


## Investigations on The Hydrophiloidea (Coleoptera: Helophoridae, Hydrochidae and Hydrophilidae) Fauna of Şanlıurfa Province

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### ABSTRACT

In this study, the aquatic Coleoptera species collected from Şanlıurfa province in 2014-2015 were evaluated. Thirty taxa concerning the superfamily of Hydrophiloidea (Coleoptera: Helophoridae, Hydrochidae and Hydrophilidae) were detected in the research area. Within these species, *Helophorus singularis* Miller, 1881 was reported for the first time from Turkey. Twenty nine taxa were also first records for Şanlıurfa province. Furthermore, species belonging to *Hydrochara* Berthold, 1827 genus that known from Turkey were discussed.

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### Research Article

## Şanlıurfa İli Hydrophiloidea (Coleoptera: Helophoridae, Hydrochidae ve Hydrophilidae) Faunası Üzerine Araştırmalar

### ÖZET

Bu çalışmada, 2014-2015 yıllarında Şanlıurfa İlinden toplanan sucul kınkanatlı türleri değerlendirilmiştir. Araştırma alanında Hydrophiloidea (Coleoptera: Helophoridae, Hydrochidae ve Hydrophilidae) üst familyasına ait 30 tür tespit edilmiştir. Bu türlerden *Helophorus singularis* Miller, 1881 Türkiye'den ilk kez bildirilmiştir. 29 tür de Şanlıurfa İli için ilk kayıttır. Ayrıca Türkiye *Hydrochara* Berthold, 1827 cinsine ait türler makale içerisinde tartışılmıştır.

### Makale Tarihiçesi

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### Anahtar Kelimeler

Kınkanatlılar,  
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### Araştırma Makalesi

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### INTRODUCTION

Order Coleoptera includes 176 families, 29500 genera and 386500 species, fossil taxa includes 31 families, 230 genera and 600 species (Slipinski et al., 2011). This Order has 4 Suborders named as; Archostemata, Myxophaga, Adephaga and Polyphaga (Lawrence, 2016; Archangelsky et al., 2016). The suborder Polyphaga includes more than %90 of the Coleoptera species (Glime, 2015). The Superfamily Hydrophiloidea is into group of Suborder: Polyphaga. This superfamily has 9 families named as; Helophoridae Leach, 1815, Epimetopidae Zaitzev, 1908, Georissidae Leporte, 1840, Hydrochidae Thomson, 1859, Spercheidae Erichson, 1837, Hydrophilidae Latreille, 1802, Sphaeritidae Shuckard,

1839, Synteliidae Lewis, 1882 and Histeridae Gyllenhal, 1808 (Lawrence, 2016; Archangelsky et al., 2016). We found and collected only the specimens of Hydrophilidae, Hydrochidae and Helophoridae families into this superfamily in the research area.

Family Hydrophilidae (water scavenger beetles) has 169 genera and 2932 described species. The members of this family are living in all over the world (except Antarctica). It was reported that the species of Hydrophilinae, Chaetarhriinae, Enochrinae, Acidocerinae and Sphaeridiinae subfamilies appeared in Palaearctic region (Archangelsky et al., 2016). So far, 103 taxa were known from Turkey (Darılmaz and İncekara, 2011; İncekara et al., 2011; Taşar, 2014; Polat et al., 2015, İncekara et al., 2016; Taşar, 2017).

Helophoridae (grooved water scavenger beetles) family can be discriminated easily from all other adult water beetles on the basis of their most conspicuous diagnostic feature: the presence of five longitudinal grooves on the disc of the pronotum (Stals, 2008). It has a single genus: *Helophorus* Fabricius, 1775. This genus includes 192 species (Archangelsky et al., 2016). 156 species were reported from Palaearctic Region (Przewoźny and Fikáček, 2016). On the other hand, 41 species were reported from Nearctic Region (Smetana, 1985); 3 species were reported from Oriental region (Angus, 1992; Hansen, 1999); nevertheless, only 2 Ethiopian region originated-species were reported (Stals, 2008). 51 species were known in Turkey (Darılmaz and İncekara, 2011; Taşar et al., 2012; Taşar, 2017).

