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FIRST RECORDS OF STIGMAEIDAE (ACARI, PROSTIGMATA) FROM THE DOMINICAN REPUBLIC

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First data on the mite family Stigmaeidae (Acari, Prostigmata) of the Dominican Republic are provided. *Storchia cuneata* Fan et Chen 1997 is recorded and redescribed from the Neotropical Region for the first time. Three species are described as new: *Stigmaeus striatus* Khaustov et Ermilov sp. n., *Eustigmaeus dominicanensis* Khaustov et Ermilov sp. n., and *E. latisetosus* Khaustov et Ermilov sp. n. In addition, some unusual morphological character states of *Storchia cuneata* are discussed.

Keywords: mites, Raphignathoidea, *Storchia*, *Stigmaeus*, *Eustigmaeus*, morphology, taxonomy

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The mite family Stigmaeidae (Acari, Prostigmata) is the largest in the superfamily Raphignathoidea and currently includes about 640 species of 33 valid genera (Fan et al., 2016, 2019; Beron, 2020). Most stigmaeid mites are free-living predators of various small arthropods. Some *Eustigmaeus* species feed on mosses, while several *Stigmaeus* and *Eustigmaeus* species are parasites of sand flies (Diptera, Psychodidae). Species of the genera *Zetzelia* and *Agistemus* are probably the second most important group of plant mite predators (after the Phytoseiidae) (Gerson et al., 2003). Prior to our study, nothing was known about the stigmaeid mites of the Dominican Republic.

During the study of forest litter samples collected in the Dominican Republic, we found three new species and recorded *Storchia cuneata* Fan et Chen 1997 for the first time from the Neotropical region. The primary aim of this paper is to describe these new species and redescribe *S. cuneata* based on the materials from the Dominican Republic.

METHODS

Mites mounted in Hoyer's medium. In the description below, the palpal, idiosomal and leg setations follow Grandjean (1939, 1944, 1946). The nomenclature of prodorsal setae follows Kethley (1990). All measurements for the holotype and the paratypes (in parentheses) and for the scale bars are given in micrometers

(µm). Mite morphology was studied using a Carl Zeiss AxioImager A2 compound microscope with a phase contrast and DIC illuminations. Photomicrographs were taken with an AxioCam ICc5 digital camera.

All materials are deposited in the acarological collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

TAXONOMY

Family *Stigmaeidae* Oudemans 1931

Genus *Storchia* Oudemans 1923

Type species: *Caligonus robustus* Berlese 1885, by original designation.

Storchia cuneata Fan et Chen 1997

Storchia cuneata Fan et Chen 1997: 164

(Figs 1–6)

Description. Female (Figs 1–3). Body elongate. Length of idiosoma 335, width 165.

Idiosomal dorsum (Fig. 1a). Prodorsal shield smooth, poorly sclerotized, with two pairs of setae (*vi*, *ve*). Ocelli absent. Hysterosomal dorsum with separated medially suranal shields with two pairs of setae (*h1*, *h2*); other dorsal setae located on tiny platelets. All dorsal setae barbed; setae *vi* and *ve* pointed, other dorsal setae weakly blunt-tipped. Right seta *c1* absent in female specimen. Cuticle antieriad and anterolaterad prodorsal

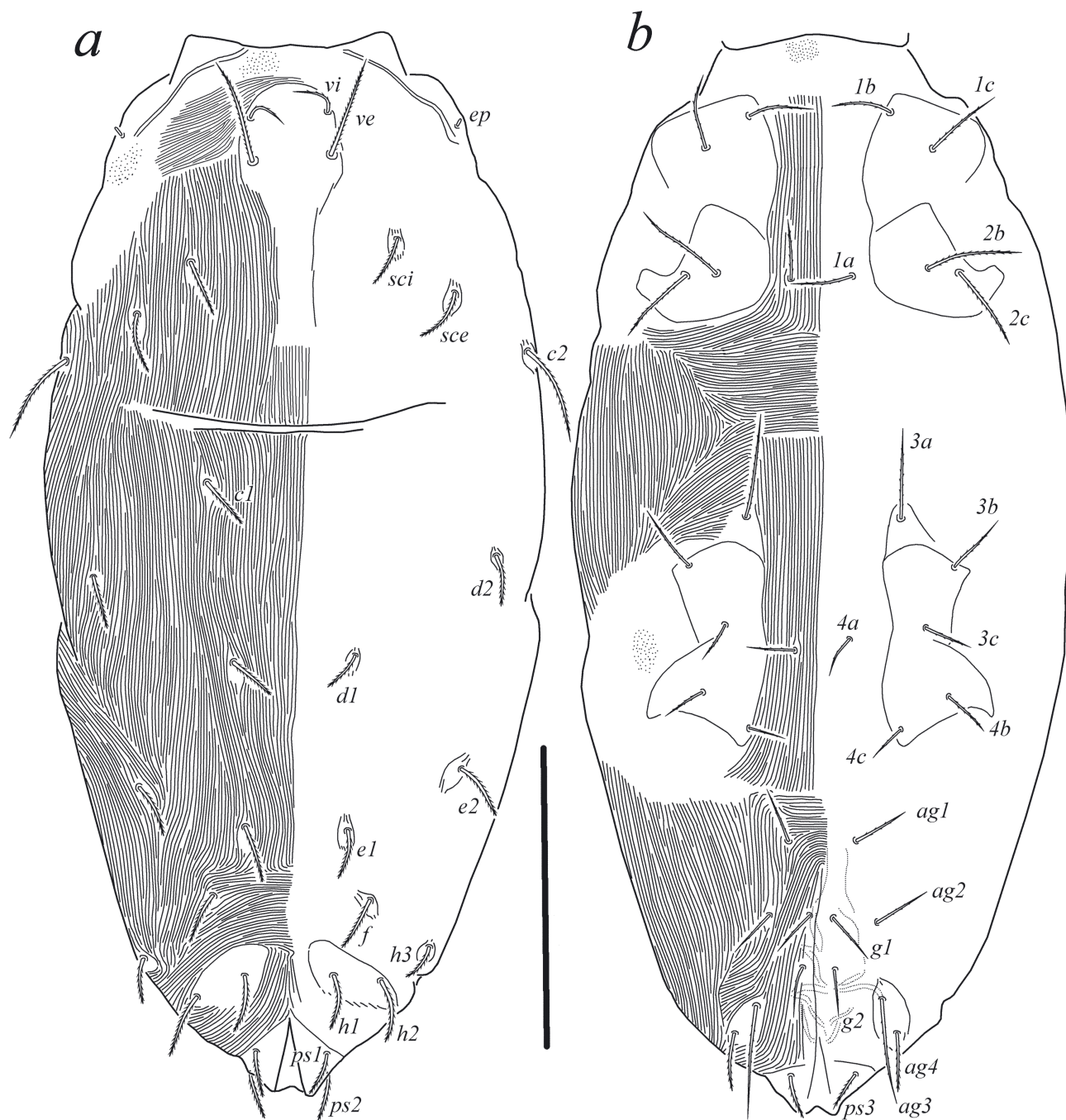


Fig. 1. *Storchia cuneata* Fan et Chen 1997, female: a – dorsum of idiosoma; b – venter of idiosoma. Scale bar 100 μ m.

shield with papillae, other dorsal surface covered with smooth striae. Cupules not evident. Lengths of dorsal setae: vi 18, ve 34, sci 20, sce 21, c1 20, c2 36, d1 18, d2 19, e1 20, e2 20, f 21, h1 19, h2 22, h3 20, ps1 16.

Idiosomal venter (Fig. 1b). All ventral plates smooth; four pairs of aggenital setae, setae ag3 and ag4 located on small plates; two pairs of genital setae. All ventral

setae weakly barbed, setae ps1–ps3 and ag4 weakly blunt-tipped, other ventral setae pointed. Setae 3a located on small endopodal plates; setae 4a situated on striated cuticle. Cuticle just posteriad gnathosoma and laterad bases of legs I–II and III–IV with tubercles. Lengths of ventral setae: 1a 21, 1b 22, 1c 27, 2b 32, 2c 29, 3a 33, 3b 22, 3c 17, 4a 17, 4b 15, 4c 14, ag1 21, ag2 21, ag3 42, ag4 20, g1 17, g2 17, ps1 16, ps2 16, ps3 15.

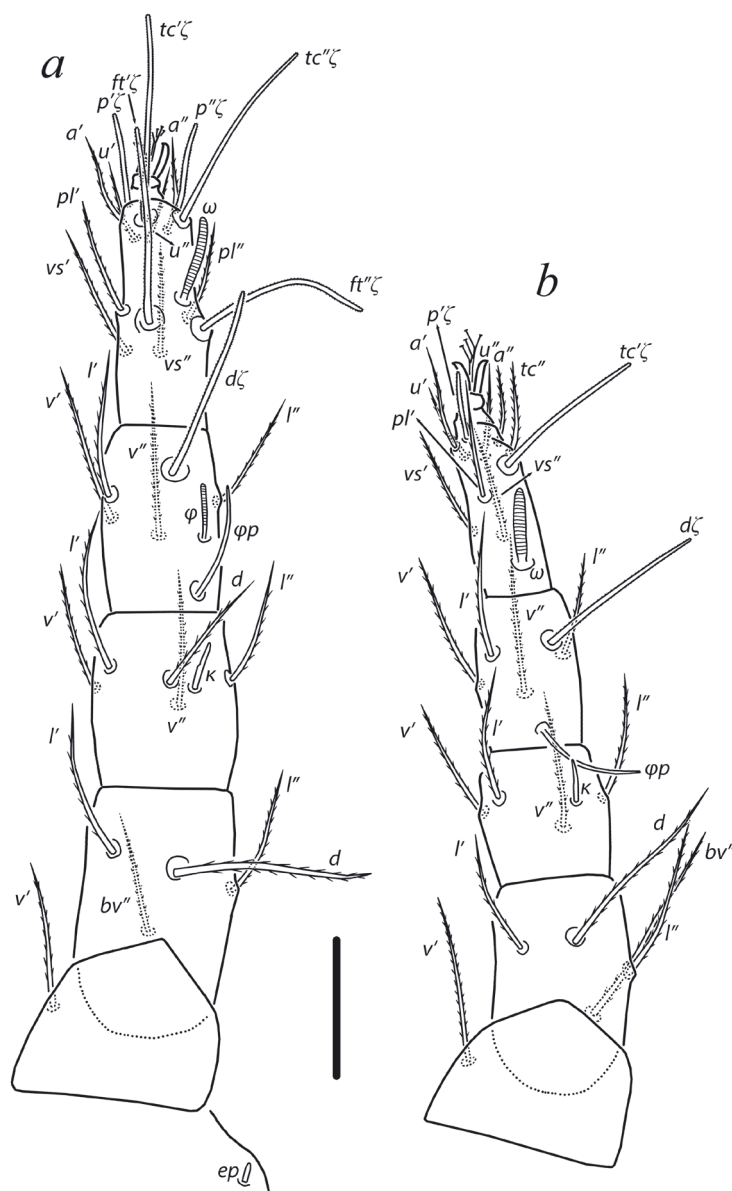


Fig. 2. *Storchia cuneata* Fan et Chen 1997, female: a – right leg I, dorsal aspect; b – right leg II, dorsal aspect. Scale bar 20 μ m.

Gnathosoma. Tibial claw well-developed, subequal in length with palptarsus. Seta l' on palpal tibia not modified. Seta d of femur weakly blunt-tipped and barbed; other palpal setae of femur, genu and tibia pointed and weakly barbed; all setae of palptarsus smooth. Number of setae on palpal segments: Tr 0, Fe 3 (d , l' , v''), Ge 2 (d , l''), Ti 3 (d , l' , l''), Ta 8 (1) eupathidia ul' , ul'' , sul , and acm , simple tactile setae ba , bp , lp , and 1 solenidion ω). Palpal supracoxal setae (ep) peg-like, located dorsally. Rostrum of subcapitulum elongate, with a pair of tiny papillae distally. Setae m and n barbed and weakly blunt-tipped, $or1$ and $or2$ smooth and pointed. Basal part of subcapitulum smooth. Length of subcapitular setae: m 20, n 24, $or1$ 12, $or2$ 12. Chelicerae dorsally

smooth, length of stylets 29; length of palps 67; length of palpal solenidion ω 4.

