

RESEARCH ARTICLE

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A contribution to the knowledge of ground beetles (Col.: Carabidae) fauna of northeastern Iran along with a new record

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Abstract

Carabidae is the third most species-rich family of the order Coleoptera. Most members of the family are predators considered beneficial components of natural and agricultural ecosystems. A faunistic study was conducted on the carabids of northeastern Iran, including Khorasan-e-Razavi, Khorasan-e-Shomali, and Golestan provinces, during 2016–2018. A total of 35 species belonging to 22 genera and seven subfamilies were identified from collected ground beetles in the studied area. The subfamily Harpalinae (58.90%) had the most number of individuals, followed by Carabinae (17.45%), Broscinae (13.45%), Scartinae (4.36%), Trechinae (3.37%), Cicindelinae (2.18%) and Siagoninae (0.36%). The dominant species was *Calosoma imbricatum deserticola* (15.27%). In total, 18 species, including six species from Khorasan-e-Razavi province, seven species from Khorasan-e-Shomali province, and five species from Golestan province, are reported for the first time for these regions. Moreover, *Calathus distinguendus* (subfamily Harpalinae) is recorded for the fauna of Iran for the first time.

Key words: Carabidae, Coleoptera, fauna, Iran, new record.

INTRODUCTION

The ground beetles (Col.: Carabidae) as one of the most specious groups of Coleoptera are distributed nearly all around the world except polar regions and reputed as beneficial biological control agents in either natural or agroecosystems (Hurka, 1996; Holland & Luff, 2000; Vincent & Cardé, 2009; Bousquet, 2010). Living within the soil's top horizons, the ground beetles inhabit diverse ecological niches. Despite occupying various land habitats from xeric to very moist ones throughout the world (Pakeman & Stockan, 2014; Serrano *et al.*, 2017), the highest species richness occurs in tropical regions, where many species live on trees (Erwin, 1985). Abundance, species richness as well as the fascinating coloration of many species of carabids have made them well-liked objects of study for many entomologists. Although different feeding strategies exist among various species from zoophagy and polyphagy to phytophagy (Pizzolotto *et al.*, 2018), most of them are active nocturnal carnivores feeding on small invertebrates and insects (Kromp, 1999; Luff,

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2007). Several species also feed on weeds and help to regulate weed populations (Lovei, 2000, 2008).

Iran is commonly known as the cross-road between the Palaearctic, Oriental and Afrotropical regions (Hakimzadeh *et al.*, 2011). Despite numerous studies on Iranian carabids (Afshar, 1944; Farahbakhsh, 1961; Morvan, 1970, 1971, 1972, 1973, 1974; Jaeger, 1990, 1992; Modarres Awal, 1997; Hejkal, 2000; Lassalle, 2001; Heinz, 2002; Fallahzadeh *et al.*, 2005; Mohammadzadeh Fard & Hodjat, 2008; Muilwijk & Felix, 2008; Sadeghi Namaghi *et al.*, 2010; Sadeghi Namaghi *et al.*, 2011; Salari & Hosseini, 2013; Samin & Sakenin, 2014; Azadbakhsh & Nozari, 2015; Azadbakhsh, 2016; Azadbakhsh, 2017a, 2017b), our knowledge about the rich fauna of the ground beetles in the country is still incomplete. Most of the studies have focused on the central, northern, or western parts of Iran while the number of studies in the eastern parts is limited; so, there are still numerous areas insufficiently studied. According to the latest checklist of Iranian ground beetles, 955 species have hitherto been reported throughout the country (Azadbakhsh & Nozari, 2015).

In this study, the faunal composition of ground beetles was investigated in three provinces of Iran (Khorasan-e-Razavi, Khorasan-e-Shomali, and Golestan). Khorasan-e-Razavi borders Khorasan-e-Shomali province in the north-west, Turkmenistan in the north and north-east, Semnan province in the west, Yazd province in the south-west, Khorasan-e-Jonoubi province in the south and Afghanistan in the south-east. Khorasan-e-Shomali borders Turkmenistan in the north and north-east, Khorasan-e-Razavi in the east to south, Semnan in the south-west and Golestan in the west. These two provinces located in northeastern Iran represent a large proportion of Iran's semi-arid regions. Golestan is located between Alborzes Mountains, Khorasan Mountains within the southern flat of Turkmenistan, and the Caspian Sea. The province has a border with Turkmenistan in the north, Khorasan-e-Shomali province in the east to the south-east, Caspian Sea, Mazandaran province in the west and Semnan province in the south. It enjoys mild weather and a temperate climate most of the year. The goal of this study is to provide a database for such a salient family whose members have a tremendous influence on the biological balance in northeastern Iran.

MATERIAL AND METHODS

Sampling sites and methods

Samples were collected from 56 localities in three provinces including, Khorasan-e-Razavi, Khorasan-e-Shomali and Golestan, northeastern Iran (Table 1). The carabid beetles were collected using pitfall traps or via hand-catching. For pitfall trapping, plastic containers (10 cm height and 8 cm width) half-filled with rotten fruit, juice, beer, and water were sunken in the ground. The traps were emptied weekly, and the collected beetles were dry pinned or preserved in 70% ethanol. Hand collecting was also carried out on the ground by the first author. Collecting involved actively searching for the beetles on the ground, in leaf litter, under logs and other substrates, under tree barks, and in rotting deadwood. Determination of the specimens at the genus and species level were done based on valid key sources; confirmation of identification of some species was carried out by Dr. Igor A. Belousov and Dr. Ilya I. Kabak (both Department of biological control, Institute for Plant Protection, Saint Petersburg, Russia). All of the identified specimens are deposited in the Insect Museum of Plant Protection Department, Ferdowsi University of Mashhad. Nomenclature and status of the carabid taxa follow the Catalogue of Palaearctic Coleoptera (Löbl & Löbl, 2017).

