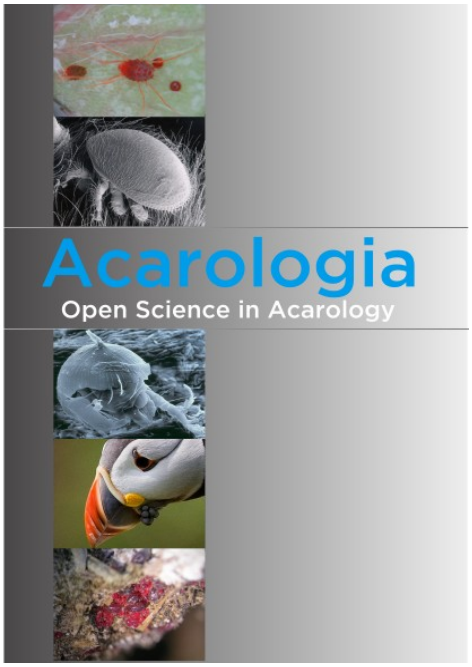

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A new record and descriptions of males of two *Stigmaeus* species from Turkey (Acari: Stigmaeidae)

İsmail ULUÇAY

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Hakkari University Colemerik Vocational School 30000, Hakkari, Turkey. iulucay@gmail.com

ABSTRACT — *Stigmaeus pulchellus* Kuznetzov, 1978, reported for the first time from Turkey, is described and illustrated based on females. In addition to the male and nymphal stages of this species, the male of *Stigmaeus kumalariensis* Akyol and Koç, 2007 is also described and illustrated in this article for the first time. The males and females presented differences in chaetotaxy, notably the absence of seta h_3 in the male of *S. pulchellus*.

KEYWORDS — Prostigmata; Raphignathoidea; *Stigmaeus pulchellus*; *Stigmaeus kumalariensis*; Turkey

INTRODUCTION

Stigmaeidae is a family within the superfamily Raphignathoidea. These mites live in or on soil, grass, leaf, mulch, lichen, bark, beetle frass, crevices in rock and leaf cavities, and a few of them are parasitic on phlebotomine flies (Meyer 1969; Ueckermann and Meyer 1987; Doğan and Ayyıldız 2003a, b; Akyol and Koç 2007, 2010; Noei *et al.* 2007; Dönel and Doğan 2011; Uluçay and Koç 2014). Currently this family consists of more than 500 species in 32 valid genera (Doğan *et al.* 2011; Bagheri *et al.* 2012; Nazari *et al.* 2012). Up to now *Agistemus* Summers, *Cheylostigmaeus* Willmann, *Eustigmaeus* Berlese, *Ledermuelleriopsis* Willmann, *Mediolata* Canestrini, *Stigmaeus* Koch, *Prostigmaeus* Kuznetsov, *Storchia* Oudemans, *Villersia* Oudemans, *Zetzellia* Oudemans and *Eryngiopus* Summers have been reported from Turkey (Doğan 2007; Dönel and Doğan 2011; Yeşilayer and Çobanoğlu 2013). The genus *Stigmaeus* has a worldwide distribution with more than 100 described species and so far 27 species have been reported from Turkey (Doğan 2007; Akyol and Koç 2007; Dönel and Doğan 2011; Özçelik and Doğan 2011; Doğan *et al*. 2015; Uluçay 2015). In this article, the male, deutonymph and protonymph of *Stigmaeus pulchellus* Kuznetzov, 1978 and the male of *S. kumalariensis* are described and illustrated for the first time. *Stigmaeus pulchellus* Kuznetzov, 1978 reported for the first time from Turkey.

MATERIALS AND METHODS

The soil and litter samples taken from various habitats in Hakkari Province in 2014 and Hatay Province in 2014 were brought to the laboratory in nylon bags, and extracted by Berlese funnels for five to seven days. Mites were collected in 70% ethanol. Stigmaeid mites were picked from the samples under a stereomicroscope and mounted on slides in Hoyer's medium. The mite figures were drawn and measured by means of a Leica DM 4000 B re-

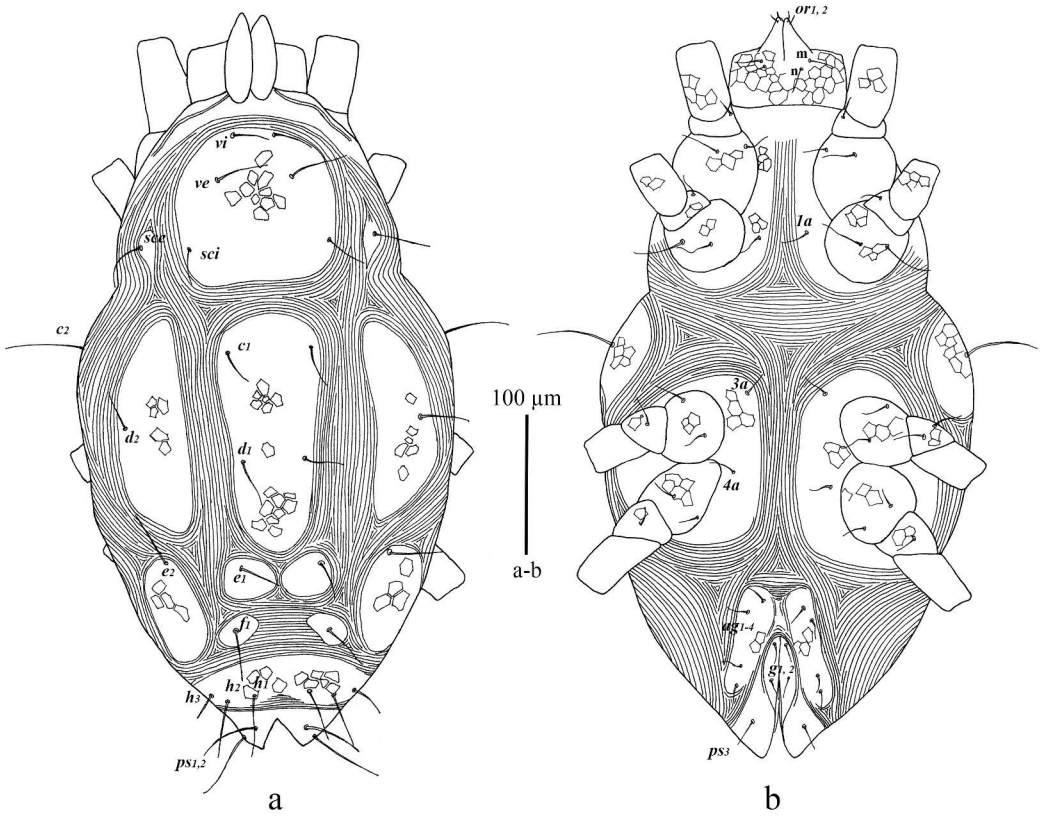

FIGURE 1: *Stigmaeus pulchellus* Kuznetzov, 1978 (female): a – dorsal view, b – ventral view.

