A new species of the genus *Stigmaeus koch* (Acari: Stigmaeidae) from Kurdistan province, Iran and description of male of *Prostigmaeus khanjanii* Bagheri and Ghorbani

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A new species of the genus *Stigmaeus* Koch (Acari: Stigmaeidae) from Kurdistan province, Iran and description of male of *Prostigmaeus khanjanii* Bagheri and Ghorbani

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ABSTRACT — A new species of the genus *Stigmaeus*, *S. kurdistanensis* n. sp. is described and illustrated based on females collected from soil under apple trees, Ghorveh city, Kurdistan province, Iran. In addition, the male of *Prostigmaeus khanjanii* Bagheri and Ghorbani, 2010 is described. A key to all known Iranian species of the genus *Stigmaeus* is provided.

KEYWORDS — Arthropods; soil; predatory mite; ectoparasites; apple tree

INTRODUCTION

Stigmaeidae is the largest family within Raphignathoidea, which was established by Oudemans (1931). Members of this family are predators and feed on arthropods, ectoparasites of dipterans and pollen feeders (Summers 1966; Ueckermann and Smith Meyer 1987; Fan and Zhang 2005). This family currently contains 32 genera, of which 12 genera are recorded from Iran (Bayzavi *et al.* 2013). The genus *Stigmaeus* Koch occurs all over the world but the genus *Prostigmaeus* Kuznetsov has only been recorded from palaearctic and afrotropical regions (Fan and Zhang, 2005). To date, 4 species of the genus *Prostigmaeus* and 33 species of *Stigmaeus* have been recorded and described from Iran (Khanjani *et al.* 2014; Bagheri *et al.* 2014; Bagheri *et al.* 2010), namely: *Prostigmaeus khanjanii* Bagheri and Ghorbani, 2010; *P. molaviae* Khanjani *et al.*, 2012; *P. tauricus* Kuznetsov, 1984; *P. vrystaatensis* Ueckermann

and Meyer, 1978 and *Stigmaeus alvandis* Khanjani and Ueckermann, 2002; *S. boshroyehensis* Khanjani *et al.*, 2010; *S. candidus* Fan and Li, 1993 (= *S. mazandaranicus* Faraji and Ueckermann, 2006); *S. cariae* Khanjani *et al.*, 2012; *S. delaramae* Khanjani *et al.*, 2014; *S. echinopus* Summers, 1962 (Ahaniazad *et al.* 2013); *S. elongatus* Berlese, 1886; *S. fissicomus* Ueckermann and Mayer, 1987 (Kamali *et al.* 2001); *S. glypticus* Summers, 1962 (Hajizadeh *et al.* 2013); *S. isfahaniensis* Bagheri *et al.*, 2014; *S. haddadi* Zarei and Bagheri, 2012; *S. iranensis* Bagheri *et al.*, 2012a; *S. kermaniensis* Changizi *et al.*, 2012; *S. kermanshahiensis* Khanjani *et al.*, 2012; *S. ladanae* Nazari *et al.*, 2012; *S. longipilis* Canestrini, 1889 (Pahlevan Yali *et al.* 2011); *S. malekii* Haddad Irani-Nejad *et al.*, 2006; *S. maraghehiensis* Bagheri *et al.*, 2012b; *S. marandiensis* Bagheri *et al.*, 2011b; *S. miandoabiensis* Bagheri and Zarei, 2012; *S. nasrinae* Nazari *et al.*, 2012; *S. petrophilus* Kuznetsov and Petrova, 1979 (Hajizadeh

et al. 2013); *S. pilatus* Kuznetsov, 1987 (Khanjani *et al.* 2010); *S. pulchellus* Kuznetsov, 1978 (Zarei and Bagheri 2012); *S. shabestariensis* Haddad Irani-Nejad *et al.*, 2010a; *S. shendabadiensis* Haddad Irani-Nejad *et al.*, 2010b; *S. siculus* (Berlese 1883) (Bagheri and Zarei 2012); *S. sphangeti* (Hull 1918) (Akbari *et al.* 2010); *S. ueckermanni* Pahlavan Yali *et al.*, 2011; *S. unicus* Kuznetsov, 1978 (Khanjani and Ueckermann 2002); *S. sinai* Swift, 1987; *S. makouensis* Bagheri *et al.*, 2013; *S. saboorii* Bagheri *et al.*, 2013. In this paper, *S. kurdistanensis* **n. sp.** and the male of *Prostigmaeus khanjanii* Bagheri and Ghorbani are described for the first time from Iran.