Hydrochidae (elongated water scavenger beetles) family has a single genus: *Hydrochus* Leach, 1817 (Hansen, 1987, 1991). This genus includes 181 species worldwide. They were found in all zoogeographic

regions (Archangelsky et al., 2016). So far, 27 species and two subspecies were reported from Palaearctic Region (Hansen, 2004). Seven species were known in Turkey (Darılmaz and İncekara, 2011; Taşar, 2017).

There is not any detailed study known about Hydrophiloidea (Coleoptera) from Şanlıurfa province in literature. The aim of this study was to present Hydrophiloidea fauna in Şanlıurfa province, Turkey. Besides, this study contributes new record and new data for Turkish Hydrophiloidea Fauna.

## MATERIALS and METHODS

### Study site

Şanlıurfa is a city located in the South-eastern Anatolian region, Turkey (Figure 1). It has terrestrial climate with an elevation of 518 meters. It has 10 districts (except centrum) including Akçakale, Birecik, Bozova, Ceylanpınar, Halfeti, Harran, Hilvan, Siverek, Suruç and Viranşehir.

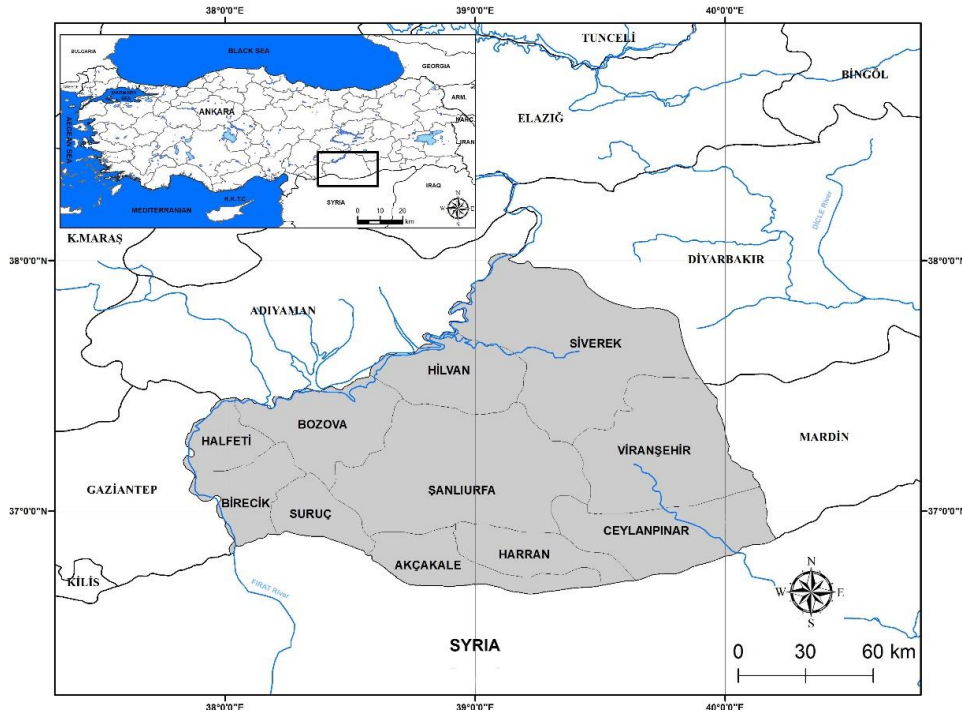


Figure 1. Map of the research area.

