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New data on the camel spider fauna of Iran (Arachnida: Solifugae). Part II. Northeast and east Iran

Новые данные о ауне сольпуг Ирана (Arachnida: Solifugae). Часть II. Северо-восточный и восточный Иран

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KEY WORDS: Sun spider, diversity, faunistic study, Middle East, new records, diurnal activity.

КЛЮЧЕВЫЕ СЛОВА: сольпуга, разнообразие, фаунистическое исследование, Средний Восток, новые находки, дневная активность.

ABSTRACT. This paper is the second contribution in the series devoted to the study of camel spider fauna of Iran. New faunistic and distributional data are provided for northeast and east of the country. In total, 18 species, nine genera of five families are listed herein, of which four species *Biton* (*Biton*) *rossicus* (Birula, 1905), *Galeodes turcmenicus* Birula, 1937, *Galeodopsis bilkjeviczi* (Birula, 1907), and *Rhagodes melanopygus* Walter, 1889 are new to the fauna of Iran. As a result of this paper, the number of solifuges species in Iran is raised to 68. Moreover, corrections on some misidentifications of solifuges at zoological museums are presented, as well as available biological and ecological notes for most species. In addition, the illustrations of the studied species, including available type materials are given. Diurnal activity is reported for the first time for the species *Galeodes fumigatus* Walter, 1889.

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РЕЗЮМЕ. Это вторая статья в серии, посвященной изучению сольпуг Ирана. Новые фаунистические данные и сведения о распространении приведены для северо-восточной и восточной части страны. Всего перечислено 18 видов из 9 родов и 5 семейств, в том числе 4 вида — *Biton* (*Biton*) *rossicus* (Birula, 1905), *Galeodes turcmenicus* Birula, 1937, *Galeodopsis bilkjeviczi* (Birula, 1907) и *Rhagodes melanopygus* Walter, 1889 — впервые отмечены в фауне Ирана. В результате число видов сольпуг, известных из Ирана, возрастает до 68. Уточнены некоторые ошибочные определения в музейных коллекциях, а также представлены заметки о биологии и экологии большинства упомянутых видов. Даны иллюстрации изученных видов, в т.ч. доступных типовых экземпляров. Впервые отмечена дневная активность для *Galeodes fumigatus* Walter, 1889.

Introduction

Iran is a country with the highest Solifugae species diversity in the Palearctic realm [Harms *et al*., 2022]. Previously, 20 genera and 66 camel spider species were recorded from Iran, belonging to five families, Daesiidae, Galeodidae, Gylippidae, Karschiidae, and Rhagodidae [Maddahi *et al*., 2017; Hosseinpour *et al*., 2020; Harms *et al*., 2022]. Despite this high diversity, the study of camel spider fauna of Iran has been neglected and mostly limited to the first half of the twentieth century, which is mainly considered by Roewer and Birula's efforts [Birula 1905a, b, 1938; Roewer, 1933, 1934, 1941, 1952]. In these studies, species descriptions are often short, imprecise, not very informative, and based on one sex and insufficient specimens. Furthermore, dominantly arid and semi-arid climate of Iran, offer much more species diversity of these desert-dwelling arachnids for most parts of the country, except in temperate humid forests in the north of the country.

In recent years, wide-ranging field works, taxonomic research, and faunistic studies have been initiated, due to explore camel spider diversity in Iran [Maddahi *et al*., 2017; 2019, 2020; Hosseinpour *et al*., 2020]. The first faunistic contribution of our camel spider survey of Iran was carried out in a relatively small Province, Kohgilouyeh and Boyer Ahmad, in the west of Iran, which provided new records for the country and new provincial records, as well as distributional data [Hosseinpour *et al*., 2020]. This paper is the second in the series aimed to investigate the diversity and distribution of solifuges in the northeast and east Iran. Apart from recording new taxa for the fauna of this

country and new provincial records, brief data on the distribution and ecology of most studied species are presented.

Material and Methods

The studied area includes five provinces that lie in northeast and east of Iran, North Khorasan, Razavi Khorasan, South Khorasan, Golestan and east of Semnan Provinces (Fig. 1A). This area is bordered by Afghanistan to the east and Turkmenistan to the north, and limited by heights in the southern part of South Khorasan Province (Kuh-e Shah Baharan) to the south, and the eastern coast of the Caspian Sea and the eastern margin of Dasht-e Kavir to the west. The geographic location of sampling localities is 54°03′ to 61°09′ longitude and 30°51′ to 37°55′ latitude with altitude from –20 to 2232 m a.s.l. The studied area has different climates, but is dominated by a warm arid climate and includes a variety of habitats such as deserts, semi-deserts, oases, low-density forests and mountains.

Freshly sampled materials were mainly hand-collected from various parts of northeast and east Iran during 2002–2017. Specimens of the species *R. eylandti* (Walter, 1889) were collected using pitfall traps. In total, 195 specimens were examined, 85 of which were recently collected and recorded from the studied area. All specimens were examined with an Olympus SZH-10 stereo-microscope and identified using the identification keys in the literature [Kraepelin, 1901; Roewer, 1933, 1934; Birula, 1905a, 1907b, 1913, 1918, 1938] and compared with the original descriptions of species. To confirm primary identification, specimens were compared with available type materials. Moreover, several materials from different depositories, including type materials of some species, were reexamined by the first author.

In spite of wide-range recent sampling efforts, no new material of species *Galeodes ephippiatus* Roewer, 1941, *Galeodes vittatus* (Roewer, 1941), *Paragaleodes melanopygus* Birula, 1905, and *Eusimonia divina* Birula, 1935 was found, and these species are listed as the fauna of the studied area based on a reexamination of type materials or the previous records in the literature.

Detailed information on museum materials, including museum code, locality, date and collector name have been provided by translating the original labels. Before these data, country and Province names are given based on the last national division. In a few cases, provided coordinates of museum materials were estimated, as their localities were based on historical data.

Images were captured by means of an Olympus DP-71 camera connected to a stereo microscope (Olympus SZH10) or using a Canon Powershot SX150 IS digital camera. In order to provide a complete depth of field, multiple images at different focal depths were taken and combined using Zerene Stacker software. Images were edited in Adobe Photoshop CC 2020 Version 21.2.4. The general habitus of each species is presented in Figs. 2 and 3 and diagnostic characters for four species are demonstrated in Figs. 4–7. The distribution map was created using DIVA-GIS Version 7.5 [Hijmans *et al*. 2004] (Fig. 1).

Depositories. Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZISP), Senckenberg Natural History Museum, Frankfurt, Germany (SMF), Zoological Museum, Ferdowsi University of Mashhad, Mashhad, Iran (ZMFUM), Zoological Museum of Golestan University, Gorgan, Iran **(**ZMGU), and the first author's private collection (HMC).

Results

As a result of the present study, five families, nine genera, and 18 species are distributed in the northeast and east Iran (Figs. 2–3). Of which, the species *Biton* (*Biton*) *rossicus*, *Galeodes turcmenicus*, *Galeodopsis bilkjeviczi*, and *Rhagodes melanopygus* are new to the camel spider fauna of Iran.

Family Daesiidae Kraepelin, 1899

Two subfamilies, two genera and two species belonging to the family Daesiidae are found in northeast and east Iran (Fig. 1C).

Subfamily Daesiinae Kraepelin, 1899
Genus *Biton* Karsch, 1880

Biton (*Biton*) *rossicus* (Birula, 1905)
Figs 1C, 3A, 4A–D.

Roewer, 1933: 406, fig. 279e (♂) (as *Daesia rossica*)
Birula, 1938: 100, fig. 67 (♂) (as *Daesia rossica*)

MATERIAL EXAMINED. ***Iran***: *South Khorasan Province*: 1♂ (ZMFUM-SOL-1060), Ghayen (33°43′N, 59°10′E), 1454 m a.s.l., 04.2011, leg. O. Mirshamsi; 1♂ (HMC-SOL-1173), 30 km E Shusf, on the road of Afzal Abad village (31°52′18″N, 60°14′16″E), 1719 m a.s.l., 5.05.2016, leg. H. Maddahi. ***Turkmenistan***: *Balkan Province*: ♂ (holotype) 1♀ (ZISP-638), Krasnovodsk (currently known as Turkmenbashi) (40°01′N, 52°58′E), 13 m a.s.l., 28.04.1899, leg. P. Maksimovich.

REMARKS. The species was hitherto known from Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan [Roewer, 1933; Birula, 1936, 1938; Gromov, 1999]. Birula [1938] considered northeast Iran as a part of the species distribution range, which was later excluded by Gromov [1999]. Moreover, during the study of Solifugae collection at ZISP by the first author, no material of the species from Iran was also found. Therefore, new findings from east Iran are considered as the first proven occurrence of the species from the country and lie in the southernmost limits of the species' known range (Fig. 1C). The species was previously regarded as a common arachnid inhabit in clay and sandy deserts of Central Asia [Birula, 1936], but freshly sampled materials were collected from the mountainous region of east Iran, representing the highest altitude (1719 m a.s.l.) within the whole species range.

Subfamily Gluviopsinae Roewer, 1933
Genus *Gluviopsis* Roewer, 1933

Gluviopsis nigrocinctus Birula, 1905
Figs 1C, 3B.

