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Contributions to the knowledge of the mite genus *Stigmaeus* Koch, 1836 (Acari: Stigmaeidae) of Turkey

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Abstract. Based on the mite specimens collected within the scope of a study on Erzincan (Turkey) mite biodiversity, two species of the genus *Stigmaeus* are described and illustrated here: *S. bifurcus* sp. nov. as new to science and *S. miandoabiensis* Bagheri & Zarei, 2012 as a new record for Turkey. Some morphological abnormalities in the new species are noted. The deutonymph of *S. miandoabiensis* is described for the first time in this study. Discovery of this stage from soil and litter under *Pinus sylvestris* in Turkey adds more data to our knowledge of the species.

Keywords. Mite, taxonomy, *Stigmaeus*, new species, new record, description, Turkey.

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Introduction

Stigmaeus Koch, 1836 is the most diverse genus in the family Stigmaeidae with 133 valid species (Fan & Zhang 2005; Doğan *et al.* 2015a, 2016; Dilkaraoğlu *et al.* 2016a, 2016b, Fan *et al.* 2016). To date, 36 species of the genus have been recorded from Turkey (Özkan *et al.* 1988, 1994; Erman *et al.* 2007; Doğan 2007; Doğan *et al.* 2015a, 2016; Dilkaraoğlu *et al.* 2016a, 2016b).

The descriptions of *Stigmaeus bifurcus* sp. nov. and *S. miandoabiensis* Bagheri & Zarei, 2012—originally found in Iran, newly recorded for the Turkish fauna—are given in this survey. The deutonymph of *S. miandoabiensis* is described for the first time.

Material and methods

The specimens were collected from Erzincan in 2014 and 2015. Methods used for specimen collection, extraction, material preservation and preparation were as discussed by Doğan (2006). The specimens were illustrated using a Leica DM 4000 B phase-contrast microscope. The nomenclature of the idiosomal shields follows that of Summers (1962). Dorsal setal and leg setal designations follow Kethley (1990) and Grandjean (1944), respectively. Setal counts of leg segments are given with solenidia in parentheses. All measurements are given in micrometers (μm) and refer to the length of the structure unless otherwise stated. For the new species, measurements of the holotype are given first followed in parentheses by those of paratypes as a range. In newly recorded species, mean values are given first and the range is given parenthetically. Body length measurements represent the distance between the base of the gnathosoma and the posterior part of the idiosoma; width was measured at the broadest point of the idiosoma. Setae were measured from the setal base to the tip of the seta; distances between setae were measured between the setal bases. Leg length was measured from the tip of the claws to the trochanter base. Palp length was measured from the tarsal tip to the trochanter base. Specimens examined were deposited in the collection of the Acarology Laboratory of Erzincan University, Turkey.

Abbreviations

Gnathosoma

ω = solenidion on palptarsus
elcp = supracoxal setae of palp
m = anterior or innermost pair of subcapitular setae
n = posterior pair of subcapitular setae
or_1 = 1st pair of adoral setae
or_2 = 2nd pair of rostral setae

Idiosoma

1a = 1st pair of intercoxal setae
3a = 2nd pair of intercoxal setae
4a = 3rd pair of intercoxal setae
ag_1 = 1st pair of aggenital setae
ag_2 = 2nd pair of aggenital setae
ag_3 = 3rd pair of aggenital setae
ag_4 = 4th pair of aggenital setae
c_1 = internal pair of humeral setae
c_2 = external pair of humeral setae
d_1 = internal pair of dorsal setae
d_2 = external pair of dorsal setae
e_1 = internal pair of lumbral setae
e_2 = external pair of lumbral setae
f_1 = internal pair of sacral setae
g_1 = 1st pair of genital setae
g_2 = 2nd pair of genital setae
h_1 = 1st pair of clunal setae
h_2 = 2nd pair of clunal setae
h_3 = 3rd pair of clunal setae
pob = post-ocular bodies

ps_1 = 1st pair of pseudanal setae
ps_2 = 2nd pair of pseudanal setae
ps_3 = 3rd pair of pseudanal setae
sce = external pair of scapular setae
sci = internal pair of scapular setae
vi = internal pair of vertical setae
ve = external pair of vertical setae

Legs

ω = solenidion on tarsi
φ = solenidion on tibia I
φρ = proximal solenidion on tibiae
κ = solenidion on genu I
elcp = supracoxal setae of leg I

Institutional abbreviation

ALEU = Acarology Laboratory of Erzincan University, Turkey

Results

Subclass Acari Leach, 1817
Superorder Acariformes Zakhvatkin, 1952
Order Trombidiformes Reuter, 1909
Suborder Prostigmata Kramer, 1877
Superfamily Raphignathoidea Kramer, 1877
Family Stigmaeidae Oudemans, 1931

Genus ***Stigmaeus*** Koch, 1836

Type species

Stigmaeus cruentus Koch, 1836, by original designation.

Description

The genus *Stigmaeus* Koch, 1836 (Acari: Stigmaeidae) can be defined by the following characters: idiosoma oval; chelicerae separate; palptibial claw subequal to or slightly shorter than palptarsus; accessory claw seta-like or spine-like, terminal eupathidion on palptarsus basally fused and split into two or three long prongs; counts of setae and solenidia from palptrochanter to palptarsus: 0, 3, 1–2, 2 + 1 claw + 1 accessory claw, 4 + 1ω + 1 subterminal spine-like eupathidion + 2 or 3 eupathidia (basally fused); subcapitulum with two pairs of subcapitular setae; prodorsum typically with a large shield, bearing three pairs of setae and a pair of platelets bearing setae *sce*; eyes present or absent, postocular bodies (*pob*) present or absent; dorsal hysterosomal area typically with one or two shields surrounded by three to five pairs of platelets, setae d_1 and d_2 never on same shield; humeral shields dorso- or ventrolateral, with setae c_2; intercalary shields entire or divided, with a pair of setae (f_1); suranal shield entire or divided, with two or three pairs of setae; coxisternal shields present, divided along midline; ventral opisthosoma with three to five pairs of aggenital setae; genital and anal valves fused or contiguous, with one to three pairs of genital setae and three pairs of pseudanal setae (Fan & Zhang 2005; Dönel & Doğan 2011; Doğan *et al.* 2015a, 2016).

Stigmaeus bifurcus sp. nov.

