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Aquatic Oligochaeta from glacial lakes of the Pirin Mountain National Park (Bulgaria)

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With 2 Tables

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Species diversity of aquatic Oligochaeta as found in the collections of Prof. A. Valkanov, gathered from glacial lakes (higher than 2000 m a.s.l.) of the Pirin Mountain, now a Bulgarian National Park recognised by UNESCO as a World Natural Heritage Site.

1 Introduction

In his biological characteristics of the glacial lakes of the Bulgarian mountains, Prof. D. VODENICHAROV (1964) noted that the class Oligochaeta "is relatively well represented, but, regretfully, it is still unsufficiently well studied" He reported four species of aquatic Oligichaeta - *Chaetogaster diaphanus, Nais variabilis, Peloscolex ferox* and *Lumbriculus variegatus* as known for glacial lakes. Actually, this are the only data about the species diversity of the group, owing to the early papers of Prof. Aleksander VALKANOV (1932, 1934, 1938) on the high mountain lakes. During the later expeditions, organized and leaded by Prof. VALKANOV (1956-1958, 1963-1968) especially for studying the life in the glacial lakes, huge amount of biological materials has been collected. The determination of these materials has been possible only recently, and we were honoured to review a part of these valuable collections.

The present paper discusses the species diversity of aquatic Oligochaeta from the glacial lakes of the Pirin Mountain within the premise of the National Park, a World Natural Heritage Site as recognised by UNESCO. In total, there are 119 glacial lakes higher than 2000 m a.s.l., besides another small 45 lakes with surface less than 1000 m² and which usually dry during the summer season.

2 Results

The reviewed collection of the Prof. Valkanov's materials contained 91 samples, gathered mainly during his 1963-1964 and 1967-1968 expeditions, and several single samples as dated on 1926, 1937, 1940, 1956, 1960 and 1962 as well. Part of the materials were misslabelled (11), other part contained undeterminable fragments or representatives of other groups of aquatic invertebrates (5

samples). Thus the total number of the reviewed samples containing Oligochaeta was 75, originated from 31 glacial lakes.

Several main characteristics of the studied lakes are shown on Table 1; the lake codes follow the numbers in the respective chapter of "The Lakes of Bulgaria" (IVANOV & al. 1964). For some lakes until now there are no available data about maximum depth.

The Oligochaeta found are listed in the Table 2, the checklist follows the order of TIMM & FINOGENOVA (1987). Some undeterminable juvenile forms have been left as genera or families.

As one may see from the Table 2, in total 11 species of aquatic oligochets were found in 31 glacial lakes (from more than 70 studied). There is no confirmation about the finding of *N. variabilis* (after VALKANOV 1938) in the reviewed collection from the glacial lakes under study. Probably, it has been the close species *N. communis*, which was found in one lake only. The most frequent in the reviewed collection is the wide opportunist *T. tubifex* (in 50.7 % of the samples) found in 20 lakes in total. The next frequent species is *L. variegatus* (in 38.7 % of the samples), found also in 20 glacial lakes.

Tab. 1: **Some characteristics of the glacial lakes, after IVANOV & al. (1964). nd = no data**

Lake code	Lake Name	Altitude, m	Surface, m²	Max. depth, m	Samples
1	Dautovo Lake	2341	6 200 000	2.0	1
3	Long Banderishko Lake	2310	45 500	10.0	2
6	Zhabeshko Lake	2322	5 600	2.0	1
7	Banderishko Lake	2345	1 500	nd	1
9	Banderishko Ribno Lake	2190	65 000	nd	1
10	Ovinatsko Lake	2295	1 400	nd	1
21	Valyavishko Lake	2329	2 600	1.8	1
34	Vassilashko Lake	2370	3 300	5.7	9
37	Tevnoto Lake	2362	63 900	29.0	2
39	Upper Vassilashko Lake	2154	23 200	3.3	1
41	Vassilashko Fish Lake	2126	35 900	3.1	1
42	Gazeysko Lake	2642	11 600	4.0	1
51	Bezbog Lake	2239	19 000	7.0	1
56	Popovo Lake (Papazgyol)	2234	123 600	29.5	19
58	Fourth Popovo Lake	2207	1 200	nd	1
70	Lower Kremesko Lake	2304	98 000	27.0	2
71	First Kamenishko Lake	2310	1 800	nd	2
73	Third Kamenishko Lake	2256	1 600	nd	3
74	Fourth Kamenishko Lake	2133	24 400	nd	1
75	Fifth Kamenishko	2132	2 500	nd	2
80	First Kornishko Lake	2431	7 800	nd	1
83	Third Kornishko Lake	2147	3 900	nd	1
85	Second Vlakhinsko Lake	2293	11 100	0.8	1
88	First Gergiysko Lake	2392	1 700	nd	5
89	Second Gergiysko Lake	2304	17 000	nd	4
91	Fourth Gergiysko Lake	2193	14 600	nd	2
93	First Spanopolsko Lake	2451	1 200	nd	2
95	Third Spanpolsko Lake	2402	8 400	2.0	1
96	Fourth Spanopolsko Lake	2212	11 300	nd	2
117	Argirovo Lake	2365	6 900	nd	1
118	Mitrovo Lake	2291	34 700	nd	2

