

## A PRELIMINARY STUDY ON OSTRACODA (CRUSTACEA) FAUNA OF THE ISTRANCA STREAMS-TURKEY

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**Abstract:** To determine the Ostracoda fauna of the Istranca region, this preliminary study was performed and seven stream, Kuzuludere, Büyükdere (Çilinkozdere), Sultanbahçedere, Papuçdere, Elmalı, Kışla and Efendi stream, located in Istranca region, were investigated. In this way, ten species; *Ilyocypris bradyi* Sars, 1890; *Pseudocandona albicans* (Brady, 1864); *Candona* sp; *Candonopsis kingsleii* (Brady & Robertson, 1870); *Physocypris kraepelini* G. W. Müller, 1903; *Heterocypris salina* (Brady, 1868); *Psychrodromus fontinalis* (Wolf, 1920); *Cypridopsis vidua* (O.F. Müller, 1776); *Potamocypris variegata* (Brady & Nonman, 1889); *Limnocythere inopinata* (Baird, 1843) were identified. The highest species number was found in Sultanbahçe stream. Also *Pseudocandona albicans* is new record for Thrace region of Turkey.

**Keywords:** Istranca Streams, Taxonomy, Ostracoda, Crustacea

### Özet: Istranca Dereleri (Türkiye) Ostrakod (Crustacea) Faunası Üzerine Bir Ön Çalışma

Istranca bölgesi'nin ostrakod faunasını belirlemek için bu ön çalışma yapılmış ve Istranca bölgesinde yer alan yedi dere, Kuzuludere, Büyükdere (Çilinkozdere), Sultanbahçedere, Papuçdere, Elmalı, Kışla ve Efendi dereleri incelenmiştir. Böylece on tür; *Ilyocypris bradyi* Sars, 1890; *Pseudocandona albicans* (Brady, 1864); *Candona* sp; *Candonopsis kingsleii* (Brady & Robertson, 1870); *Physocypris kraepelini* G. W. Müller, 1903; *Heterocypris salina* (Brady, 1868); *Psychrodromus fontinalis* (Wolf, 1920); *Cypridopsis vidua* (O.F. Müller, 1776); *Potamocypris variegata* (Brady & Nonman, 1889); *Limnocythere inopinata* (Baird, 1843) belirlenmiştir. En yüksek tür sayısı Sultanbahçe deresinde bulunmuştur. Bunlara ek olarak *Pseudocandona albicans* Türkiye'nin Trakya bölgesi için yeni kayıttır.

**Anahtar Kelimeler:** Istranca dereleri, Taksonomi, Ostrakod, Crustacea

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## Introduction

Ostracods are living beings, which have been able to sustain since Cambrian. They have been spreading all over the water bodies of world. Ostracods are not only used as ecological indicators (Mezquita et.al., 2001) but also utilized in palaeoenvironmental studies (Mischke, 2001). 'Ostracoda' has been the subject of many faunal and ecological studies. Generally faunal studies were performed in the lakes (e.g. Altınışalı, 1993; Külköylüoğlu, 1998; Dügel et al., 2008). In Turkey, ostracod fauna of flowing waters have received much less attention than lakes. There are only a few published addressing about freshwater ostracods in flowing waters (Gülen and Altınışalı, 1999; Külköylüoğlu and Yılmaz, 2006; Yaltalı, 2007; Özuluğ and Yaltalı, 2008). To this end, Istranca streams named Kuzuludere, Büyükdere (Çilinkozdere), Sultanbahçedere, Papuçdere, Elmalı, Kışla and Efendi streams are chosen as study area. The study is a preliminary study to determine the ostracod assemblages of the seven streams.

## Materials and Methods

Kuzuludere, Büyükdere (Çilinkozdere), Sultanbahçedere, Papuçdere, Elmalı, Kışla and Efendi streams are known as Istranca streams and located in the north-east of Thrace Region in Turkey (Figure 1). The Streams originate from the Istranca Mountains and flow into the Black Sea. In order to obtain drinking water for increasing human population dams were constructed on five of them (Kuzuludere, Büyükdere, Sultanbahçedere, Papuçdere, Elmalı) by ISKI (Istanbul Water Authority) within the scope of project between 1990-1995. After the dams, reservoirs with different morphometrical features were formed in the area.