TABLE 1. List of the sampling sites where pitfall traps were set, with dates of exposure of the traps and additional collecting by hand.

Locality	Hand-picking (dates)	Pitfall traps (number of traps/ dates)	Coordinates
Golestan	-		
Aghghala	-	25 traps, 22. IV. 2016	37.0141° N, 54.4506° E
Aliabad	-	25 traps, 17. III. 2017	36.9074° N, 54.8566° E
Daland	-	25 traps, 25. IV. 2016	37.0352° N, 55.0466° E
Galugah	-	25 traps, 17. III. 2017	36.7284° N, 53.8102° E
Gamishan	-	25 traps, 22. IV. 2016	37.0701° N, 54.0766° E
Golestan forst	10. III. 2017	25 traps, 17. III. 2017	37.2497° N, 56.4305° E
Gorgan	-	25 traps, 22. IV. 2016	36.8456° N, 54.4393° E
Khanbebin	-	25 traps, 23. III. 2017	37.0086° N, 54.9887° E
Maravetapeh	17. III. 2017	25 traps, 17. III. 2017	37.9022° N, 55.9554° E
Nokandeh forest	-	25 traps, 25. IV. 2016	36.7321° N, 53.9215° E
5Km S Ramiyan	-	25 traps, 25. IV. 2016	37.0147° N, 55.1403° E
Shirabad	3. III. 2017	25 traps, 10. III. 2017	36.9704° N, 55.0259° E
Khorasan-e-Razavi			
Bajestan	2. IV.2017	25 traps, 2. IV.2017	34.5221° N, 58.1722° E
Bahramiyeh	-	25 traps, 17. IV. 2017	36.6605° N, 57.5144° E
Bar	-	25 traps, 17. III. 2016	36.4933° N, 58.7173° E
Binalood	-	25 traps, 9. VIII. 2017	35.9808° N, 59.3619° E
Buzhan	-	25 traps, 9. VIII. 2017	36.2429° N, 58.9694° E
Godasia	18. IV. 2017	25 traps, 18. IV. 2017	36.2585° N, 57.5250° E
Hokmabad	-	25 traps, 17. IV. 2017	36.6317° N, 57.6042° E
Joghatay	-	25 traps, 17. IV. 2017	36.6409° N, 57.0760° E
Jowein	17. IV. 2017	25 traps, 17. IV. 2017	36.7067° N, 57.4147° E
Kalat-e-Nadrei	-	25 traps, 22. III. 2016	36.9953° N, 59.7531° E
Kariz	-	25 traps, 13. VI. 2017	34.8107° N, 60.8202° E
Kashmar	-	25 traps, 18. III. 2016	35.2434° N, 58.4687° E
Keikhosrow	-	25 traps, 30. II. 2016	36.4057° N, 58.0385° E
Khalilabad	12. III. 2016	25 traps, 18. III. 2016	35.2531° N, 58.2890° E
Malvand	-	25 traps, 11. V. 2016	35.9861° N, 57.2452° E
Mashhad	-	25 traps, 27. VII. 2017	36.2605° N, 59.6168° E
Mazdavand	-	25 traps, 20. IV. 2017	36.1556° N, 60.5284° E
Mohammadabad	-	25 traps, 18. III. 2016	35.5017° N, 58.2565° E
Neyshabour	-	25 traps, 9. VIII. 2017	36.2141° N, 58.7961° E
18Km N Neyshabour	-	25 traps, 9. VIII. 2017	36.2269° N, 58.7467° E
Quchan	10. V.2015	25 traps, 10. V.2015	37.1293° N, 58.4744° E
Robatsarpoush	18. IV. 2017	25 traps, 18. IV. 2017	36.4827° N, 57.4860° E
Rivash	-	25 traps, 9. VIII. 2017	35.4774° N, 58.4573° E
Sangan	-	25 traps, 1. III. 2017	34.4025° N, 60.2603° E
Sheshtamd	-	25 traps, 18. IV. 2017	35.9601° N, 57.7630° E
Shurvarzi	-	25 traps, 9. VIII. 2017	36.2101° N, 58.3211° E
Soltnabad	-	25 traps, 10. III. 2015	36.7458° N, 58.1167° E
Tandooreh park	-	25 traps, 29. VI.2016	37.5822° N, 58.6687° E
Taybad-40kmW	-	25 traps, 18. III. 2016	34.7395° N, 60.7777° E
Zaveh	-	25 traps, 2. III.2015	35.2747° N, 59.4678° E
Khorasan-e-shomali			
Asadli	-	25 traps, 19. IV. 2016	37.3858° N, 57.2910° E
Ashkhaneh	-	25 traps, 10. III. 2017	37.5544° N, 56.9267° E
Baba aman	-	25 traps, 24. IV. 2017	37.4881° N, 57.4352° E
Bojnourd-52kmE	-	25 traps, 24. IV. 2017	37.4702° N, 57.3143° E
Esfarayen	-	25 traps, 17. IV. 2017	37.0667° N, 57.4967° E
Farouj	-	25 traps, 23. IV. 2017	37.2318° N, 58.2178° E
45Km NW Farouj	-	25 traps, 23. IV. 2017	37.1681° N, 58.1465° E
Jolgeh	-	25 traps, 24. IV. 2017	36.9500° N, 56.3793° E
Maneh	-	25 traps, 24. IV. 2017	37.7850° N, 57.0287° E
Miyanzoo	-	25 traps, 24. IV. 2017	37.9076° N, 57.3228° E
Royin	-	25 traps, 17. IV. 2017	37.2033° N, 57.4861° E
shirvan	-	25 traps, 10. V.2015	37.4092° N, 57.9276° E
20Km N Shirvan	-	25 traps, 10. V.2015	37.4106° N, 57.8981° E
Tatar	-	25 traps, 19. IV. 2016	37.5288° N, 57.1203° E

