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RESEARCH PAPER

# Aquatic Beetles (Coleoptera: Hydrophilidae, Helophoridae) of İzmir, Manisa and Aydın Provinces (Turkey) with New Locality Records for the Aegean Region

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**Abstract**

Species composition of Hydrophilidae and Helophoridae (Coleoptera) gathered from İzmir, Manisa and Aydın provinces located in the Aegean Region of Turkey were determined in this study. Field surveys were conducted between May-November 2013 and February-November 2014. Totally, 30 species belonging to 8 genera were recorded from the study areas; 21 from Hydrophilidae and 9 from Helophoridae. Among them 15 are (50% of whole collected taxa) firstly reported from the Aegean Region of Turkey. All species were presented with updated Turkey distributions.

*Keywords*: Coleoptera, Hydrophilidae, Helophoridae, Aegean Region, Turkey.

## Introduction

The water scavenger beetles, family Hydrophilidae, are the largest group of the superfamily Hydrophiloidea comprising 173 genera and about 3000 species all over the world (Fikáček, Gentili, & Short, 2010; Mađarić, Stanković, Čorak, Ugarković, & Komarek, 2013; Bloom, Fikáček, & Short, 2014). The family is classified in six subfamilies; Hydrophilinae, Chaetarthriinae, Enochrinae, Acidocerinae, Rygmodinae and Sphaeridiinae. Five of these subfamilies and about 492 species are distributed in the Palearctic region (Ryndevich & Fikáček, 2013; Short & Fikáček, 2013). Up to now, 19 genera, 95 species and 4 subspecies of hydrophilids within two subfamilies have been known from Turkey (Darılmaz & İncekara, 2011; Yılmaz, 2011; Yılmaz & Aslan, 2014).

The family includes both aquatic and terrestrial species in terms of habitat preferences. Aquatic species prefer most kinds of stagnant waters but, adults commonly inhabit backwaters or edge of the small waters. Habitat preferences show high level of variation although a major of the family members prefer aquatic habitats. Many species occur typically in lakes, ponds and streams by contrast with some species which prefer waterfalls (*Oocyclus* Sharp, 1882), groundwaters (*Troglochares* Spangler, 1981) or water tanks of bromeliads (*Lachnodacnum* d'Orchymont, 1937) as habitat (Short & Fikáček, 2013). Terrestrial lineage comprise approximately 35% of all hydrophilids and is classified in Sphaeridiinae and Rygmodinae subfamilies (Bloom *et al*., 2014).

*Helophorus* is the single genus of small hydrophiloid family Helophoridae. The genus includes about 200 species in all over the world (Anton & Beutel, 2004) and the family members occur mostly in Palearctic and Nearctic regions (about 191 species) (Angus, 1992). The Turkish Helophoridae fauna involves 48 species and 2 subspecies belonging to 7 subgenera namely *Empleurus*, *Eutrichelophorus*, *Helophorus* s.str., *Orphelophorus*, *Rhopalohelophorus*, *Transithelophorus*, and *Trichohelophorus* (Yılmaz *et al*., 2014).

Species of Helophoridae can be easily distunguished from other aquatic Coleoptera with 5 longitudinal furrows on the pronotum and their elongated body shapes (Angus, 1992; Fikáček, 2009**;** Mart, İncekara, & Karaca, 2010). Adult helophorids are aquatic or semi aquatic, with the exception of terrestrial species of the subgenus *Empleurus* Hope, 1838 (Anton & Beutel, 2004). Generally, species prefer shallow and stagnant waters with rich organic matters, transition zone between land and water, sandy or muddy areas and moist habitats where they offen occur in very large numbers (Mart *et al*., 2010; Yılmaz, Aslan, & Ayvaz, 2014). Besides, some species such as *Helophorus alternans* Gené, 1836 and *Helophorus fulgidicollis* Motschulsky, 1860 prefer salt marshes, drainage channel with organic matters or backwater in the sea cost as suitable habitats

(Hebauer, 1994).

Although Hydrophilidae and Helophoridae represent two important aquatic groups of Hydrophiloidea, they are poorly studied in Turkey. Some faunistic studies have been performed mainly in the Eastern, Black Sea, Central Anatolia, Marmara and inner Western parts of Turkey (Kıyak, Canbulat, Salur, & Darılmaz, 2006; Ertorun & Tanatmış, 2009; İncekara, Darılmaz, Mart, Polat, & Karaca, 2009; Mart, 2009; İncekara, Polat, Darılmaz, Mart, & Taşar, 2010; Mart *et al*., 2010; Polat, İncekara, & Mart, 2010; Topkara and Balık, 2010; Taşar *et al*., 2012; Mart, Tolan, Caf & Koyun, 2014).

İzmir, Manisa and Aydın provinces are located in the western part of Turkey called as Aegean Region, and have numerous water sources with different topographic structure. The present study will be a preliminary step in order to detect the Hydrophilidae and Helophoridae fauna of western parts of Turkey where the group is rarely studied. This study and coming surveys are intended to contribute Hydrophiloidea fauna of Turkey.

