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Fauna of some Mesostigmatic Mites (Acari: Mesostigmata) in Khorramabad Region, Lorestan Province, Iran

Iman Hasanvand[1*], Mojtaba Rahmati[2], Shahriar Jafari[1], Leila Pourhosseini[1], Niloofar Chamaani[3], Mojdeh Louni[1]

[1]Department of Plant Protection, Faculty of Agriculture, Lorestan University, P.O. Box: 465, Khorramabad, Iran
[2]Department of Entomology and Plant Pathology, College of Aboureihan, University of Tehran, Pakdasht, Iran
[3]Department of Plant Protection, college of Agriculture, Isfahan University of technology,Isfahan, Iran

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ABSTRACT

Objective: In soil habitats, mesostigmatic mites (Acari: Mesostigmata) are among the most important predators of smallarthropods and nematodes. **Methods:** A study was carried out during 2009-2010 to identify theirfauna in Khorramabad county, Western Iran. Soil samples were taken from different regions. Mites were extracted by Berlese-Tullgren funnel and cleared in nesbit fluid. Microscopic slides were prepared using Hoyer's medium. Different species of some families of Mesostigmata were collected. 21 species of 12 families have been identified. Among them, 8 genera and 8 species are the first records for Lorestan province fauna that marked with one asterisk. **Results:** In the present study 21 species belong to 19 genera and 12 families were collected and identified of which eight species are new records for Lorestan Province fauna that are marked by an asterisk.

1.INTRODUCTION

Knowledge of species diversity is the key to understanding natural and disturbed ecosystems, of which soil communities form an important part (Salmane and Brumelis, 2010). Among soil dwelling organisms, mites are the one of the largest and most biologically diverse groups of the arachnids, rivaling insects in the extent to which they have successfully colonized aquatic and terrestrial habitats (Evans, 1992). The Mesostigmata are a group of mites (Acari) comprising a great diversity of vertebrate parasites-symbionts of insects, and for the most part, free-living predators. Soil, litter, plants, dung and decaying wood are all inhabited by a range of free-living mesostigmatic mites (Walter et al., 1998)

The order Mesostigmata is divided into three suborders. The suborder Monogynaspida includes a multitude of freeliving and parasitic species that occur in countless terrestrial, marine and freshwater habitats throughout the world. This suborder includes five cohorts. Gamasina cohort comprises most of the described species of mesostigmata. The Gamasina is considered to comprise four subcohorts and 10 superfamilies (Lindquist et al., 2009).

2. MATERIALS AND METHODS

Khorramabad region is located between latitude 32º 56´to 33º 51´, longitude 47º 41´to 48º 57´and altitude of 1171 m above sea level. During 2012-2013, soil samples were collected from different habitats and mites

***Corresponding Author:** Iman Hasanvand, Department of Plant Protection, Faculty of Agriculture, Lorestan University, P.O. Box: 465, Khorramabad, Iran (imanhassanvand@gmail.com)

extracted using Berlese-Tullgren funnels, cleared in Nesbitt's fluid and mounted in Hoyer's medium on microscope slides in the entomological laboratory of Plant Protection Department of Lorestan University. The list of species is presented by different families and related genera, including information about diagnosis, world distribution, records in Iran with new records in this survey. Species microhabitat and the details of the findings encompass date of collection, locality, microhabitats or hosts that were recorded.

3. RESULTS AND DISCUSSION

In the present study 21 species belong to 19 genera and 12 families were collected and identified of which eight species are new records for Lorestan Province fauna that are marked by an asterisk. The list of identified species is as follow: (F: Feamale, DN: Deutonymph)

Veigaiidae Oudemans, 1939
***Veigaia* Oudemans, 1905**
***Veigaia nemorensis* (C.L. Koch, 1892)**

Diagnosis. Presternalscutella composed of several sclerites. Ventral shield trapezoidal, with an almost straight posterior marginj on the shield there are 3 (more rarely 4) pairs of setae. The pair of setae between the ventral and anal shields are considerably shorter than the setae on the ventral shield. One pygidialsclerite.

