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A study on the species diversity of ground beetles (Coleoptera: Carabidae) from Khorasan province, Eastern Iran

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Abstract

The species diversity of ground beetles (Coleoptera: Carabidae) was studied in Khorasan province, Eastern Iran. Totally 41 species and subspecies from 23 genera and 10 subfamilies (Bembidiinae, Callistinae, Carabinae, Cicindelinae, Harpalinae, Lebiinae, Nebriinae, Oodinae, Pterostichinae, Scaritinae) were collected.

Key words: Coleoptera, Ground beetle, Carabidae, Khorasan, Iran.

Zusammenfassung

Die Artenvielfalt der Laufkäfer (Coleoptera: Carabidae) der Provinz Khorasan, Ost-Iran, wurden studiert. Insgesamt wurden 41 Arten und Unterarten von 23 Gattungen und 10 Unterfamilien. (Bembidiinae, Callistinae, Carabinae, Cicindelinae, Harpalinae, Lebiinae, Nebriinae, Oodinae, Pterostichinae, Scaritinae) gesammelt.

Introduction

Ground beetles (Coleoptera: Carabidae) are important generalist predators in agricultural fields (LUFF 1987, LÖVEI & SUNDERLAND 1996). Adult carabid beetles are generally mobile and their life span is rather long, so probably they respond to quite different biotic and abiotic cues at different times of the season (LANGMAACK et al. 2001). The distribution and activity of carabid beetles in different cropping systems have been studied extensively. Investigations usually show higher number of species and/or individuals in diversified cropping systems, compared to monocultures (RYAN et al. 1980; WIECH & WNUK 1991; ARMSTRONG & MCKINLAY 1994; BOOIJ et al. 1997).

The fauna of Iranian Carabidae was studied rather well and some researches were made by JAEGER (1990), JAEGER (1992), HEJKAL (2000), LASSALLE (2001), ALICHI & MINAEI (2002a, b), HEINZ (2002), MAGRINI & PAVESI (2003), JASKULA (2007), TOLEDANO & MARGGI (2007), GHAHARI et al. (2009a, b, c, 2010). The objective of this paper is determining of carabids fauna in Khorasan province, Eastern Iran.

Materials and Methods

The carabid specimens were collected from fourteen different regions of Khorasan province, Eastern Iran. The sampled regions of this research were Birjand, Bojnourd, Esfarayen, Fariman, Kashmar, Khalil Abad, Mashhad, Nehbandan, Neyshabour, Quchan, Sabzevar, Sarakhs, Sarbisheh, Shirvan and Torbat-e-Heydariyeh. Plastic pitfall traps, 10×15 cm (diameter × depth) and light traps were the main methods for collecting the specimens. The pitfall traps installed at 50 m intervals in different apple orchards and were part-filled with ethanol 80%. The traps were emptied weekly for three crop seasons (spring – fall) and the fallen beetles were collected. In addition to the pit fall and light traps, sweeping nets were conducted randomly in different ecosystems of the mentioned provinces. The information concerning specific name, describer and description date, locality and date of collection, and number of species (in brackets) was given. The nomenclature of the Carabidae is given sensu LÖBL & SMETANA (2003).

Results

In a total 41 carabid species and subspecies from 23 genera and 10 subfamilies were collected from different regions of Khorasan province. The list of species is given below.

Subfamily Bembidiinae LACORDAIRE 1854

Tribe Bembidiini STEPHENS 1827

Genus *Bembidion* LATREILLE 1802

***Bembidion (Peryphus) subcostatum* (MOTSCHULSKY 1850)**

Material examined: Khorasan province: Birjand (1), September 2009.

Subfamily Callistinae CHAUDOIR 1872

Tribe Chlaeniini BONELLI 1810

Genus *Chlaenius* BONELLI 1810

***Chlaenius (Nectochlaenius) canariensis persicus* REDTENBACHER 1857**

Material examined: Khorasan province: Sarakhs (2), April 2006. Khorasan province: Torbat-e-Heydariyeh (1), May 2010.

Subfamily Carabinae LATREILLE 1802

Tribe Carabini LATREILLE 1802

Genus *Calosoma* WEBER 1801

***Calosoma (Calosoma) inquisitor cupreum* DEJEAN 1826**

Material examined: Khorasan province: Kashmar (2), May 2007.

