

The Oligochaeta (Annelida) Fauna of Aksu Stream (Antalya)*

Soner ÇAPRAZ, Naime ARSLAN
Osmangazi University, Science and Arts Faculty, Biology Department, 26480, Meşelik, Eskişehir - TURKEY

Received: 02.07.2004

Abstract: The samples were collected from 10 stations from September 2002 to October 2003 with the purpose of determining the Oligochaete fauna of Aksu Stream (Antalya). Seventeen species of Oligochaeta were recorded, consisting of 7 species from the family Tubificidae, and 10 species from Naididae. All of them are reported from Aksu Stream for the first time.

Key Words: Oligochaeta, Aksu Stream, Turkey.

Aksu Çayı (Antalya) Oligochaeta (Annelida) Faunası

Özet: Aksu Çayı (Antalya) Oligochaeta Faunasının araştırılması amacıyla 10 istasyondan, Eylül 2002 - Ekim 2003 tarihleri arasında örnekler toplanmış ve incelenmiştir. Örneklerin incelenmesi sonucunda, yedi Tubificid ve on Naidid türü olmak üzere toplam onyedeki Oligochaeta türü saptanmıştır. Tespit edilen türlerin hepsi Aksu Çayı'ndan ilk defa bildirilmektedir.

Anahtar Sözcükler: Oligochaeta, Aksu Çayı, Türkiye.

Introduction

Oligochaetes, a subclass of the class Clitellata, of the phylum Annelida, have a worldwide distribution. They have species adapted to every kind of water (brackish water, fresh water or salt water) (Wetzel et al., 2000). Turkey is a country rich in terms of its aquatic ecosystems and water sources, owing to its geomorphological structure. Presently, these assets are in danger. It is necessary to determine the biological richness, especially with regards to benthic fauna, to increase the utilization of products obtained from inland water sources.

Oligochaeta species are one of the most important groups freshwater and are important food sources for some invertebrate animals and fishes. In addition, using most of the aquatic Oligochaeta species, especially species belonging to the family Naididae and Tubificidae, as bioindicator organisms is quite common (Brinkhurst and Jamieson, 1971; Kazancı and Girgin, 1998; Brinkhurst and Gelder, 1991). However, studies on the Oligochaete fauna in Turkey are not sufficient at present and there were no previous detailed studies related to the

Oligochaete fauna of Aksu Stream, which is one of the major streams near Antalya.

In recent years, very fast urbanization has been occurring in the study area, especially around Aksu Delta. The objective of the present study was to examine the Oligochaeta fauna and the distribution of Oligochaeta in Aksu Stream.

Materials and methods

In this study, 1156 specimens of aquatic Oligochaeta were collected at 10 stations along Aksu Stream (Figure 1) from September 2002 to October 2003. Samples were preserved in 4% formalin in the field. The collected materials were washed with water in sieves with different mesh sizes, then brought to the laboratory, sorted under a binocular microscope and transferred to 70% ethyl alcohol. Samples were examined by preparing temporary or permanent preparations. Temporary preparations were made with Amman's Lactophenol while permanent preparations were made with polyvinyl lactophenol or

* Based on the MSc thesis of Soner Çapraz, completed in 2003 and supervised by Naime Arslan.