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Figs 1–2; Table 1

Etymology

The name of this new species, *bifurcus*, refers to the shape of the eupathidion on the palptarsus.

Type material

Holotype

TURKEY: ♀, from soil under *Ulmus* sp., Erzincan, alt. 1275 m, 39º39'39.8" N, 39º29'28.5" E, 25 Oct. 2015.

Paratypes

TURKEY: 8 ♀♀, same data as holotype; 1 ♀, from soil under *Rosa canina*, same locality as holotype, 15 Mar. 2015.

Description

Female

Idiosoma. Elongated. Length of body (including gnathosoma): 396 (350–384). Width of body: 163 (129–157).

Gnathosoma (Fig. 2B). Gnathosoma punctate and 68 (65–70) long, chelicerae separate and punctate, 78 (74–81) long. Palp punctate and 91 (74–89) long. Counts of setae and solenidia from palptrochanter to palptarsus: 0, 3, 1, 2 + 1 claw + 1 seta-like accessory claw, 4 + 1 solenidion + 1 subterminal seta-like eupathidion + 1 bifurcate eupathidion. Palptibial claw slightly longer than palptarsus. Palp supracoxal setae (*elcp*) pudgy. Subcapitulum with two pairs of adoral setae ($or_{1,2}$) and two pairs of subcapitular setae (*m*, *n*). Dimensions and distance between subcapitular setae, *m* 14 (12–14), *n* 26 (22–25), *m–m* 21 (19–22), *n–n* 24 (23–26), *m–n* 12 (10–12).

Dorsum (Figs 1A, C–D, 2A). Integument striate except punctate peritremal region, propodosomal shield with reticulations, its posterior margin concave and with tubercles. Propodosomal shield bearing three pairs of setae (*vi*, *ve*, *sci*) and apodemal marking, eyes and post-ocular bodies absent. Setae *sce* on minute platelets. Central shield vaguely reticulate but other shields not ornamented. Central shield bearing two pairs setae (c_1, d_1). In one paratype specimen left member of setae c_1 about twice as long as right member (Fig. 1C). Setae d_2 located on marginal shield. Setae e_1 on divided median zonal shields. Setae e_2 located on minute platelets. Setae f_1 on divided intercalary shield. One pair of extra, minute and non-setose shields lateral to intercalary shields. Suranal shield divided and with three pairs of setae ($h_{1–3}$) but right member of setae h_3 absent in one paratype (Fig. 1D). Setae *vi*, *sci*, d_1 and all suranal setae slightly serrated but others smooth (Fig. 2A). Lengths and distances of dorsal idiosomal setae as follows: *vi* 16 (14–17), *ve* 42 (38–47), *sci* 20 (17–20), *sce* 41 (40–44), c_1 16 (15–17), c_2 46 (45–49), d_1 16 (16–18), d_2 34 (29–35), e_1 8 (17–20), e_2 18 (17–19), f_1 31 (34–38), h_1 21 (21–26), h_2 24 (21–26), h_3 13 (13–15), *vi–vi* 23 (24–29), *ve–ve* 33 (31–35), *vi–ve* 20 (19–22), *sci–sci* 46 (43–48), *ve–sci* 36 (33–35), *sce–sce* 99 (86–104), *sci–sce* 27 (23–29), c_1–c_1 31 (26–31), c_2–c_2 145 (124–145), c_1–c_2 63 (46–66), d_2–d_2 100 (89–102), c_1–d_1 43 (40–46), c_1–d_2 41 (35–41), d_1–d_1 28 (27–31), d_2–d_1 43 (39–43), e_2–e_2 96 (83–97), d_2–e_2 62 (51–61), d_1–e_1 47 (40–49), d_1–e_2 51 (44–49), e_1–e_1 32 (29–37), e_2–e_1 34 (27–37), f_1–f_1 46 (43–51), e_1–f_1 26 (24–26), e_2–f_1 42 (36–43), f_1–h_1 40 (35–46), f_1–h_2 40 (30–43), f_1–h_3 41 (27–36), h_1–h_1 23 (22–26), h_2–h_2 52 (48–54), h_3–h_3 70 (57–66), h_1–h_2 16 (12–14), h_2–h_3 9 (6–9).