MATERIALS AND METHODS

Mites were collected from soil under apple and fig trees in Kurdistan and Hamedan provinces and mounted directly in Hoyer's medium. The specimens were measured, identified and drawn by means of an Olympus BX₅₁ differential interference contrast microscope under 1000X magnification and equipped with a drawing tube. Body length measurements represent the distance between base of gnathosoma and end of idiosoma; width was measured above coxae III. Setae were measured from the setal base to the tip of the seta; distances between setae were measured between setal bases. Legs measurements are from trochanter to tip pretarsus.

The terminology and abbreviations used in the description of the new species follows that of Kethley (1990). Leg chaetotaxy is adapted from Fan and Zhang (2005). All measurements are given in micrometers and the measurements of the paratype are given in parentheses.

RESULTS

FAMILY STIGMAEIDAE OUDEMANS, 1931

Genus: *Stigmaeus* Koch, 1836: 4, 9.

Type species: *Stigmaeus cruentus* Koch, 1836 (unknown), by original designation.

Diagnosis — (Based on Fan and Zhang, 2005).

Female — Idiosoma narrowly to broadly oval in dorsoventral view, white, yellow, red or dark red in life. Chelicerae separate. Palptibial claw subequal to or slightly shorter than palptarsus; accessory claw seta-like or spine-like; terminal eupathidia on palptarsus basally fused and split into 3 long prongs or simple; counts of setae and solenidia from palptrochanter to palptarsus: 0, 3, 2, 2 + 1 claw + 1 accessory claw, 4 + 1 ω + 1 sub-terminal spine-like eupathidium+3 eupathidia (basally fused). Prodorsum usually with a large shield, bearing 3 pairs of setae (*vi*, *ve* and *sci*) and a pair of platelets bearing setae *sce*; eyes present or absent, post-ocular bodies (*pob*) present or absent.

Dorsal hysterosomal areas C-F usually with 1-2 shields surrounded by 3-5 pairs of platelets, sometimes much reduced or absent, shields with 2-3 pairs of setae; setae *d*₁ and *d*₂ never on same shield; humeral shields large or small, dorso- or ventrolateral, with setae *c*₂; intercalary shields (F) obvious, entire or divided along midline, with a pair of setae (*f*₁). Suranal shield (H) entire or divided, with 2-3 pairs of setae (*h*₃ absent or present). Endopodal shields I-II and III-IV present, divided along midline. Ventral opisthosoma with 3-5 pairs of aggenital setae; genital and anal valves fused or contiguous, with 1-3 pairs of genital setae and 3 pairs of pseudanal setae.

Leg tarsal claws robust; empodial shafts branching into tenent hairs before extending beyond tips of claws, with 3 pairs of tenent hairs; counts of setae and solenidia on legs I-IV: coxae (excluding *1a*, *3a* and *4a*) 2 + 1*elcp*, 2, 2, 2; trochanters 1, 1, 2, 1; femora 4-6, 4-6, 3, 2; genua 3-5 + 1 κ , 3-4 + 0-1 κ , 0-3, 0-3; tibiae 5 + 0-1 φ + 1 $\varphi\rho$, 5 + 1 $\varphi\rho$, 5 + 1 $\varphi\rho$, 5 + 1 $\varphi\rho$; tarsi 13 + 1 ω , 8-9 + 1 ω , 7 + 1 ω , 6-7 + 0-1 ω . Male. Solenidia on tarsi I-IV: 2, 2, 2, 2.

Stigmaeus kurdistanensis **n. sp.** (Figs. 1-2)

Diagnosis — Prodorsum with large, reticulated shield; eyes absent and post-ocular bodies present; median hysterosomal shield with 2 pairs of setae; suranal shield entire, with 2 pairs of setae (*h*₃ absent). All dorsal shields reticulated. Endopodal shields and coxal areas reticulated; dorsal setae long

FIGURE 1: *Stigmaeus kurdistaniensis* n. sp. (female): A – Dorsal view; B – Ventral view; C – Palp; D – Leg I; E – Leg II; F – Leg III; G – Leg IV.

