

Zeitschrift: Archives des sciences [2004-ff.]
Herausgeber: Société de Physique et d'histoire Naturelle de Genève
Band: 60 (2007)
Heft: 1

Artikel: Four new species of the genus Stigmaeus (Acari: Stigmaeidae) from Turkey
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DOI: <https://doi.org/10.5169/seals-738413>

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Four new species of the genus *Stigmaeus* (Acari: Stigmaeidae) from Turkey*

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Ms. Received the 1.11.2006, accepted 2.2.2007

Abstract

Four new species of the genus *Stigmaeus* (Acari: Stigmaeidae) from Turkey. – Four new species from Turkey, *Stigmaeus kumalariensis*, *S. dazkiriensis*, *S. devlethanensis* and *S. karabagiensis* are described based on females.

Key-words: Acari, Stigmaeidae, *Stigmaeus*, new species, Turkey

Introduction

The genus *Stigmaeus* is one of the largest groups of the family Stigmaeidae. They live in the soil and on plants, and are usually predators of other mites. A few prey on scale insects or parasitize flies (Gerson & Smiley 1990). To date eleven species are known from Turkey (Koç & Ayyildiz, 1997; Doğan & Ayyildiz, 2003; Doğan, 2003; Koç, 2005).

In this paper four new species from Turkey, *Stigmaeus kumalariensis*, *S. dazkiriensis*, *S. devlethanensis* and *karabagiensis* are described. The terminology used is based on Grandjean (1944) and Kethley (1990). All measurements are given in micrometers (µm). Type and paratype specimens are deposited in the Zoological Museum of Celal Bayar University, Manisa, Turkey.

Stigmaeus Koch, 1836

Type-species- *Stigmaeus cruentus* Koch, 1836.

Dorsum with 10-16 shields and ornamented in most species. Propodosomal shield with three or four pairs of setae. Setae *sce* can be on a small auxiliary shield. Hysterosoma with two median shields, central and suranal; with three to five pairs of smaller, usually

paired shields, humerals, marginals, median zonals, lateral zonals and intercalaries. Dorsum with 13-14 pairs of setae. Chelicera separate.

Stigmaeus kumalariensis sp. nov.

Female. (Figs. 1-8) - HOLOTYPE – (measurements of holotype followed by that of paratype): Length of body (including gnathosoma): 374 (343–380), width: 208 (208–234).

Gnathosoma- Length of gnathosoma 62 (62–68). Dimensions of subcapitular setae: m: 18, n: 16. Chelicera 88 (including digits). Palpi 120, counts of setae and solenidion on palpi (femur to tarsi): 3, 2, 2+1 claw +1 accessory claw, 4+1 ω + 1 tridentate eupathidium +1 spiniform eupathidium.

Dorsum- Dorsal shield with thick reticulum. Propodosomal shield with three pairs of setae, one pair of eyes located between setae *ve* and *sci*. Setae *sce* located on small auxiliary shields. Central shield with two pairs of setae, *c*₁, *d*₁. Setae *c*₂ on small shield ventrolaterally. Setae *e*₁ located on small shields. Marginal shield with setae *d*₂. Lateral zonal shield with setae *e*₂. Intercalary shields divided, with setae *f*₁. Suranal shield entire, with two pairs of setae, *h*₁

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* This study is based partly on the PhD thesis of M. Akyol, supervised by Kamil Koç.

