

ASSESSMENT OF SPECIES DIVERSITY AND DISTRIBUTION OF DIATOMS IN HIGH ALTITUDE AQUATIC ECOSYSTEM OF TRANS HIMALAYA, INDIA

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We studied the species diversity and distribution of diatoms in high altitude aquatic ecosystems of the Indian Trans Himalayan region. We sampled three lakes, namely Tsomoriri (Ramsar site), Pangong Tso and Tsokar Lake, representing lentic ecosystems, and four different second to third order streams and the Indus River, representing lotic ecosystems. The sampling was carried out during the months of August-September and involved collecting periphyton diatom samples by filtering the surface water and collecting phytobenthos by scrapping the submerged boulders. Thin surface of coastal sandy layer was collected in absence of boulders. We investigated 19 physico-chemical variables to examine how species respond to a range of environmental factors. We recorded 193 species from the collected water samples from the lakes and rivers and streams. Diatom valves which could not be identified were not recorded. Our study shows that streams had the highest species richness (103 sp) compared to rivers (93 sp) and lakes (95 sp). Density of diatoms was the highest in streams and the lowest in lakes. Among the lakes, the brackish lake Tsomoriri (salinity 0.6 ± 0.43 ppt) had high species richness compared to Pangong Lake (salinity 6.4 ± 0.15 ppt) and Tsokar Lake (salinity 55 ± 2.9 ppt).

We performed ordination analysis using canonical correspondence analysis (CCA) to explain the variation within diatom data, with four explanatory environment variables, i.e. dissolved oxygen (DO), total hardness, pH and temperature. The first two axes explained 29.5% of the variance in the species data. The diatom distribution in the lotic ecosystems was mainly driven by DO, considered to be comparatively low at high altitudes. The dominant taxa found in the lotic ecosystems were: *Achnanthes* spp, *Gomphonema* spp and *Encyonema* spp. The dominant taxa observed in the lentic ecosystems were *Cyclotella* spp and *Cocconeis* spp in Tsomoriri Lake, *Surirella* spp in Pangong Lake and *Stauroneis* spp in Tsokar Lake. Every aquatic habitat is important and needs preservation in order to know more about ability of diatoms in harsh conditions. More in-depth studies are needed to understand the drivers controlling the diversity and distribution of diatom species in the lentic and lotic ecosystems. We raise the question whether the low biodiversity in these endorheic lakes is due to high salinity? We suggest that more emphasis needs to be laid on water chemistry and geomorphology of these aquatic ecosystems for understanding diatom diversity and distribution.