

# A NEW SPECIES OF THE FEATHER MITE GENUS *TROUESSARTIA* (ACARIFORMES: TROUESSARTIIDAE) FROM THE CETTI'S WARBLER *CETTIA CETTI* (PASSERIFORMES: CETTIIDAE) IN EUROPEAN RUSSIA

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**ABSTRACT:** A new feather mite *Trouessartia cettiae* sp.n. (Analgoidea: Trouessartiidae) is described from the Cetti's Warbler *Cettia cetti* (Passeriformes: Cettiidae) from the south of European Russia. Being most close to *T. carpi* Till, 1954, the new species differs from the latter in the following: in both sexes, setae *c3* and *sR111* have a small subapical denticle; in males, the apophyses of adanal apodemes are situated posterior to the level of adanal suckers, and setae *4b* are situated distinctly anterior to the level of setae *3a*; in females, setae *h1* are 5–8 µm long, the copulatory opening is distant from the free margin of interlobar membrane, and the posterior part of the hysteronotal shield is entirely covered with well-outlined circular and ovate lacunae. A brief note on a world distribution of the genus *Trouessartia* is provided.

**KEY WORDS:** Astigmata, Analgoidea, systematics, fauna, Europe.

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## INTRODUCTION

The feather mite genus *Trouessartia* Canestrini, 1899 (Astigmata: Trouessartiidae), with 145 known species, is the most species-rich genus in the family (Santana 1976; Gaud and Atyeo 1986, 1987; Mironov and González-Acuña 2013; Hernandes 2014, 2017, 2022; Hernandes and Valim 2015; Constantinescu *et al.* 2018a; Mironov and Galloway 2019; Mironov and Chandler 2020; Mironov 2021a, 2021b; Mironov *et al.* 2021). Representatives of this genus are predominately associated with passerine birds (Passeriformes). The only reliable host associations outside of passerines, namely with woodpeckers (Piciformes), have been recorded for one *Trouessartia* species in Africa (Gaud 1993) and for two species in the Neotropical region (Hernandes 2014; Mironov and Bermúdez 2017). In the plumage of their avian hosts, adults and tritonymphs of these mites are located on the remiges (mainly on secondaries) and rectrices, where they usually occupy the dorsal side of the vanes.

A world revision of the genus *Trouessartia* carried out by Santana (1976), which provided redescriptions and a key to almost all species known at the time, is still the main work on the systematics of this genus, although was published over forty years ago. Major references to the taxonomic papers with descriptions of *Trouessartia* species published after this revision, one can find in the following works of the last decade: Mironov and González-Acuña (2013), Hernandes (2014, 2022), Hernandes and Valim (2015), Constantines-

cu *et al.* (2016a, b, 2018a, b), Mironov and Galloway (2019) and Mironov and Chandler (2020). Additional taxonomic reviews and keys have been provided for *Trouessartia* species groups associated with swallows (Hirundinidae) of the Euroafrican (Gaud and Atyeo 1986, 1987) and the Neoarctic (Mironov and Galloway 2019) regions, as well as with the Passeroidea of North America (Mironov and Chandler 2020).

The currently known fauna of the genus *Trouessartia* probably represents a very small portion of extant world fauna, considering that a great number of potential passerine hosts have never been examined on the subject of their feather mites. Nevertheless, it is apparent that *Trouessartia* species are most diverse on passerines from the tropical areas of the world. Of 145 known species, 105 (about 73%) have been described from passerines nesting in the tropical areas of the world (Santana 1976; Gaud and Atyeo 1986, 1987; Mironov and Kopij 2000; Valim *et al.* 2011; Mironov and González-Acuña 2013; Hernandes 2014, 2017, 2022; Hernandes and Valim 2015; Hernandes and OConnor 2017; Constantinescu *et al.* 2016a, 2016b, 2018a, 2018b; Mironov *et al.* 2021). At the same time, the feather mite fauna of Europe, which has been explored for over 150 years and probably recovered almost completely, includes only 19 (13%) *Trouessartia* species (Mironov 1983, 1996, 1997; Kolarova and Mitov 2008; Kolarova 2010; Constantinescu *et al.* 2013; Mironov *et al.* 2022). Similarly, the

fauna of *Trouessartia* species in North America, which has been explored to lesser extent and can potentially include much more species than Europe, includes only 18 species (12%) (Santana 1976; Mironov and Galloway 2019; Mironov and Chandler 2020).