RESULTS AND DISCUSSION

In total, 35 species from 22 genera belonging to 7 subfamilies were collected and identified, which represents approximately 3.66% of the species and 14.19% of genera known from the country. The largest in a number of species was the share of the tribes Harpalini (30.54%) and Carabini (17.45%) (Table 2). The most abundant were the specimens from the tribes Harpalini (84 examples of all) and Carabini (48 exes.) (Table 2).

Regarding the number of species in each genus, the results for the whole carabid complex revealed that the most species-rich was the genus *Calosoma*, followed by the genera *Harpalus*, *Chlaenius* and *Calathus*. The genera *Broscus*, *Calomera*, *Cicindela*, *Cylindera*, *Distichus*, *Lebia*, *Siagona* and *Zabrus* each represented with only one species. Among the identified ground beetles, the most abundant taxa were *Calosoma imbricatum deserticola* (42 ex., 15.27% of all) and *Broscus semistriatus* (37 ex., 13.45%), respectively. *Calathus distinguendus* is recorded for Iran for the first time. The collected species are listed below.

TABLE 2. Carabidae complex taxonomic structure.

Subfamily	Tribes	Genera		Species		Specimens	
		Number	%	Number	%	Number	%
Broscinae	Broscini	1	4.54	1	2.85	37	13.45
Carabinae	Carabini	2	9.09	7	20	48	17.45
Cicindlinae	Cicindelini	3	13.63	3	8.57	6	2.18
Harpalinae	Chlaeniini	1	4.54	3	8.57	29	10.54
	Harpalini	4	18.18	6	17.14	84	30.54
	Lebiini	1	4.54	1	2.85	2	0.72
	Pterostichini	2	9.09	2	5.71	11	4
	Sphodrini	1	4.54	3	8.57	15	5.45
	Zabrini	1	4.54	1	2.85	21	7.63
Scartinae	Scartini	2	9.09	3	8.57	12	4.36
Siagoninae	Siagonini	1	4.54	1	2.85	1	0.36
Trechinae	Bembidiini	1	4.54	2	5.71	3	1.09
	Pogonini	2	9.09	2	5.71	6	2.18
total	13	22	100	35	100	275	100

Subfamily Broscinae Hope, 1838

Tribe Broscini Hope, 1838

Subtribe Broscina Hope, 1838

Genus *Broscus* Panzer, 1813

Broscus (Broscus) semistriatus (Dejean, 1828)

Material examined: 37 ex., Khorasan-e-Razavi, Mohammadabad (Neyshabour), Mar 18, 2016, leg. M. Keikhosravi.

Geographical distribution: Southeastern Europe, Anatolia, Transcaucasia, Iran, Central Asia and the south of West Siberia.

Distribution in Iran: Northern and southern Iran (Hackel *et al.*, 2010).

Remarks: New record for Khorasan-e-Razavi province.

Subfamily Carabinae Latreille, 1802

Tribe Carabini Latreille, 1802

Subtribe Calosomatina Jeannel, 1940

Genus *Calosoma* Weber, 1801

Calosoma (Calosoma) algiricum (Géhin, 1885)

Material examined: 1 ex., Khorasan-e-Razavi, Tandooreh park, Jun 29, 2016, leg. M. Keikhosravi.

Geographical distribution: From Northern Africa through Near East to Turkmenistan; it was also recorded from southern Italy and southern Greece.

Distribution in Iran: Kerman: Dschas Morian (Mandl, 1953); Azarbaijan-e-Sharghi: Arasbaran (Ghahari *et al.*, 2010); Hormozgan: Kanadj, Bandar Abbas (Bruschi, 2013).

Remarks: New record for Khorasan-e-Razavi.

Calosoma (Calosoma) inquisitor inquisitor (Linnaeus, 1758)

Material examined: 1 ex., Golestan, Aliabad (forest), Mar 17, 2017, leg. M. Kheikhosravi.

Geographical distribution: Europe, Northern Africa, and Near East.

Distribution in Iran: Golestan: "Astrabad (= Gorgan), Kopet Dagh" (Breuning, 1927); Khorasan-e-Razavi: Kashmar (Ghahari *et al.*, 2009); Isfahan: Najaf-Abad (Ghahari *et al.*, 2010); Golestan: Gorgan; Lurestan: Khorramabad, Mazadaran: Chalus (Bruschi, 2013); Golestan: Gorgan (Afshari & Khormali, 2014); Guilan: Gysoum (Salari Gougheri *et al.* 2014); Golestan: Gorgan (Afshari & Khormali, 2014); Mazandaran: Khirood Forest (Azadbakhsh *et al.*, 2015).

