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A faunistic study on laelapid mites in Urmia, Iran

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Based on this survey 23 species of family Laelapidae have been identified which two species of them are reported as new record for Iranian mites fauna, that are marked with an asterisk. The list of identified genera and species is as follows:
Laelapidae: *Gaeolaelaps aculeifer* (Canestrini, 1884); *G. oreithyiae* (Walter and Oliver, 1989); *G. angustus* (Karg, 1965); *G. kargi* (Costa, 1968); *G. nolli* (Karg, 1962); *G. khajooii* Kazemi, Rajaei and Beaulieu, 2014; *Pneumolaelaps* (*Hypoaspisella*) *linteyini* (Samsinak, 1964); *P.* (*H.*) *berlesei* (Hirschmann, 1969);*Cosmolaelaps vacua* (Michael, 1891); *C. lutegiensis* (Shcherbak, 1971); *C. malakutsilus** Rosario, 1981; *C. ornatus* (Berlese,1903); *C. angustiscutatus* (Willmann, 1951); *Laelaspis astronomicus* (C. L. Koch, 1839); *L. equitans* (Michael, 1891); *Ololaelaps sellnicki** Bregetova and Koroleva, 1964; *Euandrolaelaps karawaiewi* (Berlese, 1903); *Hypoaspis larvicolus* Joharchi and Halliday, 2011; *Pogonolaelaps canestrinii* (Berlese, 1903); *Gymnolaelaps artavilensis* Joharchi and Halliday, 2013; *Pseudoparasitus dentatus* (Halbert, 1920); *Androlaelaps casalis* (Berlese, 1887); *A. shealsi* (Costa, 1968).

Key words: *Iran, Mesostigmata, mite, new record, soil, taxonomy.*

INTRODUCTION

Most species of free-living Mesostigmata are edaphic and occur exclusively in various soils however some of them are known from a wide range of habitats. Part of these mites are free-living predators in soil and litter, on the soil surface or on plants (Beaulieu and Weeks, 2007; Koehler, 1999; Zhang, 2003). Some soil and litter Mesostigmata are considered beneficial because they feed on arthropods and other invertebrates (Krantz, 2009). These mites are commonplace in greenhouses and are of economic importance. Predatory mites of Mesostigmata attack pest mites and other pests in greenhouses (Zhang, 2003).

The order Mesostigmata is divided into three suborders such as Sejida, Trigynaspida and Monogynaspida and it has approximately 70 families that are grouped in 26 superfamilies. Suborder Monogynaspida is the largest and most specious of the three suborders of Mesostigmata. The suborder is considered to comprise 18 superfamilies, which are relegated to five cohorts. Cohort Gamasina comprises most of the described species of Mesostigmata and include the most familiar families of soil predators, biocontrol agents, and vertebrate parasites (Lindquist et al., 2009).
The family Laelapidae increased in the size with around 90 known genera and more than 1300 species (Beaulieu et al., 2011).These mites are predators living in the soil-litter column or in the nests of vertebrates or invertebrates, paraphages of arthropods, and facultative or obligatory parasites of mammals (Lindquist et al., 2009).

Some investigations on Gamasina mites fauna have been made in Iran during recent decades. Since Kazemi and Rajaei (2013) and Nemati et al. (2012a, 2012b, 2013), some genera and species have been recorded as new species and records from Iran. In this research we introduce

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some laelapid mites from Urmia city, West Azerbaijan province and we report some new records for Iran mites fauna. A key to the genera and species in this study is provided.

MATERIAL AND METHODS

Soil and litter samples were taken from different parts in Urmia region, West Azerbaijan, Iran, during 2015. The samples were placed in Plastic bags and transferred to the laboratory and they were subsequently placed in Berlese funnels for mites extraction. The specimens were fixed and preserved in 75% ethanol. Then mites were cleared in warm lactic acid and mounted in Hoyers' medium. Slides were dried and ringed with insulating varnish. Morphological observations were made using compound microscopes equipped with differential interference contrast and phase-contrast optical systems. To determine the geographical coordinates of sampling points, GPS Data+, Version 2.91, Operation System: Android was used. For Nomination and pronunciation of various sites in Urmia region [favours to spelling, Orümyeh (N 37° 07' - 38° 08', E 44° 23' - 45° 24')], we used the national gazetteer of the province of Äzarbäijän-e Gharbi (Orümïyeh township), Iran (Anonymous, 2006). Some important keys were used for identification are Bregetova, 1977; Evans and Till, 1966; Karg, 1979, 1981, 1989. The specimens were deposited in the Acarology Laboratory, Plant Protection Department, Agricultural College, Shahrekord University (APAS) and Plant Protection Department, Agricultural College, Urmia University, Urmia (Iran).

