



## A faunistic study of aquatic beetles (Coleoptera: Hydrophilidae, Helophoridae) in Beyşehir lake basin (Konya), Türkiye

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### Abstract

This study is based on investigations conducted in 2018-2020, including a total of 17 species and 2 subspecies belonging to the families Hydrophilidae and Helophoridae (Coleoptera) which were determined from Beyşehir Lake and surrounding areas and among these taxa, 15 are new records for Konya province. *Anacena globulus* Paykull, 1798, *Enochrus quadripunctatus* (Herbst, 1797) and *Laccobius obscuratus orchymonti* Gentili, 1976 were reported from the Central Anatolia Region of Turkey within this study for the first time.

**Keywords:** Hydrophilidae, Helophoridae, Beyşehir Lake, Konya, Türkiye

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### Beyşehir gölü havzası sucul kınkanathılar faunası (Coleoptera: Hydrophilidae, Helophoridae) üzerine bir çalışma

### Özet

Bu çalışma, 2018-2020 yılları arasında Beyşehir Gölü ve çevresinden tespit edilen Hydrophilidae ve Helophoridae familyalarına ait toplam 17 tür ve 2 alttürü kapsamaktadır. Teşhis edilen taksonlardan 15 tanesi Konya ili için yeni kayıt özelliğindedir. *Anacena globulus* Paykull, 1798, *Enochrus quadripunctatus* (Herbst, 1797) ve *Laccobius obscuratus orchymonti* Gentili, 1976 ise İç Anadolu bölgesinden ilk kez bu çalışma ile bildirilmiştir.

**Anahtar kelimeler:** Hydrophilidae, Helophoridae, Beyşehir gölü, Konya, Türkiye

### 1. Introduction

Hydrophilidae or 'water scavenger beetles', represent the largest group of the Hydrophiloidea, including more than 3100 species and 6 subfamilies in all over the world and a majority of which make about 70%, are found in aquatic habitats [1]. The family is classified in six subfamilies and about 492 species are distributed in the Palaearctic region [2,3,4]. Hitherto, 19 genera, 105 species and 3 subspecies of hydrophilids have been known from Turkey [5,6,7].

Helophoridae is another important family of Hydrophiloidea classified into a single genus, *Helophorus* Fabricius, 1775 including about 201 species all over the world. Turkish Helophoridae fauna involves 50 species and 2 subspecies classified in single genus *Helophorus* having 8 *Empleurus*, *Eutrichelophorus*, *Helophorus*, *Orphelophorus*, *Rhopalohelophorus*, *Atracthelophorus*, *Transithelophorus*, *Trichohelophorus* subgenera namely [5,7].

The goal of this paper is to determine of Hydrophilidae and Helophoridae of Beyşehir Lake and surrounding areas in Konya province, Turkey. Beyşehir Lake Basin is located at Central Anatolia, surrounded by the Taurus Mountains and the Western Anatolia Mountains in terms of zoogeography. For this reason, it contains many different habitat types and creates a natural habitat in terms of flora and fauna elements. There were no comprehensive studies at Beyşehir Lake area about the mentioned families although there are numerous water sources. Therefore, this study

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involves contributions to our country's biological diversity by introducing Hydrophilidae and Helophoridae fauna of the site and local fauna with new locality records.

## 2. Materials and methods

The present study is based on Hydrophilidae and Helophoridae collected between April and October in 2018 and in 2020 from Beyşehir Lake and surroundings. Beyşehir Lake is the largest freshwater lake in Turkey and it is the third largest lake in terms of surface area after Van and Tuz Lake. Beyşehir Lake is located within the borders of Beyşehir and Kızıldağ national parks which are part of Lakes District that constitutes one of the most important wetland areas of Turkey including a series of lakes of different sizes (Figure 1).

Specimens were firstly killed with ethyl acetate or 70% ethyl alcohol solution after collected. They were taken to the laboratory for further analysis and dissection. The specimens were cleaned and then aedeagus of the specimens and other morphological characters were dissected under a stereo microscope. Identification of all samples was made by the author. All the specimens were deposited in Selçuk University, Beyşehir Ali Akkanat School of Applied Sciences, Department of Emergency and Disaster Management, Beyşehir, Turkey.

