

New records of Neelipleona for the Iranian springtail fauna (Collembola)

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YOOSEFI LAFOORAKI, E. & SHAYANMEHR, M.: *New records of Neelipleona for the Iranian springtail fauna (Collembola)*.

Abstract: Three new species of Collembola belonging to genus *Megalothorax* Willem, 1900 (new genus for Iran) are recorded for the fauna of Iran. *M. willemi* Schneider & D'Haese, 2013 and *M. perspicillum* Schneider & D'Haese, 2013 have recently described and known from Belgium and France respectively. In this survey they were collected from Mazandaran province in northern Iran and are first record for the Middle East (and the second record in the world). Also *M. incertus* Börner, 1903 is recorded for the first time from Iran. The specimens were found in the soil, litter and dead wood from four localities in Caspian Hyrcanian Mixed Forests.

Keywords: Megalothorax, Neelidae, Iran.

Introduction

Previously globular springtails were known as order Symphypleona. The family Neelidae was created by FOLSOM (1896) based on description of *Neelus murinus* Folsom, 1896 (KOVÁČ & PAPAĆ 2010). In 1971, Massoud erected three suborders within order Collembola: the Arthropleona, the Neelipleona and Symphypleona (BRETZFELD 1999). At present time most collembologists have accepted class Collembola with four orders including Entomobryomorpha, Poduromorpha, Symphypleona and Neelipleona. Neelipleona is the smallest of the four order of Collembola (SCHNEIDER & D'HAESE 2013). There are little literatures or taxonomic keys for Collembola species from Asian countries especially from those of the Middle East. The study of Collembola fauna of Iran is poorly known, too. Iran is a country in western Asia and in the Middle East with a 1,648,195 km² of area (Fig. 1). The first record of the springtails for Iranian fauna was *Sminthurus viridis* Linnaeus, 1758 found by FARAHBAKHSH (1961). The most extensive study on Collembola was carried out by COX (1982) who collected and identified 70 species of 30 genera and five families. Until now only 1 species of Neelipleona is recorded from Iran. The only record of Neelidae in Iran, *Neelus murinus* (Folsom 1896) was found by COX (1982) from Central, Mazandaran and East Azarbaijan. In this investigation some new species are added to the Iranian springtails fauna. This survey was carried out in Mazandaran province in northern Iran. Because of its geographical location between the Caspian Sea and Alborz mountains, this province has a humid, moderate Caspian weather and thus a rich faunistic and floristic diversity. The Caspian

Hyrcanian Mixed Forests ecoregion is an area of lush lowland and montane forests near the southern shores of the Caspian Sea of Iran. The ecoregion's climate is humid subtropical. In middle altitude locations it is oceanic and in the mountains, humid continental. The Alborz mountain range is the highest mountain range in the Middle East which captures the moisture of the Caspian Sea. The natural forest vegetation is temperate deciduous broadleaved forest. The dominant species of Hyrcanian forest is of Oriental Beech (*Fagus orientalis*). The main types of trees contain *Fagus orientalis*, *Quercus persica*, *Q. macranthera*, *Buxus hyrcana*, *Castanea sativa*, *Carpinus betulus* and *C. orientalis*. Also some conifers may be found in these forests.

