

## Article

### A new species of the genus *Laelaspis* Berlese (Acari: Laelapidae) from Iran

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#### Abstract

A new species of melittiphine laelapid mites, *Laelaspis mossadeghi* Babaeian & Joharchi **sp. nov.** associated with *Messor* sp. and *Tapinoma* sp. (Hymenoptera: Formicidae) is described and illustrated from Iran.

**Key words:** Acari, Taxonomy, Mesostigmata, *Laelaspis*, ants, Iran

#### Introduction

Mites of the family Laelapidae Berlese are cosmopolitan with extraordinarily wide ecological diversity including insect paraphages, parasites of vertebrates, and free-living predators that inhabit various substrates such as agricultural soils, dung, forest litter and the nests of some invertebrates (Strong & Halliday 1994; Faraji & Halliday 2009; Lindquist *et al.* 2009). The classification of the family is not stable, and different authors have used variety of narrower and broader concepts for its genera. The genera *Laelaspis* Berlese, *Holostaspis* Kolenati and *Myrmozercon* Berlese (= *Myrmonyssus* Berlese) are considered to be myrmecophiles. Other genera such as *Gymnolaelaps* Berlese, *Gaeolaelaps* Evans & Till, *Cosmolaelaps* Berlese and *Pnuemolaelaps* Berlese share a tendency to myrmecophily (Evans & Till 1966; Zeman 1982; Casanueva 1993; Walter 2003; Shaw & Seeman 2009; Walter & Moser 2010). *Laelaspis* has often been treated as a subgenus of *Hypoaspis* sens. lat., but we here consider it as a separate genus following recent works (Joharchi *et al.* 2011; 2012 a, b). The genus *Laelaspis* has been collected in many parts of the world, almost always from ants' nests (Hunter 1961, 1962; Joharchi *et al.* 2012b). Available records also indicate a few species may be found in soil or associated with small mammals (Hunter 1964; Allred 1969). The genus includes approximately 34 described species (Joharchi *et al.* 2011; Joharchi *et al.* 2012 a, b). The aim of this paper is to describe a new species of *Laelaspis* associated with ants from Iran.

## Materials and methods

Mites were extracted from soil samples using Berlese funnels, then cleared in Nesbitt's solution and finally mounted into Hoyer's medium on microslides (Walter & Krantz 2009). The line drawings and examinations of the specimens were performed with an Olympus BX50 microscope. Measurements are presented in micrometres as follows: mean (maximum-minimum). Idiosomal setal notation follows that of Lindquist and Evans (1965), the leg chaetotaxy that of Evans (1963a), the palp chaetotaxy that of Evans (1963b). Dorsal shield length and width were taken from anterior to posterior margins along the midline, and from lateral margins at level of dorsal setae r3 respectively. Length of the genitoventral shield was measured along the midline from posterior margin of the sternal shield to the posterior margin of genitoventral shield, and the width at level of Zv5. Length and width of the sternal shield were measured along the midline from anterior to posterior margin and at level of st2-st2 respectively. Length of the anal shield was measured along the midline from anterior to the posterior margin of the cribrum (which is often folded under), and the width at widest point. The holotype and two paratypes are preserved as a permanent slides and deposited in the Jalal Afshar Zoological Museum, College of Agriculture, University of Tehran, Iran (JAZM). Paratypes of the new species are also deposited in the Australian National Insect Collection, CSIRO Ecosystem Sciences, Canberra ACT, Australia (ANIC) and in the Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University (YIAU).

### Genus *Laelaspis* Berlese, 1903

*Laelaps* (*Laelaspis*) Berlese, 1903

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

*Diagnosis.* The diagnosis of *Laelaspis* used here is based on that of Joharchi *et al.* (2011; 2012b).

