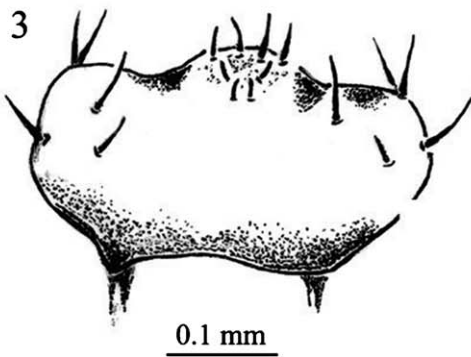
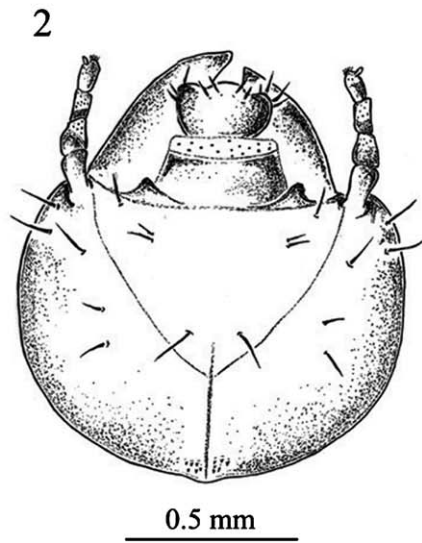
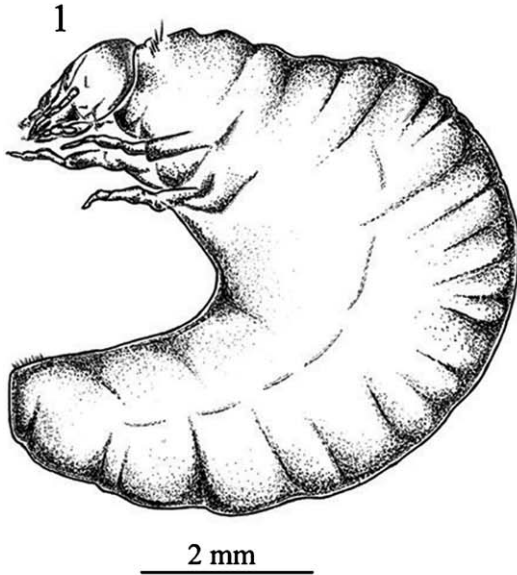
### **MATERIAL AND METHODS**

*Canthon muticus muticus* adults were collected from dung pads in open pastures permanently grazed by cattle at the Centro de Investigación y Experimentación “Alejandro Gallinal” (33°50' S, 55°32' W), Cerro Colorado, Florida, Uruguay. Beetles were reared in the laboratory at 25° C ± 2° C with a 12:12 photoperiod. Twenty pairs were placed in glass boxes (30 cm long × 20 cm wide × 15 cm high) with a layer of soil 3 cm deep and a gauze lid. A quarter liter of fresh cow dung was placed on the soil surface twice a week. Larvae in the third instar and pupae were removed from brood balls and fixed by dropping them into boiling water for about three minutes and then transferring them to 70% ethanol. Six larvae and five pupae were preserved in this manner and examined. The terminology used to describe the larvae in this paper is that of Böving (1936) and Ritcher (1966).

