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Article

New records of the family Oppiidae (Acari: Sarcoptiformes: Oribatida) for the fauna of Iran

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Abstract

In this study, seven oppiid mite species (Oribatida: Oppiidae) belonging to six genera identified from Shendabad region (East Azerbaijan province, north-western Iran), of which one genus, one subgenus, six species and one subspecies are new records for mite fauna of Iran. Some of their morphological features and distributions in the world are presented. A key to the subfamilies and genera of Shendabad region is given.

Key words: mite, fauna, Shendabad, East Azerbaijan province, new records

Introduction

The family Oppiidae Sellnick, 1937 is the largest family with 131 genera and 969 described species over the world among the oribatid mites (Subias 2011). Up to now, 10 species of this family have been described (Bayartogtokh & Akrami 2000; Akrami & Subias 2007a, b; Akrami & Subias 2008a, b, c; Akrami *et al.* 2009) and some recorded (Haddad Irani-Nejad *et al.* 2002, 2003; Akrami & Subias 2007a; Akrami 2008; Mirzaie 2010) from Iran. This family belongs to the superfamily Oppioidea and group apterogasterine which are one of the main groups of oribatid mites. Oppiid mites are found in soil and litter and their feeding behaviour is fungivorous (Smith *et al*. 1998). For example, masses of fungal spores have been identified from the gut of *Oppia neerlandica* (Oudemans) and *O. nitens* Koch (Norton & Behan-Pelletier 2009). Oppiid mites are characterized by the absence of prodorsal lamellae and apodemata III, normal chelicerae, monodactylous legs, 9−12 pairs of notogastral setae and 4−6 pairs of genital setae (Balogh & Balogh 1992). Their body size is about 200 to 600 μm in length.

Materials and methods

The oppiid mite fauna was studied in Shendabad region by taking soil samples in different months in 2008 (mid-July, mid-August, mid-September). Shendabad region

is located in Shabestar township (38º08'N, 45º37'E and 1400 m above sea level), East Azerbaijan province in north-western Iran. Each sample contains 2−4 trowels of soil taken from a maximum depth of 20 cm, in areas with trees, crop plants and weeds. Samples were transferred into the Acarological laboratory of Plant Protection Department, Faculty of Agriculture, University of Tabriz. The mites were extracted using Berlese funnel and stored in 75% ethanol, cleared by Nesbitt's medium and mounted in Hoyer's medium on microscopic slides. The slides were placed in an oven at 45−50°C for a week. The specimens were sorted into possible levels and then if it was needed, sent to the specialist of this group for confirmation. All specimens were deposited in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, University of Tabriz, Tabriz and Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran. All materials were collected by M. Mirzaie.

Results

In the faunistic study of oppiid mites of Shendabad region (East Azerbaijan province, north-western Iran), one genus, one subgenus, six species and one subspecies are new records for the mite fauna of Iran.

All species reported here are well recognizable. We do not intend to give detailed redescriptions for them, but short diagnostic characterizations are provided, with notes on their geographical distribution.

Key to the subfamilies and genera of oppiid mites from Shendabad region (East Azerbaijan province, Iran)

1. Crista present, setae c_2 well developed. Sometimes with one pair of interbothridial tubercles 2

- Crista absent, setae c_2 either absent or less developed than the remaining notogastral setae, interbothridial tubercles usually absent……..……..... 4

