

Entomofauna	40/2	Heft 20: 443-452	Ansfelden, 10. Okt. 2019
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Contributions of the Infraorders Gerromorpha and Leptopodomorpha (Insecta: Hemiptera: Heteroptera) Fauna in Amasya's Wetlands of Turkey

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Abstract

In this study, a total of 18 species in 9 genera belonging to 6 families, was recorded in wetlands of Amasya, consisting of 14 species in 7 genera belonging to 5 families of infraorder Gerromorpha and 4 species in 2 genera belonging to one family of infraorder Leptopodomorpha. Out of these species, *Hebrus pusillus pusillus* (FALLÉN, 1807), *Microvelia pygmaea* (DUFOUR, 1833), *Saldula pilosella pilosella* (THOMSON, 1871) and *Mesovelia furcata* Mulsant & Rey, 1852 are new records for the semiaquatic Heteroptera fauna both of Amasya and Black Sea region. *Chartoscirta cincta cincta* (HERRICH-SCHAEFFER, 1841) are both new records for the fauna of Amasya and middle Black Sea region of Turkey.

Key words: Heteroptera, Gerromorpha, Leptopodomorpha, Amasya, Fauna, Turkey.

Zusammenfassung

In dieser Arbeit werden 14 Arten in 7 Gattungen aus 5 Familien der Gerromorpha und 4 Arten in 2 Gattungen aus 1 Familie der Leptopodomorpha aus Süßwasser-Habitaten in der Umgebung von Amasya festgestellt. Von diesen sind die Arten *Hebrus pusillus pusillus* (FALLÉN, 1807), *Microvelia pygmaea* (DUFOUR, 1833), *Saldula pilosella pilosella* (THOMSON, 1871) und *Mesovelia furcata* Mulsant & Rey, 1852 Neufunde für die semiaquatische Heteroptera - Fauna sowohl von Amasya als auch der Schwarz-See-Region. *Chartoscirta cincta cincta* (HERRICH-SCHAEFFER, 1841) ist der Erstnachweis für die Fauna von Amasya und der mittleren Schwarzmeerregion der Türkei.

Introduction

The infraorder Gerromorpha (Hemiptera: Heteroptera) are semiaquatic insects and they are Heteroptera composed monophyletic, with the other species belonging to the partially water requiring Leptopodomorpha (POLHEMUS & POLHEMUS, 2008). The species of infraorders Gerromorpha and Leptopodomorpha are genuinely predaceous and well adapted to semiaquatic environments with being economical, biological and ecological important as these species eats tiddler and invertebrates (for example aquatic insects larva) (POLHEMUS et al., 1995). The species of Gerromorpha can be found on the water front or surface, while the other semiaquatic bugs of infraorder Leptopodomorpha are distributed on the subalittoral zone.

The Studies of semiaquatic Heteroptera from Amasya region of Turkey are made in lakes, ponds, dam lakes. Amasya is a very rich region in terms of wetlands and there are numerous rivers, dam lakes, watercourse, swamp areas and small ponds (Fig. 1). The most important of those are Yeşilirmak River and Kelkit stream. Amasya has fruitful lowlands, which are irrigated by irrigation dam, ponds and the tributary of Yeşilirmak River. Geldingen, Suluova, Merzifon and Gümüşhacıköy are the largest lowlands of Amasya. Also, Amasya shows unique features of faunal elements and constitute important areas for type localities of numerous animal species.

Although the studies in Wetlands of Amasya by DURSUN (2012) of semiaquatic Heteroptera are well known, there has been no detailed data based on up-to-date studies of the aquatic and semiaquatic Heteroptera fauna of Amasya. *Hydrometra stagnorum* (LINNAEUS, 1758), *Velia affinis affinis* KOLENATI, 1857, *Aquarius paludum paludum* (FABRICIUS, 1794) and *Gerris thoracicus* SCHUMMEL, 1832 have been reported so far by DURSUN (2012). Since data of aquatic and semiaquatic heteroptera from Amasya region is hardly known to us, the results of this study are presented here.

