

**PHORESY ON THE AQUATIC COLEOPTERA:
HELOPHORIDAE AND HYDROPHILIDAE SPECIES
IN LAKE VAN BASIN, TURKEY**

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ABSTRACT: Phoresy were studied on the Helophoridae and Hydrophilidae species in Lake Van Basin for the first time. In the research area, 3 of 30 species belonging to the family Helophoridae and 5 of 35 species belonging to the family Hydrophilidae were observed phoretic. Most cases of phoresy were observed in the species of family Hydrophilidae, genus *Enochrus*. All aquatic mites were carried under the second wings.

KEY WORDS: Phoresy, Helophoridae, Hydrophilidae, water mite, Lake Van Basin.

Phoresy or transportation on another animal's body is mainly concerned with arthropods and mites. This is an effective dispersal mechanism that migrating to another habitats of more suitable environmental conditions (Boggs & Gilbert, 1987; Mumcuoğlu & Braverman, 2010).

Most water mite's larvae parasitize the aquatic insects for easily disperse and colonize on new water bodies (Bhonak et al., 2004; Zawal, 2006).

A similar study was performed by İncekara & Erman (2008) in Turkey, and 5 of 22 helophorid and 3 of 16 hydrophilid species were presented parasitism while 2 of 16 hydrophilid species were presented phoresy.

Theoretically, Euro-Siberian fauna must be concurrent with Eremian elements, entering from eastern and southern, in the research area (Kosswig, 1955). Considering zoogeographical aspects, we believe that studying phoresy in such area will be useful.

The aim of this study was to find out the relationships between two aquatic Coleoptera families: Helophoridae, Hydrophilidae species and the water mites in Lake Van Basin.

MATERIALS AND METHODS

The samples of the aquatic beetles were collected by means of a ladle and sieve with one mm pores, through the vegetations in shallow areas of various lakes, rivers, watercourses, springs and ponds in May-October, 2010-2011. The beetles were killed using ethyl acetate or 70% alcohol solution. All larval and adult mites were collected directly from the bodies of beetles. Water mites removed from the aquatic beetles by using forceps. The photograph (Fig. 1) was taken using a Nikon type SMZU-1500 microscope and Nikon E5400 camera.

RESULTS AND DISCUSSION

In the research area, cases of phoresy were determined in 3 species of the family Helophoridae (*Helophorus* Fabricius, 1775) and 5 species of the family Hydrophilidae (*Laccobius* Erichson, 1837 and *Enochrus* Thomson, 1859).

It is hardly possible to identify a lot of water mite taxa at species level considering immature stages only, and therefore some taxa are placed in here with the higher taxon name.

There were observed 5 *Eylais* sp. (larvae), 3 *Eylais degenerata* (adult) and 2 *Hydrachna* sp. (larvae) on the species of the family Helophoridae. And there were observed 29 *Eylais* sp. (larvae) on the species of the family Hydrophilidae. Most cases of phoresy were observed in the hydrophilid species. All aquatic mites were carried under the second wings as in Figure 1.

According to the table 1; all *Eylais* members prefer male individuals for phoresy. In only one female species was observed phoretic by three *Hydrachna* members. Most water mites on mature or immature stages of developing prefer the male species of the family Helophoridae or Hydrophilidae. There is no good reason to explain the preference of mature or immature water mites for female or male adult helophorid and hydrophilid species.

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Figure 1. Water mites on the *Enochrus quadripunctatus* (Herbst, 1797) (Coleoptera: Hydrophilidae).

Table 1. Situation of phoresy on the Helophoridae and Hydrophilidae species.

Family / Genus	Species	♂/♀	Date	Locality	Situated mite number	Situated mite takson name (mature/immature)
Family: Helophoridae Genus: <i>Helophorus</i>	<i>Helophorus abeillei</i>	♂	28.06.2011	Ağrı, Patnos, Esenbel 39°03'06 N 42°55'28 E 1796 m	5	<i>Eylais</i> sp. (larvae)
	<i>Helophorus hilaris</i>	♂	28.06.2011	Ağrı, Patnos, Derecik 39°10'51 N 43°02'15 E 1791 m	3	<i>Eylais degenerata</i> (adult)
	<i>Helophorus brevipalpis</i>	♀	28.06.2011	Van, Çaldıran, Yassitepe 39°07'37 N 43°57'41 E 2048 m	2	<i>Hydrachna</i> sp. (larvae)
Family: Hydrophilidae Genus: <i>Laccobius</i>	<i>Laccobius gracilis</i>	♂	16.10.2010	Van, Dorutay, Tekindere 38°55'01 N 44°02'23 E 2134 m	4	<i>Eylais</i> sp. (larvae)
Family: Hydrophilidae Genus: <i>Enochrus</i>	<i>Enochrus halophilus</i>	♂	16.10.2010	Van, Özalp 38°39'35 N 44°00'54 E 2030 m	6	<i>Eylais</i> sp. (larvae)
		♂	28.06.2011	Van, Çaldıran 39°08'06 N 43°55'35 E 2045 m	4	<i>Eylais</i> sp. (larvae)
	<i>Enochrus segmentinatus</i>	♂	05.08.2010	Muş, Bulanık 39°05'48 N 42°14'38 E 1477 m	2	<i>Eylais</i> sp. (larvae)
	<i>Enochrus fuscipennis</i>	♂	05.08.2010	Muş, Bulanık, Göztepe 38°59'06 N 42°19'15 E 1603 m	2	<i>Eylais</i> sp. (larvae)
		♂	27.06.2011	Muş, Kayalidere 39°05'06 N 41°32'30 E 1316 m	3	<i>Eylais</i> sp. (larvae)
	<i>Enochrus quadripunctatus</i>	♂	27.06.2011	Muş, Hasköy, Koçköy 38°38'45 N 41°50'28 E 1280 m	8	<i>Eylais</i> sp. (larvae)