## Materials and Methods

### Study sites

Surveys were carried out in İzmir, Manisa and Aydın provinces located in the western Turkey, placed at coastal part of the Aegean Sea (Figure 1). Both İzmir and Aydın have typically Mediterrenean climate while Manisa has also effects of continental climate especially in the eastern and mountainous parts. All of them have a rich composition in terms of various aquatic habitats. Investigations were carried out in totally 99 different sampling sites (20 from İzmir, 35 from Manisa, 44 from Aydın) including the town centers and their surroundings. Detailed data about the whole sites sampled are listed in Table 1.

### Sampling Method and Collection

Field surveys were performed from May to November in 2013 and February to November in 2014. Specimens were collected by using a sieve, ladle or net with a diameter of 1-2 mm pore, from shallow and stagnant water, the edge of water, or under the decomposing organic matter. Samples were killed by ethyl acetate or in 70% alcohol solution and taken to the laboratory for further analysis and dissection. Diagnosis of beetles was carried out using aedeagophores and other morphological characters.

The specimens were identified to species level using the taxonomic keys and figures given by Angus (1984; 1985; 1988; 1992; 1998), Darılmaz and Kıyak (2009; 2010), Gentili (1975; 1979; 2000), Gentili and Chiesa (1975), Hansen (1982; 1987; 1991; 1999), Hansen and Hebauer (1988), Hebauer (1994), Shatrovskiy (1984), Wooldridge (1978). Turkey distributions of each species were presented according to Darılmaz and İncekara (2011). Voucher specimens are deposited at the Biology Department of Süleyman Demirel University, Isparta.

## Results

As a result of this study performed in İzmir, Manisa and Aydın provinces and their districts, totally 1325 individuals belonging to 8 genera and 30 species of Hydrophilidae (21 species) and Helophoridae (9 species) were identified. *Laccobius* and *Helophorus* were the most species-rich and abundant genera comprising about 60% of the all species. Table 2 refers to species along with their availability in the study areas. The asterisk on listed species indicates its first report from the Aegean Region. Each species is presented afterwards with data related material examined and Turkey distributions.

