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A new species of *Aethiopella* (Collembola: Neanuridae) from Nicaragua

Una nueva especie de *Aethiopella* (Collembola: Neanuridae) de Nicaragua

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Abstract. *Aethiopella pilarandresae* sp. nov. is described and illustrated. It is characterized by its small size, 6 mandibular teeth, small mucro and postantennal organ with 20-27 vesicles. It is compared with the other species from America and a key for the world species is included.

Key words: taxonomy, Pseudachorutinae, *Aethiopella*, Estelí.

Resumen. Se describe e ilustra *Aethiopella pilarandresae* sp. nov. Se caracteriza por su talla pequeña, 6 dientes mandibulares, mucrón pequeño y órgano postantenal con 20-27 vesículas. Se compara con las otras especies de América y se proporciona una clave para las especies del mundo.

Palabras clave: taxonomía, Pseudachorutinae, *Aethiopella*, Estelí.

Introduction

Originally members of this genus were considered part of *Ceratrimeria.* Börner 1906. Handschin (1942) revised the genus and divided it into 2 new genera, *Aethiopella* and *Neotropiella,* both characterized by a well-developed furcula and the presence of a moruliform postantennal organ. The main difference between them is the number of eyes per side: 8 in *Aethiopella* and 5-7 in *Neotropiella* (Handschin, 1942). *Aethiopella* Handschin, 1942 comprises up to date 22 named species, most of which are distributed in Africa and a few in the Pacific islands. From America, only 4 species have been described: *A. ariana* Najt, Thibaud and Weiner, 1990, *A. caraibensis* Thibaud and Massoud, 1983, *A. delamarei* Arlé, 1960, and *A. littoralis* Fernandes and Mendonça, 2003 for the Neotropical region (Bellinger et al., 1996-2014).

In this contribution, we describe a new species collected in Estelí, Nicaragua and provide a key for the identification of known species. Abbreviations used in this description are: Ant.= antennal segment; Abd.= abdominal segment; PAO= postantennal organ; sgd= dorsal guard sensillum; sgv= ventral guard sensillum; Th.= thoraxic segment.

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Materials and methods

Specimens were collected in Mesas de Moropotente (Estelí), Nicaragua at 3 field plots representative of recently abandoned paddocks, in 3 year old scrublands and in mature "*carbonales"* (name given to patches of agriculture practices where *Acacia pennatula* [Fabaceae: Mimosoideae] is grown to give shade to the cattle). In each plot, 10 pitfall traps filled with 75% ethanol were placed. Collembola were sorted, cleared up and mounted under slides in Hoyer's solution. Drawings were done using a phase contrast microscope and a *camera lucida*. Measurements were done with an ocular micrometer.