### Sampling method

The specimens were collected from freshwater habitats of Şanlıurfa province (Turkey) with 3,15x1 mm and 3,15 x 0,5 mm mesh sized sieves. The beetles were killed with ethyl alcohol and stored in small bottles until further identification. Specimens were cleaned with brush before identification. Aedeagophores of collected specimens were dissected under a stereo microscope (Soif SZM-45) in the laboratory. The identified species were converted into museum material and deposited in the private collections of the

author at Adıyaman University, Turkey.

## RESULTS and DISCUSSION

In the current study, 30 species of three families were collected and identified as following: Helophoridae (with 10 species), Hydrochidae (with 1 species) and Hydrophilidae (with 19 species). Locality data of collected specimens were presented in Table 1.

Within these species: *Helophorus singularis* Miller, 1881 were recorded for the first time from Turkey. From the study, 29 species/subspecies were reported as new records for Şanlıurfa province.

Table 1. Sampling locations (district, village), coordinates and altitudes.

Abbreviation	Sampling site	Coordinates	Altitude (m)
S1	Şanlıurfa	37° 16.500'N 38° 44.900'E	717
S2	Şanlıurfa, Birecik	37° 01.729'N 37° 58.364'E	346
S3	Şanlıurfa, Birecik, Yeşilözen	37° 12.528'N 37° 57.933'E	585
S4	Şanlıurfa, Bozova	37° 25.931'N 38° 22.196'E	510
S5	Şanlıurfa, Bozova	37° 25.253'N 38° 23.488'E	530
S6	Şanlıurfa, Bozova	37° 22.256'N 38° 33.785'E	571
S7	Şanlıurfa, Bozova	37° 22.342'N 38° 36.826'E	569
S8	Şanlıurfa, Bozova, Arıkök	37° 23.803'N 38° 26.987'E	574
S9	Şanlıurfa, Bozova, Çiftlik	37° 22.453'N 38° 40.635'E	562
S10	Şanlıurfa, Bozova, Karababa	37° 27.913'N 38° 15.583'E	402
S11	Şanlıurfa, Hilvan	37° 34.528'N 38° 56.689'E	591
S12	Şanlıurfa, Hilvan	37° 36.809'N 39° 08.203'E	610
S13	Şanlıurfa, Hilvan, Çatak	37° 36.437'N 39° 03.853'E	570
S14	Şanlıurfa, Hilvan, Dalca	37° 36.621'N 39° 05.969'E	580
S15	Şanlıurfa, Hilvan, Faik	37° 36.492'N 39° 00.631'E	595
S16	Şanlıurfa, Hilvan, Kırbaşı	37° 29.738'N 38° 52.973'E	695
S17	Şanlıurfa, Siverek	37° 46.781'N 39° 15.884'E	738
S18	Şanlıurfa, Siverek	37° 48.301'N 39° 35.460'E	1178
S19	Şanlıurfa, Siverek	37° 48.965'N 39° 37.369'E	1109
S20	Şanlıurfa, Siverek	37° 47.898'N 39° 34.403'E	1179
S21	Şanlıurfa, Siverek	37° 53.249'N 39° 03.796'E	851
S22	Şanlıurfa, Siverek	37° 53.176'N 39° 04.778'E	853
S23	Şanlıurfa, Siverek	37° 41.513'N 39° 15.789'E	654
S24	Şanlıurfa, Siverek	37° 43.263'N 39° 19.436'E	716
S25	Şanlıurfa, Siverek, Aşağıkaracaören	37° 21.800'N 39° 26.903'E	689
S26	Şanlıurfa, Siverek, Bucak, Beştaş	37° 51.198'N 39° 07.238'E	747
S27	Şanlıurfa, Siverek, Çamçayı	37° 41.072'N 39° 18.643'E	692
S28	Şanlıurfa, Siverek, Çiftçiler	37° 34.176'N 39° 20.384'E	753
S29	Şanlıurfa, Siverek, Darıcalı	37° 38.097'N 39° 12.008'E	653
S30	Şanlıurfa, Siverek, Hacı Kamil	37° 39.017'N 39° 12.870'E	653
S31	Şanlıurfa, Siverek, Hemo	37° 36.275'N 39° 20.220'E	722
S32	Şanlıurfa, Siverek, Kanterek	37° 41.604'N 39° 18.991'E	716
S33	Şanlıurfa, Siverek, Karakeçi	37° 24.180'N 39° 26.308'E	695
S34	Şanlıurfa, Siverek, Şaraptul	37° 47.082'N 39° 15.203'E	716
S35	Şanlıurfa, Siverek, Sarıdam	37° 13.311'N 39° 30.858'E	612
S36	Şanlıurfa, Siverek, Şehirsuyu	37° 43.249'N 39° 19.439'E	714
S37	Şanlıurfa, Siverek, Üstüntaş, Kudek	37° 47.981'N 39° 13.098'E	716
S38	Şanlıurfa, Siverek, Yücelen	37° 41.770'N 39° 18.645'E	690
S39	Şanlıurfa, Suruç, Aşağıbostancılar	37° 03.100'N 38° 21.008'E	540
S40	Şanlıurfa, Suruç, Büyükhan	37° 07.383'N 38° 23.745'E	584
S41	Şanlıurfa, Suruç, Kocaali	37° 03.375'N 38° 10.169'E	758
S42	Şanlıurfa, Viranşehir	37° 13.010'N 39° 34.200'E	576
S43	Şanlıurfa, Viranşehir	37° 10.067'N 39° 48.682'E	508
S44	Şanlıurfa, Viranşehir, Sesiğ	37° 13.401'N 39° 36.255'E	556