search microscope with special software (Leica Application Suite Version 3.6.0 - Build:488) for measurements. The setal nomenclature follows that of Kethley (1990). The specimens are slide mounted and deposited in the Acari Collection of Hakkari University, Hakkari, Turkey. All measurements are given in micrometers (µm). Measurements of legs have been taken from base of femur to tip of tarsal claw.

RESULTS

Family: Stigmaeidae Oudemans, 1931
Type genus: *Stigmaeus* Koch, 1836
Type species: *Stigmaeus cruentus* Koch, 1836.

***Stigmaeus pulchellus* Kuznetzov, 1978**

Female (n = 13) (Figures 1-2): Idiosoma oval, length of body (including gnathosoma) 505 – 552; width of body 269 – 311. Gnathosoma (Figure 2e). Length of gnathosoma 60 – 67; subcapitulum with two pairs of subcapitular setae (*m* and *n*), *m* 23 – 30, *n* 21 – 29 and two pairs of adoral setae, or_1 and or_2; distances *m-m* 29 – 38, *n-n* 23 – 26; palpi five segmented, palp tarsus with five simple setae + one tridentale eupathidium + one solenidion; palp tibia with two setae + one seta-like accessory claw + one well-developed claw; palp genu with one seta; palp femora with three setae; palp trochanter without seta.

Dorsum (Figure 1a) — Body elongated. Dorsum with 14 pairs of setae (setae h_3 present); all dorsal shields reticulated; propodosomal shield with tree pairs of setae (*vi*, *ve* and *sci*); setae *sce* located on small auxiliary shields; eyes and postocular bodies absent; central shield elongate and with 2 pairs of setae (c_1 and d_1); humeral shields with seta c_2; marginal shields elongate and with setae d_2; median zonal shield divided and with seta e_1; lateral zonal

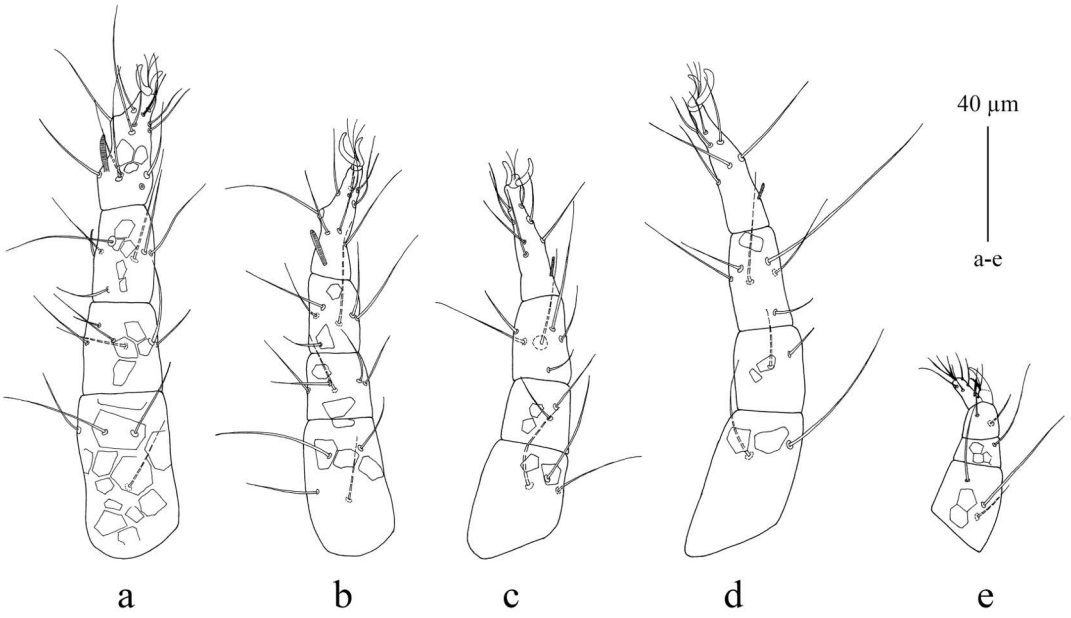

FIGURE 2: *Stigmaeus pulchellus* Kuznetzov, 1978 (female): a – leg I, b – leg II, c – leg III, d – leg IV, e – palp.

shields wide and with setae e_2; intercalary shields with f_1; suranal shield entire, recessed posteriorly and with 3 pairs of setae (h_1, h_2 and h_3); dorsal body setae faintly spinulate; c_2 is the longest dorsal seta. Length of setae as follows: *vi* 26 – 29, *ve* 37 – 48, *sci* 29 – 33, *sce* 36 – 44, c_1 29 – 34, c_2 42 – 57, d_1 26 – 35, d_2 29 – 35, e_1 29 – 36, e_2 26 – 37, f_1 32 – 38, h_1 36 – 44, h_2 35 – 45, h_3 24 – 26; distances between dorsal setae: *vi-vi* 28 – 36, *ve-ve* 45 – 60, *vi-ve* 29 – 34; *ve-sci* 49 – 53, *sci-sce* 29 – 36, c_1-c_1 51 – 66, c_1-d_1 61 – 76, d_1-d_1 40 – 46, d_1-d_2 68 – 87, d_1-e_1 73 – 80, e_1-e_1 49 – 62, e_1-e_2 50 – 61, e_1-f_1 38 – 47, f_1-f_1 52 – 76, h_1-h_1 31 – 40, h_1-h_2 15 – 17, h_2-h_3 10 – 13, h_2-h_2 68 – 94, h_3-h_3 93 – 101; ratios *vi*/*vi*-*vi* 0.8 – 1, c_1/c_1-c_1 0.5 – 0.6, d_1/d_1-d_1 0.6 – 0.8, e_1/e_1-e_1 0.5 – 0.7, f_1/f_1-f_1 0.5 – 0.6.

