

**FAUNISTIC STUDY ON NOTERIDAE AND DYTISCIDAE
(COLEOPTERA: ADEPHAGA) IN RAMSAR SITE KUYUCUK
LAKE (TURKEY), WITH FURTHER DISTRIBUTIONAL NOTES**

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[**Darılmaz, M. C., Polat, A., İncekara, Ü. & Taşar, G. E.** 2015. Faunistic study on Noteridae and Dytiscidae (Coleoptera: Adephaga) in Ramsar Site Kuyucuk Lake (Turkey), with further distributional notes. *Munis Entomology & Zoology*, 10 (2): 441-445]

ABSTRACT: In this study we established the presence of 10 aquatic beetle (Coleoptera: Adephaga) species belonging to 2 families (Noteridae and Dytiscidae) in Ramsar site Kuyucuk Lake, Kars. The specimens were collected between 2010 and 2011. Two species from Eastern Anatolian Region, and eight species from research area were recorded for the first time, and distributions in Turkey of these newly recorded species are presented.

KEY WORDS: Coleoptera, aquatic beetles, Adephaga, new records, Kuyucuk Lake.

The family Dytiscidae, known as the largest family into the suborder Adephaga with about 4000 species in 175 genera in the world, represented with 137 species and nine subspecies from Turkey in 885 species from Palearctic Region (Balke et al., 2004; Jach & Balke, 2008; Darılmaz & Kıyak, 2009; Taşar et al., 2012).

The family Noteridae, known 3 species from Turkey, represented 250 species in the world which include about 30 species from Palearctic region (Darılmaz & Kıyak, 2009).

Aim of this study is to determine the Adephaga in Ramsar site Kuyucuk Lake and make a contribution to the Turkish aquatic Coleoptera fauna.

MATERIAL AND METHODS

In summer seasons between 2010 and 2011, specimens were collected by means of a sieves that having 3,15 x 1 mm pores from the Kuyucuk Lake (map of Kuyucuk Lake is shown in Fig. 1). Firstly collected samples were killed with ethyl acetate and were stored in small bottles in the research area. Specimens were cleaned with brush before identification, and then aedeagus of the beetles were dissected under a stereo microscope in the laboratory. All samples have been deposited in the Zoological Museum, Atatürk University, Science Faculty, Department of Biology, Erzurum, Turkey. On the other hand, number of total individuals of each species is shown in Fig. 2.

RESULTS

In the Kuyucuk Lake, 10 aquatic beetle species belonging to Dytiscidae and Noteridae were recorded. One species (*Noterus clavicornis*) belonging to Noteridae and one species (*Hydaticus ponticus*) belonging to Dytiscidae recorded from Eastern Anatolian Region for the first time. And 8 species (*Rhantus*

suturalis, *Graphoderus cinereus*, *Hydroglyphus geminus*, *Scarodytes halensis halensis*, *Hygrotus impressopunctatus*, *H. parallelogrammus*, *H. inaequalis*, *Laccophilus minutus*) belonging to Dytiscidae are recorded from the research area for the first time. Number of species collected in different locations is given in Table 1.

Noteridae

Noterus clavicornis (De Geer, 1774)

Material examined: Kars; Kuyucuk Lake, 40°44'54N 43°27'17E, 1634m, 03.08.2010, 1ex.; 40°44'53N 43°27'05E, 1635m, 15.10.2011, 5ex.; 40°44'53N 43°27'03E, 1631m, 03.08.2010, 60ex.; 40°45'06N 43°27'23E, 1647m, 03.08.2010, 16ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 11ex.; 40°44'23N 43°27'15E, 1636m, 28.05.2011, 10ex.; 40°44'55N 43°29'58E, 1635m, 28.05.2011, 1ex.; 40°44'50N 43°27'23E, 1636m, 03.08.2010, 8ex.

Distribution in Turkey: Aksaray, Ankara, Antalya, Aydın, Balıkesir, Bilecik, Bolu, Çorum, Düzce, Eskişehir Isparta, İzmir, Kayseri, Konya, Manisa, Sakarya, Samsun, Trabzon (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010; Topkara & Balık, 2010).

Remark: New record of Eastern Anatolia.

Dytiscidae

Rhantus suturalis (W.S. MacLeay, 1825)

Material examined: Kars; Kuyucuk Lake, 40°44'53N 43°27'03E, 1631m, 03.08.2010, 2ex.; 40°44'23N 43°27'15E, 1636m, 28.05.2011, 1ex.; 40°44'50N 43°27'23E, 1636m, 03.08.2010, 1ex.

Distribution in Turkey: Aksaray, Ankara, Çorum, Erzurum, Kayseri, Konya, Manisa, Rize, Trabzon (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010; Hızarcıoğlu et al., 2010; İncekara et al., 2010).

Remark: New record of research area.