Determined species and their locality data are listed below:

**Family:** Helophoridae

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

*Helophorus brevipalpis* Bedel, 1881

Material examined: S10, 24.06.2014, 2 ex.; S13, 24.06.2014, 1 ex.; 30.09.2014, 2 ex.; S14, 24.06.2014, 1 ex.; S15, 24.06.2014, 2 ex.; 30.09.2014, 1 ex.; S31, 13.05.2014, 1 ex.; S36, 13.05.2014, 1 ex.; 30.09.2014, 1 ex.

***Helophorus lewisi* Angus, 1985**

Material examined: S21, 13.05.2014, 2 ex.

***Helophorus singularis* Miller, 1881**

Material examined: S21, 13.05.2014, 2 ex.

Short diagnosis: Head and pronotum are black, sometimes brownish colour. Apical segment of the maxillary palpi are symmetrical oval. Pronotal intervals are uniformly and densely granulate. Grooves are narrow. Elytra are brownish colour. Strongly striate. Elytral interstices are convex and uneven. Legs are longer. Posterior tarsi are about three quarters the length of the tibiae. According to Angus (1992) the aedeagophore of *H. singularis* (belong to our samples were presented in Figure 2.) is very distinctive, similar in shape to that of *H. obscurus*, but smaller. Our specimens have little differences between the specimens of Angus (1992). Such as the coloration of pronotum. The pronotum of *H. singularis* have matt grey, sometimes brownish colour (Angus, 1992); our samples have black, sometimes brownish colour (Figure 3).

Ecology: The samples were collected in the stony and muddy small stagnant water with very poor vegetation.

Global Distribution: Albania, Croatia, Greece, Montenegro (Przewoźny and Fikáček, 2016).