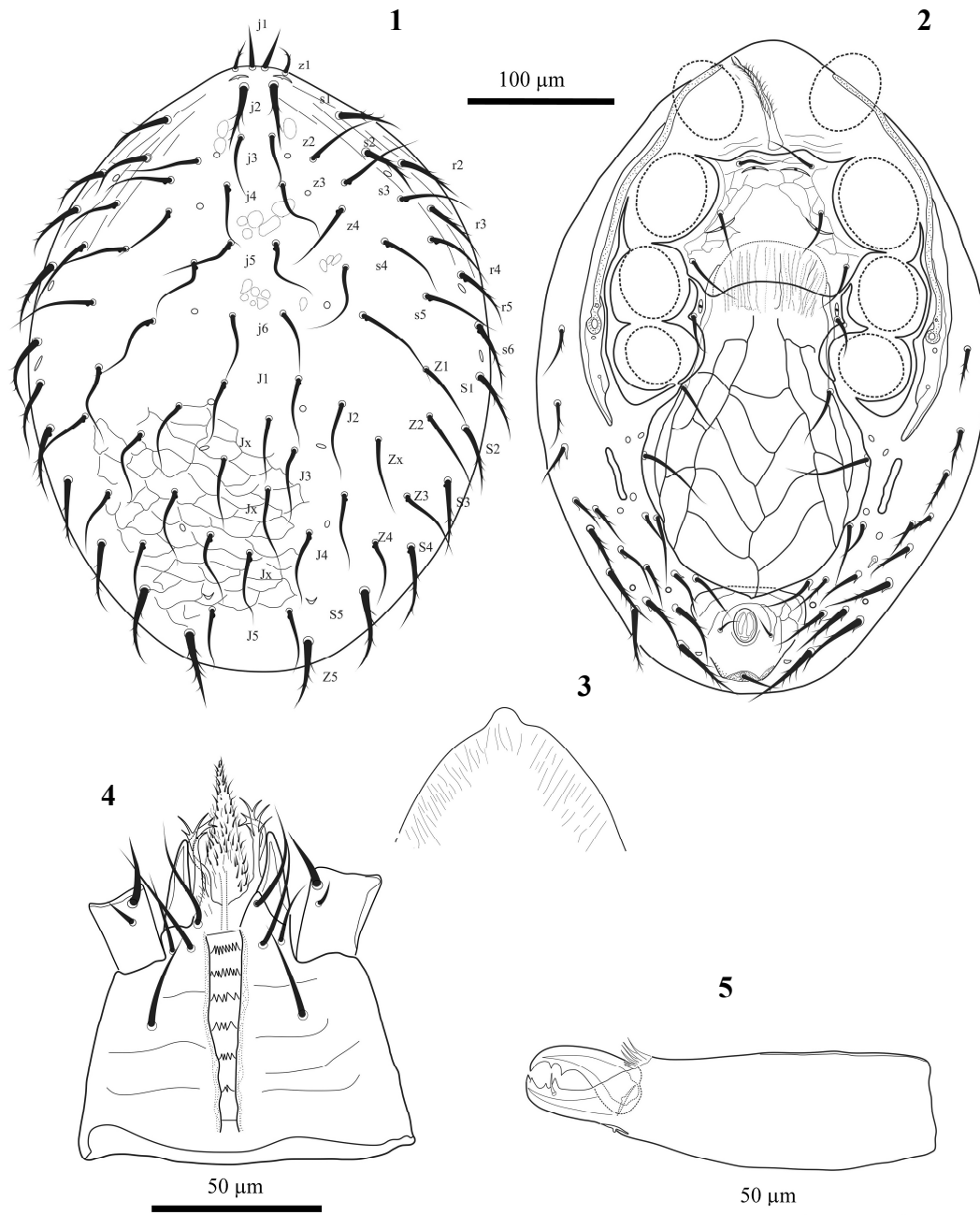
### *Laelaspis mossadeghi* Babaeian & Joharchi sp. nov. (Figs. 1–5)

*Specimens examined.* Holotype, female, Iran, Shahrekord, Dotu, 30 June 2010, E. Babaeian coll., nest of *Messor* sp. (in JAZM), Paratypes: two females same data as holotype (in JAZM); two females, Iran, Savojbolagh, Khoznan, 36°71' N, 50°32' E, alt. 1595 m a.s.l., 15 April 2010, O. Joharchi coll., in nest of *Tapinoma* sp. (in YIAU and ANIC).