**Hydrophilidae Latreille, 1802**

***Paracymus* Thomson, 1867**

***Paracymus aeneus* (Germar, 1824)**

**Material examined: İzmir,** Aliağa (92,93), 06.VII.2014, 4 ♂♂.

**Distribution in Turkey:** Bayburt, Kayseri, Samsun (Darılmaz and İncekara, 2011).

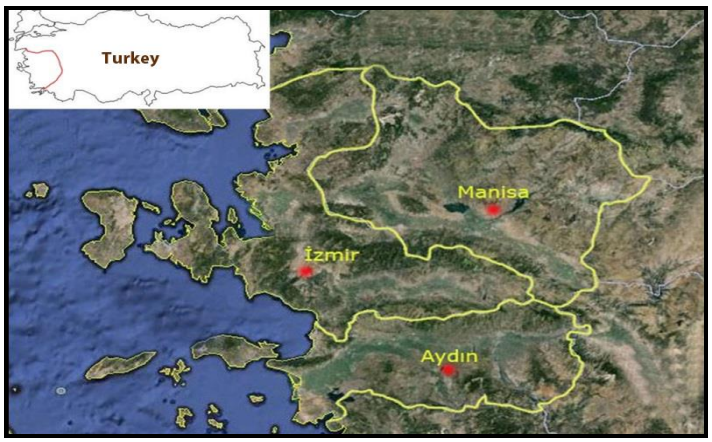


**Figure 1.** Location of the study areas.

**Table 1.** Detailed information about sampling sites including province, coordinate and altitude

| Locality number | Locality | Province | Coordinates | Altitude (m) |
|---|---|---|---|---|
| 1 | Pamukören | Aydın | K: 37°.53'.77" - D: 28°.34'.35" | 88 |
| 2 | Kuyucak | Aydın | K: 37°.59'.84" - D: 28°.30'.64" | 622 |
| 3 | Efeler | Aydın | K: 37°.50'.33" - D: 27°.37'.18" | 32 |
| 4 | Efeler | Aydın | K: 37°.48'.12" - D: 28°.00'.37" | 57 |
| 5 | Köşk | Aydın | K: 37°.49'.48" - D: 28°.03'.34" | 40 |
| 6 | Köşk | Aydın | K: 37°.51'.13" - D: 28°.11'.03" | 42 |
| 7 | Sultanhisar | Aydın | K: 37°.52'.56" - D: 28°.10'.15" | 71 |
| 8 | Sultanhisar | Aydın | K: 37°.52'.13" - D: 28°.07'.56" | 56 |
| 9 | Efeler | Aydın | K: 37°.49'.30" - D: 28°.45'.28" | 48 |
| 10 | Yenipazar | Aydın | K: 37°.49'.03" - D: 28°.10'.06" | 43 |
| 11 | Umurlu | Aydın | K: 37°.50'.59" - D: 27°.56'.41" | 49 |
| 12 | Nazilli | Aydın | K: 37°.54'.52" - D: 28°.19'.56" | 107 |
| 13 | Nazilli | Aydın | K: 37°.54'.39" - D: 28°.18'.51" | 93 |
| 14 | Nazilli | Aydın | K: 37°.52'.52" - D: 28°.18'.23" | 56 |
| 15 | Bozdoğan | Aydın | K: 37°.48'.35" - D: 28°.19'.10" | 73 |
| 16 | Bozdoğan | Aydın | K: 37°.48'.35" - D: 28°.19'.03" | 69 |
| 17 | Çine | Aydın | K: 37°.39'.13" - D: 27°.57'.53" | 36 |
| 18 | Çine | Aydın | K: 37°.38'.60" - D: 27°.56'.67" | 48 |
| 19 | Çine | Aydın | K: 37°.37'.55" - D: 27°.55'.76" | 104 |
| 20 | Çine | Aydın | K: 37°.36'.61" - D: 27°.56'.42" | 53 |
| 21 | Çine | Aydın | K: 37°.36'.13" - D: 28°.02'.25" | 64 |
| 22 | Çine | Aydın | K: 37°.38'.46" - D: 28°.05'.74" | 389 |
| 23 | Çine | Aydın | K: 37°.39'.78" - D: 28°.07'.57" | 673 |
| 24 | Bafa Gölü | Aydın | K: 37°.29'.05" - D: 27°.23'.45" | 58 |
| 25 | Bafa Gölü | Aydın | K: 37°.31'.09" - D: 27°.29'.15" | 89 |
| 26 | Bafa Gölü | Aydın | K: 37°.30'.45" - D: 27°.30'.17" | 41 |
| 27 | Söke | Aydın | K: 37°.35'.71" - D: 27°.22'.22" | 61 |
| 28 | Söke | Aydın | K: 37°.35'.44" - D: 27°.23'.22" | 5 |
| 29 | Söke | Aydın | K: 37°.39'.13" - D: 27°.26'.38" | 8 |
| 30 | Söke | Aydın | K: 37°.31'.03" - D: 27°.20'.58" | 4 |
| 31 | Serçin | Aydın | K: 37°.32'.56" - D: 27°.23'.27" | 33 |
| 32 | Kocagür | Aydın | K: 37°.51'.31" - D: 27°.58'.68" | 42 |
| 33 | Kocagür | Aydın | K: 37°.50'.38" - D: 27°.57'.02" | 51 |
| 34 | İncirliova | Aydın | K: 37°.51'.50" - D: 27°.42'.47" | 46 |
| 35 | İncirliova | Aydın | K: 37°.51'.09" - D: 27°.44'.96" | 26 |
| 36 | İncirliova | Aydın | K: 37°.50'.22" - D: 27°.42'.37" | 35 |
| 37 | İncirliova | Aydın | K: 37°.50'.22" - D: 27°.41'.15" | 31 |
| 38 | Germencik | Aydın | K: 37°.51'.18" - D: 27°.38'.48" | 45 |
| 39 | Germencik | Aydın | K: 37°.52'.24" - D: 27°.37'.67" | 55 |
| 40 | Germencik | Aydın | K: 37°.53'.34" - D: 27°.29'.35" | 67 |
| 41 | Germencik | Aydın | K: 37°.52'.21" - D: 27°.28'.18" | 84 |
| 42 | Germencik | Aydın | K: 37°.52'.53" - D: 27°.36'.50" | 71 |
| 43 | Germencik | Aydın | K: 37°.52'.34" - D: 27°.36'.42" | 62 |
| 44 | Germencik | Aydın | K: 37°.51'.23" - D: 27°.34'.24" | 56 |
| 45 | Salihli | Manisa | K: 38°.28'.63" - D: 28°.06'.43" | 135 |
| 46 | Salihli | Manisa | K: 38°.34'.36" - D: 28°.05'.16" | 92 |
| 47 | Salihli | Manisa | K: 38°.34'.56" - D: 28°.03'.94" | 94 |
| 48 | Gölmarmara | Manisa | K: 38°.37'.48" - D: 28°.05'.36" | 81 |
| 49 | Gölmarmara | Manisa | K: 38°.42'.53" - D: 27°.30'.19" | 132 |
| 50 | Demirci | Manisa | K: 38°.59'.66" - D: 28°.33'.36" | 495 |
| 51 | Ahmetli | Manisa | K: 38°.30'.22" - D: 27°.59'.41" | 91 |
| 52 | Ahmetli | Manisa | K: 38°.31'.55" - D: 27°.50'.74" | 67 |
| 53 | Turgutlu | Manisa | K: 38°.31'.15" - D: 27°.50'.55" | 69 |
| 54 | Turgutlu | Manisa | K: 38°.31'.96" - D: 27°.51'.15" | 66 |
| 55 | Gördes | Manisa | K: 38°.54'.39" - D: 28°.17'.32" | 490 |
| 56 | Gördes | Manisa | K: 38°.52'.29" - D: 28°.16'.55" | 489 |
| 57 | Gördes | Manisa | K: 38°.52'.15" - D: 28°.16'.48" | 489 |
| 58 | Gördes | Manisa | K: 38°.54'.26" - D: 28°.17'.64" | 491 |
| 59 | Gördes | Manisa | K: 38°.52'.15" - D: 28°.16'.48" | 491 |
| 60 | Gördes | Manisa | K: 38°.54'.26" - D: 28°.17'.64" | 491 |
| 61 | Gördes | Manisa | K: 38°.49'.39" - D: 28°.06'.26" | 491 |
| 62 | Gördes | Manisa | K: 38°.54'.93" - D: 28°.18'.03" | 493 |
| 63 | Selendi | Manisa | K: 38°.44'.19" - D: 28°.50'.07" | 479 |
| 64 | Selendi | Manisa | K: 38°.43'.42" - D: 28°.47'.20" | 516 |

