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Research Article

Batı Karadeniz Havzası'nın Ephemeroptera (Insecta) Faunası

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Öz

Bu çalışma, Türkiye'nin 25 nehir havzasından biri olan Batı Karadeniz Havzasının Ephemeroptera faunasını tespit etmeyi ve taksonların ekolojisini incelemeyi amaçlamaktadır. Batı Karadeniz Havzasında akarsular ve göller de dahil olmak üzere 24 istasyon belirlenmiştir. Makrobentik omurgasızların örneklemeleri, Mayıs 2014-Ekim 2015 tarihleri arasında, 24 istasyonda mevsimsel olarak gerçekleştirilmiş ve aynı lokalizasyonlarda çevresel değişkenler ölçülmüştür. Belirlenen istasyonlardan toplanan Ephemeroptera örneklemesi sonucunda 9 aile, 19 cins ve 39 taksondan oluşan toplam 2460 birey tespit edilmiştir. Ayrıca çalışma alanında tespit edilen taksonlar saprobik sisteme uygulanmış ve istasyonların mevcut durumu su kalitesi açısından gösterilmeye çalışılmıştır.

Anahtar Kelimeler: Ephemeroptera, Çeşitlilik, Fauna, Karadeniz, Ekoloji.

Ephemeroptera (Insecta) Fauna of The Western Black Sea Basın

Abstract

This study aims to detect the Ephemeroptera fauna of the Western Black Sea Basin, one of Turkey's 25 river basins, and to examine the ecology of the taxa. 24 stations, including streams and lakes, have been designated in the Western Black Sea Basin.

Samplings of macrobenthic invertebrates were performed seasonal at 24 stations between May 2014 and October 2015 in addition environmental variables were measured in the same localities. As a result of Ephemeroptera sampling collected from the designated stations, a total of 2460 individuals belonging to 9 families, 19 genera, and 39 taxa were identified. In addition, the taxa detected in the study area were applied to the saprobic system and the current status of the stations was tried to be demonstrated in terms of water quality.

Keywords: Ephemeroptera, Diversity, Fauna, Black Sea, Ecology

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1. Introduction

Ephemeroptera, one of the oldest insect orders today, is known to have appeared in the Late Carboniferous about 290 million years ago (Barber-James *et al*. 2008). It is the only group of insects with 2 adult life periods (subimago and imago) among insects (Edmunds & McCafferty 1988).

Global taxa diversity of Ephemeroptera is represented by over 3000 described taxa distributed in 42 families and 400 genera (Barber-James *et al*. 2008). Ephemeroptera has received great interest in the World as well as in Turkey. The first study concerning Ephemeroptera belongs to Ulmer (1919). After that, there have been many studies. These are Verrier (1955), Demoulin (1963, 1965), Puthz (1972, 1973, 1978), Jacob (1977), Soldan & Landa (1977), Koch (1980, 1985, 1988), Berker (1981), Braasch (1981, 1983a), Kazancı (1984; 1987a,1987b, 1990a,1990b, 1991, 1992, 1998a,1998b, 2001a, 2001b, 2009, 2011), Kazancı & Braasch (1986, 1988), Kazancı & Thomas (1989), Sowa *et al*. (1986), Tanatmış (1995, 1997, 1999, 2000, 2002, 2004a, 2004b, 2005), Belfiore *et al*. (2000), Tanatmış & Ertorun (2006, 2008), Dalkıran (2009), Taşdemir *et al*. (2008), Topkara *et al*. (2009), Kazancı & Türkmen (2008a, 2008b), Kazancı & Girgin (2008), Tanatmış & Haybach (2010), Türkmen & Özkan (2011), Özyurt & Tanatmış (2011), Salur *et al*. (2016).

Although the lifespan of members of the Ephemeroptera order, which exhibits a hemimetabolous development, is from several hours to several days in adulthood, their larval periods last from one to three years in stagnant waters or streams. Most of its taxa are herbivores. Therefore, they constitute an important link in the food chain in waters, and their diversity of taxa and abundance conditions give accurate results in determining the biological efficiencies of waters (Csoknya & Ferencz 1972; Zelinka 1984).

Ephemeroptera larvae can be found in almost every freshwater habitat, live on very different grounds, have high productivity, cannot travel very long distances, and most of their larvae are easily identified at the genus and taxa level, therefore they are cited as the best biological indicators of changes in water as a result of human activity (Kazanci & Türkmen 2008b).

