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Nine New Naididae (Oligochaeta) Species for Sakarya River, Turkey*

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Abstract: The material was collected between September 1995 and August 1998 from 79 stations on Sakarya River. A total of nine Naididae species (*Ophidonais serpentina* (Müller, 1773), *Stylaria lacustris* Lamarck, 1816, *Nais pardalis* Piguët, 1906, *Nais variabilis* Piguët, 1906, *Pristinella jenkinsae* (Stephenson, 1931), *Pristina foreli* (Piguët, 1906), *P. longiseta longiseta* Ehrenberg, 1824, *P. proboscidea* Beddard, 1896 and *P. aquiseta* Bourne, 1891) belonging to five genera were recorded for the first time from Sakarya River.

Key Words: Oligochaeta, Naididae, new record, Sakarya River, Turkey.

Sakarya Nehri İçin 9 Yeni Naididae (Oligochaeta) Türü, Türkiye

Özet: Materyal Sakarya Nehri'nden Eylül 1995- Ağustos 1998 tarihleri arasında, 79 istasyondan toplanmıştır. 5 cins'e ait toplam 9 Naididae türü (*Ophidonais serpentina* (Müller, 1773), *Stylaria lacustris* Lamarck, 1816, *Nais pardalis* Piguët, 1906, *Nais variabilis* Piguët, 1906, *Pristinella jenkinsae* (Stephenson, 1931), *Pristina foreli* (Piguët, 1906), *P. longiseta longiseta* Ehrenberg, 1824, *P. proboscidea* Beddard, 1896 and *P. aquiseta* Bourne, 1891) Sakarya Nehri'nden ilk defa saptanmıştır.

Anahtar Sözcükler: Oligochaeta, Naididae, yeni kayıt, Sakarya Nehri, Türkiye.

Introduction

The family Naididae (Oligochaeta) is one of the most important groups of aquatic Oligochaeta mainly found as true benthos in fresh water. There have been few studies related to Oligochaeta fauna in Turkey. The first study on the freshwater Oligochaeta fauna of Anatolia was performed by Sperber (1). Sperber, *loc. cit.*, identified seven species of Naididae in the material collected in Turkey by Dr K. Linderg (Lund). However, the stations where the samples were collected could not be determined, since they were not indicated clearly. On the other hand, the place names were not given in the original names; for instance the actual names of Afchin, Khodja Ali and Erekli are Afşin, Kocaali and Ereğli respectively. Furthermore, exact localities also have to be given. For instance, the place where *Pristinella jenkinsae* was collected was not defined exactly. Eventually, that study shows that seven species of Naididae are found in

Turkey but the exact locations of the samples are not clear, as mentioned above.

After a long period, two species and two genera belonging to the family Naididae were determined from Gölcük Lake by Geldiay and Tareen (2). After two years, Pop (3) recorded four Naididae species collected in Turkey. He also defined two Enchytraeidae species and three new species of Tubificidae: *Peloscolex arganoi*, *P. boitanii* and *P. coterelli*. Moubayed et al. (4) listed 12 Naididae species from Turkey, and indicated that *Nais pardalis* and *N. communis* are the most widely distributed species but are not very abundant. Later, Martinez-Ansemil and Giani (5) determined eight species of Naididae as cosmopolitan species, *Pristina menoni* as species with a large distribution and *P. proboscidea* as species with southern affinities. Finally, one genus belonging to the family Naididae, *Nais* sp., was found by Kazancı and Girgin (6) in Ankara Stream.

* Based partly on the PhD thesis of Naime P. Arslan, completed in 1998 and supervised by Yalçın Şahin.

The objectives of the present study were to examine the occurrence and distribution of Naididae in Sakarya River.

Materials and Methods

Oligochaetes were collected by dip net and grab samplers from 79 different regions (Figure 1 and Table) of Sakarya River from September 1995 to November 1995. Samples were preserved in 4% formalin in the field, returned to the lab, sorted out and transferred to 70% ethyl alcohol. Specimens were prepared for study by dehydrating through 70%, 80%, 90%, 95% and absolute ethyl alcohol and mounting in polyvinyl lactophenol.

Setal measurements were obtained with an ocular micrometer. All figures were drawn by means of a camera lucida.

The sampling stations are shown in Figure 1. The number of samples and determined species at each station in Sakarya River are given in the Table. The distribution of the species is marked on the map (Figure 2).

All samples were stored in the Biology Department, Osmangazi University, Turkey.

Results and Discussion

A total of 706 Naididae samples were examined and nine species from five different genera were determined. The morphological characteristics of the species as well as their worldwide distributions are as follows:

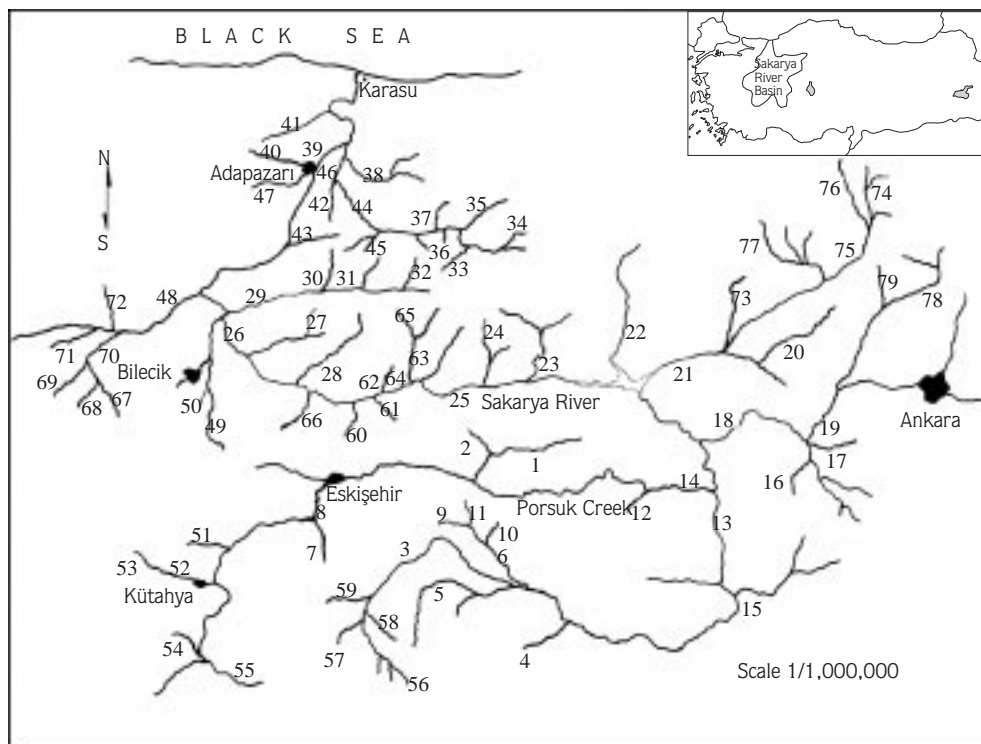


Figure 1. Geographical situation of the Sakarya River Basin and corresponding sample stations. C.: Creek, R.: River, S.: Stream.
 1- Başören C., 2-Osmaniye C., 3- Seydi C., 4- Sakarbaşı, 5- Bardakçı C., 6- Sarısu C., 7- Porsuk C., 8- Yukarı Çağlan, 9- Akyurt C., 10- Şerefiye C., 11- Sarısu, 12- Pünek C., 13- Sakarya R., 14- Porsuk C., 15- Ilıcaözü C., 16- Babayakup C., 17- Ankara S., 18- Ankara S., 19- Ova C., 20- Ayaş C., 21- Kirmir C., 22- Aladağ C., 23-Nallı C., 24- Kızıl C., 25- Çolak C., 26- Sakarya R., 27- Akçay C., 28- Akçay C., 29- Göynük C., 30- Güllük C., 31- Çubuk C., 32- Akçaalan C., 33- Mudurnu C., 34- Dedeler C., 35- Tütünlük C., 36- Araplar C., 37- Hanyatak C., 38- Dinsiz C., 39- Sakarya R., 40- Çark C., 41- Acielmalık C., 42- Kayalar C., 43- Şükriye C., 44- Kanlıçay C., 45- Ketenli C., 46- Göcek C., 47- Akçay C., 48- Göksu C., 49- Karasu C., 50- Sorgun C., 51- Sobran C., 52- Akse C., 53- Enne C., 54- Gelinkaya C., 55- Alibeyköy C., 56- Özsuu C., 57- Akın C., 58- Kayır C., 59- Seydi C., 60- Çaltı C., 61- Karağaç C., 62- Akçasu C., 63- Çatak C., 64- Sakarya R., 65-Sarıcalar C., 66- Akardere, 67- Aksu C., 68- Akçasu C., 69- Akhisar C., 70- Kocasu C., 71- Çeltikçi C., 72- Göksu C., 73- Süvari C., 74- Belen C., 75- Kocaçay, 76- Bulak C., 77- Peçenek C., 78- Koca C., 79- Ova C.: Creek, R.: River, S.: Stream.

Table. Number of samples and determined Naididae species in Sakarya River (Stations 12, 15 and 32 were not indicated in the Table because samples new for Sakarya River Fauna were not found).

S.n.	Os	Sl	Np	Nv	Pj	Pp	Pa	Pf	Pl	Coordinate		Date
										Altitude	Latitude	
1					3					39° 53	31° 06	01.09.1995
2			10		3					30° 53	39° 52	01.09.1995
3	5		2							30° 50	39° 22	02.09.1995
4		4								31° 03	39° 21	02.09.1995
5	3		2							31° 12	39° 29	03.09.1995
7		10						1		31° 07	39° 38	16.09.1995
8	4									30° 18	39° 44	16.09.1995
9			3		2	1				30° 28	39° 23	17.09.1995
10	8	5	5					1		31° 01	39° 39	17.09.1995
11			5					1		31° 03	39° 32	17.09.1995
13			2		5					30° 50	39° 40	08.09.1995
14	8		15							31° 59	39° 42	08.09.1995
16			1		3					31° 56	39° 44	09.09.1995
17					2					39° 52	39° 52	09.09.1995
18			6							32° 05	39° 53	10.09.1995
19				1						32° 32	40° 02	10.09.1995
20			5							32° 23	40° 09	11.09.1995
21			14		3					31° 57	40° 07	11.09.1995
22	4		2							31° 42	40° 17	12.09.1995
23			2		3					31° 21	40° 15	12.09.1995
24			1		2					30° 46	40° 06	13.09.1995
25			3							30° 46	40° 06	13.09.1995
26	3									30° 04	40° 16	22.09.1995
27	3		4							30° 18	40° 17	22.09.1995
28					2					30° 33	40° 18	23.09.1995
29					2					30° 32	40° 18	23.09.1995
30			5		2					30° 42	40° 29	30.09.1995
31			1		6					30° 51	40° 30	24.09.1995
33	6		2							31° 04	40° 29	25.09.1995
34					7					31° 22	40° 31	25.09.1995
35			2		3					30° 58	40° 44	29.09.1995
36	5									30° 48	40° 31	30.09.1995
37	2		1	2	4					30° 37	40° 31	30.09.1995
38			4			2				30° 45	40° 45	30.09.1995
39			4		3					30° 28	40° 50	01.10.1995
40			5							30° 19	40° 48	01.10.1995
41					5					30° 20	40° 54	02.10.1995
42			2		10					30° 29	40° 43	02.10.1995