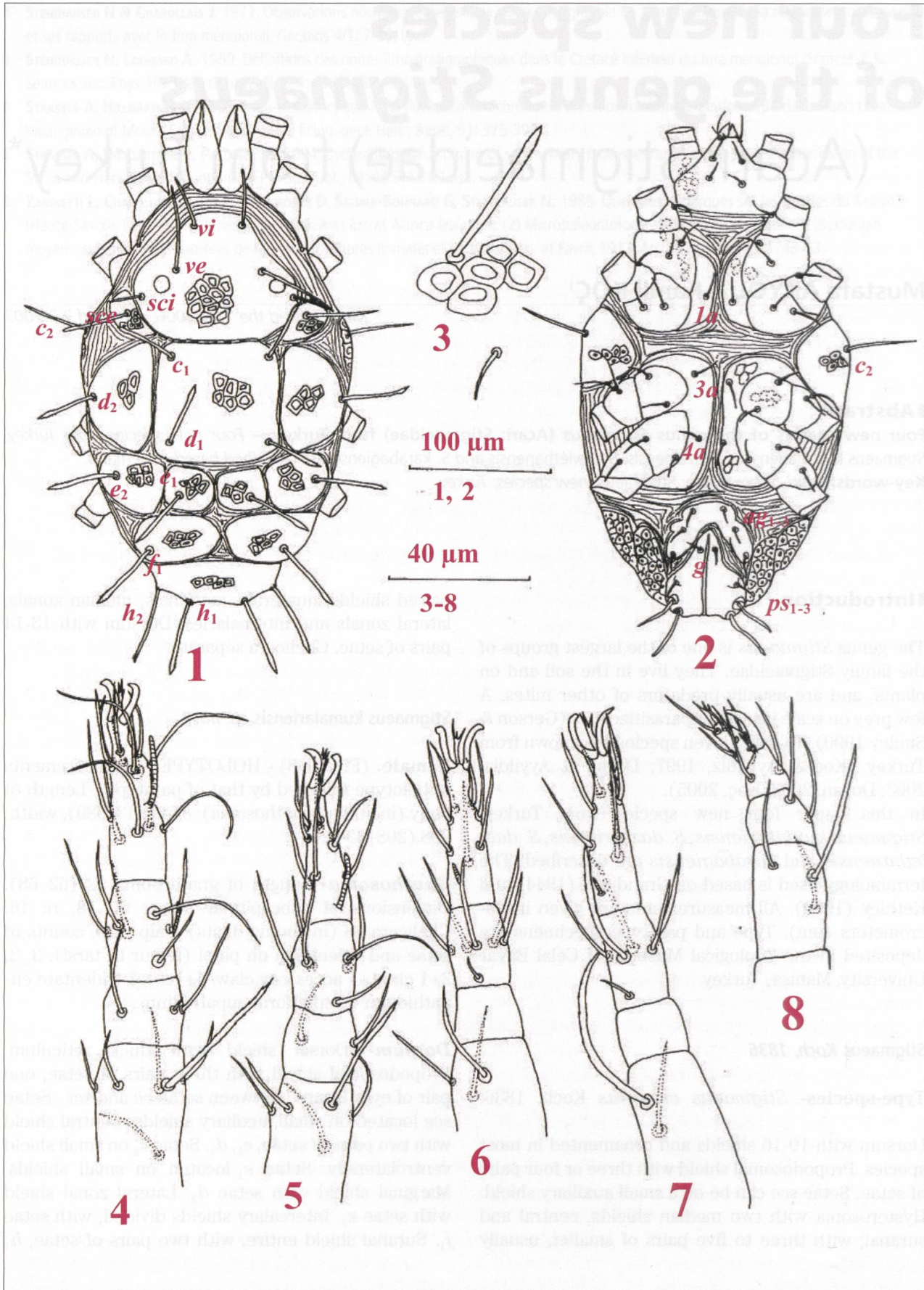


Fig. 1-8
Stigmaeus kumalariensis sp. nov. (Female)- 1. Dorsal view, 2. Ventral view, 3. Seta d_1 , reticulation and ventral seta 4a, 4. Leg I, 5. Leg II, 6. Leg III, 7. Leg IV, 8. Palpus.

and h_2 . Dorsal body setae sword-shaped with a few faint serrations and all hysterosomal setae terminally expanded and serrated. Dimensions of setae as follows: vi : 39 (39), ve : 65 (49–65), sci : 26 (26), sce : 52 (42–52), c_1 : 42 (42), c_2 : 47 (39–52), d_1 : 49 (42–47), d_2 : 44 (42–52), e_1 : 52 (44–55), e_2 : 52 (44–52), f_1 : 52 (44–57), h_1 : 57 (52–57), h_2 : 57 (52–62). Distances between setae: $vi-vi$: 34 (26), $vi-ve$: 31 (34–39), $ve-ve$: 62 (52–57), $ve-sci$: 31 (26–31), $sci-sci$: 112 (99–104), $sci-sce$: 16 (18–21), $sce-sce$: 130 (132–143), $sce-c_1$: 44 (39–42), c_1-c_1 : 73 (65–70), c_1-d_1 : 65 (59–62), c_2-c_2 : 198 (116–195), d_1-d_1 : 73 (70), d_1-d_2 : 65 (57–65), d_1-e_1 : 39 (42–44), e_1-e_1 : 52 (52–55), e_1-e_2 : 52 (49–52), e_1-f_1 : 44 (44–47), f_1-f_1 : 96 (86–88), f_1-h_1 : 44 (47), h_1-h_1 : 39 (26–31), h_1-h_2 : 21 (16), h_2-h_2 : 83 (57–65). Humeral setae c_2 , 1.1 times length of c_1 .

Venter- Coxisternal shields divided, well sclerotized, reticulated. Ventral setae subequal in length, ratio $1a:3a:4a = 1.0:1.0:1.0$; lengths $1a$: 16, $3a$: 16, $4a$: 16. Aggenital setae three pairs, slightly spinulate, with minute spinules ($ag_1=ag_2$: 16, ag_3 : 18). Contiguous genital and pseudanal covers bearing four pairs of setae (g : 13, ps_3 : 16, ps_2 : 34, ps_1 : 34). ps_2 and ps_3 long, broad and smooth.

Legs- Length of legs I–IV (from the base of femur to tip of tarsal claw): 156 (151)–130 (130)–130 (120–125)–156 (146–151). Counts of setae (solenidia in parentheses) on leg segments as follows: tarsi 13 (+ ω)-9 (+ ω)-7 (+ ω)-7 (+ ω), tibiae 5 (+ ϕ + ϕ)-5 (+ ϕ)-5 (+ ϕ)-5 (+ ϕ), genua 2 (+ k)-2-0-0, femora 6-5-3-2, trochanters 1-1-2-1, coxae 2-2-2-2. Genua I with solenidion k .