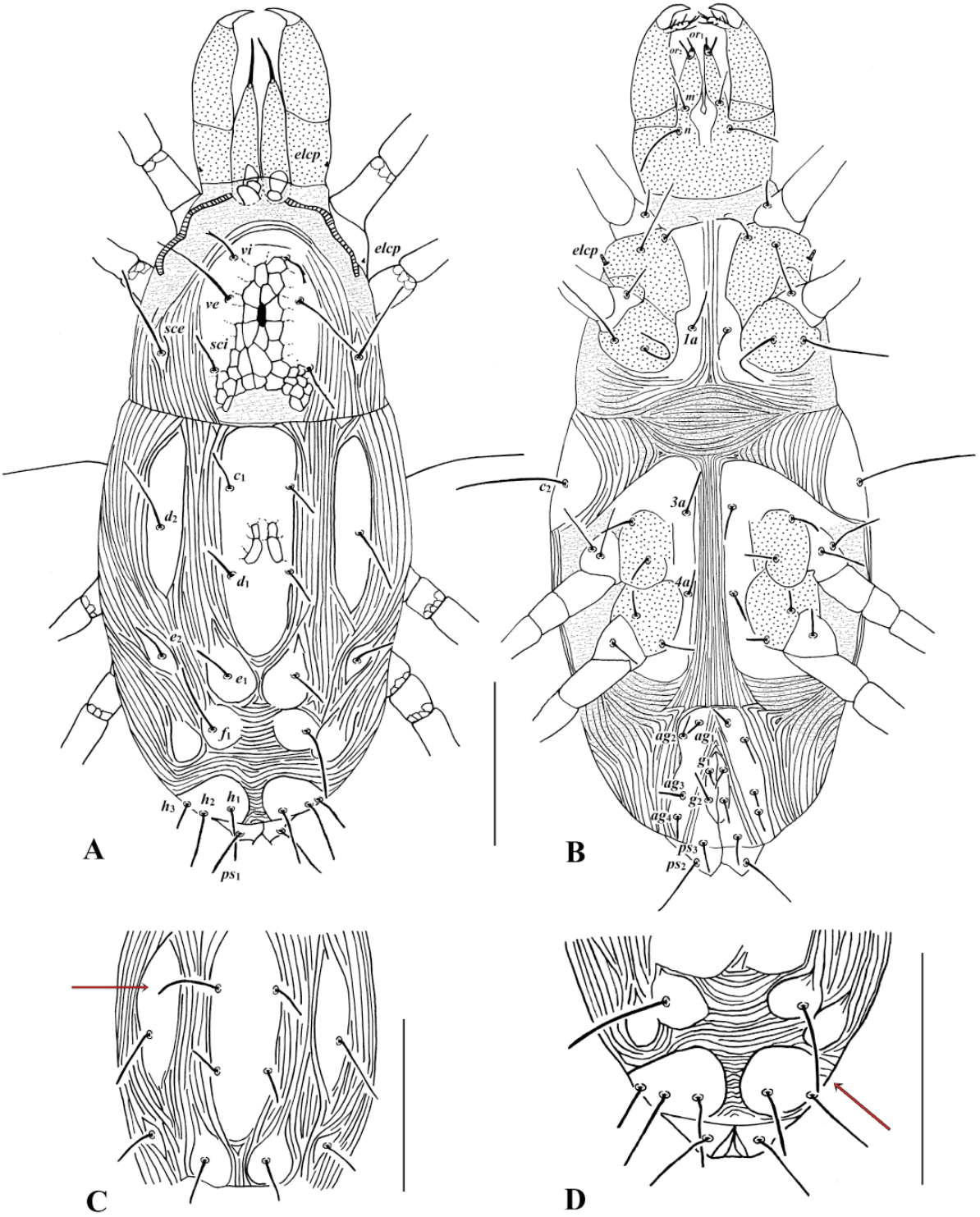

Fig. 1. *Stigmaeus bifurcus* sp. nov. **A–B**. Holotype (♀). **A**. Dorsum of body. **B**. Venter of body. – **C–D**. Paratype (♀). **C**. Abnormality: left seta c_1 about 2 times as long as the right. **D**. Abnormality: seta h_3 absent on right suranal shield in one paratype. Scale bars = 100 μm.

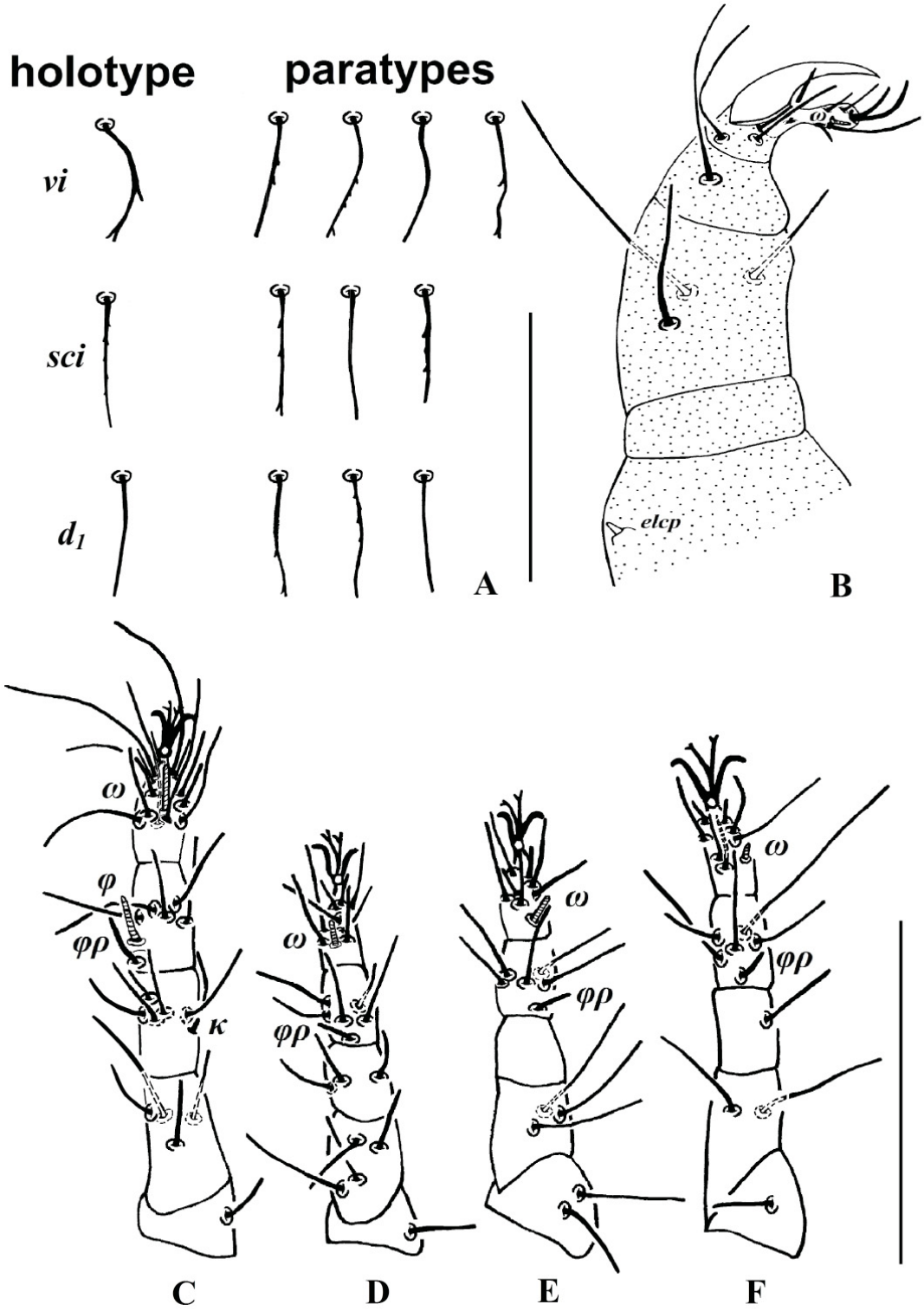

Fig. 2. *Stigmaeus bifurcus* sp. nov., holotype, ♀. **A**. Some dorsal body setae. **B**. Palp. **C**. Leg I. **D**. Leg II. **E**. Leg III. **F**. Leg IV. Scale bars: A–B = 40 μm; C–F = 100 μm.

