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Article

A new sand mite of *Schoengastia* (Acari: Trombiculidae) from the soil under camel's thorn in Iran

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Abstract

A new species of the sand-mite or chigger *Schoengastia* Oudemans, 1910 collected from the soil under camel's thorn (*Alhagi maurorum* Medik) in Iran is described. The diagnosis of the new species is in conformity with the subgenus *Priomesochela* Vercammen-Grandjean *et* Langston, 1976, the specific characters are drip-dropping shaped sensilla, shortest scutal setae and least number in idiosomal setae in the subgenus.

Key words: sand mite, *Schoengastia*, *Priomesochela*, Trombiculidae, camel's thorn, new species, Iran

Introduction

The first records of the sand-mite or trombiculid fauna of Iran were made by Vercammen-Grandjean *et al.* (1970); 20 species including 17 new ones and three new records (inadvertently given two new combinations as new species to make 19 new ones!) belonging to ten genera were documented. Next year in their *Helenicula* article Nadchatram & Traub (1971) included two Iranian new species from the collection of Smithsonian Institution (USNM). Since then Kudryashova in collaboration with her colleagues (Kudryashova *et al.* 1972, 1973a, b, 1976, 1978) and herself (1975, 1976a-d, 1977) described 50 new species and many new records from Iran over a period of eight years, and last another one new species from Iran was included in the genus *Willmannium* in 1992 (Kudryashova 1992). Goff (1983) described a new species of chigger, which was collected from preserved migratory

hamster (*Cricetulus migratorius* (Pallas, 1773)) in Iran, also from the collection of the Smithsonian Institution (USNM). Afterward Goff & Saboori (1998) described two new species and followed by Wen & Saboori (2004) who described one new species from Iran. To the time, trombiculoid sand mite fauna of Iran involves 3 families, 25 genera and about 100 species and subspecies. In the present paper, single specimen collected from the soil under camel's thorn (*Alhagi maurorum*) using Berlese funnel in Iran was described as a new species of the genus *Schoengastia*. The unfed mite was cleared in lactophenol and mounted with Hoyer's medium.

The slide was identified with a differential interference contrast microscope (Nikon Eclipse 50*i*), which was connected to an omnifocal digital camera and control unit (Nikon DS-DM-L1) in order to obtain microphotographs. The figures presented in this paper are the modified microphotos. Terminology and abbreviations follow Wen (1978, 1984) with some modification and all measurements are in micrometres.

***Schoengastia* (*Priomesochela*) *persica* Wen, Saboori *et* Akrami sp. nov.**

(Figs. 1−12)

Type material

Holotype, larva (ARS-20110305-1) collected from the soil under the perennial shrub, camel's thorn (*Alhagi maurorum* Medik) in Abarkouh city, Yazd Province, Center of Iran, 31°8' N, 53°17' E., 1500m a.s.l., 9 IX 1999, M.A. Akrami coll., deposited in the Jalal Afshar Zoological Museum, Department of Plant Protection, College of Agriculture, University of Tehran, Karaj, Iran.

Diagnosis

Schoengastia persica **sp. nov**. is characterized by the chelostyles in conformity with subgenus *Priomesochela* Vercammen-Grandjean *et* Langston, 1976 (formerly *lavoipierrei* group) of the genus *Schoengastia*, shortest scutal setae, least number of idiosomal setae, NDV= 30+23= 53, in the subgenus, palpfemorala N/N' (left/right) and 3 σ^1 (genualae I), 2 mt (mastitarsalae III). This species is similar to *S. (P.) tuberculatae* Stan Fernandes *et* Kulkarni, 2003 **comb. nov.** described from India in having same shape and close measurements of scutum, same shape of chelostyles, same pattern of leg solenidiotaxy, and almost same pattern of idiosomal setae. It may easily separated from the latter species in having narrower sensilla (25×12) and their drip-dropped shape with numerous tiny barbs, versus broader size (26−29×15−16) and tubercle-shaped sensilla apparently lacking setulae. The lengths of scutal setae of the new species is lesser (AM 22, AL 46, PL 40) than those of *S. tuberculatae* (28, 54, 45, in average respectively). The new species provided with palpfemorala nude on the left and with one short branch on the right palp (N/N'), the ventral palptibial seta with 4 branches, vs. 2−3 short barbs of palpfemorala and 3 pairs of branches on ventral palptiabiala in *S. tuberculatae.* Also 2 mt with light barbs are the distinguishing feature of the new species vs. 1 mt in *S. (P.) tuberculatae.*

Description

An unfed larva.

