Testate amoebae based paleohydrology reconstruction of mire from the Central Siberia Plateau

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The main aim of the work is to analyze the species composition of fossil communities of testate amoebae in peat deposits of the Lower Tunguska mire (the Central Siberian Plateau, Russia) for the reconstruction of the surface humidity of the studied peatland, followed by for future investigation comparison with data on other indicators for a comprehensive reconstruction of the dynamics of the mire and climate.

In paleoenvironmental reconstruction, modern and fossil assemblages of testate amoeba paired with depth to water table analysis and radiocarbon-dating are used to construct transfer functions, which provides palaeohydrological data when applied to the corresponding site. Water table depth (WTD) can point out the micro topography difference of peatland, and is also the main variable to which thecamoebians responded. TA is very sensitive to hydrological fluctuations. Its species can indicate the increase, instability and decrease of the water table.

The sampling site (64.16803 N, 100.5333 E) is a peat deposit of the Lower Tunguska mire. The mire is located in the Central Siberian plateau which is characterized by leveled watershed surfaces. The study region is characterized by continental climate with low annual precipitation and warm summers, and the frost–free period lasts 60-70 days.

Testate amoebae analysis revealed that the assemblages of testate amoebae in the peat deposits of the Lower Tunguska mire was rich and diverse. A total of 1,711 taxons of testate amoebae belonging to 62 species were counted and identified. In general, communities of testate amoebae were quite abundant in the upper peat layers to a depth of 32 cm in each sample, at least 150 individuals were found. Then their abundance decreased, as a result of which at least 50 individuals were found in samples at depths of 37-38 cm. No testate amoebae were found in the deeper layers. And eurybiont and stenobiont species predominated in fossil communities of testate amoebae.

The result of water table reconstruction based on testate amoebae communities is shown in figure 1. WTD can't be reconstructed at 50-38cm depth due to absence of TA. There is a drying trend from 38 to 31 cm, then 31 to 13 cm is a stable dry period, and moisture increases from 13 cm.

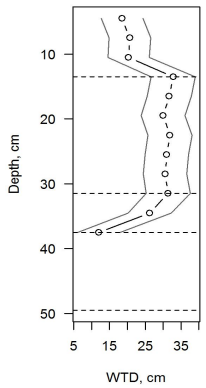

Fig. 1. The results of quantitative reconstruction of the water table depth level (WTD, cm) based on the species structure of fossil testate amoebae communities in the peat deposits of the Lower Tunguska mire.

Generally, testate amoebae indicate that peat formation started in a wet condition which then sharply increase to very dry with mean reconstructed WTD value 30cm and there is tendency to moistening last years. Further comparison with other palaeoecological proxies will provide us more data about recent climate change on the studied territory.