

**THE AQUATIC AND SEMI-AQUATIC OLIGOCHAETA FAUNA OF TURKISH THRACE****Menekşe Taş<sup>1\*</sup>, Belgin Çamur Elipek<sup>1</sup>, Timur Kırgız<sup>1</sup>,****Naime Arslan<sup>2</sup>, Seray Yıldız<sup>3</sup>**<sup>1</sup> Trakya University, Faculty of Science, Department of Biology, 22030, Edirne/Turkiye<sup>2</sup> Osmangazi University, Department of Biology, Faculty of Arts and Science, 26480, Eskişehir/Turkiye<sup>3</sup> Ege University, Faculty of Fisheries, Department of Hydrobiology, 35100, Bornova, Izmir/Turkiye

**Abstract:** In this study, freshwater Oligochaeta samples which were collected between the years 1985 and 1999 from different localities in Turkish Thrace were evaluated taxonomically. A total of 11 Oligochaeta species were determined. Also, all printed taxonomical studies on aquatic and semi-aquatic Oligochaeta fauna which were performed in Turkish Thrace until the present were discussed in this paper. As a result, it was gathered that a total of 37 species belonging Oligochaeta have been reported from Turkish Thrace. While the family Naididae was the most encountered group with 27 species, it was followed by the family Enchytraeidae with 7 species. The families Haplotaxidae, Lumbricidae, and Propappidae were represented by only one species in Turkish Thrace.

**Keywords:** Oligochaeta, fauna, aquatic, semi-aquatic, Turkish Thrace

**Özet: Trakya Bölgesi'nin Sucul ve Yarı-Sucul Oligochaeta Faunası**

Bu çalışmada, 1985-1999 yılları arasında Trakya Bölgesi'ndeki farklı lokalitelerden toplanan tatlısu Oligochaeta örnekleri taksonomik olarak değerlendirildi. Toplamda 11 Oligochaeta türü belirlendi. Ayrıca, Trakya Bölgesi'nde şimdiye dek sucul ve yarı sucul Oligochaeta faunasına ait yayınlanmış taksonomik çalışmalar da bu makalede tartışıldı. Sonuç olarak, Trakya Bölgesi'nde Oligochaeta'ya ait toplam 37 türün bulunduğu özetlendi. Naididae familyası 27 türle en çok karşılaşılan familya olarak belirlenirken bunu, 7 türle Enchytraeidae familyası izledi. Haplotaxidae, Lumbricidae ve Propappidae familyaları ise Trakya Bölgesinde sadece birer türle temsil edildi.

**Anahtar Kelimeler:** Oligochaeta, fauna, akuatik, semi-akuatik, Trakya

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## Introduction

Freshwater oligochaetes have long been recognized as common and permanent inhabitants of diverse aquatic habitats including lotic and lentic systems, surface waters, groundwater, and coarse as well as fine sediments (Brinkhurst and Jamieson, 1971).

Oligochaeta species are a very significant part of the zoobenthos in inland water bodies. Oligochaetes are good indicators of environmental variation because of easy samples collections and taxa identification, and their relatively long life cycle, limited migration ability, and different sensitivity to different environment (Barbour et al., 1999, Liu et al., 2004). Faunistic and ecological knowledge of oligochaetes in the Thrace Region of Turkey is still insufficient. There are a few studies about the taxonomy and distribution of Oligochaeta species of Turkish Thrace (Çamur-Elipek, 2003; Kırgız et al., 2005; Çamur-Elipek et al., 2006).

The Thrace region which has 24.378 km<sup>2</sup> area is located in the north-west part of Turkey. There is a lot of water resources likewise rivers, streams, lakes, ponds etc. in the region. Nevertheless, a lot of agricultural activities, industrialisation, and urbanisation cause many environmental problems and degradation in the region.

Presently, freshwater resources have been under effects of intensive pollutions in Turkish Thrace.

In this study, it was aimed to determine the aquatic and semi-aquatic oligochaeta fauna of Turkish Thrace. For this aim, the oligochaeta specimens were collected from different localities in Thrace Region of Turkey between 1985 and 1999 years and they were identified to the possible lowest taxonomic level. Also, the taxonomical data has been gathered on aquatic and semi-aquatic oligochaeta fauna from limnological studies which were performed in Thrace Region of Turkey up to now.

