

REDESCRIPTION OF *NOTHOBRYA SCHUBARTI* ARLÉ, 1961 (COLLEMBOLA, ENTOMOBRYOMORPHA)¹

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ABSTRACT: Three paratypes of *Nothobrya schubarti* Arlé, 1961 were examined in connection with a forthcoming description of a new genus of Entomobryidae. Some of the features observed by Arlé in 1961, appeared similar to those of the new genus. These included: small size, color, the presence of PAO, a falciform mucro, the trochanteral organ and the body setae. Observation of a specimen with SEM allowed us to see the PAO and the other characteristics described by Arlé in more detail, but other features not described by him were seen which indicate that the genus belongs in subfamily Orchesellinae.

KEY WORDS: Collembola, *Nothobrya*, Orchesellinae, Entomobryomorpha.

Arlé (1961) described the genus *Nothobrya* of the family Entomobryidae from Brazil which was characterized by a lack of scales, presence of a postantennal organ, and a falcate mucro. Although the genus was placed with other Entomobryidae, its taxonomic placement has remained unclear and no subsequent records of the genus have been made. Barra (1999) examined type specimens of *Nothobrya* and clearly showed it to be distinct from his genus *Capbrya*. Due to the kindness of Dr. Cleide de Mendonça (Museu Nacional, Departamento de Entomologia, Universidade Federal do Rio de Janeiro, Brazil) we were able to examine three paratypes of this unusual species and clearly establish that the genus belongs in the subfamily Orchesellinae of the family Entomobryidae.

METHODS

The specimens were preserved in ethyl alcohol, apparently in good condition (Fig. 1), but they were very fragile. One specimen was mounted on slide using Hoyer's medium; another, without cleaning due to its fragility, was dehydrated using an ethanol series followed by critical-point drying in CO₂, mounted on an aluminium SEM stub, and coated in Argon atmosphere with 16 nm of gold in an Emitech K550 sputter-coater. SEM observations were made in a Zeiss DSM 940A with a new digital image capture (Point Electronic GmbH, Germany). Although the animal is much wrinkled, the photographs have been included in this paper since they are informative. Some characteristics observed under both the light microscope and SEM are added to Arlé's 1961 description.

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Genus *Nothobrya* Arlé, 1961

Diagnosis: The genus differs from other scaleless Orchesellinae by a combination of falcate mucro, postantennal organ and curved hook-like labral papillae.

Nothobrya schubarti Arlé, 1961

(Figs. 1-8)

Body length: Excluding appendages: 1.5-2.0 mm (according to Arlé), 0.95 mm and 1.16 mm respectively for the slide mounted and the ethyl alcohol preserved specimens we studied.

Color: Ground color of body pale yellow, with blue pigment on distal part of antennal segment I, final half of antennal segments II-III, distal two thirds of antennal segment IV, and bands on the anterior half of all tergites, coxae and trochanters (Fig. 1).

Cuticle: Body seen under SEM with dense reticular pattern (Fig. 7). Scales absent.

Head: Antennae six segmented with both the first and third segments very small (Figs. 2-3). Length in mm of segments 1-6: 0.02:0.05:0.01:0.09:0.12:0.17 respectively. Ommatidia 8+8, finely reticulated with A and B larger than the others. PAO is a vesicle (15 x 5 micrometers), narrowed in its inner side, situated in front and lateral to eyes A and B. In the specimens we saw the PAO is distorted as is the rest of the body (Fig. 4). Labral formula: 4/554 (Fig. 5), with labral papillae hook-like (Fig. 6).

Abdomen: Abdominal tergite IV 1.26, 1.8 times longer than abdominal tergite III.

Chaetotaxy: Large macrosetae present on head, thoracic segments and abdominal segment I, with pointed tips (type two of Christiansen, 1958). Macrosetae shorter and very robust on abdominal segment I-VI, with clear barbules. Mesosetae of different size, with barbs that give them a pubescent appearance. Bothriotricha 2-3-2 on abdominal segments II-IV respectively, as is characteristic of almost all Entomobryidae (Szeptycki, 1979).

Tenaculum: With 4 plus 4 teeth, and two setae on the corpus.

