

DESCRIPTION OF MALE AND IMMATURE STAGES OF *EUPALOPSELLUS HAMEDANIENSIS* KHANJANI ET AL. (ACARI: EUPALOPSELLIDAE)

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ABSTRACT – The male, deutonymph, protonymph and larva of *Eupalopsellus hamedaniensis* Khanjani *et al.*, 2007. A new are described and illustrated, based on 36 larva, six protonymph, two deutonymph and seven male available specimens from sweet cherry (*Prunus avium* L.) and plum (*Prunus salicina* Lindl) (Rosaceae) in the type locality Hamedan, Hamedan province and other parts of western Iran.

Key words – Eupalopsellidae, *Eupalopsellus hamedaniensis*, predatory mites, larva, protonymph, deutonymph, male, Iran.

INTRODUCTION

Members of the genus of *Eupalopsellus* (Sellnick) feed on small arthropods especially immobile and immature stages of spider mites, false spider mites and less motile phytophagous insects like armored and unarmored scale (Summers, 1960; Meyer & Rodrigues, 1966; Zaher and Gomaa, 1978; Meyer & Ueckermann, 1984, 1989; Gerson *et al.*, 2003; Fan, 2004; Khanjani *et al.*, 2007). Seventeen species are known in this genus; two are from Iran, namely: *E. hamedaniensis* Khanjani *et al.*, 2007 and *E. prasdi* Bagheri and Khanjani, 2009. The male and immature stages of *E. hamedaniensis* described here were collected from sweet cherry (*Prunus avium* L.) and plum (*Prunus salicina* Lindl) (Rosaceae) leaves, infested with brown mite, *Bryobia rubrioculus* (Scheuten).

MATERIALS AND METHODS

The study was conducted in two different orchards in western parts of Iran. One was a 15-year-old sweet cherry orchard with 250 trees at Heydareh Gazikhan (Bahar), Hamedan Province. The orchards plots were within a flood irrigated 50 hectare cherry plantation growing different varieties of cherry trees. The second plot was a 17-year-old, Ganjnameh (Hamadan) plum orchard with 310 trees at Ababas-Abad, beside the Bu-Ali Sina University, Hamedan, Hamedan Hamadan.

To collect the different life stages of *E. hamedaniensis*, cherry and plum leaves infested by brown mite, *B. rubrioculus*, were monitored visually. A minimum of 100 plant materials composed of bud, leaf, shoot and fruit were collected using the stroke

methods (minimum of 100 strokes) (Khanjani and Khalghani, 2008).

Infested leaves from the field were transferred to the laboratory. Under a stereomicroscope mites were brushed off by hand into Petri dishes, preserved in vials of 70% ethanol and mounted on microscope slides in Hoyer's medium. The mounted mites were examined under an Olympus BX50 phase contrast microscope. Drawings were made using a camera lucida attachment.

Body length was measured from the end of the palp tarsus to the posterior margin of the idiosoma, and the width was measured at the level of c_1 ; setae were measured from their insertion to their tips; distances between setae were measured between insertions; the gnathosoma was measured from the base of the maxillicoxae to tip of palp tarsus; legs were measured from the base of coxae to the base of the claws.

Notations of palpal and leg setae follow Grandjean (1944, 1946) and Fan (2004) and that of the idiosomal setae follow Lindquist (1985). All measurements are given in micrometers (μm).

Family EUPALOPSELLIDAE Willmann, 1952
Genus *Eupalopsellus* Sellnick, 1949

Type species: *Eupalopsellus ölandicus* Sellnick, 1949: 123.

The genus *Eupalopsellus* can readily be recognized by the following combination of characters: body oval; palpus five – segmented, distal segment with one eupathidium, one solenidion, and four or five setae; palp tibia armored with or without claw, palp genu with one seta, palp femur usually with three setae; prodorsum with four pairs of setae (v_1 , v_2 , sc_1 , sc_2); opisthosoma with three dorsocentral shields CD (c_1 , d_1 , d_2), EF(e_1 , e_2 , f_1), H (h_1 , h_2); setae c_2 situated usually on separate platelets. Ventral setae $1a$, $3a$ and $4a$ present. Genital area with three pairs of aggenital setae (ag_1 -3); with one pair of genital setae (g_1) and three pairs of anal setae (sp_{1-3}). Chelicerae are slender.

***Eupalopsellus hamedaniensis* (Khanjani et al., 2007)**

Male (Figs. 1–9) ($n = 7$) – In life color is red. Idiosoma is oval in shape. Length of body (excluding gnathosoma) 305–370; (including gnathosoma) 455 (553); width 163–188; length of leg I 197–238; leg II 160–215; leg III 175–210; leg IV 175–215.

Gnathosoma (Figs. 3–5) – Chelicerae slender 102–113, (Fig. 3; movable digits 65–68. Subcapitulum with two pairs of adoral setae, or_1 12–16–; or_2 13–16 and two pairs of subcapitular setae, m 38–44 shorter

than n 40–52; distance m – m 9–16–; m – n 21–28; n – n 15–18 (Fig. 4). Palpi tapered; palp tarsus: lT 4–6 about one second length of I 17–19, terminal palp tarsal eupathidium small 7–10; terminal palp tarsal eupathidium short; palptibial claw absent, palpgenu 22–23 one half longer than palptibia 14–15; counts of setae and solenidia from palp trochaner to palptarsus: 0, 3, 1, 3, 4 + 1ω + 1 sub terminal eupathidium + 1 terminal eupathidium (Fig. 5).

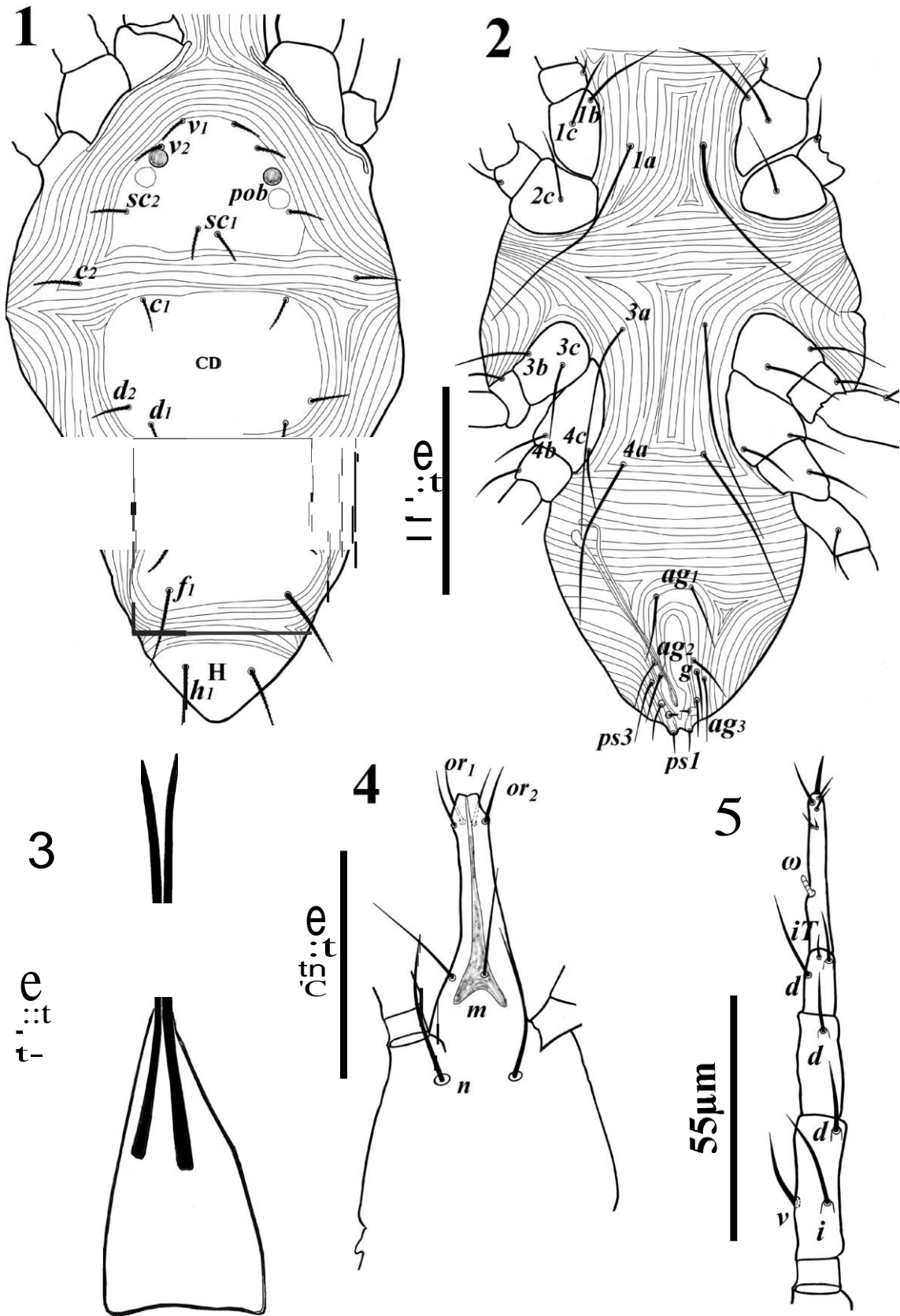
Dorsum (Fig. 1) – Idiosoma oval in shape; dorsal shields punctated; dorsal setae with small spinules. Posterior margin of prodorsal shield truncate; pob 14–16, twice as large as eyes 9–10; sc_1 more than one half distance sc_1 – sc_1 ; lengths of dorsal setae v_1 9–18, v_2 13–18, sc_1 14–17, sc_2 17–21, c_1 13–17, c_2 17–24, d_1 16–19, d_2 17–21, e_1 16–21, e_2 19–23, f_1 35–42, h_1 25–29, distances between dorsal setae; v_1 – v_1 20–25, v_1 – v_2 13–29, v_2 – v_2 42–48, v_2 – sc_1 34–47, sc_1 – sc_1 9–10, v_2 – sc_2 31–39, sc_2 – sc_2 70–78, sc_1 – c_1 56–55, sc_2 – c_2 39–41, c_1 – c_1 60–78, c_2 – c_2 117–131, d_1 – d_1 56–67, d_2 – d_2 79–89, c_1 – c_2 29–36, c_1 – d_1 51–56, d_1 – d_2 12–18, c_2 – d_2 68–70, d_1 – e_1 48–57, e_1 – e_1 45–59, e_1 – e_2 22–22, e_1 – f_1 21–39, e_2 – e_2 23–76, d_1 – e_2 24–37, d_2 – e_2 35–45, f_1 – f_1 51–58, h_1 – h_1 26–30, f_1 – h_1 32–42; ratio: v_1/v_1 – v_1 0.36–0.75, c_1/c_1 – c_1 0.19–0.26, d_1/d_1 – d_1 0.27–0.3, e_1/e_1 – e_1 0.3–0.42, f_1/f_1 – f_1 0.68–0.75, h_1/h_1 – h_1 0.9–1.0. More detail in Table 1.