In this aquatic and semiaquatic Heteroptera study, new faunistical records and ecological data is shown and it can shed light on the new scientific and ecological studies in wetlands of Amasya and black sea region.

Material and Methode

The samples of the semiaquatic Heteroptera were taken from different localities in wetlands of Amasya from 2015 to 2016 by sweeping the water surface and edges of water bodies with nets. The materials were containing 70% ethanol. In the laboratory, samples were softened in hot water for preparation of the genitalia and used for the identification of species. The materials were examined under dissecting stereomicroscope and their male genitalia (pygophores and parameres) was extracted. The following studies were used to identify the collected material by POISSON (1957), STICHEL (1955; 1956), SEIDENSTÜCKER (1957), TAMANINI (1958), KANYUKOVA (1997) and LINNAVUORI & HOSSEINI (2000). The materials were deposited in the collection of Amasya University, Faculty of Science and Arts, Department of Biology (Amasya, Turkey).

Results

Gerromorpha POPOV, 1971

Mesoveliidae DOUGLAS & SCOTT, 1867

Mesovelia furcata MULSANT & REY, 1852

Material examined: Amasya: Taşova, Destek stream, 03.09.2016, 2♀♀, 3♂♂; Samsun: Ladik lake, 03.09.2016, 4♀♀, 5♂♂.

Distribution in Turkey: Edirne, Kayseri, Sivas (ÖZESMI & ÖNDER, 1988; KIYAK & ÖZSARAC, 2001; KMENT & JINDRA, 2005; ÖNDER et al., 2006; BANBAL & FENT, 2016).

Comments: This species is rare or unique species in Turkey according to previous studies. It was first time recorded in this study from black sea region and Amasya.

Hebridae AMYOT & SERVILE, 1843

Hebrus (Hebrus) pusillus pusillus (FALLÉN, 1807)

Material examined: Amasya: Destek stream, 16.08.2015, 1♂.

Distribution in Turkey: Adana, Ankara, Edirne (?), Gaziantep, Hatay, İzmir, Konya, Mersin (OSHANIN, 1908; LINDBERG, 1922; JOSIFOV, 1986; ANDERSEN, 1995; ÖNDER et al., 2006; KIYAK et al., 2008; AUKEMA, 2009; FENT et al., 2011).

Comments: This species was recorded first time in this study from black sea region and Amasya.

Hydrometridae BILLBERG, 1820

Hydrometra stagnorum (LINNAEUS, 1758)

Material examined: Amasya: Akınoğlu stream, 17.06.2015, 1♂; Derinöz dam lake, 06.07.2015, 1♀, 1♂; Destek stream, 10.07.2015, 2♀♀, 2♂♂; Kurnaz stream, 16.06.2015, 1♀, 1♂; Gediksaray lake, 10.08.2015, 2♀♀, 2♂♂; Gümüşhacıköy, Sarayözü (Balıklı) lake, 24.06.2015, 1♀, 1♂; Yedikır dam lake, 29.05.2015, 1♀, 2♂♂; 31.08.2015, 1♀, 1♂; Merzifon, Alata lake, 13.09.2015, 1♀; Yazıköy lake, 06.09.2015, 2♀♀, 2♂♂; Alişar lake, 13.09.2015, 2♀♀, 2♂♂; Taşova, Ulugöl, 15.08.2015, 1♀, 1♂; Destek stream, 28.06.2016, 1♀, 1♂; Samsun: Ladik lake, 11.07.2015, 1♀, 2♂♂; 09.09.2015, 2♀♀, 2♂♂.

