

A FAUNAL STUDY ON PLANT BUGS (HEMIPTERA: HETEROPTERA: MIRIDAE) IN THE CENTRAL PART OF SOUTH KHORASAN PROVINCE, IRAN

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Abstract

This research was carried out in 2022 in the central part of South Khorasan province, Iran. Twenty-two species of plant bugs (Hemiptera: Miridae) belonging to 17 genera and 3 subfamilies, including Deraeocorinae (1 genus and 1 species), Mirinae (8 genera and 9 species) and Phylinae (8 genera and 12 species), were collected and identified from different host plants. In this report, three species including *Ectagela* sp., *Megacoelum brevirostre* and *Adelphocoris ticinensis* were reported from South Khorasan province for the first time. All specimens are preserved in the insect collection of the Natural History Museum of the University of Guilan.

KEY WORDS: Deraeocorinae, Mirinae, Phylinae, South Khorasan Province, Iran

Introduction

Miridae (Insecta: Heteroptera) is the largest family of Hemiptera, with more than 11,000 described species. It is subdivided into eight subfamilies, with almost 50 tribes (Cassis & Schuh, 2012; Menard *et al.*, 2013; Namyatova & Cassis, 2016). Miridae species demonstrate various food preferences and behaviors, including phytophagy, predatory, and omnivory (Cassis & Schuh, 2012).

Almost 600 species of Miridae classified into 140 genera and 7 subfamilies for Iranian fauna have been reported (Linnavuori & Hosseini, 1998, 1999, 2000; Linnavuori & Modarres, 1999; Hosseini & Linnavuori, 2000; Hosseini *et al.*, 2000; Magnien & Matocq, 2008; Linnavuori, 2006, 2007, 2009, 2010; Lashkari & Hosseini, 2012; Hosseini, 2013 a, b, c; 2014 a, b; Hosseini & Shamsi, 2014; Malvandi *et al.*, 2015; Hosseini, 2016, 2017; Mohammadi *et al.*, 2018 a, b; Zamani & Hosseini, 2018; Hosseini & Mohammadi, 2018, 2019^a,^b; Zamani & Hosseini, 2019, 2020, 2022).

Khorasan is a large province in eastern Iran that was recently divided into three different regions: North Khorasan province, Razavi Khorasan province, and South Khorasan province. Each of these regions has its own unique climate and weather conditions. South Khorasan province is located at 55.6 to 60.57 longitude and 30.31 to 35.10 latitude, and consists of highlands and plains. It has a hot and dry desert climate in the lowlands and a semi-arid climate in the highlands. Birjand is the capital city of South Khorasan province, with a minimum temperature of -22 and a maximum of 43. The vegetation of the province includes forests and dry, hilly steppes. The most abundant plant species in the forests include *Pistacia atlantica*, *Amygdalus scoparia*, *Amygdalus lycioides*, *Cercis* sp., *Ficus* sp., and *Prosopis cineraria*. Plants in the dry, hilly steppes include *Ferula assa-foetida*, *Achillea millefolium*, *Rheum* sp., and *Thymus* sp. (The General Bureau for Textbooks Printing and Distribution, 2023). A few studies have been conducted in Razavi and North Khorasan provinces (Linnavuori & Modarres, 1998, 1999; Modarres Awal, 1997a, b; Havaskary *et al.*, 2010; Malvandi *et al.*, 2015). Only one study has been done on the fauna of Heteroptera in South Khorasan province. Mohammadpour *et al.* (2017) identified 20 species and subspecies belonging to 15 genera of 7 families in the alfalfa fields of Ghaen, of which 8 species were Miridae. According to these records, no study has focused on the plant bug fauna in the center of South Khorasan province. Therefore, our study was an effort to fill this information gap.

Materials and Methods

Sampling was carried out in three counties of South Khorasan province, namely, Birjand, Khosf, and Arian Shahr, during spring and summer in 2022, using two different methods. These methods varied based on the habitat, vegetation cover, and species type. Mirid bugs were collected randomly from gardens and fields on different host plants using an insect net and sweeping the vegetation in different habitats or beating tree branches. A light trap was also used. The trap had a 100-watt lamp directly connected to the household electricity. The collected specimens were killed by ethyl acetate, transferred to the laboratory, mounted on triangular cards, and labeled.

For the study of genitalia, the pygophore was removed and softened in boiling water for a few minutes, and then male genitalia were dissected in a drop of glycerol. Photographs of specimens were taken using a Canon EOS 200D camera equipped with a Canon EF 100mm f/2.8 Macro USM macro lens attached to a 65 mm Meike macro extension tube. Partially focused images of specimens were combined in Helicon Focus software (ver. 6.7.1). Then, they were modified and formatted in Photoshop CS6. All specimens are preserved in the insect collection of the Natural History Museum of the University of Guilan.

Results

A list of species, including 22 species belonging to 17 genera and 3 subfamilies, is given below.

Subfamily Deraeocorinae Douglas & Scott, 1865

Tribe Deraeocorini Douglas & Scott, 1865

***Deraeocoris (Camptobrochis) punctulatus* (Fallén, 1807)**

Material examined: Iran, South Khorasan province: Piranj (33°03585'N, 59°29708'E. 1850m), 13.05.2022, 3 ♀♀, 2 ♂♂. Khorashad (32°75126' N, 59°40478'E. 1470m), 06.07.2022, 1 ♂. Afzalabad (33°13392'N, 59°16910'E. 1641m), 21.07.2022, 1 ♂.

This species was collected on *Brassica napus* (Fig. 1-C, D) by sweeping and light trap (Fig. 2-A).