Type materials- Holotype female, from soil and litter under *Astragalus* sp., Kumalar mountain, Çakmaktepe passage, Şuhut district, 1880 m, 22.IV.2006; one paratype female from soil and litter under *Crataegus* sp., Kocatepe place, 1874 m, Afyonkarahisar, 16.VI.2005; one paratype female from soil and litter under *Quercus* sp., Koroğlubeli, Country Forest, Bayat district, 1350 m, 19.VI.2005; one paratype female from soil and litter under *Verbascum* sp., Akdağ mountains, Dinar district, 1050 m, 19.V.2005; seven paratype female from soil and litter under *Populus* sp., Çobanlar district, 1050 m, 21.V.2005, Afyonkarahisar, Turkey, coll. M. Akyol.

Etymology- The species is named after the type locality, Kumalar mountain, Afyonkarahisar, Turkey.

Remarks- This new species resembles *S. petrophilus* Kuznetsov and Petrov, 1979 and *S. urhani* Koç, 2005 in that central shield bears two pairs of setae and dorsal shield with thick reticulum. However, it can be distinguished from the latter by the dorsal body setae being sword-shaped with a few

faint serrations and all hysterosomal setae terminally expanded and serrated (all dorsal setae serrated and terminal of spinules in *S. urhani* and *S. petrophilus*), in the setal formula of genua 2 (+ k)-2-0-0 (3 (+ k)-3 (+ k)-1-1 in *S. urhani* and *S. petrophilus*), contiguous genital and pseudanal covers bearing four pairs of setae, ps_2 and ps_1 long, broad and smooth (contiguous genital and pseudanal covers with three setae, ps_1 long and strongly barbed in *S. urhani* and *S. petrophilus*).

Stigmaeus dazkiriensis sp. nov.

Female. (Figs. 9-16) - HOLOTYPE – (measurements of holotype followed by that of paratype): Length of body (including gnathosoma): 447 (447–458), width: 218 (213–218).

Gnathosoma- Length of gnathosoma 68 (62–68). Dimensions of subcapitular setae: m : 13, n : 13. Chelicera 83 (including digits). Palpi 120, counts of setae and solenidion on palpi (femur to tarsi): 3, 1, 2+1 claw, 4+1 ω + 1 tridentate eupathidium.

Dorsum- All dorsal shields with polygonal dimples. Propodosomal shield with three pairs of setae. Eyes absent. Setae sce located on small auxiliary shields. One pair of small shields present lateral to propodosomal shield and without setae. Central shield with two pairs of setae, c_1 , d_1 . Setae c_2 on small shield ventrolaterally. Setae e_1 located on small shields. Marginal shield with setae d_2 . Lateral zonal shield with setae e_2 . Intercalary shields divided, with setae f_1 . Suranal shield entire, with three pairs of setae, h_1 , h_2 and h_3 . Dorsal body setae serrated. Dimensions of setae as follows: vi : 21 (18), ve : 27 (21–26), sci : 23 (18–21), sce : 26 (21–26), c_1 : 21 (21), c_2 : 27 (23–27), d_1 : 18 (13–18), d_2 : 18 (16–18), e_1 : 18 (16–18), e_2 : 18 (16–18), f_1 : 21 (18–21), h_1 : 23 (18–23), h_2 : 27 (27), h_3 : 18 (16–21). Distances between setae: $vi-vi$: 36 (39), $vi-ve$: 26 (23), $ve-ve$: 47 (47–55), $ve-sci$: 36 (36–42), $sci-sci$: 83 (81–88), $sci-sce$: 26 (23–27), $sce-sce$: 143 (135–140), $sce-c_1$: 83 (78–83), c_1-c_1 : 42 (44–49), c_1-d_1 : 55 (68–73), c_2-c_2 : 198 (198), d_1-d_1 : 42 (44), d_1-d_2 : 55 (68), d_1-e_1 : 52 (42–52), e_1-e_1 : 44 (44–47), e_1-e_2 : 52 (49–57), e_1-f_1 : 34 (34), f_1-f_1 : 59 (59–65), f_1-h_1 : 39 (39–44), h_1-h_1 : 26 (27), h_1-h_2 : 26 (23–26), h_2-h_2 : 75 (78–81), h_3-h_3 : 96 (99). Humeral setae c_2 , 1.2 times length of c_1 .