Calosoma (Caminara) imbricatum deserticola (Semenov, 1897)

Material examined: 11 ex., Khorasan-e-Razavi, Bajestan, Apr 2, 2017, leg. M. Keikhosravi; 9 ex., Khorasan-e-Razavi, Bar (Neyshabour), Mar 17, 2016, leg. M. Keikhosravi; 3 ex., Khorasan-e-Razavi, Jowein (Sabzevar), Apr 17, 2017, leg. M. Keikhosravi; 7 ex., Khorasan-e-Razavi, Keikhosrow (Sabzevar), Feb 30, 2016, leg. M. Keikhosravi; 12 ex., Khorasan-e-Razavi, Robatsarpoosh (Sabzevar), Apr 18, 2017, leg. M. Keikhosravi.

Geographical distribution: From northern Caspian region through Central Asia to Iran, Afghanistan and Mongolia.

Distribution in Iran: Tehran: 70 km South of Tehran; Kerman: Jussufabad (Mandl, 1967).

Remarks: New record for Khorasan-e-Razavi.

Calosoma (Calosoma) maderae dsungaricum (Gebler, 1833)

Material examined: 1 ex., Khorasan-e-Shomali, 52 Km E-Bojnourd, Apr 24, 2017, leg. M. Keikhosravi.

Geographical distribution: From southeastern Europe via Anatolia and Central Asia to Mongolia and western China.

Distribution in Iran: Golestan: Astrabad (= Gorgan), (Breuning, 1927); Mazandaran: Nowshahr (Mandl, 1967); Sistan va Balouchestan: Bampour (Mandl, 1967); Khorasan-e-Razavi: Khash (Hosseini *et al.*, 2012); Balouchistan; Khuzestan: Haft-Tapeh; Golestan: Astrabad (=Gargan), Bushehr: Bushire; Khorasan-e-Razavi: Mazdavand, 800 m; Kerman: Kerman; Teheran: Omidyeh (Bruschi, 2013).

Remarks: New record for Khorasan-e-Shomali.

Calosoma (Calosoma) sycophanta sycophanta (Linnaeus, 1758)

Material examined: 2 ex., Golestan, Golestan forest, Mar 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Northern Africa, Europe, and Asia, east to West Siberia and Northwestern China.

Distribution in Iran: Lurestan; Kermanshah and Guilan: Talesh, Elburz Mountain (Lapouge, 1907); Golestan: Nokandeh (Ghahari *et al.*, 2009); Mazandaran: Siahe bishe (Azadbakhsh, 2015); Mazandaran: Marzanabad, Elburz Mountain (Bruschi, 2013).

Subtribe Carabina Latreille, 1802

Genus *Carabus* Linnaeus, 1758

Carabus (Mimocarabus) roseni hemicalosoma (Semenov, 1903)

Material examined: 1 ex., Golestan, forest (Khanbebin), Mar 23, 2017, leg. M. Keikhosravi.

Geographical distribution: Endemic to northeastern Iran and southern Turkmenistan.

Distribution in Iran: Khorasan-e-Shomali: Bojnourd; Golestan: Gorgan (Semenov, 1903); Tehran: Varamin (Ghahari *et al.*, 2009).

Carabus (Sphodristocarabus) elegantulus elegantulus (Motschulsky, 1850)

Material examined: 1 ex., Golestan, forest (Khanbebin), Mar 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Endemic to northeastern Iran.

Distribution in Iran: Golestan: Astrabad (= Gorgan) (Semenov, 1903); Khorasan-e-Shomali: Bojnourd (Lapouge, 1924); Mazandaran: Kiyasar, Vesmine mountain; Golestan: National Park of Minu Dasht; Dowlat-abad; Ziarat (Deuve, 2000). Golestan: South of Gaz (Rapuzzi, 2005).

Subfamily Cicindelinae Latreille, 1802

Tribe Cicindelini Latreille, 1802

Subtribe Cicindelina Latreille, 1802

Genus *Calomera* Motschulsky, 1862

Calomera littoralis winkleri (Mandl, 1934)

Material examined: 1 ex., Golestan, forest (Shirabad), Mar 3, 2017, Mar 10, 2017, leg. M. Keikhosravi.

Geographical distribution: From Aegean islands and Near East through Transcaucasia and Turkmenistan to Afghanistan.

Distribution in Iran: Azarbaijan-e-Sharghi: Azarshar (Mandl, 1967); Mazandaran: Babol (Mandl, 1967); Guilan: Bandar-e-Anzali; Mazandaran: Behshahr (Rivalier, 1967); Khorasan-e-Shomali: Razan, 30 km South of Bojnourd (Naviaux, 1983).

Remarks: New record for Golestan.

Genus *Cicindela* Linnaeus, 1758

Cicindela (Cicindela) asiatica asiatica (Audouin et Brulle, 1839)

Material examined: 2 ex., Khorasan-e-Shomali, Tatar, Apr 19, 2016, leg. M. Keikhosravi.

Geographical distribution: Anatolia, Transcaucasia, Iran, Syria, and Iraq.

Distribution in Iran: Azarbaijan-e-Sharghi: Tabriz (Rivalier, 1967); Qazvin: 7 km West of Kuhin (Anichtchenko, 2007); Khorasan-e-Shomali: Bojnourd (Sadeghi. *et al.*, 2011); Chahar Mahali va Bakhtiyari: Shahr-e-Kord (Aadbakhsh *et al.*, 2015).

Genus *Cylindera* Westwood, 1831

Cylindera (Cylindera) germanica germanica (Linnaeus, 1758)

Material examined: 3 ex., Golestan, Golestan forest, Mar 23, 2017, leg. M. Keikhosravi.

Geographical distribution: Widely distributed over Europe and the Palaeartic Asia, east to East Siberia.

