

RAPHIGNATHUS SABOORII N. SP. A NEW SPECIES OF THE GENUS *RAPHIGNATHUS*
(ACARI: TROMBIDIFORMES: RAPHIGNATHIDAE) FROM NORTHWEST IRAN

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ABSTRACT — A new species of raphignathid mites from northwest Iran, *Raphignathus saboorii* n. sp. is described and illustrated. A key to all known species of *Raphignathus* in Iran is also given.

KEYWORDS — Acari; Raphignathidae; new species; Iran; *Raphignathus*

INTRODUCTION

Members of the family Raphignathidae are predacious. They can be found underneath tree bark, in lichens, in moss, in leaf litter, in pigeon nests, in soil, on a wide range of plants and in house dusts (Fan and Yin 2000; Khanjani and Ueckermann 2003). This family are easily recognized by the fused cheliceral bases, forming a stylophore; cervical peritremes not embedded in dorsal surface of stylophore and confluent coxae (Meyer and Ueckermann 1989). The genus *Raphignathus* Duges is the oldest genus in this family and has a worldwide distribution with more than 60 species of which seven are known from Iran, namely: *R. collegiatus* Atyeo, Baker and Crossley, 1961; *R. gracilis* (Rack 1962); *R. giselae* Meyer and Ueckermann, 1989; *R. zaoi* Hu,

Jing and Liang, 1995; *R. aciculatus* Fan, 2000; *R. hecmatanaensis* Khanjani and Ueckermann, 2003; *R. protaspus* Khanjani and Ueckermann, 2003 (Khanjani and Ueckermann 2003; Ghorbani *et al.* 2010). In this paper a new species, *R. saboorii* n. sp. from northwest Iran is described and figured.

MATERIALS AND METHODS

Litter and soil samples were taken from apple orchards at Maragheh, East Azerbaijan Province, Iran. Measurements were taken as follows: length of idiosoma from suture between gnathosoma and idiosoma to posterior margin of idiosoma; width of idiosoma at broadest part of idiosoma; and setae from their insertion to their tips. Distances between setae

were measured between their insertions. The terminology and abbreviations of dorsal and ventral setae follow Kethley (1990) and all measurements are given in micrometers (μm).

RESULTS

Family Raphignathidae Kramer, 1877

Type genus: *Raphignathus* Dugès, 1834 Genus *Raphignathus* Dugès, 1834

Diagnosis — Body soft to sclerotized; red or yellow in life; idiosoma oval in dorsoventral view; cheliceral bases fused; palptibial claw small, at most one half length of palptarsus; subcapitulum with 2 pairs of subcapitular setae and 2 pairs of adoral setae; dorsum with 11 – 12 pairs of setae, one pair of eyes laterally on propodosomal shield; ventrally, coxae II and III contiguous; two pairs of aggenital setae; genital shield with three or four pairs of setae; anal opening clearly separated from genital aperture and with three pairs of setae; leg empodial axis directly producing 2 rows of tenent hairs; number of male and female solenidia on tarsi often similar, but in male dorsal body shields somewhat fused and solenidia ω on tarsi enlarged.

Key to Iranian species of *Raphignathus* Dugès

1. Interscutal membrane dorsomedially with 2 pairs of setae 2
— Interscutal membrane dorsomedially with 1 pair of setae 6
2. Endopodal shields present 3
— Endopodal shields absent 5
3. Endopodal shields associated only with coxae of III-IV 4
— Endopodal shield associated with coxae I-IV *R. hecmatanaensis*
4. Median propodosomal shield adjacent to peritremes anteriorly; dorsal setae *e1* reach anterior margin of opisthosomal shield *R. gracilis*
— Median propodosomal shield widely separated from peritremes anteriorly; dorsal setae

e1 not reaching anterior margin of opisthosomal shield *R. giselae*

5. Genital shields with 4 pairs of setae
..... *R. saboorii* n. sp.
— Genital shields with 3 pairs of setae
..... *R. aciculatus*

6. Femur IV with 2 setae *R. zhaoui*
— Femur IV with 4 setae 7

7. Setae *e1* close to anterior margin of opisthosomal shield, cupule *im* on integument; 2 small shields on interscutal integument, very small *R. collegiatus*
— Setae *e1* well behind anterior margin of opisthosomal shield, cupule *im* on shield; 2 small shields on interscutal integument, much larger *R. protaspis*

Raphignathus saboorii Ghorbani and Bagheri n. sp. (Figures 1-2)

Holotype — Female: (n=2) – Length of body (paratype measurements in parenthesis) (including gnathosoma) 412 (394), (excluding gnathosoma) 277 (260), width 176 (183).

