

**Recognition and awareness-raising of toxic cyanobacterial blooms and associated poisonings at Lake Barlevice, Poland in 1884, and recent cyanobacterial toxin analyses**

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**Abstract**

Mass mortalities of fish, birds and farm animals, and human skin irritations, at Lake Barlevice, northern Poland, were attributed by Berthold Benecke in 1884 to exposure to scums containing potentially toxigenic cyanobacteria. Scum samples from this site, 122 years later, contained the cyanobacterial hepatotoxin microcystin-RR and were also neurotoxic. The prescient steps taken by Benecke to obtain further information about cyanobacterial bloom occurrence and to increase awareness of the health hazards associated with contact with cyanobacterial mass populations are discussed in relation to modern requirements.

**Key words:** cyanobacteria, microcystin, toxin, blooms, Barlevice, Benecke.

**The headwater hydrographic characteristics of large plains: the Pampa case**

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**Abstract**

The hydrographic nets in the Pampean region do not fit the classical theory of running waters. Water divides often are not-well-defined flat surfaces. Drainage networks begin in a kind of non-permanent wetlands, which move very slowly downwards as “mobile marshes”. The water masses eventually occupy dells (shallow, wide long depressions), where the flow is measured in a few meters per day. Finally, the water enters in normal channels. Such a pattern is probably representative of most plains of South America and other continents. Lenitic water bodies in the Pampa have different origins: tectonic, eolian, fluvial and coastal.

**Keywords:** headwaters, plain streams, transient marshes, dells, Pampa, Argentina.

**Oxygen regime improvement in large, lowland reservoirs during the winter period for reduction of fish suffocation: the example of the Dnieper reservoirs, Ukraine**

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**Abstract**

Two methods of improving oxygen levels in series of large, lowland reservoirs in order to reduce fish suffocation during prolonged cold winter conditions are presented. The tool for this improvement is the management of water release through hydroelectric power stations (HEPS). The first method is the enlargement of the ice-free area downstream of the HEPS by increased water release through the dam. The second method is the short-term elevation of water level in the reservoir to increase the water mixing in deep areas where fish overwinter. The former method can be effective for riverine zones, the latter for lacustrine reservoir conditions. These two techniques are demonstrated for the Dnieper reservoirs, Ukraine. The mathematical formulas for calculation of the HEPS releases and their effect on the oxygen regimes are presented, as well as examples of calculations for the Kaniv and Kremenchuk reservoirs.

**Key words:** ice cover, dissolved oxygen, HEPS releases, flow regime, reservoir, fish overwintering.

## **Changes of heavy metals' concentrations in the surface waters of SW Spitsbergen as an effect of volcanic eruptions in subpolar zone**

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### **Abstract**

Heavy metals (Cd, Cu, Pb, and Zn) were determined by Anodic Adsorptive Stripping Voltammetry (ASVA) in the samples of surface waters from SW Spitsbergen (the largest island of Arctic Archipelago Svalbard) in the period of 1993-2001. The aim of this paper was to verify the hypothesis that concentrations of investigated metals in the surface waters from SW Spitsbergen remain on constant, low range – unless some natural factors do not influence on it. The results indicate a distinct dependence between the concentration of Cd, Cu, Pb and Zn and the number of volcanic eruptions in the subpolar zone of Northern Hemisphere. The obtained dependence shows that some heavy metals determined in the surface waters of SW Spitsbergen have mostly natural origins and merely to some extant anthropogenic ones.

**Key words:** Svalbard; Hornsund; anodic stripping voltammetry; lead; copper; cadmium; zinc; subpolar volcanoes.

**Macroinvertebrate community as indicator of land-use changes in tropical watersheds, southern Brazil**

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**Abstract**

Benthic macroinvertebrate communities of two small watersheds in southern Brazil were studied focusing on functional feeding groups, spatial distribution and water quality, during an eighteen-month period, encompassing dry and wet seasons, as indicator of land use changes. The response of the community diversity to decreasing water quality was clear at the more perturbed watershed, with the functional groups distribution and the species richness within the population reduced to few taxa in the stream longitudinal length. In the rural stream, the changes in the macroinvertebrate community could be related to changes in land use or to a longitudinal pattern throughout the system. The distribution of functional groups is dominated downstream by filtering collectors and predators.

