

Controlling factors on the periods and vertical distribution of algal bloom in a subtropical off-channel reservoir

Meng-chieh Han*, Shian-chee Wu

Corresponding Author: Meng-chieh Han, e-mail: miranda_1217@hotmail.com;
scwu@ntu.edu.tw

Graduate Institute of Environmental Engineering, National Taiwan University, 71, Chou-Shan Rd., Taipei 106, Taiwan, R.O.C.

Abstract

Hsin-Shan reservoir, a subtropical off-channel reservoir which was stratified during March to October, suffered from eutrophication and algal blooms of *Microcystis* from early spring to late summer every year in the past decade. *Microcystis spp.* is a group of toxic bloom-forming algae which forms colonies and has ability to modulate cell density to migrate vertically. In 2014 and 2015, we found that the events of *Microcystis* blooms can be grouped into two types according to the timing of events and the distribution of the plume. The first type occurred within April to May at depth of 1~4 m, when there were the most serious blooms in the whole year. The second type occurred within July to August at depth of 4~7 m with lower density of algal cells. Between these two periods, *Eutetramorus fottii.*, a green algae, dominated.

The purpose of this research was trying to find the controlling factors that induce *Microcystis* blooms at certain periods of time and depth. Monthly sampling data, water qualities and nutrient concentration, and daily climate information were compared with algal concentration and species composition to find out the correlation between them. The results showed that the nutrient concentration and their spatial distribution were the main controlling factors. Low DIN:DIP ratio favored *Microcystis*, however, high DIN:DIP ratio favored *E. fottii.* Low rainfall led to the blooms of algae. The density stratification of the water body influences nutrient distribution, final vertical position of the inflowing water, and the vertical distribution of algae.

Key words

Microcystis, algal bloom, nutrients, rainfall, stratification