FIGURE 2: *Stigmaeus kurdistanensis* n. sp. (male): A – Dorsal view; B – Ventral view; C – Palp; D – Chelicera; E – Leg I; F – Leg II; G – Leg III; H – Leg IV.

and serrate. Aggenital plate reticulated and with 3 pairs of setae (ag_1 – ag_3) and genital shield with 1 pair of setae (g). Palp tarsus with one tridentae eupathidium and palp genu with 2 setae. Femora I–II with 6, 5 setae respectively; genua I–IV 3(+ κ)-3(+ κ)-1-1. Palp and leg's segments with reticulations.

Type materials — Holotype female and 3 paratype females collected from soil under apple trees, *Malus domestica* Borkh. (Rosaceae), Iran: Kurdistan Province, Ghorveh city (35°10' N, 47°48' E, 1906 m a.s.l.) 4 September 2013, coll. F. Amini. The holotype female and 2 paratype females are deposited as slide-mounted specimens in the Collection of the Acarology Laboratory, University of Bu-Ali Sina, Hamadan, Iran and one paratype female will be deposited in the National Collection of Arachnida, Plant Protection Research, Pretoria, South Africa.

Description

Female (n = 4) — Colour in life red. Idiosoma oval. Measurements of holotype with measurements of paratypes in parentheses: Length of body (excluding gnathosoma) 600 (559 – 618), (including gnathosoma) 761 (700 – 753); width 420 (313 – 415).

Dorsum (Figure 1A) — All dorsal shields reticulated; prodorsum with large shield medially; bearing three pairs of setae (vi , ve , sci), post ocular bodies (pob) present and eyes absent, setae sce located on small plates laterally; hysterosomal area C–E with a large shield medially and 4 pairs of small plates, median hysterosomal shield with two setae (c_1 , d_1), setae d_2 located on large, lateral, hysterosomal shields; ventro-lateral, humeral plate with setae c_2 ; intercalary shields (F) with setae f_1 ; suranal shield (H) entire, bearing 2 pairs of setae (h_{1-2}). All dorsal setae long and with a cluster of barbs distally except setae c_2 sparsely serrate; setae c_2 longer than the others. Lengths of dorsal setae: vi 95 (93 – 97), ve 125 (114 – 123), sci 73 (67 – 75), sce 93 (93 – 98), c_1 86 (82 – 90), c_2 136 (130 – 137), d_1 88 (82 – 90), d_2 91 (86 – 94), e_1 90 (82 – 92), e_2 98 (87 – 99), f_1 96 (87 – 99), h_1 90 (90 – 92), h_2 85 (84 – 86). Distances between dorsal setae: vi – vi 35 (39 – 40), ve – ve 100 (89 – 103), sci – sci 175 (154 – 180), sce – sce 235 (232 – 251), c_1 – c_1 89 (77 – 94), c_2 – c_2 420 (312 – 417), d_1 – d_1 92 (73 – 95), d_2 – d_2 291 (257 – 293), e_1 – e_1 83 (73 – 82), e_2 – e_2 292 (243 – 289),

f_1 – f_1 165 (145 – 167), h_1 – h_1 68 (56 – 65), h_2 – h_2 141 (134 – 142), vi – ve 125 (62 – 125), ve – sci 58 (57 – 67), sci – sce 50 (37 – 47), c_1 – c_2 95 (99 – 157), d_1 – d_2 108 (92 – 106), e_1 – e_2 101 (82 – 94), h_1 – h_2 45 (37 – 45), c_1 – d_1 100 (93 – 105), d_1 – e_1 100 (81 – 102), e_1 – f_1 79 (75 – 83), f_1 – h_1 91 (72 – 89); ratio: vi /vi–vi 2.71 (2.38), c_1 /c1–c1 0.97 (0.95 – 1.06), d_1 /d1–d1 0.96 (0.99 – 1.17), e_1 /e1–e1 1.08 (1.12 – 1.13), f_1 /f1–f1 0.58 (0.59 – 0.6), h_1 /h1–h1 1.32 (1.61 – 1.42), c_1 – c_1 : d_1 – d_1 : e_1 – e_1 : f_1 – f_1 : 0.53 (0.53 – 0.56): 0.55 (0.50 – 0.56): 0.50 (0.49 – 0.50): 1.0 (1.0).