Distribution in Iran: Guilan: Rasht (Mandl, 1959); Azarbaijan-e-Sharghi: Moghan; Guilan: Gysum (Mandl, 1967); Mazandaran: Nowshahr (Naviaux, 1983); Khorasan-e-Razavi: Mashhad (Hosseini *et al.*, 2012); Mazandaran: Dohezar; Golestan: Gorgan (Afshari & Khormali, 2014); Elburz: Karaj (Azadbakhsh *et al.*, 2015).

Subfamily Harpalinae Bonelli, 1810

Tribe Chlaeniini Brullé, 1834

Subtribe Chlaeniina Brullé, 1834

Genus *Chlaenius* Bonelli, 1810

Chlaenius (Chlaenites) spoliatus spoliatus (P. Rossi, 1792)

Material examined: 7 ex., Khorasan-e-Shomali, 20 km W Shirvan, May 10, 2015, leg. M. Keikhosravi.

Geographical distribution: Widely distributed in the Palaearctic from Northern Africa and Europe to Eastern Asia (except for the Pacific).

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Mazandaran: Babol (Mandl, 1963); Guilan (Salari *et al.*, 2012).

Remarks: New record for Khorasan-e-Shomali.

Chlaenius (Chlaenius) festivus festivus (Panzer, 1796)

Material examined: 4 ex., Khorasan-e-Shomali, Miyanzoo (Raz o Jargalan), Apr 24, 2017, leg. M. Keikhosravi; 5 ex., Golestan, Gamishan, Apr 22, 2016, leg. M. Keikhosravi.

Geographical distribution: The Palaearctic from Northern Africa and Central Europe to West Siberia, Central Asia and Afghanistan.

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Kerman: Sabzawaran and Qualeh-e Asghard; Esfahan: Pirbakran; Zanjan: Zanjan (Mandl, 1963); Guilan (Salari *et al.*, 2012); Azarbaijan-e-Sharghi: Basmenj Village (Atamehr, 2013).

Remarks: New record for Khorasan-e-Shomali.

Chlaenius (Trichochlaenius) aeneocephalus aeneocephalus (Dejean, 1826)

Material examined: 2 ex., Khorasan-e-Shomali, Baba aman, Apr 24, 2017, leg. M. Keikhosravi; 7 ex., Khorasan-e-Shomali, Asadli, Apr 19, 2016, leg. M. Keikhosravi; 4 ex., Khorasan-e-Razavi, Tandooreh park, June 29, 2016, leg. M. Keikhosravi.

Geographical distribution: From southeastern Europe through Transcaucasia and Near East to Central Asia.

Distribution in Iran: Golestan: Gorgan (Afshari & Khormali, 2014); Mazandaran: Khirood forest and NowShahr (Azadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Shomali.

Tribe Harpalini Bonelli, 1810

Subtribe Anisodactylina Lacordaire, 1854

Genus *Anisodactylus* Dejean, 1829

Anisodactylus (Hexatrachus) poeciloides pseudoaeneus (Dejean, 1829)

Material examined: 3 ex., Khorasan-e-Shomali, Esfarayen, Apr 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Southeast Europe, Cyprus, Anatolia, Transcaucasia, Iraq, Iran, Afghanistan, Kazakhstan, Kyrgyzstan, West Siberia, the western part of China and Mongolia.

Distribution in Iran: Mazandaran province (Chaudoir, 1844); Qom: Neyzar (Aadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Shomali.

Subtribe Ditomina Bonelli, 1810

Genus *Dixus* Billberg, 1820

Dixus eremita (Dejean, 1825)

Material examined: 2 ex., Khorasan-e-Shomali, 45 Km NW Farouj, Apr 23, 2017, leg. M. Keikhosravi; 1 ex., Khorasan-e-Shomali, Maneh, Apr 24, 2017, leg. M. Keikhosravi.

Geographical distribution: From southeastern Europe through Transcaucasia, Near East and Central Asia to Afghanistan.

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Kerman: Sabzawaran (Mandl, 1963); Azarbaijan-e-Sharghi: Basmenj village (Atamehr, 2013); Qazvin: Kordak (Aadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Shomali.

Subtribe Harpalina Bonelli, 1810

Genus *Acinopus* Dejean, 1821

Acinopus (Acinopus) laevigatus (Ménétriés, 1832)

Material examined: 4 ex., Khorasan-e-Razavi, Binalood, Aug 9, 2017, leg. M. Keikhosravi; 2 ex., Khorasan-e-Razavi, Bouzhan (Neyshabur), Aug 9, 2017, leg. M. Keikhosravi; 1 ex., Khorasan-e-Razavi, Hokmabad (Sabzevar), Apr 17, 2017, leg. M. Keikhosravi; 2 ex., Khorasan-e-Razavi, Shourvarz (Neyshabur), Aug 9, 2017, leg. M. Keikhosravi; 5 ex., Khorasan-e-Razavi, Joghatay, Apr 17, 2017, leg. M. Keikhosravi.

Geographical distribution: A common species distributed in southeastern Europe, Transcaucasia, Near East, Central Asia, Northwestern China and the West Himalaya.

Distribution in Iran: Mazandaran province (Ménétriés, 1832); Markazi: Arak (Mandl, 1963); Khorasan-e-Razavi: Ferdows (Sadeghi *et al.*, 2010); Ilam province; Khorasan-e-Razavi: Kashmar (Ghahari & Kesdek, 2012); Guilan: Jouben (Salari *et al.*, 2013); Ardabil: Nir (Atamehr, 2013); Golestan: Gorgan (Afshari & Khormali, 2014); Mazandaran: Kojoor; Tehran: Damavand mountain; Qazvin: Ebrahim Abad; Fars: Dasht-e Arzhan and Qalat village; Ardabil: Namin, S Kiesabbau; Chahar Mahal va Bakhtiari: Harunieh, 2300 m (Azadbakhsh *et al.*, 2015).

