

**SUPPLEMENTARY DESCRIPTION  
OF CTENOBELBA (CAUCASIABELBA) URHANI BARAN, 2015  
(ACARI: ORIBATIDA: CTENOBELBIDAE)**

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ABSTRACT: Supplementary description of *Ctenobelba (Caucasiobelba) urhani* Baran, 2015 is presented, based on adults collected from Georgia. The morphological similarity between *Ct. (Ca.) urhani* Baran, 2015 and *Ct. (Ca.) reticulata* Subías and Shtanchaeva, 2010 is discussed.

KEY WORDS: ctenobelbid mite, taxonomy, morphology, Georgia

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### INTRODUCTION

The oribatid mite subgenus *Ctenobelba (Caucasiobelba)* (Acari: Oribatida: Ctenobelbidae) was described by Subías and Shtanchaeva (2010), with *Ctenobelba (Caucasiobelba) reticulata* Subías and Shtanchaeva, 2010 as type species, based on adults from the Caucasus (Russia and Azerbaijan). Later, Baran (2015) described the second representative of the subgenus, *Ct. (Ca.) urhani* Baran, 2015, based on adults from Turkey.

We found *Ct. (Ca.) urhani* among the mite material collected from Georgia. The original description of this species (Baran 2015) is brief and incomplete (in particular, it excludes the descriptions of the gnathosoma, legs, lateral and posterior sides of the body) and contains some morphological inaccuracies. The main goals of our paper are to present a supplementary redescription of *Ct. (Ca.) urhani* based on the material from Georgia and to compare its morphology with that of *Ct. (Ca.) reticulata*.

### MATERIALS AND METHODS

**Specimens.** Five specimens of *Ct. (Ca.) urhani*: Georgia (Caucasus, West Georgia), Adjara region, Machakhela National Park, 41°31'24.088"N, 41°44'22.253"E, 663 m a.s.l., soil with leaf litter in broadleaf mixed forests with alder (*Alnus barbata*), chestnut (*Castanea Sativa*), beech (*Fagus orientalis*) and hornbeam (*Carpinus* sp.), 20 May 2023 (T. Arabuli).

Two paratypes of *Ct. (Ca.) reticulata*: Azerbaijan, Talysh, soil in subtropical forest, 1 July 2004 (U. Ya. Shtanchaeva).

**Observation and documentation.** For measurement and illustration, specimens were mounted

in lactic acid on temporary cavity slides. All measurements are in micrometers (µm); body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the notogaster; other structures were oriented to avoid parallax errors; notogastral width refers to the maximum width in dorsal aspect; setal lengths were measured perpendicular to their long axis, accounting for curvature. Formulas for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus. Drawings were made with a camera lucida using a Leica DM 2500 light microscope.

**Terminology.** Morphological terminology used in this paper mostly follows that contained in the papers on Ameroidea (e.g., Ermilov *et al.* 2014; Bayartogtokh and Ermilov 2021); in addition, see Norton (1977) for leg setal nomenclature, as well as Norton and Behan-Pelletier (2009) and Behan-Pelletier and Lindo (2023) for overview.

**Abbreviations.** *Prodorsum*: *pc*—prodorsal carina; *cos*—costula; *tcos*—transcostula; *tu*—tutorium; *st*—sejugal tubercle; *ro*, *le*, *in*, *bs*, *ex*—rostral, lamellar, interlamellar, bothridial and exobothridial setae, respectively; *exv*—vestige of second exobothridial seta. *Notogaster*: *c*, *l*, *h*, *p*—setae; *ia*, *im*, *ip*, *ih*, *ips*—lyrifissures; *gla*—opisthotal gland opening. *Gnathosoma*: *a*, *m*, *h*—subcapitular setae; *or*—adoral seta; *d*, *l*, *cm*, *acm*, *ul*, *su*, *lt*, *vt*, *inf*, *sup*—palp setae;  $\omega$ —palp solenidion; *cha*, *chb*—cheliceral setae; *Tg*—Trägårdh's organ. *Epimeral and lateral podosomal regions*: *1a*, *1b*, *1c*, *2a*, *3a*, *3b*, *3c*, *4a*, *4b*, *4c*—epimeral setae; *Vp*—posterior ventrosejugal tubercle; *z*—aperture of supracoxal gland; *PdI*, *PdII*—pedotecta I and II, respectively; *pt*—pedotectum tubercle; *dis*—dis-