***Carabus (Mimocarabus) roseni* REITTER 1897**

Material examined: Khorasan province: Shirvan (3), July 2008. Khorasan province: Sarbisheh (1), April 2009.

Subfamily Cicindelinae LATREILLE 1802

Tribe Cicindelini SLOANE 1906

Genus *Cephalota* DOKHTOUROFF 1883

Subgenus *Taenidia* RIVALIER 1950

***Cephalota (Taenidia) circumdata cankiriana* KORELL & KLEINFELD 1985**

Material examined: Khorasan province: Mashhad (2), August 2007.

***Cephalota (Taenidia) circumdata eiselti* (MANDL 1967)**

Material examined: Khorasan province: Neyshabour (1), August 2008.

***Cephalota (Taenidia) circumdata hattusae* FRANZEN 1996**

Material examined: Khorasan province: Sarakhs (1), April 2006.

Genus *Cicindela* LINNAEUS 1758

***Cicindela campestris campestris* LINNAEUS 1758**

Material examined: Khorasan province: Mashhad (1), August 2007.

***Cicindela campestris palustris* MOTSCHULSKY 1840**

Material examined: Khorasan province: Nehbandan (2), April 2010.

***Cicindela campestris pontica* FISCHER 1828**

Material examined: Khorasan province: Khalil Abad (6), June 2009.

***Cicindela monticola monticola* MÉNÉTRIES 1832**

Material examined: Khorasan province: Bojnourd (2), May 2008.

***Cicindela (Cicindela) rhodoterena* TSCHITSCHÉRINE 1903**

Material examined: Khorasan province: Birjand (1), September 2009.

***Cicindela turkestanicoides turkestanicoides* W. HORN 1938**

Material examined: Khorasan province: Sabzevar (3), June 2008.

Genus *Cylindera* WESTWOOD 1831

Subgenus *Eugrapha* RIVALIER 1950

***Cylindera (Eugrapha) arenaria viennensis* SCHRANK 1781**

Material examined: Khorasan province: Birjand (2), September 2009.

***Cylindera (Eugrapha) pygmaea* (DEJEAN 1825)**

Material examined: Khorasan province: Neyshabour (3), August 2008.

***Cylindera (Eugrapha) trisignata trisignata* (DEJEAN 1822)**

Material examined: Khorasan province: Nehbandan (1), April 2010.

Genus *Homodela* RIVALIER 1950

***Homodela ismenia ismenia* (GORY 1833)**

Material examined: Khorasan province: Kashmar (1), May 2007.

***Homodela ismenia kilikiensis* (MANDL 1961)**

Material examined: Khorasan province: Mashhad (2), August 2007.

Genus *Lophyridia* JEANNEL 1946

***Lophyridia caucasica* (ADAMS 1817)**

Material examined: Khorasan province: Quchan (2), September 2007. Khorasan province: Neyshabour (1), August 2008.

***Lophyridia concolor rouxii* BARTHELEMY 1835**

Material examined: Khorasan province: Sabzevar (1), June 2008.

***Lophyridia littoralis aulicoides* SAHLBERG 1913**

Material examined: Khorasan province: Bojnourd (2), May 2008.

***Lophyridia littoralis winkleri* (MANDL 1934)**

Material examined: Khorasan province: Mashhad (3), August 2007.

Subfamily Harpalinae BONELLI 1810

Tribe Harpalini BONELLI 1810

Genus *Acinopus* DEJEAN 1821

***Acinopus (Acinopus) laevigatus* MÉNÉTRIÉS 1832**

Material examined: Khorasan province: Kashmar (2), May 2007.

Genus *Diachromus* ERICHSON 1837

***Diachromus germanus* (LINNAEUS 1758)**

Material examined: Khorasan province: Khalil Abad (5), June 2009. Khorasan province: Torbat-e-Heydariyeh (2), May 2010.

Genus *Harpalus* LATREILLE 1802

***Harpalus cupreus* DEJEAN 1829**

Material examined: Khorasan province: Quchan (1), September 2007. Khorasan province: Neyshabour (2), August 2008.

***Harpalus (Pseudoophonus) griseus* (PANZER 1797)**

Material examined: Khorasan province: Sabzevar (3), June 2008. Khorasan province: Torbat-e-Heydariyeh (2), May 2010.

