

Article

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A new species of *Laelaspis* Berlese (Acari: Laelapidae) associated with *Tetramorium* sp. (Hymenoptera: Formicidae) from Iran

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Abstract

Laelaspis natanziensis sp. nov., a new laelapid mite (Acari: Mesostigmata) is described and illustrated based on females and male collected in the nest of *Tetramorium* sp. (Hymenoptera: Formicidae) in Natanz region, Isfahan Province, Iran.

Key words: Ants; female; male; Mesostigmata; Taxonomy.

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, b). This family is ecologically diverse, including obligate and facultative parasites of vertebrates, insect paraphages, and free-living predators that inhabit soil-litter habitats and the nests of vertebrates and arthropods (Evans and Till 1966; Strong and Halliday 1994). Joharchi *et al.* (2011) treated *Laelaspis* Berlese as a separate genus, and gave a diagnosis and comparison of diagnostic characters for the closely related genera *Gymnolaelaps* Berlese and *Pseudoparasitus* Oudemans. That concept of *Laelapsis* is followed here.

Ramroodi *et al.* (2014) have previously reviewed and provided a key to species of *Laelaspis* occurring in Iran. The most recent taxonomic work on the genus was by Kazemi (2015), who revised generic concept and its morphological attributes. Species of *Laelaspis* have been collected in many parts of the world, most are associated with ants or their nests (Joharchi *et al.* 2011). The cosmopolitan genus includes 13 identified species that previously reported from Iran (Joharchi *et al.* 2011; Joharchi & Halliday 2013; Ramroodi *et al.* 2014; Kazemi 2015). The purpose of this paper is to describe a new species of *Laelaspis* for increasing our knowledge of the Iranian fauna of Laelapidae.

Material and Methods

Laelapid specimens were collected from soil in Isfahan Province over a period of two years (2013–2014). Mites were extracted from the soil using Tullgren funnels. Specimens were cleared in Nesbitt's solution and mounted in Hoyer's medium (Walter and Krantz 2009). The line drawings and examinations of the specimens were

performed with an Olympus BX51 phase contrast microscope equipped with a drawing tube. Dorsal shield length and width were taken from the anterior to posterior margins along the midline, and at its broadest point, respectively. Length and width of the sternal shield were measured from the anterior border to the posterior margin at the full length and broadest point, respectively. Genito-ventral shield length and width were measured along the midline from anterior border of the epigynal shield to the posterior margin of the genito-ventral shield, and at the maximum, respectively. Leg lengths were measured from base of the coxa to the apex of the tarsus, excluding the pre-tarsus. The nomenclature used for the dorsal idiosomal chaetotaxy is that of Lindquist and Evans (1965), the leg chaetotaxy is that of Evans (1963a), 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 and paratypes of the new species are deposited in the Acarological Collection, Department of Plant Protection, Yazd Branch, Islamic Azad University (YIAU). All measurements in the descriptions are given in micrometres (μm).

Genus *Laelaspis* Berlese

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

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

Diagnosis

The diagnosis of the genus *Laelaspis* used here is based on Joharchi *et al.* (2011; 2012b) and Kazemi (2015).

Laelaspis natanziensis sp. nov. (Figs. 1–9)

Diagnosis

Laelaspis natanziensis sp. nov. differs from all other species in the genus by its heterogeneous in length of dorsal setae, central setae short and lateral setae elongated, female fixed digit of chelicerae with only one blunt tooth in both sexes and *vl* on palp trochanter thick.

Description

Female (n = 5)

Dorsal idiosoma (Fig. 1) – Dorsal shield length 532–545, width 437–451. Shield oval shape, with reticulation, more distinct in opisthonotal region; with 39 pairs of setae, 22 podonotal, 17 opisthonotal, including two pairs of *Zx* setae between *J* and *Z* setae. Opisthonotal region with two unpaired supernumerary seta *Jx* in each specimen. Some opisthonotal setae slightly swollen at base, with pointed tip (Fig. 2), central setae short, never reaching past base of next posterior setae (*j1* 25, *j3*, *z2*, *j4*, *s4*, *z4*, *z5*, *z6*, *j6*, *J1*, *J2*, *Jx*, *J3*, *J4*, *Zx* 35–52, *J5* 48–50), lateral setae clearly longer and thicker than central setae (*s3*, *s6* 107–111, *r5*, *S1* 100–102, *Z5* 100–105, *S2*, *S3*, *S4* 120–124, *S5* 135–139), some setae slightly serrated, seta *Z5* is about 3× the length of *J5*; Shield with 13 pairs of pore-like structures, apparently including three pairs of gland pores and 10 pairs