The Ephemeroptera order has many indicator taxa that are very sensitive to organic pollution and habitat destruction. Ephemeroptera individuals react very quickly to any pollution and deterioration that may occur in the environment. While some taxa that are susceptible to pollution disappear, others can change the structure of their communion very quickly by increasing their abundance. Therefore, it is very convenient to use Ephemeroptera individuals in the evaluation and monitoring of aquatic ecosystems in terms of environmental quality (Bauernfeind & Moog 2002).

It is also known that Ephemeroptera taxa have a very important role in determining the reference stations and fauna of these stations regarding the applications of the European Union Water Framework Directive (EU WFD) in Turkey (Kazanci & Türkmen 2012).

In this study, which was carried out in the Western Black Sea Basin, it was aimed to determine the diversity of the Ephemeroptera fauna.

2. Material and Method

In this research, seasonal sampling studies were carried out between May 2014 and October 2015 from 24 stations (**Figure** 1) determined through streams and lakes in the Western Black Sea River Basin (Bolu, Bartın, Çankırı, Düzce, Kastamonu, Karabük, Sinop, and Zonguldak).

Figure 1. *The geographical location of the study area (western black sea basın) and the sampling sites*

The streams in the region are usually short and overly sloped and flow into the Black Sea. The most important streams of the region can be listed as Filyos River, Çerkes Stream, Yünlüce Creek, Özlüce Creek, Aydost Stream, and Kızılcapınar Stream. The designated points were selected from the source in the direction of downward flow to represent the Western Black Sea basin. Information about the points is given under the title "General Characteristics of the Stations" (**Table** 1).

Benthic samples were collected from the 24 designated stations using a standard bottom scoop with a pore size of 180 mµ for 5 minutes by mixing the bottom material with the foot. During the collection of the samples, the samples were also collected from different habitats that could reflect all the characteristics of the stream, such as rocky, stony, gravel, and sandy ground, and from where the current is fast and slow.

The collected samples were stored in plastic jars filled with 4% formaldehyde and brought to Ege University Faculty of Aquaculture Inland Waters Biology Laboratory. The samples brought to the laboratory were washed with tap water and freed from bottom material and formaldehyde. The benthic groups were isolated in a bathtub with the help of thin-tipped pliers and the Ephemeroptera group was placed into small tubes. The isolated samples were stored in 70% ethyl alcohol.

Ephemeroptera Individuals were detected at the taxa level using a binocular microscope and stereomicroscope. The properties such as the head structure of the samples of individuals, the positions and colors of honeycomb pores and ocelus, the structure of the antennae, the structure and length of the legs, the shapes, pattern, and hair conditions of femurs, tibia and tarsus, the shape of the pronotum, the number, positions and shapes of gills, patterns on the abdomen segments, posterior spines and posterolateral extensions, sercus and parasercus lengths, total lengths of the body, etc. are noted for use in the diagnosis of the taxa. Then, permanent preparations were made and taxa were determined. The preparations are prepared to identify head parts such as labrum, mandibles, maxillar palps, hypopharynx, labium by separating the head from the body, and gills, legs and body parts under a microscope using euparal between slides and lamellas.

The studies of Grandi 1960; Macan 1979; Sauter 1992; Harker 1989; Edmunds 1959; Illies 1968; Sinitshenkova 1979; Pennak 1978; Müllerliebenau 1969; Türkmen & Kazanci 2013 were benefited from in the determination of Ephemeroptera taxa. The similarity of the studied localities followed by a cluster analysis (UPGMA, Unweighted Pair Group Average) was calculated starting from the quantitative data of the macroinvertebrate taxa; the Multi-Variate Statistical Package (MVSP) program version 3.1 (Kovach 1998) was used to perform cluster analysis.

