

Two species of Collembola new for the fauna of Hungary

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Abstract. Two Collembola species are recorded as new for the fauna of Hungary. *Tetracanthella pericarpatica* Kaprus & Tsalan, 2009 (Isotomidae), previously known only from the Transcarpathian Lowland and Roztochchia Hill (Ukraine), was collected in a oak-ash-elm lowland forest in Western Hungary. Some corrections and additions to the original description are given. The xerophilous species *Xenylla uniseta* Da Gama, 1963 (Hypogastruridae), found mostly in Mediterranean countries, was collected in meadow steppe habitats near Budapest. An updated description is provided with emphasis on the first instar.

Keywords. *Tetracanthella pericarpatica*, *Xenylla uniseta*, Isotomidae, Hypogastruridae, chaetotaxy, first instar.

INTRODUCTION

The collembolan fauna of Hungary is fairly well studied. The number of the species in Hungary has been steadily increasing (Traser & Dányi, 2008; Traser *et al.*, 2011) to the current total of 414 species (Dányi & Traser, 2008). Due to the diversity of biogeographical regions, many areas are still unexplored. Opportunistic sampling at two localities, carried out on survey trips or in the course of other studies, yielded two interesting species new to the Hungarian fauna: *Tetracanthella pericarpatica* and *Xenylla uniseta*.

The genus *Tetracanthella* Schött, 1891 is one of the largest genera in the family Isotomidae with about 100 described species in the Holarctic region and now six species in Hungary. The widespread hypogastrurid genus *Xenylla* Tullberg, 1869 has now nine Hungarian representatives.

MATERIALS AND METHODS

The terminology follows Deharveng & Bedos (1997), Potapov (2001), and Potapov and Deharveng (2005) for *Tetracanthella pericarpatica*, and Da Gama (1967, 1969) and Thibaud *et al.* (2004) for *Xenylla uniseta*.

General morphological abbreviations used: Ant. = Antennal segments; PAO = postantennal

organ; Th. I–III = thoracic tergites; Abd. I–VI = abdominal tergites.

Abbreviations used for *Tetracanthella pericarpatica*: a1; p1; p3 = 'normal setae' in the anterior and posterior rows ('1' in medial, '3' in more distal position on tergites); Ml; Md; Mdl = macrochaetae dorsally in lateral, dorsal and dorsolateral positions; dcA, dcH = diameter of the eyes (ocelli) 'A' and 'H'; GIII = claw (griffe) of leg III; eIII = empodium (unguiculus) of leg III; Ed3 = ergot dorsal on Ti III; d = dens; s = s-chaetae; ms = s-microchaetae; ASe, ASi = external and internal anal spine; ap = unpaired seta in the frontal area of the head (also known as 'd_o'); VT = ventral tube.

Morphological code used for *Xenylla uniseta*: *Dorsal chaetotaxy*: **a** = a₀ on the head absent; **b** = p₁ on the head absent; **f** = L1 on the head is longer than L3; **h**₁ = a₂ on Th. II-III behind a₁; **h**₂ = p₂ on Th. II-III before p₁; **j** = la₂ on Th. II-III absent; **k** = m₃ on Th. II-III absent; **l** = p₃ absent on Abd. IV; **o** = m₃ on Abd. IV absent; **q** = a₂ on Abd. V absent; *Ventral chaetotaxy*: **r** = p₁ on the head absent; **s** = m₃ absent on head; **t** = the pair of setae on Th. II-III. absent; **v** = p₁ and p₂ on Abd. II absent; **w** = p₆ on Abd. II absent; **a**₂ = a₆ on Abd. III absent; **a**₃ = p₅ on Abd. III absent; **a**₄ = m₁ on Abd. IV absent.

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RESULTS

***Tetracanthella pericarpatica* Kaprus & Tsalan, 2009**

(Figures 1–4, Tables 1–2)

Material examined. The species was collected in Vasvár-Nagymákfa, Vas county, Hungary, 47° 02'09.14"N, 16°44'23.28"E; 204m above sea level. Samples were taken in litter and mosses on logs lying on the ground (leg. Gy. Traser). A total of 65 mostly praeadult specimens were collected. The survey of the collembolan fauna of this area was carried out in the course of the 6th Hungarian Biodiversity Day on 5 June 2010. The specimens are stored at the Institute of Sylviculture and Forest Protection, University of West Hungary.