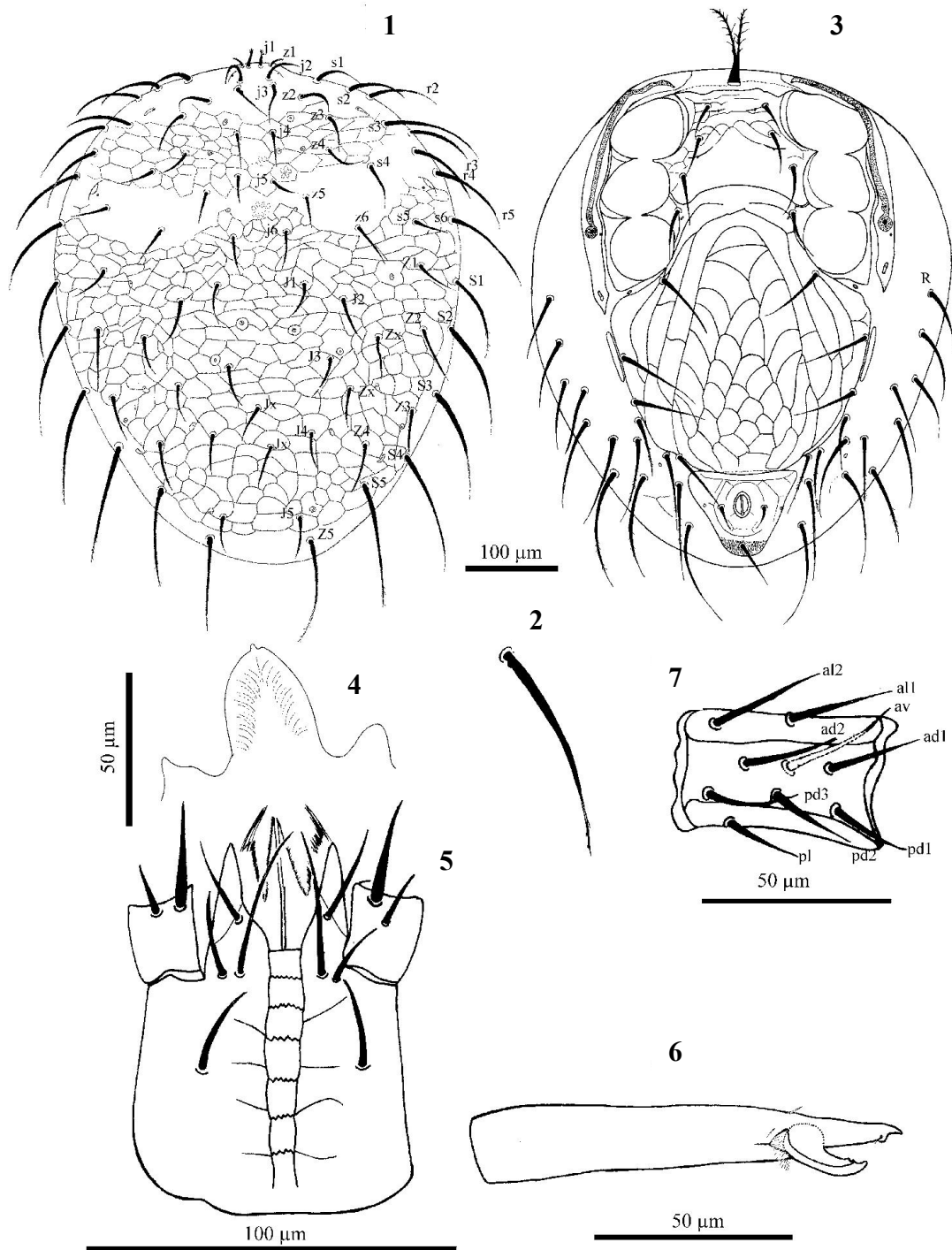
of poroids; lyrifissures near the base of *jl* large and slit-like, others smaller and ovoid to circular.