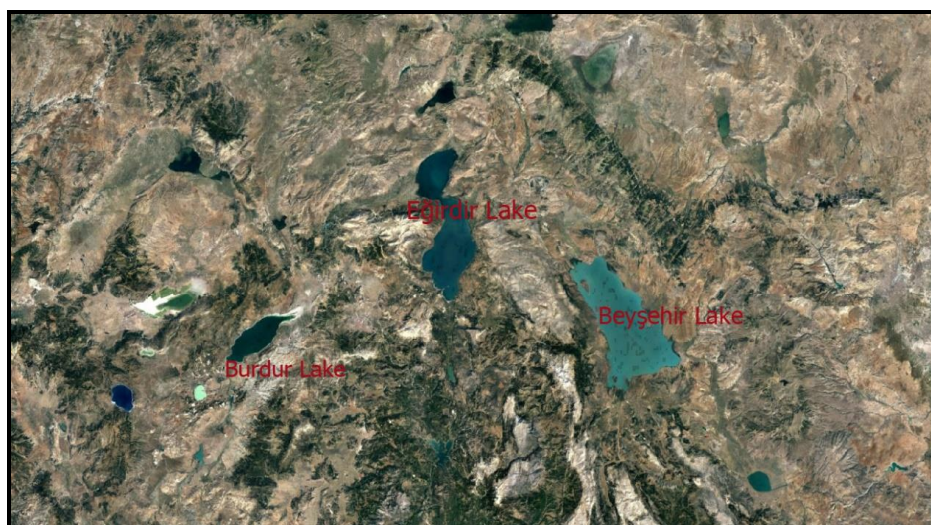


Figure 1. Beyşehir Lake and surroundings

## 3. Results

A total of 17 species and 2 subspecies of Hydrophilidae and Helophoridae were recorded from Beyşehir Lake basin. The following information is given for the material listed: Administrative district (town, village or specific locality), date, altitude, (coordinate), number of specimens. Additionally, distribution in Turkey and locality remarks are added.

### Family: Hydrophilidae Latreille, 1802

#### Genus: *Anacena* Thomson, 1859

##### *Anacena rufipes* (Guillebeau, 1896)

**Material examined:** Eflatun Pınarı, 24.07.2020, 1138 m, (37° 49' 28" N, 31° 40' 19" E), 2 ♂♂.

**Distribution in Turkey:** Bayburt, Giresun, Gümüşhane, İstanbul, Ordu, Samsun, Tokat, Trabzon [7].

**Remark:** New in Konya province.

##### *Anacena globulus* Paykull, 1798

**Material examined:** Beyşehir, 09.08.2020, 1146 m, (37° 49' 31" N 31° 40' 27" E), 1 ♂, 1 ♀.

**Distribution in Turkey:** Balıkesir, İçel, İzmir, İzmit [7].

**Remark:** New in Konya province and Central Anatolia region.

#### Genus: *Berosus* Leach, 1817

##### *Berosus spinosus* Steven, 1808

**Material examined:** Beyşehir on Akburun road, 09.09.2018, 1142 m, (37° 47' 51" N, 31° 37' 59" E), 2 ♂♂, 2 ♀♀; Konya on Beyşehir road 17.10.2018, 1654 m, (37° 38' 10" N, 32° 01' 25" E), 1 ♀.

**Distribution in Turkey:** Adana, Afyon, Aksaray, Ankara, Antalya, Aydın, Çorum, Denizli, Edirne, Elâzığ, İçel, İzmir, Kars, Kayseri, Kırşehir, Malatya, Samsun, Van [7].

**Remark:** New in Konya province.

**Genus: *Enochrus* Thomson, 1859*****Enochrus fuscipennis* (Thomson, 1884)**

**Material examined:** Beyşehir on Şarkikaraağaç road, 29.09.2018 1131 m, (37° 50' 36" N, 31° 36' 56" E), 5 ♂♂, 4 ♀♀; Konya on Beyşehir road, 17.10.2018, 1485 m, (37° 56' 08" N, 31° 57' 54" E); 1 ♂, 3 ♀♀.

**Distribution in Turkey:** Aksaray, Ankara, Artvin, Aydın, Balıkesir, Bayburt, Burdur, Bursa, Çanakkale, Çorum, Denizli, Giresun, Gümüşhane, Erzincan, Erzurum, Isparta, İzmir, Kayseri, Manisa, Ordu, Rize [7].

**Remark:** New in Konya province.

***Enochrus halophilus* (Bedel, 1878)**

**Material examined:** Beyşehir, 14.09.2018, 1134 m, (37° 40' 46" N, 31 43 27" E), 1 ♀; Konya on Beyşehir road, 17.10.2018, 1485 m, (37° 56' 08" N, 31° 57' 54" E) 3 ♂♂, 3 ♀♀.

