J.Het.Turk. ISSN 2687 - 3249 (Online edition) May, 2020
Journal of the Heteroptera of Turkey Volume 2, Issue 1

Research Article

# A new faunistical record from Kastamonu (Turkey): *Hydrometra stagnorum* (Linnaeus, 1758) (Hemiptera: Heteroptera: Hydrometridae)

İbrahim Küçükbasmacı

Kastamonu University, Faculty of Arts and Science, Department of Biology, Kastamonu TURKEY
E-mail: ikucukbasmaci@kastamonu.edu.tr

**ABSTRACT:**Heteroptera, the majority of which are terrestrial is a worldwide distributed group of insects inhabiting both terrestrial and aquatic habitats and has an important ecological role. The two infraorders, Gerromorpha and Nepomorpha, including the aquatic and semi-aquatic members of the suborder Heteroptera. The members of Hydrometridae family are one of the most distinctive heteropteran groups with their small stick-like insects with an elongate head and exceedingly slender legs. It has been reported 14 taxa from the infraordo Nepomorpha and Gerromorpha in Kastamonu so far. In this study, a new faunistic record is shown for Kastamonu. Also, morphological diagnosis, habitat, distribution in Turkey and Palearctic data of *Hydrometra stagnorum* (Linnaeus, 1758) (Hemiptera: Heteroptera: Hydrometridae) are given.

**KEYWORDS:** Heteroptera, *Hydrometra stagnorum,* new record, Kastamonu, Turkey

**To Cite this article:** Küçükbasmacı İ., 2020, A new faunistical record from Kastamonu (Turkey): *Hydrometra stagnorum* (Linnaeus, 1758) (Hemiptera: Heteroptera: Hydrometridae), *J.Het.Turk.,2* (1):34-41
**To link to this article:** https://www.j-ht.org/wp-content/uploads/2020/05/V21-A5.pdf
**Received:** April 14, 2020; **Revised:** May 1, 2020; **Accepted:** May 2, 2020; **Published online:** May 7, 2020

## INTRODUCTION

Heteroptera, the majority of which are terrestrial is a worldwide distributed group of insects inhabiting both terrestrial and aquatic habitats and has an important ecological role (Coulson & Witter, 1984; Schuh & Slater, 1995; Naranjo et al., 2010). Of the roughly 38,000 described species of heteropterans around the world, a little under 9% are aquatic and have nymphs and adults that live in the water (the majority) or on its surface, usually in nonflowing habitats (Thorp & Rogers, 2010). This order, display an enormous range of strategies to adapt to their environment. As a result, this group has adapted to almost all kinds of habitats, and thus, occurs at a high diversity in aquatic and semiaquatic environments (Freitag & Zettel, 2012).

Water bugs are found in a wide variety of natural habitats from temporary pools to large rivers and freshwater to tidal pools on coral reefs (Andersen & Weir, 2004).

Heteropteran species are a significant component of the aquatic fauna and play an important part in littoral food webs

(Nieser, 1975; Skern et al., 2010; Ghari, 2013). Water bugs are chiefly predators or scavengers, with most species feeding on a variety of invertebrate prey including mosquito larvae and aquatic bugs of the same or different species and play a major role in aquatic ecosystems where they can serve as indicators of biological quality (Andersen & Weir, 2004; Thorp & Rogers, 2010). They are beneficial to man since many species prey on mosquito larvae (Andersen & Weir, 2004).

The two infraorders, Gerromorpha and Nepomorpha, including the aquatic and semi-aquatic members of the suborder Heteroptera (Andersen, 1995; Polhemus, 1995; Banbal & Fent, 2016). Gerromorpha or semiaquatic bugs are inhabiting the surface of both stagnant and running water, as well as some marshes, shores, and hygropetric habitats (Andersen, 1995; Andersen & Weir, 2004; Dursun, 2012). Members of the group have modifications, including specialized pretarsi, unwettable body surfaces, and novel communication mechanisms, that enable them to thrive in this habitat (Schuh & Slater, 1995). Gerromorphans are widespread on all continents except Antarctica and they are predator-scavengers that feed with piercing and sucking mouthparts that are typical of predatory Hemiptera (Spence & Andersen, 1994). The species of infraorder Gerromorpha 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). 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; Banbal & Fent, 2016).

