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Contribution to the Oribatid Mite Fauna of Georgia. 2. *Carabodes* and *Lamellocephus*

(Acari, Oribatida)

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The new species *Carabodes procerus*, spec. nov. from Georgian subtropical region Adjara is described and is compared with the related species *C. femoralis* Nicolet and *C. rugosior* Berlese. The variability of length of genital setae and shape of sensillus of *C. procerus*, spec. nov. and German and Georgian specimens of *C. femoralis* and *C. rugosior* is discussed. *Lamellocephus personatus* Berlese, 1910, is redescribed with new records from Georgia. It is senior synonym to *L. ambitus* Kuliev, 1966 (syn. nov.), reported for Azerbaidzhan and Georgia.

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Introduction

Within an ecological research program in Georgia some new and rare species have been found. This contribution deals with *Carabodes* C. L. Koch, 1835 (*Carabodidae* C. L. Koch, 1837) and with *Lamellocephus* Balogh, 1961 (*Charassobatidae* Grandjean, 1958).

In the subtropical region Adjara in West Georgia the new species *Carabodes procerus*, spec. nov. was found in Kintrishi reserve, which is situated between the Black Sea and the high mounts Adjara-Imereti Sisters. The new species belongs to the *femoralis*-group of *Carabodes*. The occurrence of the related species *C. femoralis* Nicolet, 1855 and *C. rugosior* Berlese, 1916 in the same area and further samples from the same region gives the possibility to study the variability of length of genital setae and shape of sensillus between German and Georgian specimens.

Within the researches some specimens of *Lamellocephus personatus* Berlese, 1910, have been found in East and West Georgia, a rare species. A modern

redescription of the species is required and its systematic position is to be discussed.

Location of types

Types are deposited in the collection of the Zoological Institute of Georgian Academy of Sciences in Tbilisi (ZIGAST) and in the collection of the coauthor (GW).

Carabodes procerus, spec. nov.

Fig. 1

Diagnosis. Body shape slim-oval. Posterior part of prodorsum without neckhole and not depressed, but with transversal ridge. Interlamellar setae small, thin and smooth. Sensillus directed to the side, distally \pm splitted into fingers or not. Notogaster with 10 pairs of short setae. Sculpture of notogaster with roundish nodules and irregular ridges (folds).

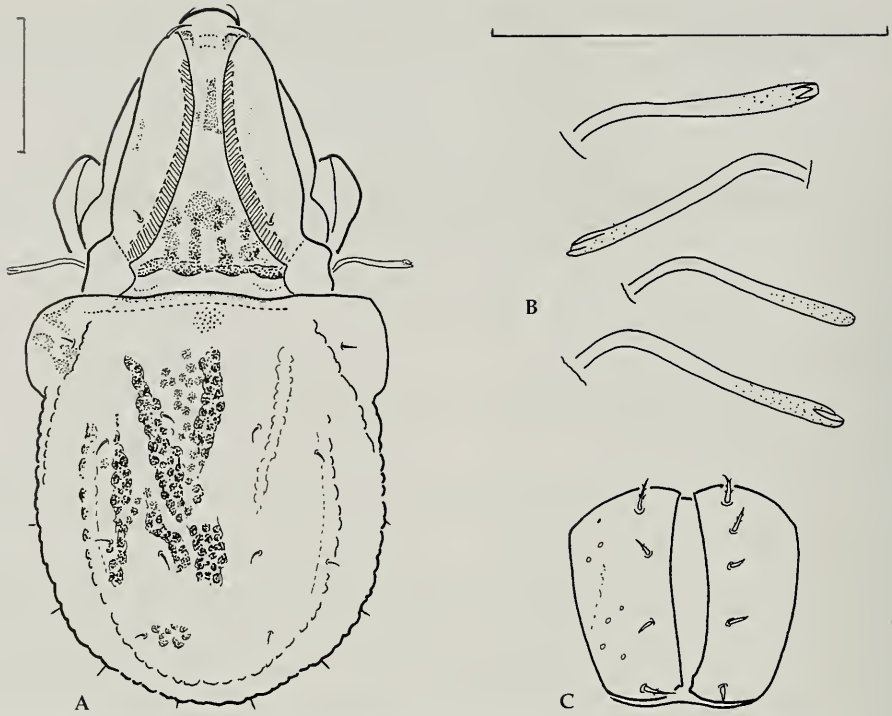


Fig. 1. *Carabodes procerus*, spec. nov. A. Dorsal aspect. B. Sensilli. C. Genital plates. Bars indicate 100 μm .