## Materials and Methods

Turkish Thrace is located between latitude 41° 06' N and longitude 27° 29' E localities of Turkey. The region lies on south of Bulgaria, and on north-east of Greece. Thrace Region which is also known as European part of Turkey is separated from Anatolia by the Marmara Sea. Furthermore, it is surrounded by the Black Sea at its north-east and the Aegean Sea at its south. The material was collected by using Ekman Birge Grab (15x15 cm) and hand grabs between the years 1985 and 1999 from a total of 19 different localities in Turkish Thrace region (Figure 1).



▼ Tunca River (Kırgız et al., 2005; Çamur-Elipek et al., 2006)

■ Lake Terkos (Çamur-Elipek, 2003)

● In the present study

**Figure 1.** The study area and the sampling localities.

The Oligochaeta samples were identified to the possible lowest taxonomic level under stereobinocular microscope by using the literatures of Brinkhurst (1971, 1978), Brinkhurst and Jamieson (1971), Brinkhurst and Wetzel (1984), Kathman and Brinkhurst (1998), Milligan (1997), Sperber (1948, 1950), Timm (1999), Wetzel et al. (2000).

Also, the data on aquatic and semi-aquatic Oligochaeta from the previous printed studies which have been performed at Lake Terkos by Çamur-Elipek (2003) and at Tunca River by Kırız et al. (2005), Çamur-Elipek et al. (2006) were discussed in the present study.

**Results and Discussion**

A total of 11 Oligochaeta species were determined from Turkish Thrace between the years 1985 and 1999 at 19 different localities. Furthermore, a total of 9 oligochaeta taxa have been reported from Terkos Lake and a total of 31 aquatic or semi-aquatic oligochaeta taxa have been reported from Tunca River (Çamur-Elipek, 2003; Kırız et al., 2005; Çamur-Elipek et al., 2006) (Table 1). Consequently, it can be reported that a total of 37 aquatic or semi-aquatic oligochaeta taxa from 28 different localities in Turkish Thrace.

It was observed that the family Naididae was the most came across group with 27 species in Turkish Thrace. The subfamily Tubificinae was the most diverse group with 16 species and it was followed by the other members of the family Naididae with 11 species. While Enchytraeidae family was represented with 7 species, the families Propappidae, Haplotaxidae, and Lumbricidae were represented with only one species.

Turkish Thrace region is a rich area for lotic and lentic habitats, apart from being of importance with regards to zoogeography, ecology and geology. It also spans both the fauna of Europe and Asia. Therefore, biological richness of

inland waters in Turkey has attracted attentions of researchers, and all these previous studies made in Turkey concerning oligochaetes are available.

According to the previous studies and the present study, Oligochaeta has been represented by a total of 37 species in Turkish Thrace region. Both collected data and present study results show that Oligochaeta fauna of Thrace region is composed of cosmopolitan or widely distributed species while Haplotaxidae and Lumbricidae have small numbers of species (Table 1). According to literature data, the most recorded genera are *Pristinella*, *Nais* accompanied by *Psammoryctides*, *Potamothrix*, *Tubifex* and *Limnodrilus*.

Irrigation, pesticides and uncontrollable anthropogenic deposits affect freshwater sources negatively. A lot of factors such as pollution from agricultural areas and settlements, destruction of the aquatic plants around the water resources, and excessive hunting cause habitat destruction with decline levels of aquatic biodiversity at freshwater resources. In the last decade, agricultural activities, industrialisation, and urbanisation have increased at Turkish Thrace. Therefore, they cause many environmental problems in the region, especially in the water resources. A lot of freshwater resources have been under effects of intensive pollutions in Turkish Thrace (Kırız and Guher, 1992; Aydınlıyım, 1997; Özkan and Kubaş, 2008; Taş et al., 2008).

Macrobenthic fauna in an aquatic ecosystem can answer the pollution by increasing or decreasing of their number, or by their extinction from the system. Oligochaeta is the one of useful group within the macrobenthic fauna to watching the pollution by use the aquatic organisms (Wetzel et al., 2000; Taş et al., 2008). This group has a lot of indicator species to show the pollution in the water resources (Brinkhurst and Jamieson, 1971; Timm, 1970 and 1999; Wetzel et al., 2000).

