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Protaphorura christiani n. sp. from Austria, with remarks on the generic status of *Protaphorura stiriaca* (STACH, 1946)
(Collembola: Onychiuridae)

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ABSTRACT. *Protaphorura christiani* n. sp. is described from the soil of a natural forest reserve in east Austria. The new species can be distinguished from its congeners by the spatulate tips of the long body setae. Generic status of *Protaphorura stiriaca* (STACH, 1946) is discussed. *Heteronychiurus* BAGNALL, 1949 is a junior synonym of *Protaphorura* ABSOLON, 1901.

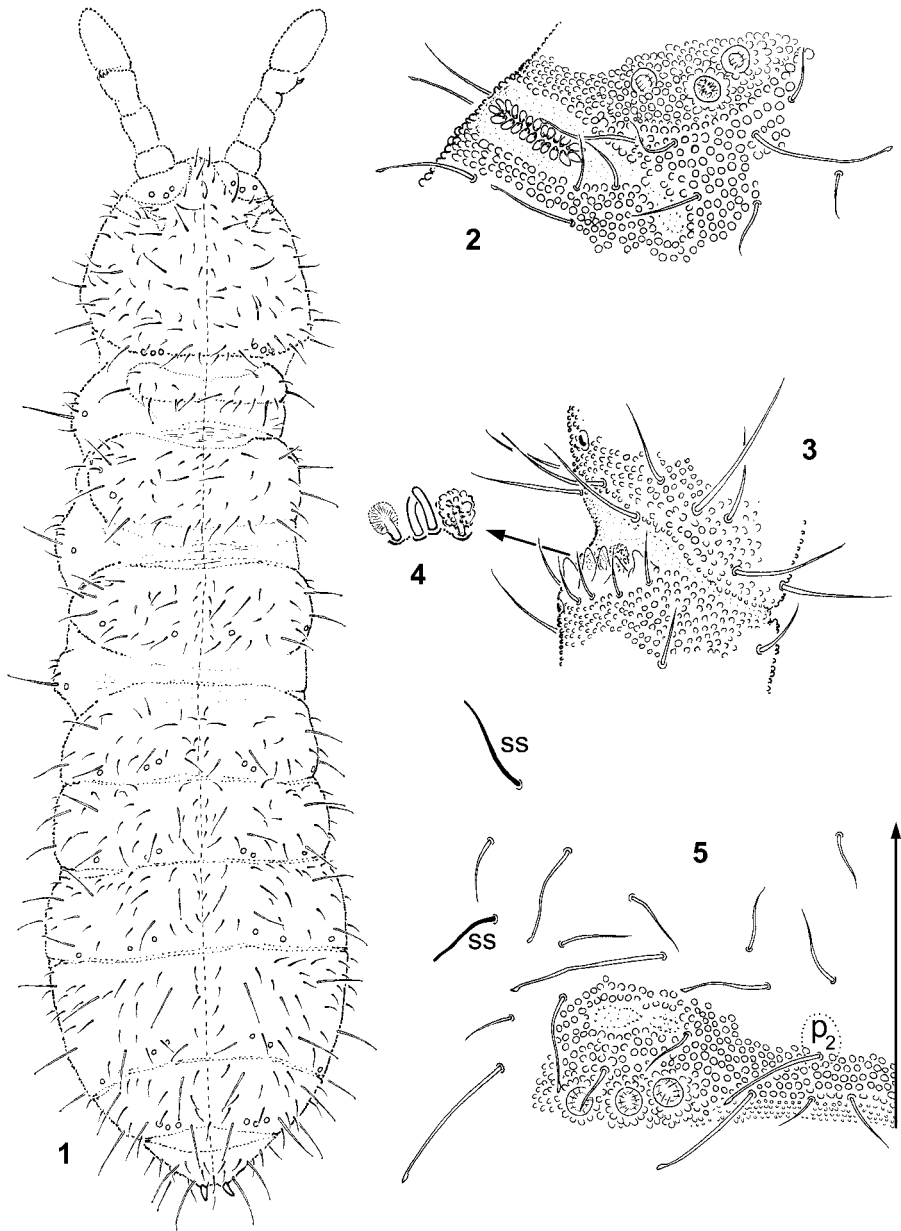
Key words: entomology, taxonomy, new species, new synonyms, Collembola, Onychiuridae, *Protaphorura*, Austria.

A new species of *Protaphorura* ABSOLON, 1901 was discovered in an east Austrian deciduous forest soil. Collembolan investigations at this site were a part of the study of soil fauna community patterns in old-growth natural forests.

