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Effect of phosphorus application on appearance of algal water bloom and rice yield in rice-barley double cropping system

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Abstract

Algal communities are important to maintain the aquatic ecosystems function. Algae have short life cycles, they respond quickly to environmental change and their diversity and density can indicate the quality of their habitat. The bloom forms before the rice seedlings have emerged, it may present a physical barrier that prevents the seedlings from penetrating the floodwater. Wind may also move the algal bloom, pushing the young plants beneath the surface. Another harmful action develops when the water dries up and the algae form a layer at the bottom of the field. The layer envelops the seedlings, which are not yet deeply rooted, and drag them to the surface when the water is let in again. Soil utilization pattern can be the main factor affecting soil physico-chemical properties, especially in soil phosphorus (P). Solid content of the algae culture solution increased with the increase in the nitrogen rather than the phosphorus concentration. Phosphoric acid was treated with conventional treatments (100-0%, before transplanting time-tillering stage), 50-50%, 0-100%, and un-treated. The herbicide was treated on the 7 DAT (day after transplanting). Green algae samples were collected 20 DAT. Total phosphoric acid was the highest at 0.06 in 50-50% treatment in 20 DAT. The amount of green algae was about twice (9.8 mg/20ml) that of un-treated. Total number of green algae was 54 species (Green algae 35 species, Euglena 9 species, Stone wheel 10 species). Among the phosphoric acid treatment methods, the number of occurrences of green algae were the highest with 39 species in 0-100%, followed by 50-50%, 28 species, conventional treatments, 22 species, non-treatment, 18 species, respectively. Rice Yield was not significantly different by phosphoric treatment time, but slightly higher than un-treated. The maximal algal biomass was observed about 2 weeks or 1 month after transplanting; the subsequent decrease of the biomass was related to the consumption by grazers and to a deficient light under the rice canopy. Maximal algal growth was observed just before tillering. To estimate the suitable method of phosphorus application in puddled-soil drill seeding of rice, available phosphorus appearance of algal water bloom, and rice yield were investigated in paddy soil of rice-barley double cropping system.

Keywords: green algae, wheat and barley, control, rice, fertilization.

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