Ventral idiosoma (Fig. 3). Tritosternum with columnar base, paired pilose laciniae, length 50–55, pre-sternal shields absent, pre-sternal area with some weak transverse lines. Sternal shield length 173–178, narrowest between coxae II (99–103) widest between coxae II & III (178–184), with concave posterior margin and undulating anterior margin, with three pairs of long and smooth sternal setae, *st1* 37–38, *st2* 49–50, *st3* 51–53, reaching past 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* (51–53) and metasternal pores located in soft skin; endopodal plates I/II, II/III fused to sternal shield, endopodal plates III/IV elongate, narrow, curved. Genito-ventral shield broad, length 313–319, maximum width 280–288, posterior margin rounded, abutting anal shield, surface with characteristic ornamentation including distinct Λ -shaped lines and polygonal ornamentation, bearing the long genital setae *st5* (76–80) and three pairs of long ventral/opisthonotal setae (75–100) on its lateral edges (*Jv1*, *Jv2*, *Zv2*). Paragenital pores located on soft skin lateral to shield behind coxae IV. Anal shield subtriangular, length 94–96, width 118–119; its anterior half surface with lineate ornamentation and a pair of lateral pores; smooth post-anal seta 49–50, longer and thicker than para-anal setae 24–25, cribrum small. Opisthogastric skin with long and narrow metapodal plates (61–62 long \times 7–8 wide), and 15 pairs of slightly serrate setae (excluding *r6*, *R1-R6* and *UR*) and one pair of pores. Parapodal plates forming subtriangular extensions behind coxae IV, narrow elongate exopodal plates II/III not fused to peritrematal shield. Peritreme extending from coxa IV to anterior level of coxa I, peritrematal shield narrow, post-stigmatal section conspicuous, with two pairs of pores.

Gnathosoma – Epistome with smooth anterior margin and with tiny lobe anteromedially (Fig. 4). Hypostomal groove with six rows of denticles each bearing 4–9 small teeth, and smooth anterior transverse line. Hypostome with four pairs of setae, internal posterior hypostomal setae *h3* longest (Fig. 5). Corniculi robust and horn-like, reaching mid-level of palp femur. Internal malae with a pair of pilose adjacent median projections, with a pair of sparsely dentate projections at lateral edges. Palp chaetotaxy: trochanter 2 (*v1* on palptrochanter thickened, somewhat spine-like), femur 5, genu 6, tibia 12, tarsus 15; all setae smooth and needle-like, palp tarsal claw two-tined. Fixed digit of chelicera with one blunt tooth (Fig. 6); pilus dentilis short; dorsal seta short, semi-prostrate; movable digit with two teeth; arthrodistal membrane with a rounded flap and short filaments.

Legs – Legs II and III short (322–324, 300–309), I and IV longer (458–460, 374–378) (including pretarsus). Leg I: coxa 0 0/1 0/1 0, trochanter 1 1/1 0/2 1, 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* thick), genu 2 3/1 2/1 2, tibia 2 2/1 2/1 2. 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 (Fig. 7), tibia 2 1/1 3/1 2; all setae fine and needle-like unless otherwise noted. Tarsi II–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.