Distribution in Iran: Alborz (Modarres Awal, 1997c; Linnavuori, 2007), Ardabil (Modarres Awal, 1996; Linnavuori, 2007; Havaskary *et al.*, 2012), East Azerbaijan (Hassazadeh *et al.*, 2009 a, b; Gharaat *et al.*, 2009; Ghahari *et al.*, 2011), Fars (Alemansoor & Ahmadi, 1993; Modarres Awal, 1997 c; Linnavuori, 2009; Zarei *et al.*, 2012), Golestan (Khormali, 2000; Ghahari & Ostovan, 2006), Guilan (Abd-Rabou & Ghahari, 2006; Linnavuori, 2007), Hamadan (Mirab-balou *et al.*, 2007, 2008), Ilam (Linnavuori, 2009), Isfahan (Modarres Awal, 1997 c; Linnavuori, 2009; Rakhshani *et al.*, 2010), Kerman (Wagner, 1961; Kiritshenko, 1966, with doubt), Kermanshah (Linnavuori, 2009), Khorasan (Reuter, 1904; Modarres Awal, 1997 b; Linnavuori & Modarres Awal, 1999; Havaskary *et al.*, 2010), Kordestan (Linnavuori, 2009; Ebrahimi *et al.*, 2012), Kuhgiluyeh & Boyerahmad (Linnavuori, 2009), Lorestan (Linnavuori, 2009), Markazi (Linnavuori, 2009; Arkani *et al.*, 2011), Mazandaran (Heiss & Linnavuori, 2002; Ghahari & Ostovan, 2006; Ghahari *et al.*, 2008 a, b, 2009), Qom (Wagner, 1961), Semnan (Jakovlev, 1877), Sistan & Baluchestan (Kiritshenko, 1966), Tehran (Lindberg, 1938; Linnavuori, 2007), West Azerbaijan (Gharaat *et al.*, 2009; Linnavuori, 2009), Yazd (Linnavuori, 2009), Zanjan (Linnavuori, 2007): cited references in Ghahari & Ch erot (2014); South Khorasan (Mohammadpour *et al.*, 2017).

General distribution: Europe: Albania, Austria, Belgium, Byelorussia, Czech Republic, Denmark, Estonia, European Kazakhstan, European Turkey, Finland, France, Germany, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Moldavia, Netherlands, Poland, Romania, Russia (Central, North and South European Territories), Serbia, Slovakia, Sweden, Switzerland, Ukraine. Asia: Azerbaijan, Afghanistan, Armenia, Asian Kazakhstan, Asian Turkey, China (Northeastern, Northern, Northwestern, Southwestern Territories and Western Plateau), Cyprus, Georgia, Iran, Iraq, Kirgizia, Korea, Mongolia, Russia (East Siberia, Far East and West Siberia), Syria, Tajikistan, Turkmenistan, Uzbekistan, Karakalpakstan (Sadullaevich & Mirganievna, 2022). Extralimital: North America (Alaska, Canada). (Aukema, 2023).

Subfamily Mirinae Hahn, 1833

Tribe Mirini Hahn, 1833

***Adelphocoris ticinensis* (Meyer-D ur, 1843)**

Material examined: Iran, South Khorasan province: Bandoemارشah (32°83051'N, 59°18209'E. 1743m), 08.05.2022, 1 ♂. Khorashad (32°75126' N, 59°40478' E. 1470m), 06.07.2022, 1 ♀.

This species was collected on *Achillea* sp. by sweeping and light trap (Figs. 1-G, H; 3-E, F).

Distribution in Iran: Guilan (Linnavuori, 2007; Hosseini, 2014), Mazandaran (Wagner, 1957; Linnavuori, 2007).

General distribution: Europe: Albania, Austria, Belgium, Bosnia, Hercegovina, Bulgaria, Byelorussia, Croatia, Czech Republic, Denmark, Estonia, Kazakhstan, France, Great Britain, Germany, Greece, Hungary, Italy, Macedonia, Moldavia, Montenegro, Netherlands, Poland, Romania, Russia (Central and South European Territory), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine. Asia: Armenia, Asian Kazakhstan, Asian Turkey, Azerbaijan, Georgia, Iran (Aukema, 2023).