*Diagnosis.* Seta z1 short and barbed, marginal setae plumose, thicker than those in central area of shield, seta Z5 stout, plumose and 1.5 x as long as J5, genitoventral shield small, circular and bearing a minute point on its posterior margin. Seta Zv1 inserted on the shield or adjacent to its margin, opisthogastric area with 17 pairs of setae, Zv2, Jv1-2 smooth, other setae distinctly plumose.

*Description.* Female. *Dorsal idiosoma.* (Fig. 1). Dorsal shield length 439 (426–451) width 246 (231–260) wide, oval, with scale-like pattern in opisthotal region and a few striations on podonotal margins, shield bearing 39 pairs of setae and three unpaired

postero-median setae: 22 pairs (j1–j6, z1–z6, s1–s6, r2–r5) in podonotal area and 17 pairs (J1–J5, Z1–Z5, Zx2–Zx3, S1–S5) in opisthonotal area, and three additional unpaired setae between J2–J3, J3–J4, and J4–J5, all setae with small knob near their base, long enough to reach the base of next posterior setae, setae j2, s1, s2, s6, r2–r5, S1–S5 and Z5 thickened and distinctly serrated in apical 1/2 or 2/3, j1 (18) smooth, z1 (16) barbed, remaining setae smooth, length of Z5= 1.5 x J5.



**Figures 1–5.** *Laelaspis mossadeghi* Babaeian & Joharchi **sp. nov.** (female). 1. Dorsal shield; 2. Ventral shield; 3. Epistome; 4. Hypostome; 5. Chelicera.

*Ventral idiosoma* (Fig. 2). Tritosternum with columnar base (20) and pilose laciniae (44), presternal shields absent, sternal shield 87 (83–91) long and 90 (86–93) wide along midline and at level of st2-st2 respectively, reticulated anterolaterally and smooth medially, bearing three pairs of moderately long setae (st1: 33, st2: 34, st3: 38) and two pairs of elongate lyrifissures (iv1, iv2); first pair oriented transversely and second pair oriented obliquely; shield with small indentation anteromedially, posterior margin concave, lateral corners extending to middle of coxae III. Metasternal setae (st4: 36) in unsclerotized cuticle with iv3, Endopodal plates III-IV robust, exopodal plates narrow and subtriangular, genitoventral shield 211 (222–199) long and 154 (163–145) wide, circular, with minute median posterior point where it overlaps the anterior margin of anal shield, and ornamented with nine large cells in the central part bordered by two lines forming an inverted V. Genitoventral shield bearing st5 (37), Zv1 (52) inserted on the shield or in soft cuticle adjacent to the shield. Metapodal shield 40 long and 5 wide oriented parallel with genitoventral shield. Opisthogastic area with 17 pairs of setae, of which Jv1, Jv2, Zv2 smooth and remaining are pilose on side of length. All setae arising from small platelets. Anal shield 71 (65–76) long and 78 (75–80) wide, subtriangular, anterior edge slightly convex, pre-anal region reticulated, with three circum-anal setae, post-anal seta 20 (19–22), longer and thicker than para-anal setae 15 (14–17). Post-stigmatal section of peritrematal shield narrow, extending well behind exopodal shield posteriorly and with two pairs of pores, peritremes long and extending to anterior margin of coxa I.

*Gnathosoma* (Figs. 3–5). Epistome with smooth anterior margin and with small lobe anteromedially (Fig. 3). Hypostome (Fig. 4) with four pairs of smooth setae, deutosternal groove with six transverse rows of denticles (3–8 denticles each), plus anterior and posterior smooth ridges, corniculi horn-like. Chelicerae (Fig. 5) normal for the genus, second segment 94 (92–97) long, tridentate: a large tooth at level of setiform pilus dentilis, two small teeth plus terminal hook, arthrodistal corona fringe-like, movable digit 26 (26–27) long, bidentate + terminal hook. Palp setation of trochanter, femur, genu, tibia, tarsus: 2-5-6-14-15; apotele with two subequal teeth.

