

TWO NEW SPECIES OF *DEUTEROSMINTHURUS*
(BOURLETIELLIDAE), EPIPHYTIC COLLEMBOLA FROM THE
NEOTROPICAL REGION WITH A KEY FOR THE AMERICAN
SPECIES

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ABSTRACT

Two new species of *Deuterostminthurus* are described and illustrated. One is found in dry forest canopy at Chamela, Jalisco, México, and the other is associated with sugarcane at La Habana, Cuba. A key for identification of the American species is included.

Key Words: *Deuterostminthurus*, taxonomy, species key

RESUMEN

Se describen e ilustran dos nuevas especies de *Deuterostminthurus*. Una de ellas encontrada en la canopia de la selva baja caducifolia de Chamela, Jalisco, México, y la otra asociada al cultivo de la caña de azúcar en La Habana, Cuba. Se incluye una clave para la identificación de las especies del Continente Americano.

Deuterostminthurus (Börner, 1901)

Body dorsally with a depression behind middle of great abdomen. Anogenital segment strongly elongated and distinctly delimited from great abdomen. Integument finely granulated. Setae unciliated, curved and moderately long. Great abdomen with three pairs of fine and long trichobothria inserted in low papillae. Two trichobothria on each side of genital segment. Ant. IV divided into 3 - 9 secondary joints in addition to basal and apical parts. Eyes 8 + 8. Claw untoothed or armed with very small inner and lateral teeth; tunica and pseudonychia absent. Unguicular filament sharply pointed, or blunt at the tip, or knobbed. Tenent hairs clavate 3, 3, and 2. Dentes smooth, about three times the length of mucro. Mucro spoon-like with smooth dorsal edges, without mucronal seta. Secondary dimorphism in male: smaller body and head length, longer antennae and different shape of anogenital segment; clasping organ on anal segment absent. Female with subanal appendages. Type species: *Sminthurus bicinctus* Koch, 1840.

The genus has 32 named species; 8 are known from the Neotropical Region and 7 from the Nearctic Region. *Deuterostminthurus lippsoni* Snider, 1978 is recorded in both regions. It was described from Maryland and reported from Florida and California. This species was also reported from Cuba by Banasco Almentero (1987). This ge-

nus was only recently recorded from Chamela, México (Palacios-Vargas & Gómez Anaya, 1993), as described here in more detail.

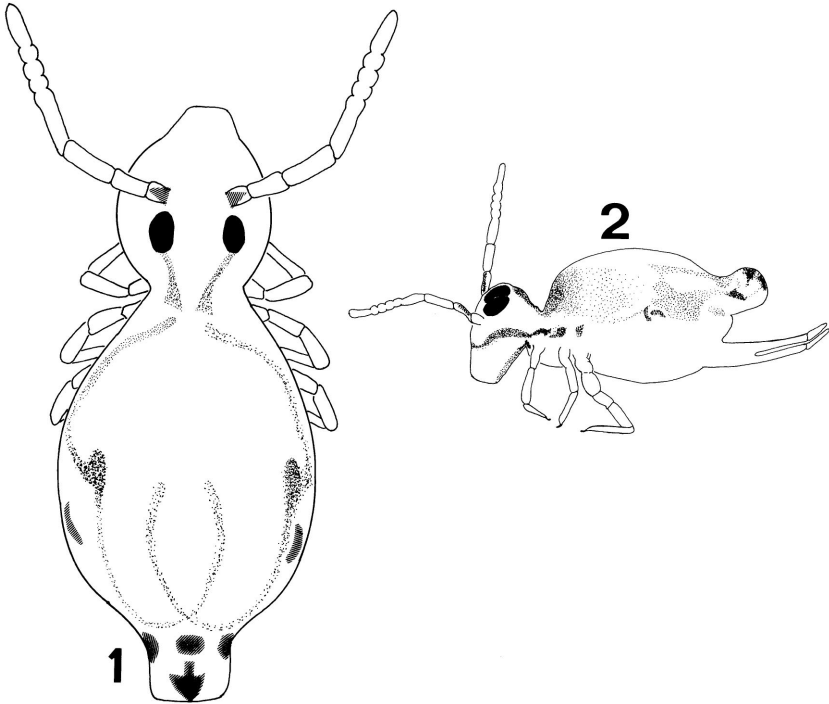
Deuterostminthurus is a cosmopolitan genus that lives in litter, epiphytic Bromeliaceae and the forest canopy. One species, *D. russatus* Maynard, 1951 is known to be part of the transitory epineuston, so it can be found in lakes and other freshwater bodies.