Birula, 1908: 333–334, figs. 1–2 (♀) (as *Gluviopsis nigrocincta*)
Roewer, 1933: 376, figs. 268b1–2 (♂) (as *Gluviopsis nigrocincta*)
Birula, 1938: 104–107, figs. 69a–b, 70, 71, 72 (♂)
Lawrence, 1956: 117, fig. 1a (♂) (as *Gnosippus afghanus*)
Maddahi *et al*., 2017: 913, fig. 2f (♂)

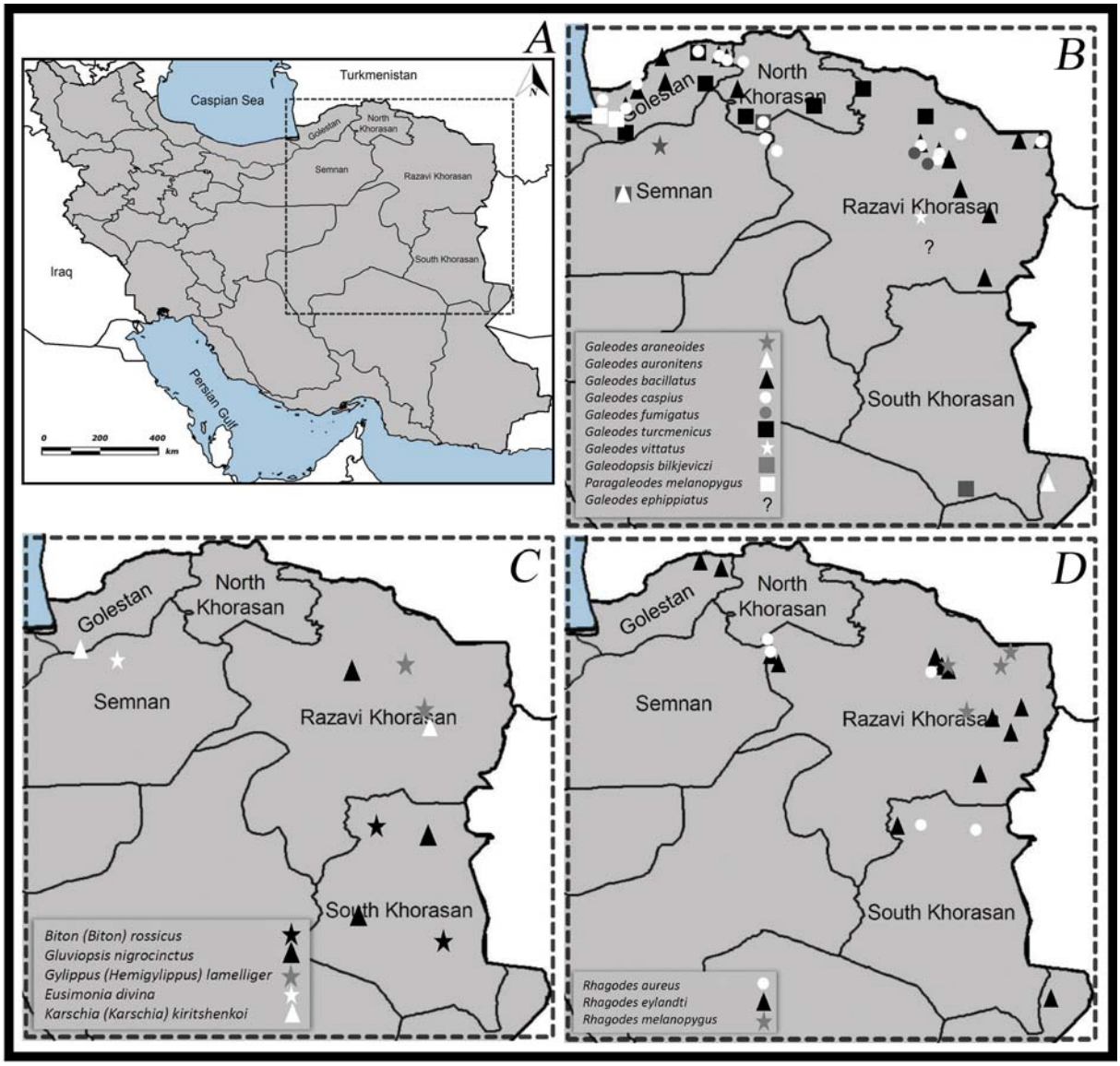

Fig. 1. Map of Iran plotting all Iranian locality records of camel spider species distributing in northeast and east of the country, based on new findings and the literature [Birula, 1905a, b, 1918, 1935b, 1938; Roewer, 1934, 1941; Gromov, 1999; Maddahi *et al*. 2015, 2017, 2019; Khazanehdari *et al*., 2016]. Map of Iran and the studied area (A), records of family Galeodidae (B), families Daesiidae, Gylippidae and Karschiidae (C), and family Rhagodidae (D).

Рис. 1. Все находки сольпуг в северо-восточной и восточной части Ирана, оригинальные и литературные данные [Birula, 1905a, b, 1918, 1935b, 1938; Roewer, 1934, 1941; Gromov, 1999; Maddahi *et al*. 2015, 2017, 2019; Khazanehdari *et al*., 2016]. Общая карта Ирана и исследованные районы (A), находки семейства Galeodidae (B), семейств Daesiidae, Gylippidae и Karschiidae (C) и семейства Rhagodidae (D).

MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 1♂ (ZMFUM-SOL-1062), Neyshabur (36°12′48″N, 58°47′45″E), 1196 m a.s.l., 9.10.2013, leg. M. Monfared. *South Khorasan Province*: 1 juvenile♀ (HMC-SOL-1175), 87 km E Ghayen, 5 km S Hajiabad village (33°35′N, 60°00′E), 1065 m a.s.l., 6.05.2016, leg. H. Maddahi.

REMARKS. The species has been previously recorded from south Turkmenistan, Tajikistan, west and central Afghanistan, east Iran (South Khorasan Province, as Sarr-Tschoch), and east Azerbaijan [Birula, 1905a, 1908; Lawrence, 1956; Roewer, 1933, 1960; Aliev, Gadzhiev, 1983]. New provincial record for Razavi Khorasan Province (Fig. 1C).

Family Galeodidae Sundevall, 1833

Three genera and 10 species belonging to the family Galeodidae are found in the northeast and east Iran (Fig. 1B).

Genus *Galeodes* Olivier, 1791

Galeodes araneoides (Pallas, 1772)
Figs 1B, 2A.

Birula, 1890: 85, figs. 11–12 (♀)
Birula, 1925: 194–197, figs. 2, 3b, 4b, 5b (♂); 200, fig. 6b (♀)