Venter- Coxisternal shields divided, well sclerotized, without reticulate. Ventral setae subequal in length, ratio $1a:3a:4a = 1.0:1.0:1.0$; lengths $1a$: 16, $3a$: 16, $4a$: 16. Aggenital covers split into two pairs small shields, ag_1 and ag_2 on the shields anteriolateral to genital cover, and ag_3 and ag_4 on the shields lateral to genital cover ($ag_1=ag_2=ag_3=ag_4$: 13). Genital covers bearing

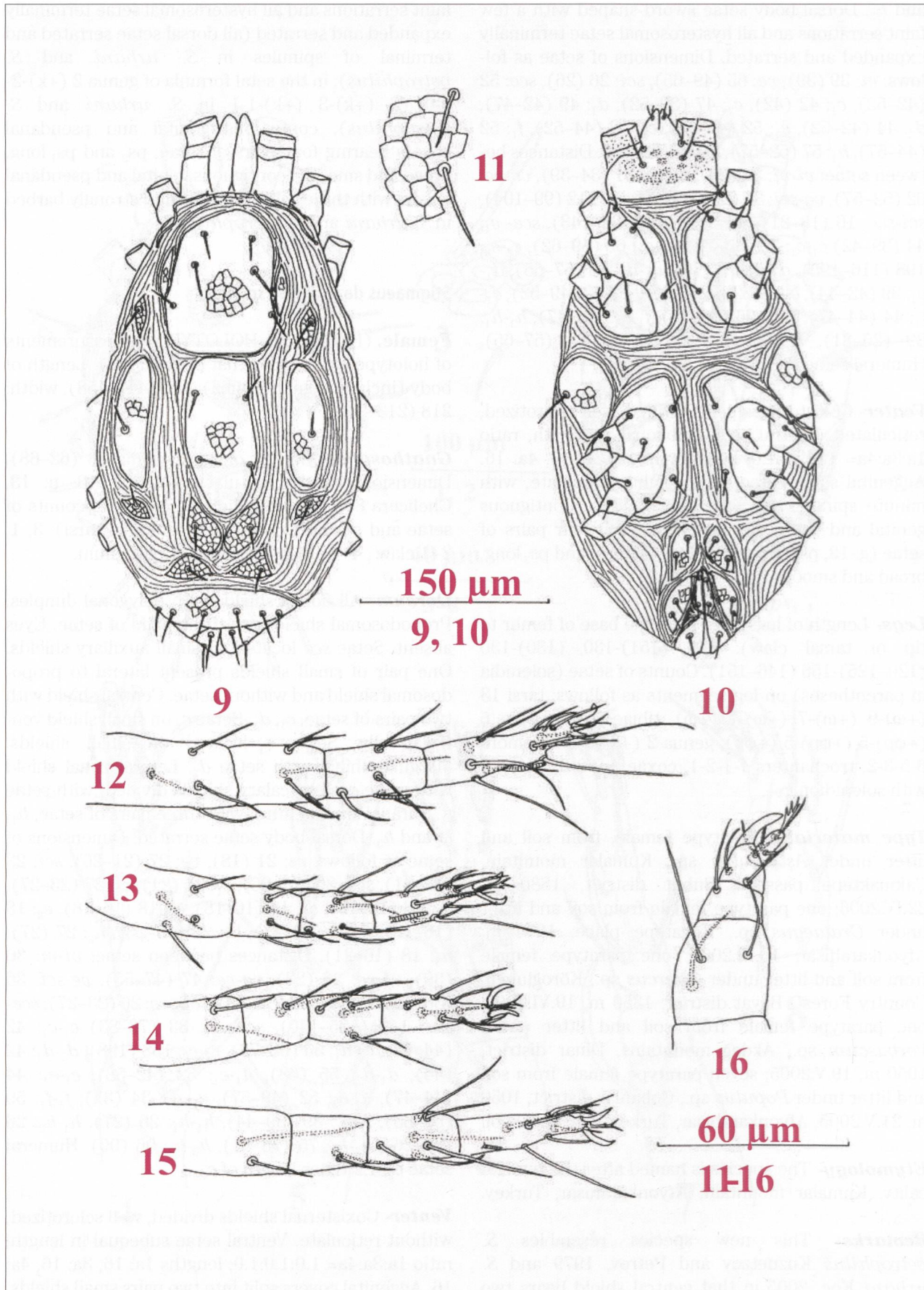


Fig. 9-16
Stigmaeus dazkiriensis sp. nov. (Female)- 9. Dorsal view, 10. Ventral view, 11. Seta vi and ve 12. Leg I, 13. Leg II, 14. Leg III, 15. Leg IV, 16. Palpus.

two pairs of setae ($g_1=g_2$: 13). Pseudanal covers bearing three pairs of setae (ps_1 : 18, $ps_2=ps_3$: 26). All genital setae slightly barbed.

Legs- Length of legs I-IV (from the base of femur to tip of tarsal claw): 156 (161–172)-125 (130–135)-125 (130)-151 (156). Counts of setae (solenidia in parentheses) on leg segments as follows: tarsi 13 (+ ω)-9 (+ ω)-7 (+ ω)-7 (+ ω), tibiae 5 (+ ϕ + ϕ p)- 5 (+ ϕ p)-5 (+ ϕ p)-5 (+ ϕ p), genua 5 (+k)-5-2-2, femora 4-4-3-2, trochanters 1-1-2-1, coxae 2-2-2-2. Genua I with solenidion *k*.