Distribution in Turkey: Adana, Amasya, Antalya, Aydın, Afyonkarahisar, Aksaray, Ankara, Artvin, Bartın, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çankırı, Çorum, Denizli, Edirne, Erzincan, Gümüşhane, Hatay, Iğdır, Isparta, İzmir, Kahramanmaraş, Kırklareli, Kırşehir, Konya, Mersin, Muğla, Niğde, Samsun, Sivas, Şanlıurfa, Tokat, Tunceli (HORVÁTH, 1883; FAHRINGER, 1922; LINDBERG, 1922; POISSON, 1925; GADEAU DE KERVILLE, 1939; HOBERLANDT, 1952; ANDERSEN, 1995; KIYAK, 2000; KIYAK et al., 2004, 2008; ÖNDER et al., 2006; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

Veliidae BRULLÉ, 1836

Microvelia (Picautia) pygmaea (DUFOR, 1833)

Material examined: Amasya: Taşova, Destek stream, 28.06.2016, 1♀.

Distribution in Turkey: Bursa, Çanakkale, Edirne, Kırşehir, Konya, Sakarya, Sivas. (HOBERLANDT, 1952; ÖNDER et al., 1981, 2006; ANDERSEN, 1995; FENT et al., 2011).

Comments: This species was recorded first time in this study from black sea region and Amasya.

***Velia affinis affinis* KOLENATI, 1857**

Material examined: Amasya: Göynücek, Gediksaray stream, 14.08.2015, 2♀♀, 1♂.

Distribution in Turkey: Adana, Amasya, Ankara, Antalya, Artvin, Bursa, Giresun, Hatay, Isparta, Konya, Malatya, Niğde, Mersin, Sivas (HOBERLANDT, 1952; TAMANINI, 1970; FENT et al., 2011; DURSUN, 2012).

Gerridae LEACH, 1815

***Aquarius paludum paludum* (FABRICIUS, 1794)**

Material examined: Amasya: Bağlıca lake, 16.06.2015, 1♀, 1♂; Derinöz dam lake, 06.07.2015, 3♀♀, 2♂♂; Destek lake, 28.05.2015, 3♀♀, 3♂♂; 19.06.2015, 3♀♀, 3♂♂; 15.08.2015, 3♀♀, 3♂♂; Destek stream, 10.07.2015, 2♀♀, 2♂♂; Kurnaz stream, 16.06.2015, 2♀♀, 1♂; Yassıçal lake, 09.07.2015, 2♀♀, 2♂♂; Ziyaret lake, 04.09.2015, 2♀♀, 2♂♂; Gediksaray lake, 10.08.2015, 3♀♀, 3♂♂; 14.08.2015, 3♀♀, 2♂♂; 18.06.2015, 2♀♀, 1♂; Gümüşhacıköy, Yakacık lake, 14.07.2015, 2♀♀, 2♂♂; Suluova, Bayırlı lake, 22.06.2015, 2♀♀, 2♂♂; Kolay lake, 12.07.2015, 2♀♀, 1♂; Sahlan stream, 10.09.2015, 2♀♀, 2♂♂; Yedikır dam lake, 31.08.2015, 2♀♀, 2♂♂; 07.09.2016, 8♀♀, 6♂♂; Taşova, Borabay lake, 16.08.2015, 3♀♀, 4♂♂; Ulugöl, 27.05.2015, 1♀, 2♂♂; 15.08.2015, 3♀♀, 1♂; Samsun: Ladik lake, 11.07.2015, 3♀♀, 2♂♂; 09.09.2015, 3♀♀, 3♂♂.

Distribution in Turkey: Adana, Afyonkarahisar, Amasya, Ankara, Antalya, Aydın, Bartın, Burdur, Bursa, Çorum, Denizli, Edirne, Hatay, Iğdır, Isparta, Muğla, Mersin, Niğde, Osmaniye, Samsun, Sinop, Kahramanmaraş (HOBERLANDT, 1952; KIYAK et al., 2004; KIYAK et al., 2008; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

***Aquarius ventralis* (FIEBER, 1860)**

Material examined: Amasya: Suluova, 26.05.2015, Eskiçelttek-Tersakan river, 1♀; Taşova, Destek stream, 19.06.2015, 2♀♀, 2♂♂; 28.06.2016, 4♀♀, 3♂♂; Samsun: Ladik lake, 11.07.2015, 2♀♀, 1♂; 09.09.2015, 1♀, 2♂♂.