Deuterostminthurus delatorrei **New Species**
(Figs. 1 - 16)

DESCRIPTION

Antennae light yellow, segment I with purple pigment dorsally. Head with two bands of pigmentation (Figs. 1 and 2), one posterior to eyes and one laterally; genae with purple pigment extending to occiput. Body yellow with purple bands and patches forming a "W". Abd. VI with two small dark purple patches. Legs and furcula without pigmentation.

Eyes 8 + 8; ocellus D half the diam of H (Fig. 3). Antennal segments female ($n=9$) ratio 1:1.5:2:1:4.9 (Fig. 4); male ($n=2$) 1:2:2.5:5:7. Ant. IV subannulated into four intermediates. Apical bulb simple; one sensorial small organ and one dorso-external microsensillum (Fig. 5). Ratio head-antenna: female, 1:1.3; male, 1:1.4. Ant. III with



Figs. 1 and 2. *Deuterostminthurus delatorrei* sp. nov. 1. Dorsal distribution of pigments. 2. Habitus lateral view.

subapical sensory rods lying in shallow depressions; an accessory sensory rod slightly oblique and posterior to sensory rods; setae normal (Fig. 6). Thoracic segmentation not distinct. Metatrochanters without oval organs. Metafemora with two posterior setulae. Tibiotarsi of the pro- and mesolegs with three well-developed, appressed, clavate tenent hairs; meta-tibiotarsi with two tenent hairs (Figs. 7 - 11). Pretarsus with anterior setulae. Unguis lanceolate with inner tooth short and a small lateral tooth. Unguiculus with a strong bristle, tapering to a strong knob (Figs. 9, 11). Ratio unguiculus: unguis = 1:0.9. Sacs of ventral tube tuberculate. Rami of tenaculum tridentate (Fig. 12); anterior corpus with three apical setulae. Manubrium with 12 dorsal setae. Dens with 5 ventral setae, 6 lateral and 19 others, one of them in dorsal position similar to a bothriotricum (Fig. 13). Mucro with rachis fused to lateral lamellae in a spoon shape, rachis forming a clear tip distally. Ratio mucro: dens = 1:2.7. Anal papillae with normal curving setae; female subanal appendage setiform (37 μ m), tip may be acuminate or with 2 - 4 teeth (Fig. 14). Setae of head and body short and curving. Male with eugenital setae longer than circumgenital setae (Fig. 15). Maximum size of female ($n=9$) 0.7 mm and male ($n=2$) 0.47 mm. Head chaetotaxy as in Fig. 16. Male similar to female except for the lack of subanal appendages and smaller size.

TYPE LOCALITY

Cuba: La Habana: Boyeros. Experimental sugarcane field.

TYPE MATERIAL

Holotype ♀ on slide, two ♂♂ paratypes and eight ♀♀ paratypes on slides. Two paratypes will be kept at the Facultad de Biología, Universidad de La Habana, the holotype and other paratypes at Facultad de Ciencias, UNAM. Type material data: sugar cane field, 80m altitude, yellow traps, 28-IV-1992, 4-VI-1992, V. González, M. Díaz and D. Prieto colls.