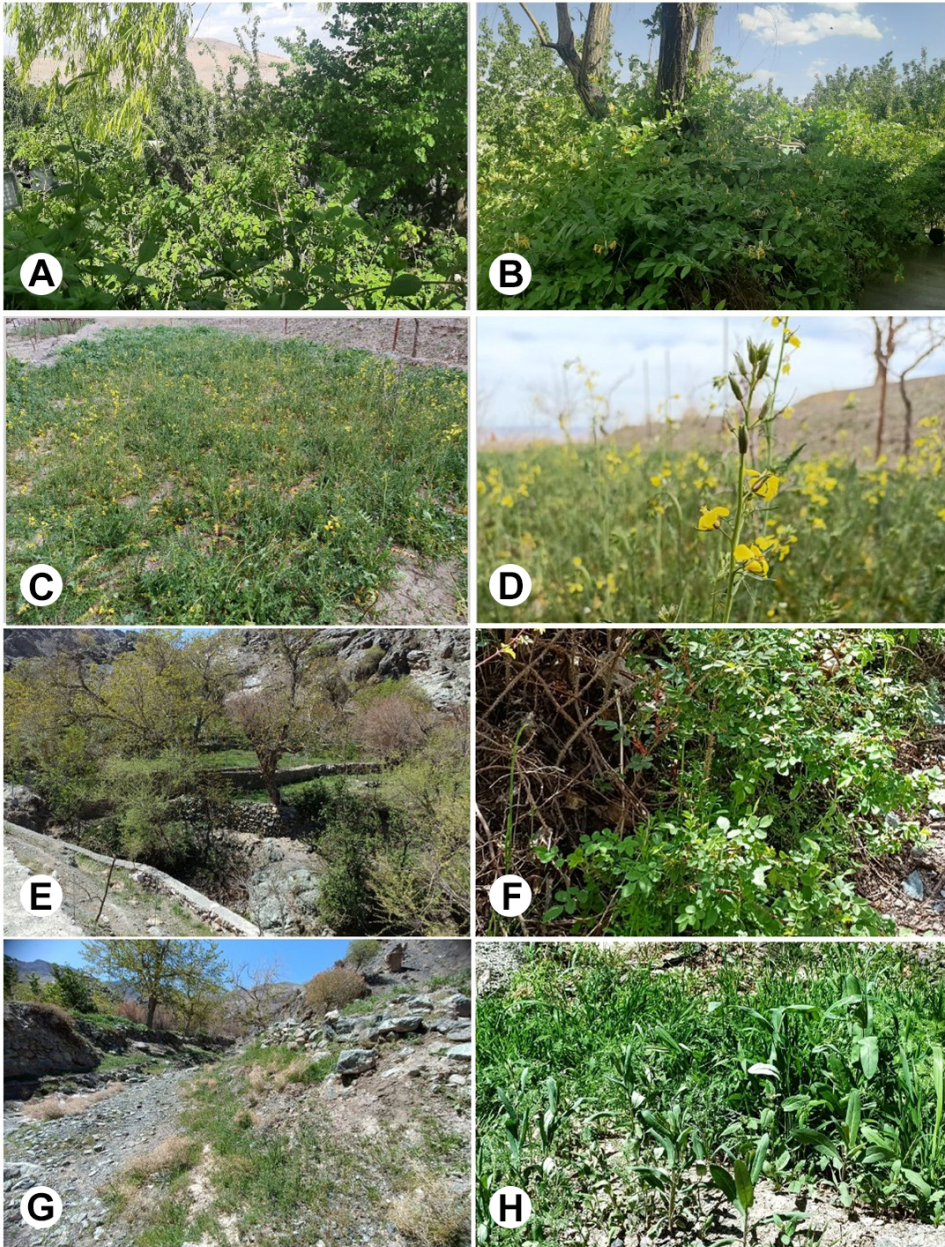


Figure 1. Habitats and plant associations: A, B – habitat of *Reuterista unicolor* and *Eurystylus bellevoeyi*; C, D – habitat of *Lygus gemellatus*; E, F – habitat of *Compsidolon nebulosum* and *Compsidolon elegantulum*.; G, H – habitat of *Adelphocoris ticinensis* and *Campylomma verbasci*.

***Creontiades pallidus* (Rambur, 1839)**

Material examined: Iran, South Khorasan province: Golefrize (32°68842'N, 59°16115'E. 1831m), 01.09.2022, 1 ♂.

This species was collected by light trap.

Distribution in Iran: Bushehr (Linnavuori, 2009), Fars (Linnavuori, 2009; Zarei *et al.*, 2012), Golestan (Karimian & Khormali, 2006; Linnavuori, 2007; Ghahari, 2013), Hormozgan (Linnavuori, 2004), Kerman (Wagner, 1958 as *C. p. virens*; Kiritshenko, 1966; Linnavuori, 2009; Shamsi *et al.*, 2014), Khorasan (Linnavuori & Modarres Awal, 1999; Hosseini *et al.*, 2006), Khuzestan (Linnavuori, 2009), Markazi (Linnavuori, 2009), Sistan & Baluchestan (Wagner, 1957 as *C. p. virens*; Kiritshenko, 1966), Tehran (Linnavuori, 2007), West Azerbaijan (Gharaat *et al.*, 2009), Zanjan (Linnavuori, 2007); cited references in Ghahari & Chérot (2014); Rafsanjan (Zeinadini *et al.*, 2015), Razavi Khorasan (Malvandi *et al.*, 2015), South Khorasan (Mohammadpour *et al.*, 2017).

General distribution: Europe: Crete, France, Greece, Italy, Malta, Sicily, Spain. North Africa: Algeria, Canary Islands, Egypt, Libya, Morocco, Madeira, Tunisia. Asia: Arab Emirates, Turkey, Cyprus, Iran, Iraq, Israel, Jordan, Saudi Arabia, Sinai, Yemen. Extralimital: tropical Africa, Brazil (introduced) (Aukema, 2023).

***Eurystylus bellevoeyi* (Reuter, 1879)**

Material examined: Iran, South Khorasan province: Rukaat (32°80758'N, 59°07374'E. 1690m), 28.03.2022, 1 ♀. Mazarerazg (32°80682'N, 59°26600'E. 1792m), 04.05.2022, 24.03.2022, 6 ♀♀. Afzalabad (33°13392'N, 59°16910'E. 1641m), 21.07.2022, 1 ♀.

This species was collected on *Triticum* sp. by sweeping and light trap (Fig. 2-B).

Distribution in Iran: Fars (Linnavuori, 2009; Zarei *et al.*, 2012), Golestan (Khormali, 2000 under the spelling *E. bellevoeyi* [sic]), Guilan (Linnavuori, 2007), Hormozgan (Linnavuori, 2004), Kerman (Wagner, 1958; Modarres Awal, 1997c; Linnavuori, 2009, Shamsi *et al.*, 2014), Khorasan (Wagner, 1957; Modarres Awal, 1997b; Linnavuori & Modarres Awal, 1999; Havaskary *et al.*, 2010), Khuzestan (Linnavuori, 2009), Kordestan (Ebrahimi *et al.*, 2012), Markazi (Arkani *et al.*, 2011), Sistan & Baluchestan (Wagner, 1957; Kiritshenko, 1966), Yazd (Linnavuori, 2009), Zanjan (Linnavuori, 2007); cited references in Ghahari & Chérot (2014); Rafsanjan (Zeinadini *et al.*, 2015), Razavi Khorasan (Malvandi *et al.*, 2015).

General distribution: Europe: France, Greece, Italy (Sicily, Pantelleria, Vulcano Island), Malta, Spain. North Africa: Canary Islands, Egypt, Libya, Morocco, Madeira, Tunisia. Asia: Afghanistan, Arab Emirates, Asian Turkey, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Oman, Saudi Arabia, Sinai, Turkmenistan, Yemen. Extralimital: Oriental regions (India, Pakistan, Sri Lanka) and tropical Africa (Aukema, 2023).