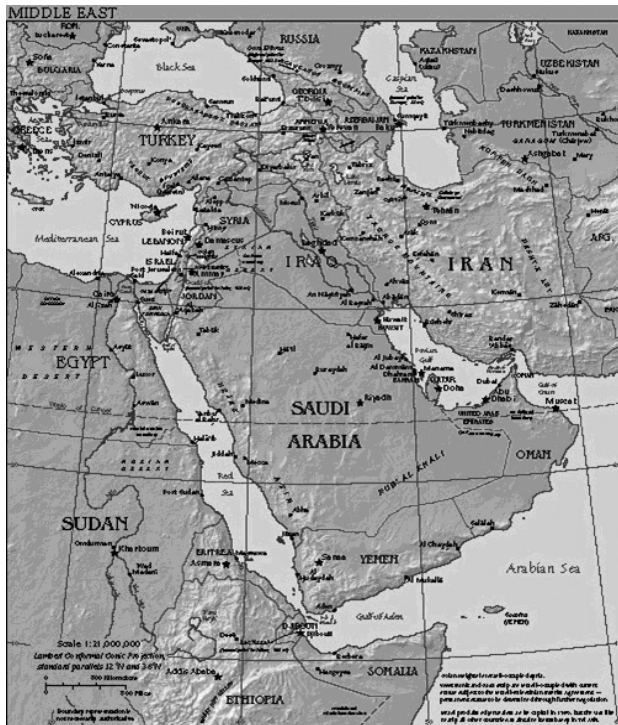


Fig. 1: Iran location in the Middle East

Material and methods

Samplings were carried out in Mazandaran province in May 2012 and March 2013. Mazandaran province is located in northern Iran. The leaf litter, soil and dead wood were collected from forests in Savadkooh, Behshahr, Neka and Noor regions. The animals were extracted by Berlese funnel and Collembola species were preserved in 75% alcohol. The specimens were cleared in KOH and mounted in Hoyer's medium and identified. The sampling sites (showed by stars in Fig. 2) are including:

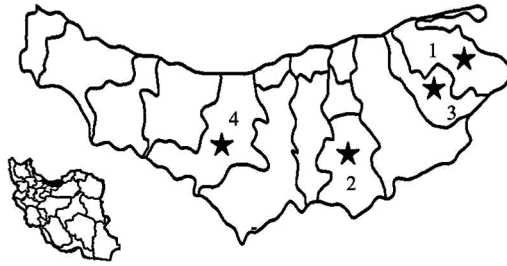


Fig. 2: Mazandaran location in northern Iran, Sampling sites: 1. Behshahr, 2. Savadkooh, 3. Neka and 4. Noor

Site 1: Jawarem Wildlife Refuge in Savadkooh region (36°13'N, 52°55'E),

Site 2: Abbas-Abad forest on Alborz mountains in Behshahr region with a lake is intermediated to the forest (36°40'N, 53°32'E),

Site 3: Hezar jarib forest in Neka region (36°39'N, 53°18'E),

Site 4: Royan in Noor region (36°20'N, 51°53'E).

Abbreviation: Ant: antenna; Th: thorax; Abd: abdomen; sf: sensory fields.

Result and discussion

The genus *Megalothorax* Willem, 1900 is recorded for the first time from Iran. Three species belonging to this genus were found from Mazandaran province in northern Iran. *M. willemi* and *M. perspicillum* were recently described by SCHNEIDER & D'HAESE (2013) and here they reported for the first time from Middle East and for the second time from the world. *M. incertus* Börner, 1903 is recorded for the first time from Iran. This species have been recorded from Middle East before and was found in Iraq by RUSEK (1981).

Genus *Megalothorax* Willem, 1900

Body range 0.2–0.7 mm. Color generally white or greyish, body in some species dotted with black, brown, orange or red pigments. When pigmentation present generally stronger in the oldest specimens. When relaxed, head perpendicular to the body, hypognathous but able to straighten up. Eyes always absent, antenna shorter than head diagonal. Ant III and IV fused together. Body of globular shape due to the development of thoracic region and the fusion of Th III with Abd I–V (great abdomen). In dorsal view, specimens appear widest at Th III. Th I clearly delimited, Th II weakly delimited from Th III. Furca well developed. Manubrium/dens articular process convex on manubrium, concave on dens. Dens subsegmented with clear suture and small anterior articular process. Specimens show a high degree of liberty in the mucro movement with respect to the dens. Retinaculum with either 3 + 3 or 4 + 4 hook-like teeth, without chaeta. Body minute, weakly pigmented, chaetotaxy sparse. Ant III and IV merged. Presence of 6 + 6 sensory fields (sf 1–6) representing crater-like deformations of the cuticle (roughly circular depression with sometimes prominent edges) distributed as follow: sf 1 and 2 on head respectively anterior and posterior to Ant, sf 3 dorsally on Th II, sensory field 4 laterally on Th II, sf 5 laterally on Th III and sf 6 dorsally on posterior part of abdomen. Presence of 14+14 free wax rod generating crypt: 2+2 on head, 9+9 on thorax and 3+3