***Protaphorura christiani* n. sp.**

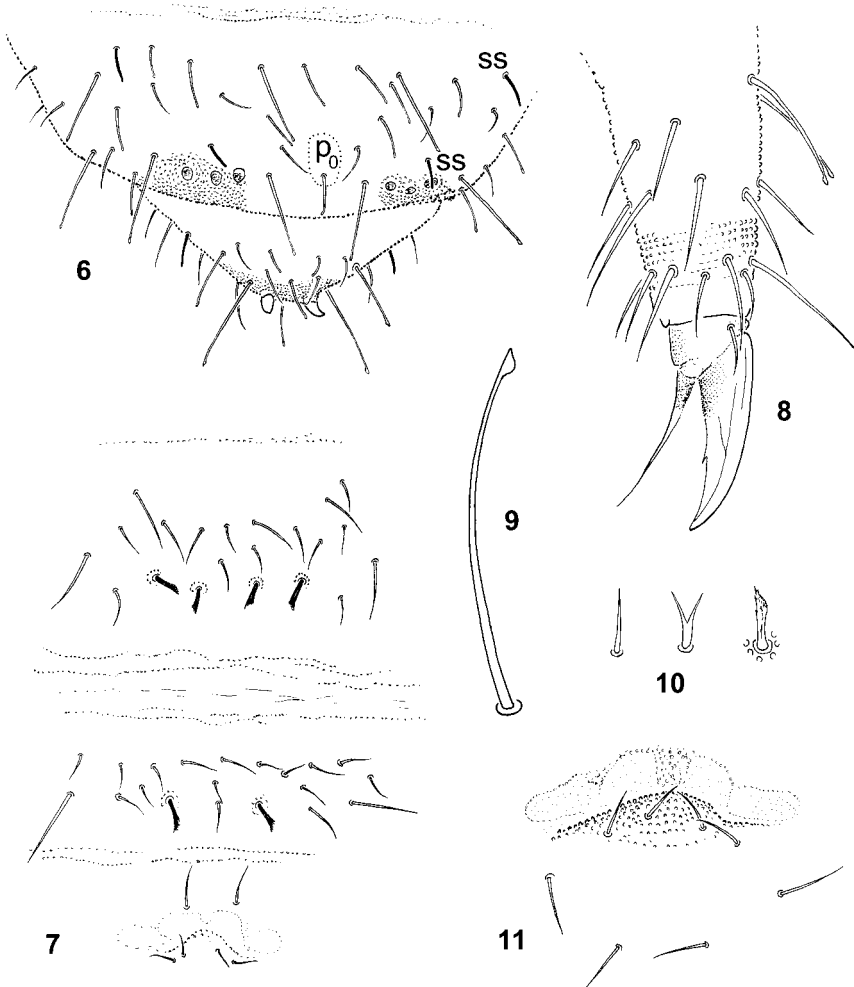
DIFFERENTIAL DIAGNOSIS

P. christiani n. sp. is related to a group of *Protaphorura* species with relatively small anal spines, small number of thoracic pseudocelli. This group contains the following European species: *P. stiriaca* (STACH, 1946) (32/001/23232); *P. spinoidea* (STEINER, 1955) (33/022/33342); *P. pseudostiriaca* (LOKSA, 1964) (32/



1-5. *Protaphorura christiani* n. sp.: 1- habitus and dorsal chaetotaxy, 2 – postantennal organ and anterior cephalic pseudocelli, 3 – antennal III sense organ, 4 – antennal III sense organ – sensory clubs, 5 – chaetotaxy of hind posterior margin of head and posterior cephalic pseudocelli, ss – sensilla

001/12132); *P. januarii* (WEINER, 1977) (32/011/23232) and *P. fistania* THIBAUD & PEJA, 1994 (33/012/33233). The new species differs from its congeners in various morphological details (especially apically rounded and spatula-like broadened dorsal meso- and macrochaetae, and the pseudocellar formula). Setae with spatulate tips are unique among the currently known *Protaphorura* species. Similar setae only occur in some species of *Onychiurus* GERVAIS, 1841, *Deuteraphorura* ABSOLON, 1901 and *Kalaphorura*, ABSOLON, 1901. Another important character of the new species is the presence of the male ventral organ on abdominal terga II and III. Within *Protaphorura* a similar organ is observed only in *P. stiriaca*.



6-11. *Protaphorura christiani* n. sp.: 6 – chaetotaxy of abdominal terga V-VI, ss – sensilla, 7 – male ventral organ, 8 – tibiotarsal chaetotaxy and claw, 9 – typical macrochaeta, 10 – changes in shape of the setae of the male ventral organ during postembryonic development, 11 – remnant of furca

MATERIAL

Holotype: Reproductive male, leg. C. LEITHNER & A. BRUCKNER, April 29, 2002; mounted on slide; deposited in the collection of the Department of Biodiversity and Evolutionary Taxonomy (former Department of Systematic Zoology and Zoogeography, Wrocław University).

