

Áron Lukács questions answers

1. Has the candidate found any unique taxa in the small mountain ponds? Which ones are they and what conditions allow them to be there?

ANS: The presence of unique diatom species in mountain closed pond ecosystems can be attributed to a mix of factors such as environmental isolation, distinct water chemistry, decreased competition, and adaptations to local stresses. These small but significant aquatic habitats could serve as essential habitats for diatom communities.

Name of species	Number of species
<i>Navicula trivialis</i>	1
<i>Surirella ovalis</i>	1
<i>Anomoeoneis sphaerophora</i>	1
<i>Diatoma vulgare</i>	1
<i>Encyonema minutum</i>	1
<i>Eunotia botuliformis</i>	1
<i>Eunotia exsecta</i>	1
<i>Fragilaria famelica</i>	1
<i>Navicula radiosa</i>	1
<i>Nitzschia solgensis</i>	1
<i>Luticola ventricifusa</i>	1
<i>Mayamaea assellus</i>	1

2. What is the candidate's opinion on the most important environmental factors affecting the community composition (both at species and trait level)? Outline the importance of water temperature and lake morphology.

ANS: The species composition and both individually and in combination traits in forest ponds were mostly influenced by conductivity and nutrients, which are recognized as important factors affecting diatoms as supported by other studies. Nutrient limitation can restrict diatom growth and lead to shifts in community composition. For example, there was a positive correlation between the mean length/width ratio of high-profile and motile taxa (HLW3, MLW4) and nutrient levels. This is consistent with previous findings that have shown a substantial link between the motile group and high nutritional levels.

Temperature is another major environmental factor affecting diatom community organization. Diatoms have temperature tolerances and preferences and exceeding them can induce physiological stress and death. Heat waves and sudden changes in temperature can disturb

diatom ecosystems and favor more resistant species. Temperature indirectly affects diatom communities by affecting water column stratification, nutrition availability, and grazing pressure. Our research also found that the level of water in the forest ponds has a notable impact on the composition of diatom species. The morphological parameters of ponds had a substantial impact on both the individual characteristics and guild composition, as well as the combined traits.

3. Outline a possible trophic cascade effect in the worst-case climate scenario. How could it affect other organisms?

ANS: Significant biological changes may occur in an outdoor mesocosm in a worst-case climatic scenario. High temperatures might potentially cause excessive algal blooms, leading to a decrease in light and oxygen levels, consequently impacting aquatic organisms. This can result in a reduction in zooplankton populations, as their access to food becomes restricted. As a result, fish and other predators can also suffer adverse effects because there is less prey available for them to feed on. These modifications can lead to a reduction in biodiversity, causing instability in the ecosystem and changing the process of nutrient cycling. Disruptions in the mesocosm offer useful insights into the possible effects of climate change on natural ecosystems.



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