Table 1. Geographical and ecological data about the sampling sites

Station	Region	Coordinates	Altitude	Stream Area	Bottom Structure
1	Sino –Dikmen Stream	35º 38' 90,7" E - 41º 68' 10,5" N	27m	Hipopotamon	%30 Sand, %70 Stone
2	Kastamonu–Bozkurt Stream	34º 00' 9,48" E - 41º 9'58,84"	47m	Metapotamon	%20 Rock, %30 Clay, %50 Stone
3	Kastamonu/Seydiler-Değirmenözü Stream	33º 58' 5,88" E - 41º 68' 1,05"	974m	Epipotamon, Metapotamon	%40 Clay, %40 Stone, %20 Sand
4	Bolu – Çerkeş Stream	32º 63' 8,58" E - 40º 86' 5,18" N	988m	Hipopotamon	%40 Stone, %40 Sand, %20 Clay
5	Kastamonu/İnebolu-Özlüce Stream	33º 60' 6,35" E - 41º 98' 3,23" N	7m	Epipotamon, Metapotamon	%50 Rock, %50 Stone
6	Kastamonu/Cide-Aydos Stream	33º 08' 7,1" E - 41º 93' 2,56" N	10m	Epipotamon, Metapotamon	%30 Sand, %70 Stone
7	Kastamonu/Cide-Mağaza Stream	32º 94' 3,9" E - 41º 87' 1,01" N	3m	Epipotamon, Metapotamon	%80 Stone, %10 Sand, %10 Rock
8	Bartın- Kozcağız Creek	32º 33' 1,74" E - 41º 63' 4,96" N	13m	Metapotamon	%30 Sand, %30 Stone, %40 Clay
9	Karabük- Yenice Stream	32º36' 8,73" E - 41º20' 5,88"N	156m	Metapotamon	%30 Gravel, %60 Stone, % 10 Clay
10	Zonguldak- Devrek Stream	32º 06' 7,02" E - 41º 28' 3,07" N	51m	Metapotamon	%20 Sand, %20 Clay, %60 Stone
11	Zonguldak-Center	31º 79' 6,14" E - 41º 44' 3,49" N	13m	Hipopotamon	%20 Sand, %30 Clay, %50 Stone
12	Karabük- Özlüce Stream	32º 76' 8,13" E - 41º 21' 6,25" N	336m	Epipotamon, Metapotamon	%80 Rock, %20 Stone
13	Zonguldak- Özlüce Stream	31º 81' 5,11" E - 41º 40' 3,85" N	202m	Hiporhitron	%20 Rock, %80 Stone
14	Zonguldak-Kızılcapınar Stream	31º 68' 5,21" E - 41º 23' 3,9" N	134m	Epipotamon	%30 Rock, %20 Sand, %50 Stone
15	Zonguldak/Çaycuma–Filyos Stream	32º 08' 6,17" E - 41º 52' 3,12" N	3m	Metapotamon	%20 Sand, %50 Mud, %30 Clay
16	Çankırı –Bayramören Stream	33º 22' 6,77" E - 40º 95' 6,76" N	740m	Metapotamon	%60 Stone, %40 Sand
17	Sinop - Kanlıçay	35º 30' 5,00" E - 41º 50' 2,20" N	564m	Hipopotamon	%30 Rock, %20 Stone, %50 Sand
18	Bartın–Arıt River	32º 58' 8,71" E –41º 48' 7,18" N	318m	Metapotamon	%10 Sand, %80 Stone, %10 Gravel
19	Kastamonu–Bozkurt Stream	34º 18' 2,04" E– 41º 89' 0,16" N	207m	Metapotamon	%10 Sand, %80 Stone, %10 Gravel
20	Karabük	32º 29' 0,13" E - 41º 13' 7,86" N	284m	Metapotamon	%30 Gravel, %60 Stone, % 10 Clay
21	Kastamonu – Valay Creek	33º 42' 6,25" E - 41º 82' 3,87" N	614m	Hiporhithron	%90 Rock, %10 Stone
22	Düzce- Güzeldere	31º 04' 7,04" E - 40º 72' 7,14" N	468m	Hiporhithron	%40 Rock, %40 Stone , %20 Sand
23	Düzce- Akçakoca	30º 98' 6,97" E– 40º 95' 6,37" N	253m	Epipotamon	%40 Rock, %40 Stone , %20 Sand
24	Bolu- Abant Lake	31º 30' 9,08" E– 40º 62' 5,29" N	1119m	Epipotamon	%60 Rock, %20 Clay, %20 Sand

3. Results

3.1. Physicochemical variables

The minimum and maximum values of measured physical and chemical variables at the stations during the study period are represented in Table 2. The lowest and highest temperature values during the study period were 11,3°C and 33°C, respectively, and salinity values were particularly low in twenty station 0,1 and high in five station 0,44. The pH values measured at the stations ranged from 7,24 to 9,11. The highest mean dissolved oxygen value recorded in the sampling period was 10,94 mg l.

