



Springtails fauna (Hexapoda, Collembola) from different ecosystems of Behshahr and suburb (Mazandaran) with two new records from Iran

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ABSTRACT. To expand study of Iranian Collembola fauna, the present study was conducted to investigate springtails fauna of different ecosystems such as forests, grasslands and gardens in the vicinity of Behshahr in the east of Mazandaran province, during 2020–2021. Several samples of soil and leaf litter were collected and specimens were extracted by Berlese funnel. Collected materials were identified by relevant taxonomic keys. The results indicated 29 species from 21 genera belonging to 10 families. Two species including *Sminthurides inaequalis* Börner, 1903 (Sminthuridae) and *Hypogastrura neglecta* Börner, 1901 (Hypogastruridae) were recorded for the first time from Iran. Despite numerous studies to identify Collembola fauna in Iran, many species are still unknown.

Key words: Hyrcania, fauna, new records, Alborz, soil biology

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INTRODUCTION

Collembola (springtails) are small hexapods (about 1–5 mm), entognathous (mouthparts located within a gnathal pouch), with one pair of antenna and primarily wingless. These arthropods have special abdominal appendages that distinguish them from insects: ventral tube (collophore), tenaculum (retinaculum) and furcula (Bellinger et al., 1996–2022). Collembola are the most abundant arthropods in land ecosystems, and they are the decomposers of soil organic materials (Larsen, 2007). Collembola class is divided into four orders including, Entomobryomorpha, Poduromorpha, Symphypleona, Neelipleona (Deharveng, 2004). Up to now more than 8000 species of springtails have been identified in around the world (Bellinger et al., 1996–2022). According to the last checklist of Collembolan fauna of Iran that was published in 2020, 232 species and 95 genera were recorded from Iran which many of

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them have been reported from Mazandaran province (Shayanmehr et al., 2020). Behshahr is one of the eastern cities in Mazandaran province that is located in $36^{\circ}41'10''\text{N}$, $53^{\circ}32'05''\text{E}$ and 15 m above sea level; because of the humid climate, it has different ecosystems including forests, grasslands and gardens then it can be a suitable habitat for soil-living arthropods. This study was conducted to investigate the springtails fauna and identifying species in Behshahr and its suburbs, because no research has been done in these areas so far.

MATERIAL AND METHODS

To study the Collembola fauna, Behshahr city in the east of Mazandaran province was selected as the site (Fig. 1). The specimens were collected from different regions of Behshahr including forests, gardens and grasslands, during 2020–2021 in spring, autumn and winter. Collembola samples were extracted from soil and leaf litter by light and heat in Berlese funnels and sorted and then conserved in vials with ethanol 75%. Collembola specimens were cleared with Nesbit's solution and then permanent microscope slides were made with Hoyer's medium. Specimens were identified to genera and species level using valid identification keys (Bellinger et al., 1996–2022). The materials were stored in the laboratory of Sari Agricultural Sciences and Natural Resources University (SANRU), Mazandaran.

