

## A SECOND SPECIES OF *PSEUDOPROTORIBATES* (ACARI: ORIBATIDA: HAPLOZETIDAE): *P. PARABADENSIS* FROM THE CAUCASUS

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**ABSTRACT:** A new record of *Protoribates parabadensis* Kulijev, 1968, in Georgia afforded the opportunity to redescribe this Caucasian species and to discuss its taxonomic status. The species is most similar to *Pseudoprotoribates luxtoni* Weigmann et Monson, 2004, and we therefore regard it as a second species of the genus: *Pseudoprotoribates parabadensis* (Kulijev, 1968). Both species have the same characteristic lamellar complex; but the species differ in the shape of the sensillus, of the discidium and the number of notogastral areae porosae.

**KEY WORDS:** Oribatida; taxonomy, Georgia

### INTRODUCTION

Recently, *Pseudoprotoribates* Weigmann et Monson, 2004, was described as a new monotypic genus of Haplozetidae, based on the type species *P. luxtoni* Weigmann et Monson, 2004. One of the characteristic traits of *Pseudoprotoribates* is the special structure of the lamellar complex: a distinct sublamella, no prolamella and the lamellar seta positioned some distance anterior to the lamellar tip. The genus has been differentiated from all other European Haplozetidae genera in a key (Weigmann and Monson 2004).

One of the authors (M. M.) has collected specimens of *Protoribates parabadensis* Kulijev, 1968, in Georgia, a species endemic to the Caucasus Region. It coincides with *P. luxtoni* in all main characters except the sensillus shape, and some finer details, and therefore can be regarded as second member of *Pseudoprotoribates*. In the following we redescribe *P. parabadensis* and discuss its taxonomic position.

### MATERIAL AND METHODS

The material was collected on 31. 07. 2005, from soil of a mixed forest of *Castanea sativa*, *Alnus barbata*, *Carpinus caucasica* and *Picea orientalis* in Kintrishi Reserve, West Georgia, at an altitude of 1030 m. Material was extracted by modified Berlese-Tulgren apparatus. The specimens were stored in ethanol and after clearing were studied in lactic acid in an open hollow-ground microscope slide. The terminology of morphological structures follows van der Hammen (1980) and Weigmann (2006).

### Family Haplozetidae Grandjean, 1936

#### Genus *Pseudoprotoribates* Weigmann et Monson, 2004

#### *Pseudoprotoribates parabadensis* (Kulijev, 1968)

Figs 1–2

*Protoribates parabadensis* Kulijev, 1968: Ghilarov and Krivolutsky 1975.

*Liebstadia parabadensis*: Subias 2004.

### REDESCRIPTION

**Diagnosis.** Haplozetid species of about 330 µm body length. Morphological characters as typical for *Pseudoprotoribates*: prodorsal lamella not well developed, with small blade-like sublamella, no prolamella; lamellar seta inserted at some distance anterior to lamellar tip. Ten pairs of short notogastral setae, about 12–18 µm long and smooth. Claviform sensillus short with ovoid head having indistinct granulation, and extremely short stalk; three pairs of notogastral areae porosae; pedotecta I and II present; discidium with acute custodium.

**General characters.** Body length of females 328–333 µm (n=3), one measured male 325 µm; with slender oval body shape, about 170–190 µm maximal width. Colour very pale brown with smooth cuticle.

**Prodorsum.** Rostrum narrow, rounded; prodorsal setae smooth, rostral seta about 20 µm, lamellar seta about 25 µm, interlamellar seta about 25 µm (measured from lateral view); prodorsal lamella slightly developed as an undulating edge; sublamella, narrow blade-like; lamellar setae in-