***Lygus gemellatus* (Herrich-Schaeffer, 1835)**

Material examined: Iran, South Khorasan province: Mazarerazg (32°80682'N, 59°26600'E. 1792m), 24.03.2022, 1 ♀. Hossein Abad (32°8360'N, 59°1974966'E. 987m), 11.04.2022, 1 ♀. Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 1 ♀. Esfahrod (32°8054'N, 59°303285'E. 1000m), 29.03.2023, 1 ♀.

This species was collected on *Cynoglossum* sp. by sweeping (Fig. 1-D) and light trap (Fig. 2-A).

Distribution in Iran: Ardabil (Linnavuori, 2007; Havaskary *et al.*, 2012), East Azerbaijan (Sadaghian *et al.*, 2004; Nikdel *et al.*, 2011; Havaskary *et al.*, 2012), Fars (Miyamoto, 1963; Linnavuori, 2009; Zarei *et al.*, 2012

as subspecies *Lygus g. gemellatus*), Golestan (Heiss & Linnavuori, 2002; Khormali, 2000; Karimian & Khormali, 2006; Linnavuori, 2007), Guilan (Linnavuori, 2007), Hamadan (Khanjani & Kalafchi, 2000; Mirabalou *et al.*, 2007, 2008; Mirabalou & Radjabi, 2013), Isfahan (Hoberlandt, 1955; Yarmand *et al.*, 2004; Razmjoo *et al.*, 2011), Kerman (Linnavuori, 2009, Shamsi *et al.*, 2014), Khorasan (Reuter, 1904 under the name *L. pratensis* var. *gemellatus*; Modarres Awal, 1997b; Linnavuori & Modarres Awal, 1999; Heiss & Linnavuori, 2002; Havaskary *et al.*, 2010), Kordestan (Linnavuori, 2009; Ebrahimi *et al.*, 2012 under the spelling *Lygus gemellats* [sic]), Markazi (Linnavuori, 2009; Arkani *et al.*, 2011), Mazandaran (Linnavuori, 2007), Tehran (Kiritshenko, 1966; Linnavuori, 2007), Yazd (Linnavuori, 2009), Zanjan (Linnavuori, 2007): cited references in Ghahari & Chérot (2014); Razavi Khorasan (Malvandi *et al.*, 2015), South Khorasan (Mohammadpour *et al.*, 2017).

General distribution: Europe: Albania, Andorra, Austria, Belgium, Bosnia, Hercegovina, Bulgaria, Byelorussia, Crete, Croatia, Czech Republic, Denmark, Estonia, European Kazakhstan, European Turkey, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Moldavia, Montenegro, Netherlands, Poland, Portugal, Romania, Russia (Central, North and South European Territory), Serbia, Slovakia, Spain, Sweden, Switzerland, Ukraine. North Africa: Algeria, Madeira, Morocco, Tunisia. Asia: Azerbaijan, Afghanistan, Armenia, Asian Kazakhstan, Asian Turkey, China (Northern, Northwestern Territories and Western Plateau), Cyprus, Georgia, Kirgizia, Iran, Mongolia, Russia (East Siberia, Far East and West Siberia), Syria, Tajikistan, Turkmenistan, Uzbekistan. Extralimital: India, Nepal, Pakistan (Aukema, 2023).

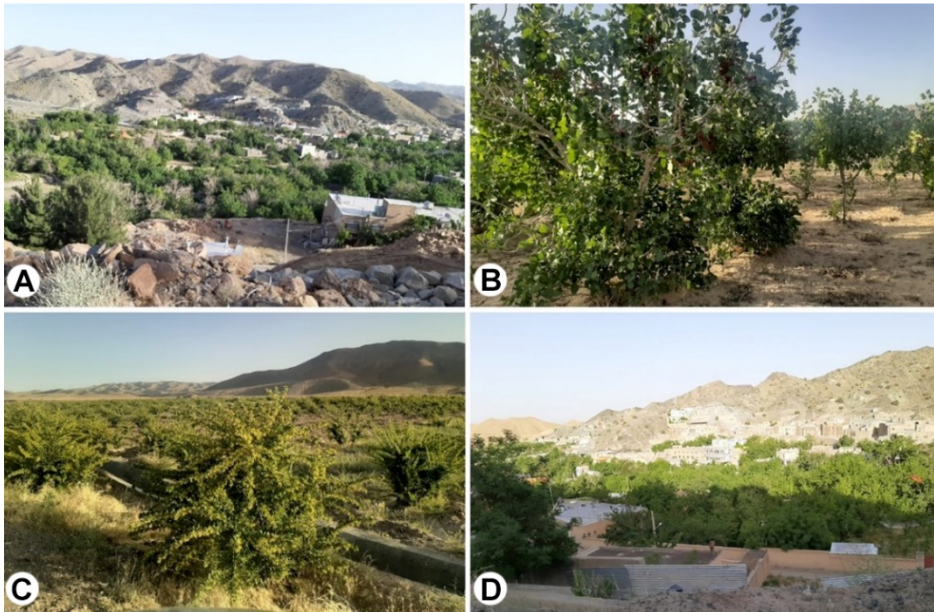


Figure 2. A – habitat of *Campylomma diversicorne*, B – habitat of *Camptotyliidea albovittata*, C – habitat of *Auchenocrepis alboscuteolata*, D – habitat of *Camptozorus linnavuorii*.

***Megacoelum brevirostre* Reuter, 1879**

Material examined: Iran, South Khorasan province: Khorashad (32°75'126"N, 59°40'478"E. 1470m), 06.07.2022, 1 ♂.

This species was collected by light trap (Fig. 3-C, D).

Distribution in Iran: East Azerbaijan (Linnavuori, 2009), Fars (Linnavuori, 2009), Guilan (Linnavuori, 2007), Isfahan (Linnavuori, 2009), Kerman (Wagner, 1958; Hashemi Rad & Radjabi, 2002; Linnavuori, 2009), Khorasan (Linnavuori & Modarres Awal, 1999, Malvandi *et al.*, 2015 misidentification as *Adelphocoris insignis*), Khuzestan (Linnavuori, 2009), Markazi (Linnavuori, 2009), Sistan & Baluchestan (Reuter, 1904; Wagner, 1957), Yazd (Linnavuori, 2009), Zanjan (Linnavuori, 2007): cited references in Ghahari & Chérot (2014); Rafsanjan (Zeinadini *et al.*, 2015).

