

## SUPPLEMENTARY DESCRIPTION OF *ORIBATULA ELEGANTISSIMA* BALOGH AND MAHUNKA, 1965 (ACARI: ORIBATIDA: ORIBATULIDAE)

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**ABSTRACT:** The redescription of *Oribatula elegantissima* Balogh and Mahunka, 1965 (Oribatida: Oribatulidae) is presented, based on the material collected from dry soil in the steppes of the Altai Republic, Russia. The main morphological traits of this species are summarized.

**KEYWORDS:** oribatid mite, *Oribatula*, morphology, redescription, Altai

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### INTRODUCTION

The oribatid mite *Oribatula elegantissima* (Acari: Oribatida: Oribatulidae) was described and illustrated (dorsal, ventral and lateral sides of the body) by Balogh and Mahunka (1965) from Mongolia. Later, Bayartogtokh and Smelyansky (2003) presented supplementary description of this species, including a figure of the dorsal side.

At present, *O. elegantissima* is distributed in the eastern Palaearctic region (Subías 2022).

Among the mite material collected from the Altai, we found two specimens of *O. elegantissima*. The original (Balogh and Mahunka 1965) and the supplementary descriptions (Bayartogtokh and Smelyansky 2003) of the species are correct and understandable, but they are incomplete. In particular, they exclude the descriptions of: the gnathosoma and legs, the structures of the podosomal and the posterior regions. The main goal of our paper is to present a redescription of *O. elegantissima* on the basis of material from the Altai, and to summarize the species' main morphological traits, which will help with its identification in the future.

### MATERIALS AND METHODS

**Specimens.** Two specimens (one male and one female) of *O. elegantissima*: Russia, the Altai Republic, Ust-Kansky District, 50°56'04.0"N 84°52'38.2"E, 1,060 m a.s.l., dry soil in the steppe, June 13, 2022 (leg. A. A. Khaustov, O. Joharchi, I. Döker, V. A. Khaustov, R. V. Latyntsev).

**Observation and documentation.** Mites were extracted using Berlese's funnels without electric lamps in laboratory conditions over the course of seven days and preserved in 70% ethanol. Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. Body length was measured in lateral view, from

the tip of the rostrum to the posterior edge of the notogaster. Notogastral width refers to the maximum width of the notogaster in dorsal view. Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers (µm). Formulas for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). 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 transmission light microscope “Leica DM 2500”. Images were obtained with an AxioCam ICc3 camera using a Carl Zeiss transmission light microscope “Axio Lab.A1”.

**Terminology.** General morphological terminology used in this paper mostly follows that of F. Grandjean: see Travé and Vachon (1975) for references, Norton (1977) for leg setal nomenclature and Norton and Behan-Pelletier (2009) for overview.

**Abbreviations.** Prodorsum: *lam*—lamella; *tu*—tutorium; *ro*, *le*, *in*, *ex*, *bs*—rostral, lamellar, interlamellar, exobothridial, and bothridial seta, respectively; *D*—dorsophragma; *P*—pleurophragma. Notogaster: *len*—lenticulus; *c*, *da*, *la*, *dm*, *lm*, *dp*, *lp*, *h*, *p*—setae; *Aa*, *A1*, *A2*, *A3*—porose areas; *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 solenidium; *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; *Am*—humeral porose area; *PdI*, *PdII*—pedotectum I and II, respectively; *cir*—circumpedal carina. Anogenital region: *g*, *ag*, *an*, *ad*—genital, aggenital, anal, and adanal seta, respectively; *iad*—adanal lyrifissure; *Ap*—

postanal porose area; *p.o.*—preanal organ. Legs: *Tr*, *Fe*, *Ge*, *Ti*, *Ta*—trochanter, femur, genu, tibia, and tarsus, respectively; *p.a.*—porose area;  $\epsilon$ —famulus; *d*, *l*, *v*, *ev*, *bv*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl*—setae;  $\omega$ ,  $\sigma$ ,  $\varphi$ —solenidia.