RESULTS

Family Laelapidae Berlese, 1892

Genus *Gaeolaelaps* Evans & Till, 1966

***Gaeolaelaps aculeifer* (Canestrini, 1884)**

Some important morphological characters: Legs II and IV with stout spine-like setae; podonotal setae conspicuously longer than opisthonotal setae, at least twice as length of opisthonotal setae; with seven pairs of R setae on soft cuticle; PX2-3 present; fixed digit of chelicerae with 12-14 teeth (Evans and Till, 1966).

Distribution and habitats in West Azerbaijan: Miandoab, foliage and soil of sugar beet fields,2003; Urmia, aerial plants part and soil of potato fields, 2004, soil, 2011; Salmas, soil and plant debris of apple orchards, 2011; Khoy, soil of sunflower fields, 2012 (Kazemi and Rajaei, 2013). Miandoab County, soil of apple orchards, 2014 (Zarei and Kazemi, 2014).

Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 12♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m, 15/May/2015; Urmia University, soil of apple orchard, 1♀, 37° 39' 17" N, 44° 58' 36" E, 1361 m; 4/Jun./2015; Urmia University, soil, 2♀♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015; Qäsemlü valley, soil and litter, 15♀♀, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015; Näzlü road, soil of apple orchard, 2♀♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

***Gaeolaelaps oreithyiae* (Walter and Oliver, 1989)**

Some important morphological characters: Dorsal shield oval; Legs II and IV with stout spine-like setae; podonotal setae approximately as long as opisthonotal setae; with one rx seta on podonotal part; PX2-3 present; smaller than *G. aculeifer* (Canestrini, 1884); Dorsal shield 684 µm long and 360 µm wide (Walter and Oliver, 1989).

Distribution and habitats in West Azerbaijan: Miandoab County, soil of apple orchards, 2014 (Zarei and Kazemi, 2014).

Materials examined: Orümïyeh. Urmia University, soil, 1♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015; Qäsemlü valley, soil and litter, 1♀, 37° 16' 48" N, 45° 08' 06" E, 1425 m;

29/Aug./2015; Näzlü dam, soil, 8♀♀, 37° 40' 19" N, 44° 55' 22" E, 1379 m; 6/Sept./2015; Kaboodan island, soil, 1♀, 37° 28' 33" N, 45° 35' 21" E, 1329 m; 9/ Sept./2015.

***Gaeolaelaps angustus* (Karg, 1965)**
Some important morphological characters: Leg II with stout spine-like setae; Opisthonotal shield narrower than podonotal shield; leg I shorter than idiosoma; PX2-3 absent; dorsal shield without a curvature at the posterior part (Costa, 1966; Karg, 1965).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Urmia University, soil of apple orchard, 1♀, 37° 39' 17" N, 44° 58' 36" E, 1361 m; 4/Jun./2015; Urmia University, soil, 2♀♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015; Urmia University, soil, 7♀♀, 37° 39' 35" N, 44° 58' 53" E, 1368 m; 23/Aug./2015; Qäsemlü valley, soil and litter, 1♀, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015; Näzlü, soil of apple orchard, 1♀, 37° 40' 38" N, 44° 57' 10" E, 1370 m; 6/Sept./2015; Näzlü road, soil of apple orchard, 3♀♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

***Gaeolaelaps kargi* (Costa, 1968)**
Some important morphological characters: Legs without stout spine-like setae; PX2-3 present; dorsal setae approximately long, some of them reaching to base of next setae; z3 absent; with R1 and R7; peritreme long and reaches to coxa I (Costa, 1968).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Qäsemlü valley, soil and litter, 14♀♀, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015;