cidium. *Anogenital region*: *g*, *ag*, *an*, *ad*—genital, aggenital, anal, and adanal setae, respectively; *iad*—adanal lyrifissure; *po*—preanal organ. *Legs*: *Tr*, *Fe*, *Ge*, *Ti*, *Ta*—trochanter, femur, genu, tibia, and tarsus, respectively; *pa*—porose area; *ε*—famulus; *d*, *l*, *v*, *ev*, *bv*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl*—setae;  $\omega$ ,  $\sigma$ ,  $\varphi$ —solenidia.

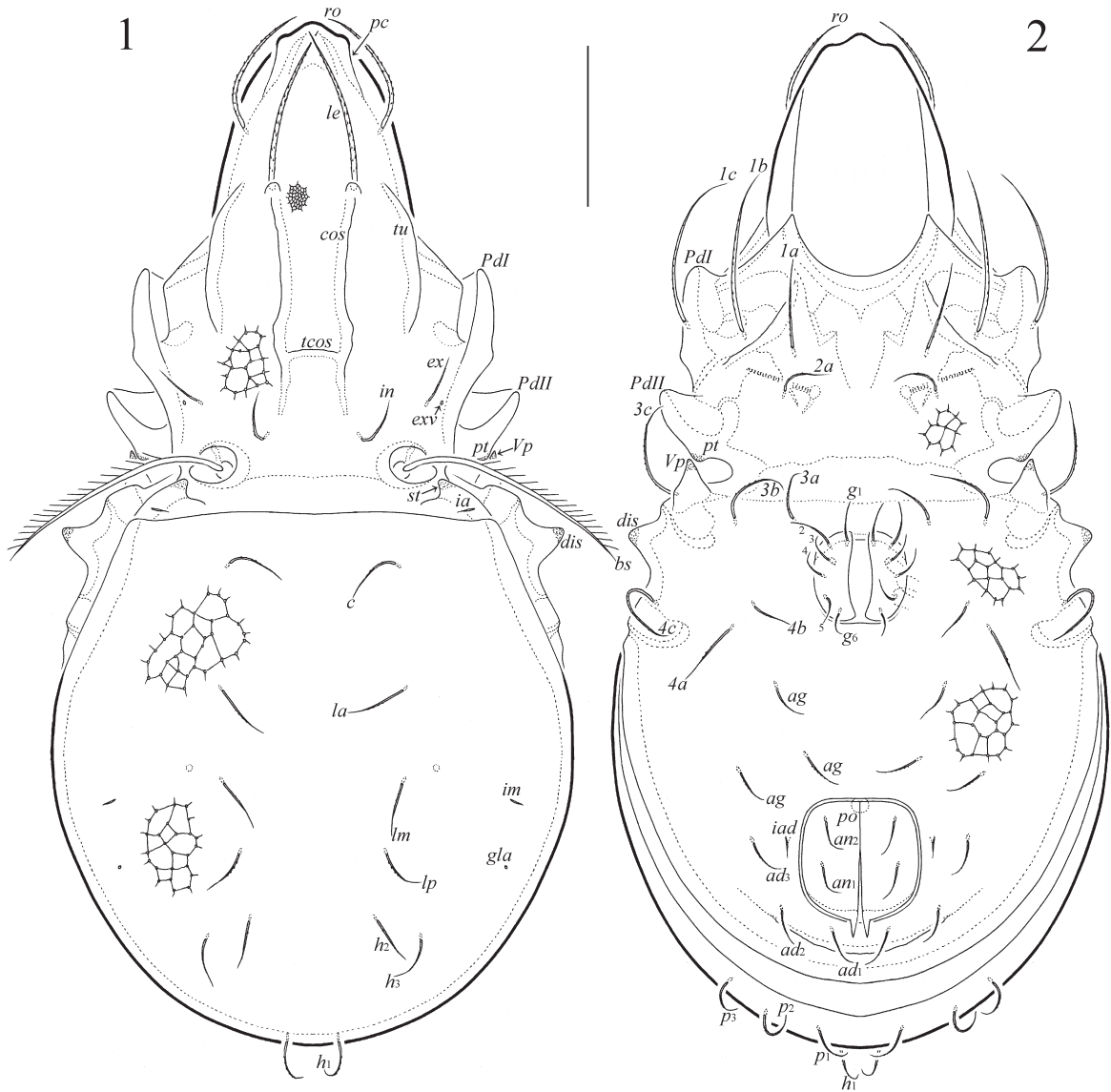
**TAXONOMY**

***Ctenobelba (Caucasiobelba) urhani* Baran, 2015**  
(Figs. 1–12)

**Redescription.** *Measurements.* Body length: 315–330 (four females), 300 (one male); notogaster width: 157–165 (four females), 150 (one male).

*Integument* (Figs. 1–6). Body yellow-brownish to brown. Surface smooth, covered (except genital and anal plates, legs, and anterior part of prodorsum) by thick layer of cerotegument consisting of sparsely located granules connected by cerotegumental constrictions; granules and constrictions forming heavy micro- or macroreticulate ornamentations typical for the subgenus.

*Prodorsum* (Figs. 1, 3, 5). Rostrum bidentate (well visible in anterodorsal view), with two small teeth and semi-rectangular indentation between them (Fig. 5). Rostral region with two short, longitudinal carinae slightly divergent posteriorly, creating an illusion of undulate rostrum in dorsal view. Costula long, ridge-like; a pair of parallel costulae connected



Figs. 1–2. *Ctenobelba (Caucasiobelba) urhani* Baran, 2015, adult (gnathosoma, legs omitted): 1—dorsal view; 2—ventral view. Scale bar=50  $\mu$ m.

by simple translamella in medioposterior parts. Rostral (41–45) and lamellar (56–60) setae setiform, barbed; interlamellar and exobothridial setae (19–26) setiform, thin, slightly barbed; bothridial seta (82–92) setiform, with 15–17 long ciliae unilaterally except mediobasal part. Tutorium well developed, ridge-like. Dorsosejugal region with one pair of simple tubercles (posterolaterally to each bothridium).