Table 2. Physicochemical variables of the sampling sites

	Summer	**Autumn**	**Winter**	**Spring**
pH	8,63-7,68	8,25-7,24	9,11-8,45	8,46-7,7
Temperature (°C)	33-21	20,2-11,3	24,2-14	25,8-18,1
Electrical conductivity (µs/cm)	836-272	854-321	439-102,7	832-130,5
Dissolved Oxygen (mg/L)	10,59-7,03	10,39-6,19	10,94-8,09	10,4-7
Salinity (‰)	0,41-0,1	0,42-0,12	0,25-0,11	0,44-0,13

3.2.Biological Findings

3.2.1.Taxa of Ephemeroptera Detected in the Study Area

In this study, a total of 2460 Ephemeroptera Individuals belonging to 9 families, 19 genera and 39 taxa were identified at 24 stations choosen on streams and lakes in the Western Black Sea River Basin.

3.2.2. The similarity of the stations

Cluster analysis was performed based on the average number of individuals of taxa at different stations. UPGMA analysis grouped the stations with similarity more than 50% according to the occurred taxa. In general view, all the localities have very high similarity (more than 90%) to each other. According to your UPGMA analysis based on Ephemeroptera taxa, first of all, the stations are divided into two main groups. There are 16 stations in the first group, while there are 8 stations in the second group. Stations A17 and A22, which have a rocky bottom, the bottom structure of the other stations 8, 9, 10 and 15 are different, all have a prevalent clay muddy bottom and similarities in their faunal components; they form another cluster (**Figure 2**).

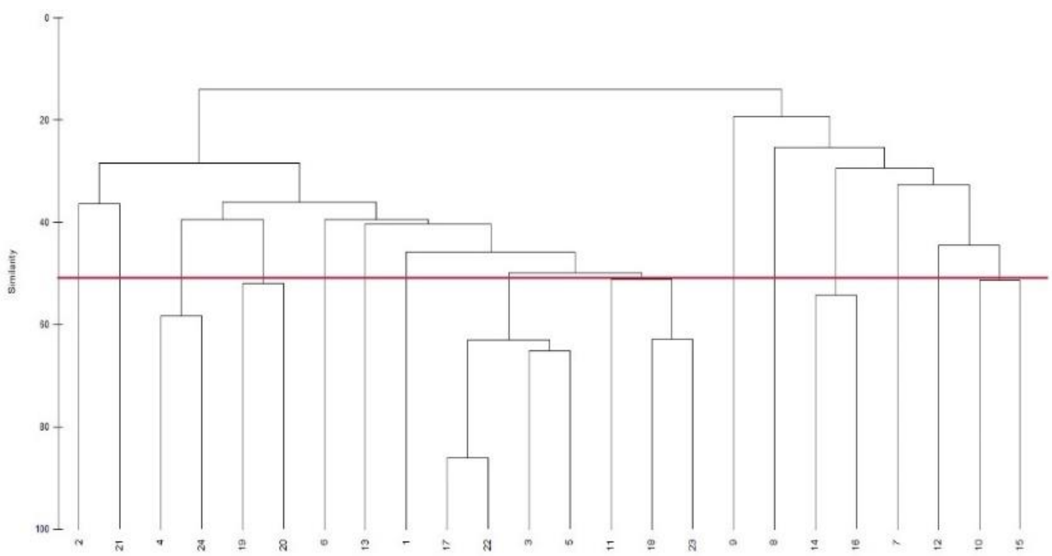

Figure2. *UPGMA dendrogram showing the similarity of the contents of the stations according to taxa*

The families with the largest number of genera in the Ephemeroptera families are Baetidae (4), Heptageniidae (4), and Leptophlebiidae (4). They make up 21.05% of the total number of genera (**Figure** 2.). The maximum number of taxa belongs to the Heptageniidae family (13). The family with the highest number of individuals is the family of Baetidae with 1973 individuals (**Table 3**). The distributions of taxa detected according to the stations investigated are also given in Table 4.

3.3.3.Taxa of Ephemeroptera Identified

39 taxa group taxa of mayflies representing 19 genera and 9 families have been recorded from the study area.

