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A NEW SPECIES OF *LAELASPIS* BERLESE (ACARI: LAELAPIDAE) FROM IRAN AND A KEY TO IRANIAN SPECIES

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ABSTRACT — This paper describes a new species of mites in the genus *Laelaspis* from Iran. *Laelaspis guilaniensis* n. sp. was collected from soil under alder trees in Gisoom forest, Talesh, Guilan Province, Iran. The new species is described and illustrations are provided. A key to all known Iranian species of the genus is provided.

KEYWORDS — Laelapidae; taxonomy; soil; Iran; myrmecophiles; Guilan

INTRODUCTION

The Laelapidae is one of the largest families of free-living Mesostigmata, but it has not yet achieved a stable classification (Joharchi *et al.*, 2012a, 2012b). *Hypoaspis* Canestrini and related genera have had an especially complicated and confusing history. *Laelaspis* Berlese, 1903 has often been treated as a subgenus of *Hypoaspis* Canestrini, 1884 (Hunter, 1961; Hunter and Glover, 1968; Karg, 1982, 1993; Faraji *et al.*, 2008). Joharchi *et al.* (2011) treated *Laelaspis* as a separate genus, and gave a diagnosis and comparison of diagnostic characters for the closely related genera *Gymnolaelaps* and *Pseudoparasitus*. That concept of *Laelaspis* is followed here. The cosmopolitan genus *Laelaspis* includes 12 species in Iran and most species are associated with ants or their nests. However, a few were collected in soil, and most species have only been collected on few

occasions, so it is difficult to draw any firm conclusions about their host specificity (Joharchi *et al.*, 2012b).

Joharchi *et al.* (2011, 2012a, 2012b) previously reported on eight species of mites of the genus *Laelaspis* and on several genera associated with ants in Iran. Joharchi *et al.* (2012b) provided a key to species of *Laelaspis* occurring in the Western Palaearctic Region and a summary of their host associations and biology. The purpose of this paper is to describe another species of *Laelaspis* to increase our knowledge of the Iranian fauna of Laelapidae.

MATERIALS AND METHODS

Laelapid specimens were collected from soil in Guilan Province over a period of two years. Mites were removed from soil using Tullgren fun-

nels. Mites were cleared in Nesbitt's solution and mounted in Hoyer's medium. The nomenclature used for the dorsal idiosomal chaetotaxy is that of Lindquist and Evans (1965), the leg chaetotaxy is that of Evans (1963a), the palp chaetotaxy is that of Evans (1963b), and names of other anatomical structures mostly follow Evans and Till (1979). We use the term "lyrifissures" to refer to slit-shaped sensilli, and "pore" for circular or oval-shaped cuticular openings of unspecified function. The holotype of the new species is deposited in the Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University (YIAU); the paratype is deposited in the Acarological collection, Department of Plant Protection, Faculty of Agricultural Sciences, University of Guilan (APAG). All measurements in the descriptions are given in micrometres (μm).

RESULTS

Genus *Laelaspis* Berlese

Laelaps (*Laelaspis*) Berlese, 1903: 13.

Type species *Laelaps astronomicus* Koch, 1839, by original designation.

Diagnosis — See Joharchi *et al.* (2011).

Notes on the genus — *Laelaspis* belongs to a group of genera of Laelapidae in which the genito-ventral shield of the female is greatly expanded, so that its posterior margin abuts the anal shield and its lateral margins extend outward behind coxae IV. The expanded genito-ventral shield in these genera captures at least two pairs of ventral setae in addition to the genital setae on the extreme edges of the shield. *Laelaspis* is distinguished from *Gymnolaelaps* by its two-tined palp tarsal claw, the absence of pre-sternal shields, and the presence of two distinct Δ -shaped lines on the genito-ventral shield. *Laelaspis* differs from *Pseudoparasitus* because *Pseudoparasitus* has at least two pairs of setae on the surface of the genito-ventral shield, well inside the edges of the shield, while all the genital setae of *Laelaspis* and *Gymnolaelaps* are on the extreme edges of the shield.