The water resources of stream are spring water and also, the water of streams and reservoirs are used as drinking water. Basin of streams is completely surrounded with oak and beech forests. Until recent years it was very difficult to get access to those streams in the forest region. Thanks to the roads built during the process of supply piping, the streams become accessible. The Ostracoda assemblages of this region is attractive because there is no environmental pollution in the concerning area.

All of the material from the streams were collected with a special hand net made of Müller fabric. Material inside mud was fixed with 4% formaldehyde and washed with pressurized tap water using sieves, 0.25; 0.16; 0.08 mm of mesh sizes repeatedly in the laboratory. Ostracod specimens were preserved in 70 % ethyl alcohol; soft body parts slides were prepared with dissection needles inside polyvinylalcohol lactophenol and orange-G. Identification of species is based on morphological aspects of the carapace and the soft body parts. During the classification Meisch 2000 was used. Dissolved oxygen, conductivity, pH and temperature values of the stations were measured at the area with portable WTW multi-line P4. Physical and chemical parameters of the streams with codes and geographical coordinates can be seen at the Table 1.



**Figure 1.** Istranca streams in the Thrace region and the distribution of the sampling stations at the study area.

**Table 1.** Name of streams with geographical coordinates considered in this study and some physical and chemical parameters of the stations. C: Conductivity ( $\mu\text{S}/\text{cm}$ ), DO: Dissolved oxygen mg/L, T (w): Water Temperature  $^{\circ}\text{C}$ , T (a): Air Temperature  $^{\circ}\text{C}$ .

Code	Site	Date	Geographical Coordinates		T(w) $^{\circ}\text{C}$	T (a) $^{\circ}\text{C}$	pH	DO mg/L	C $\mu\text{S}/\text{cm}$
St7	Kuzuludere	19 Apr. 2001	41° 28' 16" N	28° 17' 25" E	11.3	15	6.68	10.9	105
St19	Sultanbahçe	4 May. 2001	41° 33' 35" N	28° 03' 58" E	15.6	31.0	-	10.7	295
St21	Sultanbahçe	4 May. 2001	41° 34' 44" N	28° 05' 60" E	15.3	30.0	-	10.4	210
St17	Papuçdere	18 Sep. 2000	41° 39' 47" N	27° 58' 38" E	14.4	-	6.70	12.3	271
St28	Papuçdere	18 Sep. 2000	41° 38' 01" N	28° 04' 31" E	23.7	30	7.38	-	-
St29	Papuçdere	13 Jun. 2001	41° 40' 51" N	27° 57' 19" E	23	30	-	3.40	-
St30	Papuçdere	13 Jun. 2001	41° 41' 04" N	27° 52' 55" E	22.9	30	-	4.97	250
St33	Büyükdere	24 Jul. 2001	41° 31' 25" N	28° 12' 14" E	31.4	34	-	-	450
St34	Büyükdere	24 Jul. 2001	41° 31' 02" N	28° 11' 48" E	26	33	-	-	158
St35	Elmalı	25 Jul. 2001	41° 34' 40" N	28° 08' 12" E	25	33	-	-	117
St37	Elmalı	25 Jul. 2001	41° 34' 55" N	28° 08' 25" E	29	33	-	-	157
St38	Kışla	18 Jun. 2004	41° 58' 00" N	28° 02' 02" E	-	-	-	-	-
St40	Efendi	18 Jun. 2004	41° 53' 17" N	27° 59' 50" E	-	-	-	-	-

## Results and Discussion

The study was performed to determine the Ostracoda fauna of the Istranca streams and ten species were found. Tables 2 summarize the information on distribution and total number of the species in the study area that results of this study. Also the list including identified ostracod species with codes of sampling site and specimen number are given as follow.

Class: Ostracoda

Subclass: Podocopa G.W. Müller, 1894

Order: Podocopida Sars, 1866

Suborder: Podocopina Sars, 1866

Superfamily: Cypridoidea Baird, 1845

Family: Candonidae Kaufmann, 1900

Subfamily: Candoninae Kaufmann, 1900

*Candona* sp.

Material: St38, 1 ♀

Species status of genus *Candona* was not determined due to low specimen number.

*Pseudocandona albicans* Brady, 1864

Material: St21, 5 ♀; St29, 1 ♀; St35, 2 ♀.