Table (continued)

43			2		5		2	1		30° 20	40° 40	03.10.1995
44			6		4				4	30° 30	40° 34	03.10.1995
45				4	6					30° 36	40° 37	04.10.1995
46	5		8						5	30° 34	40° 43	04.10.1995
47			10	2						30° 10	40° 53	05.10.1995
48		6	3		2					29° 56	40° 22	05.10.1995
49	4		4		5		3	1		29° 59	40° 05	06.10.1995
50	5		10		2					29° 49	40° 02	06.10.1995
51	4		10		7				1	29° 57	39° 44	19.10.1995
52		5	8							29° 50	39° 28	19.10.1995
53	4				2					29° 39	39° 32	20.10.1995
54			2		5					29° 52	39° 22	20.10.1995
55			3		2					30° 07	39° 06	20.10.1995
56			2		4					30° 40	39° 08	21.10.1995
57	5	10								30° 24	39° 20	21.10.1995
58	6	8	2		2					30° 37	39° 12	22.10.1995
59	5	12	2		2					30° 45	39° 30	22.10.1995
60				1	5	1				30° 15	40° 03	27.10.1995
61	2	3	2		3					30° 27	40° 04	27.10.1995
62			6	1						30° 41	40° 10	28.10.1995
63	2	5	2	1	2					30° 48	40° 13	28.10.1995
64	3		3		3					30° 52	40° 03	28.10.1995
65			2						1	30° 42	40° 18	29.10.1995
66	2		8	5	2					30° 07	40° 12	29.10.1995
67		5	4		2					29° 45	39° 55	21.11.1995
68			5		5					29° 31	40° 03	03.11.1995
69			6		10			2		29° 27	40° 07	03.11.1995
70	2	8	5							29° 30	40° 09	04.11.1995
71		5	10							29° 32	40° 16	04.11.1995
72		20	5		4			1		29° 37	40° 19	05.11.1995
73			4		2					32° 05	40° 16	14.11.1995
74	2		3							32° 37	40° 30	15.11.1995
75			2		3					32° 37	40° 35	15.11.1995
76			3	1	2					32° 35	40° 36	16.11.1995
77			15	2	2					32° 15	40° 25	17.11.1995
78			10	1	2					32° 52	40° 17	18.11.1995
79			5	2	2					32° 43	40° 14	18.11.1995
T.	102	106	280	23	167	4	5	8	11			

S.n.: Station number; Os: *Ophidonais serpentina*; Sl: *Stylaria lacustris*; Np: *Nais pardalis*; Nv: *Nais variabilis*; Pj: *Pristinella jenkiniae*; Pp: *Pristina proboscidea*; Pa: *Pristina aequisetia*; Pf: *Pristina foreli*; Pl: *Pristina longiseta longiseta*; T: Total.

