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Oribatid mites (Acari: Oribatida) of Shiraz township, Fars province, Iran

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Abstract

Faunal study of oribatid mites (Acari: Oribatida) in Shiraz township (Fars province – southern Iran) was conducted during 2009-2010. Totally, 68 species belonging to 62 genera and 40 families were collected and identified. Of which one genus and 7 species are reported for the first time from Iran, and 9 families, 18 genera and 21 species are reported for the first time from Fars province.

Key words: Acari, Oribatida, Shiraz, Iran, fauna.

Zusammenfassung

Im Zeitraum von 2009-2010 wurden im Stadtgebiet von Shiraz (Provinz Fars - Süd-Iran) faunistischen Untersuchung der Hornmilben (Acari Oribatida) durchgeführt. Insgesamt wurden 68 Arten, die in 62 Gattungen und 40 Familien gehören, gesammelt und bestimmt. Von denen eine Gattung und 7 Arten zum ersten Mal aus dem Iran dokumentiert werden. Für der Provinz Fars werden 9 Familien, 18 Gattungen und 21 Arten erstmals festgestellt.

Introduction

Oribatid mites (formerly Cryptostigmata), also known as moss mites or beetle mites, are a suborder of mites (Suborder Oribatida), in the superorder Acariformes, order Sarcoptiformes. They range in size from 0.2 to 1.4 millimetres. Oribatid mites generally have low metabolic rates, slow development and low fecundity. Species are iteroparous with adults living a relatively long time; for example, estimates of development time from egg to adult vary from several months to two years in temperate forest soils. Oribatid mites have six active instars: prelarva, larva, three nymphal instars and the adult. All these stages after the prelarva feed on a wide variety of material including living and dead plant and fungal material, lichens and carrion; some are predatory, but none is parasitic and feeding habits may differ between immatures and adults of the same species (HOY 2008; NORTON & BEHAN-PELLETIER 2009).

The Oribatida are of economic importance as hosts of various tapeworm species, and by increasing the breakdown of organic material in the soil, in a similar manner to earthworms (BAKER & WHARTON 1952).

During 2009- 2010, oribatid mite fauna of Shiraz township, Fars province, Iran was studied. Shiraz is the fifth most populous city of Iran and the capital of Fars province. In 2009 the population of the city was 1,455,073, the majority of whom are Persian. Shiraz is located in the south of Iran and the northwest of Fars province, 919 kilometres (571 mi) south of Tehran. It is built in a green plain at the foot of the Zagros Mountains 1,500 metres (4,900 feet) above sea level. A seasonal river, Rudkhaneye Khoshk, flows through the northern part of the city and on into Maharloo Lake. As of 1920, the area had a large forest of oak trees. It has a moderate climate and has been a regional trade center for over a thousand years. It is regarded as one of the oldest cities of ancient Persia. Shiraz's climate has distinct seasons, and is overall classed as a hot semi-arid climate, though it is only a little short of a hot-summer Mediterranean climate. Summers are hot, with a July average high of 37.8 °C (100.0 °F). Winters are cool, with average low temperatures below freezing in December and January. Around 300 mm (12 in) of rain falls each year, almost entirely in the winter months (Wikipedia site).

Materials and methods

Soil and litter samples were taken from different locations of Shiraz, during 2009- 2010, and were transferred to the Acarological laboratory of Shiraz University. The mites were extracted by Berlese funnel. Oribatid mites were removed, cleared in lactophenol and mounted in Hoyer's medium on glass microscopic slides for identification. The slides were placed in an oven at 45°C for 10 days and then the specimens were examined using a light microscope (Zeiss Standard 20). All specimens deposited in the Acarological Collection of the Department of Plant Protection, College of Agriculture, Shiraz University, Iran. All specimens collected by junior author.

Results

During this study, 68 species belonging to 62 genera and 40 families of oribatid mites from various habitats of Shiraz township were collected and identified, of which one genus and 7 species are reported for the first time from Iran, and 9 families, 18 genera and 21 species are reported for the first time from Fars province. Also 2 families and 3 genera of this collection have previously reported and 6 species have described.