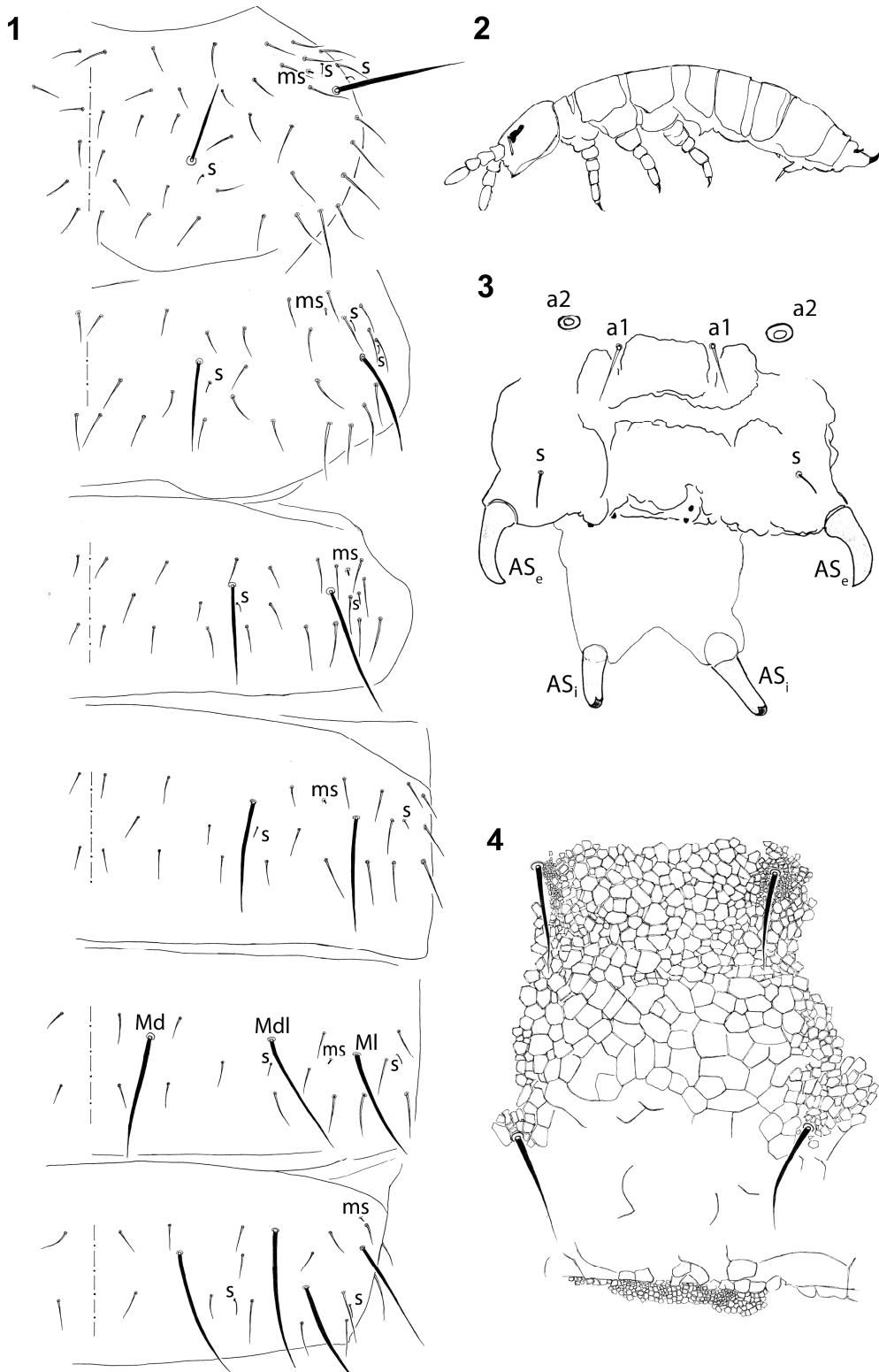
Since *T. pericarpatica* was formerly known and described only from Ukraine, we present a summary of the most important characters and proportions based on the specimens collected in Hungary (Tabs. 1–2) along with some additional information and corrections to the original description. The proportions used follow the comparative measurements by Deharveng (1987).