VARIATION

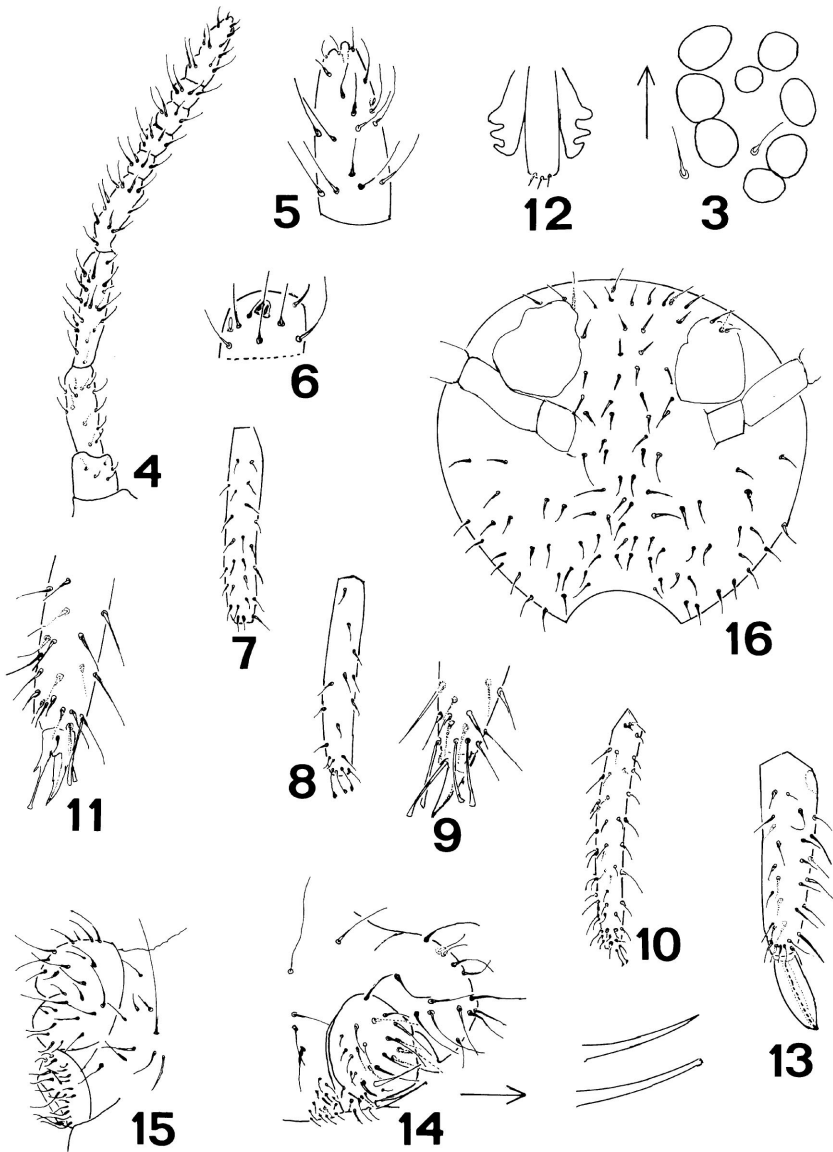
The number of teeth on subanal appendage ($n=11$) varied as follows (frequency in parentheses): one (1), two (5), three (3), and four (2). In the same specimen the number of teeth may vary from side to side. One bifid seta was observed on a trochanter. Another specimen had one extra ventral dental seta.

ETYMOLOGY

This species is named after Dr. Salvador de La Torre, Cuban entomologist.

DISCUSSION

The new species is very similar to *D. lipponi* Snider, 1978, which shares the presence of a heavily knobbed unguiculus. Other species with a knobbed unguiculus are *D. xeromorphus* Snider, 1978 and *D. wexfordensis* (Snider, 1969). *D. lipponi* differs in having five subsegments of antennal IV (after the original description) while in *D. delatorrei* it has four. The only reduced ocellus in the new species is "D". *D. lipponi* has an oval organ in the metatrochanter, which is lacking in *D. delatorrei*. *D. lipponi* has



Figs. 3 - 16. *Deuterosminthurus delatorrei* sp. nov. 3. Right eyepatch. 4. Antennal segments I to IV. 5. Ant. IV distal portion. 6. Ant. III distal portion. 7. Tibiotarsus II external view. 8. Tibiotarsus II internal view. 9. Foot complex of leg II. 10. Tibiotarsus III. 11. Foot complex of leg III. 12. Tenaculum. 13. Dens and mucro. 14. Female, anal and genital region, with subanal appendages enlarged, lateral view. 15. Male, anal and genital region. 16. Head chaetotaxy.

more pigmentation in a very different pattern. Subanal appendages in *D. delatorrei* are thicker and apically toothed.

This species occurs exclusively in epiphytic environments. It was never found in soil and litter samples taken monthly during a two-year study of sugarcane. This species was first caught when yellow traps were used.