According to Meisch (2000) the species is synonym with *Candona paralella*. The rare species generally prefers small water bodies with a muddy bottom and lives in permanent and temporary stagnant or slow flowing waters (Meisch 2000). In Turkey, it was recorded firstly from lake Birgi (İzmir) as bisexual population of *Candona paralella* by Gülen (1985b). In our study, *P. albicans* was found in three streams (Sultanbahçe, Papuçdere, Elmalı) and it is first report for Thrace region (Figure 2).

*Candonopsis kingsleii* (Brady & Robertson, 1970)

Material: St7, 3 ♀, 1 ♂; St21, 1 ♀, 4 ♂.

Generally, the species recorded from littoral zone of lakes and small permanent water bodies and several records from underground waters (Meisch 2000). In Turkey, *C. kingsleii*, was recorded firstly by Gülen (1985a) from hot water spring (Bağlama köyü – Antakya). The species is widely distributed both Thrace and Anatolia (e.g. Altınışlı, 1993; Gülen, 1985b; Özuluğ, 2000; Özuluğ, 2002).

Subfamily: Cyclopyridinae Kaufman, 1900

*Physocypria kraepelini* G.W. Müller, 1903

Material: St33, 1 ♀; St34, 2 ♀, 2 ♂.

*P. kraepelini* has wide distribution like *C. kingsleii*, (e.g. Gülen, 1985a; Gülen, 1985b; Özuluğ, 2000; Dügel et al., 2008.).

Family: Ilyocyprididae Kaufmann, 1900

*Ilyocypris bradyi* Sars, 1890

Material: St21, 2 ♀.

The species is a common and wide spread Holarctic species and also there is many record from Thrace and Anatolia (e.g. Gülen, 1977; Gülen and Altınsaçlı, 1999; Özuluğ and Kılıç, 2002; Dügel et al., 2008).

Family: Cyprididae Baird, 1845

Subfamily: Herpetocypridinae Kaufmann, 1900

*Psychrodromus fontinalis* (Wolf, 1920)

Material: St19, 1 ♀.

*P. fontinalis* is very similar species with *P. olivaceus*. *P. fontinalis* would be distinguished with very broader calcareous inner lamella at booths ends of valves and posterior uropodal spine with filamentous tip (Meisch 2000).

Subfamily: Cyprinotinae Bronshtein, 1947

*Heterocypris salina* (Brady, 1868)

Material: St40, 32 ♀.

Although *H. salina* is common and widely distributed species, it is found only one station with the highest specimen number.

Subfamily: Cypridopsinae Bronshtein, 1947

*Cypridopsis vidua* (O.F. Müller, 1776)

Material: St7, 8 ♀; St17, 10 ♀; St21, 1 ♀; St28, 3 ♀; St33, 3 ♀; St34, 6 ♀; St37, 5 ♀; St38, 5 ♀.

*C. vidua* which is the most frequently species and it was found almost all streams (Table-2). According to Dügel et al. (2008) *C. vidua* has wide range of tolerances to different environmental conditions.

*Potamocypris variegata* (Brady and Norman, 1889)

Material: St7, 4 ♀; St37, 4 ♀.

It is common and widely distributed species (Meisch, 2000).

Superfamily: Cytheroidea Baird, 1850

Family: Limnocytheridae Klie, 1938

*Limnocythere inopinata* (Baird, 1843)

Material: St21, 2 ♀; St30, 1 ♀; St33, 2 ♀.

It is also common and widely distributed species (e.g. Meisch, 2000; Kılıç, 2001; Özuluğ, 2000).

In addition the taxonomical features, distribution of the species at the area are very interesting. The highest species number (6) was found in Sultanbahçe stream (Table 2). Other four streams, Kuzuludere, Papuçdere, Büyükdere, Elmalı, have equal species number (3). With regard to size and flow rate Papuçdere is the largest stream among the considered streams in this study. Even though highest sampling number of Papuçdere stream, only three species was found. This situation suggests that high flow rate could have negative effect on the species distribution.