Distribution in Turkey: Adana, Antalya, Aydın, Düzce, Burdur, Denizli, Hatay, Isparta, Kırklareli, Mersin, Muğla, Niğde, Samsun, Sinop (LINDBERG, 1922; HOBERLANDT, 1952; KIYAK et al., 2007; FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris argentatus* SCHUMMEL, 1832**

Material examined: Amasya: Bağlıca lake, 16.06.2015, 1♀, 1♂; Derinöz dam lake, 06.07.2015, 1♀, 1♂; Kurnaz stream, 16.06.2015, 1♀, 1♂; Ziyaret lake, 04.09.2015, 2♀♀, 2♂♂; Gediksaray lake, 10.08.2015, 1♀, 2♂♂; Gümüşhacıköy, Yakacık lake, 14.07.2015, 1♀, 1♂; Suluova, Bayırlı lake, 22.06.2015, 2♀♀, 2♂♂; Mindor stream, 11.09.2015, 1♀, 1♂; Sahlan stream, 10.09.2015, 2♀♀, 2♂♂; Yedikır dam lake, 07.09.2016, 4♀♀, 4♂♂; Merzifon, Paşa (Hırka) lake, 12.09.2015, 1♀, 2♂♂; 100. Yıl lakei, 13.09.2015, 1♀, 2♂♂.

Distribution in Turkey: Adana, Antalya, Aydın, Burdur, Çorum, Denizli, Isparta, Kahramanmaraş, Kayseri, Mersin, Muğla, Niğde, Sinop, Tekirdağ (HOBERLANDT, 1952; ÖNDER et al., 2006; KIYAK et al., 2008; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris caucasicus* KANYUKOVA, 1982**

Material examined: Amasya: Taşova, Destek stream, 15.08.2015, 2♀♀, 1♂; Samsun: Ladik lake, 11.07.2015, 2♀♀, 2♂♂; 09.09.2015, 1♀, 1♂.

Distribution in Turkey: Çorum, Tokat, Van (FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris asper* (FIEBER, 1860)**

Material examined: Amasya: Yedikır dam lake, 31.08.2015, 1♀; Taşova, Destek lake, 16.08.2015, 1♀, 1♂; Samsun: Ladik lake, 11.07.2015, 1♀, 1♂.

Distribution in Turkey: Adana, Ağrı, Çorum (SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris costae fieberi* STICHEL, 1938**

Material examined: Amasya: Taşova, Destek Stream, 19.06.2015, 2♀♀, 1♂; Merzifon, Yazıköy Gölleti, 06.09.2015, 6♀♀, 5♂♂; Çayırköy Gölleti, 06.09.2016, 3♀♀, 3♂♂.

Distribution in Turkey: Ankara, Afyonkarahisar, Antalya, Ardahan, Artvin, Aksaray, Aydın, Burdur, Bursa, Çankırı, Çorum, Denizli, Erzincan, Giresun, Isparta, İzmir, Kastamonu, Kırklareli, Kırşehir, Kocaeli, Mersin, Muğla, Niğde, Sivas, Tekirdağ, Tunceli, Van (HOBERLANDT, 1952; KIYAK et al., 2004, 2008; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris lacustris* (LINNAEUS, 1758)**

Material examined: Amasya: Çavuş (Kızılbayır) stream, 05.09.2015, 1♂; Çekerek river, 06.09.2015, 1♂; Deliçay, 06.09.2015, 2♀♀; Yeşilimak, 06.09.2015, 1♂, 1♀; Sevincer stream, 13.08.2015, 1♂; Akınoğlu stream, 13.08.2015, 2♀♀; Yenice stream, 13.08.2015, 2♀♀; Çorum stream, 18.06.2015, 1♂, 1♀; 14.08.2015, 2♀♀, 1♀.