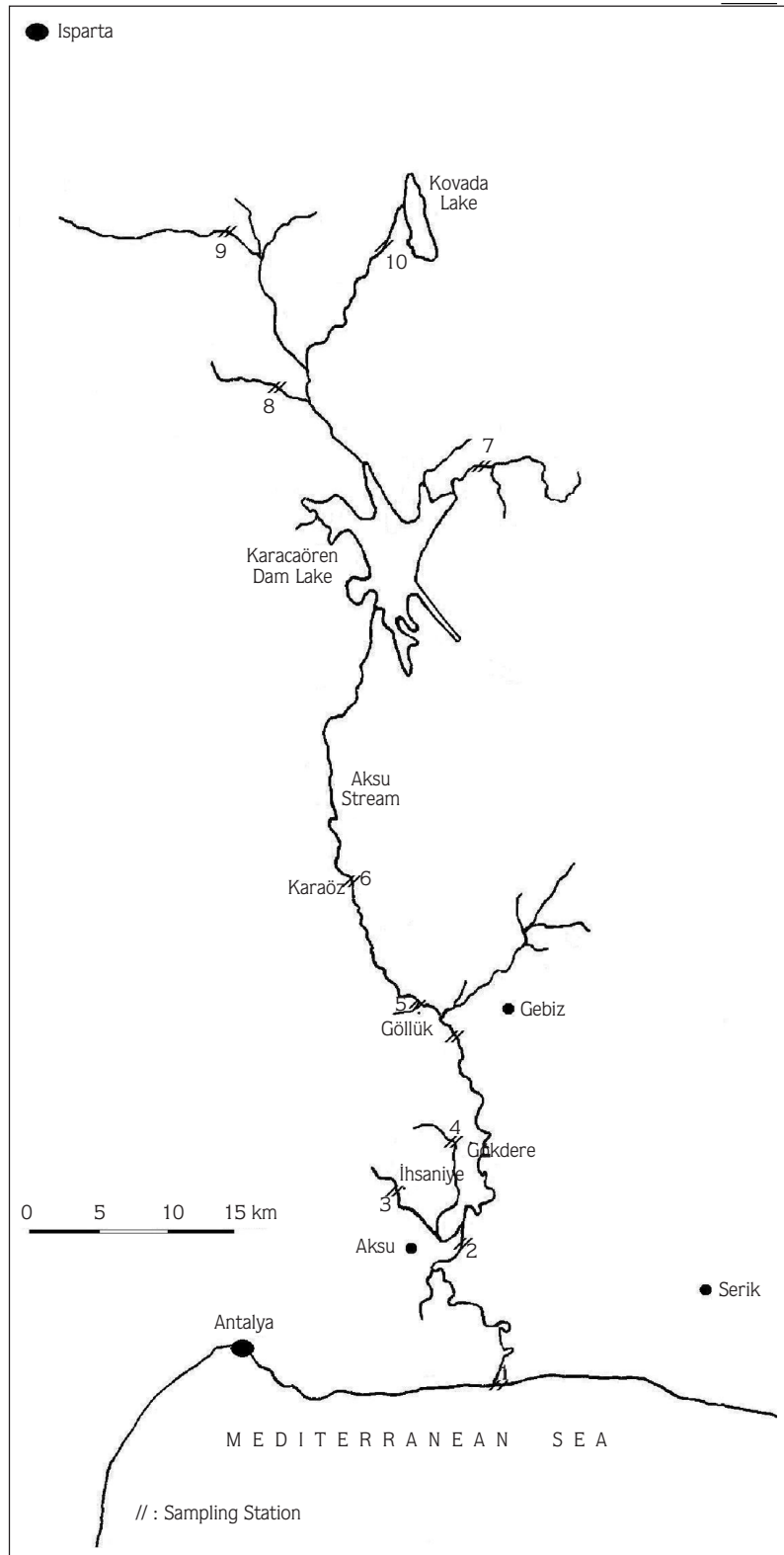


Figure 1. Study area and sampling stations.

Canada balsam. To identify the samples, Brinkhurst and Jamieson (1971), Kasprzak (1972), Timm (1999), Sperber (1948) were used.

Collecting Localities: The coordinates of the stations in Aksu Stream Basin where the Oligochaeta samples were collected are as follows:

1- Delta of Aksu Stream: Near Kundu Village, (45°57'989"N-27°90'298"E); 2- Tehnelli Village (45°67'784"N-27°84'014"E); 3- Ağlar Stream, İhsaniye Village (45°70'048"N-27°79'353"E); 4- Kavgacılar Village (45°77'284"N-27°80'596"E); 5- Değirmen Stream, Güloluk Village (45°84'621"N-27°76'323"E); 6- Aksu Stream, Karaöz Village (45°97'689"N-27°64'996"E); 7- Boladin Stream, Karaöz Village (°45'89'54"N-27°67'705"E); 8- Beldibi Stream, Kargı Village (46°05'510"N-27°64'292"E); 9- Isparta Stream, Aşağıgökdere Village (46°33'404"N-27°49'167"E); 10- Aksu Stream (°46'37'584"N-27°53'155"E).