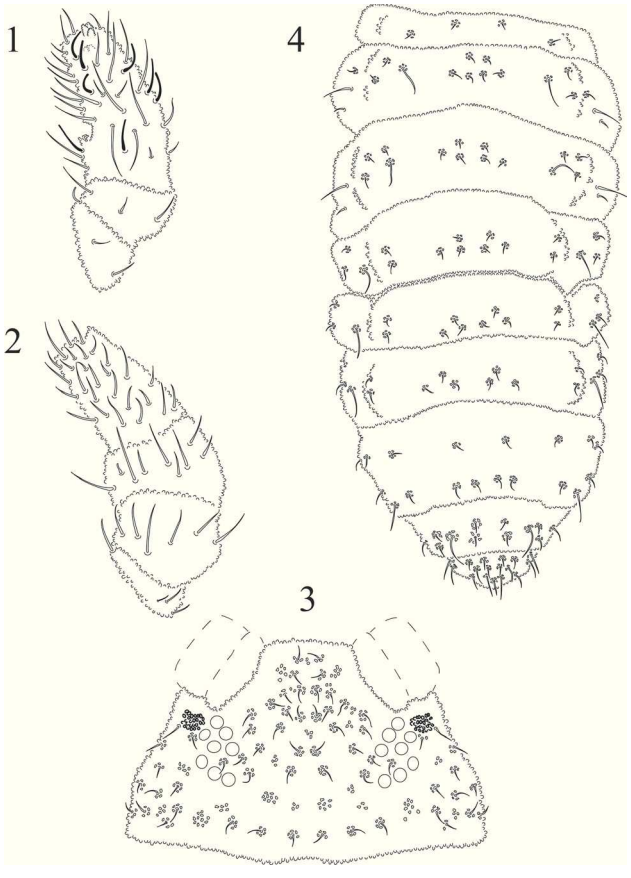
Description

Genus *Aethiopella* Handschin, 1942
Type species *Aethiopella flavoantennata* (Philiptschenko, 1926).
Diagnosis (modified from Massoud, 1967). Body form variable, but always with paratergites or paratergal areas. Ant. III and IV dorsally fused, the limit between them is only observable in ventral view and precisely at this limit the sense organ is located on Ant III. This consists of 2 rods of variable shape under a cuticular fold. Ant. IV always is longer than Ant. III, with bilobed or trilobed apical bulb, apical pit, microsensillum and several simple sensilla, sometimes similar to setae. Oral cone elongated. The maxillae are always styliform, sometimes with 2

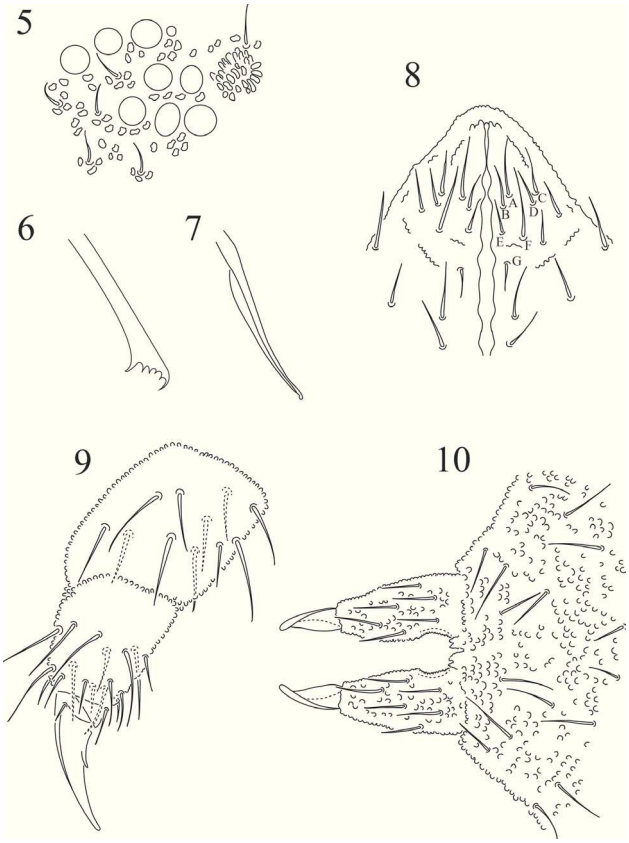
lamella, but never toothed or fringed. Postantennal organ morula-shape, 8 eyes on each side of the head. Unguis with 1 internal tooth. Capitate tenent hairs and empodial appendage absent. Furcula present and well developed.

Aethiopella pilarandresae sp. nov. (Figs. 1 - 13)

Holotype (male): Body length 0.68 mm; average (n= 9): 0.75 mm, range 0.6-0.9 mm. Color purplish. Body setae smooth and short, each surrounded by 5 or 6 granules. Cuticle granulose, and paratergites conspicuous on thoracic segments and from Abd. I to III. Ant. I with 7 setae, Ant. II with 11 setae, Ant. III and IV fused dorsally (Fig. 1), with 20-23 setae. Sensory organ of Ant. III with 2 small (2 μm) club-shaped sensilla under a cuticular fold, 2 guard sensilla (sgd and sgv) and ventral microsensillum (Fig. 2). Ant. IV with trilobed apical bulb, 7 sensilla, 1 microsensillum and subapical organite (Fig 1). Eyes 8+8, grouped on 5+3 in each side, with strongly pigmented eye patch. PAO moruliform, twice the size of 1 eye, with 20-27 vesicles (Fig. 5). Mandible with 6 subequal small teeth (Fig. 6). Maxillae styliform, 2 fused lamella, with crochet