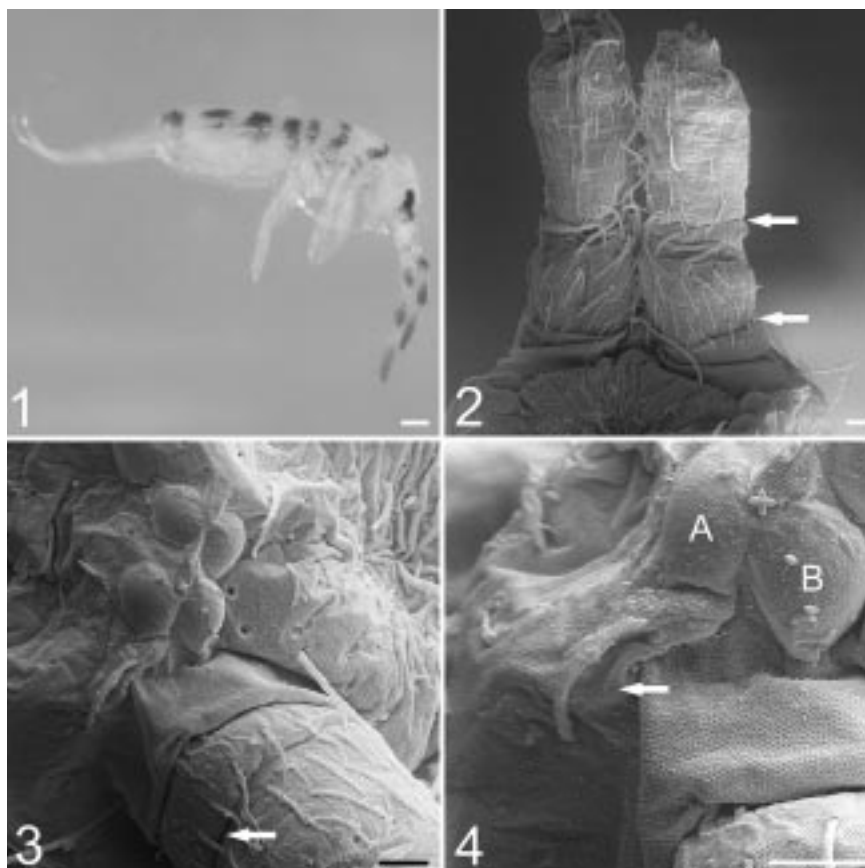
Furcula: Dentes ringed (Fig. 7) on basal three quarters, with the final portion narrowed and striated transversally. Mucro falcate without basal spine.

Leg: Trochanteral organ with three or four smooth setae.

Foot complex: Tenent hair truncate. Pretarsus with a single short blunt seta. Claw elongate, with the two teeth of the internal edges very basal, and without unpaired distal tooth in the two specimens we observed. Unguiculus with four lamellae but the external two are very narrow and fused about two thirds of the way from the base to the apex of the unguiculus. The two inner lamellae fused near the apex (Fig. 8).

Type-locality: Brazil, Parnaíba (Piauí), Fazenda Lama Prêta, "numerosos ex. sobre a lama e no "mud-crack" em volta da lagôa", XI.1960. R. Arlé leg. Otto Schubart found three specimens from Pernambuco (Riacho Terra Nova, 5.IX.1937). Material deposited at Museu Nacional, Universidade Federal do Rio de Janeiro.

Remarks: The PAO of *N. schubarti* was described by Arlé as a vestigial vesicle. Barra (1999) described it as a vesicle with a cavity on the top, but probably this observation resulted from the poor condition of the material he saw, long in ethyl alcohol and collapsed. The SEM examination of a paratype revealed that the PAO is a vesicle larger than described by Arlé; Figure 4 shows clearly the outline of the vesicle and how it is partially collapsed inward. The chaetotaxy and smooth seta at the ventral side of the final whorl of leg III are similar to most genera of the Entomobryidae. The trochanteral organ is poorly developed, as mentioned by Arlé, with three or four short and smooth setae. Arlé mentioned an almost imperceptible unpaired unguis tooth but we saw none under the SEM. The "type five" setae (Christiansen, 1958) are similar to those seen in *Entomobrya* (Fig. 7). The peculiar hooked labral papillae are similar to those seen in some species of *Orchesellides*, *Heteromurus* and *Dicranorchesella* (Mari Mutt, 1985). The segmental ratios and the presence of 6 segmented antennae indicate that this genus is best placed in the subfamily Orchesellinae.