Body length is up to 1.5mm, the adults are rather broad while the juveniles are rather slim in shape. The coloration is dark bluish-black, including the antennae. The cuticular granulation of the tergites is fine before and behind the two rows of setae, while the polygons between the rows are coarser, even bigger than the sockets of the macrochaetae. They are biggest on Abd. IV–VI where the so-called smooth areas can also occur. The canals between the big polygons are well marked. However, individual variants can show much finer granulation without smooth areas. Mesochaetae are not shortened in the axial part of tergites, the macrochaetae are long and pointed. On Abd. IV. the setae p3 and p1 are of subequal length. Eyes 8+8, the ocelli G and H are smaller in diameter. The seta 's' on Ant. III of the male is present in our specimens. Labrum with two prae-labral and 5,5,4 labral setae, the outer maxillary lobe with 4 sublobal hairs. On the labium 4 basomedial, 5 basolateral, 3 proximal hairs and 3 hyaline setae are present. There are three postlabial

hairs along the ventromedial groove. Between the medial line and pc3 on the posterior margin of the head are 4(5)+4(5) setae. The frontal seta 'ap' is absent on the head dorsum, but unpaired setae sometimes cause asymmetry. The axial chaetotaxy is reduced to 10(12);8(6)/4;4;4;4. The corner mesochaeta on Th. II tergum is stronger than the other setae of the 'p' row. The number of 's' and 'ms' chaetae on Th. II – Abd. V is 3,3/2,2,2,2,4 (s) and 1,1/1,1,1,1 (ms). First coxa with seta. Tibiotarsi with 21, 21, 23 setae and 1,2,2 long and clavate tenent hairs dorsally in the apical whirls. Femora ventrally with one long curved seta and 2 s setae. VT with 2+2 posterior (caudal) and 3+3 laterodistal setae. Manubrium with 6(5)+6(7) posterior setae. The anterior and posterior manubrial subcoxae with (4+2)+(4+2) setae, respectively. Dens with 2 posterior and 1 anterior setae. The anal spines are very strong, amber colored and bent. The papillae of the anterior pair are very strong and connected by a bulge of strongly sclerotized cuticle. On this bulge the polygons can coalesce to smooth areas. The medial mesochaetae (a1) on Abd. V are slightly posterior to the medial macrochaetae (a2). Arrangement and parameters of setae and spines on the dorsum of Abd. V–VI as follows: $a2-a2/a1-a1 = 2.5$; $a1-a1/a1-a2 = 1.5$; $a2-ASi/a2-Ase = 1.8$; $a2-ASi/a2-a2 = 1.6$; $a2-a2/a1-a1 = 2.2$.

Ecology. Many *Tetracanthella* species occur in Alpine moss habitats (Deharveng, 1987; Deharveng and Bedos, 1997; Potapov and Deharveng, 2005), others can be found in forest litter (Kaprus and Tsalan, 2009). In Hungary, *T. pericarpatica* was collected on moss and in litter of a lowland oak-ash-elm (*Fraxino pannonicae*–*Ulmum*) forest at the foot of the Alps in the district of Praenoricum, rather far from the Transcarpathian type locality. Most probably the species was washed down by the river Csömöc to the bank sediment and the adjacent wet meadows where some specimens were collected from decaying plant matter.

Remarks. Since *T. pericarpatica* was described from a similar wetland forest habitat (Kaprus and Tsalan, 2009), it is probably a stenotopic hygrophilous and silvicolous lowland species.



Figures 1–4. *Tetracanthella pericarpatica*, 1 = Dorsal chaetotaxy of Th. II-III and Abd. I-IV (right side of the body); 2 = Habitus; 3 = Abd. V-VI with the strongly sclerotized bulge between the ASPs; 4 = Reticulation on the dorsomedial part of Abd. IV

***Xenylla uniseta* Da Gama, 1963**

(Figures 5–11, Table 3)

Material examined. The species was collected on the Tétényi Plateau, Budapest, Hungary, 47° 25'46.02"N, 18°58'21.58"E, 207m above sea level, on 24 October 2009, 14 and 30 May 2011 (leg. M. Korda). A total of 115 included a number of first instar specimens. In both cases soil cores were extracted. The specimens are stored at the Institute of Sylviculture and Forest Protection, University of West Hungary.

