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Two first records (*Pristina (Pristina) synclites* Stephenson, 1925 and *Bratislavia palmeni* (Munsterhjelm, 1905) for the freshwater Oligochaeta fauna of Türkiye

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Abstract

In this study, two species belonging Oligochaeta were reported as first records in Turkish freshwater ecosystems. *Pristina (Pristina) synclites* Stephenson, 1925 (Pristinide) and rare *Bratislavia palmeni* (Munsterhjelm, 1905) (Naididae), collected from Hemşin Stream (Rize-Pazar; part of the lower Yeşilırmak River System) and Lake Çıldır respectively, are first records for the Turkish Oligochaeta fauna. In addition, the genus *Bratislavia* was also reported for the first time in the Anatolian fauna. Thus, it was contributed to biological richness of Turkish freshwater fauna. In Türkiye, 150 freshwater Oligochaeta species have been reported until today. With this study, this number increased to 152.

Key words: Oligochaeta, Naididae, Pristinidae, first record, Türkiye

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Türkiye'nin sucul Oligochaeta faunası için yeni iki kayıt (*Pristina (Pristina) synclites* Stephenson, 1925 ve *Bratislavia pelmeni* (Munsterhjelm, 1905))

Özet

Bu çalışmada, Oligochaeta'ya ait iki tür Türkiye tatlı su ekosistemlerinden ilk kez kaydedildi. Hemşin Deresi'nden (Rize-Pazar; Aşağı Yeşilırmak Nehir Sistemi'nin parçası) toplanan *Pristina (Pristina) synclites* Stephenson, 1925 ve Çıldır Gölü'nden toplanan nadir *Bratislavia palmeni* (Munsterhjelm, 1905) Türkiye Oligochaeta faunası için ilk kayıtlardır. Ayrıca, *Bratislavia* cinsi de Anadolu faunası için ilk kayıt niteliğindedir. Böylelikle, Türkiye tatlı su faunasının biyolojik zenginliğine katkı sağlandı. Bugüne kadar Türkiye'den 150 Oligochaeta türü kaydı verilmiş, çalışmamızdaki ilk kayıtlarla bu sayı 152'ye yükselmiştir.

Anahtar kelimeler: Oligochaeta, Naididae, Pristinidae, ilk kayıt, Türkiye

1. Introduction

Oligochaeta is a very important group in benthic macroinvetebrates at aquatic ecosystems. The most diverse and widely distributed annelid group in both terrestrial and aquatic habitats is known as Oligochaeta. Over 5000 valid oligochaete species have been identified to date, 1100 of which are freshwater species. They represent over 30 families, about 23 of which are found in freshwaters. The Oligochaeta can be found in terrestrial, freshwater, marine, and estuarine environments [1]. In Türkiye, up to date 150 Oligochaeta species were recorded from different freshwater habitats [2, 3]. The only country to almost cover three of the 34 global biodiversity hotspots completely is Türkiye (Irano-Anatolian, Caucasus, and Mediterranean). A high biodiversity is supported by their geographic settings, where mountains serve as an isolation barrier for aquatic organisms and by the features of their peninsulas [3, 4]. Although research on Türkiye's aquatic oligochaete fauna has grown over the past 20+ years, it is still unclear how many different oligochaete species there are. To date, the occurrence of *Pristina (Pristina) synclites* Stephenson, 1925 and *Bratislavia palmeni* (Munsterhjelm, 1905) in Türkiye have not been reported. The aim of this study was to contribute to the diversity and distribution of aquatic oligochaetes from inland waters in Türkiye.

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In this paper, data are presented on the first records and the occurrences of *Pristina (Pristina) synclites* (Hemşin Stream) and *Bratislavia palmeni* (Çıldır Lake) in Türkiye. *Pristina (Pristina) synclites* and *Bratislavia palmeni*, which is known as rare species, they are belonging to Oligochaeta which are common and abundant taxon in freshwater ecosystems. Although five species of *Pristina (P. aequiseta* Bourne, 1891, *P. arcaliae* Pop, 1974, *P. foreli* Bourne, 1891, *P. longiseta* Ehrenberg, 1931, *P. proboscidea* Beddard, 1896) have been reported from different aquatic ecosystems of Türkiye before [3], there is no record on *Pristina (Pristina) synclites* in Turkish inland waters and *Bratislavia palmeni* has not been also reported before. Therefore, the species *Pristina (Pristina) synclites* and genus *Bratislavia* are first records and the first findings of these species from Türkiye were presented in this study.