Results and Discussion

The samples collected during the research period indicate the presence of 17 species of Oligochaeta:

*Aulodrilus pluriset*a (Piguet, 1906), *Aulodrilus pigueti* Kowalewski, 1914, *Potamothenix hammoniensis* (Michaelsen, 1901), *Psammoryctides albicola* (Michaelsen, 1901), *Tubifex tubifex* (Müller, 1774), *Limnodrilus hoffmeisteri* Claparède, 1862, *Limnodrilus udekemianus* Claparède, 1862, belonging to the family Tubificidae, *Chaetogaster diaphanus* (Gruithuisen, 1828), *Nais pardalis* Piguet, 1906, *Nais variabilis* Piguet, 1906, *Nais communis* Piguet, 1906, *Nais bretscheri* Michaelsen, 1899, *Dero digitata* (Müller, 1774), *Aulophorus furcatus* (Müller, 1774), *Pristinella osborni* (Walton, 1906), *Pristinella jenkiniae* (Stephenson, 1931) and *Stylaria lacustris* (Linnaeus, 1767) belonging to the subfamily Naididae. The Table shows the distribution of the species identified in Aksu Stream Basin. In addition, some characteristics of the species are shown in Figure 2.

Although species richness was not high in the study area, the greatest number was at station 1 (7 species), followed by stations 2 (6 species) and 6 (5 species). Among these 3 stations, in Aksu Stream Delta (station 1) the abundance of Oligochaeta species was not high except for *Stylaria lacustris*. It was the most abundant Oligochaeta species observed during the study period at

Table. Composition and distribution of Oligochaeta species determined in Aksu Stream.

No.	Species	Sampling Stations										
		1	2	3	4	5	6	7	8	9	10	
Tubificidae	1	<i>Aulodrilus pluriset</i> a				+						
	2	<i>Aulodrilus pigueti</i>	+									
	3	<i>Potamothenix hammoniensis</i>				+						
	4	<i>Psammoryctides albicola</i>		+								
	5	<i>Tubifex tubifex</i>		+	+	+		+		+	+	
	6	<i>Limnodrilus hoffmeisteri</i>					+				+	+
	7	<i>Limnodrilus udekemianus</i>		+								
Naididae	8	<i>Chaetogaster diaphanus</i>							+			
	9	<i>Nais pardalis</i>	+	+					+			+
	10	<i>Nais variabilis</i>	+						+			+
	11	<i>Nais communis</i>	+	+								
	12	<i>Nais bretscheri</i>					+					
	13	<i>Dero digitata</i>		+								
	14	<i>Aulophorus furcatus</i>	+									
	15	<i>Pristinella osborni</i>								+		
	16	<i>Pristinella jenkiniae</i>	+							+	+	
	17	<i>Stylaria lacustris</i>	+							+		

