

A STUDY ON THE CADDISFLY FAUNA (INSECTA: TRICHOPTERA) OF KASTAMONU AND A NEW SPECIES RECORD FOR TURKEY

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ABSTRACT: This research was carried out in Kastamonu between May 2003 and September 2007, forty-three species and one subspecies of Trichoptera belonging to 23 genera of 14 families (Rhyacophilidae, Glossosomatidae, Ptilocolepidae, Hydroptilidae, Philopotamidae, Polycentropodidae, Psychomyiidae, Hydropsychidae, Lepidostomatidae, Limnephilidae, Sericostomatidae, Odontoceridae, Beraeidae and Leptoceridae) were determined. According to earlier studies, thirty-seven species and three subspecies of Trichoptera have been reported to date in the fauna of Kastamonu (Appendix 1). Trichoptera fauna of Kastamonu has increased to 69 from 40 with this study. Twenty-nine of 69 taxa are new records for the Trichoptera fauna of Kastamonu. Also, *Cheumatopsyche persica* Mey, 2004 is recorded for the first time for Trichoptera fauna of Turkey.

KEY WORDS: Trichoptera, fauna, new record, Kastamonu, Turkey

Order Trichoptera is a unique order living in freshwaters in their larvae and pupa periods among insect groups having holometabolous and being dependent on this habitat. One of the most attractive features of Trichoptera is that they form cases specific to genera and species thereof in larvae period. Sand, little stones, minerals, various plant parts and small mollusk shells are used as materials in construction of cases (Sipahiler, 2000a). Adult insects found close to rivers and on the coastal plants and often found in large numbers in lakes and streams. Adult caddisflies are strongly attracted to the light. Majority of Trichoptera species live in streams. They live in every zone from spring areas of streams to potamon zones where the stream is poured into the sea. Along with stream, there are also Trichoptera species living in lakes (Wiggins & Currie, 2008; Sipahiler, 2000a).

The order Trichoptera has approximately 49 families, 616 genera and 14.548 species in the world of which 26 families and 1.888 species are known in the Western Palaearctic (Morse, 2011, 2016). The Trichoptera fauna of Turkey is represented by 481 taxa of 80 genera of 21 families (449 species and 32 subspecies) (Darılmaz & Salur, 2015).

It is seen that there are still spaces to be investigated about Turkey Trichoptera and the fauna could not be revealed detailedly. The aim of this study is to determine Trichoptera fauna of Kastamonu Province and to make a contribution to Turkey Trichoptera fauna.

MATERIAL AND METHODS

This study is based on 462 specimens of Trichoptera and all the specimens were collected by the first author from Kastamonu between May 2003 and

September 2007 for the Ph.D. thesis (Küçükbaşmacı, 2008). Aquatic net was used in collection of caddisfly larvae. Adult samples were collected by sweeping the vegetation along stream sides with a hand net in site studies performed in the morning. After killing of the samples in kill tank these samples were taken into alcohol flasks. Light trap was used in site studies carried out at night (Kıyak, 2000; Malicky, 2004). Samples were kept in 80% ethyl alcohol.

The specimens were identified using the stereomicroscope. Morphological characters and genitalia were used for identification of species. It was used in the identification of adult sample from Brohmer (1979), Cakin (1983), Malicky (2004), Marshall (1978), Nogradi & Uherkovic (2002), Sipahiler (1987, 2004, 2006), Steinmann (1972, 1973, 1974), Ulmer (1909).

It was used in the identification of larvae from Brohmer (1979), Edington & Hildrew (1981), Hickin (1942, 1943, 1948, 1952, 1954, 1967), Macan (1959), Mackay (1978), Stresemann et al. (1986), Ulmer (1909), Zamora-Muñoz et al. (1995).

The material examined under headings; locality kod, district, captured date and males/females number of captured species is given for each species. The collection is deposited at the Laboratory of Zoology of the Faculty of Sciences and Arts, Kastamonu University, Turkey.

A list of localities is given in Table1. District, sampling station, altitude, latitude, longitude and stream information is given in this table. Also, the map illustrating the working area is in Figure 1.

RESULTS

Field studies were performed between May and September of 2003-2007 in Kastamonu in Black Sea Region and samples of 289 adults and 173 larvae of the Order Trichoptera were collected. It was detected as a result of determination procedures that these were forty-three species and one subspecies belonging to 23 genera of 14 families of the Order Trichoptera. The distribution of species/subspecies per family is as follows: Rhyacophilidae (4), Glossosomatidae (1), Ptilocolepidae (1), Hydroptilidae (3), Philopotamidae (3), Polycentropodidae (3), Psychomyiidae (3), Hydropsychidae (12), Lepidostomatidae (2), Limnephilidae (6), Sericostomatidae (1), Odontoceridae (1), Beraeidae (1) and Leptoceridae (3). One out of the forty-four total taxa reported here is new record for the Turkey caddisfly fauna.

Systematic list of described caddisflies, collected in the Kastamonu from 2003–2007, as follows:

(Abbreviations: S-Sampling station kod, ♂-male, ♀-female)

Family RHYACOPHILIDAE Stephens, 1836

Rhyacophila clavalis Martynov, 1913

Material examined: S6, Bozkurt: 16.VI.2007. 1 ♂.

Rhyacophila fasciata Hagen, 1859

Material examined: S12, Devrekani: 10.IX.2006. 1 ♂.