on abdomen. Absence of scaling off star-like granules. Always 2+2 neosminthuroid chaetae laterally on Abd IV sternum. Five guard chaetae on sensory field 6. At most 3+3 swollen sensilla on body (excluding those included in sensory field) (SCHNEIDER & D'HAESE 2013).

***Megalothorax incertus* Börner, 1903**

Material examined: The species were found in Jawarem Wildlife Refuge, Savadkooh region. Samples were taken from soil and litters on 24. May 2012. In this forest, species diversity of plants is including of *Alnus* spp., *Fagus orientalis*, *Diospyrus lotus*, *Albizzia julibrisin*, *Quercus persica*, *Acer cappadocicum*.

Distribution: This species is recorded for the first time from Iran. It occurs in Iraq (RUSEK 1981:80), Europe, North America and Australia (BRETTFELD 1999).

Description: Total length 0.5 mm. Body setae slightly spine like. Ant IV with 1 thick sensillum and 8 long ones. Labral setae "a" smooth; empodium with more or less protruding tubercle. Retinaculum with 3+3 teeth. Manubrium with 2+2 setae. Mucro narrow, without constriction; edges serrate (BRETTFELD 1999).

***Megalothorax willemi* Schneider & D'Haese, 2013**

Material examined: It was found in Neka/Hezar jarib and Behshahr/Abbas-abad in 28 March 2013 and in Noor/Kadirsar in 1 March 2013. The specimens of this species were collected from soil and leaf litter under *Parrotia persica*, *Quercus* sp. and *Pinus* sp. trees and from dead wood.

Distribution: The species was recently described from Belgium. It was discovered in park near the type locality of *M. minimus*. Represent edaphic species with occurrence in different habitats like forest litter, moss, caves (SCHNEIDER & D'HAESE 2013). This is the first record of the species from the Middle East.

Description: Integumentary channels on the back of the head and laterally and dorsally on forehead, connection to *linea ventralis* circular. Sensilla inside sensory fields all candle flame-shaped, curved. Protuberance near labrum. Basomedian fields of labium with 3+3 chaetae. Presence of the chaetaXon Ant IV. One guard trichobothrium of sf 3 on the internal side, the other on the external side. Each claw of ordinary size, subequal. Abd I to V terga with 19+19 chaetae. Absence of dorsal sensilla s3. Abd IV sternum with 2+2 chaetae. Retinaculum with 3+3 teeth. Mucro smooth (SCHNEIDER & D'HAESE 2013).

***Megalothorax perspicillum* Schneider & D'Haese, 2013**

Material examined: The species was found in Neka/Hezar jarib and Behshahr/Abbas-abad in 28. March 2013. It was collected from soil and leaf litter under *Parrotia persica* and *Pinus* sp. trees and from dead wood.

Distribution: This species was recently described from garden of National Museum of Natural History in Paris, France (SCHNEIDER & D'HAESE 2013). This is the first record of the species from the Middle East.

Diagnosis: Sensilla inside sf 3 to 6 globular. Integumentary channels on the back of the head and laterally and dorsally on thorax and abdomen. Connection with *linea ventralis* ventrally on head crossed. Basomedian fields of labium with 4+4 chaetae. Each claw of ordinary size, subequal. Abd I to V terga with 18+18 chaetae. Presence of dorsal sensilla s3. 3+3 chaetae on Abd IV sternum. Retinaculum with 4+4 teeth. Mucro thin and serrate (SCHNEIDER & D'HAESE 2013). The specimens of *M. perspicillum* collected in this study have specific pattern of integumentary channels on head and body and missing β 2 and β 4 setae on abdomen. One specimen was found with serrate labrum setae R1, R2.

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