Genus *Harpalus* Latreille, 1802***Harpalus (Harpalus) distinguendus distinguendus*** (Duftschmid, 1812)

Material examined: 3 ex., Khorasan-e-Razavi, Bajestan, Apr 2, 2017, leg. M. Keikhosravi; 11 ex., Khorasan-e-Razavi, Sangan, Mar 1, 2017, leg. M. Keikhosravi; 4 ex., Khorasan-e-Shomali, Asadli, Apr 19, 2016, leg. M. Keikhosravi; 1 ex., Golestan, Maravehtaph, Mar 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Common in the Palaearctic from the Iberian Peninsula to East Siberia and Mongolia.

Distribution in Iran: Mazandaran province (Chaudoir, 1844); Khorasan-e-Razavi: Torbat-e-Heydariye; Torbat-e-Jam; Kashmar and Ghaenat (Sadeghi *et al.*, 2010); Khorasan-e-Razavi province (Hosseini *et al.*, 2012); Ardabil: Gorjan Village (Atamehr, 2013). Kermanshah: Kermanshah; Gazvin: Kordak; Guilan: Hashtpar (Azadbakhsh *et al.*, 2015).

Remarks: New record for Golestan.

Harpalus (Pseudophonus) griseus (Panzer, 1796)

Material examined: 11 ex., Khorasan-e-Razavi, Bahramiyeh (Sabzevar), Apr 17, 2017, leg. M. Keikhosravi; 7 ex., Khorasan-e-Razavi, Khalilabad, Mar 18, 2016, Mar 12, 2016, leg. M. Keikhosravi; 3 ex., Khorasan-e-Razavi, Mohammadabad, (Kashamr), Mar 18, 2016, leg. M. Keikhosravi; 4 ex., Khorasan-e-Shomali, Farouj, Apr 23, 2017, leg. M. Keikhosravi; 1 ex., Golestan, Gorgan, Apr 22, 2016, leg. M. Keikhosravi.

Geographical distribution: Widely distributed in the Palaearctic from the Iberian Peninsula and Northern Africa to Eastern Asia.

Distribution in Iran: Kerman: Kerman (Mandl, 1963); Lurestan: Khorramabad; Tehran: 2800m Tarsee (Mandl, 1963); Khorasan-e-Razavi: Bardaksan; Mashhad; Dargaz; Serakhs; Ghaenat and Ferdows (Sadeghi *et al.*, 2010); Guilan: Talesh (Salari *et al.*, 2013); Kerman: Kerman; Sirch (Azadbakhsh *et al.*, 2015).

Harpalus (Pseudophonus) rufipes (De Geer, 1774)

Material examined: 13 ex., Khorasan-e-Razavi, Kashmar, Mar 18, 2016, leg. M. Keikhosravi; 1 ex., Khorasan-e-Razavi, Neyshabour, Aug 9, 2017, leg. M. Keikhosravi; Golestan, 5 ex., Nokandeh forest, Apr 25, 2016, leg. M. Keikhosravi.

Geographical distribution: The most part of the Palaearctic region except for Eastern Asia.

Distribution in Iran: Kerman: Saguch; Mazandaran: Babol and Chalus (Mandl, 1963); Khorasan-e-Razavi: Mashhad and Neyshabor (Sadeghi *et al.*, 2010); Ilam province (Ghahari & Kesdek, 2012); Khorasan-e-Razavi Mashhad (Hosseini *et al.*, 2012); Ardabil: Pars Abad Moghan Village (Atamehr,

2013); Guilan: Bandar Anzali; Fouman; Talesh and Roudbar (Salari *et al.*, 2013); Mazandaran: Khiroud forest; Kerman: Mahan (Azadbakhsh *et al.*, 2015).

Remarks: New record for Golestan.

Tribe Lebiini Bonelli, 1810

Subtribe Lebiina Bonelli, 1810

Genus *Lebia* Latreille, 1802

Lebia (Lebia) trimaculata (Villers, 1789)

Material examined: 2 ex., Khorasan-e-Razavi, Mashhad, Jul 27, 2017, leg. M. Keikhosravi.

Geographical distribution: Southern Europe, Northern Africa, Near East, and Central Asia.

Distribution in Iran: Azarbaijan-e-Sharghi: Kandovan (Jaskula, 2007); Tehran: Golhak 1400m (Gueorguiev, 2011); Elburz: Kraj; Kerman: Mahan; Yazd: Dehbala (Azadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Razavi.

Tribe Pterostichini Bonelli, 1810

Genus *Poecilus* Bonelli, 1810

Poecilus (Poecilus) cupreus cupreus (Linnaeus, 1758)

Material examined: 3 ex., Khorasan-e-Shomali, Shirvan, May 10, 2015, leg. M. Keikhosravi; 1 ex., Golestan, 5 Km S Ramiyan, Apr 25, 2016, leg. M. Keikhosravi.

Geographical distribution: Widely distributed in the Palaearctic Eurasia from France to West Siberia and Northwestern China.

Distribution in Iran: Khorasan-e-Razavi: Chenaran Razavi (Sadeghi *et al.*, 2010); Chahar Mahal va Bakhtiari: Shahrekord (Samin *et al.*, 2011); Ardabil: Gorjan Village; Golestan: Gorgan (Atamehr, 2013); Mazandaran: Khiroud forest (Azadbakhsh *et al.*, 2015).