Laelaspis guilaniensis n. sp. (Figure 1)

Specimens examined — Holotype, female, Iran, Guilan Province, Talesh, Gisoom forest, 37°39' N, 49°01' E, 25 April 2013, S. Ramroodi coll., from soil under alder trees in forest. One paratype female, same data as holotype (in APAG).

Description of the Female (Figure 1)

Dorsal idiosoma — Dorsal shield length 456 – 460, width 336 – 340 ($n = 2$) (Fig. 1A). Shield oval shaped, with reticulation, more distinct in opisthonotal region; with 39 pairs of long setae, 22 podonotal, plus *r6* off the shield, 17 opisthonotal, including two pairs of *Zx* setae between *J* and *Z* setae, almost all setae slightly swollen at base, with pointed tip (Fig. 1B), very long, reaching well past base of next posterior setae (*j1* 24, *j3*, *z2*, *j4*, *z5*, *j6*, *J1*, *Jx* 62 – 64, *J3* 67–68, *J5* 40 – 42, *Z5* 54 – 56), lateral setae thicker than central setae, almost all setae slightly serrated (Fig. 1C), length 89–99, seta *Z5* is 1.5 × the length of *J5*; opisthonotal region with three unpaired supernumerary seta *Jx* in each specimen. Shield with 11 pairs of pore-like structures, apparently including three pairs of gland pores (labelled *g* in Figure 1) and eight pairs of poroids; lyrifissures near the base of *j1* large and slit-like, others smaller and ovoid to circular. Lateral soft skin surrounding the shield with three pairs setae in the *R* series.

Ventral idiosoma — (Fig. 1D). Tritosternum with columnar base (17 – 20 long × 10 – 12 wide), paired pilose laciniae, length 50 – 55, pre-sternal shields absent, pre-sternal area with some weak transverse lines. Sternal shield length 104–106, narrowest between coxae II (77 – 79) widest between coxae II & III (124 – 126), with slightly concave posterior margin and undulating anterior margin, with three pairs of short and smooth sternal setae, *st1* 27 – 28, *st2* 30 – 32, *st3* 30 – 32, not reaching base of next posterior setae, one pair of lyrifissures adjacent to setae *st1*, a pair of larger lyrifissures between *st2* and *st3*; antero-lateral surface of sternal shield with lineate ornamentation, central area smooth. Metasternal platelets absent, metasternal setae *st4* (30 – 32) and metasternal pores located in soft skin; endopodal plates II/III fused to ster-

