

Orijinal araştırma (Original article)

**Contributions to the knowledge of Iranian aquatic polyphaga
(Coleoptera) fauna**

İran'ın sucul polyphaga (Coleoptera) faunasına katkılar

Ümit İNCEKARA¹ Mustafa DARILMAZ² Reza VAFAEİ³ Ahmet POLAT^{1*}

Abstract

In this study, we established the presence of 42 aquatic beetle (Coleoptera: Hydrophiloidea) species belonging to 13 genera and 3 families (Helophoridae, Hydrochidae and Hydrophilidae) in Guilan, Mazandaran, Qazvin, Sanandaj and Tehran provinces of Iran. The specimens were collected between 2008 and 2009. Eleven species were recorded from Iran for the first time, and distributions in Iran and worldwide of these newly recorded species are presented.

Key words: Coleoptera, aquatic beetles, Polyphaga, diversity, new records, Iran

Özet

Bu çalışmada, İran'ın Guilan, Mazandaran, Qazvin, Sanandaj ve Tehran bölgelerinde 13 cins ve 3 familyaya ait 42 sucul böcek türünün varlığı tespit edildi. Numuneler 2008 ve 2009 yılları arasında toplandı. 11 tür İran'dan ilk kez kaydedildi, kaydedilen bu türlerin İran ve dünya genelindeki dağılımları sunuldu.

Anahtar sözcükler: Coleoptera, sucul böcekler, Polyphaga, çeşitlilik, yeni kayıtlar, İran

¹ Atatürk University, Faculty of Science, Department of Biology, 25240, Erzurum, Turkey

² Aksaray University, Faculty of Arts and Science, Department of Biology, 68100, Aksaray, Turkey

³ Entomology Department, Islamic Azad University, Science and Research Branch, Tehran, Iran

* Sorumlu yazar (corresponding author) e-mail: ahmetpolat@atauni.edu.tr

Alınış (Received): 18.05.2012

Kabul edilmiş (Accepted): 01.11.2012

Introduction

The aquatic beetle fauna of Iran is partly known. Hosseinie (1992a; 1992b; 1994; 1995a; 1995b) studied the aquatic beetle fauna of Fars, Guilan, Mazandaran and Khuzestan Provinces. Ostovan and Niakan (2004) studied the diversity, abundance, and biology of aquatic insects, including aquatic beetles, in Ardabil and Fars Provinces. Cox and Cox (1982) studied aquatic species of Dytiscidae, Gyrinidae, Haliplidae and Hydrophilidae, in Amir-Kolayeh and part of Anzali. Zahiri (1995) studied beetles of Haliplidae and Noteridae from the Provinces Fars and Khuzestan. Johari (1997) studied the specimens of *Enochrus* from the aquatic coleopteran collection of the Shiraz University. Atamehr (2002); Atamehr et al., (2004) reported 51 species belonging to 40 genera and 14 families from the province of Tabriz.

Recently, aquatic beetles (Coleoptera: Adepaga) from the province of Markazi were studied by Vafei et al., (2007) in the different types of springs there. In that study, twenty-four species were detected, among which eleven were found for the first time in Iran. A faunistic study on Iranian Polyphaga was performed by Vafei et al. (2009) in which the Turkish and Iranian populations of the rare species *Coleostoma transcaspicum* Reitter, 1906 were morphologically compared.

Material and Methods

In 2008-2009, the water beetle fauna from Guilan, Mazandaran, Qazvin, Sanandaj and Tehran provinces was studied. These provinces are located in north and central Iran. For collecting aquatic beetles, sweeping the water with a metal sieve or net was the main method; in some cases, a drag-type net or light trap was used. The samples were separated by means of forceps and sorted 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. The slide-mounted specimens and material preserved in fluid are stored in the collections of the Department of Entomology of Arak Azad University. The date of sampling and total number of individuals are noted. Species new for Iran are marked with an asterisk.

Countries have been coded as follows after Hansen (2004).