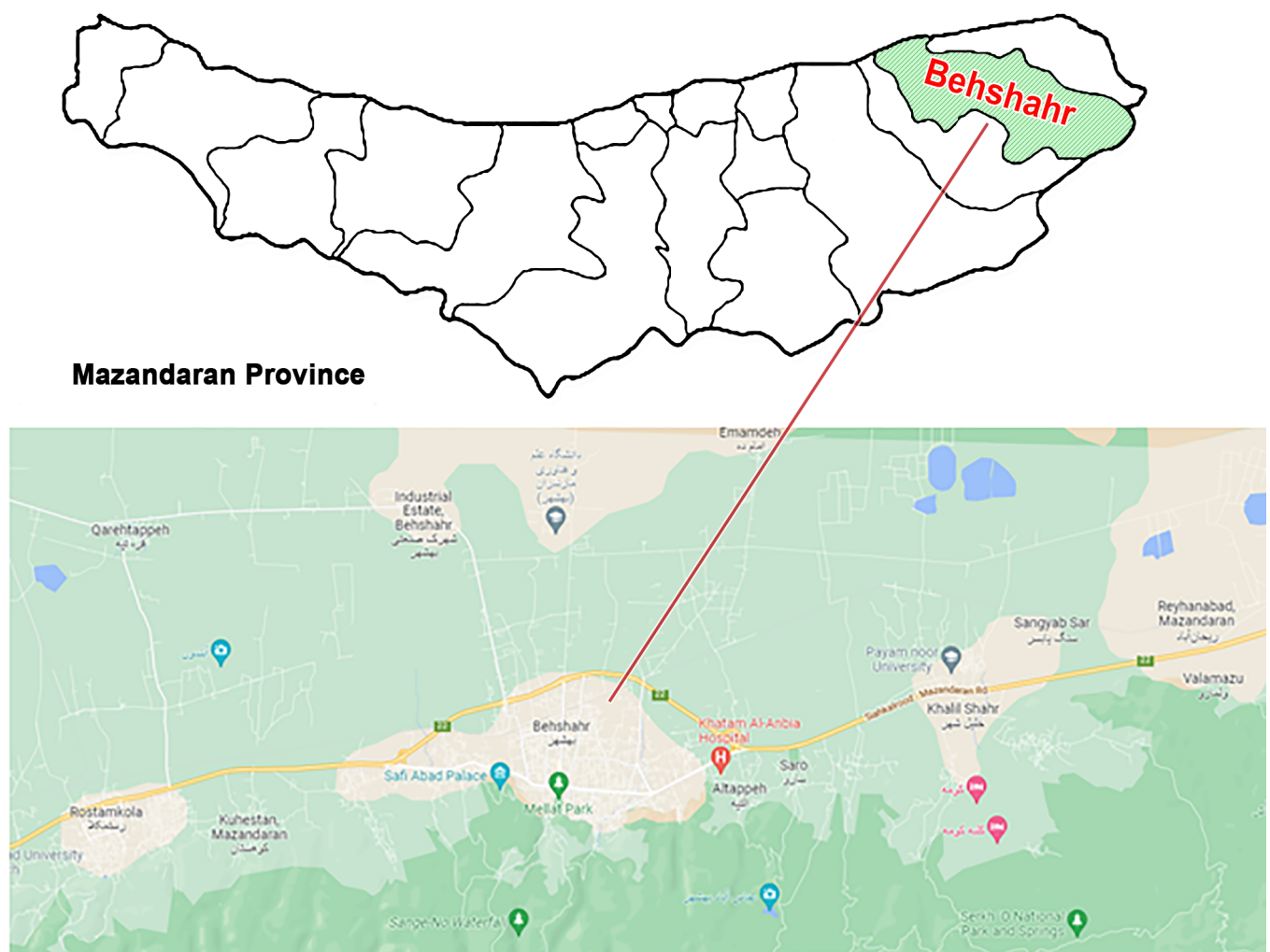


Figure 1. The map of sampling area in Mazandaran province, Behshahr vicinity.

RESULTS

The results of study included 29 species from 21 genera belonging to 10 families from different regions in Behshahr, Mazandaran. Two species including *Sminthurides inaequalis* Börner, 1903 (Sminthurididae) and *Hypogastrura neglecta* Börner, 1901 (Hypogastruridae) were recorded for the first time from Iran.

Phylum Arthropoda Latreille, 1829

Class Collembola Lubbock, 1871

Order Poduromorpha Börner, 1913

Family Onychiuridae Lubbock, 1867

Subfamily Onychiurinae Börner, 1901

Genus *Heteraphorura* Bagnall, 1948

Heteraphorura iranica Kapruś, Shayanmehr & Yoosefi Lafooraki, 2017

Material examined. Two specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Three specimens, Iran, Mazandaran province, Behshahr, Cheshmeh Chahkhani, leaf litter, 36°49'40"N, 53°32'18"E, 378 m a.s.l., 3-V-2021; Seven specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan, Kermanshah and Mazandaran provinces (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. Iran (Shayanmehr et al., 2020; Yahyapour et al., 2020).

Heteraphorura kaprusi Arbea, Yahyapour & Shayanmehr, 2020

Material examined. Five specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021; One specimen, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Three specimens, Iran, Mazandaran province, Behshahr, Cheshmeh Chahkhani, leaf litter, 36°49'40"N, 53°32'18"E, 378 m a.s.l., 3-V-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Yahyapour et al., 2020).

Distribution in the world. Iran (Yahyapour et al., 2020).

Genus *Protaphorura* Absolon, 1901

Protaphorura levantina (Christiansen, 1956)

Material examined. Two specimens, Iran, Mazandaran province, Behshahr, Khonak Jam, soil and leaf litter, 36°40'27"N, 53°31'21"E, 244 m a.s.l., 10-XI-2020; One specimen, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan, Kermanshah and Mazandaran provinces (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. Lebanon and Syria (Christiansen, 1956).