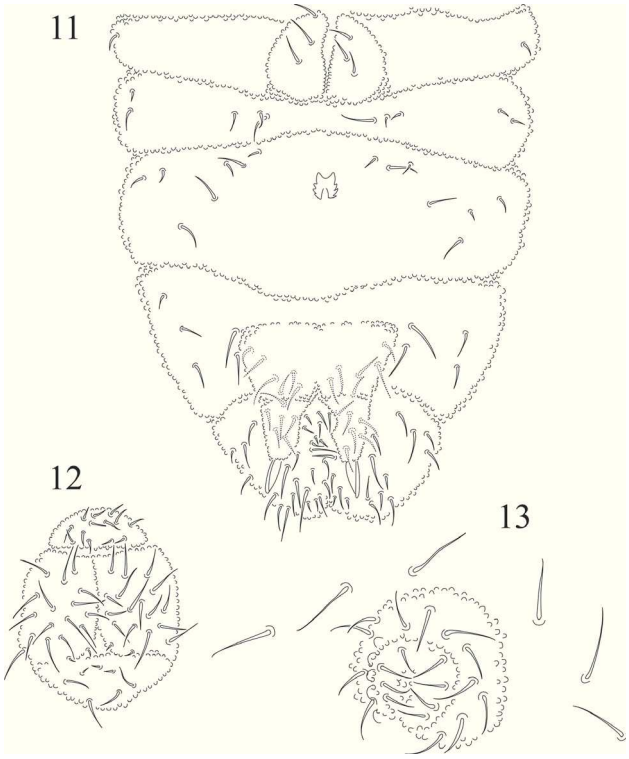


Figures 1-4. *Aethiopella pilarandresae* sp. nov. 1, Ant. 1-IV dorsal view; 2, Ant. I- IV ventral view; 3, chaetotaxy of the head; 4, thorax and abdomen chaetotaxy.



Figures 5-10. *Aethiopella pilarandresae* sp. nov. 5, eyes and postantenal organ; 6, mandibles; 7, maxilla; 8, labium; 9, tibiotarsus III; 10, furcula.

apex (Fig. 7). Buccal cone typical of the genus. Labium bearing setae A-G (Fig. 8). Dorsal chaetotaxy composed of microsetae (10 μm), mesosetae (15 μm) and long sensilla (35 μm). Sensillar formula by a half tergum: 022/11111. All body setae are simple and smooth (Figs. 3 and 4). Head with microsetae and mesosetae (Fig. 3.). Th. I with 2+2 dorsal setae, Th. II and III with 2 lateral setae. Abd. V with posterior margin straight and abd. VI totally visible (Fig. 4). Chaetotaxy of legs I-III as follows; subcoxa 1-3 setae, coxae 5-6 setae, trochanter 5-6 setae, femora 10-11 setae and tibiotarsi with 2 whorls of setae, proximal with 7 and with 11. Foot complex with 1 pretarsal setae and 1 internal tooth (Fig. 9). Ventral tube with 3+3 setae; tenaculum with 3 teeth on each ramus (Fig. 11). Furcula fully developed: manubrium with 8+8 ventral setae; 3 on each side longer than others; dens 6+6 similar setae; mucro with lamella "spoon-shaped" (Fig. 10). Ratio mucro: dens: 1.7. Each anal valve with 16 setae and 2 setolae (Fig.12), all smooth. Genital plate of female with 3+3 pregenital setae



Figures 11-13. *Aethiopella pilarandresae* sp. nov. 11, abdominal ventral chaetotaxy; 12, genital and anal of female plates; 13, male genital plate.