Rhyacophila nubila Zetterstedt, 1840

Material examined: S41, Central: 03.IX.2006, 2 ♂♂; S42, Central: 17.VI.2006, 2 ♂♂; S44, Central: 25.VII.2007, 2 ♀♀; S34, Central: 30.V.2006, 1 ♀; S43, Central: 17.VI.2006, 2 ♂♂, 1 ♀; S14, Araç: 09.IX.2006, 2 ♀♀; S7, Çatalzeytin: 16.VI.2007, 5 ♂♂; S16, İhsangazi: 13.IX.2006, 2 ♂♂; S24, Şenpazar: 18.IX.2006, 5 ♂♂; S45, Central: 18.VIII.2006, 2 ♀♀; S2, Azdavay: 29.V.2005, 1 larvae; S27, Tosya: 10.VII.2005, 5 larvae; S18, İnebolu: 30.VII.2005,

2 larvae; S21, Pınarbaşı: 25.V.2003, 4 larvae; S38, Central: 03.VII.2005, 2 larvae; S31, Central: 29.VI.2005, 3 larvae.

***Rhyacophila osellai* Malicky, 1981**

Material examined: S45, Central: 18.VIII.2006, 2 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

Family GLOSSOSOMATIDAE Wallengren, 1891

***Synagapetus anatolicus* Çakın, 1983**

Material examined: S28, Tosya: 20.VI.2006, 7 ♂♂.

Family PTILOCOLEPIDAE Martynov, 1913

***Ptilocolepus colchicus* Martynov, 1913**

Material examined: S29, Tosya: 20.VI.2006, 1♂.

Remarks: It is newly recorded from Kastamonu province.

Family HYDROPTILIDAE Stephens, 1836

***Hydroptila cornuta* Mosely, 1922**

Material examined: S7, Çatalzeytin: 16.VI.2007, 5♂♂.

***Hydroptila oemerueneli* Sipahiler, 2003**

Material examined: S7, Çatalzeytin: 16.VI.2007, 2♂♂.

***Hydroptila tigurina* Ris, 1894**

Material examined: S23, Şenpazar: 18.IX.2006, 2♀♀.

Family PHILOPOTAMIDAE Stephens, 1829

***Wormaldia khourmai* Schmid, 1959**

Material examined: S17, İhsangazi: 28.VII.2006, 1♂; S28, Tosya: 20.VI.2006, 2 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Philopotamus montanus* Donovan, 1813**

Material examined: S6, Bozkurt: 16.VI.2007, 2♂♂; S30, Central: 14.VII.2005, 9 larvae; S27, Tosya: 10.VII.2005, 5 larvae; S44, Central: 09.V.2004, 1 larvae.

Remarks: It is newly recorded from Kastamonu province.

***Philopotamus variegatus* (Scopoli, 1763)**

Material examined: S28, Tosya: 20.VI.2006, 2♂♂; S11, Daday: 11.VII.2006, 1♂, 1♀.

Remarks: It is newly recorded from Kastamonu province.

Family POLYCENTROPODIDAE Ulmer, 1903

***Cyrnus trimaculatus* Curtis, 1834**

Material examined: S20, Küre: 08.VIII.2006, 5 ♂♂.

***Polycentropus flavomaculatus flavomaculatus* (Pictet, 1834)**

Material examined: S44, Central: 09.V.2004, 2 larvae; S21, Pınarbaşı: 25.VII.2007, 2 larvae.

***Plectrocnemia latissima* Martynov, 1913**

Material examined: S12, Devrekani: 10.IX.2006, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

Family PSYCHOMYIIDAE Walker, 1852

***Psychomyia pusilla* Fabricius, 1781**

Material examined: S23, Şenpazar: 18.IX.2006, 4 ♀♀; S15, İhsangazi: 09.IX.2006, 5 ♀♀; S21, Pınarbaşı: 20.VII.2007, 6 ♂♂, 21 ♀♀; S22, Pınarbaşı: 16.IX.2006, 1 ♀; S19, Küre: 08.VIII.2006, 9 ♂♂, 1 ♀.

Remarks: It is newly recorded from Kastamonu province.

***Tinodes conjuncta* Martynov, 1913**

Material examined: S19, Küre: 08.VIII.2006, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

***Tinodes valvatus* Martynov, 1913**

Material examined: S30, Central: 06.VII.2006, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

Family HYDROPSYCHIDAE Curtis, 1835

***Cheumatopsyche flavellata* Mey, 2004**

Material examined: S21, Pınarbaşı: 20.VII.2007, 4 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Cheumatopsyche lepida* (Pictet, 1834)**

Material examined: S21, Pınarbaşı: 20.VII.2007, 3 ♂♂, 1 ♀; S23, Şenpazar: 18.IX.2006, 3 ♂♂, 1 ♀; S14, Araç: 09.IX.2006, 22 ♂♂, 19 ♀♀.

Cheumatopsyche persica* Mey, 2004

Material examined: S21, Pınarbaşı: 20.VII.2007, 3 ♂♂; S7, Çatalzeytin: 16.VI.2007, 9 ♂♂; S22, Pınarbaşı: 16.IX.2006, 1 ♂.

Remarks: It is newly recorded from Turkey.

