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Redescription of *Onychiurus rectospinatus* (Collembola: Onychiuridae)

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Collembola, Onychiuridae, *Onychiurus* s. str., taxonomy, redescription, synonymy

Abstract. *Onychiurus rectospinatus* Stach, 1922 is redescribed. *O. arvensis* Rusek, 1979 is a junior synonym of *O. rectospinatus*. Morphological differences between *O. rectospinatus* and *O. circulans* Gisin, 1952 are given.

INTRODUCTION

Onychiurus rectospinatus Stach, 1922 was described based on specimens collected on the area of former Austro-Hungarian Empire, within the present borders of Slovakia. Later Stach (1934) considered it as a subspecies of *O. ambulans* (L., 1758). Finally, Stach (1954) restated it as a valid species – *O. rectospinatus*.

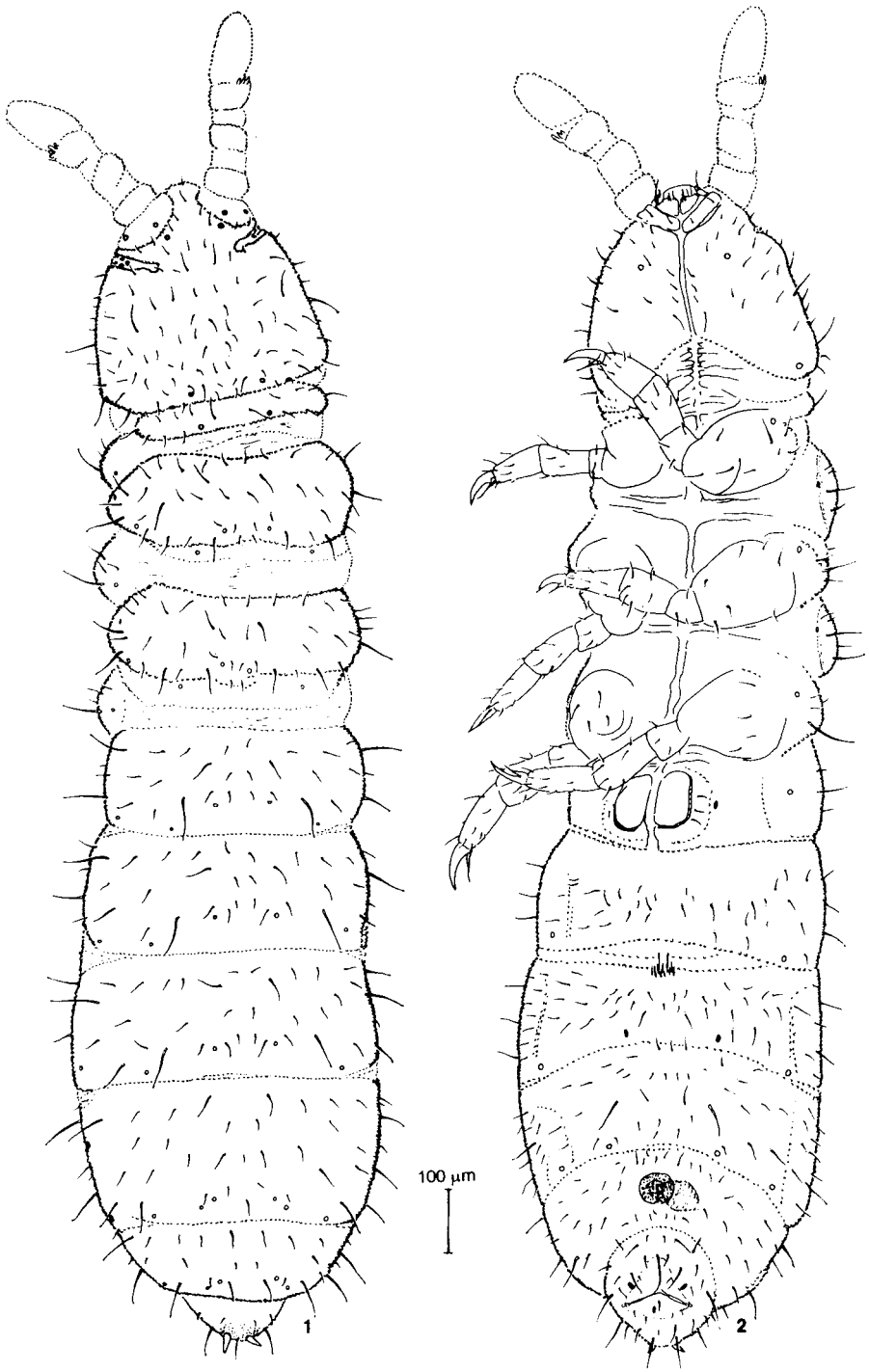
The examination of type material of *O. rectospinatus* has shown that the original description and redescription (Stach, 1922, 1954) were inaccurate. A very important morphological character – the shape of the setae, was omitted or overlooked. This inaccuracy was repeated in keys to species (Gisin, 1960; Palissa, 1964), and possibly was a reason of description of *O. arvensis* Rusek, 1979, which is here synonymized with *O. rectospinatus*. In addition, a related species has been found among Stach's type material, specimens collected in Poland, identified as *O. rectospinatus*, here identified as *Onychiurus circulans* Gisin, 1952. This suggest that a redescription of *O. rectospinatus*, with considering characters used in modern taxonomy of Onychiuridae, is necessary.