**Table 1.** Continued

| Locality number | Locality | Province | Coordinates | Altitude (m) |
|---|---|---|---|---|
| 65 | Selendi | Manisa | K: 38°.42'.43"-D: 28°.48'.38" | 679 |
| 66 | Alaşehir | Manisa | K: 38°.28'.08"-D: 28°.16'.12" | 90 |
| 67 | Alaşehir | Manisa | K: 38°.29'.54"-D: 28°.08'.06" | 89 |
| 68 | Kula | Manisa | K: 38°.25'.38"-D: 28°.26'.56" | 146 |
| 69 | Kula | Manisa | K: 38°.28'.00"-D: 28°.12'.88" | 130 |
| 70 | Kula | Manisa | K: 38°.27'.75"-D: 28°.13'.88" | 153 |
| 71 | Kula | Manisa | K: 38°.27'.18"-D: 28°.24'.41" | 153 |
| 72 | Sarıgöl | Manisa | K: 38°.16'.41"-D: 28°.40'.06" | 187 |
| 73 | Sarıgöl | Manisa | K: 38°.16'.04"-D: 28°.38'.01" | 190 |
| 74 | Akhisar | Manisa | K: 38°.46'.56"-D: 27°.53'.32" | 193 |
| 75 | Akhisar | Manisa | K: 38°.55'.02"-D: 27°.58'.56" | 793 |
| 76 | Kavaklıdere | Manisa | K: 38°.25'.19"-D: 28°.20'.89" | 142 |
| 77 | Kırkağaç | Manisa | K: 39°.05'.55"-D: 27°.40'.25" | 251 |
| 78 | Kırkağaç | Manisa | K: 39°.05'.08"-D: 27°.41'.02" | 362 |
| 79 | Saruhanlı | Manisa | K: 38°.41'.12"-D: 27°.38'.16" | 90 |
| 80 | Menderes | İzmir | K: 38°.15'.07"-D: 27°.07'.11" | 119 |
| 81 | Seferihisar | İzmir | K: 38°.04'.62"-D: 26°.57'.04" | 102 |
| 82 | Seferihisar | İzmir | K: 38°.14'.28"-D: 26°.50'.04" | 114 |
| 83 | Kemalpaşa | İzmir | K: 38°.25'.20"-D: 27°.39'.23" | 179 |
| 84 | Bayındır | İzmir | K: 38°.14'.72"-D: 27°.41'.28" | 177 |
| 85 | Menemen | İzmir | K: 38°.39'.30"-D: 27°.04'.48" | 35 |
| 86 | Menemen | İzmir | K: 38°.37'.48"-D: 27°.07'.11" | 11 |
| 87 | Menemen | İzmir | K: 38°.37'.32"-D: 27°.07'.55" | 16 |
| 88 | Menemen | İzmir | K: 38°.36'.50"-D: 27°.04'.29" | 12 |
| 89 | Menemen | İzmir | K: 38°.34'.44"-D: 27°.06'.12" | 95 |
| 90 | Menemen | İzmir | K: 38°.34'.58"-D: 27°.06'.04" | 79 |
| 91 | Aliağa | İzmir | K: 38°.48'.97"-D: 27°.01'.07" | 35 |
| 92 | Aliağa | İzmir | K: 38°.46'.59"-D: 26°.58'.04" | 77 |
| 93 | Aliağa | İzmir | K: 38°.51'.28"-D: 27°.01'.64" | 38 |
| 94 | Torbalı | İzmir | K: 38°.08'.49"-D: 27°.21'.27" | 29 |
| 95 | Torbalı | İzmir | K: 38°.06'.43"-D: 27°.22'.29" | 13 |
| 96 | Bergama | İzmir | K: 39°.67'.31"-D: 27°.09'.42" | 153 |
| 97 | Bergama | İzmir | K: 39°.09'.08"-D: 27°.09'.11" | 247 |
| 98 | Bergama | İzmir | K: 39°.07'.05"-D: 27°.12'.21" | 44 |
| 99 | Bergama | İzmir | K: 39°.07'.20"-D: 27°.11'.46" | 68 |

***Enochrus* Thomson, 1859**

***Enochrus bicolor* (Fabricius, 1792)**

Material examined: İzmir, Torbalı (94, 95), 14.VII.2013, 2 ♂♂, 4 ♀♀; Seferihisar (81) 20.X.2013, 1 ♂, 2 ♀♀; Aliağa (92, 93) 06.VII.2014, 3 ♂♂, 1 ♀; Manisa, Gölmarmara (48), 15.IX.2013, 4 ♂♂, 1 ♀; Turgutlu (54) 20.IV.2014, 1 ♂, 1 ♀; Aydın, Bozdoğan (15) 30.III.2014, 4 ♂♂, 1 ♀; Çine (18), 18.V.2014, 1 ♂, 1 ♀.