C t e n a c a r i d a e GRANDJEAN 1954

***Beklemishevia* sp.**

S a m p l e c o d e : D1, A13 (Refer to Table 1)

N o t e s : This is the first record of this genus for Fars province.

***Ctenacarus araneola* (GRANDJEAN 1932)**

S a m p l e c o d e : B7, B8

D i s t r i b u t i o n : Pantropical and Subtropical regions (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

***Gilarovella* sp.**

S a m p l e c o d e : A2, A19, A13, B7, D1, D2, D4, D8, D20

N o t e s : This is the first record of this genus for Fars province.

***Neoctenacarus hastilis* MORITZ 1974**

S a m p l e c o d e : D7

D i s t r i b u t i o n : South central Europe (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

N o t e s : This is the first record of this genus and species for Fars province.

A p h e l a c a r i d a e GRANDJEAN 1954

***Aphelacarus acarinus acarinus* (BERLESE 1910)**

S a m p l e c o d e : A1, A9, A19, A23, B1, B7, D4, D11, D15, D20

D i s t r i b u t i o n : Semicosmopolitan (Holarctic, Ethiopian, Neotropical); Iran (AKRAMI & SABOORI 2012).

H y p o c h t h o n i i d a e BERLESE 1910

***Hypochthonius luteus* OUDEMANS 1917**

S a m p l e c o d e : A13, A14, A17, A18, A20

Distribution: Holarctic region, northeast of Oriental region, New Zealand (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000a).

Cosmochthoniidae GRANDJEAN 1947

***Cosmochthonius* sp.**

Sample code: D6, D20, A19, D7, D11, D8, A18

***Phyllozetes emmae* (BERLESE 1910)**

Sample code: A23, D20, B7

Distribution: Pantropical (except Ethiopian) and Subtropical (SUBIAS 2014).

Notes: This is the first record of this genus and species for Fars province.

Haplochthoniidae HAMMEN 1959

***Haplochthonius* (H.) *chamela* MAHUNKA & MEJIA-RECAMIER 1998**

Sample code: A13, A19, D11, D20

Distribution: Mexico (SUBIAS 2014).

Notes: This is the first record of this species for Iran.

***Haplochthonius* (H.) *sanctaeluciae* BERNINI 1973**

Sample code: D4, D7, D8, D11, A16, B1, B7

Distribution: Southern Palaearctic region (Mediterranean and west central Asia), Senegal, Neotropical region (Galapagos and Chile) (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Haplochthonius* (H.) *simplex* (WILLMANN 1930)**

Sample code: A20, D7

Distribution: Semicosmopolitan: Holarctic, Ethiopian (Senegal and Congo) and Oriental (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

Sphaerochthoniidae GRANDJEAN 1947

***Sphaerochthonius splendidus* (BERLESE 1904)**

Sample code: A18, D8, B3, D11, A2, A13, A20, D21, D20, B7, A9, A12, D2

Distribution: Pantropical, Neotropical and Subtropical regions and Iran (SUBIAS 2014; BAYARTOGTOKH & AKRAMI, 2000a).

Brachychthoniidae THOR 1934

***Brachychthonius* sp.**

Sample code : A18, D20, D21, D7, D8, A9, D21, B1, A12, A4, A14, D1, A17, A10, D5

Notes : This is the first record of this family for Fars province.

***Eobrachychthonius* sp.**

Sample code : D20

***Liochthonius* sp.**

Sample code : A18, D2, D20, A14, D4, D3

***Poecilochthonius italicus* (BERLESE 1910)**

Sample code : A14, A15

Distribution : Holarctic (SUBIAS 2014); Iran (AKRAMI & SABOORI 2004).

***Synchthonius crenulatus* (JACOT 1938)**

Sample code : A14

Distribution : Holarctic (SUBIAS 2014).

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

***Synchthonius elegans* FORSSLUND 1957**

Sample code : A13

Distribution : Holarctic (SUBIAS 2014).