2. Materials and methods

During the TUBİTAK (Scientific and Technological Research Council of Turkey) funded project over two hundred sites in the rivers and lakes were sampled to investigated Naididae fauna of Türkiye. Two of them are Lake Çıldır and Hemşin Stream.

Lake Çıldır is located in northeastern part of Türkiye. It's a large freshwater lake between Kars and Ardahan provinces (Figure 1a). Its surface area is 124 km^2 and it has a maximum depth of around 40 m [5]. Its altitude is 1959 m. In addition, Lake Çıldır has IBA (important bird area) and IPA (important plant area) status due to the fact that it is home to two rare birds. One *Bratislavia palmeni* sample was collected in July 2017 using hand net from littoral section of the Lake Çıldır. Although three stations were sampled, *Bratislavia palmeni* samples was obtained only one station (littoral section of the lake (Figure 1, station 1).

Hemşin Stream (Figure 1b), which has 38.5 km length, rises from Gito plateau and directly run-off to Black Sea [6]. The stream is shallow (0.5 m) and its sediment contained gravel, sandy-mud with submerged vegetation. *Pristina (P.) synclites* samples were collected from among riverbank's macrophytes.

All samples were fixed in 70% ethyl alcohol *in situ*. Oligochaeta samples were retransferred into ethyl alcohol in the laboratory and mounted in glycerin. Samples were identified to species level using the key of Timm (2009) and (Tim & Martin (2019) [7, 8]. All morphological characters of the samples were examined and photographed using Zeiss Primo Star microscope with Axiocam 506 color camera.

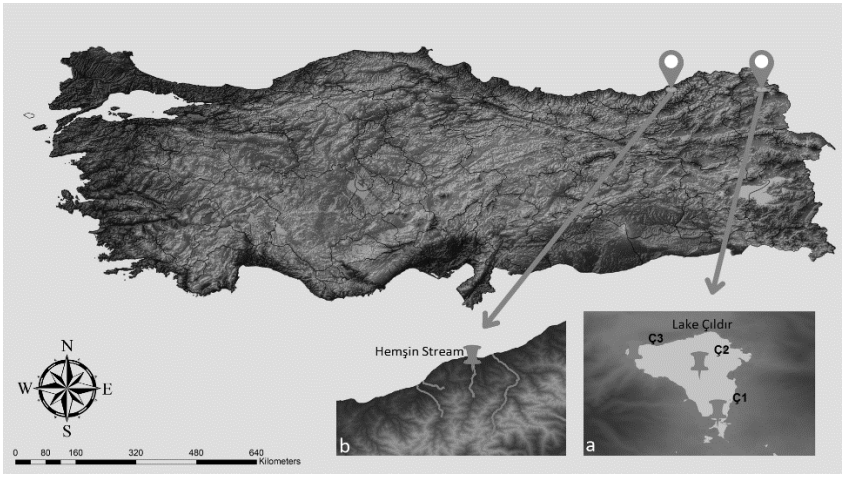

Figure 1. Geographical position of Lake Çıldır and Hemşin Stream in Türkiye, with location of sampling points (this map was modified from Arslan & Mercan (2020) and Alkan et al. (2016) [3, 5])

3. Results

Literature data and the morphological features of the *Pristina (P.) synclites* and *Bratislava palmeni* are given below.

Oligochaeta
Tubificida
Family Naididae
Genus Bratislavia Kosel, 1976
***Bratislavia palmeni* (Munsterhjelm, 1905)**

The genus *Bratislavia* was reported by Kosel [9] and according to the description morphological features of the species is as follows: eye absent, no pigment. Dorsal setae starting in III, dorsal bundles contain 1-2 non serrate hair and 1-3 bifid needles setae with parallel very long teeth and upper is slightly longer. Hair setae 160-320 µm, needles 68-78 µm long. Ventral setae in anterior 4-6 with equally teeth, in mature individuals after clitellum 5-6 setae but in posterior 2-4 setae per bundles.

