



Effects of *Microcystis aeruginosa* and purified microcystin-LR on the feeding behavior of *Daphnia pulicaria*

Ghadouani, Anas, Bernadette Pinel-Alloul, Klaus Plath, Geoffrey A. Codd, Winfried Lampert

Limnol. Oceanogr., 49(3), 2004, 666-679 | DOI: 10.4319/lo.2004.49.3.0666

ABSTRACT: We investigated the mechanisms behind the negative effects of cyanobacteria on zooplankton by comparing the effects of *Microcystis aeruginosa* single cells, colonies, and toxins on the feeding behavior of *Daphnia pulicaria* in three independent experiments. The animals were fed a mixture of *Scenedesmus* supplemented by increasing proportions (0, 20, 50, 80, 100%) of *Microcystis* or concentrations (0, 50, 500, 5,000 ng ml⁻¹) of purified microcystin-LR. The changes in feeding behavior, as indicated by the appendage beat, mandible or labrum movement rates were evaluated by a direct observation method that coupled video recording and computerized image analysis. *Daphnia* responded in a different manner to the presence of single cells and colonies. In the case of the single cells, the mandibular movement rate (MMR) declined more than appendage beat rate (ABR), suggesting that *Daphnia* have the ability to discriminate between *Microcystis* and *Scenedesmus*. Colonies, on the other hand, produced a typical feeding interference response: the animals increased their labral rejection rate (LRR) and showed starvation signs. LRR increased in the presence of both unicellular and colonial *Microcystis*. In both cases, the changes in MMR and ABR were rapidly reversible and hence unlikely to be caused by intoxication from the presence of cellbound microcystins. In contrast, the addition of purified microcystin-LR at the concentration of 5,000 ng ml⁻¹ produced a nonreversible impairment of *Daphnia* feeding behavior.

Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.