Protaphorura golestanica Kapruś, Shayanmehr & Yoosefi Lafooraki, 2017

Material examined. Thirteen specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Four specimens, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan and Mazandaran provinces (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. So far only known from the type locality in Golestan and Mazandaran province, Northern Iran (Yahyapour et al., 2020).

Genus *Deuteraphorura* Absolon, 1901***Deuteraphorura dashenazensis* Arbea, Yahyapour & Shayanmehr, 2020**

Material examined. Five specimens, Iran, Mazandaran province, Behshahr, Mellat park, soil and leaf litter, 36°41'03"N, 53°32'31"E, 36 m a.s.l., 21-I-2021; One specimen, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from soil and leaf litter in Mazandaran province (Yahyapour et al., 2020).

Distribution in the world. Iran (Yahyapour et al., 2020).

Family Hypogastruridae Börner, 1906**Genus *Hypogastrura* Bourlet, 1839*****Hypogastrura manubrialis* (Tullberg, 1869)**

Material examined. Five specimens, Iran, Mazandaran province, Behshahr, *Citrus* garden, soil, 36°43'53"N, 53°35'13"E, -16 m a.s.l., 5-III-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Central, Golestan, Guilan, E. Azarbaijan, Mazandaran, Kohgiluyeh and Boyer-Ahmad, Khuzestan, Tehran, W. Azarbaijan and Zanjan provinces (Shayanmehr et al., 2020).

Distribution in the world. Cosmopolitan (Fjellberg, 1998).

***Hypogastrura neglecta* (Börner, 1901) (Fig. 2)**

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021, leg.: S. Vahedi Moghadam.

Description. Body length about 1.0 mm, body colour bluish gray, first antennal segment with seven setae. Tibiotarsi with one long apical setae, with long mucro and anal spine absent.

Distribution in Iran. This species is reported for the first time from Iran.

Distribution in the world. Palaearctic (Fjellberg, 1998).

Genus *Ceratophysella* Börner, 1932***Ceratophysella stercoraria* (Stach, 1963)**

Material examined. Six specimens, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. The species is widespread in Golestan, Kermanshah, Kohgiluyeh and Boyer-Ahmad, Kerman, Lorestan, Mazandaran and Tehran (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. Bulgaria, Russia, Ukraine, partly Middle Asia (Thibaud et al., 2004).

Family Neanuridae Börner, 1901**Subfamily Pseudachorutinae Börner, 1906****Genus *Pseudachorutes* Tullberg, 1871*****Pseudachorutes dubius* Krausbauer, 1898**

Material examined. Six specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Central, Guilan and Mazandaran provinces (Shayanmehr et al., 2020).

Distribution in the world. Cosmopolitan (Fjellberg, 1998).