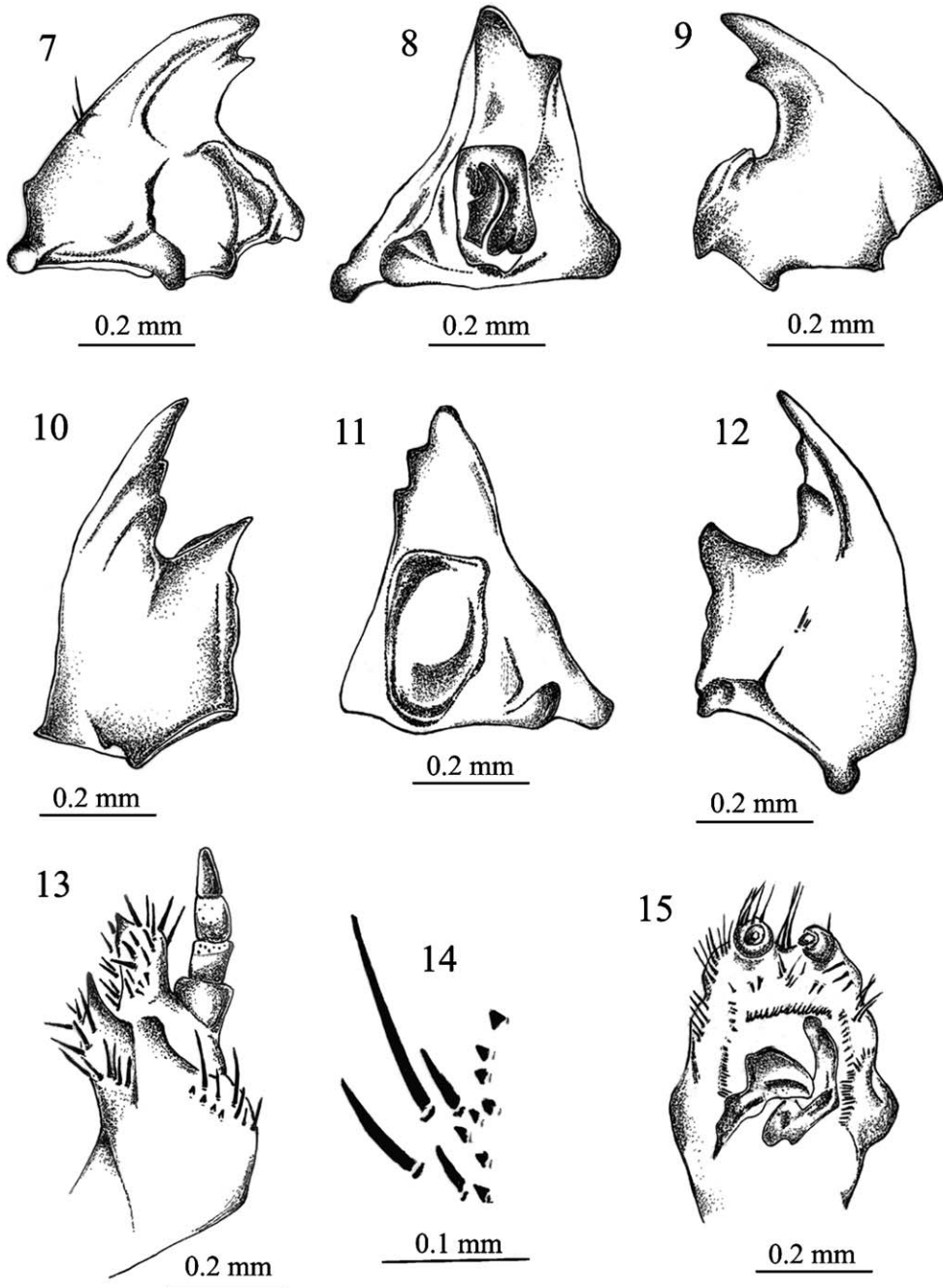
*Canthon muticus muticus* Harold, 1868, third instar (Figs. 1–15)

**Description.** Body C-shaped, slightly humped dorsally (Fig. 1). Length 17 mm; width at abdomi-

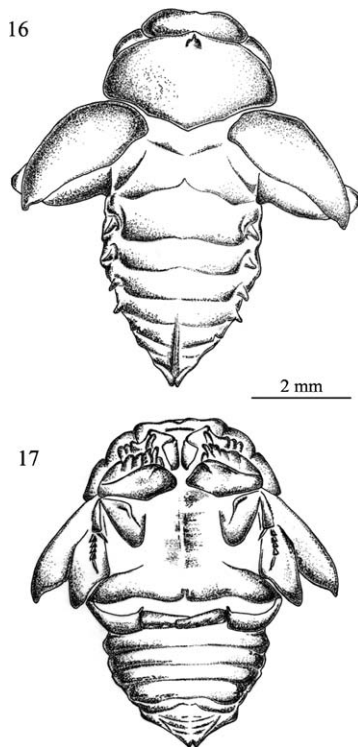
nal gibbosity 7 mm. **Cranium** (Fig. 2): Maximum width of head capsule 3.5 mm. Surface of cranium finely punctate, light yellow-brown; surface area of the clypeus, labrum, and mandibles pigmented. Epicranial suture marked; frontal suture extending



Figs. 1–6. *Canthon muticus muticus*, third instar. 1) Habitus; 2) Head, frontal view; 3) Labrum; 4) Epipharynx; 5) Antenna; 6) Raster.