Hysterosomal shield CD transverse rectangular, with 3 pairs of setae, c_1 , d_1 and d_2 ; shield EF entire, square in shape, with three pairs of setae, e_1 , e_2 and f_1 ; ratio c_1 – c_1 : d_1 – d_1 : e_1 – e_1 : f_1 – f_1 = 1.18(1.35): 1.14(1.16): 0.89(1.02): 1.0(1.0); humeral platelets present, bearing setae c_2 ; suranal shield entire, with one pairs of setae.

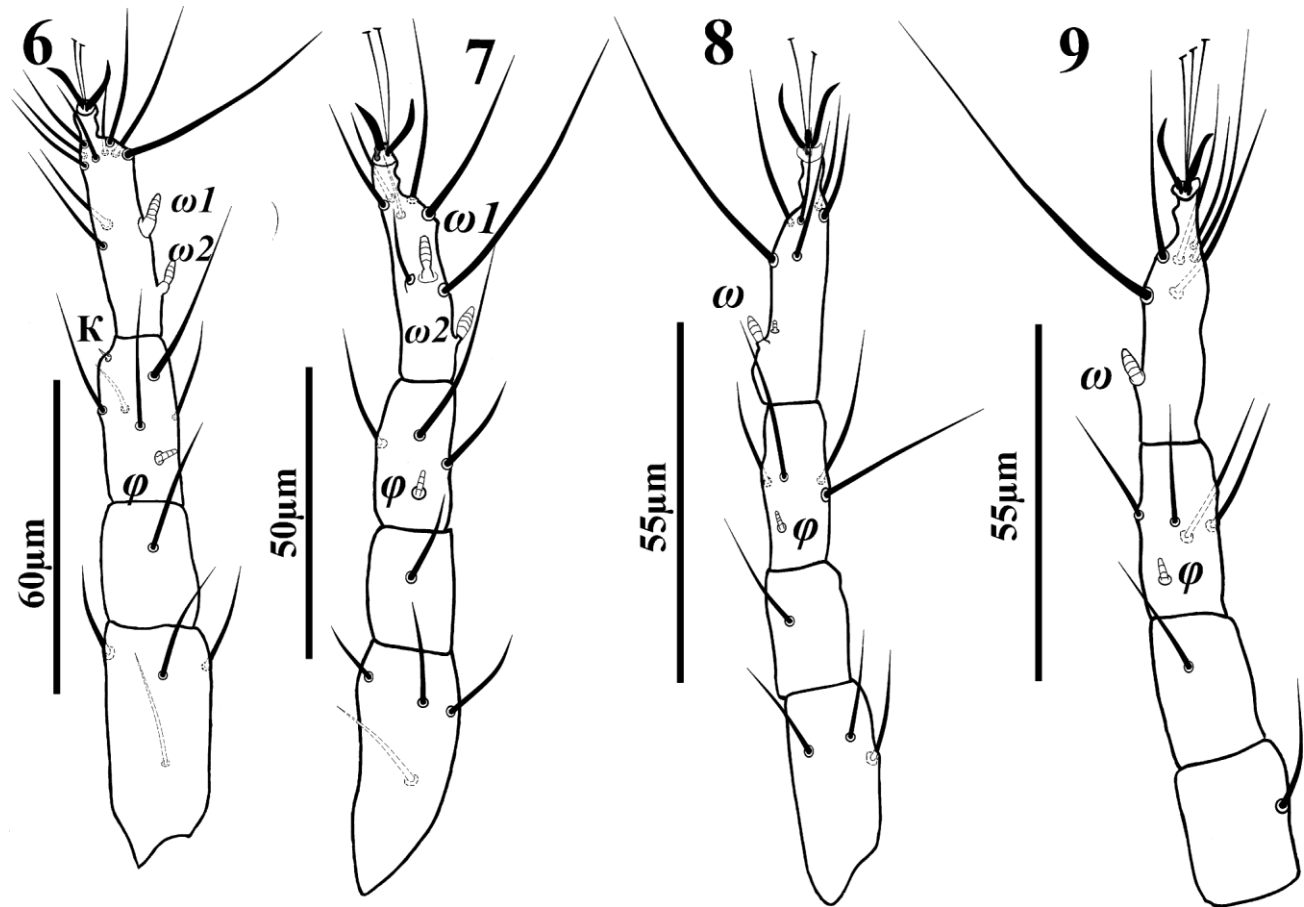
Venter (Fig. 2) – Idiosoma completely striated; ventral setae are whip like; length of setae $1a$ 75–96, $1b$ 22–32, $1c$ 22–30, $2c$ 28–38, $3a$ 65–86, $3b$ 22–28, $3c$ 22–28, $4a$ 42–65, $4b$ 20–25 and $4c$ 16–25. $1a$ about two times length of third pair of ventral setae; ratio $1a$: $3a$: $4a$ = 1.77–1.48: 1.55–1.05: 1.0–1.0. Aggenital setae on individual platelets ag_1 22–32, ag_2 16–26, ag_3 22–30, ps_1 – ps_1 6–8, ps_2 – ps_2 8–10, ps_3 – ps_3 14–17; distance ag_1 – ag_1 19–25, ag_2 – ag_2 17–19, ag_3 – ag_3 18–24; genital setae 19, ps_3 10–13, ps_2 3–4, ps_1 6–9.

Legs (Figs. 6–9) – Legs are rather short, about half the length of idiosoma. Formula of leg segments as follows: coxae 2-1-2-2; trochanters 1-1-1-1; femora 4-4-3-1; genua 1-1-1-1; tibia 5 + 1ϕ + k -4 + 1ϕ -4 + 1ϕ -4 + 1ϕ ; tarsi 10 + 2ω -7 + 2ω -6 + 2ω -6 + 1ω . Length of solenidia $I\omega_1$ 6-7, $I\omega_2$ 5-7; $II\omega_1$ 4-7, $II\omega_2$ 6-7; $III\omega_1$ 3-3. $III\omega_2$ 7-8; $IV\omega_1$ 5-6.

