

CALIGONELLA SABOORII N. SP. (ACARI: TROMBIDIFORMES: CALIGONELLIDAE)
FROM WESTERN IRAN

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ABSTRACT — A new species of the genus *Caligonella* Berlese, 1910 (Acari: Trombidiformes: Caligonellidae), *C. saboorii* n. sp. is described and illustrated. This new species was collected from soil and litter under a walnut tree, *Juglans regia* L. (Juglandaceae) in Khorramabad, Lorestan Province, Southwestern Iran. A key to all known species of the genus *Caligonella* is provided.

KEYWORDS — predatory mite; free-living; walnut tree; Khorramabad

INTRODUCTION

The family Caligonellidae was erected by Grandjean (1944) based on genus *Caligonella*, with *C. humilis* (Koch, 1838) as type species. Members of this family are small, reddish in life, free-living and can feed on small arthropods. They are often found in various habitats such as soil, leaf litter and bark of trees, moss, storehouses and bird nests (Summers and Schlinger 1955; Meyer and Ueckermann 1989; Fan 2000; Doğan 2003; Ahaniazad and Bagheri 2012; Akyol and Koç 2012). This family currently comprises five genera, of which the genus *Caligonella* currently contains 9 known species namely: *C. humilis* (Germany), *C. afroensis* (Meyer and Ueckermann 1989) (South Africa), *C. claviparma* (Meyer and Ueckermann 1989) (South Africa), *C. scutovata* (Meyer and Ueckermann 1989) (South Africa), *C. geonoma* (Meyer and Ueckermann 1989) (South Africa), *C. tunxiensis* (Hu and Hu 1997) (China), *C.*

venusta (Khaustov and Kuznetsov 1997) (Ukraine), *C. tunica* Fan 2000 (China), *C. haddadi* Bagheria *et al.* 2013 (Iran). In this study a tenth species of the genus is described.

MATERIALS AND METHODS

The specimens were collected from soil and litter under Walnut tree, *Juglans regia* L. (Juglandaceae), in Khorramabad vicinity (Lorestan province), Southwestern Iran. The mites were mounted directly in Hoyer's medium on microscopic slides. The slides were dried at 50°C in an oven, sealed with nail polish and examined under an Olympus BX51 Differential Interference Contrast microscope (DIC). Drawings were made with a camera lucida. The terminology, the setal notations and leg chaetotaxy used in the description of the new species follow that of Kethley (1990). All measurements are in micrometers. The measurements

of the holotype are followed by the variations in the paratypes. A key to species of the genus *Caligonella*, based on females is provided.

Family Caligonellidae Grandjean, 1944 Genus *Caligonella* Berlese 1910 Type species — *Caligonella humilis* (Koch, 1838) = *Stigmaeus humilis* Koch, 1838 Genus. Diagnosis — Relatively small, soft-bodied mites, dorsal shields absent or present, with two pairs of eyes. Stylophore bullet-shaped; fixed digits (spinae) undeveloped, at least not present as slender, spinous processes; peritremata arise on anterior tip of stylophore, terminate on its dorsal surface. Palpus stubby, total length not exceeding that of femur I. Claw small in relation to palptibia (Summers and Schlinger 1955).

Key to the species of the genus *Caligonella* (Females).

1. Dorsal shield present 2
— Dorsal shield absent 3
2. Anal covers with one pair of setae ... *C. scutovata*
— Anal covers with two pairs of setae *C. claviparma*
3. Anal covers with three pairs of setae .. *C. venusta*
— Anal covers with one pair of setae 4
4. Genu II with a solenidion *C. tunica*
— Genu II without a solenidion 5
5. Solenidia on tibia I equal in length *C. geonoma*
— Outer solenidion on tibia I longer than inner solenidion 6
6. Venter of idiosoma with shield between coxae *C. afroensis*
— Venter of idiosoma without shield between coxae 7
7. Outer solenidion on tibia I two times longer than inner solenidion 8
— Outer solenidion on tibia I more than two times

longer than inner solenidion 9

8. Solenidion on tarsus I longer than outer solenidion on tibia I and two times longer than the solenidion on tarsus II *C. humilis*
— Solenidia on tarsus I-II and outer solenidion on tibia I are equal in length *C. saboorii* **n. sp.**