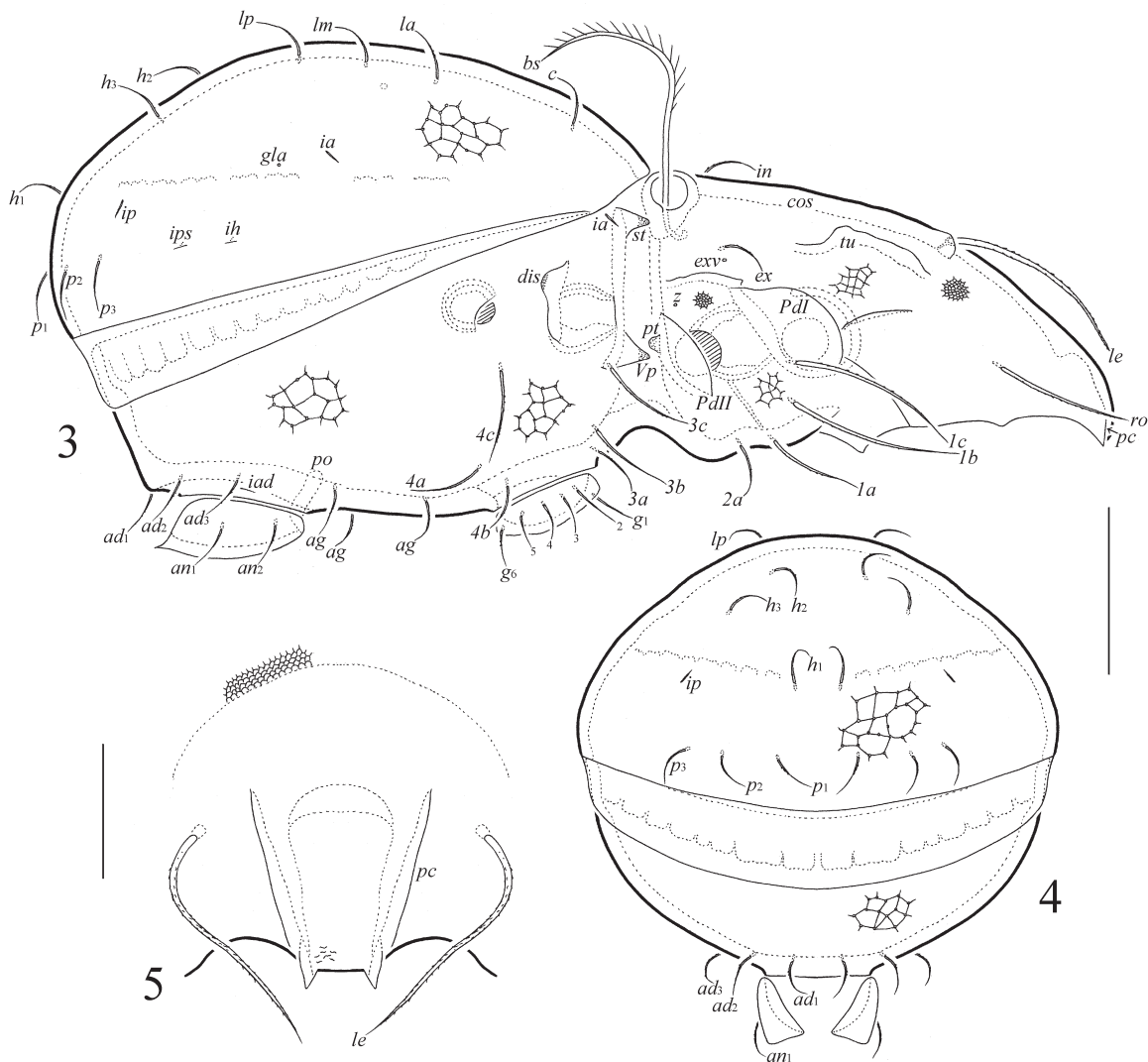
*Notogaster* (Figs. 1–4). All notogastral setae (22–26) setiform, thin, slightly barbed; setae *c*, *la*, *lm*, *lp*, *h*<sub>2</sub> located in two longitudinal, parallel rows in dorsomedial part of notogaster. Opisthonotal gland opening and all lyrifissures present but poorly visible due to cerotegument.

*Gnathosoma* (Figs. 6–8). Subcapitulum size: 71–75 × 45–49; subcapitular setae (*a*: 17; *m*: 22–24; *h*: 34–37) setiform, barbed; *a* thinnest, *h* thickest;

