A NEW SPECIES OF THE GENUS *NEOPHYLLOBIUS* BERLESE (ACARI: CAMEROBIIDAE) FROM IRAN

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ABSTRACT – A new species of the genus *Neophyllobius* Berlese, 1886, namely, *Neophyllobius mitrae* **n. sp.** is described. The new species was collected from soil under date trees (*Phoenix datylofera* L.) (Arecaceae) in Ahwaz, Kuzestan Province, south of Iran. A key to all known species of Iran is given.
Key words – Acari, Camerobiidae, *Neophyllobius*, Ahwaz, *Phoenix datylofera* L., Iran.

INTRODUCTION

The family Camerobiidae is the second largest family in the superfamily of Raphignathoidea after Stigmaeidae, which was designated by Southcott (1957). Currently, this family comprises six genera (Bolland, 1986; DuToit *et al*. 1998). Members of this family can be found on the plants, moss, leaf litters, and soil (Bolland, 1986), preying on phytophagous mites, the first instar nymphs of armored scale insects (Meyer, 1962; Richards, 1962; Gerson, 1971, 1972, 1973; Chaudhri *et al*., 1974; Gerson and Smiley, 1990; DuToit *et al*., 1998; Bolland and Mehrnejad, 2001; Khanjani and Ueckermann, 2002, 2006; Khanjani *et al*., 2010). Two genera and seven species of this family are recorded from Iran to date, namely, *Neophyllobius persiaensis* Khanjani and Ueckermann from litter under *Sophora pachycarpa* Schrenk (Fabaceae); *N. cameli* Khanjani and Ueckermann from litter under tea bushes; *Neophyllobius astragalusi* Khanjani and Ueckermann from soil under *Astragalus* sp. bushes; *Neophyllobius pistachiae* Bolland and Mehrnejad from tenuipalpid and eriophyid mites which were associated with pistachio trees; *Neophyllobius asalii* Khanjani and Ueckermann, from grass litter; *Neophyllobius zolfigolii* Khanjani *et al*., 2010, from soil under wild rose bushes; and *Neophyllobius kamalii* Khanjani *et al.*, 2010, from pomegranate leaves infested with *Cenopalpus irani* Dosse (Acari:Tenuipalpidae). In this article, the eighth species is described.

MATERIALS AND METHODS

Mites for this study were collected from Ahwaz ($31^{\circ}20^{1}$ N, $48^{\circ}41^{1}$ E, 18 m (above sea level) a.s.l.), Khuzestan Province, in soil under date trees. The collected mites were separated under a stereomicroscope and directly mounted in Hoyer's medium. Chaetotaxy of the new species follows Kethley (1990) and Khanjani *et al.* (2010). All measurements are given in micrometers.

Genus *Neophyllobius* Berlese

***Neophyllobius elegans* Berlese**, 1886: **19**

Diagnosis – Dorsum with 14 or 15 μm long, stout, serrated setae; two pairs of eyes. Ventral surface with two pairs of setae, *4a*, *ag*; anogenital valves with two pairs of genital setae (g_{1-2}) and three pairs of

pseudoanal setae ($ps_{1–3}$). Coxae I–II and coxae III–IV well separated; coxal shields smooth or reticulated; trochanters visible from dorsal view, each with one seta; genual setae more whip like, genua I and II with seta *k*, genua less than one-fourth of the length of tibiae. Setal formula of tibiae 9-9 or 8-8-7; each tibia of female with a solenidion but tibia I of male with two solenidia (ϕ); tarsi III and IV of female without solenidia; tarsi 9(1ω) or 10(1ω)-9(1ω) or 10(ω)-7 or 8(0-1ω)-7 or 8. Tarsi I–IV with two mid-ventral setae. All tarsi with two claws and an empodium with tenent hairs.

KEY TO *NEOPHYLLOBIUS* SPECIES OF IRAN

1. Tarsi formula 10(ω)-10(ω)-8-8 ..... **2**
– Tarsi formula 10(ω)-9(ω)-8-8 ..... **4**

2. Setae c_1, d_1 and e_1 equal to sub equal in length **3**
– Setae c_1 (62) less than half length of d_1 (143) and e_1 (116)..... ..... ***N. persiaensis*** **Khanjani & Ueckermann**

3. Setae c_1 (74), d_1 (69) and f_1 (62) subequal in length; genual setae I-II about half length of tibiae ***N. cameli*** **Khanjani & Ueckermann**
– Setae (c_1, d_1 and e_1) equal in length (125); genual setae I-II longer than tibiae..... ..... ***N. pistachiae*** **Bolland & Mehrnejad**