Type materials- Holotype female, from soil and litter under *Pistacia terebinthus*, Maymun mountains, near Lake Acıgöl, Dazkırı district, 900 m, 18.III.2006; one paratype female from soil and litter under *Juniperus* sp., Maymun mountains, Yukarıyenice village, Dazkırı district, 900 m, 17.XII.2005; one paratype female from soil and litter under *Populus* sp., sechisar district, 1130 m, 19.V.2006, Afyonkarahisar, Turkey, coll. M. Akyol.

Etymology- The species is named after the type locality, Dazkırı, Afyonkarahisar, Turkey.

Remarks- This new species resembles *S. pulchellus* Kuznetsov, 1978 in that central shield bears two pairs of setae, eyes absent, in the setal formula of femora and genua. However, it can be distinguished from the latter by genital shield and pseudanal shield separated, genital covers bearing two pairs of setae and pseudanal covers bearing three pairs of setae (contiguous genital and pseudanal covers bearing five pairs of setae in *S. pulchellus*), setae *ve/sci*: 1.2 (setae *ve/sci*: 1.6 in *S. pulchellus*), with one pair of additional small shields lateral to propodosomal shield (without additional small shields in *S. pulchellus*).

Stigmaeus devlethanensis sp. nov.

Female. (Figs. 17-24) - HOLOTYPE – (measurements of holotype followed by that of paratype): Length of body (including gnathosoma): 515 (572), width: 239 (229).

Gnathosoma- Length of gnathosoma 73 (83). Dimensions of subcapitular setae: m: 18 (13), n: 18 (21). Chelicera 94 (including digits). Palpi 109, counts of setae and solenidion on palpi (femur to tarsi): 3, 1, 2+1 claw, 4+1 + 1 tridentate eupathidium +1 spiniform eupathidium.

Dorsum- No reticulation on dorsal shields. Propodosomal shield with three pairs of setae. Eyes absent. Setae *sce* located on small auxiliary

shields. Dorsomedian setae c_1 and d_1 originate on small detached shields from central shield. Setae c_2 ventrolaterally and no on small shield. Setae e_1 located on small shields. Marginal shield with setae d_2 . Lateral zonal shield with setae e_2 . Intercalary shields divided, with setae f_1 . Suranal shield entire, with three pairs of setae, h_1 , h_2 and h_3 . Dorsal body setae with a few faint spinules. Dimensions of setae as follows: *vi*: 23 (21), *ve*: 26 (23), *sci*: 23 (23), *sce*: 27 (26), c_1 : 21 (23), c_2 : 42 (42), d_1 : 18 (21), d_2 : 21 (23), e_1 : 18 (21), e_2 : 21 (21), f_1 : 27 (26), h_1 : 27 (27), h_2 : 39 (39), h_3 : 26 (21). Distances between setae: *vi-vi*: 34 (36), *vi-ve*: 34 (34), *ve-ve*: 65 (68), *ve-sci*: 39 (55), *sci-sci*: 99 (120), *sci-sce*: 27 (23), *sce-sce*: 156 (166), *sce-c*₁: 88 (91) c_1-c_1 : 65 (71), c_1-d_1 : 78 (86), c_2-c_2 : 221 (218), d_1-d_1 : 49 (57), d_1-d_2 : 57 (62), d_1-e_1 : 62 (70), e_1-e_1 : 52 (52), e_1-e_2 : 47 (52), e_1-f_1 : 34 (39), f_1-f_1 : 68 (78), f_1-h_1 : 49 (47), h_1-h_1 : 27 (36), h_1-h_2 : 21 (29), h_2-h_2 : 73 (86), h_3-h_3 : 94 (144). Humeral setae c_2 , 2.0 times length of c_1 .

Venter- Coxisternal shields divided, without reticulate. Ventral setae differ in length, ratio 1a:3a:4a: 0.7:1.0:1.0; lengths 1a: 16 (18), 3a: 21 (23) and 4a: 21 (23). Aggenital covers split into two pairs small shields, ag_1 and ag_2 on the shields anteriolateral to genital cover, and ag_3 and ag_4 on the shields lateral to genital cover ($ag_1=16$ (16), $ag_2=16$ (16), $ag_3=18$ (18), $ag_4:18$ (23)). Genital covers bearing two pairs of setae ($g_1=13$, $g_2=16$) Pseudanal covers bearing three pairs of setae ($ps_1:34$, $ps_2:18$, $ps_3:16$). All genital setae slightly barbed.

Legs- Length of legs I-IV (from the base of femur to tip of tarsal claw): 182 (182)-140 (146)-146 (156)-172 (182). Counts of setae (solenidia in parentheses) on leg segments as follows: tarsi 13 (+ ω)-9 (+ ω)-7 (+ ω)-7 (+ ω), tibiae 5 (+ ϕ + ϕ p)- 5 (+ ϕ p)-5 (+ ϕ p)-5 (+ ϕ p), genua 5 (+k)-4-2-2, femora 4-4-3-2, trochanters 1-1-2-1, coxae 2-2-2-2. Genua I with solenidion *k*.