***Hydropsyche botosaneanui* Marinković-Gospodnetić, 1966**

Material examined: S7, Çatalzeytin: 16.VI.2007, 9 ♂♂; S40, Central: 25.V.2007, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche bulbifera* McLachlan, 1878**

Material examined: S16, İhsangazi: 13.IX.2006, 1 ♂; S8, Daday: 11.VII.2006, 1 ♂; S15, İhsangazi: 09.IX.2006, 2 ♂♂; S13, Devrekani: 08.IX.2006, 2 ♂♂; S26, Tosya: 06.IX.2006, 3 ♂♂; S14, Araç: 09.IX.2006, 3 ♂♂; S9, Daday: 11.VII.2006, 3 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche exocellata* Dufour, 1841**

Material examined: S14, Araç: 09.IX.2006, 2 ♂♂; S26, Tosya: 06.IX.2006, 2 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche incognita* Pitsch, 1993**

Material examined: S14, Araç: 09.IX.2006, 2 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche instabilis* (Curtis, 1834)**

Material examined: S7, Çatalzeytin: 16.VI.2007, 1 ♂; S19, Küre: 08.VIII.2006, 1 ♂; S45, Central: 18.VIII.2006, 6 ♂♂, 1 ♀; S38, Central: 03.VII.2005, 3 larvae; S3, Azdavay: 24.VII.2005, 10 larvae; S44, Central: 09.V.2004, 4 larvae; S30, Central: 14.VII.2005, 12 larvae; S46, Central: 09.VII.2005, 7 larvae; S27, Tosya: 10.VII.2005, 2 larvae; S38, Central: 10.VII.2005, 14 larvae.

***Hydropsyche krassimiri* Malicky, 2001**

Material examined: S45, Central: 18.VIII.2006, 1 ♂; S7, Çatalzeytin: 16.VI.2007, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche mahrkusha* Schmid, 1959**

Material examined: S30, Central: 06.VII.2006, 6 ♂♂; S4, Ağlı: 24.VII.2005, 5 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche pellucidula* (Curtis, 1834)**

Material examined: S16, İhsangazi: 13.IX.2006, 3 ♂♂; S14, Araç: 09.IX.2006, 1 ♂; S24, Şenpazar: 18.IX.2006, 2 ♂♂; S23, Şenpazar: 18.IX.2006, 1 ♂; S7, Çatalzeytin: 16.VI.2007, 1 ♂; S1, Abana: 30.VII.2005, 7 larvae; S3, Azdavay: 24.VII.2005, 6 larvae.

Remarks: It is newly recorded from Kastamonu province.

***Hydropsyche sciligra* Malicky, 1977**

Material examined: S14, Araç: 09.IX.2006, 4 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

Family LEPIDOSTOMATIDAE Ulmer, 1903

***Dinarthrum iranicum* Schmid, 1959**

Material examined: S28, Tosya: 20.VI.2006, 4 ♂♂; S17, İhsangazi: 28.VII.2006, 2 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

***Lepidostoma hirtum* Fabricius, 1775**

Material examined: S44, Central: 25.VII.2007, 8 ♀♀; S19, Küre: 30.VII.2005, 2 larvae; S36, Central: 26.VII.2005, 3 larvae; S33, Central: 29.VI.2005, 3 larvae; S39, Central: 20.VI.2006, 18 larvae; S37, Central: 12.VII.2003, 4 larvae; S35, Central: 03.VII.2005, 1 larvae; S8, Daday: 15.IX.2005, 1 larvae; S2, Azdavay: 29.V.2005, 3 larvae; S25, Taşköprü: 20.VI.2006, 4 larvae.

Remarks: It is newly recorded from Kastamonu province.

Family LIMNEPHILIDAE Kolenati, 1848

***Grammotaulius nigropunctatus* Retzius, 1783**

Material examined: S32, Central: 04.V.2005, 16 larvae.

Remarks: It is newly recorded from Kastamonu province.

***Limnephilus hirsutus* (Pictet, 1834)**

Material examined: S24, Şenpazar: 18.IX.2006, 1 ♂.

***Limnephilus lunatus* Curtis, 1834**

Material examined: S25, Taşköprü: 20.VI.2006, 1 ♀; S13, Devrekani: 06.VII.2006, 1 ♀.

***Limnephilus ponticus* McLachlan, 1898**

Material examined: S28, Tosya: 20.VI.2006, 1 ♂; S4, Ağlı: 24.VII.2005, 1♀.

***Limnephilus rhombicus* (Linnaeus, 1758)**

Material examined: S32, Central: 04.V.2005, 18 larvae.

Remarks: It is newly recorded from Kastamonu province.

***Potamophylax latipennis* (Curtis, 1834)**

Material examined: S45, Central: 18.VIII.2006, 1 ♂, 1 ♀.

Remarks: It is newly recorded from Kastamonu province.

Family SERICOSTOMATIDAE Stephens, 1836

***Schizopelex anatolica* Schmid, 1964**

Material examined: S6, Bozkurt: 16.VI.2007, 1 ♂; S29, Tosya: 20.VI.2006, 4 ♂♂.

Remarks: It is newly recorded from Kastamonu province.

Family ODONTOCERIDAE Wallengren, 1891

***Odontocerum hellenicum* Malicky, 1972**

Material examined: S45, Central: 18.VIII.2006, 1 ♂, 1 ♀.

Remarks: It is newly recorded from Kastamonu province.

Family BERAIEIDAE Wallengren, 1891

***Beraea walteri* Malicky, 1975**

Material examined: S29, Tosya: 20.VI.2006, 1 ♂.