Scutum. Pentagonal shaped without shoulders, pitting sparse, lateral and posterior margins surrounded by fine pleat, anterior margin moderately straight, lateral margins slanting, rear margin deeply convex medially. Sensilla capitate with numerous tiny barbs, drip-dropping shaped with hollow internal area. Sensillary bases not far apart, less than 1/3 of PW and lining close to PLs level, ASB 26 subequal to PSB 23, anterior ridge of SB prominent, posterior ridge shallow. AM with spine-like barbs, slightly below ALs level, 22 long and not reached SBs level; ALs and PLs long with moderately long barbs, AL the longest, 2 times as long as AM and 1/6 longer than PL. Eyes 2/2 subequal on ocular platelets at PL angles.

Gnathosoma. Chelostyle usual broad and long, sickle-shaped with 7/6 (left/right) recurved dorsal teeth on the proximal 2/3, ventral tooth long and blunt, tricuspid cap normal. Chelobase thick, conical shaped with pseudochela sharp tipped. Palps stout, palptibial claw trifurcate, all palpal setae thin and short, palpfemorala 20, nude on the left and with a single short barb on the right palp, offshoot 6 from its half way; nude palpgenuala 16; 3 palptibialae 20 each, dorsal and lateral nude, ventral palptibiala with 4 long branches. Palptarsus with one stout and one normal barbed setae dorsally, one lateral and four ventral barbed setae, a hairlike ζ° (subterminala) and a ω° (solenidion, 7 long) ventrally. Galeala nude and galeal organ normal. Gnathocoxal seta (gx) barbed, submarginally situated.

Idiosoma. Both dorsal and ventral setae sparse and with short barbs. One pair of humerals; two pairs of sternals. Anal aperture before two rows of ventral setae from the rear.

Legs. All legs 7-segmented of normal features, each terminating in a pair of claws and a claw-like empodium, onychotrichiae absent; ordinary barbed setae moderately long; 3 σ^1 (genuala I) and $g\kappa^1$ (microgenuala I) on P^1 and 2 light barbed mt (mastitarsalae) on P^3; otherwise normal number of 2 φ^1 (tibiala I) and $ti\kappa$ (microtibiala), ω^1 (tarsala I) and $t\kappa^1$ (microtarsala I), ζ (s, subterminala), ε (ps, parasubterminala), ζ^1 (pt^1, pretarsala I); σ^2 (genuala II), 2 φ^2 (tibiala II), ω^2 (tarsala II), $t\kappa^2$ (microtarsala II), ζ^2 (pt^2); σ^3 (genuala III), φ^3 (tibiala III). All solenidia being thin and short.

SIF= 7Bs-N-3-3111.2000	fp= N/N'.N.NNB	IP = 753
fSP= 7.7.7	Sc: Sh= —	Oc= ②/②
fcx= 1.1.1	pc= + +	fSt:2.2, fHv= 0
fRT= 1.1.1	ALs/AM, PLs—SB	fDS: 2+8.(6.2).6.4.2= 30
$(ps+s+pt^1+pt^2)$= N	AL>PL>>AM	fVS: 6.8.4a5=23
$t^1 < t^2$, t^3= 0, ot= 0	Sn: Cp	NDV= 30+23 = 53
fBP^1= 1.1.5.4.8.21	fBP^2= 1.2.4.3.6.17	fBP^3= 1.2.3.3.6.14

