



CHECKLIST AND DIVERSITY OF WATER MITES (Acari: Hydrachnidia) IN KERMAN PROVINCE (SOUTHEAST OF IRAN)

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Key words:

water mites,
taxonomy,
new records,
Kerman
Iran.

SYNOPSIS

This checklist contains 37 species, in 16 genera and 13 families of water mites including new collecting places for some species in the province. One family (Unionicolidae), three genera (*Panisopsis*, *Mideopsis*, *Neumania*), one subgenus (*Pilolebertia*) and two species *Nilotonia* (*Manotonia*) *persica* Pešić & Saboori, 2006 and *Protzia persica* Bader & Sepasgozarian, 1980 are new records for Kerman province. Upon the results earned until now, it seems that the water mite's fauna of Kerman province has been consisted at first from *Atractides*, *Torrenticola*, *Hygrobates* and *Sperchon* species, although the occurrence of *Lebertia* species seems diverse and should be investigated.

INTRODUCTION

The water mites (Hydrachnidia) are the most diversified group of the Acari in freshwaters and are abundant and specious in aquatic habitats. They are grouped into eight super families, over 50 families, more than 300 genera containing about 6000 species (DAVIDS et al., 2006). The life cycle is unique among the Acari with a heteromorphic parasitic / phoretic larva and two pupas-like resting stages. The larva parasitizes mainly infect hosts with apparently no strict host specificity. Deutonymphs and adults are voracious predators feeding mainly on insect's egg, insect larvae and micro crustaceans. Most species show a high degree of habitat/microhabitat specialization. Temperature, current speed, substratum type, physiographic and geomorphologic factors are the major determinants of species composition in water mite communities (DISABATINO et al., 2000).

BIOGEOGRAPHICAL DATA: The Province of Kerman covers an area of 181,714 sq. km. and is located in the south east of Iran. This province is the largest province and includes 11% of the total area of the country. The altitudes and heights of the province are a part or the continuation of the central mountain ranges of the country. The same prolong from the volcanic folds beginning in East Azerbaijan, and by branching out in the central plateau of Iran, and terminating in Sistan va Baluchestan. These mountain ranges have brought about vast plains in the Province of Kerman. The Bashagard and Koohbanan Mountains are the highest in this region that rise majestically upwards. The climate in the province varies in different regions depending on the relief of the land. The north, northwest and central areas experience a dry and moderate climate, whereas in the south and southeast, the weather is warm and relatively humid. Possessing different climates and environments it has a unique and special fauna and flora, but unfortunately received less attention and examination. According to PEŠIĆ et al. (2005b) most sampling sites in Iran are intermittent streams, with above-ground flow near their mountain source, dry sections and perhaps an above-ground section near their mid-course, with subsequent absorption into the ground. The streams are characterized by having a bare pebble bed, banks without riparian vegetation (streams are fully exposed to isolation, often with high summer temperatures), small dimensions (one to a few meters wide and a few centimeters deep) and often a short course. This comment is also correct for Kerman province. It should be mentioned that unfortunately, during the recent year, many aquatic ecosystems have been destroyed because of drought, lack of raining and urban life extension in this area.

MATERIAL AND METHODS

The checklist of the water mite fauna of Kerman Province was compiled after a faunistic investigation from March to January 2009. Published data and recent researches by the author have also been used. The data from all papers published previously and also Species referred to in undergraduate and postgraduate theses are also considered here. For new records, water mites were collected by hand netting, sorted on the spot from the living material, conserved in Koneke's fluid and dissected as described elsewhere (e.g. GERECKE 1991). The material will be deposited in the Acarological collection of Shahid Bahonar University of Kerman. New collecting sites are Chah moozi Sardoieh, Mohammad abad, Joshan, Faryab, Dalfard, Deh Rastegar, Temnoieh, Dehghazi, Kohbanan, Javazm, Rigan (Fig. 1). For all of the species new collecting place and for some of them Habitat was given.