Distribution in Turkey: Afyonkarahisar, Ağrı, Ardahan, Antalya, Aydın, Burdur, Bolu, Çorum, Denizli, Edirne, Erzincan, Giresun, Hatay, Iğdır, Isparta, İstanbul, Karabük, Kilis, Muğla, Sakarya, Samsun, Sinop, Sivas, Tekirdağ, Tokat, Trabzon, Van (HOBERLANDT, 1952; KIYAK et al., 2004, 2008; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012; TOPKARA & USTAĞLU, 2015).

Comments: This species was recorded first time in this study from Amasya.

***Gerris maculatus* TAMANINI, 1946**

Material examined: Amasya: Taşova, Destek lake, 16. 08. 2015, 1♀, 1♂.

Distribution in Turkey: Adana, Ağrı, Ardahan, Antalya, Edirne, Erzincan, Hatay, Kayseri, Marmara Bölgesi, Sinop, Sivas, Van, Tekirdağ, Tunceli (SEIDENSTÜCKER, 1957; FENT et al., 2011; DURSUN, 2012).

Comments: This species was recorded first time in this study from Amasya.

***Gerris thoracicus* SCHUMMEL, 1832**

Material examined: Amasya: Deliçay, 06.09.2015, 1♂, 1♀; Suluova, Bayırlı lake, 22.06.2015, 3♀♀, 2♂♂; Kolay lake, 12.07.2015, 2♀♀, 1♂; Sahlan stream, 10.09.2015, 2♀♀, 3♂♂; Yedikır dam lake, 31.08.2015, 3♀♀, 2♂♂; Taşova, Borabay lake, 16.08.2015, 1♀, 2♂♂; Ulugöl, 27.05.2015, 1♀, 2♂♂; Samsun: Ladik lake, 11.07.2015, 2♀♀, 2♂♂; 09.09.2015, 2♀♀, 2♂♂.

Distribution in Turkey: Adana, Ağrı, Amasya, Ankara, Antalya, Ardahan, Artvin, Aydın, Bartın, Burdur, Bursa, Çankırı, Çorum, Erzincan, Denizli, Edirne, Giresun, Hatay, Iğdır, Isparta, İzmir, Kahramanmaraş, Karabük, Kırşehir, Konya, Muğla, Mersin, Niğde, Samsun, Sinop, Sivas, Tekirdağ, Tokat, Trabzon (LINDBERG, 1922; HOBERLANDT, 1952; SEIDENSTÜCKER, 1957; KIYAK et al., 2008; SALUR & MESCI, 2009; FENT et al., 2011; DURSUN, 2012).

***Leptopodomorpha* POPOV, 1971**

***Saldidae* AMYOT & SERVILE, 1843**

***Chartoscirta cincta cincta* (HERRICH-SCHAEFFER, 1841)**

Material examined: Amasya: Taşova, Destek stream, 28.06.2016, 1 ♀.

Distribution in Turkey: Artvin, Burdur, Edirne, Kocaeli (ÖNDER et al., 2006; ŞERBAN, 2010; FENT et al., 2011).

Comments: This species is widely distributed from Thrace region extending also to the east of black sea region in Turkey. It was here recorded for the first time from Amasya province and middle black sea region.

***Saldula arenicola arenicola* (SCHOLTZ, 1847)**

Material examined: Amasya: Derinöz dam lake, 06.07.2015, 3♀♀, 2♂♂; Destek lake, 28.05.2015, 3♀♀, 2♂♂; 19.06.2015, 2♀♀, 2♂♂; 15.08.2015, 3♀♀, 3♂♂; Destek stream, 10.07.2015, 2♀♀, 2♂♂; Yassıçal lake, 09.07.2015, 2♀♀, 2♂♂; Gediksaray lake, 10.08.2015, 3♀♀, 3♂♂; 14.08.2015, 3♀♀, 2♂♂; Gümüşhacıköy, Yakacık lake, 14.07.2015, 2♀♀, 2♂♂; Suluova, Kolay lake, 12.07.2015, 2♀♀, 1♂; Taşova, Destek lake, 16. 08. 2015, 1♀, 1♂; Samsun: Ladik lake, 11.07.2015, 2♀♀, 2♂♂.