The members of Hydrometridae family are one of the most distinctive heteropteran groups with their small stick-like insects with an elongate head and exceedingly slender legs (Schuh & Slater, 1995; Umar et al., 2013). Their peculiar appearance makes it very hard to confuse them with any other group (Gooderham & Tsyrlin, 2002). Many members are having an extremely elongate body and appendages which usually pale brown. All taxa have the eyes far removed from the anterior margin of the pronotum. Commonly called marsh treaders or water measurers, they range in length from 2.7 to 22 mm (Schuh & Slater, 1995; Gooderham & Tsyrlin, 2002). Their most peculiar feature is their head, almost as long as the thorax and with spherical posteromedial eyes. The eyes are located about halfway along the head. The antennae are longer than the head. The legs end in two tarsal claws that insert terminally. There are both, macropterous and micropterous specimens (Oscoz et al., 2011; Umar et al., 2013).

The members of the family Hydrometridae inhabit in quiet permanent water, in well-vegetated areas, or under overhanging banks. (Thorp & Rogers, 2010).

Hydrometrids live on the surface of the water at the edges of wetlands, lakes, and ponds, often hiding amongst vegetation (Gooderham & Tsyrlin, 2002). Commonly found in the pasture streams, often along the margins or in pools and they walk on the surface film of the water and on plants that project above the water (Umar et al., 2013).

They are normally slow-moving animals but can move rapidly when disturbed. Their slow movement and slender limbs allow them to blend in with vegetation on the water surface (Gooderham & Tsyrlin, 2002). Similarly, to the family Gerridae, they show a certain degree of tolerance to different alterations in the environment (Oscoz et al., 2011). These insects are predators. Most species lack wings or have reduced winged forms (Thorp & Rogers, 2010). They feed or scavenge on small animals fallen on the surface of the water. Surface-dwelling springtails are one of their favorite foods (Gooderham & Tsyrlin, 2002).

Both the family Hydrometridae and the

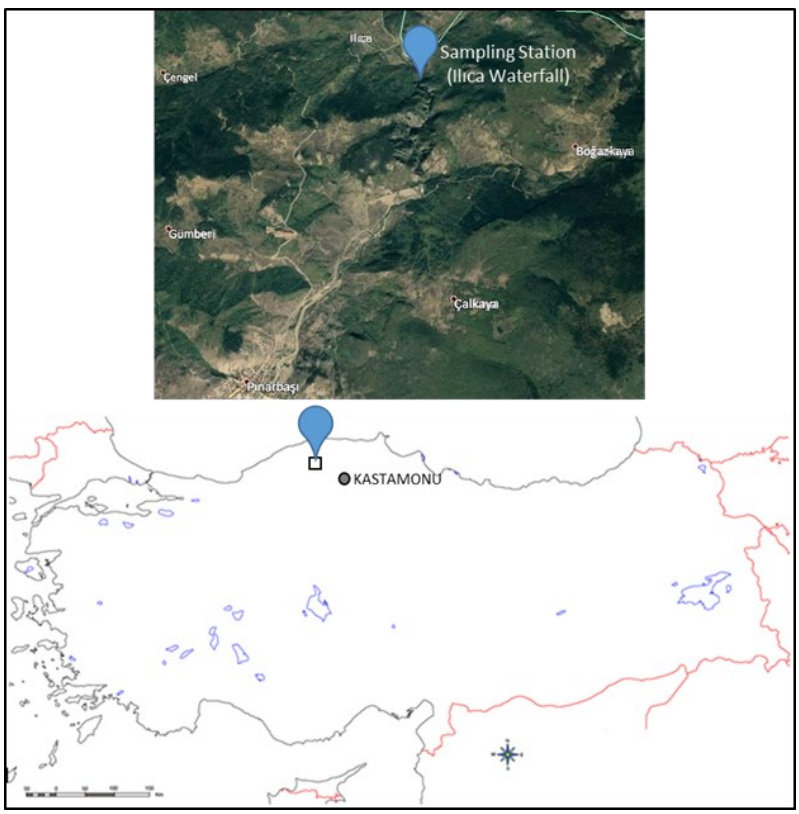
genus *Hydrometra* are found throughout the World (Gooderham & Tsyrlin, 2002). *Hydrometra* spp. are usually found on or around quiet bodies of water and generally are associated with marginal vegetation but may also be found on damp rock walls. They can walk on the water surface with great agility and apparent effortlessness (Schuh & Slater, 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. The current Gerromorpha fauna of Turkey is represented with 9 genera and 27 species/subspecies within 5 families (Fent et al., 2011; Banbal & Fent, 2016).