This work presents a description of a new *Trouessartia* species from the Cetti's Warbler, *Cettia cetti* (Pallas, 1776) (Passeriformes: Cettiidae), captured in European Russia. This bird is distributed in the western- and southern-most areas of Europe, on the Mediterranean coast of Africa, in West Asia and in the Transcaspian areas of Asia, up to the Tian-Shan Mountains (Gill *et al.* 2022). In European Russia, the Cetti's Warbler is relatively rare. It occurs mainly in the Caucasus and along the northern coast of the Black Sea (Koblik and Arkhipov 2014), although in the last decade, it has significantly increased its range in the south of Russia (Zabashta 2020).

#### MATERIALS AND METHODS

The material used in this work was collected in the course of a long-term survey of ectoparasites and pathogens of birds, carried out by the Rostov-on-Don Plague Control Research Institute in the Rostov Oblast, Russia, between 2001 and 2020. Birds, captured with mist-nets, were identified, ringed and checked for the presence of feather mites and other ectoparasites. Feather mites were collected with a preparation needle under a stereomicroscope and fixed in tubes with 70% ethanol. After processing, all birds were released into the wild. In the laboratory, feather mite samples were mounted on slides in Hoyer's medium according to the standard technique (Krantz and Walter 2009). Investigations of the mite specimens and drawings were made using a Leica DM 2500 microscope equipped with a differential interference contrast illumination (DIC) and a camera lucida.

The description and measuring techniques follow the latest taxonomic works on feather mites of the family Trouessartiidae (Mironov and González-Acuña 2013; Hernandez 2014, 2017; Constantinescu *et al.* 2016a, 2016b; Mironov and Galloway 2019; Mironov and Chandler 2020; Mironov *et al.* 2021). Morphological terms and idiosomal chaetotaxy follow Gaud and Atyeo (1996), and the leg chaetotaxy is that of Grandjean (1939). All measurements are in micrometers ( $\mu\text{m}$ ).

Scientific names of birds follow Gill *et al.* (2022). All type material is deposited in ZISP—Zoological Institute of the Russian Academy of Sciences (Saint Petersburg, Russia).

#### SYSTEMATICS

Family **Trouessartiidae Gaud, 1957**

Genus ***Trouessartia* Canestrini, 1899**

***Trouessartia cettiae* sp. n.**

(Figs. 1–6)

**Type material.** Holotype male (ZISP 21039), 9 male and 11 female paratypes (ZISP 21040–21059) from *Cettia cetti* (Pallas, 1776) (Passeriformes: Cettiidae), field No Z-3350, Russia, Rostov Oblast, near Rostov-on-Don, 14 August 2016, coll. A. V. Zabashta.

**Description.** *Male* (holotype, ranges for 9 paratypes in parentheses) (Figs. 1, 3A, 4A–D, F, 5A, B). Idiosoma, length  $\times$  width, 555 (515–555)  $\times$  260 (250–260), length of hysterosoma 360 (340–360). Prodorsal shield: length along midline 155 (145–160), greatest width posterior to scapular setae 170 (155–165), anterior part at level of trochanters II not narrowed, anterolateral extensions rounded and not extending to epimerites Ia, lateral margins not fused with scapular shields, posterior margin with small median extension, surface without ornamentation (Figs. 1A, 5A). Internal scapular setae *si* setiform, 28 (25–30) long, separated by 70 (62–70); external scapular setae *se* separated by 115 (110–120). Setae *c2* spiculiform, 52 (48–55) long, situated in antero-medial angle of humeral shields. Setae *c3* narrowly lanceolate with subapical denticle, 25 (25–30) long (Fig. 4F). Prohysteronotal and lobar parts of hysteronotal shield not split, delimited from each other by a pair of lateral incisions extending to bases of setae *e2* and by transverse fold between these setae; total length of hysteronotal shield from anterior margin to lobar apices excluding lamellae 350 (325–350), width at anterior margin 180 (170–180). Length of prohysteronotal part along midline 225 (215–230), anterior margin slightly concave, lateral margins at level of trochanters III with deep concavities, dark-sclerotized patch at these concavities without well-defined border, surface without ornamentation. Dorsal setae *d1*, *d2*, *e2* present, setae *f2* absent. Length of lobar shield 120 (110–120). Opisthosoma strongly attenuate posteriorly; opisthosomal