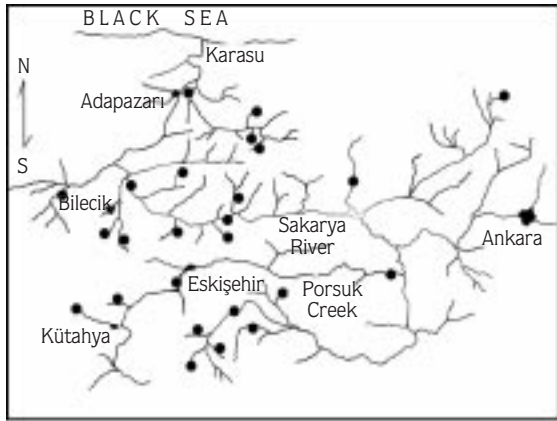


Figure 2a. Distribution of *O. serpentina*

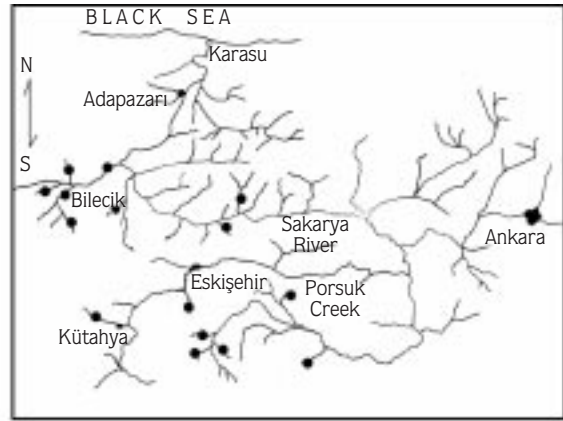


Figure 2b. Distribution of *S. lacustris*

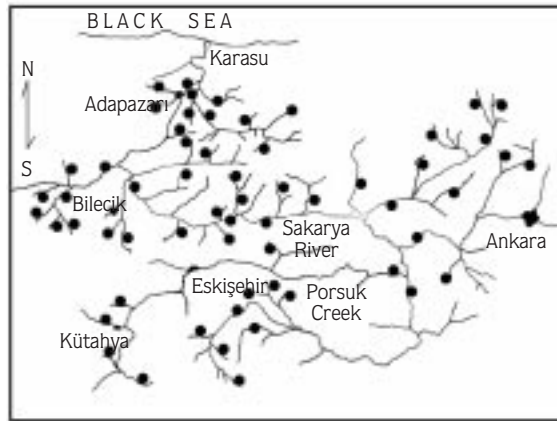


Figure 2c. Distribution of *N. pardalis*

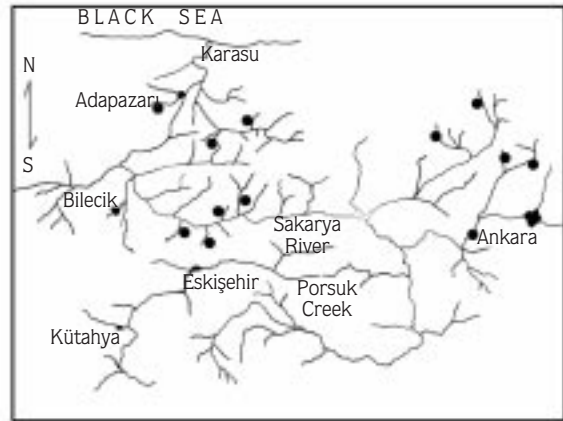


Figure 2d. Distribution of *N. variabilis*

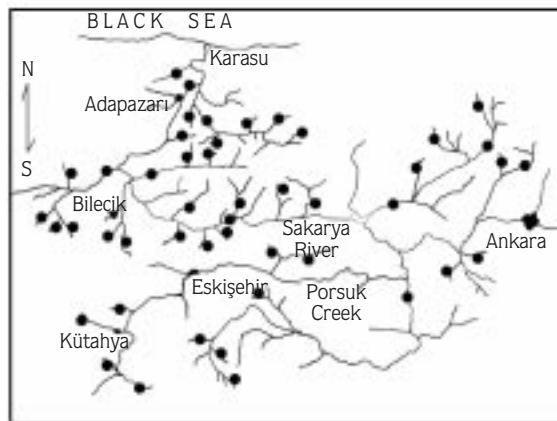


Figure 2e. Distribution of *P. jenkinae*

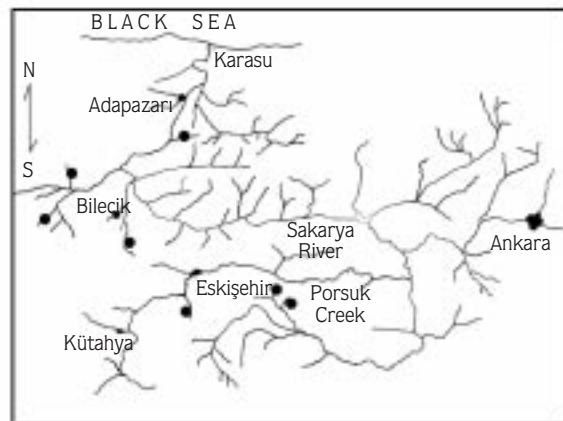


Figure 2f. Distribution of *P. foreli*

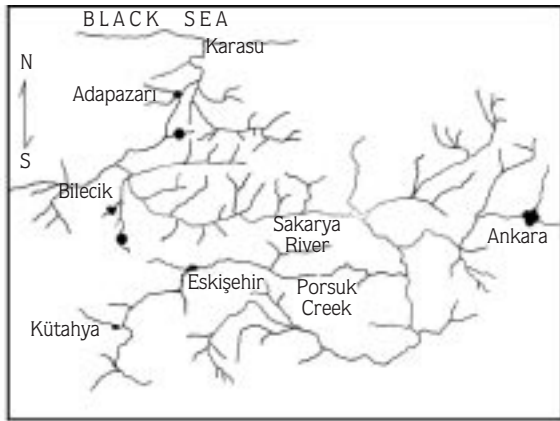


Figure 2g. Distribution of *P. aequisetata*

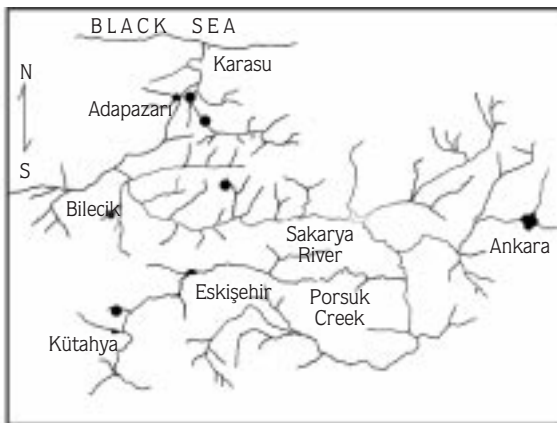


Figure 2h. Distribution of *P. longiseta longiseta*

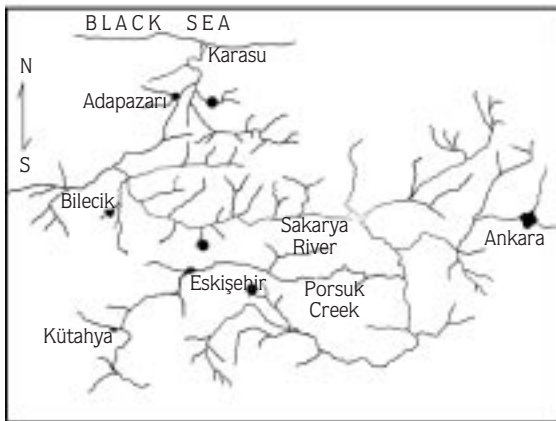


Figure 2i. Distribution of *P. proboscidea*

Figure 2. The distribution of the Naididae species in Sakarya River Basin.

Abbreviations: The following abbreviations are used in the text: *l(p)* = body length (preserved), *d(p)* = diameter (preserved), *s* = number of segments, Roman numeral = segmental number.