Table 1. Differences among the *Stigmaeus* species having laterally two extra non setose dorsal shields. – = absent; + = present.

Characters	Species								
	***S. bifurcus* sp. nov.**	***S. hashtrudiensis***	***S. caria***	***S. kerman-shahiensis***	***S. shabestariensis***	***S. petilus***	***S. erzincanus***	***S. additicius***	***S. ceylani***
Shape of accessory claw on palp tibia	seta-like	seta-like	spine-like	spine-like	spine-like	spine-like	seta-like	spine-like	seta-like
Shape of palp eupathidion	bifurcate	bifurcate	bifurcate	bifurcate	trident	trident	trident	?	trident
The number of setae on palp tibia (except for claw and accessory claw)	2	2	3	3	2	2	2	2	2
Shape of dorsal body setae	almost smooth	smooth	almost smooth	almost smooth	smooth	slightly serrated (except for setae *ve*, *sce*, d_2, c_2)	stout	slightly serrated	slightly spinulate
Platelets bearing the setae sce	+	– or +	–	+	+	+	+	–	+
Apodemal marking	+	– or +	–	–	–	–	+	+	+
Additional a pair of shields next to propodosomal shield	–	–	–	–	+	–	+	–	+
Median zonal shields	divided	divided	divided	divided	divided	entire	divided	divided	divided
Suranal shield	divided	divided	divided	divided	entire	divided	entire	entire, but recessed anteriorly	entire
The number of setae pairs on suranal shield	3	3	3	3	3	2	3	3	3
Aggenital shields	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	longitudinally divided into two parts	divide into four parts
Shape of aggenital setae	smooth	smooth	smooth	smooth	smooth	slightly serrated	smooth	smooth	smooth
Pattern on ventral shields	–	– or +	–	–	–	–	+	+	–
Setal formulae of leg genua	5(+1κ)-3-0-1	5(+1κ)-4-1-2	5(+1κ)-2-0-1	5(+1κ)-3-0-2	5(+1κ)-5-2-2	5(+1κ)-3-0-1	5(+1κ)-5-2-2	5(+1κ)-5-2-2	5(+1κ)-5-2-2
Setal formulae of leg tarsi	13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-8(+1ω)-7(+1ω)-7	13(+1ω)-9(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-9(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-9(+1ω)-7(+1ω)-7(+1ω)	13(+1ω)-9(+1ω)-7(+1ω)-7(+1ω)

*The Turkish specimens of *S. hashtrudiensis* Bagheri & Maleki, 2014 have a pair of additional small platelets (Uluçay 2015) but not in the type specimens (Bagheri *et al.* 2014).

Venter (Fig. 1B). Almost striate. Back of coxae I–II and III–IV striate with tubercles. Humeral shields without reticulations and bearing setae c_2. Coxisternal shields divided, smooth and bearing three pairs of setae (*1a*, *3a*, *4a*). Lengths and distances of these setae: *1a* 14 (12–13), *3a* 14 (12–14), *4a* 14 (11–14), *1a–1a* 17 (17–21), *3a–3a* 23 (20–29), *4a–4a* 23 (16–26). Genital and anal shields contiguous, two pairs of smooth genital ($g_{1,2}$) and three pairs of slightly serrate pseudanal setae ($ps_{1–3}$). ps_3 shorter than other pseudanal setae. Four pairs of aggenital setae ($ag_{1–4}$) on long and divided aggenital shields. Lengths of these setae as follows: ag_1 10 (8–10), ag_2 10 (8–10), ag_3 10 (8–10), ag_4 11 (9–11), g_1 7 (6–9), g_2 12 (10–13), ps_1 27 (23–27), ps_2 25 (22–25), ps_3 13 (12–14).

Legs (Figs 2C–F). Coxae I–IV with punctation. Length: leg I 138 (136–140), leg II 106 (100–107), leg III 114 (108–115), leg IV 128 (121–129). Counts of setae and solenidia on legs I–IV: coxae 2-2-2-2; trochanters 1-1-2-1; femora 4-4-3-2; genua 5(+1κ)-3-0-1; tibiae 5(+1φ+1φρ)-5(+1φρ)-5(+1φρ)-5(+1φρ); tarsi 13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω). All tarsi with solenidia. Lengths of solenidia: Iω 11 (8–12), IIω 8 (7–9), IIIω 6 (3–5), IVω 6 (3–5).

Male and immature stages

Unknown.

Remarks

This new species resembles *Stigmaeus kermanshahiensis* Khanjani *et al.*, 2012 and *S. caria* Khanjani *et al.*, 2012 in that the eyes and post-ocular bodies are absent, suranal shield divided, one pair of extra, minute and non-setose shields lateral to the intercalary shields, and the palp tarsus bears a bifurcate eupathidium. However, it can be separated from *S. kermanshahiensis* by the following characters: one seta on genu IV (vs two setae in *S. kermanshahiensis*), palptibia with two setae (vs three setae in *S. kermanshahiensis*), and apodemal marking present (absent in *S. kermanshahiensis*). *Stigmaeus bifurcus* sp. nov. can also be distinguished from *S. caria* by the following characters: three setae on genu II (vs two setae in *S. caria)*, palptibia with two setae (vs three setae in *S. caria*), *sce* on minute platelets (on striate integument in *S. caria*), and apodemal marking present (absent in *S. caria*). The new species is also similar to *S. hashtrudiensis* Bagheri & Maleki, 2014; however, it differs from the latter in its apodemal marking and different numbers of setae on genua II–IV (genua 5(+1κ)-3-0-1 in the new species vs 5(+1κ)-4-1-2 in *S. hashtrudiensis*). See Table 1 for a comparitive presentation of characters among different *Stigmaeus* species.

Stigmaeus miandoabiensis Bagheri & Zarei, 2012
Figs 3–5

Material examined

TURKEY: 2 ♀♀, 1 DN from soil and litter under *Pinus sylvestris*, Erzincan, alt. 1210 m, 39º45'00.8" N, 39º29'17.8" E, 23 Oct. 2014; 1 ♀ from soil under *Rosa canina*, Erzincan, 1275 m, 39º39'39.8" N, 39º29'28.5" E, 15 Mar. 2015.

Description

Female (Figs 3, 5) (n=3)

Idiosoma. Oval. Length of body (including gnathosoma): 350 (335–371). Width of body: 120 (114–128).

