

Author: [ADVANCED](#) | Volume Page

Keyword: |



[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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[\[PDF \(892K\)\]](#) [\[References\]](#)

Additional Profits by an Introduction of Polyculturing into Monoculturing at Paddy Field

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Abstract

To investigate the additional profits by an introduced complexity of cropping into rice monoculturing at an usual paddy field, the serial experiments were carried out in 2004.

- 1) In the experiment to confirm the possibility of using water hyacinth (*Eichhornia crassipes*, WH) as green manure, we selected the two experimental factors which were nitrogen applied by basal chemical fertilizer and nitrogen applied by WH grown at the previous cropping. Rice yield reduced with an increment of applied quantity of WH at 0gN/m², but rice yield at 2.5gN/m² (1/2 plot) were almost as same as 5.0gN/m² at the conventional plot, so we could estimate the effect of applied fertilizer level on rice yield. It was also estimated to be nitrogen starvation in the soil.
- 2) In the experiment to confirm the possibility of distribution to rice growth preferentially by the side dressing and controlled release fertilizer in place of uniform application of fertilizer to top soil with the shift of transplanting time between rice and WH, it was not observed the effects of chemical fertilizer type and co-existence of WH on preferential growth of rice.
- 3) In the experiment to confirm the reduction of methane production from a paddy field by an introduction of co-existence crop, differences between plots were observed in methane fluxes and Eh values, but the difference of total methane production during growing season was not significant among plots and the difference between treatment plots and conventional plots.
- 4) It was estimated that competition between rice and WH was happened at some severe conditions only. In the future studies, it is important to collect more fundamental data on

precise decomposition rate of WH in soil and maintenance at an optimum nutritional condition to solve a nitrogen starvation at the various practical cases.

Key words

[rice](#), [paddy field](#), [monoculture](#), [fertilizer type](#), [additional profits](#), [polyculture](#), [water hyacinth](#), [methane flux](#), [model plant](#), [nutrient transfer](#)

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