9. Outer solenidion on tibia I three times longer than inner solenidion, Solenidia on tarsus I and tarsi II subequal in length *C. haddadi*
— Outer solenidion on tibia I four times longer than inner solenidion, Solenidion on tarsus I obviously longer than solenidion on tarsus II *C. tunxiensis*

Caligonella saboorii **n. sp.** Ahmadhoseini and Khanjani (Figs. 1 - 2)

Diagnosis — Dorsal and venter of idiosoma without shield; outer solenidion on tibia I two times longer than inner one; solenidia on tarsi I and II and outer solenidion on tibia I are equal in length; dorsum with three pairs of cupules.

Female (n = 4) — Measurements of holotype: total length of body (including gnathosoma) 420 (400 – 415), length of body (excluding gnathosoma) 315 (305 – 320), width 180 (170 – 185).

Dorsum (Fig. 1a) — Dorsal integument entirely with simple striations, prodorsum without shield and with 11 pairs of subequal setae; one pair of eyes and a pair of post ocular bodies (*Pob*) present laterally between setae *sci* and *sce*. Integument with three pairs of dorsolaterally cupules, *ia* located behind post ocular bodies, *im* antero-lateral to setae *d1* and *ip* potero-lateral to setae *f1*, anal opening posteriorly, with one pair of pseudanal setae (*ps1*). All dorsal setae are simple, length of dorsal setae as follows: *vi* 20 (18 – 20), *ve* 26 (24 – 25), *sci* 22 (20 – 22), *sce* 20 (19 – 21), *c1* 20 (18 – 21), *c2* 20 (19 – 20), *d1* 18 (19 – 20), *e1* 18 (17 – 18), *f1* = *h1* = *h2* 18 (17 – 18); distances between dorsal setae: *vi*–*vi* 27 (24 – 28), *ve*–*ve* 120 (116 – 125), *vi*–*ve* 63 (58 – 65), *sci*–*sci* 49 (48 – 53), *sce*–*sce* 175 (155 – 180), *sci*–*sce* 85 (80 – 87), *ve*–*sci* 34 (27 – 36), *c1*–*c1* 35 (29 – 32), *c1*–*c2* 50 (46 – 52), *c2*–*c2*