Material examined and remarks: During the expedition, 3 stations were sampled in Lake Çıldır, but one specimens of *B. palmeni* was obtained from outside littoral section of Lake Çıldır (Figure 1a, station 1) from muddy sediment and among vegetation (depth 0.2 m, no current) on 20 July 2017 (leg. Mercan, D.; det. Arslan, N.). Sample was mounted on a slide and deposited at Hydrobiology laboratory in Eskişehir Osmangazi University.

Small worm, eyeless, 2 mm., segment number 32. Dorsal bundles beginning from III. Each dorsal bundles consist of 1-2 hair setae, 65-150 µm long, and 1-2 needle setae, 50-85 µm long, the upper of two parallel teeth being longer. In ventral bundles 2-4 setae, 45-85 µm long, with teeth of equal length.

According to literature *B. palmeni* reported from littoral zone of the Lake Balbanty [10], in marshes [11], carp pond, a drainage canal and a small pond [9] and flooded meadow with sedges located near the river [12]. Our samples were also collected from outside littoral region of the lake. We can conclude that ecological preference of the species seems to temporary pools. Up to date, the known distribution areas of the *B. palmeni*, who considered as rare, was Russia, Romania, Slovakia and Austria [12].

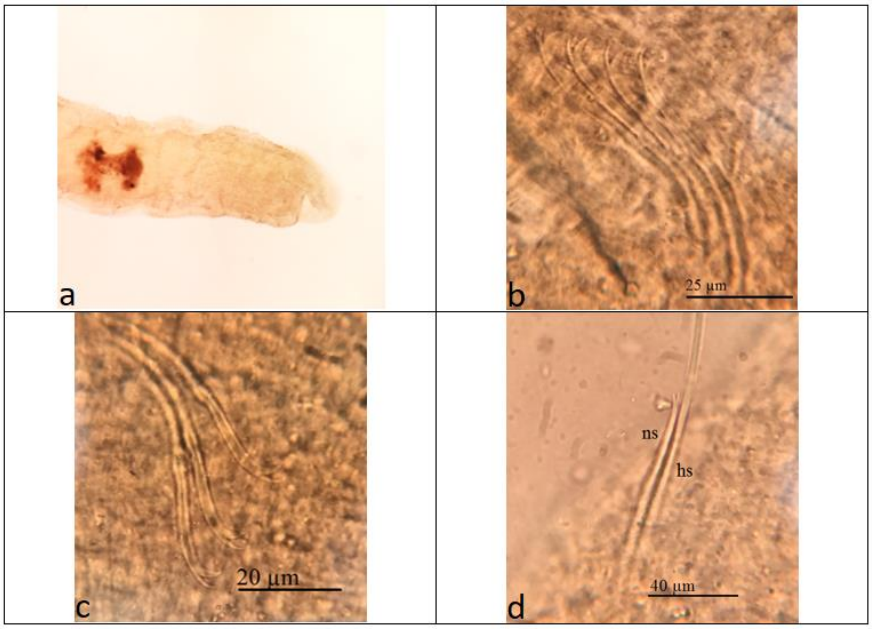

Figure 2. *Bratislavia palmeni*: a- general view proksimal end of body, b-anterior ventral setae, c- ventral setae in midbody, d- hair and needle setae (ns: needle setae, hs: hair setae).

Family Pristinidae

Genus Pristina Ehrenberg, 1828

***Pristina (Pristina) synclites* Stephenson, 1925**

The genus *Pristina*, belonging to the family Pristinidae was described by Ehrenberg [13]. Description of *Pristina (P.) synclites* is as follows: 5-7 mm., segment number 35-61, prostomium forming a short proboscis, hair setae 1-2 per bundle, non-serrated; needlesss 1-2 per bundle, stout, with a weak nodulus and long teeth; ventral setae 4 per bundle in anterior segment, decreasing in number backwards, with teeth equally long; in II-VII nodulus median or slightly proximal, in the following segments distal [14].

Material examined and remarks: There are only two individuals that we could obtained from Hemşin Stream (Rize) on 18 July 2017 (leg. Mercan, D.; det. Arslan, N.). Samples were mounted on a same slide and deposited at Hydrobiology laboratory in Eskişehir Osmangazi University.