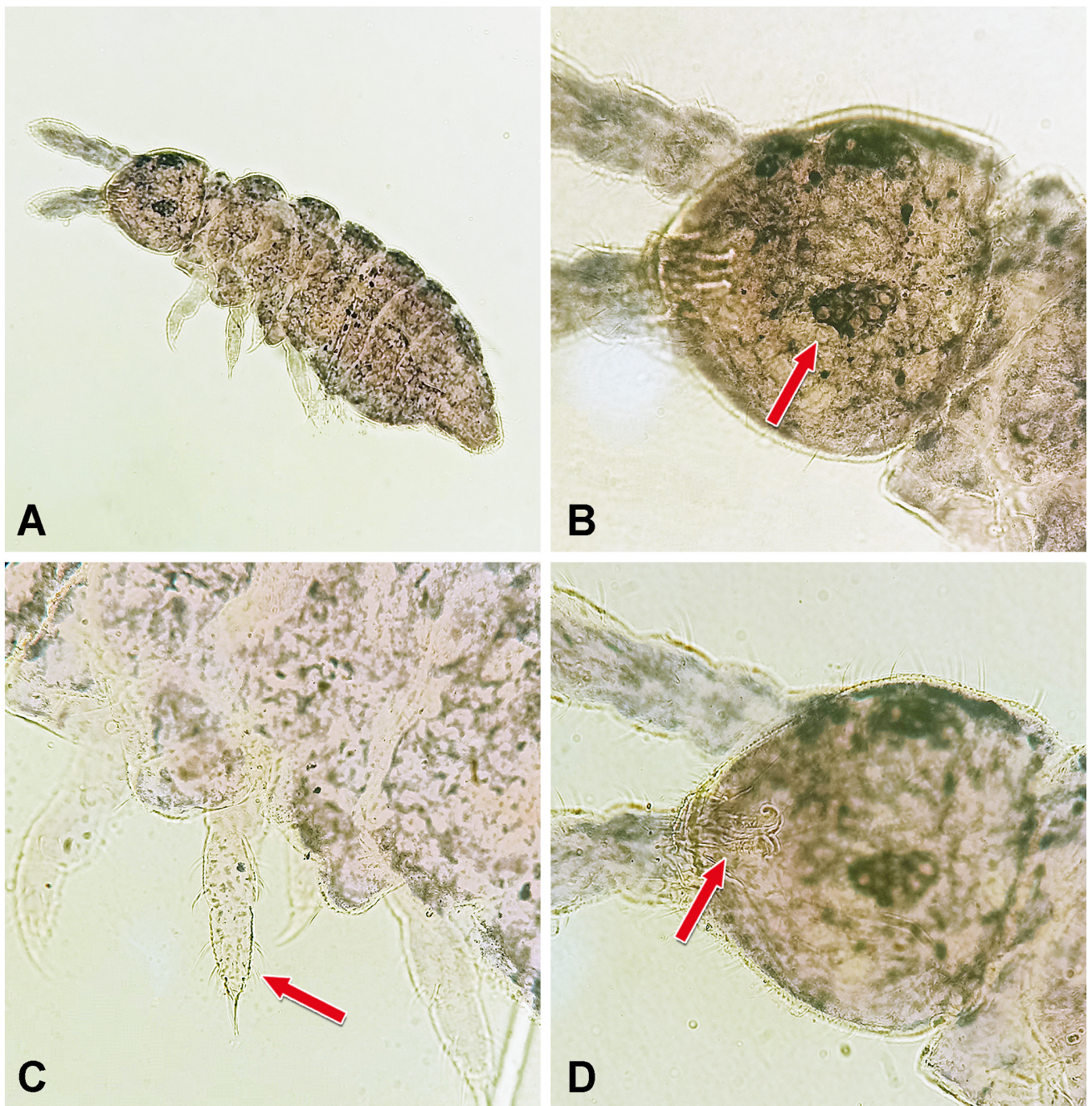


Figure 2. *Hypogastrura neglecta* Börner, 1901. **A.** General habitus (10×); **B.** Ocelli (40×); **C.** Tarsus (40×); **D.** Molar plate (40×).

***Pseudachorutes subcrassus* Tullberg, 1871**

Material examined. Four specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Central, Guilan and Mazandaran provinces (Shayanmehr et al., 2020).

Distribution in the world. Palearctic (Fjellberg, 1998).

Subfamily Frieseinae Massoud, 1967**Genus *Friesea* Dalla Torre, 1895***Friesea claviseta* Axelson, 1900

Material examined. Three specimens, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Shayanmehr et al., 2020).

Distribution in the world. Cosmopolitan (Fjellberg, 1998).

Friesea sp.

Material examined. Two specimens, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021; Two specimens, Iran, Mazandaran province, Behshahr, Cheshmeh Chahkhani, leaf litter, 36°49'40"N, 53°32'18"E, 378 m a.s.l., 3-V-2021, leg.: S. Vahedi Moghadam.

Subfamily Neanurinae Börner, 1901**Genus *Neanura* MacGillivray, 1893***Neanura* sp.

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Two specimens, Iran, Mazandaran province, Behshahr, Cheshmeh Chahkhani, leaf litter, 36°49'40"N, 53°32'18"E, 378 m a.s.l., 3-V-2021, leg.: S. Vahedi Moghadam.

Order Entomobryomorpha Börner, 1913**Family Entomobryidae Schaffer, 1896****Genus *Heteromurus* Wankel, 1860***Heteromurus major* (Moniez, 1889)

Material examined. Six specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Four specimens, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020; Seven specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species is really common and reported from many habitats in Central, E. Azarbaijan, Guilan, Mazandaran, Kermanshah, Lorestan and Tehran provinces (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. Cosmopolitan species (Fjellberg, 2007).