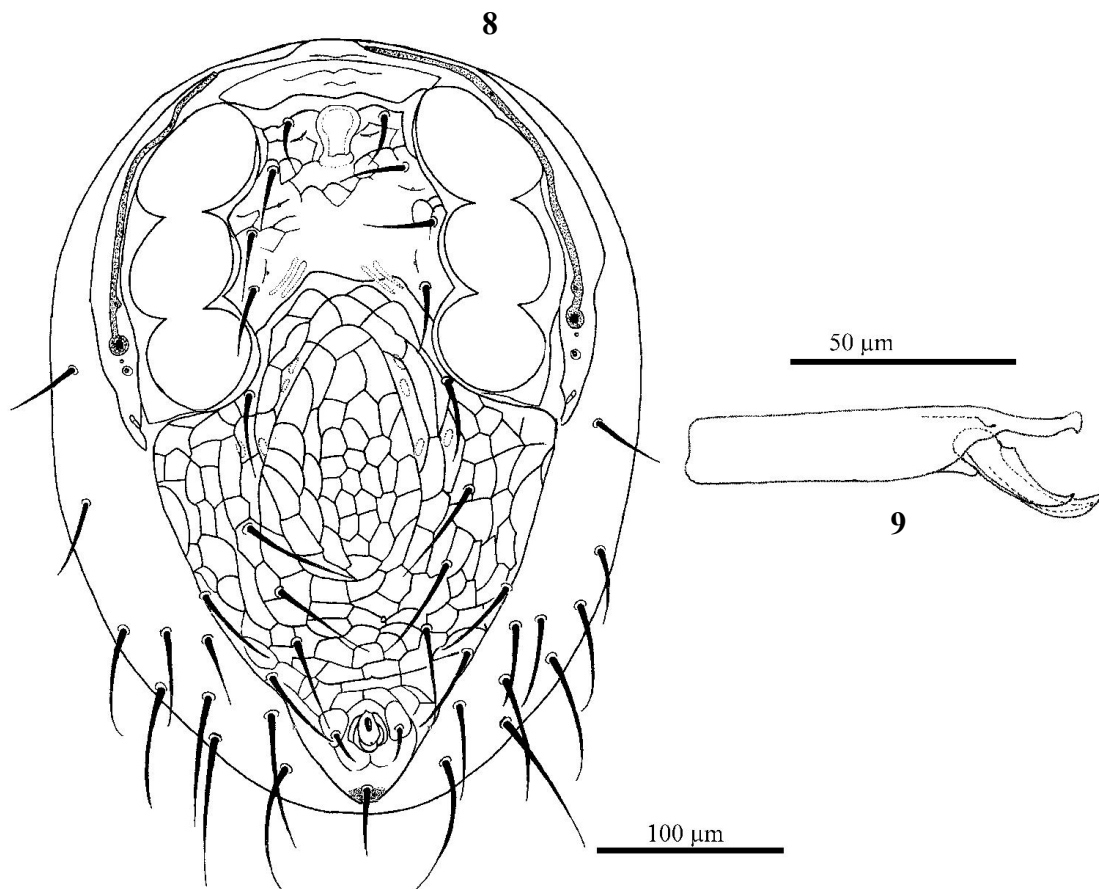
Genital structures – Insemination ducts on posterior margin of coxa III; structures not seen, apparently unsclerotised.



Ventral idiosoma (Fig. 8) – Pre-sternal shields absent. Sternal, genital, endopodal, ventral and anal shields fused to form a holovenral shield (length 377) with 10 pairs of setae (*st1-st5* plus opisthogastric setae *Jv1-Jv3*, *Zv1-Zv2*) and four pairs of poroids, surface with characteristic ornamentation without two distinct Λ -shaped lines. Unpaired post-anal seta (36) longer and thicker than para-anal (20) setae, cribrum small, anal pores visible. Peritreme extending from coxa IV to anterior level of coxa I, peritrematal shield very narrow anterior to stigmata, post-stigmatal section narrow and conspicuous, with a pair of small pores, and one pair of large pores anterior to the stigmata.

Gnathosoma – Movable digit (30) of chelicera with one large proximal tooth; spermatodactyl longer than movable digit (38); arthrodial membrane with a rounded flap and a few short filaments; fixed digit with distal hook (Fig. 9).

Legs – All legs with well-developed pretarsus and claws. Cheatotaxy: Legs II not modified, all legs similar to those of female.



Figures 8-9. *Laelaspis natanziensis* sp. nov. (male) – 8. Ventral view of idiosoma; 9. Chelicerae.

Type material

Holotype, female, Iran, Isfahan Province, Natanz, 33°32' N, 54°51' E, altitude 1600 m a.s.l., 7 Oct. 2014, E. Masoomi coll., in nest of *Tetramorium* sp. (Formicidae) (deposited in YIAU). Paratypes: two females, one male, same data as holotype (deposited in YIAU); two females, Iran, Isfahan Province, Natanz, 33°32' N, 54°51' E, altitude 1600 m a.s.l., 2 Oct. 2015, E. Masoomi coll., in nest of *Tetramorium* sp. (Formicidae) (deposited in YIAU).

Etymology

The name of this species refers to the type locality province, Natanz.