## Conclusions

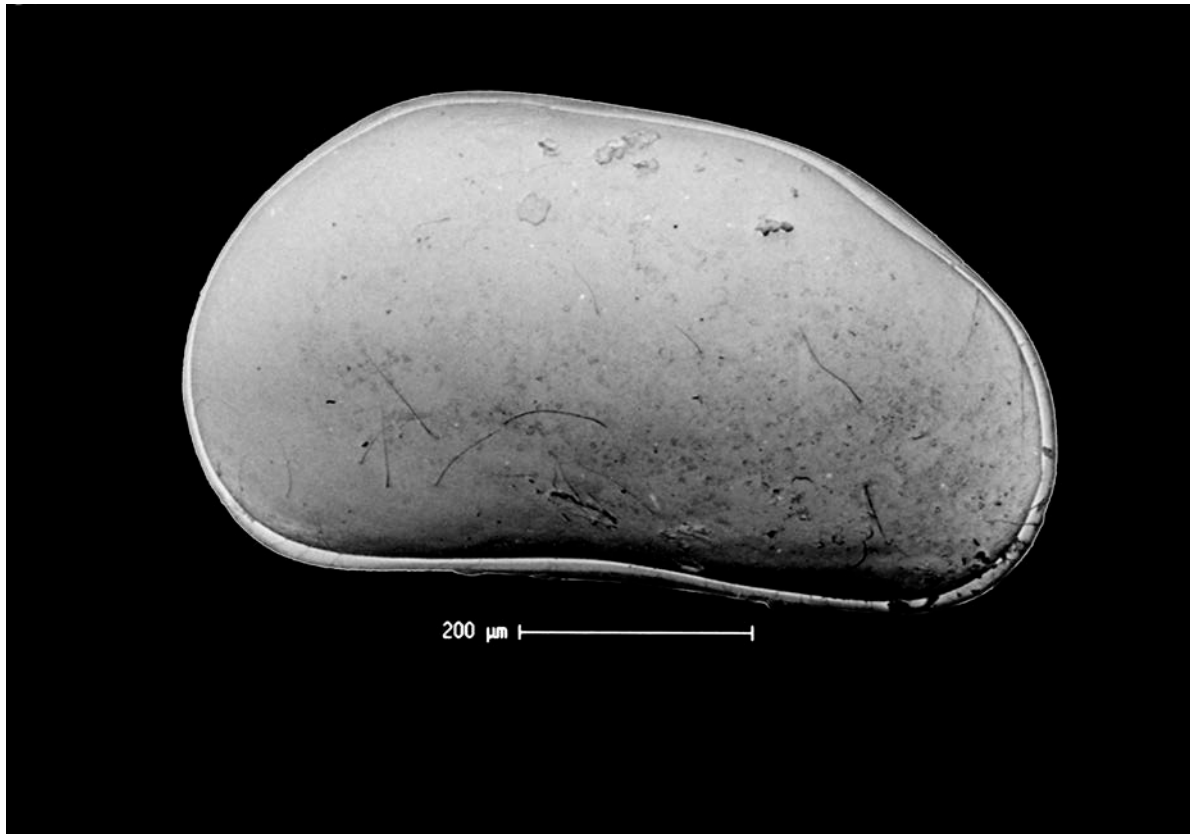
This is a taxonomical study to contribute to Ostracoda fauna of Turkey thus ten species were reported from Istranca streams and one of them, *Pseudocandona albicans*, is the first time, have been recorded in the Thrace region of Turkey. Finally, this study is a preliminary study, more detailed and seasonal study including spring point would be suggested to perform in the future.

## Acknowledgements

This work was supported by the Research Fund of The University of Istanbul. Project number 1550/16012001. Also I would like to thank Dr. Hülya Sarı De-Zeu for her help during the lab study and Dr. E. Pietrzeniuk for giving me the opportunity to compare with their collection in the Naturkunde Museum -Berlin.

Table 2. Distribution of the species in the study area and total species number of the streams

Species	Strems and Codes	Kuzulu dere	Sultanbahçe dere			Papuçdere				Büyükdere		Elmalı dere		Kışla dere	Efendi dere
		St 7	St 19	St 21	St 17	St 28	St 29	St 30	St 33	St 34	St 35	St 37	St 38	St 40	
<i>Ilyocypris bradyi</i>			*												
<i>Ilyocypris biplicata</i>									*						
<i>Candona sp.</i>													*		
<i>Pseudocandona albicans</i>			*			*				*					
<i>Candonopsis kingsleii</i>	*		*												
<i>Physocypris kraepelini</i>									*	*					
<i>Heterocypris salina</i>														*	
<i>Psychrodromus fontinalis</i>			*												
<i>Cypridopsis vidua</i>	*		*	*	*			*	*		*	*	*	*	
<i>Potamocypris variegata</i>	*										*				
<i>Limnocythere inopinata</i>				*			*	*							
Total species number		3	6			3				4		3		2	1

Figure 2. Lateral view of female *Pseudocandona albicans* Brady, 1864

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