

New Records of Gerromorpha and Nepomorpha (Hemiptera: Heteroptera) Fauna of Turkey

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ABSTRACT

This study was performed in the period of 2013-2014 in various freshwater habitats ranging from lakes, dam lakes, rivers, streams, irrigation channels and trough in Turkish Thrace in order to determine the Gerromorpha and Nepomorpha fauna of the city. *Hydrometra gracilentia* Horváth, 1899 (Hydrometridae) is new record for the fauna of Turkey, *Limnopus rufoscutellatus* (Latreille, 1807) (Gerridae), *Mesovelina furcata* Mulsant and Rey, 1852 and *Mesovelina vittigera* Horváth, 1895 (Mesoveliidae) and *Microvelia (Microvelia) reticulata* (Burmeister, 1835) (Veliidae) are new records for fauna of Turkish Thrace Region. First exact localities are provided for three species, (*Anisops sardeus sardeus* Herrich-Schäffer, 1849, *Hesperocorixa linnaei* (Fieber, 1848) and *Sigara mayri* (Fieber, 1860)) whose presence in Turkish Thrace was formerly reported without any locality details.

Key words: Heteroptera, Turkish Thrace, fauna, taxonomy, aquatic and semiaquatic insects, new record.

INTRODUCTION

The two infraorders, Gerromorpha and Nepomorpha, including the aquatic and semi-aquatic members of the suborder Heteroptera. All members of semi-aquatic Gerromorpha are predators feeding on other Arthropoda. They show polymorphism in terms of their wing structures and adults are represented with wingless, short-winged and long-winged forms. Nepomorpha are aquatic, mainly predators but some also show omnivorous habits (Andersen, 1995; Polhemus, 1995).

The first comprehensive study on Gerromorpha and Nepomorpha in Turkey dates back to Hoberlandt (1952) in which he summarized all the available records from the country. Recently Fent *et al.* (2011), performed a detailed study in which a critical checklist was given for aquatic and semi-aquatic Heteroptera of Turkey and Thrace Region based on both new (4 new records for Turkey fauna and 4 new records for Thrace Region fauna) and all previous records. The review for later supplemented by additional papers on Turkish fauna by Dursun (2011, 2012) and Topkara *et al.* (2013). Dursun (2011, 2012), after investigating the material he collected in different localities in Anatolia and the Turkey material of Seidenstücker preserved in Zoologische

Staatssammlung München, reported a number of species of which two are new records for Turkey and made the re-description of *Rhagovelia nigricans nigricans* which confirmed the former record of the subspecies given by Seidenstücker (1957). On the other hand, Topkara *et al.* (2013) recorded *Limnporus rufoscutellatus* in Turkey for the first time.

In the light of the distributional data given in above mentioned studies, the current Gerromorpha fauna of Turkey is represented with 9 genera and 27 species/subspecies within 5 families and Nepomorpha fauna by 19 genera and 49 species/subspecies within 9 families, while these two groups in Thrace Region are represented with 5 genera and 10 species/subspecies within 3 families and 12 genera and 29 species/subspecies within 8 families, respectively (Fent *et al.*, 2011). Fent *et al.* (2011) also reported that 7 species given in the region formerly without any locality information need to be confirmed with precise locality data and that 3 species whose occurrence in the region is doubtful need to be verified.

MATERIAL AND METHODS

The study material was collected from various natural and artificial aquatic environments ranging from lakes, dam lakes, rivers, streams, irrigation channels and trough in Edirne province from June to September 2011 and from March to September 2014 when aquatic and semi-aquatic bugs are particularly active.

The material was sampled from the water body, water surface and waterfront with the help of a sweeping net and with a light trap, in addition to other sampling methods, since some species within some families are also active in night hours. All the sampled material was placed and kept in 96% ethanol containing tubes. The keys of Stichel (1955-1956), Nieser (1972), Poisson (1957), Jansson (1986), Andersen (1990, 1993) Rabitsch (2005) and Kanyukova (2006) were consulted in identifications of the sampled material.