Family: Naididae

Subfamily: Naidinae

Genus: *Ophidonais* Gervais, 1838

Ophidonais serpentina (Müller, 1773)

l(p): 2.2-8.2 mm; *d(p)*: 0.3-0.4 mm; *s*: 30-70. Most specimens have no eyes. If present, they are rectangular. Prostomium is short and conical. The body has thin covering foreign particles and sensory papillae. Dorsal setal bundle beginning in VI: one seta per bundle, 130-155 µm long, with distal nodulus, very stout, with blunt and double pointed distal end (Figure 3a) and all bundles unisetal. Generally, in anterior segments the dorsal setae are lacking (in five samples entirely) or at various places along the body. Ventral setae in anterior segments 4-6, with median nodulus, with upper tooth longer than lower. Ventral setae are in II, longer (150-165 µm) than the rest (Figure 3b). Number of ventral setae decreasing to posterior segments, 3-4, 120-130 µm, with approximately equal teeth, the distal tooth thinner, with distal nodulus (Figure 3c) and setae in posterior segments slightly thicker than the anterior.

Ohtaka (7) and Sperber (1) described the length of setae in Japanese and Turkish specimens respectively as follows: the ventral setae 180-208 µm long in II, in the rest 152-180 µm, the dorsal setae 140-172 µm. Sperber (1) indicated the length of dorsal setae as approximately 125 µm in the material collected in Turkey by Dr K. Lindberg. In comparison, the ventral setae in the present specimens are shorter than those of the samples of Ohtaka (8), dorsal setae longer than those identified by Sperber (1). In addition, the measurements of dorsal setae shorter than the lower end of the range reported by Sperber and Ohtaka.

Material examined: One hundred and two specimens were collected from 25 stations (Table) among aquatic plants (especially thick vegetation) and from mud substratum.

Previous record from Turkey: Afchin (1). As we indicated before, the original name of Afchin is Afşin.

Distribution in Sakarya River Basin: See Figure 2a.

World Distribution: Europe, North and South America, Siberia and Turkey (8).

Genus: *Stylaria* Lamarck, 1816

Stylaria lacustris (Linnaeus, 1767)

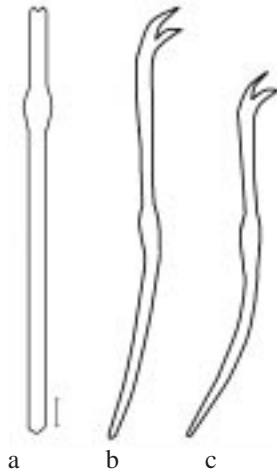


Figure 3. *Ophidonais serpentina*, a- dorsal setae, b- ventral setae in II, c- posterior ventral setae. Scale: 10 μ m.

l (p): 3.2- 5 mm + proboscis; d (p): 0.4-0.5 mm; s: 22-40. Proboscis is projecting from a notch between two lateral lobes (Figure 4a). The preserved specimens lack eyes. The proboscis 360-1150 μ m long. Dorsal setal bundle beginning in VI consisting of 1(2) finely serrated hair(s), 250-325 μ m and 1(2) simple pointed and lacking a nodulus needle(s), 85-95 μ m. Ventral bundles composed of 4-6 setae in which distal tooth is longer than the proximal (Figure 4b), 150-165 μ m long, all alike, with a proximal nodulus, distal portion of setae straight, proximal portion angularly bent.

Moubayed and Martinez (4) reported *Stylaria lacustris* from Tigris without mentioning the length of the setae. The hair setae are shorter than those of the Swedish samples of Sperber (9) but longer than those given by Davis (10). The needle setae are approximate in size to the published range.

Most records are from lentic waters, and also from brackish waters. Dumnicka (11) reported the species in great numbers from the clean water reaches of a lowland river with a muddy bottom partially overgrown by macrophytes and classified it as phytophilous. Davis (10) reported *Stylaria lacustris* from gravel riffles of a clean water stream with moderately dense macrophytes and filamentous algae. Timm (12) found the species in brackish water with salinity less than 7‰, also in open water and even in the profundal. Our samples were collected from various fresh waters, especially in the vegetation zone, and were also found on sandy substrates.

Material examined: One hundred and six specimens were collected from 14 stations (Table), among aquatic plants and sandy substratum.

Previous record from Turkey: Diyarbakır-Tigris (4).

Distribution in Sakarya River Basin: See Figure 2b.

World Distribution: Europe, West Asia, North America, found in brackish water also (the Baltic) (8).

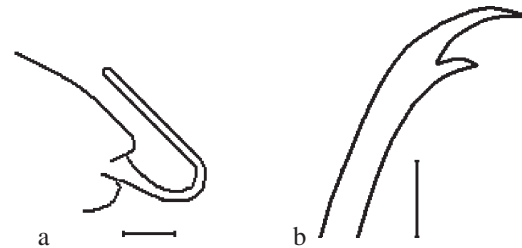


Figure 4. *Stylaria lacustris*, a- Anterior end of body, b- distal end of ventral setae in II. Scales: a- 0.2 mm; b- 10 μ m.

Genus: *Nais* Müller, 1773

Nais pardalis Piguët, 1906

l(p): 1.7-2.5 mm; d(p): 0.2-0.3 mm; s: 19-30. Most specimens have eyes. Worms are yellow or dark yellow. Ventral setae of II-V are composed of 3-4 setae, 110-135 μ m, with distal tooth 1.5-2 times longer than proximal and median nodulus (Figures 5a-b). Posterior ventrals 2-3, 72-90 μ m, with a distal nodulus, of two types: 1. normal setae with equal tooth or distal tooth slightly longer than lower and 2. thickened setae, with distal tooth 2-2.5 times longer than proximal, 70-90 μ m long and 3-4.5 μ m thick (Figure 5c). Dorsal setae beginning in segment VI: 1(2) hair, 120-255 μ m and length of dorsal setae decreasing to posterior segments; 1(2) needles 40-70 μ m long with a distal nodulus, 2 fine, obscure parallel and equal teeth (Figure 5d).