*Legs*. Tarsi I–IV with claws and ambulacra. Legs I 316 (353–280) and IV longer 326 (348–304) longer than legs II 246 (257–236) and III 225 (241–209). Leg II slightly thicker than the others, surface of legs finely reticulated. Chaetotaxy: Leg I: coxa 0 0/1 0/1 0, trochanter 1 0/1 1/2 1, femur 2, 3/2, 2/2, 2, genu 2, 3/2, 3/1, 2 (all dorsal and lateral setae thickened), tibia 2, 3/2, 3/1, 2. Leg II: coxa 0 0/1 0/1 0, trochanter 1 0/1 1/2 1, femur 2, 3/1, 2/2, 1 (*ad1*, *pd2*, *pv1*, *pl* thickened), genu 2, 3/1, 2/1, 2 (all dorsal and ventral setae thickened), tibia 2, 2/1, 2/1, 2 (all ventral setae thickened). Leg III: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 1, 2/1, 1/0, 1 (*ad1*, *ad2* and *al* thickened), 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, femur 2, 1/1, 1/0, 1 (*ad1* and *ad2* thickened), genu 2, 2/1, 3/0, 1, tibia 2, 1/1, 3/1, 2 (ventral setae longer and thickened). Tarsi I–IV with 18 setae 3, 3/2, 3/2, 3 + *mv*, *md*.

#### Notes

According to the key to species of *Laelaspis* occurring in the Western Palaearctic Region provided by Joharchi *et al.* (2012b), *Laelaspis mossadeghi* Babaeian & Joharchi **sp. nov.** is most similar to *L. pennatus*. The two species are very similar in most aspects,

the only obvious differential characters being the size and shape of the genitoventral shield (broadly oval and almost level with outer margin of coxae IV in *L. pennatus* but smaller, circular and nearly extending to mid-level of coxae IV in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**), lengths and shape of posterior dorsal setae Z5 and J5 (seta Z5 sharply thickened and is 46–49  $\mu\text{m}$  = 1.5 x J5 in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**, but narrowly thickened and are 69–75  $\mu\text{m}$  = 2 x J5 in *L. pennatus*), number teeth on the fixed digit of the chelicera (with a small blunt proximal tooth, a larger median one and two small distal teeth in *L. pennatus*, but with a larger median one followed by a small one and a small distal one in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**), the shape of epistome (triangular in *L. pennatus* but semicircular in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**), posterior margin of genitoventral shield (rounded in *L. pennatus* but with minute point in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**), setae *ad2*, *ad3*, *al1*, *pl1* and *pl2* on femur I (thickened in *L. pennatus* but simple in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**), setae *ad1-ad3*, *al1*, *al2*, *pl1* and *pl2* on genu I, setae *ad1*, *pd2*, *pv1* and *pl* on femur II, setae *ad1-ad3*, *av* and *pv* on genu II, setae *av* and *pv* on tibia II and setae *ad1*, *ad2* and *al* on femur III (simple in *L. pennatus* but thickened in *L. mossadeghi* Babaeian & Joharchi **sp. nov.**). The characteristic marking on the genitoventral shield of the two species is also different (Joharchi *et al.* 2012b).