**Figs. 7–15.** *Canthon muticus muticus*, third instar. 7) Right mandible, ventral view; 8) Right mandible, frontal view; 9) Right mandible, dorsal view; 10) Left mandible, dorsal view; 11) Left mandible, frontal view; 12) Left mandible, ventral view; 13) Right maxilla, dorsal view; 14) Stridulatory teeth of maxilla, dorsal view; 15) Hypopharynx, dorsal view.



**Figs. 16–17.** *Canthon muticus muticus*, pupa. 16) Dorsal view; 17) Ventral view.

to base of antenna. Vertex with basal group of micro-sensilla. Epicranium with 3 dorsal setae and group of 3 lateral setae on each side. Frons on each side with 1 posterior frontal seta, 2 exterior frontal setae, and 1 seta in anterior angle. Fronto-clypeal suture rectilinear. **Labrum** (Fig. 3): Strongly trilobed, width 2X length, with 4 anterior setae, 4 posterior setae, 3 lateral anterior setae, and 2 interior setae on each side. **Epipharynx** (Fig. 4): Dextiortoma and laeotorma merged with rhomboidal epitorma. Protophobea with row of short, compact sensilla. Chaetoparia with 4 short setae. **Mandibles**: Thick and asymmetric. Right mandible (Figs. 7–9) with broad base and 2 rounded, unequal scissorial teeth separated by a groove and single seta on lateral margin. Molar area irregularly lobed. Ventral surface with a stridulatory

ridge extended to incisive area. Lateral area with 3 setae. Left mandible (Figs. 10–12) with narrow base and 3 scissorial teeth, apical one longest. Molar area with a prominent, conical tooth; stridulatory ridge short. **Maxilla** (Fig. 13): Palp 4-segmented, apical segment conical. Stridulatory area on dorsal face of stipes (Fig. 14), with 8 teeth arranged in uneven row, 3 lateral setae, and 3 anterior setae. Galea with apical mucro; with 10 thick mesal setae and 5 lateral setae; 7–10 thick mesal setae aligned from mucro to base. Lacinia with sclerotized, conical uncus; 1 seta on base of uncus and 1 meso-ventral seta; with row of 5 elongated ventral setae and 6 exterior setae. **Labium-hypopharynx** (Fig. 15): Oncyli asymmetrical, strongly sclerotized, left side larger; both oncyli framed by microsensillae, with 6–8 short setae on right side. Central lobe of glossa with 4 long and 4 short setae on each side. Lateral right lobe with 3 thick, pointed setae and 4–6 thin, long setae; left lateral lobe with 11–13 long setae. **Antennae** (Fig. 5): Four-segmented, third segment with conical sensory organ; last segment markedly small. **Thorax**: Prothoracic shield with anterior, angular projection on each side. **Abdomen**: Raster (Fig. 6) with 24 short, inconspicuous teiges on each side arranged in two irregular areas defining a pseudoseptular area.

***Canthon muticus muticus* Harold, 1868, pupa**  
(Figs. 16–17)

**Description.** Exarate, glabrous. Vertex slightly sinuous. Pronotum transverse with rounded margins and a short, anterior, median tubercle. Meso- and metanotal projections present. Abdomen with finger-like projection on each side of terga III–VI. Caudal projections present.

## DISCUSSION

The morphology of the larva and pupa of *C. muticus muticus* conforms with those characters diagnostic for the genus *Canthon* (Edmonds and Halffter 1978). In the larva, these characters are: a) sensory area of third antennomere conical; b) chaetopariae each with 3–9 setae; c) lateral area of mandible with 3–4 setae; d) uncus of lacinia without basal tooth; e) pronotum with distinct shields bearing anterior angles; f) legs lacking terminal

**Table 1.** Comparison of chaetotaxy and stridulatory teeth of *Canthon muticus muticus* with other species of *Canthon*.