Nais pardalis was reported from Sivas by Sperber (1), and he described the length of setae (without mentioning hairs and needle) as follows: the ventral setae 2 μ m thick, 95-100 μ m long, the range of tooth 9: 5 μ m in II-IV; in segment VI thickened setae, 3.5-4 μ m thick, 65-80 μ m long. In comparison, although the thickness and range of teeth ventral setae are similar, ventral setae in II-V in the present specimens are longer than the higher end of the range given by Sperber (1). However, the range of teeth and thickness of posterior ventral setae closely agree with

Sperber's description, posterior ventral setae in Sakarya River samples are shorter. Hair and needle setae could not be compared because they were not given by Sperber.

Material examined: Two hundred and eighty specimens were collected from mud, muddy-sand, gravel substratum and also among aquatic plants.

Previous record from Turkey: Sivas (1).

Distribution in Sakarya River Basin: See Figure 2c.

World Distribution: Europe, Asia, North and South America (8).

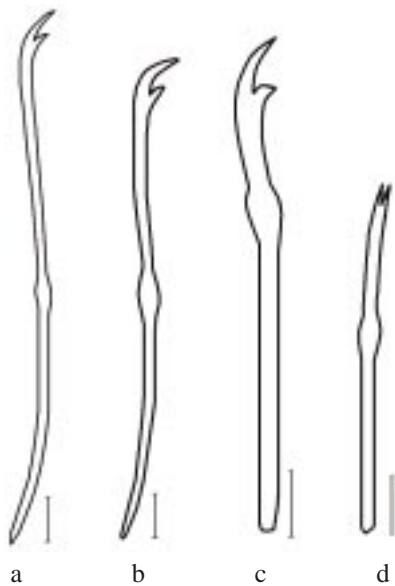


Figure 5. *Nais pardalis*, a- ventral setae in II, b- ventral setae in III, c- ventral setae in VI, d- needle setae. Scale: 10 μ m.

***Nais variabilis* Piguet, 1906**

l(p): 2.5-2.9 mm; d(p): 0.2-0.3mm; s: 22-32. All samples are with eyes. Ventral setae are 4-5 per bundle with those of II-V (Figures 6a-b) longer, straighter and thinner than those which follow, and with a median nodulus. Dorsal setae beginning in VI. Hairs and needles 1-2 per bundle, needles (Figure 6c) with a distal nodulus and short teeth, 65-70 μ m long. Penial setae in segment VI, 3 per bundle, 120 μ m long. Mature sample was found in September. Stomach widens abruptly.

It is known that *Nais variabilis* is excessively variable morphologically. Harman *et al.* (13) identified two distinctive morphs (larger and smaller specimens) from

Texas. According to Harman *et al.* (13), the range of setae length of larger specimens, anterior ventral setae 124-139 μ m, posterior ventral setae 92-118 μ m, hairs up to 330 μ m and needle setae 70-98 μ m; in smaller specimens, 80-99 μ m, 60-75 μ m, 100-121 μ m, and 40-59 μ m respectively. *Nais variabilis* samples, identified by Davis (10), supported that theory. However, our *Nais variabilis* samples are not excessively variable morphologically. *Nais variabilis* samples collected from Sakarya River are characterized by hairs 1(2), up to 315 μ m and 175 μ m in posterior; needles, 1(2), 65-70 μ m; ventrals 4-5, in II-V 85-92 μ m; posterior ventrals 70-80 μ m (Figure 6b). Timm (12) reported mature *Nais variabilis* samples from June until August. In the present study a mature sample was found in September.

This species was reported to inhabit sewage filter beds, ponds, lakes and streams; it was also found in brackish water by Davis (10). In addition, it was reported to occur in abundance in stony bottomed, organically enriched streams by Learner *et al.* (14). Our samples were found at 12 stations, sandy-mud substratum and among vegetation.

Previous record from Turkey: Ayva bay (from a cave), Urfa (from a cold cave) (1).

Material examined: One mature and 22 non-mature samples were collected from the vegetation zone and mud-sandy sediment from 12 stations (Table).

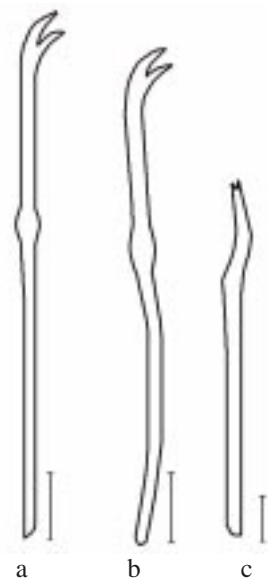


Figure 6. *Nais variabilis*, a- ventral setae in II, b- posterior ventral setae, c- needle setae. Scale: 10 μ m.

Distribution in Sakarya River Basin: See Figure 2d.

World Distribution: Cosmopolitan (8).

Subfamily: *Pristininae* Lastockin, 1924

Genus: *Pristinella*

Pristinella jenkiniae (Stephenson, 1931)

l(p): 1.5-2.2 mm; d(p): 0.2 mm; s: 24-31. Eyes absent. Prostomium is triangular. Dorsal setae with 1(2) non-serrated hair, 130-160 µm long and 1(2) needle setae, 52-80 µm, with distal nodulus, curved distally, bifid and with teeth long and parallel (Figure 7a). Proximal tooth of needle setae is thicker, longer than distal one. Proximal teeth are 7-9 µm long, distal teeth 5-7 µm. Ventrals with equally long teeth, 4-5 in anterior segment, 2-3 posteriorly per bundle, 45-60 µm long, with a distal nodulus (Figures 7b-c). Ventral setae are usually uniform in shape but in some samples anterior ventral segment setae and their teeth slightly finer than behind.