Notes : This is the first record of this species for Iran.

Epilohmanniidae OUDEMANS 1923

***Epilohmannia cylindrica cylindrica* (BERLESE 1904)**

Sample code : A8, A17

Distribution : Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SABOORI 2004).

***Epilohmannia* sp.**

Sample code : A13

Lohmanniidae BERLESE 1916

***Cryptacarus promecus* GRANDJEAN 1950**

Sample code : B1

Distribution: Southern Palaearctic (Mediterranean and west central Asia) and Ethiopian (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

Notes: This is the first record of this genus and species for Fars province.

***Papillacarus aciculatus* (BERLESE 1905)**

Sample code: A13

Distribution: West central Palaearctic region, Vietnam (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2004).

***Papillacarus chamartinensis* PEREZ-INIGO 1967**

Sample code: B3

Distribution: Spain and Iran (SUBIAS 2014).

Notes: This is the first record of this species for Fars province.

***Lohmannia turcmenica* BULANOVA-ZACHVATKINA 1960**

Sample code: A17

Distribution: Southern Palaearctic, Southeastern China and Argentina (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

Protoplophoridae EWING 1917

***Protoplophora iranica* AKRAMI & BEHMANESH 2012**

Sample code: A13, D20

Distribution: Iran (SUBIAS 2014).

Notes: This family reported for the first time from Iran and the species described (AKRAMI & BEHMANESH 2012).

Euphthiracaridae JACOT 1930

***Acrotritia ardua* (KOCH 1841)**

Sample code: A12, A16, A15, A8, A7, A14

Distribution: Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

Phthiracaridae PERTY 1841

***Atropacarus echinodiscus* (MAHUNKA 1982)**

Sample code: A20, A21

Distribution: Southern Palaearctic (Greece and Iran) (SUBIAS 2014; AKRAMI et al. 2006)

Notes : This is the first record of this genus and species for Fars province.

***Atropacarus striculus* (KOCH 1835)**

Sample code : A20, A21

Distribution : Semicosmopolitan (Holarctic, Oriental, Central America and Australian) (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

Notes : This is the first record of this species for Fars province.

***Phthiracarus* sp.**

Sample code : A14, A15, A21, D1

***Malaconothridae* BERLESE 1916**

***Malaconothrus (M.) monodactylus* (MICHAEL 1888)**

= *Malaconothrus (M.) egregius* (BERLESE 1904)

Sample code : A14

Distribution : Holarctic and Neotropical (SUBIAS 2014); Iran (AKRAMI et al. 2008).

Notes : This is the first record of this species for Fars province.

***Malaconothrus (M.) processus* HAMMEN 1952**

Sample code : A18

Distribution : South central Europe (SUBIAS 2014).

Notes : This is the first record of this species for Iran.

***Nothridae* BERLESE 1896**

***Nothrus biciliatus* KOCH 1841**

Sample code : A7, A12, A13, A21

Distribution : Germany, Netherlands, Sweden, Austria, Denmark, Hungary, Italy, Japan, Ireland (BALOGH & MAHUNKA 1983) and Iran (AKRAMI & SABOORI 2012).

***Crotoniidae* THORELL 1876**

***Camisia (Camisia) borealis* (THORELL 1871)**

Sample code : A13, A21

Distribution : Boreoalpina (Eurosiberian, Caucasus and Greenland) (SUBIAS 2014).

Notes : This is the first record of this species for Iran and the family for Fars province.

***Camisia (C.) horrida* (HERMANN 1804)**

Sample code: A18

Distribution: Holarctic, North of Oriental, Ethiopian and North of Neotropical (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2004).

Notes: This is the first record of this species for Fars province.

Hermannelliidae GRANDJEAN 1934

***Hermanniella dolosa* GRANDJEAN 1931**

Sample code: A13

Distribution: Palaearctic region (SUBIAS 2014); Iran (AKRAMI et al. 2008).

Notes: This is the first record of this family for Fars province.