Venter (Figure 1B) — Ventral cuticle striated coxisternal regions I–II and III–IV with reticulations (Figure 1B). Lengths of setae $1a$ 36 (35 – 40), $1b$ 38 (31 – 40), $1c$ 70 (65 – 72), $2b$ 63 (59 – 67), $2c$ 42 (39 – 43), $3a$ 38 (38 – 42), $3b$ 43 (38 – 45), $3c$ 45 (31 – 40), $4a$ 41 (36 – 43), $4b$ 37 (37 – 41), $4c$ 37 (33 – 38), ag_1 34 (33 – 37), ag_2 39 (37 – 40), ag_3 49 (47 – 50), g 27 (25 – 30), ps_1 65 (66 – 73), ps_2 37 (37 – 45), ps_3 40 (39 – 44). Aggenital area reticulated, with 3 setae (ag_{1-3}), setae ag_3 longer than ag_{1-2} ; genital shield with 1 pair of setae (g); anal plate with 3 pairs of setae (ps_{1-3}), pseudanal setae ps_1 distally serrated and almost two times longer than setae ps_{2-3} .

Gnathosoma (Figure 1C) — Ventral infracapitulum with two pairs of infracapitular setae, m 43 (40 – 43) and n 34 (29 – 36), two pairs of adoral setae, $or1$ 29 (30 – 32), $or2$ 38 (37 – 39) (Figure 1C). Chelicerae free 95 (95 – 100), movable digit 127 (126 – 132) (Figure 1A). Palp five segmented, palp tarsus with 4 simple setae + one simple eupathidium + one solenidion (ω) + one tridentae eupathidium, palp tibia with two setae + one well developed claw + one accessory claw seta-like, palp genu with one seta and palp femur with three setae (Figure 1C).

Legs (Figures 1D–G) — Length of leg I 253 (243 – 273); leg II 221 (208 – 238); leg III 230 (223 – 243), leg IV 251 (253 – 270). Setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-2-2-2; trochanters 1-1-2-1; femora 6-5-3-2, genua 3(+ κ)-3(+ κ)-1-1; tibiae 5(+ φ , + $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$); tarsi 13(+ ω)-9(+ ω)-7(+ ω)-7(+ ω). Length of solenidia: I ω 25 (20 – 30), II ω 25 (26 – 28), III ω 15 (14 – 20), IV ω 15 (14 – 18); I $\varphi\rho$ 39 (37 – 39), I φ 16 (12 – 18), II $\varphi\rho$ 32 (32 – 35), III $\varphi\rho$ 24 (24 – 29), IV $\varphi\rho$ 28 (27 – 29); I κ 72 (72 – 77), II κ 12 (10 – 11).

Male (n = 1) — Idiosoma oval. Length of body (excluding gnathosoma) 587, (including gnathosoma) 655; width 275.

Dorsum (Figure 2A) — Dorsal shields completely reticulated; prodorsal shield bearing four pairs of setae (*vi*, *ve*, *sci*, *sce*); post ocular bodies (*pob*) present; eyes absent; hysterosomal area C-F almost covered by large median and 3 pairs of plates laterally (Figure 2A); median and lateral hysterosomal shields fused, with setae *c*₁, *d*₁, *d*₂, *e*₁, intercalary shield divided with setae *f*₁; suranal shield entire, with two pairs of setae (*h*₁, *h*₂). All dorsal setae barbed. Lengths of dorsal setae: *vi* 92, *ve* 107, *sci* 70, *sce* 100, *c*₁ 50, *c*₂ 95, *d*₁ 45, *d*₂ 55, *e*₁ 30, *e*₂ 107, *f*₁ 80, *h*₁ 52, *h*₂ 70. Distances between dorsal setae: *vi-vi* 37, *ve-ve* 85, *sci-sci* 67, *sce-sce* 232, *c*_{1-c}₁ 57, *c*_{2-c}₂ 275, *d*_{1-d}₁ 57, *d*_{2-d}₂ 182, *e*_{1-e}₁ 42, *e*_{2-e}₂ 150, *f*_{1-f}₁ 92, *h*_{1-h}₁ 37, *h*_{2-h}₂ 80, *vi-ve* 55, *ve-sci* 62, *sci-sce* 45, *c*_{1-c}₂ 50, *d*_{1-d}₂ 65, *e*_{1-e}₂ 60, *h*_{1-h}₂ 25, *c*_{1-d}₁ 67, *d*_{1-e}₁ 60, *e*_{1-f}₁ 42, *f*_{1-h}₁ 52. Ratio: *vi/vi-vi* 2.48, *c*_{1/c}_{1-c}₁ 0.87, *d*_{1/d}_{1-d}₁ 0.78, *e*_{1/e}_{1-e}₁ 0.71, *f*_{1/f}_{1-f}₁ 0.86, *h*_{1/h}_{1-h}₁ 1.4, *h*_{2/h}_{2-h}₂ 0.87, *h*_{1/h}₂ 0.74, *c*_{1-c}₁: *d*_{1-d}₁: *e*_{1-e}₁: *f*_{1-f}₁ : 0.62: 0.62: 0.45: 1.0.

