Oligochaeta of Lake Taimyr: a preliminary survey

Tarmo Timm

Institute of Zoology and Botany (Estonian Academy of Sciences), Võrtsjärvi Limnological Station. EE-2454 Rannu, Tartumaa, Estonia

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Abstract

Lake Taimyr in Siberia is northernmost among the world’s large lakes: 73°40’–75°20’ N, 99–106° E. The lake area is up to 4650 km² in summer, with a maximum depth of 26 m and a mean depth of only 2.8 m. The ice-free period lasts about three months. The water level sinks 5.5–6 m during winter, so that 85% of the bottom surface is frozen into ice for some time and subjected to negative temperatures, probably down to −20 °C. In artificially melted sediment samples, 75–92% of animals survived. The average summer biomass of zoobenthos is about 1 g m⁻² wet weight, a half of this being formed by Oligochaeta. Altogether 76 samples with 3742 oligochaete specimens collected by V. N. Grèze in 1943–1944 were studied. At least 14 taxa of Tubificidae, Lumbriculidae, and Enchytraeidae were found in the lake, and some more enchytraeids in an adjacent river. Many immature animals could not be identified to species. Naididae were completely lacking probably due to the absence of macrovegetation. The shallow freezing zone is inhabited mostly by Alexandrovia ringulata. The profundal fauna is dominated by Lamprodrilus isoporusr, Stylodrilus sp., and Isochaetides sp.

Introduction

From papers on Oligochaeta collected during the Arctic expeditions (e.g., Eisen, 1879; Čejka, 1914; Smith & Welch, 1919), one can conclude that the freshwater and terrestrial northern oligochaete fauna consists mostly of Enchytraeidae, with a few species of Lumbricidae and Lumbriculidae. The northernmost lake studied in North America (Char Lake at 75° N) is inhabited by only two enchytraeid species (Nurminen, 1973).

However, Lake Taimyr in North Siberia supports a much more diverse oligochaete fauna. It was investigated in 1943–1944 by an expedition of the Siberian Branch of the All-Union Research Institute of Lake and River Fisheries, led by V. N. Grèze (1947a, 1947b, 1957). The oligochaetes collected on that expedition are studied further here. In spite of severe environmental conditions, Lake Taimyr shelters a diverse oligochaete fauna made up mainly of Tubificidae and Lumbriculidae, with a smaller complement of enchytraeids.

In this paper, the general composition of the oligochaete fauna and its zonal distribution in the lake are dealt with. A taxonomic scrutiny of the separate species is in progress and will be published elsewhere.

Habitat description

Lake Taimyr lies in the middle of the Taimyr Peninsula in North Siberia, Russia, 73°40’–75°20’ N and 99–106° E (Atlas SSSR, 1962), on average 6 m above sea level (Haack Grosser Weltatlas, 1968), between the Byrranga Mountains in the north and a tundra-covered lowland in the south. The Lake is northernmost among the world’s large lakes. The Upper Taimyra River is its biggest inflow, the outflowing Lower Taimyra River runs into the Kara Sea (Fig. 1). The catchment area of the lake occupies 80 000 km²; it was partially flooded by a late marine transgression (Grèze, 1947a). Due to the continuing rise of the land, the average water level is decreasing at a rate of about one meter each century (Grèze, 1947a, 1957).
The surface area of Lake Taimyr reaches 4650 km$^2$ in early July when snow-melt water accumulates, decreasing to 4000 km$^2$ in autumn. The maximum depth in the high water period reaches 26 m, with an average depth of only 2.8 m. For eighty percent of the lake surface area the water depth is less than 4 m. The lake is covered with ice about 2 m thick for at least nine months of a year. The last ice masses thaw in July, then freezing starts again in mid-September; thus the fully ice-free period lasts for not more than two months. The water level continues to fall through the winter. By spring, 75% of the water volume has discharged, and the water level has dropped by 5.5–6 m. In autumn, the shallows freeze to the bottom and the descending ice surface becomes concave in the deeper areas (Fig. 2). Surface sediments of 85% of the bottom,