E-Europe: AB Azerbaijan, AL Albania, AR Armenia, AU Austria, BE Belgium, BH Bosnia Herzegovina, BU Bulgaria, BY Belarus, CR Croatia, CT Russia: Central European Territory, CZ Czech Republic, DE Denmark, EN Estonia, FI Finland, FR France (incl. Corsica, Monaco), GB Great Britain (incl. Channel Islands), GE Germany, GR Greece (incl. Kriti) HU Hungary, IR Ireland, IT Italy (incl. Sardegna, Sicilia, San Marino), KZ Kazakhstan, LA Latvia, LT Lithuania, MA Malta, MC Macedonia, NL The Netherlands, NR Norway, NT Russia: North European Territory, PL Poland, PT Portugal, RO Romania, SK Slovakia, SL Slovenia, SP Spain (incl. Gibraltar), ST Russia: South European Territory, SV Sweden, SZ Switzerland, TR Turkey, UK Ukraine, YU Yugoslavia (Serbia, Montenegro). N-North Africa: AG Algeria, CI Canary Islands, EG Egypt, MO Morocco (incl. Western Sahara), MR Madeira Archipelago, TU Tunisia. A-Asia: AE Arab Emirates, AF Afghanistan, CY Cyprus, ES Russia: East Siberia, FE Russia: Far East, IS Israel, KZ Kazakhstan, LE Lebanon, SY Syria, TR Turkey.

Results

List of species

Helophoridae

Helophorus (*Atracthelophorus*) *brevipalpis* Bedel, 1881

Material examined: Tehran: Jajrood, 35°44'N 51°42'E, 28.IX.2008, 1 male, 2 females.

Helophorus (*A.*) *zagrosicus* Angus, 1988

Material examined: Mazandaran: Sari, Parchikola, 36°33'N 53°02'E, 22.VII.2008, 1 male.

Helophorus (Eutrichelophorus) micans Falderman, 1835

Material examined: Tehran: Abali, Emamzadeh hashem, 35°45'N 51°57'E, 29.IX.2008, 1 female.

Helophorus (Rhopalhelophorus) hilaris Sharp, 1916

Material examined: Alborz: Karaj, Jalangedar, 35°57'N 50°51'E, 03.X.2008, 5 females; Khorvin, 36°02'N 50°55'E, 29.XI.2008, 1 male, 2 females. Khoshroodpey, Dolat rodbar, 36°33' N 53°02'E, 05.V.2008, 7 males, 1 female.

Helophorus (s. str.) aquaticus (Linneaus, 1758)

Material examined: Alborz: Karaj, Khorvin, 36°02'N 50°55'E, 29.XI.2008, 2 females; Jalangedar, 35°57'N 50°51'E, 1478m, 10.VIII.2009, 2 males.

Helophorus (s. str.) liguricus Angus, 1970

Material examined: Dareh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 1 male.

Hydrochidae

Hydrochus flavipennis Kuster, 1852

Material examined: Guilan: Langaroud, Chaf, 37°16'N 50°25'E, 07.VII.2008, 1 male.

General distribution: E: AB, CR, UK; A: TR, IS (Hebauer, 1994; Hansen, 2004; Darılmaz and Kiyak, 2008).

Hydrophilidae

Anacaena limbata (Fabricius, 1792)

Material examined: Alborz: Karaj, Jalangedar, 35°57'N 50°51'E, 1478m, 10.VIII.2009, 1 male.

General distribution: E: AR, AU, BE, BH, BU, BY, CT, CZ, DE, FI, FR, GB, GE, GR, HU, IR, IT, LA, NL, NT, PL, PT, RO, SK, SP, ST, SV, SZ, UK, YU; N: AG; A: FE, IS, KZ, SY, TR, WS; NAR (Hebauer, 1994; Hansen, 2004; Hebauer and Klausnitzer, 1998; Bouzid and Incekara, 2006; Jia and Zhao, 2008; Incekara et al., 2010; Darılmaz and Incekara, 2011).