***Gaeolaelaps nolli* (Karg, 1962)**
Some important morphological characters: Peritreme short, reach to midlevel of coxa II; with 2 elongate setae (pd2-3) on tarsus IV; legs without stout spine-like setae; leg I longer than idiosoma; PX2-3 present; dorsal setae approximately long, some of them reaching to the base of next setae; genital shield reticulated; posterior half of dorsal shield reticulated (Karg, 1979).
Distribution and habitats in West Azerbaijan: Salmas, soil and plant debris, 2011; Urmia, soil, 2011 Kazemi and Rajaei (2013). Miandoab County, soil of apple orchards, 2014 (Zarei and Kazemi, 2014).
Materials examined: Orümïyeh. Urmia University, soil and litter, 5♀♀, 37° 39' 15" N, 44° 58' 44" E, 1362 m; 4/Jun./2015; Urmia University, soil and litter, 1♀, 37° 39' 16" N, 44° 58' 40" E, 1363 m; 4/Jun./2015; Qäsemlü valley, soil and litter, 18♀♀, 2♂♂, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015; Band, soil of apple orchard, 19 ♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015.

***Gaeolaelaps khajooii* Kazemi, Rajaei and Beaulieu, 2014**
Some important morphological characters: Peritreme short; opisthonotal shield narrower than podonotal shield; legs without stout spine-like setae; genital shield reticulated; J4, J5, Z5 are barbed (Kazemi et al., 2014).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Näzlü, soil of apple orchard, 1♀, 37° 40' 38" N, 44° 57' 10" E, 1370 m; 6/Sept./2015; Näzlü dam, soil, 1♀, 37° 40' 19" N, 44° 55' 22" E, 1379 m; 6/Sept./2015;

Genus *Pneumolaelaps* Berlese, 1920

***Pneumolaelaps linteyini* (Samsinak, 1964)**

Some important morphological characters: Peritreme short; legs without stout spine-like setae; legs I, II, III shorter than idiosoma; PX2-3 present; dorsal setae approximately short; genital shield smooth; st1 on the anterior line of sternal shield (Samšinák, 1962).

Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.

Materials examined: Urmia University, soil, 1♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015.

***Pneumolaelaps berlesei* (Hirschmann, 1969)**

(Fig. 1)

Some important morphological characters: Peritreme long; legs without stout spine-like setae; dorsal setae with medium size; j5 longer than 1/2 j5-j6; PX2-3 present; with 4 excessive setae between J series; genital shield reticulated; lacks separate pre-sternal shields; presternal area reticulated (Hirschmann et al., 1969; Karg, 1979).

Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.

Materials examined: Orümïyeh University, soil, 2♀♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015; Qäsemlü valley, soil and litter, 6♀♀, 2♂♂, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015.

Genus *Cosmolaelaps* Berlese, 1903

***Cosmolaelaps vacua* (Michael, 1891)**

Some important morphological characters: Dorsal setae lanceolate with a knob at basal part; with two unpaired accessory setae between J series; genital shield narrow, with parallel lateral margins; leg I shorter than idiosoma; epistome rounded with denticulate margin; fixed digit of chelicerae with 5 teeth (Bregetova, 1977; Evans and Till, 1966; Karg, 1981).

Distribution and habitats in West Azerbaijan: Urmia, soil, 2011 (Kazemi and Rajaei, 2013).

Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 4♀♀, 37° 19' 20" N, 45° 17' 53" E, 1319 m; 15/May/2015; Rashkän, soil of apple orchard, 2♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m; 15/May/2015. Urmia University, soil, 2♀♀, 37° 39' 35" N, 44° 58' 53" E, 1368 m; 23/Aug./2015; Näzlü road, soil of apple orchard, 2♀♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

***Cosmolaelaps lutegiensis* (Shcherbak, 1971)**

Some important morphological characters: Dorsal setae with a basal small knob; with two unpaired accessory setae between J series; genital shield without parallel lateral margins, well reticulated; tectum rounded with denticulate margin; fixed digit of chelicerae with 2 teeth (Shcherbak, 1971).

Distribution and habitats in West Azerbaijan: Salmas, soil and plant debris of apple orchards, 2011 (Kazemi and Rajaei, 2013). Miandoab County, soil of apple orchards, 2014 (Zarei and Kazemi, 2014).

Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 6♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m; Band, soil of apple orchard, 2♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015; Näzlü road, soil of apple orchard, 3♀♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

Cosmolaelaps malakutsilyus **Rosario, 1981**
(Fig. 1)
Some important morphological characters: Dorsal setae lanceolate with a basal small knob; dorsal shield not covering whole of dorsum; with weak sclerotised presternal area; sternal shield with reticulate surface; anterior margin of sternal shield not clearly defined; posterior margin of sternal shield reaching middle of coxae III; lateral margins of genital shield are parallel, with reticulate surface; peritremes long epistome with a median tip process and lateral teeth (Rosario, 1981).
Iran record: This is the first report of this species for Iranian mite fauna.
Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 3♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m.

Cosmolaelaps pinnatus **Ramroodi, Hajizadeh and Joharchi, 2014**
Some important morphological characters: Dorsal setae leaf-like, plumose, broadened without a basal small knob; with two unpaired accessory setae between J series; with indistinct anterior margin of sternal shield; ad1 and ad2 on femur IV and pd3 on femur I leaf-like; post anal setae feather-like (Ramroodi et al., 2014).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Band, soil of apple orchard, 3♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015**.**

Cosmolaelaps angustiscutatus **(Willmann, 1951)**
Some important morphological characters: Dorsal setae lanceolate with a distinct basal knob; Z5 and J5 smooth and not barbed or serrate; PX2-3 present; sternal shield and genital shield reticulated; movable digit with two large teeth and a row of small denticles between them (Hirschmann et al., 1969).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Band, soil of apple orchard, 2♀♀, 1♂, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015**.**

Genus *Laelaspis* Berlese, 1903
Laelaspis astronomicus **(C. L. Koch, 1839)**
Some important morphological characters: Central opisthonotal setae short; j6 not long enough to reach the base of J1; z3 present; width of genital shield equal to length; R-r setae thicker and barbed; with three unpaired accessory setae between J series (Bregetova, 1977; Joharchi et al., 2012).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Band, soil of apple orchard, 3♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015**.**

Laelaspis equitans **(Michael, 1891)**
Some important morphological characters: Central opisthonotal setae long; Z5 longer than J5; posterior margin of genital shield rounded; opisthonotal with 6 unpaired setae between J series; (Bregetova, 1977; Joharchi et al., 2012).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Band, soil of apple orchard, 2♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015**.**

Genus *Ololaelaps* Berlese, 1904
(Fig. 2)
***Ololaelaps sellnicki* Bregetova and Koroleva, 1964**
Some important morphological characters: Epipleoron without reticulate structure; peritremal shield is fused at its posterior part with genitor-ventro-anal shield; genitor-ventro-anal shield with 11 setae; spermatheca not bifid at its tip; fixed digit of chelicerae tridentate, pilus dentilis setiform; anterior margin of epistome finely denticulate; with three tined apotele; peritreme extends to middle of coxa I (Bregetova, 1977).
Iran record: This is the first report of this species for Iranian mite fauna.
Materials examined: Orümïyeh. Näzlü, soil of apple orchard, 1♀, 37° 40' 38" N, 44° 57' 10" E, 1370 m; 6/Sept./2015; Näzlü dam, soil, 1♀, 37° 40' 19" N, 44° 55' 22" E, 1379 m; 6/Sept./2015; Band, soil of apple orchard, 3♀, 1♂, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015;

Genus *Euandrolaelaps* Bregetova, 1977
***Euandrolaelaps karawaiewi* (Berlese, 1903)**
Some important morphological characters: Dorsal setae acicular; sternal shield reticulated; chelicerae with small digits, fixed digit with two small teeth; femur II with a strong protuberance; curniculi long and extended to middle level of palpgenu (Costa, 1968).
Distribution and habitats in West Azerbaijan: Miandoab, Foliage and soil of sugar beet fields, 2003; Urmia, Aerial plants part and soil of potato fields, 2004; soil, 2011; Salmas, soil and plant debris off apple orchards, 2011 (Kazemi and Rajaei, 2013).
Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 3♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m; Urmia University, soil and litter, 2♀♀, 37° 39' 15" N, 44° 58' 44" E, 1362 m; 4/Jun./2015; Urmia University, soil of grape orchard, 2♀♀, 37° 39' 16" N, 44° 58' 40" E, 1363 m; 4/Jun./2015; Urmia University, soil, 3♀♀, 37° 39' 29" N, 44° 58' 42" E, 1403 m; 23/Aug./2015; Band, soil of apple orchard, 2♀♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015; Näzlü road, soil of apple orchard, 3♀♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