World distribution. In forest litter, in rotting stumps, in the soil on meadows and in the forest, in moss, in old ants nests, in rodents nests. USSR.widely distributed. Holarctic (Bregetova, 1977).

Iran Records. This mite species has been reported from Kermanshah, Hamedan and Kohkiluyeh and Boyer-Ahmad Provinces (Kazemi and Rajaei, 2013).

New Records. Makhmalkooh district, 21.7.2012, (2F), soil under willow tree. ***Veigaia planicola* Berlese, 1882**

Diagnosis. Genital shield not fused with ventral shield. Punctate organs off shield. On the ventral shield there are 6 or 5 pairs of setae (if the anterior pair is not on the shield, it is in front of it). Notogaster with 13 pairs of setae.One pygidialsclerite.

World distribution. In moss, in forest litter, in the surface layer of ,the soil in parks and forests, accidentally on rodents. USSR.Odessa oblast', Crimea, Caucasus, Central Asia. Western Europe, USA (Bregetova, 1977).

Iran Records. This mite species has been reported from Isfahan, Tehran, Kermanshah and West Azerbaijan Provinces (Kazemi and Rajaei, 2013).

New Records. Bishe district, 1.5.2012, (3F), soil under cedar tree.

Family Laelapidae Berlese, 1892
Genus *Euandrolaelaps* Bregetova, 1977
Euandrolaelaps karawaiewi (Berlese, 1903)

Diagnosis. Dorsal shield with 39 pairs of thin setae, covered with a small-celled reticulum. Sternal shield with a straight posterior margin, presternalscutella well developed. Genito-ventral shield set at some distance from the anal shield. Metapodal scutella narrow, elongately oval.femur II with a short blunt spur, genu and tibia with 1 sharp spine, tarsus with 2 or 3 ventral spines. Chelicerae with short chelae, movable digit with 1 tooth, fixed digit with two teeth.

World distribution. Western Europe, North and West of Asia, Ukrain, Israel, (Costa, 1968).

Iran Records. Following Kazemi and Rajaei (2013)

New Records. Sabzevar district, 5.6.2012, (1F), soil; Zivdar district, 22.1.2013, (2F), soil of Pomegranate orchards. Zorandol district, 25.9.2012, (2F), soil of raspberry shrub; Veisian district, 6.2.2013, (1F), soil of apple orchards.

Genus Gaeolaelaps Evans & Till, 1966
Gaeolaelaps aculeifer (G. Canestrini, 1884)

Diagnosis. Thedorsal shield is narrowed towards its posterior end, with 39 pairs of setiformsetae and covered with faint reticulation. The sternal shield with a narrow posterior margin, the metasternal seta and associated pores are on interscutal membrane. The genital shield is flask-shaped. Anal shield is narrowed.

World distribution. Common in soil, forest litter, compost, in moss, in rotting vegetables, in the nestes of rodents and of the sand martin. USSR: widely distributed. Western Europe, Algeria, Israel (Bregetova, 1977).

Iran Records. With wide distribution in Iran.Following Kazemi and Rajaei (2013).

New Records. Greet district, 5.10.2012, (3F), soil of willow tree.
Gaeolaelaps queenslandicus (Womersley, 1956)

Diagnosis. Peritremelonger, reaches at least to anterior level of coxa I. Dorsal shield attenuated, with sudden constriction caudally. Leg I longer than idiosoma, femur II with a thick spine. Epistome with 2 teeth longer than the others.Moveable digit of chelicerae with 2 teeth; palp tarsal claw 3-tined.

World distribution. America (Hawaei Islands), Australia, Africa and Asia (Tenorio, 1982).

Iran Records. Common insoil, litter, body of birds or their nests, decaying plants and stored products, widely

distributed: Fars, Chaharmahal and Bakhtiari, Guilan, Isfahan, Yazd, Kerman, West Azerbaijan, RazaviKhorasan, Mazandaran and Tehran (Kazemi and Rajaei, 2013).

New Records. Faculty of Agricultural (University of Lorestan), 7.11.2012, (1F), soil of cypress tree.