In this semiaquatic Heteroptera study, a new faunistic record is shown for Kastamonu. Also, morphological diagnosis, habitat, distribution in Turkey and Palearctic data of *H. stagnorum* are given based on literature and personal investigation and it is believed that this study will shed light on the new faunistic studies in wetlands of Kastamonu and Turkey.

## MATERIALS AND METHODS

This study was conducted based on the samples collected on 19.04.2019 in Ilıca Waterfall Zara stream (Map 1) in Pınarbaşı district of Kastamonu province. The material was sampled from the water surface and waterfront with the help of a sweeping net. The sampled material was placed and kept in 80% ethanol containing tubes. The materials were examined and photographed under dissecting stereomicroscope in the laboratory. Poisson (1957), Schuh & Slater (1995), Cooke (2015) and Çerçi & Koçak (2016) were used in identifications of the sampled material. The materials were deposited in the collection of Kastamonu University, Faculty of Sciences and Arts, Department of Biology (Kastamonu, Turkey).




Map 1. The sampling station, where *Hydrometra stagnorum* (Linnaeus, 1758) samples are collected from Ilıca Waterfall, Pınarbaşı/Kastamonu (Satellite map: Google Earth Pro)

## RESULTS

### Hydrometroidea Billberg, 1820

### Hydrometridae Billberg, 1820

### *Hydrometra* Latreille, 1796

### *Hydrometra stagnorum* (Linnaeus, 1758)

**Material examined:** Pınarbaşı-Ilıca Waterfall, Zara stream/Kastamonu, 41° 39'17.00"N, 33° 8'29.78"E, 19.04.2019, 428m, 2♀,1♂.

**Morphological diagnosis:** General color blackish brown (Figure 1, A); dorsal side of the abdomen dull. Clypeus truncated, anterior margin rounded (Figure 1, B). Distance from the anterior margin of the eyes to the end of the head, twice that of the posterior margin of the eyes to the base of the head. Posterior femurs reaching the middle of the 6th abdominal segment visible in females (Figure 1, C) them and the tip of the abdomen in males. Sternites of the 6th and 7th abdominal segment of the female without tooth (Figure 1, D); Sternites of the 6th and 7th abdominal segment of the male, on both sides, a short tooth located near their respective anterior end (Figure 1, E-F). Length: 10,5 mm.