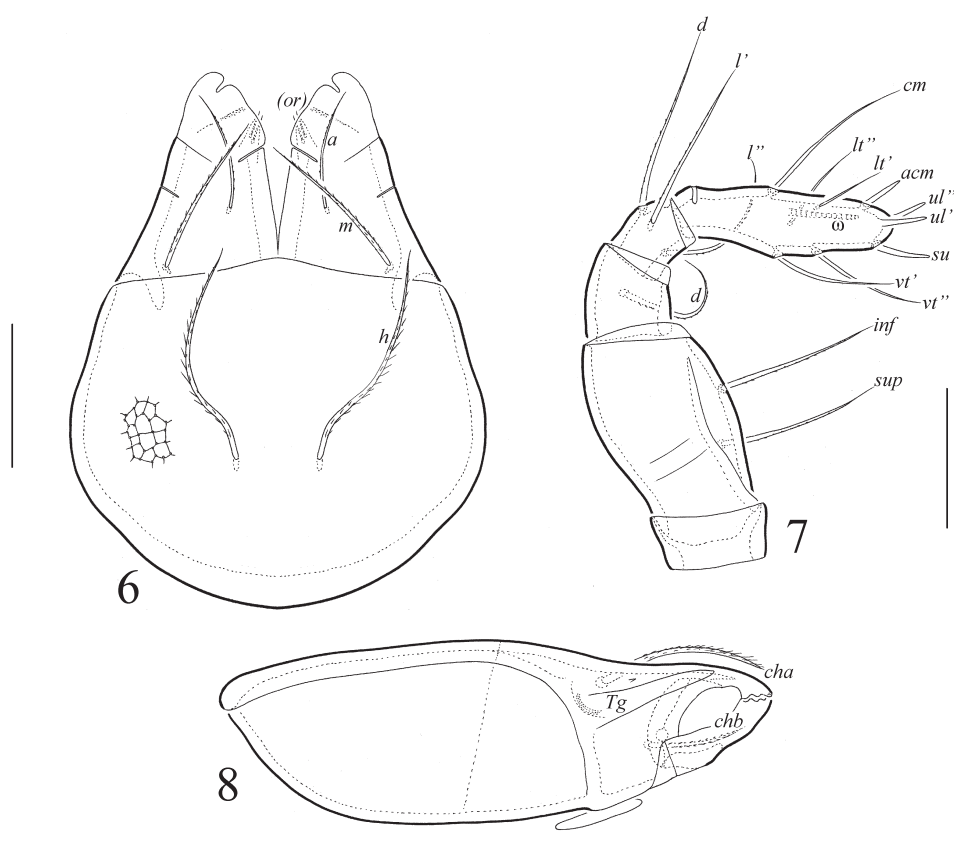
both adoral setae (5) setiform, thin, smooth. Chelicera length: 79–82; seta *cha* (24–26) setiform, barbed and shortly ciliate in distal part; *chb* (13–15) setiform, barbed. Palp length: 45–49; formula: 0–2–1–3–9+solenidion.

*Epimeral and lateral podosomal regions* (Figs. 2, 3). All epimeral setae (*1a*, *3b*, *3c*, *4c*: 28–32; *1b*, *1c*: 52–56; *2a*, *3a*, *4b*: 19–26; *4a*: 22) setiform, slightly barbed; *1b* and *1c* thicker than others; *3b* inserted on triangular, rounded distally ventrosejugal tubercle. Pedotectum II with simple ventral tubercle. Discidium triangular, rounded distally.

*Anogenital region* (Figs. 2–4). Genital (*g*<sub>1</sub>, *g*<sub>2</sub>: 22–26; others: 15–19), aggenital (19–22), anal (19–22), and adanal (19–22) setae setiform, thin, slightly barbed. Adanal lyrifissure close and parallel to anal plate.



Figs. 3–5. *Ctenobelba (Caucasiobelba) urhani* Baran, 2015, adult (gnathosoma, legs omitted): 3—right lateral view; 4—posterior view; 5—anterior part of prodorsum, anterodorsal view. Scale bars=50  $\mu$ m (3, 4), 20  $\mu$ m (5).



Figs. 6–8. *Ctenobelba (Caucasiobelba) urhani* Baran, 2015, adult: 6—subcapitulum, ventral view; 7—palp, left, paraxial view; 8—chelicera, left, paraxial view. Scale bars=20  $\mu\text{m}$  (6, 8), 10  $\mu\text{m}$  (7).

*Legs* (Figs. 9–12). Claws of each leg smooth. Porose area on leg segment not observed. Formulas of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–4–3–4–16) [1–1–2], III (2–3–2–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia as indicated in Table 1. Famulus short, slightly swollen distally, located between solenidia; seta *s* on tarsus I eupathidial, located between paired setae *u* and *a*; all solenidia rod-like or slightly bacilliform (except setiform, flexible  $\sigma$  on genu I), rounded distally.

