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Studies on free-living freshwater nematodes from Skadar Lake Montenegro

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Abstract. Hydrobiological studies of Skadar Lake, Montenegro were performed in 2014. The present study provides the first information on free-living freshwater nematodes from Skadar Lake, Montenegro. In our study, we identified 15 species of freshwater free-living nematodes belonging to 11 genera. This is the first detailed study on free-living freshwater nematodes from the Skadar Lake, Montenegro. The identified 15 species and 11 genera are new to the hydrofauna of Montenegro.

Key words: Free-living freshwater nematodes, Skadar Lake, Montenegro.

Introduction

Nematodes are one of the most numerous groups in the animal world. They are considered to be in a state of biological progress, which is characterized by the following signs:

1. Increase in the fertility of species populations.
2. Expansion of the area.
3. Broad ecological plasticity and conquest of new ecological niches.

Free-living freshwater nematodes inhabit the surface layer of the bottom (sand or silt) at a depth of 2-3 cm. They are found among algae and among the growths on stones (Rees, 1940).

The exact number of nematode species is not known. Compared with other groups of worms, nematodes have adapted to different living conditions due to their solid cuticle, which makes them less sensitive to the oxygen content and to the impact of other ecological factors. Free-living freshwater nematodes form an important part of the biomass of the meiobenthos, but they are mostly neglected in hydrobiological studies.

Skadar Lake (Albanian: Shkodër; Montenegrin: Skadarsko) is the largest lake on the Balkan Peninsula. It is located on the border between Montenegro and Albania, at 5 m above sea level, with an area of 356 to 370 km² (depending on seasonal fluctuations in its level). Most of it is on the territory of Montenegro. It is named after the neighboring city of Shkodra in northern Albania. Length from northwest to southeast 43 km, width up to 26 km, depth 44 m, volume 1.93 km³.

Material and Methods

A total of 11 samples were collected in Skadar lake in the Montenegrin part of Skadar Lake in 2014 (Fig.1 A and B). Samples were fixed in 4% formalin then heated in a water bath to stretch and measure**.** Some of the nematodes were collected by scraping at stones. Others were collected by scooping substrate from the bottom and straining it through sieves with sizes ranging from 0.5 mm to 50 microns.

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The determination and the presentation of the species was made according to Gagarin (1981).

The formula of De Man (1886) was used to determine the species qualitative composition.

In our study, we identified 15 species of freshwater free-living nematodes belonging to 11 genera.

Fig. 1. A – Skadar Lake of Montenegro (stone scraping), B – view of the lake (Photo A – Evgeniya Tosheva, Photo B – Stefan Stoichev).

Results and Discussion

The present study provides the first detailed information on free-living freshwater nematodes from Skadar Lake, Montenegro. The enormous quantity of the nematodes, which, according to some authors (Rees 1940), amount to several millions of specimens/m^2, determines their significance for the balance of the organic substances in the water basins. Nematodes represent an example of such an evolutionary state of a taxonomic unit, which is designed by Severtsov (according to Paramonov 1970) with the term biological progress. The species density of the longitudinal distribution of the species is unequal. Free-living nematodes are a major component of freshwater meiofaunal communities, where they often attain very high densities (>1 million individuals per m^2; Traunspurger, 2000; Traunspurger et al., 2012).

A large proportion of nematodes inhabit very different substrates, which proves their eurytopic nature. Some nematodes prefer only hard or only soft substrates. These nematodes exhibit stenotopic character. The freshwater nematode fauna is ecologically diverse. Its composition includes typical freshwater inhabitants, species migrating to saline pre-estuarine river areas, freshwater species, organisms inhabiting rock growths, mosses, and others that sometimes fall into the water due to washing away of coastal rocks. In our study, we identified 15 species of freshwater free-living nematodes belonging to 11 genera.

The identified 15 species and 11 genera are new to the hydrofauna of Montenegro.

The distribution of free-living freshwater nematodes found by us is presented in Table 1.

Table 1. Species composition and distribution of free-living freshwater nematodes in Skadar Lake, Montenegro.

	Nematoda	Distribution
1	*Monhystera filiformis* Bastian,1865	Found everywhere in the lake. Cosmopolitan in Europe.
2	*Tobrilus gracilis* (Bastian,1865)	Found everywhere in the lake. Cosmopolitan in Europe.
3	*Tobrilus stefanskii* (Micoletzky,1925) Andrassy,1959.	Found in the growths on the stones
4	*Dorylaimus stagnalis* Dujardin,1848	Found everywhere in the lake. Cosmopolitan in Europe.
5	*Paradorylaimus filiformis* (Bastian ,1865) Andrassy,1969	Found everywhere in the lake. Cosmopolitan in Europe
6	*Eudorylaimus carteri* (Bastian,1865) Andrassy,1959	Found everywhere in the lake. Cosmopolitan in Europe.
7	*Rhabditis filiformis* Butschli,1873	Found everywhere in the lake. Cosmopolitan in Europe. Found among rotting macrophyte debris
8	*Prismatolaimus intermedius* (Butschli,1873) de Man,1880	Found in the sand
9	*Plectus cirratus* Bastian, 1865	Found in the mud. Found in the growths on stones. Recorded once.
10	*Plectus parvus* Bastian,1865	Found in the mud
11	*Aphanolaimus aquaticus* Daday, 1897	Found in the sand. Recorded once.
12	*Mononchoides striatus* (Butschli,1876) Goodey,1963	Found in the growths on stones. Recorded once.
13	*Tripyla filicaudata* de Man,1880	Found in the growths on stones.
14	*Tripyla glomerans* Bastian,1865	Found everywhere in the lake. Cosmopolitan in Europe.
15	*Tripyla selifera* Buetschli,1873	Found in the mud, Found in the growths on stones.

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References

Gagarin, V. (1981) *Opredelitel - presnovodnie nematody evropejskoj chasti SSSR*. Nauka, St. Petersburg, 248 pp.

Man, J. (1886) *Anatomische Untersuchungen über freilebende Nordsee Nematoden*. (P. Froberg) Leipzig, 82 pp.

Paramonov, A. (1970) *Osnovy fitogeljmintologii*. Nauka, Moskva, 3, 254 pp. (in Russian).

Rees, C. (1940) A preliminary study of the ecology of a mud flat. *Journal of the Marine Biological Association of the United Kingdom*, 24: 185-199.

Stoichev, S. (1996): On the free-living nematode fauna from Bulgarian inland waters. *Lauterbornia*, 25: 22–30.

Traunspurger, W. (2000) The biology and ecology of lotic nematodes. Freshwater Biology; 4:29–45.

Traunspurger, W., Höss, S., Witthöft-Mühlmann, A., Wessels, M. & Güde, H. (2012) Meiobenthic community patterns of oligotrophic and deep lake Constance in relation to water depth and nutrients. *Fundamental and Applied Limnology*, 180: 233–248.