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Article

A new species of the genus *Raphignathus* (Acari: Raphignathidae) from western Iran

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Abstract

A new species of the genus *Raphignathus* Dugés (Acari: Raphignathidae), *R. khorramabadensis* Bagheri **sp. nov.** is described and illustrated from soil in Bisheh region, suburb of Khorramabad in Lorestan province, western Iran.

Key words: Trombidiformes, Raphignathina, Khorramabad, Lorestan province.

Introduction

Raphignathidae is the oldest family in superfamily Raphignathoidea and belongs to the Trombidiformes (Walter *et al*. 2009). They are predaceous mites and can be found underneath tree bark, in lichens, moss, leaf litter, pigeon nest and intestine of wedded seal, in soil, on a wide range of plants and in house dusts (Fan & Yin 2000, Khanjani & Ueckermann 2003). They can be characterized by cheliceral basis forming a stylophore, cervical peritremes not embedded in dorsal surface of stylophore and confluent coxae. The genus *Raphignathus* Dugés is one of two genera in this family and has a worldwide distribution with 63 species of which 16 are introduced from Iran, namely, *R. aethiopica* (Meyer & Ryke, 1960), *R. collegiatus* Atyeo, Baker & Crossley, 1961, *R. gracilis* Rack, 1962, *R. sceptrum* Chaudhri, Akbar & Rasool, 1979, *R. hexeris* Chaudhri, 1979, *R. bakeri* Zaher & Gomaa, 1980, *R. ehari* Zaher & Gomaa, 1980, *R. atyeoi* Meyer & Ueckermann, 1989, *R. giselae* Meyer & Ueckermann, 1989, *R. zhaoi* Hu, Jing & Liang, 1995, *R. aciculatus* Fan, 2000, *R. hecmatanaensis* Khanjani & Ueckermann, 2003, *R. protaspus* Khanjani & Ueckermann, 2003, *R. saboorii* Ghorbani & Bagheri, 2011, *R. larestanensis* Bagheri, 2012 and *R. azarshahriensis* Ahaniazad *et al.*, 2012 (Kamali *et al.* 2001; Khanjani & Ueckermann 2003; Ghorbani *et al*. 2010; Ghorbani *et al*. 2011; Dehghan Dolati *et al.* 2011; Rahmani *et al.* 2011; Shirinbeik Mohajer *et al.* 2012; Bagheri *et al*. 2012; Ahaniazad *et al*. 2012). In this paper a new species, *R. khorramabadensis* **sp. nov.** from southwest Iran is described and illustrated.

Material and Methods

Mites were extracted from soil by mean using a Berlese Tullgren funnel. Specimens were cleared in Nesbitt's fluid, mounted in Hoyer's medium (Walter & Krantz 2009)

and examined at 1000× magnification under an Olympus BX41 phase contrast microscope. All drawings were made by using a drawing tube. The length of gnathosoma was measured from the base of the chelicerae to the tip of palp, the length of the idiosoma from the suture between the gnathosoma and idiosoma to the posterior margin of the idiosoma, the width of the idiosoma at the broadest part of the idiosoma and setae were measured from their insertion to their tips; distances between setae were measured between their insertions. The terminology and abbreviations follow that of Kethley (1990) and all measurements are given in micrometers (μm).

Family Raphignathidae Kramer, 1877
Genus *Raphignathus* Dugés, 1834
Type species: *Raphignathus ruberrimus* Dugés, 1834

***Raphignathus khorramabadensis* Bagheri sp. nov. (Figs. 1–7)**

Diagnosis

Median shield spherical anteriorly and truncated posteriorly, with three pairs of setae; palpfemur with three setae; no setae on interscutal membrane; the small plates behind the prodorsal shields present; all dorsal shields punctated and dorsal setae setiform; coxisternal shields adjacent to coxae I –IV, with three pairs of setae; setal formula of femora-tarsi as follows: femora 6-6-4-4; genua 5(+κ)-5(+κ)-4-4; tibiae 5(φ +*φp*)-5(+*φp*)- 5(+*φp*)-4(+*φp*); tarsi 19(+*ω1*+ *ω2*)-15(+ω)-13(+ω)- 13(+ω).