Discussion

At the start of this study, 13 species of *Laelaspis* had been reported from Iran. According to the key to species of *Laelaspis* occurring in the Iran provided by Ramroodi *et al.* (2014), *Laelaspis natanziensis* **sp. nov.** resembles to *Laelaspis dariusi* Joharchi and Jalaeian, 2012, *Laelaspis astronomicus* (Koch, 1839) and *Laelaspis dubitatus* Hunter, 1964.

The four species are very similar in most aspects, the only obvious differential characters being the lengths and shape of dorsal setae (central setae short and lateral setae very long in *Laelaspis natanziensis* **sp. nov.**), number of teeth on the fixed digit of the chelicera (fixed digit of chelicerae with only one blunt tooth in *Laelaspis natanziensis* **sp. nov.**), and shape of setae *vl* on palp trochanter (thickened in *Laelaspis natanziensis* **sp. nov.**). The characteristic marking and size of the genitoventral shield of the four species are also different.

Most species of *Laelaspis* occurring in the Western Palearctic region are associated with ants or their nests but the ecological role of this genus is unknown. Some authors have reported that species of *Laelaspis* found elsewhere are predators that feed on small invertebrates in their hosts' nests (Hunter 1961, Rasmy *et al.* 1987, Metwally *et al.* 1990). They may feed on exudates from the ant's body or their eggs, or on other small invertebrates in the microhabitats created by the ants. This has not been established experimentally, and it will be necessary to do feeding experiments to establish the true ecological role of these mites.

Acknowledgements

We sincerely thank to Dr. Bruce Halliday (CSIRO Entomology, Canberra, Australia) for constructive comments. We are very grateful to Nastaran Razavi Susan for her help in figures preparation. We are grateful to the anonymous reviewers for their valuable suggestions.

References

- 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. Part II. Classification. *Bulletin of the British Museum (Natural History), Zoology*, 14: 107–370.
- Evans, G.O. & Till, W.M. (1979) Mesostigmatic mites of Britain and Ireland (Chelicerata: Acari-Parasitiformes). An introduction to their external morphology and classification. *Transactions of the Zoological Society of London*, 35: 145–270.
- Hunter, P.E. (1961) The genus *Laelaspis*, with description of three new species (Acarina: Laelaptidae). *Annual 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.
- Joharchi, O. & Halliday, B. (2013) A new species and new records of *Gymnolaelaps Berlese* from Iran (Acari: Laelapidae), with a review of the species occurring in the Western Palaearctic Region. *Zootaxa*, 3646: 039–050.
- 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., 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.
- 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.
- Kazemi, Sh. (2015) A new species of *Laelaspis Berlese* (Acari: Mesostigmata: Laelapidae) from Iran, with a revised generic concept and notes on significant morphological attributes in the genus. *Zootaxa*, 4044 (3): 411–428.
- Koch, C.L. (1835–1844) Deutschlands Crustaceen, Myriapoden und Arachniden. Ein Beitrag zur Deutschen Fauna. Herrich-Schäffer, Regensburg, 94 pp.
- 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.
- Ramroodi, S., Joharchi, O. & Hajizadeh, J. (2014) A new species of *Laelaspis Berlese* (Acari: Laelapidae) from Iran and a key to Iranian species. *Acarologia*, 54: 177–182.
- 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.
- 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.

Received: 4 December 2015

Accepted: 16 December 2015

Published: 15 January 2016

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گونه جدیدی از جنس *Laelaspis* Berlese (Acari: Laelapidae) مرتبط با
Tetramorium sp. (Hymenoptera: Formicidae) از ایران

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چکیده

یک گونه کنه لایید جدید، با نام *Laelaspis natanziensis* sp. nov. بر اساس نر و ماده‌هایی که از لانه مورچه جنس *Tetramorium* sp. (Hymenoptera: Formicidae) از منطقه نطنز استان اصفهان جمع‌آوری شده بود، توصیف و ترسیم شد. واژگان کلیدی: مورچه‌ها ماده، نر، میان‌استیگمایان، آرایه‌شناسی.

تاریخ دریافت: ۱۳۹۴/۹/۲۷

تاریخ پذیرش: ۱۳۹۴/۹/۳

تاریخ چاپ: ۱۳۹۴/۱۰/۲۵