**Table 1.** The Oligochaeta taxa which are determined in the localities in Turkish Thrace (1: Çamur-Elipek, 2003; 2: Kirgız et al., 2005; 3: Çamur-Elipek et al., 2006)

Taxa	1	2	3	Present Study
<b>Family: Haplotaxidae</b>				
<i>Haplotaxis gordioides</i> Hartmann, 1821	*			
<b>Family: Naididae</b>				
<i>Paranais frici</i> Hrabe, 1941			*	
<i>Ophidonais serpentina</i> Müller, 1773				*
<i>Nais communis</i> Piguët, 1906			*	
<i>Nais variabilis</i> Piguët, 1906			*	
<i>Nais pardalis</i> Piguët, 1906			*	
<i>Nais elinguis</i> Müller, 1773			*	*
<i>Stylaria lacustris</i> Linnaeus, 1767	*		*	*
<i>Dero digitata</i> Müller, 1773			*	
<i>Aulophorus furcatus</i> Müller, 1774			*	
<i>Pristinella jenkiniae</i> Stephenson, 1931			*	
<i>Pristinella bilobata</i> Bretscher, 1903	*		*	
<b>Subfamily: Tubificinae</b>				
<i>Tubifex</i> sp.			*	
<i>Tubifex tubifex</i> Müller, 1774			*	*
<i>Tubifex nerthus</i> Michaelsen, 1908	*			
<i>Limnodrilus</i> sp.			*	
<i>Limnodrilus hoffmeisteri</i> Claparède, 1862			*	*
<i>Limnodrilus udekemianus</i> Claparède, 1862	*		*	*
<i>Psammoryctides albicola</i> Michaelsen, 1901			*	*
<i>Psammoryctides deserticola</i> Grimm, 1877	*			
<i>Psammoryctides moravicus</i> Hrabe, 1934			*	
<i>Potamothrix hammoniensis</i> Michaelsen, 1901			*	*
<i>Aulodrilus pigueti</i> Kowalewski, 1914	*			
<i>Aulodrilus plurisetia</i> Piguët, 1906	*		*	
<i>Aulodrilus limnobioides</i> Bretscher, 1899			*	
<i>Rhyacodrilus coccineus</i> Vejdovsky, 1876			*	
<i>Isochaetides</i> sp.	*			
<i>Peipsidrilus</i> sp.			*	
<b>Family: Enchytraeidae</b>				
<i>Henlea perpusilla</i> Friend, 1911		*		
<i>Enchytraeus buccholzii</i> Vejdovsky, 1876		*		*
<i>Frederica</i> sp.		*		
<i>Cognettia</i> sp.		*		
<i>Cognettia glandulosa</i> Michaelsen, 1888		*		
<i>Cognettia sphagnetorum</i> Vejdovsky, 1877		*		*
<i>Lumbricillus</i> sp.		*		
<b>Family: Lumbricidae</b>				
<i>Eiseniella tetraedra</i> Savigny, 1826			*	
<b>Family: Propappidae</b>				
<i>Propappus volki</i> Michaelsen, 1916		*		*

Most naidid species occurring throughout the world are also cosmopolitan (Wetzel et al., 2000) and they have clearly adapted to a wide range of environmental conditions (Brinkhurst and Jamieson, 1971). The subfamily Tubificinae and several of its genera (e.g. *Tubifex* and *Limnodrilus*) are considered cosmopolitan specimens (Wetzel et al., 2000). *Limnodrilus hoffmeisteri*, a cosmopolitan, is perhaps the most commonly collected freshwater oligochaete throughout the world. It occurs in a wide variety of surface water habitats, reaching very high abundance in organically enriched areas often with records of *Tubifex tubifex* and of *Limnodrilus udekemianus* (Brinkhurst, 1975), which is also supported by this study.

The Enchytraeidae is a cosmopolitan family which contains semi-aquatic species and have found from the littoral region of aquatic habitats (Wetzel et al., 2000; Kırgız et al., 2005). Most species are terrestrial but a few are found commonly in freshwater and they have large number at littoral zone or marine (Nielsen and Christensen, 1959). However, in this study, the specimens belonging this family were collected from littoral region of the aquatic habitats of Turkish Thrace (Table 1).

## Conclusion

As a result of this study, it was shown that valuable aquatic resources and the living things within these habitats are becoming increasingly susceptible to both natural and environmental changes. Thus, conservation strategies to protect aquatic life are necessary to maintain the balance of nature and support the availability of resources for future generations.

It was suggested to perform the detailed studies on Oligochaeta fauna of Turkish Thrace as soon as possible because the water resources are under deterioration threat. This may cause extinction of the benthic fauna in the water resources.

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