Small worms, 3-3,5 mm, prostomium with short proboscis, body has thin, dorsal setae starting from II: 1-2 non serrate hair setae and 1-2 bifid and distinct long teeth needdle setae. In anterior segment hair setae 2, in posterior 1 per bundle and shorter, 180-320 µm long; needle setae 90-205 µm long, with lower tooth slightly longer than the upper. Ventral setae by 3-4 in forebody, approximately median nodulus, with upper tooth longer than lower, 55-70 µm long. Number of ventral setae decreasing to posterior segments (1-2 posteriorly), 45-60 µm long, with approximately equal teeth.

Pristina (P.) synclites were reported from Piumhi River at highest densities accompanied by four euryoc species, *Dero furcatus*, *Dero sawayai*, *Bothrioneurum* sp. and *Limnodrilus hoffmeisteri* [15]; in urban stream with low concentration of dissolved oxygen [16], organically enriched reservoirs [17], pool of zoo-pond among floating macrophytes [18].

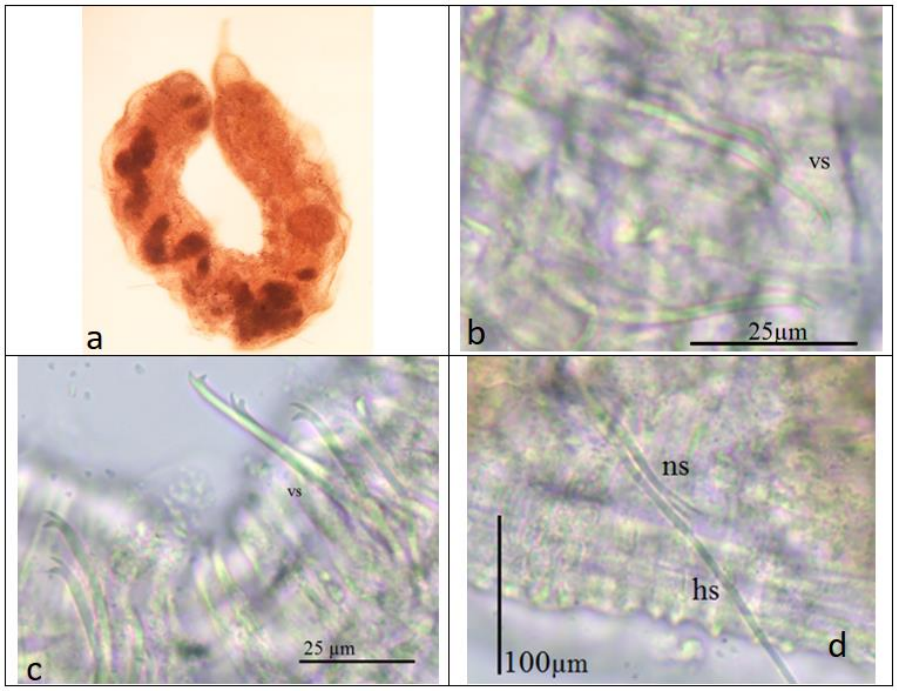

Figure 3. *Pristina (P.) synclites*: a- general view of body, b-anterior ventral setae, c- posterior ventral setae, d- hair and needle setae (vs: ventral setae, ns: needle setae, hs: hair setae)

4. Conclusions and discussion

In this study, *Pristina (Pristina) synclites* and *Bratislavia palmeni* belonging freshwater Oligochaeta were reported as first records for Türkiye fauna. Also, genus *Bratislavia* is reported first time in the Anatolian fauna.
Bratislavia palmeni was collected from Lake Çıldır and only one individual was obtained. Rare *B. palmeni* (Naididae) is first record for the Turkish freshwater Oligochaeta fauna. In addition, the genus *Bratislavia* is also first report for the Anatolian Oligochaeta fauna. Up to date, the known distribution areas of the *B. palmeni*, who considered as rare, was Russia, Romania, Slovakia and Austria [12]. With the present study, it can be concluded that the species has a wider distribution area than known. The regions where the species has been recorded to date are usually temporarily dry water ecosystems [9, 10, 11, 12]. As it is explained in parts of material examined and remarks, *B. palmeni* specimen was obtained from outside littoral section of lake from muddy sediment and among vegetation. In a recent study from Austria about the species, it was collected from flooded meadow with sedges located (0.15-0.2 m) [12]. In line with the results obtained from this study and the literature, it can be concluded that *B. palmeni* prefers shallow, rich in aquatic plants and stagnant aquatic ecosystems. This situation shows us that regions that are temporarily under water and dry out sometimes may also be habitats for different macroinvertebrate individuals and these regions should be taken into consideration more while sampling in river and lake surveys.