Distribution in Turkey: Adana, Ankara, Antalya, Tunceli (LINDBERG, 1922; HOBERLANDT, 1952; SEIDENSTÜCKER, 1964; FENT et al., 2011).

Comments: This species was recorded here for the first time from Amasya province and black sea region.

***Saldula pilosella pilosella* (THOMSON, 1871)**

M a t e r i a l e x a m i n e d : Amasya: Suluova, Eskiçelttek-Tersakan river, 26.05.2015, 2♀♀, 1♂; Yedikır dam lake, 07.09.2016, 12♀♀, 11♂♂; Samsun: Ladik lake, 03.09.2016, 5♀♀, 7♂♂.

D i s t r i b u t i o n i n T u r k e y : Edirne, Karaman (FENT et al., 2011; ÇERÇİ & KOÇAK, 2016).

Comments: This species distributed rare in Turkey and It was here recorded for the first time from Amasya province and black sea region.

***Saldula saltatoria* (LINNAEUS, 1758)**

M a t e r i a l e x a m i n e d : Amasya: Suluova, Eskiçelttek-Tersakan river, 26.05.2015, 3♂♂.

D i s t r i b u t i o n i n T u r k e y : Adana, Burdur, Bursa, Çankırı, Edirne, Karaman, Konya, Ordu (ÖNDER et al., 2006; KIYAK et al., 2008; ÇERÇİ & KOÇAK, 2016; FENT et al., 2011).

Comments: This species was recorded here for the first time from Amasya province.

Acknowledgements

We are grateful to Amasya University (project number FMB-BAP 15-0135) for their financial support of the project.

Literature

- ANDERSEN N.M. (1995): Infraorder Gerromorpha POPOV, 1971 - semiaquatic bugs. Pp. 17-114. In: AUKEMA B. & Ch. RIEGER (eds) Catalogue of the Heteroptera of the Palaearctic Region. Vol. 1. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, xxvi + 222 pp.
- AUKEMA B. (2013): Fauna Europaea. <http://www.faunaeur.org/> (Last update 23 August 2013).
- BANBAL T. & M. FENT (2016): New Records of Gerromorpha and Nepomorpha (Hemiptera: Heteroptera) Fauna of Turkey. – Journal of Entomological Research Society **18** (3): 121-128.
- ÇERÇİ B. & Ö. KOÇAK (2016): Contribution to the knowledge of Heteroptera (Hemiptera) fauna of Turkey. – Journal of Insect Biodiversity **4** (15): 1-18.
- DITRICH T., PAPÁČEK M. & T. BROUM (2008): Spatial distribution of semiaquatic bugs (Heteroptera: Gerromorpha) and their wing morphs in a small scale of the Pohořský Potok stream spring area (Novohradské Hory Mts.). – Silva Gabreta **14**: 173-178.
- DURSUN A. (2012): Additional records of Gerromorpha (Hemiptera: Heteroptera) and redescription of *Rhagovelia nigricans nigricans* (BURMEISTER, 1835) from Anatolia (Turkey). – Turkish Journal of Zoology **36** (5): 652-661.
- FAHRINGER J. (1922): Eine Rhynchotenausbeute aus der Türkei, Kleinasien und benachbarten Gebieten. – Konowia **1**: 137-144.
- FENT M., KMENT P., ELİPEK-ÇAMUR B. & T. KIRGIZ (2011): Annoated catalogue of Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha (Hemiptera: Heteroptera) of Turkey with new records. – Zootaxa **2856**: 1-84.