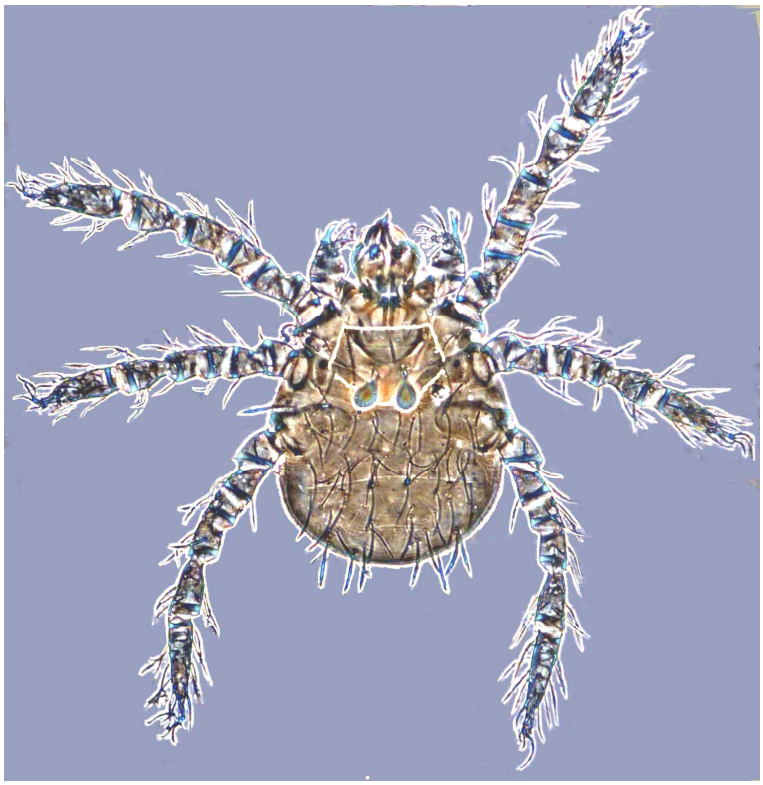
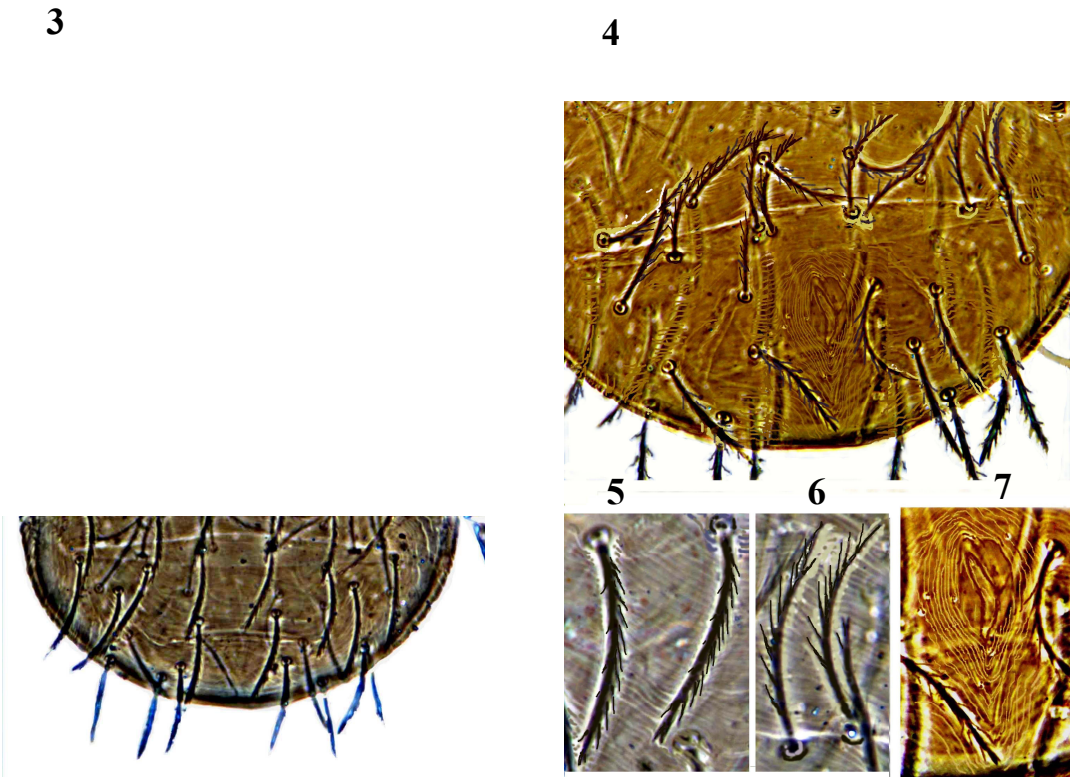