Genus *Hypoaspis* Canestrini, 1884
***Hypoaspis larvicolus* Joharchi and Halliday, 2011**
Some important morphological characters: Dorsal setae very long; four long setae on tarsus IV; two macrosetae on genu III and IV; Tibia IV with 11 setae; Separate anal shield in male (Joharchi and Halliday, 2011).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Näzlü dam, soil, 22♀♀, 6♂, 37° 40' 19" N, 44° 55' 22" E, 1379 m; 6/Sept./2015;

Genus *Pogonolaelaps* Nemati and Gwiazdowicz, 2016
***Pogonolaelaps canestrinii* (Berlese, 1903)**
Some important morphological characters: Palp apotel three-tined; genu IV with 10 setae; podonotal setae with small setae with small knob at their base; opisthonotal setae with 7 pairs of long barbed setae; with three unpaired setae between J series; presternal area with a pair of indistinct poorly sclerotized plates; st4 absent (Nemati and Gwiazdowicz, 2016).
Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.
Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 1♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m; 15/May/2015; Band, soil of apple orchard, 1♂ , 37° 28' 16" N, 44° 56' 52" E, 1477 m;

29/Sept./2015; Näzlü road, soil of apple orchard, 1♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

Genus *Gymnolaelaps* Berlese, 1916

***Gymnolaelaps artavilensis* Joharchi and Halliday, 2013**

Some important morphological characters: Dorsal shield with 40 long slightly serrated setae; palp apotel three-tined; enlarged genitor-ventral shield with three pairs of setae on its lateral edges; st4 present (Joharchi and Halliday, 2013).

Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.

Materials examined: Orümïyeh. Band, soil of apple orchard, 1♀, 37° 28' 16" N, 44° 56' 52" E, 1477 m; 29/Sept./2015.

Genus *Pseudoparasitus* Berlese, 1916

***Pseudoparasitus dentatus* (Halbert, 1920)**

Some important morphological characters: Genital shield longer than wide (length/width=2/1), with 4 pairs of setae; exopodal plate triangular and punctate; separate exopodal plate from genito-ventral shield; (Bregetova, 1977; Karg, 1989).

Distribution and habitats in West Azerbaijan: This is the first report of the species for the West Azerbaijan.

Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 1♀, 37° 19' 20" N, 45° 17' 53" E, 1319 m; 15/May/2015.

Genus *Androlaelaps* Berlese, 1903

In present work we follow the definition of Shaw, 2014 to consider *Androlaelaps* and *Haemolaelaps* as two separate genera.

***Androlaelaps casalis* (Berlese, 1887)**

Some important morphological characters: Reticulated genital shield longer than wide, with one pair of setae; genital shield widest at level of second pair of flanking setae, then tapering posteriorly; distance between genital and anal shield not exceeding distance from anterior margin of anal shield to anus; both sexes with pilus dentilis slender and setiform; peritreme long (Evans and Till, 1966).

Distribution and habitats in West Azerbaijan: Urmia, house dust, 1994; Miandoab, foliage and soil of sugar beet fields,2003; Salmas, soil and plant debris of apple orchards, 2011; Khoy, soil of sunflower fields, 2012; Khoy, Salmas, Bukan, Mahabad, Urmia, Gharehziaadin, dried fruits and nuts, 2012 (Kazemi and Rajaei, 2013).

Materials examined: Orümïyeh. Qäsemlü valley, soil and litter, 1♀, 37° 16' 48" N, 45° 08' 06" E, 1425 m; 29/Aug./2015;

***Androlaelaps shealsi* (Costa, 1968)**

Some important morphological characters: Reticulated genital shield longer than wide, with one pair of setae; posterior part of genital shield abuts the anal shield; cheliceral fixed digit with a large inflated, flame shaped, pilus dentilis; peritreme long (Costa, 1968).