General distribution: Europe: Russia (South European Territory: Dagestan). Asia: Azerbaijan, Kazakhstan, Turkey, Cyprus, Iran, Iraq, Israel, Tajikistan, Turkmenistan, Uzbekistan (Aukema, 2023).

***Orthops (Montanorthops) pilosulus* Jakovlev, 1877**

Material examined: Iran, South Khorasan province: Bandedare (32°8'1049"N, 59°2'1985"E. 1760m), 15.07.2022, 1 ♀.

This species was collected by sweeping (Fig. 1-E).

Distribution in Iran: Guilan (Linnavuori, 2007), Kerman (Reuter, 1904 under the name *Lygus foreli* var *pilosulus*; Linnavuori, 2009), Khorasan (Linnavuori & Modarres Awal, 1999), Semnan (holotype from Shahrud cf. Kerzhner & Josifov, 1999; Linnavuori, 2007), Tehran (Linnavuori, 2007), Zanjan (Linnavuori, 2007), Northern Iran (no locality cited) (Jakovlev, 1877); cited references in Ghahari & Chérot (2014); Razavi Khorasan (Malvandi *et al.*, 2015), South Khorasan (Mohammadpour *et al.*, 2017).

General distribution: Asia: Kazakhstan, Iran, Kirgizia, Russia (East Siberia), Turkmenistan, Uzbekistan (Aukema, 2023).

***Orthops* sp.**

Material examined: Iran, South Khorasan province: Golefrize (32°68'842"N, 59°16'115"E. 1831m), 01.09.2022, 1 ♀.

This species was collected by light trap. This specimen remained at species level because it is female.

***Reuterista unicolor* Rosenzweig, 1997.**

Material examined: Iran, South Khorasan province: Piranj (33°03'585"N, 59°29'708"E. 1850m), 13.05.2022, 2 ♂♂.

This species was collected by light trap (Fig. 1-A).

Distribution in Iran: Razavi Khorasan (Linnavuori & Modarres Awal, 1999).

General distribution: Asia: China (Northwestern Territory), Iran, Tajikistan, Turkmenistan, Uzbekistan (Aukema, 2023).

Tribe Stenodemini China, 1943

***Trigonotylus caelestialium* (Kirkaldy, 1902)**

Material examined: Iran, South Khorasan province: Golefrize (32°68842'N, 59°16115'E. 1831m), 17.09.2022, 1 ♂.

This species was collected by light trap (Fig. 2-B).

Distribution in Iran: Ardabil (Linnavuori, 2007; Hosseini, 2013c), East Azerbaijan (Gharaat *et al.*, 2009; Linnavuori, 2009), Fars (Linnavuori, 2009), Golestan (Linnavuori, 2007), Guilan (Linnavuori, 2007; Hosseini, 2013c), Isfahan, Kermanshah (Linnavuori, 2009), Khorasan (Linnavuori & Modarres Awal, 1999), Khuzestan, Kordestan (Linnavuori, 2009), Kuhgiluyeh & Boyerahmad (Linnavuori, 2009), Mazandaran (Linnavuori, 2007), West Azerbaijan (Linnavuori, 2009; Gharaat *et al.*, 2009), Zanjan (Linnavuori, 2007); cited references in Ghahari & Chérot (2014).

General distribution: Europe: Albania, Austria, Belgium Bosnia, Hercegovina, Bulgaria, Byelorussia, Czech Republic, Denmark, Estonia, Kazakhstan, Finland, France, Great Britain, Greece, Germany, Greece (Crete), Hungary, Italy, Liechtenstein, Lithuania, Luxembourg, Malta, Macedonia, Moldavia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia (Central, North and South European Territories), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine., North Africa: Azores. Asia: Armenia, Asian Kazakhstan, Azerbaijan, China (Central, Northeastern, Northern, Northwestern, Southwestern Territories), Georgia, Iran, Japan, Kirgizia, Korea, Mongolia, Russia (East Siberia, Far East and West Siberia), Tajikistan, Turkmenistan, Uzbekistan. Extralimital: North America, Pakistan (Aukema, 2023).

Subfamily Phylinae Douglas & Scott, 1865

Tribe Phylini Douglas & Scott, 1865

***Compsidolon (Compsidolon) elegantulum* Reuter, 1899**

Material examined: Iran, South Khorasan province: Bandedare, 03.04.2022 (32°80876'N, 59°21553'E. 1834 m). 1 ♀. Piranj, 13.05.2022 (33°03585'N, 59°29708'E. 1850m) 2 ♀, 2♂.

This species was collected by light trap (Fig. 1-B).

Distribution in Iran: Fars (Linnavuori, 2010), Khorasan (Linnavuori & Modarres Awal, 1999), Tehran (Linnavuori, 2007).

General distribution: Asia: Asian Turkey, Iran, Iraq, Israel, Jordan, Syria (Aukema, 2023).

***Compsidolon (Compsidolon) nebulosum* (Reuter, 1878)**

Material examined: Iran, South Khorasan province: Afzalabad (33°13392'N, 59°21985'E. 1641m), 15.04.2022, 1 ♀, 21.07.2022 1 ♀, 3 ♂♂. Bandedare (32°80876'N, 59°21553'E. 1834 m), 23.04.2022, 5 ♀♀. Pasuj1 (33°01310' N, 59°29743'E. 1760m) 02.06.2022 7 ♀♀, Pasuj2 (33°01601'N, 59°29635'E. 1809m), 10.06.2022 2 ♀♀.

This species was collected on *Rosa* sp. By sweeping (Fig. 1-F).