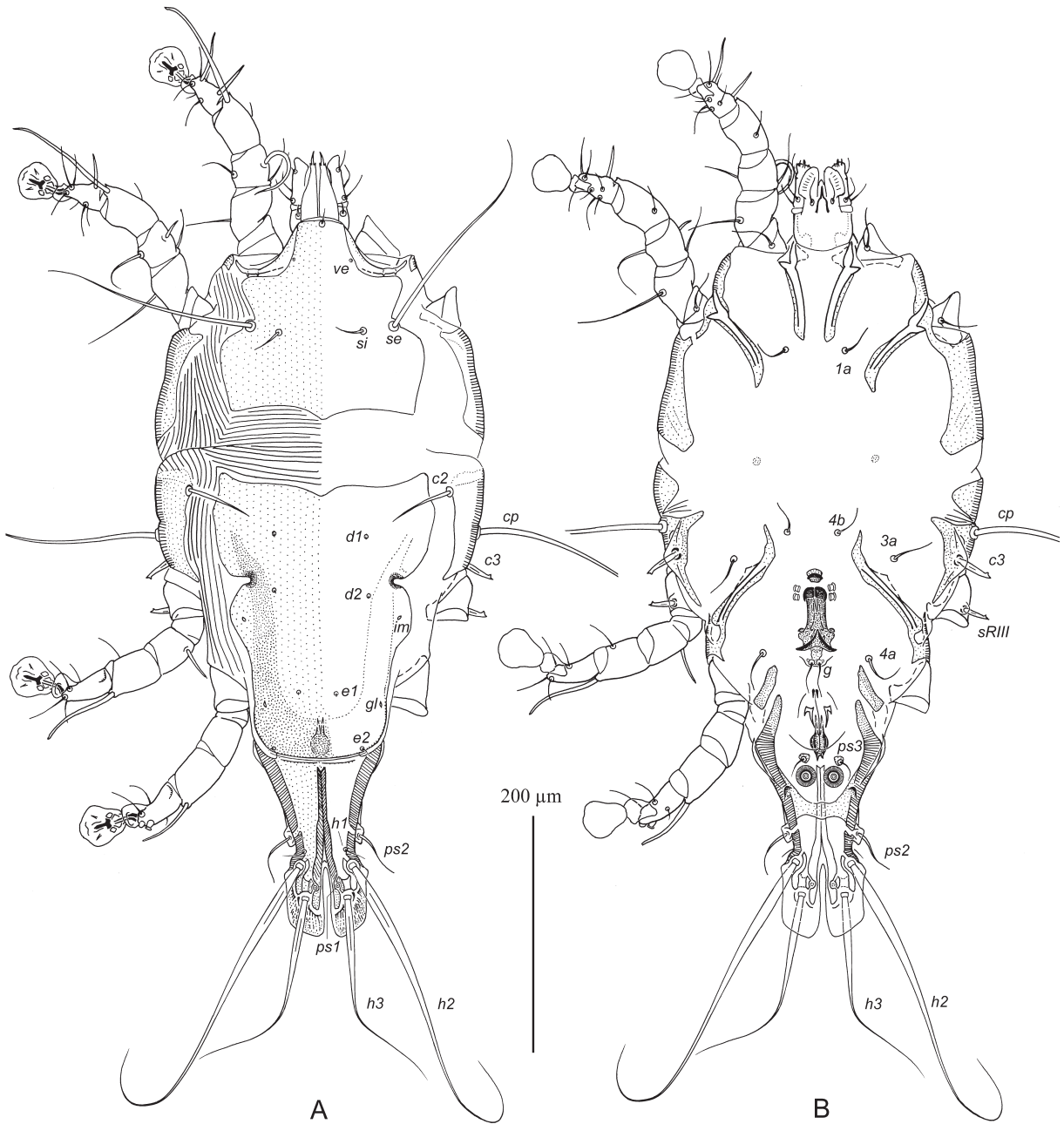


Fig. 1. *Trouessartia cettiae* sp.n., male. A—dorsal view, B—ventral view.

lobes fused with each other along midline forming a heavily sclerotized median septum, only apical parts of lobes posterior to level of setae *h2* separated by narrow parallel-sided terminal cleft. Length of terminal cleft from anterior end to lobar apices 32 (25–32), total length from anterior end to posterior margins of terminal lamellae 52 (50–55), width 7 (5–7). Terminal lamellae roughly semi-ovate, with smooth margins, length from bases of setae *h3* to lamellar apices 30 (30–32), greatest width 31 (30–35). Distances between dorsal setae: *c2:d2* 85 (77–85), *d2:e2* 125 (115–

125), *e2:h2* 97 (85–98), *h2:h3* 28 (25–28), *h2:h2* 45 (43–46), *h3:h3* 37 (35–38), *d1:d2* 48 (42–50), *e1:e2* 48 (38–48), *ps1:h3* 10 (8–10).