Distribution and habitats in West Azerbaijan: Miandoab, foliage and soil of sugar beet fields, 2003 (Kazemi and Rajaei, 2013).

Materials examined: Orümïyeh. Rashkän, soil of apple orchard, 7♀♀, 37° 13' 54" N, 45° 19' 19" E, 1319 m; 15/May/2015; Kaboodan island, soil, 2♀♀, 37° 28' 33" N, 45° 35' 21" E, 1329 m; 9/ Sept./2015; Näzlü road, soil of apple orchard, 1♀, 37° 37' 34" N, 45° 01' 00" E, 1366 m; 17/Oct./2015.

Key to genera and species (Female) of present identified mites in this study

1- Pilus dentilis long, slender or inflated; typically has both pl1 and pl2 present on genu IV making 10 setae on this segment ……...***Androlaelaps*** **Berlese, 1903** (2)
- Pilus dentilis not as above, genu IV normally with one pl seta…….. (3)
2- The distance between epigynal and anal shield at least is about one-third of anal shield length; pilus dentilis long and slender ……...***A. casalis*** **(Berlese, 1887)**
- Epigynal shield abutting or may overlaps anterior margin of anal shield; pilus dentilis inflated basally……...***A. shealsi*** **(Costa, 1968)**
3- Female with anal shield fused with genito-ventral shield……***Ololaelaps*** **Berlese, 1904**
* Peritrematal shield fused at its posterior part with genito-ventro-anal shield…….
…….***O. sellnicki*** **Bregetova and Koroleva, 1964**
- Female with anal shield separated from genito-ventral shield ……... (4)
4- Genital shield expanded laterally posterior to coxae IV, very large and extending to area adjacent to anal shield…… (18)
- Genital shield not very large, not extending to anal shield……(5)
5- Z4 very long and wavy, at least three times as long as Z5; femur II and III with macrosetae
…….***Hypoaspis*** **Canestrini, 1884**
Four long macrosetae on tarsus IV; two macrosetae on genu III and IV……..
……..***H. larvicolus*** **Joharchi and Halliday, 2011**
- Z4 not very long and wavy; femur II and III not as above……(6)
6- Dorsal setae never be simple and acicular, expanded in various shape (leaf-like, spatulate or lanceolate with a small basal knob)……...***Cosmolaelaps*** **Berlese, 1903** (7)
- Dorsal setae acicular and not as above……...(11)
7- Dorsal setae feather-like……***C. pinnatus*** **Ramroodi, Hajizadeh and Joharchi, 2014**
- Dorsal setae lanceolate with a small basal knob……(8)
8-Posterior part of dorsal shield with abrupt contriction; there are about 10 pairs of setae between genital and anal shields ……..***C. angustiscutatus*** **(Willmann, 1951)**
- Posterior part of opisthonotum without abrupt contriction; there are maximum two pairs of setae between genital and anal shields …….(9)
9- Tectum with a median pointed tip……***C. malakutsilus*** **Rosario, 1981**
- Tectum without a median pointed tip…….(10)
10- Dorsal setae knife-shaped, j1 leaf-like and narrow……***C. vacua*** **(Michael, 1891)**
- Dorsal setae lancet-shaped, j1 acicular and slightly thickened ….***C. lutegiensis*** **(Shcherbak, 1971)**
11- Female with enlarged spur and spine-like setae on femur II…***Euandrolaelaps*** **Bregetova, 1977**
* Fixed digit of chelicerae with 2 small teeth; epistome smooth anteriorly…….……
…….***E. karawaiewi*** **(Berlese, 1903)**
- Female lacks enlarged spur and spine-like setae on femur II……...(12)
12- Epistome fairly denticulate in anterior margin ……***Gaeolaelaps*** **Evans and Till, 1966** (13)
- Epistome fairly smooth in anterior margin …….....***Pneumolaelaps*** **Berlese, 1920** (17)
13- Peritreme short, extending to mid-level of coxae II…….(14)
- Peritreme long, extending to coxa I…….(15)
14- The width of dorsal shield in podonotal part nearly as the same as in opisthonotal region ……..
.....***G. nolli*** **(Karg, 1962)**
- Dorsal shield clearly widest at the level of setae r3 and tapers posteriorly with parallel lateral maigins in opisthonotal part……***G. khajooii*** **Kazemi, Rajaei, and Beaulieu, 2014**
15- Dorsal shield wedge-shaped, posterior half narrower than anterior half and with converged lateral margins in opisthonotal part; apotele three-tined……***G. angustus*** **(Karg, 1965)**
- Dorsal shield not wedge-shaped; apotele two-tined…….(16)