Types. Holotype: ♀, Georgian subtropical region, Adjara, Kintrishi Reserve, H: 884 m, 41°43'27" E, 42°03'46" N, 29.8.2001 (ZIGAST). – Paratypes: 7, same data (3 in ZIGAST, 4 in GW); 2, v. Khino, 1000 m, same date (ZIGAST).

Description

General characters. Length of body – 450–550 μm . Width – 225–300 μm (relation length: width = 1:0,50–1:0,55). Color – dark brown, almost black. Cuticle covered with granulated cerotegument.

Prodorsum with nodules and irregular ridges. Rostral and lamellar setae are smooth and thin. Interlamellar setae short, thin, smooth. Sensillus directed to the side, shape of the slightly thickened head varies from rounded to splitted into fingers, distally with very fine granulation. Posterior part of prodorsum with transversal “wave”-shaped chitin ridge, without neckhole.

Notogaster. 10 pairs of small notogastral setae, c-seta at the shoulder. Sculpture of notogaster with roundish nodules and with coarse irregular longitudinal ridges (folds) (Fig. 1A).

Ventral region shows no peculiarities. Coxisternal chaetotaxy: 3-1-3-3. Anogenital chaetotaxy: 4g, 1ag, 2an, 3ad (exceptionally 5g). The genital setae are less than 10 μm long, with fine setulae (Fig. 1C). All tarsi with one claw.

Derivatio nominis. *Procerus* means “slim” in latin.

Localities. Adjara, Kintrishi Reserve, damp biotopes, mean annual precipitation is 3898 mm. v. Didvake, chestnut forest, *Castanea sativa*; v. Khino, mixed wood with *Castanea sativa*, *Carpinus caucasica*, *Alnus barbata*, some specimens of *Picea orientalis*, underwood with *Corylus avellana*, *Rhododendron ponticum*, *Rubus dolichocarpus*, *Sambucus ebulus*.

Discussion. The new species belongs to the “*femoralis*-group” with (1) distinct long notogastral ridges (folds), (2) posterior part of prodorsum without neckhole, (3) one pair of notogastral c-setae at the shoulder, (4) slim sensilli with \pm splitted ends, sometimes with short setulae.

All members of this group differ from *C. procerus*, spec. nov. evidently, as discussed in the following.

C. femoralis Nicolet, 1855 is larger (555–715 μm), sensillus is directed to the side or anteriorly, posterior part of prodorsum depressed, without transversal ridge, but sculpture of notogaster very similar, mostly with more distinct folds (cf. Sellnick & Forsslund 1953, Bernini 1970, Mahunka 1987, Perez-Iñigo 1997). In one sample together with *C. procerus* occurred two specimens of *C. femoralis* (with body sizes of: 615 \times 385 μm and 555 \times 340 μm). Relation of