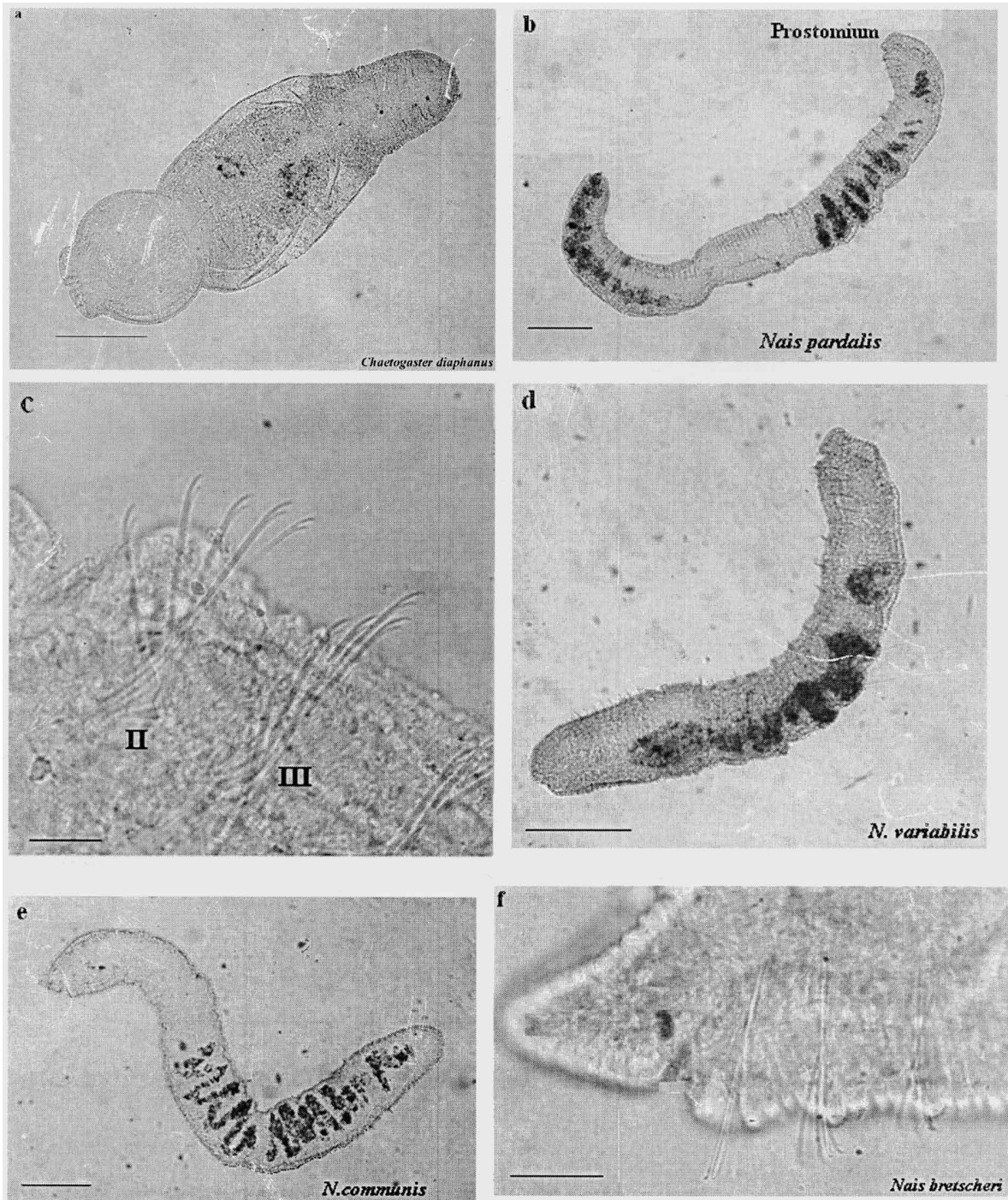


Figure 2. a- *Chaetogaster diaphanus*, a- general view of the body; *Nais pardalis*, b- body, c- anterior ventral setae; *Nais variabilis*, d- body; *Nais communis*, e- general view of the body; *Nais bretscheri*, f- anterior ventral setae, g- giant setae; *Aulophorus furcatus*, h- posterior end of body; *Dero digitata*, i- whole body, j- anterior ventral setae; *Pristinella osborni*, k- body, l- anterior ventral setae; *Pristinella jenkiniae*, m- general view of the body; *Stylaria lacustris*, n- whole body; *Aulodrilus pigueti*, o- posterior dorsal bundles; *Aulodrilus plurisetia*, p- posterior ventral setae; *Potamothrix hammoniensis*, r- anterior end of the body, s- spermathecal setae; *Psammoryctides albicola*, t- anterior end of the body, u- ventral setae; *Tubifex tubifex*, v- penis sheath; *Limnodrilus hoffmeisteri*, w- penis sheath; *Limnodrilus udekemianus*, y- anterior ventral setae. Scales: a, d, h, i, k and m 0.1 mm; e, b and n 0.2 mm; r and t 0.5 mm; u, 5 μ m; c and v 10 μ m; j, l and p 15 μ m; f, g, o, s, w and y 20 μ m.