10 circumgenital and 2 eugenital setae (Fig. 12). Genital plate of male with 3+3 pregenital setae, 12 circumgenital setae and 4+4 eugenital setae (Fig. 13).

Taxonomic summary

Type material: holotype male and 38 paratypes on slides (16 females, 16 males and 6 juveniles). Nicaragua, Mesas de Moropotente (Estelí) 1241 msnm (13º19'30"-13º60'30" N, 86º11'00"-86º22'00" W), 22/VIII/07. Soil and litter, dominant vegetation *Senna squineri* and *Croton jalapensis*.

Etimology: named after Dr. Pilar Andrés (Centre de Recerca Ecologica i Aplicacions Forestals, Bellaterra, Barcelona, Spain) for her contributions to soil ecology and collection of the type material.

Remarks. Aethiopella pilarandresae sp. nov. is characterized by the presence of 6 teeth on the mandible, mucro smaller than dens and postantennal organ with 20-27 vesicles, differing from *A. ariana* in the number of sensilla on Ant. IV (7 vs. 8) and a trilobed apical bulb (vs. bilobed). Furcula is very different, all dental setae on the new species are similar, but in *A. ariana* 2 distal setae are thicker than others; mucro has a thin complete external lamella while in *A. ariana* it is thick, incomplete not reaching the tip. The Abd. V of *A. pilarandresae* sp. nov. has only 2 pairs of setae between the sensorial setae (vs. 3 pairs). The new taxon differs from *A. caraibensis* in its smaller size (0.6-0.9 vs. 1.2-2.7 mm), the shape of mandible (subequal teeth vs. 1 big basal tooth), the evident sensilla on Ant. IV (vs. inconspicuos), and the number of postantennal vesicles (20-27 vs. 36). *A. delamarei* has a similar size but differs clearly from the Nicaraguan species in having undifferentiated sensilla on Ant. IV (*vs.* evident), a small postantennal organ (12-15 vs. 20-27 vesicles) and mandibles with only 4 teeth (vs. 6). *A. littoralis* is larger than *A. pilarandresae* sp. nov. (0.8-2.0 vs. 0.6-0.9mm) and has barbulated setae (vs. smooth) and slightly capitate sensorial setae (vs. acuminate), and more mandibular teeth (9-19 vs. 6); additionaly the eugenital setae of males are spiniform (vs. setiform).

Key to the species of *Aethiopella.*

1. Mandible with 6 or fewer teeth, mucro smaller than the dens (except *A. kuolo* and *A. flavoantennata*). 2
1'. Mandible with more than 6 teeth, mucro and dens variable in size. 16
2. PAO with 20 or more vesicles, unguis with or without lateral teeth. 3
2'. PAO with less than 20 vesicles, unguis always with 1 internal tooth 12
3. Mandible with 6 teeth 4
3'. Mandible with less than 6 teeth. 6
4. Unguis without lateral teeth 5
4'. Unguis with 1 inner tooth and 2 lateral teeth, Ant. IV with 7 sensilla, PAO with 22 vesicles. . . . . .
. . . . . .*A. villiersi* Massoud, 1963
5. Ant. IV with 8 sensilla, 2 dental setae thicker than others . . . . . *A. ariana* Najt, Thibaud and Weiner, 1990
5'. Ant. IV with 7 sensilla, all dental setae thin. . . . . *A. pilarandresae* n. sp.
6. Mucro longer than dens, with 3 setae; mandible with 3 teeth, Ant. IV with 3 sensilla, PAO with 30 vesicles . . . . . .
. . . . . .*A. kuolo* Christiansen and Bellinger, 1992
6'. Mucro smaller than dens (except *A. flavoantennata*), with more than 3 setae, mandible, with more than 3 teeth, Ant. IV with more than 3 sensilla, PAO with variable number of vesicles. 7