4. Setae c_1 (59), $e_1 \leq 128$, $f_1 \leq 105$ **7**
– Setae $c_1 \geq 165$, $e_1 \geq 152$, $f_1 \geq 118$..... **5**

5. Setae c_1 (95) 2.6 times length of h_2 (37)..... ..... ***N. kamalii*** **Khanjani *et. al.***
– Setae c_1 more than three times length of h_2 .... **6**

6. Seta *d* on femur I as long as or slightly shorter than distance to articulation facet with genu; setae c_1 208, d_1 and e_1 223 long; c_1 extends past posterior margin of body..... ..... ***N. astragalusi*** **Khanjani & Ueckermann**
– Seta *d* clearly shorter than distance to articulation facet; setae c_1 (195), d_1 (163) and e_1 (173) long, c_1 extends beyond f_1 .... ***N. asalii*** **Khanjani & Ueckermann**

7. Setae e_1 (103), f_1 (72) and h_1 (25)..... ..... ***N. zolfigolii*** **Khanjani *et al***
– Setae e_1 (128), *f1* (105) and h_1 (42)..... ..... ***N. mitrae*** **n. sp.**

Neophyllobius mitrae **n. sp**.

(**Figs. 1–12**)

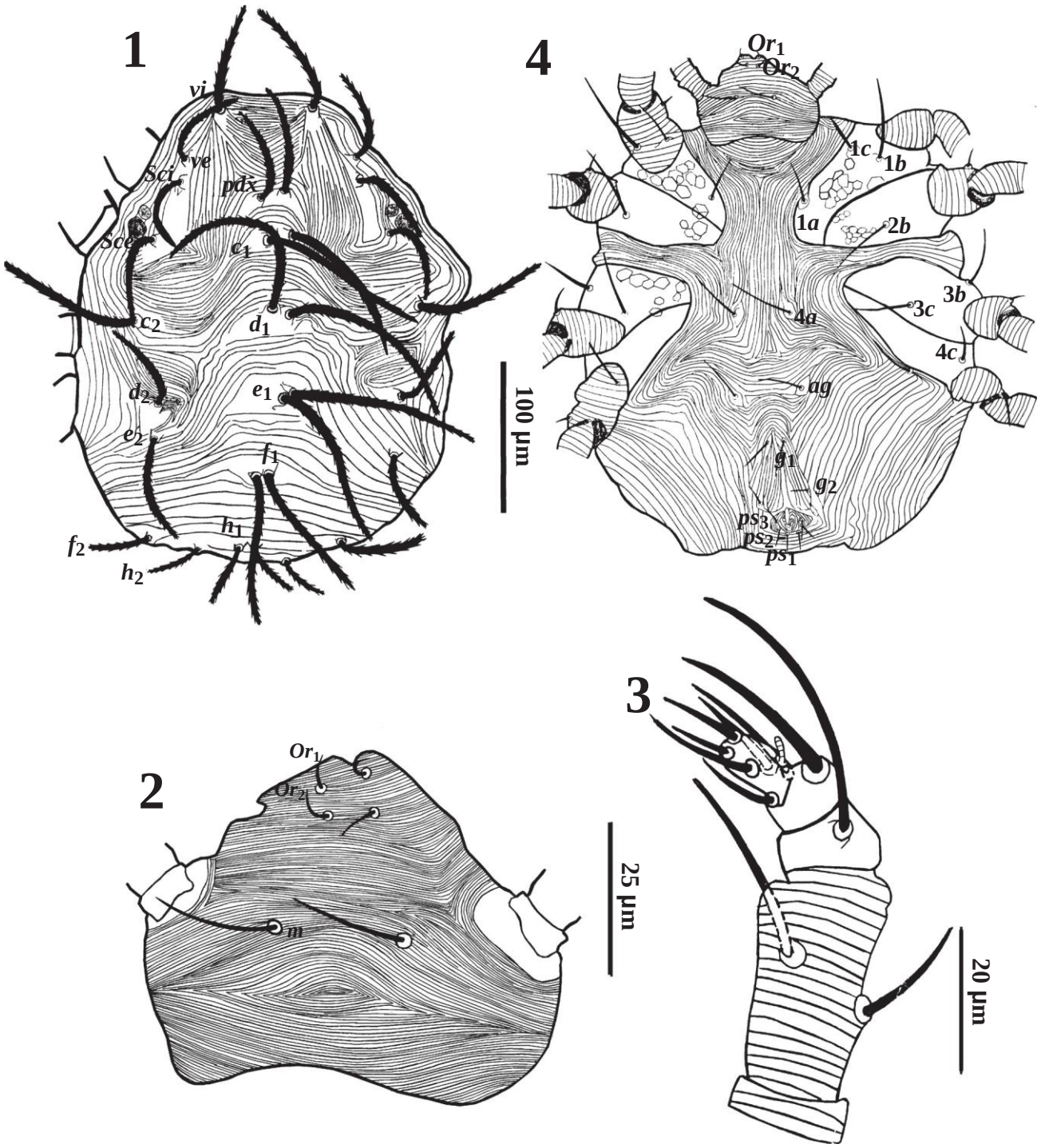
FEMALE – Dimensions (measurements of holotype with measurements of paratype in parenthesis): length of body excluding gnathosoma 341 (344), width 222 (225).