Distribution in Turkey: Aksaray, Ankara, Antalya, Burdur, Denizli, Edirne, Erzincan, İçel, İzmir, Kars, Kayseri, Kırşehir, Ordu, Van (Darılmaz and İncekara, 2011; Aslan *et al*., 2015).

***Enochrus fuscipennis* (Thomson, 1884)**

Material examined: Manisa, Salihli (46), 15.IX.2013, 1 ♂, 5 ♀♀; Demirci (50), 15.IX.2013, 2 ♂♂; Turgutlu (54), 20.IV.2014,1 ♀; Kavaklıdere (76), 12.X.2014, 1 ♀; Aydın, Bozdoğan (15) 30.III.2014, 2 ♂♂, 1 ♀.

Distribution in Turkey: Artvin, Aksaray, Ankara, Balıkesir, Bayburt, Burdur, Bursa, Çanakkale, Çorum, Denizli, Giresun, Gümüşhane, Erzincan, Erzurum, Isparta, İzmir, Kayseri, Ordu, Rize (Ertorun and Tanatmış, 2009; Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

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

Material examined: İzmir, Torbalı (94), 14.VII.2013, 1 ♂; Menemen (85), 06.VII.2014, 1 ♂; Aliağa (92), 06.VII.2014, 1 ♀; Manisa, Selendi (65), 07.VII.2013, 3 ♂♂; Salihli (45), 15.IX.2013, 4 ♂♂; Gördes (55, 58), 20.VII.2014, 4 ♂♂, 4 ♀♀.

Distribution in Turkey: Afyon, Burdur, Isparta, Kayseri (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Enochrus politus* (Kuster, 1849)**

Material examined: İzmir, Bergama (99), 06.VII.2014, 1 ♂; Manisa, Gördes (55), 20.VII.2014, 1 ♂.

Distribution in Turkey: Uşak (Darılmaz and İncekara, 2011).

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

Material examined: İzmir, Aliağa (92), 06.VII.2014, 1 ♂; Manisa, Selendi (63) 07.VII.2013, 3 ♀♀; Salihli (46), 15.IX.2013, 3 ♂♂; Gördes (62),

**Table 2.** Species composition of aquatic beetles collected from the studied provinces

| Species | İzmir | Manisa | Aydın |
|---|---|---|---|
| *Paracymus* | | | |
| **P. aeneus* | + | | |
| *Enochrus* | | | |
| *E. bicolor* | + | + | + |
| *E. fuscipennis* | | + | + |
| **E. halophilus* | + | + | |
| **E. politus* | + | + | |
| **E. quadripunctatus* | + | + | |
| *Helochares* | | | |
| *H. lividus* | + | + | |
| *H. obscurus* | + | | |
| **H. punctatus* | + | + | |
| *Hydrobius* | | | |
| *Hy. fuscipes* | + | | + |
| *Hydrochara* | | | |
| *Hyd. caraboides* | | + | |
| *Laccobius* | | | |
| **L. chiesai* | + | + | |
| **L. halophilus* | + | | + |
| **L. obscratus orchymonti* | + | + | + |
| *L. scutellaris* | + | | + |
| *L. simulatrix* | | + | + |
| *L. striatulus* | | + | |
| *L. syriacus* | + | + | |
| **L. alternus* | | | + |
| *L. gracilis* | + | + | + |
| *Coelostoma* | | | |
| **C. orbiculare* | | + | |
| *Helophorus* | | | |
| *Hlp. micans* | | + | + |
| **Hlp. aquaticus* | | | + |
| **Hlp. grandis* | + | + | + |
| *Hlp. syriacus* | | | + |
| *Hlp. brevipalpis* | + | + | + |
| **Hlp. flavipes* | | | + |
| **Hlp. hilaris* | | | + |
| **Hlp. montenegrinus* | + | | |
| *Hlp. obscurus* | + | + | + |

*Firstly recorded from Aegean Region with this study.

20.VII.2014, 1 ♂.

Distribution in Turkey: Antalya, Denizli, Edirne, Isparta, Ordu (Darılmaz and İncekara, 2011).

***Helochares* Mulsant, 1844**

***Helochares lividus* (Forster, 1771)**

Material examined: İzmir, Torbalı (95), 14.VII.2013, 2 ♂♂; Seferihisar (81), 20.X.2013, 2 ♂♂, 1 ♀; Menemen (85), 06.VII.2014, 3 ♂♂; Bergama (99), 06.VII.2014, 1 ♂; Manisa, Gölmarmara (48), 15.VII.2013, 1 ♀; Salihli (45, 46) , 15.VII.2013, 8 ♂♂, 2 ♀♀; Gördes (60, 62), 20.VII.2014, 1 ♂, 2 ♀♀; Alaşehir (66), 12.X.2014, 1 ♂, 1 ♀.