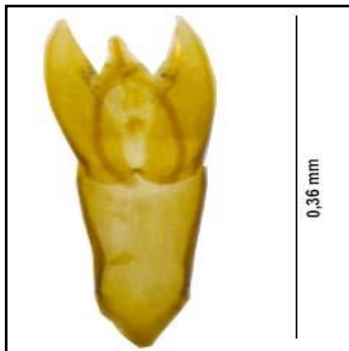


Figure 2. Male genitalia; aedeagophore of *Helophorus singularis* Miller, 1881

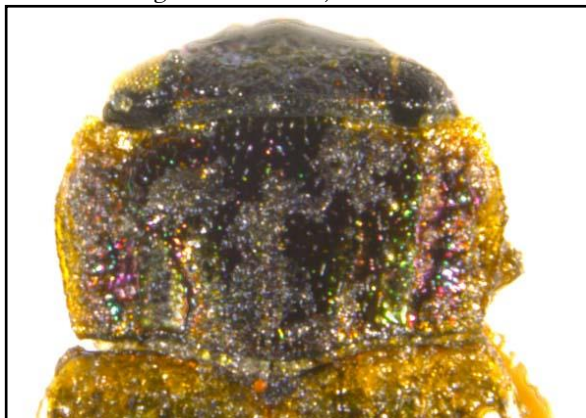


Figure 3. Pronotum of *Helophorus singularis* Miller, 1881

***Helophorus nubilus* Fabricius, 1776**

Material examined: S15, 24.06.2014, 2 ex.; S23, 13.05.2014, 1 ex.

***Helophorus micans* (Faldermann, 1835)**

Material examined: S15, 24.06.2014, 4 ex.; 30.09.2014, 5 ex.; S21, 13.05.2014, 4 ex.; 30.09.2014, 3 ex.; S28, 13.05.2014, 2 ex.; 30.09.2014, 2 ex.; S34, 13.05.2014, 5 ex.; 30.09.2014, 7 ex.; S35, 13.05.2014, 5 ex.; 30.09.2014, 2 ex.; S11, 01.06.2015, 10 ex.; S12, 01.06.2015, 13 ex.; S16, 01.09.2015, 2 ex.; S17, 01.09.2015, 6 ex.; S18, 01.09.2015, 4 ex.; S19, 01.09.2015, 3 ex.; S20, 01.09.2015, 2 ex.; S25, 01.09.2015, 2 ex.; S27, 04.07.2015, 8 ex.; S29, 04.07.2015, 5 ex.; S30, 04.07.2015, 2 ex.; S32, 04.07.2015, 6 ex.; S38, 04.07.2015, 2 ex.; S40, 13.05.2014, 8 ex.; S41, 13.05.2014, 2 ex.; S42, 14.05.2014, 7 ex.; S43, 14.05.2014, 5 ex.; S44, 14.05.2014, 5 ex.

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

Material examined: S21, 13.05.2014, 4 ex.; 30.09.2014, 4 ex.; S17, 01.09.2015, 2 ex.; S18, 01.09.2015, 1 ex.; S19, 01.09.2015, 1 ex.; S20, 01.09.2015, 2 ex.

***Helophorus grandis* (Illiger, 1798)**

Material examined: S21, 13.05.2014, 8 ex.; 30.09.2014, 5 ex.; S24, 13.05.2014, 5 ex.; S26, 13.05.2014, 3 ex.; S17, 01.09.2015, 2 ex.; S18, 01.09.2015, 5 ex.; S19, 01.09.2015, 2 ex.; S20, 01.09.2015, 3 ex.

***Helophorus hiliaris* Sharp, 1916**

Material examined: S13, 24.06.2014, 2 ex.; S21, 13.05.2014, 2 ex.; S24, 13.05.2014, 2 ex.; S31, 13.05.2014, 1 ex.; S34, 13.05.2014, 3 ex.; S37, 13.05.2014, 5 ex.; 30.09.2014, 5 ex.; S1, 13.05.2014, 2 ex.; S16, 01.09.2015, 2 ex.; S30, 04.07.2015, 2 ex.; S39, 13.05.2014, 3 ex.

***Helophorus pallidipennis* Mulsant & Wahanru, 1852**

Material examined: S15, 24.06.2014, 2 ex.; 01.06.2015, 2 ex.; S21, 13.05.2014, 2 ex.; S36, 13.05.2014, 1 ex.; 30.09.2014, 2 ex.