16- Podonotal setae conspicuously longer than opisthonotal setae; without rx setae on podonotal part of dorsal shield……...***G. aculeifer*** **(Canestrini, 1884)**
- Podonotal setae not conspicuously longer than opisthonotal setae; with rx setae on podonotal part of dorsal shield……...***G. oreithyiae*** **(Walter and Oliver, 1989)**
17- Peritreme short, extending to posterior level of coxa II……***P. linteyini*** **(Samsinak, 1964)**
- Peritreme long, extending to coxa I……...***P. berlesei*** **(Hirschmann, 1969)**
18-In addition of genital setae (st5) at least two ventral setae (Zv1 and Jv1) located well inside on genito-ventral shield)…… ***Pseudoparasitus*** **Berlese, 1916**
* Genital shield longer than wide……....***P. dentatus*** **(Halbert, 1920)**
- Genital shield with one to three pairs of setae in addition to the genital setae st5, all located on the edges of the shield……(19)
19- Internal mala with elongate densely hairs; st4 absent……..……
……..…..***Pogonolaelaps*** **Nemati and Gwizdowicz, 2016**
* With three unpaired setae between J series……***P. canestrinii*** **(Berlese, 1903)**
- Internal mala without such elongate densely hairs; st4 present……(20)
20- Palp tarsal claw two-tined; presternal plate absent…….... ***Laelaspis*** **Berlese, 1903** (21)
- Palp tarsal claw three-tined; Presternal plate present……***Gymnolaelaps*** **Berles, 1916**
* Dorsal shield with 40 pairs of long slightly serrated setae…….
……***G. artavilensis*** **Joharchi and Halliday, 2013**
21- Dorsal setae long, central opisthonotal setae well exceed the base of successive setae……...
.....***L. equitanse*** **(Michael, 1891)**
- Dorsal setae short, none of central opisthonotal setae long enough to reach the base of the next posterior setae……. ***L. astronomicus*** **(C. L. Koch, 1839)**

DISCUSSION

The information about the Laelapidae of Iran is poor. During a survey on Laelapidae in Orümïyeh region, Iran, 23 species were collected. Among them two species were new records for Iran's mite fauna and 15 species were reported as new records for the fauna of West Azerbaijan Province. The genera and their number of species are: *Gaeolaelaps* Evans & Till (6), *Pneumolaelaps* Berlese (2), *Cosmolaelaps* Berlese (5), *Laelaspis* Berlese (2), *Ololaelaps* Berlese (1), *Euandrolaelaps* Bregetova (1), *Hypoaspis* Canestrini (1), *Pogonolaelaps* Nemati and Gwiazdowicz (1), *Gymnolaelaps* Berlese (1), *Pseudoparasitus* Berlese (1) and *Androlaelaps* Berlese (2). In the previous literature some species of the Laelapidae such as: "*Eulaelaps oudemansi* Turk, 1945, (Urmia); *E. stabularis* (C.L. Koch, 1839), (Salmas); *Gaeolaelaps minor* (Costa, 1968), (Miandoab); *G. queenslandicus* (Womersley, 1956), (Salmas, Urmia, Khoy); *Hypoaspis krameri* (G. & R. Canestrini, 1881), (Urmia); *Pneumolaelaps asperatus* (Berlese, 1904), (Miandoab, Urmia); *P. azerbaijaniensis* (Faraji, Abedi & Ostovan, 2008), (Salmas); *P. curtipilis* (Hirschmann, 1969), (Urmia); *P. hirschmanni* (Karg, 1979), (Urmia); *P. ovoidea* (Hirschmann, 1969), (Urmia); *Pseudoparasitus missouriensis* (Ewing, 1909), (Salmas); *Stratiolaelaps miles* (Berlese, 1892), (Urmia); have been reported from West Azerbaijan Province (Kazemi and Rajaei, 2013) that those have not been found in our study. Some species have been reported from special habitats, for example: *Eulaelaps oudemansi* Turk, 1945 and *Hypoaspis krameri* (G. & R. Canestrini, 1881), from house dust; *Stratiolaelaps miles* (Berlese, 1892), from stored wheat; (Kazemi and Rajaei, 2013). The maximum number of specimens were found for *G. nolli* (Karg, 1962) and *G. aculeifer* (Canestrini, 1884) with 43 and 32 specimens, respectively. Based on the impressive number of records of mesostigmatic mites from West Azerbaijan province, it seems that number of species inhabiting in this area is quite high. Also probably there are several new species of Mesostigmata that undiscovered for science and this however requires further investigations. Finally further investigation needed to conduct serious sampling in different habitats to find undiscovered species in this area.

