Arch. Biol. Sci., Belgrade, 59 (3), 239-242, 2007. DOI:10.2298/ABS0703239V

FAUNISTIC STUDY OF THE AQUATIC BEETLES (COLEOPTERA: POLYPHAGA) OF MARKAZI PROVINCE (CENTRAL IRAN) WITH NEW RECORDS

[1]R. VAFAEI, [2]H. OSTOVAN, [3]Ü. INCEKARA, and [4]V. PEŠIĆ

[1]*Entomology Department, Islamic Azad University, Arak Branch*, Arak, Iran
[2]*Entomology Department, Islamic Azad University, Science and Research Branch,* Tehran, Iran
[3]*Department of Biology Science and Arts Faculty, Atatürk University* 25240 Erzurum, Turkey
[4]*Department of Biology, Faculty of Science, University of Montenegro,* 81000 Podgorica, Montenegro

*Abstrac*t - In this study, we establish the presence of 24 aquatic beetle (Coleoptera: Polyphaga) species belonging to 13 genera and five families in Markazi Province of Central Iran. Specimens were collected between 2001 and 2005. Eleven species and four genera are recorded from Iran for the first time. The ecological significance of the new records is briefly discussed.

Key words: Coleoptera, aquatic beetles, diversity, Markazi Province, Iran.

UDC 595.763 /.768 (55-191.2)

INTRODUCTION

Aquatic Coleoptera constitute an important part of the macrozoobenthos of freshwater habitats. Small and temporary water bodies have more species than large and permanent ones (L a r s o n, 1985). Aquatic beetles have their greatest abundance and diversity in temperate regions (S p a n g l e r, 1982). These insects are not selective in their choice of water bodies and occur in a wide variety of habitats (G a l e w s k i, 1971; Z a i t s e v, 1953), although many species may prefer certain types of water bodies (H o s s e i n i e, 1978). Many of them, especially dytiscids and many hydrophilids, are generally found in habitats of small shallow water bodies or on the margin of rivers and marshes, and they occupy the zone of emergent vegetation, mats of plant debris, or flooded terrestrial vegetation along the shoreline (J ä c h and M a r g a l i t, 1987). The aquatic beetle fauna of Iran is partly known. H o s s e i n i e (1992a, 1992b, 1994, 1995a, 1995b) studied the aquatic beetle fauna of Fars, Guilan, Mazandaran and Khuzestan Provinces. O s t o v a n et al. (2004) studied the diversity, abundance, and biology of aquatic insects, including aquatic beetles, in Ardabil and Fars Provinces. C o x and C o x (1982) studied water beetles of the families Dytiscidae, Hydrophilidae, Gyrinidae, and Haliplidae in Amir-Kolayeh and the part of Anzali. Z a h i r i (1995) studied beetles of Haliplidae and Noteridae from the Fars and Khuzestan Provinces. J o h a r y (1996) studied the beetles of the genus *Enochrus* from the aquatic coleopteran collection of Shiraz University. A t a m e h r (2002, 2004) reported 51 species belonging to 40 genera and 14 families from Tabriz Province. Aquatic beetles (Coleoptera: Polyphaga) from Markazi Province were studied to obtain valuable documentation of their occurrence in the different types of springs there. Twenty-four species were detected, among which 11 were found for the first time in Iran. A further aim of this study was to consider the obtained faunistic results from the ecological aspect.

MATERIALS AND METHODS

In 2001-2005, the water beetle fauna from 29 sampling sites was studied. Markazi Province (were the sampling was done) is located in Central Iran between 48°57' and 51°03' East and 33°23' and 35°35' North, and covers an area of 29,491 km^2. The climate of Markazi Province is arid to semiarid. The average rainfall is 309.7 mm/year. Markazi Province has two permanent streams, Ghare-Chae (273 km) and Ghom Rood (85 km), and many small streams such as Khomain, Nozhan, Emarat, Razeghan, Masleghan, and Azna.

For collecting aquatic beetles, sweeping the water

Table 1. List of sampling sites in Markazi Province (Abbreviations: No. = number, Abbr. = abbreviations of the site).