**Distribution in Turkey:** Afyonkarahisar, Burdur, Isparta, İzmir, Kayseri, Manisa [7].

**Remark:** New in Konya province.

***Enochrus quadripunctatus* (Herbst, 1797)**

**Material examined:** Yenişarbademli, Gölyaka, 06. 09. 2020, 1141 m, (37° 43' 49" N, 31 27 00" E), 2 ♂♂; Kızıldağ National Park, 06. 09. 2020, 1146 m, (37° 44' 23" N, 31 25 19" E), 1 ♂.

**Distribution in Turkey:** Antalya, Denizli, Edirne, Isparta, İzmir, Manisa, Ordu [7].

**Remark:** New in Konya province and Central Anatolia region.

**Genus: *Helochares* Mulsant, 1844*****Helochares punctatus* Sharp, 1869**

**Material examined:** Beyşehir, 22.09.2018, 1190 m, (37° 48' 49" N, 31° 43' 04" E), 2 ♂♂; Şarkikaraağaç, 29.09.2018, 1131 m, (37° 50' 36" N, 31° 36' 56" E), 2 ♂♂, 5 ♀♀; Konya on Beyşehir road, 17.10.2018, 1485 m, (37° 56' 08" N, 31° 57' 12" E), 2 ♂♂.

**Distribution in Turkey:** Artvin, Burdur, Çorum, Isparta, İzmir, Manisa [7].

**Remark:** New in Konya province.

***Helochares obscurus* (Müller, 1776)**

**Material examined:** Konya on Beyşehir road, 17.10.2018, 1654 m, (37° 38' 10" N, 32° 01' 25" E), 1 ♂, 1 ♀.

**Distribution in Turkey:** Adana, Ankara, Balıkesir, Bayburt, Burdur, Bursa, Çanakkale, Giresun, Isparta, İzmir, Kayseri, Sakarya, Samsun, Ordu [7].

**Remark:** New in Konya province.

**Genus: *Hydrobius* Leach, 1815*****Hydrobius fuscipes* (Linnaeus, 1758)**

**Material examined:** Tolca, 20. 09. 2020, 1129 m, (37° 54' 43" N, 31° 29' 44" E), 5 ♂♂, 3 ♀♀; Şarkikaraağaç on Beyşehir road, 11. 10.2020, 1323 m, (37° 58' 43" N, 31° 25' 35" E), 7 ♂♂, 4 ♀♀.

**Distribution in Turkey:** Aydın, Ankara, Artvin, Bayburt, Bilecik, Çorum, Erzincan, Erzurum, Giresun, Gümüşhane, İçel, İzmir, Kayseri, Konya, Ordu, Rize, Samsun, Tokat, Trabzon [7].

**Genus: *Laccobius* Erichson, 1837*****Laccobius bipunctatus* (Fabricius, 1775)**

**Material examined:** Isparta on Konya road, 14.08.2020, 1210 m, (38° 02' 31" N, 31° 26' 48" E), 4 ♂♂, 3 ♀♀; Beyşehir, 20. 09. 2020, 1129 m, (37° 39' 35" N, 31° 42' 20" E), 5 ♂♂, Beyşehir, 20. 09. 2020, 1131 m, (37° 39' 15" N, 31° 40' 20" E), 1 ♀.

**Distribution in Turkey:** Afyon, Artvin, Bayburt, Bolu, Çorum, Erzurum, Giresun, Gümüşhane, Kastamonu, Ordu, Trabzon [7].

**Remark:** New in Konya province.

***Laccobius gracilis* Motschulsky, 1855**

**Material examined:** Beyşehir on Konya road, 11.10.2018, 1132 m, (37° 42' 03" N, 31° 43' 48" E), 2 ♂♂; Beyşehir on Konya road, 17.10.2018, 1654 m, (37° 38' 10" N, 32° 01' 25" E) 1 ♂; Bademli, 08.11.2018, 1193 m, (37° 38' 18" N, 31° 41' 53" E), 4 ♂♂, 1 ♀; Eflatun Spring, 24.07.2020, 1138 m, (37° 49' 28" N, 31° 40' 19" E), 2 ♂♂, 1 ♀.

**Distribution in Turkey:** Adana, Adıyaman, Ankara, Antalya, Artvin, Aydın, Bayburt, Balıkesir, Bilecik, Bingöl, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çorum, Denizli, Diyarbakır, Edirne, Erzincan, Erzurum, Gaziantep, Giresun, Gümüşhane, Hakkâri, Hatay, Isparta, İçel, İstanbul, İzmir, Kars, Kastamonu, Kayseri, Kilis, Kocaeli, Manisa, Mardin, Muğla, Muş, Niğde, Ordu, Rize, Samsun, Sinop, Sivas, Şırnak, Tokat, Trabzon, Van, Yozgat [7].

