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Responses of Crop Growth by an Introduction of Polyculturing into Monoculturing at Paddy Field

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Abstract

At a paddy field with introduction of some complexities based on biodiversity, we investigated the effect of plant population of water hyacinth (*Eichhornia crassipes*, WH), selected as a covering model plant for water-surface and a companion plant to rice plant, on responses of crop growth. The plant population of rice plant was constant, and plant population of WH was only changed as follows ; 22.2, 16.7, 11.1, 5.6, 0hill/m^2 and WH without rice plant (11.1hill/m^2). Experimental plots were arranged with randomized design including three repetitions. Although yield of rice decreased with the increment of plant population of WH, height of WH increased. As an extinction coefficient decreased, light competition between rice plant and WH increased. As LAI of rice plant decreased, nutrition competition also observed. With the increment of plant population of WH, panicle number per m^2, final brown rice yield decreased as a result of decrease of glumaceous flower number per head. Although paddy yield decreased with the increment of plant population of WH, total fixation rates of carbon and nitrogen surely increased by the contribution of WH. If we are prepared to decrease the paddy yield, we obtained some useful data in order to propose a new cropping systems based on environmental conservation and biodiversity in future.

Key words

rice, environmental conservation, paddy field, response of crop growth, plant population, biodiversity, monoculture, polyculture, water hyacinth, model plant

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