RESULTS

Family Eylaidae Leach

Genus *Eylais* Latreille

Eylais planipons Walter

New collecting places: Dalfard, Dehshirak, Ghariyatolarab, Bardsir stream.

Iranian records: Kerman Province – "*Eylais planipons novata* K.Viets" (ASADI et al., 2003a).

Distribution: Mediterranean, Iran.

Habitat: pools of running water.

Family Hydrodromidae Viets

Genus *Hydrodroma* Koch

Hydrodroma rheophila Cook

New collecting places: Dalfard, Temnoeyh, Bidkhan, Dehshirak.

Iranian records: Fars (SCHWOERBEL & SEPASGOSARIAN, 1978); Markazi Province.

Distribution: India, Iran.

Habitat: ponds.

Hydrodroma torrenticola (Walter)

New collecting places: Dalfard, Rayen.

Iranian records: Mazandaran Province (SCHWOERBEL & SEPASGOSARIAN, 1978); Mazandaran Province (PEŠIĆ et al, 2003), Kerman Province.

Distribution: Europe, Iran.

Habitat: ponds.

Family Hydryphantidae Piersig

Genus *Protzia* Piersig

Protzia persica Bader & Sepasgozarian

New Kerman records: Mohammad abad, Joshan.

Iranian records: Fars Province (BADER & SEPASGOZARIAN, 1980b); Fars Province – (PEŠIĆ, 2005).

Family Sperchontidae Thor

Genus *Sperchon* Kramer

Sperchon algeriensis Lundblad

New collecting places: Javazm, Rigan,

Iranian records: Kerman Province (PEŠIĆ et al., 2005a); Khorasan Province (PEŠIĆ et al., 2006a).

Distribution: Algeria, Spain, Canary Islands, S Italy, Sicily, Iran.

Sperchon amuzgari Bader & Sepasgosarian

New collecting places: Chatrood, Sardoieh, Jedkan.

Iranian records: Borudjerd (BADER & SEPASGOZARIAN, 1979); Kerman, Esfahan, Yazd, Hamedan and Mazandaran Provinces (PEŠIĆ et al., 2004b).

Distribution: Iran.

Sperchon fundamentalis Bader & Sepasgosarian

New collecting places: Dalfard, Bam road.

Iranian records: Tehran Province (Karaj, Tehran-Amol road) (BADER & SEPASGOZARIAN, 1980a); Kerman Province (ASADI et al., 2003a); Kerman, Tehran, Mazandaran Province (PEŠIĆ et al., 2004b).

Distribution: Iran, Turkey.

Habitat: rhitrobiont.

Sperchon bispinosus Bader & Sepasgosarian

New collecting places: Dalfard, Yas chaman.

Iranian records: Tehran Province (Karaj) (BADER & SEPASGOZARIAN, 1982); Kerman, Yazd, Hamedan, Markazi Province (PEŠIĆ et al., 2004b).

Distribution: Iran.

Sperchon setiger Thor

New collecting places: Chatrood, Dosari.

Iranian records: Kerman, Esfahan, Fars Province (PEŠIĆ et al., 2004b).

Distribution: Palaearctic.

Sperchon papillosus Thor

New collecting places: Joshan, Deh ghazi, Dalfard, Anbar abad.

Iranian records: Mazandaran Province (PEŠIĆ et al., 2004b); Markazi, Kerman, Lorestan Province (PEŠIĆ et al., 2005b).

Distribution: Europe, Turkey, Iran.

Family Anisitsiellidae Koenike

Genus *Nilotonia* Nordenskiöld

Nilotonia (Dartia) pinnata Guo, Jin & Asadi

New collecting place: Jiroft.

Iranian records: Kerman Province (GUO et al., 2006).

Distribution: Iran.

Nilotonia persica Pešić & Saboori

New Kerman records: Kohbanan, Temnoeieh.

Iranian records: Kerman, sistan, Fars.

Remark: This is the second record of the species after the original description. (Male of this species has been described recently (PEŠIĆ & VAFAEI, 2009).