RESULTS

Gerromorpha Popov, 1971

Family: Gerridae Leach, 1815

Limnporus rufoscutellatus (Latreille, 1807)

Turkey Distribution: Rize-İkizdere-(Kuzeyaksu Lake) (Topkara *et al.*, 2013). New record for Turkish Thrace Region.

Material examined: Edirne province: Uzunköprü-Bıldır (pond), 80m 30.08.2013, 1♂.

Family: Hydrometridae Billberg, 1820

Hydrometra gracilenta Horváth, 1899

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Distribution in Palaearctic Region: Nearly all Europe, Asia: Azerbaijan, Iran, Turkmenistan, Tajikistan, Kazakhstan, Mongolia, China (Northwest Region), Russia (Western Siberia, Eastern Siberia, Far East), Japan; and from North Africa Egypt, Morocco (Andersen, 1995; Aukema *et al.*, 2013).

Turkey Distribution: New record for Turkey

Material examined: Edirne province: Enez, Büyük Gala Lake, 0m, 07.04.2014, 1♀; Havsa, Tahal (stream), 50m, 13.06.2014, 1♀; İpsala, Koyuntepe, Telmata Lake, 28m, 03.09.2013, 1♂; Sultanköy (dam), 59m, 12.09.2013, 3♂♂; Keşan, Dişbudak (stream), 92m, 09.09.2013, 1♂; Kılıçköy, Karahisar, Kanal Stream, 16m, 03.09.2013, 1♀, 1♂; Lalapaşa, Hamzabeyli (pond), 378m, 15.07.2014, 3♀♀; Meriç, Büyükkaltıaç (stream), 40m, 12.08.2014, 1♀; Nasuhbey (pond), 33m, 04.08.2014, 1♀; center, İskender, Sazlı Stream, 87m, 20.08.2013, 1♂; city center, Pazarkule, Meriç River, 35m, 23.07.2013, 1♂; Üyükütatar (stream), 44m 29.05.2014, 2♂♂; Süloğlu, Büyükgerdelli (pond), 163m, 12.06.2013, 1♀; Uzunköprü, Altinyazı (irrigation channel), 24m, 06.09.2013, 1♀, 1♂; Hamidiye (stream), 108m, 06.09.2013, 1♂.

Family: Mesoveliidae Douglas and Scott, 1867

***Mesovelia furcata* Mulsant and Rey, 1852**

Turkey Distribution: Kayseri-Sultan Sazlığı (Özesmi and Önder, 1988; Kiyak and Özşaraç, 2001); Sivas-Demiryurt (Tödürge Lake) (Kment and Jindra, 2005). New record for Turkish Thrace Region.

Material examined: Edirne province: Lalapaşa, Hamzabeyli (pond), 378m 15.07.2014, 3♀♀, 2♂♂.

***Mesovelia vittigera* Horváth, 1895**

Turkey Distribution: İçel (Erdemli) (Hoberlandt, 1952); Adana (Linnavuori, 1965); Mersin (Önder *et al.*, 2006); Antalya, Denizli (Kiyak *et al.*, 2008). New record for Turkish Thrace Region.

Material examined: Edirne province: Enez-Hisarlı (pond), 203m, 23.06.2013, 1♀; center, İskender, Sazlı Stream, 87m, 20.08.2013, 1♀.

Family: Veliidae Brullé, 1836

***Microvelia (Microvelia) reticulata* (Burmeister, 1835)**

Turkey Distribution: Konya-Beyşehir (Beyşehir Lake), Sivas-Demiryurt (Tödürge Lake) (Kment and Jindra, 2005); Konya, Sivas (Önder *et al.*, 2006). New record for Turkish Thrace Region.