7. Unguis with 2 internal teeth and 2 lateral teeth,. mandible with 5 teeth and PAO with 20-25 vesicles . . . . . *A. pedifalx* Salmon, 1956
7'. Unguis an inner tooth. 8
8. Mandible with 5 teeth 9
8'. Mandible with 4 teeth 11
9. Abd. V in shape of "V" with Abd. VI embedded and covered 10
9'. Abd. V with straight margin so the Abd. VI is fully visible, PAO with 50 vesicles, Ant. IV with 6 sensilla and dens with 5 setae . . . . . *A. condei* Massoud, 1963
10. PAO with 22 vesicles, Ant. IV with 14 sensilla and dens with 6 setae . . . . . *A. machadoi* Massoud, 1963
10'. PAO with 30 vesicles, Ant. IV with 17 sensilla and dens with 6 setae . . . . *A. flavoantennata* Philiptschenko, 1926
11. PAO with 50-60 vesicles, Ant. IV with 6 sensilla . . . . . *A. silvestris* Najt and Weiner, 1997
11'. PAO with 30 vesicles, Ant. IV with 6 sensilla . . . . . *A. tournieri* Delamare Deboutteville, 1951
12. Furcula reduced to a bulge, mandible with 5 teeth 13
12'. Furcula well developed, mandible with 4 teeth 14
13. Dens with 6-7 setae, mandible teeth in a single plane and PAO with 13-16 vesicles . . . . . *A. africana* Delamare Deboutteville, 1945
13'. Dens with 5-6 setae, mandible teeth in 2 planes and PAO with 16 vesicles . . . . . *A maculata* Delamare Deboutteville, 1945
14. Dens with 5 setae, PAO with 8 vesicles, Ant. IV with 8 sensilla . . . . . *A. mangenoti* Massoud, 1963
14'. Dens with 6 setae, PAO with 13-25 vesicles 15
15. PAO with 13-15 vesicles, Abd. V in "V" shape, and Abd. VI embedded in it, Ant. IV with 6 sensilla . . . . . *A. littoralis* Fernandes and Mendonça, 2003
15'. PAO with 15-25 vesicles and Abd. V with straight margin, Abd. VI is fully visible . . . . . *A. delamarei* Arlé, 1960
16. PAO with 40 or more vesicles 17
16'. PAO with less 40 vesicles 19
17. Mucro longer than dens, mandible with 14 large teeth arranged in circle, 1 large inner tooth, 2 smaller teeth in extremes, PAO with 40-50 vesicles, 6 setae on dens . . . . . *A. basilewskyi* Salmon, 1956
17'. Mucro same size than dens 18
18. Mandible with 20 teeth, PAO with 60 vesicles, 6 setae on dens . . . . *A. mandibulata* Delamare Deboutteville, 1945
18'. Mandible with 12 teeth in semicircle, PAO with 45-53 tubercules, claw with 1 inner tooth and 2 lateral teeth, 5-6 setae on dens . . . . . *A. ugandensis* Salmon, 1954
19. Unguis with more than 1 inner tooth, PAO with 20 or 21 vesicles. 20
19'. Unguis with 1 inner tooth, PAO with more than 30 vesicles 21
20. Mandible with many teeth in ring, claw with 4-5 inner teeth and PAO with 20 vesicles . . . . . *A. handschini* Denis, 1924
20'. Mandible with 8 teeth, claw with 3 inner teeth and 2 lateral teeth, Ant. IV with 6 sensilla. . . . . *A. jeanneli* Massoud, 1963
21. Abd. V with straight margin, Abd. VI is fully visible, 6 setae in dens, Ant. IV with 7 sensilla, PAO with 36 vesicles, mandible with 9-10 teeth. . . . . *A. caraibensis* Thibaud et Massoud, 1983
21'. Abd. V in "V" shape, Abd. VI is covered, 7 setae in dens, PAO with 38 vesicles, mandible with 13 teeth, 4 basal and 9 apical . . . . . *A. guineensis* Handschin, 1942

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