Family Lebertiidae Thor

Genus *Lebertia* Neuman

Lebertia (Pseudolebertia) abseta Guo, Jin & Asadi

Collecting place: Sekonj

Iranian records: Kerman Province (GUO et al., 2006).

Distribution: Iran

Lebertia (Pseudolebertia) glabra Thor

New collecting places: Deh rastegar.

Iranian records: Tehran, Kerman, Mazandaran, Bakhtiari, Hamedan, Kermanshah, Lorestan, Khorasan, East & West Azarbayjan Province – "*Lebertia lineata* Thor" (SEPASGOSARIAN, 1999).

Distribution: W-Palaeartic.

Habitat: rhitrobiont.

Lebertia (pilolebertia) sp.

New collecting places: Temnoieh, Javazm, Deh rastgar: subgenus is new for the province.

Remark: subgenus is new for the province.

Family Torrenticolidae Piersig

Genus *Torrenticola* Piersig

Torrenticola (Torrenticola) nana Di Sabatino & Gerecke

New collecting places: Chatrood, sardooeieh, Joshan.

Iranian records: Kerman Province (ASADI et al., 2003b); Fars Province (PEŠIĆ et al., 2004c); Kermanshah Province (PEŠIĆ et al., 2006b).

Distribution: Iran, Israel, Turkey.

Habitat: rhithral.

Torrenticola (Torrenticola) saboori Pešić & Asadi

New collecting places: Mohyabad, Mahan, Do sari, Shahre babak, Jedkan.

Iranian records: Kerman Province (PEŠIĆ & ASADI, 2002); Kerman, Chahar Mahal and Bakhtiari Province (PEŠIĆ et al., 2004c); Kerman Province (PEŠIĆ et al., 2005b).

Distribution: Iran.

Habitat: rhithral.

Torrenticola (Megapalpis) jasmineae Bader

New collecting place: Jedkan

Iranian records: Mazandaran Province (Lahidjan) (BADER, 1988); Kerman Province (PEŠIĆ et al., 2005b), (PEŠIĆ et al., 2004c); Hamedan Province (PEŠIĆ et al., 2006b).

Distribution: Iran, Israel, Turkey.

Habitat: hyporheobiont.

Genus *Monatractides* K.Viets

Monatractides algeriensis (Lundblad)

New collecting places: Joshan.

Iranian records: Kerman Province (PEŠIĆ & SABOORI, 2004).

Distribution: Algeria, Southern Italy, Iran.

Habitat: hyporheobiont.

Family Hygrobatidae Koch

Genus *Hygrobates* Koch

Hygrobates calliger Piersig

New collecting places: Kahnooj, Temnoieh.

Iranian records: Mazandaran, Kerman Province (PEŠIĆ et al., 2004b); Kerman Province (PEŠIĆ et al., 2005b).

Distribution: Palaearctic.

Hygrobates fluviatilis (Ström)

New collecting places: Dalfard, Javazm, Joshan, Kahnooj.

Iranian records: Kerman Province (ASADI et al., 2003a); Mazandaran, Kerman, Esfahan, Chahar Mahal and Bakhtiari, Yazd, Fars, Markazi, Hamedan Province (PEŠIĆ et al., 2004b); Khorasan Province (PEŠIĆ et al., 2006a).

Distribution: Europe, Turkey, Iran.

Habitat: rhitrobiont.

Genus *Atractides* Koch

Atractides (Atractides) gereckeii Pešić

New collecting place: Dosari

Iranian records: Kerman Province (PEŠIĆ et al., 2004b).

Distribution: Iran.

Habitat: hyporheobiont.

Atractides (Atractides) iranicus Pešić & Asadi

New collecting places: Faryab, Mohyabad.

Iranian records: Kerman Province (PEŠIĆ & ASADI, 2002); Kerman Province (New Kerman records: Faryab, Mohyabad (PEŠIĆ et al., 2004a).

Distribution: Iran.

Habitat: rhitrobiont.

