

CONTRIBUTIONS TO THE KNOWLEDGE OF ADEPHAGAN FAUNA IN ADIYAMAN PROVINCE, TURKEY (COLEOPTERA: DYTISCIDAE, GYRINIDAE, HALIPLIDAE AND NOTERIDAE)

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[Aykut, M. & Taşar, G. E. 2018. Contributions to the knowledge of Adepagan fauna in Adiyaman province, Turkey (Coleoptera: Dytiscidae, Gyrinidae, Haliplidae and Noteridae). *Munis Entomology & Zoology*, 13 (1): 249-255]

ABSTRACT: Water beetles belong to four families (Coleoptera: Adepaga: Dytiscidae, Gyrinidae, Haliplidae and Noteridae) collected from Adiyaman province (south-eastern part of Turkey) between 2013-2014 years, were evaluated. Totally, 34 species (Dytiscidae: 31, Gyrinidae: 1, Haliplidae: 1, Noteridae: 1) were described. Of these; *Hydaticus seminiger* De Geer, 1774 and *Liopterus haemorrhoidalis* (Fabricius, 1787) are second record for the Dytiscidae fauna of Turkey. Moreover, all described species are new record for Adiyaman province and 30 of them are new record for the south-eastern region of Turkey.

KEY WORDS: Coleoptera, Adepaga, Dytiscidae, Gyrinidae, Haliplidae, Noteridae, Adiyaman, Turkey

The family Dytiscidae Leach, 1815 is important component of aquatic beetles. The members of this family known as predaceous diving beetles and could be found in all type of fresh water habitats Nilsson & Holmen (1995). The family is represented by 182 genera and approximately 4,450 species, which are distributed around the world Nilsson & Hájek (2017a). In the Palearctic region, it is represented by 15 tribes, 80 genera and approximately 600 species Nilsson & Hájek (2017b). In Turkey 29 genera and 155 species have been reported (Gueorguiev, 1981; Darılmaz & Kiyak, 2009a, b; Fery & Erman, 2009; Fery, 2009; Fery & Hendrich, 2011a, b; Fery & Przewozny, 2011; Hájek et al., 2011; Hernando et al., 2012; Vorst & Fery, 2014). Of these 35 are endemic to Turkey Nilsson & Hájek (2017a). Gyrinidae family has 750 species belong to 13 genera in worldwide. Both adults and larvae are true aquatic Garrido et al. (2011). 11 species were known from Turkey Darılmaz & Kiyak (2009a). Haliplidae family has about 200 species belong to 5 genera in worldwide. Both adults and larvae live in a wide variety of freshwater habitats Garrido et al. (2011). 16 species were known from Turkey Darılmaz & Kiyak (2009a). Noteridae family has 250 species belong to 14 genera in worldwide. Both adults and larvae are aquatic Garrido et al. (2011). Three species were known from Turkey Darılmaz & Kiyak (2009a).

There are many systematic, faunistic, ecologic and zoogeographic studies, by the native and foreign authors about the water beetle fauna of Turkey. But there isn't any comprehensive study about Dytiscidae, Gyrinidae, Haliplidae and Noteridae (Coleoptera: Adepaga) from Adiyaman province and other provinces of South-eastern Anatolian region until this study. The aim of this study is to give species distribution of Dytiscidae, Gyrinidae, Haliplidae and Noteridae (Coleoptera: Adepaga) from Adiyaman province, Turkey. And also it contributes new data from Turkish Aquatic Coleoptera fauna.

MATERIAL AND METHODS

The specimens were collected from freshwater habitats of Adiyaman province, Turkey (Fig. 1) by a net having a diameter of 0,5 mm during 2013-2014 periods. A total of 56 sampling were made at 35 different localities. Specimens were fixed and preserved in 70% ethyl alcohol solution at spot. The clayed and muddy substance on their surfaces was brushed off with a small paint brush in the laboratory and each specimen was checked for identifications. Genitalia of collected specimens were dissected under a stereo microscope in the laboratory. The examined Dytiscidae materials were deposited in the private collection of the first author at Dicle University, Diyarbakır, Turkey. The other specimens of the families were deposited in the private collection of the second author at Adiyaman University, Kahta Vocational High School, Turkey.