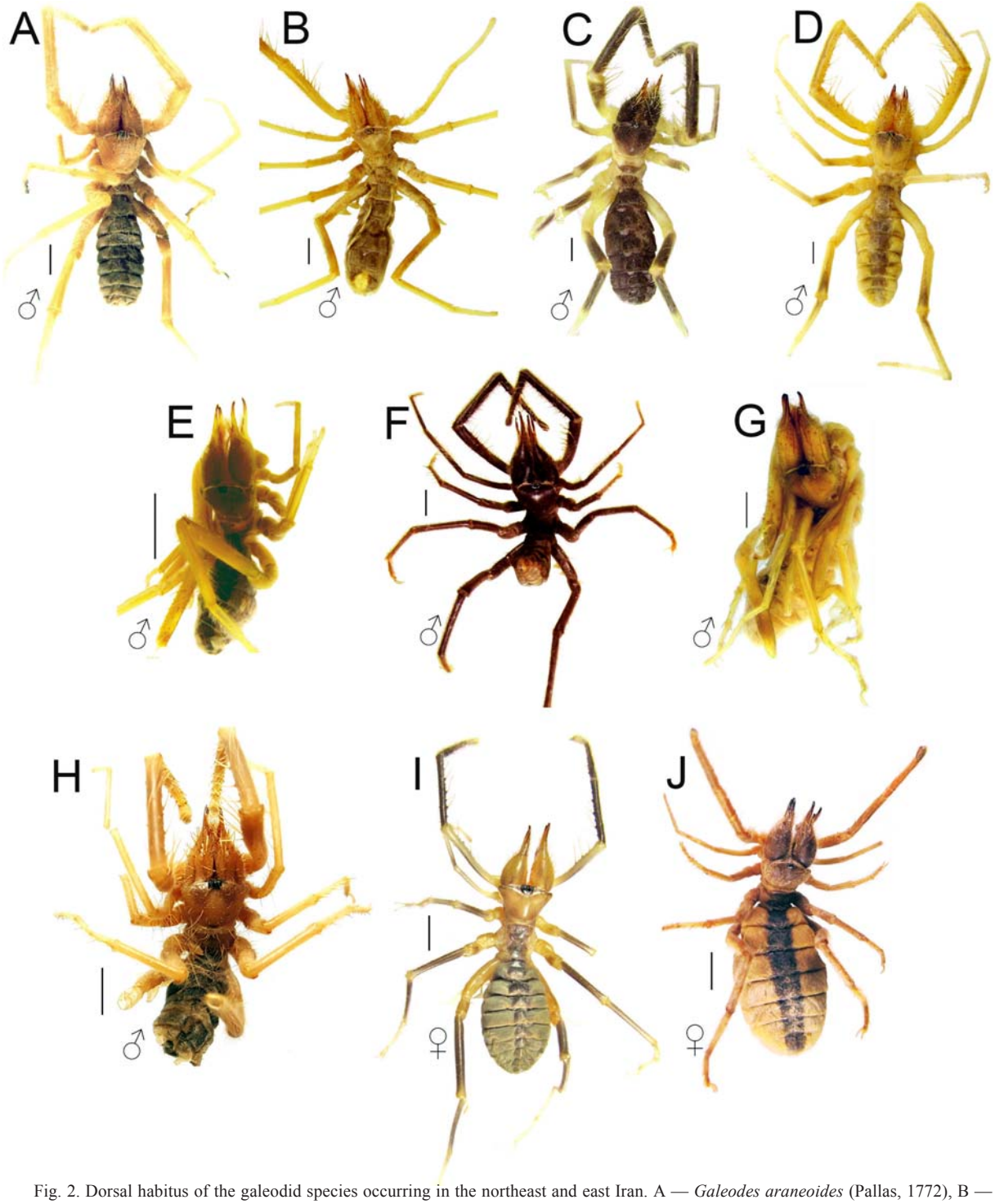

Fig. 2. Dorsal habitus of the galeodid species occurring in the northeast and east Iran. A — *Galeodes araneoides* (Pallas, 1772), B — *G. auronitens* Birula, 1905, C — *G. bacillatus* Birula, 1905, D — *G. caspius* Birula, 1890, E — *G. ephippiatus* Roewer, 1941, holotype, F — *G. fumigatus* Walter, 1889, G — *G. vittatus* (Roewer, 1941), holotype, H — *G. turcmenicus* Birula, 1937, holotype, I — *Galeodopsis bilkjeviczi* (Birula, 1907), J — *Paragaleodes melanopygus* Birula, 1905, holotype. Scale bars = 5.0 mm.

Рис. 2. Сольпуги-галеодиды северо-восточной и восточной части Ирана, внешний вид с дорсальной стороны. Масштаб 5,0 мм.

Roewer, 1932: 35–49, figs. 20, 35, 37, 45; 52 & 54, figs. 47, 48 (♀)
Birula, 1938: 111 & 116, figs. 74b, 75 (♂)

MATERIAL EXAMINED. ***Iran***: *Semnan Province*: 6♂♂ 2♀♀ (ZISP-130), Shahroud (36°24′N, 55°00′E), 1316 m a.s.l., 05–06.1914; 1 juvenile (ZISP-132), same data, leg. O. Gert. *Tehran Province*: 2♂♂ 2♀♀ (ZISP-123), Tehran (35°41′N, 51°20′E), 1185 m a.s.l., 1884, leg. Danilow. *Gilan Province*: 1♀ (ZISP-128) (Originally labelled as *Galeodes araneoides persicus* Birula, 1905), Rostamabad (36°54′N, 49°29′E), 176 m a.s.l., 19.05.1904, leg. N.A. Zarudny; 1♀ (ZISP-129) (Originally labelled as *Galeodes araneoides persicus* Birula, 1905), Kara Rud, 20.05.1904, leg. N.A. Zarudny.

REMARKS. This is a widespread species distributed in Afghanistan, Armenia, Azerbaijan, Egypt, Iran, Iraq, Israel, Kazakhstan, Russia (Volgograd), Syria, Turkey, Turkmenistan and Ukraine [Kraepelin, 1901; Birula, 1905b, 1938; Roewer, 1934, 1941, 1959; Harvey, 2003]. The species was previously recorded from Gilan, Tehran, and Semnan Provinces in Iran [Kraepelin, 1901; Birula, 1905b, 1938; Roewer, 1934]. Only re-examined museum materials from Semnan Province, Iran were shown in Fig. 1B.

Galeodes auronitens Birula, 1905
Figs 1B, 2B.

MATERIAL EXAMINED. ***Iran***: *Semnan Province*: 1♂ 1♀ (HMC-SOL-1107, 1111), 65 km S Damghan, Jandaq road (35°37′N, 54°26′E), 1253 m a.s.l., 4.06.2013, leg. R. Babaei Savasari. *Sistan va Baluchestan Province*: 1♂ 3♀♀ (ZISP-144), Neisar (formerly known as a place in W Zabol), the vicinity of Helmand River (30° 56′N, 61°16′E), 481 m a.s.l., 21–24.05.1898, leg. N.A. Zarudny; 1♂ (mistakenly typed as female in Birula, 1905b) (ZISP-145), on the road between Neisar and Aliabad (an unidentified place near Zabol), 1–10.06.1901, leg. N.A. Zarudny.

REMARKS. This solifuge has been previously recorded from east Iran and distributed in South Khorasan, Sistan va Baluchestan and Kerman Provinces [Birula, 1905a, b; Roewer, 1934]. New provincial record for Semnan Province (Fig. 1B). Endemic to Iran.

Galeodes bacillatus Birula, 1905
Figs 1B, 2C.

Khazanehdari *et al*., 2016: 610, fig. 2a, b (♂♀)
Maddahi *et al*., 2017: 913, fig. 2a (♂)

MATERIAL EXAMINED. ***Iran***: *North Khorasan Province*: 1♀ 2♂♂ (ZMGU-SOL-1024, 1032, 1036), 70 km W Ashkhaneh, 6 km W Robat-e-Ghareh Bill (37°20′22.47″N, 56°15′22.79″E), 1244 m a.s.l., 26.07.2013, 3.09.2013 & 10.06.2014, respectively, leg. H. Maddahi; 4♀♀ (ZMFUM-SOL-1093, 1094, 1095, 1100), same data in 3.09.2013. *Golestan Province*: 1♂ (ZMGU-SOL-1004), Maraveh Tappeh (37°54′12.94″N, 55°57′33.19″E), 76 m a.s.l., 10.06.2013, leg. B. Moghaddam; 1♂ (ZMGU-SOL-1008), 30 km SE Maraveh Tappeh, Yekkeh Chenar (37°49′57.01″N, 56°05′ 05.23″E), 550 m a.s.l., 16.06.2013, leg. H. Maddahi; 1♂ (ZMFUM-SOL-1070), same data; 1♀ (ZMFUM-SOL-1077), 15 km N Gonbad Kavus, Cheper Ghoyma (37°26′01.21″N, 55°05′ 33.04″E), 46 m a.s.l., 23.06.2013, leg. R. Babaei Savasari; 1♂ 1♀ (ZMGU-SOL-1019, 1020), 5 km N Aq Qala (37°02′51.37″N, 54°28′ 15.00″E), –10 m a.s.l., 5.07.2013, leg. H. Maddahi; 2♀♀ 1♂ (ZMFUM-SOL-1080-2), same data in 4–5.07.2013; 1 juvenile 1♂ (ZMGU-SOL-1027, 1028), 20 km N Anbar Olum (37°16′24.16″N, 54°38′03.31″E), 7 m a.s.l., 25.08.2013, leg. H. Maddahi; 1♂ 1 juvenile (ZMFUM-SOL-1087, 1088), same data; 1 juvenile 2♀♀ (ZMGU-SOL-1029-31), 45 km NE Dashli Burun (37°51′24.70″N, 55°02′09.76″E), 41 m a.s.l., 30.08.2013, leg. H. Maddahi; 1 juvenile 3♀♀ (ZMFUM-SOL-1089-92), same data. *Razavi Khorasan Province*: 1♀ (ZMFUM-SOL-1007), the vicinity of Mashhad (36° 17′35″N, 59°31′49″E), 1082 m a.s.l., 1.09.2012, leg. O. Mirshamsi; 1♀ (ZMFUM-SOL-1022), same data in 27.05.2013, leg. M. Khazanehdari; 1♂ 1♀ (ZMFUM-SOL-1001, 1017), Mashhad, Ferdowsi University of Mashhad campus (36°18′21.74″N, 59°31′ 53.63″E), 1034 m a.s.l., 06.2012 & 11.2010, respectively, leg. O. Mirshamsi; 1♂ (ZMFUM-SOL-1041), same data in 09.2012, M. Monfared; 1♂ (ZMFUM-SOL-1008), same data in 4.07.2011, leg. Hosseinie; 1 juvenile (ZMFUM-SOL-1023), Mashhad, Behesht-e Reza Cemetery (36°10′1.52″N, 59°41′53.72″E), 997 m a.s.l., 16.05. 2013, leg. H. Banazadeh; 2♀♀ (ZMFUM-SOL-1013, 1020), Chenaran, Kaho (36°26′31.89″N, 59°12′19.40″E), 1419 m a.s.l., 23.07. 2012 & 10.05.2002, respectively, leg. O. Mirshamsi; 1♂ (ZMFUM-SOL-1010), Fariman (35°42′25″N, 59°51′00″E), 1396 m a.s.l., 13.06.2009, leg. O. Mirshamsi; 2♂♂ 1♀ (ZMFUM-SOL-1026-8), Fariman, Samarghave (35°18′22.34″N, 60°19′28.57″E), 1325 m a.s.l., 05.2013, leg. M. Khazanehdari; 1♂ 2♀♀ (ZMFUM-SOL-1050-2), Sarakhs (36°32′42″N, 61°09′28″E), 470 m a.s.l., 26.07.2013, leg. M. Khazanehdari; 6♂♂ 1 juvenile (ZMFUM-SOL-1006, 1031, 1032, 1034, 1035, 1036, 1037), 77 km SW Sarakhs, the vicinity of Bazangan lake (36°17'45″N, 60°25'53″E), 854 m a.s.l., 27.06.2013, leg. M. Khazanehdari; 1♂ (HMC-SOL-1174), 37 km S Khaf, Sangan-Niazabad road, 5 km N Niazabad (34°15′55″N, 60°14′39″E), 730 m a.s.l., 6.05.2016, leg. H. Maddahi. *Sistan va Baluchestan Province*: 2♂♂ (ZISP-160), the vicinity of Sargad, Kuuscha village (probably refer to a village near Bampur city), 3.05.1901, leg. N.A. Zarudny.