Atractides (Atractides) mossahebi Pešić

New collecting places: Mohammad abad.

Iranian records: Kerman Province – “*Atractides cf. arcuatus*” (nec. *A. arcuatus* Thor) (ASADI et al., 2003b); Yazd, Fars, Kerman Province (PEŠIĆ et al., 2004b).

Distribution: Iran.

Habitat: rhitrobiont.

Atractides (Atractides) mirko pesici Pešić

New collecting places: Kohbanan.

Iranian records: SE Iran: Kerman Province (PEŠIĆ et al., 2004a); (PEŠIĆ et al., 2005b); Khorassan Province (PEŠIĆ et al., 2006a); Fars Province (PEŠIĆ & VAFAEI, 2009).

Distribution: Iran.

Habitat: rhitrobiont.

Atractides (Atractides) nodipalpis (Thor)

New collecting place: Joshan.

Iranian records: Kerman Province (ASADI et al., 2003a); Mazandaran, Fars Province (PEŠIĆ et al., 2004b).

Distribution: Palaeartic.

Habitat: rhitrobiont.

Atractides (Atractides) kermanensis Pešić

New collecting place: Joshan.

Iranian records: Kerman Province (PEŠIĆ et al., 2005c); Khorasan Province (PEŠIĆ et al., 2006a).

Distribution: Iran.

Habitat: hyporheobiont.

Atractides (Atractides) robustus (Sokolow)

New collecting places: Sardoieh.

Iranian records: Mazandaran, Tehran, Kerman, Yazd Province (PEŠIĆ et al., 2004a); Khorasan Province (PEŠIĆ et al., 2006a).

Distribution: Russia, Caucasus, Central and Southern Europe, Iran.

Habitat: hyporheobiont.

Atractides acutirostris (Motaş & C. Angelier)

New collecting places: Kerman, Chah moozi.

Iranian records: Mazandaran, Kerman, Esfahan, Fars Province (PEŠIĆ et al., 2004b).

Distribution: Central and Southern Europe, British Islands, Greece, Israel, Iran.

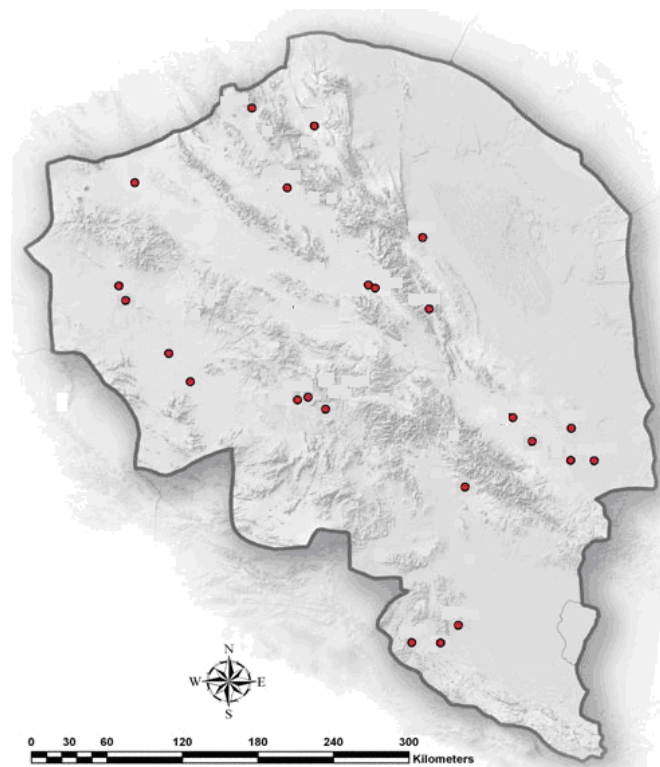


Figure 1: Map of studied area (Kerman province), the main collecting sites of new studied places are given.

Family Unionicolidae Oudemans

Genus *Forelia* Haller

Forelia variegator (Koch)

New collecting place: Sekonj

Iranian records: Kerman, Hamedan Province (PEŠIĆ et al., 2004a).