***Hermanniella picea* (KOCH 1839)**

= *H. punctulata* BERLESE 1908

Sample code: A18

Distribution: Holarctic (Palaearctic: less frequent in the North, and U.S.A.: Virginia), North-East of Oriental and the Philippines (SUBIAS 2014).

Notes: This is the first record of this species for Iran.

Neolioididae SELLNICK 1928

***Neoliodes terrestris* (WALLWORK 1963)**

Sample code: A16

Distribution: Tropical: Ethiopian, Oriental (India) and Neotropical (Venezuela and Mexico), and southern Palaearctic (Caucasus and west-central Asia) (SUBIAS 2014).

Notes: This is the first record of this species for Iran and the family for Fars province.

Licnodamaeidae GRANDJEAN 1954

***Licnodamaeus pulcherrimus* (PAOLI 1908)**

Sample code: A2, A13, D20

Distribution: Palaearctic region (SUBIAS 2014); Iran (AKRAMI 2007).

Licnobelbidae GRANDJEAN 1965

***Licnobelba latiflabellata* (PAOLI 1908)**

= *L. alestensis* GRANDJEAN 1931

Sample code: A6, A13, A18

Distribution: Western Palaearctic (except North) and west of Siberia (SUBIAS 2014); Iran (AKRAMI 2007).

Notes: This is the first record of this family for Fars province.

Gymnodamaeidae GRANDJEAN 1954

***Jacotella frondeus* (KULJIEV 1979)**

= *Plesiodamaeus ornatus* MAHUNKA 1979

Sample code: A20, A21, A18, A16, D8, A13, A6, B1

Distribution: Eastern Mediterranean (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Joshuella* spp.**

Sample code: D2, D20, A2, B8, D8, A19, D6

Aleurodamaeidae PASCHOAL & JOHNSTON 1985

***Aleurodamaeus* (*Aleurodamaeus*) *setosus* (BERLESE 1883)**

Sample code: A21, D11, D20, A2, A13, A16

Distribution: Southern Palaearctic (SUBIAS 2014) and Iran (AKRAMI 2007).

Microzetidae GRANDJEAN 1936

***Berlesezetes aegypticus* (BAYOUMI 1977)**

Sample code: A9, A13, D3

Distribution: Egypt (SUBIAS 2014) and Iran (AKRAMI 2007).

***Christovizetes iranensis* AKRAMI & BEHMANESH 2011**

Sample code: H3, H5

Distribution: Iran (SUBIAS 2014).

Notes: This species described for the first time (AKRAMI & BEHMANESH 2011).

Zetorchestidae MICHAEL 1898

***Zetorchestes reticulatus* KARPPINEN & POLTAVSKAJA 1990**

Sample code: A13

Distribution: Caucasus (SUBIAS 2014).

Notes: This is the first record of species for Iran and the family for Fars province.

E r e m a e i d a e OUDEMANS 1900

***Eueremaeus* sp.**

S a m p l e c o d e : A21

N o t e s : This is the first record of this family for Fars province.

E r e m u l i d a e GRANDJEAN 1965

***Eremulus avenifer* BERLESE 1913**

S a m p l e c o d e : A15

D i s t r i b u t i o n : Southern Palaearctic (Italy and South Eastern Palaearctic), Oriental and Polynesia (Tahiti) (SUBIAS 2014); Iran (AKRAMI & SABOORI 2001).

N o t e s : This is the first record of this family for Fars province.

D a m a e o l i d a e GRANDJEAN 1965

***Damaeolus asperatus* (BERLESE 1904)**

S a m p l e c o d e : A2, A18, A21, D6, D15, D20

D i s t r i b u t i o n : Holarctic (Palaearctic: except North, and U.S.A.: Columbia) (SUBIAS 2014); Iran (ALIKHANI et al. 2012).

N o t e s : This is the first record of this species for Fars province.

T h y r i s o m i d a e GRANDJEAN 1953

***Banksinoma exobothridialis* BAYARTOGTOKH 1997**

S a m p l e c o d e : B6

D i s t r i b u t i o n : Mongolia (SUBIAS 2014); Iran (AKRAMI & BEHMANESH unpublished data).