Discussion – Male of *E. hamedaniensis* Khanjani et al. resembles slightly *E. deformatus* Fan, 2004 in general appearance. It can be differentiated from the later by: posterior margin of prodorsal shield entire in the former but incised in the later; genual formula is



Figs. 1-5. *Eupalopsellus hamedaniensis* Khanjani *et al.*, male – 1. dorsal view of idiosoma; 2. ventral view of idiosoma; 3. chelicera; 4. subcapitulum; 5. palp.



Figs. 6–9. *Eupalopsellus hamedaniensis* Khanjani *et al.*, male – 6. leg I; 7. leg II; 8. leg III; 9. leg IV.

1-1-1-1 compared with 1 + 1κ-1-1-1 in *E. deformatus*; tarsi 10 + 2ω-7 + 2ω-6 + 2ω-6 + 1ω compared with tarsi 10 + 2ω-9 + 2ω-6 + 2ω-6 + 1ω in the later; subcapitular setae (m 40–52, n 38–44) of *E. hamedaniensis* longer than those of *E. deformatus* ($m = n = 17$) and ratio $la: 3a: 4a = 1.77(1.48): 1.55(1.05): 1.0(1.0)$ in the *E. hamedaniensis* but ratio $la: 3a: 4a = 5.8: 5.8: 1.0$ *E. deformatus*.

Deutonymph (Figs. 1–18) ($n = 2$) – In life color is red. Idiosoma is oval in shape. Dimensions: Length of body (excluding gnathosoma) 320–325; (including gnathosoma) 532–536; width 218–224; length of leg I 205–210; leg II 173–183; leg III 165–175; leg IV 160–173.

Gnathosoma (Figs. 12–14) – Chelicerae slender 174–177, is depicted on Fig. 12; movable digits 60–62. Subcapitulum with two pairs of adoral setae, or_1 12–13; or_2 13–16 and two pairs of subcapitular setae, m 24–28 as long as n 22–25; distance $m-m$ 12–15; $m-n$ 13–19; $n-n$ 11–13 (Fig. 13). Palpi tapered; palp tarsus: l^1T 11–12 as long as length of I 10–12, terminal palptarsal

eupathidium 9–10; terminal palp tarsal eupathidium slightly small; palptibial claw absent, palpgenu 20–22 as long as palptibia 16–18; counts of setae and solenidia from palp trochaner to palptarsus: 0, 3, 1, 3, 4 + 1ω + 1 sub terminal eupathidium + 1 terminal eupathidium.

Dorsum (Fig. 10) – Idiosoma oval; dorsal shields punctated; dorsal setae with small spinules. Posterior margin of prodorsal shield truncate; pob 15–18, twice as large as eyes 9–10; sc_1 two times as long as distance sc_1-sc_1 ; lengths of dorsal setae v_1 15–16, v_2 26–28, sc_1 30–31, sc_2 27–29, c_1 20–22, c_2 25–30, d_1 25–26, d_2 27–30, e_1 22–23, e_2 30–33, f_1 41–44, h_1 31–33, h_2 27–31; distances between dorsal setae; v_1-v_1 23–24, v_1-v_2 20–21, v_2-v_2 50–53, v_2-sc_1 46–48, sc_1-sc_1 14–15, v_2-sc_2 36–39, sc_2-sc_2 96–97, sc_1-c_1 43–44, sc_2-c_1 45–48, c_1-c_1 69–72, c_2-c_2 131, d_1-d_1 61–63, d_2-d_2 105–107, c_1-c_2 33–34, c_1-d_1 50–55, d_1-d_2 22–25, c_2-d_2 55–59, d_1-e_1 51–55, e_1-e_1 51–54, e_1-e_2 92, e_1-f_1 24, e_2-e_2 92, d_1-e_2 38–45, d_2-e_2 43–54, f_1-f_1 62–64, h_1-h_1 30–33, h_1-h_2 17–19, h_2-h_2 64–65, f_1-h_1 32–42, f_1-h_2 40–44.

Table 1. Measurements of male of *Eupalosellus hamedaniensis* Khanjani *et al.*

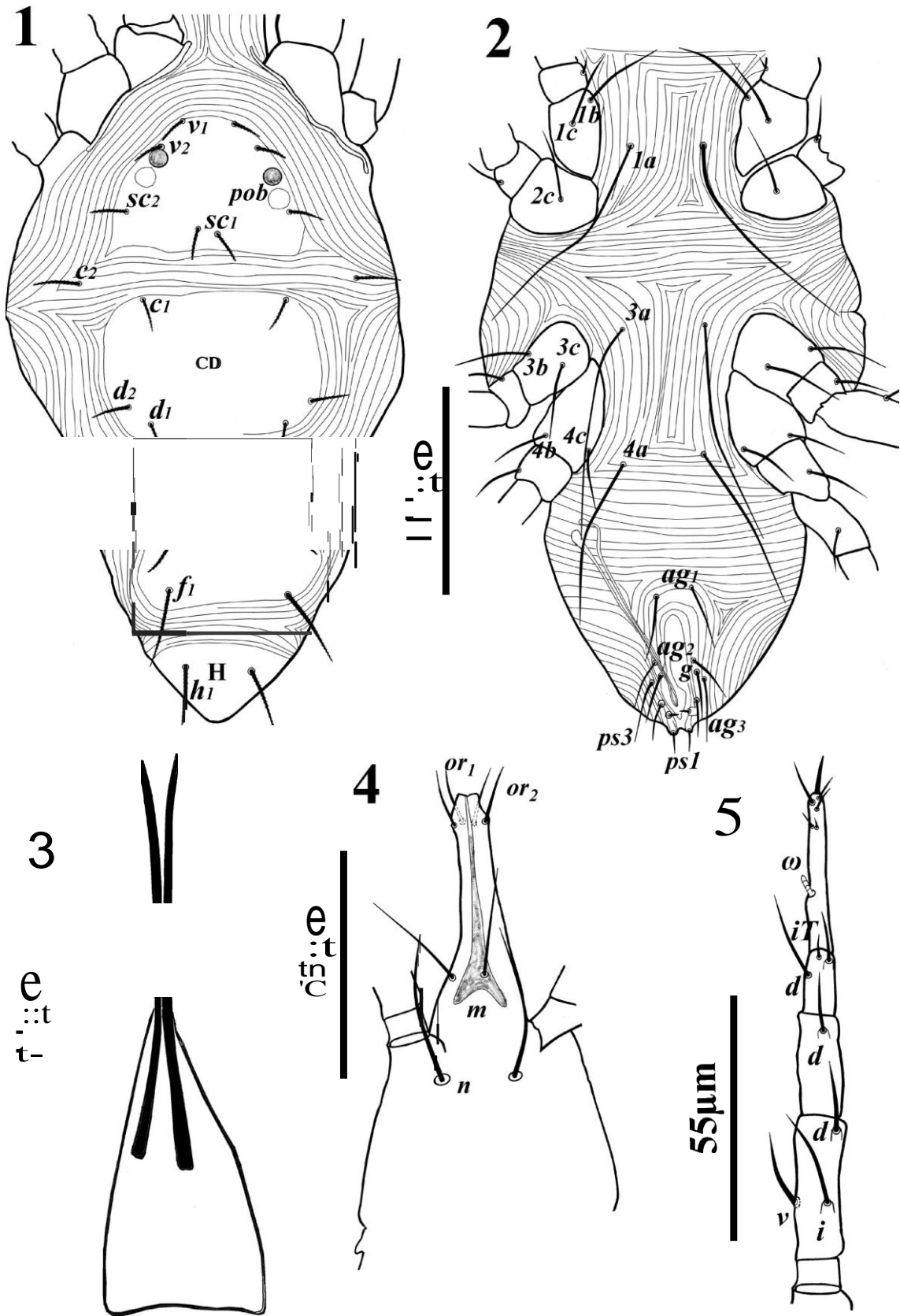
Stages	Male (n = 7)				Characters	Mean	SD	Min	Max
	Characters	Mean	SD	Min					
Total length	499	32.637	455	553	Sc2–sc2	41.5	2.2583	38	46
Idiosoma length	334.3	22.385	305	370	Sc2–c1	48.83	9.8675	26	59
Body width	175.2	10.206	163	188	C1–c1	69.5	6.8337	60	78
Leg I	216.8	10.187	197	238	C2–c2	123.5	5.2058	117	131
Leg II	184	17.989	160	215	C1–d1	53.5	1.2247	51	56
Leg III	188.7	12.612	175	210	d1–d1	62.5	4.5055	56	67
Leg IV	201.2	13.949	175	215	D1–d2	15.33	1.8619	12	18
V1	14.33	2.8048	9	18	D1–e1	51.83	2.7869	48	57
V2	15.5	1.7607	13	18	D2–e2	40.67	3.266	35	45
Sc1	15.33	0.8165	14	17	D2–d2	85	4.3818	79	89
Sc2	18.17	1.169	17	21	e1–e1	51.67	5.0067	45	59
c1	15	1.2649	13	17	e2–e2	46.67	25.097	23	76
c2	21	1.6733	17	24	E1–f1	28	7.0427	21	39
d1	18	0.8944	16	19	f1–f1	53.83	2.4014	51	58
d2	19.17	1.169	17	21	F1–h1	35.67	1.7512	32	42
e1	19	0.8944	16	21	h1–h1	28	2.1909	26	30
e2	20.67	1.2111	19	23	E2–e2	78.5	8.5264	66	88
f1	38.33	1.7512	35	42	C1–c2	32.83	0.9832	29	36
h1	26.67	1.3663	25	29	D1–e2	32.17	2.3166	24	37
V1–V1	22.33	2.0656	20	25	Ps1	7.667	1.2111	6	9
V2–V2	44.83	2.6394	42	48	Ps2	3.833	0.4082	3	4
V1–V2	20.17	4.446	13	29	Ps3	12	1.0954	10	13
Sc1–sc2	9.333	1.2111	8	11	Ag1	26.5	2.5884	22	32
V2–sc1	39.67	4.9666	34	47	g–g	17.33	1.5055	15	20
Sc1–sc2	33.17	1.6021	31	36	Ag2	20.17	2.9944	16	26
Sc2–sc2	73.33	3.3267	70	78	Ag3	25	1.6733	22	30
V2–sc2	33.83	2.9944	31	39	4a	54.83	4.7924	42	65
3b	25	2	22	28	Ag2–ag2	17.5	0.8367	17	19
3c	24.67	1.8619	22	28	Ag3–ag3	21	1.8974	18	24
2c	33.33	2.7325	28	38	Ps3–ps3	15.17	1.472	14	17
1a	33.67	12.388	75	96	Ps2–ps2	8.833	1.3292	8	10
1b	25.67	3.3862	22	32	Ps1–ps1	6.833	0.7528	6	8
1c	26.67	2.582	22	30	Or1–Or1	4.833	0.4082	4	5
M	34.5	5.9582	38	44	Or2–Or2	7.667	0.8165	6	8
Or2	15.17	0.9832	13	16	n	44.67	2.6583	40	52