No	Sampling site	coordinates	habitat	Abbr.
1.	Alma Cheshmeh (13 km S of Ashtian)	49° 59′E 34°25′N	spring	ALM
2.	Aman-Abad (22 km E of Arak)	49°56′ E 34°02′N	pool	AMN
3.	Amir-Abad (8 km E of Nahavand)	49°06′E 34°59′N	stream	AMR
4.	Anjedan (30 km E of Arak)	50°02′ E 33°58′N	stream	ANJ
5.	Ashtian	50°00′E 34°32′N	pool	ASH
6.	Band-e-Shahabbasi (25 km NE of tafresh)	50°07′E 34°54′N	river	BSH
7.	Dastjerd (25 km W of Ashtian)	50°15′E 34°34′N	spring	DSJ
8.	Imamzadeh-Davoud	49°50′E 34°52′N	spring	IZD
9.	Haji-Abad	49°06′E 34°51′N	pool	HJA
10.	Hendoodar (25 km SW of Shazand)	49°13′E 33°47′N	pool	HDD
11.	Hezarkhanei (10 km NE of Ashtian)	50°04′E 34°35′N	stream	HZR
12.	Hezaveh (17 km NW of Arak)	49°33′E 34°11′N	stream	HZV
13.	Hossain-Abad-Baghdadi (near Arak)	49°45′E 34°02′N	pool	HBG
14.	Jalayer (26 km N of Tafresh)	50°02′E 34°53′N	river	JLR
15.	Joshiran	49°08′E 34°25′N	pool	JSH
16.	Khayr-Abad	50°00′E 34°08′N	pool	KHR
17.	Khosbijan	49°22′E 34°08′N	pool	KHS
18.	Komaijan	49°20′E 34°44′N	pool	KMJ
19.	Mahallat	50°27′E 33°55′ N	stream	MHL
20.	Mashhad-Mayghan	494°3′E 34°13′N	pool	MSM
21.	Mazlaghan	50°04′E 35°02′N	pool	MZL
22.	Nazm-abad (near Arak)	49°45′E 34°02′ N	stream	NZM
23.	Nobaran	49°52′E 35°09′N	pool	NBR
24.	Noor-abad (18 km Wof Shazand)	49°26′E 33°47′ N	stream	NOR
25.	Razeghan	495°7′E 35°21′N	pool	RZG
26.	Saveh (Sorkh-Deh	50°23′E 35°02′N	river	SVH
27.	Senejan (10 km SW of Arak)	49°37′E 34°03′N	stream	SNJ
28.	Tafresh	50°01′E 34°42′N	river	TFR
29.	Varcheh (20 km NW of Khomain)	49°55′E 33°47′N	spring	VRC

with a metal sieve or net was the main method; in some cases, a drag-type net or light trap was used. All captured samples were separated with forceps. Sorting was performed wet or dry in a flat white tray. The beetles were preserved in 95% alcohol, which was subsequently replaced by a mixture of 75% alcohol and 5% glycerin after 24 hours.

Slide-mounted specimens and material preserved in fluid are stored in collections of the Department of Entomology of Arak Azad University.

A list of localities is given in Table 1. The 'List of species" gives the sampling locations for each species. The date of sampling and total number of individuals are also noted. All specimens were collected by the senior author. Species new for Iran are marked with an asterisk, genera new for Iran with two asterisks.

RESULTS

List of species

Family Hydrophilidae

***Anacaena lutescens* (Stephens, 1829)

Material: MSM 25.06.2002 2.

Laccobius farsicus Gentili, 1975

Material: HBG 21.08.2003 5, AMN 14.07.2002 2, 21.08.2003 1.

L. syriacus Guillebeau 1896

Material: HBG 21.08.2003 1, AMN 14.07.2002 1, 21.08.2003 2.

L. sipylus Orchymont 1939

Material: KHR 05.08.2001 5, KMJ 05.08.2001 4.

**L. gracilis* Motschulsky 1855

Material: IZD 24.07.2001 3.

Helochares sp.

Material: DSJ 27.06.2003 2.

Enochrus bicolor (Fabricius, 1792)

Material: SVH 08.06.2002 6.

E. quadripunctatus (Herbst, 1797)

Material: ANJ 19.06.2005 5, BSH 12.11.2002 3, TFR 13.11.2004 7, NOR 24.07.2002 2, SVH 27.07.2004 4, IZD 12.07.2005 3, NZM 01.10.2001 9, 21.09.2003 1, HDD 02.10.2004 3, MHL12.09.2005 1, HJA 2309.2004 2, VRC 09.09.2003 5, DSJ 25.08.2004 1, HBG 16.07.2002 3, KHS 28.08.2004 2, KMJ 13.07.2003 1, MZL 06.07.2003 1.

E. fuscipennis (Thomson, 1884)

Material: KHS 28.08.2004 5, JSH 29.09.2004 2, 01.08.2005 1, JLR 17.10.2004 2.

**Hydrobius fuscipes* (Linnaeus, 1785)

Material: RZG 29.05.2002 2.

Hydrochara dichroma (Fairmaire, 1892)

Material: AMN 21.07.2003 3, ANJ 02.07.2003 15, KHR 05.08.2001 2, 28.09.2003 2.