Distribution in Iran: Alborz (Linnavuori, 2007), Fars (Linnavuori, 2010), Isfahan (Linnavuori, 2010), Kerman (Reuter, 1904 under the combination *Psallus nebulosus*) Kermanshah (Linnavuori, 2010), Khorasan (Wagner, 1957 under the combination *Psallus nebulosus*; Linnavuori & Modarres Awal, 1999), Kuhgiluyeh & Boyerahmad (Linnavuori, 2010), Semnan (Linnavuori, 2010), Sistan & Baluchestan (Wagner, 1957 under the

combination *Psallus nebulosus*; Kiritshenko, 1966), Tehran (Linnavuori, 2007), West Azerbaijan (Linnavuori, 2010), cited references in Ghahari & Chérot (2014).

General distribution: Asia: Armenia, Asian Kazakhstan, Azerbaijan, Iran, Kirgizia, Tajikistan, Turkmenistan, Uzbekistan (Aukema, 2023).

Subtribe Phylina Douglas & Scott, 1865

***Ectagela* sp.**

Material examined: Iran, South Khorasan province: Chahak (33°30239'N, 58°89859'E. 1380m), 31.07.2022 1 ♀.

This species was collected on *Pistachio vera* (Anacardiaceae) by sweeping. This specimen was not identified at species level (Fig. 3-A, B).

Tribe *Exaeretini* Puton, 1875

***Auchenocrepis alboscuteolata* Puton, 1874**

Material examined: Iran, South Khorasan province: Afzalabad (33°13392'N, 59°21985'E. 1641m), 21.07.2022, 4 ♂♂. Golefrize, 17.09.2022, 1 ♂. (32°68842'N, 59°16115'E. 1831m).

This species was collected by light trap (Fig. 2-C).

Distribution in Iran. Fars (Linnavuori, 2010), Hormozgan (Wagner, 1968; Linnavuori, 2004), Kerman (Wagner, 1958), Khorasan (Reuter, 1904 under the name *Auchenocrepis minutissima* var. *alboscuteolata*; Linnavuori & Modarres Awal, 1999), Khuzestan (Linnavuori, 2010), Sistan & Baluchestan (Wagner, 1957); cited references in Ghahari & Chérot (2014); Razavi Khorasan (Malvandi *et al.*, 2015).

General distribution: Europe: Italy (Pantelleria). North Africa: Algeria, Egypt, Libya, Morocco, Tunisia. Asia: Arab Emirates, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Saudi Arabia, Syria, Yemen. Extralimital: tropical Africa (Niger, Sudan, W Sahara), Pakistan (Aukema, 2023).

***Camptozorus linnavouri* Kerzhner, 1996**

Material examined: Iran, South Khorasan province: Afzalabad (33°13392'N, 59°21985'E. 1641m), 21.07.2022, 1 ♂.

This species was collected by light trap (Fig. 2-D).

Distribution in Iran: Endemic Razavi Khorasan (Linnavuori and Modares Awal, 1999).

General distribution: Asia: Iran (Aukema, 2023).

Tribe *Nasocorini* Reuter, 1883

***Badezorus immaculatus* Linnavuori, 1997**

Material examined: Iran, South Khorasan province: Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 3 ♂♂.

This species was collected by light trap.

Distribution in Iran: Razavi Khorasan (Linnavuori, 1997; Linnavuori & Modarres Awal, 1999)

General distribution Asia: Asian Kazakhstan, Iran, Turkmenistan. (Aukema, 2023).

***Camptotylidea albovittata* (Reuter, 1903)**

Material examined: Iran, South Khorasan province: PIranj (33°03585'N, 59°29708'E. 1850m), 13.05.2022, 3 ♂♂. Pasuj2 (33°01601'N, 59°29635'E. 1809m), 10.06.2022, 2 ♀♀, 4 ♂♂. Khorashad (32°75126' N, 59°40478'E. 1470m), 06.07.2022, 14 ♀♀, 5 ♂♂. Afzalabad (33°13392'N, 59°21985'E. 1641m), 21.07.2022, 10 ♀♀, 14 ♂♂.

This species was collected by light trap (Fig. 2-A).

Distribution in Iran: Razavi Khorasan (Linnavuori and Modares Awal, 1999; Malvandi *et al.*, 2015).

General distribution: Asia: Asian Kazakhstan, Iran, Saudi Arabia, Turkmenistan, Uzbekistan (Aukema, 2023).

***Camptotylidea sinaïtica* (Linnavuori, 1964)**

Material examined: Iran, South Khorasan province: Golefrize (32°68842'N, 59°16115'E. 1831m), 17.09.2022, 1 ♂.

This species was collected by light trap.

Distribution in Iran: Guilan (Linnavuori, 2007), Razavi Khorasan (Linnavuori, 1997).

General distribution: Asia: Iran, Sinai, Turkmenistan, Uzbekistan (Aukema, 2023).

***Camptotylidea suturalis* (Reuter, 1903)**

Material examined: Iran, South Khorasan province: Afzalabad (33°13392'N, 59°16910'E. 1641m), 21.07.2022, 31 ♀♀, 20 ♂♂. PIranj (33°03585'N, 59°29708'E. 1850m), 13.05.2022, 1 ♀, 1 ♂. Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 5 ♀♀, 3 ♂♂.

This species was collected by light trap (Fig. 2-B).

Distribution in Iran: Fars (Linnavuori, 2010), Hormozgan (Linnavuori, 2004), Kerman (Wagner, 1958 under the original combination *Atomophora suturalis*), Khorasan (Linnavuori, & Modarres Awal, 1999), Sistan & Baluchestan (Wagner, 1957 under the original combination *Atomophora suturalis*; Linnavuori, 1986, Kerzhner & Josifov, 1999 under the name *C. alhagii*); cited references in Ghahari & Chérot (2014); Razavi Khorasan (Malvandi *et al.*, 2015).

General distribution: North Africa: Tunisia. Asia: Asian Kazakhstan, China (Northern, Northwestern Territories), Iran, Mongolia, Tajikistan, Turkmenistan, Uzbekistan (Aukema, 2023).