**Key words:** Benthic macroinvertebrates, Stream, Trophic relation, Water quality, Tropical watersheds.

**Comparison of inhibiting effects of low water temperature and high stocking density on reproduction in female *Micropterus salmoides* (L.)**

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**Abstract**

Three samples of the same population of black-bass (*Micropterus salmoides*) were reared for two years in different environmental conditions to evaluate the impact of oocyte resorptive process on further spawning

The fish group reared in temperate climate, low density spawned in May-June and their oocyte degeneration lasted all following summer. The group reared in temperate climate, high density did not spawn but atretic process went on similarly. Females in temperate climate completed the degenerative process in autumn, and then started the maturation of a new batch of young oocytes.

The cold-climate group reared in low density did not spawn, but degeneration of oocytes began only in autumn, simultaneously with a growing on of the mature ones. This double evolution lasted all the following spring and was achieved only in summer, so maturation of a new batch of young oocytes as late as next autumn. The histological characteristics of ovaries showed that, if favourable stocking conditions were restored, normal oocyte maturation started again.

**Key words.** *Micropterus salmoides*, oocyte degeneration, spawning inhibition, environmental factors

**Effect of zeolite (sodium aluminosilicate) on the removal of copper from water and fish and an improvement of RNA:DNA ratio in *Oreochromis mossambicus* (Peters)**

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**Abstract**

The 96 h LC<sub>50</sub> value of copper for *O. mossambicus* was 4.27 ppm. The RNA and protein contents and RNA:DNA ratio were increased with exposure period in control fish and it indicates growth of fish during the experiment. Copper toxicity reduced the above parameters in exposed fish. Adding zeolite to the copper treated cultures caused the increase of RNA, protein contents and RNA:DNA ratio to a level similar to the control. The concentration of 2 g zeolite dm<sup>-3</sup> showed the best performance of all variants used. Concentrations of zeolite between 2 and 8 g dm<sup>-3</sup> added to median lethal of copper contaminated water caused a gradual decline of the metal content in test water and its removal after 180 days. The dose of 0.5 g zeolite dm<sup>-3</sup> was too small. The removal of copper from water to sediment and elimination of accumulated copper from fish tissues were most pronounced in concentration of 2 g zeolite dm<sup>-3</sup>. It is considered as an optimum dose.

**Key words:** metal accumulation, metal removal, ions interaction, nucleic acids, protein, optimum dose

## **Influence of reed belt on the chemical characteristics of sediment interstitial water**

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### **Abstract**

Changes in the chemical composition of the interstitial water were examined in healthy and die-back reed stands (from reed tussocks and the open water area around them) of Lake Fertő/Neusiedler See. Electrical conductivity and the concentrations of  $\text{Cl}^-$ ,  $\text{S}^{2-}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$  and  $\text{NH}_4^+$  increased while the  $\text{SO}_4^{2-}$  concentration, pH, redox potential and temperature decreased as a function of depth. The conductivity and the  $\text{Cl}^-$ ,  $\text{S}^{2-}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{NH}_4^+$  concentrations of the interstitial water were lower and the  $\text{SO}_4^{2-}$  concentration was higher in the reed tussocks than around them. Low redox potential and high  $\text{S}^{2-}$  concentration characterised the degraded reed stands. Differences in the chemical characteristics of the interstitial water among reedshoots and in unvegetated area and among healthy and die-back reed stands demonstrate that the degree of reed cover and the health condition of the *Phragmites australis* influence the chemical features of the interstitial water. Knowing the range of chemical characteristics in the sediment interstitial water the processes ( $\text{SO}_4^{2-}$  reduction, nitrification and denitrification processes etc.) occurring in sediment can be predicted.

The fate of chemical parameters is strongly connected with the presence and properties of *Phragmites australis* stands and in turn the aquatic vegetation highly depends on the chemical composition of sediment interstitial water.

**Key words:** sediment interstitial water, chemical characteristics, reed belt, PCA, Lake Fertő/Neusiedler See

## Diversity of zoosporic fungi recovered from the surface water of four Egyptian lakes

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### Abstract

Thirty-six identified in addition to four unidentified species and one variety appertaining to eleven genera of zoosporic fungi were recovered from 76 surface water samples which were collected randomly from the four major Egyptian lakes (nineteen samples from each). *Phytophthora* (10 species + one variety) and *Achlya* (8 identified + unidentified species) contributed the broadest spectra of isolated species. *Saprolegnia*, *Pythium*, *Phytophthora* and *Achlya* were the commonest genera. The richest lake in zoosporic species was Menzalah followed by Borolous and Karoon while the poorest was Aswan High Dam Lake. The pH value had no effect on the diversity of fungal distribution in these lakes but the total soluble salts and organic matter content affected the quality of zoosporic fungi.

**Key words:** Surface water, water bodies, zoosporic fungi, distribution, Saprolegniaceae, Pythiaceae