Dorsum — (Figure 1a) Propodosoma with one median and 2 lateral shields; without small shields behind median propodosomal shield. Median shield with three pairs of setae (*vi*, *ve* and *c1*), and separated from lateral shields by striations; each lateral shield with three pairs of setae, (*sci*, *sce* and *c2*), and with one eye; integument behind median propodosomal shield punctuated, interscutal membrane with two pairs of setae, (*d1* and *e1*) situated on small platelets. Opisthosomal shield with four pairs of setae, (*f1*, *h1*, *h2* and *h3*), setae *f1* not located on margin of opisthosomal shield. Three pairs of lyrifissures present, one pair (*ia*) on posterior margin of lateral shields, one pair (*im*) on integument between lateral and opisthosomal shields, and one pair (*ip*) on anterior margin of opisthosomal shield. All dorsal setae simple. Dimension of setae as follows: *vi* 26 (25); *ve* 27 (26); *sci* 26 (26); *sce* 26 (24); *c1*

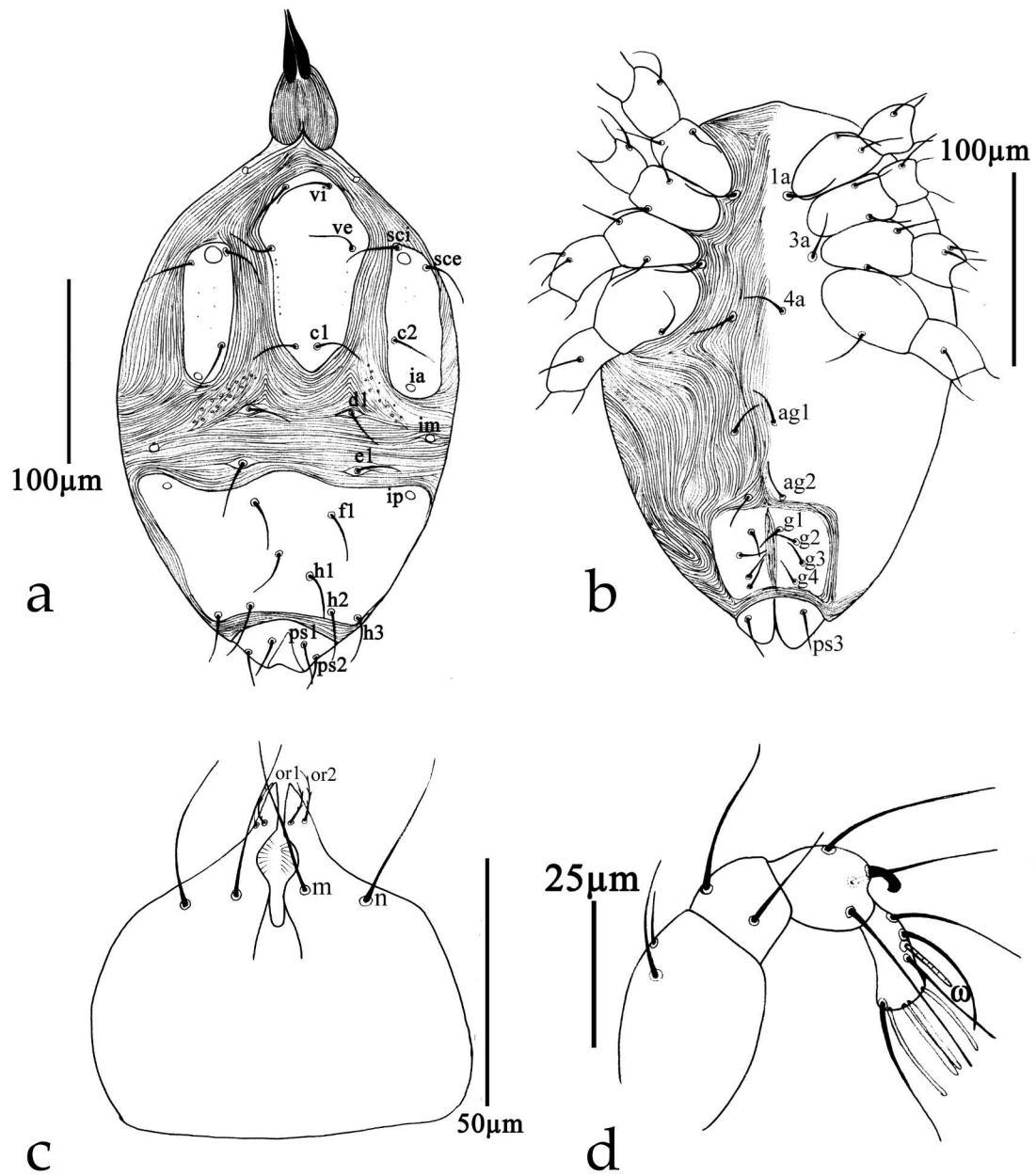


FIGURE 1: *Raphignathus saboorii* n. sp. (Female): a – Dorsal view, b – Ventral view, c – Subcapitulum, d – Palp.