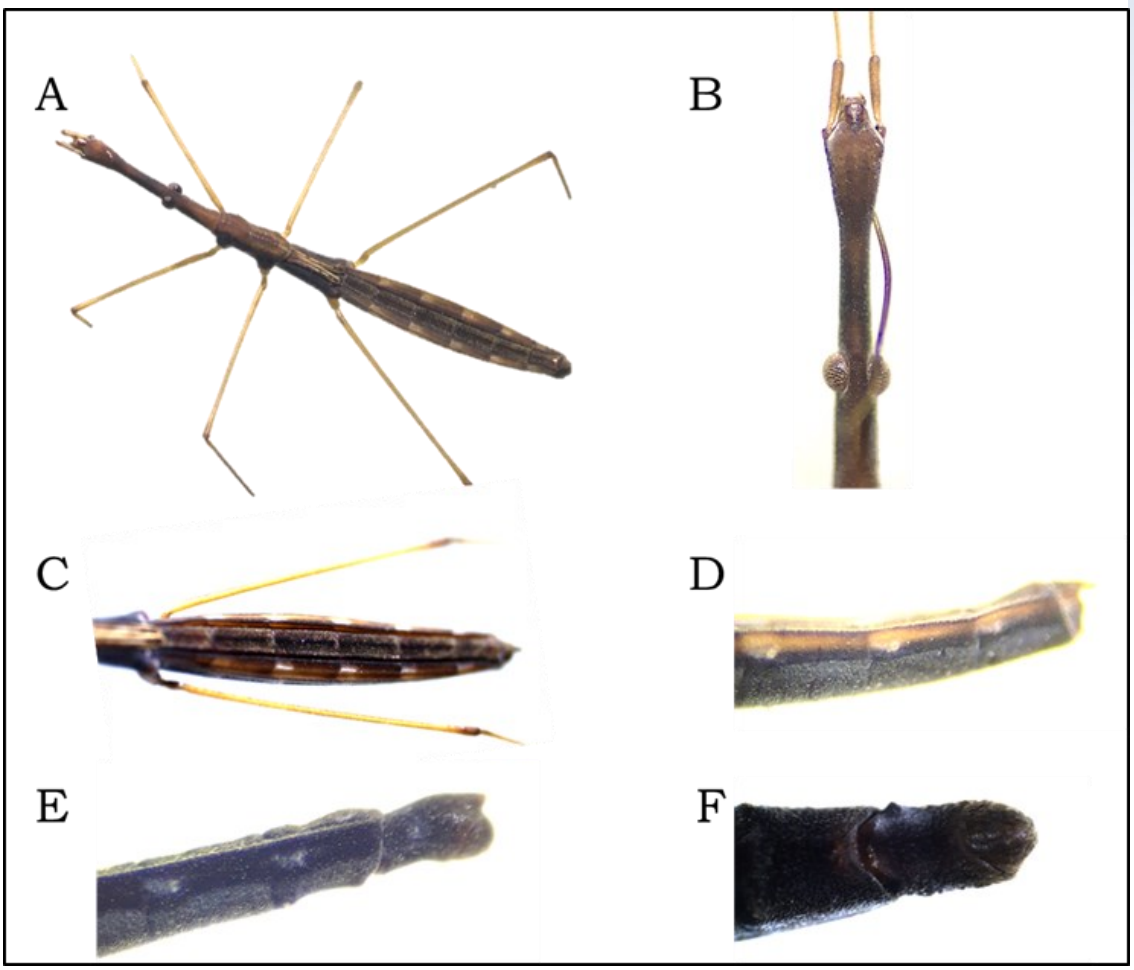



Figure 1. *Hydrometra stagnorum* (Linnaeus, 1758); A) adult female; B) head, dorsal view; C) abdomen and hind femur of female, dorsal view; D) the last three segment of the female abdomen, lateral view; E) the last three segment of the male abdomen, lateral view; F) sternites of the 6th and 7th abdominal segment of the male, ventral view (Photo by İ. Küçükbasmacı).

**Habitat:**

Samples of this species were found in stagnant pools formed by large rocks near the Ilıca Waterfall (Figure 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, Kırklar-eli, Kırşehir, Konya, Mersin, Muğla, Niğde, Samsun, Sivas, Şanlıurfa, Tokat, Tunceli (Horváth, 1883; Fahringer, 1922; Lindbergh, 1922; Poisson, 1925; Gadeau de Kervılle, 1939; Hoberlandt, 1952; Andersen, 1995; Kıyak, 2000; Kıyak et al., 2004, 2008; Önder et al., 2006; Salur & Mesci, 2009; Fent et al., 2011; Dursun, 2012; Dursun & Fent, 2019) and Kastamonu (this paper).

**Distribution in Palaearctic: Europe:** Albania, Austria, Belgium, Bulgaria, Crete, Croatia, Czech Republic, Denmark, European Kazakhstan, European Turkey, Finland, France, Great Britain, Germany, Greece, Hungary, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Macedonia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia (ST), Sardinia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine. **North Africa:** Algeria, Azores, Canary Islands, Egypt, Morocco, Tunisia. **Asia:** Azerbaijan, Afghanistan, Asian, Kazakhstan, Armenia, Asian Turkey, Cyprus, Georgia, Iran, Iraq, Israel, Jordan, Kirgizia, Lebanon, Syria, Tadzhikistan, Turkmenistan, Uzbekistan (URL-1).

Figure 2. Sampling station, Ilıca Waterfall, Pınarbaşı/Kastamonu (Photo by İ. Küçükbasmacı)

**CONCLUSION AND DISCUSSION**

In this study, it is evaluated that the morphological description, habitat, distribution in Turkey and phenology of the *H. stagnorum* which collected from Ilıca Waterfall (Zara stream) in the Pınarbaşı district of Kastamonu province. With this study, this species was recorded the first time in Kastamonu province.