Legs (Figs 2, 3). Length of legs: I 135, II 110, III 110, IV 115. Empodial tenant hairs capitate. Eupathidia (d on tibiae I and II, (tc), (ft) on tarsus I and p' , tc' on tarsus II) unusually weakly pubescent. Leg I (Fig. 2a). Coxae I posterodorsally with peg-like leg supracoxal setae (ep). Leg setation: Tr 1 (v'), Fe 4 (d , l' , l'' , bv''), Ge 6 (d , l' , l'' , v' , v'' , k), Ti 5 (2) ($d\xi$, l' , l'' , v' , v'' , ϕ , $\phi\rho$), Ta 14 (1) ($p'\xi$, $p''\xi$, $tc'\xi$, $tc''\xi$, $ft'\xi$, $ft''\xi$, u' , u'' , a' , a'' , pl' , pl'' , vs' , vs'' , ω). Seta k 7 smooth, blunt-tipped, slightly asymmetric; seta d of femur weakly blunt-tipped and barbed; other setae (except eupathidia) pointed and weakly barbed. Solenidion ω 12 digitiform;

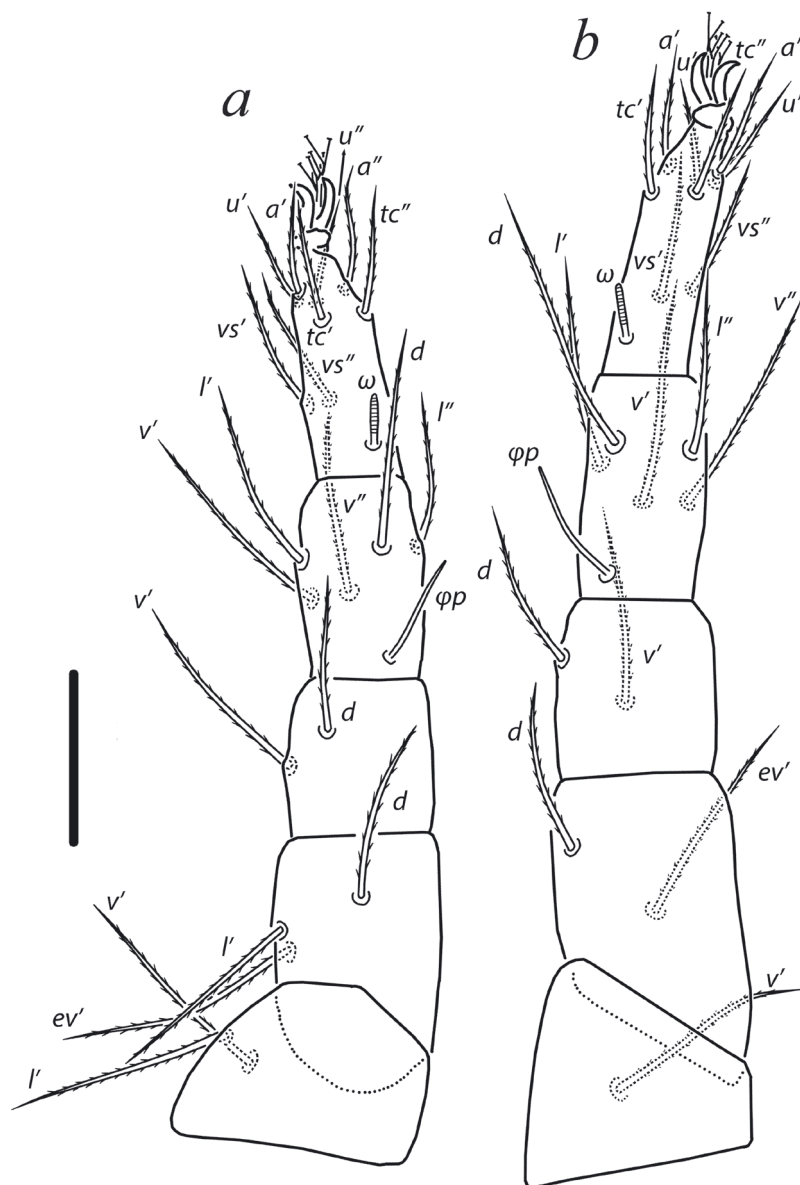


Fig. 3. *Storchia cuneata* Fan et Chen 1997, female: *a* – right leg III, dorsal aspect; *b* – right leg IV, dorsal aspect. Scale bar 20 μ m.

solenidion ϕ 8 baculiform, solenidion $\phi\phi$ 17 uniformly thin. Leg I (Fig. 2*b*). Leg setation: Tr 1 (v'), Fe 4 (d , l' , l'' , bv''), Ge 5 (l' , l'' , v' , v'' , k), Ti 5 (1) ($d\xi$, l' , l'' , v' , v'' , ϕp), Ta 10 (1) ($p\xi$, $tc'\xi$, tc'' , u' , u'' , a' , a'' , pl' , vs' , vs'' , ω). Seta k 7 of genu rod-like, slightly asymmetric; other setae (except eupathidia) pointed and weakly barbed. Solenidion ω 10 digitiform; solenidion ϕp 17 uniformly thin. Leg III (Fig. 3*a*). Leg setation: Tr 2 (l' , v'), Fe 3 (d , l' , ev'), Ge 2 (d , v'), Ti 5 (1) (d , l' , l'' , v' , v'' , ϕp), Ta 8 (1) (tc' , tc'' , u' , u'' , a' , a'' , vs' , vs'' , ω). Solenidion ω 7 baculiform; solenidion ϕp 15 uniformly thin. All leg setae pointed and barbed. Leg IV (Fig. 3*b*). Leg setation: Tr 1 (v'), Fe 2 (d , ev'), Ge 2 (d , v'), Ti 5 (1) (d , l' ,

l'' , v' , v'' , ϕ), Ta 8 (1) (tc' , tc'' , u' , u'' , a' , a'' , vs' , vs'' , ω). Solenidion ω 6 baculiform; solenidion ϕp 15 uniformly thin. All setae pointed and barbed.

M a l e (Figs 4–6). Idiosoma elongate, but opisthosoma much narrower than in female. Length of idiosoma 285, width 140.

Idiosomal dorsum (Figs 4*a*, 6*a*). In general, similar to female, but setae $h3$ absent. Setae $ps1$ – $ps3$ located dorsally; setae $ps1$ and $ps2$ short, thick, spiniform; other setae as in female. Aedeagus poorly sclerotized in basal half. Lengths of dorsal setae: vi 15, ve 27, sci 16, sce 18, $c1$ 15, $c2$ 27, $d1$ 14, $d2$ 16, $e1$ 13, $e2$ 15, $f15$, $h1$ 12, $h2$ 21, $ps1$ 5, $ps2$ 4, $ps3$ 15.

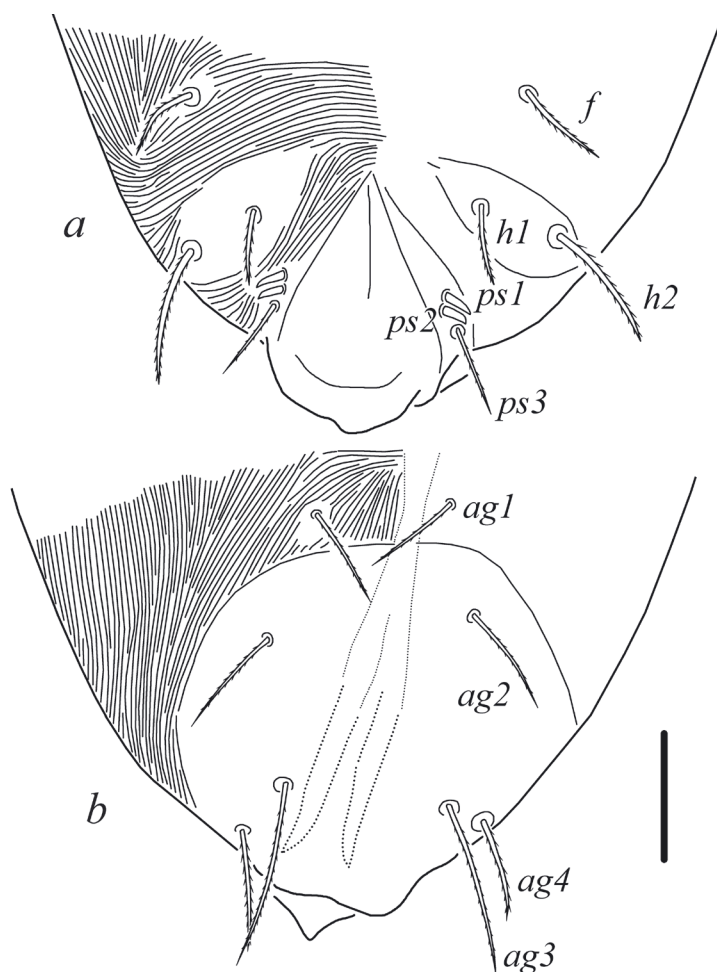


Fig. 4. *Storchia cuneata* Fan et Chen 1997, male: a – opisthosoma, dorsal aspect; b – opisthosoma, ventral aspect. Scale bar 20 μ m.

Idiosomal venter (Fig. 4b). Podosoma as in female. Opisthosoma with smooth, weakly sclerotized aggenital plate. Aggenital plate with three pairs of smooth or weakly barbed aggenital setae *ag2–ag4*; setae *ag1* located anteriorly on tiny platelets. Lengths of ventral setae: *1a* 19, *1b* 18, *1c* 27, *2b* 27, *2c* 26, *3a* 28, *3b* 21, *3c* 16, *4a* 17, *4b* 16, *4c* 15, *ag1* 17, *ag2* 18, *ag3* 35, *ag4* 18.

Gnathosoma (Fig. 5) as in female. Length of palp 63; length of stylets 29; length of palpal solenidion ω 4; length of subcapitular setae: *m* 18, *n* 22, *or1* 10, *or2* 11.

Legs in general similar to those of female, except presence of digitiform male solenidia on tarsi I–IV (Figs 6b–6d). Length of legs: I 125, II 100, III 105, IV 115. Lengths of solenidia and setae *k*: ω I 13, ω σ I 17, ϕ 7, ϕ pI 16, *k*I 6, ω II 9, ω σ II 18, ϕ pII 16, *k*II 6, ω III 6, ω σ III 15, ϕ pIII 13, ω IV 7, ω σ IV 16, ϕ pIV 13.

Larva and *nymphs* unknown.

Material examined. Two specimens (σ and ϕ): Dominican Republic, 19°02' N, 69°35' W, Samana Province, Los Haitises National Park, semidecayed leaves in the San Gabriel Limestone Cave (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia).

Remarks. *Storchia cuneata* was described from China (Fan and Chen, 1997). Ours is the first record of this species from the Dominican Republic and the Neotropical region. The specimens from the Dominican Republic completely match the original description. However, the original description lacks detailed illustrations of legs and gnathosoma. That is why we decided to redescribe this species based on the specimens from the Dominican Republic.

Genus *Stigmaeus* Koch 1836

Type species: *Stigmaeus cruentus* Koch 1836, by subsequent designation by Berlese (1910).