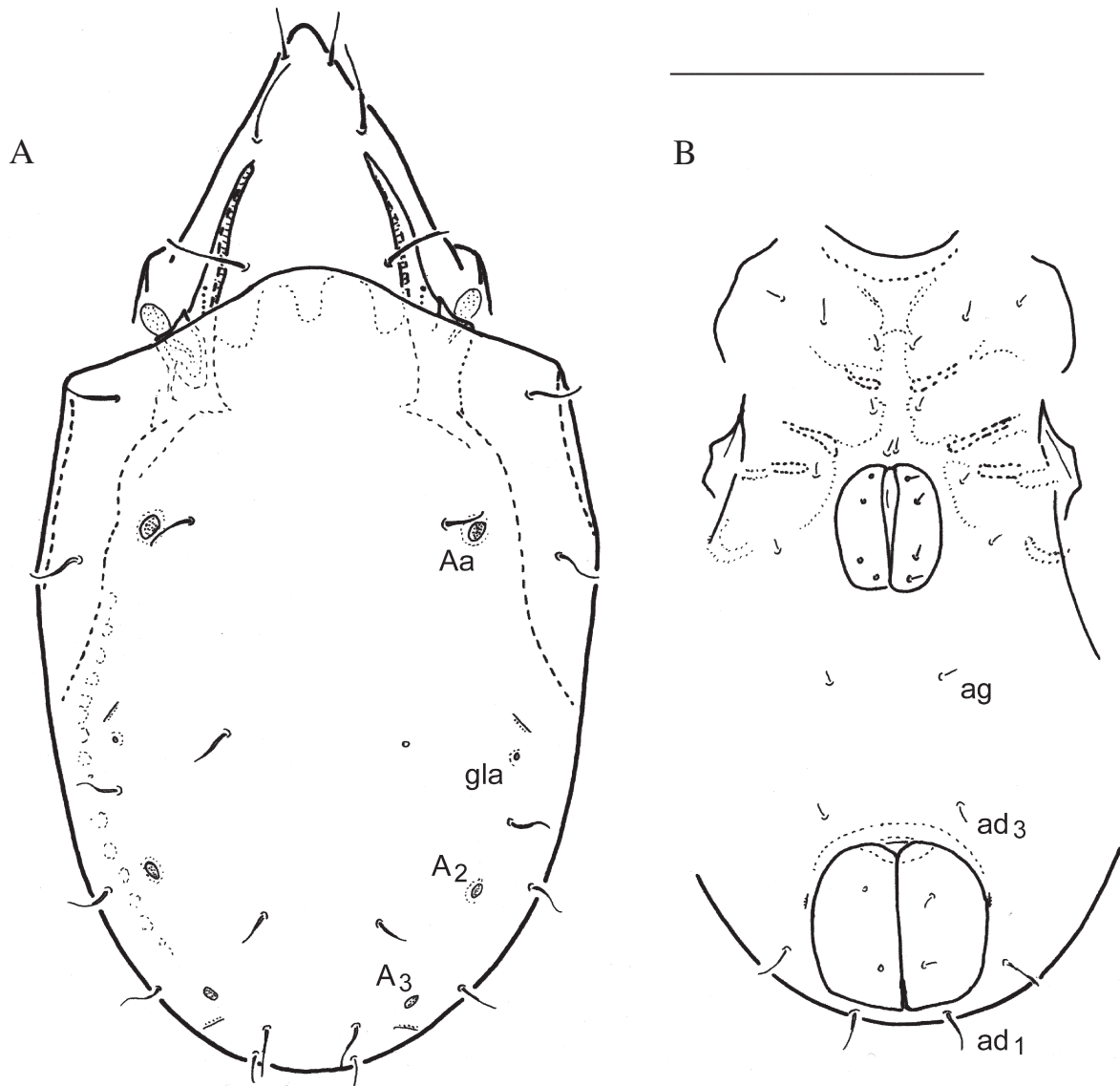


Fig. 1. *Pseudoprotoribates parabadensis*. A — dorsoal view; B — ventral view of epimeral and ano-genital region (legs not illustrated).

*Aa*, *A<sub>2</sub>*, *A<sub>3</sub>*: notogastral areae porosae; *ag*, *ad*: aggenital, adanal setae; *gla*: opisthonotal gland (scale bar = 100  $\mu$ m).

serted on the prodorsal surface rather than lamellar/sublamellar tip. Tutorium not observed (hidden by the legs or absent?). Bothridium with small tooth at anterior border, as seen in dorsal view (Figs 1a and 2). Sensillus pedicel extremely short and not protruding the bothridium, sensillus head ovoid, with indistinct granulation, about 12  $\mu$ m.

Notogaster. Slender oval, anterior margin protruding towards prodorsum. Pteromorphs immovable without line of desclerotization (hinge), curving ventrally with rounded edges. Ten pairs of fine smooth notogastral setae, all between 12–18  $\mu$ m long, in the usual haplozetid positions. Three pairs of areae porosae small, round to oval, the anterior areae *Aa* the largest, *A<sub>1</sub>* absent. All lyrifissures present, opisthonotal gland pores visible (Fig. 1a).

Ventral region. Epimeres with normal setation (3–1–3–3). Epimeral fields and apodemes without peculiarities. Discidium with acute custodium tip. Genital plates rounded, with four pairs of short genital setae; aggenital setae short; anal plates with two pairs of small anal setae; three pairs of adanal setae in the normal haplozetid position, the longest are *ad<sub>1</sub>* at about 13  $\mu$ m; lyrifissures *iad* paraanal (Fig. 1b).

Gnathosoma. Without special characters, at least none that can be observed without dissection.

Legs. All legs are monodactylous. Tarsi comparatively short, especially tarsus I. All femora with ventral carina.