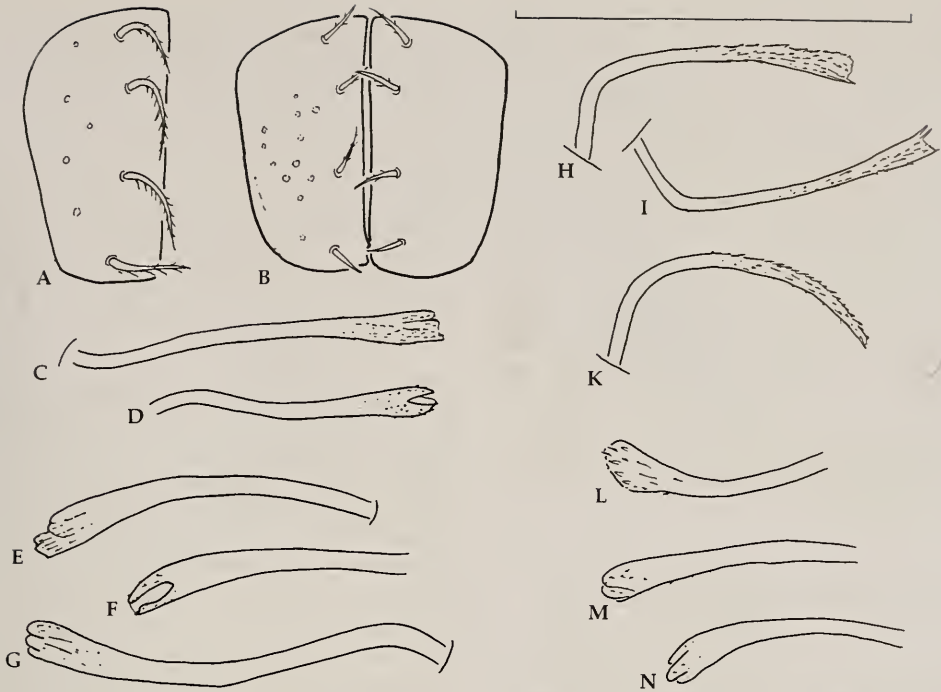


Fig. 2. A-G. *Carabodes femoralis* Nicolet. A. Genital plate, specimen from Georgia. B. Genital plate, specimen from Germany. C-D. Sensilli, specimens from Georgia. E-G. Sensilli, specimens from Germany. H-N. *Carabodes rugosior* Berlese. H-K. Sensilli, specimens from Georgia. L-N. Sensilli, specimens from Germany.

the length to width in *C. femoralis* is 1:0,60 to 1:0,65 (examined in georgian and german specimens), contrary to *C. procerus* with 1:0,50 to 1:0,55.

C. rugosior Berlese, 1916 (cf. Sellnick & Forslund 1953; Bernini 1970) is also larger than *C. procerus* in average: 520-650 μm ; posterior part of notogaster depressed, with lateral nodes, sculpture of notogaster with one well developed, strong median ridge and irregular, smaller ridges, covered by fine granula but without the nodules as in *C. procerus* and *C. femoralis*.

C. perezinigo Salinas, 1971 (Salinas 1971) is small and less slim: 460 \times 270 μm and has finger shaped sensilli, but interlamellar setae are reduced to alveoli, posterior part of prodorsum is depressed, sculpture of notogaster with coarser nodules and three less distinct longitudinal ridges.

C. apuanicus Bernini, 1979 (Bernini 1979) has body measures of 445 \times 240 μm , no shoulder setae, longer and strong interlamellar setae, long notogastral setae and the notogastral sculpture consists of many folds and fine punctuation only.

C. auriculatus Mahunka, 1987 (Mahunka 1987) is a larger species (574-689 \times 344-419 μm), basally between the lamellae a pair of large elevations is present, the peduncle of sensillus is very long, the

head is small and spinose; the sculpture of notogaster is similar to *C. procerus* and *C. femoralis*.

Variability in *C. procerus*, spec. nov. and related species

Fig. 2

We observed some variability in the shape of sensilli and genital setae in *C. femoralis* and *C. rugosior*. This should be discussed with regard to the characters of *C. procerus*, spec. nov.

The genital setae of *C. procerus* are less than 10 μm and with some very short setulae (Fig. 1C). The genital setae of *C. femoralis* from Georgia are about 15 μm in length and have a few short setulae (Fig. 2B), whereas in German specimens the genital setae are more than 25 μm in length, showing obvious setulae (Fig. 2A). The genital setae of *C. rugosior* are about 15 μm , smooth or with minute setulae, at most.

The sensilli of the three species are variable with regard to the shape of the head and it's fine structure. The sensillus of *C. procerus* is only slightly thickened, at most. The distal part is covered with small granula; the tip is rounded, or in most of the

specimens dissected into two or three parts. The tip resembles fingerlike warts or looks like a dissected end of a tube (Fig. 1B).

The sensilli of *C. femoralis* are more variable. Either the tip is dissected into two or three parts with fingerlike warts or a dissected end of a tube, or it is more or less flattened. The granula at the distal part are minute or obvious. The sensillus morphology in Georgian (Figs 2C,D) and in German specimens (Figs 2E-G) is similar.

The sensilli of *C. rugosior* from Georgian origin (Figs 2H-K) seem to be quite different, but when studying the variability in German specimens (Figs 2L-N) we observe similar types with flat tip and strong setulae besides specimen with fingerlike dissected tips.

We regard the sensillus shape of the three species as variable and without importance to discriminate the species.