***Harpalus saxicola* DEJEAN 1829**

Material examined: Khorasan province: Sabzevar (5), June 2008. Sarbisheh (2), April 2009.

***Harpalus (Harpalus) smyrnensis* HEYDEN 1888**

Material examined: Khorasan province: Birjand (3), September 2009.

Genus *Scybalicus* SCHAUM 1862

***Scybalicus oblongiusculus* (DEJEAN 1829)**

Material examined: Khorasan province: Bojnourd (3), May 2008. Khorasan province: Fariman (3), April 2010.

Subfamily Lebiinae BONELLI 1810

Tribe Lebiini BONELLI 1810

Genus *Cymindis* LATREILLE 1806

***Cymindis (Cymindis) andreae* MÉNÉTRIÉS 1832**

Material examined: Khorasan province: Bojnourd (1), May 2008.

Genus *Lebia* LATREILLE 1802

***Lebia trimaculata* (VILLERS 1789)**

Material examined: Khorasan province: Shirvan (2), July 2008.

Subfamily Nebriinae LAPORTE 1834

Tribe Nebriini LAPORTE 1834

Genus *Nebria* LATREILLE 1802

***Nebria (Nebria) hemprichi* KLUG 1832**

Material examined: Khorasan province: Sabzevar (4), June 2008.

Subfamily Oodinae LA FERTÉ-SÉNÉCTÈRE 1851

Tribe Oodini LA FERTÉ-SÉNÉCTÈRE 1851

Genus *Oodes* BONELLI 1810

***Oodes gracilis* A. VILLA & G. B. VILLA 1833**

Material examined: Khorasan province: Sarakhs (3), April 2006.

Subfamily Pterostichinae BONELLI 1810

Tribe Amarini (Zabriini) BONELLI 1810

Genus *Amara* BONELLI 1810

***Amara (Curtonotus) convexiuscula* (MARSHAM 1802)**

Material examined: Khorasan province: Esfarayen (4), April 2009.

Genus *Poecilus* BONELLI 1810

***Poecilus (Poecilus) cupreus* (LINNAEUS 1758)**

Material examined: Khorasan province: Esfarayen (3), April 2009. Khorasan province: Torbat-e-Heydariyeh (1), May 2010.

***Poecilus (Omaseus) wollastoni* WOLLASTON 1854**

Material examined: Khorasan province: Birjand (4), September 2009.

Tribe Platynini BONELLI 1810
Genus *Anchomenus* BONELLI 1810

***Anchomenus dorsalis* (PONTOPPIDAN 1763)**

Material examined: Khorasan province: Sarakhs (4), April 2006. Khorasan province: Quchan (1), September 2007.

Genus *Laemostenus* BONELLI 1810

***Laemostenus (Sphodroides) cordicollis* (CHAUDOIR 1854)**

Material examined: Khorasan province: Khalil Abad (4), June 2009. Khorasan province: Fariman (1), April 2010.

Tribe Pterostichini BONELLI 1810
Genus *Pterostichus* BONELLI 1810

***Pterostichus (Platysma) niger* (SCHALLER 1783)**

Material examined: Khorasan province: Mashhad (1), August 2007. Khorasan province: Sarbisheh (2), April 2009.

Genus *Zabrus* CLAIRVILLE 1806

***Zabrus (Eutroctes) aurichalceus* (ADAMS 1817)**

Material examined: Khorasan province: Neyshabour (1), August 2008.

Subfamily Scaritinae BONELLI 1810

Tribe Scaritini BONELLI 1810

Genus *Scarites* FABRICIUS 1775

***Scarites (Scarites) procerus eurytus* (FISCHER VON WALDHEIM 1829)**

Material examined: Khorasan province: Nehbandan (4), April 2010.

Discussion

Khorasan province is the largest province in Iran and included very diverse climates and flora. This study is a partial work of carabids' fauna of Khorasan province, as collecting only 41 carabid species means this fact. Therefore we suggest that the research is continued by other researchers in this part of Iran and it is expected several other species which were not collected in this work. Regarding to the importance of carabids in biological control of pests, conducting the faunal works on these beneficial insects in different regions of Iran is necessary.

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