GNATHOSOMA (Figs. 2 and 3) – Gnathosoma 90 (93) long (from base of infracapitulum to tip of palp) and 82 (83) wide. Infracapitulum only with setae *m* 22 (24) and two pairs of adoral setae ($or_{1–2}$), or_1 7 (7), or_2 12; *m-m* 25 (270) (Fig. 2). Palp (Fig. 3) five segmented with following setal distribution: tarsus with two eupathidia, three simple setae, one small solenidion; tibia with three tactile setae, one blade-like seta; genu with one long, slender, serrated seta 33 (35); femur with two serrated setae 15 (17), 28 (31); length of chelicerae 66 (69).

DORSUM – With 15 pairs of long serrated setae set on tubercles (Fig. 1), all setae longer than distance to setae next behind. Length of prodorsal setae: *vi* 75 (79), *ve* 64 (64), *sci* 61 (62), *sce* 64 (66), *pdx* 68 (72); opisthosomal setae: c_1 108 (109), c_2 93 (95), d_1 148 (139), d_2 87 (67), e_1 128 (130), e_2 74 (70), f_1 98 (112), f_2 55 (52), h_1 42 (43), h_2 36 (37). Distances between setae: *vi–vi* 61 (64), *ve–ve* 109 (110), *vi–ve* 43 (39), *vi–pdx* 55 (62), *vi–pdx* 58 (64), *pdx–pdx* 15 (13), *pdx–*c_1 29 (33) c_1–d_1 51 (53), d_1–d_1 10 (9), d_1–d_2 83, d_1–e_1 55 (57), sc_i–sc_i 113 (115), *ve–sci* 14 (15), *sce–sce* 152 (153), *sci–sce* 42 (43), *sce–*c_1 100 (105) *sce–*c_2 42 (42), c_1–c_1 14 (16), c_1–c_2 76 (71), c_2–c_2 152 (154), d_2–d_2 179 (183), e_1–e_1 6 (7), e_1–f_1 61 (62), f_1–h_1 52 (50), e_1–e_2 74 (78), d_2–e_2 57 (59), f_1–f_1 10 (11), f_1–f_2 71 (74), f_2–f_2 131 (133), e_2–f_2 35 (43), h_1–$h_1$10 (11), h_1–h_2 22 (27), h_2–h_2 55 (59), c_2–d_2 53 (55), d_2–e_2 57 (59), f_2–h_2 68 (72). Two pairs of eyes, anterolateral to *sce*.

