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Editorial

Special Issue "The Response of the Plankton Community to Environmental Stress"

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The equilibrium of ecosystems highly depends on its health (resilience) and the strength and intensity of environmental influences. Due to recent accelerated human activities, ecosystems have exhibited remarkable signs of stress; therefore, investigation of stress on ecosystem structure and function has become a fundamental and hot topic in ecology.

In its original sense, stress is a specific response of an individual organism to a stimulus. At a larger scale, environmental factors can be regarded as stimuli to which an ecosystem provides a structural or functional response. Based on the intensity and frequency of an impact, disturbance and stress factors can be distinguished. This discrimination depends largely on the health (resilience) of the ecosystem. The impact can be considered as stress if there are fundamental alterations to the structure and function of the ecosystem, so the understanding response of ecosystems to stressors is a fundamental and urgent task in the ecology community.

In this Special Issue, we focus on the effects of several stress factors, such as temperature, oxygen, and nutrients, on the planktonic elements of aquatic ecosystems.

Korponai et al. [1] investigated cladoceran remains in sediments and found that ambient temperature as a stressor affects the body size of cladocerans. Under warmer environment, cladocerans are smaller, which is reflected in the size distribution of the remains. Therefore, variation in the size of cladoceran remains can be used as an useful proxy in environmental reconstructions.

Karpowitz et al. [2] showed that although zooplankton can tolerate low oxygen conditions, persistent oxygen deficiency can be considered as a serious stress and causes significant changes in zooplankton composition. Smaller zooplankton taxa, especially rotifers, are less sensitive to low oxygen content and oxygen deficiency. As a consequence, smaller zooplankton assemblages contain less carbon in their biomass, transporting less carbon from the phytoplankton to the higher trophic levels; thus, the oxygen content of a water body affects the carbon cycle of lakes appreciably.

Tóth et al. [3] investigated the effect of fish food quality on zooplankton in a fish farm. According to the results, changes in the quality of fish food did not alter the zooplankton structure of fishponds. Cereal food did not decrease the biodiversity of zooplankton, therefore cereal fish food is usable as an alternative feed source in fishponds.

A further study by Tóth et al. [4] revealed that the structure of planktonic rotifer communities is significantly determined by nutrients. The high nutrient content of runoff from fish farms can alter seasonal changes in a rotifer community. The nutrient-rich effluent strengthened the dominance of common species in summer, while the extra nutrient input delayed the decline of the rotifer community at the point of effluence in autumn.

Xia et al. [5] showed that although eutrophication is a key stressor for algae, planktonic and epipelic algae are affected differently by nutrients. Temperature, TP, and TN can be regarded as main stressors for planktonic algae, whereas TN and N:P ratios are more critical for epipelic algae.

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