Hydrochara sp.

Material: AMN 14.07.2002 1, 21.07.2003 2, 06.08.2003 1.

***Coelostoma orbiculare* (Fabricius, 1775)

Material: JSH 29.09.2004 2.

**C. transcaspicum* Reitter, 1906)

Material: JSH 29.09.2004 1.

Family: Helophoridae

Helophorus micans Faldermann, 1835

Material: ASH 25.06.2002 3, ASH (Fayz-Abad) 15.07.2003 4, NBR 29.08.2001 3, 27.09.2003 1, SNJ 17.07.2001 2.

**H. liguricus* Angus, 1970

Material: SNJ 17.07.2001 2.

H. angustatus Motschulsky, 1860

Material: NBR 29.08.2001 5, SNJ 17.07.2001 1, ASH 25.06.2002 1, ASH (Fayz-Abad) 15.07.2003 3.

H. brevipalpis Bedel, 1881

Material: ALM 27.07.2001 3, 26.06.2002 6, NBR 29.08.2001 2, 27.09.2003 1, SNJ 17.07.2001 7, HDD 02.10.2004 2, MHL 12.09.2005 9.

H. hilaris Sharp, 1916

Material: SNJ 17.07.2001 4, HDD 02.10.2004 1, NOR 24.07.2002 1, ALM 27.07.2001 5, 26.06.2002 2, MHL 12.09.2005 2.

Family: Hydraenidae

***Limnebius paranuristanus* Ferro, 1989

Material: BSH 19.08.2003 3.

**Ochthebius* sp.

Material: BSH: 19.08.2003 2.

Family: Elmidae

***Stenelmis* sp.

Material: AMR 08.09.2002 2, HJA 08.09.2002 1.

**Esolus* sp.

Material: AMR 0809.2002 1, HJA 08.09.2002 3.

Family: Dryopidae

**Dryops algericus* (Lucas, 1849)

Material: MZL 24.06.2005 3, 06.07.2003 1, SVH 11.07.2002 1, 08.06.2002 2, 27.07.2004 1.

DISCUSSION

In freshwater habitats of Markazi Province, 24 aquatic beetle species (Coleoptera: Hydrophilidae, Helophoridae, Hydraenidae, Elmidae, and Dryopidae) belonging to 13 genera and five families were recorded at 29 sites. Of these, the genera *Anacaena, Coelostoma*, *Limnebius* and *Stenelmis*, and the species *Anacaena lutescens*, *Laccobius gracilis*, *Hydrobius fuscipes*, *Coelostoma orbiculare, C. transcaspicum*, *Helophorus liguricus*, *Limnebius paranuristanus*, *Ochthebius* sp., *Stenelmis* sp., *Esolus* sp., and *Dryops algericus* are recorded from Iran for the first time.

The total number of specimens of aquatic beetles collected in freshwater habitats of Markazi Province amounts to 218. Five species are dominant (> 5% of total abundance). In decreasing order, they are as follows (% of total abundance is given in parentheses): *Enochrus quadripunctatus* (24.3%), *Helophorus brevipalpis* (13.8%), *Hydrochara dichroma* (10.1%, *Helophorus hilaris* (6.9%), and *H. micans* (6.0%). Six species are subdominant (abundance of 2-5%): *Enochrus fuscipennis* (4.6%), *Helophorus angustatus* (4.6%), *Laccobius sipylus* (4.1%), *L. farsicus* (3.7%), *Dryops algericus* (3.7%) and *Enochrus bicolor* (2.8%). The remaning 13 species have abundance of <2%.

Further studies aiming to improve our knowledge on Iranian water beetles should focus on collecting in little

known areas, revision of the still unstudied material from additional families and filling the large gaps in our knowledge regarding the diversity of water beetles in some specific habitats.

Acknowledgments – This article is part of the senior author's Ph.D. thesis and was supported by Islamic Azad University (Science and Research Branch) in Tehran, Iran. We thank Dr. Albrecht Komarek for critical reading of the first draft. The first author is grateful to Dr. France Hebauer for valuable assistance in certification of the studied material; to Dr. Mohammad Reza Ghari, Dr. Mehrdad Navabakhsh and Dr. Mostafa Yousefi-Rad for their financial and technical support; and to his wife for her help.

REFERENCES

Atamehr, A., Kamali, K., and *H. Ostovan* (2004). A faunistical study of aquatic Coleoptera in Tabriz region, Iran. *Proceedings of the 16th Plant Protection Congress*, 122.

Atamehr, A. (2002). A Faunistical Study of Aquatic Coleoptera in Tabriz Region, Iran and Bioecological Study on Richness species. Ph.D. Thesis, Islamic Azad University, Science and Research Branch, 1-194.

