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Bio-feeding and fertiliser management effect on nutrient flow and productivity of the minapadi cultivation system in Indonesia

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Abstract

Minapadi is a cultivation system in paddy fields that grows rice integrated with fish. For many years, the minapadi system was not widely practised due to product safety and health caused by the high use of chemical application in rice production. However, the demands for environmentally friendly agriculture encourage the practice of this system. The objectives of this study are to find the best bio-feed formula and fertilisation based on differences in nitrogen content and to analyse the effect of nitrogen applied on nitrogen flow, performance, and productivity in the minapadi system. The Minapadi system field experiment was designed as a plot with a size of 5m × 6 m, where each plot was made with an additional a circular model trench with width of 40 cm and depth of 50 cm to facilitate fish growth. The experiment was conducted using a randomised block design method with four treatments of different nitrogen levels of bio-feed: control, 5 %, 7 %, and 9 %, with three replications. The hybrid rice of the Inpari-32 variety and Tilapia (*Oreochromis niloticus*) was cultivated in the experiment. The results showed that the bio-feed treatments showed a significant effect on rice and fish growth and production in 7 % nitrogen application. Nutrient flow showed that the feed with 7 % nitrogen was the most suitable for fish growth integrated with rice as the highest in the weight (120.56 g), and nitrogen content in the feces (7.92 %). In this line, nitrogen plant uptake was obtain advantage that 5 % nitrogen was improved nitrogen soil content to 0.43 % and 0.28 % in plant tissue. This study highlights the importance of developing bio-feed based in the minapadi system. Nutrient flow could be maintained because nutrients dissolved in water from fish feces and urine, and it sedimented on the soil surface, are utilised by rice plants as a nutrient source.

Keywords: Bio-feed, cultivation system, minapadi, nutrient flow, tilapia