Table 3. *Ephemeroptera families; Number and percentage of genera, taxa and nymphs.*

Families	Number of Genera	Number of Genera (%)	Number of Taxa	Number of Taxa (%)	Number of Nymphs	Number of Nymphs(%)
Baetidae	4	21,05	12	30,77	1973	80,2
Caenidae	1	5,26	2	5,13	34	1,38
Ephemeridae	1	5,26	2	5,13	4	0,16
Ephemerellidae	2	10,53	3	7,69	91	3,70
Heptageniidae	4	21,05	13	33,33	236	9,59
Isonychiidae	1	5,26	1	2,56	17	0,69
Leptophlebiidae	4	21,05	4	10,26	38	1,54
Potamanthidae	1	5,26	1	2,56	56	2,28
Siphlonuridae	1	5,26	1	2,56	10	0,41

Table 4. *List of the identified taxa and their occurrences (ind/m^2) annual and dominance (%D) values at the sites*

Taxa	**Samples Stations**																								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**	**(23)**	**(24)**	**%**
1.Family: Baetidae Leach, 1815																									
Alainites muticus (Linnaeus, 1758)	2	5				22					8							1			11				1,99
Baetis buceratus Eaton, 1870		3						2	17	26	146	19			4										8,82
Baetis fuscatus (Linnaeus, 1761)		6				3						13		6		21									1,99
Baetis lutheri MüllerLiebenau, 1967	5	2	4				3		9		11	8						50	7	9	1		18		5,16
Baetis pavidus Grandi, 1951			10	6							13	2								26	3			6	2,68
Baetis rhodani (Pictet, 1843)	15	7	77	120	181	29					235		14	3		1	43	64	16	7	24	52	137	58	44,02
Baetis scambus Eaton, 1870						7																			0,28
Baetis vardarensis Ikonomov, 1962							4					25													1,18
Baetis vernus Curtis, 1834	17		7		2	13			2		50	21	24	6	1		19	30	7			10	40		10,12
Baetis (*Nigrobaetis*) *gracilis* Bogoescu & Tabacaru, 1957															1										0,04
Cloeon dipterum (Linnaeus, 1761)	25					2	1	53								5									3,50
Procloeon penulatum (Eaton, 1870)												2		1	7										0,41
2. Family: Caenidae Newman,1853																									
Caenis luctuosa (Burmeister, 1839)	4													1		3		2							0,41
Caenis macrura Stephens, 1835						1	1			5		2	2	4	2	6			1						0,98
3. Family: Ephemerellidae Klapálek, 1909																									

Taxa	Samples Stations																							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**	**(23)**	**(24)**	**%**
Ephemerella notata Eaton, 1887													4												0,16
Serratella ignita (Poda, 1761)		1					1	11	1					1				25	1	1	2				1,79
Torleya major (Klapálek, 1905)						2	1											32			2		6		1,75
4. Family: Ephemeridae Latreille, 1810																									
Ephemera danica Müller, 1764																				1	2				0,12
Ephemera vulgata Linnaeus, 1758										1															0,04
5. Family: Heptageniidae Needham, 1901																									
Ecdyonurus (Ecdyonurus) dispar (Curtis, 1834)							1										1	1		1					0,16
Ecdyonurus (Ecdyonurus) starmachi Sowa, 1971														1					7						0,33
Ecdyonurus (Ecdyonurus) submontanus Landa, 1969																					10				0,41
Electrogena affinis (Eaton, 1887)	1						5					5			2	16		5							1,38
Electrogena antalyensis (Braasch & Kazanci in Kazancı & Braasch, 1986)													6												0,24
Electrogena lateralis (Curtis, 1834)													7												0,28
Electrogena quadrilineata (Landa, 1969)																						1			0,04
Epeorus (Ironopsis) alpicola (Eaton, 1871)						11													13	8				41	2,97
Epeorus (Caucasiron) caucasicus (Tshernova, 1938)									1												5				0,24
Epeorus (Epeorus) zaitzevi Tshernova, 1981	1																								0,04
Epeorus (Caucasiron) znojkoi (Tshernova, 1938)																	6	2				4	9		0,85
Rhithrogena semicolorata (Curtis, 1834)										22		4			1						10				1,50
Rhithrogena zelinkai Sowa & Soldán, 1984									28																1,14