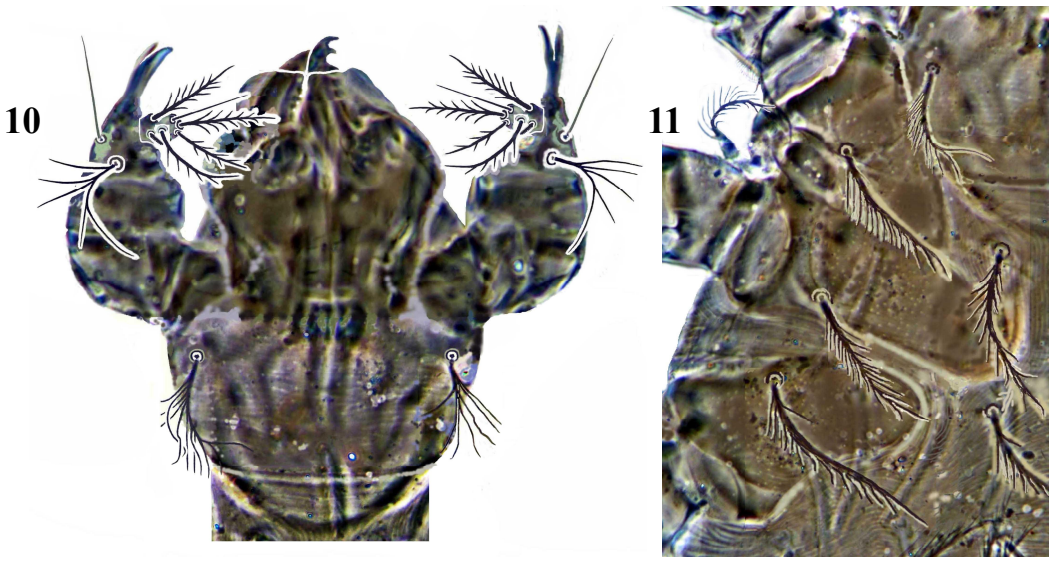
Figure 1. *Schoengastia* (*Priomesochela*) *persica* Wen, Saboori *et* Akrami **sp. nov**. (larva). Dorsal view.

Figure 2. *Schoengastia* (*Priomesochela*) *persica* **sp. nov.** (larva). Scutum and ocelli.



Figures 3–7. *Schoengastia* (*Priomesochela*) *persica* **sp. nov.** (larva). 3. Dorsum showing DS pattern; 4. Posterior area showing VS pattern; 5. Magnified DS; 6. Magnified VS; 7. Anus.

Figures 8–9. *Schoengastia* (*Priomesochela*) *persica* **sp. nov.** (larva). 8. Chelicerae and palpi (dorsal view); 9. Left chelostyle (dorso-lateral view).



Figures 10−11. *Schoengastia* (*Priomesochela*) *persica* **sp. nov.** (larva). 10. Gnathosoma (v.v.) showing gnathocoxa, protruded hypostome and paired lateral palpi (five segmented); 11. Leg coxae showing coxal setae along with gnathocoxal and sternal setae (left side).

Figure 12. *Schoengastia* (*Priomesochela*) *persica* **sp. nov.** (larva). Leg genua, tibiae and tarsi of 3 legs (P^1, P^2, P^3) showing solenidiotaxy and specialized setae, the lengths (in micrometres) of the setae are shown.