Venter (Figure 2B) — Endopodal shields I-II and III-IV with reticulations. Lengths of setae *1a* 22, *1b* 35, *1c* 35, *2b* 35, *2c* 27, *3a* 2, *3b* 22, *3c* 17, *4a* 27, *4b* 25 and *4c* 20, *ag*₁ 26, *ag*₂ 30, *ag*₃ 38, *ps*₁ 27, *g*₁ 2, *g*₂ 2. Aggenital plate smooth with three setae (*ag*₁₋₃).

Gnathosoma (Figures 2C-D) — Ventral infracapitulum reticulated and with two pairs of infracapitular setae, *m* 30 and *n* 22, two pairs of adoral setae, *or*₁ 22, *or*₂ 32 (Figure 2B). Chelicerae free 132, movable digit 65 (Figure 2D). Palp five segmented, palp tarsus with 4 simple setae + one simple eupathidium + one solenidium (ω) + one tridentate eupathidium, palp tibia with two setae + one well developed claw + one spine-like accessory claw, palp genu with two seta and palp femur with three setae (Figure 2C).

Legs (Figures 2E-H) — Length of leg I 224, leg II 195; leg III 185, leg IV 205. Setation same as female except tarsi I-IV with two solenidia and solenidia longer. Length of solenidia: I ω ₁ 43, I ω ₂ 25, II ω ₁ 38, II ω ₂ 22, III ω ₁ 32, III ω ₂ 12, IV ω ₁ 26, IV ω ₂ 12; I $\varphi\rho$ 35, I φ 15, II $\varphi\rho$ 31, III $\varphi\rho$ 20, IV $\varphi\rho$ 23; I κ 55; II κ 8.

Remarks — The new species *Stigmaeus kurdistanensis* n. sp. resembles *S. siculus* (Berlese, 1883) in that dorsal shields are reticulated, median hysterosomal shield with two setae, *pob* present, eyes and *h*₃ absent. However it differs from the latter in: all dorsal and ventral setae longer than that of *S. siculus*; ventral infracapitulum and all leg and palp segments with reticulations in *E. kurdistanensis* instead of smooth in *S. siculus* and *pob* small, between setae *ve-sci* in the new species instead of large in *S. siculus*.

The new species also resembles *S. echinopus* Summers, 1962, in having all leg and palp segments with reticulations, suranal shield entire and reticulated, *pob* present and median hysterosomal shield with two setae. However, *S. kurdistanensis* differs from the latter in: aggenital shield reticulated instead of smooth in *S. echinopus*, all dorsal and ventral setae longer than those of *S. echinopus* and genual setae κ short in *S. kurdistanensis* in contrast to long in *S. echinopus*.

Immature stages — Unknown.

Etymology — The species is named after the locality where it was collected, namely Kurdistan province.

Genus: *Prostigmaeus* Kuznetsov, 1984

Type species: *Prostigmaeus tauricus* Kuznetsov, 1984

Diagnosis — (Based on Ueckermann and Meyer, 1987 and Fan and Zhang, 2005).