Anacaena rufipes Guillebeau, 1896

Material examined: Alborz: Karaj, Kordan, 35°57'N 50°50'E, 1426m, 23.I.2009, 1 male, 1 female; Jalangedar, 35°57'N 50°51'E, 1478m, 10.VIII.2009, 1 female.

General distribution: E: BH, GR, IT, YU; A: IS, LE, SY, TR (Hansen, 1999; 2004; Incekara et al., 2010; Darılmaz and Incekara, 2011).

Berosus (Enoplurus) bispina Reiche and Saulcy, 1856

Material examined: Gilan: Amlash, Sulush, 37°32'N 50°12'E, 19.VIII.2008, 1 male, 3 females.

Berosus (E.) frontifoveatus Kuwert, 1888

Material examined: Mazandaran: Babol, Gaemshahr, 35°54'N 50°45'E, 30.IX.2008, 2 males.

Berosus (E.) spinosus (Steven, 1808)

Material examined: Kumle, Hadikelaye, 37°13'N 50°13'E, 20.VIII.2008, 4 males, 6 females; Mazandaran: Sari, Akande, 36°42'N 53°04'E, 15.VII.2008, 3 males; Babol, Gaemshahr, 35°54'N 50°45'E, 30.IX.2008, 3 males, 9 females.

Berosus (s. str.) *affinis* Brulle, 1922

Material examined: Gilan: Siahkal, Tuteky, 49°31'N 37°02'E, 15.VIII.2008, 1 male, 1 female.

Berosus (s. str.) *signaticollis* (Charpentier, 1825)

Material examined: Khoshrodpey, Dolat rodbar, 36°33'N 53°02'E, 08.V.2008, 1 male.

Coleostoma orbiculare (Fabricius, 1775)

Material examined: Langaroud, Chamkhale, 37°19'N 50°28'E, 06.VIII.2008, 3 females.

Coelostoma transcasicum Reitter, 1906

Material examined: Gilan: Langaroud, Chaf, 37°16'N 50°25'E, 07.VII.2008, 2 males. Mazandaran: Babol, Bijikola, 36°32'N 52°40'E, 30.IX.2008, 1 female. Daeh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 2 males.

Enochrus affinis (Thunberg, 1794)

Material examined: Dareh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 2 males, 2 females; Kore Sia, Talkh Spring, 30°38'N 50°11'E, 302m, 28.V.2009, 3 males, 1 female.

General distribution: E: AR, AU, BE, BH, BU, BY, CR, CT, CZ, DE, EN, FI, FR, GB, GE, IT, LA, LT, NL, NR, NT, NR, NT, PL, SK, ST, SV, SZ, UK; A: ES, FE, KZ, TR, WS; N: AG (Hansen, 2004; Darilmaz and Incekara, 2011).

Enochrus bicolor Fabricius, 1792

Material examined: Dareh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 1 male.

Enochrus fuscipennis Thomson, 1884

Material examined: Gilan: Kalachay, 37°12'N 50°22'E, 20.VIII.2008, 2 males. Mazandaran: Ghaemshahr, Bala lamok, 35°54'N 50°45'E, 02.VII.2008, 4 males; 35°54'N 50°45'E, 02.VII.2008, 6 males; Ghaemshahr, Payin lamok, 35°54'N 50°45'E, 23.V.2008, 1 male. Qazvin: Rajaedasht, 36°20'N 50°27'E, 16.IX.2008, 2 males. Tehran: Firoozkooh, Gadok, 35°53'N 52°58'E, 15.IX.2008, 6 males, 5 females; Firuzkuh, Mazdaran, 35°34'N 52°36'E, 10.X.2008, 1 male.

Enochrus halophilus (Bedel, 1878)

Material examined: Gilan: Amlash, 37°06'N 50°10'E, 10.VIII.2008, 4 females.

General distribution: E: DE, FR, GB, GE, IR, NL, SP, SV; A: CY, TR (Hansen, 2004; Darilmaz and Kiyak, 2009).