Character	<i>C. humectus</i>	<i>C. pilularius</i>	<i>C. edentulus</i>	<i>C. cyanellus cyanellus</i>	<i>C. muticus muticus</i>
Lateral epicranial setae	*	4	2–3	4–6	3
Exterior frontal setae	*	4–9	2–3	3–4	2
Anterior frontal setae	*	8–17	1–3	2	0
Chaetoparia	3–4	7–9	5–7	7–8	4
Stridulatory teeth	7	12–17	6–7	12–13	8

\*These characters were not mentioned in the description by Edmonds and Halffter (1972).



papillae; g) third abdominal segment lacking dorso-medial prominence; and h) raster indistinct, venter of last abdominal segment with inconspicuous setae often arranged in two loose, oval palidia. In the pupa, these characters are: a) pair of papillate pronotal projections present, fused as a single process; b) meso- and metanotal projections present; c) lateral, finger-like tergal projections present on segments III–VI; and d) caudal projections callous-like.

A comparison of the larval morphology of *C. muticus muticus* with known congeners (Ritcher 1966; Edmonds and Halffter 1972; Palestriini and Barbero 1993; Hernández-Martínez and Martínez 2003) shows that the species can be distinguished on the basis of a combination of head chaetotaxy and stridulatory teeth (Table 1). The pupae of *Canthon* are also very similar, differing only by the pronotal projections. The pupa of *C. muticus muticus*, like that of *C. cyanellus cyanellus*, has a median pronotal projection, whereas *C. edentulus* (Palestriini and Barbero 1993) and the other species studied by Edmonds and Halffter (1978) have a pair of pronotal papillae. Halffter and Matthews (1966) do not mention pronotal projections in *C. pilularius*.

This comparative study of the immature stages of *Canthon* revealed that there is little variation in larval and pupal characters among species, a finding consistent with Edmonds and Halffter's (1978) conclusions that there is a high degree of intrageneric homogeneity within Scarabaeinae and that at the species level, practically all potentially useful diagnostic characters are quantitative.

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#### REFERENCES CITED

- Böving, A. 1936.** Description of the larva of *Plectris aliena* and explanation of new terms applied to the epipharynx and raster. *Proceedings of Entomological Society of Washington* 38: 169–185.
- Edmonds, W. D., and G. Halffter. 1972.** A taxonomic and biological study of the immature stages of some New World Scarabaeinae (Coleoptera: Scarabaeidae). *Anales de la Escuela Nacional de Ciencias Biológicas (México)* 19: 85–122.
- Edmonds, W. D., and G. Halffter. 1978.** Taxonomic review of immature dung beetles of the subfamily Scarabaeinae (Coleoptera: Scarabaeidae). *Systematic Entomology* 3: 307–331.
- Halffter, G., and A. Martínez. 1968.** Revisión monográfica de los *Canthonina* americanos (Coleoptera, Scarabaeidae) (3ª Parte). *Revista de la Sociedad Mexicana de Historia Natural* 29: 209–299.
- Halffter, G., and E. G. Matthews. 1966.** The natural history of dung beetles of the subfamily Scarabaeinae (Coleoptera, Scarabaeidae). *Folia Entomológica Mexicana* 12–14: 1–312.
- Hernández-Martínez, G., and I. Martínez M. 2003.** Desarrollo larval de *Canthon cyanellus cyanellus* Leconte 1859 (Coleoptera: Scarabaeidae). *Acta Zoológica Mexicana* (n. s.) 89: 185–200.
- Medina, C. A., C. H. Scholtz, and B. D. Gill. 2003.** Morphological variation and systematics of *Canthon* Hoffmannsegg, 1817 and related genera of New World *Canthonini* dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae). *Deutsche Entomologische Zeitschrift* 50: 23–68.
- Palestriini, C., and E. Barbero. 1993.** Contributo alla conoscenza degli stadi preimaginali nei *Canthonina* (Coleoptera: Scarabaeidae): il terzo stadio larvale e la pupa di *Canthon edentulus* Harold, 1868. *Bolletino del Museo regionale di Scienze naturali – Torino* 2: 377–386.
- Ritcher, P. O. 1966.** White Grubs and their Allies. A Study of North American Scarabaeoid Larvae. Oregon State Monographs, Studies in Entomology, N° 4, Oregon State University Press, Corvallis, OR.

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