Material examined: Edirne province: Lalapaşa, Vaysal (pond), 438m, 15.07.2014, 1♀; Meriç, Nasuhbey (pond), 33m, 04.08.2014, 3♀♀, 1♂.

Nepomorpha Popov, 1968

Family: Corixidae Leach, 1815

***Hesperocorixa linnaei* (Fieber, 1848)**

Turkey Distribution: Ankara (Poisson, 1925; Gadeau de Kerville, 1939; Hoberlandt,

1952); Antalya, Burdur, Düzce, Isparta (Poisson, 1957); Bolu-Düzce-(Çilimli), Bursa-İnegöl-(Süpürtü), Bursa-center-(Doğanköy), Bursa-M. Kemalpaşa-(Ali Seydi), Sakarya-Adapazarı-(Ormanköy) (Önder *et al.*, 1981); Anatolia, Turkish Thrace (Jansson, 1986); Adapazarı, Ankara, Bolu-Düzce, Bursa-center (İnegöl), Kayseri-Sultan Sazlığı (Özesmi and Önder, 1988); Adana, Ağrı, Ankara, Aydın, Bolu, Bursa, Denizli, Kayseri, Sakarya, Sivas (Önder *et al.*, 2006); Antalya, Aydın, Burdur, Denizli, Isparta (Kiyak *et al.*, 2007); Kayseri-Pınarbaşı (Kurttepe-Kurttepe Stream) (Topkara, 2013).

Material examined: Edirne province: İpsala, Yenikarpuzlu (irrigation channel), 20m, 12.09.2013, 2♂♂; center, Iskender, Sazlı Stream, 87m, 20.08.2013, 6♀♀, 1♂.

***Sigara (Halicorixa) mayri* (Fieber, 1860)**

Turkey Distribution: İçel-Erdemli (Hoberland, 1952); İçel-Tarsus (Seidenstücker, 1959); Adana (Linnavuori, 1965); Aydın-Kuşadası (Wagner, 1966); Anatolia, Turkish Thrace (Jansson, 1986); Adana, Afyonkarahisar, Aydın, Mersin (Önder *et al.*, 2006); Adana (Fent *et al.*, 2011).

Material examined: Edirne province: Enez (trough), 24m, 12.09.2013, 1♂; Havsa, Oğulpaşa (stream), 85m, 30.08.2014, 1♂.

Family: Notonectidae Latreille, 1802

***Anisops sardeus sardeus* Herrich-Schäffer, 1849**

Turkey Distribution: Mersin-Erdemli (Brooks, 1951); Adana-Abacılar, Erdemli, Kilis, Mersin, Suluhan-Doğu Toros (Hoberlandt, 1952); Adana (Linnavuori, 1965); İzmir-Kuşadası (Wagner, 1966); Adana, Gaziantep, Mersin (Önder *et al.*, 2006); Antalya, Aydın, Denizli, Muğla (Kiyak *et al.*, 2007); Osmaniye-Haruniye (Düziçi) (Fent *et al.*, 2011). Turkish Thrace (Polhemus, 1995; Aukema, 2013).