Type materials- Holotype female and one paratype female from soil and litter under *Juniperus* sp., Devlethan village, Hocalar district, 1050 m, 15.X.2005, Afyonkarahisar, Turkey, coll. M. Akyol.

Etymology- The species is named after the type locality, Devlethan village, Afyonkarahisar, Turkey.

Remarks- This new species resembles *S. pseudoluteus* Liang & Hu, 1987 in that dorsomedian setae c_1 and d_1 originate on small detached shields from central shield, eyes absent and in the setal formula of femora 4-4-3-2. However, it can be distinguished from the latter by the setal formula of genua 5(+k)-5-2-2 (setal formula of genua 5-4-2-2 in *S. pseudoluteus*), setae *ve/sci*: 1.1 (setae *ve/sci*: 1.4 in *S. pseu-*

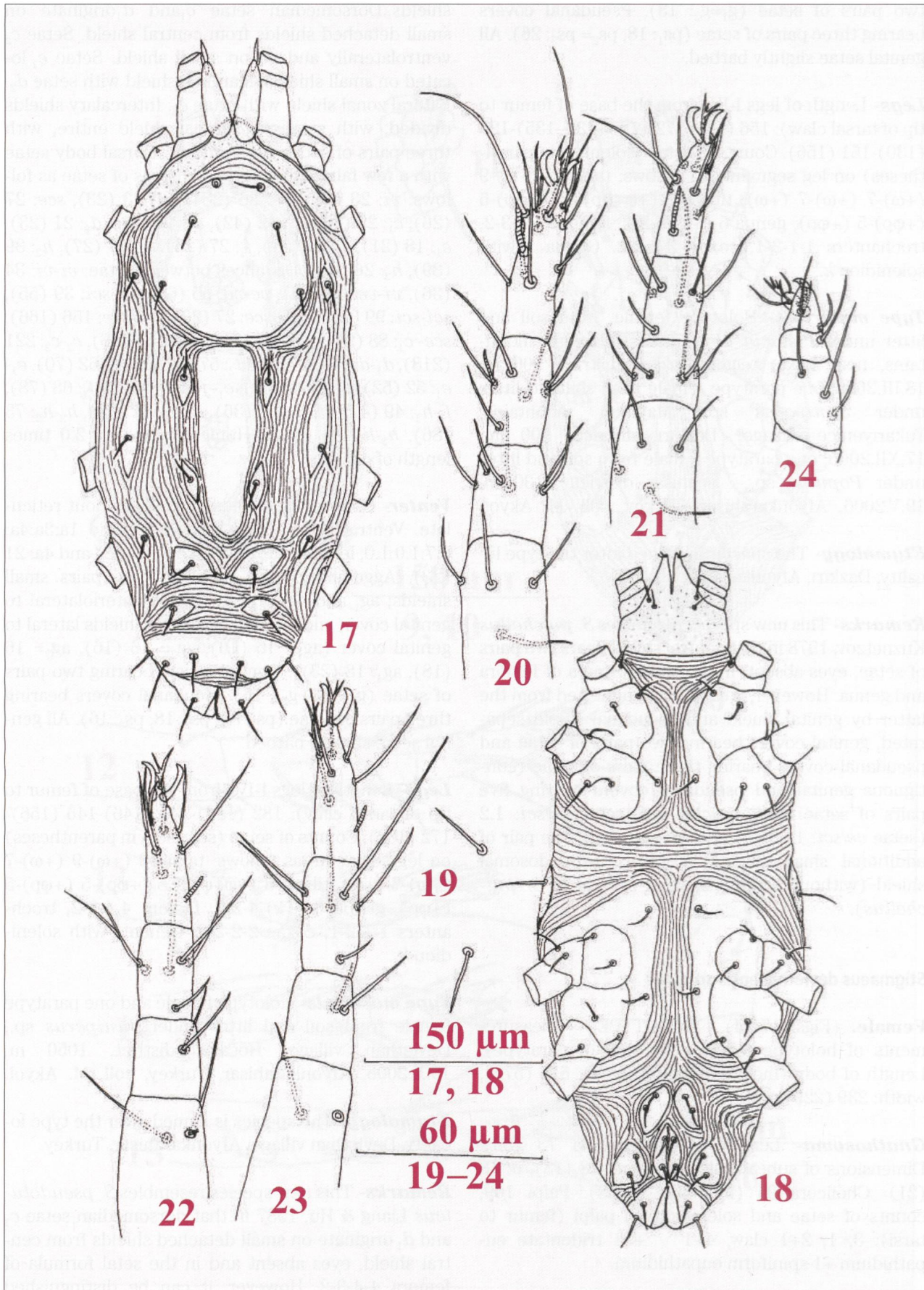


Fig. 17-24
Stigmaeus devlethanensis sp. nov. (Female)- 17. Dorsal view, 18. Ventral view, 19. Seta vi and ve 20. Leg I, 21. Leg II, 22. Leg III, 23. Leg IV, 24. Palpus.

doluteus), genital shield and pseudanal shield separated, genital covers bearing two pairs of setae and pseudanal covers bearing three pairs of setae (contiguous genital and pseudanal covers bearing five pairs of setae in *S. pseudoluteus*).