Enochrus politus (Küster, 1849)

Material examined: Gilan: Amlash, 37°06'N 50°10'E, 10.VIII.2008, 2 males.

General distribution: E: IT, PT, SP; N: AG, CI, EG, MO, MR, TU; A: AE, AF, CY, IS, LE, OM, SY, TR; (Hansen, 2004; Darilmaz and Kiyak, 2009; Fikacek et al., 2010).

Enochrus quadripunctatus Herbal, 1797

Material examined: Mazandaran: Ghaemshahr, Bala lamok, 35°54'N 50°45'E, 02.VII.2008, 1 male, 1 female.

Enochrus testaceus (Fabricius, 1801)

Material examined: Alborz: Karaj, Jalangedar, 35°57'N 50°51'E, 11.IX.2008, 1 female.

General distribution: E: AB, AR, AU, BU, BY, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GR, HU, IR, IT, LA, LT, NL, NR, NT, PL, RO, SK, SP, ST, SV, SZ, UK, YU; A: ES, FE, KZ, TR, WS (Hansen, 2004; Darılmaz and Kiyak, 2009).

Helochares obscurus (Müller, 1776)

Material examined: Gilan: Amlash, 37°06'N 50°10'E, 10.VIII.2008, 1 male. Mazandaran: Ghaemshahr, Bala lamok, 35°54'N 50°45'E, 02.VII.2008, 1 male, 1 female.

Helochares punctatus Sharp, 1869

Material examined: Dareh Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 1 female.

Hydrobius fuscipes (Linnaeus, 1758)

Material examined: Mazandaran: Ghaemshahr, Bala lamok, 35°54'N 50°45'E, 02.VII.2008, 1 female.

Hydrochara caraboides (Linnaeus 1758)

Material examined: Mazandaran: Polsefid, Shormast, 36°06'N 53°02'E, 07.IX.2008, 1 female.

General distribution: E: AL, AU, BE, BH, BU, BY, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GR, HU, IT, LA, LT, NL, NR, NT, PL, RO, SK, SL, SP, ST, SV, SZ, UK, YU; A: ES, TR, WS (Smetana, 1980; Hansen, 1999; 2004; Incekara et al., 2003; 2009; Darılmaz and Incekara, 2011).

Hydrochara flavipes (Steven, 1808)

Material examined: Mazandaran: Polsefid, Shormast, 36°06'N 53°02'E, 07.IX.2008, 3 males, 1 female; Ghaemshahr, Bala lamok, 35°54' N 50°45'E, 02.VII.2008, 2 females.

Laccobius (Dimorpholaccobius) bipunctatus (Fabricius, 1775)

Material examined: Mazandaran: Sari, Koy khil, 36°33'N 53°02'E, 18.V.2008, 1 female. Qazvin: Rajaedasht, 36°25'N 50°13'E, 16.IX.2008, 2 males; Kuhin, Yleh Gonbad, 36°22'N 49°39'E, 1494m, 25.07.2009, 1 male.

General distribution: E: AL, AU, BE, BH, BU, BY, CR, CZ, DE, EN, FI, FR, GB, GE, GR, HU, IR, IT, LA, LT, MC, NL, NR, NT, PL, PT, RO, SK, SL, SP, SV, SZ, UK, YU; N: MO, TU; A: AR, KZ, TM, TR (Gentili and Chiesa, 1975; Hansen, 2004; Darılmaz and Incekara, 2011).

Laccobius (D.) halophilus Gentili, 1982

Material examined: Gilan: Siahkal, Tuteky, 37°08'N 49°38'E, 15.VIII.2008, 3 females. Kumle, Lat, 37°20'N 50°11'E, 08.VII.2008, 4 males, 5 females.

Laccobius (D.) hauserianus Kniz, 1914

Material examined: Khair abad River, 30°20'N 50°17'E, 197m, 29.XI.2008, 3 males, 5 females.

