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Paleolimnological reconstruction of Lake Vekeri— are cladocerans able to answer different utilization methods?

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INTRODUCTION & AIM

Aquatic ecosystems are undergoing various changes due to natural and anthropogenic stressors. **Paleolimnological approaches** can be used to **trace** the **environmental changes** that have occurred in a water body and its catchment by examining the physical, chemical, and biological information, or **proxies**, preserved in **sediment cores**, and to **determine** the timing and extent of these **changes**. Our research **aimed** to study past environmental changes, reconstruct different aspects of the past ecosystem, and investigate the **different utilization** of Lake Vekeri by examining **Cladocera remains** preserved in the sediment.

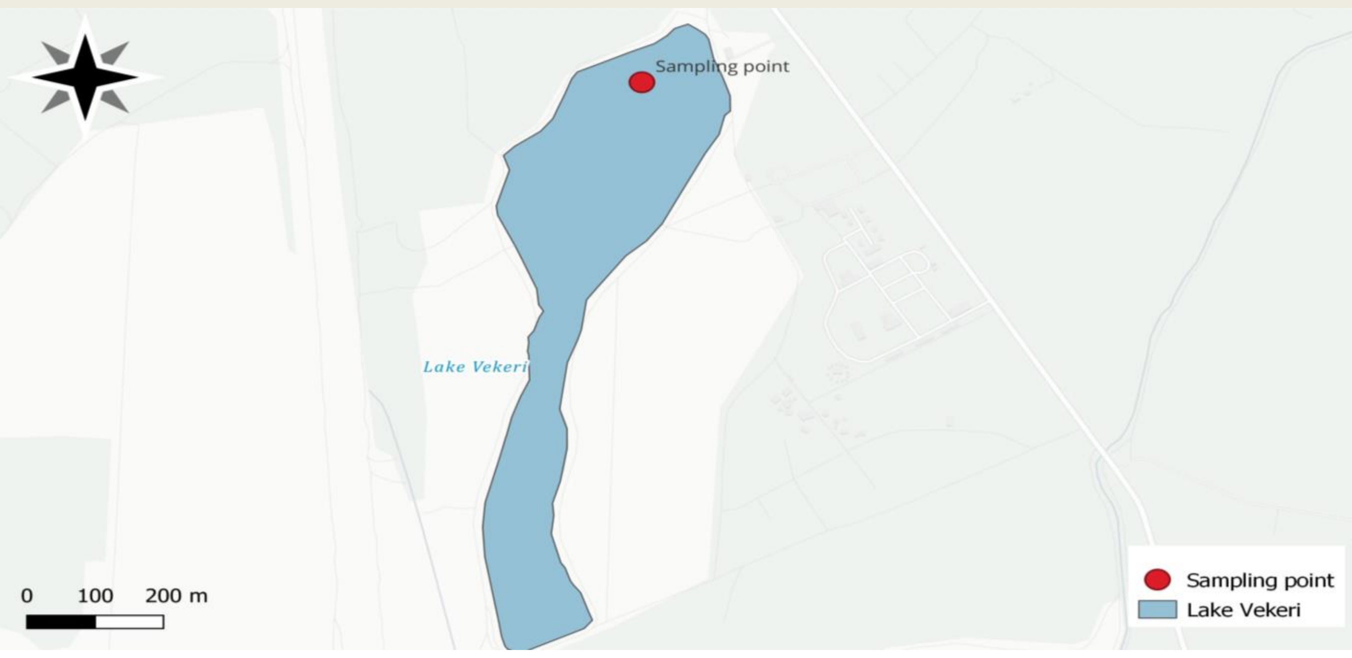

Figure 1. Study area and sampling point.

METHOD

- Study area**: Lake Vekeri**, which is located in the Eastern Hungarian region.
- Collection: 21. August 2024.
- **10 cm long sediment cor**e was collected, with gravity corer.
- The core was **sliced every centimeter**.
- **Exploration** of the **Cladocera remains** according to a standard method of Korhola and Rautio (2001).
- Remains were **identified** at a **species level**, identification was based on keys by Szeroczyńska and Sarmaja-Korjonen (2007) and Gulyás and Forró (1999).
- Statistical analysis was performed using vegan package in the statistical environment R v. 4.2.1.

Picture 1. Sediment core.