Sperber (1) described *Pristinella jenkiniae* from Turkey as follows: the ventral setae about 50 µm long, hair setae 1-2, 140-170 µm and non-serrated, needle setae 1-2, 50 µm, 2 µm thick and proximal teeth 8-10 µm long. In comparison, the ventral and needle setae in the present samples are longer than those in Sperber's samples.

Pristinella jenkiniae was collected from a wide range of current velocities and within a wide temperature range by Pascar-Gluzman and Dimentman (15), who reported euryoecic and eurythermal species. Our samples were collected from muddy, sandy, gravel substratum and among thick vegetation. In addition, *P. jenkiniae* is the second most widely distributed species in Sakarya River. This fact can be explained by the euryoecic and eurythermal character of *P. jenkiniae* as Pascar-Gluzman and Dimentman (15) reported.

Material examined: One hundred and sixty-seven specimens were collected from 47 different freshwater bodies (Table).

Previous record from Turkey: Erekli, Khodja Ali (1). As we indicated before, the original names of Erekli and Khodja Ali are Ereğli and Kocaali.

Distribution in Sakarya River Basin: See Figure 2e.

World Distribution: Europe, South and North America, Africa and Asia (8).



Figure 7. *Pristinella jenkiniae*. a- anterior ventral setae, b- posterior ventral setae, c- needle setae. Scales: a, b- 5 µm; c- 10 µm.

Genus: *Pristina* Ehrenberg, 1828

Pristina foreli (Piguet, 1906)

l(p): 2-2.5 mm; d(p): 0.2 mm; s: 20-23. Prostomium has proboscis (Figure 8a). Eyes absent. Dorsal setae beginning in II, 1-2 hair setae and 1-2 needle setae per bundle. Ventral setae 3-5 per bundle, 60-65 µm long and with proximal nodulus in II (Figure 8b) in others 55-60 µm long and distal nodulus. In II-VII upper tooth longer than lower, in VIII upper tooth slightly longer, behind VIII equally long. Hair setae finely serrated, 120-160 µm long; needle setae finely bifid, without nodulus and 40-50 µm long (Figure 8c).

Material examined: Eight samples were identified from seven stations (Table).

Previous records from Turkey: Erekli and Insirti (1), and it was reported from Anatolia without mentioning its exact locality (3).

Distribution in Sakarya River Basin: See Figure 2f.

World Distribution: Europe, Turkestan, Japan and Africa (8).

Pristina aequisetata Bourne, 1891

l(p): 1.5-2 mm; d(p): 0.17-0.25 mm; s: 19-23. Prostomium forms a proboscis (Figure 9a), 55-80 µm long. Dorsal setae beginning in II, 1(2) hair setae and 1-

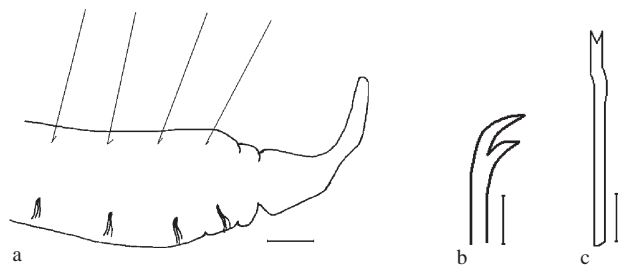


Figure 8. *Pristina foreli*. a- anterior end of the body, b- distal end of ventral setae in segment II, c- needle setae. Scales: a- 0.5 mm; b- 5 μ m; c- 10 μ m.

2 needle setae per bundle. Hair setae are finely serrated, in II 95-135 μ m long the rest up to 200 μ m, the longest hairs are in mid-body. Needle setae 35-42 μ m long, bifid and with fine teeth, without a nodulus and slightly curved distally. Ventral setae are 4-7 per bundle. In most samples ventral setae 6-7 per bundle in II, 50-55 μ m long, with proximal nodulus and upper tooth longer than lower (Figure 9b); in others (except V) 45-50 μ m long, teeth of about equal length and distal nodulus (Figure 9c). The enlargement of the ventrals in V, 3-4 per bundle, 55-62 μ m long, upper tooth twice as long as lower (Figure 9d), much thicker than the rest, with distal nodulus and proximal tooth of the enlargement setae is not reduced. All measurements are within the published range, except for the minimal length of hairs.

During the research period, *P. aequisetata* samples were found at only two stations, in small and shallow fresh water from sandy, sandy-gravel substrates. Harman et al. (13) indicated that *P. aequisetata* has a rather widespread but spotty distribution. Our *P. aequisetata* samples were not widespread, but had a spotty distribution as Harman et al. (13) mentioned.

Material examined: Five samples were identified from two stations (Table).

Previous record from Turkey: According to compiled knowledge from several sources, *Pristina aequisetata* f. *foreli* and *P. aequisetata* f. *aequisetata* were listed from Turkey by Moubayed et al. (4).

Distribution in Sakarya River Basin: See Figure 2g.

World Distribution: Cosmopolitan. Also in oligohaline water (8).