Cox, M. L., and *P. Cox* (1982). The water beetles of Amir Kelaieh and Pahlavi marshes in Northern Iran (Coleoptera: Dytiscidae, Haliplidae, Gyrinidae, and Hydrophilidae) *Entomol. News*, **118**, 145-156.

Hosseinie, Sh. (1978). Aquatic Coleoptera from South-western Iran (Haliplidae, Dytiscidae and Gyrinidae, with a note on Hydrophilidae). *The Coleopterists Bull*., **32** (2), 167-176.

Hosseinie, Sh. (1992a). A report on the aquatic Coleoptera of Bushehr, Iran. *Latissimus* (Newsletter of the Balfour-Browne Club), 10.

Hosseinie, Sh. (1992b). Report on the aquatic Coleoptera of Hormozgan, Iran. *Latissimus* (Newsletter of the Balfour-Browne Club), 1-22.

Hosseinie, Sh. (1994). A survey of the water Beetles of Khuzestan, Iran. *Latissimus* (Newsletter of the Balfour-Browne Club), 1-23.

Hosseinie, Sh. (1995a). Report on the aquatic Coleoptera of Guilan, a province in the North of Iran. *Latissimus*, (Newsletter of the Balfour-Browne Club), 1-11.

Hosseinie, Sh. (1995b). Water beetles in the Mazandaran Province, North of Iran. *Latissimus* (Newsletter of the Balfour-Browne Club), 1-20.

Jäch, M., and *J. Margalit* (1987). Distribution of dytiscids in springs of the western Dead Sea area (Coleoptera: Dytiscidae). *The Coleopterists Bull*., **41** (4), 327-334.

Johari, H. A. (1997). *A faunistical Study of Enochrus Thomson (Col : Hydrophilidae) in Iran*. M. Sc. Thesis, Shiraz University, 1-257.

Larson, D. J. (1985). Structure in temperate predaceous diving beetle communities (Coleoptera: Dytiscidae). *Holarct. Ecol*. **8**, 18-32.

Ostovan, H., and *J. Niakan* (2004). Ecological and faunistical study of aquatic Coleoptera in South and North of Parishan Lake. *Journal of Agricultural Sciences*, Islamic Azad University, **4** (10), 93-116.

Spangler, P. J. (1982). Coleoptera. In: *Aquatic Biota of Tropical South America*. (Eds. S.H. Hurlbert, G. Rodriguez and N.D. dos Santose), 328-397. San Diego State University, San Diego, California.

Zaitsev, F. A. (1953). *Nasekomye Zhestkokrylye. Plavuntsovyei Vertyachki. Fauna SSSR* **58**, 1-376.

Zahiri, F. (1995). *A Faunistical Study of Aquatic Coleoptera (Haliplidae and Noteridae) in Fars and Khouzestan Provinces*. M. Sc. Thesis, Shiraz University, 1-204.

ФАУНИСТИЧКА СТУДИЈА ВОДЕНИХ КОЛЕОПТЕРА (COLEOPTERA: POLYPHAGA) ПРОВИНЦИЈЕ МАРКАЗИ (ЦЕНТРАЛНИ ИРАН) СА НОВИМ НАЛАЗИМА ВРСТА

[1]Р. ВАФАЕИ, [2]Х. ОСТОВАН, [3]У. ИНЦЕКАРА и [4]В. ПЕШИЋ

[1]*Одсек за ентомологију, Исламски Азад Универзитет*, Арак, Иран
[2]*Одсек за ентомологију, Исламски Азад Универзитет*, Техеран, Иран
[2]*Ататурк Универзитет, Одсек за биологију, Факултет за науку и уметност,* 25240, Ерзерум, Турска
[4]*Одсек за биологију, Универзитет Црне Горе,* 81000 Подгорица, Црна Гора.

У раду су наведене 24 врсте водених колеоптера (Coleoptera: Polyphaga) из 13 родова и пет фамилија, сакупљене у провинцији Маркази у централном Ирану, у периоду 2001–2005. Једанаст врста (*Anacaena lutescens*, *Laccobius gracilis*, *Hydrobius fuscipes*, *Coelostoma orbiculare, C. transcaspicum*, *Helophorus liguricus*, *Limnebius paranuristanus*, *Ochthebius* sp., *Stenelmis* sp., *Esolus* sp. and *Dryops algericus*) и четири рода (*Anacaena, Coelostoma*, *Limnebius* and *Stenelmis*) регистроване су за фауну Ирана по први пут. Еколошки значај нових налаза укратко је размотрен.