REMARKS. The species has been previously recorded from South Khorasan, Sistan va Baluchestan and Kerman Provinces in east Iran [Birula, 1905a, b; Roewer, 1934; Khazanehdari *et al*., 2016]. This is a new camel spider record for the Golestan and North Khorasan Provinces (Fig. 1B). This species has been suggested as a junior synonym of *Galeodes caspius* [Maddahi *et al*., 2017].

Galeodes caspius Birula, 1890
Figs 1B, 2D.

Birula, 1890: 85, figs. 5–8 (♀)
Birula, 1925: 195, fig. 4c (♂)
Roewer, 1932: 35, fig. 19
Roewer, 1933: 256, fig. 219 (♂)
Birula, 1938: 111, fig. 74c (♂); 127, fig. 79 (♂)
Gromov, 1999: 186, fig. 2 (♀)
Bird *et al*., 2015: 9, fig, 1a, b (♂♀)
Khazanehdari *et al*., 2016: 610, fig. 2c, d (♂♀)
Maddahi *et al*., 2017: 913, fig. 2b (♂)

MATERIAL EXAMINED. ***Iran***: *North Khorasan Province*: 1♀ (HMC-SOL-1210), 61 km W Ashkhaneh, Garmab (37°43′58″N, 56°20′07″E), 578 m a.s.l., 10.09.2016, leg. G. Mohammadi Kashani. *Golestan Province*: 1 juvenile 2♀♀ (ZMGU-SOL-1026, 1033, 1037), Maraveh Tappeh (37°54′12.94″N, 55°57′33.19″E), 76 m a.s.l., 25.08.2013, 9.09.2013 & 6.07.2014, respectively, leg. H. Maddahi; 1 juvenile 2♂♂ (ZMFUM-SOL-1067, 1096, 1101), same data in 16.06.2013, 4.09.2013 & 1.08.2014, respectively; 3♂♂ (ZMGU-SOL-1005-7), 30 km SE Maraveh Tappeh, Yekkeh Chenar (37°49′57.01″N, 56°05′05.23″E), 550 m a.s.l., 16.06.2013, leg. H. Maddahi; 1♀ 2♂♂ (ZMFUM-SOL-1068, 1069, 1071), same data; 1♂ (ZMFUM-SOL-1073), 40 km W Maraveh Tappeh, Makhtomgholi Faraghi Tomb (37°55′45.25″N, 55°38′39.80″E), 369 m a.s.l., 18.06.2013, leg. H. Maddahi; 1♂ (ZMGU-SOL-1015), 7 km SW Incheboron, Tengli (37°24′55.70″N, 54°39′00.25″E), 12 m a.s.l., 1.07.2013, leg. H. Maddahi; 1♂ 1♀ (ZMGU-SOL-1016, 1017), 7 km N Gomish Tappeh (37°08′05.63″N, 54°03′23.58″E), –20 m a.s.l., 2.07.2013, leg. H. Maddahi; 2♂♂ (ZMFUM-SOL-1078, 1079), same data; 1♂ (ZMGU-SOL-1018), 5 km N Aq Qala (37°02′51.37″N, 54°28′15.00″E), –10 m a.s.l., 4.07.2013, leg. H. Maddahi. *Razavi Khorasan Province*: 1♂ (HMC-SOL-1254), Mashhad, Khorshid Park (36°17′44″N, 59°29′16″E), 1175 m a.s.l., 18.06.2017, leg. H. Maddahi; 2♀♀ (ZMFUM-SOL-1056, 1061), Mashhad, Ferdowsi University of Mashhad campus (36°18′21.74″N, 59°31′53.63″E), 1034 m a.s.l., 20.08.2013 & 10.2013, respectively, leg. O. Mirshamsi; 2♀♀ 1 juvenile♀ (HMC-SOL-1243-5), 12 km SW Mashhad, Shelgerd village (36°13′26″N, 59°30′40″E), 1305 m a.s.l., 28.05.2015, leg. H. Maddahi; 1♀ (ZMFUM-SOL-1038), same data in 15.06.2013, leg. H. Banazadeh; 1 juvenile♀ (HMC-SOL-1179), 35 km NE Mashhad, the vicinity of Gujgi-ye Bala village (36°34′58″N, 59°49′50″E), 1349 m a.s.l., 17.07.2016, leg. H. Maddahi; 1♂ (ZMFUM-SOL-1043), Chenaran, Kahu village (36°26′ 31.89″N, 59°12′19.40″E), 1419 m a.s.l., 05.2012, leg. O. Mirshamsi; 1♂ 1♀ (HMC-SOL-1192-3), the vicinity of Sarakhs (36°32′N, 61°09′E), 275 m a.s.l., 17.04.2015, leg. R. Babaei Savasari; 1♀ (HMC-SOL-1145), same data in 4.06.2016, leg. S. Shafaei; 1♂ 1♀ (ZMFUM-SOL-1004 & 1115), same data in 18.07.2013 & 09.2015, respectively, leg. O. Mirshamsi; 2♀♀ 1♂ (HMC-SOL-

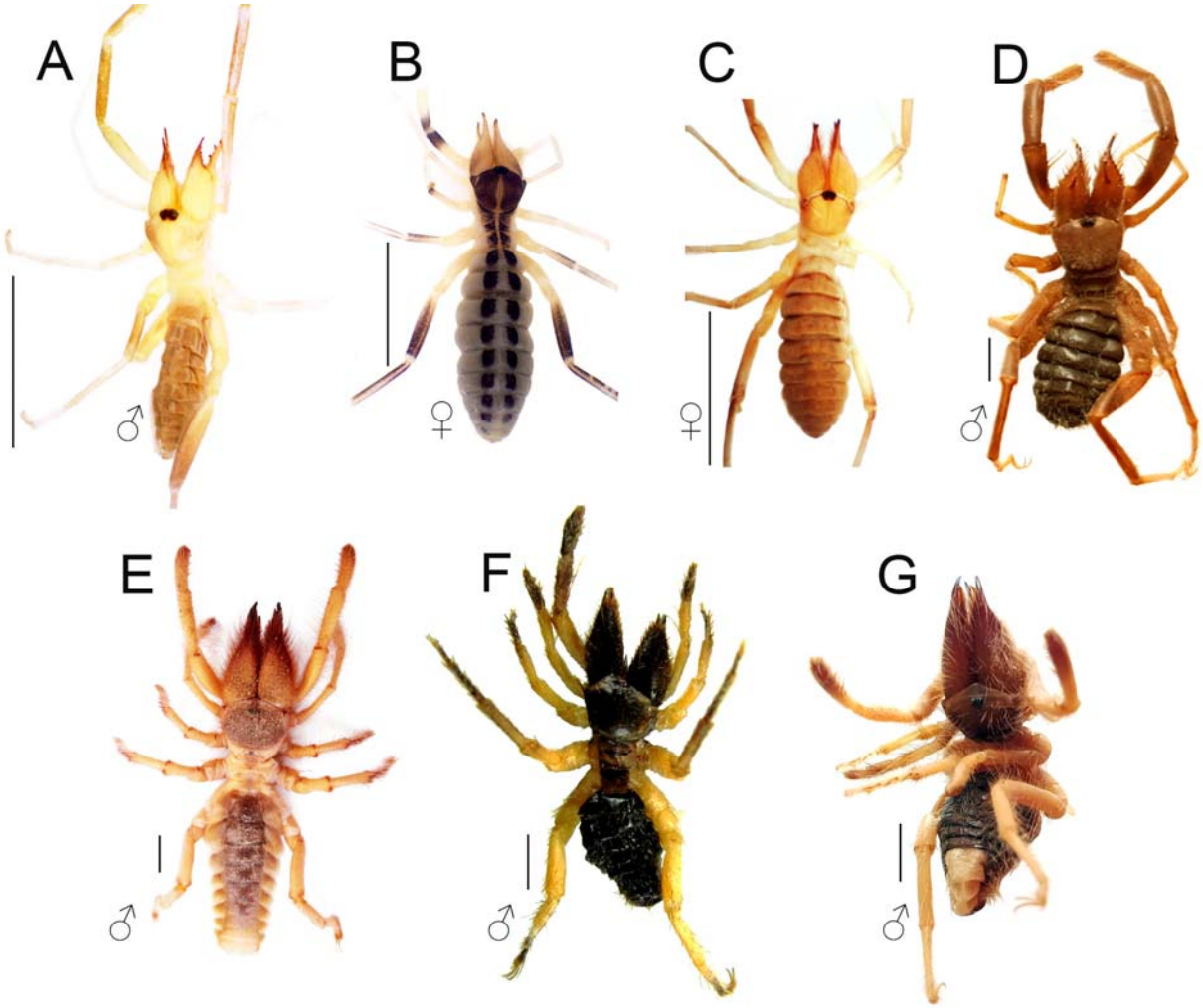

Fig. 3. Dorsal habitus of the studied species of the families Daesiidae (A and B), Karschiidae (C), Gylippidae (D), and Rhagodidae (E–G), distributing in northeast and east of Iran. A — *Biton* (*Biton*) *rossicus* (Birula, 1905), B — *Gluviopsis nigrocinctus* Birula, 1905, C — *Karschia* (*Karschia*) *kiritshenkoi* Birula, 1918, D — *Gylippus* (*Hemigylippus*) *lamelliger* Birula, 1906, holotype, E — *Rhagodes aureus* (Pocock, 1889), F — *R. eylandti* (Walter, 1889), G — *R. melanopygus* Walter, 1889, holotype. Scale bars = 5.0 mm.