Lamellocephus personatus Berlese, 1910

Fig. 3

Diagnosis. Rostrum medially incised. Lamellae long, broad, not connected by a translamella, bound to the bothridia. Rostral, lamellar and interlamellar setae very short, fine, smooth. Sensillus leaf-shaped, barbed. Notogaster with an arched shoulder lath anteriorly, the anterior middle part of notogaster with broad flat depression. On both sides of the genital plates with longitudinal ridges which end in denslike tubercles, the epimeres IV with strong lateral and posterior tubercles; 5 pairs of genital setae, 2 pairs of adanal setae, only. The mouth parts seem to be suctorial.

Description

General characters. Length – 345-420 µm. Color – light brown. Cuticle with fine granulation, with coarsely granulated cerotegument.

Prodorsum. Rostrum incised medially. Lamellae broad, long, parallel, bounded with large bothridia, not meeting each other, without translamella. Sensillus leaf-shaped, barbed, about 40 µm long. Bothridium opening anteriorly, with strong carina at the lateral side. Rostral, lamellar and interlamellar setae short, fine, smooth. Prodorsum with fine structure of granules and irregular lines.

Notogaster with an arched shoulder lath anteriorly. 10 pairs of short, fine and smooth setae. Two pair of them – c_2 and la – arising on small tubercles. The anterior middle part of notogaster with broad flat depression (Figs 3A,B). Cuticle covered by coarsely granulated cerotegument.

Ventral region with fine granulation. Pedotectum I large, Pedotectum II small; tutorium a long and small blade without free tip (Fig. 3A). On both sides of genital opening with longitudinal ridges which end in denslike tubercles, anteriorly. The epimeres IV with strong lateral and posterior tubercles; 5 pairs of short genital setae. Epimeral chaetotaxy: 3-1-3-2, mostly vestigial or short; the setae $3c$ seem to be absent in some specimens, the setae $4b$ are vestigial, positioned on the posterior tubercles of the epimere IV. Anogenital chaetotaxy: 5 g, 1 ag, 2 an, 2 pairs of adanal setae, only (Fig. 3C).

Legs monodactyl.

Material and localities. 1, East Georgia, Algethy Reserve, *Picea* forest, 30.7.2001; 2, West Georgian subtropical region, Adjara, Kintrishi Reserve: 1, v. Khino, mixed forest with *Castanea sativa*, *Carpinus caucasica*, *Alnus barbata*, *Picea orientalis*; underwood with *Corylus avellana*, *Rhododendron ponticum*, *Rubus dolichocarpus*, *Sambucus ebulus*; H: 1000 m, 41°43'27" E, 42°03'46" N; 1, v. Didvake, chesnut forest with *Castanea sativa*, H: 884, 29.8.2001.

Ecology and distribution. The species has been reported from Italy: Trentino – Alto Adige (Berlese 1910; Schuster 1965), Florence region (Grandjean 1962); Switzerland: Tessin (Grandjean 1962) and Austria: Kärnten (Schuster 1965). From Caucasus Region a second species has been reported, *L. ambitus* Kuliev, 1966 (Kuliev 1966), which is junior synonym to *L. personatus*, in our opinion. The new Georgian records indicate a preference for forest litter in warm-temperate climate, as found in Toscana (Italy) and in Georgia. The records in Austria, Switzerland and northern Italy might indicate occurrence in warm southern subalpine biotopes.

Discussion. The species has been described by Berlese (1910) as *Tectocephus personatus*, later transferred into the genus *Tegeocranellus* (Berlese, 1913) and illustrated by a sketchy drawing. Balogh (1961: 302) established the genus *Lamellocephus* with *T. personatus* as type species (junior synonym *Tessacarus* Grandjean, 1962) as a member of Tectocephidae. Schuster (1965) discussed the taxonomic position and presented further characteristics and records. Illustrations have been published by Balogh (1961), Balogh & Balogh (1992), and after studying the type material by Mahunka & Mahunka-Papp (1995), who gave further diagnostic characters, a better drawing, and transferred the species from Tectocephidae to Charassobatidae. Grandjean (1964: 532) gives the leg solenidiotaxy of *Lamellocephus personatus*, the same as in *Charassobates*.