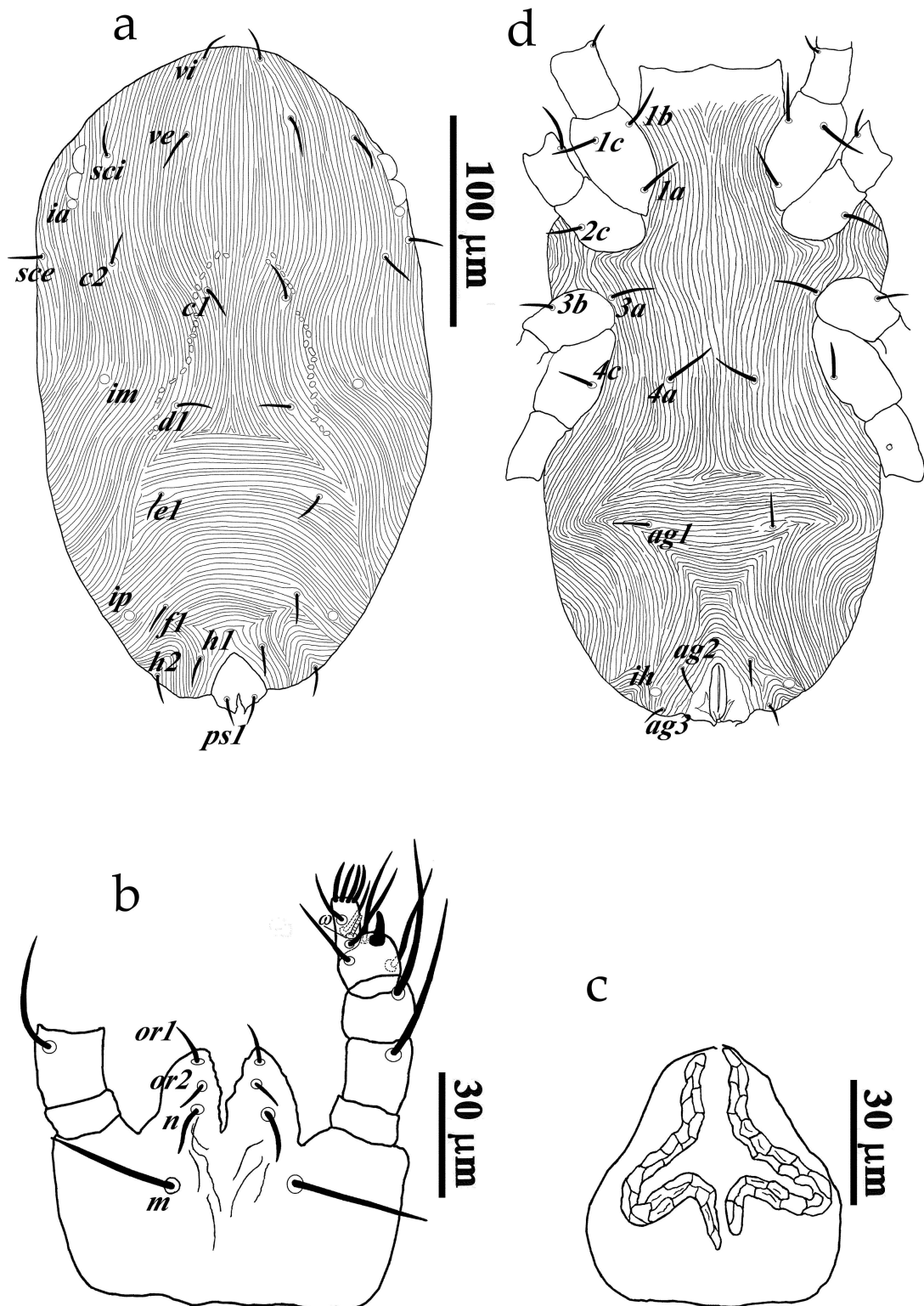


FIGURE 1: *Caligionella saboorii* n. sp. (Female): a – Dorsal view, b – Gnathosoma, c – Peritreme, d – Ventral view.

