

Description of two new species of the genus *Micranurida* Börner, 1901 (Collembola: Neanuridae, Pseudachorutinae) from Russia, with notes on the genus *Lanzhotia* Rusek, 1985

Adrian Smolis, Louis Deharveng & Anne Bedos

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Micranurida russica sp. n. and *Micranurida potapovi* sp. n. from the Russian Far East are fully illustrated and described. Both new species belong to a small group of *Micranurida* species characterized by thick globular sensilla on thorax II and abdomen IV. Remarks on *Lanzhotia brachycera* Rusek, 1985 are also included.

A. Smolis Department of Evolutionary Biology and Ecology, University of Wrocław, Przybyszewskiego 63/77, 51–148 Wrocław, Poland; E-mail: adek@biol.uni.wroc.pl

L. Deharveng & A. Bedos, Muséum National d'Histoire Naturelle, UMR 7205 France, CNRS/MNHN, CP50, 45rue Buffon, 75005 Paris, France; E-mail: deharven@mnhn.fr

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1. Introduction

In 1901 Börner established the genus *Micranurida* for his new springtail species *Micranurida pygmaea* from Europe. To date *Micranurida* includes 25 species distributed mainly in the Northern Hemisphere, and only *M. fluminensis* Fernandes & Mendonça, 2004 and *M. wladimiri* Najt & Rubio, 1978 have been described from South America.

Most species of the genus have a body length of only 0.3–0.5 mm and are the smallest members of the family Neanuridae. *Micranurida* species, besides their often minute size, are characterized by simple and not complicated postantennal organ, 0–5 (usually 0–2) eyes, simple and reduced mouthparts (mandibles rather thin with maximum 5 teeth, maxilla elongate and styliform usually without dentate lamellae, absence of labial seta L), complete reduction of furcula and retina-

culum, and highly reduced chaetotaxy on body and appendages. Morphologically the genus strongly recalls the genera *Anurida* Laboulbène, 1865, *Lanzhotia* Rusek, 1985, *Rusekella* Deharveng, 1982 and *Stachorutes* Dallai, 1973. Nevertheless, an examination of the characters listed above allows to easily separate *Micranurida* from them.

Two new species belonging to the genus *Micranurida* were discovered during the Collembolan investigations in Russian Far East. Their descriptions and taxonomic affinities are presented below.

2. Material and methods

Type specimens are preserved in the Muséum national d'Histoire naturelle in Paris, France (MNHN) and the entomological collection of

Wrocław University, Poland (ZIWU). Terminology essentially follows Smolis and Skarżyński 2004, and the following abbreviations are used in the text: ant. I–IV = antennal segments I–IV, AIII = antennal III organ, PAO = postantennal organ, th. I–III = thoracic terga I–III, abd. I–VI = abdominal terga I–VI.

3. Taxonomy

3.1. Description of *Micranurida russica* sp. n. (Fig. 1)

Material examined. Holotype: female on slide: Russia, Primorsky Krai, Khasan Area, Barabash [43°11' N 131°29'E], deciduous forest near old quarry, soil and litter, 27.IX.2004, leg. Romuald Jacek Pomorski, ZIWU. Paratype: juvenile on slide, same data as holotype, MNHN. Other material: 3 females and 1 juvenile, MNHN and ZIWU.

Diagnosis. The species is well differentiated by: fusion of sensilla A and B on ant. IV, slightly curved ventral guard sensillum in AIII, 1+1 eyes, oval PAO, globular sensilla on th. II and abd. IV, presence of setae p_2 on abd. I–IV and tibiotarsal formula: 17, 17, 16.

Description. Habitus typical of the genus (Fig. 1a). Body length (without antennae) 0.32–0.44 mm (holotype: 0.36 mm). Colour of the body white. Granulation rather coarse, with areas of larger granules as in Fig. 1i.

Antennae slightly shorter than head (Fig. 1). Ant. I with 7 setae, Ant. II with 11 setae. Dorsal and ventral chaetotaxy of ant. III–IV as in Figs. 1b and c. Ant. III and IV fused dorsally. AIII with two small internal sensilla and two equal, cylindrical, slightly curved guard sensilla. Ventral microsensillum on ant. III present. Ant. IV with erect large simple apical vesicle, seta i , very small subapical organite (or), microsensillum (ms) and 6 well differentiated sensilla A–F. Sensilla C, D, E and F drop-like. Sensilla A and B hammer-like and fused together linearly.