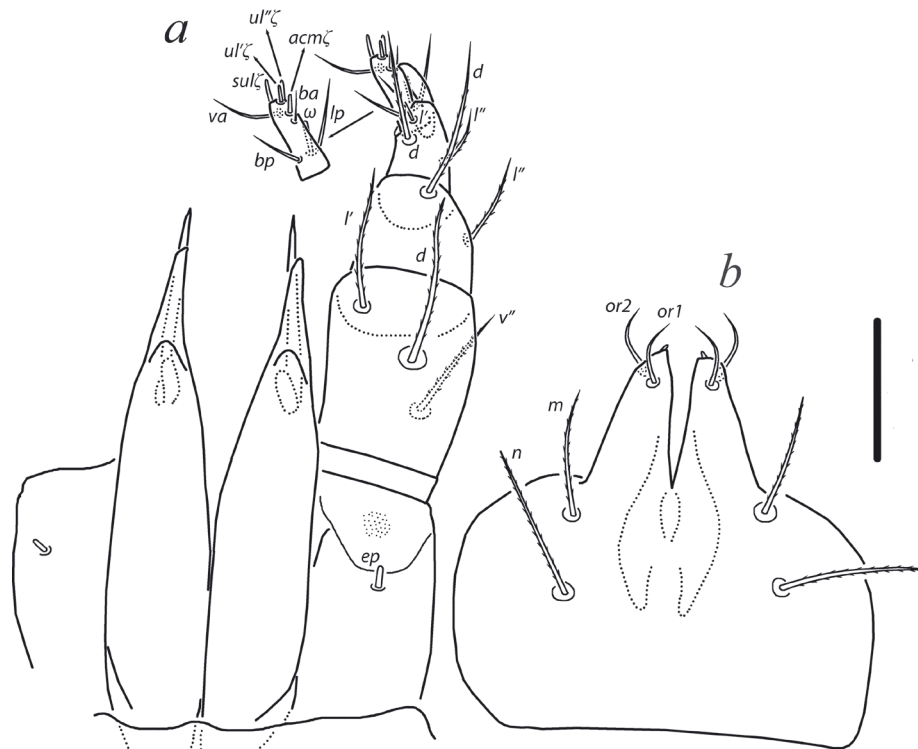


Fig. 5. *Storchia cuneata* Fan et Chen 1997, male: a — gnathosoma, dorsal aspect; b — subcapitulum. Scale bar 20 μ m.

***Stigmaeus striatus* Khaustov et Ermilov sp. n.**

(Figs 7–10)

Description. Female. Body elongate. Length of idiosoma 305 (300–310), width 160 (160–170).

Idiosomal dorsum (Fig. 7a). Ocelli and postocular bodies absent; prodorsal apodeme well-developed and situated between setae *ve*. Idiosomal dorsum almost completely striated; vestigial prodorsal shield only with one pair of setae *vi*; suranal shield divided medially and with three pairs of setae (*h1*, *h2*, *h3*); setae *c2* located ventrally on elongate poorly defined plate invaded with striae posteriorly. All dorsal setae weakly barbed and blunt-tipped. Cupules not evident. Cuticle anterior and anterolaterad central prodorsal shield with papillae. Setae *ps1* located dorsally. Lengths of dorsal setae: *vi* 8 (7–8), *ve* 16 (15–17), *sci* 10 (10–11), *sce* 16 (15–16), *c1* 10 (8–10), *c2* 27 (26–29), *d1* 9 (7–9), *d2* 9 (8–9), *e1* 9 (8–9), *e2* 9 (8–9), *f* 10 (10–11), *h1* 13 (12–13), *h2* 19 (19–21), *h3* 10 (10–12), *ps1* 19 (18–19).

Idiosomal venter (Fig. 7b). All ventral plates smooth; four pairs of aggenital setae; setae *ag2*–*ag4* situated on poorly defined aggenital plates; two pairs of genital setae. Setae *ps2* blunt-tipped, other ventral setae pointed; setae *ps2* and *ps3* barbed, other ventral setae smooth or with tiny hardly discernable barbs. Cuticle just posterior to gnathosoma and laterad bases of legs I–II and

III–IV with tubercles. Lengths of ventral setae: *1a* 19 (16–19), *1b* 20 (17–20), *1c* 45 (42–45), *2b* 82 (73–82), *2c* 29 (29–33), *3a* 21 (17–21), *3b* 16 (16–17), *3c* 15 (13–15), *4a* 11 (15–16), *4b* 12 (11–12), *4c* 11 (11–12), *ag1* 12 (11–12), *ag2* 11 (10–11), *ag3* 12 (11–12), *ag4* 17 (16–17), *g1* 13 (11–13), *g2* 14 (14–15), *ps2* 18 (16–19), *ps3* 16 (14–17).

Gnathosoma (Fig. 8). Tibial claw well-developed, longer than short palptarsus. Seta *l'* on palpal tibia not modified. All palpal setae of femur, genu and tibia (except smooth *l'Ti*) pointed and weakly barbed; all setae of palptarsus smooth. Number of setae on palpal segments: Tr 0, Fe 3 (*d*, *l'*, *v''*), Ge 1 (*d*), Ti 3 (*d*, *l'*, *l''*), Ta 8 (1) (fused eupathidia *ul'*, *ul''*, *sul*, eupathidium *acm*, simple tactile setae *ba*, *bp*, *lp*, and 1 solenidion ω). Palpal supracoxal setae (*ep*) peg-like, located dorsally. Rostrum of subcapitulum elongate. All subcapitular setae pointed and smooth. Basal part of subcapitulum smooth. Length of subcapitular setae: *m* 16 (16–18), *n* 22 (20–22), *or1* 8 (8–9), *or2* 8 (8). Chelicerae dorsally smooth, length of stylets 23 (23–25); length of palps 56 (56–59); length of palpal solenidion ω 4 (4).

Legs (Figs 9, 10). Length of legs: I 97 (97–100), II 78 (78–83), III 84 (84–88), IV 96 (96–100). Empodial raylets capitate. Leg I (Fig. 9a). Coxae I posterodorsally with peg-like leg supracoxal setae (*el*). Leg setation: Tr 1 (*v'*), Fe 4 (*d*, *l'*, *l''*, *bv''*), Ge 4 (*d*, *l'*, *l'*, *k*), Ti 5 (1) (*d*, *l''*, *l'*, *v''*, *v'*, $\phi\phi$), Ta 12 (1) (*p* ξ , *p''* ξ , *tc* ξ , *tc''* ξ , *ft* ξ , *ft''*, *u'*, *u''*, *a'*, *a''*,

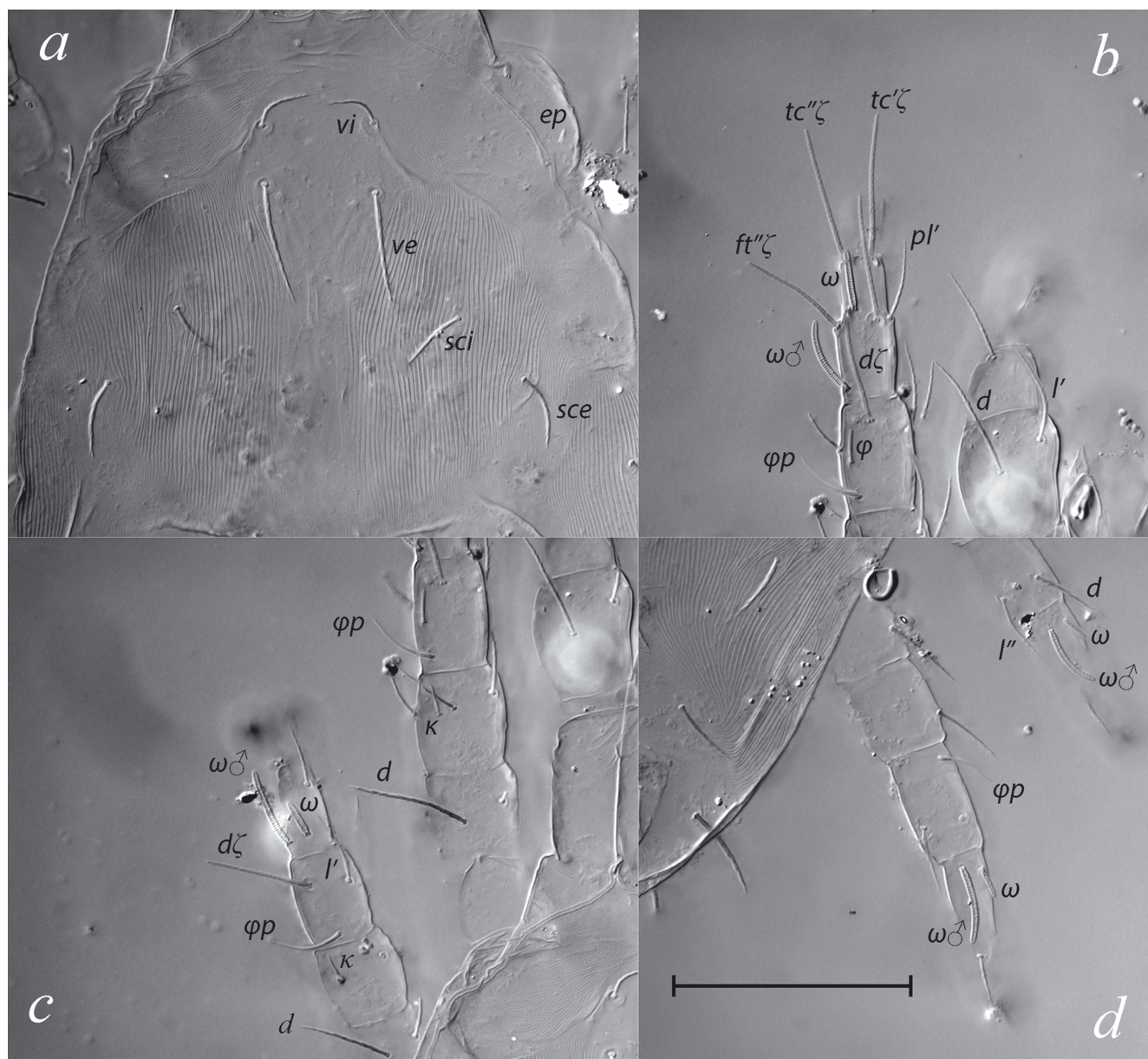


Fig. 6. DIC micrographs of *Storchia cuneata* Fan et Chen 1997, male: *a* – prodorsum, *b* – left leg I, *c* – left legs I and II, *d* – right legs III and IV. Scale bar 50 μ m.

pl', *vs*, ω). Setae (*p*), (*tc*) and *ft'* of tarsus eupathid-like; seta *k* 4 (4–5) smooth, blunt-tipped; seta *d* of femur blunt-tipped and barbed; other setae pointed and weakly barbed. Solenidion ω 8 (8) digitiform; solenidion ϕ absent, solenidion ϕp 12 (12) baculiform. Leg II (Fig. 9b). Leg setation: Tr 1 (*v'*), Fe 4 (*d*, *l'*, *l''*, *bv''*), Ge 2 (*l'*, *l''*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 8 (1) (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *pl'*, *vs*, ω). Seta *d* of femur blunt-tipped and barbed; other setae pointed and weakly barbed. Solenidion ω 6 (6) digitiform; solenidion ϕp 8 (8–10) baculiform. Leg III (Fig. 10a). Leg setation: Tr 1 (*v'*), Fe 3 (*d*, *l'*, *ev'*), Ge 0, Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 7 (1) (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*, ω). Solenidia ω 4 (4) and ϕp 8 (8–9) baculiform.

Seta *d* of femur blunt-tipped and barbed, other setae pointed and barbed. Leg IV (Fig. 10b). Leg setation: Tr 0, Fe 2 (*d*, *ev'*), Ge 1 (*d*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 7 (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*). Solenidion ω absent; solenidion ϕp 8 (8–9) baculiform. Setae *d* of femur and genu blunt-tipped and barbed, other setae pointed and barbed.