**Remarks.** Based on the supplementary description and known literature (Baran 2015), we propose the following diagnosis for *Ct. (Ca.) urhani*. Body length: 315–337; rostrum bidentate; rostral region with two longitudinal carinae; costulae parallel, connected by translamella; rostral and lamellar setae long, setiform, barbed; interlamellar, exobothridial, notogastral, and many anogenital setae short, setiform, slightly barbed; bothridial seta long, setiform, with 15–17 ciliae unilaterally; dorsosejugal region with one pair of tubercles; notogastral setae *c*, *la*, *lm*, *lp*, *h*<sub>2</sub> located in two longitudinal

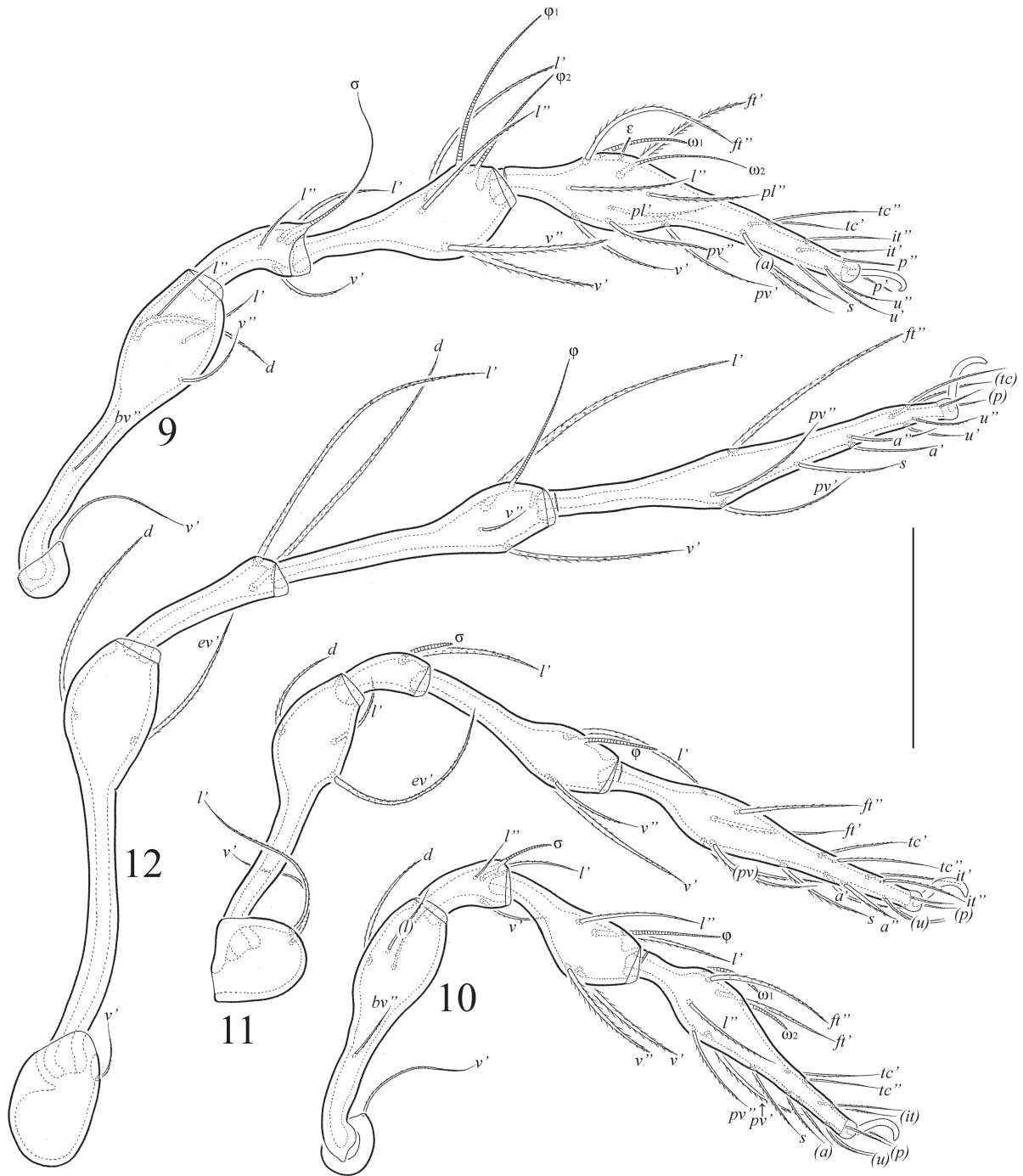
parallel rows in the dorsomedial part of notogaster; epimeral setae *1b* and *1c* longer and thicker than others; epimeral seta *3b* inserted on ventrosejugal tubercle; pedotectum II with ventral tubercle.