- GADEAU DE KERVILLE H. (1939): Liste méthodique des invertébrés et des vertébrés récoltés en Asie-Mineure. Pp. 67-148 [Hemiptera pp. 116-125]. In: Voyage zoologique d'Henri Gadeau de Kerville en Asie-Mineure (avril-mai 1912). Tome 1, 1ère partie. Paul Lechevalier, Paris, 148 pp.
- HOBERLANDT L. (1952): Results of the zoological scientific expedition of the National Museum in Praha to Turkey. 2. Hemiptera-Heteroptera I. The aquatic and semiaquatic Heteroptera of Turkey. – *Acta Entomologica Musei Nationalis Pragae* **26** (352): 1-74.
- HORVÁTH G. (1883): Heteroptera anatolica in regione brussae collecta. – *Természetrájsi Füzetek* **7**: 21-30.
- JOSIFOV M. (1986): Über die Verbreitung mancher Heteropterenarten auf der Balkanhalbinsel und der Insel Zypern. – *Acta Zoologica Bulgarica* **31**: 42-48.
- KANYUKOVA E.V. (1997): Hebridae of Russia and adjacent countries (Heteroptera). – *Zoosystematica Rossica* **6**: 223-236.
- KIYAK S. (2000): Işık Dağı ve çevresinde yaşayan Heteroptera (Insecta) türlerinin faunistik, sistematik ve ekolojik yöneden araştırılması-I. – *Journal of the Institute of Science and Technology, Gazi University* **13**: 323-345.
- KIYAK S. & Ö. ÖZSARAC (2001): Checklist of aquatic and semiaquatic Heteroptera of Turkey, with a new record. – *Journal of the Entomological Research Society* **3**: 17-32.
- KIYAK S., SALUR A., CANBULAT S. & Ö. ÖZSARAC (2004): Contributions of the aquatic and semiaquatic Heteroptera fauna of the Afyon Province. – *Gazi Üniversitesi Fen Bilimleri Dergisi* **17** (2): 31-34.
- KIYAK S., CANBULAT S. & A. SALUR (2007): Nepomorpha (Heteroptera) fauna of south-western Anatolia (Turkey). – *Boletín de la Sociedad Entomológica Aragonesa* **40**: 548- 554.
- KIYAK S., SALUR A. & S. CANBULAT (2008): Gerromorpha and Leptopodomorpha (Insecta; Heteroptera) Fauna of Southwest Anatolia. *Turkish Journal of Zoology* **32**: 309-326.
- KMENT P. & Z. JINDRA (2005): New records of true bugs (Heteroptera) of Balkan peninsula. – *Acta Entomologica Slovenica* **13**: 9-20.
- LINDBERG H. (1922): Verzeichnis der von John Sahlberg und Uuno Saalas in den Mittelmeergebieten gesammelten semiaquatischen und aquatischen Heteropteren. – *Notulae Entomologicae* **2**: 15-19 + 46-49.
- LINNAVUOR R.E. & R. HOSSEINI (2000): Heteroptera of Guilan with remarks on species of the adjacent areas. Part I. Nepomorpha, Gerromorpha, Leptopodomorpha, Cimicomorpha: Nabidae, Anthocoridae, Cimicidae, Microphysidae. Guilan University Press, Rasht, 94 pp.
- OLOSUTEAN H. & D.M. ILIE (2013): Are semi-aquatic bugs (Heteroptera: Nepomorpha) indicators of hydrological stability of permanent ponds? *Aquatic Insects: International – Journal of Freshwater Entomology* **35** (3-4): 105-118.
- OSHANIN B. (1908): Verzeichnis des Palaearktischen Hemipteren mit besonderer Berücksichtigung ihrer Verteilung im Russischen Reiche. I. Band. Heteroptera. II. Lieferung. Tingididae–Acanthiidae. *Ezhgodnik Zoologicheskago Muzeya Imperatorskoy Akademii Nauk* **13** (Prilozhenie): 395-586.
- ÖNDER F., ÜNAL E. & A. ÜNAL (1981): Heteroptera fauna collected by light traps in some districts of northwestern part of Anatolia. – *Türkiye Bitki Koruma Dergisi* **5**: 151-169.
- ÖNDER F., KARSAVURAN Y., TEZCAN S. & M. FENT (2006): Türkiye Heteroptera (Insecta) kataloğu. (Heteroptera (Insecta) catalogue of Turkey). – Ege Üniversitesi Ziraat Fakültesi, İzmir.
- ÖZESMİ U. & F. ÖNDER (1988): Sultan Sazlığı (Kayseri) nın sucul Heteroptera ve Coleoptera türleri üzerinde faunistik bir çalışma. (Faunistic studies on the aquatic heteropterous and coleopterous insects of Sultan Sazlığı (Kayseri/Turkey). Pp. 177-186. In: IX. Ulusal Biyoloji Kongresi, 21-23 Eylül 1988, Vol. 2. Sivas.

