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Redescription of *Plutomurus kelasuricus* Martynova, 1969 (Collembola: Tomoceridae) from Georgian caves

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The collembolan species *Plutomurus kelasuricus* Martynova, 1969 is redescribed and illustrated based on material sampled in Georgian caves. Differences from the morphologically similar *P. abchasicus* Martynova, 1969 are discussed. A key to species of the genus *Plutomurus* found in the Caucasus is provided.

Keywords: Springtails; *Plutomurus*; cave; Georgia.

Introduction

The springtail genus *Plutomurus* Yosii, 1956 is found in North America, Europe, and Asia and comprises 27 species living in caves or soil (Jordana et al., 2012). Six species have been recorded so far in the Caucasus (Martynova, 1969; Kniss & Thibaud, 1999; Barjadze & Djanashvili, 2008; Djanashvili & Barjadze, 2011; Jordana et al., 2012): *Plutomurus abchasicus* Martynova, 1969 (Georgia, in soils), *P. birsteini* Djanashvili and Barjadze, 2011 (Georgia, in caves), *P. jeleznovodski* Kniss and Thibaud, 1999 (north Caucasus, in a cave), *P. kelasuricus* Martynova, 1969 (north and south Caucasus, in caves), *P. ortobalaganensis* Jordana and Baquero, 2012 (Georgia, in a cave) and *P. sorosi* Kniss and Thibaud, 1999 (north Caucasus, in a cave). *Plutomurus kelasuricus* was described based on two greatly damaged specimens from the cave Kelasuri by Martynova (1969), and the description was brief and incomplete. The species was subsequently redescribed based on seven specimens collected in Baribana (Northern Caucasus) and Sataplia IV caves by Kniss and Thibaud (1999), but the authors did not investigate material from the type locality. We were able to examine material collected in the caves of the Abkhazia, Samegrelo and Imereti regions in 1967-1970 and in Leskhulukhe and Sataplia I caves in 2012 and 2013. Based on this material, we provide further information on the species characters of *P. kelasuricus*.

Diagnosis of the genus *Plutomurus* Yosii, 1956

Eyes from 6+6 to 0+0. Prelabral setae from 2+2 to 4+4. This genus is easily distinguished by the presence of large spine-like setae at the external bases of the dens combined with well-developed multisetaceous trochanteral organs on the trochanter and on the base of the femur. There are four or fewer intermediate teeth on the mucro, and there is only a single small mucronal lamella, usually on the basal tooth. Most have some pigment, but the eyes are often reduced (Yosii, 1956, 1967). Sexual dimorphism absent. The genus is Holarctic but does not occur in arctic regions. It is often found in alpine areas. Within the Holarctic region, species are limited to eastern Asia, Europe, the Caucasian region, and western North America. Although 60% are found in caves and many of these have not been found elsewhere, they show very little troglomorphy.

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Figure 1. Sampling sites for *Plutomurus kelasuricus* Martynova, 1969.

Plutomurus kelasuricus Martynova, 1969 (Figures 1–2)

Material: 6 ex., Kelasuri cave, 23.x.1969, leg. R. Djanashvili; 8 ex., Akhali Atoni cave, 20.ix.1969, leg. R. Djanashvili; 3 ex., Adzaba cave, 16.vi.1968, leg. R. Djanashvili; 2 ex., Aghmosavlet Gumista I cave, 17.x.1969, leg. R. Djanashvili; 1 ex., Aghmosavlet Gumista II cave, 17.x.1969, leg. R. Djanashvili; 2 ex., Tsebelda cave, 25.vii.1969, leg. R. Djanashvili; 1 ex., Shakurani II cave, 2.ix.1969, leg. R. Djanashvili; 2 ex., Shakurani IV cave, 28.viii.1969, leg. R. Djanashvili; 6 ex., Solkota cave, 25.viii.1968, leg. R. Djanashvili; 2 ex., Sataplia IV cave, 18.viii.1970, leg. R. Djanashvili; 1 ex., Leskhulukhe cave, 30.vi.2013, leg. Sh. Barjadze; 2 ex., Sataplia I cave, 21.iii.2012, leg. Sh. Barjadze; (Figure 1). Slides are deposited at the Institute of Entomology of the Agricultural University of Georgia, Tbilisi, Georgia.