Family LEPTOCERIDAE Leach, 1815

***Athripsodes longispinosus* (Martynov, 1909)**

Material examined: S21, Pınarbaşı: 20.VII.2007, 3 ♂♂, 1♀; S22, Pınarbaşı: 16.IX.2006, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

***Athripsodes sewangensis* Martynov, 1925**

Material examined: S44, Central: 25.VII.2007, 8 ♀♀; S10, Daday: 11.VII.2006, 1 ♀; S45, Central: 18.VIII.2006, 1 ♀.

Remarks: It is newly recorded from Kastamonu province.

***Leptocerus interruptus* (Fabricius, 1775)**

Material examined: S13, Devrekani: 06.VII.2006, 10 ♂♂; S5, Seydiler: 06.VII.2006, 1 ♂.

Remarks: It is newly recorded from Kastamonu province.

DISCUSSION

In this study, a total of 462 Trichoptera were collected between May 2003 and September 2007, in order to determine the Trichoptera fauna of Kastamonu. As result of diagnostic species collected have been identified 43 species and 1 subspecies belonging to the genus 23 of the 14 families (Appendix 1.), which is 9.14% percentage of the number of caddisfly recorded in Turkey. 29 of 44 taxa are new for the Trichoptera fauna of Kastamonu. Also, one species is recorded for the first time Trichoptera fauna of Turkey.

The most remarkable feature of Turkey Trichoptera fauna is that it is a continuation of Europe Order Trichoptera fauna. Widely distributed species of Europe (21%) and specific species of the Eastern Mediterranean zoogeographical region (19%) constitute 40% of Anatolian species. Excluding the majority of the Caucasian Region, almost all relatives of endemic species are in Europe. 6% of known species show holarctic and palearctic distribution. Ratio of species of which distribution is restricted with Turkey and Iran is 3% (Sipahiler, 2000a).

In this study, when distributions of Trichoptera species collected from Kastamonu around the world are examined, it is seen that 14 species (20%) are distributed in Europe, 4 species (6%) are distributed in Caucasia, 5 species (7%) are distributed in Iran, 13 species (19%) are distributed in Anatolia (Endemic), 28 species (41%) are distributed in Europe-Asia, 4 species (6%) are distributed in Caucasus-Iran and 1 species (1%) is distributed in Cyprus (Fig. 2).

Most of the taxa have been identified in Kastamonu shows distribution in Europe-Asia. The species of *Hydroptila occulta*, *Wormaldia khourmai*, *Cyrnus trimaculatus*, *Psychomyia pusilla*, *Cheumatopsyche lepida*, *Hydropsyche pellucidula*, *Limnephilus hirsutus* and *Limnephilus lunatus* were reported to have spread through Europe, Caucasus and Iran in general. The species *Psychomyia pusilla* was described also from the Levant, northern Africa (Sipahiler, 2005) and Japan (Kimura et al., 2007), *Cheumatopsyche lepida* was described from the Levant (Sipahiler, 2005), *Hydropsyche pellucidula* was reported in Siberia (Ivanov & Melnitsky, 2007) and China (Yang et al., 2005) and the species *Limnephilus hirsutus* was known to have spread through Siberia (Sipahiler, 2005).

In the previous studies, the species of *Rhyacophila nubila*, *Cheumatopsyche capitella*, *Hydropsyche instabilis*, *Hydropsyche bulbifera*, *Hydropsyche incognita*, *Micropterna hatatitla*, *Athripsodes longispinosus* were reported to have spread through Europe and Iran. Besides this, the species of *Rhyacophila nubila* was reported to have spread through Iraq (Al-Zubaidi & Al-Kayah, 1987) and Israel (Sipahiler, 2013a). *Cheumatopsyche capitella*'s range also extends to India (Oláh et al., 2008), Pakistan (Oláh, 1994), Nepal (Malicky, 2006) and Turkistan (Sipahiler, 2005). The species of *Hydropsyche instabilis* was reported to have spread through the Levant (Sipahiler, 2012) and Turkmenistan (Oláh, 1994). *Hydropsyche bulbifera* was described from Turkmenistan (Oláh, 1994) and *Hydropsyche incognita* was known to have spread through the Levant (Sipahiler, 2005).

Although the species of *Polycentropus flavomaculatus*, *Hydropsyche exocellata*, *Lepidostoma hirtum*, *Limnephilus rhombicus* were reported to have spread through Europe and Caucasus; *Polycentropus flavomaculatus* was described from Siberia (Ivanov & Melnitsky, 2007) and Japan (Kimura et al., 2007). Besides this *Hydropsyche exocellata* was described from Uzbekistan (Abdullaeyva, 2002), *Lepidostoma hirtum* was described from Siberia (Ivanov & Melnitsky, 2007), Japan (Ito, 2005), China (Huang et al., 2005) and Mongolia

(Chuluunbat & Morse 2007) and the species of *Limnephilus rhombicus* was also reported to have spread through Siberia (Beketov, 2006; Ivanov & Melnitsky, 2007), Mongolia (Chuluunbat & Morse, 2007) and USA (Houghton et al., 2011).

In general the species of *Rhyacophila fasciata*, *Hydroptila cornuta*, *Hydroptila forcipata*, *Hydroptila tineoides*, *Tinodes valvatus*, *Hydropsyche botosaneanui*, *Grammotaulius nigropunctatus*, *Potamophylax latipennis*, *Adicella syriaca* were known to have spread through Europe and Caucasus. In addition to this, the subspecies *Rhyacophila fasciata* was described from Pakistan (Oláh, 2010), *Hydroptila forcipata* was described from Siberia (Ivanov & Melnitsky, 2007), *Tinodes valvatus* and *Adicella syriaca* was described from the Levant (Sipahiler, 2005), *Hydropsyche botosaneanui* was described from Syria (Sipahiler, 2005), *Grammotaulius nigropunctatus* and *Potamophylax latipennis* were also reported to have spread through Siberia (Ivanov, 2011).