Female — Idiosoma elongate and somewhat spindle-shaped; prodorsum with a large shield medially, bearing 3 pairs of setae namely *vi*, *ve* and *sci*; setae *sce* lateral to *sci* on integument; *pob* and eyes absent; humeral shields ventro-laterally, with setae *c*₂; opisthosoma with a relatively long median shield carrying setae *c*₁ and *d*₁; setae *e*₁ placed on 2 small shields posterior to median shield; intercalary shields (F) divided along midline, with a pair of setae (*f*₁); suranal shield (H) entire or divided, bearing 3 pairs of setae (*h*₁₋₃). Chelicerae separate. Palptibial claw subequal to or slightly shorter than palptarsus; accessory claw seta-like or spinelike; terminal eupathidia on palptarsus separate, counts of setae and solenidia from palptrochanter to palptarsus: 0,

3, 2, 2 + 1 claw + 1 accessory claw, 4 + 1 ω + 2 subterminal spine-like eupathidia + 2 unfused eupathidia; endopodal shields I-II and III-IV present; anogenital area with 4 pairs of aggenital setae (ag_{1-4}), 3 pairs of genital setae (g_{1-3}) and 3 pairs of pseudanal setae (ps_{1-3}).

Male — Solenidia on tarsi I-IV: 2, 2, 2, 2.

Prostigmaeus khanjanii Bagheri and Ghorbani, 2010
(Fig. 3)

Diagnosis — Prodorsum with large, reticulated shield medially with 3 setae (vi , ve , sci); opisthosomal shield reticulated, with 2 pairs of setae (c_1 , d_1), suranal shield entire, bearing 3 pairs of setae (h_{1-3}). Endopodal shields I-II and III-IV present; aggenital shield with 4 pairs of setae (ag_{1-4}); genital plate with 3 pairs of setae (g_{1-3}). Palp genu with 2 setae; terminal eupathidia on palptarsus separate.

Leg segments' setal formulae as follows: coxae 2-2-2-2; trochanters 1-1-2-1; femora 6-4-3-2, genua 5(+ κ)-5(+ κ)-2-2; tibiae 5(+ φ , + $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$); tarsi 13(+ ω)-9(+ ω)-7(+ ω)-7(+ ω).

Male. As in female but: shields of hysterosomal area E-F fused; Tarsi I-IV with two solenidia.

Description

Male ($n = 3$) — Idiosoma elongate. Length of body (excluding gnathosoma) 377 – 417, (including gnathosoma) 433 – 470; width 197.

Material examined — Three males collected from soil under fig trees, *Ficus carica* L. (Moraceae), Iran: Hamedan Province, Heydareh village (34°48'27" N, 48°28'0.85" E, 1873 m a.s.l.), 6 November 2013, coll. F. Amini. Deposited as slide-mounted specimens in the Collection of the Acarology Laboratory, University of Bu-Ali Sina, Hamadan, Iran.

Dorsum (Figure 3A) — Prodorsum with rather large reticulations, large shield bearing 3 pairs of setae (vi , ve , sci); post ocular bodies (pob) and eyes absent; hysterosoma with an elongate, large median shield, with 2 setae (c_1 , d_1); zonal and intercalary shields fused, bearing 2 pairs of setae (e_1 , f_1); suranal shield entire and with 2 pairs of setae (h_1 , h_2). All hysterosomal shields reticulated. Lengths of dorsal setae: vi 19 – 23, ve 19 – 24, sci 24 – 25, sce 21 – 22,

c_1 11 – 13, c_2 23 – 27, d_1 8 – 11, d_2 14 – 17, e_1 11 – 16, e_2 10 – 15, f_1 9 – 11, h_1 21 – 26, h_2 21 – 24, h_3 20 – 23. Distances between dorsal setae: $vi-vi$ 23 – 26, $ve-ve$ 43 – 46, $sci-sci$ 54 – 57, $sce-sce$ 120 – 127, c_1-c_1 35 – 41, c_2-c_2 212 – 220, d_1-d_1 28 – 30, d_2-d_2 320 – 325, e_1-e_1 92 – 95, e_2-e_2 118 – 123, f_1-f_1 57 – 63, h_1-h_1 42 – 43, h_2-h_2 59 – 63, h_3-h_3 27 – 37, $vi-ve$ 41 – 45, $ve-sci$ 46 – 49, $sci-sce$ 35 – 43, c_1-c_2 84 – 91, d_1-d_2 63 – 71, e_1-e_2 46 – 53, h_1-h_2 11 – 14, c_1-d_1 61 – 63, d_1-e_1 62 – 66, e_1-f_1 30 – 32, f_1-h_1 48 – 49. Ratio: $vi/vi-vi$ 0.83 – 0.88, c_1/c_1-c_1 0.30 – 0.31, d_1/d_1-d_1 0.28 – 0.36, e_1/e_1-e_1 0.10 – 0.16, f_1/f_1-f_1 0.15 – 0.17, h_1/h_1-h_1 0.05 – 0.06, h_2/h_2-h_2 0.35 – 0.45, h_1/h_2 0.35 – 0.38, $c_1-c_1: d_1-d_1: e_1-e_1: f_1-f_1: h_1-h_2$ 0.47 – 0.49: 1.50 – 1.61: 1.0.