Distribution in Turkey: Adana, Aksaray, Ankara, Bingöl, Burdur, Çorum, Erzurum, Edirne, Isparta, İzmir, Ordu, Samsun, Tokat, Trabzon (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

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

Material examined: İzmir, Torbalı (95), 14.VII.2013, 3 ♂♂, 2 ♀♀; Seferihisar (81), 20.X.2013, 2 ♀♀.

Distribution in Turkey: Adana, Ankara, Balıkesir, Bayburt, Burdur, Bursa, Çanakkale, Giresun, Isparta, İzmir, Kayseri, Sakarya, Samsun, Ordu (Ertorun and Tanatmış, 2009; Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Helochares punctatus* Sharp, 1869**

Material examined: İzmir, Torbalı (95), 14.VII.2013, 2 ♂♂, 1 ♀; Manisa, Demirci (50), 15.IX.2013, 2 ♂♂, 5 ♀♀.

Distribution in Turkey: Artvin, Burdur, Çorum, Isparta (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Hydrobius* Leach, 1815**

***Hydrobius fuscipes* (Linnaeus, 1758)**

Material examined: İzmir, Aliağa (92), 06.VII.2014, 1 ♀; Aydın, Çine (17, 19) 18.V.2014, 2 ♂♂, 1 ♀.

Distribution in Turkey: Ankara, Artvin, Bayburt,

Bilecik, Burdur, Çorum, Erzincan, Erzurum, Giresun, Gümüşhane, Isparta, İçel, İzmir, Kayseri, Konya, Ordu, Rize, Samsun, Tokat, Trabzon (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Hydrochara* Berthold, 1827**

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

Material examined: Manisa, Selendi (65), 07.VII.2013, 1 ♂.

Distribution in Turkey: Bayburt, Isparta, İzmir, Kayseri, Samsun, Tokat (Darılmaz and İncekara, 2011).

***Laccobius* Erichson, 1837**

***Laccobius chiesai* Gentili, 1974**

Material Examined: İzmir, Menemen (85), 06.VII.2014, 3 ♂♂, 2 ♀♀; Manisa, Selendi (65), 07.VII.2013, 3 ♂♂; Gördes (59), 20.VII.2014, 3 ♂♂, 1 ♀.

Distribution in Turkey: Ankara, Isparta (Darılmaz and İncekara, 2011; Yılmaz, 2011).

***Laccobius halophilus* Gentili, 1982**

Material Examined: İzmir, Bergama (99), 06.VII.2014, 1 ♂, 1 ♀; Aydın, Çine (20), 18.V.2014, 3 ♂♂.

Distribution in Turkey: İçel, Muğla (Darılmaz and İncekara, 2011).

***Laccobius obscratus orchymonti* Gentili, 1976**

Material Examined: İzmir, Menemen (85), 06.VII.2014, 2 ♂♂, 2 ♀♀; Manisa, Selendi (63), 07.VII.2013, 5 ♂♂; Demirci (50), 15.IX.2013, 1 ♂, 1 ♀; Aydın, Çine (18), 18.V.2014, 1 ♂.

Distribution in Turkey: Adıyaman, Burdur, Gaziantep, Hatay, Isparta, Kilis (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Laccobius scutellaris* Motschulsky, 1855**

Material Examined: İzmir, Seferihisar (81), 20.X.2013, 1 ♂; Menemen (85), 06.VII.2014, 1 ♂; Manisa, Selendi (63), 07.VII.2013, 1 ♂, 1 ♀; Aydın, İncirliova (35), 02.XI.2014, 1 ♂.

Distribution in Turkey: Adana, Antalya, Balıkesir, Bilecik, Bitlis, Burdur, Bursa, Çanakkale, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Konya, Muğla, Samsun, Siirt (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

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

Material Examined: Manisa, Gördes (61), 20.VII.2014, 3 ♂♂, 2 ♀♀; Aydın, Çine (18, 20), 18.V.2014, 2 ♂♂, 3 ♀♀; İncirliova (35), 02.XI.2014, 3 ♂♂.

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 (Darılmaz and İncekara, 2011).

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

Material Examined: Manisa, Gördes (55, 62), 20.VII.2014, 8♂♂, 4 ♀♀.

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 (Darılmaz and İncekara, 2011).

***Laccobius syriacus* Guillebeau, 1896**

Material Examined: İzmir, Seferihisar (81), 20.X.2013, 1 ♂; Manisa, Demirci (50), 15.IX.2013, 2 ♂♂, 2 ♀♀.

Distribution in Turkey: Adana, Afyon, 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, Mardin, Muğla, Ordu, Osmaniye, Rize, Sakarya, Samsun, Sinop, Şanlıurfa, Tokat, Trabzon, Van (Ertorun and Tanatmış, 2009; Darılmaz and İncekara, 2011).

***Laccobius alternus* Motschulsky, 1855**

Material Examined: Aydın, Germencik (39), 02.XI.2014, 4 ♂♂.

Distribution in Turkey: Erzincan (Darılmaz and İncekara, 2011).