Gnathosoma (Fig. 5B). Gnathosoma punctate and 68 (67–71) long, chelicerae separate and punctate, 79 (74–82) long. Palp punctate and 73 (69–79) long. Counts of setae and solenidia from palptrochanter to palptarsus: 0, 3, 1, 2 + 1 claw + 1 seta like accessory claw, 4 + 1 solenidion + 1 subterminal seta-like eupathidion + 1 bifurcate eupathidion. Palptibial claw about subequally as long as palptarsus. Palpal

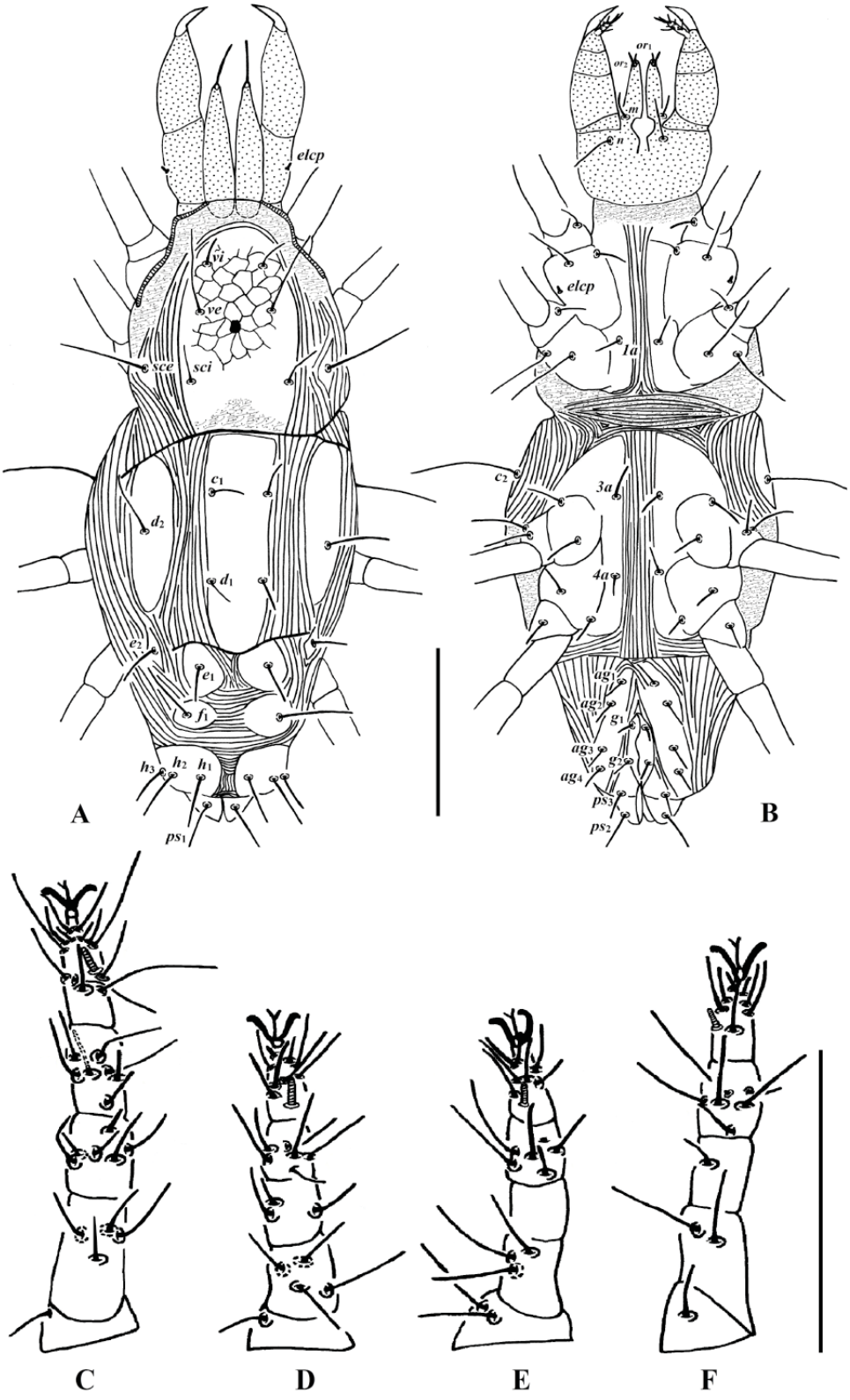

Fig. 3. *Stigmaeus miandoabiensis* Bagheri & Zarei, 2012 (♀). **A**. Dorsum of body. **B**. Venter of body. **C**. Leg I. **D**. Leg II. **E**. Leg III. **F**. Leg IV. Scale bars = 100 μm.