Epimerites I free. Rudimentary sclerites rEpIIa minute circular. Genital apparatus: long and narrow, length excluding epiandrum and basal sclerite 53 (52–54), greatest width 30 (28–30); epiandrum (pregenital sclerite) small ovate; distal ends of parameres with large hook-like extensions; aedeagus long and thin, with tip extending beyond distal ends of parameres; latigenital sclerites not developed; basal sclerite extending

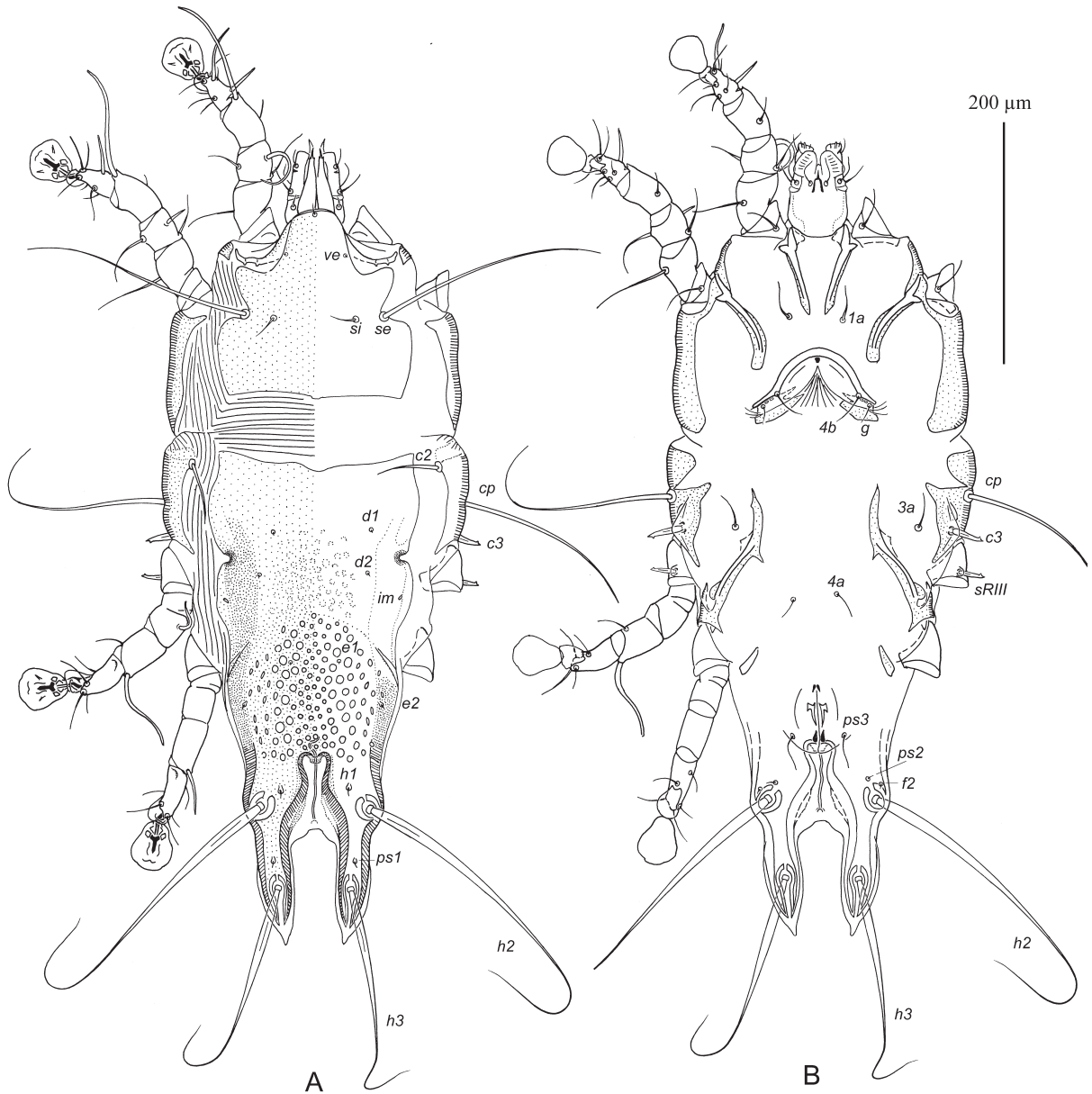


Fig. 2. *Trouessartia cettiae* sp.n., female. A—dorsal view, B—ventral view.

to level of setae *g* (Fig. 3A). Anterior and posterior pairs of genital papillae similar in size and equidistant from midline. Genital shield absent. Setae *g* filiform, with bases adjacent to each other, shorter than half the distance between setae *g* and *ps3*. Postgenital plaque (cuticular fold flanking area around genital setae *g*) small trapezoidal. Apophyses of adanal apodemes shaped as rounded and heavily sclerotized tubercles situated posterior to level of adanal suckers (Fig. 5B). Lateral margins of opisthosoma with narrow membranes. Translobar apodeme wide. Adanal

shields represented by small plates of irregular form bearing setae *ps3*. Adanal suckers 15 (15–16) in diameter. Inner ends of epimerites IIIa extend beyond level of setae *4b*, without extensions on inner margins. Epimerites IVa shaped as oblique longitudinal plates, with anterior ends extending to level of setae *g*. Setae *4b* situated anterior to level of setae *3a*, both pairs anterior to genital apparatus apex; setae *4a* and *g* approximately at same transverse level. Distances between ventral setae: *4b:3a* 18 (18–24), *4b:4a* 105 (102–105), *g:ps3* 82 (78–82), *ps3: h3* 113 (100–115).

