

CONTINUOUS PALEOENVIRONMENTAL SEDIMENT RECORD FROM TWO LAKES ON VALDAY ICE MARGINAL ZONE STARTED SHORTLY AFTER THE ICE RETREAT

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This work presents the results of multi-proxy studies of the sediments from two lakes in the eastern part of the Valdai Highlands, which is the marginal zone of the last ice sheet. At the Zvan and Pirov lakes, a ground-penetrating radar profiling was carried out and several lake sediment cores up to 5 m long were retrieved with the Russian peat corer. The cores were subject to visual analysis of lithological facies, the analysis of the organic carbon and nitrogen content, pollen and diatom analyzes. To determine the age of the sediments, a number of radiocarbon dates were obtained. As a result, we performed detailed reconstruction of vegetation evolution since the ice sheet retreat and found that significant mass of dead ice had degraded about 14 cal. ka BP. For the first time in this region, the first peak of spruce has been clearly dated and referred to the period 14-13 cal. ka BP. Oscillations of the level of small lakes in the Holocene were controlled by climate. Karst processes played an important role in the formation of modern lake basins. The clear traces of the agricultural activity shortly before 2000 cal. a BP were discovered.

FIRST RECORD OF PHREATALONA PROTZI (HARTWIG, 1900) (CLADOCERA, CHYDORIDAE) IN PECHORA DELTA, NENETS AUTONOMOUS REGION, RUSSIA

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Cladocera (Branchiopoda: Crustacea) is the key component of aquatic ecosystems. They are commonly used in paleoecological reconstructions of climatic and environmental change. Cladocerans indicate changes in the effect of various abiotic and biotic environmental factors on the condition of lakes (trophic status, acidity, depth, lake-level changes, ionic structure of water etc.). The studies of cladoceran assemblages in lakes have demonstrated and suggested that this group of hydrobionts can be successfully used as an indicator of the changes caused by climate change occurring in the ecosystem [1].

The study area is located in the Polar Circle, within the Pechora River delta, at the territory of the Nenets State Nature Reserve. Subfossil cladocerans of the Nenets autonomous okrug are poorly known. However, the data available currently on subfossil cladocerans in the region under investigation are insufficient.

The sediment samples from 17-Pe-03 lake (68°11'30.8"N, 53°47'36.2"E) were used for analysis of subfossil cladoceran remains. *Phreatalona protzi* was discovered for the first time in this region of Russia and this is the most eastern point of findings of this species. *Ph. protzi* can be distinguished by its characteristic shape of headshield with a short rounded rostrum and a notched posterior margin of carapax. We found head shields, carapaxes and postabdomens in the sediment samples (Fig 1).

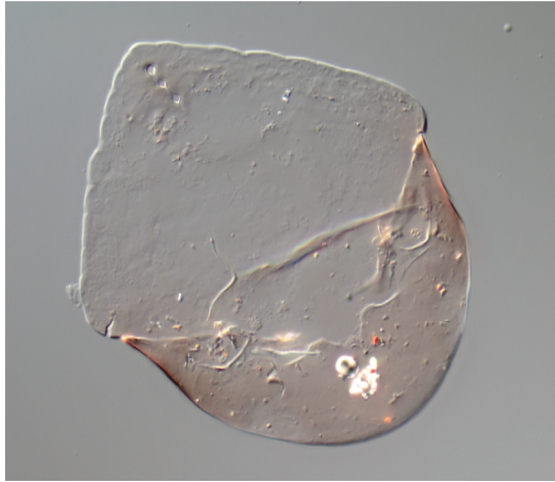


Fig. 1. Photos of headshield (200 μm) and postabdoment (140 μm) of *Phreatalona protzi* (Hartwig, 1900) from lake 17-Pe-03 (Pechora Delta, Nenets Autonomous Region, Russia)

According to Kotov, *Ph. protzi* is distributed in Central and North-East Europe, in streams and rivers on river sand [2]. The species has been found in Finland, Ireland, England, Belgium, Germany, Poland, Czech Republic, Slovakia, Hungary, Romania [3], Turkey, France [4]. The ecology of *Ph. protzi* is poorly known. The species is adapted to permanent riverine conditions and may have lost the ability to withstand desiccation or temperature fluctuations [3]. The environmental spectrum of the finding sites is wide and ranges from relatively nutrient poor clear water lakes to eutrophic turbid water lakes, thereby indicating that *Ph. protzi* is not narrowly restricted to particular habitats. Rare species reported from lakes, springs, river edges, in channels, in small streams mostly in hyporheic zone [3]. *Ph. protzi* occurs under various environmental conditions and has no clear preference to, for instance, lake area or depth. [5]. The findings of this species indicate a periodic flow of river water into the water area of lakes.

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