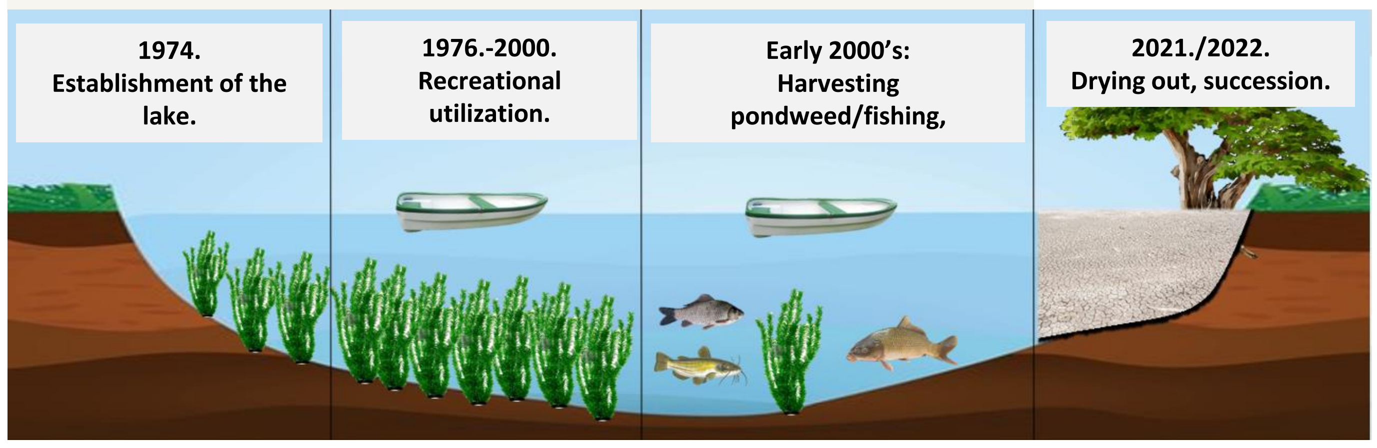

Figure 2. The different utilization periods of Lake Vekeri.

RESULTS & DISCUSSION

According to the **sedimentation rate** (2mm /year), we determined the age of the core, which is **50 years**. We found 18 cladoceran species. According to the **End Member Modelling Analysis**, we created **4 EM-groups** based on 4 Cladoceran communities. These EM components represent the proportion of the 4 EM communities found in different layers. At a depth of 2-3 cm, which was a period of intensive fishing, the EM1 community dominated, EM4 community dominated from the 1st cm. The dominant species in the EM1 community were the Bosmina species, which are pelagic. Depth of 7-8 cm the EM3 community was dominant, the dominant species were *A. guttata* and *A. quadrangularis*, which are **littoral species**. The proportion of **vegetation-associated species** (*G. testudinaria*) has increased, which suggests that this period was the **recreational period**, with dense macrophyte-covered littoral regions. EM2 community was absent at the 0-4 cm depth, and the number of vegetation-associated species decreased, confirming the harvesting of pondweed **(Figure 3.),(Figure 4.)**.

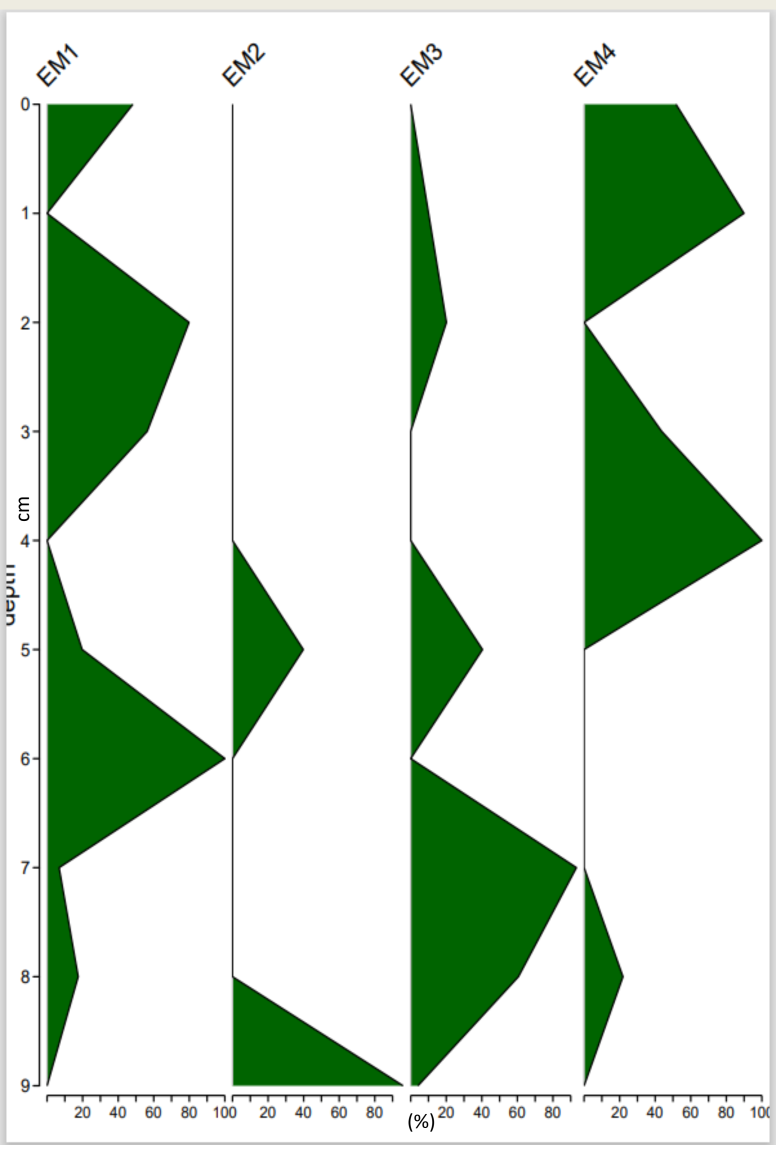

Figure 3. Result of End Member Modelling Analysis.