Male and immatures unknown.

Type material. Holotype (♀), slide № T-St-014: Dominican Republic, 18°32' N, 68°22' W, La Altagracia Province, Monkey Land, leaf litter under trees and bushes (date and collector unknown; collection of the

Tyumen State University Museum of Zoology, Tyumen, Russia); three paratypes (♀♀): same data.

Differential diagnosis. The new species is most similar to *Stigmaeus caeculus* Barilo 1989, *S. canestrinii* Stathakis, Kapaxidi et Papadoulis 2019, *S. mollibus* Khaustov 2016, *S. nasrinae* Nazari, Khanjani et Kamali 2012, and *S. pseudoparmatus* Doğan, Doğan et Erman 2017 in that they all share the following character states in females: hysterosomal dorsum without distinct central and marginal shields, setae *h3* present, four pairs of aggenital and two pairs of genital setae, palpgenu without seta *l''*, femora I and II with four setae each, genu II with two setae (*l'*, *l''*), genu III without setae, and genu IV with one seta (*d*). The new species differs from all the aforementioned species by the absence of seta *pl''* on tarsus I, absence of seta *l'* on trochanter III, absence of seta *v'* on trochanter IV, and absence of solenidion ω on tarsus IV (vs. present in closely related species).

Etymology. The name of the new species is derived from Latin *striatus* meaning *striate* and refers to an almost completely striated idiosomal dorsum.

Genus *Eustigmaeus* Berlese 1910

Type species: *Stigmaeus kermesinus* Koch 1841, by original designation.

Eustigmaeus dominicanensis Khaustov et Ermilov sp. n.
(Figs 11–14; 19a, 19b)

Description. Female. Idiosoma almost round in outline. Length of idiosoma 245 (240–250), width 210 (210–215).

Idiosomal dorsum (Figs 11a, 19a). Ocelli present. Idiosoma completely covered by single holodorsal shield with large irregular in shape dimples and tiny puncta inside dimples (Fig. 19A); subcuticular reticulation not visible. All dorsal setae flattened, recurved, slightly foliate, distinctly bilaterally barbed and situated on well-developed protuberances; setae *f* characteristically bent distally. Hysterosomal setae with rounded apices. Major and minor callosities absent. Cupules not evident. Lengths of dorsal setae: *vi* 77 (73–78), *ve* 76 (74–82), *sci* 59 (55–60), *sce* 65 (61–65), *c1* 68 (65–70), *c2* 53 (50–53), *d1* 82 (75–82), *d2* 65 (65–68), *e1* 90 (86–92), *e2* 69 (62–74), *f* 86 (82–86), *h1* 48 (47–50), *h2* 40 (36–40).

Idiosomal venter (Figs 11b, 19b). Endopodal plates fused medially; posterior endopodal plate striated in posterior part (Fig. 19b); anterior and posterior endopodal plates with weak reticulation pattern. Humeral plate subtriangular, with distinct large dimples. All ventral setae pointed; pseudanal setae (*ps1*–*ps3*) weakly barbed, other ventral setae smooth. With one pair of aggenital setae. Aggenital plate smooth and fused with suranal shield. Coxisternal plates I–IV with hardly discernable puncta. Lengths of ventral setae: *la* 17 (15–17), *lb* 18

(17–18), *lc* 15 (13–16), *2b* 14 (13–15), *2c* 14 (14–15), *3a* 16 (14–16), *3b* 14 (14–16), *3c* 14 (14–15), *4a* 16 (14–16), *4b* 13 (13–14), *4c* 15 (13–15), *ag* 12 (12–13), *ps1* 16 (16–17), *ps2* 17 (16–19), *ps3* 15 (14–15).

Gnathosoma (Fig. 12). Tibial claw well-developed, subequal in length with palptarsus. Seta *l'* on palpal tibia short, distinctly asymmetric, axe-shaped. Seta *d* of palpfemur blunt-tipped and barbed, other palpal setae of femur, genu and tibia (except *l'Ti*) pointed and barbed; all tarsal setae smooth. Number of setae on palpal segments: Tr 0, Fe 3 (*d*, *l'*, *v''*), Ge 2 (*d*, *l''*), Ti 3 (*d*, *l'*, *l''*), Ta 8(1) (fused eupathidia *ul'*, *ul''*, *sul*, eupathidion *acm*, simple tactile setae *ba*, *bp*, *lp*, and 1 solenidion ω). Palpal supracoxal setae (*ep*) short, needle-like, located dorsolaterally. Rostrum of subcapitulum with distinct lateral lamellae and hardly discernable tiny projections distally; distal part of rostrum evenly rounded, not V-shaped. All subcapitular setae pointed; setae *m* and *or2* weakly barbed, other subcapitular setae smooth. Basal part of subcapitulum smooth. Length of subcapitular setae: *m* 16 (16–17), *n* 13 (13–14), *or1* 13 (13–14), *or2* 16 (14–16). Chelicerae smooth dorsally, length of stylets 36 (34–36); length of palps 78 (78–79); length of palpal solenidion ω 5 (5).

Legs (Figs 13, 14). Length of legs: I 135 (135), II 115 (115), III 120 (115–120), IV 135 (130–135). Empodial raylets weakly capitate. Leg I (Fig. 13a). Coxae I posterodorsally with needle-like leg supracoxal setae (*el*). Leg setation: Tr 1 (*v'*), Fe 6 (*d*, *l'*, *l''*, *v'*, *v''*, *bv''*), Ge 4 (*d*, *l'*, *l''*, *k*), Ti 5 (2) (*d*, *l'*, *l''*, *v'*, *v''*, ϕ , $\phi\phi$), Ta 13 (1) (*p''* ξ , *p''* ξ , *tc''* ξ , *tc''* ξ , *ft''* ξ , *ft''* ξ , *u'*, *u''*, *a'*, *a''*, *pl'*, *pl''*, *vs*, ω). Setae (*p*), (*tc*) and (*ft*) of tarsus eupathid-like. Setae *d*, *l''* of femur, *d*, (*l*) of genu, *d*, *l'* of tibia distinctly thickened, flattened, blunt-tipped and strongly barbed; seta *k* 8 (7–8) blunt-tipped, needle-like; other setae pointed and barbed; solenidion ω 23 (22–23) digitiform; solenidia ϕ 6 (6–7) and $\phi\phi$ 13 (13–14) baculiform. Leg II (Fig. 13b). Leg setation: Tr 1 (*v'*), Fe 5 (*d*, *l'*, *l''*, *v'*, *bv''*), Ge 3 (*d*, *l'*, *l''*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, $\phi\phi$), Ta 9 (1) (*p''* ξ , *tc''* ξ , *tc''*, *u'*, *u''*, *a'*, *a''*, *pl'*, *vs*, ω). Setae *p'* and *tc'* of tarsus eupathid-like; setae *d*, *l''* of femur, *d*, (*l*) of genu, *d*, *l'* of tibia thickened, flattened, blunt-tipped and strongly barbed; seta *k* of genu absent; other setae pointed and barbed. Solenidion ω 14 (12–14) digitiform; solenidion $\phi\phi$ 8 (8–9) baculiform. Leg III (Fig. 14a). Leg setation: Tr 1 (*v'*), Fe 3 (*d*, *l'*, *ev'*), Ge 1 (*d*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, $\phi\phi$), Ta 7 (1) (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*, ω). Solenidia ω 7 (7) and $\phi\phi$ 8 (7–8) baculiform. Setae *l'* of trochanter, *d*, *l'* of femur, *d* of genu, *d*, *l'* of tibia thickened, flattened, blunt-tipped and strongly barbed; other setae pointed and barbed. Leg IV (Fig. 14b). Leg setation: Tr 1 (*v'*), Fe 2 (*d*, *ev'*), Ge 1 (*d*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, $\phi\phi$), Ta 7 (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*). Solenidion ω absent; solenidion $\phi\phi$ 8 (7–8) baculiform. Setae *d* of femur and genu, *d*, *l'* of tibia thickened, flattened,

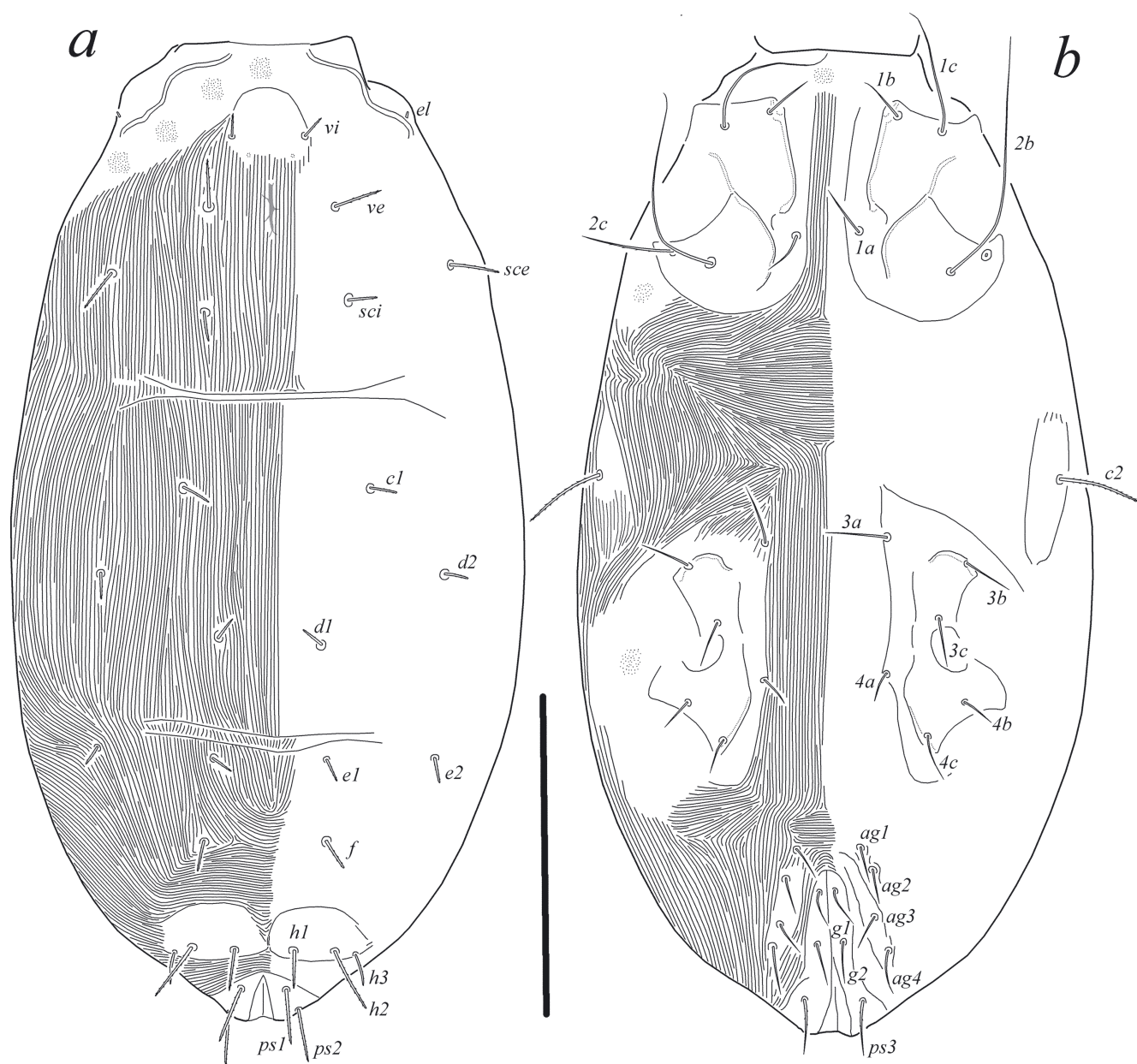


Fig. 7. *Stigmaeus striatus* sp. n., female: *a* – dorsum of idiosoma, *b* – venter of idiosoma. Scale bar 100 μ m.

blunt-tipped and strongly barbed; other setae pointed and barbed.