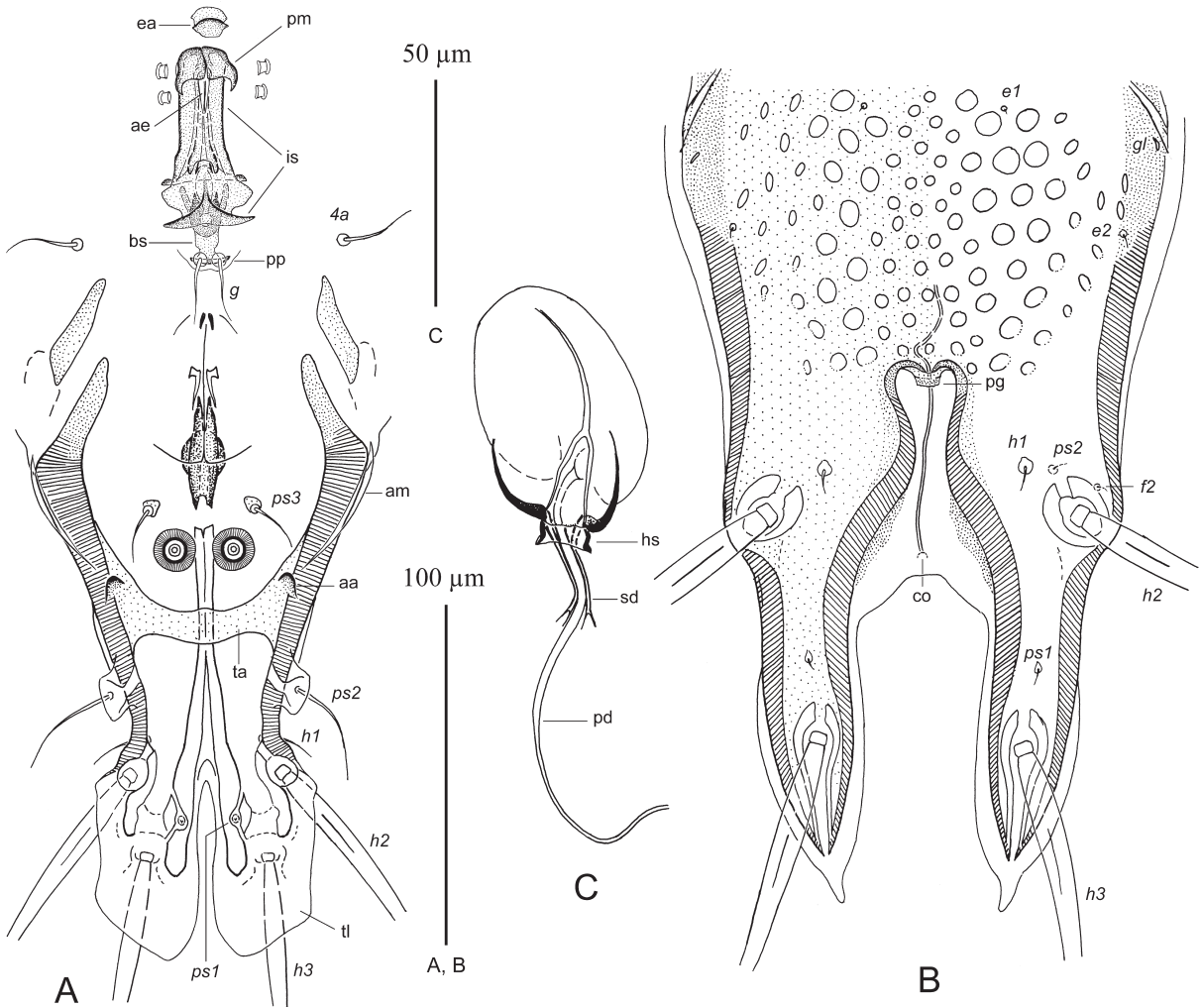


Fig. 3. *Trouessartia cettiae* sp.n., opisthosoma and genital apparatus. A—genital apparatus and opisthosoma of male, ventral view; B—opisthosoma of female, dorsal view; C—spermatheca and spermaducts. Abbreviations: aa—apophysis of adanal apodeme, ae—aedeagus, am—adanal membrane, bs—basal sclerite, co—copulatory opening, ea—epiandrium, hs—head of spermatheca, is—intermedial sclerite, pd—primary spermaduct, pg—primary spermaduct guide, pm—paramere of genital apparatus, pp—postgenital plaque, sd—secondary spermaducts, ta—translobar apodeme, tl—terminal lamella.