We confirm this systematic position within Charassobatidae and give some arguments for it. The mouthparts are slim, obviously suctorial, as described by Grandjean (1958) for the typical genus

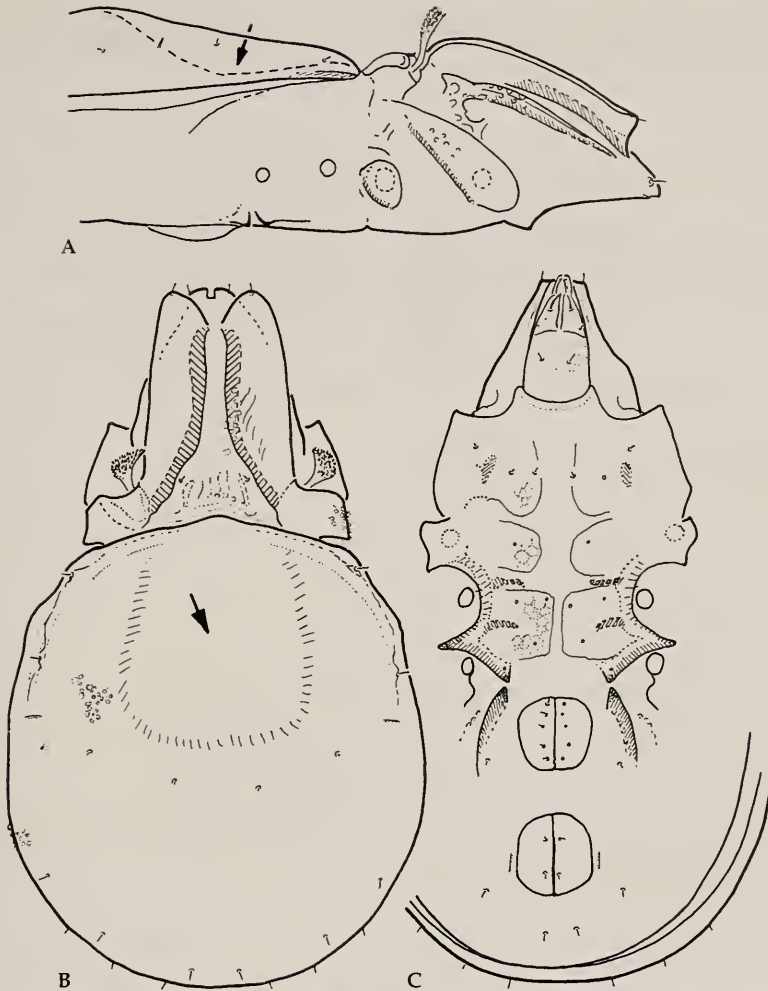


Fig. 3. *Lamellocephus personatus* Berlese. A. Lateral aspect. 3B. Dorsal aspect. 3C. Ventral aspect. The arrows indicate the anterior depression of notogaster.

Charassobates Grandjean, 1958. *Lamellocephus personatus* shows a less obvious depression in the anterior half of the notogaster compared with that in *C. cavernosus* (Grandjean, 1929), as illustrated with care by Grandjean (1958), thus this notogastal depression might be a family character (Some further *Charassobates* species with notogastal depression are described from South America, mostly without details). The general body shape, the lamellar construction, the rostral incision and the suctorial mouthparts are common in both genera.

The differences in the more obvious characters are the loss of pedotecta II, 13 pairs of notogastal setae (with centrodorsal setae), the less obvious dense-like tuberculi in epimeres IV, 3 pairs of setae on epimeres IV, no aggenital carinae, the full set of

three adanal setae in *Charassobates*, as to be in contrast to *L. personatus*. The epimeral IV region and the aggenital ridges are similar in *L. personatus* and in the argentinian charassobatid species, *Topalia problematica* Balogh & Csiszar, 1963, which has some other specific characteristics (cf. Balogh & Csiszar 1963, Balogh & Balogh 1992). But we cannot decide which of the specific differentiating characters in *Lamellocephus* are diagnostic for the genus or for the species *L. personatus*; the genus is monotypical up to now. The loss of pedotecta II in *Charassobates cavernosus*, by Grandjean (1958) indicated as family specific, is only a genus character, at most.

The description of *Lamellocephus ambitus* Kuliiev, 1966 (Kuliiev 1966), found in Azerbaidzhan and Georgia (Karppinen et al. 1987), refers no characters

which are not found in *L. personatus* also, as described by Mahunka & Mahunka-Papp (1995) and this paper. We regard it as junior synonym to *L. personatus*.

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