RESULTS

34 species belong to four families (Dytiscidae, Gyrinidae, Haliplidae and Noteridae) were collected and described from the study area. All identified species are new for Adiyaman province; also new to south-eastern region of Turkey except four: *Hygrotus lernaeus* (Schaum, 1857), *Hydroglyphus geminus* (Fabricius, 1792), *Ilybius chalconatus* (Panzer, 1796) and *Laccophilus hyalinus* (De Geer, 1774). Furthermore, *Hydaticus seminiger* De Geer, 1774 and *Liopterus haemorrhoidalis* (Fabricius, 1787) are second record for the Dytiscidae fauna of Turkey. Determined species and their locality data are listed in Table 1.

Family Dytiscidae Leach, 1815

Agabus biguttatus (Olivier, 1795)

Specimens examined: A1, 4.6.2013, 7 ex.; A3, 4.6.2013, 5 ex.; A4, 4.6.2013, 3 ex.; A5, 20.6.2013, 6 ex.; A10, 24.6.2013, 12 ex., 22.05.2014, 15 ex.; A14, 17.6.2013, 2 ex.; A30, 3.6.2013, 12 ex.; A31, 3.6.2013, 2 ex.; A34, 6.6.2013, 5 ex.; A35, 24.6.2013, 6 ex.

Agabus bipustulatus (Linnaeus, 1767)

Specimens examined: A3, 4.6.2013, 5 ex.; A4, 20.6.2013, 4 ex.; A5, 28.5.2014, 1 ex.; A10, 24.6.2013, 7 ex., 22.05.2014, 9 ex.; A13, 22.5.2014, 3 ex.; A20, 17.6.2013, 7 ex.; A28, 5.6.2013, 13 ex.; A31, 3.6.2013, 6 ex. A33, 5.6.2013, 3 ex.; A36, 5.6.2013, 3 ex.

Agabus caraboides Sharp, 1882

Specimens examined: A13, 20.6.2013, 3 ex.; A17, 21.9.2013, 2 ex.; A30, 3.6.2013, 7 ex.

Agabus conspersus (Marshall, 1802)

Specimens examined: A7, 7.6.2013, 5 ex.; A16, 3.5.2014, 2 ex.

Agabus glacialis Hochhuth, 1846

Specimens examined: A1, 4.6.2013, 3 ex.; A3, 4.6.2013, 2 ex.; A4, 4.6.2013, 1 ex.; A9, 4.6.2013, 4 ex.

Agabus nebulosus (Forster, 1771)

Specimens examined: A10, 24.6.2013, 6 ex., 22.05.2014, 3 ex.; A14, 17.6.2013, 1 ex.; A30, 3.6.2013, 5 ex.; A34, 6.6.2013, 3 ex.

Colymbetes fuscus (Linnaeus, 1758)

Specimens examined: A17, 21.9.2013, 2 ex.; A21, 18.6.2013, 1 ex.; A22, 18.6.2013, 2 ex.; A25, 5.6.2013, 4 ex.

Deronectes sahlbergi Zimmermann, 1932

Specimens examined: A17, 06.05.2014, 3 ex.

Dytiscus marginalis (Linnaeus, 1758)

Specimens examined: A12, 4.6.2013, 5 ex.; A29, 22.5.2014, 2 ex.

Graptodytes veterator veterator Zimmermann, 1918

Specimens examined: A13, 17.6.2013, 4 ex.; 22.05.2014, 3 ex.

***Hydaticus seminiger* DeGeer, 1774 (Fig. 2)**

Specimens examined: A10, 28.4.2014, 3 ex., 22.5.2014, 1 ex.

Remark: This species previously reported from Denizli Province (Darılmaz & Kiyak, 2009b). It is second record for Turkish Dytiscidae fauna.

***Hydroglyphus geminus* (Fabricius, 1792)**

Specimens examined: A2, 4.6.2013, 6 ex.; A5, 20.6.2013, 17 ex.; A8, 4.6.2013, 13 ex.; A9, 4.6.2013, 1 ex.; A10, 24.6.2013, 1 ex., 28.4.2014, 3 ex.; A12, 4.6.2013, 1 ex.; A13, 20.6.2013, 13 ex.; A16, 3.6.2013, 7 ex.; A17, 21.9.2013, 3 ex.; A19, 18.6.2013, 6 ex.; A20, 17.6.2013, 11 ex.; A21, 18.6.2013, 11 ex., 8.5.2014, 6 ex.; A22, 18.6.2013, 5 ex.; A23, 3.6.2013, 4 ex.; 28.5.2014, 2 ex.; A24, 18.6.2013, 5 ex.; A25, 5.6.2013, 4 ex.; A26, 18.6.2013, 2 ex.; A28, 5.6.2013, 4 ex., 22.5.2014, 12 ex.; A29, 5.6.2013, 13 ex.; A33, 17.6.2013, 2 ex. 3.5.2014, 1 ex.; A34, 6.6.2013, 1 ex.; A35, 11.9.2013, 4 ex.