It has been reported 14 taxa from the infraordo Nepomorpha and Gerromorpha in Kastamonu so far. Önder et al. (2006), Fent et al. (2011), Küçükbasmacı & Kıyak (2015) and Yazıcı (2020) reported that the

following taxa of Nepomorpha have been found in Kastamonu: *Micronecta anatolica anatolica* Lindberg, 1922, *Corixa punctata* (Illiger, 1807), Hesperocorixa occulta (Lundblad, 1929), *Sigara limitata limitata* (Fieber, 1848), *S. nigrolineata nigrolineata* (Fieber, 1848), *S. lateralis* (Leach, 1817), *Notonecta glauca glauca* Linnaeus, 1758, *N. obliqua meridionalis* Poisson, 1926, *N. marmorea* Fabricius, 1803.

Also Fent et al. (2011), Dursun (2012), Küçükbasmacı & Kıyak (2015), Yazıcı (2020) reported that the following taxa of Gerromorpha have been found in Kastamonu: *Velia saulii* Tamanini, 1947, *Aquarius najas* (De Geer, 1773); *Gerris costae costae* (Herrich-Schäffer, 1850), *G. costae fieberi* Stichel, 1938, *G. lateralis* Schummel, 1832.

No records of Hydrometridae family from Kastamonu have been given so far. In this study, *H. stagnorum* was recorded the first time in Kastamonu province.

Çerçi and Koçak (2016) reported that *H. stagnorum* which is much longer (9.00–13.00 mm) than *H. gracilenta* Horváth, 1899 (7.50–9.00 mm). In this study, it was measured the length of *H. stagnorum* as 10,5mm.

The Ilıca Waterfall originates from the steep slopes of Horma canyon and pours its water from 10 m high into the lake. The surrounding of the waterfall is rich in humid forest with rich ground covered with grass and bushes. It is located near the Çatak canyon, the Valla canyon, the Ilgarini cave and the Küre Mountains National Park. The Ilıca Waterfall formed from the steep slopes of Horma canyon pours its water into Zara stream which flows through the canyon (Çoban & Aydınözü, 2016). The water of the small lake formed by the Ilıca Waterfall continues through the big rocks. Both the lake and the pools formed between these rocks have created suitable habitats for Heteroptera species to live. This study is a preliminary study on Kastamonu aquatic and semi-aquatic Heteroptera fauna.

Consequently, Kastamonu aquatic and semi-aquatic Heteroptera fauna has not been well studied yet. Here it has been tried to contribute to the faunistically works held in Kastamonu and Turkey.

## REFERENCES


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.

Andersen, N.M., Weir, T.A., 2004, Australian water bugs. Their biology and identification (Hemiptera-Heteroptera, Gerromorpha & Nepomorpha). Entomograph, Vol. 14. Apollo Books, Stenstrup & CSIRO Publishing, Collingwood, 344 pp.

Banbal, T., Fent, M., 2016, New Records of Gerromorpha and Nepomorpha (Hemiptera: Heteroptera) Fauna of Turkey, *Journal of the Entomological Research Society*, 18(3), 121-128.

Cooke, A.A., 2015, A review of the Hemiptera of Great Britain: The Aquatic and Semi-aquatic Bugs (Dipsocoromorpha, Gerromorpha, Leptopodomorpha & Nepomorpha). Species Status No. 24. Natural England Commissioned Report NECR188.

Coulson, R.N., Witter, J.A., 1984, *Forest Entomology: Ecology and Management,* NY: Wiley. 669 pp.

Çerçi, B., Koçak, Ö., 2016, Contribution to the knowledge of Heteroptera (Hemiptera) fauna of Turkey, *Journal of Insect Biodiversity*, 4 (15), 1-18.

Çoban, A., Aydınözü, D., 2016, Ilıca Şelalesi (Kastamonu-Pınarbaşı), *Electronic Turkish Studies*, *11*(18).

Dursun, A., Fent, M., 2018, Contributions to Nepomorpha (Hemiptera: Heteroptera) fauna in wetland areas of Amasya, Turkey, *Acta Biologica Turcica,* 31, 193–202.

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.

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.

Freitag, H., Zettel, H., 2013, Aquatic Heteroptera of the Lake Manguao Catchment, Palawan and new Rank of *Rhagovelia kawakamii hoberlandti* Hungerford & Matsuda 1961, *Philippine Journal of Systematic Biology, 6*, 54-80.

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.

Ghahari, H., 2013, A study on aquatic and semiaquatic bugs (Hemiptera: Heteroptera) from northern Iran, *Biologiezentrum Linz/ Austria*, 45(2), 1991-1996.