**Remark:** New in Konya province.

***Laccobius obscuratus aegaeus* Gentili, 1974**

**Material examined:** Beyşehir, 20. 09. 2020, 1131 m, (37° 39' 15" N, 31° 40' 20" E), 4 ♂♂, 4 ♀♀; Şarkikarağaç on Beyşehir road, 11. 10.2020, 1323 m, (37° 58' 43" N, 31° 25' 35" E) 2 ♂♂, 2 ♀♀; Doğanbey, 29. 11. 2020, 1292 m, (37° 47' 44" N, 31° 53' 31" E) 2 ♂♂.

**Distribution in Turkey:** Adana, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bayburt, Bilecik, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çorum, Denizli, Erzincan, Erzurum, Giresun, Gümüşhane, Isparta, İçel, İstanbul, İzmir, Kastamonu, Kayseri, Kırklareli, Kocaeli, Konya, Manisa, Muğla, Niğde, Ordu, Osmaniye, Rize, Samsun, Sinop, Tokat, Trabzon, Van [7].

***Laccobius obscuratus orchymonti* Gentili, 1976**

**Material examined:** Beyşehir on Konya road, 11.10.2018, 1132 m, (37° 42' 03" N, 31° 43' 48" E), 5 ♂♂, 1 ♀; Doğanbey, 29. 11. 2020, 1292 m, (37° 47' 44" N, 31° 53' 31" E), 1 ♂, 1 ♀.

**Distribution in Turkey:** Adıyaman, Aydın, Gaziantep, Hatay, İzmir, Kilis, Manisa [7].

**Remark:** New in Konya province and Central Anatolia.

***Laccobius striatulus* (Fabricius, 1801)**

**Material examined:** Isparta on Konya road, 14.08.2020, 1210 m, (38° 02' 31" N, 31° 26' 48" E), 2 ♂♂, 1 ♀.

**Distribution in Turkey:** Ankara, Antalya, Artvin, Balıkesir, Bayburt, Bilecik, Bitlis, Bolu, Bursa, Çanakkale, Erzurum, Eskişehir, Giresun, Gümüşhane, Hatay, Isparta, İstanbul, İzmir, Kayseri, Kocaeli, Konya, Kütahya, Malatya, Manisa, Muğla, Ordu, Sakarya, Samsun, Sivas, Tokat, Trabzon [7].

***Laccobius simulatrix* d'Orchymont, 1932**

**Material examined:** Üçpınar, 29. 11. 2020, 1231 m, (37° 48' 19" N, 31° 49' 35" E), 3 ♂♂, 2 ♀♀.

**Distribution in Turkey:** Adana, Ağrı, Aksaray, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bayburt, Bitlis, Bolu, Bursa, Çanakkale, Çorum, Denizli, Edirne, Erzincan, Erzurum, Giresun, Gümüşhane, Hakkâri, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırklareli, Kırşehir, Kocaeli, Manisa, Muğla, Niğde, Ordu, Osmaniye, Samsun, Sivas, Tokat, Trabzon, Van, Yozgat [7].

**Remark:** New in Konya province.

***Laccobius syriacus* Guillebeau, 1896**

**Material examined:** Bademli, 08.11.2018, 1193 m, (37° 38' 18" N, 31° 41' 53" E), 2 ♀♀; Isparta on Konya road, 14.08.2020, 1210 m, (38° 02' 31" N, 31° 26' 48" E), 3 ♂♂, 1 ♀.

**Distribution in Turkey:** Adana, Afyonkarahisar, Aksaray, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bayburt, Bilecik, Bitlis, Bolu, Burdur, Bursa, Çorum, Denizli, Diyarbakır, Edirne, Gaziantep, Giresun, Gümüşhane, Erzincan, Erzurum, Hakkâri, Hatay, Isparta, İçel, İzmir, Kars, Kayseri, Kahramanmaraş, Kastamonu, Konya, Manisa, Mardin, Muğla, Ordu, Osmaniye, Rize, Sakarya, Samsun, Sinop, Şanlıurfa, Tokat, Trabzon, Van [7].