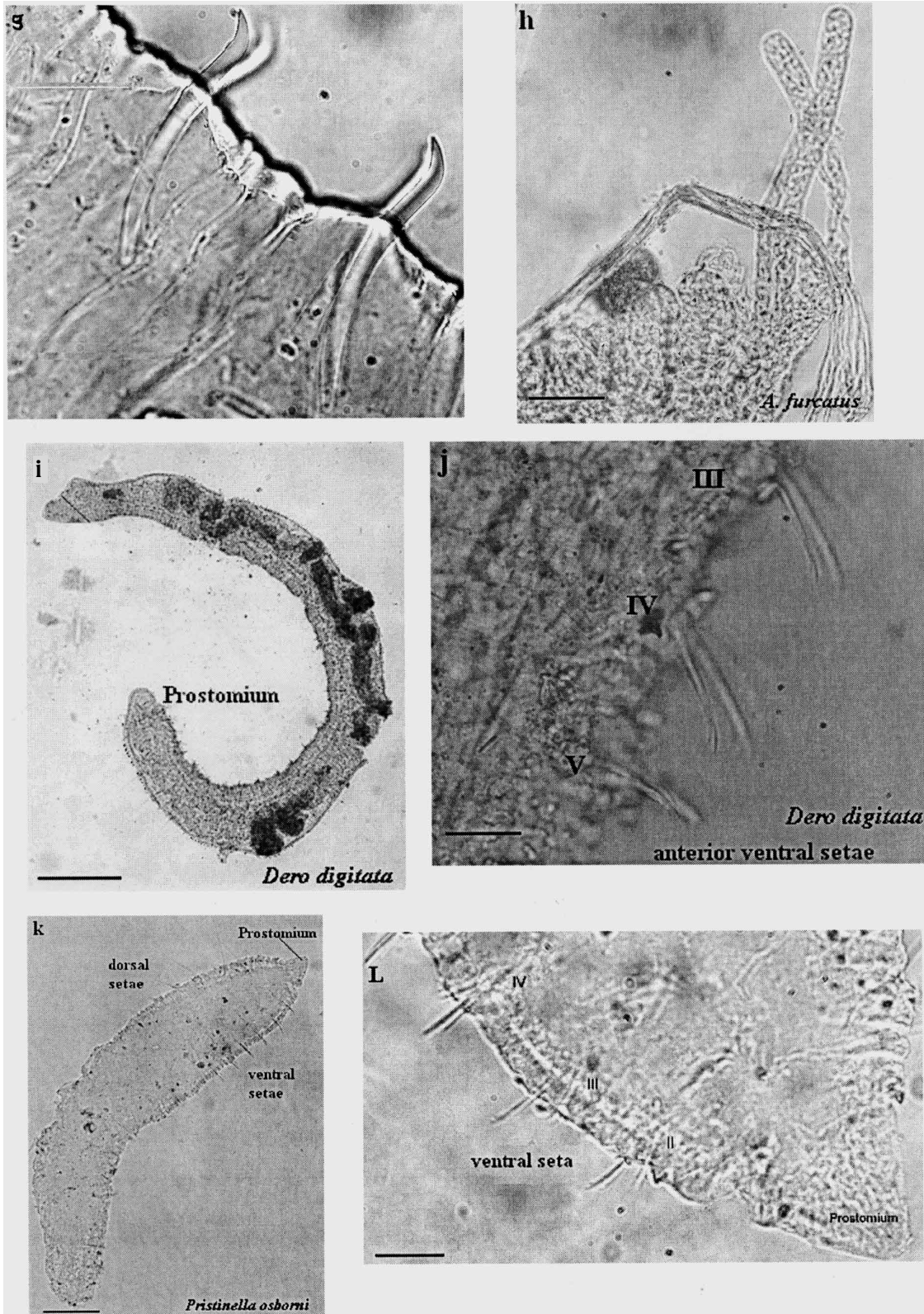


Figure 2. (continued)