Hysterosomal shield CD rectangular, with 3 pairs of setae, c_1 , d_1 and d_2 ; shield EF entire, squareish, with three pairs of setae, e_1 , e_2 and f_1 ; ratio: v_1/v_1-v_1 0.65–0.67, sc_1/sc_1-sc_1 2.14–2.07, c_1/c_1-c_1 0.29–0.31, d_1/d_1-d_1 0.41–0.41, e_1/e_1-e_1 0.43–0.45, f_1/f_1-f_1 0.64–0.69, h_1/h_1-h_1 1.46–1.42, c_1-c_1 : d_1-d_1 : e_1-e_1 : f_1-f_1 = 1.11–1.13: 0.97–0.99: 0.82–0.84: 1.0:1.0; humeral platelets present, bearing setae c_2 ; suranal shield entire, with 2 pairs of setae, h_1 and h_2 .

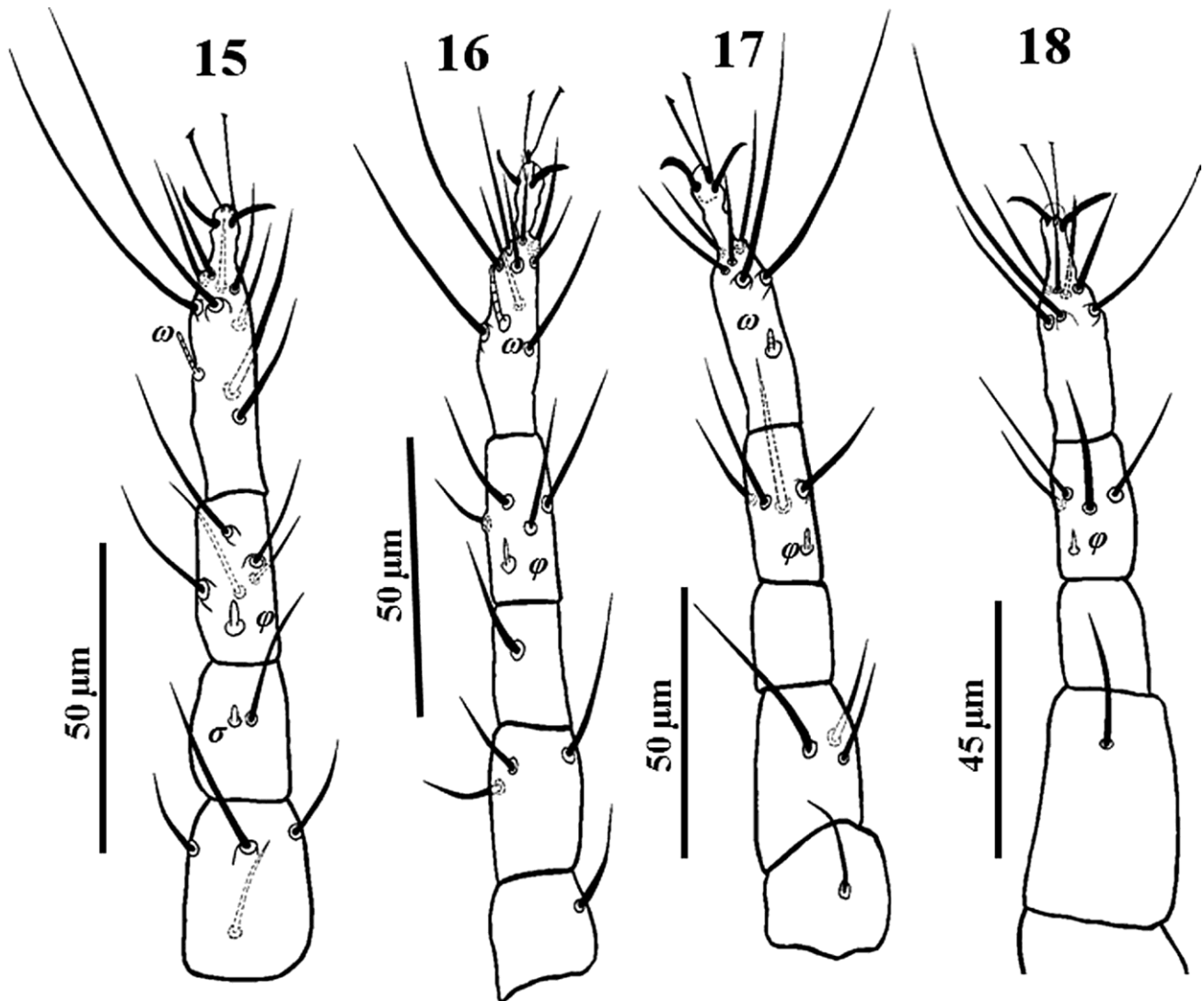
Venter (Fig. 11) – Striated; ventral setae are whip like; length of setae $1a$ 78–85, $1b$ 23–30, $1c$ 26–28,

$2c$ 32–33, $3a$ 50–60, $3b$ 22–25, $3c$ 15–20, $4a$ 25–27, $4b$ 18–28 and $4c$ 20–22. Seta $1a$ about three times longer than ventral setae $4a$; ratio $1a$: $3a$: $4a$ = 3.12–3.15: 2.00–2.22: 1.00–1.00. Aggenital setae on individual platelets ag_1 16–18, ag_2 13–15, ag_3 12–13, ps_1-ps_1 12, ps_2-ps_2 14, ps_3-ps_3 11; distance ag_1-ag_1 24, ag_2-ag_2 35–36, ag_3-ag_3 39–39, ps_1 14–18, ps_2 10–12, ps_3 11–12.