Рис. 3. Сольпуги семейств Daesiidae (A и B), Karschiidae (C), Gylippidae (D), и Rhagodidae (E–G) северо-восточной и восточной части Ирана, внешний вид с дорсальной стороны: Масштаб 5,0 мм.

1116, 1121, 1183), the vicinity of Davarzan (36°20′N, 56°54′E), 915 m a.s.l., 16.08.2013, 25.09.2013 & 23.07.2016, respectively, leg. H. Maddahi; 1♀ (ZMFUM-SOL-1024), same data in 2.04.2013; 1♂ (HMC-SOL-1191), 34 km NW Joghatay, Azadvar (36°44′ 42.22″N, 56°43′12.53″E), 963 m a.s.l., 20.06.2015, leg. R. Babaei Savasari. *Semnan Province*: 1♀ (HMC-SOL-1105), 180 km E Shahroud, Forumad village (36°30′40″N, 56°45′16″E), 1230 m a.s.l., 24.06.2013, leg. M. Maddahi. ***Turkmenistan***: *Ahal Province*: ♂ (holotype) 1♀ 2 juvenile (ZISP-213), Ashgabat (37°56′N, 58°22′E), 219 m a.s.l., 1896, leg. P. Variensov; 1♂ (paratype) 1♀ (ZISP-214), Bäherden (38°25′N, 57°26′E), 161 m a.s.l., 05.1904, unreadable col. *Balkan Province*: 2♂♂ 2♀♀ (ZISP-221), Kyzyl-Arvat (Today known as Serdar) (38°59′N, 56°17′E), 98 m a.s.l., 1892, leg. A. Semenov.

REMARKS. This is a widespread species and has been previously recorded from China, Uzbekistan, Kazakhstan, Kyrgyzstan, Turkmenistan, Tajikistan, Iran, Azerbaijan, Turkey, and Israel [Kraepelin, 1901; Birula, 1938; Roewer, 1934; Zilch, 1946; Gromov, 1999; Harvey, 2003]. Its distribution in Iran was unknown, as there was only one published record in the literature from Tehran (as Teheran) in the north of Iran [Birula, 1905b]. Recently, it has been reported from Razavi Khorasan and South Khorasan Provinces in the northeast and east of Iran [Khazanehdari *et al*., 2016]. New records for North Khorasan, Golestan, and Semnan Provinces (Fig. 1B). The species is abundantly distributed in eastern half of Iran, occurring from –20 m below sea level up to 1419 m above sea level. It is found in different habitats in Iran, such as dry and semi-dry deserts, foothills and mountainous regions, but it prefers dwelling at clay and sandy deserts with sparse vegetation. The species *Galeodes caspius* was generally found at early night to midnight, but several specimens were caught before sunset. This camel spider is active for a bit more than half of the year in the studied area, from early April to mid-October, and becomes much more active in June and July.

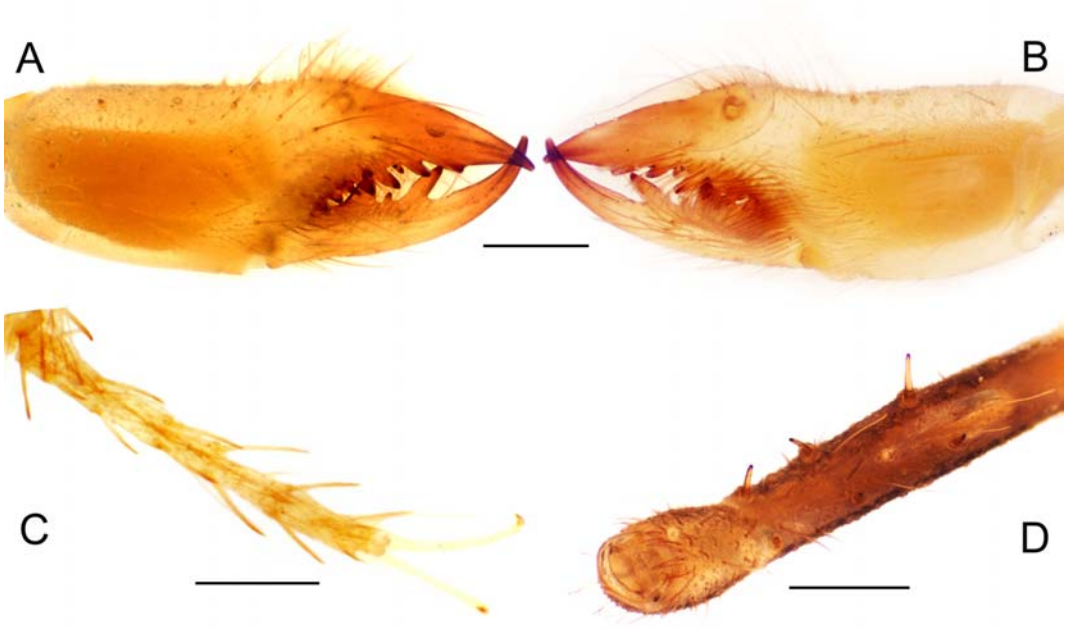

Fig. 4. Male of *Biton* (*Biton*) *rossicus* (Birula, 1905). A and B — retrolateral (left) and prolateral (right) cheliceral views, C — tarsus of left fourth leg, D — tarsus and metatarsus of left pedipalp. Scale bars = 1.0 mm.

Рис. 4. Самец *Biton* (*Biton*) *rossicus* (Birula, 1905). A и B — хелицеры, ретролатерально (левая) и пролатерально (правая), C — лапка 4-й пары ног, D — лапка и предлапка левой педипальпы. Масштаб 1,0 мм.

Fig. 5. Male of *Galeodes fumigatus* Walter, 1889. A and B — retrolateral (left) and prolateral (right) cheliceral views, C — tarsus of fourth left leg, D — tarsus and metatarsus of right pedipalp. Scale bars = 1.0 mm.

Рис. 5. Самец *Galeodes fumigatus* Walter, 1889. A и B — хелицеры, ретролатерально (левая) и пролатерально (правая), C — лапка 4-й пары ног, D — лапка и предлапка левой педипальпы. Масштаб 1,0 мм.

Galeodes ephippiatus Roewer, 1941
Figs 1B, 2E.

MATERIAL EXAMINED. ***Iran***: *Khorasan Province*: ♂ (holotype) (SMF-RII/8075/476-71).

REMARKS. This species is only known from male holotype from an unidentified place (Fig. 1B) in Great Khorasan Province, northeast and east Iran (This Province was divided into three Provinces, North Khorasan, Razavi Khorasan and South Khorasan in 2004) [Roewer, 1941; Zilch, 1946]. The distribution and ecology of this endemic solifuge is unknown.

Galeodes fumigatus Walter, 1889
Figs 1B, 2F, 5A–D.

Walter, 1889: 1110, fig. 1 (♀)
Roewer, 1932: 132, fig. 121 (♂)
Birula, 1938: 130, figs. 80–81 (♂); 176, plate 1, fig. 2
Gromov, 1999: 186, fig. 3 (♂)
Maddahi *et al*., 2017: 913, fig. 2e (♂) (as *Paragaleodes fulvipes*)

MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 1♂ (ZMFUM-SOL-1003), 35 km SW Mashhad, the vicinity of Moghan village (36°08′N, 59°22′E), 1748 m a.s.l., 10.06.2012, leg. O. Mirshamsi (misidentification as *Paragaleodes fulvipes*); 1♂ (HMC-SOL-1126), 37 km W Mashhad, 5 km SW Zoshk village (36°18′30″N, 59°08′28″E), 2044 m a.s.l., 06.2015, leg. A. Mahmoudi. ***Turkmenistan***: *Lebap Province*: 2♂♂ 2♀♀ (ZISP-270), Karakum desert, Repetek, 1.02.1907, leg. Pavlowski; 2♂♂ 1♀ (ZISP-265), same data, 6.06.1904, leg. Fisher; 1♂ 1♀ (ZISP-274), Karakum desert, 5.05.1908, no col.

REMARKS. So far, this species has been recorded from Uzbekistan, Turkmenistan and southeast Iran [Kraepelin, 1901; Roewer, 1934, 1941; Birula, 1938; Zilch, 1946]. It has been only known from one female record from an unidentified place in Baluchestan, southeast Iran [Roewer, 1941]. Newly collected materials are the first male records for Iran and new provincial records for Razavi Khorasan Province (Fig. 1B), representing the highest altitude in the whole species range. These materials were captured from cold mountainous region in the eastern part of the Binalud Mountain at noon, while wandering among rocks and small bushes. The diurnal activity might be correlated to low temperature at night in this region. Although, this species was considered as a common species in sandy deserts of Turkmenistan by Gromov [1999], it is almost rare in the northeast Iran.