O p p i i d a e SELLNICK 1937

***Lasiobelba (Lasiobelba) neonominata* SUBIAS 2004**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Ethiopian (South Africa and Malagasy), Hawaii and southern Palaearctic (Western Mediterranean and Iran) (SUBIAS 2014; AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

***Ramusella (Ramusella) persica* BEHMANESH, AKRAMI & SUBIAS 2013**

= *Ramusella* (*R.*) *iranica* BEHMANESH, AKRAMI & SUBIAS 2012

S a m p l e c o d e : A9, A24

D i s t r i b u t i o n : Iran (SUBIAS 2014).

Notes : This species described for the first time (BEHMANESH et al. 2012).

***Ramusella (R.) puertomonttensis* HAMMER 1962**

Sample code : H2

Distribution : Tropical (India: west Bengal, Melanesia: I. Fiji and Neotropical: Chile and Brazil) and southern Palaearctic (Mediterranean and Eastern Asiatic Russia) (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

Notes : This is the first record of this species for Fars province.

***Ramusella (Insculptoppia) insculpta* (PAOLI 1908)**

Sample code : A3, A4, A14

Distribution : Palaearctic region, Vietnam (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

***Ramusella (I.) farsi* AKRAMI, SUBIAS & BEHMANESH 2011**

Sample code : A4, H5

Distribution : Iran (SUBIAS 2014).

Notes : This species described for the first time (AKRAMI et al. 2011).

***Ramusella (I.) iranica* AKRAMI & SUBIAS 2008**

Sample code : B1

Distribution : Iran (AKRAMI & SUBIAS 2008; SUBIAS 2014).

Notes : This is the first record of this species for Fars province.

***Ramusella (Insculptoppiella) varians* (WALLWORK 1961)**

Sample code : B1

Distribution : Ethiopian (Ghana and I. St. Helena) and center of southern Palaearctic (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

Notes : This is the first record of this species for Fars province.

***Ramusella (Rectoppia) damavandica* AKRAMI & SUBIAS 2008**

Sample code : A13

Distribution : Iran (AKRAMI & SUBIAS 2008; SUBIAS 2014).

***Discoppia (Cylindroppia) cylindrica* (PEREZ-INIGO 1965)**

Sample code : A13, B1

Distribution : Southern Palaearctic, Oriental and Central America (SUBIAS 2014) and Iran (AKRAMI & SUBIAS 2007).

***Microppia minus* (PAOLI 1908)**

Sample code: A3, A4, A13, A14, A20, B1, B3

Distribution: Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

Notes: This is the first record of this species for Fars province.

***Rhinoppia obsoleta* (PAOLI 1908)**

Sample code: A2, A13

Distribution: Palaearctic region, Greenland, New Zealand, Hawaii (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

***Oppiella (Oppiella) nova* (OUDEMANS 1902)**

Sample code: A2, A3, A12, A14, A23, B2

Distribution: Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

Notes: This is the first record of this species for Fars province.

Tectocephidae GRANDJEAN 1954

***Tectocephus minor* BERLESE 1903**

Sample code: A18, A20

Distribution: Semicosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

***Tectocephus velatus* (MICHAEL 1880)**

Sample code: A2, A7, A13, A18, A24, D5

Distribution: Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

Passalozetidae GRANDJEAN 1954

***Passalozetes (Passalozetes) africanus* GRANDJEAN 1932**

Sample code: A2, A22, A23, D7

Distribution: South central Palaearctic region, Guinea (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000a).

Ceratozetidae JACOT 1925

***Ceratozetes (Ceratozetes) cf. macromediocris* SHALDYBINA 1970**

Sample code: A14, A16

Distribution: *Ceratozetes (C.) macromediocris* distributed in Eastern Europe (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

Punctoribatidae THOR 1937

***Punctoribates (Punctoribates) liber* PAVLITCHENKO 1991**

Sample code: A18, A21

Distribution: Mediterranean region and Iran (SUBIAS 2014).