It has been reported four species in the genus *Cheumatopsyche* Wallengren, 1891 in Turkey so far. According to Darılmaz & Salur (2015) distribution in the Turkey of this species are as follows: *Cheumatopsyche capitella* (Martynov, 1927): Elazığ, Isparta (Sipahiler & Malicky, 1987), Çanakkale, Muğla (Malicky & Sipahiler, 1993), Osmaniye, Erzurum (Kumanski & Sipahiler, 2002), Konya (Sipahiler, 2003a), Bartın, Kastamonu (Sipahiler, 2007). *Cheumatopsyche flavellata* Mey, 2004: Erzincan, Hakkari (Oláh, 2010). *Cheumatopsyche lepida* (Pictet, 1834): Ankara, Ardahan, Artvin, Bayburt, Bolu, Çanakkale, Çankırı, Hatay, Kahramanmaraş, Kars, Konya, Kütahya, Tunceli (Sipahiler & Malicky, 1987), Balıkesir, İzmir (Malicky & Sipahiler, 1993), Ankara, Artvin, Erzurum (Kumanski & Sipahiler, 2002), Ağrı, Bitlis, Kahramanmaraş, Kayseri, Malatya, Sivas (Uherkovich & Nógrádi, 2002), Bartın, Kastamonu (Sipahiler, 2007), Ankara (Girgin & Kazancı, 2008), Giresun, Ordu (Sipahiler, 2010a), Hakkari (Oláh, 2010). *Cheumatopsyche processuata* (Martynov, 1927): Şanlıurfa (Uherkovich & Nógrádi, 2002).

Cheumatopsyche persica, described by Mey in 2004 from the provinces of Chaharmahal va Bakhtiari and Kerman, is rather common in Iran (Chvojka, 2006). According to Morse (2016), *C. persica* was reported from Iran by Chvojka (2006) and from Turkey by Oláh (2010). *C. persica* was found in Azarbaijan Gharbi Province, Kermanshah Province, Fars Province, Khuzestan Province, Lorestan Province, Zanjan Province in Iran (Chvojka, 2006). Also Oláh (2010) reported two male specimen of *C. persica* collected from Busher Province, S-Zagros, Thang e Ram near Dalekhi, 400 m in Iran by P. Gyulai & A. Garai but there is no information about it found in Turkey. In our research, *C. persica* has been found from Kastamonu, has been recorded for the first time for Turkey Trichoptera fauna.

Frequency of each species of seventeen families detected in Kastamonu is seen in Figure 3. Sixty-nine taxa (66 species and 3 subspecies) were found to be represented by seventeen families. Hydropsychidae family has 15 taxa (21.7%), Limnephilidae has 10 taxa (14.4%), Hydroptilidae has 9 taxa (13.0%), Psychomyiidae has 6 taxa (8.6%), Leptoceridae has 5 taxa (7.2%), Rhyacophilidae, Philopotamidae and Polycentropodidae families have 4 taxa (5.7%), Glossosomatidae has 3 taxa (4.3%), Lepidostomatidae has 2 taxa (2.8%), Ptilocolepidae, Uenoidae, Goeridae, Sericostomatidae, Odontoceridae, Calamoeratidae and Beraeidae families have 1 taxa (1.4%).

Family Hydropsychidae induced the majority of trichopteran with 15 taxa (21.7%), while Limnephilidae 10 taxa (14.4%), Hydroptilidae 9 taxa (13.0%), Psychomyiidae 6 taxa (8.6%), Leptoceridae 5 taxa (7.2%).

As a consequence of screening of faunistic studies carried out relating to Turkey Trichoptera so far, 37 species and 3 subspecies belonging to 20 genera of 13 families have been detected in Kastamonu (Kumanski & Sipahiler, 2002; Malicky, 1997; Sipahiler & Malicky, 1987; Sipahiler, 1986, 1996, 1999, 2000b, 2003b, 2004, 2006, 2007, 2010b, 2012, 2013a, 2013b, 2014, 2015). Of these, 14 species and 1 subspecies were seen, and 23 species and 2 subspecies were not seen in this study. Trichoptera number known in Kastamonu was raised up to 69 species/subspecies with this study. 29 of 63 taxa determined were firstly recoded for Kastamonu Trichoptera fauna. Species/subspecies determined in Kastamonu before and with this study were given Appendix 1.

The Order Trichoptera and other orders contain some deterministic species for detection of water quality. Studies relating to determination of distribution and population of the Order Trichoptera in Turkey, recoding of its habitat and phenology, formation of faunistic inventory and detection of biological diversity were not sufficient. In this study, field studies were made in different localities and habitats and Kastamonu Trichoptera fauna was tried to be detected. Consequently, it will be possible to find more species with other studies to be planned similarly and reveal Turkey Trichoptera fauna detailedly in the future in our country having diverse geographical and climate features.

These results suggest that our country has quite a different geographic and climatic characteristics reveals the fact that more species found in each local region of Turkey in detail illustrates the need for local operation.

Note: This study is a part of Ph.D. thesis of the first author.