Material examined: Edirne province: Enez, Abdurrahim (stream), 27m, 12.09.2013, 1♀, 1♂, 2 nymphs; trough, 12.09.2013, 3♀♀, 1♂; Hisarlı (pond), 203m, 23.06.2013, 1♀; Enez (trough), 24m, 12.09.2013, 10♀♀, 4♂♂; Yenice (trough), 70m, 24.08.2014, 1♀, 1♂; Yenimahalle (pond), 30m, 12.09.2013, 3♀♀, 2♂♂; Havsa, Abalar (stream), 70m, 30.08.14, 5♀♀, 3♂♂; Oğulpaşa (stream), 85m, 30.08.2013, 1♀, 1 nymph; İpsala, Balabancık (stream), 36m, 12.09.2013, 6♀♀, 4♂♂, 6 nymphs; trough, 12.09.2013, 5♀♀, 7♂♂; Korucu (stream), 75m, 23.08.2014, 1♀, 5♂♂; Koyuntepe, Telmata Lake, 28m, 03.09.2013, 1♂; Sarıcaali (stream), 23m, 12.08.2014, 1♀; Sultanköy (trough), 59m, 12.09.2013, 23♀♀, 9♂♂; Turpçular (stream), 29m, 23.08.2014, 4♀♀, 1♂; Yenikarpuzlu (irrigation channel), 20m, 12.09.2013, 13♀♀, 7♂♂; Keşan, Beğendik (pond), 114m, 23.08.2013, 7♀♀, 3♂♂; Dişbudak (stream), 92m, 09.09.2013, 3♀♀, 5♂♂; Kılıçköy, Karahisar, Kanal Stream, 16m, 03.09.2013, 1♀; Lalacık (trough), 158m, 23.08.2014, 1♀; Mecidiye (stream), 45m, 09.09.2013, 7♀♀, 2♂♂; 26.08.2014, 5♀♀, 1♂; Mercan (irrigation channel), 38m, 09.09.2013, 1♀, 3♂♂, 3 nymphs; Pınar (irrigation channel), 174m, 26.08.2014, 1♀, 1♂; Sazlıdere (trough), 119m, 09.09.2013, 14♀♀, 10♂♂; Yaylaköy (puddle), 154m, 26.08.2014, 4♀♀, 1♂; Yerlisu (irrigation channel), 174m, 09.09.2013, 11♀♀, 5♂♂, 11 nymphs; Meriç, Adasarhanlı (pond), 38m, 12.08.2014, 6♀♀, 1♂; Akçadam (trough), 60m, 12.09.2013, 4♀♀, 3♂♂; Büyükalıtağaç (stream), 40m, 12.08.2014, 1♀, 1♂; Karayusuflu (pond), 24m, 12.09.2013, 1♂; Koca Stream, 40m, 12.09.2013, 1♀, 1 nymph; Nasuhbey (pond), 33m, 04.08.2014, 2♀♀, 1♂; Seren (pond), 40m, 12.09.2013, 3♀♀, 3♂♂, 2 nymphs; Yenicegörece (trough), 20m, 12.09.2013, 41♀♀, 6♂♂; center, Budakdoğanca (pond), 116m, 15.09.2013, 7♀♀, 8♂♂; Kemal (trough), 84m, 15.09.2013, 3♀♀, 3♂♂; Orhaniye (stream), 15m, 03.09.2013, 21♀♀, 6♂♂;

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Süloğlu-Domurcalı (trough), 199m, 21.09.2013, 3♂♂; Geçkinli (stream), 151m, 01.09.2013, 1♂; Süloğlu, Süloğlu Pond, 160m, 01.09.2013, 10♀♀, 4♂♂; Uzunköprü, Türkobası Ana Stream, 26m, 06.09.2013, 1♀, 1♂; Danişment, Koca Brook, 60m, 30.08.2013, 3♀♀, 2♂♂; Bildir (pond), 80m, 30.08.2013, 17♀♀, 8♂♂, 4 nymphs; Ergene River, 32m, 30.08.2013, 1♂, 7 nymphs; Çalıköy (pond), 97m, 12.09.2013, 20♀♀, 9♂♂; Kavacık (pond), 52m, 06.09.2013, 83♀♀, 18♂♂, 1 nymph.

CONCLUSIONS AND DISCUSSION

In the present study performed in order to investigate Gerromorpha and Nepomorpha fauna of Edirne, one species from Gerromorpha (*Hydrometra gracilenta*-Hydrometridae) was identified as a new record for Turkey and 4 species (*Limnoporos rufoscutellatus*-Gerridae, *Mesovelvia furcata*, *M. vittigera*-Mesoveliidae and *Microvelia reticulata*-Veliidae) as new records for Thrace Region.