Gooderham, J., Tsyrlin, E., 2002, *The waterbug book: a guide to the freshwater macroinvertebrates of temperate Australia.* CSIRO publishing.

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.

Horváth, G., 1883, Heteroptera anatolica in regione brussae collecta, *Természetrajzi Füzetek***,** 7: 21-30.

Kıyak, S., 2000, Işık Dağı ve çevresinde yaşayan Heteroptera (Insecta) türlerinin faunistik, sistematik ve ekolojik yönden araştırılması-I, *Journal of the Institute of Science and Technology, Gazi University*, 13: 323-345.

Kıyak, S., Salur, A., Canbulat, S., 2008, Gerromorpha and Leptopodomorpha (Insecta; Heteroptera) Fauna of Southwest Anatolia, *Turkish Journal of Zoology*, 32: 309-326.

Kıyak, S., Salur A., Canbulat, S., Özsaraç, Ö., 2004, Contributions of the aquatic and semiaquatic Heteroptera fauna of the Afyon Province, *Gazi Üniversitesi Fen Bilimleri Dergisi*, 17 (2): 31-34.

Küçükbasmacı, İ., Kıyak, S., 2015, A study on the fauna of Heteroptera of Ilgaz mountains (Kastamonu, Çankırı) with a new record for Turkey, *Nevsehir Science and Technology Review,* 4, 1–33.

Lindberg, H., 1922, Vezeichnis der von John Sahlberg und Uunio Saalas in den Mittelmeergebieten gesammelten semiaquatilen und aquatilen Heteropteren, *Notulae Entomologicae*, 2: 15-19 + 46-49.

Naranjo C., Munoz Riviaux S., Moreira, F.F.F., Correa Court, R., 2010, Taxonomy and distribution of aquatic and semiaquatic Heteroptera (Insecta) from Cuba. *Revista de biologia tropical (International Journal of Tropical Biology),* 58 (3): 897-907.

Nieser, N., 1975, The water bugs (Heteroptera: Nepomorpha) of the Guyana Region, *Stud. Fauna Suriname Guyanas,* 59: 1-303.

Nieser N., 1978, Heteroptera, pp. 280-285, *In: Illies J. (ed.), Limnofauna Europaea,* G. Fischer Verlag, Stuttgart, 1-552.

Oscoz, J., Galicia, D., Miranda, R., 2011, *Identification guide of freshwater macroinvertebrates of Spain*, Springer: Dordrecht, Netherlands, 153 pp.

Önder, F., Karsavuran, Y., Tezcan, S., Fent, M., 2006, *Türkiye Heteroptera (Insecta) Kataloğu.* Ege Üniversitesi Ziraat Fakültesi, İzmir, 164.

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., Jansson A., Kanyukova, E., 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., 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 Leptopodo morpha. The Netherlands Entomological Society, Amsterdam, 1: 63-73.

Salur, A., Mesci, S., (2009): Gerromorphan fauna of Çorum province in Turkey (Insecta: Heteroptera), *Munis Entomology and Zoology*, 4: 340-345.

Schuh, R.T., Slater, J.A., 1995, True bugs of the world (Hemiptera, Heteroptera), Classification and natural history, Ithaca and London, 1-337.

Skern, M., Zweimuller, Schiemer, I.F., 2010, Aquatic Heteroptera as indicators for terrestrialisation of floodplain habitats, *Limnologica,* 40: 241-250.

Spence, J.R., Anderson, N.M., 1994, Biology

of water striders: interactions between systematics and ecology, *Annual review of entomology*, 39(1), 101-128.

Thorp, J.H., Rogers, D.C., 2010, *Field guide to freshwater invertebrates of North America*, Academic Press, 274 pp.

Umar, D.M., Harding, J.S., Winterbourn, M.J., 2013, *Freshwater Invertebrates of the Mambilla Plateau, Nigeria*. School of Biological Sciences, University of Canterbury, 86 pp.

URL-1: https://catpalhet.linnaeus.naturalis.nl/linnaeus_ng/app/views/species/nsr_taxon.php?id=636&cat=tab_distribution (Date accessed: 11.04.2020).

Yazıcı, G., 2020, Overview of the Zoogeographical Distribution of Aquatic and Semi-Aquatic Heteroptera (Hemiptera) in Turkey. *Journal of Insect Biodiversity and Systematics*, 6(2), 135-155.