Galeodes turcmenicus Birula, 1937
Figs 1B, 2H.

Birula, 1937: 585, fig. 11a–c (♂); 587, fig. 12 (♀)
Roewer, 1941: 192, fig. 141 (♂)
Maddahi *et al*., 2017: 913, fig. 2c (♂)

MATERIAL EXAMINED. ***Iran*****:** *North Khorasan Province*: 4♂♂ (HMC-SOL-1246-9), 15 km SE Jajarm (36°53′N, 56°32”E), 932 m a.s.l., 15.05.2017, leg. Mohammadi & Abedini; 1♀ (ZMFUM-SOL-1005), Esfarayen (37°03′N, 57°30′E), 1253 m a.s.l., 2013, O. Mirshamsi. *Razavi Khorasan Province*: 1♀ (HMC-SOL-1320), 10 km NE Faruj, Khabushan Village (37°18′52″N, 58°17′35″E), 1302 m a.s.l., 07.2017, leg. Azimi; 1♂ (HMC-SOL-1148), 25 km NE Dargaz, Lotfabad, Toghi (36°52′N, 59°20′E), 247 m a.s.l., 12.06.2015, leg. A. Mahmoudi. *Golestan Province*: 1♂ (ZMFUM-SOL-1072), 40 km W Maraveh Tappeh, Makhtomgholi Faraghi Tomb (37°55′45.25″N, 55°38′39.80″E), 369 m a.s.l., 17.06.2013, H. Maddahi; 1♀ (ZMFUM-SOL-1084), 60 km S Gorgan, Chahar Bagh (36°36′N, 54°30′E), 2232 m a.s.l., 7.07.2013, leg. H. Maddahi; 1♀ (ZMFUM-SOL-1086), 35 km E Kalaleh, Tangrah (37°24′04.69″N, 55°46′50.94″E), 492 m a.s.l., 14.08.2013, A. M. Anehdordi. ***Turkmenistan***: *Balkan Province*: ♂ (holotype) 1♀ (ZISP-468), Aj-Dere (currently known as village Aýdere in Magtymguly District, located in the Kopet Dag mountains) (38°24′N, 56°45′E), no date, leg. E. König.

REMARKS. This camel spider occurs in Kazakhstan and Turkmenistan [Birula, 1937, 1938, Roewer, 1941; Gromov, 1999; Harvey, 2003]. The record from Azerbaijan by Aliev and Gadzhiev [1983] is probably erroneous. Our findings are new camel spider records for the fauna of Iran (Fig. 1B), representing the southernmost distribution range of the species. The species was previously considered as a common solifuge in clay deserts [Gromov, 1999], and herein is also reported from mountainous regions and foothills in northeast Iran, occurring up to 2232 m a.s.l.

Galeodes vittatus (Roewer, 1941)
Figs 1B, 2G.

MATERIAL EXAMINED. ***Iran*****:** *Razavi Khorasan Province*: ♂ (holotype) (SMF-RII/8076/477), Torbat-e-Heydarieh (as Torbat-e-Haidar) (35°15′N, 59°13′E), 1337 m a.s.l., no date, no col.

REMARKS. This species is only known based on male holotype from northeast Iran (Fig. 1B) [Roewer, 1941; Zilch, 1946]. No extra distributional and ecological data for this endemic camel spider is available.

Genus *Galeodopsis* Birula, 1903

Galeodopsis bilkjeviczi (Birula, 1907)
Figs 1B, 2I.

Birula, 1907a: 280–282, figs. 1–4 (♀)
Birula, 1938: 144, fig. 82b (♀); 147, fig. 84a, b (♀)
Maddahi *et al*., 2017: 913, fig. 2d (♀) (as *Galeodopsis cyrus*)

MATERIAL EXAMINED. *Razavi Khorasan Province*: 1♀ (HMC-SOL-1181), 34 km NW Joghatay, Azadvar (36°44′42.22″N, 56°43′12.53″E), 963 m a.s.l., 21.07.2016, leg. H. Maddahi; 1♀ (HMC-SOL-1125), same data in 5.09.2014, leg. R. Babaei Savasari. *South Khorasan Province*: 1 juvenile♀ (HMC-SOL-1139), 76 km S Nehbandan, 20 km S Heydarabad village (30°51′02″N, 59°58′54″E), 1102 m a.s.l., 2.05.2016, leg. H. Maddahi. *Semnan Province*: 1♀ (ZMFUM-SOL-1111), 65 km S Damghan, Jandaq road (35°37′N, 54°26′E), 1253 m a.s.l., 4.06.2013, leg. R. Babaei Savasari (misidentification as *Galeodopsis cyrus*).

REMARKS. This camel spider was only known from east Turkmenistan [Roewer, 1934; Birula, 1938]. New record for fauna of Iran and new provincial records for Razavi Khorasan, South Khorasan and Semnan Provinces (Fig. 1B).

Genus *Paragaleodes* Kraepelin, 1899

Paragaleodes melanopygus Birula, 1905
Figs 1B, 2J.

Erdek, 2021: 161–166, figs. 1–6 (♂♀)

MATERIAL EXAMINED. ***Iran*****:** *Golestan Province*: ♀ (holotype) (ZISP-601), Gürgenj River, in the vicinity of E Astrabad city (today known as Gorgan Rud River in NE Gorgan), 10.02.1904, leg. E.M. Philippovitsch; 1♀ (paratype) (ZISP-602), Kara-ssu River, in the vicinity of Astrabad city (today known as Qarasu River in 7 km S Bandar Torkaman, it was formerly considered as a part of Mazandaran Province) (36°49′N, 54°03′E), –20 m a.s.l., 17.02.1904, leg. E.M. Philippovitsch.

REMARKS. This species was known from Golestan and Gilan Provinces in north Iran (Fig. 1B), Turkmenistan, Azerbaijan, and Turkey [Birula, 1905a, b, 1938; Roewer, 1934; Aliev, Gadzhiev, 1983; Gromov, 1999; Erdek, 2021]. No new material was found from the studied area.

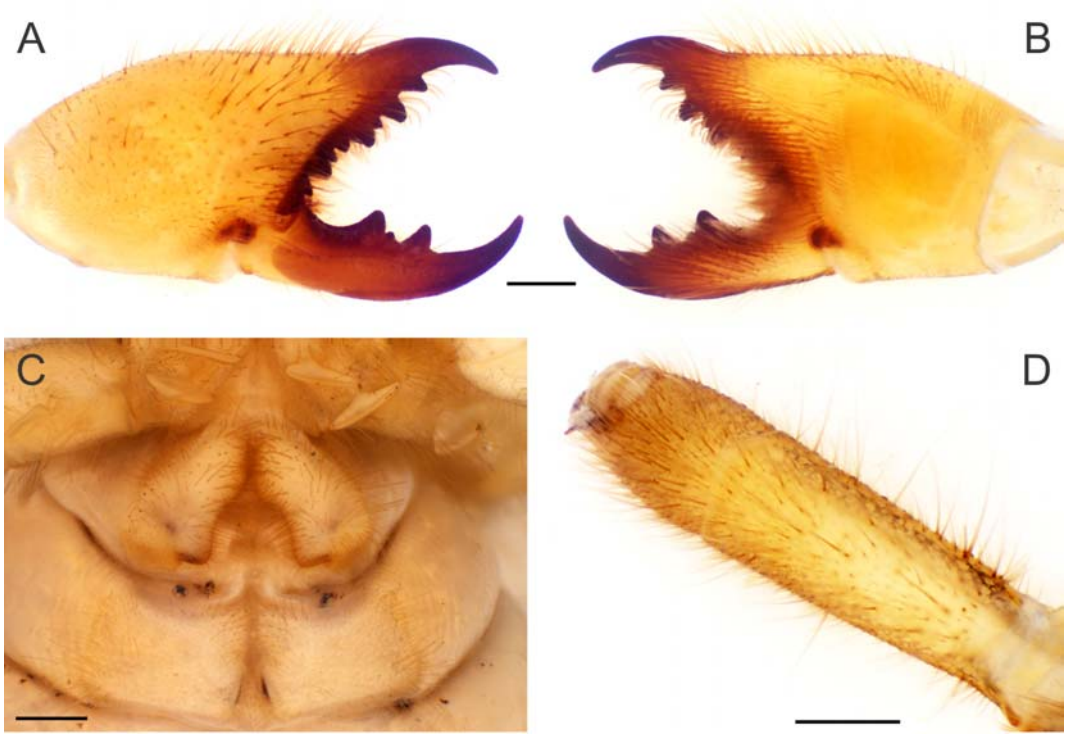

Fig. 6. Female of *Gylippus* (*Hemigylippus*) *lamelliger* Birula, 1906. A and B — retrolateral (left) and prolateral (right) cheliceral views, C — genital sternite, D — right pedipalp. Scale bars = 1.0 mm.