Onychiurus rectospinatus Stach, 1922

Onychiurus rectospinatus Stach, 1922: 8.
Onychiurus ambulans rectospinatus; Stach, 1934: 183.
Onychiurus arvensis Rusek, 1979: 143, syn. n.

DIAGNOSIS. Postantennal organ, composed of 13–17 vesicles, covered by secondary vesicles. No trace of furca. Pseudocellar (pso) formula dorsally: 32/133/33353; ventrally: 11/000/1112; on subcoxa 2 pseudocelli. Formula of parapseudocelli (psx) ventrally: 0/000/101002+1^{m} (each anal lobe with 1 psx), all femora ventrally with 1 parapseudocellus. Male ventral organ situated on 2nd and 3rd abdominal sterna. Abdominal segment VI relatively small, with anal spines. Dorsal chaetotaxy with forked or apically rounded setae.

REDESCRIPTION. Length without antennae 1.8–2.3 mm, lectotype 1.85 mm. Colour white. Body shape typical of *Onychiurus* s. str. (Figs 1, 2), with relatively small abdominal segment VI, with anal spines (30–40 μm long). Antennae approximately as long as head. No trace of furca. Granulation more or less uniform, distinct, somewhat coarser on terga, head capsule and around anal spines (Fig. 3), secondary granules 2–5 μm in diameter. Area



Figs 1–2: *O. rectospinatus*. 1 – dorsal chaetotaxy and position of pso; 2 – ventral chaetotaxy and position of pso and psx (black).

antennalis distinct. Antennal III sense organ composed of 5 guard setae, 2 sensory rods, 2 bent and smooth sensory clubs and 5 papillae (Fig. 7). Postantennal sense organ (PAO) 50–60 μm long, consisting of 12–17 vesicles, covered with secondary vesicles (Fig. 9).

Pseudocellar (pso) formula dorsally: 32/133/33353; ventrally: 11/000/1112; on subcoxa 2 pso (pseudocelli 8–10 μm in diameter). Formula parapseudocelli (psx) ventrally: $0/000/101002+1^{m}$ (each anal lobe with 1 psx), all femora ventrally with 1 psx. Position of pso and psx as in Figs 1 and 2.

Dorsal chaetotaxy as in Fig. 1, usually symmetrical, well differentiated into macrochaetae and microchaetae (macrochaetae length: on abdominal terga V and VI – 50–60 μm, on thoracic and I–IV abdominal terga – 25–40 μm). Macrochaetae and most of other setae on dorsal side apically rounded or forked (Fig. 11). Abdominal tergum IV always with seta a_0 and sometimes with m_0. Setae located in front of anal spines relatively short, usually not reaching anal spines (Figs 3, 4). Between legs on pro-, meso- and metathorax no setae. Tubus ventralis without setae at base. Ventral abdominal chaetotaxy as in Fig. 2.

Antennal segment IV with a subapical organelle, composed of two pits of which one is deep and usually ampullaceous, the other is shallow, with small sensilla (Fig. 6). Microsensillum on antennal segment IV in latero-external position, c. 1/2 length from the base. Antennal segment III with microsensillum slightly below antennal III sense organ (Fig. 7). Thoracic terga II and III with microsensilla laterally.

Claws (Fig. 13) always without teeth, 60–70 μm long in largest specimens. Empodial appendage without basal lamella, appendage length equal to 3/4 inner edge of the claw, 25–30 μm long in largest specimens. Tibiotarsi with symmetrical distal verticil, composed of 9 setae.