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APPENDIX 1. A list of species/subspecies of Trichoptera recorded from Kastamonu. In the list below, the taxa determined in the present study are marked with the sign of “▲”, and the taxa known only from available literatures “■”.

No	Species	Remarks*
Rhyacophilidae		
1	<i>Rhyacophila clavalis</i> Martynov, 1913	■▲
2	<i>Rhyacophila fasciata</i> Hagen, 1859	■▲
3	<i>Rhyacophila nubila</i> Zetterstedt, 1840	■▲
4	<i>Rhyacophila osellai</i> Malicky, 1981	▲
Glossosomatidae		
5	<i>Agapetus altineri</i> Sipahiler, 1989	■
6	<i>Agapetus delicatulus</i> McLachlan, 1884	■
7	<i>Synagapetus anatolicus</i> Cakin, 1983	■▲
Ptilocolepidae		
8	<i>Ptilocolepus colchicus</i> Martynov, 1913	▲
Hydroptilidae		
9	<i>Hydroptila armathai</i> Schmid, 1959	■
10	<i>Hydroptila atargatis</i> Malicky, 1997	■
11	<i>Hydroptila cornuta</i> Mosely, 1922	■▲
12	<i>Hydroptila forcipata</i> (Eaton, 1873)	■
13	<i>Hydroptila occulta</i> (Eaton, 1873)	■
14	<i>Hydroptila oemeruenei</i> Sipahiler, 2003	■▲
15	<i>Hydroptila tigurina</i> Ris, 1894	■▲
16	<i>Hydroptila tineoides</i> Dalman, 1819	■
17	<i>Hydroptila varla</i> Sipahiler, 1996	■
Philopotamidae		
18	<i>Wormaldia khourmai</i> Schmid, 1959	▲
19	<i>Wormaldia subnigra</i> McLachlan, 1865	■
20	<i>Philopotamus montanus</i> Donovan, 1813	▲
21	<i>Philopotamus variegatus</i> (Scopoli, 1763)	▲
Polycentropodidae		
22	<i>Cyrnus trimaculatus</i> Curtis, 1834	■▲
23	<i>Polycentropus flavomaculatus flavomaculatus</i> (Pictet, 1834)	■▲
24	<i>Polycentropus ierapetra septentrionalis</i> Kumanski, 1986	■
25	<i>Plectrocnemia latissima</i> Martynov, 1913	▲
Psychomyiidae		
26	<i>Psychomyia dadayensis</i> Sipahiler, 2006	■
27	<i>Psychomyia pusilla</i> Fabricius, 1781	▲
28	<i>Tinodes conjuncta</i> Martynov, 1913	▲
29	<i>Tinodes devrekensis</i> Sipahiler, 2014	■
30	<i>Tinodes popovi</i> Kumanski, 1975	■

31	<i>Tinodes valvatus</i> Martynov, 1913	▲
Hydropsychidae		
32	<i>Cheumatopsyche capitella</i> Martynov, 1927	■
33	<i>Cheumatopsyche flavellata</i> Mey, 2004	▲
34	<i>Cheumatopsyche lepida</i> (Pictet, 1834)	■▲
35	<i>Cheumatopsyche persica</i> Mey, 2004	▲
36	<i>Hydropsyche botosaneanui</i> Marinković-Gospodnetić, 1966	▲
37	<i>Hydropsyche bulbifera</i> McLachlan, 1878	▲
38	<i>Hydropsyche exocellata</i> Dufour, 1841	▲
39	<i>Hydropsyche incognita</i> Pitsch, 1993	▲
40	<i>Hydropsyche instabilis</i> (Curtis, 1834)	■▲
41	<i>Hydropsyche krassimiri</i> Malicky, 2001	▲
42	<i>Hydropsyche kurensis</i> Sipahiler, 2010	■
43	<i>Hydropsyche lepnevae</i> Botosaneanu, 1967	■
44	<i>Hydropsyche mahrkusha</i> Schmid, 1959	▲
45	<i>Hydropsyche pellucidula</i> (Curtis, 1834)	▲
46	<i>Hydropsyche sciligrana</i> Malicky, 1977	▲
Uenoidae		
47	<i>Thremma anomalum</i> McLachlan, 1876	■
Goeridae		
48	<i>Lithax musaca</i> Malicky, 1972	■
Lepidostomatidae		
49	<i>Dinarthrurum iranicum</i> Schmid, 1959	▲
50	<i>Lepidostoma hirtum</i> Fabricius, 1775	▲
Limnephilidae		
51	<i>Drusus bayburtii</i> Cakin, 1983	■
52	<i>Drusus muchei ilgazensis</i> Sipahiler, 1996	■
53	<i>Grammotaulius nigropunctatus</i> Retzius, 1783	▲
54	<i>Limnephilus hirsutus</i> (Pictet, 1834)	■▲
55	<i>Limnephilus lunatus</i> Curtis, 1834	■▲
56	<i>Limnephilus ponticus</i> McLachlan, 1898	■▲
57	<i>Limnephilus rhombicus</i> (Linnaeus, 1758)	▲
58	<i>Micropterna hatatitla</i> Malicky, 1985	■
59	<i>Micropterna ilgazica</i> Sipahiler, 2015	■
60	<i>Potamophylax latipennis</i> (Curtis, 1834)	▲
Sericostomatidae		
61	<i>Schizopelex anatolica</i> Schmid, 1964	▲
Odontoceridae		
62	<i>Odontocerum hellenicum</i> Malicky, 1972	▲
Calamoceratidae		
63	<i>Calamoceras illiesi</i> Malicky & Kumanski, 1974	■
Beraeidae		
64	<i>Beraea walteri</i> Malicky, 1975	■▲
Leptoceridae		
65	<i>Adicella syriaca</i> Ulmer, 1907	■
66	<i>Athripsodes longispinosus</i> (Martynov, 1909)	▲
67	<i>Athripsodes sewangensis</i> Martynov, 1925	▲
68	<i>Setodes bulgaricus</i> Kumanski, 1976	■
69	<i>Leptocerus interruptus</i> (Fabricius, 1775)	▲

Table 1. Locality data for the sampling stations.