Venter (Figure 1b) — Endopodal shields separated, with subcutaneous reticulation and with ventral setae *1a* 20 – 23, *3a* 20 – 24, *4a* 21 – 25; aggenital shields with subcutaneous reticulation and bearing four pairs of aggenital setae (ag_1-ag_4), length of ag_1 17 – 20, ag_2 18 – 20, ag_3 19 – 21, ag_4 21 – 29; anogenital area with two pairs of genital setae and three pairs of pseudanal setae (ps_1-ps_3); length of anogenital setae; g_1 18 – 22, g_2 25 – 31, ps_1 40 – 53, ps_2 50 – 54, ps_3 21 – 25.

Legs (Figures 2a-d) — Length of legs I-IV : Leg I 157 – 186; leg II 125 – 151; leg III 129 – 151; leg IV 149 – 173; counts of setae (solenidia and setae κ included) of legs I - IV: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 1; femora 4, 4, 3, 2; genua 6(κ), 5, 2, 2; tibiae 7(φ,φp), 6(φp), 6(φp), 6(φp); tarsi 14(ω), 10(ω), 8(ω), 8(ω).

Male (n = 9) (Figure 3): Length of body (including gnathosoma) 343 – 391; width of body 159 – 192. Gnathosoma (Figure 3g). Length of gnathosoma 52 – 57; subcapitulum with two pairs of subcapitular setae (*m* and *n*), *m* 19 – 24, *n* 17 – 22 and two pairs of adoral setae, or_1 and or_2; distances *m*-*m* 25 – 31, *n*-*n* 17 – 20; *n*:*m* 0.9 – 1; palpal chaetotaxy as in female.

Dorsum (Figure 3a) — All dorsal shields reticulated; propodosomal shield with tree pairs of setae (*vi*, *ve* and *sci*); setae *sce* located on small auxil-

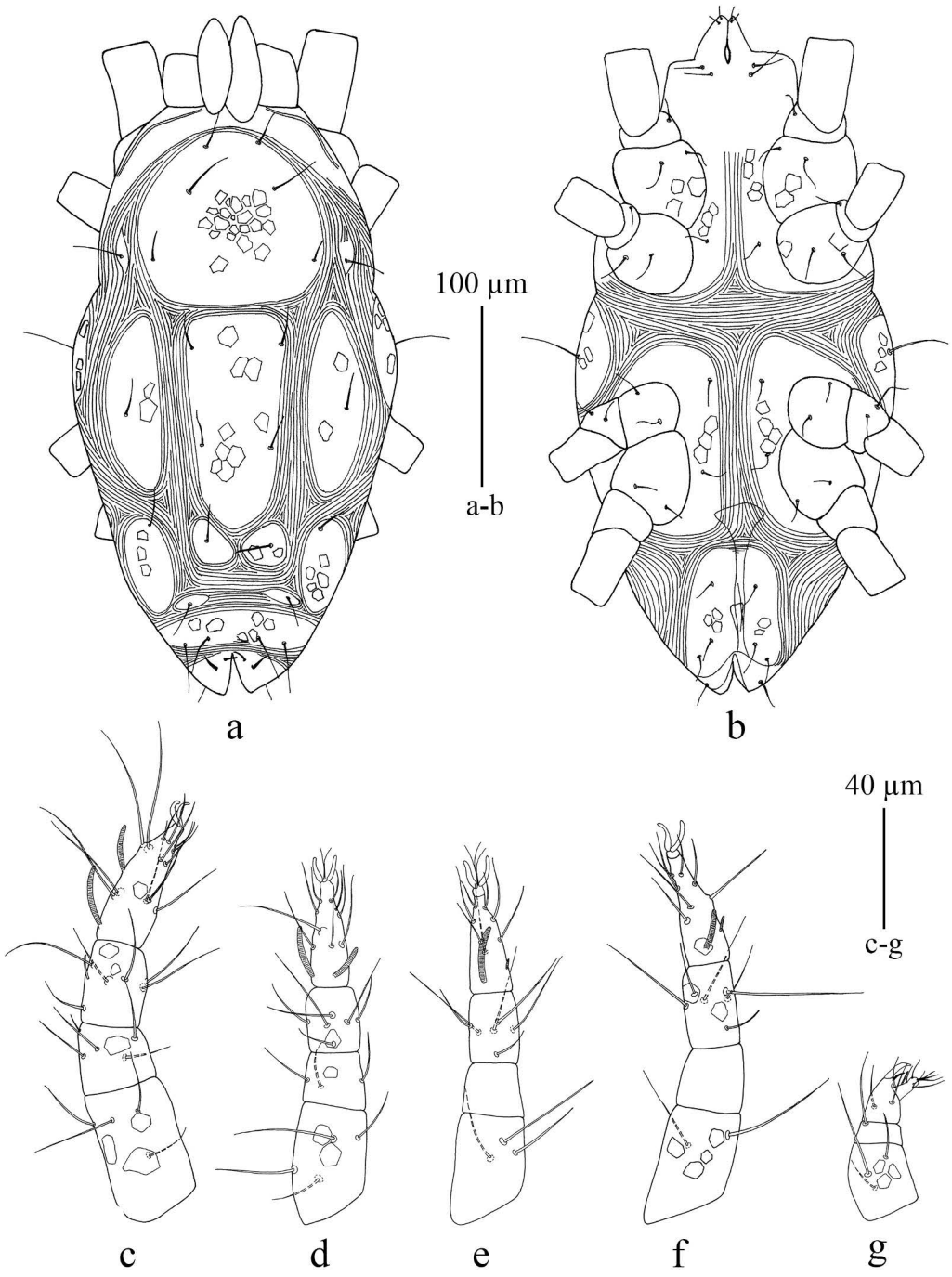

FIGURE 3: *Stigmaeus pulchellus* Kuznetzov, 1978 (male): a – dorsal view, b – ventral view, c – leg I, d – leg II, e – leg III, f – leg IV, g – palp.