Oribatellidae JACOT 1925

***Oribatella* sp.**

Sample code: A4, A17, A18

Notes: This is the first record of this family for Fars province.

Zetomotrichidae GRANDJEAN 1934

***Zetomotrichus persicus* AKRAMI & BEHMANESH 2013**

Sample code: A2, A13

Distribution: Iran (SUBIAS 2014).

Notes: This species described for the first time (AKRAMI & BEHMANESH 2013a).

***Ghilarovus* sp.**

Sample code: Unknown

Oribatulidae THOR 1929

***Oribatula (O.) tibialis* (NICOLET 1855)**

Sample code: A1, A6, A13, A16, A21, D1, D2

Distribution: Holarctic region, India (SUBIAS 2014); Iran (AKRAMI et al. 2008).

***Oribatula (Zygoribatula) connexa* BERLESE 1904**

Sample code: A4, A9, A17

Distribution: Subtropical region (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000b).

***Oribatula (Z.) undulata* BERLESE 1916**

Sample code: A4, A7, A9, A10, A17

Distribution: Pantropical and subtropical regions (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Oribatula (Z.) cf. skrabini* (BULANOVA-ZACHVATKINA 1967)**

Sample code: A6, A24, B7, B8, D1

Distribution: *Oribatula* (Z.) *skrjabini* distributed in southern Palaearctic region (SUBIAS 2014).

Scheloribatidae GRANDJEAN 1933

***Scheloribates fimbriatus* THOR 1930**

Sample code: D4, D5

Distribution: Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000b).

Protoribatidae J. & P. BALOGH 1984

***Protoribates (P.) paracapucinus* (MAHUNKA 1988)**

Sample code: A3, A7, A13, A17, A18, A20

Distribution: Oriental region, Congo, Ecuador and Iran (SUBIAS 2014; BAYARTOGTOKH & AKRAMI 2000b).

***Protoribates (Triaunguis) obtusus* (MIHELICIC 1956)**

Sample code: A13

Distribution: Southern Palaearctic (Mediterranean and Iran) (BAYARTOGTOKH & AKRAMI 2000b; SUBIAS 2014).

Notes: This is the first record of this species for Fars province.

Haplozetidae GRANDJEAN 1936

***Baloghiella granulata* BAYARTOGTOKH & AKRAMI 2000**

Sample code: D4

Distribution: Iran (BAYARTOGTOKH & AKRAMI 2000b; SUBIAS 2014).

***Haplozetes fusifer* (BERLESE 1908)**

Sample code: A10, A13, A19, D20

Distribution: Mediterranean, India (SUBIAS 2014); Iran (AKRAMI & BEHMANESH 2013b).

Galumnidae JACOT 1925

***Galumna iranensis* MAHUNKA & AKRAMI 2001**

Sample code: A4, A9, A13, A19, A20, D20

Distribution: Iran (MAHUNKA & AKRAMI 2001; SUBIAS 2014).

***Galumna karajica* MAHUNKA & AKRAMI 2001**

Sample code: A18, D3, D15

Distribution: Iran (MAHUNKA & AKRAMI 2001; SUBIAS 2014).

***Pilogalumna tenuiclava* (BERLESE 1908)**

= *Allogalumna boevi* KRIVOLUTSKAJA 1952

Sample code: A7, A10, A13, A14, A16, A21

Distribution: Holarctic region (SUBIAS 2014); Iran (AKRAMI 2007).

***Pergalumna* sp.**

Sample code: Unknown

Parakalummidae GRANDJEAN 1936

***Neoribates (Neoribates) granulatus* AKRAMI & BEHMANESH 2012**

Sample code: A13

Distribution: Iran (SUBIAS 2014).