Hydrometra gracilenta was sampled in several habitats like river, lake, dam lake, dam lake drainage and water through in 15 different localities in the study region. The distributional range of *H. gracilenta* covers Asia, North Africa, and Europe including Bulgaria and Greece, both neighboring Edirne, which constitute the southeastern point of its European distribution. The recent records of the species in Edirne, therefore, expand its southern Europe range towards east. *H. gracilenta* is distinguished from other species of the genus by its distal part of the head in front of the eyes being 1.5 times larger than the proximal part, by presence of a small tooth lateral to the 6th abdominal segment of males and by the triangular pointed shape of distal part of its clypeus.

Finding *Mesovelvia furcata* and *M. vittigera* in the study region represents the first record of Mesoveliidae in Thrace Region. Mesoveliidae is represented in Palaearctic Region with 6 species among which 3 *Mesovelvia* species occurs in Europe, including Balkan Peninsula (Berchi *et al.*, 2016). The members of the family in Turkey are *M. furcata* and *M. vittigera* so far known only in Anatolia (Andersen, 1995; Aukema *et al.*, 2013). Specimens of *M. furcata* were sampled in one locality to the north of Edirne (Hamzabeyli-Pond). This species is known in Anatolia from Kayseri and Sivas (Kment and Jindra, 2005; Önder *et al.*, 2006). The distribution of the species covers Europe and Asia and its presence in North Africa is doubtful and needs validation (Andersen, 1995).

The other representative of Mesoveliidae, *M. vittigera*, was sampled in two localities, one in İskender, a village in central district, and the other in Hisarlı in Enez district to the south of Edirne Province. Samplings in both localities were performed from stream and pond type habitats. *M. vittigera* was reported from a few localities in Anatolia. This species has a wide range of distribution in Palaearctic and is also known from Australian, Ethiopian and Oriental zoogeographic regions, however, its distribution in Europe is confined to Mediterranean regions (Andersen, 1995; Aukema *et al.*, 2013; Berchi *et al.*, 2016). The two representatives of Mesoveliidae in the present study can be distinguished from each other based on presence of a spines on ventral surface of hind tibia (ventral surface of hind tibia of *M. furcata* possesses thin black spines while *M. vittigera* is spinless) (see also Berchi *et al.*, 2016).

Limnopus rufoscutellatus, the new record for Thrace Region, was sampled in one locality (Bildir-pond) to the south of Edirne. This record is also the first finding of the genus in the region. This species has recently been recorded in Turkey by Topkara *et al.* (2013) from Rize province. The genus *Limnopus* has 3 species within the ranges of Palaearctic Region of which 2 species are only distributed in a few Far East countries. *L. rufoscutellatus* is widespread species in Europe and Asia and in addition to Palearctic, but it is also distributed in Alaska, and northwest Canada (Andersen, 1995; Aukema *et al.*, 2013). The only ♂ specimen of *L. rufoscutellatus* that could be sampled in the study region is distinguished from *Aquarius* and *Gerris* by its reddish brown body color, its antennal length longer than half length of the body, its total length of 2nd and 3rd antennal segments longer than 1st segment and presence of two black spots in antero-lateral part of the pronotum.

Microvelia is represented in Turkey with 3 species (widely distributed *M. pygmaea* and *M. reticulata*, and *M. hozari* endemic to Anatolia) but in Thrace region, it has been represented so far with only *M. pygmaea* (Fent *et al.*, 2011). The new record of the genus in the present study, *M. reticulata*, was found in ponds in two localities, one in the north (Vaysal) and the other in the south (Nasuhbey) of the city. The species is known from Europe and Palaearctic Asia (Andersen, 1995; Aukema *et al.*, 2013) and it was reported in Turkey from Konya and Sivas by Kment and Jindra (2005) and Önder *et al.* (2006).