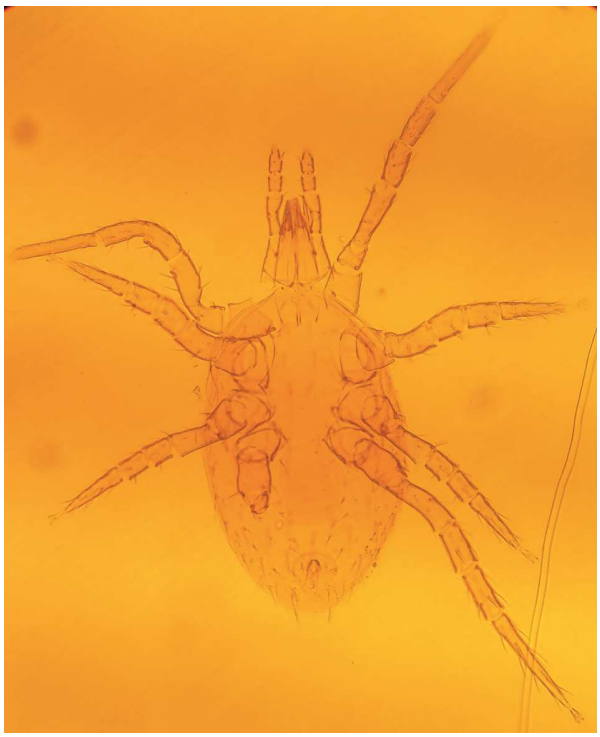

FIGURE 1. *Cosmolaelaps malakutsilyus* Rosario, 1981

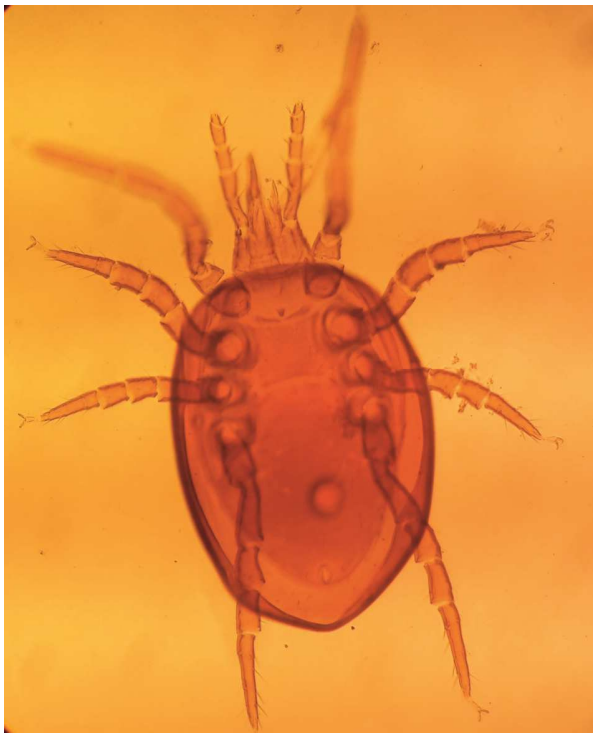

FIGURE 2. *Ololaelaps sellnicki* Bregetova and Koroleva, 1964

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