Male and immatures unknown.

Type material. Holotype (♀), slide № T-St-015: Dominican Republic, 18°32' N, 68°22' W, La Altagracia Province, Monkey Land, leaf litter under trees and bushes (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia); one paratype (♀): same data; two paratypes (♀♀): Dominican Republic, 18°09' N, 68°41' W, La Altagracia Province, Saona Island, leaf litter in

mixed forest (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia); one paratype (♀): the Dominican Republic, 19°32' N, 69°26' W, Samana Province, vicinities of the El Limón waterfall, leaf litter in mixed forest (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia).

Differential diagnosis. The new species belongs to the *segnis* species-group, which comprises some 22 species that all share the following character states in females: one pair of aggenital setae, prodorsal,

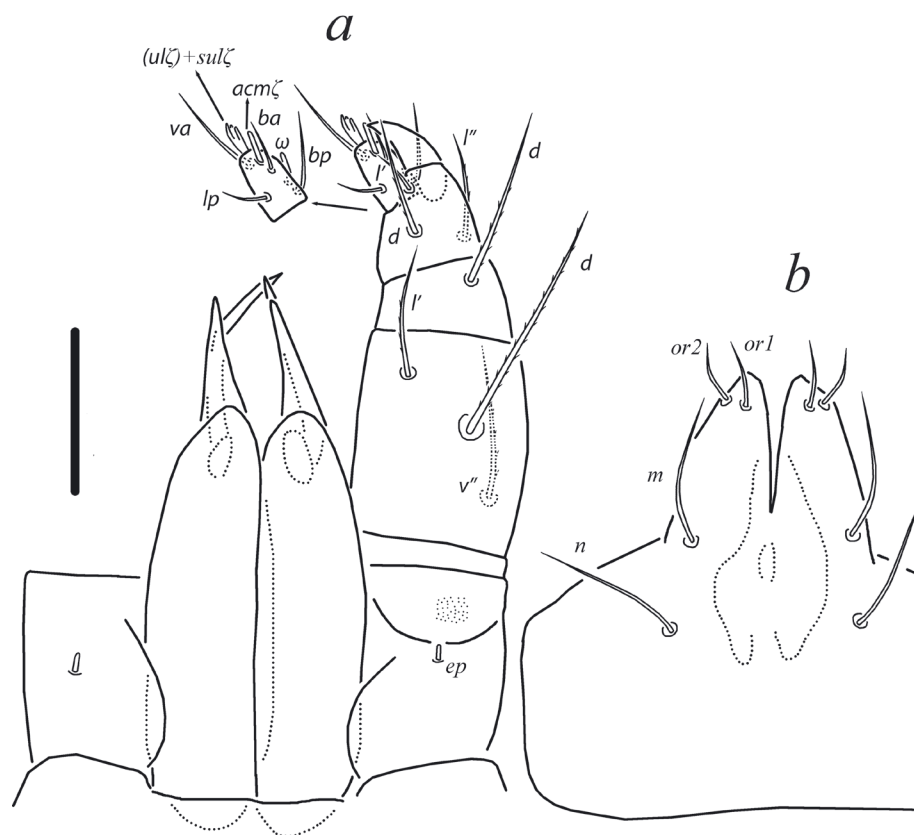


Fig. 8. *Stigmaeus striatus* sp. n., female: a — gnathosoma, dorsal aspect; b — subcapitulum. Scale bar 20 μm.

and hysterosomal shields usually fused into single holodorsal shield; dorsal idiosomal setae flattened and curved; seta *k* on genu II and solenidion ω on tarsus IV absent. The new species is most similar to *Eustigmaeus eburneus* Fan et Zhang 2005, *E. floridensis* Maake, Ueckermann et Childers 2016, *E. lyallpuriensis* (Chaudhri 1968), *E. maladahon* (Rimando et Corpuz-Raros 1997), *E. microsegni* (Chaudhri 1965), *E. oliveirai* Paktinat-Saeij et Bagheri 2016, and *E. smithi* (Chaudhri 1965) in the presence of seta *p'* on tarsus II. The new species differs from *E. eburneus*, *E. maladahon*, and *E. smithi* in having five setae on femur II (vs. four setae on femur II in *E. eburneus*, *E. maladahon*, and *E. smithi*). The new species differs from *E. lyallpuriensis* and *E. oliveirai* in having distinctly bilaterally barbed dorsal idiosomal setae (vs. dorsal idiosomal setae smooth or weakly barbed in *E. lyallpuriensis* and *E. oliveirai*). The new species differs from *E. floridensis* and *E. microsegni* in having distinctly longer dorsal idiosomal setae, especially *f* (82–86) (vs. *f* 39–56 in *E. floridensis* and *f* 48 in *E. microsegni*). Tarsal chaetotaxy is unknown for *E. depuratus* Tseng 1982, *E. ensifer* Tseng 1982, *E. foliaceus* Tseng 1982, *E. fujianicus* Zhang 1993, and *E. modiolus* (Summers et Price 1961). The new species differs from *E. modiolus* in having fused medially endopodal plates of legs I–II and III–IV (vs. endopodal plates of legs I–II incompletely separated and endopodal plates

of legs III–IV completely separated medially in *E. modiolus*). The new species differs from *E. fujianicus* in having strongly barbed dorsal hysterosomal setae (vs. smooth in *E. fujianicus*) and in the distance between setae *e1* being almost two times longer than the distance between setae *c1* (vs. distances *c1*–*c1* and *e1*–*e1* subequal in *E. fujianicus*). The new species differs from *E. depuratus* in having three setae on genu II (vs. four in *E. depuratus*). The new species differs from *E. ensifer* in the distance between setae *e1* being almost two times longer than distance between setae *c1* (vs. distances *c1*–*c1* and *e1*–*e1* subequal in *E. ensifer*). The new species differs from *E. foliaceus* in having setae *f* distinctly bent distally (vs. not bent in *E. foliaceus*).

E t y m o l o g y. The name of the new species refers to its geographical distribution in the Dominican Republic.

***Eustigmaeus latisetosus* Khaustov et Ermilov sp. n.**
(Figs 15–18; 19c, 19d)

Description. Female. Idiosoma ovate in outline. Length of idiosoma 255 (305), width 225 (245).

Idiosomal dorsum (Figs 15a, 19c). Ocelli present. Idiosoma completely covered by single holodorsal shield

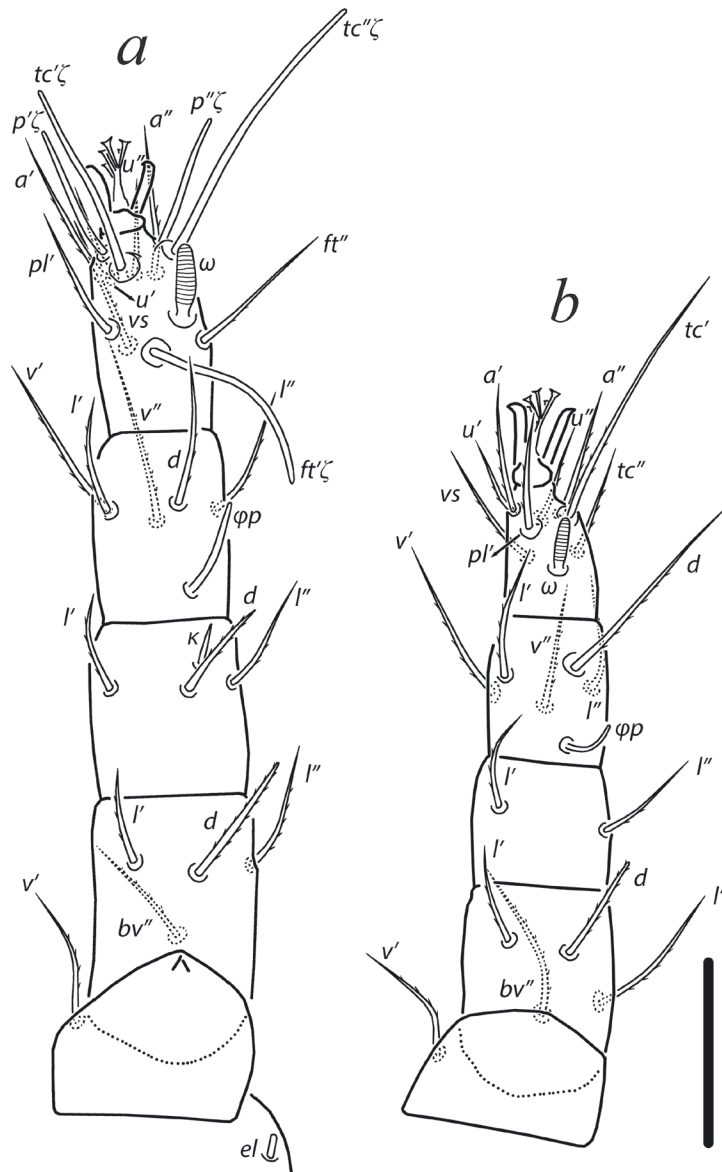


Fig. 9. *Stigmaeus striatus* sp. n., female: a — right leg I, dorsal aspect; b — right leg II, dorsal aspect. Scale bar 20 μ m.

with large irregular in shape dimples and tiny puncta inside dimples (Fig. 19c); holodorsal shield with some transverse striae anteriorly; setae *c1*; subcuticular reticulation not visible. All dorsal setae flattened, recurved, aciculate, slightly foliate, distinctly bilaterally barbed and situated on well-developed protuberances. Major and minor callosities absent. Cupules not evident. Lengths of dorsal setae: *vi* 70 (71), *ve* 72 (75), *sci* 56 (61), *sce* 64 (65), *c1* 60 (63), *c2* 77 (72), *d1* 73 (69), *d2* 68 (69), *e1* 75 (79), *e2* 72 (80), *f* 78 (84), *h1* 48 (52), *h2* 44 (45).

Idiosomal venter (Figs 15b, 19d). Endopodal plates fused medially; posterior endopodal plate striated in

posterior part (Fig. 19d); anterior and posterior endopodal plates without reticulation pattern. Humeral plate subtriangular, with distinct large dimples. All ventral setae pointed; pseudanal setae (*ps1-ps3*) weakly barbed, other ventral setae smooth. With one pair of aggenital setae. Aggenital plate smooth and fused with suranal shield. Coxisternal plates I–IV with hardly discernable puncta. Lengths of ventral setae: *1a* 19 (20), *1b* 22 (26), *1c* 16 (18), *2b* 14 (17), *2c* 14 (15), *3a* 16 (23), *3b* 13 (19), *3c* 15 (19), *4a* 19 (21), *4b* 14 (16), *4c* 15 (17), *ag1* 16 (19), *ps1* 17 (20), *ps2* 14 (17), *ps3* 15 (17).