***Laccobius gracilis* Motschulsky, 1855**

Material Examined: İzmir, Menemen (85), 06.VII.2014, 1 ♂; Manisa, Selendi (65), 07.VII.2013, 4 ♂♂, 1 ♀; Gördes (55, 61, 62), 20.VII.2014, 2 ♂♂, 1 ♀; Kavaklıdere (76), 12.X.2014, 1 ♂; Aydın, Çine (20), 18.V.2014, 4 ♂♂.

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 (Darılmaz and İncekara, 2011).

***Coelostoma* Brullé, 1835**

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

Material Examined: Manisa, Sarıgöl (72), 07.VII.2013, 1 ♂; Gölmarmara (48), 15.IX.2013, 1 ♀.

Distribution in Turkey: Ankara, Artvin, Bayburt, Burdur, Bursa, Çanakkale, Çorum, Erzurum, Giresun, Gümüşhane, Isparta, İçel, Kayseri, Ordu, Samsun,

Tokat, Trabzon (Ertorun and Tanatmış, 2009; Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

**Helophoridae Leach, 1815**

***Helophorus* Fabricius, 1775**

***Helophorus micans* (Folderman, 1835)**

Material Examined: Manisa, Turgutlu (53), 20.IV.2014, 5 ♂♂; Aydın, Bozdoğan (15), 30.III.2014, 3 ♂♂, 6 ♀♀.

Distribution in Turkey: Adana, Aksaray, Bayburt, Hatay, Balıkesir, Burdur, Çanakkale, Çorum, Diyarbakır, Erzurum, Giresun, Isparta, İçel, İzmir, Kayseri, Samsun, Tokat, Trabzon, Tuz Gölü, Van Gölü (Darılmaz and İncekara, 2011; Yılmaz, 2011).

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

Material Examined: Aydın, Sultanhisar (7), 15.III.2014, 3 ♂♂.

Distribution in Turkey: Adana, Aksaray, Ankara, Bayburt, Bilecik, Bingöl, Burdur, Bursa, Bolu, Çorum, Diyarbakır, Erzurum, Hakkâri, Giresun, Gümüşhane, Isparta, İçel, İstanbul, Kars, Kastamonu, Kayseri, Kırklareli, Mardin, Muş, Ordu, Sakarya, Samsun, Sinop, Şırnak, Van (Darılmaz and İncekara, 2011; Aslan *et al*., 2015).

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

Material Examined: İzmir, Seferihisar (81), 20.X.2013, 1 ♂; Kemalpaşa (83), 20.IV.2014, 1 ♂; Manisa, Ahmetli (52), 20.IV.2014, 2 ♂♂, 1 ♀; Aydın, Çine (17, 18), 18.V.2014, 3 ♂♂, 3 ♀♀.

Distribution in Turkey: Antalya, Burdur, Tokat (Darılmaz and İncekara, 2011; Aslan *et al*., 2015).

***Helophorus syriacus* Kuwert, 1885**

Material Examined: Aydın, Çine (17), 18.V.2014, 2 ♂♂; Germencik (39), 02.XI.2014, 2 ♂♂.

Distribution in Turkey: Adana, Burdur, Çorum, Denizli, Diyarbakır, Gaziantep, Hatay, Isparta, İzmir, Mardin, Samsun, Tokat, Hatay Amanos Dağları (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Helophorus brevipalpis* Bedel, 1881**

Material Examined: İzmir, Bayındır (84), 01.VI.2014, 2 ♀♀; Manisa, Turgutlu (53, 54), 20.IV.2014, 8 ♂♂, 1 ♀; Ahmetli (52), 20.IV.2014, 7 ♂♂; Aydın, Nazilli (12, 13), 05.V.2013, 20 ♂♂, 15 ♀♀; Yenipazar (10), 15.III.2014, 5 ♂♂; Umurlu (11), 15.III.2104, 2 ♂♂, 2 ♀♀; Sultanhisar (7), 15.III.2014, 1 ♂; Bozdoğan (15, 16), 30.III.2014, 6 ♂♂, 2 ♀♀ ; Çine (17, 18, 19, 20, 22), 18.V.2014, 21 ♂♂, 12 ♀♀; Germencik (39), 02.XI.2014, 1 ♂.

Distribution in Turkey: Aksaray, Ankara, Bayburt, Antalya, Artvin, Burdur, Bursa, Çorum, Erzurum, Erzincan, Giresun, Gümüşhane, Isparta, İstanbul, İzmir, Kahramanmaraş, Kayseri, Kırklareli, Muğla, Niğde, Ordu, Samsun, Sinop, Van, Trabzon, Tuz Gölü (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Helophorus flavipes* Fabricius 1792**

Material Examined: Aydın, Çine (19), 18.V.2014, 1 ♂, 1 ♀.

Distribution in Turkey: Burdur, Çorum, Erzincan, Gümüşhane, Kars, Kayseri, Tokat (Darılmaz and İncekara, 2011; Aslan *et al*., 2015).

***Helophorus hilaris* Sharp, 1916**

Material Examined: Aydın, Sultanhisar (7), 15.III.2014, 1 ♂, 1 ♀.

Distribution in Turkey: Bayburt, Burdur, Diyarbakır, Erzincan, Erzurum, Giresun, Gümüşhane, Hakkâri, Kayseri, Mardin, Muş, Ordu, Samsun, Tokat, Şırnak, Van (Darılmaz and İncekara, 2011; Aslan *et al*., 2015).