## Discussion

The new species belongs to the genus *Laelaspis*, following the concept of the genus as defined by Joharchi *et al.* (2011, 2012a, b). So far, a total of 12 species of *Laelaspis* have been reported from Iran: *L. vitzthumi* (Womersley), *L. astronomicus* (Koch), *L. imitatus* Reitblat, *L. calidus* Berlese, *L. dariusi* Joharchi & Jalaeian, *L. humeratus* (Berlese), *L. equitans* (Michael), *L. kamalii* Joharchi & Halliday, *L. pennatus* Joharchi & Halliday, *L. persicus* Joharchi & Halliday, *L. secedens* (Berlese) and *L. ovisugus* (Berlese) (Nemati *et al.* 2000; Hajizadeh *et al.* 2010; Nemati & Babaeian, 2010; Joharchi *et al.* 2012a, b; Joharchi 2012). Most of the species of *Laelaspis* occurring in the Western Palaearctic region are associated with ants or their nests, while a few have been collected in the nests of mammals or in soil and litter. Most of these species have only been collected on a few occasions, so it is not yet possible to draw any firm conclusions about their host specificity. The biology of mites of this genus is not well studied, but it appears likely that they are predators, feeding on other nest inhabitants such as acarid mites or nematodes (Rasmy *et al.* 1987; Metwally *et al.* 1990; Joharchi *et al.* 2012b).

## Etymology

The new species is named in honour of Prof. Mohammad Saeed Mossadegh (Department of Plant Protection, College of Agriculture, Shahid Chamran University, Ahvaz, Iran).

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## References

- Allred, D.M. (1969) New mesostigmatid mites from Pakistan with keys to genera and species. *Journal of Medical Entomology*, 6: 219–244.
- Casanueva, M.E. (1993) Phylogenetic studies of the free-living and arthropod associated Laelapidae (Acari: Mesostigmata). *Gayana Zoologia*, 57: 21–46.
- Evans, G.O. (1963a) Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari: Mesostigmata). *Bulletin of the British Museum (Natural History), Zoology*, 10: 277–303.
- Evans, G.O. (1963b) Some observations on the chaetotaxy of the pedipalps in the Mesostigmata (Acari). *Annals and Magazine of Natural History (Series 13)*, 6: 513–527.
- Evans, G.O. & Till, W.M. (1966) Studies on the British Dermanyssidae (Acari: Mesostigmata). Part II. Classification. *Bulletin of the British Museum (Natural History), Zoology*, 14: 107–370.
- Faraji, F. & Halliday, B. (2009) Five new species of mites (Acari: Laelapidae) associated with large Australian cockroaches (Blattodea: Blaberidae). *International Journal of Acarology*, 35(3): 245–264.
- Hajizadeh, J., Faraji, F. & Rafati Fard, M. (2010) Mites of the family Laelapidae (Acari: Mesostigmata) in Gilan province and four new records for Iran, with a key to Gilan species. *Journal of Plant Protection*, 24: 196–209 [in Persian with English abstract].
- Hunter, P.E. (1961) The genus *Laelaspis*, with descriptions of three new species (Acarina: Laelaptidae). *Annals of the Entomological Society of America*, 54: 672–683.
- Hunter, P.E. (1964) Three new species of *Laelaspis* from North America (Acarina: Laelaptidae). *Journal of the Kansas Entomological Society*, 37: 293–301.
- Hunter, P.E. & Davis R. (1962) Two new species of *Laelaspis* mites (Acarina: Laelaptidae). *Proceeding of the Entomological Society of Washington*, 64: 247–252.
- Lindquist, E.E., Krantz, G.W. & Walter, D.E. (2009) Order Mesostigmata. In: Krantz, G.W. & Walter, D. E. (Eds.), *A Manual of Acarology*. Third edition. Texas Tech University Press, Lubbock, pp. 124–232.
- Joharchi, O. (2012) Laelapidae (Acari: Mesostigmata) mites associated with insects in Iran. In: Murariu, D., Adam, C., Chişamera, G., Iorgu, E., Ovidiu Popa, L. & Paula Popa, O. (Eds.) *Abstract Book of Annual Zoological Congress of "Grigore Antipa" Museum, Bucharest, Romania*, p. 59.
- Joharchi, O., Halliday, B., Saboori, A. & Kamali, K. (2011) New species and new records of mites of the family Laelapidae (Acari: Mesostigmata) associated with ants in Iran. *Zootaxa*, 2972: 22–36.
- Joharchi, O., Halliday, B., & Saboori, A. (2012) Three new species of *Laelaspis* Berlese from Iran (Acari: Laelapidae), with a review of the species occurring in the Western Palaearctic Region. *Journal of Natural History*, 46: 1999–2018.
- Joharchi, O., Jalaiean, M., Paktinat-Saeed, S. & Ghafarian, A. (2012) A new species and new records of *Laelaspis* Berlese (Acari, Laelapidae) from Iran. *ZooKeys*, 208: 17–25.