Рис. 6. Самка *Gylippus* (*Hemigylippus*) *lamelliger* Birula, 1906. A и B — хелицеры, ретролатерально (левая) и пролатерально (правая), C — генитальный стернит, D — правая педипальпа. Масштаб 1,0 мм.

Family Gylippidae Roewer, 1933

One genus and one species belonging to the family Gylippidae is found in northeast Iran (Fig. 1C).

Genus *Gylippus* Simon, 1879

Gylippus (*Hemigylippus*) *lamelliger* Birula, 1906
Figs 1C, 3D, 6A–D.

Birula, 1906: 25, fig. 1 (♂)
Birula, 1907b: 890, fig. 5 (♀)
Birula, 1913: 325, fig. 3; 394, fig. 12a–b (♂); 400, plate XI figs. 1–9 (♂♀)
Roewer, 1933: 815, figs. 231a–c & 232 (♂♀)
Birula, 1938: 87, fig. 56a–d (♂); 88, fig. 57a–c (♀)
Khazanehdari *et al*., 2016: 611, fig. 3a–c (♀)
Maddahi *et al*., 2017: 913, fig. 2h (♀)

MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 2♀♀ (ZMFUM-SOL-1021, 1045), the vicinity of Mashhad (36°17′N, 59°36′E), 1054 m a.s.l., 17.04.2013 & 28.03.2008, leg. M. Khazanehdari & O. Mirshamsi, respectively; 1♀ (ZMFUM -SOL-1114), the vicinity of Fariman (35°35′N, 59°55′E), 1371 m a.s.l., 05.2016, leg. O. Mirshamsi. ***Turkmenistan***: *Ahal Province*: ♂ (holotype) (ZISP-707), Serakhs (36°31′N, 61°12′E), 284 m a.s.l., 04.1905, leg. S. Bilkjevicz; 1♀ (ZISP-709), Achal-teke, 1896, leg. K. Anger.

REMARKS. This camel spider distributed from southwest Kazakhstan, across Turkmenistan and Uzbekistan to the northeast Iran [Birula, 1906, 1907b, 1913, 1938; Roewer, 1933; Gromov, 1999]. Birula's record [1913] from Khorasan, northeast Iran (as chorassan, Hussein-Abad) correspond to an unidentified locality in Razavi Khorasan Province, as there are some villages by the same name. The most recent report of the species was recorded from Mashhad, Razavi Khorasan Province (Fig. 1C) [Khazanehdari *et al*., 2016].

Family Karschiidae Kraepelin, 1899

Two genera and two Karschiid species distributed in northeast Iran (Fig. 1C).

Genus *Eusimonia* Kraepelin, 1899

Eusimonia divina Birula, 1935
Fig. 1C.

Birula, 1935a: 305, fig. 3b (♀) (as *Karschia* (?) *demokidovi*)
Birula, 1935b: 1218–1219, figs. 1a–b, 2a–d (♂♀)
Birula, 1938: 39 & 66, figs. 16a, 42 (♀); 70–78, figs. 45a, 46, 49, 50 (♂♀) (as *Karschia* (?) *demokidovi*)
Roewer, 1941: 186, plate 8, fig. 29 (♀); 189, plate 11, figs. 69–73 (♂) (as *Barrella divina*); 185, plate 7, fig. 5 (♀) (as *Karschia demokidovi*)
Gromov, 2000: 81–82, figs. 1–12 (♂♀)
Roewer, 1960: 8, fig. 1 (♂) (as *Barrella divina*)

REMARKS. This species was hitherto known from Afghanistan, Iran, Kazakhstan, Turkmenistan and Uzbekistan [Birula, 1935b, 1938; Roewer, 1941, 1960; Gromov, 1999, 2000]. It was only recorded from the eastern foothills of Alburz Mountains in Shahroud, Semnan Province, northeast Iran (Fig. 1C) [Birula, 1935b, 1938].

Genus *Karschia* Walter, 1889

Karschia (*Karschia*) *kiritshenkoi* Birula, 1918
Figs 1C, 3C.

Roewer, 1933: 292 & 294, figs. 221b, 222b (♂)
Birula, 1938: 52, fig. 25 (♂); 53, fig. 26 (juvenile♀)
Khazanehdari *et al*., 2016: 613, fig. 5a–d (♀) (as *Karschia persica*)
Maddahi *et al*., 2017: 913, fig. 2k (♀) (as *Karschia persica*)
MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 1♀ (ZMFUM-SOL-1053), the vicinity of Fariman (35°22′06.21″N, 59°59′21.17″E), 2222 m a.s.l., 5.08.2013, leg. M. Khazanehdari (misidentification as *Karschia persica*).
REMARKS. It was only known from mountainous region in Golestan Province (as the northern slope of Schah Kuh Mountains, Asterabad and the way between Gorgan and Shahroud), northeast Iran (Fig. 1C) [Birula, 1918, 1938]. New provincial record for Razavi Khorasan Province. Endemic to Iran.

Family Rhagodidae Pocock, 1897

One genus and three species belonging to the family Rhagodidae are found in northeast and east Iran (Fig. 1D).

Genus *Rhagodes* Pocock, 1897

Rhagodes aureus (Pocock, 1889)
Figs 1D, 3E.

Pocock, 1889: 118, plate 13, fig. 6 (♀) (as *Rhax aurea*)
Birula, 1938: 23, figs. 7a, b, 8, 9 (♂♀); 176, plate 1, fig. 3 (♀)
Khazanehdari *et al*., 2016: 610, fig. 2f (♂)
Maddahi *et al*., 2017: 913, fig. 2l (♂)
MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 1♂ (ZMFUM-SOL-1106), 34 km NW Joghatay, Azadvar (36°44′42″N, 56°43′12″E), 963 m a.s.l., 5.09.2014, leg. R. Babaei Savasari. *Semnan Province*: 1♂ (ZMFUM-SOL-1196), 180 km E Shahroud, Forumad village (36°30′40″N, 56°45′16″E), 1230 m a.s.l., 28.05.2017, leg. M. Maddahi. *South Khorasan Province*: 1♂ (ZMFUM-SOL-1002), the vicinity of Ghayen (33°43′N, 59° 10′E), 1462 m a.s.l., 09.2010, leg. B. Abedi; 1♂ (ZISP-768), Zirkuh, between village Bam Rud and village Torbat-Sheikh-e-Jam (unidentified place in approximately 90 km E Ghayen) (33°40′N, 60°04′E), 905 m a.s.l., 13–24.10.1898, leg. N.A. Zarudny. ***Turkmenistan*****:** *Ahal Province*: 1 juvenile♂ 1♀ (ZISP-772), Serakhs (36°31′N, 61°12′E), 284 m a.s.l., 04.1905, leg. C. Bilkevich. ***Afghanistan*****:** *Herat Province*: 2♂♂ (ZISP-770), S Kushki (also known as Kushk or Koshk, a city in 80 km N Herat) (34°57′N, 62°13′E), 1068 m a.s.l., 1897, leg. K. Anger.
REMARKS. This solifuge species was hitherto known from east Iran, south Turkmenistan and west Afghanistan [Birula, 1905a, b, 1938; Roewer, 1933, 1960; Lawrence, 1956; Gromov, 1999]. The species was incorrectly considered as camel spider fauna of Somalia [Harvey, 2003]. It was previously recorded from South Khorasan Province in Iran [Birula, 1905a, b, 1938]. New distributional record for Razavi Khorasan and Semnan Provinces (Fig. 1D). The report from Sistan va Baluchestan Province by Birula [1905b] is erroneous, in ZISP re-examined. It is a quite rare species, especially females.

Rhagodes eylandti (Walter, 1889)
Figs 1D, 3F.

Walter, 1889: 1110, fig. 3 (♂) (as *Rhax eylandti*); 1110, fig. 2 (♂) (as *Rhax plumbescens*)
Birula, 1938: 26, fig. 10 (♂); 176, plate 1, fig. 5 (♂) (as *Rhagodes plumbescens*); 176, plate 1, fig. 4 (♀) (as *Rhagodes grimmi*)
Maddahi *et al*., 2015: 279–283, figs. 1, 2a–c, 3a–e (♂)
Khazanehdari *et al*., 2016: 610, fig. 2e (♀) (as *Rhagodes melanochaetus*)
Maddahi *et al*., 2017: 913, fig. 2m (♂); 913, fig. 2n (♀) (as *Rhagodes melanochaetus*)
Maddahi *et al*., 2019: 496–504, figs. 1, 2a–i, 3a–g, 4a–h, 5a–d (♂♀)
MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 3 juv♂ 1♀ (HMC-SOL-1130), Mashhad, Ferdowsi University of Mashhad campus (36°18′21.74″N, 59°31′53.63″E), 1034 m a.s.l., 05–06.2015, leg. H. Maddahi (by pitfall traps).
REMARKS. The taxonomy of this species has been recently revised and three taxa, *Rhagodes plumbescens* (Walter, 1889), *Rhagodes melanochaetus* Heymons, 1902 and *Rhagodes melanopygus nigricans* Birula, 1905 synonymized with *Rhagodes eylandti* [Maddahi *et al*., 2019]. This camel spider was hitherto known in Turkmenistan, northeast and east Iran, and Afghanistan [Birula, 1905b, 1938; Kraepelin 1901; Roewer 1933; Zilch, 1946; Lawrence, 1956; Maddahi *et al*., 2015, 2019]. The species was frequently recorded from eastern Iran, Golestan, Semnan, Razavi Khorasan, South Khorasan, and Sistan va Baluchestan Provinces [Birula, 1938; Roewer 1933; Maddahi *et al*., 2015, 2019] (Fig. 1D). The record from Kerman Province, Iran [Khazanehdari *et al*., 2016, as *Rhagodes melanochaetus*] was erroneous, re-examined in ZMFUM. This species considered a common solifuge in clay and sandy deserts and in clay foothills.