Laccobius (D.) hindukuschi Chiesa, 1966

Material examined: Alborz: Karaj, Kordan, 35°57'N 50°50'E, 1426m, 25.07.2009, 1 male, 1 female. Qazvin: Fashandak, 36°08'N 50°42'E, 24.XI.2008, 2 males, 2 females. Tehran: Bumahen, 35°44'N 51°46'E, 10.IX.2008, 4 males. Khair abad River, 30°20'N 50°17'E, 197m, 29.XI.2008, 2 males, 6 females.

Laccobius (D.) obscuratus aegaeus Gentili, 1974

Material examined: Tehran: Bumahen, 35°44'N 51°46'E, 10.IX.2008, 1 male, 3 females.

General distribution: E: GR, UK; A: TR (Gentili and Chiesa, 1975; Hansen, 2004; Polat et al., 2010; Darılmaz and Incekara, 2011).

Laccobius (D.) quaesitus Gentili, 1988

Material examined: Hosein abad Bridge, Marun, 30°39'N 50°11'E, 301m, 01.V.2009, 1 male, 1 female.

Laccobius (D.) simulatrix d'Orchymont, 1932

Material examined: Kumle, Otaghwar, 37°10'N 50°27'E, 10.VIII.2008, 3 males, 4 females.

Laccobius (D.) sipylus d'Orchymont, 1939

Material examined: Qazvin: Fashand, 36°01'N 50°45'E, 1723m, 27.VI.2009, 1 male, 1 female.

Laccobius (D.) syriacus Guillebeau, 1896

Material examined: Alborz: Karaj, Khorvin, 36°01'N 50°50'E, 1812m, 25.VII.2009, 1 male, 2 females; Karaj, Kordan, 35°57'N 50°50'E, 1426m, 23.I.2009, 1 male. Tehran: Bumahen, 35°44'N 51°46'E, 10.IX.2008, 1 male, 3 females.

Laccobius (Microlaccobius) alternus Motschulsky, 1855

Material examined: Alborz: Karaj, Kordan, 35°57'N 50°50'E, 1426m, 23.07.2009, 2 males.

General distribution: E: AL, AU, BH, CR, CZ, FR, GE, GR, HU, IT, PL, RO, SK, SL, SP, ST, SZ, U; A: AR, TR (Chiesa, 1959; Gentili, 2000; Hansen, 2004; Darılmaz and Kiyak, 2010; Darılmaz and Incekara 2011).

Laccobius (M.) gracilis gracilis Motschulsky, 1855

Material examined: Mazandaran: Sari, Koy khil, 36°33'N 53°02'E, 18.V.2008, 2 males. Qazvin: Jowestan, 36°02'N 50°38'E, 1516m, 24.XI.2008, 1 female. Kumle, Otaghwar, 37°10'N 50°27'E, 10.VIII.2008, 3 males, 2 females; Khair abad River, 50°17'E 30°20'N, 197m, 29.XI.2008, 1 male; Khair abad River, 50°17'E 30°20'N, 197m, 29.XI.2008, 7 males, 3 females.

Limnoxenus niger (Gmelin, 1790)

Material examined: Mazandaran: Gazanak, Vana, 35°55'N 52°13'E, 13.IX.2008, 1 female. Daeh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 2 females.

Paracymus aeneus (Germar, 1824)

Material examined: Daeh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 1 male.

Sternolophus decens Zaitzev, 1909

Material examined: Daeh, Garmabe, 30°31'N 50°24'E, 369m, 06.VI.2009, 1 male.