X. uniseta was originally described from Dalmatia (Da Gama 1963) and subsequently found in Serbia (Loksa & Bogojević 1970), the Iberian Peninsula (Acón 1975, Jordana *et al.* 1997) South-East Ukraine (Bondarenko-Borisova & Sandul 2002) and into the Transcarpathian region (Kapur, pers. comm.). Based on the Hungarian specimens, we give details of the chaetotaxy and add new information to the data of Da Gama (1963, 1967, 1969), Loksa & Bogojević (1970), Thibaud *et al.* (2004) and Jordana *et al.* (1999). Examination of numerous juvenile specimens uncovered further particulars of the first instar's chaetotaxy in comparison with the adult stage (Table 3).

According to Da Gama (1969), *X. uniseta* is a species with morphological characters coded as “b, f, h1, h2, q, a4”, which applies to the adult specimens collected in Hungary. First instar juveniles show “a, b, f, h1, h2, I, j, k, l, n, o, q” dorsally, and “r, s, t, v, w, y, a2, a3, a4” ventrally.

The oligochaetous body chaetotaxy of the first instar resembles that of the corresponding stages of other Hypogastruridae (Yosii 1961, Thibaud 1970).

Ecology. *Xenylla uniseta* is a rare xerophilous species chiefly known from Mediterranean countries. The locality in Ukraine is an interglacial forest-steppe refugium (Bondarenko-Borisova & Sandul 2002). The Hungarian specimens were collected in the following dolomite-steppe meadow associations: *Seselio leucospermi* – *Festucetum pallentis*, *Chrysopogono* – *Caricetum humilis*, *Festuco pallenti* – *Brometum pannonicum*, *Cleistogeni* – *Festucetum sucatae*.

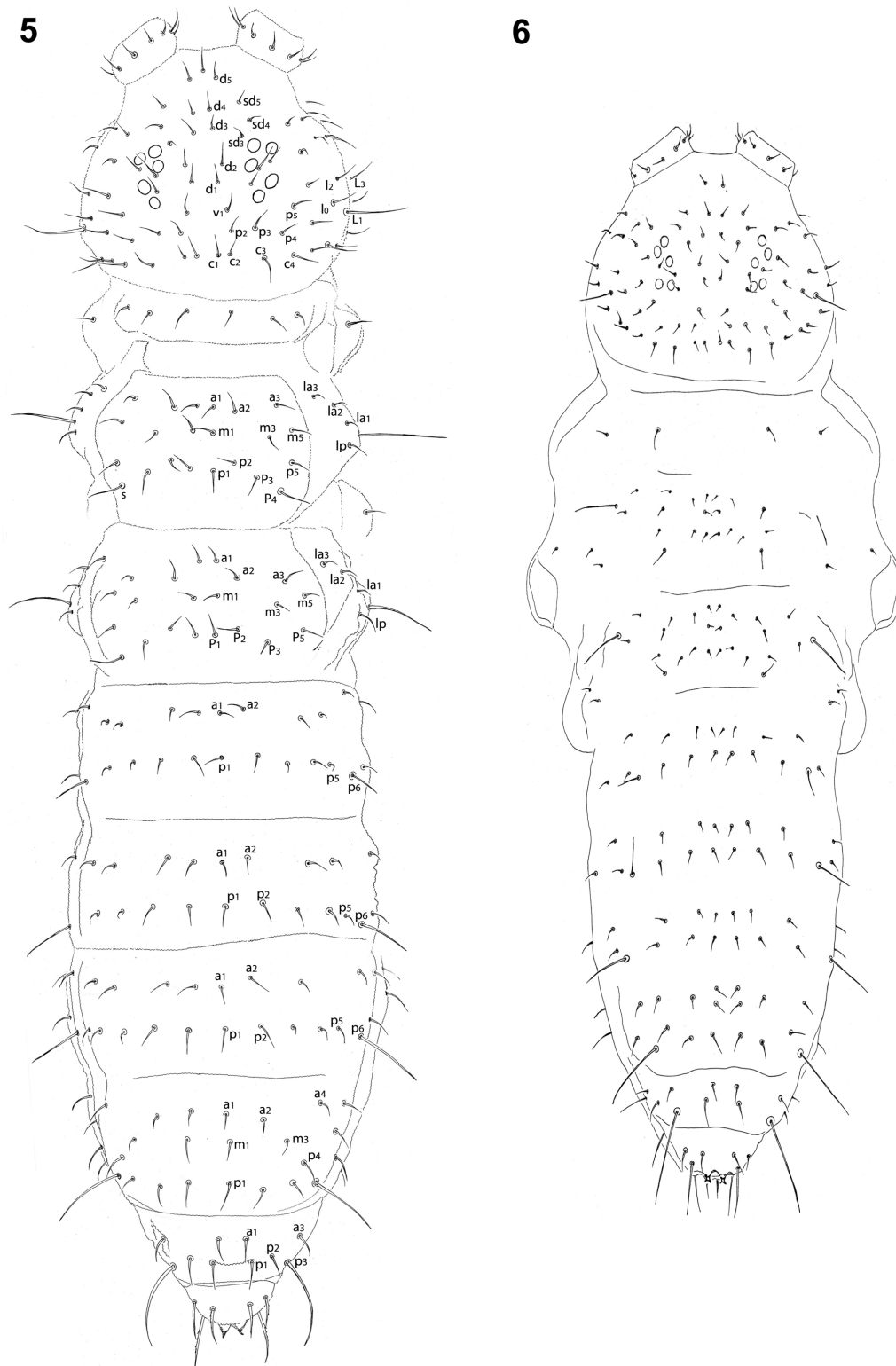
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Table 1. Main characters of *T. pericarpatica*