Legs (Figs. 15–18) – Legs are rather short, about half length of the idiosoma. Setal formula of leg segments as follows: coxae 2-1-2-2; trochanters 1-1-1-1;



Figs. 1-5. *Eupalopsellus hamedaniensis* Khanjani *et al.*, male – 1. dorsal view of idiosoma; 2. ventral view of idiosoma; 3. chelicera; 4. subcapitulum; 5. palp.



Figs. 15–18. *Eupalopsellus hamedaniensis* Khanjani *et al.*, deutonymph – 15. leg I; 16. leg II; 17. leg III; 18. leg IV.

femora 4-3-3-1; genua 1 + 1 κ -1-0-0; tibia 5 + 1 ϕ -4 + 1 ϕ -4 + 1 ϕ -4 + 1 ϕ ; tarsi 9 + 1 ω -8 + 1 ω -7 + 1 ω -7. Length of solenidia I ω 9-10; II ω 8-8-; III ω 2-3.

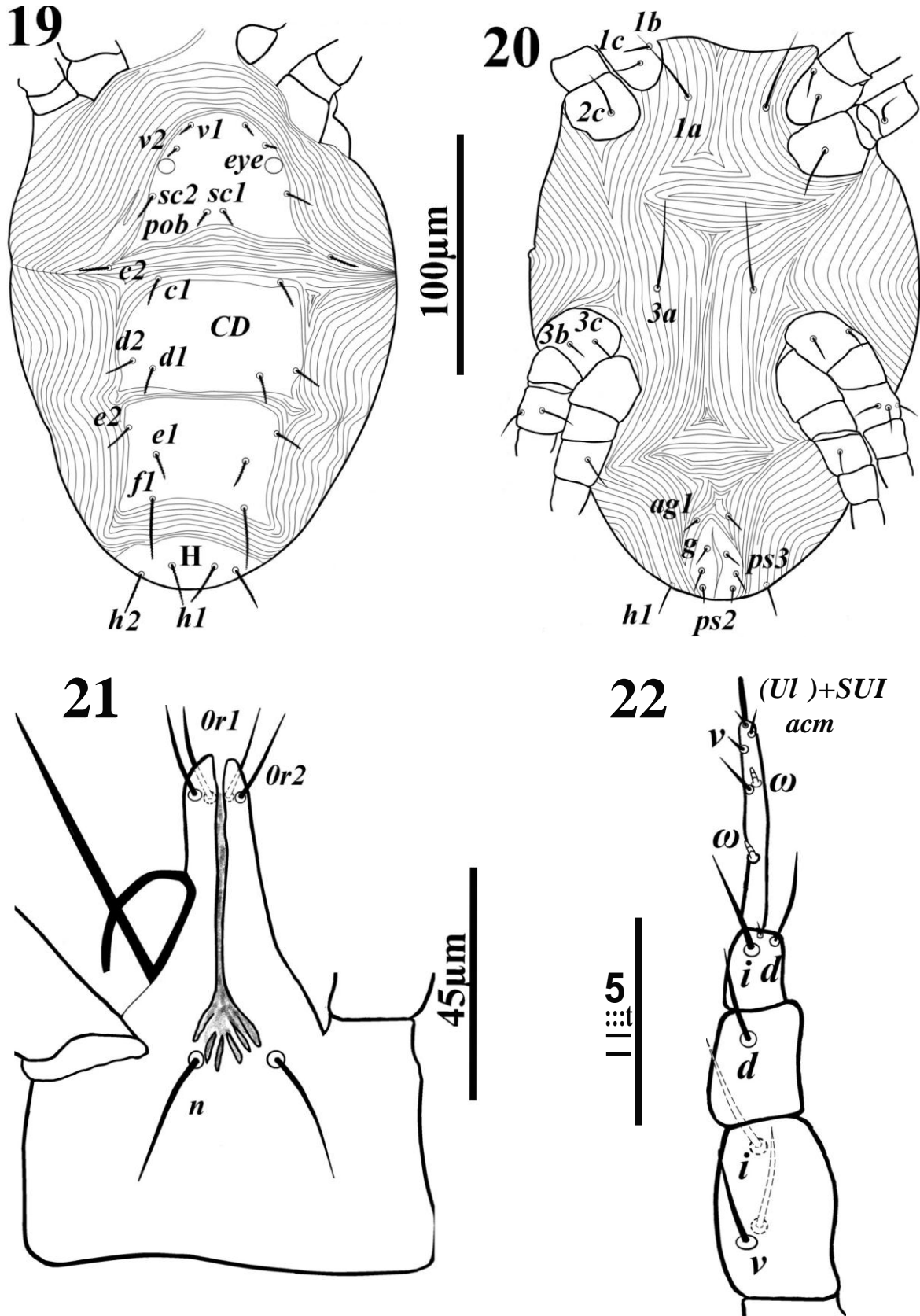
Remarks – Deutonymph is similar to female in most respects, but differs as follows: anogenital area with three pairs of setae (ps_{1-3}) whereas four pairs in female; dorsal setae longer than in female; genual formula 1 + 1 κ -1-0-0 but 1 + 1 κ -1-1-1 in female.

Protonymph (Figs. 19–26) ($n = 6$) – Red in life. Idiosoma is oval in shape. Length of body (excluding gnathosoma) 225–358; (including gnathosoma) 313–495; width 160–225; length of leg I 150–220; leg II 122–188; leg III 138–178; leg IV 126–188.

Gnathosoma (Figs. 21–22) – Chelicerae slender 95–100, similar to that of deutonymph (Fig. 12);

movable digits 50–62. Subcapitulum with two pairs of adoral setae, or_1 12–16, or_2 15–17 and one pair of subcapitular setae, m 22–44; distance m – m 13–15 (Fig. 21). Palpi tapered; palp tarsus: l^tT 3–4 about fifth the length of I 15–17, terminal palp tarsal eupathidium short 7–9; palp tibial claw absent, palp genu 10–11 half the length of palp tibia 20–20; counts of setae and solenidia from palp trochaner to palp tarsus: 0, 3, 1, 3, 4 + 1 ω + 1 sub terminal eupathidium + 1 terminal eupathidium.

Dorsum (Fig. 19) – Idiosoma oval; dorsal shields punctated; dorsal setae with small spinules. Posterior margin of prodorsal shield truncate; pob 12–13, twice as large as eyes 7–9; sc_1 shorter than half distance sc_1 – sc_1 ; lengths of dorsal setae v_1 10–15, v_2 8–15, sc_1



Figs. 19-22. *Eupalopsellus hamedaniensis* Khanjani *et al.*, protonymph – 19. dorsal view of idiosoma; 20. ventral view of idiosoma; 21. subcapitulum; 22. palp.