Discussion

In freshwater habitats of five provinces (Guilan, Markazi, Mazandaran, Qazvin, Sanandaj and Tehran) in Iran, 42 aquatic beetle species/subspecies (Coleoptera: Helophoridae, Hydrochidae and Hydrophilidae) belonging to 17 genera and three families were recorded at 29 different sites. Of these, *Anacaena limbata* (Fabricius, 1792), *A. rufipes* Guillebeau, 1896, *Enochrus affinis* (Thunberg, 1794), *E. halophilus* (Bedel, 1878), *E. politus* (Küster, 1849), *E. testaceus* (Fabricius, 1801), *Hydrochara caraboides* (Linnaeus 1758), *Hydrochus flavipennis* Kuster, 1852, *Laccobius (Dimorpholaccobius) bipunctatus*

(Fabricius, 1775), *L. (D.) obscuratus aegaeus* Gentili, 1974 and *L. (Microlaccobius) alternus* Motschulsky, 1855 are recorded from Iran for the first time.

The total number of Polyphaga species of aquatic beetles collected in freshwater habitats of Markazi Province amounts to 29. Six species/subspecies are dominant (> 5% of total abundance). In decreasing order, they are as follows (% of total abundance is given in parentheses): *Enochrus fuscipennis* (12.7%), *Berosus spinosus* (11.8%), *Laccobius gracilis gracilis* (9%), *L. hindukuschi* (8%), *Helophorus hilaris* (7.5%) and *L. halophilus* (5.6%). Five species are subdominant (abundance of 2-5%): *Enochrus affinis* (3.8%), *Laccobius syriacus* (3.8%), *L. hauserianus* (3.8%), *L. simulatrix* (3.3%) and *Hydrochara flavipes* (2.8%). The remaining 31 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

We are grateful to the beetle collectors (Dina Yaghubi, Raheleh Bahmani, Lamyen Soltani Zadeh, Shohreh Faghizadeh Gorji, Elham Irani and Reza Hematiyan) for their contribution to the study.

References

- Atamehr, A. 2002. A Faunistical Study of Aquatic Coleoptera in Tabriz Region, Iran and Bioecological Study on Richness species. Islamic Azad University, Ph.D. Thesis, 194.
- Atamehr, A., K. Kamali, & H. Ostovan, 2004. A faunistical study of aquatic Coleoptera in Tabriz region, Iran, 122. Proceedings of the 16th Plant Protection Congress.
- Bouzid, S. & Ü İncekara, 2006. Distributional notes on Northeastern Algerian Hydrophilidae (Coleoptera), with three new records. Turkish Journal of Zoology, 30 (3): 305-308.
- Chiesa, E., 1959. Hydrophilidae Europe. Bologna, 199 pp.
- Cox, M.L. & P. Cox, 1982. The water beetles of Amir Kelaieh and Pahlavi marshes in Northern Iran (Coleoptera: Dytiscidae, Halplidae, Gyrinidae, and Hydrophilidae). Entomological News, 118: 145-156.
- Darılmaz, M.C. & S. Kiyak, 2008. An Annotated checklist and key to the Turkish Elongated Water Scavenger Beetles (Coleoptera: Hydrochidae). Baltic Journal of Coleopterology, 8 (2): 149-154.
- Darılmaz, M.C. & S. Kiyak, 2009. The genus *Enochrus* Thomson (Coleoptera: Hydrophilidae) from Turkey, checklist and new records. Archives of Biological Sciences, Belgrade, 61 (4): 762-772.
- Darılmaz, M.C. & S. Kiyak, 2010. Occurrences of the subgenus *Microlaccobius* Gentili in Turkey (Coleoptera: Hydrophilidae, *Laccobius*) with taxonomic notes. Turkish Journal of Zoology, 34 (1): 63-68.
- Darılmaz, M.C. & Ü. İncekara, 2011. Checklist of Hydrophiloidea of Turkey (Coleoptera: Polyphaga). Journal of Natural History, 45 (11-12): 685-735.
- Fikáček, M., E. Gentili & A.E.Z. Short, 2010. Order Coleoptera, family Hydrophilidae. Arthropod fauna of the UAE, 3: 135-165.
- Gentili, E., 2000. Distribuzione del genere *Laccobius* (Coleoptera, Hydrophilidae) in Anatolia e problemi relativi. Biogeographia, 21: 173-214.
- Gentili, E. & A. Chiesa, 1975. Revisione dei *Laccobius* paleartici (Coleoptera: Hydrophilidae). Memorie della Società Entomologica Italiana, 54: 1-187.
- Hansen, M., 1999. World Catalogue of Insects. Hydrophiloidea (Coleoptera). Apollo Books, 2, Stenstrup, 416 pp.
- Hansen, M., 2004. Hydrophilidae-Histeroidea-Staphylinidae, 1-942. In Family Hydrophilidae. (Eds: Ivan Löbl, Ales Smetana) Catalogue of Palearctic Coleoptera. Volume 2, Apollo Books, Stenstrup, 942 pp.
- Hebauer, F., 1994. The Hydrophilidae of Israel and Sinai (Coleoptera, Hydrophilidae). Zoology in the Middle East, 10: 74-137.