One unpigmented and relatively large eye on each side of head present. 3+3 setae oc present. Postantennal organ oval, consisting of 9–10 simple vesicles (Fig. 1h). Buccal cone short, labium as in Fig. 1e, without papillae. Labrum with 4, 3, 4

setae, prelabrals 4. Mandibles and maxillae as in Figs. 1f and g. Dorsal chaetotaxy of head as in Fig. 1a, seta a_0 absent, unpaired seta d_1 or even setae d_1 present, seta p_1 present. Head with 2+2 setae along ventral line (Fig. 1e).

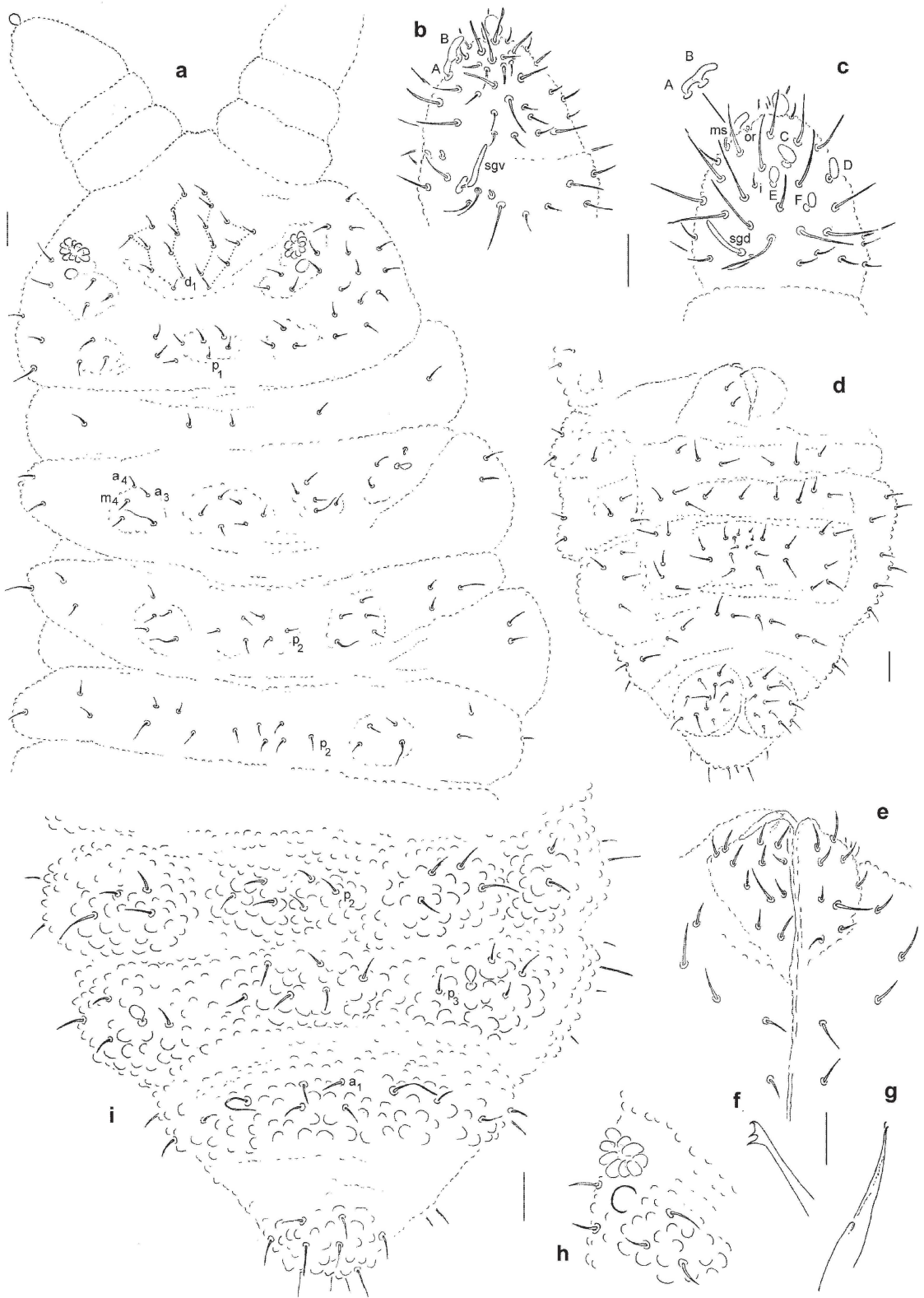
Dorsal chaetotaxy of thorax and abdomen as in Figs. 1a and i. Body setae short and fine, smooth and acuminate. Thorax I with 3+3 setae. Sensillar formula of body 022/11111. Lateral sensilla on th. II and abd. IV globular (Figs. 1a, i), other sensilla slender, thin and longer than nearby ordinary setae. Setae m_4 on th. II–III present. Setae a_3 and a_4 on th. II–III present or a_3 sporadically and asymmetrically absent, setae a_2 absent. Setae p_2 present on th. II–abd. IV, in forward position. Setae a_3 on abd. I–III present, setae p_3 on abd. IV and setae a_1 on abd. V present. Thoracic sternum without setae, ventral tube with 4+4 setae. Unpaired seta absent on abd. II sternum, present on abd. III. Six microsetae on furcula rudimentary (Fig. 1d).