***Helophorus montenegrinus* Kuwert, 1885**

Material Examined: İzmir, Kemalpaşa (83), 20.IV.2014, 1 ♂.

Distribution in Turkey: Ankara, Bolu, Burdur, Bursa, Giresun, Isparta, İçel, İstanbul, Kastamonu, Kırklareli, Ordu, Samsun, Sinop, Tokat, Trabzon (Darılmaz and İncekara, 2011; Yılmaz, 2011; Aslan *et al*., 2015).

***Helophorus obscurus* Mulsant, 1844**

Material Examined: İzmir, Kemalpaşa (83), 20.IV.2014, 3 ♂♂, 2 ♀♀; Bayındır (84), 01.VI.2014, 3 ♂♂, 2 ♀♀; Manisa, Turgutlu (53, 54), 20.IV.2014, 6 ♂♂, 2 ♀♀; Aydın, Efeler (3), 09.II.2014, 3 ♂♂, 1 ♀; Köşk (5, 6), 09.II.2014, 3 ♂♂, 4 ♀♀; Yenipazar (10), 15.III.2014, 1 ♂, 7 ♀♀; Sultanhisar (8), 15.III.2014, 3 ♂♂, 2 ♀♀; Çine (22), 18.V.2014, 6 ♂♂, 2 ♀♀; Germencik (39), 02.XI.2014, 1 ♂.

Distribution in Turkey: Artvin, Bolu, Bursa, Çorum, Erzincan, Erzurum, Giresun, Isparta, İstanbul, İzmir, Kayseri, Kırklareli, Ordu, Samsun, Sinop, Tokat, Trabzon (Darılmaz and İncekara, 2011).

## Discussion

Aquatic beetles belonging to Hydrophilidae and Helophoridae were determined from the Aegean Region of Turkey based on field surveys conducted during 2013 and 2014: 17 species were recorded from Aydın province, 19 each from Izmir and Manisa. It was also determined that 15 of the species (50%) were not previously reported from the region. According to the results; *Enochrus bicolor*, *Laccobius obscratus orchymonti*, *L. gracilis*, *Helophorus grandis*, *H. brevipalpis* and *H. obscurus* were the common species recorded from the all three provinces. However, *Helochares obscurus*, *Paracymus aeneus* and *Helophorus montenegrinus* were collected only from İzmir, *Hydrochara caraboides*, *Laccobius striatulus* and *Coelostoma orbiculare* sampled only from Manisa, and *L. alternus*, *Helophorus aquaticus*, *H. syriacus*, *H. flavipes* and *H. hilaris* only from Aydın province.

*Laccobius* was one of the most common genera (9 species) in the study region displaying a wide range of habitat preference including generally shallow waters and their edges. The most abundant species were *L. simulatrix* and *L. striatulus*. Also, *L. alternus* was recorded from Aydın second time after its unique locality record from Erzincan (Darılmaz and İncekara, 2011). *Helophorus* species constituted other abundant group, and were mainly collected from Aydın province preferring stagnant, temporary waters or muddy areas near the water source. *H. brevipalpis* was the most individual rich species sampled in all provinces. Additionally *H. aquaticus*, *H. flavipes*, *H. hilaris* and *H. montenegrinus* were firstly recorded from western Turkey with this study.

*Enochrus* has been the third largest hydrophilid genus in terms of species number after *Laccobius* and *Helophorus*. Adults usually occur in well vegetated waterbodies and waters with rich nutrient and productivity due to eutrophication. According to Darılmaz and Kıyak (2009), taxonomy of *Enochrus* is still poorly known and ecological data is available only for some widespread species. *Enochrus politus* was sampled from İzmir and Manisa for the first time by this study, and the second time for Turkey after Uşak province (Darılmaz and İncekara, 2011).

The genera *Paracymus, Hydrobius*, *Hydrochara* and *Coleostoma* are all represented by single species. The present study adds western parts of Turkey (İzmir) to the distributional area of *Paracymus aeneus* which was known only from northern and central Anatolia parts up to now (Darılmaz and İncekara, 2011). It is known that this species prefers small saline pools with rich vegetation (Greenwood and Wood, 2003). Accordingly, the salinity value of the water was measured as 62.03 ppt where *Paracymus* individuals were collected in İzmir province. *Coleostoma* is a terrestrial genus which is classified in Sphaeridiinae, and family members generally live in semi-aquatic habitats away from water under various kinds of decaying organic matter (Hansen, 1987). In this study, *C. orbiculare* was sampled from Manisa and firstly recorded from the Aegean Region of Turkey.

Consequently, in the present study 30 taxa belonging to the Hydrophilidae and Helophoridae were listed from İzmir, Manisa and Aydın provinces and their districts, of which one-half were firstly reported from the Aegean Region of Turkey. Investigated areas intrinsically provides numerous water sources all resulting with suitable conditions for aquatic beetles. In addition to, there is still a certain need of collecting more specimens, especially in the whole 'Aegean Region', either to add new records for the Turkish fauna.

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