Distribution: Palaearctic.

Genus *Neumania* Lebert

Neumania sp.

Kerman record: chah moozi.

Iranian records: Gilan, Fars Province (SEPASGOZARIAN, 1999).

Remarks: Two species of the genus *Neumania* have been reported from Iran (*Neumania phreaticola* Motas & Tanasachi and *Neumania* sp.), this is the third report of *Neumania* from Iran and also the first report of family and genus from Kerman province.

Family Aturidae Thor

Genus *Aturus* Kramer

Aturus sp.

New collecting places: Temnoieh, Mohammad abad.

Iranian records: Tehran, Kerman, Mazandaran, Bakhtiari, Hamedan, Kermanshah, Lorestan, Khorasan, East & West Azarbayjan Province (SEPASGOZARIAN, 1999).

Aturus barbatulus K. Viets

Iranian records: Lorestan Province (PEŠIĆ, 2004b), Kerman province (ASADI, 2009)

Distribution: S Europe, Iran.

Habitat: lentibiont.

Family Momoniidae Viets

Genus *Stygomomonía* Szalay

Stygomomonía latipes Szalay

Iranian records: Kerman, Tehran Province (PEŠIĆ et al., 2005b).

Distribution: Europe, Iran.

Habitat: ponds.

Family Mideopsidae Koenike

Genus *Mideopsis* Neuman

Mideopsis sp.

Kerman records: Temnoieh: new for Kerman.

Remark: two species of *Mideopsis* have been reported from Iran up to now: *Mideopsis orbicularis* (Müller) and *Mideopsis roztozensis* Biesiadka & Kowalik. This is the third report of *Mideopsis* genus from Iran which is different from the mentioned species and is being described (unpublished data).

Habitat: pools of running waters.

Family Arrenuridae Thor

Genus *Arrenurus* Duges

Arrenurus (Arrenurus) crenatus Piersig

New collecting places: Baft, Dalfard.

Iranian records: Hamedan Province (SCHWOERBEL & SEPASGOSARIAN, 1977); Kerman Province (ASADI et al., 2003a).

Distribution: Palaearctic.

Habitat: ponds, pools of running water.

Arrenurus (Micruracarus) cyprioticus Smit & Pešić

New collecting places: sardoeieh, ghale askar.

Iranian records: Kerman Province (SMIT & PEŠIĆ, 2006).

Distribution: Cyprus, Iran.

Habitat: ponds, pools of running water.

DISCUSSION AND CONCLUSION

In this study we investigated a new area of the province which has not been investigated before (Fig. 1). This checklist contains 37 species, in 16 genera and 13 families, of water mites including new collecting places for some species in the province. One family (Unionicolidae), three genera (*Panisopsis*, *Mideopsis*, *Neumania*), and two species, *Nilotonia* (*Manotonia*) *persica* and *Protzia persica*, are new records for Kerman province. New species from the genus *Mideopsis* is also under description.

Despite some previous studies in recent years in Kerman province our current knowledge of the water mites' diversity is not complete in the northwest, east and east west of this province. With regards to the previous studies, it seems that the water mite's fauna of Kerman province consist of primarily *Atractides*, *Torrenticola*, *Hygrobates*, and *Sperchon* species. In a good agreement with previous studies (PEŠIĆ et al., 2005) among the reophilic species *Hygrobates fluviatilis* abundantly colonizes running waters, probably due to pollution of surface waters and temporary characters of most sampling sites. Additionally, according to our new investigation, the occurrence of *Lebertia* species seems diverse and is currently studied according to GERECKE (2009). The content of Kerman fauna is close to some near provinces such as Fars, Yazd and sistān va Baloochestān. The colonization of interstitial habitats is not investigated in this province except for some limited periods of research. So it is necessary to be investigated in further research completely.

ACKNOWLEDGMENT:

The author is thankful to the Shahid Bahonar University of Kerman for providing the financial support to carry out this research work.

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Received: 1. February 2010.