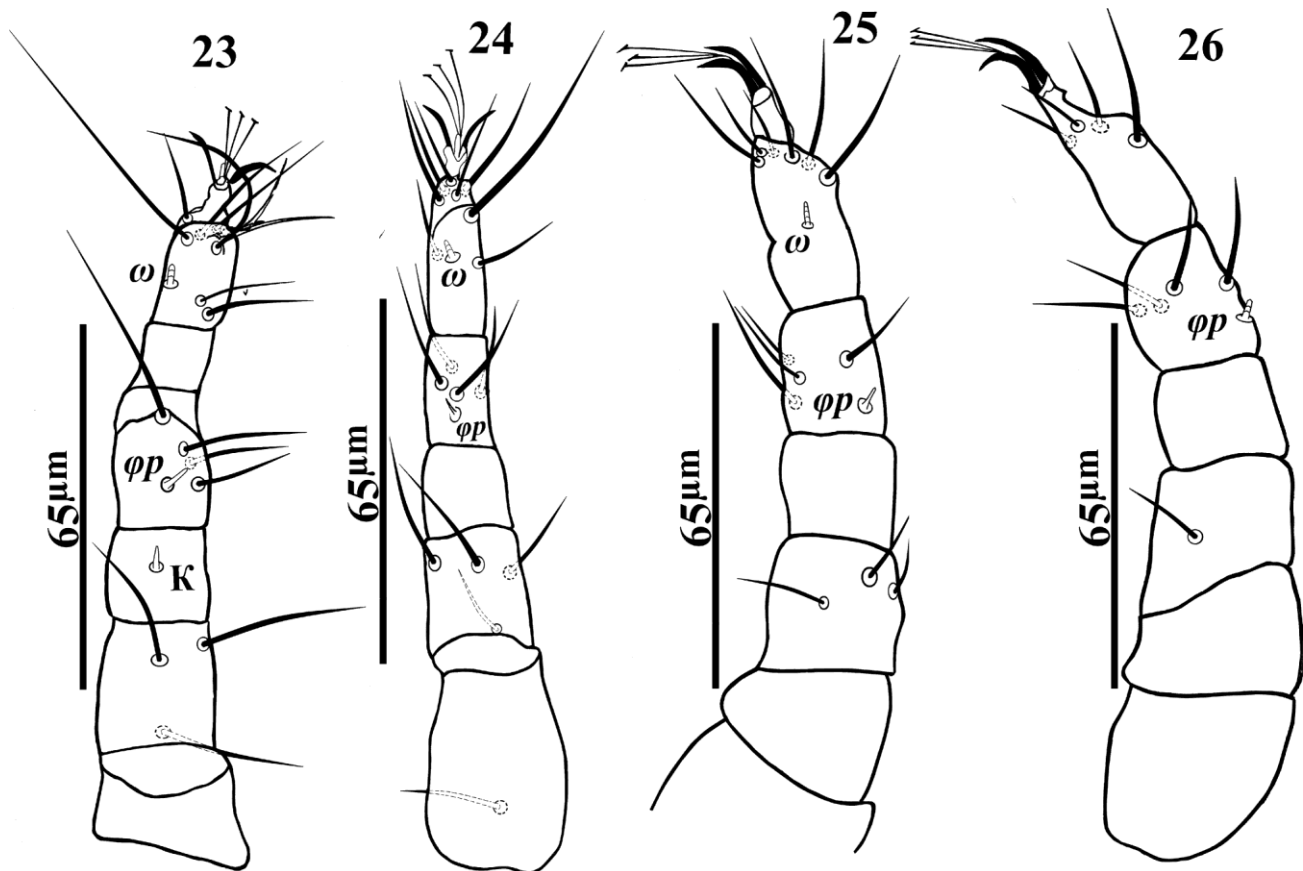
11–23, sc_2 14–23, c_1 14–20, c_2 17–21, d_1 14–20, d_2 15–20, e_1 17–20, e_2 17–21, f_1 46–50, suranal shield entire, with two pairs of setae h_1 21–30, h_2 24–34; distances between dorsal setae: v_1-v_1 20–28, v_1-v_2 25–33, v_2-v_2 41–53, v_2-sc_1 36–41, sc_1-sc_1 9–11, v_2-sc_2 36–43, sc_2-sc_2 62–75, sc_1-c_1 36–49, sc_2-c_2 31–42, c_1-c_1 58–75, c_2-c_2 104–138, d_1-d_1 51–70, c_1-c_2 23–26, c_1-d_1 44–63, d_1-d_2 10–18, c_2-d_2 53–48, d_1-e_1 44–53, e_1-e_1 43–69, e_1-e_2 20–24, e_1-f_1 19–28, e_2-e_2 70–78, d_1-e_2 28–33, d_2-e_2 33–55, f_1-f_1 24–55, h_1-h_1 20–26, h_1-h_2 3–18, h_2-h_2 24–59, f_1-h_1 32–48, f_1-h_2 34–32. More detail in Table 2.

Hysterosomal shield *CD* rectangular, with three pairs of setae, c_1 , d_1 and d_2 ; shield *EF* entire, squareish, with three pairs of setae, e_1 , e_2 and f_1 ; ratio c_1/c_1-c_1 0.2–0.29, d_1/d_1-d_1 0.3–0.32, e_1/e_1-e_1 0.3–0.41, f_1/f_1-f_1 0.7–1.54, v_1/v_1-v_1 0.50–0.54, h_1/h_1-h_1 0.8–1.15; c_1-c_1 : d_1-d_1 : e_1-e_1 : f_1-f_1 = 2.90–2.88: 2.55–2.69: 2.15–2.65: 1.0–1.01; humeral platelets present, bearing setae c_2 ; suranal shield entire, with two pairs of setae, h_1 and h_2 ; ratio h_1 : h_2 = 0.88–0.88:1.0–1.0.

Venter (Fig. 20) – Striated; ventral setae whip like; length of setae la 63–85, $1b$ 20–22, $1c$ 24–30, $2c$ 26–38, $3a$ 58–75, $3b$ 24–28, $3c$ 19–24. Seta $1a$ longer than $3a$ of ventral setae; $4a$ absent; ratio la : $3a$ = 1.09–1.13: 1.0–1.0. Aggenital setae on individual platelets ag_1 13–26, pseudoanal setae: ps_1 11–14, ps_2 13–18, ps_3 13–14; distance ag_1-ag_1 10–11, ps_1-ps_1 13–14, ps_2-ps_2 18–19, ps_3-ps_3 9–10.

Legs (Figs. 23–26) – Legs very short, about one – third the length of the idiosoma. Setal formula of leg segments as follows: coxae 2-1-2-0; trochanters 0-0-0-0; femora 4-4-3-1; genua 0 + 1k-0-0-0; tibia 5 + 1 ϕp -4 + 1 ϕp -4 + 1 ϕp -4 + 1 ϕp ; tarsi 9 + 1 ω -9 + 1 ω -6 + 1 ω -6; Length of solenidia I ω 4-5; II ω 3-4, III ω 2-3.

Remarks – Protonymph differs from deutonymph as follows: anogenital area with one pair aggenital setae (ag_1) but three pairs in deutonymph; coxa IV with two setae in deutonymph; coxa IV without setae in protonymph; trochanters 1-1-1-1; femora 1-1-1-1 and



Figs. 23–26. *Eupalopsellus hamedaniensis* Khanjani *et al.*, protonymph – 23. leg I; 24. leg II; 25. leg III; 26. leg IV.

Table 2. Measurements protonymph of *Eupalosellus hamedaniensis* Khanjani et al.

Stages	Protonymph (n = 6)				Characters	Mean	SD	Min	Max
Characters	Mean	SD	Min	Max	Characters	Mean	SD	Min	Max
Total length	412	78.9	313	495	c1-c1	64	7.26	58	75
Idiosoma length	301	53.9	225	358	C2-c2	116	15	104	138
Body width	189	28.5	160	225	C1-d1	51	6.07	44	63
Leg I	176	23.7	150	220	d1-d1	62	9.66	51	70
Leg II	150	25	122	188	D1-d2	13	0.89	10	18
Leg III	155	18.9	138	178	D1-e1	49	3.08	44	53
Leg IV	153	23.2	126	188	D2-e2	41	8.31	33	55
V1	13	2.12	10	15	D2-d2	87	8.56	77	95
V2	13	2.61	8	15	e1-e2	22	1.34	20	24
Sc1	16	3.78	11	23	e1-e1	56	12.5	43	69
Sc2	18	2.95	14	23	e2-e2	72	3.49	70	78
c1	16	2.51	14	20	E1-f1	25	2.95	19	28
c2	20	0.84	17	21	f1-f1	45	12.7	24	55
d1	18	2.17	14	20	F1-h1	36	6.22	32	48
d2	19	2.07	15	20	h1-h1	22	3.03	20	26
e1	19	0.89	17	20	H1-h2	14	5.46	3	18
e2	20	1.1	17	21	H2-h2	47	14.3	24	59
f1	48	4.7	46	50	Ps2	11	4.09	4	14
h1	25	3.67	21	30	Ps3	16	2.61	12	18
h2	29	4.36	24	34	Ag1	16	5.37	13	26
Vi-vi	24	3.58	20	28	Ps1	16	4.47	13	24
Ve-ve	46	6.07	41	53	3a	69	5.79	58	75
V1-v2	27	13.7	15	43	3c	21.5	2.19	19	24
V2-sc1	39	1.1	36	41	2c	32	3.66	26	38
Sc1-sc2	35	3.49	29	40	1a	69	8.14	63	85
Sc2-sc2	70	5.63	62	75	Or1	14	1.3	12	16
Sc1-c1	42	6.27	36	49					
m-m	13	2.19	9	15					
Or-m	44	4.02	35	49					