Kod	District	Sampling Station	Altitude m	Latitude °N	Longitude °E	Stream
S1	Abana	Denizbükü village	94	41° 57'	34° 06'	Ezine Stream
S2	Azdavay	Sada village	914	41° 44'	33° 29'	Sada Stream
S3	Azdavay	Aliköy village	493	41° 49'	33° 20'	Devrekani Stream
S4	Ağlı	Şenpazar crossroads	992	41° 42'	33° 30'	Devrekani Stream
S5	Seydiler	Odabaşı village	1008	41° 38'	33° 38'	Devrekani Stream
S6	Bozkurt	Yakaören village road	95	41° 57'	33° 57'	Ezine Stream
S7	Çatalzeytin	Duran village	100	41° 54'	34° 14'	Tepe Stream
S8	Daday	Sarıçam village	850	41° 28'	33° 30'	Daday Stream
S9	Daday	Eymir village crossroads	826	41° 28'	33° 34'	Daday Stream
S10	Daday	Talıpler village	768	41° 27'	33° 40'	Daday Stream
S11	Daday	Selalmaz village	1020	41° 28'	33° 09'	Daday Stream
S12	Devrekani	Başakpınar village	1152	41° 39'	33° 59'	Devrekani Stream
S13	Devrekani	Şeyhbalı village road	1050	41° 36'	33° 46'	Devrekani Stream
S14	Araç	Başköy village	699	41° 13'	33° 23'	İlgaz Stream
S15	İhsangazi	Akkaya village	784	41° 13'	33° 28'	İlgaz Stream
S16	İhsangazi	İsalar village	905	41° 10'	33° 34'	Subükü Stream
S17	İhsangazi	Belençalı village	1025	41° 08'	33° 35'	Subükü Stream
S18	İnebolu	Ayvaköy village	137	41° 56'	33° 46'	Söke stream
S19	Küre	Ersizlerdere village	587	41° 50'	33° 43'	Ersizler Stream
S20	Küre	Kastamonu-Küre direction, 52 km	1170	41° 46'	33° 43'	Small pond
S21	Pınarbaşı	İhca village	415	41° 39'	33° 07'	Devrekani Stream
S22	Pınarbaşı	İhca waterfall	450	41° 39'	33° 08'	Zara Stream
S23	Şenpazar	Dereköy village	281	41° 47'	33° 09'	Devrekani Stream
S24	Şenpazar	Valay-II bridge	448	41° 49'	33° 17'	Devrekani Stream
S25	Taşköprü	Şahinçati village	1187	41° 13'	34° 11'	Bayat Stream
S26	Tosya	Ortalıca village	455	41° 02'	34° 15'	Devrez Stream
S27	Tosya	Ortalıca village	521	41° 02'	34° 15'	Geyikli Stream
S28	Tosya	Tosya-Taşköprü road	1434	41° 10'	34° 05'	Kara stream
S29	Tosya	Bürnük village crossroads	1483	41° 08'	34° 03'	Yarakin Stream
S30	Central	Gelindağı, Yüreveren village	976	41° 31'	33° 47'	Yüreveren Stream
S31	Central	Uzunoluk village	789	41° 21'	33° 53'	Karasu Stream
S32	Central	Kastamonu-Araç direction, 11. km, Kırısoğlu village	1137	41° 21'	33° 40'	Kırısoğlu Stream
S33	Central	Kastamonu-Tosya direction, Hatipoğlu village crossroads	923	41° 17'	33° 56'	Kara Stream
S34	Central	Aşağı Yuva village	903	41° 16'	33° 49'	Karasu Stream
S35	Central	Evciler village	1177	41° 14'	33° 55'	Evciler Stream
S36	Central	Kaçıllar village	1082	41° 14'	33° 53'	Kara Stream
S37	Central	Kırık village	1030	41° 12'	33° 48'	Karasu Stream
S38	Central	Akçataş village	1142	41° 11'	34° 01'	Kara Stream
S39	Central	Cebeci village	1158	41° 10'	34° 01'	Kara Stream
S40	Central	Beşdeğirmenler village	1032	41° 11'	33° 47'	Karasu Stream
S41	Central	Beşdeğirmenler village, Set trout resort	1080	41° 10'	33° 47'	Karasu Stream

S42	Central	Beşdeğirmenler village, Set trout resort	1177	41° 09'	33° 48'	Karasu Stream
S43	Central	Çatören village	1230	41° 08'	33° 47'	Karasu Stream
S44	Central	Çatören village	1176	41° 07'	33° 46'	Karasu Stream
S45	Central	İlgaz mountains, Yukarı Tüfekçi village	1436	41° 05'	33° 43'	Karasu Stream
S46	Central	İlgaz mountains, Bostan village, Derbent trout resort	1567	41° 04'	33° 45'	Karasu Stream