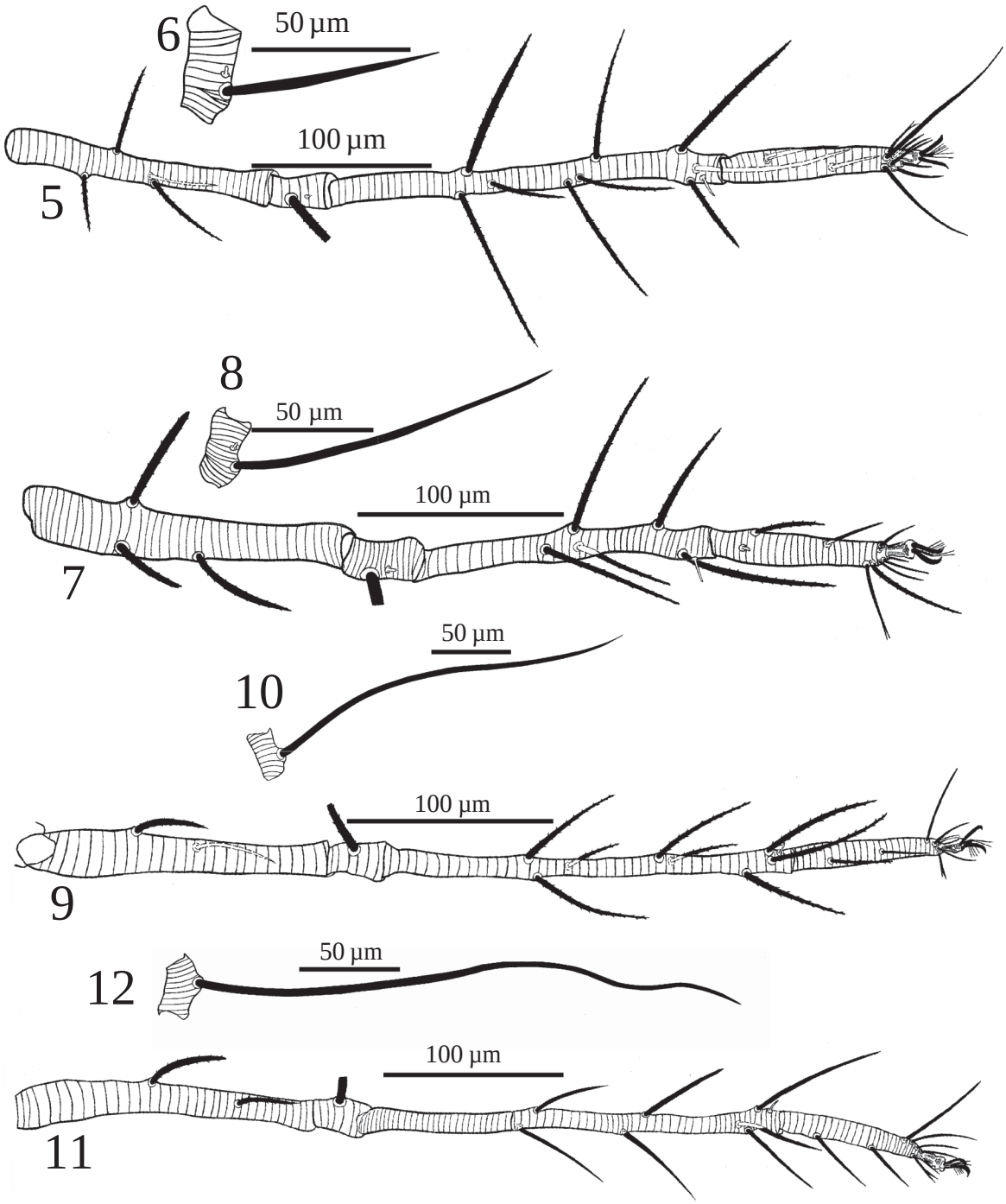
VENTER (Fig. 4) – Coxal setae stout and serrate, setae *1a* slender and slightly serrate. Endopodal shields absent. Anogenital area with one pair of aggenital setae (*ag*), two pairs of genital setae ($g_{1–2}$), and three pairs of anal setae ($ps_{1–3}$) (Fig. 4). Ventral setae: Setae *1a* 31 (33), *1b* 29 (27), *1c* 59 (60), *2c* 51 (51), *3b* 36 (41), *3c* 45 (46), *4a* 43 (48), *4b* 18 (25) *4c* 35 (36). Anogenital setae: *ag* 27 (27), g_1 22 (25), g_2 13 (14), ps_1 11 (8), ps_2 12 (13), ps_3 14 (15); distances g_1–g_1 12 (14).

LEGS (Figs. 5–12) – Leg measurements: I 599 (584), leg II 523 (490), leg III 546 (546), leg IV 590 (596). Chaetotaxy of leg segments as follows (specialized setae in parentheses and not included in setal counts): coxae 3-1-2-2, trochanters 1-1-1-1, femora 4-3-2-2, genua 1(κ)-1(κ)-1-1, tibiae 9(φ)-8(φ)-8(φ)-7(φ), tarsi 10(ω)-9(ω)-8-8. Legs setae as indicated in Figs. 5–12. Genual setae III–IV longer than those of I–II (Figs. 5–8). Genual setae length as follows: I–IV: 81 (83)–155 (157)–282 (236)–331 (327).