- Lindquist, E.E. & Evans, G.O. (1965) Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata). *Memoirs of the Entomological Society of Canada*, 47: 1–64.
- Metwally, A.M., Abbassy, M.R., Montasser, S. & Mowafy, M.H. (1990) Notes on the biology of *Laelaspis astronomicus* Koch, Acari: Laelapidae, when fed on free-living nematodes. *Al-Azhar Journal of Agricultural Research*, 12: 9–15.
- Nemati, A. & Babaeian, E. (2010) Mites associated with insects in Chaharmahal-Bakhtiari, Khuzestan and Bushehr Provinces. In: Manzari, S. (Ed.) *Abstract Book of 19<sup>th</sup> Iranian Plant Protection Congress, Tehran, Iran*, p. 364.
- Nemati, A., Mossadegh, M.S. & Kamali, K. (2000) Some mites the Laelapidae (Acari: Mesostigmata) collected from ant and termite nests in Ahvaz region, Khuzestan Province. *Abstract Book of 14<sup>th</sup> Iranian Plant Protection Congress, Isfahan, Iran*, p. 381.
- Rasmy, A.H., Nasr, A.K. & Reda, A.S. (1987) Reproductive response and development of three soil predaceous mites utilizing the acarid mite *Tyrophagus casei* Oud. as an alternate diet. *Anzeiger für Schadlingskunde, Pflanzenschutz, Umweltschutz*, 60: 92–94.
- Shaw, M.D. & Seeman, O.D. (2009) Two new species of *Myrmozercon* (Acari: Laelapidae) from Australian ants (Hymenoptera: Formicidae). *Zootaxa*, 2025: 43–55.
- Strong, K. & Halliday, B. (1994) Three new species of *Hypoaspis* Canestrini (Acarina: Laelapidae) associated with large Australian cockroaches. *Journal of Australian Entomological Society*, 33: 87–96.
- Walter, D.E. (2003) A new mite from an arboreal ant (Formicidae: *Polyrachis* sp.): *Myrmozercon iainkayi* n. sp. (Mesostigmata: Laelapidae). *International Journal of Acarology*, 29(1): 81–85.
- Walter, D.E. & Krantz, G.W. (2009) Collecting, rearing, and preparing specimens. In: Krantz, G.W. & Walter, D.E. (Eds.) *A manual of Acarology* 3rd ed. Texas Tech University Press USA. pp. 83–96.
- Walter, D.E. & Moser, J. (2010) *Gaeolaelaps invictianus*, a new and unusual species of Hypoaspidinae mite (Acari: Mesostigmata: Laelapidae) phoretic on the red imported fire ant *Solenopsis invicta* Buren (Hymenoptera: Formicidae) in Louisiana, USA. *International Journal of Acarology*, 36(5): 399–407.
- Zeman, P. (1982) Two new species of Hypoaspidinae (Acari: Mesostigmata: Dermanyssidae) associated with ants. *Vestník Československe Spolecnosti Zoologicke*, 46: 231–237.

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### گونه جدیدی از جنس (*Laelaspis* Berlese (Acari: Laelapidae) از ایران

اسماعیل بابائیان، امید جوهرچی و علی اصغر سراج

#### چکیده

گونه جدیدی از کنه‌های خانواده *Laelapidae* و زیرخانواده *Melittiphinae*. با نام علمی *Laelaspis mossadeghi sp. nov.* مرتبط با مورچه‌های (*Hymenoptera: Tapinoma sp.* و *Messor sp.* (Formicidae) از ایران توصیف می‌شود.

واژگان کلیدی: کنه‌ها، رده‌بندی، میان‌استیگمایان، *Laelaspis*، مورچه‌ها، ایران.

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