***Hydroporus discretus* Fairmaire and Brisout, 1859**

Specimens examined: A15, 3.6.2013, 3 ex.; A17, 21.9.2013, 2 ex.; A22, 18.6.2013, 6 ex.; A25, 5.6.2013, 7 ex.; A29, 5.6.2013, 2 ex.

***Hydroporus marginatus* (Duftschmid, 1805)**

Specimens examined: A15, 3.6.2013, 2 ex.; A 21, 20.5.2014, 3 ex.

***Hydroporus palustris* (Linnaeus, 1761)**

Specimens examined: A9, 4.6.2013, 7 ex., 22.5.2014, 5 ex.; A12, 4.6.2013, 4 ex.

***Hydroporus planus* (Fabricius, 1782)**

Specimens examined: A11, 04.06.2013, 8 ex.

***Hydroporus pubescens* (Gyllenhal, 1808)**

Specimens examined: A13, 3.05.2014, 3 ex.; A16, 22.5.2014, 5 ex.

***Hydroporus tessellatus* (Drapiez, 1819)**

Specimens examined: A19, 18.6.2013, 2 ex.; A29, 5.6.2013, 1 ex.; A30, 3.6.2013, 3 ex.

***Hydrovatus cuspidatus* (Kunze, 1818)**

Specimens examined: A9, 24.6.2013, 5 ex.; A10, 22.5.2014, 2 ex.

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

Specimens examined: A10, 24.6.2013, 2 ex., 22.05.2014, 5 ex.; A12, 4.6.2013, 2 ex.; A14, 17.6.2013, 2 ex.; A30, 3.6.2013, 3 ex.; A31, 3.6.2013, 1 ex.; A34, 6.6.2013, 11 ex.

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

Specimens examined: A9, 4.6.2013, 3 ex., 22.5.2014, 2 ex.; A12, 4.6.2013, 5 ex.; A27, 5.6.2013, 4 ex.; A32, 18.6.2013, 1 ex.

***Hygrotus lernaeus* (Schaum, 1857)**

Specimens examined: A12, 4.6.2013, 5 ex.; A23, 3.6.2013, 2 ex.

***Ilybius chalconatus* (Panzer, 1796)**

Specimens examined: A10, 28.04.2014, 3 ex.

***Ilybius fuliginosus fuliginosus* (Fabricius, 1792)**

Specimens examined: A18, 3.6.2013, 3 ex.; A22, 18.6.2013, 1 ex.; A27, 17.5.2014, 2 ex.

***Laccophilus hyalinus* (De Geer, 1774)**

Specimens examined: A6, 20.6.2013, 6 ex.; A7, 4.6.2013, 13 ex.; A10, 24.6.2013, 7 ex.; A19, 18.6.2013, 5 ex.; A21, 18.6.2013, 19 ex.; A22, 18.6.2013, 2 ex.; A26, 18.6.2013, 6 ex.; A31, 3.6.2013, 8 ex.; A32, 18.6.2013, 2 ex.

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

Specimens examined: A2, 4.6.2013, 23 ex.; A9, 4.6.2013, 12 ex., 22.5.2014, 13 ex.; A16, 3.6.2013, 36 ex.; A17, 21.9.2013, 3 ex., 8.4.2014, 6 ex.; A19, 18.6.2013, 7 ex.; A24, 18.6.2013, 5 ex.; A27, 5.6.2013, 9 ex.

***Laccophilus poecilus* Klug, 1834**

Specimens examined: A9, 4.6.2013, 5 ex., 22.5.2014, 7 ex.; A12, 4.6.2013, 6 ex.; A17, 21.9.2013, 5 ex.; A20, 17.6.2013, 8 ex.; A22, 18.6.2013, 1 ex.; A23, 3.6.2013, 4 ex.; 28.5.2014, 2 ex.; A24, 18.6.2013, 9 ex.; A26, 18.6.2013, 2 ex.

***Liopterus haemorrhoidalis* (Fabricius, 1787) (Fig. 3)**

Specimens examined: A9, 4.6.2013, 5 ex.; A10, 28.04.2014, 7 ex.