- Hebauer, F. B. & Klausnitzer, 1998. Süßwasserfauna Von Mitteleuropa 20/7, 8, 9, 10 Insecta: Coleoptera: Hydrophiloidea (Exkl. *Helophorus*). Spektrum Akademischer Verlag, Heidelberg, Berlin, 134 pp.
- 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.
- İncekara, Ü., A. Mart & O. Erman, 2003. Check-list of the Hydrophilidae (Coleoptera) species of Turkey and a new record for the Turkish fauna. Turkish Journal of Zoology, 27: 47-53.
- İncekara, Ü., A. Mart, A. Polat & H. Karaca, 2009. Studies on Turkish Hydrophilidae (Coleoptera) III. Genus *Hydrochara* Berthold 1827 with description of *Hydrochara major* sp. n. Turkish Journal of Zoology, 33(3): 315-319.
- İncekara, Ü., A. Polat, M.C. Darılmaz, A. Mart & G.E. Taşar, 2010. Aquatic Coleoptera fauna of Ramsar site Sultan Sazlığı (Kayseri, Turkey) and its surroundings: new distribution records of four species from the southern limit of its range. Archives of Biological Sciences, Belgrade, 62 (4): 1181-1191.
- Jia, Feng-long. & L. Zhao, 2008. Two newly recorded species of the genus *Anacaena* (Coleoptera: Hydrophilidae) from China. Entomotaxonomia, 3: 222-224.
- Johari, H. A., 1997. A faunistical Study of *Enochrus* Thomson (Col: Hydrophilidae) in Iran. Shiraz University, M. Sc. Thesis, 257.
- Ostovan, H. & 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.
- Polat, A., Ü. İncekara & A. Mart, 2010. A Faunistic study on the Helophoridae, Hydrophilidae and Hydrochidae (Coleoptera) in Samsun and Tokat provinces (Turkey), with new record and first description of female of *Hydrochara major* İncekara, 2009. Turkish Journal of Entomology, 34 (2): 227-239.
- Smetana, A., 1980. Revision of the genus *Hydrochara* Berth. (Coleoptera: Hydrophilidae). Memoirs of the Entomological Society of Canada, 111: 1-100.
- Vafei, R., H. Ostovan, Ü. İncekara & V. Pesic, 2007. Faunistic Study of the Aquatic beetles (Coleoptera: Polyphaga) of Markazi Province (Central Iran) with new records. Archives of Biological Sciences, Belgrade, 59 (3): 239-242.
- Vafaei, R., M.C. Darılmaz, E. Nazari, Ü. İncekara & N. Piazak, 2009. Contributions to the knowledge of Iranian aquatic Coleoptera fauna (Dytiscidae, Gyrinidae, Helophoridae and Hydraenidae) with new records and notes on the rare species *Coleostoma transcaspicum* Reitter, 1906. Acta Entomologica Serbica, 14(1): 101-107.
- Zahiri, F., 1995. A Faunistical Study of Aquatic Coleoptera (Halipilidae and Noteridae) in Fars and Khuzestan Provinces. Shiraz University, M. Sc. Thesis, 204.