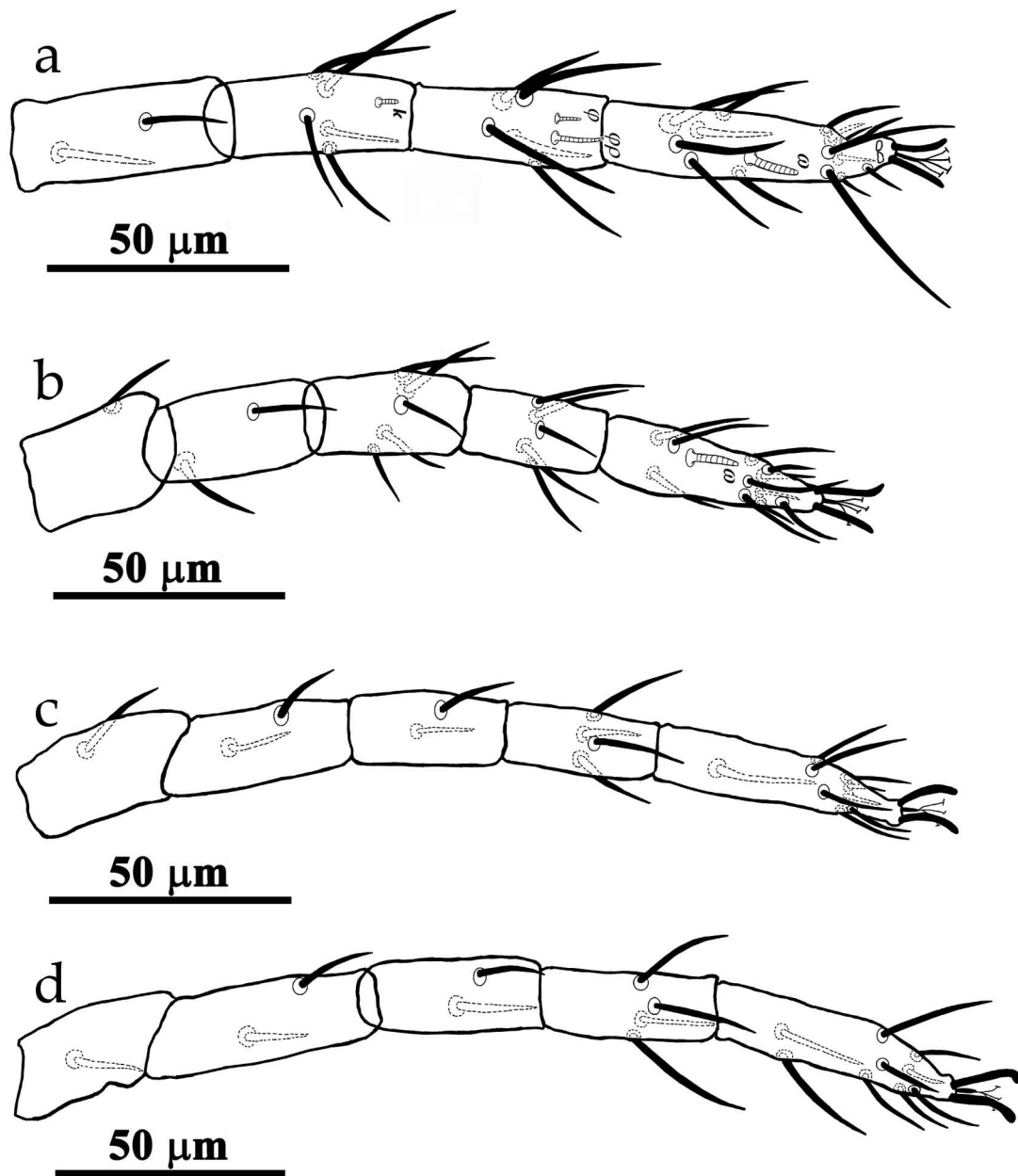


FIGURE 2: *Caligonella saboorii* n. sp. (Female): a – Leg I, b – Leg II, c – Leg III, d – Leg IV.

124 (117 – 127), $c1-1$ 52 (47 – 54), $d1-d1$ 50 (52 – 55), $d1-e$ 40 (37 – 40), $e1-e1$ 75 (68 – 74), $e1-f1$ 50 (43 – 51), $f1-f1$ 63 (57 – 68), $f1-h1$ 30 (28 – 30), $f1-h2$ 31 (28 – 32), $h1-h1$ 24 (21 – 23), $h1-h2$ 29 (27 – 30), $h-h2$ 52 (43 – 47). The ratio of dorsal setae as follows: $vi/vi-vi$ 0.74 (0.75 – 0.89), $c1/c1-c1$ 0.57 (0.62 – 0.65), $d1/d1-d1$ 0.36 (0.36 – 0.36), $e1/e1-e1$ 0.24 (0.22 – 0.25), $f1/f1-f1$ 0.26 (0.25 – 0.29), $h1/h1-h1$ 0.75 (0.73 – 0.80), $h2/h2-h2$ 0.35 (0.38 – 0.39), $h1/h2$ 1.00 (0.94 – 1.00), $c1-c1: d1-d1: e1-e1: f1-f1: h1-h2$ (0.47 – 0.55): (0.79 – 0.91): (1.08 – 1.19): (1.00).

Gnathosoma (Figs. 1b-c) — Chelicerae with proximal components completely fused in midline, forming bullet-shaped stylophore; peritremes confined to dorsal surface of stylophore, with 24–26 chambers on each side (Fig. 3). Palpi five segmented, palp tarsus distally with four eupatidia + one solenidion 5 (4 – 5) long + three setae, palp tibia with three setae and one small claw 6 (5 – 6); palpgenu and palpfemur each with one seta (Fig. 2). Subcapitular setae m 35 (34 – 36), n 13 (13 – 15) long, adoral setae $or1$ 10 (9 – 10), $or2$ 11 (9 – 10); $m-m$ 30 (28 – 35), $n-n$ 12 (12 – 14) and $m-n$ 18 (18 – 20), $or1-or1$ 20 (19 – 20), $or2-or2$ 18 (20 – 21), $or1-or2$ 8 (7 – 9) (Fig. 2).