Anisops sardeus sardeus, *Hesperocorixa linnaei* and *Sigara mayri* were formerly reported by Jansson (1986), Polhemus (1995) and Aukema (2013) for fauna of Thrace Region but the authors did not mention any exact localities for any of the species, and Fent *et al.* (2011) pointed out their presence in the region needs confirmation. The presence of these 3 taxa in Thrace region was confirmed with precise locality information based on their present records in Edirne. *H. linnaei* and *S. (Halicorixa) mayri* were recorded in two localities each whereas *A. sardeus sardeus* were sampled from a number of localities.

The species number of Gerromorpha fauna of Turkey increased to 28 with the addition of 1 new species. The Thrace Region fauna, on the other hand was updated to be represented with 4 families, 7 genera and 15 species/subspecies with the addition of 1 family and 2 genera for the region.

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REFERENCES

- Andersen, N. M., 1990, Phylogeny and taxonomy of water striders, genus *Aquarius* Schellenberg (Insecta, Hemiptera, Gerridae), with a new species from Australia. *Steenstrupia*, 16: 37-81.

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- Andersen, N. M., 1993, Classification, phylogeny, and zoogeography of the pond skater genus *Gerris* Fabricius (Hemiptera: Gerridae). *Canadian Journal of Zoology*, 71(12): 2473-2508.
- Andersen, N. M., 1995, *Infraorder Gerromorpha Popov, 1971-semiaquatic bugs*. In: Aukema, B., Rieger, Ch. (Eds.) *Catalogue of the Heteroptera of the Palaearctic Region*. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, 1: 17-114.
- Aukema, B., 2013, <http://www.faunaeur.org/> 29.08.2013.
- Aukema, B., Rieger, Ch., Rabitsch, W., 2013, *Catalogue of the Heteroptera of the Palaearctic Region*. The Netherlands Entomological Society, Amsterdam, 6: 629 pp.
- Berchi, G. M., Kment, P., Copilaş-Ciocianu, D., Rakosy, L., Damgaard, J., 2016, Water treaders of Romania and adjacent countries and their phylogenetic relationships (Hemiptera: Heteroptera: Mesoveliidae). *Annales Zoologici* (Warszawa), 66(2): 193-212.
- Brooks, G. T., 1951, A revision of the genus *Anisops* (Notonectidae, Hemiptera). *University of Kansas Science Bulletin*, 34: 301-519.
- Dursun, A., 2011, A study on the Nepomorpha (Heteroptera) species of some provinces of Anatolia, Turkey, with new records of *Anisops debilis perplexus* Poisson, 1929 and *Notonecta reuteri reuteri* Hungerford, 1928. *Türkiye Entomoloji Dergisi*, 35(3): 461-474.
- Dursun, A., 2012, Additional records of Gerromorpha (Hemiptera: Heteroptera) and redescription of *Rhagovelia nigricans* (Burmeister, 1835) from Anatolia (Turkey). *Turkish Journal of Zoology*, 36(5): 652-661.
- Fent, M., Kment, P., Çamur-Elipek, B., Kırgız, T., 2011, Annotated 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 (Hemiptera)* In: Voyage zoologique d'Henri Gadeau de Kerville en Asie-Mineure (Avril-Mai 1912). Paul Lechevalier, Paris, 1(1): 116-125.
- 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) (1948-1950): 1-74.
- Jansson, A., 1986, The Corixidae (Heteroptera) of Europe and some adjacent regions. *Acta Entomologica Fennica*, 52: 1-93.
- Kanyukova, E. V., 2006, *Vodnye poluzhestkokrylye nasekomye (Heteroptera: Nepomorpha, Gerromorpha) fauny Rossii i sopredelnykh stran*. [Aquatic and semiaquatic (Heteroptera: Nepomorpha, Gerromorpha) of the fauna of Russia and neighbouring countries]. Dal'nauka, Vladivostok, 296.
- Kiyak, S., Canbulat, S., Salur, A., 2007, Nepomorpha (Heteroptera) fauna of south-western Anatolia (Turkey). *Boletín de la Sociedad Entomológica Aragonesa*, 40: 548-554.
- Kiyak, S., Özşarap, Ö., 2001, Cheklist 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., 2008, Gerromorpha and Leptopodomorpha (Insecta; Heteroptera) Fauna of Southwest Anatolia. *Turkish Journal of Zoology*, 32: 309-326.
- Kment, P., Jindra, Z., 2005, New and interesting records of true bugs (Heteroptera) from Turkey, southeastern Europe, Near and Middle East. *Acta Entomologica Musei Nationalis Pragae*, 45: 3-16.
- Linnavuori, R., 1965, Studies on the South-and Eastmediterranean Hemipterous Fauna. *Acta Entomologica Fennica*, 21: 1-69.
- Nieser, N., 1972, De Nederlandse water-en oppervlakte wantsen (Heteroptera: Nepomorpha en Gerromorpha). [The Dutch aquatic and semi-aquatic bugs (Heteroptera: Nepomorpha and Gerromorpha)]. *Wetenschappelijke Mededelingen van de Koninklijke Nederlandse Natuurhistorische Vereniging*, 155: 1-103.