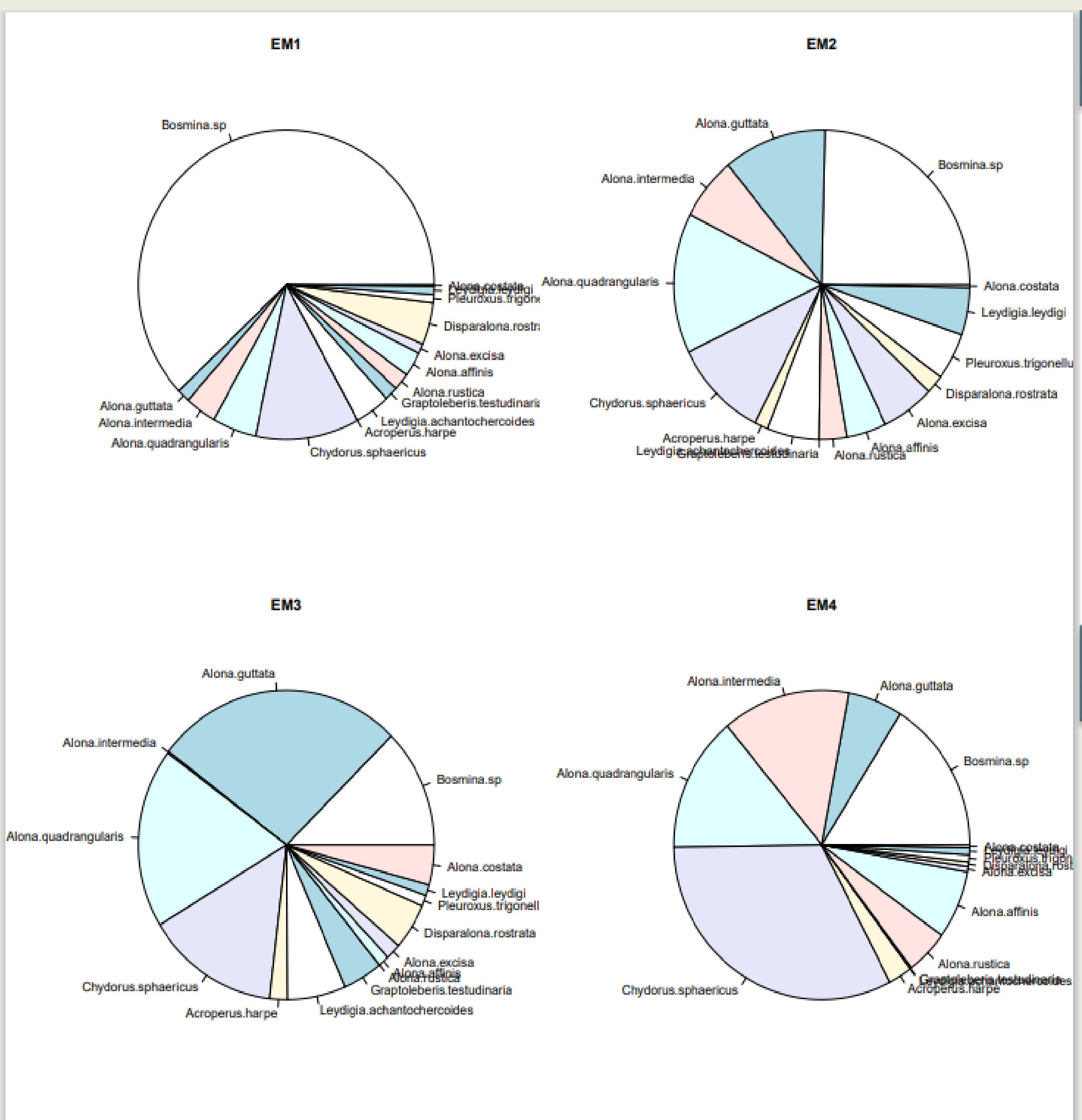

Figure 4. The species composition of the 4 distinct EM groups by abundance.

CONCLUSION

According to our results for the analysis of the **subfossil Cladocera community**, we were able the **reconstruct past environmental changes** and the effects of the different **utilization** methods on the ecosystem. The results offer **insights** for comprehending the **lake's ecosystem** and prove that the examination of the subfossil Cladocera community is an important tool for **paleolimnological reconstruction.**

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