Remarks: New records for Khorasan-e-Shomali and Golestan provinces.

Genus *Pterostichus* Bonelli, 1810

Pterostichus (Lyrothorax) caspius (Ménétriés, 1832)

Material examined: 6 ex., Golestan, Aghghala, Apr 22, 2016, leg. M. Keikhosravi; 1 ex., Golestan, Daland, Apr 25, 2016, leg. M. Keikhosravi.

Geographical distribution: Endemic to eastern Transcaucasia (Talysh) and northern Iran.

Distribution in Iran: Azarbaijan-e-Sharghi: Basmenj Village (Atamehr, 2013); Mazandaran: Khiroud forest (Azadbakhsh *et al.*, 2015).

Remarks: New record for Golestan.

Tribe Sphodrini Laporte, 1834

Subtribe Calathina Laporte, 1834

Genus *Calathus* Bonelli, 1810

Calathus (Calathus) distinguendus (Chaudior, 1846)

(Fig. 1)

Material examined: 2 ex., Khorasan-e-Razavi, Kalat-e-Naderi, Mar 22, 2016, leg. M. Keikhosravi.

Geographical distribution: Was known from the Balkans, Moldova, south of Ukraine and Russia, Transcaucasia, and Anatolia.

Distribution in Iran: Khorasan-e-Razavi, new record.

Remarks: This species is very similar in appearance to *C. fuscipes*, but distinguished from it by shorter metepisternum, which is not longer than wide, and by characters of the male genitalia. Flightless species; length 9.5–13 mm, width about 3 mm; body black, not metallic, mouthparts dark reddish, antennae, with first segment light red, legs black, with femora apically and tibiae basally reddish brown. Head: medium-sized. Pronotum: almost parallel-sided basally; hind angles well-marked, almost right; disc moderately convex, markedly depressed latero-basally; basal foveae

oval, coarsely punctate. Elytra: striae distinct, complete; intervals 3 and 5 with several discal punctures. Legs: long, slender; tarsal claws serrate.

***Calathus (Calathus) fuscipes fuscipes* (Goeze, 1777)**

Material examined: 7 ex., Khorasan-e-Razavi, 18 km N Neyshabour, Aug 9, 2017, leg. M. Keikhosravi; 3 ex., Khorasan-e-Razavi, Rivash, Aug 9, 2017, leg. M. Keikhosravi.

Geographical distribution: Central, northern and eastern Europe, Caucasus, Transcaucasia, Iran and Iraq; introduced in North America.

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Gilan: Masuleh, Gorgan: Naharkhoran (Battoni, Vereschagina, 1884); Esfahan: Shahreza (Samin *et al.*, 2011); Ardabil: Namin Village (Atamehr, 2013); Mazandaran: Khiroud forest, NowShahr (Azadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Razavi.

***Calathus (Neocalathus) ambiguus ambiguus* (Paykull, 1790)**

Material examined: 3 ex., Khorasan-e-Razavi, Quchan, May 10, 2015, leg. M. Keikhosravi.

Geographical distribution: The West Palaearctic region up to West Siberia, Central Asia and Afghanistan in the east.

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Elburz: Karaj; Qazvin: Rudbar (Azadbakhsh *et al.*, 2015).

Remarks: New record for Khorasan-e-Razavi.

Tribe Zabrini Bonelli, 1810

Subtribe Zabrina Bonelli, 1810

Genus *Zabrus* Clairville, 1806

***Zabrus (Zabrus) morio morio* (Ménétriés, 1832)**

Material examined: 9 ex., Khorasan-e-Razavi, Zaveh (Torbat Hedariye), Mar 2, 2015, leg. M. Keikhosravi; 5 ex., Khorasan-e-Razavi, Godasia (Sabzevar), Apr 18, 2017, leg. M. Keikhosravi; 7 ex., Khorasan-e-Razavi, Soltanabad (Sabzevar), Mar 10, 2015, leg. M. Keikhosravi.

Geographical distribution: Anatolia, Transcaucasia, Iran, Syria, northern Pakistan and Central Asia.

Distribution in Iran: Mazandaran: Firusabad; Chalus; Khorasan-e-Shomali: Bojnourd (Jedlička, 1968); Khorasan-e-Shomali: 5 km South of Pish Qaleh; Lorestan: Khorram Abad South of Mahmudvand (Anichtchenko & Tapiador, 2008); Azarbaijan-e-Sharghi: Basmenj Village (Atamehr, 2013); Golestan: Gorgan (Afshari & Khormali, 2014); Mazandaran: Khiroud forest; Kojoor; Firooz Kola; Lashak (Azadbakhsh *et al.*, 2015).

Subfamily Scaritinae Bonelli, 1810

Tribe Scaritini Bonelli, 1810

Subtribe Scaritina Bonelli, 1810

Genus *Distichus* Motschulsky, 1858

***Distichus planus* (Bonelli, 1813)**

Material examined: 1 ex., Khorasan-e-Razavi, Malvand (Sabzevar), May 11, 2016, leg. M. Keikhosravi; 2 ex., Khorasan-e-Razavi Sheshtamad (Sabzevar), Apr 18, 2017, leg. M. Keikhosravi.

Geographical distribution: Northern Africa, southern Europe, Near East, and Central Asia.