Family Parasitidae Oudemans, 1901
Genus *Parasitus* Latreille, 1795
Parasitus fimetorum (Berlese, 1903)

Diagnosis. The lateral margins of the posterior dorsal shield never extend over onto the ventral side of the body, the shield bears fewer than 40 pairs of setae; The sculptural ornamentation is made up of pits or is absent, or it covers only a small part of the entire surface of the dorsal shields; First pair of sternal setae acicular, not bifid at their ends; Tectum with 3 apices, which may be expanded or dissected at their ends; In the vaginal cavity there are evident plicate, fringed or dentate sclerotized structures; The end of the genital shield is extended in the form of a point; The movable digit of the chelae of the chelicerae bears 3 large teeth; The endogyniumdocs not have a compact medial structure and a circle in front of this; Armed in a very complex and very diverse fashion, with teeth of different sizes.

World distribution. Northern, Western europe, Italy, Canada, Moldova, Latvia, The Caucasus, Russia, Western Siberia, Tuva, PrimorskiiKrai (Marchenko, 2002).

Iran Records. Mazandaran, Semnan, Tehran, Kerman, Khuzestan, Alborz, Golestan, Kohkiluyehva Boyer-Ahmad, West Azerbaijan, North Khorasan, RazaviKhorasan, Markazi, East Azerbaijan and Fars Provinces (Kazemi and Rajaei, 2013).

New records. Bishe district, 2.10.2012, (2F), soil and litter; Chamseyedi district, 5.10.2012, (5DN), soil of wheat field.

Comments. The family, genera and species are new records for Lorestan province mite fauna.

Family Pachylaelapidae Berlese, 1913
Genus *Onchodellus* Berlese, 1904
Onchodellus karawaiewi (Berlese, 1920)

Diagnosis. Medium-sized, oval mites. Dorsal shield 470 – 610 X 260 – 380, covered with a fine reticulation, the dorsal setae reach or do not reach the bases of the following setae, setae S8 (21 – 26) approximately half as long as S7 (41 – 65). Sternal shield with an even distinct reticulation.Genito-ventral shield with an almost straight posterior margin, its length is equal to its width. Anal shield wide, its width exceeds its length. The peritremes extend onto the dorsal shield but they do not reach the bases of F2. Gnathosoma with wide corniculi and densely pubescent, apically bifid inner lobes.

World distribution. In forest litter, rotting vegtation, ants nests and rodents nests. USSR: Tataria, Ukraine, Georgia, Uzbekistan, Tomsk oblast (Bregetova, 1977). Western Europe, Northern America, Israel (Mašán, 2007).

Iran Records. Common insoil, leaf-litter, debris of trees, manures, ground covering plants and ant nests. East Azerbaijan, Khuzestan, Hamedan, Kerman, Markazi, Kermanshah, Fars, Mazandaran, Chaharmahal and Bakhtiari, RazaviKhorasan, West Azerbaijan, Tehran, North Khorasan and Kerman provinces (Kazemi and Rajaei, 2013).

New records. Bishe district, 10.9.2012, (5F), soil of walnut trees; Sabzevar district, 21.3.2013, (1F), soil of peach orchard.

Genus *Pachylaelaps* Berlese, 1888
Pachylaelaps pectinifer (G. & R. Canestrini, 1881)

Diagnosis. Dorsal shield 0.76 – 0.870 X 0.43 – 0.58 mm, dorsal setae heterogeneous, dorsocentral setae approximately 2/3 of the length of the setae beside the posterior margin of the body. On the sternal shield there is a distinct structural pattern in the form of a central longitudinal band.. Length of genito-ventral shield exceeds or is about equal to its width, posterior margin of shield wider than the anterior margin of the anal shield, the width of the latter is considerably greater than its length. Spermathecae with a widened apex.Tectum with a long, relatively wide neck, the distal part is expanded in a pectinate fashion and is multifid. On the movable digit of the chelicerae there are two teeth, on the fixed digit – one tooth and a bifid apex. Body oval.

World distribution. In soil, forest litter and rodents nests. USSR: Leningrad and Voloda oblast, Ukraine, Moldavia, Georgia, Nakhichvan ASSR. North Africa (Bregetova, 1977). Europe, North America ,Israel(Mašán, 2007).