***Helophorus subcarinatus* Angus, 1985**

Material examined: S15, 24.06.2014, 1 ex.; S23, 02.06.2015, 1 ex.

**Family: Hydrochidae****Genus: *Hydrochus* Leach, 1817*****Hydrochus flavipennis* Kuster, 1852**

Material examined: S15, 01.06.2015, 3 ex.

**Family: Hydrophilidae****Genus: *Anacaena* Thomson, 1859*****Anacaena rufipes* (Guillebeau, 1896)**

Material examined: S15, 24.06.2014, 2 ex.

**Genus: *Enochrus* Thomson, 1859*****Enochrus bicolor* (Fabricius, 1792)**

Material examined: S8, 12.05.2014, 2 ex.; 24.06.2014, 2 ex.

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

Material examined: S15, 24.06.2014, 3 ex.; 01.06.2015, 1 ex.

***Enochrus ochropterus* (Marshall, 1802)**

Material examined: S15, 24.06.2014, 2 ex.; S26, 02.06.2015, 3 ex.

***Enochrus politus* (Küster, 1849)**

Material examined: S14, 24.06.2014, 1 ex.; S33, 13.05.2014, 2 ex.; S37, 02.06.2015, 5 ex.; S20, 01.09.2015, 2 ex.

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

Material examined: S4, 24.06.2014, 2 ex.; S15, 24.06.2014, 4 ex.; 30.09.2014, 5 ex.; 01.06.2015, 4 ex.; S21, 13.05.2014, 2 ex.; S5, 24.06.2014, 12 ex.; S6, 24.06.2014, 8 ex.; S7, 24.06.2014, 4 ex.; S16, 01.09.2015, 2 ex.; S25, 01.09.2015, 7 ex.; S32, 04.07.2015, 2 ex.; S38, 04.07.2015, 5 ex.; S42, 14.05.2014, 5 ex.; S43, 14.05.2014, 2 ex.; S44, 14.05.2014, 12 ex.

***Enochrus testaceus* (Fabricius, 1801)**

Material examined: S22, 02.06.2015, 2 ex.

**Genus: *Helochaeres* Mulsant, 1844*****Helochaeres lividus* (Forster, 1771)**

Material examined: S15, 24.06.2014, 10 ex.; 30.09.2014, 5 ex.; 01.06.2015, 2 ex.; 04.07.2015, 5 ex.; 01.09.2015, 2 ex.

***Helochaeres obscurus* (O. F. Müller, 1776)**

Material examined: S31, 13.05.2014, 3 ex.

**Genus: *Hydrochara* Berthold, 1827**

Remark: The members of this genus have a worldwide distribution (Hansen, 1999). Nine species (*H. affinis* Sharp, 1873, *H. caraboides* Linnaeus, 1758, *H. dichroma* Fairmaire, 1892, *H. flavipalpis* Boheman, 1851, *H. flavipes* Steven, 1808, *H. libera* Sharp, 1884, *H. semenovi* Zaitzev, 1908, *H. similis* d'Orchymont, 1919 and *H. vicina* Bameul, 1996) were known from Palaearctic region. Three of these species (*H. caraboides* Linnaeus, 1758, *H. dichroma* Fairmaire, 1892 and *H. flavipes* Steven, 1808) were also known from Turkey (Darılmaz and İncekara, 2011; Przewoźny and Fikáček, 2016). There were many samples of these species were collected in the research area. The discrimination key of Genus *Hydrochara* spp. that known from Turkey was presented below in order to simplify the identification by other researchers:

- (1) Prosternal carina has not long spin posteriorly (Figure 4b)..... *H. flavipes*  
 Prosternal carina has long spin posteriorly (Figure 4a) ..... 2  
 (2) In male genitalia (aedeagus), parameres are thin, long and making curve inwards and outwards (Figure 3c) ..... *H. caraboides*  
 Parameres are wider in the middle and making curve outwards slightly (Figure 3b) ..... *H. dichroma*



Figure 3. Aedeagus: a; *H. flavipes*, b; *H. dichroma*, c; *H. caraboides*.