Description of female (*n* = 3)

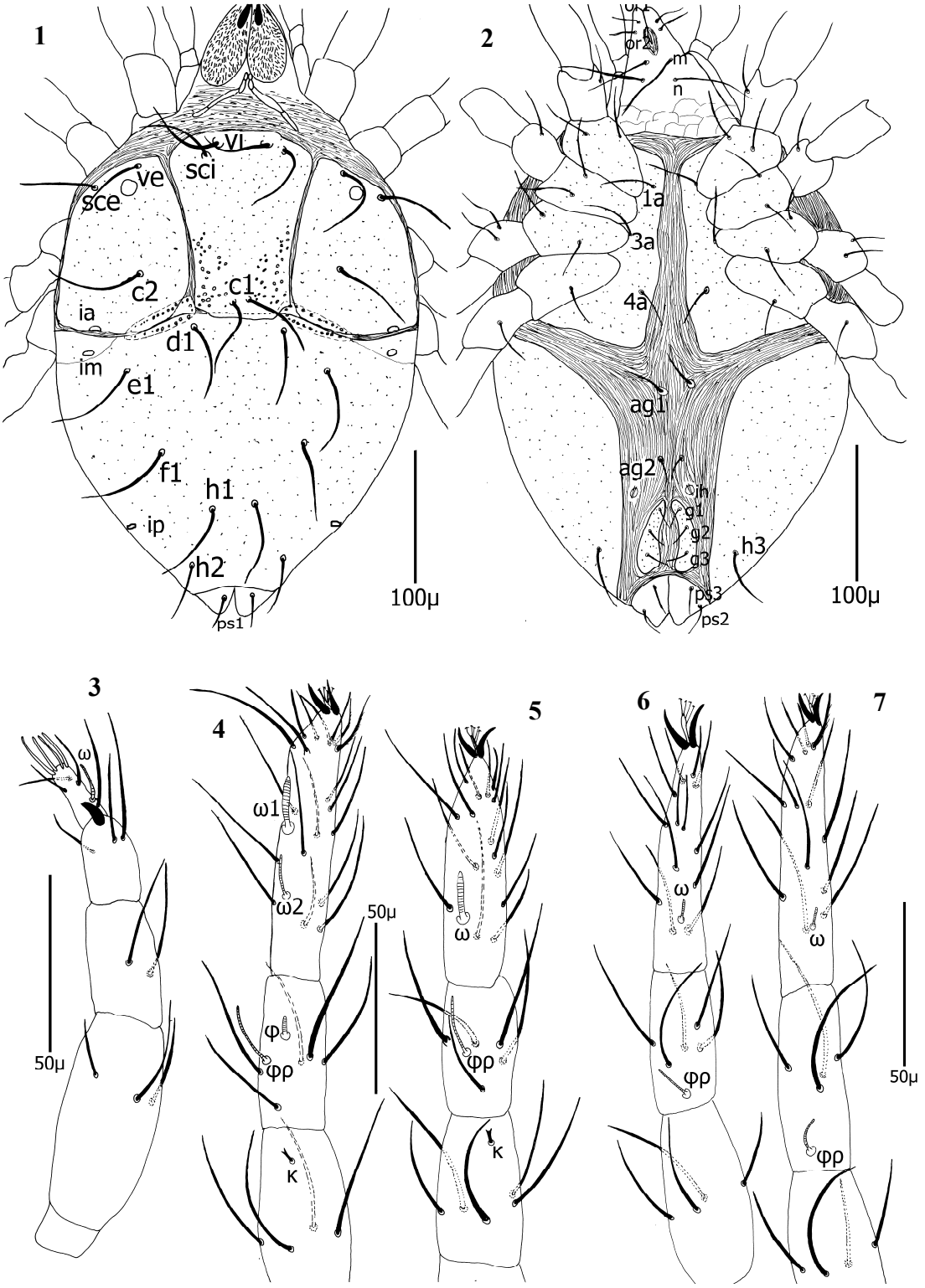
Idiosoma oval, length of body (including gnathosoma) (the measurements for the paratypes in parenthesis): 562 (575–587); length of gnathosoma 190 (200–210); width of body 262 (282–292); length of leg I 346 (375–378); leg II 302 (330–341); leg III 323 (350–356); leg IV 399 (422–428).