Graphoderus cinereus (Linnaeus, 1758)

Material examined: Kars; Kuyucuk Lake, 40°44'54N 43°27'17E, 1634m, 03.08.2010, 3ex.; 40°44'53N 43°27'05E, 1635m, 15.10.2011, 1ex.; 40°44'53N 43°27'03E, 1631m, 03.08.2010, 2ex.; 40°44'55N 43°29'58E, 1635m, 28.05.2011, 2ex.

Distribution in Turkey: Afyon, Agri, Ankara, Erzurum (Darılmaz & Kiyak, 2009; Hızarcıoğlu et al., 2010).

Remark: New record of research area.

Hydaticus ponticus Sharp, 1882

Material examined: Kars; Kuyucuk Lake, 40°44'55N 43°29'58E, 1635m, 28.05.2011, 6ex.

Distribution in Turkey: Aydın, Burdur (Darılmaz & Kiyak, 2009).

Remark: New record of Eastern Anatolia.

Hydroglyphus geminus (Fabricius, 1792)

Material examined: Kars; Kuyucuk Lake, 40°44'53N 43°27'05E, 1635m, 15.10.2011, 3ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 1ex.; 40°44'55N 43°29'58E, 1635m, 28.05.2011, 18ex.; 40°44'50N 43°27'23E, 1636m, 03.08.2010 9ex.

Distribution in Turkey: Adana, Afyon, Aksaray, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bolu, Bursa, Çorum, Edirne, Erzurum, Eskişehir, Gümüşhane, Isparta, İçel, İzmir, Kastamonu, Kayseri, Konya, Kilis, Manisa, Muğla, Rize, Samsun, Trabzon, Yozgat (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010).

Remark: New record of research area.

Scarodytes halensis halensis (Fabricius, 1787)

Material examined: Kars; Kuyucuk Lake, 40° 44'53N 43°27'05E, 1635m, 15.10.2011, 1ex.

Distribution in Turkey: Aksaray, Ankara, Antalya, Artvin, Bursa, Çorum, Erzurum, Eskişehir, Gümüşhane, Isparta, İçel, İzmir, Kayseri, Van, Trabzon, Yozgat (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010).

Remark: New record of research area.

***Hygrotus impressopunctatus* (Schaller, 1783)**

Material examined: Kars; Kuyucuk Lake, 40°44'53N 43°27'03E, 1631m, 03.08.2010, 5ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 2ex.; 40°44'23N 43°27'15E, 1636m, 28.05.2011, 2ex.

Distribution in Turkey: Çorum, Erzurum, Konya (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010).

Remark: New record of research area.

***Hygrotus parallelogrammus* (Ahrens, 1812)**

Material examined: Kars; Kuyucuk Lake, 40°44'53N 43°27'03E, 1631m, 03.08.2010, 2ex.; 40°45'06N 43°27'23E, 1647m, 03.08.2010, 1ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 6ex.

Distribution in Turkey: Afyon, Ankara, Erzurum, Konya, Kütahya, Samsun, Tuz Lake, Toros Mountains (Darılmaz & Kiyak, 2009).

Remark: New record of research area.

***Hygrotus inaequalis* (Fabricius, 1777)**

Material examined: Kars; Kuyucuk Lake, 40°44'54N 43°27'17E, 1634m, 03.08.2010, 5ex.; 40°44'53N 43°27'05E, 1635m, 15.10.2011, 8ex.; 40°44'53N 43°27'03E, 1631m, 03.08.2010, 8ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 2ex.; 40°44'23N 43°27'15E, 1636m, 28.05.2011, 7ex.; 40°44'50N 43°27'23E, 1636m, 03.08.2010, 1ex.

Distribution in Turkey: Afyon, Ankara, Artvin, Bolu, Çorum, Erzurum, Isparta, Kayseri, Konya, Manisa, Samsun (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010; Hızarcıoğlu et al., 2010; İncekara et al., 2010).

Remark: New record of research area.

***Laccophilus minutus* (Linnaeus, 1758)**

Material examined: Kars; Kuyucuk Lake, 40°44'53N 43°27'05E, 1635m, 15.10.2011, 24ex.; 40°44'53N 43°27'03E, 1631m, 03.08.2010, 22ex.; 40°45'06N 43°27'23E, 1647m, 03.08.2010, 6ex.; 40°44'53N 43°27'03E, 1639m, 28.05.2011, 2ex.

Distribution in Turkey: Afyon, Aksaray, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bolu, Burdur, Bursa, Çorum, Erzurum, Eskişehir, Gümüşhane, Isparta, İzmir, Kastamonu, Kayseri, Konya, Manisa, Rize, Samsun, Sinop, Sivas, Trabzon, Toros Mountains Yozgat (Darılmaz & Kiyak, 2009; Darılmaz et al., 2010; Topkara & Balık, 2010).

Remark: New record of research area.