***Campylomma diversicorne* Reuter, 1878**

Material examined: Iran, South Khorasan province: Afzalabad (33°13392'N, 59°16910'E. 1641m), 21.07.2022, 2 ♀♀, 4 ♂♂. Golefrize (32°68842'N, 59°16115'E. 1831m), 01.09.2022, 3 ♀♀, 1 ♂. Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 5 ♀♀, 6 ♂♂.

This species was collected by light trap (Fig. 2-C).

Distribution in Iran: Ardabil (Linnavuori, 2007; Ghahari *et al.*, 2011), Bushehr (Linnavuori, 2010), East Azerbaijan (Khaghaninia *et al.*, 2010), Fars (Linnavuori, 2010; Zarei *et al.*, 2012), Golestan (Khormali, 2000; Ghahari & Ostovan, 2006; Ghahari *et al.*, 2011; Ghahari, 2013), Guilan (Linnavuori, 2007), Hamadan (Abd-

Rabou & Ghahari, 2006), Hormozgan (Wagner 1968; Linnavuori, 2004), Ilam (Linnavuori, 2010), Isfahan (Rakhshani *et al.*, 2010), Kerman (Reuter, 1904; Wagner, 1958; Mehrnejad & Linnavuori, 2012), Kermanshah (Linnavuori, 2010), Khorasan (Wagner, 1957; Abd-Rabou & Ghahari, 2006; Linnavuori & Modarres Awal, 1999; Havaskary *et al.*, 2010), Khuzestan (Farahbakhsh, 1961; Linnavuori, 2010), Kordestan (Linnavuori, 2010; Ebrahimi *et al.*, 2012), Kuhgiluyeh & Boyerahmad (Linnavuori, 2010), Markazi (Arkani *et al.*, 2011), Mazandaran (Ghahari & Ostovan, 2006; Ghahari *et al.*, 2011), Sistan & Baluchestan (Wagner, 1957), Tehran (Linnavuori, 2007), West Azerbaijan (Linnavuori, 2010), Zanjan (Linnavuori, 2007), cited references in Ghahari & Chérot (2014); Razavi Khorasan (Malvandi *et al.*, 2015).

General distribution: Europe: Bulgaria, European Turkey, Greece, Crete, Italy North Africa: Egypt Asia: Afghanistan, Arab Emirates, Armenia, Asian Kazakhstan, Asian Turkey, China (Northern, Northwestern and Southwestern Territories), Cyprus, Iran, Iraq, Israel, Kirgizia, Saudi, Arabia, Tajikistan, Turkmenistan, Uzbekistan. Extralimital: Pakistan (Aukema, 2023).

***Campylomma verbasci* (Meyer-Dür, 1843)**

Material examined: IRAN, South Khorasan province: Piranj (33°03585'N, 59°29708'E. 1850m), 13.05.2022, 2 ♀♀, 1 ♂. Pasuj2 (33°01601'N, 59°29635'E. 1809m), 10.06.2022, 2 ♀♀, 2 ♂♂. Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 1 ♀, 1 ♂. Afzalabad (33°13392'N, 59°16910'E. 1641m), 21.07.2022, 9 ♀♀, 12 ♂♂. Mazareerazg (32°80547'N, 59°26115'E. 1792m), 04.05.2022, 2 ♂♂. Bandeomarsah (32°83051'N, 59°18209'E. 1743m), 08.05.2022, 1 ♀, 2 ♂♂.

This species was collected by sweeping and light trap (Fig. 1-G).

Distribution in Iran: Ardabil (Linnavuori, 2007), East Azerbaijan (Abd-Rabou & Ghahari, 2006; Gharaat *et al.*, 2009), Fars (Linnavuori, 2010), Golestan (Ghahari & Ostovan, 2006; Ghahari *et al.*, 2011), Guilan (Linnavuori, 2007), Ilam (Linnavuori, 2010), Isfahan (Linnavuori, 2010), Kerman (Mehrnejad & Linnavuori, 2012; Ghahari *et al.*, 2011), Kermanshah (Abd-Rabou & Ghahari, 2006 under the junior synonym *C. nicolasi*; Linnavuori, 2010), Khorasan (Malkeshi *et al.*, 1998; Linnavuori & Modarres Awal, 1999; Havaskary *et al.*, 2010), Khuzestan (Modarres Awal, 1997c), Kordestan (Linnavuori 2010, Ebrahimi *et al.*, 2012), Lorestan (Linnavuori, 2010), Mazandaran (Heiss & Linnavuori, 2002), Tehran (Linnavuori, 2007), West Azerbaijan (Mostaan, 1993 under the spelling *campulomma* [sic] *verbasci*; Modarres Awal, 1997c; Pourhadji, 2001; Gharaat *et al.*, 2009; Linnavuori, 2010), Zanjan (Linnavuori, 2007), Northern Iran (no locality cited) (Jakovlev, 1877 under the generic name *Agallistestis*), cited references in Ghahari & Chérot (2014).

General distribution: Europe: Andorra, Austria, Belgium, Bosnia, Hercegovina, Bulgaria, Byelorussia, Crete, Croatia, Czech Republic, Denmark, Estonia, European, Kazakhstan, European, Turkey, Finland, France, Great Britain, Germany, Greece, Hungary, Italy, Kosovo, Latvia, Liechtenstein, Luxembourg, Macedonia, Moldavia, Netherlands, Norway, Poland, Portugal, Romania, Russia (South European Territory), Serbia, Slovakia, Spain, Sweden, Switzerland, Ukraine. North Africa: Algeria, Canary Islands, Egypt, Libya, Morocco, Tunisia. Asia: Afghanistan, Armenia, Asian Kazakhstan, Asian Turkey, Azerbaijan, China (Northern and Northwestern Territory), Cyprus, Georgia, Iran, Israel, Jordan, Kirgizia, Lebanon, Saudi Arabia, Tajikistan, Turkmenistan, Uzbekistan. Extralimital: North America (introduced) (Aukema, 2023).