2. Lamellar costulae absent ……Medioppiinae……..... *Microppia*

- Lamellar costulae present ……....Oppiellinae…….……..... 3

3. Sensillus fusiform and smooth, rostrum with naso..... *Dissorhina*

- Sensillus radiate, rostrum tridentate…..... *Berniniella*

4. Anterior margin of notogaster with protruding humeral processes…… ..... Oxyopiinae..... *Oxyoppia* (*Dzarogneta*)

- Anterior margin of notogaster without protruding humeral processes..... 5

5. Lamellar and translamellar lines absent ……..…..Oppiinae..... *Oppia*

- Lamellar and translamellar lines present .....Multioppiinae..... 6

6. Notogaster with 10 pairs of setae ..... *Anomaloppia*

- Notogaster with 9 pairs of setae..... 7

7. With 2 pairs of sigillae between interlamellar setae…..... *Graptoppia* (*Graptoppia*)

- With 3 pairs of sigillae between interlamellar setae..... 8

8. Rostral setae straight, sensillus fusiform..... *Ramusella* (*Rectoppia*)

- Rostral setae geniculate, sensillus fusiform and ciliate or pectinate……

……...*Ramusella* (*Ramusella*)

List of species

***Dissorhina ornata* (Oudemans, 1900)**

Measurements: Length: 286-315 µm, width: 156-160 µm.

Material examined

42 adult specimens, 12 specimens in soil under alfalfa (*Medicago sativa* L.) fields, 14 specimens in soil under apple (*Malus* spp.) and peach (*Prunus persica* (L.)) orchards, mid-August 2008, 8 specimens in soil under alfalfa fields, 8 specimens in soil under apple and peach orchards, mid-September 2008.

Diagnostic characters

Prodorsal surface with costulae, basal costulae narrow, directed laterally; rostral setae near each other on a small naso; sensillus fusiform and smooth, its distal end roundish, blunt at tip; notogaster with 10 pairs of setae nearly equal in length, none of them reaching the insertion of the setae behind them, Setae c_2 poorly developed, epimeral setal formula (I-IV) 3-1-3-3, anogenital formula: 5-1-2-3; fissure *iad* in paraanal position.

Distribution: Holarctic and eastern Africa (Subias 2011).

Comment: This is the first record of the genus and species for Iran.

***Microppia minus longisetosa* Subias and Rodriguez, 1988**

Measurements: Length: 188-190 µm, width: 84-95 µm.

Material examined

Six adult specimens, two specimens in soil under alfalfa fields, two specimens in soil under apple and peach orchards, mid-August 2008, one specimen in soil under alfalfa fields, one specimen in soil under apple and peach orchards, mid-September 2008.

Diagnostic characters

Prodorsum without costulae; cristae inconspicuous; rostrum rounded; sensillus short, capitate and smooth (although it show a side view more or less punctate on distal); notogaster with 10 pairs of long setae, setae c_2 present; anogenital formula: 5-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; fissure *iad* in adanal position.

Distribution: Mediterranean and Argentina (Subias 2011).

Comment: This is the first record of the subspecies for Iran.

***Graptoppia* (*Graptoppia*) *neonominata* Subias, 2004**

Measurements: Length: 205 µm, width: 115 µm.

Material examined

One adult specimen, soil under alfalfa fields, mid-August 2008.

Diagnostic characters

Lamellar and translamellar lines developed; sensillus fusiform, ciliate (with 12 to 13 short bristles); rostrum rounded, a distinct transverse line is present on the rostrum, close behind the rostral setae; rostral setae much longer than their mutual distance, finely pilose; lamellar and interlamellar setae glabrous and about half the length of their mutual distance; anterior border of notogaster overlaps the posterior part of the bothridia to some extent; 9 pairs of short notogastral setae present (without setae c_2); setae ad_3 behind aggenital setae, anogenital formula: 5-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; fissure *iad* in paraanal position.

Distribution: Ethiopian (South Africa and Congo) and southern Europe (Subias, 2011)**.**

Comment: This is the first record of the subgenus and species for Iran and Asia respectively.

***Ramusella* (*R.*) *clavipectinata* (Michael, 1885)**

Measurements: Length: 300 µm, width: 165 µm.

Material examined

One adult specimen, soil under alfalfa fields, mid-August 2008.