Male ventral organ situated on 2nd and 3rd abdominal sterna, fully developed only in mature specimens with ductus ejaculatorius. It consists of a pair of thickened, sharply pointed setae on posterior margin of abdominal sternum II and a group of 10–12 similar setae on anterior margin of abdominal sternum III (Fig. 12).

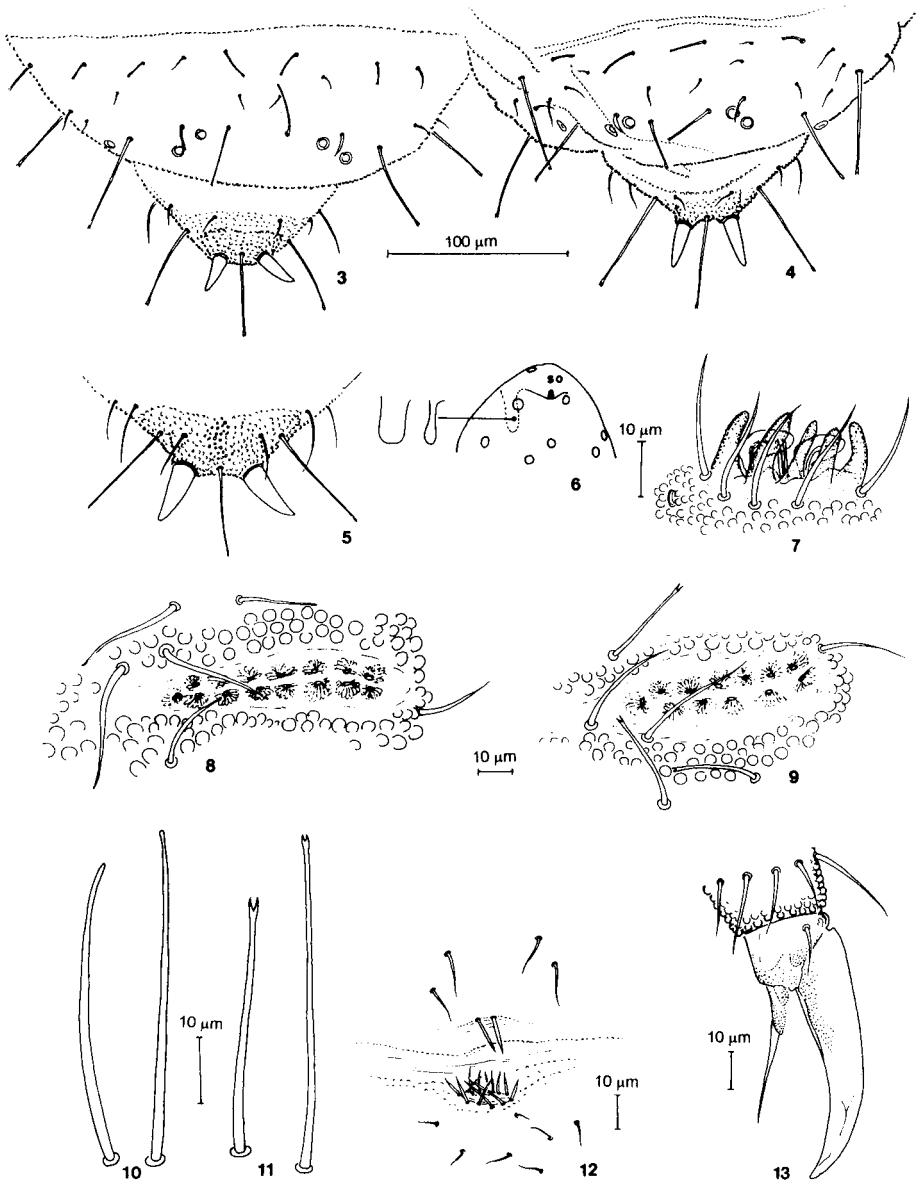
VARIABILITY. In all the investigated material fully forked setae were present only in adults, and additionally this character was particularly strongly expressed in males. At first, the setae of juvenile specimens are acuminate, after the following moult they become apically rounded.

In one specimen one anal spine was duplicated.

TYPE MATERIAL: Lectotype (♂) on separate slide, here designated, labelled: "Berekalia, near Léva (Kom. Bars), Slovakia (Hungaria) under stones near a house, vii–ix.1915, leg. J. Stach"; 10 paralectotypes (3♂, 4♀, 3 juv.) on slides and 8 paralectotypes in alcohol, same data, coll. of Institute of Animal Systematics and Evolution, PAS, Kraków, Poland.