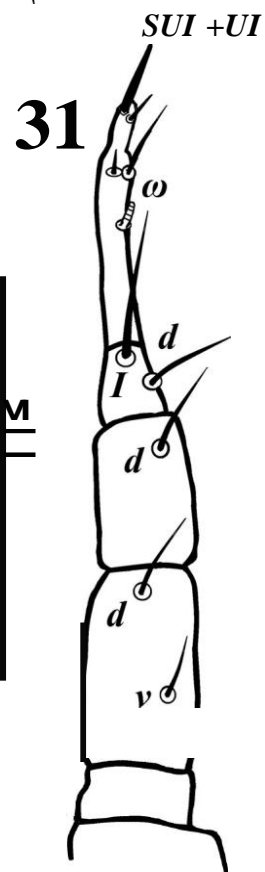
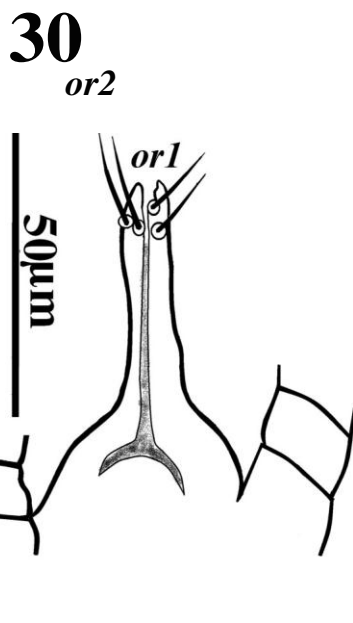
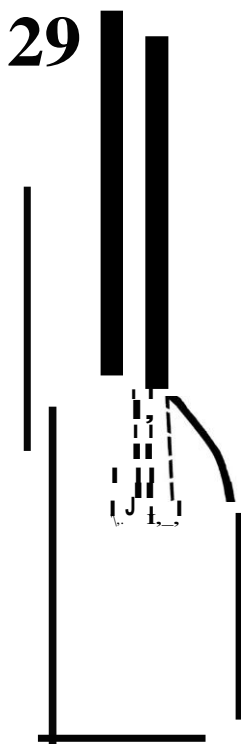
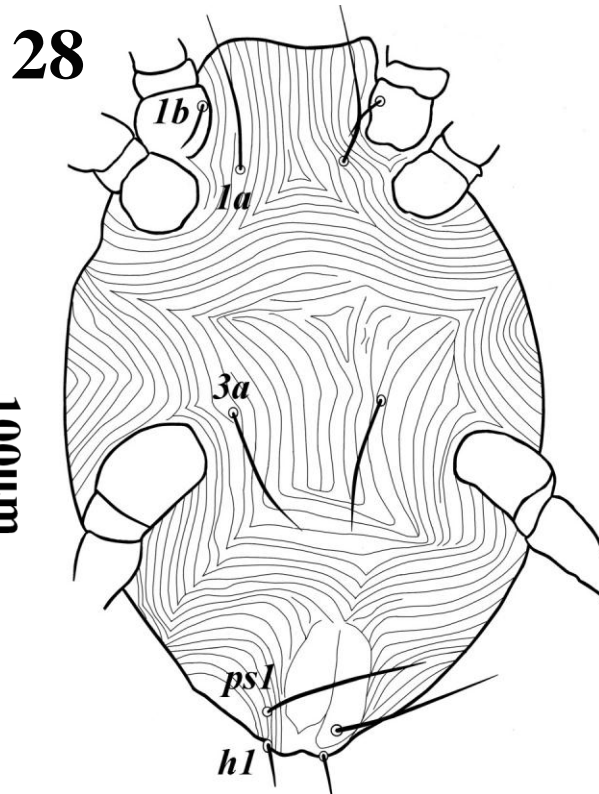
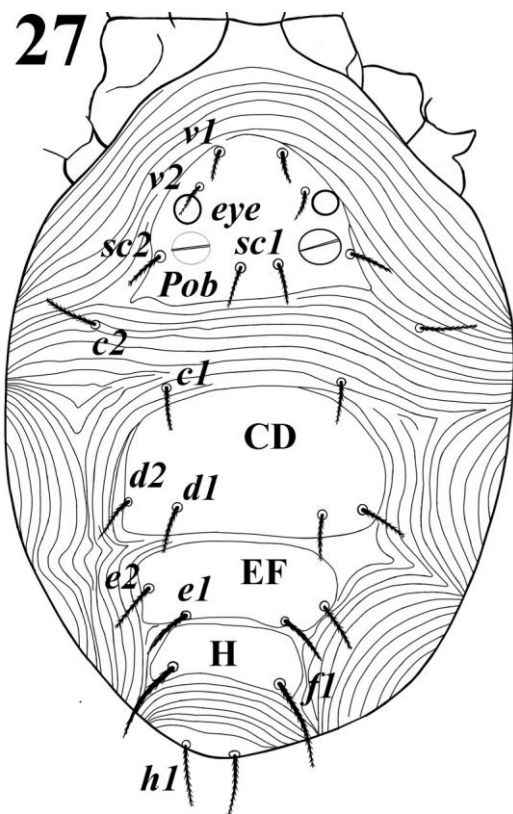
genua 1 + 1K-1-0-0 in deutonymph but 0-0-0-0, 4-4-3-1 and 0 + 1K-1-0-0 in protonymph.

Larva (Figs. 27–34) ($n = 36$) – Red in life. Idiosoma oval. Dimensions: length of body (excluding gnathosoma) 208–323; (including gnathosoma) 333–443; width 130–145; length of leg I 125–137; leg II 113–125; leg III 110–122.

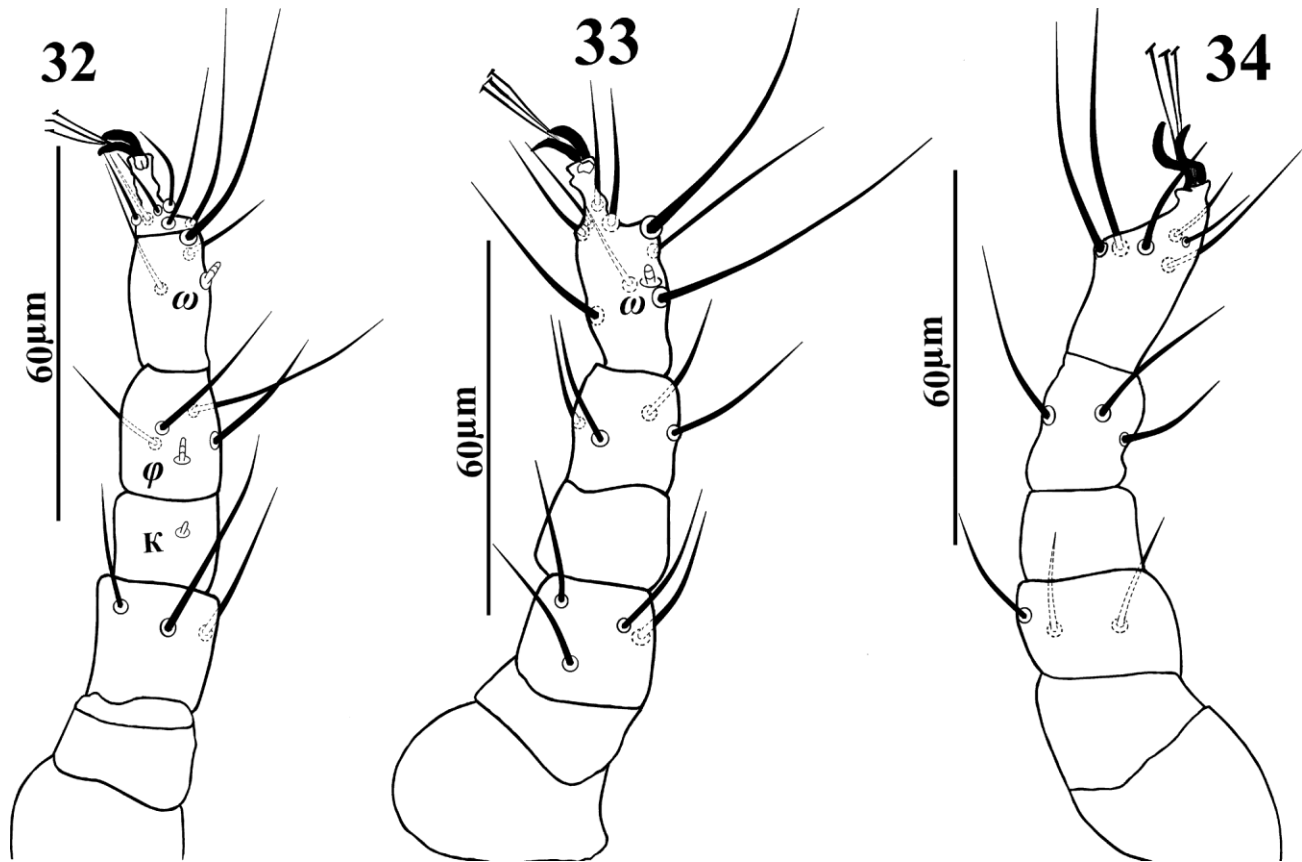
Gnathosoma (Figs. 29–31) – Chelicerae slender 134–135 (Fig. 29); movable digits 46–48. Subcapitulum with two pairs of adoral setae, or_1 12–14; or_2 13–14, without subcapitular setae. Palpi tapered; palp tarsus: l^tT 2–3 about one fifth length of I 15–17, terminal palp tarsal eupathidium short 6–7; palp tibial claw absent, palp genu 17–18 about twice length of palp tibia 9–10; counts of setae and solenidia from palp trochaner to palp tarsus: 0, 2, 1, 3, 4 + 1ω + 1 subterminal eupathidium + 1 terminal eupathidium.