iary shields; eyes and postocular bodies absent; central shield elongate and with 2 pairs of setae (c_1 and d_1); humeral shields with setae c_2; marginal shields elongate and with setae d_2; median zonal shield divided and with setae e_1; lateral zonal shields wide and with setae e_2; intercalary shields with f_1; suranal shield entire and with two pairs of setae (h_1, and h_2); dorsal body setae faintly spinulate; c_2 is the longest dorsal setae. Dimensions of setae as follows: *vi* 20 – 22, *ve* 29 – 32, *sci* 21 – 23, *sce* 26 – 29, c_1 20 – 24, c_2 36 – 42, d_1 20 – 24, d_2 21 – 27, e_1 21 – 23, e_2 21 – 24, f_1 22 – 26, h_1 23 – 28, h_2 30 – 32; distances between dorsal setae: *vi-vi* 20 – 26, *ve-ve* 41 – 48, *vi-ve* 23 – 26, *ve-sci* 39 – 43, *sci-sce* 18 – 22, c_1-c_1 40 – 49, c_1-d_1 52 – 58, d_1-d_1 32 – 37, d_1-d_2 40 – 47, d_1-e_1 49 – 52, e_1-e_1 27 – 39, e_1-e_2 22 – 30, e_1-f_1 26-31, f_1-f_1 46 – 59, h_1-h_1 24 – 29, h_1-h_2 10 – 13, h_2-h_2 50 – 54; ratios vi/vi-vi 0.8 – 1.0, c_1/c_1-c_1 0.5, d_1/d_1-d_1 0.6 – 0.7, e_1/e_1-e_1 0.6 – 0.8, f_1/f_1-f_1 0.4 – 0.5.

Venter (Figure 3b) — Ventral view similar to that of the female. Lengths of setae: *1a* 18 – 20, *3a* 16 – 19, and *4a* 16 – 18 and ratio *1a*:*3a*:*4a* 1-1.2:1-1.2:1. Aggenital area with three pairs of setae, ag_1 16 – 19, ag_2 19 – 21 and ag_3 18 – 22; anogenital area with three pairs of pseudanal setae ps_1 6, ps_2 9 – 10 and ps_3 17 – 19.

Legs (Figures 3c-f) — Length of legs: leg I 135 – 150, leg II 110 – 120, leg III 106 – 120, leg IV 125 – 139. Setal formulae of leg segments as follows: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 0; femora 4, 4, 3, 2; genua 5(κ), 3, 0, 0; tibiae 7(φ,φp), 6(φp), 6(φp), 6(φp); tarsi 15(2ω), 11(2ω), 9(2ω), 9(2ω).

Deutonymph (n = 6) (Figure 4): Length of body (including gnathosoma) 396 – 469, width 189 – 278. Gnathosoma (Figure 4g). Length of gnathosoma 55 – 59; subcapitulum with two pairs of subcapitular setae (*m* and *n*), *m* 18 – 23, n 16 – 20 and two pairs of adoral setae, or_1 and or_2; distances *m*-*m* 26 – 34, *n*-*n* 19 – 22; palpal chaetotaxy as in female.

Dorsum (Figure 4a) — Dorsal view similar to that of the female except suranal shield without setae h_3; length of dorsal setae: *vi* 21 – 24, *ve* 34 – 39, *sci* 26 – 27, *sce* 32 – 35, c_1 25 – 28, c_2 42 – 44, d_1 22 – 29, d_2 27 – 30, e_1 27 – 30, e_2 29 – 33, f_1 32, h_1 34 – 39, h_2 32 – 36, h_3 24 – 26; distances between dorsal setae: *vi-vi* 26 – 33, *ve-ve* 47 – 57, *vi-ve* 23 – 30, *ve-sci* 41 – 49, *sci-sce* 23 – 36, c_1-c_1 51 – 60, c_1-d_1 62 – 66, d_1-d_1 33 – 38, d_1-d_2 53 – 78, d_1-e_1 50 – 67, e_1-e_1 40 – 46, e_1-e_2 45 – 54, e_1-f_1 34 – 39, f_1-f_1 52 – 57, h_1-h_1 26 – 30, h_1-h_2 12 – 16, h_2-h_2 55 – 65; ratios vi/vi-vi 0.6 – 0.8, c_1/c_1-c_1 0.5, d_1/d_1-d_1 0.6 – 0.8, e_1/e_1-e_1 0.6 – 0.7, f_1/f_1-f_1 0.6.

Venter (Figure 4b) — Ventral view similar to that of the female. Lengths of setae: *1a* 17 – 20, *3a* 17 – 18, *4a* 15 – 18; aggenital shields with subcutaneous reticulation and bearing three pairs of aggenital setae (ag_1-ag_3), length of ag_1 13 – 15, ag_2 15 – 16 and ag_3 12 – 17; anogenital area with three pairs of pseudanal setae (ps_1-ps_3); length of anogenital setae; ps_1 32 – 34, ps_2 31 – 42, ps_3 18 – 22.

Legs (Figures 4c-f) — Length of legs I-IV : Leg I 145 – 155; leg II 114 – 124; leg III 114 – 127; leg IV 123 – 137; counts of setae (solenidia and setae κ included) of legs I - IV: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 0; femora 4, 4, 3, 2; genua 5(φ), 3, 0, 0; tibiae 7(φ,φp), 6(φp), 6(φp), 6(φp); tarsi 14(ω), 10(ω), 8(ω), 8(ω).

Protonymph (n = 7) (Figure 5): Length of body (including gnathosoma) 311 – 399, width 161 – 238. Gnathosoma (Figure 5g). Length of gnathosoma 50 – 53; subcapitulum with one pair of subcapitular setae *n* 16 – 17 and two pairs of adoral setae, or_1 and or_2; distances *n*-*n* 20 – 25; palpal chaetotaxy as in female.