Gnathosoma (Fig. 16). Tibial claw well-developed, subequal in length with palptarsus. Seta *l'* on palpal tibia

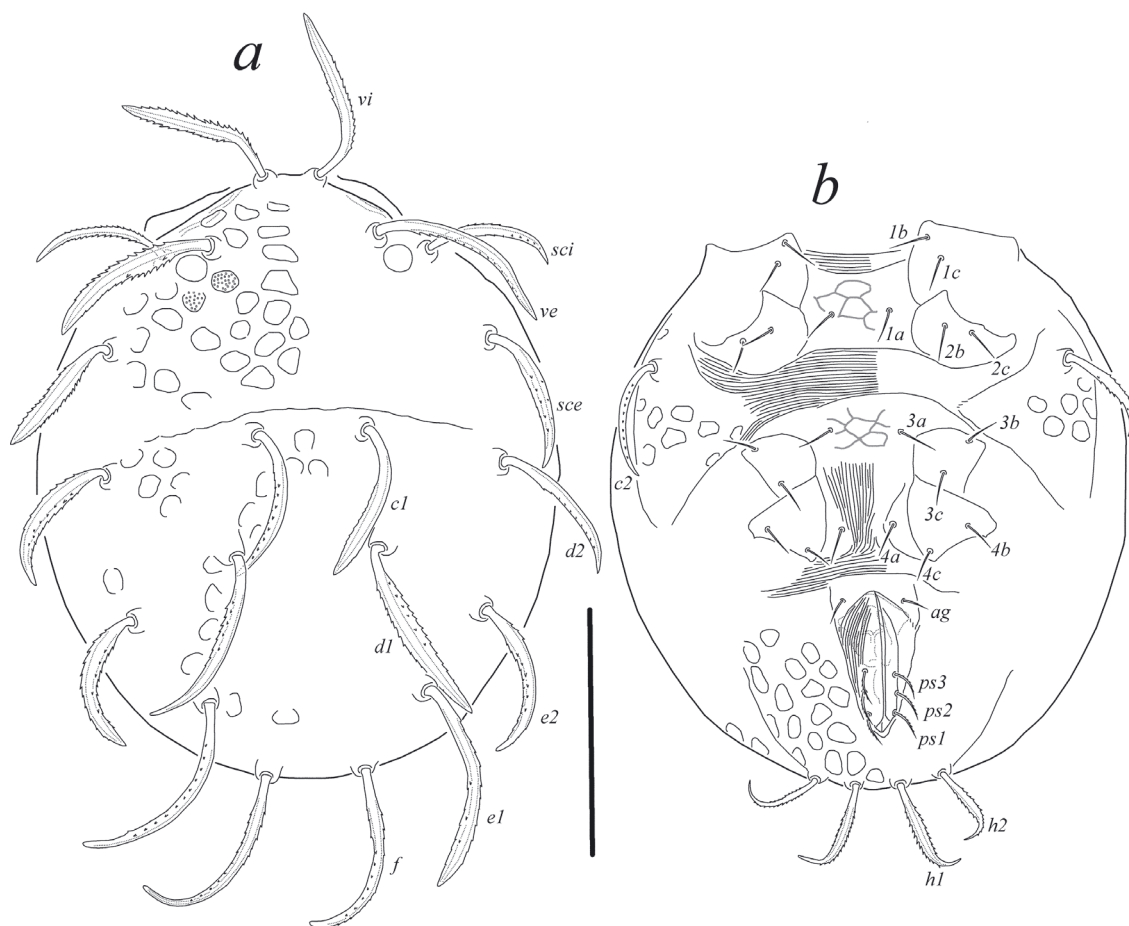


Fig. 11. *Eustigmaeus dominicanensis* sp. n., female: *a* – dorsum of idiosoma; *b* – venter of idiosoma. Scale bar 100 μ m.

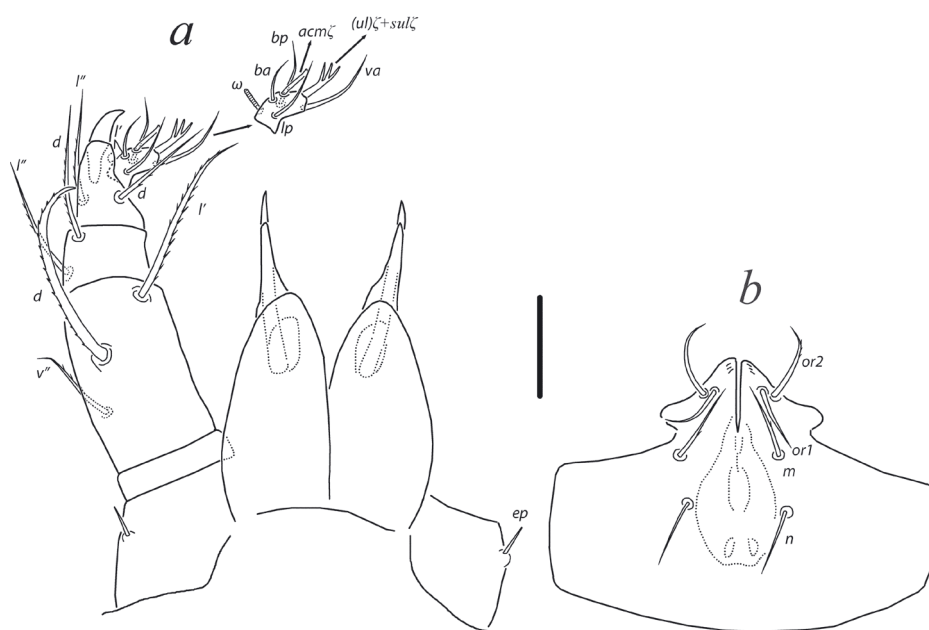


Fig. 12. *Eustigmaeus dominicanensis* sp. n., female: *a* – gnathosoma, dorsal aspect; *b* – subcapitulum. Scale bar 20 μ m.

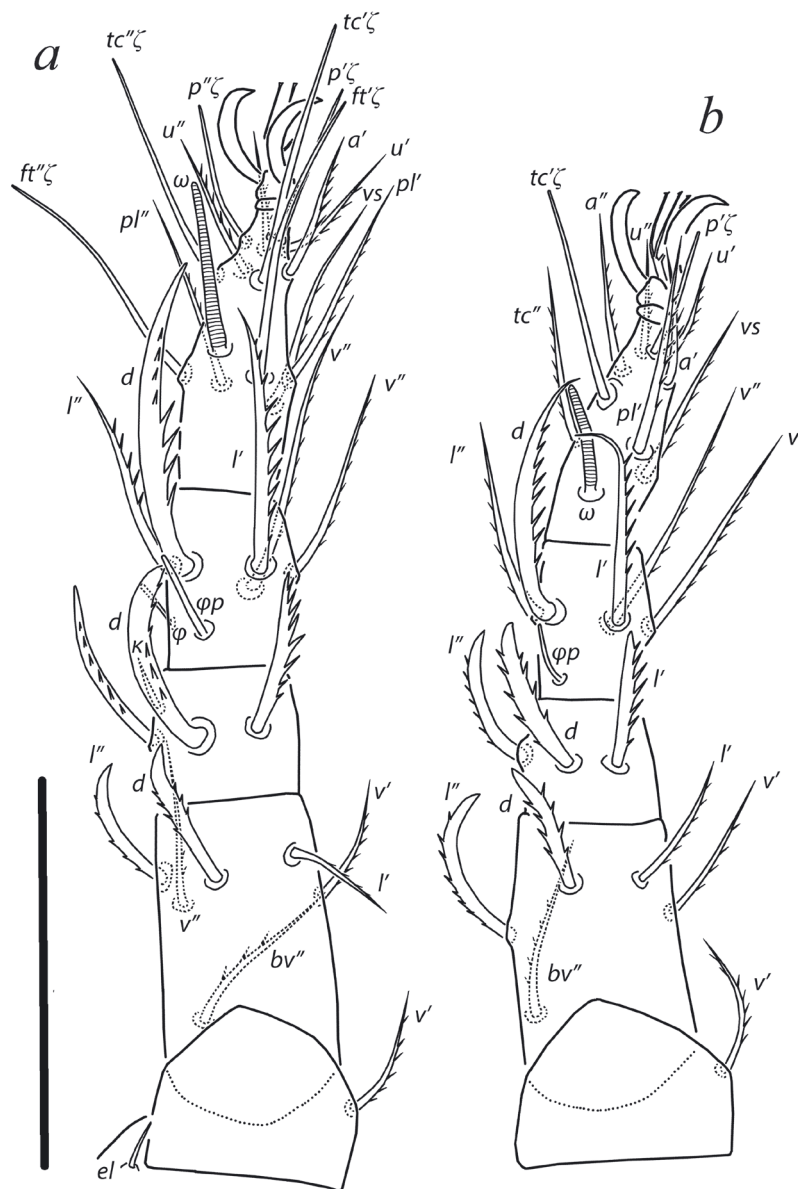


Fig. 13. *Eustigmaeus dominicanensis* sp. n., female: a — left leg I, dorsal aspect; b — left leg II, dorsal aspect. Scale bar 50 μ m.

thickened, flattened, blunt-tipped and strongly barbed; seta *k* 8 (7) blunt-tipped, needle-like; other setae pointed and barbed; solenidium ω 27 (26) digitiform; solenidia ϕ 7 (7) and ϕp 15 (17) baculiform. Leg II (Fig. 17b). Leg setation: Tr 1 (*v'*), Fe 5 (*d*, *l'*, *l''*, *v'*, *bv''*), Ge 3 (*d*, *l'*, *l''*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 8 (1) (*tc''*, *tc'*, *u'*, *u''*, *a'*, *a''*, *pl'*, *vs*, ω). Seta *p'* of tarsus absent; seta *tc'* of tarsus eupathid-like; setae *d*, *l''* of femur, *d*, (*l*) of genu and tibia thickened, flattened, blunt-tipped and strongly barbed; seta *k* of genu absent; other setae pointed and barbed. Solenidium ω 15 (17) digitiform; solenidium ϕp 10 (12) baculiform. Leg III (Fig. 18a). Leg setation: Tr 1 (*v'*), Fe 3 (*d*, *l'*, *ev'*), Ge 1 (*d*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 7 (1) (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*, ω). Solenidia

ω 6 (7) and ϕp 8 (10) baculiform. Setae *d*, *l'* of femur, *d* of genu, *d*, *l'* of tibia thickened, flattened, blunt-tipped and strongly barbed; other setae pointed and barbed. Leg IV (Fig. 18b). Leg setation: Tr 1 (*v'*), Fe 2 (*d*, *ev'*), Ge 1 (*d*), Ti 5 (1) (*d*, *l'*, *l''*, *v'*, *v''*, ϕp), Ta 7 (*tc'*, *tc''*, *u'*, *u''*, *a'*, *a''*, *vs*). Solenidium ω absent; solenidium ϕp 8 (9) baculiform. Setae *d* of femur and genu, *d*, *l'* of tibia thickened, flattened, blunt-tipped and strongly barbed; other setae pointed and barbed.

Male and immatures unknown.