Taxa	**Samples Stations**																								
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**	**(20)**	**(21)**	**(22)**	**(23)**	**(24)**	**%**
6. Family: Isonychiidae Burks, 1953																									
Isonychia ignota Walker, 1853														9		8									0,69
7. Family: Leptophlebiidae Banks, 1900																									
Choroterpes (*Choroterpes*) *picteti* Eaton, 1871						4	1							1		6		6							0,73
Habroleptoides confusa Sartori & Jacob, 1986																					8				0,33
Habrophlebia lauta Eaton, 1884													1										5		0,24
Paraleptophlebia werneri Ulmer, 1920																			7						0,28
8. Family: Potamanthidae Albarda (in Selys-Longchamps), 1888																									
Potamanthus luteus (Linnaeus, 1767)				5			5	11		8		3		1	15	8									2,28
9. Family: Siphlonuridae Ulmer, 1920																									
Siphlonurus lacustris Eaton, 1870				10																					0,41
Isonychia ignota Walker, 1853														9		8									0,69
7. Family: Leptophlebiidae Banks, 1900																									
Choroterpes (*Choroterpes*) *picteti* Eaton, 1871						4	1							1		6		6							0,73
Habroleptoides confusa Sartori & Jacob, 1986																					8				0,33
Habrophlebia lauta Eaton, 1884													1										5		0,24
Paraleptophlebia werneri Ulmer, 1920																			7						0,28

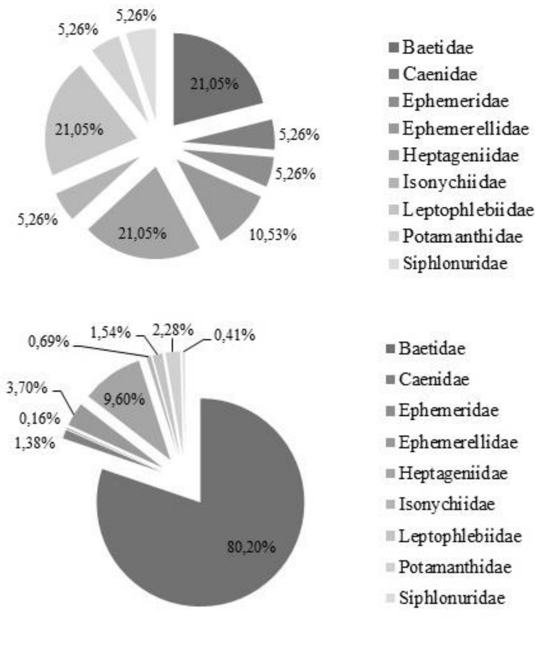

Figure 3. *Distributions of families and genera*

4. Discussion and Conclusion

In this study, a total of 2460 Ephemeroptera individuals belonging to 9 families, 19 genera, and 39 taxa were identified at 24 stations choosen on streams and lakes in the Western Black Sea River Basin. The Heptageniidae family has the maximum number of taxa kullanımı daha uygun olduğunu düşünüyorum. (13) (Table 3). It consist of 33.33% of the total number of taxa. The family with the highest number of individuals is the family of Baetidae with 1973 individuals (Table 3). It consist of 80.2% of the total number of individuals (**Figure** 3).

The families with the largest number of genera in the Ephemeroptera families are Baetidae (4), Heptageniidae (4), and Leptophlebiidae (4). They make up 21.05% of the total number of genera (**Figure** 3).

When we evaluate it in terms of the number of taxa; The Heptageniidae family ranks first with 13 taxa, while the Baetidae family ranks second with 12 taxa. The Leptophlebiidae family ranks third with 4 taxa.

The Heptageniidae family contains a large number of indicator taxa of very clean and unspoiled environments. In our study, 4 genera (*Rhitrogena*, *Epeorus*, *Ecdyonurus*, *Electrogena*) and 13 taxa belonging to this family were identified, which consist of 33% of the total number of taxa (**Table** 3). Common characteristics of the taxa identified is that they all generally prefer xenosaprobic, oligosaprobic and betamezosaprobic environments (Bauernfeind *et al*. 2002). In this study, these taxa were found in stations with xenosaprobic, oligosaprobic and betamezosaprobic properties.