OTHER MATERIAL: 7 sp. on slides and 13 sp. in alcohol, labelled as follows: "Nagy-Salló (Kom. Bars), Slovakia (Hungaria) 7.vi.1924, leg. E. Dudich", at present Tekovské Lužany, Pohronská pahorkatina, Slovakia, coll. of Institute of Animal Systematic and Evolution, PAS, Kraków, Poland; 1 sp. on slide, 6 sp. in alcohol, labelled as follows: "Berek, Slovakia, 1915, leg. J. Stach", at present ?, coll. of Institute of Animal Systematic and Evolution, PAS, Kraków, Poland; holotype (♂) of *Onychiurus arvensis* Rusek, 1979, Moravia, Troubsko near Brno, Czech Republic, alfalfa field, soil samples, 2.vii.1974/A-352, leg. J. Rusek, J. Rusek coll.; 1 sp. (♂) on slide, Małopolska Upland, Skowronno near Pinczów, Poland, steppe nature reserve "Skowronno", under stone, 10.vii.1995, leg. R. J. Pomorski (author's collection).

AFFINITY. *O. rectospinatus* is closely related to *Onychiurus circulans* Gisin, 1952, from which it differs in the ventral pso formula (*O. rectospinatus* – 11/000/1112, *O. circulans* – 12/111/3212), distinctly apically rounded or forked setae (in *O. circulans* most of setae are



Figs 3–13. 3 – lectotype of *O. rectospinatus*, chaetotaxy, granulation and position of pso on abdominal terga V and VI; 4 – holotype of *O. arvensis*, chaetotaxy, granulation and position of pso on abdominal terga V and VI; 5 – *O. circulans*, abdominal tergum VI; 6 – *O. rectospinatus*, scheme of apical part of antenna, so – subapical organelle; 7 – *O. rectospinatus*, antennal III sense organ; 8 – *O. circulans*, shape of setae surrounding postantennal organ; 9 – *O. rectospinatus*, shape of setae surrounding postantennal organ; 10 – *O. circulans*, shape of abdominal macrochaetae; 11 – *O. rectospinatus*, shape of abdominal macrochaetae; 12 – *O. rectospinatus*, male ventral organ; 13 – *O. rectospinatus*, claw, and empodial appendage.

retused or slightly rounded) (Figs 8–10) and shorter setae located on VI abdominal tergum, which usually do not extend to the anal spines (in *O. circulans* the setae extend to the anal spine) (Fig. 5).

TAXONOMIC REMARKS. Comparison of the original description (Rusek, 1979) and the holotype of *O. arvensis* with the type material of *O. rectospinatus* reveals no important morphological differences. Both species have forked setae, the same pseudocellar formula and very similar chaetotaxy (Figs 3, 4), granulation and shape of male ventral organ. Differences in body length (1.2 mm – *O. arvensis*, 1.8–2.3 mm – *O. rectospinatus*) and other metric characters, in some details of chaetotaxy (no seta m_0 on abdominal segment IV and arrangement of additional setae in dorsal chaetotaxy in *O. arvensis*) and in the number of vesicles in PAO result from the fact that *O. arvensis* was decribed on the basis of 1 specimen. The author had more material available (6 specimens), but the values of metric characters given in his description disregard the range of their individual variation. The holotype of *O. arvensis* is an immature male; this is indicated by the not fully formed male ventral organ, the structure of the genital plate and the absence of ductus ejaculatorius (cf. Rusek, 1979: Fig. 9). In addition, the specimen on the slide is distinctly shrunken and, as a result, some of the measurements are not fully reliable. In the light of these facts, *O. arvensis* is considered to be a junior synonym of *O. rectospinatus*.

ZOOGEOGRAPHIC REMARKS. In Stach's collection, specimens collected in Poland, and labelled "Mników, near Kraków, Poland, in cave under stone, 15.v.1921, leg. M. Kusiak", identified as *O. rectospinatus*, actually represent *O. circulans* which, consequently, is a new species for the Polish fauna (Stach, 1964; Szeptycki & Weiner, 1980). The record increases the known range of the species eastwards; hitherto it included Madeira, France, Switzerland, Austria and Germany (Gisin, 1960; Salmon, 1964).

O. rectospinatus cannot be removed from the list of Polish Collembola, because a new locality of this species is given above. Thus the known distribution area of the species comprises Czech Republic, Slovakia and south-eastern Poland. Literature records exist of *O. rectospinatus* from Spain, Italy and Lithuania (Salmon, 1964) but, in the light of this redescription, they require confirmation.

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