Pristina (Pristina) synclites (Pristinide) specimens were collected from Hemşin Stream (Rize-Pazar; part of the lower Yeşilırmak River System). This species is also first record for the Turkish freshwater Oligochaeta fauna. Up to now, five species of the genus *Pristina (P. aequiseta, P. arcaliae, P. foreli, P. longiseta* and *P. proboscidea*) have been recorded from Basins of Sakarya, Kuzey Ege, Susurluk, Dicle-Fırat, Meriç Ergene, Burdur, Ceyhan in Türkiye. Only two individuals were obtained from Hemşin Stream located in Doğu Karadeniz Basin with this study. According to literature *Pristina (P.) synclites* is generally abundant in polluted aquatic systems where other zoobenthic specimens are present in low densities, and extreme habitat such as zoo-pond owing to its high tolerance as indicated by Bode et al. [19].

In Türkiye, the first record of *Pristina* genus was reported by Sperber and 7 naidin species were recorded for first time in the country [20]. Sperber, loc. cit., identified seven species of Naididae (*Nais pardalis* Piguet, 1906, *Nais variabilis* Piguet, 1906, *Ophidonais serpentina* (Müller, 1773), *Pristina foreli* Bourne, 1891, *Pristinella jenkinae* (Stephenson, 1931), *Pristinella menoni* (Aiyer, 1930), *Vejdovskyella intermedia* (Bretscher,1896)) in the material collected from Turkey by Dr. K. Linderg (Lund). However it is reported that the stations where the samples were collected could not be determined, since Sperber and Dr. K. Linderg were not indicated clearly [21]. After a long period, Pop [22] recorded four *Pristina* species (*Pristina arcaliae* Pop, 1974, *Pristina foreli* Bourne, 1891, *Pristina longiseta* Ehrenberg, 1931, *Pristina proboscidea* Beddard, 1896) collected in Bozova and Antalya, no locality, no locality and Muğla, respectively. Since 1949, several Turkish scientists have contributed to the knowledge of the naidids of Turkey.

In Türkiye, 150 freshwater Oligochaeta species have been reported until today [3]. With this study, this number increased to 152. Türkiye is home to many disconnected rivers and lakes that are separated from one another by mountains. Surveys of Türkiye newly discovered and understudied aquatic habitats will undoubtedly yield new distributional records and new species to science. As a result, it is recommended to continue to carry out similar studies to determine the biodiversity of our country.

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References

[1] Martin, P., Martinez-Ansemil, E., Pinder, A., Timm, T. And Wetzel, M. J. (2008). Global diversity of oligochaetous clitellates (‘‘Oligochaeta”Clitellata) in freshwater. Hydrobiologia, 595, 117-127.

[2] Arslan, N., Ulukütük, S., & Mercan, D. (2018). Assessment of water quality in three sub-basins of Susurluk River (Northwest Anatolia) according to invertebrates and biotic indices. *Biological Diversity and Conservation*, 11(3), 1-8.

[3] Arslan, N., & Mercan, D. (2020). The Aquatic Oligochaete Fauna of Lake Çıldır, Ardahan-Kars, Turkey, Including an Updated Checklist of Freshwater Annelids Known to Occur in the Country. *Zoosymposia*, 17, 53-76.

[4] Arslan, N. (2006). Records of Aphanoneura and Aquatic Oligochaetes from Turkey. *Fresenius Environmental Bulletin*, 15(4), 249-254.