Legs. Setae *cG*, *mG* of genua I, II filiform. Genual solenidia  $\sigma$ I and  $\sigma$ II situated at midlength of corresponding genu (Fig. 4A, B). Trochanteral setae *sR*III narrowly lanceolate, with subapical denticle, 20 (18–20) long. Legs IV with ambulacral disc extending to bases of setae *h*3. Tarsi III, IV with small rounded ridge on anti-axial surface (Fig. 3C). Tarsus IV 35 (35–38) long; modified setae *d* barrel-shaped, with discoid cap, situated in distal 1/3 of this segment; modified setae *e* hemispheroid, without cap, situated apically (Fig. 4D). Lengths of solenidia:  $\sigma$ I 72 (65–72),  $\sigma$ II 12 (10–12),  $\sigma$ III 28 (22–28),  $\phi$ IV 50 (46–50).

*Female* (range for 10 paratypes) (Figs. 2, 3B, C, 4E, 5C). Idiosoma, length  $\times$  width, 590–645  $\times$  240–265, length of hysterosoma 390–400. Prodorsal shield: shape and ornamentation as in male, 155–165  $\times$  155–170. Setae *si* spiculiform, 28–32 long, separated by 70–75; setae *se* separated by 110–120. Setae *c*2 spiculiform, 45–50 long, situated in anteromedial angle of humeral shields. Setae *c*3 narrowly lanceolate, with bidentate or acute apex, 25–29 long. Hysteronotal shield: length from anterior margin to posterior tips 375–400, width at anterior margin 170–185; lateral margins at level of trochanters III with deep concavities,