Iran Records. Soil, litter, debris of trees and ant nests.Isfahan, Mazandaran, Chaharmahal and Bakhtiari, West Azerbaijan, Tehran, Kerman and Golestan provinces (Kazemi and Rajaei, 2013).

New Records. Shirkhani district, 12.3.92, (1F), soil of apricot orchard.

New records. Shirkhani district, 5.5.2012, (1F), soil of apricot orchard.

Family Ameroseiidae Evans, 1961
Genus *Epicriopsis* Berlese, 1916
Epicriopsis horridus (Kramer, 1876)

Diagnosis. Many dorsal setae very long and thick (of the same thickness as the tubercles), they have fine but dis-

tinct spinules: J3of about the same length as the body; in the center of the dorsal shield j5, j6 are short, their tips do not reach the bases of the following setae (Figure 100, 1). Tectum wide (Figure 100, 2). Legs I especially long, exceeding the length of the body. From above the tubercles appear stellate, with 3-5 points.

World distribution. In mixed forests, in humus, in rotting hay, in moss. In the USSR: afew finds in Leningrad, Gor'kiy and Odessa oblast's, in Moldavia, the Crimea and the Northern Caucasus. Western Europe (Bregetova, 1977).

Iran Records. East Azerbaijan Province (Tabriz). Soil of orchards (Kamali *et al*. 2001); Golestan Province (Gorgan). Soil and litter (Kazemi *et al.,* 2011.

New records. Bishe district, 17.4.2013, (2F), soil under willow trees.

Family Melicharidae Hirschmann, 1962
Genus *Proctolaelaps* Berlese, 1923
Proctolaelaps pygmaeus (Müller, 1860)

Diagnosis. Dorsal shield with 43 pairs of homogeneous setae, most fairly long.Anal shield pear-shaped, anus large, j*4* approximately same length as z4. Anterior margin of tectum with numerous denticles.Hypostomal C1 setae distinctly thicker than other setae on gnathosoma, anterior margin of epistome curved and irregulary denticulate, fixed-digit of chelicerae with 4-7 large proximal teeth and curved row of 3-5 small distal teeth.

World distribution. In rotting plant remains, in moss, in food stores, in nests of small mammals. USSR: ubiquitously (Bregetova, 1977), cosmopolitan (Chant, 1963).

Iran Records. Wide distribution in Iran (Kazemi and Rajaei, 2013).

New records. Babazeid district, 2.6.2012, (1F), soil of lemon orchard; Mehdiabad district, 3.2.2013, (1F), soil of vine orchard.

Family Uropodidae Kramer, 1881
Genus *Discourella* Berlese, 1910
Discourella modesta (Leonardi, 1899)

Diagnosis. The bases of setae S5 are on a separate platelet,wile I4 and Z5 are on a common platelet. Genital shield elongated, narrowed anteriorly, on the shield along its lateral margins there are situated small pits, grouped in two irregular rows.

World distribution. In the soil, in forest litter. USSR: Lithuania, western Europe (Bregetova, 1977).

Iran Records. Fars Province (Marvdasht, Kamfiruz). Soil and decayedplants under the oak trees (Beyzavi & Ostovan 2012).

New records. Badrabad district, 14.4.2012, (2F), soil under cedar trees.

Comments. The family, genera and species are new records for Lorestan province mite fauna.

Genus *Uropoda* Latreille, 1806
Uropoda orbicularis (Müller, 1776)

Diagnosis. Body oval. Dorsal setae i4 expanded, penicillate. Genital shield anteriorly with a spike of medium length, setae V3 and VX4 penicillate.

World distribution. In rotting plant substrates, manure, compost, in moss and in soil. USSR: Lithuania, Moscow oblast'. Western Europe (Bregetova, 1977).Cosmopolitan (Bajerlein and Bloszyak, 2004) .

Iran Records. Following Kazemi and Rajaei (2013)

New records. Ghalesangi district, 25.3.2012, (5F), soil of apple orchard.