- Önder, F., Karsavuran, Y., Tezcan, S., Fent, M., 2006, *Türkiye Heteroptera (Insecta) Kataloğu*. Ege Üniversitesi Ziraat Fakültesi, İzmir, 164.
- Önder, F., Ünal, E., Ünal, A., 1981, Heteroptera fauna collected by light traps in some districts of northwestern part of Anatolia. *Türkiye Bitki Koruma Dergisi*, 5: 151-169.
- Özesmi, U., Önder, F., 1988, Sultan Sazlığı (Kayseri)'nin sucul Heteroptera ve Coleoptera türleri üzerinde faunistik bir çalışma. *IX. Ulusal Biyoloji Kongresi*, 21-23 Eylül, 2: 177-186.
- 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*, 1925: 327-330.
- Poisson, R., 1957, *Hétéroptères aquatiques. Faune de France*. Fédération Française des Sociétés de Sciences Naturelles, Paris, 61: 263.
- Polhemus, J. T., 1995, *Family Notonectidae Latreille, 1802-backswimmers*. In: Aukema, B., Rieger, Ch. (Eds.) Catalogue of the Heteroptera of the Palaearctic Region. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, 1: 63-73.
- Rabitsch, W., 2005, Spezialpraktikum Aquatische und Semiaquatische Heteroptera Bestimmungsschlüssel der Gerromorpha Österreichs, 1-48. <https://homepage.univie.ac.at/wolfgang.rabitsch/Heteropt.html> (03.2010).
- Seidenstücker, G., 1957, Anadolu'dan 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., 1959, *Sigara emesan*. sp. und einige Corixiden aus der Türkei und Syrien. *Revue de la Faculté des Sciences Naturelles de l'Université d'Istanbul, Série B, Sciences Naturelles*, 24: 33-38.
- Stichel, W., 1955-1956, *Illustrierte Bestimmungstabellen der Wanzen. II. Europa (Hemiptera-Heteroptera Europae)*. Wolfgang Stichel, Berlin-Hermsdorf, 1: 168.
- Topkara, E. T., 2013, Contribution to the knowledge on distribution of water boatmen (Heteroptera: Corixidae) in Turkey. *Ege Journal of Fisheries and Aquatic Sciences*, 30(1): 15-19.
- Topkara, E. T., Ustaoglu, M. R., Balik, S., 2013, First record of *Limnoporus rufoscutellatus* (Latreille, 1807) (Heteroptera: Gerridae) from Turkey, with some ecological notes. *Ege Journal of Fisheries and Aquatic Sciences*, 30(2): 83-84.
- Wagner, E., 1966, Eine Heteropterenausbeute aus der Türkei (Hemiptera, Heteroptera). *Bulletin des Recherches Agronomiques de Gembloux*, 1: 646-654.

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