Preface to special theme

Proceedings of the Plankton Ecology Group (PEG) Workshop in Mexico City (12–18 February 2012)

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Plankton is an important constituent of aquatic ecosystems, dominated in freshwater ecosystems by diverse groups of bacterioplankton, phytoplankton, and zooplankton. The Plankton Ecology Group (PEG) has made noteworthy headway in understanding ecosystem dynamics through a series of formal PEG meetings (a brief update can be found in Lürling 2013). The most recent PEG Workshop was hosted by the National Autonomous University of Mexico, 12–18 February 2012 (Lürling et al. 2012), organized under the auspices of SIL. The meeting was attended by 125 participants from 9 countries, the majority (>60%) of whom were young, enthusiastic students from various post-graduate programs in Mexico. The PEG working group chairman, Dr. Miquel Lürling, in his introduction to the workshop highlighted the salient contributions of PEG to general ecological plankton theory. The first plenary lecture during this meeting was delivered by the president of SIL, Dr. Brian Moss, followed by regular contributions, both oral and poster. Following the workshop, it was decided to publish selected lectures in the SIL journal, Inland Waters (IW). An editorial committee formed to assist with the peer review process selected 9 manuscripts for publication in a special PEG issue of Inland Waters. The contributions in this issue represent a wide range of planktonic organisms, including toxic cyanobacteria, and the physical and chemical conditions under which the organisms occur. Some authors discuss the role of competition, predation, or both in freshwater ecosystems.

Dr. Henri Dumont and his co-authors present a state-of-the-art review of invertebrate predation by flatworms. Although flatworms occur in waters from the Arctic to the Equator, their planktonic occurrence is nonrandom. Dumont et al. describe the unique cases of crustacean predation by the flatworms, as well as report the occurrence of 2 co-occurring species of flatworms from a Brazilian lake; one feeds on other flatworms as well as on zooplankton, especially cladocerans. In contrast, previously recorded Mesostoma is no longer found in another nearby lake in Brazil, but the reasons for its absence are not understood. Using examples from Chinese waterbodies, the authors explain that Rhynchosmesostoma, due to its release of toxic substances, is harmful to Daphnia galeata but less harmful to Ceriodaphnia quadrangula.

Another work related to the toxins in aquatic ecosystems is from Alillo-Sánchez et al., who quantify the levels of microcystin LR and the abundances of Anabaena spp. in Valle de Bravo, a drinking water reservoir in Mexico. The presence of toxic cyanobacteria in many waterbodies of Mexico is a matter of general concern for both the limnologists and the authorities of drinking water supplies. The authors demonstrate that during early spring to midsummer, the microcystin levels in this reservoir exceed the limits prescribed by the WHO standards (1 µg L⁻¹) for drinking waters, and during some periods, especially in April, are 5 times higher (5.56 μg L⁻¹) than the standard. During summer, cyanobacterial abundance also exceeds the WHO guidelines. This study thus recommends the need to regularly quantify the development of cyanobacteria and their cyanotoxins in Valle de Bravo, especially during summer.

The field work of Alillo-Sánchez et al. was further extended to lab experiments by Lin et al., who quantify the populations of 2 rotifer species (Platirnus patulus and Brachionus havanaensis belonging to Brachionidae). These rotifers were fed solely a diet of Chlorella or Anabaena, or a 1:1 mixture of these 2 diets. The authors also tested the effect of Anabaena on the competition between these 2 rotifer species. Anabaena was toxic and caused extinction of rotifer populations, regardless of whether it was offered alone or as a 1:1 mixture with the green alga Chlorella. In mixed rotifer cultures, the peak...
densities of both *P. patulus* and *B. havanaensis* were much lower than if the 2 were cultured separately. It seems that both *P. patulus* and *B. havanaensis* have similar sensitivities to *Anabaena*; both species failed to grow if this cyanobacterium was included in their diet.