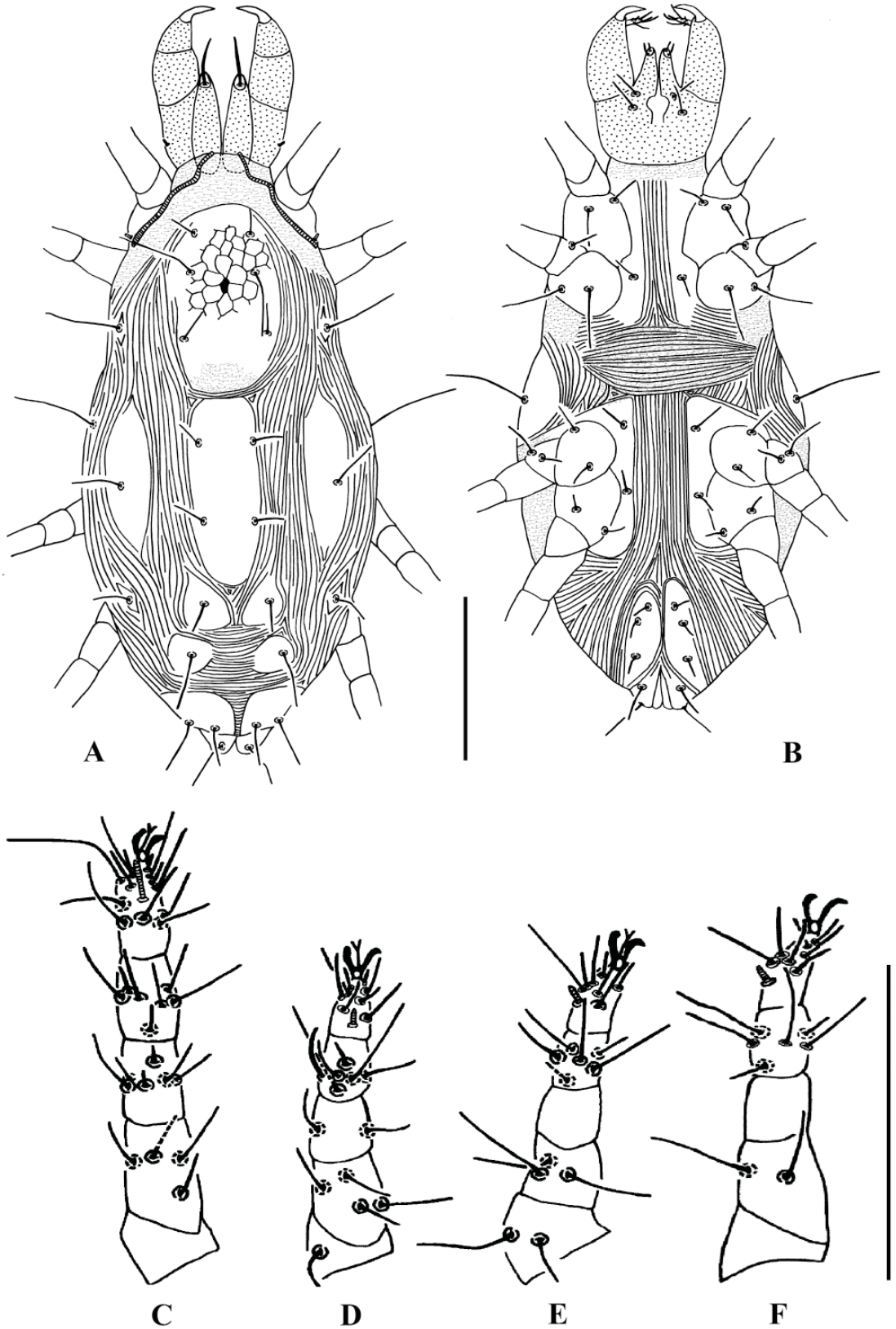

Fig. 4. *Stigmaeus miandoabiensis* Bagheri & Zarei, 2012 (deutonymph). **A**. Dorsum of body. **B**. Venter of body. **C**. Leg I. **D**. Leg II. **E**. Leg III. **F**. Leg IV. Scale bars = 100 μm.

supracoxal setae (*elcp*) pudgy. Subcapitulum with two pairs of adoral setae ($or_{1,2}$) and two pairs of subcapitular setae (*m*, *n*). Dimensions and distance between subcapitular setae: *m* 11 (11–12), *n* 16 (16–17), *m–m* 21 (18–24), *n–n* 23 (23–24), *m–n* 11 (8–12).

Dorsum (Figs 3A, 5A). Integument striate except punctate peritremal region. Propodosomal shield with reticulations, its anterior and posterior margin with tubercles. Propodosomal shield bearing three pairs of setae (*vi*, *ve*, *sci*) and apodemal marking, eyes and post-ocular bodies absent. Setae *sce* on minute platelets. Central shield bearing two pairs of setae (c_1, d_1). Setae d_2 located on marginal shield. Setae e_1 on divided median zonal shields. Setae e_2 located on minute platelets. Setae f_1 on divided intercalary shield. Suranal shield divided and with three pairs of setae ($h_{1–3}$). Setae *vi*, *sci*, c_1, d_1 and e_1 slightly serrated but others smooth (Fig. 5A). Lengths and distances of dorsal idiosomal setae as follows: *vi* 13 (12–16), *ve* 41 (40–41), *sci* 18 (17–20), *sce* 40 (39–40), c_1 15 (14–18), c_2 45 (43–46), d_1 15 (14–16), d_2 25 (18–31), e_1 18 (15–22), e_2 17 (16–17), f_1 31 (28–34), h_1 21 (20–22), h_2 20 (20–21), h_3 15 (15–15), *vi–vi* 25 (24–26), *ve–ve* 33 (32–35), *vi–ve* 22 (20–23), *sci–sci* 45 (44–46), *ve–sci* 34 (32–35), *sce–sce* 86 (82–91), *sci–sce* 23 (20–25), c_1–c_1 28 (27–29), c_2–c_2 115 (107–124), c_1–c_2 49 (48–51), d_2–d_2 90 (82–99), c_1–d_1 40 (39–42), c_1–d_2 38 (34–43), d_1–d_1 26 (24–28), d_2–d_1 36 (32–40), e_2–e_2 76 (70–86), d_2–e_2 54 (52–57), d_1–e_1 43 (40–45), d_1–e_2 42 (40–46), e_1–e_1 31 (29–35), e_2–e_1 24 (22–28), f_1–f_1 44 (41–48), e_1–f_1 24 (24–25), e_2–f_1 37 (34–41), f_1–h_1 32 (28–36), f_1–h_2 28 (26–30), f_1–h_3 27 (27–27), h_1–h_1 21 (20–23), h_2–h_2 46 (44–48), h_3–h_3 55 (53–57), h_1–h_2 14 (13–14), h_2–h_3 7 (6–8).