Figs. 1–4. *Neophyllobius mitrae* **n. sp.** – 1. Dorsal view of female; 2. infracapitulum; 3. palp of female; 4. ventral view of female.

REMARKS – *Neophyllobius mitrae* closely resembles *N. persiaensis* Khanjani and Ueckermann, 2002, but differs from the latter in: coxae, reticulate versus smooth; tarsi, 10(ω)-9(ω)-8-8 in the former versus 9(ω)-9(ω)-7-8 in the later; length dorsal setae, *pdx* 70, $c_1$108 (109), f_2 55 (52), in *N. mitrae* opposed to



Figs. 5–12. *Neophyllobius mitrae* **n. sp.** – 5. leg I of female; 6. genual setae I of female; 7. leg II of female; 8. genual setae II of female; 9. leg III of female; 10. genual setae III of female; 11. leg IV of female; 12. genual setae IV of female.

pdx 49 (46–54), c_1 62 (62), f_2 39 (39) in *N. persiaensis*; genual seta, II–IV 155 (157)–282 (236)–331 (327), respectively, in the former whereas 123 (100), 185 (162–196), 262 (223), respectively, in the latter. For more details see Table 1.

MALE – Unknown.

Table 1. Dimensions of dorsal and genual setae of Iranian *Neophyllobius*.

Setal lengths	*N. mitrae* **n. sp.**	*N. zolfigoli*	*N. kamalii*	*N. pistaciae*	*N. camelli*	*N. astragalusi*[a]	*N. asalii*	*N. persiaensis*
vi	77 (77)	75 (63–80)	63 (54–68)	85	49	92	83 (68–83)	88 (65–88)
ve	64 (64)	59 (55–63)	68 (55–70)	80	54	85	60 (60–70)	69 (54–62)
sci	61 (62)	53 (53–55)	67 (45–68)	85	46	85	75 (58–70)	62 (54–62)
sce	65 (66)	56 (53–63)	69 (65–78)	85	46	85	76 (65–73)	54 (54–62)
pdx	70 (72)	53 (53–58)	79 (74–83)	110	54	108	88 (82–88)	49 (46–54)
c_1	108 (109)	59 (58–70)	95 (78–100)	125	74	208	195 (170–198)	62 (56–62)
c_2	93 (95)	83 (75–85)	77 (70–78)	110	69	162	110–133	103 (77–103)
d_1	143 (144)	110 (103–113)	87 (72–90)	125	69	223	163 (150–180)	143 (111–143)
d_2	77 (78)	50 (50–58)	65 (55–68)	70–78	46	92	68 (68–75)	69 (46–79)
e_1	128 (130)	105 (102–115)	75 (65–75)	125	69	223	173 (145–188)	116 (102–116)
e_2	72 (74)	61 (58–65)	45 (41–48)	70	46	100	80 (68–80)	72 (54–75)
f_1	105 (106)	75 (68–83)	52 (42–54)	95	62	178	128 (113–143)	100 (78–100)
f_2	53 (55)	35 (33–40)	38 (32–38)	50	39	77	53 (53–63)	39 (33–52)
h_1	42 (43)	27 (25–33)	12 (10–14)	35	34	46	38 (45–58)	31 (31–43)
h_2	36 (37)	28 (25–30)	39 (31–40)	45	34	62	50 (43–50)	33 (30–40)
***Ge* I**	81 (83)	73 (70–75)	175 (170)	145	112	266	238 (250)	77 (70–87)
***Ge* II**	156 (155)	101 (80–113)	200 (170)	202	85	285	288 (312)	123 (95–140)
***Ge* III**	259 (282)	151 (148–160)	255 (267)	261	177	324	313 (326)	185 (130–195)
***Ge* IV**	329 (327)	224 (213–225)	283 (285)	277	231	Broken off	363 (356)	262 (195–162)

Note: [a]Only the measurements of holotype were available.

ETYMOLOGY – This species is named in honor of Mrs. Mitra Baharlu, one of the post-graduate students of the first author, Shahid Chamran University of Ahwaz, Iran, for her assistance in collecting the specimens.

Type Materials – Holotype and paratype females were collected from aforementioned location on 18 October 2003 by Mitra Baharlu. The type materials are preserved as slide-mounted specimens and the holotype female is deposited in the Acari Collection of Department of Plant Protection, Faculty of Agriculture, University of Bu-Ali Sina, Hamedan, Iran; and the paratype female will be deposited in the Arachnida Collection of ARC – Plant Protection Research Institute, Pretoria, South Africa.

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