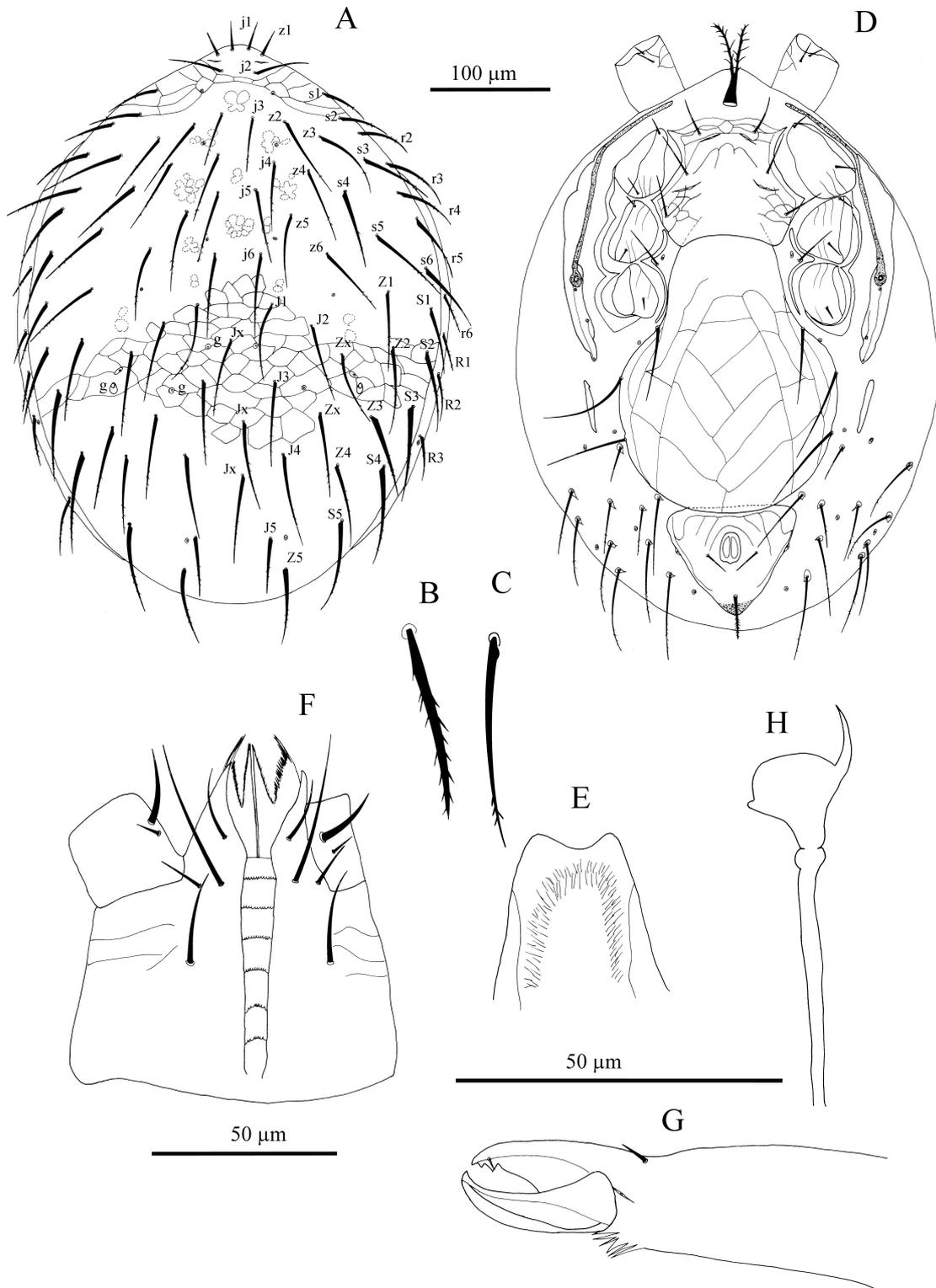


FIGURE 1: *Laelaspis guilaniensis* n. sp., female: A – dorsal shield; B – seta Z5 enlarged; C – dorsal shield seta j3 enlarged; D – ventral idiosoma; E – epistome; F – Hypostome; G – chelicerae; H – insemination structures.

nal shield, endopodal plates III/IV elongate, narrow, curved. Genito-ventral shield broad, length 223 – 225, maximum width 176 – 179, posterior margin rounded, abutting anal shield, surface with characteristic ornamentation including distinct Λ -shaped lines and polygonal ornamentation, bearing the long genital setae *st5* (42 – 44) and two pairs of long setae (70 – 72) on its lateral edges. Paragenital pores located on soft skin lateral to shield behind coxae IV. Anal shield subtriangular, length 84 – 86, width 104 – 106; its anterior half with lineate ornamentation and a pair of lateral pores; serrate post-anal seta 30 – 32, longer and thicker than para-anal setae, 15 – 17. Opisthogastric skin with long and narrow metapodal plates (42 – 43 long \times 5 – 7 wide), and 10 pairs of slightly serrate setae, each arising on small sclerotised platelet, and five pairs of pores. Exopodal plates forming sub-triangular extensions behind coxae IV, narrow elongate exopodal plates II/III not fused to peritrematal shield. Peritreme extending from coxa IV to mid of coxa I, peritrematal shield narrow, post-stigmatal section conspicuous, with two pairs of pores.