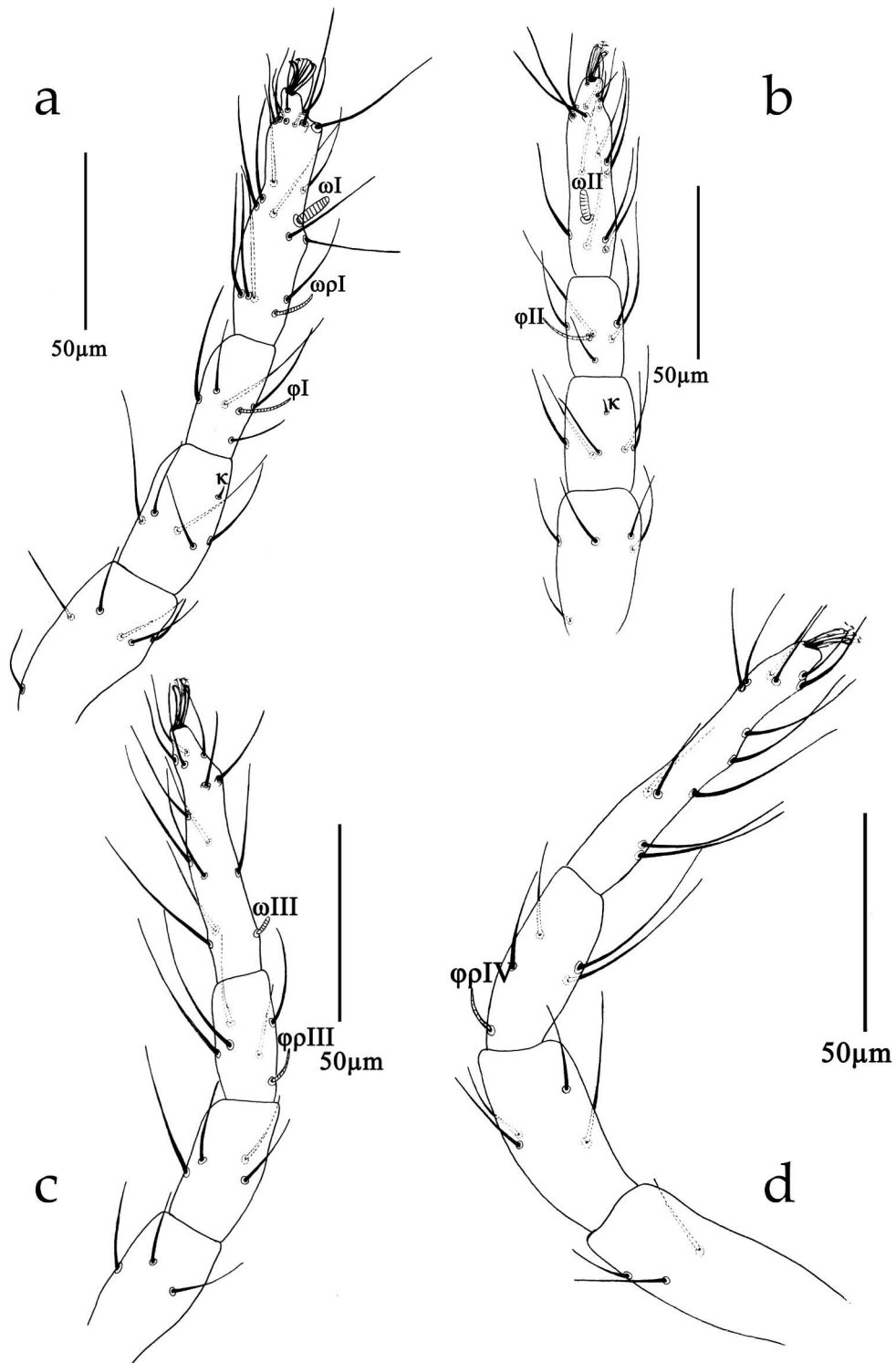


FIGURE 2: *Raphignathus saboorii* n. sp. (Female): a – Leg I, b – Leg II, c – Leg III, d – Leg IV.

20 (19); *c2* 25 (24); *d1* 19 (21); *e1* 20 (21); *f1* 22 (24); *h1* 24 (29); *h2* 22 (29); *h3* 19 (26); Distances between dorsal setae: *vi* – *vi* 23 (22); *ve* – *ve* 41 (46); *vi* – *ve* 33 (30); *ve* – *sci* 25 (26); *vi* – *sci* 49 (47); *sci* – *sci* 94 (72); *sci* – *sce* 25 (25); *sce* – *sce* 130 (116); *c1* – *c1* 13 (16); *c1* – *c2* 42 (43); *c2* – *c2* 90 (108); *c1* – *d1* 41 (37); *d1* – *d1* 53 (58); *d1* – *e1* 30 (22); *e1* – *e1* 59 (63); *e1* – *f1* 27 (22); *f1* – *f1* 42 (55); *f1* – *h1* 33 (35); *f1* – *h2* 49 (57); *f1* – *h3* 60 (60); *h1* – *h1* 119 (27); *h1* – *h2* 28 (30); *h2* – *h2* 43 (55); *h2* – *h3* 13 (12); *h3* – *h3* 73 (70); ratios: *vi* / *vi* – *vi* 1.13; *c1* / *c1* – *c1* 1.53; *d1* / *d1* – *d1* 0.35; *e1* / *e1* – *e1* 0.33; *f1* / *f1* – *f1* 0.52; *h1* / *h1* – *h1* 1.26; *h2* / *h2* – *h2* 0.51; *h3* / *h3* – *h3* 0.26; *c1* – *c1*:*d1* – *d1*:*e1* – *e1*:*f1* – *f1* = 1: 1.26: 1.4: 1.

Venter — (Figure 1b) Endopodal shields absent; setae *1a* and *3a* near coxae I and III respectively, setae *4a* on membrane posterior to coxae IV; venter striated except for coxae; aggenital area with two pairs of aggenital setae (*ag1* – *ag2*); genital area with four pairs of setae (*g1* – *g4*); anal shield with three pairs of anal setae (*ps1* – *ps3*). Measurements of setae: *1a* 33 (30), *3a* 26 (27), *4a* 22 (25), *ag1* 17 (20), *ag2* 18 (19), *g1* 16(16), *g2* 15 (16), *g3* 15 (15), *g4* 15 (15), *ps1* 15 (15), *ps2* 15 (17) and *ps3* 14 (16).