Dorsum (Figure 5a) — Dorsal view similar to that of the female except suranal shield without setae h_3; length of dorsal setae: *vi* 17 – 19, *ve* 31 – 35, *sci* 20 – 23, *sce* 28 – 31, c_1 22 – 25, c_2 39 – 45, d_1 23 – 25, d_2 23 – 26, e_1 24 – 27, e_2 26 – 29, f_1 28 – 32, h_1 24 – 32, h_2 25 – 34; distances between dorsal setae: *vi-vi* 25 – 31, *ve-ve* 44 – 54, *vi-ve* 22 – 24, *ve-sci* 34 – 45, *sci-sci* 74 – 85, *sci-sce* 17 – 26, c_1-c_1 44 – 48, c_1-d_1 48 – 54, d_1-d_1 25 – 32, d_1-d_2 41 – 64, d_1-e_1 41 – 51, e_1-e_1 28 – 40, e_1-e_2 23 – 36, e_1-f_1 24 – 35, f_1-f_1 42 – 51, h_1-h_1 21 – 29, h_1-h_2 9 – 15, h_2-h_2 40 – 52; ratios vi/vi-vi 0.6 – 0.7, c_1/c_1-c_1 0.5 – 0.6, d_1/d_1-d_1 0.7 – 1.0, e_1/e_1-e_1 0.7 – 1.0, f_1/f_1-f_1 0.6 – 0.7.

Venter (Figure 5b) — Ventral view similar to that of the female. Lengths of setae: *1a* 15 – 17, *3a* 15 – 16; without setae *4a*; aggenital shields with subcutaneous reticulation and bearing one pair of aggenital setae ag_1 11 – 14; anogenital area with three pairs of

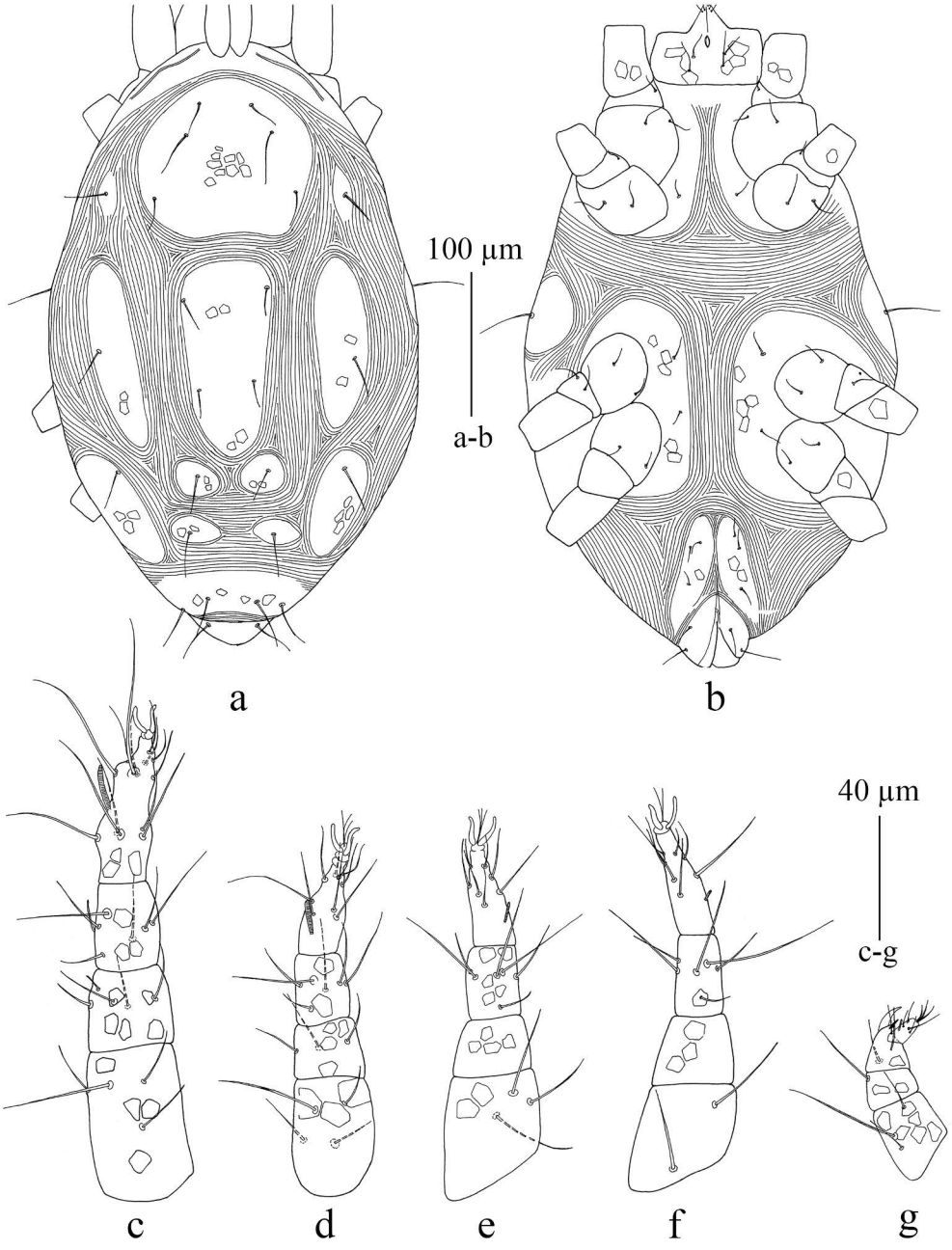

FIGURE 4: *Stigmaeus pulchellus* Kuznetzov, 1978 (deutonymph): a – dorsal view, b – ventral view, c – leg I, d – leg II, e – leg III, f – leg IV, g – palp.