Rhagodes melanopygus Walter, 1889
Figs 1D, 3G, 7A–H.

Walter, 1889: 1110, fig. 4 (♂) (as *Rhax melanopyga*)
Birula, 1938: 18–19, figs. 4, 5a (♂); 34, fig. 14 (♀)
Maddahi *et al*., 2017: 913, fig. 2o (♂)
MATERIAL EXAMINED. ***Iran***: *Razavi Khorasan Province*: 1♂ 1♀ (ZMFUM-SOL-1009, 1149), Mashhad (36°17′60″N, 59° 36′00″E), 1054 m a.s.l., 1.06.2012 & 5.06.2017, respectively, leg. O. Mirshamsi; 1♂ (ZMFUM-SOL-1128), same data in 16.06.2015, leg. Moallem; 2♂♂ (ZMFUM-SOL-1018, 1046), W Sarakhs, Khaje forest (36°31′12″N, 60°38′11″E), 568 m a.s.l., 1.06.2012, leg. O. Mirshamsi; 1♂ (HMC-SOL-1203), 77 km SW Sarakhs, the vicinity of Bazangan lake (36°17′45″N, 60°25′53″E), 854 m a.s.l., 4.06. 2016, leg. H. Maddahi; 1♂ (ZMFUM-SOL-1029), Fariman (35°35′ 00″N, 59°55′24″E), 1371 m a.s.l., 13.06.2013, leg. M. Khazanehdari. ***Turkmenistan***: *Ahal Province*: ♂ (holotype) (ZISP-821) (originally labelled as *Rhax melanopygus*), Ashgabat (37°56′N, 58°22′E), 219 m a.s.l., 27.05.1886, leg. G. Radde and A. Walter; ♀ (female paratype) (ZISP-824), same data in 24.06.1896, leg. P. Variensov; 1♀ (ZISP-816), same data in 15.06.1907, leg. K. Demokidov; 4♂♂ (ZISP-820), same data, no date, leg. Konig; 1♂ (ZISP-826), Bagyr (a city in 12 km W Ashgabat) (37°57′48″N, 58°13′01″E), 273 m a.s.l., 30.06.1906, leg. C. Bilkevich; 1♂ (ZISP-823), Anay (currently known as Annau in 8 km SE Ashgabat) (37°53′N, 58°32′E), 247 m a.s.l., 21.04.1896, leg. P. Variensov. *Balkan Province*: 1♂ (ZISP-825), Kyzyl-Arvat (currently known as Serdar) (38°59′N, 56°17′E), 98 m a.s.l., 1891, leg. A. Semenov; 1 juvenile (ZISP-818), the environs of Krasnovodsk (currently known as Turkmenbashi) (40°01′N, 52°58′E), 13 m a.s.l., 13.06.1928, leg. V. Gusakovsky. *Mary Province*: 1 juvenile (ZISP-819), Murgap (a city in 18 km SE Mary) (37°29′30″N, 61°58′31″E), 227 m a.s.l., 13–18.05. 1910, leg. Uvarof; 1♂ (ZISP-786) (misidentification as *Rhagodes eylandti*), Transcaspica (no detailed locality), 1895, no col.
REMARKS. This camel spider was hitherto reported from the south and west Turkmenistan, central Afghanistan, north Pakistan and northeast and northwest Iran [Birula,

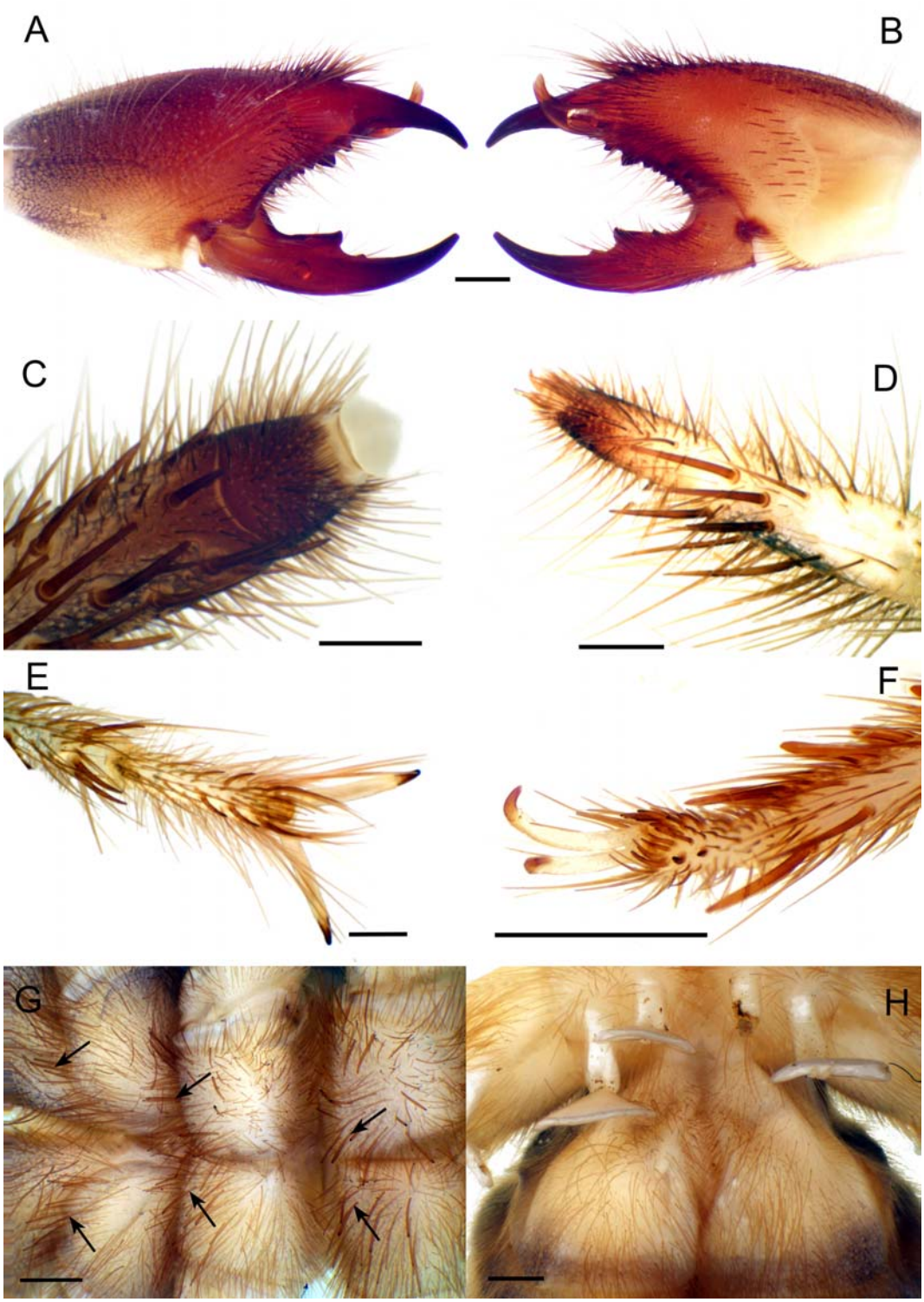

Fig. 7. *Rhagodes melanopygus* Walter, 1889. A and B — retrolateral (left) and prolateral (right) cheliceral views, C — tarsus and metatarsus of right pedipalp, D, E, F — first, fourth and third right legs, respectively, G — bacilli, H — genital sternite and malleoli. A–E, G, and H — male, F — female. Arrows in Fig. G show bacilli. Scale bars = 1.0 mm.

Рис. 7. *Rhagodes melanopygus* Walter, 1889. A и B — хелицеры, ретролатерально (левая) и пролатерально (правая), C — лапка и предлапка правой педипальпы, D, E, F — 1-я, 4-я и 3-я правые ноги, соответственно, G — bacilli, H — генитальный стернит и маллеолы. A–E, G и H — самец, F — самка. Стрелки на рис. G показывают bacilli. Масштаб 1,0 мм.

1905b, 1938; Roewer, 1933, 1941; Zilch, 1946; Lawrence, 1956]. The species was only known by two records of subspecies *Rhagodes melanopygus nigricans* Birula, 1905 from Iran [Birula, 1905b; Zilch, 1946]. According to the results of Maddahi *et al*. [2019], this subspecies is taxonomically invalid and its two previous records from northeast and northwest Iran belong to species *Rhagodes eylandti* and *R. caucasicus*, respectively. Therefore, our materials from northeast Iran provide the first proven occurrence of *Rhagodes melanopygus* for the country (Fig. 1D). This species prefers living in dry and semi-dry habitats with low altitude. Females are rare.

NOTE. Reexamination of museum materials deposited at ZISP, revealed that few male specimens of the species *R. melanopygus* were mistakenly identified and labeled as *R. eylandti*. It might be because of color polymorphism of male *R. eylandti*.

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