Remark: This species reported from Kütahya (Guéorguiev 1981) without any detailed locality information. It is the second report for Turkish aquatic fauna with first detailed locality information.

***Nebrioporus stearinus suavis* (Sharp, 1882)**

Specimens examined: A19, 18.6.2013, 5 ex., A32, 18.6.2013, 2 ex.

***Rhantus suturalis* (W.S. MacLeay, 1825)**

Specimens examined: A4, 04.06.2013, 1 ex.; A9, 22.05.2014, 3 ex.

***Scarodytes halensis* (Fabricius, 1787)**

Specimens examined: A9, 22.5.2014, 13 ex.; A11, 20.6.2013, 5 ex.; A17, 21.9.2013, 3 ex A26, 18.6.2013, 6 ex.

Family Gyrinidae***Gyrinus distinctus* Aubé, 1838**

Specimens examined: A2, 4.6.2013, 5 ex.; A11, 20.6.2013, 3 ex.; A28, 5.6.2013, 5 ex., 18.4.2014, 2 ex.

Family Haliplidae***Peltodytes caesus* (Duftschmid, 1805)**

Specimens examined: A9, 4.6.2013, 8 ex.; A12, 4.6.2013, 5 ex.; A19, 18.6.2013, 12 ex.

Family Noteridae***Noterus clavicornis* (De Geer, 1774)**

Specimens examined: A9, 4.6.2013, 3 ex., 22.5.2014, 4 ex.; A12, 4.6.2013, 1 ex., 17.4.2014, 17 ex.; A19, 18.6.2013, 12 ex., A25, 24.5.2014, 27 ex.

DISCUSSION

As a result of this work 34 aquatic adephagan species belong to four families (Dytiscidae, Noteridae, Haliplidae and Gyrinidae) were identified in the research area. Despite the numerous systematic, faunistic, ecologic and zoogeographic studies about Turkish aquatic beetle, none of such studies have been performed in Adiyaman and also in South-eastern region of Turkey. Thus all identified species are recorded as new for Adiyaman province. Surprisingly all identified species are new to south-eastern region of Turkey except four. It is clear that, more different species will be record with more detailed studies for this area in the future.

ACKNOWLEDGEMENTS

Author would sincerely thanks to Dr. Hans Fery (Berlin/Germany) for identification of some Dytiscidae specimens. This study has partly (financially) been supported by Adiyaman University, project numbered: KMYOBAP-2012/0001.

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Table 1. Location of the sampling sites where water beetles were found.

| Abbreviation | Sampling site | Coordinates | Altitude(m) |
|--------------|--------------------------------|-----------------------|-------------|
| A1 | Adiyaman, centrum | 37°55'24"N 38°17'00"E | 1160 |
| A2 | Adiyaman, centrum | 37°43'41"N 38°11'50"E | 685 |
| A3 | Adiyaman, centrum, Koçali | 37°55'54"N 38°15'26"E | 1067 |
| A4 | Çelikhhan | 37°59'06"N 38°15'35"E | 1270 |
| A5 | Besni, Akpınar | 37°44'54"N 37°46'37"E | 814 |
| A6 | Besni, Su gözü | 37°39'20"N 37°48'30"E | 700 |
| A7 | Gölbaşı | 37°47'57"N 37°39'45"E | 900 |
| A8 | Gölbaşı | 37°48'11"N 37°40'07"E | 900 |
| A9 | Gölbaşı, Azaplı Lake | 37°45'59"N 37°33'20"E | 880 |
| A10 | Gölbaşı, Büyük Lake | 37°47'44"N 37°38'35"E | 881 |
| A11 | Gölbaşı, Saydere | 37°45'22"N 37°44'52"E | 842 |
| A12 | Gölbaşı, Gözeler Pond | 37°43'56"N 37°30'38"E | 883 |
| A13 | Gölbaşı, Karaburun | 37°45'53"N 37°35'51"E | 907 |
| A14 | Kahta, Yassıkaya fountain | 37°55'22"N 38°36'28"E | 630 |
| A15 | Kahta, Değirmenbaşı | 37°57'40"N 38°40'17"E | 867 |
| A16 | Kahta, Doluca | 37°54'32"N 38°34'27"E | 865 |
| A17 | Kahta, Karakuş Hill | 37°52'10"N 38°35'03"E | 872 |
| A18 | Kahta, Daşlıca | 37°53'44"N 38°34'26"E | 768 |
| A19 | Kahta, Karadut, Tanbaşı | 37°54'50"N 38°48'59"E | 854 |
| A20 | Kahta, Cendere Bridge | 37°56'11"N 38°36'40"E | 612 |
| A21 | Kahta Stream | 37°52'03"N 38°37'18"E | 550 |
| A22 | Kahta-Gerger way | 37°51'43"N 38°40'25"E | 700 |
| A23 | Kahta, Old Kahta | 37°56'03"N 38°38'07"E | 664 |
| A24 | Gerger | 37°59'01"N 38°56'43"E | 555 |
| A25 | Gerger | 37°51'44"N 38°40'27"E | 760 |
| A26 | Gerger, Ballı | 37°53'17"N 38°51'16"E | 600 |
| A27 | Gerger, Karagöl (Sülüklü Lake) | 37°59'25"N 38°49'22"E | 1115 |
| A28 | Gerger, Kütüklü | 37°58'25"N 38°49'05"E | 1165 |
| A29 | Gerger, Şahintepe | 37°55'24"N 38°48'39"E | 870 |
| A30 | Sincik | 38°01'47"N 38°37'10"E | 1227 |
| A31 | Sincik | 38°01'10"N 38°37'12"E | 1200 |
| A32 | Sincik-Gerger way | 37°51'36"N 38°35'46"E | 777 |
| A33 | Sincik, Çatbahçe | 37°57'51"N 38°36'00"E | 707 |
| A34 | Tut | 37°47'02"N 37°50'53"E | 660 |
| A35 | Samsat | 37°45'34"N 38°32'08"E | 588 |