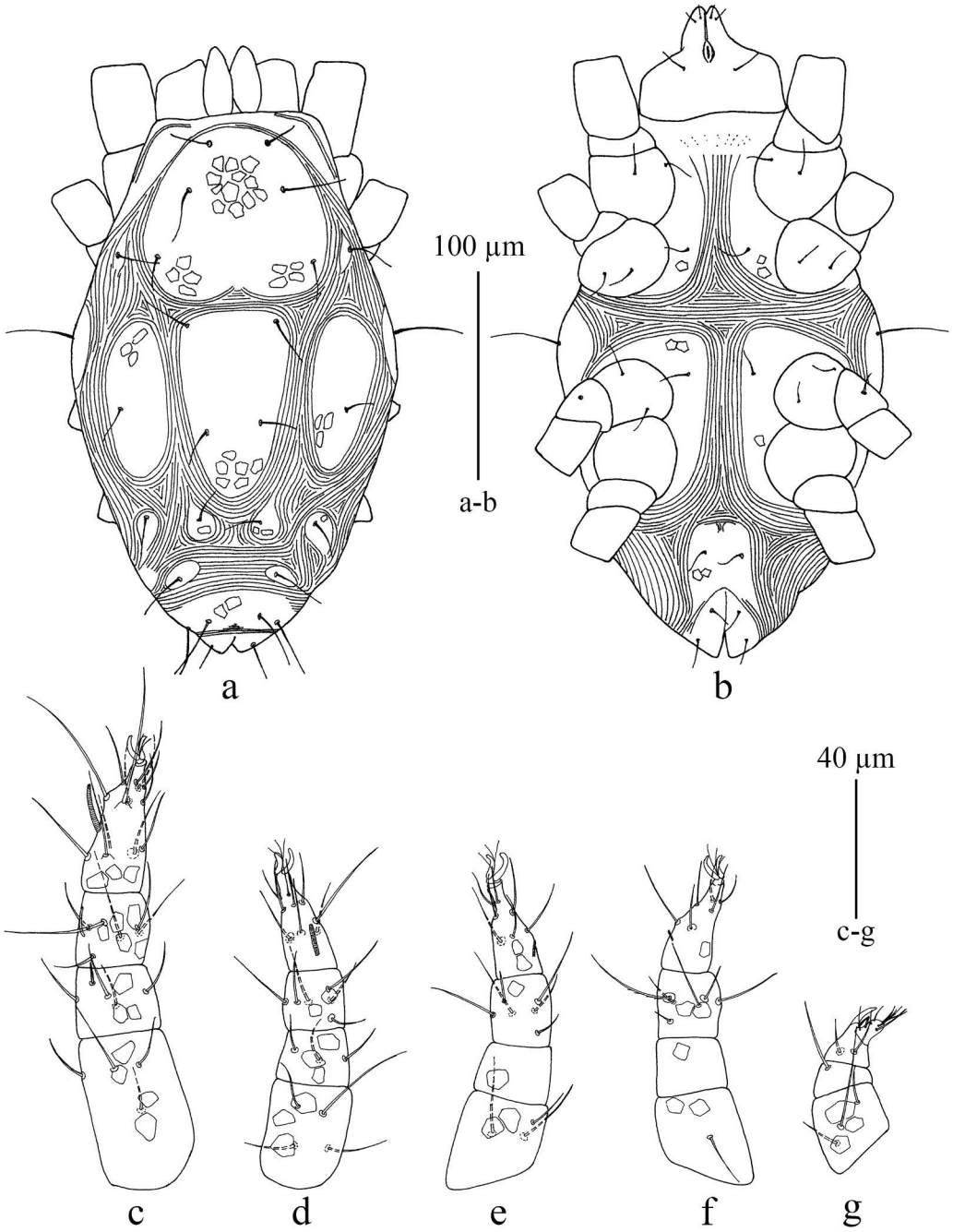

FIGURE 5: *Stigmaeus pulchellus* Kuznetzov, 1978 (protonymph): a – dorsal view, b – ventral view, c – leg I, d – leg II, e – leg III, f – leg IV, g – palp.