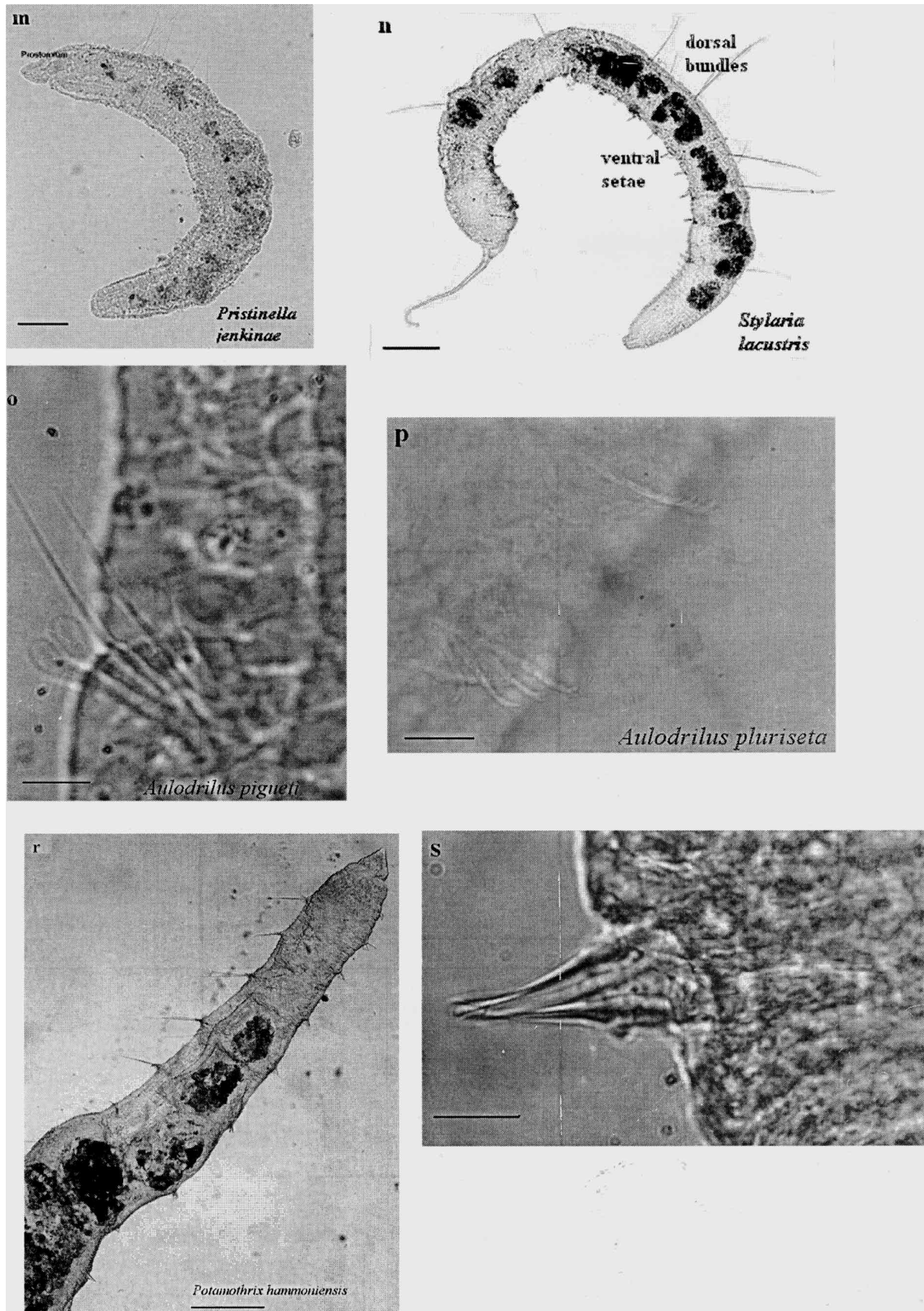


Figure 2. (continued)