Figure 1. Map of the study area; Adiyaman province, Turkey.

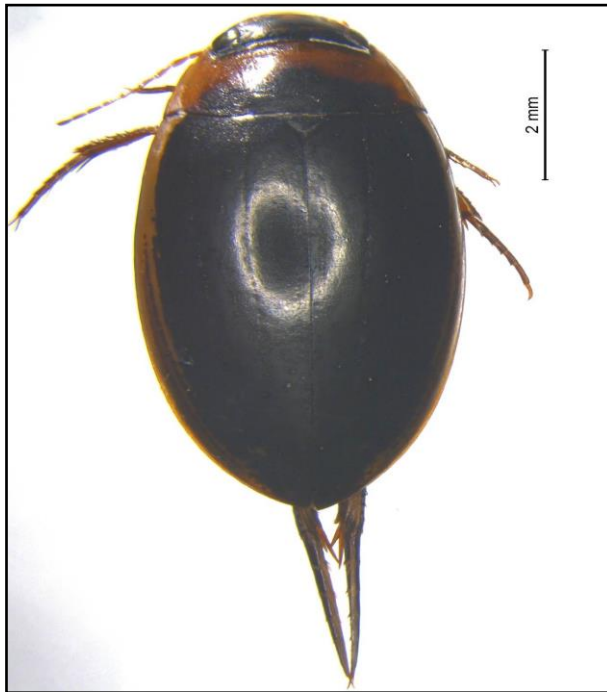


Figure 2. *Hydraticus seminiger* DeGeer, 1774.

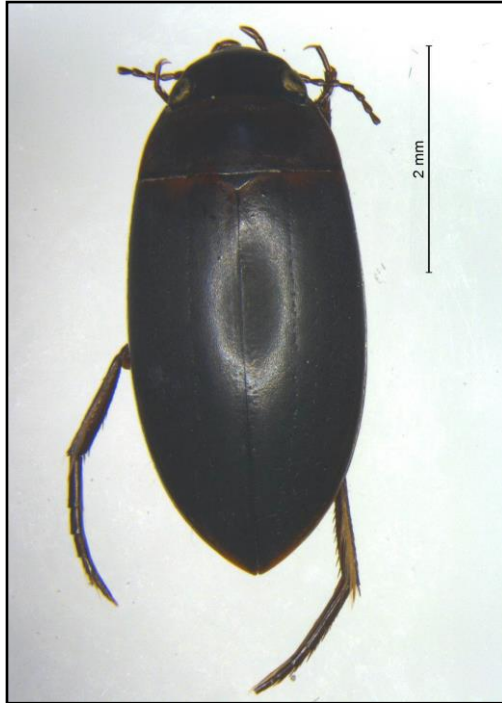


Figure 3. *Liopterus haemorrhoidalis* (Fabricius, 1787).