Gnathosoma — Epistome trapezoidal, smooth (Fig. 1E). Hypostomal groove with six rows of denticles each bearing 8-14 small teeth, and smooth anterior transverse line. Hypostome with four pairs of setae, internal posterior hypostomal setae *h3* longest (Fig. 1F). Corniculi robust and horn-like, reaching mid-level of palp femur. Palp chaetotaxy: trochanter 2 (*vt1* thick), femur 5, genu 6, tibia 12, tarsus 15; all setae smooth and needle-like, palp tarsal claw two-tined. Fixed digit of chelicera with two blunt teeth (Fig. 1G); pilus dentilis short and robust; dorsal seta short, prostrate; movable digit without teeth; arthrodistal membrane with a rounded flap and short filaments.

Legs — Legs II and III short (222-224, 298-302), I and IV longer (346-348, 306-308) (excluding pretarsus). Leg I: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 1 (*ad* thick), femur 2 3/2 2/2, genu 2 3/2 3/1 2, tibia 2 3/2 3/1 2. Leg II: coxa 0 0/1 0/1, trochanter 1 0/1 1/2 1, femur 2 3/1 2/2 1 (*ad1* and *pd2* thick), genu 2 3/1 2/1 2, tibia 2 2/1 2/1 2 (*pv1* thick). Leg III: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 1 2/1 1/0 1 (*ad1* thick), genu 2 2/1 2/1 1, tibia: 2 1/1

2/1 1. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 0/1 0/2 1 (*av* thick), femur 1 2/1 1/0 1 (*ad1* and *ad2* thick), genu 2 2/1 3/0 1 (ventral thick), tibia 2 1/1 3/1 2 (ventral thick); all setae fine and needle-like unless otherwise noted. Tarsi I-IV with 18 setae 3 3/2 3/2 3 + *mv*, *md*. All pre-tarsi with a pair of claws and a long thin membranous ambulacrum.

Genital structures — (Fig. 1H): Insemination ducts opening on posterior margin of coxa III; sacculus an irregular, with a thorn like structure, dark coloured mass behind genito-ventral shield, each duct entering separate sacculus via circular openings. The proximal ends of the ducts slightly swollen at junction with rami.

Etymology — The name of this species refers to the type locality province, Guilan.

Notes — *Laelaspis guilaniensis* differs from all other species in the genus by its dorsal shield long setae, seta *Z5* much longer than *J5*; seta *vt1* on the palp trochanter thick, movable digit of chelicerae without teeth, fixed digit of chelicera with two blunt teeth and post-anal seta serrate.

***Laelaspis mossadeghi*
Babaeian and Joharchi, 2013**

Hypoaspis (Laelaspis) imitate (sic.) – Nemati and Babaeian, 2010: 364 (misidentification).

Remarks — This species was described from the former USSR in association with the rodent *Meriones tristrami* Thomas (Reitblat, 1963). It was reported from unidentified insects in Iran by Nemati and Babaeian (2010), but we have had the opportunity to examine specimen and we believe this was a misidentified specimen of *Laelaspis mossadeghi*, therefore *Laelaspis imitatus* Reitblat, 1963 is excluded from the Iranian fauna.

DISCUSSION

The new species might have two different features, the shape of the spermatheca, which should be confirmed by examination of more species and the lack of teeth on the movable digit of the chelicerae. The last character has been seen in three other species

(*Laelaspis kamalii* Joharchi and Halliday, 2012; *Laelaspis equitans* (Michael, 1981) and *Laelaspis persicus* Joharchi and Halliday, 2012) that have been recorded from Iran previously. Therefore dentition of the movable digit of the chelicerae provides a diagnostic character in the genus.