Type material. Holotype (♀), slide № T-St-016: Dominican Republic, 18°25' N, 68°53' W, La Romana Province, Casa de Campo, vicinities of Altos de

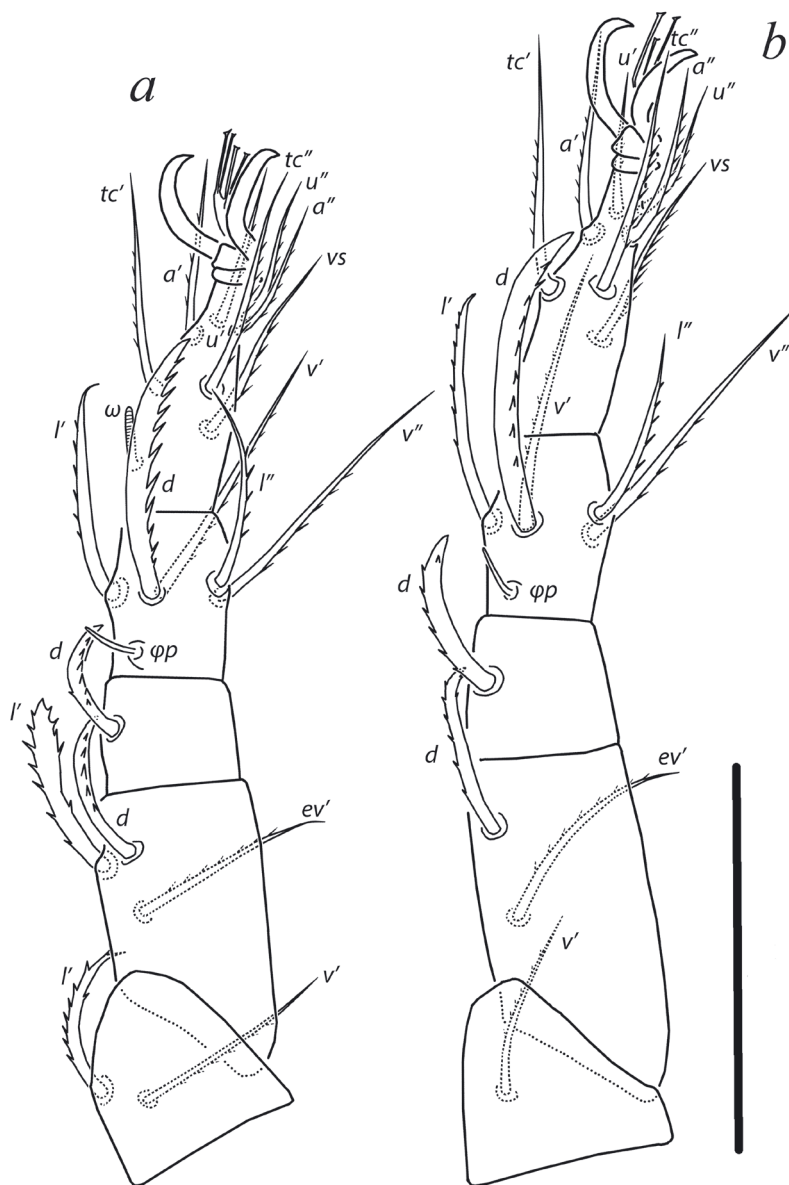


Fig. 14. *Eustigmaeus dominicanensis* sp. n., female: a — right leg III, dorsal aspect; b — right leg IV, dorsal aspect. Scale bar 50 μ m

Chavón, leaf litter under trees and bushes (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia); one paratype (♀): Dominican Republic, 18°32' N, 68°22' W, La Altagracia Province, Monkey Land, leaf litter under trees and bushes (date and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia).

Differential diagnosis. The new species belongs to the *segnis* species-group. The new species is most similar to *Eustigmaeus arcuatus* (Chaudhri 1965), *E. brevivestitus* Kaźmierski et Donczyk 2003, *E. chilensis*

(Chaudhri 1965), *E. corticolus* (Wood 1966), *E. crassifolius* Bizarro et Johann 2020, *E. mixtus* (Wood 1966), *E. ornatus* Ueckermann et Smith Meyer 1987, *E. ptilosetus* Fan et Zhang 2005, *E. segnis* (Koch 1836), and *E. simplex* (Wood 1966) in the absence of seta *p'* on tarsus II. The new species differs from *E. corticolus* and *E. ptilosetus* in having five setae on femur II (vs. four setae on femur II in *E. corticolus* and *E. ptilosetus*). The new species differs from *E. crassifolius* in having five setae on each tibiae II–IV (vs. four in *E. crassifolius*). The new species differs from *E. chilensis* in having distinctly bilaterally barbed dorsal idiosomal setae (vs. dorsal idiosomal setae smooth or weakly barbed in *E. chilensis*). The new species differs from *E. brevivestitus*,

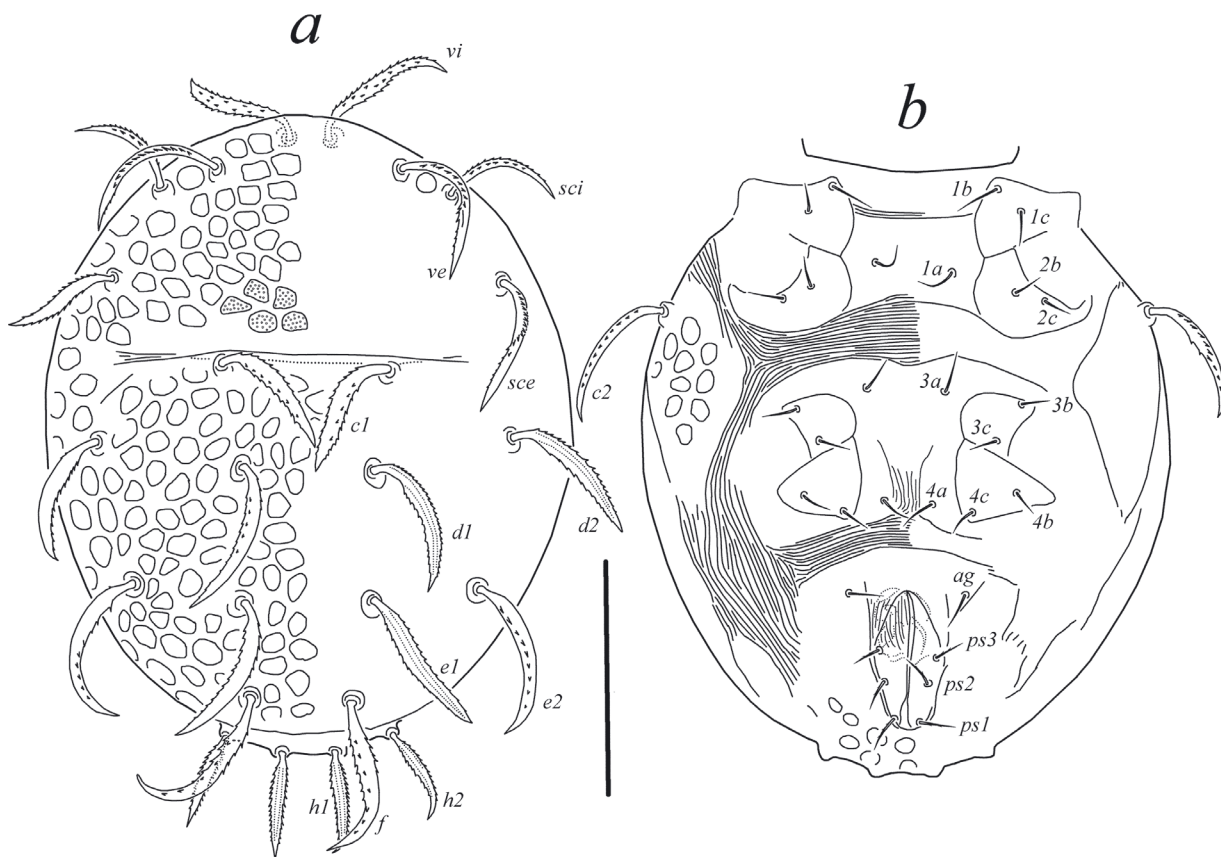


Fig. 15. *Eustigmaeus latisetosus* sp. n., female: *a* – dorsum of idiosoma; *b* – venter of idiosoma. Scale bar 100 μ m.

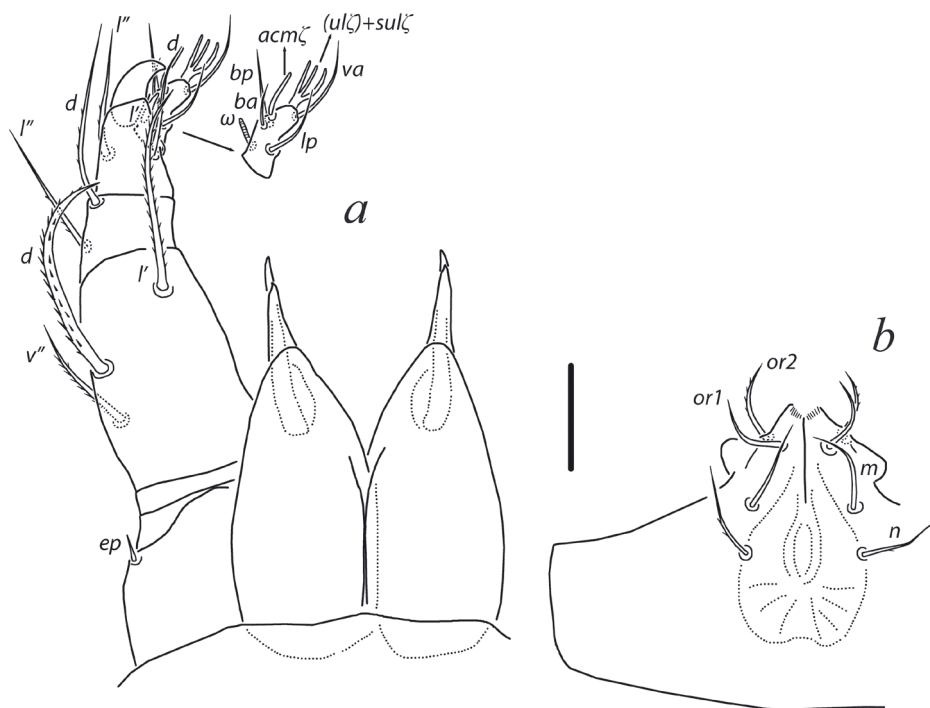


Fig. 16. *Eustigmaeus latisetosus* sp. n., female: *a* – gnathosoma, dorsal aspect; *b* – subcapitulum. Scale bar 20 μ m.

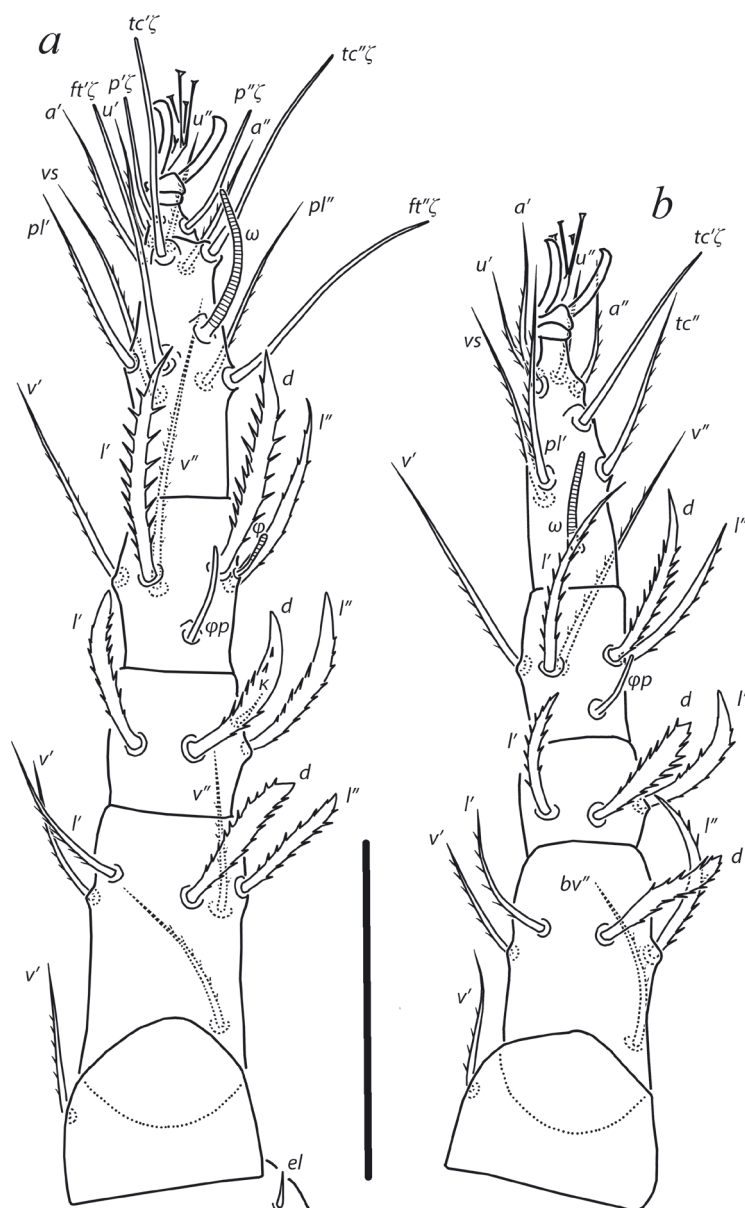


Fig. 17. *Eustigmaeus latisetosus* sp. n., female: a — right leg I, dorsal aspect; b — right leg II, dorsal aspect. Scale bar 50 μ m.