[5] Alkan, A., Gökçek, Ç., Akba, U., & Alkan, N. (2016). Spatial Distributions of Heavy Metals in the Water and Sediments of Lake Çıldır, Turkey. *Ekoloji*, 25(98), 9-16. https://doi.org/10.5053/ekoloji.2015.23

[6] Rize il Raporu. (2013). T.C. Kalkınma Bakanlığı Doğu Karadeniz Projesi Bölge Kalkınma İdaresi Başkanlığı. Accessed date: 29 September 2022.

[7] Timm, T. (2009). A guide to the freshwater Oligochaeta and Polychaeta of Northern and Central Europe. Lauterbornia, 66, 235 p.

[8] Timm, T., & Martin, P. (2019). Phylum Annelida. In J. H. Thorp & D. Christopher Rogers (Eds.), Volume IV: Keys to Palaearctic Fauna Thorp and Covich’s Freshwater invertebrates (4th ed., pp. 357-518). Waltham, MA, USA: Academic Press, Elsevier.

[9] Košel, V. (1976). *Bratislavia* gen. nov. a new genus for *Pristina elegans* Finogenova, 1966 (Oligochaeta: Naididae). *Biologia, Bratislava*, 31, 105-108.

[10] Finegenova, N. P. (1966). Revizija rodov Peipsidrilus Timm, 1977 I Umbadrilus Timm, 1978 (Tubificidae, Oligochaeta). In Limnologiceskie issledovanija na zalive Onezskogo ozera Bol’soe Onego (pp. 199-203). Leningrad.

[11] Pop, V. (1973). Deux espèces Nouvelles de Pristina (Naididae, Oligochaeta) et leurs affinities. *Studia Universitatis Babe s-Bolyai Series Biologia*, 1, 79-89.

[12] Šporka, F., Ofenböck T., & Graf W. (2008). *Bratislavia palmeni* (Munsterhjelm, 1905) (Naididae) and *Peipsidrilus pusillus* Timm,1977 (Tubificidae) two rare Oligochaeta species new to the Austrian fauna. *Lauterbornia*, 63, 15-22.

[13] Ehrenberg, C. G. (1828). Symbolae physicae. Animalia evertebrata. Phyrozoa. Berlin (cited from Sperber, 1948).

[14] Brinkhurst, R. O., & Jamieson, B. G. M. (1971). Aquatic Oligochaeta of the world. Toronto: Univ. Toronto Press.

[15] Suriani-Affonso, A. L., França, R. S., Marchese, M., & Rocha, O. (2011). Environmental factors and benthic Oligochaeta (Annelida, Clitellata) assemblages in a stretch of the Upper São Francisco River (Minas Gerais State, Brazil). *Brazilian Journal of Biology*, 71(2), 437-446.

[16] Alves, R. G., Marchese, M. R., & Escarpinati, S. C. (2006). Oligochaeta (Annelida, Clitellata) in lotic environments in the state of São Paulo, Brazil. *Iheringia, Zoologia*, 96(4), 431-435.

[17] Fusari, L. M., & Fonseca-Gessner, A. A. (2006). Environmental assessment of two small reservoirs in southeastern Brazil, using macroinvertebrate community metrics. *Acta Limnologica Brasiliensia*, 18(1), 89-99.

[18] Nesemann, H., Sharma, G., & Sinha, R. K. (2004). Aquatic Annelida (Polychaeta, Oligochaeta, Hirudinea) of the Ganga River and adjacent water bodies in Patna (India: Bihar), with description of a new leech species (Family Salifidae). *Annalen des Naturhistorischen Museums in Wien*, 105 B, 139-187.

[19] Bode, R. W., Novak, M. A., & Abele, L. E. (1996). Quality Assurance Work Plan for Biological Stream Monitoring in New York State. Albany, NY: NYS Department of Environmental Conservation.

[20] Sperber, C. (1958). Über einige Naididae aus Europa, Asien und Madagaskar. *Ark. Zool., Svenska Vetenskop, Stockholm*, 12(2), 45-53.

[21] Polatdemir Arslan, N. & Şahin, Y. (2003). Nine new Naididae (Oligochaeta) species for Sakarya River, Turkey. *Turkish Journal of Zoology*, 27, 27-38.

[22] Pop, V. (1974). Faunistische forschungen in den grundwässern des nahen ostens, XII. Oligochaeta (Annelida). *Archiv für Hydrobiologie*, 73, 108-121.