Comments. The genera and species are new record for Lorestan province mite fauna.

Family Trematuridae Berlese, 1917
Genus *Nenteria* Oudemans, 1915
Nenteria stylifera (Berlese, 1904)

Diagnosis. Dorsal setae plumose. Spike of genital shied bifid.

World distribution. In rotten wood, compost, on wet meadows, the litter layer in oak groves. Hungary, Western Europe (Bregetova, 1977).

Iran Records. Following Kazemi and Rajaei (2013)

New records. Faculty of Agricultural (University of Lorestan), 11.12.2012, (3F), soil of cypress trees.

Comments. The family, genera and species are new records for Lorestan province mite fauna.

Family Dinychidae Berlese, 1916
Genus *Uroobovella* Berlese, 1903
Uroobovella difoveolata Hirschmann & Z-Nicole, 1969

Diagnosis. Marginal shield not divided in its posterior part. Dorsal shield smooth with luminous points or pores, dorsal setae not all of the same length, on the posterior margin of the shield 4 setae are expanded and pubescent. Genital shield with a short spike.

World distribution. In rotting wood. German Federal Republic (Bregetova, 1977).

Iran Records. RazaviKhorasan Province (Sarakhs, Bazangan Lake coast). ex. *C. hispanus*(Kazemi *et al*. 2008); Mazandaran Province (Galugah).ex. *E.pallens*(Kazemi *et al*. 2008).

New records. Rashnoo district, 26.8.2012, (1F), soil of walnut trees; Veisian district, 21.3.2013, (1F), soil of vine orchard.

Comments. The family, genera and species are new records for Lorestan province mite fauna.

Family Ascidae Oudemans, 1905
Genus *Antennoseius* Berlese, 1916
Antennoseius bacatus Athias-Henriot, 1961

Diagnosis. On the notogaster there are 3 unpaired setae in addition to the 16 paired setae. The setae on the dorsal surface are densely plumose. Fixed digit of the chelicerae 7 denticles, movable digit with 2 denticles.legs I shorter than body.

World distribution. In moss, moist straw chaff, on soil, rarely on ploughed land. USSR: Brest oblast. South and Central Europe (Bregetova, 1977).

Iran Records. Following Kazemi and Rajaei (2013)

New records. Ghalesangi district, 5.7.2012, (1F), soil of apple orchard; Zarinchogha district, 5.1.2013, (1F), soil under oak trees.

Comments. The family, genera and species are new records for Lorestan province mite fauna.

Genus *Iphidozercon* Berlese, 1903
Iphidozercon gibbus (Berlese, 1903)

Diagnosis. Dorsal shield smooth in the center with an elevation.Marginal setae (about 10 pairs) off the shield, partially on the ventral surface.Genital shield with parallel lateral margins.Fixed digit with 2 teeth, movable digit with 3-4 teeth. At the base of the movable digit there is no outgrowth. Apex of tectum 3-dentate, lateral margins serrated

World distribution. In soil, humus, compost, in forest litter under rotting leaves, in rodents' nests. USSR:Trans-Carpathia, Odessa oblast. Western Europe, Algeria (Bregetova, 1977).

Iran Records. Following Kazemi and Rajaei (2013)

New records. Veisian district, 25.2.2012, (1F), soil under walnut trees.

Comments. The genera and species are new record for Lorestan province mite fauna.

Genus *Arctoseius* Thor, 1930
Arctoseius cetratus (Sellnick, 1940)

Diagnosis. Lateral margins of dorsal shield smooth, with a clearly evident notch. Tectum with 2 tines. Dorsal setae shorter, tips of and do not reach the bases of the following setae. Fixed digit of chelae of chelicerae with 6-10 denticles. Fixed digit of chelicerae with 8-10 denticles.

World distribution. Prefers an evenly moist substrate. In the soil of meadows, in cultivated soil with plantings of potato, cabbage and lucerne, rarely in broad-leaved and mixed forests, in strongly decomposed compost, in rotting hay. North America, the most parts of Europe (Karg, 1971), Western Europe (Bregetova, 1977).