Dorsum (Fig. 1). Prodorsum with one median and two lateral shields; median shield spherical anteriorly and truncated posteriorly, with three pairs of setae (*vi*, *sci* and c_1); lateral prodorsal shields with one pair of eyes, three pairs of setae (*ve*, *sce* and c_2) and one pair of cupules (*ia*); opisthosomal shield with six pairs of setae (d_1, e_1, f_1, h_1, h_2, and h_3) and one pair of cupules (*ip*); with no setae on interscutal membrane; the small plates behind the prodorsal shields present and concealed under dorsal plates; all dorsal shields punctated and dorsal setae setiform. Lengths of dorsal setae as follows: *vi* 70 (65–67); *ve* 65 (66–67); *sci* 72 (65–72); *sce* 62 (63–68); c_1 63 (63–65); c_2 70 (65–70); d_1 62 (61–62); e_1 72 (67–71); f_1 67 (62–68); h_1 60 (60–62); h_2 50 (50–52); h_3 52 (50–55); distances between dorsal setae: *vi–vi* 40 (38–45); *sci–sci* 60 (53–60); *vi–sci* 15 (15–20); *ve–sce* 37 (45–49); *ve–*c_2 72 (73–75); *sce–*c_2 65 (60–62); c_1–c_1 10 (10–12); d_1–d_1 66 (75–76); d_1–e_1 45 (52–55); e_1–e_1 151 (154–165); f_1–f_1 105 (102–110); e_1–f_1 60 (55–57); h_1–h_1 35 (33–40); h_1–h_2 45 (43–45); h_2–h_2 75 (72–73); h_3–h_3 90 (87–100).

Venter (Fig. 2). Venter striated, with coxisternal shields adjacent to coxae I-IV; setae *4a* on coxisternal shields; aggenital area with two pairs of setae (ag_1 and ag_2); genital and anal opening contiguous; genital shields punctated, with three pairs of setae (g_1-g_3); anal opening dorsoventrally, with three pairs of setae (ps_1-$_3$), ps_1 dorsally and ps_2-ps_3 ventrally; one pair of cupules (*ih*) located anterolaterally to genital shields.

Lengths of setae as follows: ag_1 27 (30–35); ag_2 25 (24–25); g_1 18 (17–25); g_2 24 (25–26); g_3 20 (20–23); ps_1 27 (25–27); ps_2 25 (27–29); ps_3 25 (24–27); *1a* 40 (44–52);

3a 27 (32–33); *4a* 33 (35–36).



Figures 1–7. *Raphignathus khorramabadensis* Bagheri **sp. nov.** (female). 1. Dorsal view of idiosoma; 2. Ventral view of body; 3. Palp; 4. Leg I (genu-tarsus); 5. Leg II (genu-tarsus); 6. Leg III (genu-tarsus); 7. Leg IV (genu-tarsus).

Gnathosoma: Subcapitulum (Fig. 2) smooth with reticulations under cuticle; two pairs of subcapitular setae *m* 51 (56–60), *n* 50 (55–60) and two pairs of adoral setae or_1 17 (20–21), or_2 18 (21-22) present; stylophore conical and with bacillus-like striation; palpi (Fig. 3) five-segmented; palp chaetotaxy (femur-tarsus) as follows: 3-2-3+1claw-4+1ω+4 eupathidia.

Legs (Figs. 4–7): Number of setae on legs I–IV: coxae 2-2-2-1; trochanter 1-1-2-1; femora 6-6-4-4; genua 5(+κ)-5(+κ)-4-4; tibiae 5(φ+*φp*)-5(+*φp*)-5(+*φp*)-4(+*φp*); tarsi 19(+ *ω1*+ *ω2*)-15(+ω)-13(+ω)-13(+ω).

Male and immature stages: Unknown.

Etymology

This species is named after the city, Khorramabad, where it was collected.

Type material

Holotype female and two paratype females from soil in Bisheh region, suburb of Khorramabad in Lorestan province, southwestern Iran, collected by Shahriar Jafari. The holotype and one paratype female were deposited in the Arachnida Collection of Plant Protection Research Institute, Pretoria, South Africa and one paratype female was deposited in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, University of Maragheh, Iran.

Remarks

The new species is very close to *R. neocardinalis* Atyeo by having a well-developed hysterosomal shield with setae (d_1-h_3) and no setae on interscutal membrane but differs from that in: 1. Dorsal setae in new species are longer than distances to setae next behind (shorter in *R. neocardinalis*); 2. e_1-e_1 > f_1-f_1 in new species [e_1-e_1 < f_1-f_1 *R. neocardinalis*; (according to Fig. 21; Atyeo 1963)]; 3. Lengths of tarsi I-II-IV: 95 (100–102)-78 (85-86)-101 (105-106) in new species vs. 66-50-70 in *R. neocardinalis*; Lengths of legs I-IV: 346 (375–378)-302 (330–341)-323 (350–356)-399 (422–428) in new species vs. 249-207-232-283 in *R. neocardinalis*.