Description: Body length 2.3 to 4.2 mm. Head between eye patches, antennal bases, body, basal half of III antennal segment, legs (except tibiotarsi) and manubrium well pigmented: grey pigment distributed as dens points on the yellow background. Antennae a little shorter than body. Eye patch small, black with 6 eyes (Figure 2C). Prelabral setae 3+3, labrum with 5, 5, 4 setae and 4 curved setae on the distal part of labrum (Figure 2E). Trochanteral organ well-developed on trochanter and femur, composed of more than 40 short setae and several long ones. Spine-like setae on tibiotarsus I, II, and III: 0, 0, 1. Tenent hairs very short, pointed. Ratio of unguis, unguiculus, and tenent hair is 29:14:9. Unguis with well-developed pseudonychia, 0.34 to 0.40 times as long as inner part of unguis. Unguis of pro-, meso- and metalegs with 0-3 inner teeth (Figure 2D, 2F). Unguiculus of all legs always with 1-3 inner teeth. Tenaculum with 4+4 teeth and without a heavy seta on corpus (Figure 2A). Ratio of manubrium/dens/mucro is 7.5:12.5:1. Ventral side of manubrium with numerous, relatively thick and large setae. Outer margins of dens with 5 thick and large spine-like setae. Mucro without subapical denticles and a seta projecting prominently beyond apex (Figure 2B). Dental formula variable: 11-17 **I-V** / 4-6 **I** 1-2 **I** 1 **I** 1 **I** 1 **I** 1 **I** 1-2 **I** 1 **I** 1 **I** (large dental spines are in Roman and bold) (Figure 2G).