Notes: This family reported for the first time from Iran and the species described (AKRAMI & BEHMANESH 2012)

Acknowledgement

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Table 1: Sampling information

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location
	Degree	Minutes	Degree	Minutes				
A1	29	32	52	35	1810	Cotoneaster, <i>Cotoneaster</i> sp. (Rosaceae)	24.VII.2009	Hillside Bajgah
A2	29	32	52	35	1810	Locoweed, <i>Astragalus</i> sp. (Papilionaceae)	24.VII.2009	Hillside Bajgah
A2	29	32	52	35	1810	Prickly thrift, <i>Acantholimon</i> sp. (Plumbaginaceae)	24.VII.2009	Hillside Bajgah
A6	29	32	52	35	1810	Wild fig, <i>Ficus johannis</i> Boiss. (Moraceae)	1.IX.2009	Hillside Bajgah
A7	29	32	52	35	1810	Clover, <i>Trifolium</i> sp. (Papilionaceae)	1.IX.2009	Hillside Bajgah
A8	29	32	52	35	1810	Tamarisk, <i>Tamarix</i> sp. (Tamaricaceae)	5.IX.2009	College of Agriculture Bajgah
A8	29	32	52	35	1810	Wild mint, <i>Mentha</i> sp. (Labiatae)	5.IX.2009	College of Agriculture Bajgah
A9	29	32	52	35	1810	Bermuda grass, <i>Cynodon dactylon</i> (L.) (Gramineae)	5.IX.2009	College of Agriculture Bajgah
A12	29	32	52	35	1810	Alfalfa, <i>Medicago sativa</i> L. (Papilionaceae)	13.X.2009	College of Agriculture Bajgah
H4	29	32	52	35	1810	Common fig, <i>Ficus carica</i> L. (Moraceae)	5.VI.2010	Mount Bamoo Bajgah
H1	29	32	52	35	1810	Elm tree, <i>Ulmus campestris</i> L. (Ulmaceae)	10.VI.2010	College of Agriculture Bajgah
H2	29	32	52	35	1810	Rotten tree trunk of willow, <i>Salix</i> sp. (Salicaceae)	10.VI.2010	College of Agriculture Bajgah
H3	29	32	52	35	1810	Rotten tree trunk of willow	10.VI.2010	College of Agriculture Bajgah

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location
	Degree	Minutes	Degree	Minutes				
H9	29	32	52	35	1810	Ash, <i>Fraxinus</i> sp. (Oleaceae)	10.VI.2010	College of Agriculture Bajgah
H5	29	32	52	35	1810	Azarole hawthorn, <i>Crataegus azarolus</i> L. (Rosaceae)	11.VI.2010	Mount Bamboo Bajgah
H6	29	32	52	35	1810	<i>Acantholimon</i> sp.	11.VI.2010	Mount Bamboo Bajgah
H8	29	32	52	35	1810	<i>Cotoneaster</i> sp.	11.VI.2010	Mount Bamboo Bajgah
A10	29	32	52	35	1810	Common reed, <i>Phragmites australis</i> (Cav.) (Gramineae)	6.IX.2009	Dry river Shiraz
A16	29	40	52	8	1953	<i>Acantholimon</i> sp.	2. XI.2009	Around the street Khanezenyan
A21	29	40	52	8	1953	Berberis, <i>Berberis</i> sp. (Berberidaceae)	2. XI.2009	Around the street Khanezenyan
A18	29	34	52	57	2042	<i>Crataegus azarolus</i>	2. XI.2009	Oak forest Dasht Arjan
A13	29	34	52	57	2042	Oak tree, <i>Quercus</i> sp. (Fagaceae)	2. XI.2009	Oak forest Dasht Arjan
A14	29	39	52	59	2013	<i>Salix</i> sp.	2. XI.2009	Around the river Dasht Arjan
A17	29	39	52	59	2013	Weeds	2. XI.2009	Around the river Dasht Arjan
A11	29	39	52	58	2022	<i>Phragmites australis</i>	2. XI.2009	Around the river Dasht Arjan
A19	29	48	52	18	2431	Mountain almond, <i>Amygdalus scoparia</i> Spach (Rosaceae)	2. XI.2009	Top of the mountain Ghalat
A19	29	48	52	18	2431	<i>Crataegus azarolus</i>	2. XI.2009	Top of the mountain Ghalat
A20	29	48	52	19	2072	Oriental plane tree, <i>Platanus orientalis</i> L. (Platanaceae)	2. XI.2009	Around the river Ghalat
A20	29	48	52	19	2072	Persian walnut, <i>Juglans regia</i> L. (Juglandaceae)	2. XI.2009	Around the river Ghalat
A20	29	48	52	19	2072	Moss	2. XI.2009	Around the river Ghalat
A15	29	48	52	19	2072	Rotten tree trunk of oriental plane tree,	2. XI.2009	Around the river Ghalat

