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Rehabilitation of Disturbed Aquatic Ecosystem by Artificial Ecosystem

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Recently, many artificial vegetation islands (AVI) are installed at lakes and reservoirs. Even though the main purpose of installation of artificial vegetation island was water quality improvement, it was impossible to catch out the evidence of improvement. Under the AVI, the water quality was worse than control site by simple comparing of the chemical parameters. For example, the values of SS and COD under AVI were about two times higher than those of control site. But, the abundance of zooplankton of AVI site at extreme period was 400 times higher than that of control site. This means that the AVI is acting as a new ecosystem created by macrophyte and microorganisms. So for scrutinizing the microbial ecosystem under the AVI and possible mechanism of water quality improvement through newly created ecosystem, we measured the microbial and biological parameters at Lake Paldang, where the large AVI was installed at May, 2000. Zooplankton and bacterial numbers and exoenzyme activities (beta-glucosidase and phosphatase) were measured biweekly from 3, November 2001 to 20, April 2002 at AVI site and control site. The zooplankton numbers of AVI site were averagely 25 times higher than those of control site. Respiratory active bacterial numbers were 3-8 times higher at AVI site, but the total bacterial number was not different at both sites. And both enzymatic activities were also higher at AVI site than those of control site. These results suggest that the biological compositions and ecological functions of newly created ecosystem under AVI were quite different from those of control site. Moreover, this new ecosystem was operating for organic material removal by respiration of zooplankton and high activities of microorganisms. These high activities were resulted from the tight couplings of zooplankton-phytoplankton-macrophyte-bacteria relationships.