**Family Helophoridae Leach, 1815**

**Genus:** *Helophorus* Fabricius, 1775

***Helophorus aquaticus* (Linnaeus, 1758)**

**Material examined:** Beyşehir Yakamanastır National Park, 06.10.2018, 1234 m, (37° 37' 59" N, 31° 42' 12" E), 2 ♂♂, 2 ♀♀, Şarkikarağaç on Beyşehir road, 11. 10.2020, 1323 m, (37° 58' 43" N, 31° 25' 35" E), 3 ♂♂, 2 ♀♀; Beyşehir on Konya road, 11. 10. 2020, 1149 m, (37° 42' 29" N, 31° 44' 37" E), 1 ♀; Üçpınar, 29. 11. 2020, 1231m, (37° 48' 19" N, 31° 49' 35" E), 1 ♂, 1 ♀.

**Distribution in Turkey:** Adana, Aksaray, Ankara, Aydın, Bayburt, Bilecik, Bingöl, Bursa, Bolu, Çorum, Diyarbakır, Erzurum, Hakkâri, Giresun, Gümüşhane, Isparta, İçel, İstanbul, Kars, Kastamonu, Kayseri, Kırklareli, Mardin, Muş, Ordu, Sakarya, Samsun, Sinop, Şırnak, Van [7].

**Remark:** New in Konya province.

***Helophorus brevipalpis brevipalpis* Bedel, 1881**

**Material examined:** Beyşehir on Akburun road, 09.09.2018, 1142 m, (37° 47' 51" N, 31° 37' 59" E), 15 ♂♂, 8 ♀♀; Beyşehir, 22.09.2018, 1190 m, (37° 48' 49" N, 31° 43' 04" E), 3 ♂♂, 1 ♀; Beyşehir Yakamanastır National Park, 06.10.2018, 1234 m, (37° 37' 59" N, 31° 42' 12" E), 3 ♂♂, 4 ♀♀; Beyşehir Ağılönü, 06.10.2018, 1186 m, (37° 38' 35" N, 31° 44' 23" E), 5 ♂♂; Eflatun Spring, 24.07.2020, 1138 m, (37° 49' 28" N, 31° 40' 19" E), 5 ♀♀.

**Distribution in Turkey:** Aksaray, Ankara, Antalya, Artvin, Aydın, Bayburt, Burdur, Bursa, Çorum, Erzurum, Erzincan, Giresun, Gümüşhane, Isparta, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kırklareli, Manisa, Muğla, Niğde, Ordu, Samsun, Sinop, Van, Trabzon, Tuz Lake [7].

**Remark:** New in Konya province.

***Helophorus syriacus* Kuwert, 1885**

**Material examined:** Beyşehir Yakamanastır National Park, 06.10.2018, 1234 m, (37° 37' 59" N, 31° 42' 12" E), 2 ♂♂; Beyşehir Ağılönü, 06.10.2018, 1186 m, (37° 38' 35" N, 31° 44' 23" E), 1 ♂.

**Distribution in Turkey:** Adana, Amanos Mountains (Hatay), Aydın, Burdur, Çorum, Denizli, Diyarbakır, Gaziantep, Hatay, Isparta, İzmir, Mardin, Samsun, Tokat [7].

**Remark:** New in Konya province.

**4. Conclusions and discussion**

Totally 17 species and 2 subspecies were recorded from Beyşehir Lake and surrounding areas within this study. *Laccobius* (5 species, 2 subspecies), *Enochrus* (3 species), *Helophorus* (3 species), *Anacaena* (2 species), *Helochares* (2 species), *Berosus* (1 species), *Hydrobius* (1 species) were represented. Among all, fifteen taxa were recorded in Konya province with this study for the first time. Only 10 species and 1 subspecies were known in Konya province in literature up to now [7], and after the research carried out for the present study, that total number of Hydrophilidae and Helophoridae has been increased to 24 species and 2 subspecies. *Anacena globulus* Paykull, 1798, *Enochrus quadripunctatus* (Herbst, 1797) and *Laccobius obscuratus orchymonti* Gentili, 1976, all of which were reported in Central Anatolia Region of Turkey for the first time. Additionally, *Anacaena rufipes* (Guillebeau, 1896), *Enochrus halophilus* (Bedel, 1878), *Helochares punctatus* Sharp, 1869, *Helochares obscurus* (Müller, 1776) and *Laccobius bipunctatus* (Fabricius, 1775) are recorded for the second time from Central Anatolia in this study. Hydrophilidae and Helophoridae represent two important groups among aquatic beetle fauna of Turkey and aquatic beetle fauna has not fully been presented. This study constitutes a single contribution in order to complete the data on Turkish aquatic beetles and more studies are required to better understand the overall distribution of Hydrophilidae and Helophoridae.

**Acknowledgements**

The study was supported by Department of Scientific Research Project Management of Selçuk University with the Project number 18401093.

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