Venter (Fig. 1d) — Ventral surface striated and three pairs of simple setae present, $1a$ located on coxae I but $3a$ and $4a$ located on integument, genital valves without seta, and aggenital region with three pairs of setae ($ag1-3$), one pair of cupules (ih) located lateral to setae $ag2$ (Fig. 4). Length of ventral setae as follows: $1a$ 28 (30 – 31), $1b$ 25 (23 – 26), $1c$ 27 (24 – 26); $2c$ 19 (18 – 20), $3a$ 28 (28 – 29), $3b$ 20 (17 – 21), $4a$ 22 (20 – 21), $4b$ 21 (20 – 22), $ag1$ 22 (21 – 24), $ag2$ 16 (17 – 18), $ag3$ 14 (13 – 15). Distances: $ag1-ag1$ 60 (55 – 63), $ag2-ag2$ 32 (28 – 31), $ag3-ag3$ 43 (38 – 45), $ag1-ag2$ 65 (63 – 68), $ag2-ag3$ 29 (30 – 32). Anal valves in dorsal position and with one pair of setae $ps1$ 15 (14 – 16).

Legs (Figs. 2) — Leg measurements are from coxa to pretarsus; leg I 280 (270 – 285); leg II 212 (210 – 215); leg III 220 (212 – 226), leg IV 253 (245 – 250); Setal formulae of leg segments as follows: coxae 3-1-2-1; trochanters 1-1-1-1; femora 2-2-2-2; genua 5+1 κ -5-2-2; tibiae 5+1 φ +1 $\varphi\rho$ -5-4-4; tarsi 15+1 ω -11+1 ω - 9 - 9 (Figs. 5-8). Outer solenidion of

tibia I ($\varphi\rho$) 11 (10 – 11) twice as long as inner solenidion (φ) 5 (4 – 5); solenidion on tarsus I 10 (10 – 11), solenidion on tarsus II 10 (10 – 10).

Differential diagnosis — *Caligonella saboorii* n. sp. resembles *C. haddadi* and *C. humilis* by having the same leg setal formulae but differs from *C. haddadi* by three main characters: (1) the length of dorsal setae in new species (17 – 26) longer than those *C. haddadi* (14 – 17); (2) the outer solenidion of tibia I two times as long as inner solenidion in *C. saboorii* n. sp. instead of three times longer than inner solenidion in *C. haddadi*; (3) the outer solenidion on tibia I (10 – 11), solenidion on tarsus I (10 – 11) and solenidion on tarsi II (10 – 10) are equal in length in new species whereas outer solenidion on tibia I (15 – 16), longer than solenidion on tarsus I (11 – 12) and solenidion on tarsus II (10 – 10) in *C. haddadi*. The new species shares with *C. humilis* the identical setal formulae of legs and one pair of pseudanal setae but can readily be distinguished from the latter by: (1) the length of dorsal setae in new species (17 – 26) longer than those *C. humilis* (13); (2) the outer solenidion on tibia I and solenidion on tarsus I are equal in length versus outer solenidion on tibia I shorter than solenidion on tarsus I in *C. humilis*; (3) The solenidion on tarsus I and solenidion on tarsus II are equal in length in the new species whereas two times longer than on tarsus II in *C. humilis*.

Type materials — The holotype female and three paratype females were collected from soil and litter under Walnut tree, *Juglans regia* L. (Juglandaceae) in Khorramabad vicinity Lorestan province (33°56'N, 48°39'E, a.s.l. 1703 m), 8 July, 2012, by Mohammad Ahmad Hoseini. The holotype female and two paratype females are deposited in the Collection of the Acarology Laboratory, University of Bu-Ali Sina, Hamedan, Iran. One paratype female, will be deposited in the mite Section of National Collection of Arachnida, Plant Protection Research Institute, Pretoria, South Africa.

Etymology — This species is named in honor of Prof. Alireza Saboori, Department of Plant Protection, College of Agriculture, Tehran University, Karaj, Iran.

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