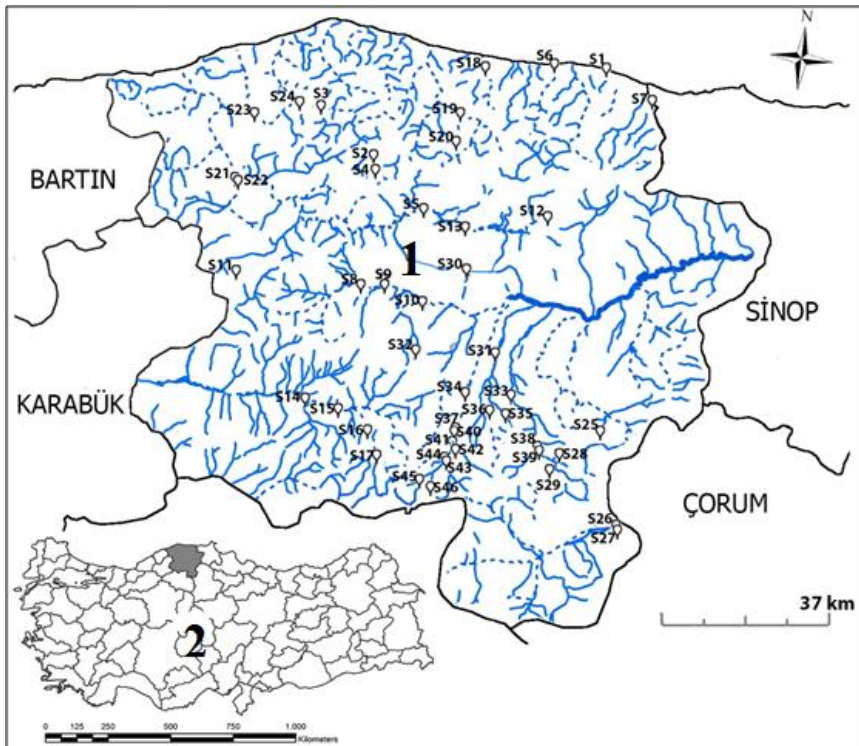


Figure 1. Map of study area: 1 Kastamonu, 2 Turkey

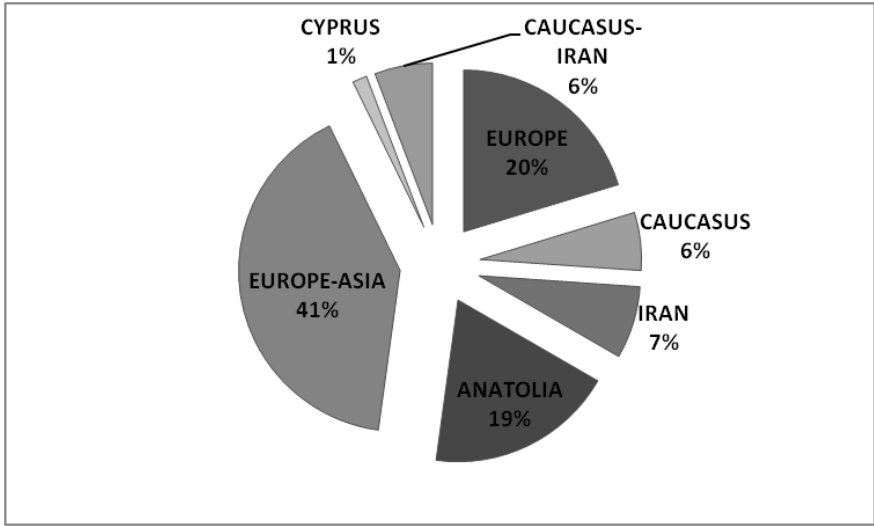


Figure 2. The world distribution in the Trichoptera taxa determined in the Kastamonu.

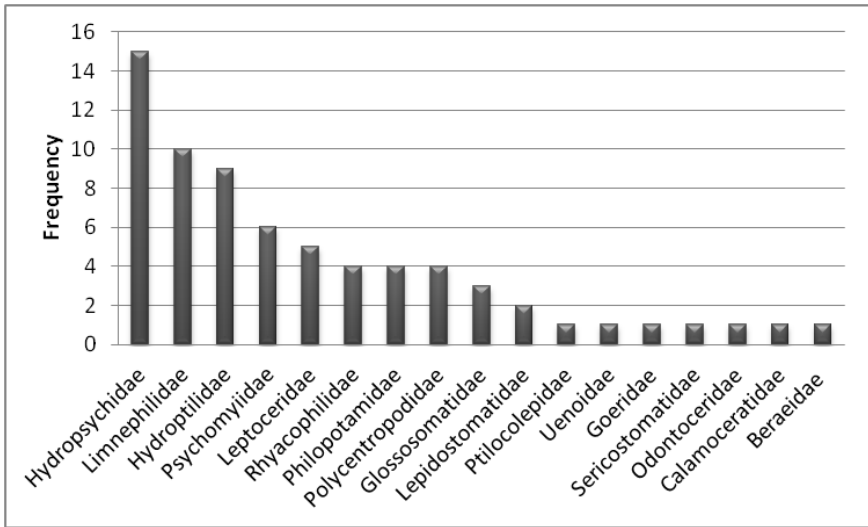


Figure 3. The frequency per species of seventeen families in the Kastamonu.