## DISCUSSION

The type material of *Ct. (Ca.) urhani* is not available for study, but the SEM micrographs in Baran's paper (2015) allow us to understand its diagnostic characteristics. Therefore, we have no doubt about the correctness of our identification.

The problem is that *Ct. (Ca.) urhani* is very similar to the type species, *Ct. (Ca.) reticulata*. The original description of the latter is brief and incomplete, but thanks to the two paratypes kindly sent to us by L.S. Subías and U.Ya. Shtanchaeva we have made a detailed comparison of these two species (except for the distal parts of all legs that are broken in both paratypes).

According to Baran (2015: 390, *Remarks* section), *Ct. (Ca.) urhani* differs from *Ct. (Ca.) reticulata* in the morphology of the notogastral, exobothridial and bothridial setae, as well as in the presence



Figs. 9–12. *Ctenobelba (Caucasiobelba) urhani* Baran, 2015, adult: 9—leg I, right, antiaxial view; 10—leg II, right, antiaxial view; 11—leg III, right, paraxial view (trochanter turned); 12—leg IV, right, paraxial view (trochanter turned). Scale bar=50  $\mu$ m.

of translamella. We affirm that the morphology of the notogastral, exobothridial and bothridial setae is similar in both species: norogastral and exobothridial setae setiform, slightly barbed; bothridial seta with strong ciliae unilaterally in mediobasal part (variability in localization present). One erroneous contradiction is in the fact that Baran (2015: 1390,

Fig. 1A) described the notogastral and exobothridial setae in the cerotegumental layer while drawing them implausibly, while Subías and Shtanchaeva (2010) described the morphology of these setae without cerotegument. Additionally, Subías and Shtanchaeva (2010: 81, Fig. 1) drew ciliae on the bothridial setae incorrectly.



Based on our morphological comparison, *Ct. (Ca.) urhani* and *Ct. (Ca.) reticulata* are identical in all morphological traits except for the presence/absence of translamella (present in *Ct. (Ca.) urhani*, absent in *Ct. (Ca.) reticulata*). On the one hand, the probability that these two are the same species is very high, since the presence/absence of a translamella could theoretically be considered morphological variability. On the other hand, the presence/absence of a translamella is used for a diagnosis at the species level in related groups (e.g., Eremaeidae); additionally, despite similar morphology, the presence of cryptic species may occur.

Hence, we tentatively support the species independence of *Ct. (Ca.) urhani* and *Ct. (Ca.) reticulata*. However, comparison of their molecular data is needed in the future.

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Table 1  
Leg setation and solenidia of adult *Ctenobelba (Caucasiobelba) urhani* Baran, 2015

Leg	Tr	Fe	Ge	Ti	Ta
I	v'	d, (l), bv'', v''	(l), v', σ	(l), (v), φ <sub>1</sub> , φ <sub>2</sub>	(ft), (tc), (it), (p), (u), (a), s, (pv), (pl), v', l'', ε, ω <sub>1</sub> , ω <sub>2</sub>
II	v'	d, (l), bv''	(l), v', σ	(l), (v), φ	(ft), (tc), (it), (p), (u), (a), s, (pv), l'', ω <sub>1</sub> , ω <sub>2</sub>
III	l', v'	d, l', ev'	l', σ	l', (v), φ	(ft), (tc), (it), (p), (u), (a), s, (pv)
IV	v'	d, ev'	d, l'	l', (v), φ	ft'', (tc), (p), (u), (a), s, (pv)

Note: Roman letters refer to normal setae; Greek letters—to solenidia (except ε—famulus); single quotation mark (') designates setae on the anterior and double quotation (')—setae on the posterior side of a given leg segment; parentheses refer to a pair of setae.