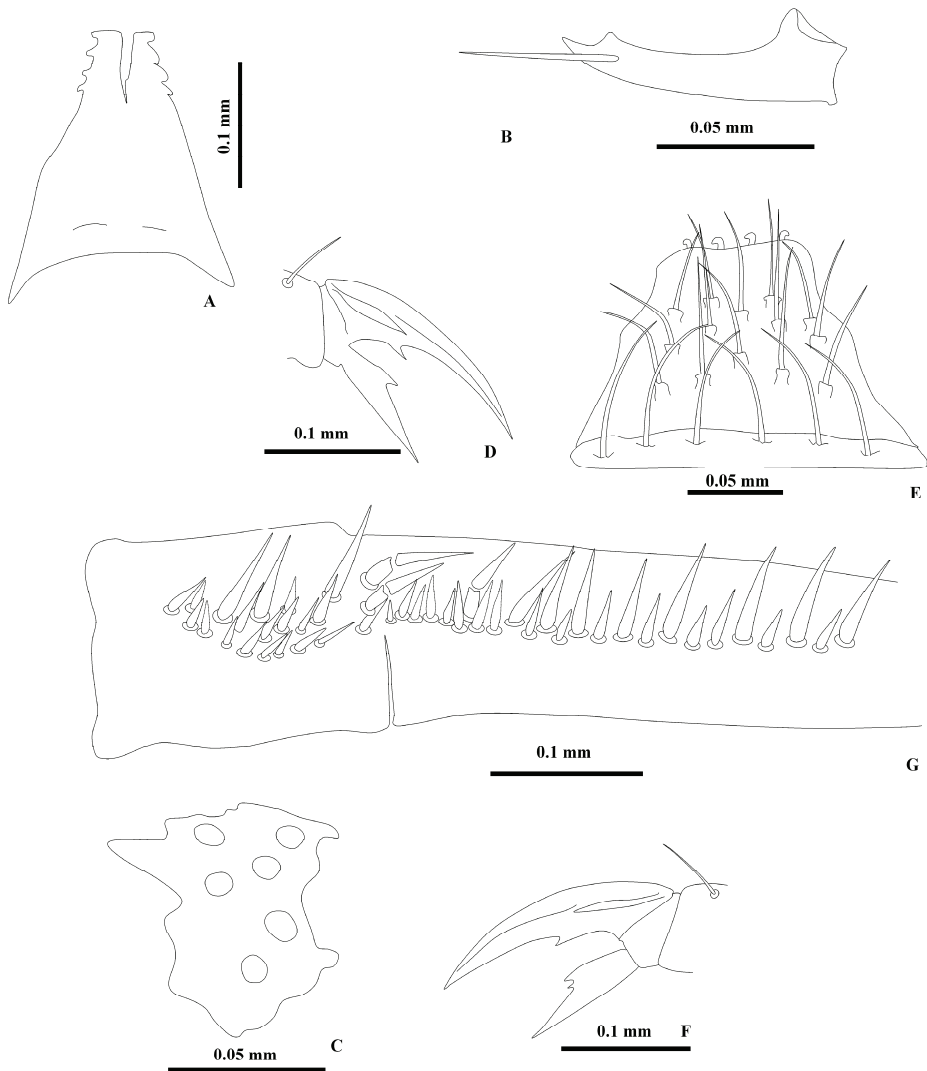


Figure 2. *Plutomurus kelasuricus* Martynova, 1969: (A) tenaculum; (B) mucro (mucronal setae are omitted); (C) eye patch; (D) claw III; (E) prelabral and labral setae; (F) claw III; (G) dens.

Remarks: Martynova (1969) did not compare *P. kelasuricus* with its morphologically most closely related species in the original description, while Kniss and Thibaud (1999) considered *P. kawasawai* Yosii, 1956 and *P. yamatensis* Yosii, 1956 as closely-related species. *Plutomurus kelasuricus* resembles *P. abchasicus* Martynova, 1969 in the number of eyes, pointed tenent hairs, presence of inner tooth in the unguiculus, and differs from *P. abchasicus* by the distribution of spine-like setae on tibiotarsus I, II, and III (0, 0, 1 in *P. kelasuricus*, 0, 0, 2 in *P. abchasicus*) and the number of prelabral setae (3+3 in *P. kelasuricus*, 2+2 in *P. abchasicus*).

Key to the species of the genus *Plutomurus* Yosii, 1956 in the Caucasus

1. Eye patch always with 6 eyes 2
 - Eye patch always with fewer than 6 eyes 5
2. Tenent hair weakly to moderately clavate 3
 - Tenent hair pointed 4
3. Trochanteral organ with more than 40 setae. Unguiculus of all legs always without minute inner teeth. Dental formula: 5-15 **I-II** / 2-9 **I 0-** 3 0-**I** 0-3 0-**I** 0-3 0-**I** 0-2 0-**I** 0-2 0-**I** *P. birsteini* Djanashvili and Barjadze, 2011
 - Trochanteral organ with fewer than 40 setae. Unguiculus of all legs always with a few minute inner teeth. Dental formula: 4-5 **I** / 6 **I** 3 **I** *P. jeleznovodski* Kniss and Thibaud, 1999
4. Prelabral setae 2+2. Spine-like setae on tibiotarsus I, II, and III 0, 0, 2 *P. abchasicus* Martynova, 1969
 - Prelabral setae 3+3. Spine-like setae on tibiotarsus I, II, and III 0, 0, 1 *P. kelasuricus* Martynova, 1969
5. Eye patch with 4 or 5 eyes. Mucro with 3 subapical denticles. Tenent hair clavate *P. sorosi* Kniss and Thibaud, 1999
 - Eye patch without eyes. Mucro without subapical denticles. Tenent hair pointed *P. ortobalaganensis* Jordana and Baquero, 2012

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