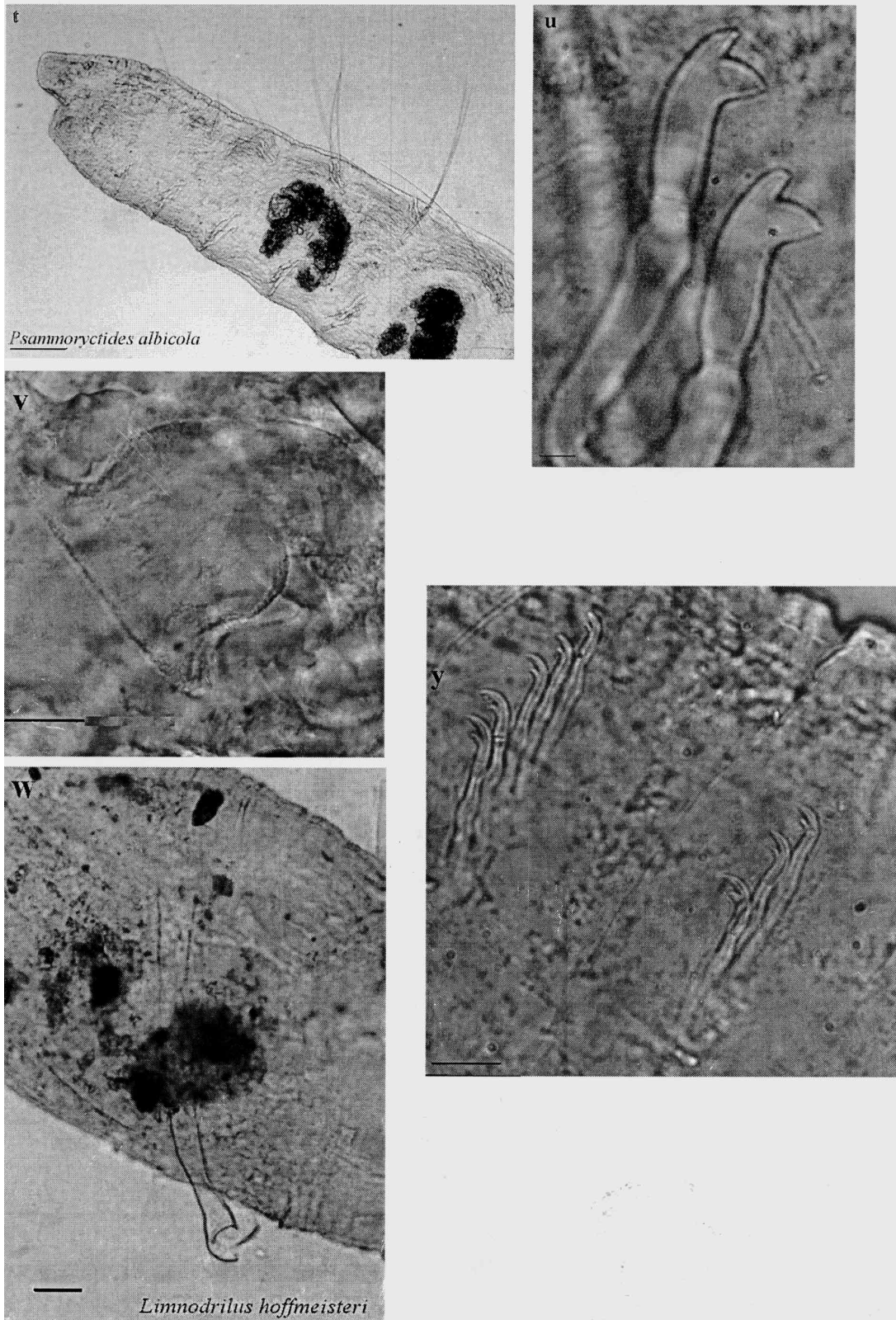


Figure 2. (continued)

station 1. Timm (1970) found the species in brackish water with salinity less than 7‰, also in open water and even in the profundal zone. To, *Stylaria lacustris* has been recorded from various water bodies, and in brackish waters (e.g. Timm, 1970; Dumnicka, 1978; Davis, 1982). It is known that this species can tolerate low temperatures (to -8 °C) and high NaCl concentrations in water (Chekanovskaya, 1962; Verdonschot, 1987, respectively). The greatest number of *Stylaria lacustris* samples was collected at station 1, from sandy substrates, followed by station 6.

It is known that most Naidid species are intolerant of saline conditions; however, Learner and Edwards (1963) found that *Nais variabilis* and *Nais communis* were unlikely to tolerate a salt concentration much greater than about 0.5% (3000 mg Cl⁻¹). These 2 species were also determined in Aksu Stream Delta and this knowledge is consistent with our findings.