Venter (Figures 3B-C) — Ventral cuticle with striae; endopodal shields II-III and III-IV present and smooth (Figure 17). Lengths of setae $1a$ 17 – 21, $1b$ 22 – 25, $1c$ 24 – 30, $2b$ 32 – 37, $2c$ 31 – 32, $3a$ 26 – 31, $3b$ 20 – 24, $3c$ 15 – 18, $4a$ 21 – 26, $4b$ 14 – 17 and $4c$ 17 – 18, ag_1 18 – 24, ag_2 19 – 21, g_1 2 – 3, g_2 3 – 5, ps_1 15 – 17. Aggenital plate with striae and two setae (ag_{1-2}). Genital plate indicated in figure 18.

Gnathosoma (Figure 3D) — Ventral infracapitulum with two pairs of subcapitular setae, m 15 – 18 and n 16 – 17, two pairs of adoral setae, $or1$ 7 – 10, $or2$ 5 – 6 (Figure 3B). Chelicerae free 58 – 63, movable digit 29 – 34 (Figure 3A). Palp five segmented, palp tarsus with 4 simple setae + one solenidion (ω) + 2 subterminal spine-like eupathidia + 2 separate eupathidia, palp tibia with two setae + one well developed claw + one spine-like accessory claw, palp genu with two seta and palp femur with three setae (Figure 3D).

Legs (Figures 3E-H) — Length of leg I 163 – 167; leg II 123 – 125; leg III 124 – 128, leg IV 150 – 155. Setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-2-2-2; trochanters 1-1-2-1; femora 6-4-3-2, genua 5(+ κ)-5(+ κ)-2-2; tibiae 5(+ φ , + $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$)-5(+ $\varphi\rho$); tarsi 13(+ ω_1 , + ω_2)-9(+ ω_1 , + ω_2)-7(+ ω_1 , + ω_2)-7(+ ω_1 , + ω_2). Length of solenidia: I ω_1 29 – 35, I ω_2 17 – 19, II ω_1 28 – 29, II ω_2 13 – 14, III ω_1 25 – 29, III ω_2 4 – 6, IV ω_1 23 – 26, IV ω_2 6 – 7; I $\varphi\rho$ 19 – 24, I φ 6 – 9, II $\varphi\rho$ 15 – 18, III $\varphi\rho$ 11 – 15, IV $\varphi\rho$ 14 – 16; I κ 3 – 5; II κ 4 – 7.

Remarks — Males of this species exhibit all fea-

FIGURE 3: *Prostigmaeus khanajinii* Bagheri and Ghorbani (male): A – Dorsal view; B – Ventral view; C – Genital plate; D – Palp; E – Leg I; F – Leg II; G – Leg III; H – Leg IV.

tures of the female descriptions, except that the male tarsi I-IV are with two solenidia instead of one solenidium in female, zonal and intercalary shields fused, bearing 2 pairs of setae (e_1, f_1) whereas completely separate in the female.