At the start of this study, 12 species of *Laelaspis* had been reported from Iran. Nemati *et al.* (2000) reported *Pseudoparasitus (Gymnolaelaps) vitzthumi* from Iran on the basis of specimens collected from the nest of *Tapinoma simrothi* Krausse. We have not had the opportunity to examine any specimens to confirm this identification, but on the basis of the photomicrographs and illustrations in Nemati (1999), we believe this was a misidentification of some unknown species of *Laelaspis*, therefore *L. vitzthumi* (Womersley, 1956) is excluded from the Iranian fauna. Joharchi *et al.* have previously provided a key to species of *Laelaspis* occurring in the Western Palaearctic Region with a summary of their host associations and biology (Joharchi *et al.*, 2012b). We now provide an identification key for all known Iranian species of the genus (partly from Joharchi *et al.*, 2012b). The following key is based on direct examination of specimens.

Key to species of *Laelaspis* occurring in Iran, partly from Joharchi *et al.*, 2012b

1. Dorsal shield setae long, central opisthotal setae long enough to reach well past base of next posterior seta (Fig. 1A)..... 2
— Dorsal shield setae shorter, central opisthotal setae short, sometimes reaching base of next posterior seta but never past it..... 7
2. Seta Z5 clearly longer than J5 (Fig. 1A)..... 3
— Seta Z5 short, equal or shorter than J5, never two to three times longer than J5.....
.....*Laelaspis kamalii* Joharchi and Halliday, 2012
3. Movable digit of chelicera edentate (Fig. 1G) ... 4
— Movable digit of chelicera denticulate 5
4. Most of the setae especially in the opisthotal region of dorsal shield very long (length ≥ 110) and

- wavy, post-anal seta smooth, seta *v1* on the palp trochanter not thickened.....
.....*Laelaspis equitans* (Michael, 1981)
— Most of the setae especially in the opisthotal region of dorsal shield long (length < 105), post-anal seta serrate, seta *v1* on the palp trochanter thickened (Figs. 1D, 1F) *Laelaspis guilaniensis* n. sp.
5. Posterior margin of genito-ventral shield rounded, seta *v1* on the palp trochanter thickened (Figs. 1D, 1F)..... 6
— Posterior margin of genito-ventral shield truncate, seta *v1* on the palp trochanter normal..... *Laelaspis humeratus* (Berlese, 1904)
6. Genito-ventral shield broadly oval and almost level with outer margin of coxae IV.....
.....*Laelaspis pennatus* Joharchi and Halliday, 2012
— Genito-ventral shield smaller, circular and nearly extending to mid-level of coxae IV.....
....*Laelaspis mossadeghi* Babaeian and Joharchi, 2013
7. Movable digit of chelicera edentate.....
..... *Laelaspis persicus* Joharchi and Halliday, 2012
— Movable digit of chelicera denticulate 8
8. Dorsal shield setae very short, none long enough to reach the base of the next posterior seta..... . *Laelaspis ovisugus* (Berlese, 1904)
— Dorsal shield setae longer, at least some long enough to reach the base of the next posterior seta..... 9
9. Genito-ventral shield longer than wide, lateral edges reaching only to mid-level of coxae IV..... . *Laelaspis secedens* (Berlese, 1920)
— Genito-ventral shield width equal with length, extending laterally beyond outer edges of coxae IV..... 10
10. Post-anal seta smooth 11
— Post-anal seta serrate.....
..... *Laelaspis calidus* (Berlese, 1924)

11. Dorsal shield setae in podonotal setae very long, reaching well past base of next posterior setae, seta *v1* on the palp trochanter thick.
..... *Laelaspis dariusi* Joharchi and Jalaieian, 2012 — Dorsal shield setae in podonotal setae small, never reaching past base of next posterior setae, seta *v1* on the palp trochanter normal.
..... *Laelaspis astronomicus* (Koch, 1839)

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