Measurements (μm) (n = 1)

	AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sn (d× φ + p)	HS	DS	VS	St^1	St^2
Ht	54	73	21	26	23	49	25	22	46	40	35(25×12+10)	39	31/37	25/32	42	34

Id= 180×153	Cx^1= 48×37	cx^1= 37	T^1= 69×23	P^1= 263	Oca= 8
Gn= 100×64, gx= 34	Cx^2= 57×29	cx^2= 37	T^2= 57×19	P^2= 236	Ocp= 7
Chs= 32, Chb=46×30	Cx^3= 51×34	cx^3= 40	T^3= 74×15	P^3= 254	op= 19

Remarks

The genus *Schoengastia* Oudemans, 1910, is the nominotypical genus of the tribe Schoengastiini Vercammen-Grandjean, 1960 of Trombiculinae; the genus *Radfordiana* Womersley, 1952 was synonymized with it by Goff (1982). The genus is characterized by larval SIF=7Bs-N-1/3-2/3111-0/2000; all legs 7-segmented, usually long and slender; scutum subpentagonal, without shoulders, punctate with posterior margin deeply convex, pleat may occur at posterior half or its rear margin; sensilla expanded, broadly clavate to globose, with minute setulae; SBs situated not far apart and lining close to PLs level, ASB subequal to PSB, scutal setae marginal, AM short, nearly as long as half length of PL, PL>AL>>AM; eyes 2 pairs on ocular platelets; chelostyles long, with dorsal row of teeth and 1−3 ventral teeth, galeala nude, rarely with 1−2 basal barbs; palptarsus 7Bs, palptibial claw 1−3 furcate; legs with 2−3 (rarely 5) σ^1 (genualae I), 0−2 mt (mastitarsalae), sometimes light barbed. Parasites of reptiles (mostly lizards and some snakes), birds and mammals including man, one exceptional case found on land snails in tropics (Vercammen-Grandjean *et al*. 1970).

Vercammen-Grandjean (1958) classified the genus *Schoengastia* Oudemans, 1910 into 3 subgenera, *Schoengastia* s. str., *Phrynacarus* Lawrence, 1949, and *Endotrombicula* Ewing, 1931, the latter two subgenera are intradermal parasites of amphibians. The genus *Radfordiana* was not concerned by him. Later he (V.-G. 1960) expanded the genus to include 6 subgenera, *i.e. Schoengastia* s. str., *Anoploschoengastia* Vercammen-Grandjean, 1960, *Oenoschoengastia* Womersley *et* Kohls, 1947, *Phrynacarus* Lawrence, 1949, *Endotrombicula* Ewing, 1931 and *Neoschoengastoides* Vercammen-Grandjean, 1960. However, in his later works Vercammen-Grandjean (V.-G. 1968; V.-G. *et al.* 1973) listed only 5 subgenera including *Radfordiana* exempting *Anoploschoengastia* and *Phrynacarus.* Afterward Vercammen-Grandjean & Langston (1976) proposed the "6th" subgenus *Priomesochela* of the genus *Schoengastia*, with *S. lavoipierrei* Jadin *et* Vercammen-Grandjean, 1952 as type, for the *Schoengastia* species armed with medium chelostyles, versus long and almost straight ones in the subgenus *Schoengastia* s. str., with *Trombidium vandersandei* Oudemans, 1905 as type of original designation. Beside the sickle-shaped chelostyle and the length of it shorter than chelobase, the species of the subgenus *Priomesochela* such as *Schongastia (P.) persica* **sp. nov.**, *S.(P.) tuberculatae,* etc. have SBs in lining with PLs level, ASB subequal to PSB, and nude palpgenuala (fT= B(N).N._ _ _). In the subgenus *Schoengastia* s. str., the length of long and straight chelostyle exceeds that of chelobase, SBs set beneath PLs level,

ASB>>PSB, and palpgenuala is barbed (fT= B.B. _ _ _).

This new species is the first species of the genus *Schoengastia* recorded in Iran.

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چکیده

گونهٔ جدیدی از کنه‌های جنس *Schoengastia* توصیف می‌شود که از خاک پای گیاه خارشتر (*Alhagi maurorum* Medik) از ایران جمع‌آوری شده بود. گونهٔ جدید به زیر جنس *Priomesochela* Vercammen-Grandjean *et* Langston, 1976 تعلق دارد که از ویژگی‌های این زیرجنس داشتن موی حسی قطره‌ای شکل، کوتاه‌ترین موی معمولی روی سپر و تعداد کم موهای ایدیوزوما است.