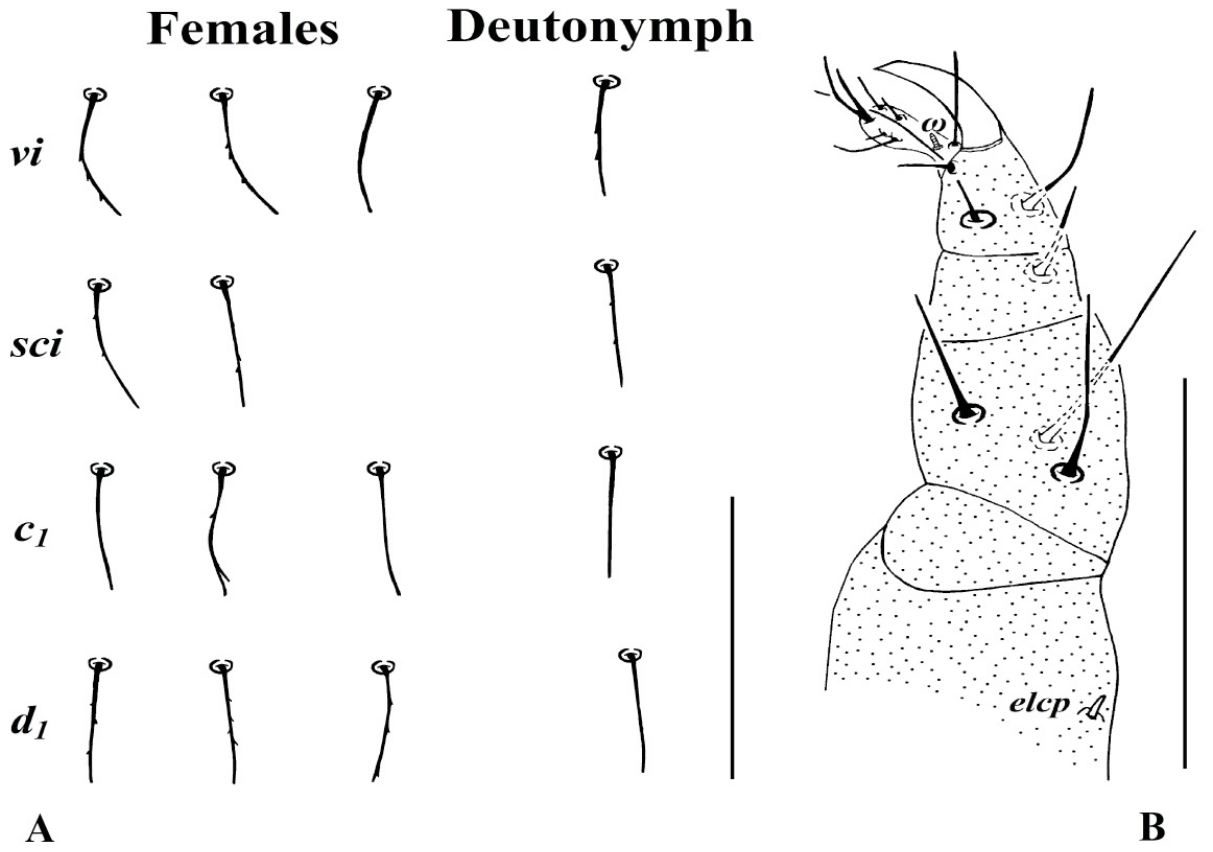

Fig. 5. *Stigmaeus miandoabiensis* Bagheri & Zarei, 2012. **A**. Some dorsal body setae. **B**. Palp (♀). Scale bars = 40 μm.

Venter (Fig. 3B). Almost striate. Back of coxae II and III–IV striate with tubercles. Humeral shields without ornamentation, bearing setae c_2. Coxisternal shields divided, without ornamentation, bearing three pairs of setae (*1a*, *3a*, *4a*). Lengths and distances of these setae: *1a* 12 (11–13), *3a* 12 (11–13), *4a* 11 (10–13), *1a–1a* 19 (17–20), *3a–3a* 23 (18–26), *4a–4a* 21 (18–23). Genital and anal shields contiguous, two pairs of genital ($g_{1,2}$) and three pairs of pseudanal setae ($ps_{1–3}$), ps_3 shorter than other pseudanal setae. Four pairs of aggenital setae ($ag_{1–4}$) on long and divided aggenital shields. Lengths of these setae as follows: ag_1 9 (8–9), ag_2 9 (8–9), ag_3 9 (8–9), ag_4 10 (9–10), g_1 8 (7–9), g_2 9 (7–10), ps_1 24 (23–25), ps_2 21 (19–23), ps_3 11 (11–11).

Legs (Figs 3C–F). Lengths: leg I 136 (133–142), leg II 100 (97–105), leg III 103 (102–106), leg IV 125 (118–132). Counts of setae on legs I–IV: coxae 2-2-2-2, trochanters 1-1-2-1, femora 4-4-3-2, genua 5(+1κ)-3-0-1, tibiae 5(+1φ+1φρ)-5(+1φρ)-5(+1φρ)-5(+1φρ), tarsi 13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω). Lengths of solenidia: Iω 10 (10–10), IIω 8 (8–8), IIIω 4 (4–5), IVω 5 (4–6).

Deutonymph (DN) (Figs 4–5) (n = 1)

Idiosoma. Length of body (including gnathosoma): 334. Width of body: 136.

Gnathosoma. Lengths: gnathosoma 60, chelicerae 69, palp 68. Number of setae on palp segments as in female. Dimensions and distance between subcapitular setae: *m* 12, *n* 15, *m–m* 18, *n–n* 23, *m–n* 10.

Dorsum (Fig. 4A). As in female except suranal shields with two pairs of setae. Lengths and distances of dorsal idiosomal setae as follows: *vi* 13, *ve* 36, *sci* 16, *sce* 33, c_1 13, c_2 41, d_1 13, d_2 21, e_1 14, e_2 14, f_1 26, h_1 7, h_2 20, *vi–vi* 26, *ve–ve* 29, *vi–ve* 17, *sci–sci* 39, *ve–sci* 31, *sce–sce* 96, *sci–sce* 29, $c_1–c_1$ 27, $c_2–c_2$ 130, $c_1–c_2$ 52, $d_2–d_2$ 99, $c_1–d_1$ 37, $c_1–d_2$ 41, $d_1–d_1$ 23, $d_2–d_1$ 42, $e_2–e_2$ 94, $d_2–e_2$ 55, $d_1–e_1$ 41, $d_1–e_2$ 52, $e_1–e_1$ 30, $e_2–e_1$ 30, $f_1–f_1$ 40, $e_1–f_1$ 23, $e_2–f_1$ 37, $f_1–h_1$ 34, $f_1–h_2$ 29, $h_1–h_1$ 19, $h_2–h_2$ 41, $h_1–h_2$ 11.

Venter (Fig. 4B). Ventral view similar to that of female but genital shield and its setae absent, aggenital shields bearing three pairs of aggenital setae ($ag_{1–3}$). Lengths of ventral setae as follows: *1a* 10, *3a* 14, *4a* 10, *1a–1a* 20, *3a–3a* 33, *4a–4a* 33. ag_1 7, ag_2 7, ag_3 7, ps_1 18, ps_2 16, ps_3 12.