***Atomoscelis onusta* (Fieber, 1861)**

Material examined: Iran, South Khorasan province: Bujd (32°84054'N, 59°32416'E. 1550m), 31.03.2022, 5 ♀♀, 2 ♂♂. Piranj (33°03585'N, 59°29708'E. 1850m), 13.05.2022, 1 ♀, 1 ♂. Pasuj2 (33°01601'N, 59°29635'E. 1809m), 10.06.2022, 2 ♀♀, 5 ♂♂. Absharchardeh (32°80923'N, 59°24177'E. 1670m), 19.06.2022, 2 ♀♀. Khorashad (32°75126'N, 59°40478'E. 1470m), 06.07.2022, 15 ♀♀, 15 ♂♂. Afzalabad, 21.07.2022 (33°13392'N, 59°16910'E. 1641m) 16 ♀♀, 13 ♂♂.

This species was collected by light trap.

Distribution in Iran: Alborz, Ardabil (Linnavuori, 2007), Fars (Linnavuori, 2010), Golestan (Ghahari, 2013), Guilan (Linnavuori, 2007), Kerman (Wagner, 1958), Khorasan (Modarres Awal, 1997b; Linnavuori & Modarres Awal, 1999), Khuzestan (Linnavuori, 2010), Kordestan (Linnavuori, 2010), Tehran (Linnavuori 2007), West Azerbaijan (Linnavuori, 2010), Zanjan (Linnavuori, 2007); cited references in Ghahari & Chérot (2014).

General distribution: Europe: Austria, Bulgaria, Croatia, Czech Republic, European Kazakhstan, European Turkey, France, Germany, Greece, Hungary, Italy, Macedonia, Moldavia, Netherlands, Romania, Russia (Central and South European Territories), Serbia, Slovakia, Slovenia, Spain, Ukraine. North Africa: Algeria, Canary Islands, Morocco, Madeira, Tunisia. Asia: Azerbaijan, Afghanistan, Armenia, Asian Kazakhstan, Asian Turkey, China (Northern and Northwestern Territories), Georgia, Iran, Iraq, Israel, Jordan, Kirgizia Mongolia, Russia (East and West Siberia), Tajikistan, Turkmenistan, Uzbekistan, Yemen. Extralimital: North America (introduced), tropical Africa (W Sahara) (Aukema, 2023).

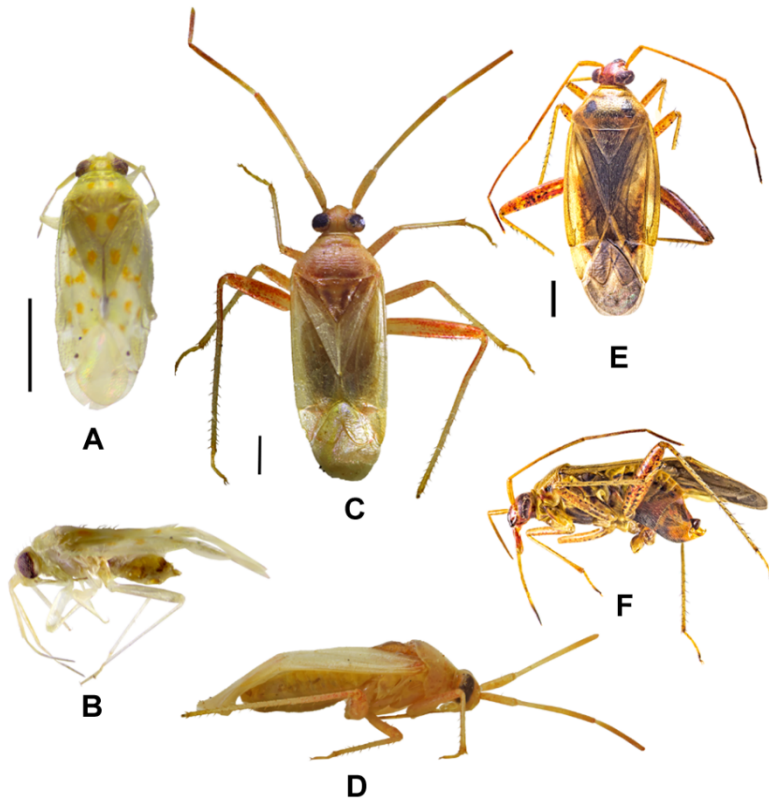


Figure 3. A, B – *Ectagela* sp., C, D – *Megacoelum brevirostre*, E, F – *Adelphocoris ticinensis*; Scale=1mm.

Conclusion

In total, 22 species were collected and identified from various host plants in South Khorasan province, with a focus on the city of Birjand and the vicinity, including 12 species belonging to Phyllinae (54.54%), 9 Mirinae species (40.9%) and 1 Deraeocorinae species (4.54%). This study reports three species including *Ectagela* sp., *Megacoelum brevirostre* and *Adelphocoris ticinensis* from South Khorasan province for the first time (Fig. 3).

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ФАУНИСТИЧКА ИСТРАЖИВАЊА СТЕНИЦА (HEMIPTERA: HETEROPTERA: MIRIDAE) У ЦЕНТРАЛНОМ ДЕЛУ ПРОВИНЦИЈЕ ЈУЖНИ ХОРАСАН, ИРАН

ФАТЕМЕЗАРА БАГЕРИ, РЕЗА ХОСЕИНИ И МОЗГАН ЗАМАНИ

Извод

Ово истраживање је спроведено 2022. године у централном делу провинције Јужни Хорасан, Иран. Прикупљене су 22 врсте стеница (Hemiptera: Heteroptera: Miridae) из 17 родова и 3 потфамилије, укључујући Deraeocorinae (1 род и 1 врста), Mirinae (8 родова и 9 врста) и Phyllinae (8 родова) сакупљених на 12 различитих врста биљака домаћина. У овом раду су по први пут регистроване три врсте из провинције Јужни Хорасан, то су: *Ectagela* sp., *Megacoelum brevirostre* и *Adelphocoris ticinensis*. Сви примерци су сачувани у колекцији инсеката Природњачког музеја Универзитета Гилан.

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