The reviewed collection seems poorer in terms of species diversity comparing with the oligochets from glacial lakes of the other Bulgarian high mountain Rila, where 22 species have been established in 28 lakes (UZUNOV & VARADINOVA, in print). In the Prof. Valkanov's material from the Pirin Mountain we didn't find species like *Spirosperma ferox* EISEN, *S. velutinus* (Grube), *C. diaphanus* (GRUITHUISEN), and other common species for the Rila Mountain.

The most of the species found are typical under oligotrophic conditions (after TIMM 1987). The very special case is the presence of *T. tubifex*, a species known mainly as a polysaprobic indicator. Prof. S. HRABE (1981) also reported the finding of *T. tubifex* in 15 of 20 studied lakes of High Tatra Mountain (between 1800 and 2157 m a.s.l.). There are many other communications about findings of this species in springs, oligotrophic lakes, small brooks and streams. In most of the cases, however, the species has been represented in small numbers, in countrary of its findings under meso- and especially eutrophic conditions, where *T. tubifex* occurs as a dominant in the cenotic structure of the zoobenthos. The fact confirms again the large ecological tolerance of this widely opportunistic oligochete worm.

In terms of quantity, the samples under review were very poor the oligochete representatives found were few in numbers, even single specimens.

Tab. 2: Aquatic Oligochaeta from the glacial lakes of the Pirin Mountain National Park as found in the collections of Prof. A. VALKANOV

Taxon	Lake Code
NAIDIDAE	
Nais communis PIGUET 1906	21
Nais elinguis MÜLLER 1773	85
TUBIFICIDAE g.sp.juv.	34, 37, 96
Aulodrilus pluriseta (PIGUET 1906)	75
Tubifex tubifex (MÜLLER 1773)	1, 7, 21, 34, 37, 39, 42, 51, 56, 70, 71, 73, 74, 75, 88, 89, 91, 95, 117, 118,
Limnodrilus udekemianus CLAPARÈDE 1862	9
ENCHYTRAEIDAE g. sp. juv.	34
Henlea sp. [?ventriculosa (UDEKEM 1854)]	3, 34, 71, 75, 88
Mesenchytraeus armatus (LEVINSEN 1884)	3, 75
Lumbricillus lineatus (MÜLLER 1774)	34
LUMBRICULIDAE g. sp. juv.	56
Lumbriculus variegatus (MÜLLER 1774)	1, 5, 6, 9, 10, 34, 39, 41, 56, 58, 71, 73, 74, 80, 83, 88, 89, 91, 93, 96,
Stylodrilus heringianus CLAPARÈDE 1862	21, 41, 56, 58, 71
LUMBRICIDAE g. sp. juv.	56, 93
Dendrobaena alpina (ROSA 1884)	93

Inspite of the fact that they are few species, the aquatic Oligochaeta are an important component of the benthic invertebrate communities of the glacial lakes. Being a part of their overall biodiversity, the Oligochaeta should be paid the same level of protection within these unique and very fragile mountain ecosystems. New studies may assess further the current status of the Oligochaeta fauna and potential impacts of the high mountain tourism on the biodiversity of the glacial lakes.

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