Pristina longiseta longiseta Ehrenberg, 1824

l(p): 1-2 mm; d(p): 0.1-0.2 mm; s: 19-23. Eyes absent. Prostomium with a proboscis (Figure 10a) and

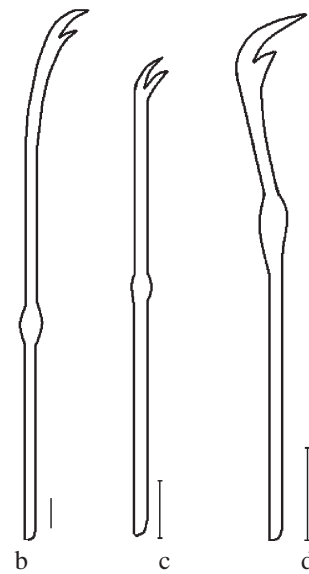
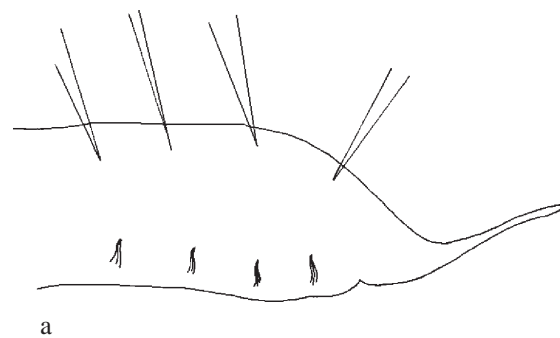


Figure 9. *Pristina aequisetata*. a- anterior end of the body, b-ventral setae in II, c- posterior ventral setae, d- enlargement setae in V. Scales: a- 0.5 mm; b, c- 5 μ m; d- 10 μ m.

worms are pale white. Dorsal setae beginning in II, 2-3 hair setae and 1-2 needle setae per bundle. Hair setae serrated. Hair setae extremely elongate in segment III, non-serrated and up to 590 μ m long, in others serrated, 170-190 μ m. Needle setae simple pointed, 45-60 μ m long. Ventral setae are 4-7 per bundle. Ventrals of II 5-7, 70-76 μ m long (Figure 10b), usually longer than those of III, with proximal nodulus, in others 60-65 μ m long and about median or slightly proximal nodulus, upper tooth longer in II and III, in others about equal to lower.

Naidu and Naidu (16) described the length of setae of *P. longiseta longiseta* and Rodriguez (17) examined differences in the anterior ventral setae between *P. longiseta longiseta*, European subspecies, and *P. leidyi*, American taxon. She observed less difference between ventral setae II and III. Our findings and measurements are within the published range.

P. longiseta longiseta samples were collected from sandy substratum and among aquatic plants.

Material examined: Eleven specimens were described from four stations (Table).

Previous record from Turkey: It was reported from Turkey without mentioning the exact locality by Pop (3).

Distribution in Sakarya River Basin: See Figure 2h.

World Distribution: Europe, Asia, Africa and Australia (8).

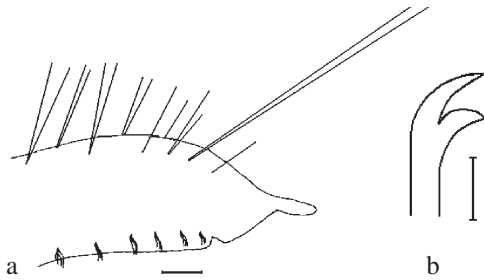


Figure 10. *Pristina longiseta longiseta*, a- anterior end of the body, b- distal end of ventral setae. Scales: a- 0,2 mm; b- 10 μ m.

Pristina proboscidea Beddard, 1896

l(p): 1.5-21 mm; d(p): 0.2 mm; s: 18-30. Eyes absent. Prostomium forms a proboscis (Figure 11a). Dorsal setae from II, composed of 3-4 conspicuous serrated hair setae, 200-375 μ m long and 1-2 fine, simple pointed needle setae, 50-55 μ m long and without nodulus. Ventral setae 4-8 per bundle, all uniform, with upper tooth longer than lower, in II 4 and 75-80 μ m long (Figure 11b), between III and IV 5-7 (remainder 6-7) and 65-70 μ m long. Ventral setae in posterior segment 42-55 μ m long (Figure 11c).

Pop (3) described the length of setae in Turkish specimens as follows: anterior ventrals 3-4, in II 57 μ m long, in the mid-body 4-6, 48-52 μ m, posterior ventrals 4-5, 44 μ m long. Hair setae are 130-350 μ m, needle setae 44-52 μ m long. Although the form and length of setae in the Sakarya River samples closely agree with Pop's description, the number and length of ventral setae (especially in segment II) in the present samples are greater. In addition, the number of ventral setae in posterior segment is not as high as 9. The hairs and needle setae shorter than published range.

Samples were collected from sandy, gravel substratum and among aquatic plants.

Material examined: Four samples were described from three stations (Table).

Previous record from Turkey: Yatağan, Muğla (3).

Distribution in Sakarya River Basin: See Figure 2i.

World Distribution: South America, Zanzibar, South and East Asia and Australia (8).

In previous studies, 14 Naididae species were reported from Anatolia (1-4). In this study nine species from five genera were determined. These nine species of Naididae are already known from Anatolia but were never reported from Sakarya River. Among these species *Nais pardalis*, *Pristinella jenkiniae* and *Ophidonais serpentina* have a wide distribution in Sakarya River.

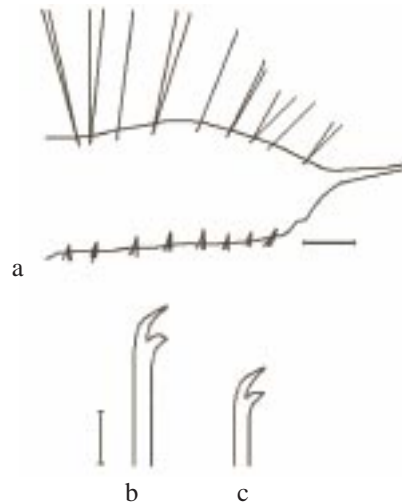


Figure 11. *Pristina proboscidea*, a- anterior end of the body, b- distal end of ventral setae in II, c- distal end of posterior ventral setae. Scales: a- 0,2 mm; b,c- 5 μ m.

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