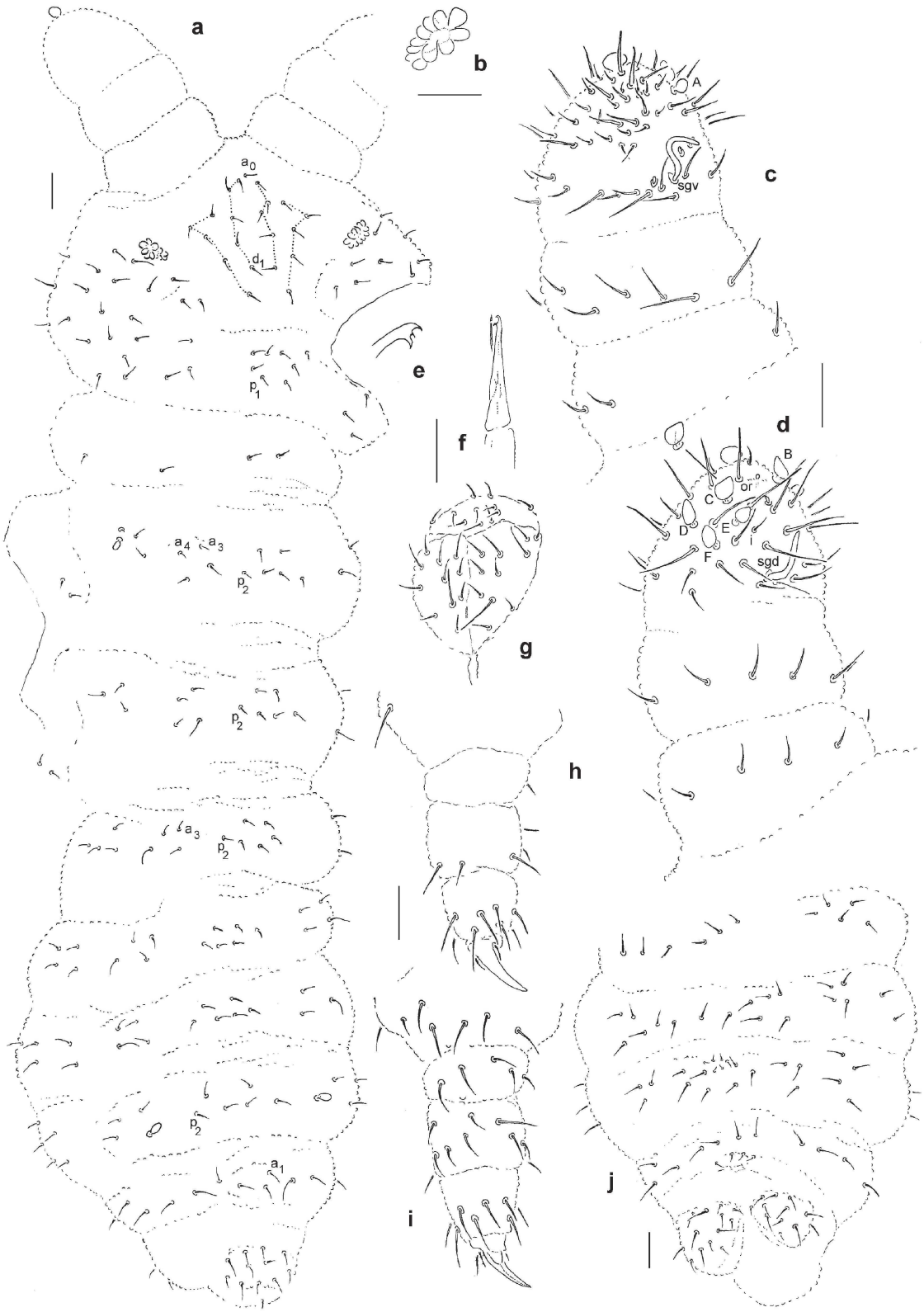
Leg chaetotaxy from I to III as follows: tibiotarsi with 17, 17, 16 (seta M present, setae A_3 and A_6 absent) and without clavate tenent hairs; femora I, II, III with 12, 11, 10. Trochanters with 5 each. Coxae I, II, III with 3, 6, 6; subcoxae I, II, III with 1, 2, 2. Claws with neither inner nor lateral teeth. Empodial appendage absent.