Distribution in Iran: Fars: Farsistan region (Kollar & Redtenbacher, 1849); Khorasan-e-Razavi: Mah-Velat (Sadeghi *et al.*, 2010); Kerman: Zarand (Sadeghi *et al.*, 2011). Golestan: Gorgan (Afshari & Khormali, 2014); Kermanshah: Bisotun; Kermanshah, Golestan: Daland, 10 km S.W. of Minudasht; Azarbaijan-e-Gharbi: Makue, Urmia; Fars: Persepolis; Golestan: Taleb Abad; Bandar-e-Torkaman; Khorasan-e-Razavi: Tabas, Shurlaq; Mazandaran: Tonekabon; Khiroud forest and 5 km West of Sari;

Tehran: Tehran; Elburz: Karaj University; Sistan va Baluchestan: Kuh-e-Khvajeh; Lorestan: 25 km NWW of Dorud (Azadbakhsh *et al.*, 2015).

Genus *Scarites* Fabricius, 1775

Scarites (Parallelomorphus) terricola persicus (Chaudoir, 1842)

Material examined: 4 ex., Khorasan-e-Razavi, Kariz (Gonabd), Jun 13, 2017, leg. M. Keikhosravi.

Geographical distribution: Georgia, Azerbaijan, Iran, Turkmenistan, Uzbekistan and Pakistan.

Distribution in Iran: Mazandaran: Behshahr, (Ghahari *et al.*, 2003); Khorasan-e-Razavi Mashhad, (Hosseini *et al.*, 2012); Hormozgan: Ahmady and Rodan, Kerman: Sirch and Mahan (Azadbakhsh *et al.*, 2015).

Scarites (Scarites) procerus eurytus (Fischer von Waldheim, 1828)

Material examined: 2 ex, Khorasan-e-Razavi, Mazdavand (Taybad), Apr 20, 2017, leg. M. Keikhosravi; 3 ex., Khorasan-e-Razavi, 40 km W-Taybad, Mar 18, 2016, leg. M. Keikhosravi.

Geographical distribution: Northern Africa, southern Europe, Caucasus, Near East, Central Asia, Afghanistan, and Pakistan.

Distribution in Iran: Mazandaran Province (Chaudoir, 1842); Kerman: Sabzewaran (Mandl, 1963); Mazandaran: Amol; Golestan: Galugah; (Ghahari *et al.*, 2009); Khorasan-e-Jonoubi: Nehbandan (Ghahari & Kesdek, 2012); Sistan va Baluchestan: Kuh-e-Khvajeh; Hormozgan: east of Tuzh village; Miankaleh; Mazandaran: Ghalhe Palangan; Guilan: Bandar-e-Anzali and 20 km east of Astara Khorasan-e-Razavi: Shurlaq (Azadbakhsh *et al.*, 2015).

Subfamily Siagoninae Bonelli, 1813

Tribe Siagonini Bonelli, 1813

Genus *Siagona* Latreille, 1804

Siagona europaea europaea (Dejean, 1826)

Material examined: 1 ex., Golestan, forest (Maravetapeh), Mar 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Northern Africa, southern Europe, Caucasus, Near East, Central Asia, Afghanistan, Pakistan, and western India.

Distribution in Iran: Kerman: Sabzewaran and Jaz-Moryan (Mandl, 1963); Azarbaijan-e-Sharghi: Basmenj Village (Atamehr, 2013); Golestan: Gorgan (Afshari & Khormali, 2014); Kermanshah: Kermanshah (Aadbakhsh *et al.*, 2015).

Subfamily Trechinae Bonelli, 1810

Tribe Bembidiini Stephens, 1827

Subtribe Bembidiina Stephens, 1827

Genus *Bembidion* Latreille, 1802

Bembidion (Chlorodium) almum almum (J.R. Sahlberg, 1900)

Material examined: 1 ex., Khorasan-e-Shomali, Royin (Esfarayen), Apr 19, 2016, leg. M. Keikhosravi.

Geographical distribution: Transcaucasia, Iran, Central Asia, Afghanistan, and Mongolia.

Distribution in Iran: Khorasan-e-Shomali: Ala Dag (Netolitzky, 1934).

Bembidion (Peryphus) abbreviatum pulpani Fassati, 1955

Material examined: 2 ex., Khorasan-e-Razavi, Jolgeh (Jajarm), Apr 24, 2017, leg. M. Keikhosravi.

Geographical distribution: From Anatolia through Iran and Central Asia to Afghanistan.

Distribution in Iran: Chahar Mahal va Bakhtiari: Shadegan; Qom: Neyzar, Delijan (Azadbakhsh *et al.*, 2015).

Tribe Pogonini Laporte, 1834

Genus *Bedeliolus* Semenov, 1900

Bedeliolus vigil (Semenov, 1900)

Material examined: 3 ex., Khorasan-e-Shomali, Ashkhaneh, Mar 10, 2017, leg. M. Keikhosravi.

Geographical distribution: Known from Iran and Turkmenistan.

Distribution in Iran: Fars: Kazerun (Jedlička, 1931); Khorasan province (Reitter, 1908).

Genus *Pogonus* Dejean, 1821***Pogonus (Pogonus) micans*** (Chaudoir, 1842)

Material examined: 3 ex., Golestan, forest (Galugah), Mar 17, 2017, leg. M. Keikhosravi.

Geographical distribution: Iran, Iraq, Afghanistan, and Kazakhstan.

Distribution in Iran: Mazandaran province (Chaudoir, 1842); Khuzestan: Shadegan (Jedlička, 1961); Fars: Nirizsee (Mandl, 1963); Hormozgan: Mand River (Azadbakhsh *et al.*, 2015); Khuzestan: Sofhe (Ahmadi *et al.*, 2016).

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