Iran Records. Following Kazemi and Rajaei (2013)

New records. Bishe district, 5.6.2012, (2F), soil of walnut trees; Badrabad district, 14.2.2013, (4F), soil of peach orchard.

Comments. The genera and species are new record for Lorestan province mite fauna.

Family Blattisociidae Garman, 1948
Genus *Cheiroseius* Berlese, 1916
Cheiroseius* (*Posttrematus*) *necroniger (Oudemans, 1903)

Diagnosis. Setae dorsal shield smooth, J1 short; Two pairs of postgenitalsclerites or the anterior pair is fused into 1 narrow sclerite; Sternal shield without a delimited central portion, with a pair of semi-circular depressions beside the anterior margin; Ventro-anal shield larger, often with somewhat angular protruding lateral margins, from which the shield narrows towards the broadly rounded posterior margin, with 3 pairs of ventral setae, lateral margins of ventro-anal shield protruding to the sides; Tarsus I longer than tibia and with pulvilli or at least with claws,claws on legs I smaller than claws on legs II-IV, of the same size, all setae on tarsi I slender; Peritremes extended behind the stigmata.

World distribution. In debris on the bank of a river, on marshy meadows.USSRi Leningrad oblast'. Western Europe, Africa (Bregetova, 1977).

Iran Records. Following kazemi and Rajaei, 2013.

New records. Shirkhani district, 12.3.2012, (4F), soil under walnut trees

Comments. The species is new record for Lorestan province mite fauna.

Genus *Lasioseius* Berlese, 1916

Lasioseius youcefi Athias-henriot, 1959

Diagnosis. Holodorsal shield lacking two pairs of setae in row *J*, some setae on dorsal shield serrate. Many of the setae on the dorsal shield and the postanal setae with a short pubescence.

World distribution. This species has a worldwide distribution and has been reported from Africa, North America and Europe (KadkhodaEliaderani*et al*., 2013).

Iran Records. Following kazemi and Rajaei, 2013.

New records. Kakareza district, 17.7.2012, (1F), soil of apple orchard.

Comments. The species is new record for Lorestan province mite fauna.

Family Macrochelidae Vitzthum, 1930
Genus *Macrocheles* Latreille, 1829
Macrocheles robustulus (Berlese, 1904)

Diagnosis. Ventro-anal shield elongated. sternal shield evenly coverd with small pits or punctation, lines absent. Setae D1, M1, Sc, M10, M11 slightly pubescent at their tips; F1 set close together at their bases. Medium-sized mites.

World distribution. Common in manure, under hay stacks, more rarely in rodents nests. Phoresy on small dung beetles of the family Scarabaeidae. They prey on colonies of the pot worm Enchytraeusalbidus. Tataria, Donetsk oblast, Checheno-Ingushskaya, Georgia, Ubiquitously distributed (Bregetova, 1977).

Iran Records. Following Kazemi and Rajaei (2013)

New records. Badrabad district, 14.2.2012, (2F), soil under cedar trees.

Family Podocinidae Berlese, 1913
Genus *Podocinum* Berlese, 1882
Podocinum pacificum (Berlese, 1895)

Diagnosis. Width of ventro-anal shield greater than its length. On the dorsal shield there are 16 pairs of setae which taper gradually from the base to the tip, of these - 6 pairs are long and thick, with a short pu- pescence: F1 smooth. On the ventral side beside the posterio-lateral margins of the body there is a pair of short setae on the soft cuticle. On tarsi I there are no long subapical setae.

World distribution. In the litter layer of broad-leaved and coniferous forests, in humus, under ricks, under stones, in moss. USSR: Black Sea coast from Sukhumi to Batumi, Lagodekhi National Park, Lenkoran', environs of Saratov. Europe (Spain, Italy, Austria, Rumania), Algeria, India, Japan, California, Argentina (Bregetova, 1977).

Iran Records. Mazandaran Province (Region not mentioned). Soil of forests (Ostovan & Saboori 1999); (Gorgan). Soil (Malek-Shahkouyi*et al*., 2011).

New records. Veisian district, 23.2.2012, (1F), soil under sycamore.

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