Heteromurus nitidus (Templeton, 1835)

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Khonak Jam, soil and leaf litter, 36°40'27"N, 53°31'21"E, 244 m a.s.l., 10-XI-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan, Guilan and Mazandaran provinces (Shayanmehr et al., 2020; Bakhshi et al., 2022).

Distribution in the world. Cosmopolitan species (Fjellberg, 2007).

***Heteromurus variabilis* Martynova, 1974**

Material examined. Four specimens, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Ghasemi Cherati, 2017).

Distribution in the world. Palaearctic, Tajikistan (Bellinger et al., 1996–2022).

Genus *Orchesella* Templeton, 1836***Orchesella cincta* (Linnaeus, 1758)**

Material examined. Twelve specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021; Twenty eight specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan and Mazandaran provinces (Shayanmehr et al., 2020).

Distribution in the world. Holarctic (Bellinger et al., 1996–2022).

Genus *Entomobrya* Rondani, 1861***Entomobrya atrocincta* Schött, 1896**

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Golestan, Mazandaran and Kermanshah provinces (Shayanmehr et al., 2020).

Distribution in the world. Argentina, Colombia, Costa Rica, Guatemala, Mexico, Peru and Venezuela (Mari Mutt & Bellinger, 1990), North America (Jordana, 2012).

Genus *Mesentotoma* Salmon, 1942***Mesentotoma* sp.**

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Namayan Tappeh grassland, soil, 36°43'13"N, 53°32'43"E, -11 m a.s.l., 9-IV-2021, leg.: S. Vahedi Moghadam.

Genus *Pseudosinella* Schäffer, 1897***Pseudosinella octopunctata* Börner, 1901**

Material examined. Four specimens, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Central, E. Azarbaijan, Golestan, Guilan, Mazandaran, Kerman, Kermanshah, Lorestan, Isfahan, W. Azarbaijan, Tehran and Zanjan provinces (Shayanmehr et al., 2020).

Distribution in the world: Cosmopolitan (Fjellberg, 2007). North America and Europe (Jordana, 2012).

Family Tomoceridae Schaffer, 1896**Genus *Tomocerus* Nicolet, 1842*****Tomocerus vulgaris* (Tullberg, 1871)**

Material examined. More than twenty specimens, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from soil in Central, E. Azarbaijan, Golestan, Guilan, Mazandaran, Kermanshah and Zanjan provinces (Shayanmehr et al., 2020).

Distribution in the world. Cosmopolitan (Bellinger et al., 1996–2022).

Family Isotomidae Schaffer, 1896

Genus *Anurophorus* Nicolet, 1842

Anurophorus silvaticus Potapov & Stebaeva, 1990

Material examined. More than twenty specimens, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Yoosefi Lafooraki et al., 2019).

Distribution in the world. Holarctic (Potapov, 2001).

Genus *Folsomia* Willem, 1902

Folsomia manolachei Bagnall, 1939

Material examined. Two specimens, Iran, Mazandaran province, Behshahr, Imamzadeh Yusuf, leaf litter, 36°43'19"N, 53°37'7"E, -3 m a.s.l., 13-XII-2020, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Kermanshah province (Shayanmehr et al., 2020).

Distribution in the world. Palaearctic (Fjellberg, 2007).

Genus *Isotomurus* Börner, 1903

Isotomurus sp.

Material examined. Three specimens, Iran, Mazandaran province, Behshahr, Mellat park, soil and leaf litter, 36°41'03"N, 53°32'31"E, 36 m a.s.l., 21-I-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. Some dispersed reports of the genus have been published from Mazandaran, Golestan and Kerman collected from that the species level of identification remain unknown (Shayanmehr et al., 2020).

Order Symphypleona Börner, 1901

Family Katiannidae Börner, 1913

Genus *Sminthurinus* Börner, 1901

Sminthurinus aureus (Lubbock, 1862)

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Guilan and Mazandaran provinces (Yahyapour & Shayanmehr, 2011; Yahyapour, 2012; Daghighi, 2012; Daghighi et al., 2013).

Distribution in the world. Palaearctic (Fjellberg, 2007).

Sminthurinus sp.

Material examined. These specimens were collected from Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Family Sminthurididae Börner, 1906

Genus *Sminthurides* Börner, 1900

***Sminthurides inaequalis* Börner, 1903 (Fig. 3)**

Material examined. Two specimens, Iran, Mazandaran province, Behshahr, Khat-e-gaz grassland, soil, 36°44'10"N, 53°34'27"E, -19 m a.s.l., 5-II-2021, leg.: S. Vahedi Moghadam.