**TAXONOMY**

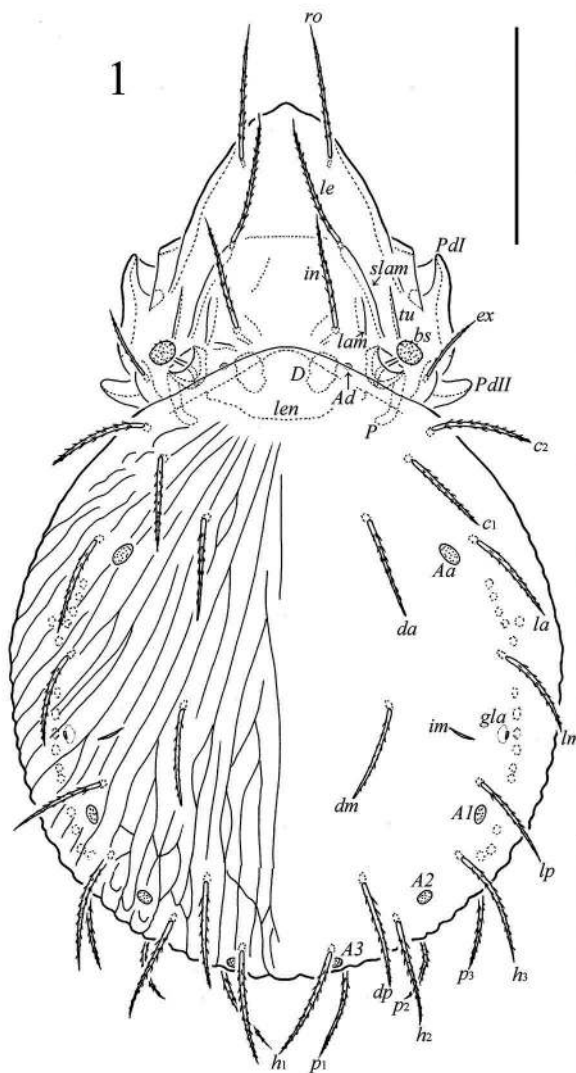
*Oribatula elegantissima* Balogh and Mahunka, 1965 (Figs. 1–11)

**Supplementary description. Measurements.** Body length: 405 (male), 420 (female); notogaster width: 255 (male and female).

**Integument.** Body color light brown. Body surface punctate (visible under high magnification,  $\times 1,000$ ). Notogaster longitudinally or obliquely

oriented striate; some striations fused, partially forming elongate cells. Anogenital region, anal plates and lateral parts of epimeres sparsely foveolate (foveoles rounded or slightly elongate, their diameter or length up to 4).

