The effects of phosphorus and nitrogen on phytoplankton dominance in tropical fish ponds

ABSTRACT

Nine ponds were used to determine the effects of phosphorus (P) and nitrogen (N) loading on: the phytoplankton dominance in tropical fish ponds. Three ponds received triple superphosphate (TSP), three received triple superphosphate plus urea (TSPUrea) and the rest served as the control. Addition of both phosphorus and nitrogen (TSP-Urea treatment) resulted in higher total phytoplankton than the TSP treatment and the control ($P < 0.05$). In general, blue-green algae formed the dominant group in TSPUrea treatment ponds followed by dinoflagellates, green algae, euglenoids and diatoms. In TSP-Urea treatment ponds, green algae was the most abundant group followed by blue-green, dinoflagellates, euglenoids and diatoms. Addition of combined nitrogen and phosphorus to the ponds not only significantly increased ($P <0.05$) total phytoplankton densities, but also caused a shift from bluegreen algal dominance to green algae. TSP treatment ponds showed significantly higher: blue-green algae than TSP-Urea treatment in the early culture cycle. However, as the ponds became more productive with time, blue-green algae also appeared to be common in TgP-Urea treatment in spite of high N: P ratios. The blue-green algae increased linearly with the increase of total phytoplankton in all treatments ($r2 = 0.58$. $P < 0.01$).

Keyword: Fish pond; Nitrogen; Phosphorus; Phytoplankton; Algae growth