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location	
	Degree	Minutes	Degree	Minutes					
A22	29	31	52	50	1437	<i>Platanus orientalis</i> L. (Platanaceae)	18.XI.2009	Hillside	Kaflarak
A23	29	31	52	50	1437	Beneath the stone	18.XI.2009	Hillside	Kaflarak
B1	29	32	52	46	1471	<i>Acantholimon</i> sp.	18.XI.2009	Hillside	Kaflarak
B5	29	32	52	46	1464	<i>Ficus carica</i>	18.XI.2009	Hillside	Kaflarak
B8	29	33	52	42	1428	<i>Acantholimon</i> sp.	18.XI.2009	Hillside	Kaflarak
A24	29	30	52	50	1409	<i>Astragalus</i> sp.	18.XI.2009	Around the road	Kaflarak
B2	29	32	52	46	1456	<i>Medicago sativa</i>	18.XI.2009	Around the road	Kaflarak
B6	29	33	52	43	1426	<i>Phragmites australis</i>	18.XI.2009	Around the road	Kaflarak
B7	29	30	52	50	1411	<i>Phragmites australis</i>	18.XI.2009	Around the road	Kaflarak
B3	29	31	52	47	1413	<i>Tamarix</i> sp.	18.XI.2009	Around the lake	Kaflarak
B4	29	31	52	47	1416	<i>Tamarix</i> sp.	18.XI.2009	Around the lake	Kaflarak
D6	29	24	52	47	1504	Weeds	17.XII.2009	Hillside	Sarvestan
D7	29	24	52	47	1546	<i>Tamarix</i> sp.	17.XII.2009	Hillside	Sarvestan
D8	29	24	52	47	1546	<i>Amygdalus scoparia</i>	17.XII.2009	Hillside	Sarvestan
D2	29	24	52	47	1540	<i>Astragalus</i> sp.	17.XII.2009	Hillside	Sarvestan
D10	29	24	52	47	1558	<i>Astragalus</i> sp.	17.XII.2009	Hillside	Sarvestan
D11	29	24	52	47	1545	<i>Acantholimon</i> sp.	17.XII.2009	Hillside	Sarvestan
D12	29	24	52	47	1624	<i>Amygdalus scoparia</i>	17.XII.2009	Hillside	Sarvestan
D20	29	24	52	47	1600	<i>Ficus carica</i>	17.XII.2009	Hillside	Sarvestan
D21	29	24	52	47	1608	Wild cherry, <i>Cerasus</i> sp. (Rosaceae)	17.XII.2009	Hillside	Sarvestan
D14	29	26	52	42	1460	<i>Amygdalus scoparia</i>	17.XII.2009	Hillside	Sarvestan
D9	29	20	52	48	1550	<i>Tamarix</i> sp.	17.XII.2009	Hillside	Maharloo
D1	29	20	52	48	1550	Moss	17.XII.2009	Hillside	Maharloo
D3	29	20	52	48	1550	<i>Cotoneaster</i> sp.	17.XII.2009	Hillside	Maharloo
D4	29	20	52	48	1550	<i>Ficus johannis</i>	17.XII.2009	Hillside	Maharloo
D5	29	24	52	47	1468	<i>Astragalus</i> sp.	17.XII.2009	Around the lake	Maharloo
						Weeds	17.XII.2009		

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