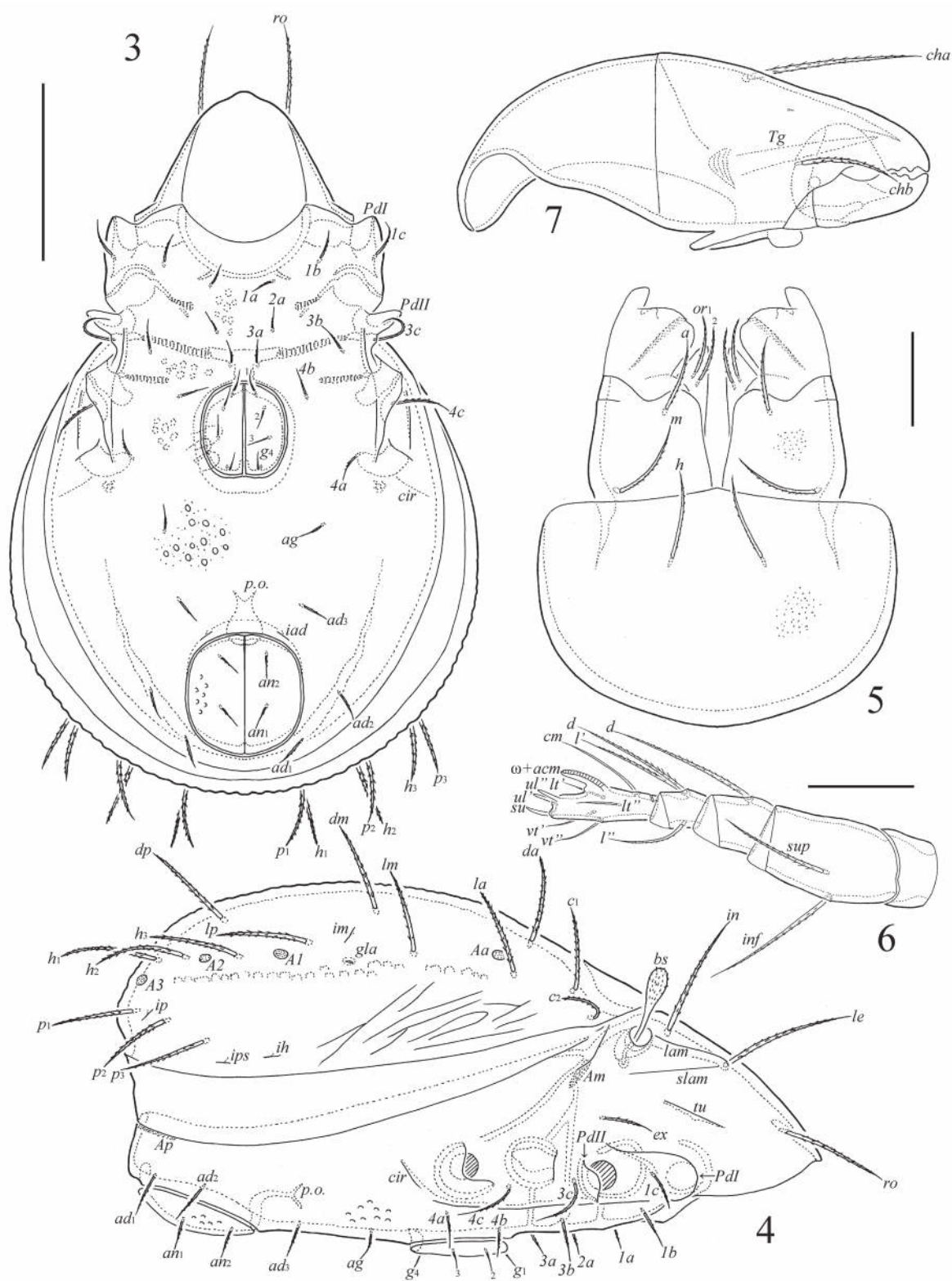
**Prodorsum.** Rostrum indistinctly protruding, rounded. Lamella well developed, shorter than half of prodorsum (measured in lateral view), without cusp. Translamella absent but indistinct ridge observed instead it (most likely, vestigial translamella). Sublamella and tutorium lineate. Sublamellar porose area absent. Rostral (60–64), lamellar (79–82), interlamellar (71–75), and exobothridial (30–37) setae stiff, barbed; bothridial seta (45–49) clavate, with short stalk and slightly longer, barbed



Figs. 1–2. *Oribatula elegantissima* Balogh and Mahunka, 1965, adult: 1—dorsal view (legs omitted); 2—dorsal view, microscope image. Scale bar=100  $\mu$ m (1), magnification  $\times 400$  (2).

head. Bothridium not covered by anterior margin of notogaster in dorsal view. Dorsosejugal porose

area oval, poorly visible (7–11 × 5–7) oval, located posterolateral to insertion of interlamellar