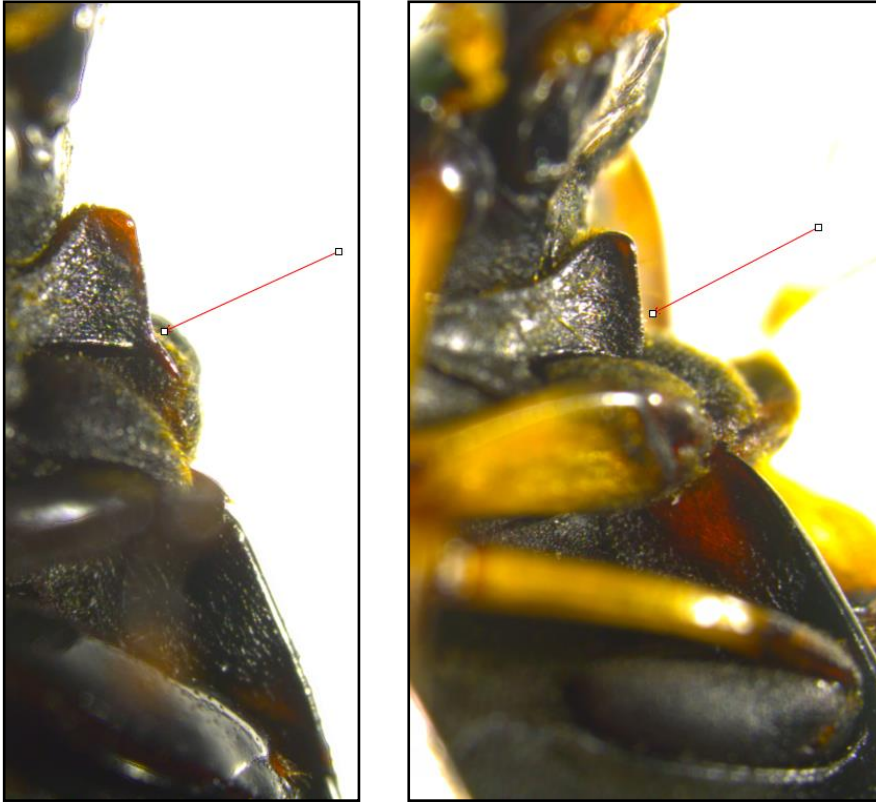


Figure 4. Spin in prosternal carina: a; *H. caraboides*, b; *H. flavipes*.

***Hydrochara caraboides* (Linnaeus, 1758)**

Material examined: S15, 24.06.2014, 4 ex.; 30.09.2014, 2 ex.

***Hydrochara dichroma* (Fairmaire, 1892)**

Material examined: S15, 24.06.2014, 2 ex.; 30.09.2014, 4 ex.; 01.06.2015, 8 ex.; 04.07.2015, 2 ex.; S43, 14.05.2014, 4 ex.

***Hydrochara flavipes* (Steven, 1808)**

Material examined: S15, 01.06.2015, 2 ex.; 30.09.2014, 3 ex.; S42, 14.05.2014, 5 ex.; S44, 14.05.2014, 4 ex.

**Genus: *Laccobius* Erichson, 1837**

***Laccobius bipunctatus* (Fabricius, 1775)**

Material examined: S4, 24.06.2014, 3 ex.; S8, 24.06.2014, 1 ex.

***Laccobius hindukuschi* Chiesa, 1966**

Material examined: S36, 13.05.2014, 2 ex.

***Laccobius sipylus* d'Orchymont, 1939**

Material examined: S37, 02.06.2015, 3 ex.; 30.09.2014, 1 ex.