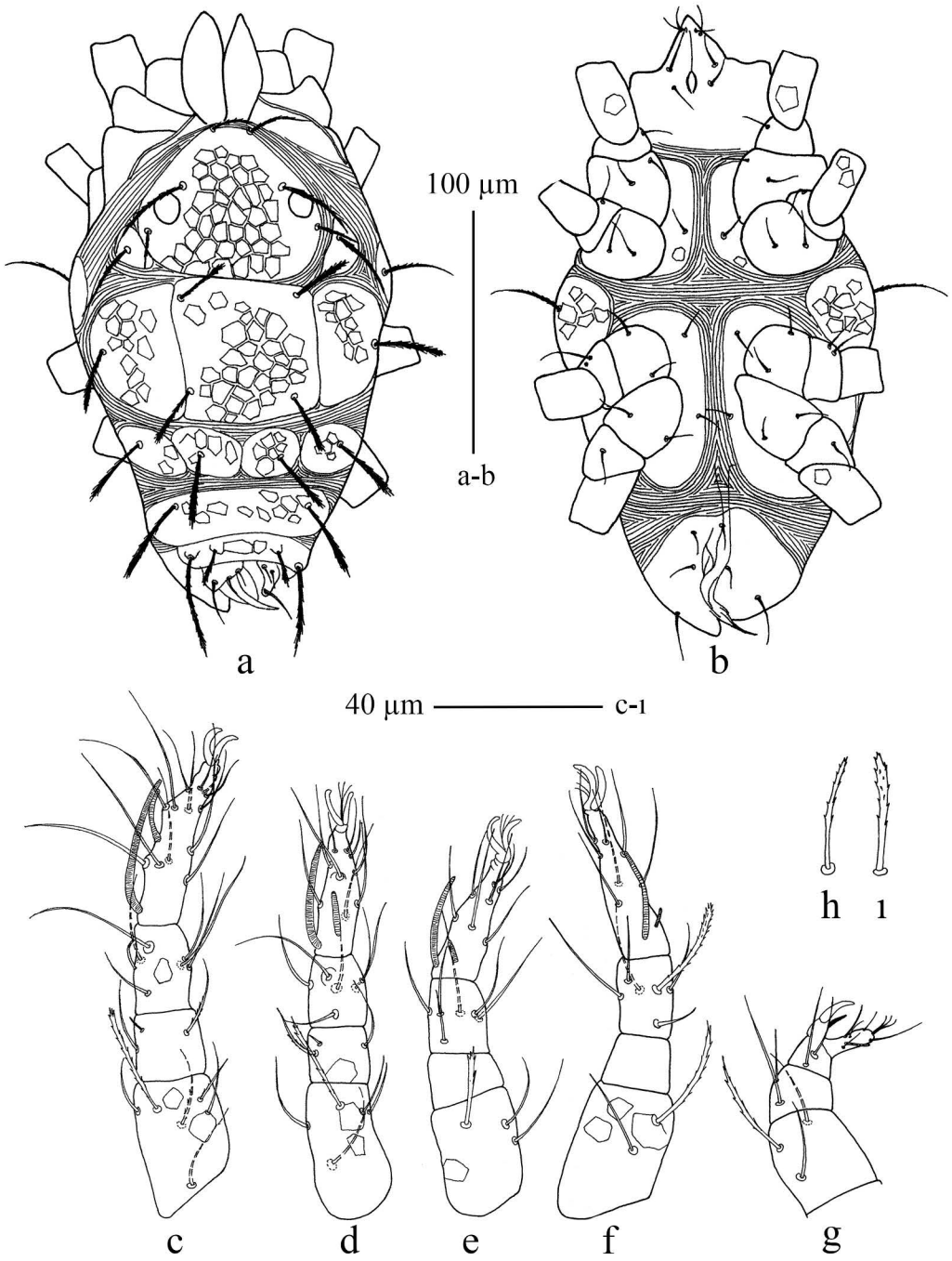

FIGURE 6: *Stigmaeus kumalariensis* Akyol & Koç 2007 (male): a – dorsal view, b – ventral view, c – leg I, d – leg II, e – leg III, f – leg IV, g – palp, h – setae c_1, i – setae d_1.

pseudanal setae (ps_1-ps_3); length of anogenital setae; ps_1 17 – 22, ps_2 13 – 19, ps_3 14 – 17.

Legs (Figures 5c-f) — Length of legs I-IV : Leg I 121 – 130; leg II 97 – 104; leg III 95 – 101; leg IV 98 – 105; counts of setae (solenidia and setae κ included) of legs I-IV: coxae 2, 2, 2, 0; trochanters 0, 0, 1, 0; femora 4, 4, 3, 1; genua 5(κ), 3, 0, 0; tibiae 7(φ,φp), 6(φp), 6(φp), 6(φp); tarsi 14(ω), 10(ω), 8(ω), 7(ω).

Material examined: 13 females, 9 males, 6 deutonymph and 7 protonymph from litter and soil under *Astragalus* sp., Turkey, Hakkari, Berçelan Mountain (37°43′075"N, 43°44′264"E, 3075 m), 25 June 2014.

The Turkish specimens resembles the type specimens and Iran specimens in most respects but differ in the length of body (including gnathosoma) 505 – 552. It is seen that the Turkish specimens are bigger: the length of body is 350 – 388 in the type specimen. The length of dorsal setae is similar to that of type specimen and longer than those of Iranian specimen. Apart from these, the other measurements and the features of our specimens resemble those of the type specimen in all respects (Kuznetsov 1978; Zarei and Bagheri 2012). Males of this species exhibit the same features of the female descriptions, except that the male tarsi I-IV are with two solenidia instead of one solenidion in female; the length of body and dorsal setae are shorter than those of the female; no setae h_3 on the suranal shield; trochanteral chaetotaxy of the male 1, 1, 2, 0 and that of the female 1, 1, 2, 1; genual chaetotaxy of the male 5(κ), 3, 0, 0 and that of the female 6(κ), 5, 2, 2; the female bears 4 aggenial setae and the male bears 3 aggenital setae.

Stigmaeus kumalariensis Akyol & Koç 2007

Male (n = 5) (Figure 6): Length of body (including gnathosoma) 246 – 279; width of body 117 – 163. Gnathosoma (Figure 6g). Length of gnathosoma 46 – 48; subcapitulum with two pairs of subcapitular setae (*m* and *n*), *m* 15 – 16, *n* 9 – 11 and two pairs of adoral setae, or_1 and or_2; palpi five segmented, palp tarsus with five simple setae + one tridentale eupathidium + one solenidion; palp tibia with two setae + one accessory claw + one well-developed claw; palp genu with two setae; palp femora with three setae; palp trochanter without setae.

Dorsum (Figure 6a) — Dorsal shields 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 humeral shield ventrolaterally; marginal shield with setae d_2; median zonal shield divided and with setae e_1; lateral zonal shields with setae e_2; intercalary shield entire, with setae f_1; suranal shield entire, with two pairs of setae, h_1 and h_2. Dorsal body setae sword shaped with a few faint serrations and all hysterosomal setae terminally expanded and serrated (Figures 6h-i). Dimensions of setae as follows: *vi* 26 – 32, *ve* 36 – 47, *sci* 16 – 19, *sce* 32 – 36, c_1 29 – 33, c_2 30 – 36, d_1 28 – 34, d_2 31 – 35, e_1 31 – 34, e_2 33 – 38, f_1 37 – 44, h_1 17 – 23, h_2 39 – 47; distances between dorsal setae: *vi*-*vi* 15 – 17, *ve*-*ve* 30 – 41, *vi*-*ve* 22 – 25, *ve*-*sci* 19 – 24, *sci*-*sce* 10 – 12, *sci*-*sci* 65 – 76, *sce*-*sce* 75 – 99, *sce*-c_1 23 – 31, c_1-c_1 42 – 50, c_1-d_1 35 – 40, c_2-c_2 129 – 157, d_1-d_1 39 – 48, d_1-d_2 36 – 42, d_1-e_1 22 – 30, e_1-e_1 31 – 35, e_1-e_2 22 – 27, e_1-f_1 19 – 24, f_1-f_1 50 – 59, f_1-h_1 21 – 26, h_1-h_1 20 – 25, h_1-h_2 8 – 10, h_2-h_2 40 – 48; ratios *vi*/*vi*-*vi* 1.6 – 1.9, c_1/c_1-c_1 0.6 – 0.7, d_1/d_1-d_1 0.7 – 0.8, e_1/e_1-e_1 0.9 – 1.0, f_1/f_1-f_1 0.7 – 0.8.