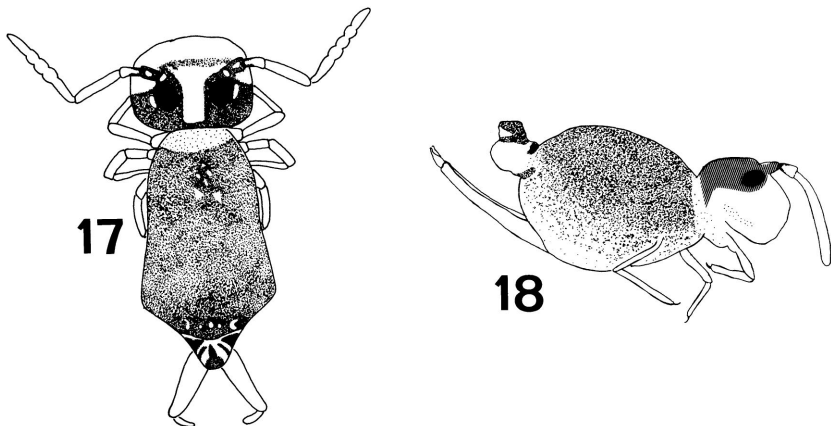
Deuterosminthurus maassius **New Species**

(Figs. 17 - 29)