Bojorge-García et al. report on the species richness and diversity of benthic diatom communities from the mountain streams of the Valle de Bravo Basin in the Mexican Volcanic Belt, including 74 diatom species and their substratum preferences. *Cymbella silesiaca*, *Rhicosphonia abbreviata*, and *Reimeria sinuata* were abundant and occurred frequently. About three-fourths of the diatom species did not show a clear preference for the substratum. Stream discharge and water temperature strongly affected the distribution of epilithic diatoms, suggesting facilitation between macroalgae and diatoms.

Another study related to the phytoplankton abundance and biomass from Leoni et al. explores the variations in depth-related distribution of phytoplankton composition and biomass at different depths (0–19 m) of Lake Iseo, a large oligo-holomictic waterbody in Italy. At 9–13 m depth stratum, the phytoplankton abundance was the greatest, mainly composed of Bacillariophyceae and Cyanobacteria, while Chlorophyceae were most abundant in the surface water.

The causes and consequences of water level fluctuations common in drinking water reservoirs have been comprehensively addressed by Zohary and Ostrovsky (2011), but regional studies of this topic are uncommon. Valeriano-Riveros et al. present quantitative data on phytoplankton abundance and water level changes in the drinking water reservoir Valle de Bravo. Included in the many interdependent aspects is the effect of mixing at boundary layers, which can cause the hypolimnetic temperature to increase in this reservoir.

Górniak and Karpowicz study the seasonal variations of crustacean zooplankton in a shallow, polyhumic reservoir in northeastern Poland by reanalyzing ~2 decades of chlorophyll *a* (Chl-*a*) data and crustacean abundance. This long-term study recorded some 51 species of Crustacea, which included 33 species of Cladocera, 17 species of Cyclopoida, and one species of Calanoida. The most common species were *Daphnia cucullata*, *Diaphanosoma brachyurum*, *Bosmina longirostris*, *Eubosmina coregoni*, *Clydorus sphaericus*, and *Mesocyclops leuckarti*. The authors found that zooplankton biomass was negatively correlated to Chl-*a* levels. High concentrations of Chl-*a* caused a shift in the zooplankton abundances, and large-bodied cladocerans were replaced by smaller species.

Vázquez-Sánchez et al. address seasonal changes in zooplankton abundance and diversity in the reservoir Valero Trujano (State of Guerrero, Mexico). They reported the diversity and density of rotifers collected during 2010–2011 along with selected physicochemical variables. The reservoir has some 62 rotifer species, Brachionidae being the most abundant; *Horaëlla thomassoni* (Trichosphaeridae) and *Wolga spinifera* (Trichotriidae), although rare in Mexico, were also abundant in this reservoir. The common phytoplankton genera reported were *Pediastrum*, *Cosmarium*, *Closterium*, *Nitzschia*, *Microcystis*, *Planktothrix* (Oscillatoria), and *Merismopedia*.

Espinosa-Rodriguez et al. report zooplankton–phytoplankton interactions under laboratory conditions using rotifers and green algae. They tested the effect of 2 algal species (*Chlorella vulgaris* and *Pseudokirchneriella subcapitata*) on the population abundance of 4 brachionid rotifer species (*Brachionus angularis*, *B. havanaensis*, *B. rubens*, and *Plattonus patulus*) at 3 algal levels (2.9, 5.8, and 11.6 µg DW mL⁻¹ for 24 h). Irrespective of algal density, *B. havanaensis* reached the highest abundance among the 4 species under the test conditions. In addition, growth of these rotifers differed between the 2 algal species. For example, *B. havanaensis*, when fed the highest food level of *P. subcapitata* attained about 800 ind. mL⁻¹, but when fed *C. vulgaris* at this level, the maximum density was about 250 ind. mL⁻¹.

These PEG Proceedings result from dedicated efforts of authors and the reviewers. Dr. Miquel Lürling as the PEG Chairman offered many constructive suggestions for the success of the workshop. The guest editors thank the anonymous reviewers for their constructive comments, the editorial staff of Inland Waters for advice, and the Freshwater Biological Association for publishing this special issue of Inland Waters. The authorities at Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, particularly Dr. Patricia Dávila Aranda, are gratefully acknowledged for their generous support in hosting this meeting.

**References**