R. khorramabadensis Bagheri **sp. nov**. is also close to *R. conspicuus* (Berlese), *R. cardinalis* (Ewing). However the new species can easily distinguish from the latter species by having two distinct solenidia on tibia I (5+*φ*+*φp*) and one obvious solenidion on tarsus IV (13+*ω*), whereas *R. cardinalis* has just one solenidion on tibia I and *R. conspicuus* has 13 simple setae on tarsus IV.

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References

Ahaniazad, M., Bagheri, M., Gharakhani, G. & Zarei, E. (2012) *Raphignathus azarshahriensis* n. sp. (Acari: Trombidiformes: Raphignathidae) from northwest Iran. *Acarologia*, 51(4): 425–430.

Atyeo, W.T. (1963) New and redescribed species of Raphignatidae (Acarina) and a discussion of the chaetotaxy of the Raphignathoidea. *Journal of the Kansas*

Entomological Society, 36: 172–186.
Bagheri, M., Akrami, M. A. & Majidi, M. (2012) *Raphignathus larestanensis*, a new species of the genus *Raphignathus* Dugès (Acari: Raphignathidae) from southern Iran. *Systematic & Applied Acaroloy*, 17(1): 53–58.
Dehghan Dolati, M., Asadi, M. & Ostovan, H. (2011) Fauna of predatory mites (Acari) associated with Palm trees in Bam country, Iran. *19th Iranian Plant Protection Congress*, 31 July–3 August, Tehran, p. 15.
Fan, Q.-H. & Yin, X.-M. (2000) The genus *Raphignathus* (Acari: Raphignathidae) from China. *Systematic & Applied Acarology*, 5: 83–98.
Ghorbani, H., Bagheri, M., Saber, M., Mehrvar, A. & Navaii Bonab, R. (2010) Study of family Raphignathidae (Acari: Prostigmata) fauna of orchards and crop fields of Maragheh. *19th Iranian Plant Protection Congress*, 31 July–3 August, Tehran, p. 360.
Ghorbani, H., Bagheri, M., Ueckermann, E. A., Navaei Bonab, R., Mehrvar, A. & Saber, M. (2011) *Raphignathus saboorii* n. sp. a new species of the genus *Raphignathus* (Acari: Trombidiformes: Raphignathidae) from northwest Iran. *Acarologia*, 51(4): 425–430.
Kamali, K., Ostovan, H. & Atamehr A. (2001) *A catalog of mites and ticks (Acari) of Iran.* Islamic Azad University Scientific Publication Center, Tehran. 192 pp.
Kethley, J. (1990) Acarina: Prostigmata (Actinedida). *In*: Dindal, D.L. (Ed.), *Soil Biology Guide*. John Wiley and Sons, New York, pp. 667–756.
Khanjani, M. & Ueckermann, E. A. (2003) Two new species of the genus *Raphignathus* Dugés (Acari: Raphignathidae) from Iran. *Acarologia*, 43: 299–306.
Rahmani, H., Ueckermann, E.A. & Borji, F. (2011) First record of some families, genera and species of Trombidiformes mites (Acari: Trombidiformes) from Zanjan province. *2nd Iranian Pest Management Conference (IPMC)*, 14–15 September, Kerman, p. 134.
Shirinbeik Mohajer, S., Bagheri, M., Saboori, A., Yazdanian, M. & Asadeh, Gh. (2012) Fauna of mites of the superfamily Raphignathoidea (Acari: Prostigmata) in Gorgan county, Golestan province, Iran. *20th Iranian Plant Protection Congress*, 26–29 August, Shiraz, p. 467.
Walter, D. E. & Krantz, G. W. (2009) Collecting, rearing, and preparing specimens. *In*: Krantz, G. W. & Walter, D. E. (eds.) *A Manual of Acarology.* Third edition. Texas Tech University Press, pp. 83–94.
Walther, D.E., Lindoquist, E.E., Smith, I.M., Cook, D.R. & Krantz, G.W. (2009) Order Trombidiformes. *In*: Krantz, G.W. & Walter, D.E. (eds.) *A Manual of Acarology*. Third edition. Texas Tech University Press, pp. 233–420.

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گونهٔ جدیدی از جنس *Raphignathus* (Acari: Raphignathidae) از غرب ایران

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چکیده

گونهٔ جدیدی از جنس *Raphignathus* Dugés (Acari: Raphignathidae) به نام *R. khorramabadensis* Bagheri **sp. nov.** که از خاک منطقه بیشه از حومه شهرستان خرم‌آباد واقع در استان لرستان در غرب ایران جمع آوری شده بود، توصیف و ترسیم شده است.

واژگان کلیدی: Trombidiformes ، Raphignathina ، خرم‌آباد، استان لرستان.

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