Paratypes: Same data as holotype. 49 paratypes, on slides (13) and in alcohol (36), kept with the holotype; 11 paratypes deposited at the Naturhistorisches Museum, Vienna.

Locus typicus: Austria, Lower Austria, Kolmberg near Bruck/Leitha: 16°41' E / 47°58' N, 345 m a. s. l. Litter layer and soil of an oak/hornbeam forest. Soil: Calcaric Planosol (HACKL et al. 2000). Vegetation: a mosaic of *Carici pilosae-Carpinetum* NEUHÄUSL et NEUHÄUSLOVÁ-NOVOTNÁ 1964 (56%), *Cynancho-Tilietum platyphyllis* WINTERHOFF 1963 (16%) and *Corno-Quercetum pubescentis* MÁTHÉ et KOVÁCS 1962 (5.8%).

ETYMOLOGY

Protaphorura christiani is named in honor of ERHARD CHRISTIAN, the eminent soil zoologist and dedicated teacher.

DESCRIPTION

Color white. Length without antennae: reproductive males 1.55 mm, reproductive females 1.7-1.85 mm. Body shape cylindrical (fig. 1). Granulation of body surface generally uniform and fine, antennal bases well marked.

Antennae nearly as long as head. Antennal segment IV with a subapical organite. Microsensillum on antennal segment IV in latero-external position at about 1/3 of segment length from the base of the segment.

Antennal organ III with 5 guard setae, 5 relatively small papillae, 2 sensory rods, 2 similar in size sensory clubs: one is morel-like distinctly granulated, the other sponge-like (figs. 3-4). The microsensillum is inserted slightly below antennal organ III.

Postantennal organ of *Protaphorura* type, with 20-26 simple vesicles (fig. 2).

Pseudocelli: dorsal 33/012/33333; ventral 1/000/00000; subcoxae 1/1/1. Pseudocelli of thorax II in lateral position (fig. 1). Two specimens showed asymmetrical arrangement of pseudocelli: an additional (fourth) pseudocellus on the antennal base and the posterior margin of the head.

Parapseudocelli: ventral 1/000/100001; subcoxae 0/0/0.

Thoracic terga II and III with lateral microsensilla. Dorsal chaetotaxy nearly symmetrical, well differentiated into macro-, meso- and microchaetae (fig. 1). Dorsal meso- and macrochaetae apically rounded and spatula-like broadened (figs 5, 6, 9). Microchaetae pointed. Sensilla weakly differentiated, well visible only on head and abdominal tergum V (figs 5, 6). Sensilla formula 2/011/222121. Head without d_0 , with p_2 shifted forward (fig. 5). Abdominal tergum V with p_0 , abdominal tergum VI with one medial seta. Short setae in front of the anal spines in

(sub)parallel arrangement (fig. 6). Setae between the legs on thorax I-III: 1+1, 2+2(1+1), 2+2. Ventral tube with 2+2 basal setae and c. 9+9 setae on the shaft.

Claw I-III with a small inner tooth. Empodial appendage without basal lamella, slightly longer than inner edge of the claw. Tibiotarsus I-III with a distal verticil of 11 setae (fig. 8).

Male ventral organ with 4 thickened setae on abdominal sternum II and 2 similar setae on abdominal sternum III (fig. 7). These setae are thickened and sharply pointed in immature males, and forked in subadults. In reproductive males the setae appear obliquely cut and fringed (fig. 10).

Furca reduced to a shallow pocket with 2+2 setulae on the cuticular fold (fig. 11).

Anal spines slender, on indistinct papillae.

REMARKS

P. christiani n. sp. is closely related to *P. stiriaca*. A detailed examination of the type material of *P. stiriaca* not only confirmed the accuracy of the original description (STACH, 1946), but also enabled us to ascertain that the generic status of this species needed comments and explanations.

P. stiriaca was described from Austria by STACH (1946). BAGNALL (1949) established a new genus *Heteronychiurus* for this species. He listed the following features in his diagnosis: "The structure of the sensory clubs, of SO. Ant. III, the unusual swollen form of the body and the nature of the m ventral organ ...". For a long time the genus was ignored or regarded as subjective synonym of *Protaphorura* ABSOLON, 1901. WEINER (1996) and POMORSKI (1998) in their generic revisions accepted it, but without investigations of *P. stiriaca*.

The morphological study of the species listed above in the "Differential diagnosis" showed that other species of *Protaphorura* can display a mosaic of characters regarded by BAGNALL as diagnostic for *Heteronychiurus*. For this reasons we think that erection of the genus *Heteronychiurus* was not justified and undoubtedly it is a junior synonym of *Protaphorura*.

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