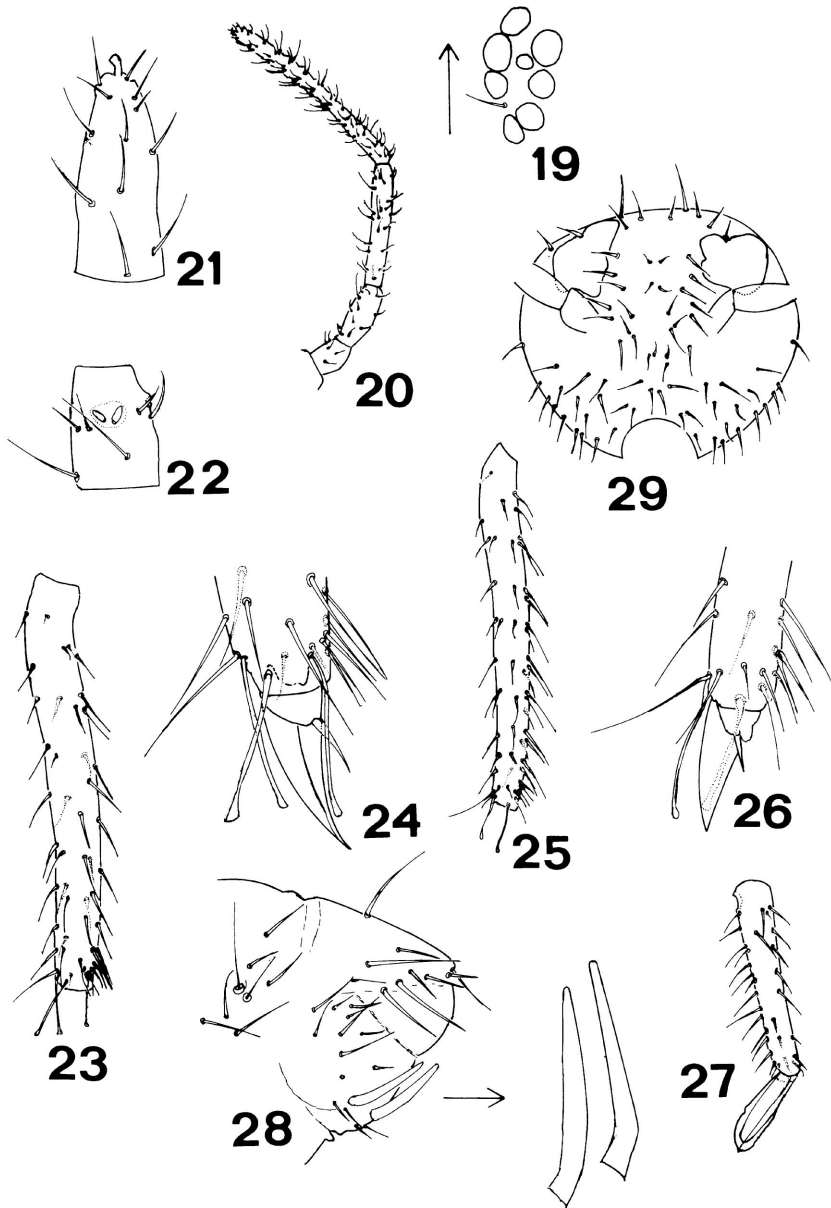
DESCRIPTION

Antennae light yellow, segment I with dark purple pigment. Head with ocular patches and posterior region with pigmentation (Figs. 17, 18). Great abdomen very dark, except for a clear area in the middle thoracic region. Anal papilla with only dorsal pigmentation dark purple; ventrally body is light, lacking of dark purple. Legs and furcula lack pigmentation.

Eyes 8 + 8; ocellus D half the diam of H; F and G a little smaller than H (Fig. 19). Antennal segments female, ($n=8$) ratio of 1:1.7:3:1:5.4 (Fig. 20). Ant. IV slightly subannulated into three intermediates. Apical bulb simple; one small sensorial organ and one microsensilla dorso-external (Fig. 21). Ratio head: antenna as 1: 1.6. Ant. III with subapical sensory rods lying in shallow depressions; accessory sensory rod slightly oblique and posterior to sensory rods; with ventral microsensillae (Fig. 22). Some setae on Ant. I and II are long and thick. Thoracic segmentation not distinct. Metatrochanters with oval organs. Metafemora without posterior setulae. Tibiotarsi of the pro- and mesolegs with 3 strong, appressed, clavate tenent hairs; meta-tibiotarsi with 2 tenent hairs (Figs. 23, 25). Pretarsus with an anterior setula. Unguis lanceolate with a small apical inner tooth and small lateral teeth. Unguiculus lanceolate ending in an acuminate bristle (Figs. 24, 26). Ratio unguiculus: unguis = 1:2.3. Sacs of ventral tube tuberculate. Rami of tenaculum tridentate; corpus with 3 apical setulae. Manubrium with 12 dorsal setae. Dens with 3 ventral setae, 6 lateral and 13 others, one of them in dorsal position similar to a bothriotricum (Fig. 27). Mucro with rachis fused to lat-



Figs. 17 and 18. *Deuterosminthurus maassius* sp. nov. 17. Dorsal distribution of pigment. 18. Habitus lateral view.



Figs. 19 - 29. *Deuterosminthurus maassius* sp. nov. 19. Right eyepatch. 20. Antennal segments I to IV. 21. Ant. IV distal portion. 22. Ant. III distal portion. 23. Tibiotarsus II. 24. Foot complex of leg II. 25. Tibiotarsus III. 26. Foot complex of leg III. 27. Dens and mucro. 28. Female, anal and genital region, with subanal appendages enlarged, lateral view. 29. Head chaetotaxy.

eral lamellae in a spoon shape, edges somewhat undulating, rachis forming a thin tip at the end of the mucro. Anal papillae with normal curving setae; female subanal appendage large and very thick, apically rounded (67 μm long, 7.8 μm wide) (Fig. 28). Setae of head and body long and thick, some of them appear as spines (Fig. 29). Two pairs of anal setae are very thick. Maximum size of female ($n=8$): 1.22 mm. The male is unknown.

TYPE LOCALITY

Mexico: Jalisco: Chamela, Estación de Biología, Instituto de Biología, Universidad Nacional Autónoma de México.

TYPE MATERIAL

Holotype ♀ on slide, eight ♀♀ paratypes on slides. Two paratypes will be kept at the Institute of Biology, UNAM and two at Chamela Field Station, the remainder at Facultad de Ciencias, UNAM. Data of type material: tropical dry forest, 40 m altitude, fogging, 18-VIII-1992, A. Pescador, A. Rodríguez Palafox and J. A. Gómez Anaya colls.

VARIATION

One specimen had four intermediate subdivisions on Ant. IV.

ETYMOLOGY

This species is dedicated to Dr. Manuel Maass, Centro de Ecología, UNAM for his contributions to tropical dry forest ecology.