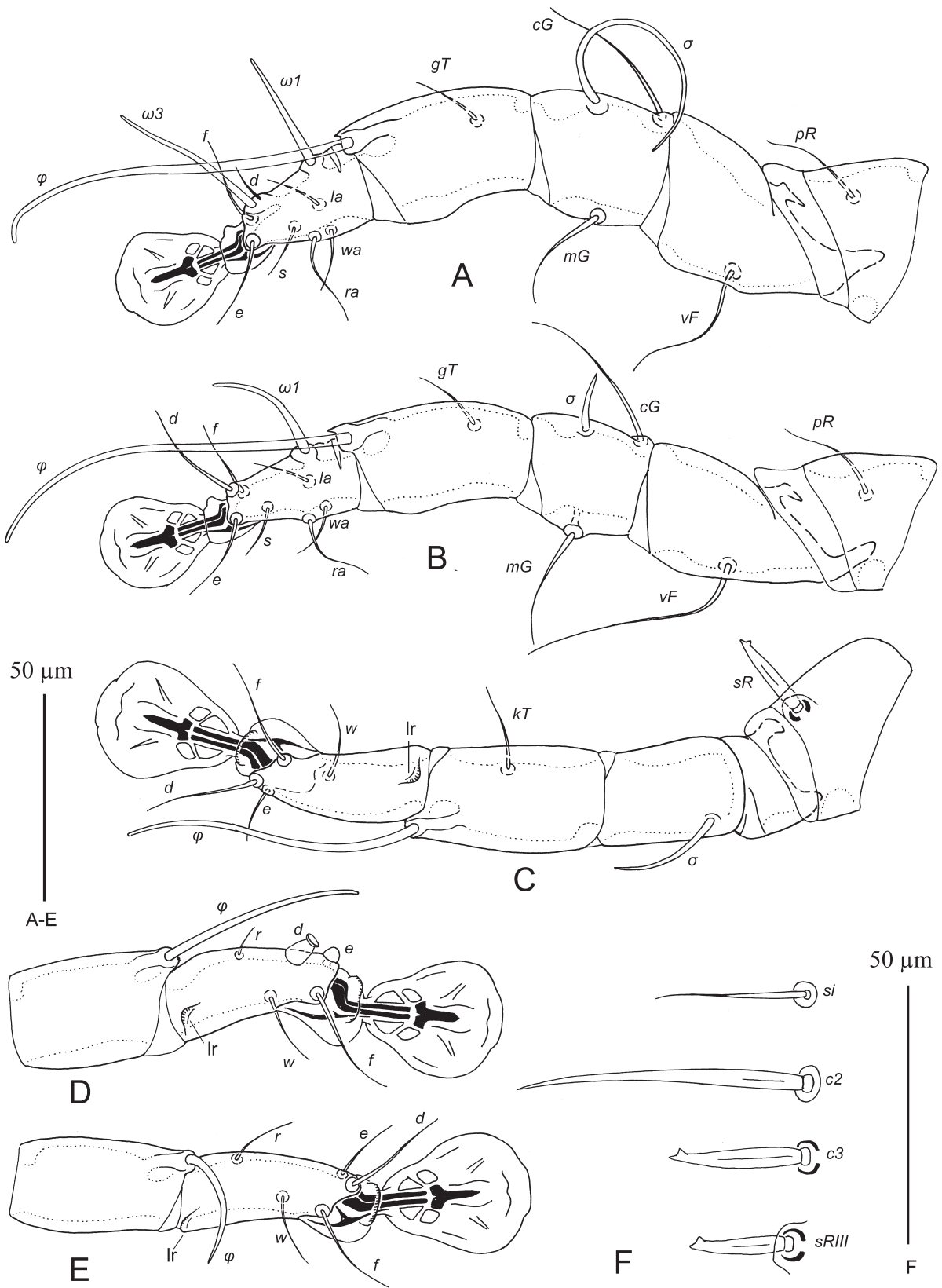


Fig. 4. *Trouessartia cettiae* sp.n., details. A–C—legs I–III of male, respectively; D—tibia and tarsus IV of male; E—tibia and tarsus IV of female; F—setae *si*, *c2*, *c3* and *sRIII* of male, respectively. Abbreviations: *l\_r*—lateral ridge of tarsus.