Legs (Figs 4C–F). Lengths: leg I 122, leg II 94, leg III 105, leg IV 115. Counts of setae on legs I–IV: coxae 2-2-2-2, trochanters 0-1-2-0, femora 4-4-3-2, genua 5(+1κ)-2-0-0, tibiae 5(+1φ+1φρ)-5(+1φρ)-5(+1φρ)-5(+1φρ), tarsi 13(+1ω)-8(+1ω)-7(+1ω)-7(+1ω). Lengths of solenidia: Iω 12, IIω 7, IIIω 4, IVω 3.

Male and immature stages

Unknown.

Distribution

Iran (Bagheri & Zarei 2012; Hajizadeh *et al.* 2013; Beyzavi *et al.* 2013; Navaei-Bonab *et al.* 2015; Rahmati *et al.* 2015).

Remarks

Stigmaeus miandoabiensis was described from Iran by Bagheri & Zarei (2012). Hajizadeh *et al.* (2013) and Beyzavi *et al.* (2013) compiled checklists of Iranian prostigmatic mites, which equally included *S. miandoabiensis*. Later, Navaei-Bonab *et al.* (2015) and Rahmati *et al.* (2015) also mentioned this species briefly.

Stigmaeus miandoabiensis is very close to *S. planus* Kuznetzov, 1978, but it can be distinguished from the latter by e_2 situated on minute platelets (on striate integument in *S. planus*), $ag_1–ag_4$ on the same shield ($ag_{1,2}$ on one shield and $ag_{3,4}$ on another shield in *S. planus*), and longer *ve*.

Table 2. The number of raphignathoid mite species known from Turkey.

Superfamily Raphignathoidea (8 families, 25 genera, 192 species)
- Family Barbutiidae (1 genus, 2 species)
  - Genus *Barbutia* (2 species)
- Family Caligonellidae (3 genera, 10 species)
  - Genus *Caligonella* (1 species)
  - Genus *Molothrognathus* (5 species)
  - Genus *Neognathus* (4 species)
- Family Camerobiidae (3 genera, 30 species)
  - Genus *Camerobia* (1 species)
  - Genus *Neophyllobius* (18 species)
  - Genus *Tycherobius* (11 species)
- Family Cryptognathidae (3 genera, 18 species)
  - Genus *Cryptognathus* (5 species)
  - Genus *Cryptofavognathus* (2 species)
  - Genus *Favognathus* (11 species)
- Family Eupalopsellidae (2 genera, 5 species)
  - Genus *Eupalopsellus* (4 species)
  - Genus *Eupalopsis* (1 species)
- Family Homocaligidae (1 genus, 1 species)
  - Genus *Homocaligus* (1 species)
- Family Raphignathidae (1 genus, 23 species)
  - Genus *Raphignathus* (23 species)
- Family Stigmaeidae (11 genera, 103 species)
  - Genus *Agistemus* (3 species)
  - Genus *Cheylostigmaeus* (5 species)
  - Genus *Eryngiopus* (4 species)
  - Genus *Eustigmaeus* (25 species)
  - Genus *Ledermuelleriopsis* (11 species)
  - Genus *Mediolata* (8 species)
  - Genus *Prostigmaeus* (1 species)
  - Genus *Stigmaeus* (38 species)
  - Genus *Storchia* (4 species)
  - Genus *Villersia* (1 species)
  - Genus *Zetzellia* (3 species)

This species is a new record for Turkish fauna, and its deutonymph was identified for the first time in this study. Generally, the Turkish specimens are similar to the type specimens except for the fact that the anterior and posterior regions of the propodosomal shield are covered with tubercles.

Discussion

The superfamily Raphignathoidea belongs to the suborder Prostigmata. They are worldwide in distribution, abundant in most geographical regions, and are even found in the Antarctic region (Fan & Zhang 2005). Most raphignathoid mites are known from the drier edaphic microhabitats such as litter, soil, bark and moss (Doğan *et al.* 2014). Raphignathoidea comprises 11 families, eight of which have been recorded from Turkey: Barbutiidae, Caligonellidae, Camerobiidae, Cryptognathidae, Eupalopsellidae, Homocaligidae, Raphignathidae and Stigmaeidae (Doğan 2007; Erman *et al.* 2007; Doğan *et al.* 2014). Until now, 192 raphignathoid mite species (including the two species in this paper) in 25 genera have been found in Turkey (Table 2).

Stigmaeidae, a family within the superfamily Raphignathoidea, is a large cosmopolitan group of genera distinguished by the position of the dorsal shields, number of subcapitular setae, size of the palptibial claw, shape of the terminal eupathidia on the palptarsus, cheliceral base fused or free, and presence of coxisternal shields (Dönel & Doğan 2011). Currently, it consists of 33 genera (excluding *Erynglpusopsis* Tseng, 1982 accepted as synonym of *Eryngiopus* Summers, 1964 by Doğan *et al.* [2015b]) and more than 575 species (Fan 2005; Dönel & Doğan 2011; Zhang *et al.* 2011; Fan & Flechtmann 2015; Doğan *et al.* 2015a, 2015c; Fan & Ueckermann 2016; Fan *et al.* 2016). The genus *Stigmaeus* is one of the oldest and most diverse genera in the Stigmaeidae (Fan & Zhang 2005) with 133 valid species (Fan & Zhang 2005; Doğan *et al.* 2015a, 2016; Dilkaraoğlu *et al.* 2016a, 2016b, Fan *et al.* 2016). To date, 36 species of the genus *Stigmaeus* have been reported from Turkey (Özkan *et al.* 1988, 1994; Erman *et al.* 2007; Doğan 2007; Doğan *et al.* 2015a, 2016; Dilkaraoğlu *et al.* 2016a, 2016b). In this paper, we described one new species and reported a new record of *Stigmaeus* from Turkey. This raises the total number of *Stigmaeus* species for Turkey to 38.

Some variations and asymmetric morphological abnormalities in the species are noted. In both *Stigmaeus* species, the shape of some dorsal body setae vary. Some setae are slightly serrated, whereas others are smooth (Figs 2A, 5A). Among the paratypes of *Stigmaeus bifurcus* sp. nov., in one specimen the left seta c_1 is about two times as long as the right (Fig. 1C). Seta h_3 is absent on right suranal shield in another paratype of the new species (Fig. 1D).

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