***Stigmaeus karabagiensis* sp. nov.**

Female. (Figs. 25-32) - HOLOTYPE - (measurements of holotype followed by that of paratype): Length of body (including gnathosoma): 395 (374-395), width: 172 (156).

Gnathosoma- Length of gnathosoma 62 (57). Dimensions of subcapitular setae: m: 23 (21), n: 34 (39). Chelicera 78 (including digits). Palpi 94, counts of setae and solenidion on palpi (femur to tarsi): 3, 1, 2+1 claw, 4+1 ω + 1 tridentate eupathidium +1 spiniform eupathidium.

Dorsum- No reticulation on dorsal shields. Propodosomal shield with two pairs of setae (*vi* and *ve*). Setae *sci* on small shield and separated from propodosomal shield. Eyes absent. Setae *sce* located on small auxiliary shields. Dorsomedian setae *c*₁ and *d*₁ originate on small detached shields from central shield. Setae *c*₂ ventrolaterally and no on small shield. Setae *e*₁ located on small shields. Marginal shield with setae *d*₂. Lateral zonal shield with setae *e*₂. Intercalary shields divided, with setae *f*₁. Suranal shield divided, with three pairs of setae, *h*₁, *h*₂ and *h*₃. Dorsal body setae with a few faint spinules. Dimensions of setae as follows: *vi*: 13 (13), *ve*: 31 (26), *sci*: 13 (16), *sce*: 18 (16), *c*₁: 13 (13), *c*₂: 27 (27), *d*₁: 13 (13), *d*₂: 13 (13), *e*₁: 13 (13), *e*₂: 13 (13), *f*₁: 16 (16), *h*₁: 18 (18), *h*₂: 26 (26), *h*₃: 16 (16). Distances between setae: *vi-vi*: 23 (26), *vi-ve*: 16 (16), *ve-ve*: 31 (34), *ve-sci*: 39 (39), *sci-sci*: 60 (60), *sci-sce*: 21 (27), *sce-sce*: 112 (117), *c*_{1-c}₁: 39 (41), *c*_{1-d}₁: 60 (55), *d*_{1-d}₁: 34 (34), *d*_{1-d}₂: 39, *d*_{1-e}₁: 47 (49), *e*_{1-e}₁: 39 (36), *e*_{1-e}₂: 27 (31), *e*_{2-e}₂: 101 (99), *e*_{1-f}₁: 26 (27), *f*_{1-f}₁: 49 (52), *f*_{1-h}₁: 34 (31), *h*_{1-h}₁: 27 (27), *h*_{1-h}₂: 13 (13), *h*_{2-h}₂: 55 (52), *h*_{3-h}₃: 73 (70). Humeral setae *c*₂, 2.0 times length of *c*₁.

Venter- Coxisternal shields divided. Ventral setae differ in length, ratio 1a:3a:4a: 0.7:1.0:1.0; lengths 1a: 16 (18), 3a: 21 (23) and 4a: 21 (23). Aggenital setae four pairs, with minute spinules (*ag*₁: 16 (16), *ag*₂: 16(16), *ag*₃: 16 (18), *ag*₄: 18 (23)). Genital covers with three pairs of setae (*g*₁: 13, *g*₂: 16, *g*₃: 34). Pseudanal covers bearing three pairs of setae (*ps*₁= *ps*₂= *ps*₃: 18). One pair of aggenital shields.

Legs- Length of legs I-IV (from the base of femur to tip of tarsal claw): 130 (130)-94 (99)-94 (99)-114 (114). Counts of setae (solenidia in parentheses) on

leg segments as follows: tarsi 13 (+ ω)-9 (+ ω)-7 (+ ω)-7 (+ ω), tibiae 5 (+ ϕ + $\phi\phi$)- 5 (+ $\phi\phi$)-5 (+ $\phi\phi$)-5 (+ $\phi\phi$), genua 5 (+k)-2-0-1, femora 4-4-3-2, trochanters 1-1-2-1, coxae 2-2-2-2. Genua I with solenidion *k*.

Type materials- Holotype female and two paratype female from soil and litter under *Verbascum* sp., Emirdağları, Kayadanağıl place, B.Karabağ, Bolvadin district, 1100 m, 20.V.2005; one paratype female from soil and litter under *Populus* sp., Taşköprü place, Sultandağı district, 970 m, 16.XI.2004; one paratype female from soil and litter under *Cerasus vulgaris*, Afyonkarahisar, near the Özdilek, 1040 m, 19.XII.2005, Afyonkarahisar, Turkey, coll. M. Akyol.

Etymology- The species is named after the type locality, B. Karabağ, Afyonkarahisar, Turkey.