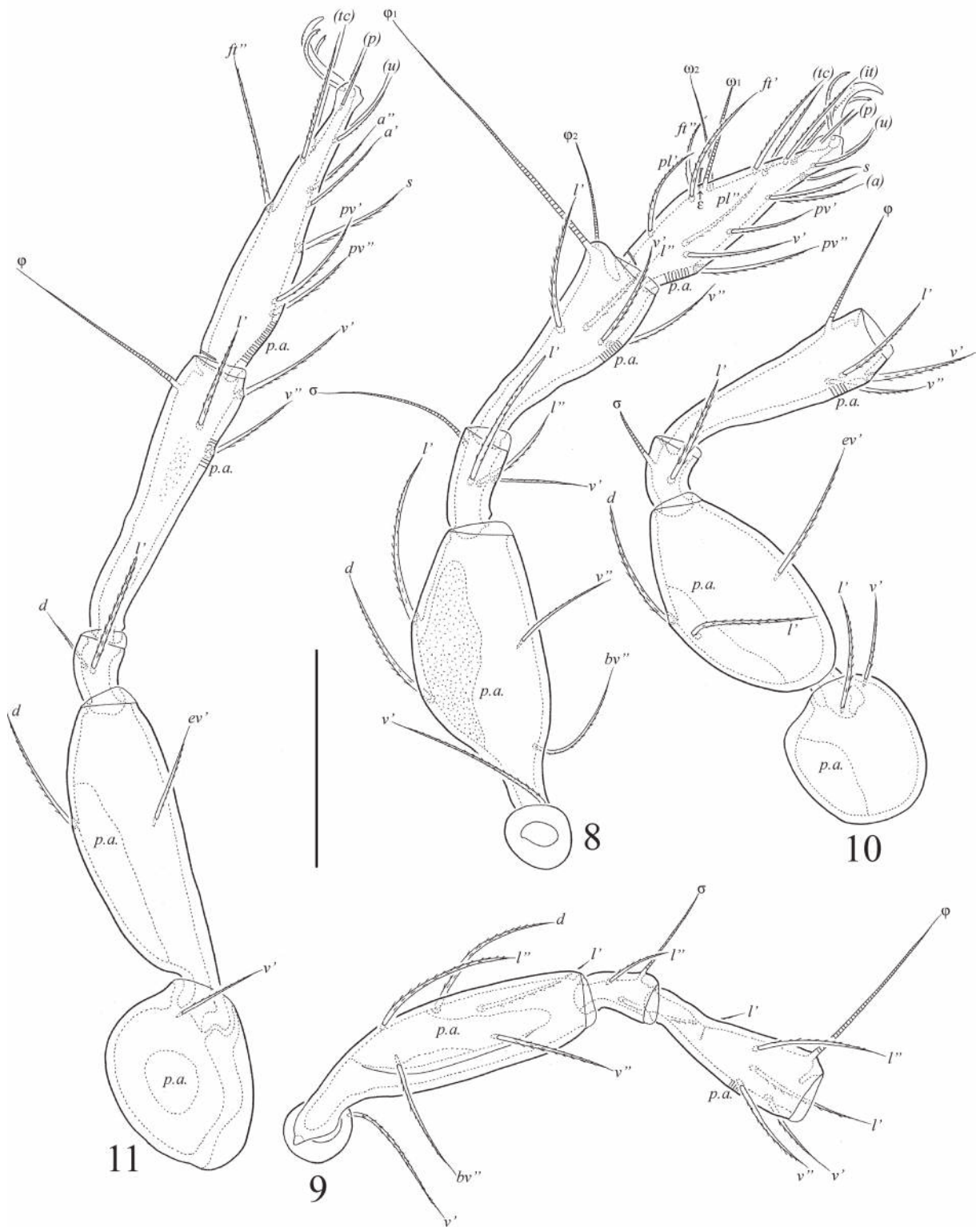
Figs. 3–7. *Oribatula elegantissima* Balogh and Mahunka, 1965, adult: 3—ventral view (gnathosoma and legs omitted); 4—right lateral view (gnathosoma and legs omitted); 5—subcapitulum, ventral view; 6—palp, left, antiaxial view; 7—chelicera, right, antiaxial view. Scale bars=100 μm (3, 4), 20 μm (5–7).



seta. Dorsophragma comparatively short, slightly elongated.

*Notogaster*. Anterior notogastral margin convex medially. Lenticulus well visible. Fourteen

pairs of notogastral setae ( $p_1-p_3$ : 45–49; others: 60–67) stiff, barbed. Four pairs of porose areas rounded (7–11). Opisthonotal gland opening and all lyrifissures (*ia*, *im*, *ip*, *ih*, *ips*) distinct.



Figs. 8–11. *Oribatula elegantissima* Balogh and Mahunka, 1965, adult: 8—leg I, left, paraxial view; 9—leg II (tarsus omitted), right, antiaxial view; 10—leg III (tarsus omitted), left, antiaxial view; 11—leg IV, left, antiaxial view.

*Gnathosoma*. Subcapitulum size: 101–105 × 75; subcapitular (*a*, *m*, *h*: 22–26) and adoral (13–15) setae setiform, barbed. Chelicera length: 109–116; cheliceral setae (*cha*: 39–41; *chb*: 22–26) setiform, barbed. Palp (75–79) setation: 0–2–1–3–9(+ $\omega$ ); postpalpal seta (7) thorn-like, smooth.