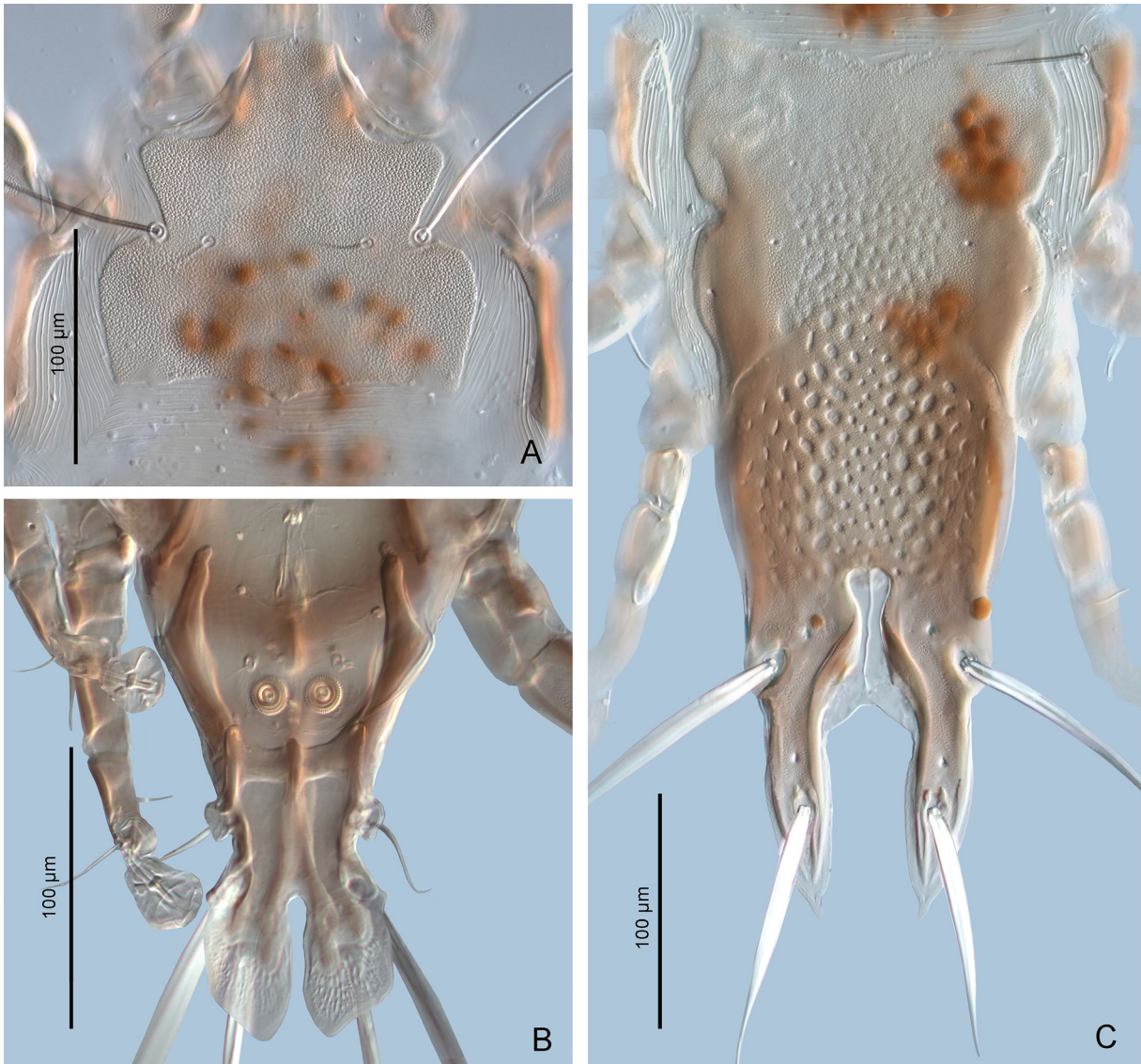


Fig. 5. *Trouessartia cettiae* sp.n. A—prodorsal shield of male, dorsal view; B—opisthosoma of male, ventral view; C—hysteronotal shield of female, dorsal view.

dark-sclerotized patch at these concavities without a well-defined border; anterior part of the shield without ornamentation; posterior part entirely covered with well-outlined circular and ovate lacunae, among which lacunae in median area noticeably smaller than in lateral parts (Figs. 2A, 3B, 5C). Dorsal setae *d1*, *d2*, *e2* present. Setae *h1* short setiform, 5–8 long, situated anteromesal from setae *h2*, 27–29 from corresponding lateral margins of hysteronotal shield. Width of opisthosoma at level of setae *h2* 110–125. Setae *ps1* situated dorsally, equidistant from margins of opisthosomal lobes. Supranal concavity open posteriorly into terminal cleft. Length of terminal cleft from anterior end of supranal concavity to

lobar apices 150–165, length from free margin of interlobar membrane to lobar apices 92–100, greatest width of cleft 35–40. Interlobar membrane occupying anterior 1/4 of terminal cleft. External copulatory tube absent; copulatory opening situated ventrally, distant from free margin of interlobar membrane; basal guides of copulatory tube absent; primary spermatiduct guide short, trapezoidal in shape. Distances between dorsal setae: *c2:d2* 84–88, *d2:e2* 105–120, *e2:h2* 82–85, *h2:h3* 65–75, *h2:h2* 87–95, *h3:h3* 60–68, *d1:d2* 35–40, *e1:e2* 35–38, *h1:h2* 18–20, *h1:h1* 56–63, *ps1:h3* 22–25.

Epimerites I free. Epigynum 35–40 long, 95–110 wide. Inner margins of epimerites IIIa with

short acute extension. Epimerites IVa present. Adanal sclerites absent. Setae *f2*, *ps2* minute. Head of spermatheca with short collar about 5 long; primary spermaduct slightly enlarged in proximal part; secondary spermaducts 25–30 long (Fig. 3C).

Legs I–III as in males. Trochanteral setae *sRIII* narrowly lanceolate, with subapical denticle, 18–20 long. Tarsi III, IV with small rounded ridge on anti-axial surface. Legs IV with ambulacral disc extending to level of setae *ps1*. Length of solenidia:  $\sigma$ I 65–75,  $\sigma$ II 12–14,  $\sigma$ III 23–25,  $\phi$ IV 28–32.

**Differential diagnosis.** Among currently described species, *Trouessatia cettiae* sp. n. is most similar to *T. carpi* Till, 1954 from the White-browed Scrub Robin, *Cercotrichas leucophrys* (Vieillot, 1817) (Muscicapidae) (Till 1954) in the following characters: in both sexes, setae *dl* are present, the lateral margins of hysteronotal shield have incisions at the level of trochanters III; in males, the prohysteronotal and lobar parts of the hysteronotal shield are not separated, and the apophyses of adanal apodemes are represented by rounded tubercles; in females, the external copulatory tube is absent, and the copulatory opening is situated on the interlobar membrane. *Trouessatia cettiae* differs from *T. carpi* in the following features: in both sexes, setae *c3* and *sRIII* have a small subapical denticle; in males, the apophyses of adanal apodemes are situated posterior to the level of adanal suckers, and setae *4b* are situated distinctly anterior to the level of setae *3a*; in females, setae *hl* are 5–8 long, the copulatory opening is distant from the free margin of interlobar membrane, and the posterior part of the hysteronotal shield (from the level of trochanters IV) is entirely covered with well-outlined circular and ovate lacunae, which are noticeably smaller on the median area of the hysteronotal shield than on the lateral areas. In both sexes of *T. carpi*, setae *c3* and *sRIII* have simple acute apices; in males, the apophyses of adanal apodemes are situated at the level of adanal suckers, and setae *3a* and *4b* are situated at the same transverse level; in females, setae *hl* are about 15 long, the copulatory opening is situated at the very margin of interlobar membrane, and the posterior part of the hysteronotal shield has faintly visible ovate lacunae.

**Etymology.** The specific epithet is derived from the generic name of the type host and is a noun in the genitive case.

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