Remarks- This new species resembles *S. pseudoluteus* Liang & Hu, 1987 and *S. devlethanensis* sp. nov. in that dorsomedian setae *c*₁ and *d*₁ originate on small detached shields from central shield, eyes absent and in the setal formula of femora 4-4-3-2. However, it can be distinguished from the latter by in the setal formula of genua 5(+k)-2-0-1 (setal formula of genua 5-4-2-2 in *S. pseudoluteus*; 5(+k)-5-2-2 in *S. devlethanensis* sp. nov.), setae *velsci*: 2.4 (setae *velsci*: 1.4 in *S. pseudoluteus*; *velsci*: 1.1 in *S. devlethanensis* sp. nov.), suranal shield divided, aggenital shield one pairs (suranal shield entire, aggenital shield two pairs in *S. pseudoluteus* and *S. devlethanensis* sp. nov.).

■ Acknowledgements

We are very grateful to Eddie A. Ueckermann (ARC-Plant Protection Research Institute, South Africa) and Qing-Hai Fan (Fujian Agricultural and Forestry University, China) for review and criticism of the manuscript.

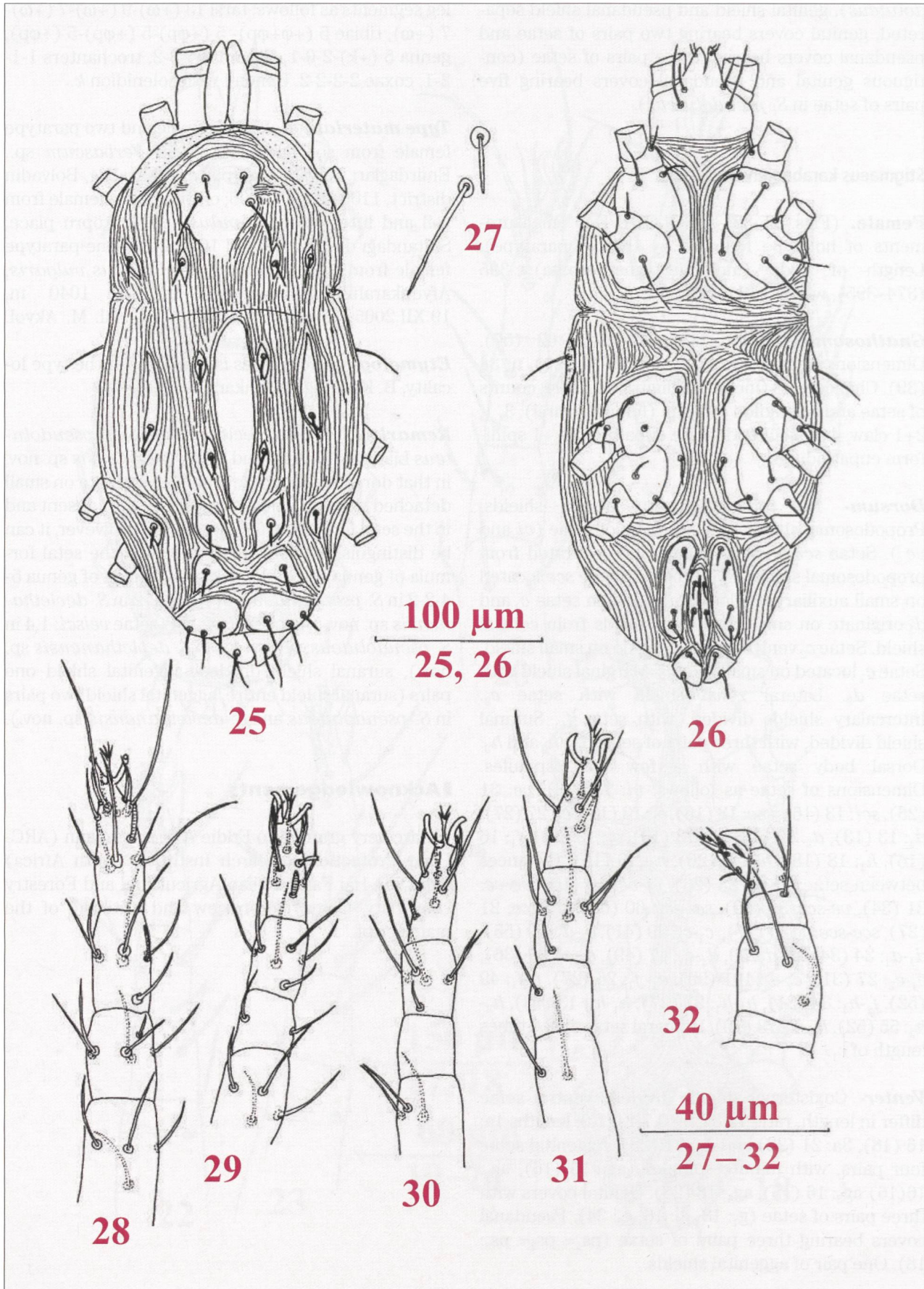


Fig. 25-32
Stigmaeus karabagiensis sp. nov. (Female)- 25. Dorsal view, 26. Ventral view, 27. Seta vi and ve 28. Leg I, 29. Leg II, 30. Leg III, 31. Leg IV, 32. Palpus.

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