A B S T R A C T

STUDIES ON CYANOBACTERIA (BLUE GREEN ALGAE) AND AZOLLA AS BIOFERTILIZERS FOR RICE

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(Degree: Doctor of Philosophy).

The primary aim of this study was to examine the possible use of Cyanobacteria and Azolla as nitrogenous biofertilizers for rice in Sri Lanka.

Since, tested initial multiplication methods of these organisms and preliminary pot experiments gave positive results, experiments in rice fields were attempted both in dry and wet zones of Sri Lanka. Azolla showed a good growth in all the tested localities, while Cyanobacteria showed appreciable growth only at Maha-Iluppallama (low country dry zone). In general, it was found that Azolla grows better in environments with relatively less light, low temperature and a pH close to neutral, but it was also demonstrated that Azolla could gradually be adapted to higher light and temperature conditions, and once adapted it has a very rapid growth. The growth of Cyanobacteria in the field at neutral pH showed a little success only in the dry zone location indicating that their growth is favoured by relatively high levels of light, temperature and above neutral pH. In adition to

environmental conditions, biotic factors like algal-grazers and Azolla pests severely limit field establishment of these organisms.

While significant increase in grain yield of rice could be obtained by incorporating Azolla, no such positive effects were shown with Cyanobacteria. In comparison to chemical fertilizers, grain yields obtained with Azolla were equivalant to 55-84 kg N ha^{-1} applied as urea.

Isotope experiments using ^{15}N and ^{32}P showed that these nutrients are effectively taken up by the associated rice crop after soil incorporation of Azolla. These studies also demonstrated that additional P fertilizer is not necessary when Azolla is used in rice culture.

Besides supplying nutrients, Azolla was shown to be beneficial to the rice crop as an efficient suppressor of weeds.

These studies clearly demonstrate the potential of Azolla as a biofertilizer for rice in Sri Lanka. However, further research, especially with respect to pest problems, should be done before recommending Azolla for widespread use by farmers.