E. mixtus, and *E. ornatus* in having fused medially endopodal plates of legs III and IV (vs. completely separated in *E. brevivestitus*, *E. mixtus*, and *E. ornatus*). The new species differs from *E. simplex* in having striated posteriorly fused endopodal plates of legs III–IV (vs. smooth in *E. simplex*) and much thicker dorsal idiosomal setae. The new species differs from *E. arcuatus* and *E. segnis* in having much thicker dorsal idiosomal setae. Among the species with an undescribed tarsal setation, the new species differs from *E. depuratus* in having three setae on genu II (vs. four in *E. depuratus*). The new species differs from *E. fujianicus* in

having strongly barbed dorsal idiosomal setae (vs. at least central hysterosomal setae smooth in *E. fujianicus*). The new species differs from *E. ensifer* in having much thicker (more foliate) dorsal idiosomal setae (vs. dorsal setae not foliate in *E. ensifer*). The new species differs from *E. foliaceus* in having subequal distances between setae *c1–c1* and *d1–d1* (vs. distance *c1–c1* almost twice shorter than *d1–d1* in *E. foliaceus*).

Etymology. The name of the new species is a combination of Latin words *latus*, meaning *wide*, and *seta*, meaning *bristle*, and refers to wide dorsal idiosomal setae.

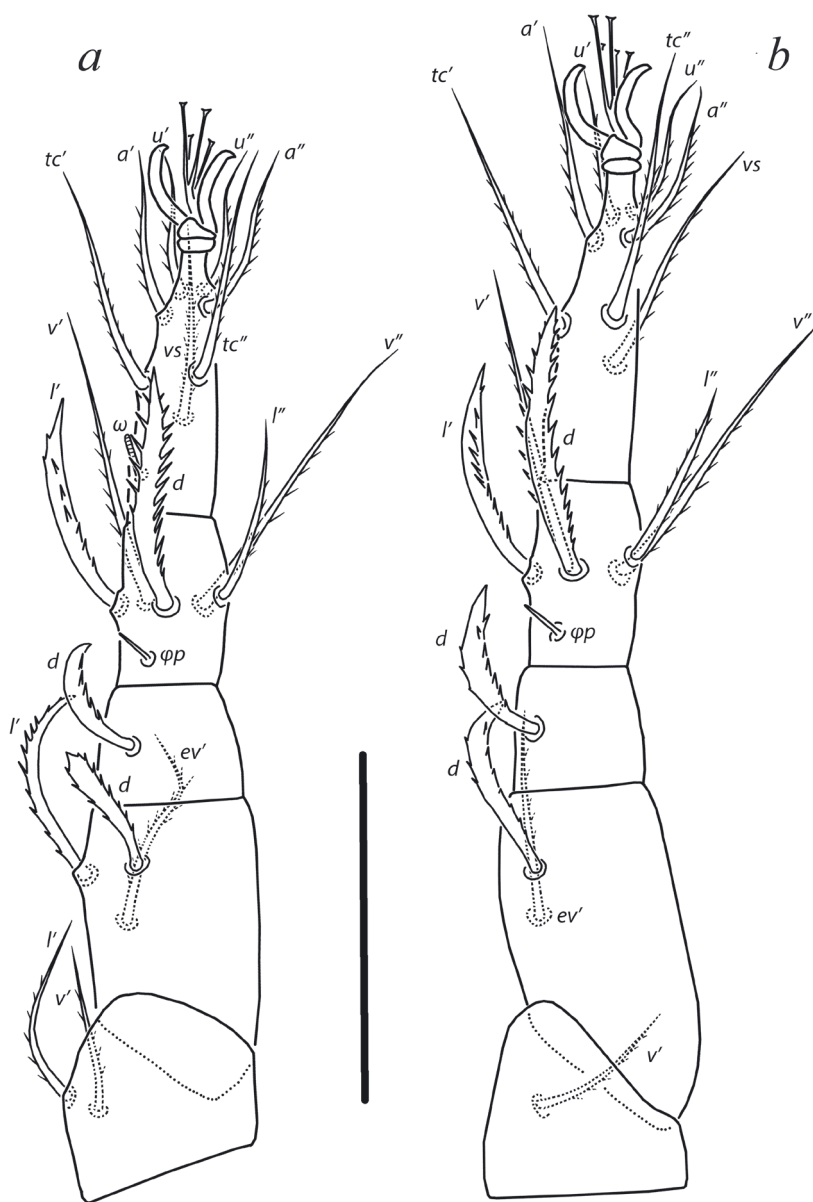


Fig. 18. *Eustigmaeus latisetosus* sp. n., female: *a* – right leg III, dorsal aspect; *b* – right leg IV, dorsal aspect. Scale bar 50 μ m.

DISCUSSION

During this study, we found several characters in *Storchia cuneata* that are unusual for the Stigmaeidae family. In the original description of this species (Fan, Chen, 1997), the authors just mentioned the quantity of setae on legs, but did not homologize them. In fact, this species has the maximum known number of tarsal setae among Stigmaeidae. Grandjean (1944) created the setal nomenclature for the family Stigmaeidae based on the early derivative species *Storchia robusta* (= *Apostigmaeus navicella*). He indicated 13-9-7-8 setae on tarsi I–IV in

female (plus one solenidion on each tarsus). In *Storchia cuneata*, the number of tarsal setae in female is 14-10-8-8. The analysis of setal homologies revealed that tarsi I–III have one additional ventral seta. Undoubtedly, it is paired to *vs* seta. A pair of *vs* setae was previously known only on tarsus IV in several *Storchia* species. Grandjean (1944) designated them as *vs'* and *vs''*. We also designated additional setae on tarsi I–III as *vs'* and *vs''*. In some species of the genus *Mediolata*, tarsus II also has 10 setae, but in that case, additional seta *p''* is present (Khaustov, 2022).

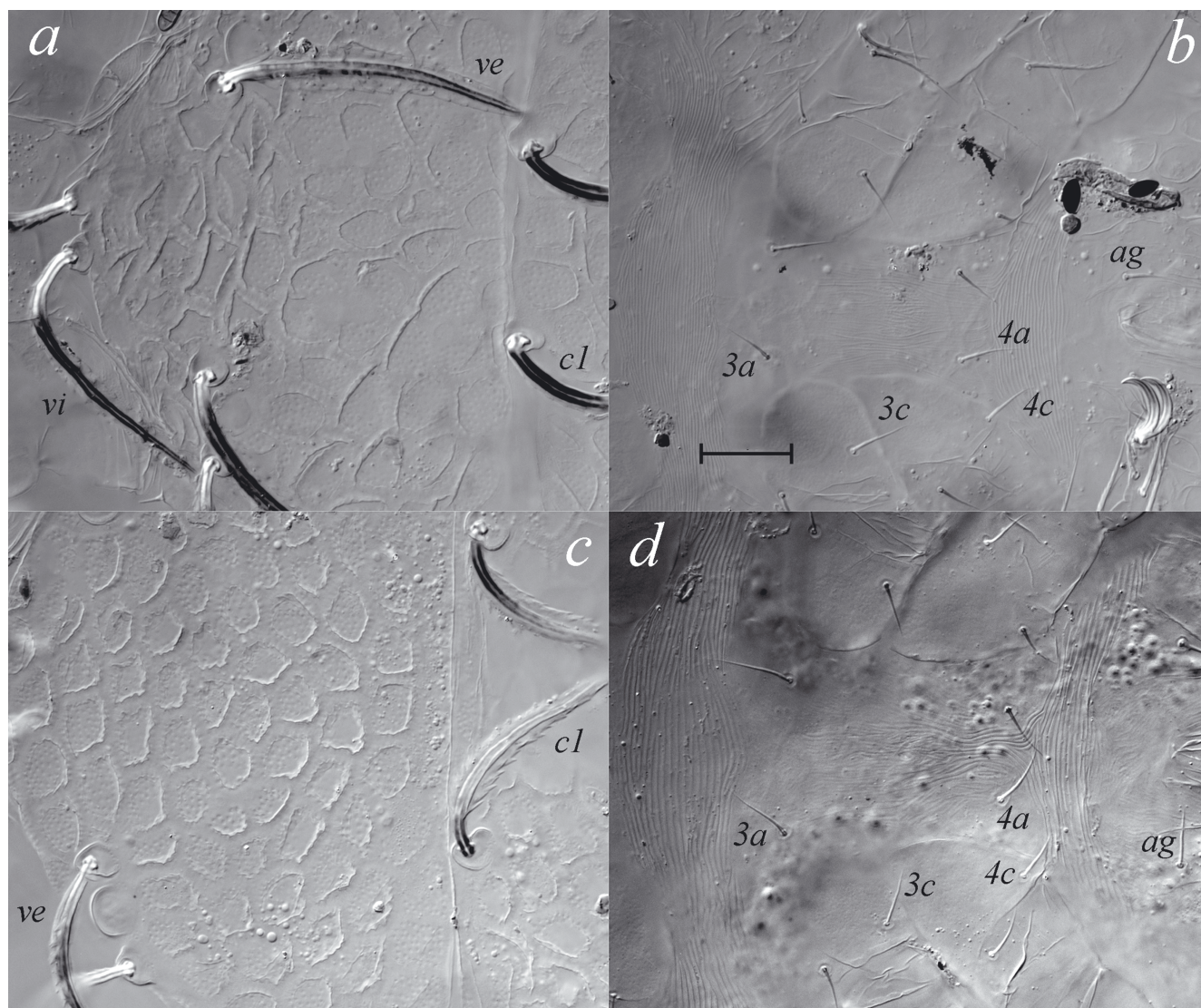


Fig. 19. DIC micrographs of *Eustigmaeus dominicanensis* sp. n. (a, b) and *E. latisetosus* sp. n. (c, d), females: a, c – prodorsum; b, d – posterior endopodal plates. Scale bar 20 μ m.

Another unusual character of *S. cuneata* that is unusual for the family Stigmaeidae is the weakly pubescent eupathidia on tarsi I and II. This character state was not reported in the original description of this species. In all other described species of the family Stigmaeidae, eupathidia on tarsi I and II are smooth. A similar weakly pubescent eupathidia on tarsi I and II were reported in the sister family Barbutiidae (Khaustov, Tolstikov, 2022).

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This work does not contain any studies involving human and animal subjects that meet the criteria of the Directive 2010/63/EU.

CONFLICT OF INTEREST

The authors of this work declare that they have no conflicts of interest.

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ПЕРВЫЕ НАХОДКИ КЛЕЩЕЙ СЕМЕЙСТВА STIGMAEIDAE (ACARI, PROSTIGMATA) В ДОМИНИКАНСКОЙ РЕСПУБЛИКЕ

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Представлены сведения о первых находках клещей семейства Stigmaeidae (Acari, Prostigmata) в Доминиканской Республике. Вид *Storchia cuneata* Fan and Chen 1997 впервые обнаружен в неотропическом регионе и переописан. Описаны три новых вида: *Stigmaeus striatus* Khaustov et Ermilov sp. n., *Eustigmaeus dominicanensis* Khaustov et Ermilov sp. n. и *E. latisetosus* Khaustov et Ermilov sp. n. Обсуждены некоторые необычные морфологические признаки вида *Storchia cuneata*.

Ключевые слова: клещи, Raphignathoidea, *Storchia*, *Stigmaeus*, *Eustigmaeus*, морфология, таксономия