**Distribution and habitats.** Kulijev (1968) described the species from Nukha-Zakatala mixed

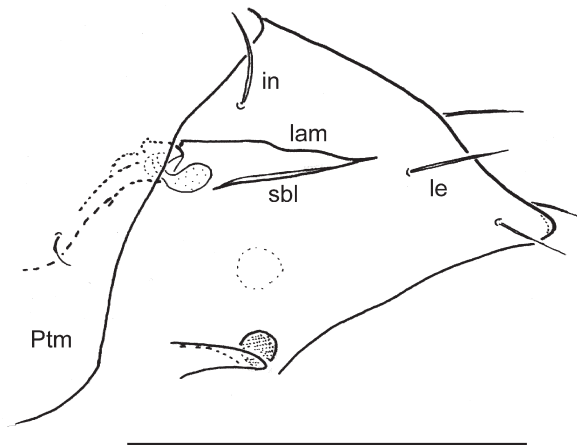


Fig. 2. *Pseudoprotoribates parabadensis*. Dorso-lateral view of prodorsum, right side (leg I and gnathosomal not illustrated). *in*, *le*: interlamellar, lamellar seta; *lam*: lamella; *sbl*: sublamella; *Ptm*: pteromorph (scale bar = 100µm).

forest in Azerbaijan. He considered the species as a stenobiontic one because he found it in rotten wood of different trees, including *Fagus*. We found it in soil of mixed forest dominated by *Castanea sativa*.

## DISCUSSION

*Pseudoprotoribates parabadensis* was described originally as member of *Protoribates* sensu lato (sensu Berlese 1908), differentiated from *Protoribates* (*Scheloribates*) Berlese, 1908, by monodactylous claws. *P. parabadensis* was keyed by Ghilarov and Krivolutsky (1975) still within *Protoribates* s. l., together with many species having diverse taxonomic positions in modern systematic concepts. European species of “*Protoribates* species sensu lato” belong partly to the genus *Protoribates* s. str. (cf. Weigmann et al. 1993), partly to *Liebstadia* (sensu Miko and Weigmann 1996), with others in several other genera. Many European and non-European genera and species are hard to evaluate because the lamellar structures are not documented in detail and are not illustrated in lateral view. We will not discuss the familial concept, here (see Weigmann and Monson 2004), but it is contrary to that of Balogh and Balogh (1984, 1992) and was preferred by Subias (2004), who transferred *P. parabadensis* to *Liebstadia* in his unexplained list. The diagnostic character of *Liebstadia*, the lamellar edge connecting the lamellar seta with the interlamellar seta, is not present in *P. parabadensis*.

Comparing *P. parabadensis* with its only congener, *P. luxtoni*, the following characters are common to both: (1) Lamellar ridge of prodorsum

slightly developed as an undulating edge, with blade-like sublamella, no prolamella; (2) lamellar setae not inserted on lamellar tip but at some distance anterior to the lamellar tip; (3) ten pairs of notogastral setae; (4) large, immovable, well developed pteromorphs; (5) four pairs of genital setae, one pair of aggenital setae, two pairs of anal setae, three pairs of adanal setae; (6) epimeral setal formula 3–1–3–3; (7) legs monodactylous.

*P. parabadensis* differs from *P. luxtoni* in having the following traits: (8) sensillus claviform, very short with ovoid-head (in *luxtoni*: sensillus fusiform, of moderate length, head with two rows of spines laterally); (9) three pairs of notogastral areae porosae, *A*<sub>1</sub> absent (in *luxtoni*: four pairs); (10) discidium with acute custodium (in *luxtoni*: without custodium tip).

Now we are able to better differentiate the generic- vs. species-level characters, which could not be done with certainty in the original description of *Pseudoprotoribates* of Weigmann et Monson (2004), because of monotypy. Characters 1–7 are “constant characters” in the sense of Beck (1985) and characterize the genus. Characters 8–10 are of lower taxonomic importance and are “alternative characters” in the sense of Beck (1965), characterizing the species. We find similar “alternative characters” within other oripodoid genera, such as: variation of sensillus shape in *Haplozetes* (e.g. in Beck 1964), in *Protoribates* s. str. (e.g. in Weigmann et al. 1993), in *Liebstadia* (e.g. in Miko et Weigmann 1996); full or reduced number of notogastral areae porosae in *Liebstadia* (e.g. in Miko et Weigmann 1996; cf. Weigmann 2006); absence of an acute tip of the custodium, in *Protoribates capucinus* (e.g. Miko et al. 1994) which is a typical haplozetid character, normally.

## CONCLUSION

As a consequence of the characters of the two *Pseudoprotoribates* species that are discussed above, the diagnosis of the genus as presented in Weigmann et Monson (2004) must be revised.

**New diagnosis of *Pseudoprotoribates*.** Prodorsal lamella slightly developed as an undulating edge; sublamella narrow blade-like; prolamella absent; lamellar setae inserted at some distance anterior to the lamellar tip; ten pairs of notogastral setae; 3–4 pairs of notogastral areae porosae; well developed, large, immovable pteromorphs; four pairs of genital setae, one pair of aggenital setae, two pairs of anal setae, three pairs of adanal setae; epimeral setal formula 3–1–3–3; legs monodactylous.

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