The Baetidae family ranks second with 4 genera and 12 taxa (31%). The Baetidae family appears to contain some of the most resistant taxa to organic contamination and low oxygen levels.

Larvae belonging to the Leptophlebiidae family are usually found in cracks or crevices in stony areas in the hypocreneon and rhithron regions of streams (Buffagni *et al*. 2009). The Leptophlebiidae family is represented in our country by 12 taxa belonging to six genera (Kazanci & Türkmen 2012). In this study, it is represented by 4 genera and 4 taxa. According to Moog *et al*. (1997), the taxa *Habroleptoides confusa* and *Habrophlebia lauta* show saprobic values that characterize oligotrophic waters, which usually range from 1.5 to 2. In our study, both taxa were identified from the stations, which are accepted as references.

The family with the highest number of individuals is the family of Baetidae with 1973 individuals (**Table** 3). It consist of 80.2% of the total number of individuals (**Figure 3**).

B. rhodani, which is very common in streams and is known as the taxa with a high population density, had the highest density in this study with 1083 individuals. It was also the most common taxa in the 24 stations studied (18 Stations). *Baetis rhodani*, which is found in every region of the streams from the hypocreneon region to the potamon region, is a taxa with the highest temperature tolerance (eurythermic) that best tolerates a wide range of factors (Buffagni *et al*. 2009). They can be found in environments from xenosaprobic to alphamezosaprobic. However, they generally prefer oligosaprobic and betamezosaprobic environments (Bauernfeind & Haybach 2012). *Baetis rhodani* is an eurytherm species, the species has previously been recorded at similar habitats (Vilenica *et al.* 2016a; 2016b;2017a; 2017b). The presence of the potamal element is due to the eurytopic *B. rhodani* that inhabits a wide range of freshwater habitats (Bauernfeind & Soldán 2012; Buffagni *et al.* 2017).

Baetis vernus is the second common taxa with 249 individuals identified from 15 stations which has tolerance and prefers xenosaprobic and oligosaprobic environments.

With 127 individuals identified in 12 stations, *B. lutheri* prefers oligosaprobic and betamezosaprobic environments but is rarely found in xenosaprobic environments.

Caenis macrura larvae, reported from 9 stations, are located between the regions of epirhithton and hypopotamon. They can also be found in coastal areas of lakes (Bauernfeind & Soldan 2012). They prefer slow-current or stagnant water environments. They can be found in environments from xenosaprobic to alphamezosaprobic. However, they generally prefer betamezosaprobic environments (Bauernfeind & Haybach 2012).

The larva of *Serratella ignita*, the second taxa identified from 9 stations, has a fairly wide ecological tolerance range. It can be found in any type of stream covered by stones, gravels, or underwater plants and organic debris (Bauernfeind & Soldan 2012). They can be found in every region of the streams, from the hypocretin region to the metapotamon region. But they generally prefer metarhithron and hyporhithron regions (Buffagni *et al*. 2009). They prefer oligosaprobic, betamezosaprobic and alphamezosaprobic environments, but are mostly distributed in betamezosaprobic environments.

Potamanthus pluteus larva (Buffagni *et al*. 2009) is found in the stony and sandy parts of the epipotamon and metapotamon regions of the streams in the mountainous regions. In our study, they were identified in 8 stations. They have a high tolerance for organic pollution. Although they usually prefer betamezosaprobic environments, they can also be found in alphamezosaprobic environments (Bauernfeind & Haybach 2012).

If we look at the taxa distributions of the detected taxa by stations; Ephemeroptera larvae were found in all 24 stations studied. of these stations, 12, 14, 18, and 21 are the stations where the most taxa were identified with 11 taxa. Stations 6 and 7 with 10 taxa, station 16 with 9 taxa, stations 15 and 19 with 8 taxa have the highest diversity of taxa (**Table** 4).

Considering the effect of temperature on the distributions of taxa: The continuous presence of *B. rhodani* in all three periods indicates that the ecological tolerance of the species is high, the water temperature at the sampling stations is the highest temperature in the summer season: accordingly, the taxa rodani with the highest abundance is.

As a result of this study, in order to better understand the distributional and ecological features of the taxa occurring in the area, more samplings should be designed at various depths and representing different habitats.the Ephemeroptera fauna in the Western Black Sea Region was determined and it was aimed to contribute to Turkish biodiversity and to provide comparison opportunities for future monitoring studies.

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