DISCUSSION

Deuterosminthrus maassius sp. nov. is similar to *D. tristani* Denis, 1933 from Costa Rica. The new species differs in having no pigmentation on the antennae and a different color pattern. Head chaetotaxy is similar, with four small setae on the frons; however, *D. maassius* lacks tubercles with setae. The subanal appendage of female *D. tristani* is bifid, whereas that of *D. maassius* is thick and apically rounded. Compared to the drawings of Denis (1933), there seems to be a different ventral dental chaetotaxy. Mucronal edges of the new species are somewhat undulate, while in *D. tristani* species they are smooth. Both species share the presence of large stout setae, spine-like on the head and body; most of the species in the genus have small to moderate and thin setae.

We collected soil and litter samples ($n=960$) during a two-year study at Chamela and never found *D. maassius* sp. nov. However, several specimens were caught with Malaise traps, and also with the aid of a fogger and contact insecticide. Therefore this species is apparently also associated with epiphytes. In September 1992, we fogged the canopy in an area covering 100 m². Among other arthropods we collected more than 1,013,000 specimens of Collembola. We identified 16 species of Collembola, including *D. maassius* sp. nov. However the great majority (98%) belonged to *Salina banksi* MacGillivray, 1894.

KEY TO SPECIES OF THE GENUS *DEUTEROSMINTHURUS* (BÖRNER, 1901) FROM THE AMERICAN CONTINENTS *

1. Needle of unguiculus not apically knobbed 2
- Needle of unguiculus knobbed 3

2. Dens with one subapical ventral seta; setae on head and body thick, spine-like (Costa Rica)..... *D. tristani* Denis
Dens with several subapical ventral setae (3-6); setae on head and body thin and short..... 4
 3. Ant. IV with 4-5 intermediate subsegments..... 5
Ant. IV with 7 - 15 intermediate subsegments..... 10
 4. Unguiculus as long as ventral edge of unguis 12
Unguiculus short, 1/3 - 1/2 as long as ventral edge of unguis 6
 5. Dens with 5 ventral setae; female appendage with 2 (1-4) teeth (Cuba)..... *D. delatorrei* sp. nov.
Dens with 6 ventral setae; female appendage without any teeth (USA and Cuba)..... *D. lipponi* Snider
 6. Dens with 3 ventral setae 7
Dens with 5 - 6 ventral setae 8
 7. Dens with 3 very short ventral setae; Ant. IV with 5-7 intermediate subsegments (USA) *D. russatus* Maynard
Dens with 3 long ventral setae; Ant. IV with 3 intermediate, poorly defined subsegments; head and body with thick spine- like setae (México)..... *D. maassius* sp. nov.
 8. Dens with 5 ventral setae and 6 intermediate subsegments (Brazil) *D. salinensis* Arlé
Dens with 6 ventral setae 9
 9. Ant. IV with 6 subsegments; tip of female appendage without any teeth; tibiotarsus with spines (Brazil)..... *D. richardsi* Arlé
Ant. IV with 6-9 subsegments; female appendage spatulate with 7 teeth; without spines on tibiotarsus III (USA) *D. lurida* Snider
 10. With ciliated setae on body; very small species (0.75 mm) (USA)..... *D. xeromorphus* Snider, 1978
With smooth setae on head and body; larger species (1.0-1.3 mm) 11
 11. Dens with 6 ventral setae; unguiculus with a very long tooth; female appendage spatulate with 5 teeth (USA)..... *D. validentatus* Snider
Dens with 5 ventral setae; unguis with small tooth; tip of female appendage without teeth (USA) *D. wexfordensis* (Snider)
 12. Ant. IV with 6 intermediate subsegments (Brazil) *D. aueti* Arlé
Ant. IV with 14 - 15 intermediate subsegments (USA)..... *D. nonfasciatus* Snider
- *Dubious records and inaccurately described species are not included in this key.

ENDNOTE

Specimens of *Deuterostminthurus* from Cuba were collected by Lic. Magaly Díaz and Dr. Dania Prieto; those from Chamela were collected by Dr. Alfonso Pescador, M. Sc. Alicia Rodríguez and José A. Gómez Anaya. We are grateful to all of these collaborators. Proyecto DGAPA IN2078/91 y Convenio de Intercambio Académico México-Universidad de La Habana.

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