Key to the Iranian species of genus *Stigmaeus* (Female)

1. Median propodosomal shield absent 2
— Median propodosomal shield present 3
2. Genua II-III with 5-3 setae *S. saboorii*
— Genua II-III with 4-4 setae *S. kermaniensis*
3. Hysterosoma without median shield 4
— Hysterosoma with median shield 7
4. Genua II-IV with 2-0-1 setae 5
— Genua III-IV with 5-3-3 setae *S. elongatus*
5. Femora I-II with 4-4 setae, suranal shield divided... 6
— Femora I-II with 6-5 setae, suranal shield entire..... *S. candidus*
6. Prodorsal shield smooth, aggenital setae ag_{1-2} inserted on soft cuticle, genu I with one solenidium..... *S. shendabadiensis*
— Prodorsal shield in center region reticulated, aggenital setae ag_{1-2} inserted on entire shield, genu I without solenidium *S. nasrinae*
7. Median hysterosomal shield with 2 pairs of setae... 8
— Median hysterosomal shield with 3 pairs of setae... 25
8. Femur I with 4 setae 9
— Femur I with 6 setae..... 21
9. Femur IV with 1 seta..... *S. alvandis*
— Femur IV with 2 setae 10
10. Genu I with 3 (1) setae *S. ueckermannii*
— Genu I with 5 (1) setae 11
11. Genu III without seta 12
— Genu III with 1 or 2 setae 15
12. Genu IV with 1 seta 13
— Genu IV with 2 setae 14
13. Genu II with 2 setae *S. cariae*
— Genu II with 3 setae *S. miandoabiensis*
14. Genu II with 3 setae; seta h_3 present; prodorsal shield reticulated *S. kermanshahiensis*
— Genu II with 4 setae; seta h_3 absent; prodorsal shield smooth *S. iranensis*
15. Genua II-III with 4-1 setae 16
— Genua II-III with 5-2 setae 18
16. Prodorsal, median, lateral and median zonal shields reticulated *S. makouiensis*
— Prodorsal, median, lateral and median zonal shields smooth..... 17
17. Palp tarsus with one bifurcate eupathidium..... *S. isfahaniensis*
— Palp tarsus with one tridentate eupathidium..... *S. marandiensis*
18. Suranal shield entire..... 19
— Suranal shield divided..... *S. pulchellus*
19. Dorsal shields heavily ornamented with polygonal cells; tarsi II with 9 (1) setae 20
— Dorsal shields reticulated, tarsi II with 8 (1) setae..... *S. maraghehiensis*
20. Coxisternal, ano-genital shields, hypostome and legs reticulated *S. ladanae*
— Coxisternal, ano-genital shields and legs smooth and hypostome punctuated *S. shabestariensis*

21. Femur II with 4 setae 22
— Femur II with 5 setae 24
22. Genua III-IV without setae *S. unicus*
— Genua III-IV with 1 setae 23
23. Prodorsal shield smooth, eyes present, 3 pairs aggenital setae *S. pilatus*
— Prodorsal shield polygonal reticulated, eyes absent, 5 pairs aggenital setae *S. sinai*
24. Genital region with 3 pairs of aggenital (ag_{1-3}) and 1 pair of genital setae (g_1), tarsi I-II with 13(1)-9(1) setae 25
— Genital region with 4 pairs of aggenital (ag_{1-4}) and 2 pairs of genital setae (g_{1-2}), tarsi I-II with 13(1)-9(1) setae *S. petrophilus*
25. Genu II with 3 (+ κ) setae, aggenital region with polygonal reticulations 26
— Genu II with 4 setae, aggenital region smooth *S. echinipus*
26. Leg segments with reticulation, dorsal setae long, setae *vi* 93-95, *ve* 125-122 *S. kurdistanensis* **n. sp.**
— Leg segments smooth, dorsal setae shorter, setae *vi* 40-45, *ve* 75-86 *S. siculus*
27. Femur II with 4 setae 28
— Femur II with 5 setae 29
28. Eyes present; tarsi II with 9 (1) setae *S. boshroyensis*
— Eyes absent; tarsi II with 7 (1) setae *S. maleki*
29. Genua III with 1 smooth seta, prodorsal shield reticulated 30
— Genua III with 1 barbed, prodorsal shield smooth *S. longipilis*
30. Tarsi I with 13 (1) setae 31
— Tarsi I with 12 (1) setae *S. glypticus*

31. Aggenital region with 3 pairs of setae (ag_{1-3}) . 32
— Aggenital region with 2 pairs of setae (ag_{1-2}) *S. fissicomus*
32. Coxisternal and legs reticulated 33
— Coxisternal and legs smooth *S. haddadi*
33. Ratio setae d/v on tibia IV 0.9; setae d on tibia IV 35 long *S. sphangeti*
— Ratio setae d/v on tibia IV 1.4; setae d on tibia IV 60 long *S. delaramae*

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