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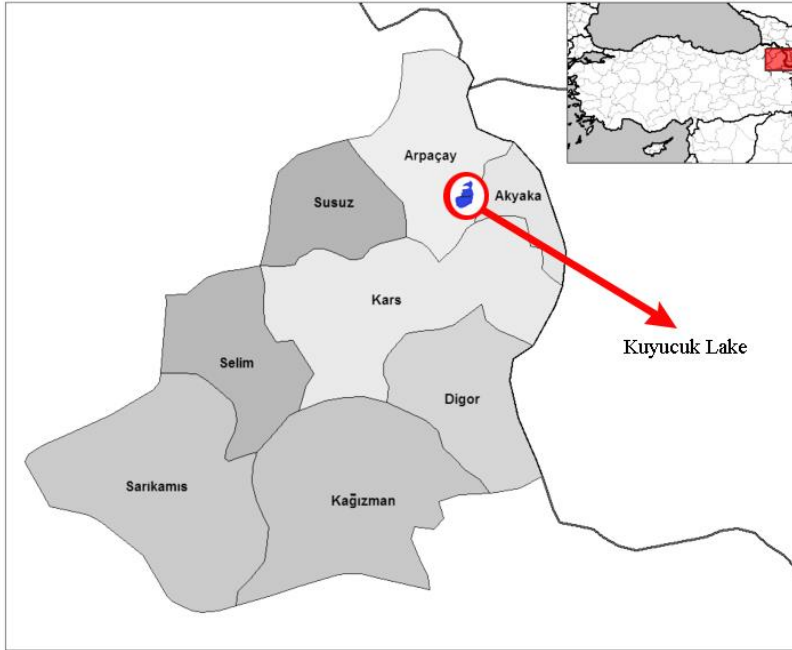


Figure 1. Map of research area.

Table 1. Collected species and locations. **1:** 40°44'54N 43°27'17E, 03.08.2010, 1634m; **2:** 40°44'50N 43°27'23E, 03.08.2010, 1636m; **3:** 40°44'53N 43°27'03E, 03.08.2010, 1631m; **4:** 40°45'06N 43°27'23E, 03.08.2010, 1647m; **5:** 40°44'53N 43°27'03E, 28.05.2011, 1639m; **6:** 40°44'23N 43°27'15E, 28.05.2011, 1636m; **7:** 40°44'55N 43°29'58E, 28.05.2011, 1635m; **8:** 40°44'53N 43°27'05E, 15.10.2011, 1635m.

Species	Localities							
	1	2	3	4	5	6	7	8
<i>Noterus clavicornis</i>	1 ex.	8 ex.	60 ex.	16 ex.	11 ex.	10 ex.	1 ex.	5 ex.
<i>Rhantus suturalis</i>		1 ex.	2 ex.			1 ex.		
<i>Graphoderus cinereus</i>	3 ex.						2 ex.	1 ex.
<i>Hydaticus ponticus</i>							6 ex.	
<i>Hydroglyphus geminus</i>		9 ex.			1 ex.		18 ex.	3 ex.
<i>Scarodytes halensis halensis</i>								1 ex.
<i>Hygrotus impressopunctatus</i>			5 ex.		2 ex.	2 ex.		
<i>Hygrotus parallelogrammus</i>			2 ex.	1 ex.	6 ex.			
<i>Hygrotus inaequalis</i>	5 ex.	1 ex.	8 ex.		2 ex.	7 ex.		8 ex.
<i>Laccophilus minutus</i>			22 ex.	6 ex.	6 ex.			24 ex.

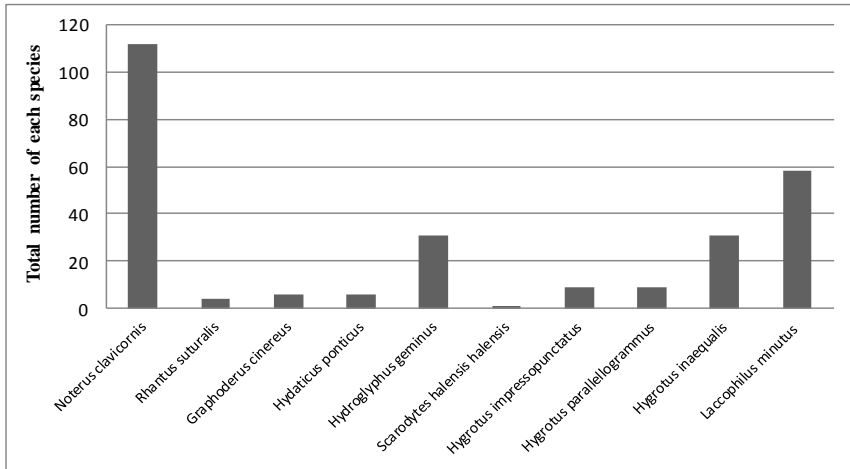


Figure 2. Comparison of total individuals of the species.