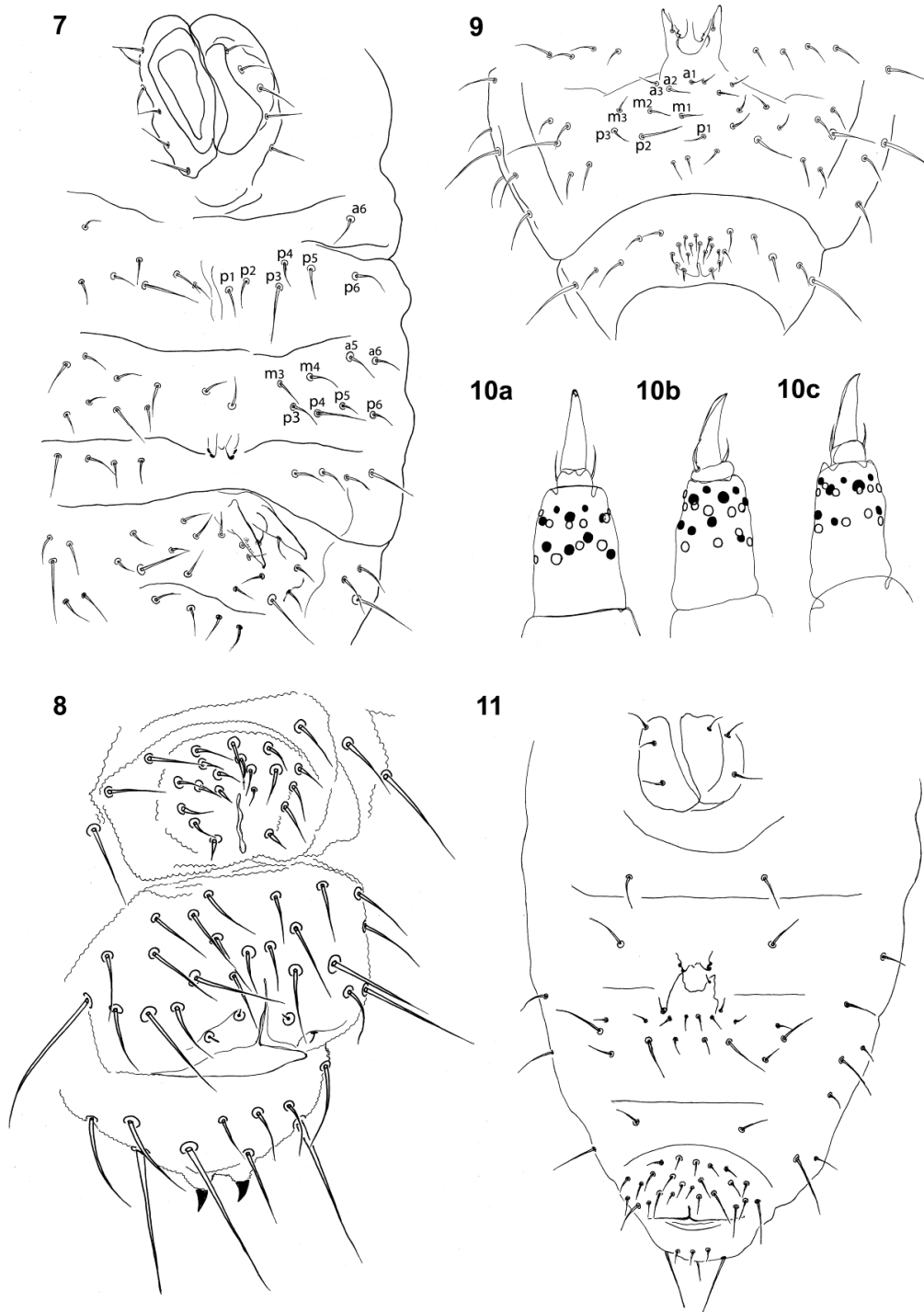
Features	<i>Tetracanthella pericarpatica</i>
PAO	3.5-4xs as long as nearest ocellus
praelabral and sublobal hairs	2 praelabral and 4 sublobal hairs
number of setae on tibiotarsi I, II, III	21, 21, 23
seta on coxa I	present
manubrium	with 6(5)+6(7) posterior setae
dens	with 1+2 seate (anterior + posterior)
mucro	with 2 teeth
retinaculum	with 3 teeth, no seta
smooth fields between the cuticle polygons	present, sometimes absent
anal spines	very strong, amber color, fortification between the two spines prominent
ventromedian seta on the metasternum	present (1+1)

