Seasonal shifts in chemotype composition of Microcystis sp. communities in the pelagial and the sediment of a shallow reservoir

Welker, Martin, Lenka ejnohová, Danka Némethová, Hans von Döhren, Jirí Jarkovský, Blahoslav Marálek

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ABSTRACT: The various oligopeptides produced by individual *Microcystis* clones enable the classification of individual colonies of *Microcystis* in distinct peptide chemotypes. The dynamics and diversity of coexisting chemotypes are regarded as major factors influencing the microcystin-content of blooms of this potentially toxic cyanobacterial genus. We compared the chemotype composition in planktonic and benthic *Microcystis* communities in Brno reservoir (Czech Republic) from July to November 2004 by single-colony mass spectrometry (n = 783). Ninety-two peptides were selected to characterize 37 chemotypes as revealed by K-means clustering. In the course of the season the *Microcystis* community became significantly less diverse (linear regression of Shannon indices, $p < 0.001$) in the pelagic, and in November two chemotypes[both of which did not contain microcystins]accounted for nearly 80% of the colonies. In contrast, other chemotypes that were dominant in the pelagic in July were no longer encountered after August, whereas some chemotypes that never accounted for high relative abundances were encountered throughout the season. The shift to some few dominant chemotypes in the pelagic was also reflected by changes in the benthic community where the same chemotypes increased in relative abundances. Nonetheless, chemotypes were identified in the sediment in July and November that were never found in plankton samples. A principal component analysis revealed that communities in the pelagial and the benthal were very different in July but converged during the season because of the deposition of dominant planktonic chemotypes in the sediment. In accordance with the declining percentage of toxin-producing *Microcystis* colonies, the microcystin content of seston samples decreased significantly from 0.9 mg g'' dry weight to levels below the detection limit (linear regression, $p < 0.001$).