Dorsum (Fig. 27) – Idiosoma oval; dorsal shields punctated; dorsal setae with small spinules. Posterior margin of prodorsal shield truncate; pob 9–12, twice as large as eyes 9–11; sc_1 shorter than half distance sc_1-sc_1 ; lengths of dorsal setae v_1 9–12, v_2 11–13, sc_1 11–15, sc_2 13–16, c_1 13–14, c_2 16–20, d_1 13–17, d_2 16–17, e_1 15–19, e_2 16–20, f_1 28–31, h_1 19–23; distances between dorsal setae; v_1-v_1 16–22, v_1-v_2 9–15, v_2-v_2 32–34, v_2-sc_1 22–29, sc_1-sc_1 5–7, v_2-sc_2 23–24, sc_2-sc_2 52–55, sc_1-c_1 40–43, sc_2-c_2 30–31, c_1-c_1 44–49, c_2-c_2 79–81, d_1-d_1 37–41, d_2-d_2 58–60, c_1-c_2 20–28, c_1-d_1 34–40, d_1-d_2 10–12, c_2-d_2 54–57, d_1-e_1 28–34, e_1-e_1 31–34, e_1-e_2 12–15, e_1-f_1 15–18, e_2-e_2 52–57, d_1-e_2 24–27, d_2-e_2 25–54, f_1-f_1 31–36, h_1-h_1 15–17, f_1-h_1 25–28. More detail in Table 3.

Hysterosomal shield CD rectangular, with two pairs of setae, d_1 and d_2 ; shield EF entire, rectangular with two pairs of setae, e_1 , e_2 ; ratio c_1-c_1 : d_1-d_1 :



Figs. 27-31. *Eupalopsellus hamedaniensis* Khanjani *et al.*, larva-27. dorsal view of idiosoma; 28. ventral view of idiosoma; 29. chelicera; 30. subcapitulum; 31. palp.



Figs. 32–34. *Eupalopsellus hamedaniensis* Khanjani *et al.*, larva – 32. leg I; 33. leg II; 34. leg III.

Table 3. Measurements of larva of *Eupalopsellus hamedaniensis* Khanjani *et al.*

Stages	Larva (n = 36)				Characters	Mean	SD	Min	Max	
	Characters	Mean	SD	Min						Max
Body width		135	5.26	130	145	C1–C1	45.8	1.94	44	49
Leg I		130	5.05	125	137	C1–d1	36.7	2.16	34	40
Leg II		119	5.38	113	125	d1–d1	39.2	1.47	37	41
Leg III		117	4.66	110	122	D1–d2	10.7	1.03	10	12
V1		10.8	1.16	9	12	D1–e1	32.2	2.78	28	34
V2		11.7	0.81	11	13	D2–e2	34.3	11.9	25	54
Sc1		13.2	1.32	11	15	D2–d2	59.2	0.75	58	60
Sc2		14.2	1.16	13	16	e1–e1	31.8	1.47	31	34
c1		13.7	0.51	13	14	E1–f1	16.8	1.16	15	18
c2		18.3	1.96	16	20	f1–f1	32.8	1.72	31	36
d1		15	1.41	13	17	h1–h1	15.8	0.75	15	17
d2		16.3	0.51	16	17	E1–e2	13.5	1.22	12	15
e1		17.3	1.36	15	19	Ps1	79	5.09	74	85
e2		18.2	1.72	16	20	3a	59.2	5.63	50	65
f1		29.2	1.16	28	31	1a	54.8	5.7	45	60
h1		20.5	1.64	19	23	1b	27.7	6.25	20	35

Table 4. Leg segment setal counts of different stages of *Eupalopsellus hamedaniensis* Khanjani *et al.*

Life stage	Cx I-IV	Tr I-IV	Fe I-IV	Ge I-IV	Ti I-IV	Ta I-IV
Female	2-1-2-2	1-1-1-1	4-4-3-1	1 + 1κ-1-1-1	5 + 1φ-4 + 1φ-4 + 1φ-4 + 1φ	9 + 1ω-8 + 1ω-7 + 1ω-7
Male	2-1-2-2	1-1-1-1	4-4-3-1	1-1-1-1	5 + 1φ + 1-4 + 1φ-4 + 1φ-4 + 1φ	10 + 2ω-7 + 2ω-6 + 2ω-6 + 1ω
Deutonymph	2-1-2-2	1-1-1-1	4-3-3-1	1 + 1κ-1-0-0	5 + 1φ-4 + 1φ-4 + 1φ-4 + 1φ	9 + 1ω-8 + 1ω-7 + 1ω
Protonymph	2-1-2-0	0-0-0-0	4-4-3-1	0 + -0-0-0	5 + 1φp-4 + 1φp-4 + 1φp-4 + 1φp	9 + 1ω-9 + 1ω-6 + 1ω-6
Larva	1-0-0	0-0-0	1φ-0-0	1-0-0	4 + 1φ-4-3	9 + (1ω)-9 + (1ω)-6

e_1-e_1 : f_1-f_1 = 1.42-1.36: 1.19-1.14: 1.0-0.94: 1.0-1.0; humeral platelets present, bearing setae c_2 ; suranal shield entire, with one pair of setae, h_1 (Fig. 27).

Venter (Fig. 28) – striated; ventral setae are whip-like; length of setae la 45-60, lb 20-35, $3a$ 50-65. Setae $1a$ about twice length of $3a$ ventral setae; ratio $la:3a$ = 1.08-0.92: 1.0-1.0; ps_1-ps_1 22.

Legs (32-34) – Three pairs of legs short, about half the length of idiosoma. Number of setae and solenidia (in parentheses) on leg segments: coxae 1-0-0; trochanters 0-0-0; femora 4-3-3; genua 1κ;-0-0; tibia 4 + (1φ)-4-3; tarsi 9 + (1ω)-9 + (1ω)-6. Length of solenidia Iω 3-4; IIω 2-3.

Remarks – see Table 4.

Material Examined – Seven male specimens were collected from sweet cherry (*Prunus avium* L.) and Plum (*Prunus salicina* Lindl) leaves infested with brown mite, *B. rubrioculus* (Scheuten) (Acari: Tetranychidae), 9 August 2008, 29 August 2008, 5 September 2008, 26 September 2008, 11 September 2009; Iran: Abbas-Abad, Hamedan, Hamedan province (34°47'54"N 48°30'53"E), altitude 1830 m above sea level, Elahe Rostami, coll.; two deutonymphs were collected from *Achillea millefolium* L. (Asteraceae), 29 October 2009; Iran: Heydareh, Hamedan, Hamedan province (34°48'N, 48°28'E), altitude 1873 m above sea level, Bahman Asali Fayaz, coll.; six protonymphs were collected from sweet cherry with infested leaves, Iran: Abbas-Abad, Hamedan, Hamedan province (34°47'54"N 48°30'53"E), altitude 1830 m above sea level); 29 August 2008, 17 July 2009, 14 August 2009, 9 October 2009, Elahe Rostami, coll.; 36 larvae were collected from sweet cherry leaves leaves; Iran: Abbas-Abad, Hamedan, Hamedan province (34°47'54"N, 48°30'53"E) altitude 1830 m above sea level; 15 August 2008, 29 August 2008, 5 September 2008, 26 September 2008, 24 October 2008, 14 August 2009, 28 August 2009, 4 September 2009, 11 September 2009, 18

September 2009, Elahe Rostami, coll.; six male, one deutonymph, five protonymph and 35 larva mounted specimens are deposited in the Acari Collection of the Department of Plant Protection, Faculty of Agriculture, University of Bu-Ali Sina, Hamedan, Iran and one slide mounted specimen will be deposited in the Arachnida Collection of ARC-Plant Protection Research Institute, Pretoria, South Africa.

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