***Laccobius syriacus* Guillebeau, 1896**

Material examined: S10, 24.06.2014, 2 ex.; S13, 24.06.2014, 2 ex.; S15, 24.06.2014, 3 ex.; 30.09.2014, 5 ex.; 01.06.2015, 4 ex.; 04.07.2015, 2 ex.; 01.09.2015, 1 ex.; S24, 13.05.2014, 2 ex.; S26, 13.05.2014, 4 ex.; S31, 13.05.2014, 2 ex.; S33, 13.05.2014, 2 ex.; 30.09.2014, 5 ex.; S34, 13.05.2014, 2 ex.; S36, 13.05.2014, 2 ex.; S37, 02.06.2015, 5 ex.; 30.09.2014, 5 ex.; S2, 13.05.2014, 3 ex.; S3, 13.05.2014, 3 ex.; S9, 01.06.2015, 1 ex.; S11,

01.06.2015, 2 ex.; S12, 01.06.2015, 3 ex.; S18, 01.09.2015, 3 ex.; S39, 13.05.2014, 3 ex.

***Laccobius alternus* Motschulsky, 1855**

Material examined: S10, 24.06.2014, 2 ex.

***Laccobius gracilis* Motschulsky, 1855**

Material examined: S10, 24.06.2014, 1 ex.; S13, 24.06.2014, 1 ex.; 30.09.2014, 2 ex.

**Genus: *Coelostoma* Brullé, 1835**

***Coelostoma orbiculare* (Fabricius, 1775)**

Material examined: S4, 24.06.2014, 1 ex.; S36, 02.06.2015, 2 ex.; 30.09.2014, 1 ex.; S6, 24.06.2014, 1 ex.

The most dominant species in the research area were indicated as *Helophorus micans*, *Laccobius syriacus* and *Enochrus quadripunctatus*, respectively. Furthermore, some species belong to *Hydrochara* (Coleoptera: Hydrophilidae) genus were also observed extensively in the research area. Three species (*Hydrochara caraboides*, *H. dichroma* and *H. flavipes*) of this genus were known in Turkey (Darilmaz and Incekara, 2011). More than one samples of these species were collected from the research area. The image of some morphological characters and the discrimination key were presented to facilitate the identification of these species.

The north side of the research sustained more species and samples than the south side. The reason might be the droughts and less aquatic habitats of the area.

However, the habitats with abundant species were observed in Hilvan and Siverek districts located in the north side of the city.

To the best of our knowledge, so far, there is not any study on the species of Helophoridae and Hydrochidae families in Şanlıurfa province. Two species (*Laccobius sculptus* d'Orchymont, 1935 and *Laccobius syriacus* Guillebeau, 1896) of Hydrophilidae family were reported in Şanlıurfa province before (Darılmaz and İncekara, 2011). Nonetheless, *Laccobius sculptus* d'Orchymont, 1935 was reported in Şanlıurfa province, none of the specimens of this species was found at the research area in the current study.

It was reported that Hydrophiloidea superfamily had 161 taxa (Coleoptera: Helophoridae; 51, Hydrochidae; 7 and Hydrophilidae; 103) in Turkey (Darılmaz and İncekara, 2011; İncekara et al., 2011; Taşar et al., 2012; Taşar, 2014; Polat et al., 2015, İncekara et al., 2016; Taşar, 2017). First record of *Helophorus singularis* Miller, 1881 is presented with this study from Turkey. For this reason, the number of the species of Hydrophiloidea superfamily (including Helophoridae, Hydrochidae and Hydrophilidae families) were raised to 162 taxa. In the current study, 30 taxa were identified in the studied area as follows: 10 taxa of Helophoridae, 1 taxon of Hydrochidae and 19 taxa of Hydrophilidae families. Consequently, this study presents new distributional data for Turkish Hydrophiloidea fauna. More studies are needed to establish the overall distribution of Turkish Hydrophiloidea fauna.

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