Table 2. Proportions of *T. pericarpatica*

Head		Thorax II			Abdomen IV				Leg III			
PAO/ dcA	dcA/ dcH	Ml/ p1	Md/ p1	p1/ GIII	Md/ p1	p3/ p1	p1/ a1	p1/ GIII	GIII/ eIII	Ed3/ GIII	d/ GIII	ASi/ GIII
3.5-4	1.88	4.4	3.3	0.55	5.3	0.9	1.1	0.5	3.1	1	1	0.96



Figures 5–6. *Xenylla uniseta*, dorsal chaetotaxy, 5 = adult; 6 = first instar



Figures 7–11. *Xenylla uniseta*, 7 = Ventral chaetotaxy of Abd. I–IV (adult); 8 = Ventral chaetotaxy of Abd. V–VI (adult); 9 = Ventral chaetotaxy of Abd. IV–V (adult male) 10a–c = Chaetotaxy of Tita I–III (circles: ventral side, dots: dorsal side); 11 = Ventral chaetotaxy of abdominal segments (first instar)

Table 3. Main characters of *Xenylla uniseta*, adult and first instar

Features	Adult	First instar
blunt setae on Ant. IV.	present	absent
a ₀ on the head	present	absent
praelabral/labral setae	4/554	2/444
number of labial setae	6 proximal, 5 basolateral and 4 basomedial	3 proximal, 5 basolateral and 4 basomedial
postlabial setae along ventral groove	3	2
maxillary palp	with one sublobal hair	with one sublobal hair
number of setae on tibiotarsi	19,19,18	18,18,17
distal verticil on tibiotarsi	11	10
setae on Abd. VI.	serrated (some)	all smooth
anal spines shape	small, slightly curved	bispinate
ventromedial setae on Th. II. and Th. III.	present	absent
Abd. II. ventral chaetotaxy	a6 + p1-6	only one seta
laterodistal setae on the VT	4+4 (in some cases more, sometimes asymmetrical)	3+3

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