Etymology. Named after its terra typica, Russia.

Discussion. The morphological characters of white body, thick lateral sensilla on th. II and abd. IV, ventral guard sensillum of ant. III slightly curved, fusion of antennal sensilla A and B place *Micranurida russica* sp. n. near *M. bescidica* Smolis & Skarżyński, 2004, described from the Carpathians (central Europe, Smolis & Skarżyński 2004). The new species differs from it in the presence of 1+1 eyes (v. absent), presence of 9–10 vesicles in PAO (v. 5–7), antennal sensilla C and D separate (v. fused), presence of seta i on

► Fig. 1. *Micranurida russica* sp. n. – a. Dorsal view of head, thorax and first abdominal segment. – b. Antennal segments III–IV, ventral side. – c. Antennal segments III–IV, dorsal side. – d. Abdomen, ventral view. – e. Labium and setae VI. – f. Mandible. – g. Maxilla. – h. Postantennal organ and ocular area. – i. Chaetotaxy and granulation of abdominal terga III–VI. Scale bars 0.01 mm.





ant. IV (v. absence), presence of setae p_2 on abd. I–IV (v. absence) and presence of 17, 17, 16 setae on tibiotarsi I–III (v. 14, 14, 14).

3.2. Description of *Micranurida potapovi* sp. n. (Fig. 2)

Material examined. Holotype: female on slide: Russia, Primorskyi Krai, Partizansk Region, Ekaterinovka [42°55' N 133°02' E], Chandalez Range, forest soil, Berlese extraction, 26.IX. 2004, leg. Louis Deharveng & Anne Bedos (Ru-103), MNHN.

Diagnosis. The species is easily recognizable due to: 6 drop-like sensilla A–F on ant. IV, strongly S-shaped ventral guard sensillum in AIII, absence of eyes, elliptical PAO, the presence of setae a_3 on abd. I–III, setae p_2 on abd. IV and tibiotarsal formula: 12, 12, 11.

Description. Habitus typical of the genus (Fig. 2a). Body length of holotype: 0.41 mm. Colour of the body white. Granulation fine and homogenous.

Antennae slightly shorter than head (Fig. 2a). Chaetotaxy of antennae as in Figs. 2c and d. Ant. I with 7 setae, Ant. II with 11 setae. Ant. III and IV fused dorsally. AIII with two small internal sensilla, strongly S-shaped ventral guard sensillum (sgv) and slightly curved dorsal guard sensillum (sgd). Ventral microsensillum on ant. III present. Ant. IV with erect large simple apical vesicle, seta i , very small subapical organite (or), microsensillum (ms) and 6 well differentiated drop-like sensilla A–F.

Eyes absent. 3+3 setae oc present. PAO oval consisting of 11 simple vesicles (Fig. 2b). Buccal cone short and wide, labium as in Fig. 2g, without papillae. Labrum with 4, 4 setae, prelabrals 4. Mandibles and maxillae as in Figs. 2e and f, relatively strong. Dorsal chaetotaxy of head as in Fig.

2a, seta a_0 , even setae d_1 and setae p_1 present. Head with 2+2 setae along ventral line.

Dorsal chaetotaxy of thorax and abdomen as in Fig. 2a. Body setae short and fine, smooth and acuminate. Thorax I with 3+3 setae. Sensillar formula of body 022/11111. Lateral sensilla on th. II and abd. IV globular (Fig. 2a), other sensilla slender, thin and slightly longer than nearby ordinary setae. On th. II–III setae m_4 and a_2 absent, a_3 and a_4 present. Setae p_2 present on th. II–abd. IV. Setae a_3 on abd. I–III and a_1 on abd. V present, setae p_3 on abd. IV absent. Thoracic sterna without setae, ventral tube with 4+4 setae. Unpaired seta absent on abd. II sternum, present on abd. III. Six microsetae on furcula rudimentary (Fig. 2j).

Leg setation (Fig. 2h and i) from I to III as follows: tibiotarsi with 12, 12, 11 and without clavate tenent hairs (all setae T absent; setae A_3 , A_6 and M absent); femora I, II, III with 9–10, 11, 10. Trochanters with 5 each. Coxae I, II, III with 3, 7, 7; subcoxae III with 1, 2, 2. Claws with neither inner nor lateral teeth. Empodial appendage absent.