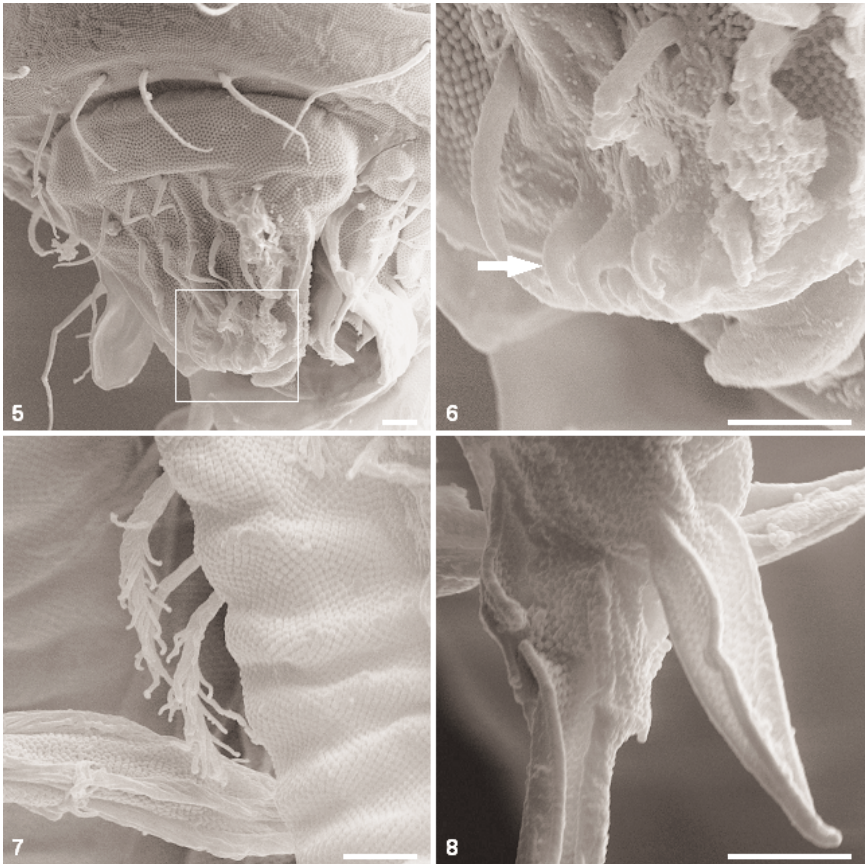
Figs. 1-4. *Nothobrya schubarti*. 1, Lateral habitus showing coloration, length of bar = 0.1 mm. Figs. 2-4 length of bars = 10 micra. 2, First two antennal segments, showing the basal subdivisions (SEM). The arrows point to the end of the two subsegments. 3, First antennal segment, PAO and first ommatidia (SEM). The arrow points to the end of the first subsegment. 4, Detail of collapsed PAO (arrow) and two first ommatidia (SEM).

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LITERATURE CITED

Arlé, R. 1961. Novas espécies de colêmbolas aquáticas (Nota preliminar). Atas da Sociedade de Biologia do Rio de Janeiro 5:34-37.



Figs. 5-8. *Nothobrya schubarti* (SEM), length of bars = 5 micra. 5, Labrum (square: Fig. 6). 6, Detail of hook-like labral papillae (arrow). 7, Partial view of the crenulate dens, with two setae to show their barbule morphology. 8, Unguiculus showing three of the four lamellae and basal part of the unguis.

Barra, J.-A. 1999. Un nouveau genre *Capbrya* avec deux nouvelles espèces de la Province du Cap (Rép. Sud Africaine) (Collembola: Entomobryidae). Bulletin de l'Institut Royal Des Sciences Naturelles de Belgique 69:19-24.

Bellinger, P. F., K. A. Christiansen, and F. Janssens. 1996-2004. Checklist of the Collembola: Families. <http://www.collembola.org/taxa/collemba.htm> [Last updated on 2004.03.29 by Frans Janssens].

Christiansen, K. A. 1958. The Nearctic members of the genus *Entomobrya* (Collembola). Bulletin of the Museum of Comparative Zoology, Harvard 118:440-545.

Mari Mutt, J. A. 1985. Three new species of Orchesellides from North Korea (Collembola: Entomobryidae: Orchesellinae). International Journal of Entomology, 25(4):297-309.

Szeptycki, A. 1979. Chaetotaxy of the Entomobryidae and its Phylogenetic Significance, Morpho-systematic studies on Collembola. IV. Polska Akademia Nauk Instytut Zoologiczny Krakow 1979:45-47.