Description. Body length about 0.6 mm, body colour bluish violet, ventral side paler. With 6+6 ommatidia that ommatidia C and D missing. Fourth antennal segment in females with 5 subsegments without intermediate annulations, the basal segment being the longest. Claws with inner tooth. Dens with few setae, about 5 spine like inner, about 6 outer. Mucro moderately broad but distally narrow, inner edge with about 8 rough teeth, outer edge smooth with a middle tooth, anterior edge narrow and smooth, seta present.

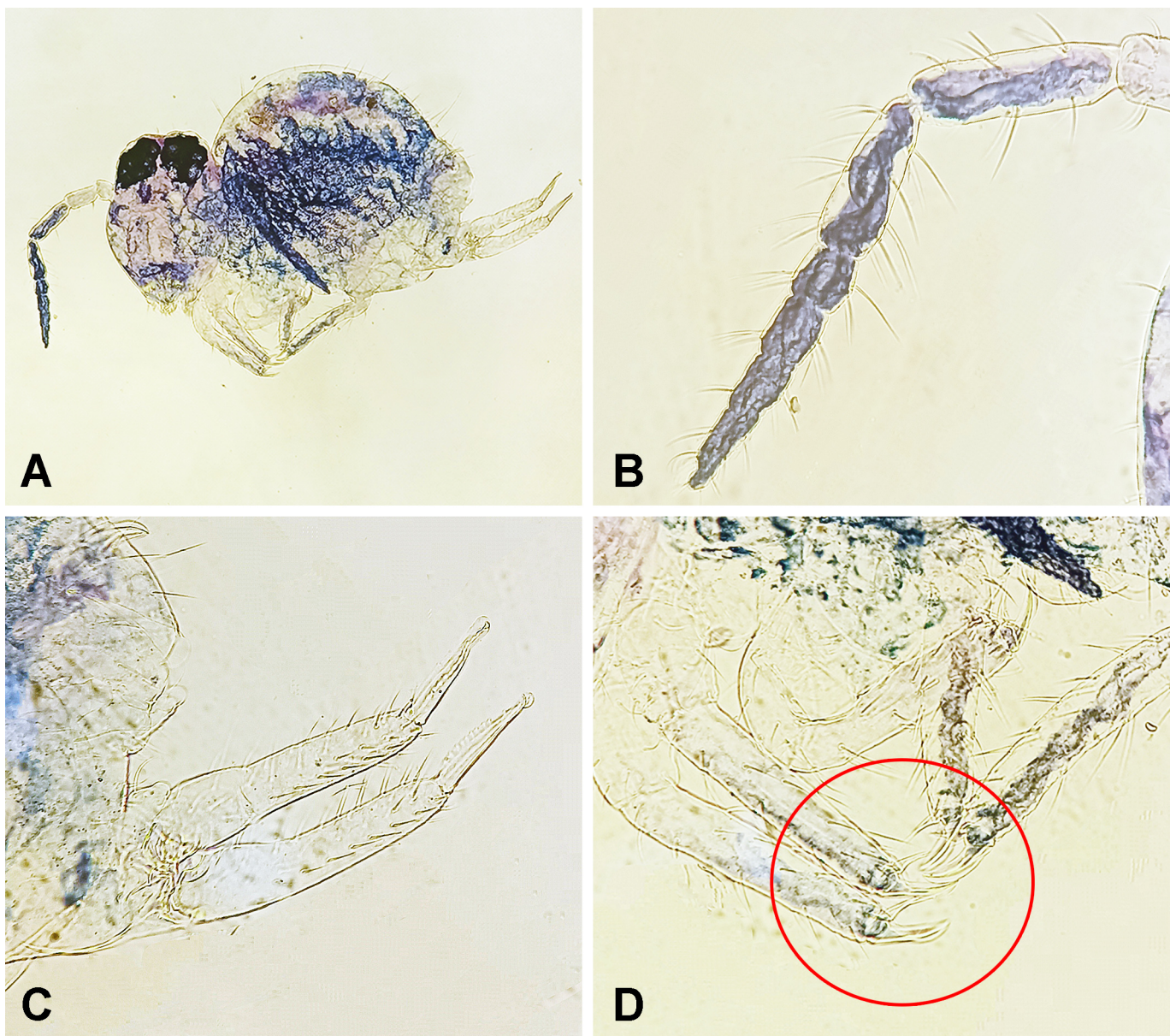


Figure 3. *Sminthurides inaequalis* Börner, 1903. **A.** General habitus (10×); **B.** Antenna (40×); **C.** Furca (40×); **D.** Tarsus (40×).