Venter (Figure 6b) — Ventral cuticle transversely striate between coxisternal regions II-III; coxisternal shields I-II and III-IV are surrounded by longitudinal striae. Lengths of setae: *1a* 13 – 15, *3a* 14, and *4a* 12 – 13 and ratio *1a*:*3a*:*4a* 1.2:1.2:1. Aggenital area with three pairs of setae, ag_1 11 – 14, ag_2 12 – 15 and ag_3 18 – 24; anogenital valves with three pairs of pseudanal setae, ps_1 7, ps_2 7 – 9 and ps_3 14 – 17.

Legs (Figures 6c-f) — Length of legs: leg I 109 – 116, leg II 90 – 99, leg III 87 – 97, leg IV 98 – 109. Setal formulae of leg segments as follows: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 1; femora 6, 5, 3, 2; genua 3(κ), 3(κ), 0, 0, tibiae 7(φ,φp), 6(φp), 6(φp), 6(φp); tarsi 15 (2ω), 11 (2ω), 9 (2ω), 9 (2ω).

Material examined: 5 males from litter and soil under *Pinus* sp., Turkey, Hatay, Payas Village (36°45′32"N, 36°11′51"E, 4 m), 22 May 2014.

This species was described by Akyol and Koç (2007) from litter under *Astragalus* sp., *Crateagus* sp.,

Quercus sp. *Verbascum* sp. and *Populus* sp, in Afyonkarahisar and based on a female (Akyol and Koç 2007). Male specimens were described from litter and soil under *Pinus* sp. Males of this species exhibit the same features of the female descriptions, except that the male tarsi I-IV are with two solenidia instead of one solenidion in female; length of body and dorsal setae shorter than those of the female and intercalary shield fused (separate in the female).

DISCUSSION

Reference to the presence of seta h_3 in the males and immature stages of *Stigmaeus* species is seldom made. The following species are only known from their females and all of them have seta h_3 *S. planus* Kuznetesov 1978, *S. makouensis* Bagheri & Maleki 2013, *S. cariae* Khanjani, Pishehvar, Mirmoayedi & Khanjani 2012, *S. kermanshahiensis* Khanjani, Pishehvar, Mirmoayedi & Khanjani 2012, *S. marandiensis* Bagheri & Ueckermann 2011, *S. isfahanensis* Bagheri, Jafari & Saboori, 2014, *S. iranenesis* Bagheri & Gheblealivand 2012, *S. alvandis* Khanjani & Ueckermann, 2002, *S. raneyi* Summers 1962, *S. karabagiensis* Akyol & Koç, 2007, *S. hashtrudiensis* Bagheri & Maleki 2014, *S. shabestariensis* Haddad, Lotfollahi & Akbari 2010, *S. ladanae* Nazari Khanjani & Kamali, 2012, *S. maraghehiensis* Bagheri & Ueckermann 2012, *S. cataloniensis* Faraji & Ueckermann 2006, *S. additicus* Dönel & Doğan 2011, *S. dazkiriensis* Akyol & Koç 2007, *S. devlethanensis* Akyol & Koç, 2007, *S. purpurascens* Summers 1962, *S. lucaris* Summers 1962, *S. ueckermanni* Pahlavan-Yali, Khanjani, Razmjou 2011, *S. sariensis* Bagheri 2014, *S. reductus* Barilo 1986, *S. uncus* Summers, 1962, *S. gracilimus* Summers 1962, *S. constrictus* Summers, 1962, *S. stercus* Kuznetsov & Petrova, 1979, *S. amasyanus* Dönel, Doğan, Sevsay & Bal 2012, *S. erzincanus* Doğan, Bingül, Dilkaraoğlu & Fan 2015, *S. berwariensis* Uluçay 2015.

The male of *S. luteus* (syn. *S. elongatus* according to Wood 1973), *S. arboricola, S. brevisetis, S. candidus* are described and the differences between the males and females of them are given.

The female of *S. luteus* bears 3 setae on the suranal shield, and the male has merely 2 (Summers, 1962, p 516). *S. arboricola* female bears h_3, whereas the male does not; trochanteral and genual cheatotaxy are the same in the female and the male; the female has 4 aggenital setae and the male has 3 aggenital setae (Fan and Zhang 2005, p 92).

In *S. brevisetis* the female has h_3 but the male and protonymph do not; trochanteral chaetotaxy of the male 1, 1, 2, 0 and that of the female 1, 1, 2, 1; genual chaetotaxy of the male 5(κ), 2, 0, 0 and that of the female 6(κ), 5, 2, 2; the female bears 4 aggenial setae and the male bears 2 aggenital setae (Wood 1973, p 370; Fan and Zhang 2005, p 93).

The male of *S. candidus* has been additionally described: the length of seta h_3 on the female is given, but that of the male isn't stated; trochanteral chaetotaxy of the male 1, 1, 2, 0 and that of the female 1, 1, 2, 1; genual chaetotaxy of the male 6, 2, 0, 0 and that of the female 6, 2, 0, 1. (Fan and Li, 1993, p 323).

The male of *S. pulchellus* without setae h_3 on the suranal shield; trochanteral chaetotaxy of the male 1, 1, 2, 0 and that of the female 1, 1, 2, 1; genual chaetotaxy of the male 5(κ), 3, 0, 0 and that of the female 6(κ), 5, 2, 2; the female bears 4 aggenial setae and the male bears 3 aggenital setae.

Males of genus *Stigmaeus* differ from females in that they have aedeagus, two solenidia (ω) on tarsi I-IV, the body smaller; setae $ps_{1,2}$ reduced and peglike, dorsal setae shorter, genital and anal openings fused and genital setae absent. The leg chaetotaxy and the number of aggenital setae can be identical or different in the female and male. These characters can be used for identification of the male of *Stigmaeus*.

The males of *S. brevisetis*, *S. candidus* and *S. pulchellus* are with fewer setae on the segments of the legs than the females. The male of *S. kumalariensis* leg chaetotaxy and the number of aggenital setae are the same with those of the adult female.

The nymphal stages of *Stigmaeus* differ from the females mainly in a reduction of leg setae. The deutonymph differs in the absence of genital folds and trochanter IV nude (Fan and Zhang 2005). The prontonymph lacks seta *4a*, one subcapitular seta

and has fewer setae in aggenital area (Fan and Zhang 2005).

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