Gnathosoma — Subcapitulum (Figure 1c) ventrally with two pairs of subcapitular setae (*m* and *n*), equal in length, *m* = *n* = 30, and 2 pairs of adoral setae (*or1* and *or2*) which are slightly serrated; distances between *n* – *n* 36, *m* – *m* 19, *n* – *m* 12. Dorsal stylophore with striae. Palpi (Figure 1d) five segmented; palptarsus with four setae, four eupathidia and one solenidion (ω); palptibia with three setae and one small claw; palpgenu and palpfemur each with two setae; palptrochanter without setae.

Legs — (Figure 2) length of legs I–IV (from base of coxae to tip of tarsal claw): 275(251) – 235(205) – 243(225) – 319(255). Chaetotaxy of leg segments as follows: coxae (excluding *1a*, *3a* and *4a*) 2-2-2-1, trochanters 1-1-2-1, femora 6-5-3-3, genua 5+1 κ -5+1 κ -4-4, tibiae 5+1 ϕ -5+1 ϕ -5+1 ϕ -4+1 ϕ , tarsi 19+1 ω +1 ω -16+1 ω -13+1 ω -13.

Male and immature stages — Unknown.

Etymology — The species is named in honor of Prof. Alireza Saboori (Professor of Entomology, University of Tehran, Iran), for his great efforts to develop of Acarology in Iran.

Type material — Holotype and 1 paratype female of *Raphignathus saboorii* n. sp. were collected from soil in apple orchards, 20 August 2009, Maragheh, East Azerbaijan province, Iran, by Hamed Ghorbani. The holotype and paratype females will be deposited in the Arachnida Collection of Plant Protection Research Institute, Pretoria, South Africa.

Remarks — The new species is very closely related to *R. sceptrum* Chaudhri, Akbar and Rasool (Chaudhri *et al.* 1979) by having: 4 pairs of genital setae, 2 pairs of setae on interscutal membrane, 2 pairs of setae on palpfemur and simple dorsal setae but can be distinguished from the later as follows:

1. *R. sceptrum* has one pair of small shields behind the anteromedian propodosomal shield which are absent in new species.
2. setae *f1* in new species well behind the anterior margin of opisthosomal shield but in *R. sceptrum* *f1* situated on anterior margin of opisthosomal shield.
3. tarsi I and IV with 21 and 13 setae in new species *vs* 19 and 12 in *R. sceptrum*, respectively.

Raphignathus saboorii also resembles *R. gracilis* by having 2 pairs of interscutal setae, 2 setae on palpfemur, simple dorsal setae and absence of small shields on interscutal membrane but, can be separated by following features:

1. genital shields with 4 pairs of setae in *R. saboorii* *vs.* 3 pairs in *R. gracilis*
2. tarsus II with 17 setae *vs.* 16 in *R. gracilis*.
3. coxisternal III–IV is absent in new species but present in *R. gracilis*.

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REFERENCES

- Chaudhri W. M., Akbar S., and Rasool D. A. 1979 — Studies on the predatory mites of Pakistan. — Department of Agricultural and Pakistan Agricultural Research Council, Project no. P K ARC, 30: 191-198.
- Fan Q-H., and Yin X-M. 2000 — The genus *Raphignathus* (Acari: Raphignathidae) from China — Syst. Appl. Acarol., 5: 83-98.
- Ghorbani H, Bagheri M, Saber M, Mehrvar A, and Navaii-Bonab R. 2010 — Study of family Raphignathidae (Acari: Prostigmata) fauna of orchards and crop fields of Maragheh — *In*: Manzari S. (Ed.). Iranian Pant Protection Congress, Tehran, Iran. pp. 360.
- Kethley J. 1990 — Acarina: Prostigmata (Actinedida). *In*: Dindal, D.L. (Ed.), Soil Biology Guide — John Wiley & Sons, New York: 667-756.
- Khanjani M. and Ueckermann E. A. 2003 — Two new species of the genus *Raphignathus* Duges (Acari: Raphignathidae) — *Acarologia*, 43(1): 299-306.
- Meyer M.-K.-P. (Smith) and Ueckerman E. A. 1989 — African Raphignathoidea (Acari: Prostigmata). Entomology Memoir. Republic of Africa — Department of Agriculture and Water Supply, Repub., 74: 1-58.

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