Distribution in Iran. This species is reported for the first time for Iran fauna.

Distribution in the world. Italy, Palermo, Portugal (Bretfeld, 1999).

Genus *Sminthurus* Latreille, 1804

Sminthurus ghilarovi Stebaeva, 1966

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Pasand forest, leaf litter, 36°39'56"N, 53°36'46"E, 357 m a.s.l., 12-X-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Mehrafrooz Mayvan et al., 2015).

Distribution in the world. Palaearctic (Bretfeld, 1999).

Family Dicyrtomidae Börner, 1906

Genus *Dicyrtoma* Bourlet, 1841

Dicyrtoma fusca (Lubbock, 1873)

Material examined. One specimen, Iran, Mazandaran province, Behshahr, Abbas Abad forest, soil and leaf litter, 36°40'17"N, 53°35'56"E, 292 m a.s.l., 23-V-2021, leg.: S. Vahedi Moghadam.

Distribution in Iran. This species was collected from Mazandaran province (Shayanmehr et al., 2020).

Distribution in the world. Holarctic (Fjellberg, 2007).

DISCUSSION

In this study, 29 species of springtails were recorded for the first time in Behshahr County. *Sminthurides inaequalis* Börner, 1903 (Sminthuridae) and *Hypogastrura neglecta* Börner, 1901 (Hypogastruridae) were new records for collembolan fauna of Iran. According to the last checklist of Iranian Collembola (Shayanmehr et al., 2020), only one species of genus *Sminthurides* has been recorded from Iran, *S. malmgreni* (Tullberg, 1876). From genus *Hypogastrura*, nine species were already recorded from Iran including *H. assimilis* (Krausbauer, 1898), *H. ellisi* (Skarżyński & Kahrarian, 2017), *H. manubrialis* (Tullberg, 1869), *H. martiani* (Skarżyński & Kapruś, 2009), *H. persica* (Kahrarian, Vafaei-Shoushtari, Skarżyński & Konikiewicz), *H. purpurescens* (Lubbock, 1867), *H. socialis* (Uzel, 1891), *H. tullbergi* (Schäffer, 1900) and *H. vernalis* (Carl, 1901) (Shayanmehr et al., 2020). So far, a lot of researches have been done to identify the Collembola species in the northern forests of Iran, and many species have been reported. It is necessary to conduct researches in other parts of Iran to identify more species of Collembola.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: S. Vahedi Moghadam: performed the project as a Master Science thesis; M. Shayanmehr: encouraged A.B. to investigate, supervised the project and the finding of this work; M. Mohamadi Sharif, M.: advised the project and took the lead in writing the manuscript; All authors read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

Not applicable.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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فون پادمان در اکوسیستم های مختلف بهشهر و حومه (مازندران) به همراه دو گزارش جدید از ایران

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چکیده: به منظور گسترش مطالعه فون پادمان ایران، این بررسی برای شناسایی این بندپایان در اکوسیستم های مختلف مانند جنگل ها، مراتع و باغات در شهرستان بهشهر در شرق استان مازندران طی سال های ۱۳۹۹-۱۴۰۰ انجام شد. چندین نمونه از خاک و خاک برگ جمع آوری و نمونه ها به وسیله قیف برلیز استخراج شدند. نمونه های جمع آوری شده بر اساس کلیدهای تاکسونومیک معتبر شناسایی شدند. نتایج نشان دهنده حضور ۲۹ گونه از ۲۱ جنس متعلق به ۱۰ خانواده می باشد. دو گونه از جمله *Hypogastrura* (Sminthuridae) *Sminthurides inaequalis* Börner, 1903 و *Hypogastruridae* *neglecta* Börner, 1901 برای اولین بار از ایران گزارش می شوند. با وجود مطالعات بسیار برای شناسایی فون پادمان ایران، هنوز بسیاری از گونه ها ناشناخته هستند.

واژگان کلیدی: هیرکانی، فون، گزارش جدید، البرز، بیولوژیک خاک