- POISSON R. (1925): Hémiptères aquatiques d'Asie Mineure recueillis par M. H. GADEAU DE KERVILLE en 1912. Remarques sur les Notonectes. – Bulletin de la Société Entomologique de France 327-330: 164 pp.
- POISSON R. (1957): Hétéroptères aquatiques. Faune de France. Vol. 61. Fédération Française des Sociétés de Sciences Naturelles, Paris, 263 pp.
- POLHEMUS J.T., JANSSON A. & E. KANYUKOVA (1995): Infraorder Nepomorpha. Pp. 13–18. In: AUKEMA B. & Ch. RIEGER (eds) Catalogue of the Heteroptera of the Palaearctic Region. Vol. 1. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, xxvi + 222 pp.
- POLHEMUS J.T. & D.A. POLHEMUS (2008): Global diversity of true bugs (Heteroptera: Insecta) in freshwater. – Hydrobiologia **595**: 379-391.
- SALUR A. & S. MESCI (2009): Gerromorphan fauna of Çorum province in Turkey (Insecta: Heteroptera). – Munis Entomology and Zoology **4**: 340-345.
- SEIDENSTÜCKER G. (1957): Anadoludan Heteropterler I. Heteroptera aus Anatolien I. Revue de la Faculté des Sciences Naturelles de l'Université d'Istanbul, Série B, Sciences Naturelles, **22**: 179-189.
- SEIDENSTÜCKER G. (1964): *Saldula xanthochila misis* nov. subsp. aus Anatolien (Heteroptera, Saldidae). Pp. 80-83. In: Festschrift, 75 Jahre Neues Gymnasium Nürnberg.
- STICHEL W. (1955-1956): Illustrierte Bestimmungstabellen der Wanzen. II. Europa (Hemiptera-Heteroptera Europae). Vol. 1. Wolfgang Stichel, Berlin – Hermsdorf, 168 pp.
- ŞERBAN C. (2010): Faunistic data on some true bugs [sic!] species (Insecta: Heteroptera) from West Turkey. [Results of the "Taurus" - 2005 and "Focida" - 2006 expeditions]. Travaux du Muséum National d'Histoire Naturelle Grigore Antipa **53**: 171-180.
- TAMANINI L. (1958): Alcune osservazioni sulle *Velia* della Russia e descrizione di una nuova species. XIV Contributo allo studio del genere *Velia* LATR. (Heteroptera, Veliidae [sic!]). – Doriana, Annali del Museo Civico di Storia Naturale "G. Doria" **2** (83): 1-7.
- TAMANINI L. (1970): Osservazioni sulla geonemia delle *Velia* orientali e descrizione di una nuova species. XX Contributo allo studio del genere *Velia* LATR. (Heteroptera, Veliidae). – Bollettino della Società Entomologica Italiana **102**: 30-35.
- TOPKARA E.T. & M.R. USTAOĞLU (2015): A study on the aquatic Coleoptera and aquatic-semiaquatic Heteroptera (Insecta) fauna of Lake Kartal (Denizli) and ecological notes. – Ege University Journal of Fisheries and Aquatic Sciences **32** (1): 45-50.

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Fig 1: Research area Amasya in Turkey

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Jahr/Year: 2019

Band/Volume: [0040](#)

Autor(en)/Author(s): Dursun Ahmet, Fent Meral

Artikel/Article: [Contributions of the Infraorders Gerromorpha and Leptopodomorpha \(Insecta: Hemiptera: Heteroptera\) Fauna in Amasya's Wetlands of Turkey 443-452](#)