Etymology. The new species is dedicated to Mikhail Potapov, an excellent Russian collembologist and our friend.

Discussion. Though only one specimen has been collected, the new species is well characterized, its chaetotaxy is perfectly symmetrical, and it is an adult: we therefore decided to describe it. *Micranurida potapovi* sp. n. is most similar to *M. sensillata* (Gisin, 1953) (west European species) in strongly S-shaped ventral guard sensillum of AIII, elliptical PAO, fine and uniform granulation of body, ant. IV with seta i , similar chaetotaxy of th. II–III (setae m_4 absent) and identical number and arrangement of tibiotarsal setae (tibiotarsi I, II, III with 12, 12, 11 setae respectively). Nevertheless, they can be easily distinguished by the following characters: number of sensilla on ant. IV (in *M. potapovi* 6 v. in *M. sensillata* 5), localization of two small sensilla in AIII (in *M. potapovi* both between guard sensilla v. in *M. sensillata* one between guard sensilla and second outside), presence/absence of seta a_0 on head (in *M. potapovi* present v. in *M. sensillata* absent) and dorsal chaetotaxy of abdomen (in *M. potapovi* setae a_2 on abd. I–III and setae p_2 on abd. IV present v. in *M. sensillata* mentioned setae absent).

◀ Fig. 2. *Micranurida potapovi* sp. n. – a. Habitus and dorsal chaetotaxy. – b. Postantennal organ. – c. Antenna, ventral side. – d. Antenna, dorsal side. – e. Mandible. – f. Maxilla. – g. Labium and labrum. – h. Chaetotaxy of coxa, trochanter, femur and tibiotarsus, dorsolateral view. – i. Chaetotaxy of coxa, trochanter, femur and tibiotarsus, ventrolateral view. – j. Abdominal segments II–VI, ventral view. Scale bars 0.01 mm.

4. Notes on the genus *Lanzhotia* Rusek, 1985

Arrangement, number and shape of sensilla on third and fourth antennal segments are some of the best diagnostic characters in the taxonomy of *Micranurida*. Morphological modifications and presence/absence of some antennal structures are common within the genus, connected probably with minute size of most members and their deeply edaphic lifestyle. Among *Micranurida* species, *M. balta* Fjellberg, 1998 (reported from Europe: Sweden, Denmark and Poland) is easily recognized by its 10 dagger-like sensilla (see Smolis & Skarżyński 2005: Figs. 4–6). The same conspicuous condition is known by us only in *Lanzhotia brachycera* Rusek, 1985 (see Rusek 1985: Figs. 2A, B), a member of the monotypic genus described from Czech Republic. A detailed study of the original description of *L. brachycera* and materials of *M. balta* (including types) showed that both taxa have many other similarities: absence of eyes, elongated sensillum B on ant. IV, rounded PAO, lanceolate and slightly thickened lateral sensilla on th. II and abd. IV, absence of setae p_2 on abd. I–IV; but also important differences in the number of vesicles in PAO (in *balta* 7–9 v. in *brachycera* 6–7), in the presence/absence of cryptopygy (in *balta* absent v. in *brachycera* present), in the chaetotaxy of labrum

(in *balta* 4/3,2,4 v. in *brachycera* 2/2,4,4), in the number of mandibular teeth (in *balta* 3–4 v. in *brachycera* 2), in the presence/absence of bosses in furcal area (in *balta* absent v. in *brachycera* present), and in the number of setae on ventral tube (in *balta* 4+4 v. in *brachycera* 3+3). In the light of these observations we state that the taxonomical status of *Lanzhotia brachycera* is unclear, and undoubtedly it needs verification and further studies on the basis of the type material of the species. The investigation should explain and resolve the question of the possible synonymy of the mentioned genus with *Micranurida*.

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References

- Börner, C. 1901: Neue Collembolenformen und zur Nomenclatur der Collembola Lubb. — Zoologischer Anzeiger 24: 696–712.
- Rusek, J. 1985: *Lanzhotia brachycera* **gen. n., sp.n.** from Central Europe (Collembola, Pseudachorutidae). — Acta entomologica bohemoslovaca 82: 175–179.
- Smolis, A. & Skarżyński, D. 2004: A new species of the genus *Micranurida* Börner, 1901 from Poland (Collembola: Neanuridae). — Genus 15 (1): 1–5.
- Smolis, A. & Skarżyński, D. 2005: Notes on *Micranurida balta* Fjellberg, 1998 (Collembola: Neanuridae), a springtail species new for the Polish fauna. — Polskie Pismo Entomologiczne 74: 57–60.