Diagnostic characters

Prodorsal surface punctuate**;** rostrum rounded; rostral setae barbed and nearly as long as interlamellar ones; sensillus fusiform, its head with six long barbs; notogaster oval, with 9 pairs of finely barbed setae, broadly rounded anteriorly, anogenital formula: 5-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; fissure *iad* in adanal position.

Distribution: Semicosmopolitan (Palearctic, U.S.A.: California, Malagasy, Oriental and Hawaii) (Subias 2011).

Comment: This is the first record of the species for Iran.

***Ramusella* (*Rectoppia*) *fasciata* (Paoli, 1908)**

Measurements: Length: 312−345 μm, width: 151−185 μm.

Material examined

Four adult specimens, soil under alfalfa fields, mid-August 2008.

Diagnostic characters

Prodorsum without costulae; sensillus fusiform, with long stalk, its head with long barbs; rostral setae straight, their apical half divergent; with nine pairs of long and finely barbed notogastral setae, anogenital formula: 5-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; fissure *iad* in adanal position.

*Distribution***:** Semicosmopolitan (Western Palearctic: except north, U.S.A.: Florida, Somalia. India: Tripura, and sub-Antarctic: I. Amsterdam) (Subias 2011).

Comment: This is the first record of the species for Iran.

***Oxyoppia* (*Dzarogneta*) *intermedia* Subias and Rodriguez, 1986**

Measurements: Length: 380 μm, width: 190 μm.

Material examined

One adult specimen in soil under alfalfa fields, mid-August 2008.

Diagnostic characters

Rostral crest well-developed; rostral setae dorsally inserted, situated far from each other, extending well beyond tip of rostrum; sensillus setiform and pectinate; 10 pairs of very long and nearly smooth notogastral setae, setae c_2 well developed; humeral processes not developed; anogenital formula: 5-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; adanal lyrifissures are direct apoanal.

Distribution: Spain (Subias 2011).

Comment: This is the first record of the species for Asia (this species has only been recorded from Spain).

***Berniniella bicarinata* (Paoli, 1908)**

Measurements: Length: 220 μm, width: 120 μm.

Material examined

One adult specimen in soil under alfalfa fields, mid-August 2008.

Diagnostic characters

Rostrum divided by two deep incisions, the middle part acute; rostral setae long and barbed, lamellar and interlamellar setae short, fine and smooth; costulae present, posterior branch long and reaches bothridia; dorsosejugal suture protruding anteriorly, and its median part straight; 10 pairs of notogastral setae, anogenital

formula: 4-1-2-3, epimeral setal formula (I-IV) 3-1-3-3; lyrifissures *iad* in paraanal position.

Distribution: Palearctic (common) and Vietnam (Subias, 2011).

Comment: This is the first record of the species for Iran.

Discussion

In 2008, the highest monthly average temperature (28.7°C) and highest density of mites occurred in mid-August. On the other hand, the lowest temperature (24.6°C) and density of mites were related to mid-September. The highest density of oppiid mites was collected in soil under alfalfa. The family Oppiidae comes second after the family Oribatulidae in the highest density. Among the collected species, the highest density of oppiid mite was related to *Dissorhina ornata* (42 specimens) and the lowest density was related to *Graptoppia* (*Graptoppia*) *neonominata*, *Ramusella* (*R.*) *clavipectinata*, *Oxyoppia* (*Dzarogneta*) *intermedia* and *Berniniella bicarinata* (each with one specimen).

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چکیده

در این بررسی هفت گونه کنه از خانواده Oppidae (Oribatida) متعلق به شش جنس از منطقه شندآباد (استان آذربایجان شرقی، شمال غرب ایران) شناسایی شدند که از بین آن‌ها یک جنس، یک زیرجنس، شش گونه و یک زیرگونه برای فون کنه‌های ایران جدیدند. برخی از ویژگی‌های ریخت‌شناسی و پراکندگی در جهان ارایه شده است. کلید شناسایی زیرخانواده‌ها و جنس‌های اریباتیدهای منطقه شندآباد آورده شده است.