Species with the widest distribution at the 10 sampling sites among the 17 Oligochaeta species are; *T. tubifex* (at 6 sites), *Limnodrilus hoffmeisteri* (at 3 sites), *Nais pardalis* (at 4 sites), *N. variabilis* (at 3 sites) and *Pristinella jenkiniae* (at 3 sites) belonging to the family Naididae (Table).

The family Tubificidae and several of its genera (e.g., *Tubifex* and *Limnodrilus*) are considered cosmopolitan species (Wetzel et al., 2000). *Tubifex tubifex* and *Limnodrilus hoffmeisteri* were recorded as the most abundant Oligochaeta species at stations 3 and 9, respectively.

Most naidids species are also cosmopolitan, occurring throughout the world (Wetzel et al., 2000) and they have clearly adapted to a wide range of environmental conditions (Brinkhurst and Jamieson, 1971). Although *Nais pardalis* showed the widest distribution at the 10 sampling site among the 10 Naididae species determined (Table), its abundance was not high. However, *N. variabilis* was determined at 3 sampling sites in our research area but its abundance was higher than that of *N. pardalis*. Davis (1982) reported *N. variabilis* in brackish water, and we determined this species at Aksu Stream Delta. Our findings support this knowledge.

Pristinella jenkiniae was reported as eurytopic and eurythermal species by Pascas-Gluzman and Dimentman (1984). This species was found in our research area at 3 sites including Aksu Stream Delta (Table), but its abundance was not high, like *N. variabilis*.

References

- Brinkhurst, R.O. and Jamieson, B.G.M. 1971. Aquatic Oligochaeta of the World, Oliver and Boyd, Edinburgh.
- Brinkhurst, R.O. and Gelder, S.T. 1991. Annelida: Oligochaeta and Branchiobdellida. In: Ecology and Classification of North American Freshwater Invertebrates (ed. J.H. Torp and A.P. Covich), Academic Press, California, 401-428.
- Chekanovskaya, O.V. 1962. Aquatic Oligochaeta of the U.S.S.R. Published for the United States Department of the Interior and the National Science Foundation, Washington, D.C., by Amerind Publish Co. Pvt. Ltd., New Delhi), pp. 87-95.
- Davis, R.J. 1982. New records of aquatic Oligochaeta from Texas, with observations on their ecological characteristics. *Hydrobiologia* 96: 15-29.
- Dumnicka, E. 1978. Communities of oligochaetes (Oligochaeta) of the River Nida and its tributaries. *Acta Hydrobiol.* 20: 117-141.
- Kasprzak, K. 1972. Variability of a *Chaetogaster diaphanus* (Gruisthuisen), 1828 (Oligochaeta, Naididae) in different environments. *Zoologica Poloniae*, 22: 44-51.
- Kazancı, N. and Girgin, S. 1998. Distribution of Oligochaeta species as bioindicators of organic pollution in Ankara Stream and their use in biomonitoring. *Tr. J. of Zoology*, 22: 83-87.
- Learner, M.A. and Edwards, R.W., 1963. The toxicity of some substances to *Nais* (Oligochaeta). *Proc. Soc. Wat. Treat. Exam.* 12: 161-168.
- Pascas-Gluzman, C. and Dimentman, C. 1984. Distribution and habitat characteristics of Naididae and Tubificidae in the inland waters of Israel and the Sinai Peninsula. *Hydrobiologia* 115: 197-205.
- Sperber, C. 1948. A taxonomical study of Naidide Zool. *Bidr. Uppsala*, 28: 1-296.
- Timm, T., 1970. On the fauna of the Estonian Oligochaeta. *Pedobiologia* 10: 52-78.
- Timm, T. 1999. A Guide to the Estonian Annelida. *Naturalist's Handbooks* 1, Tart-Tallin, 208 pp.
- Verdonschot F.M. 1987. Aquatic Oligochaete in ditches. *Hydrobiologia* 115 : 283-292.
- Wetzel, M.J., Kathman, R.D., Fend, S.V. and Coates, K.A. 2000. Taxonomy, systematics, and ecology of freshwater Oligochaeta. Workbook prepared for North American Benthological Society Technical Information Workshop, 48th Annual Meeting, Keystone Resort, CO. 120p.+ app.