*Epimeral and lateral podosomal regions*. Epimeral setal formula: 3–1–3–3; setae (*3c*, *4c*: 30–34; *1a*, *2a*, *3a*: 19–22; others: 22–28) setiform barbed. Humeral porose areas *Am* diffuse; *Ah* not observed. Discidium not developed. Circumpedal carina short, indistinct.

*Anogenital region*. Four pairs of genital (15–17), one pair of aggenital (19–22), two pairs of anal (19–22), and three pairs of adanal (22–26) setae setiform, barbed. Adanal lyrifissure located close and anterior to anal aperture. Adanal setae *ad*<sub>1</sub> in posterolateral, *ad*<sub>2</sub> in lateral, *ad*<sub>3</sub> in anterior positions to anal plate. Postanal porose area band-like.

*Legs*. Median claw thicker than lateral claws, all slightly barbed dorsally; both lateral claws with small tooth ventrodistally. Dorsoparaxial porose area on femora I–IV and on trochanters III, IV, proximoventral porose area on tarsi I–IV and distoventral porose area on tibiae I–IV distinct. Formulas of leg setation and solenidia: I (1–4–3–4–19) [1–2–2], II (1–5–2–4–15) [1–1–2], III (2–3–1–3–15) [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, inserted lateral to solenidion  $\omega_1$ ; seta *s* on tarsus I eupathidial, located between paired setae *u* and *a*. Solenidia  $\omega_1$  on tarsus I,  $\omega_1$  and  $\omega_2$  on tarsus II and  $\sigma$  on genu III slightly bacilliform; other solenidia setiform.

**Remarks.** Based on our redescription and on the available data (Balogh and Mahunka 1965; Bayartogtokh and Smelyansky 2003) of adult *O. elegantissima*, we propose the following diagnostic morphological traits for this species: body size: 405–466 × 247–314; notogaster longitudi-

nally or obliquely striate; anogenital region foveolate; rostrum rounded; lamella simple, without cusp; translamella absent or vestigial; rostral, lamellar and interlamellar setae stiff, barbed; bothridial seta clavate, barbed; notogastral setae medium-sized, stiff, barbed; four pairs of porose areas rounded; epimeral and anogenital setae setiform, barbed; discidium not developed; postanal porose area band-like; leg femur I with four setae.

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Table 1  
Leg setation and solenidia of adult *Oribatula elegantissima* Balogh and Mahunka, 1965.

Leg	<i>Tr</i>	<i>Fe</i>	<i>Ge</i>	<i>Ti</i>	<i>Ta</i>
I	<i>v'</i>	<i>d</i> , <i>l'</i> , <i>bv''</i> , <i>v''</i>	( <i>l</i> ), <i>v'</i> , $\sigma$	( <i>l</i> ), ( <i>v</i> ), $\varphi_1$ , $\varphi_2$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), <i>v'</i> , ( <i>pl</i> ), $\varepsilon$ , $\omega_1$ , $\omega_2$
II	<i>v'</i>	<i>d</i> , ( <i>l</i> ), <i>bv''</i> , <i>v''</i>	( <i>l</i> ), $\sigma$	( <i>l</i> ), ( <i>v</i> ), $\varphi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> ), $\omega_1$ , $\omega_2$
III	<i>l'</i> , <i>v'</i>	<i>d</i> , <i>l'</i> , <i>ev'</i>	<i>l'</i> , $\sigma$	<i>l'</i> , ( <i>v</i> ), $\varphi$	( <i>ft</i> ), ( <i>tc</i> ), ( <i>it</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )
IV	<i>v'</i>	<i>d</i> , <i>ev'</i>	<i>d</i> , <i>l'</i>	<i>l'</i> , ( <i>v</i> ), $\varphi$	<i>ft''</i> , ( <i>tc</i> ), ( <i>p</i> ), ( <i>u</i> ), ( <i>a</i> ), <i>s</i> , ( <i>pv</i> )

Note: Roman letters refer to normal setae, Greek letters—to solenidia (except  $\varepsilon$ —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.