RESEARCH PAPER:

Hydrological characters and their relationship in fish ponds manured with different organic manures

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SUMMARY

Hydrology of water bodies play an important role in regulating the various metabolic activities of fish. Optimum levels of these parameters are essential for the better survival and growth of fish as organic manures influence the quality of water to a large extent. The present investigation describes the effect of three organic manures *viz*., raw cowdung (T_1), vermicompost (T_2) and poultry manure (T_3) on various hydrobiological and physico-chemical characteristics in ponds stocked with carp fry. Dissolved oxygen (DO), pH, transparency, alkalinity, free CO_2, H_2S, nitrate nitrogen, ammonical nitrogen, phosphorus and plankton were estimated. Amount of free CO_2, H_2S and ammonical nitrogen was found to be higher in cowdung and poultry manure treatments and for some period of time, it was found above the toxicity level. The hydrological characteristics and productivity profiles of ponds reveal that vermicompost is better manure for fish culture than poultry manure and cowdung.

Key words : Hydrological characters, Cowdung, Vermicompost, Poultry manure, Fish pond

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The use of organic manures as fertilizers in aquaculture is an ancient practice and continues to be used as an efficient and economical means of increasing production in aquaculture ponds. In many tropical developing countries, where the priority is to provide low cost meat to low income population, use of supplementary feed is not feasible as it raises the cost of production, making the product beyond the reach of majority of population.

Several studies have been conducted on the fish production efficiencies of different manures in various countries (Sharma and Olah, 1986; Little and Muir, 1987; Singh and Sharma, 1999). However, very few investigations have been done to evaluate the impact of different organic manures on the hydrobiology of fish ponds (Ghosh *et.al.*, 1984; Fang *et al.,* 1986; Salomoni and Caputo, 1989; Zaccarato *et al.*, 1995 and Singh and Sharma, 1999). The present study was designed to obtain a comparative account of hydrobiology and their relation in fish ponds manured with cowdung, vermicompost and poultry manure.

MATERIALS AND METHODS

The experiment was conducted at the Fish Seed Farm, Department of Fisheries, College of Agriculture, IGAU, Raipur, for a period of hundred days during September to December 2004. Six earthen ponds of average 750 m^2 with 1.25 m average depth were stocked with carp fry @ 1 lakh fry/ha. Water temperature, pH, transparency, DO, free CO_2, total alkalinity, H_2S, nitrate and ammonical nitrogen and phosphorus were recorded at weekly intervals following standard methods (APHA, 1989). Quantitative estimation of phytoplankton was done with the help of drop method and zooplanktons were counted with the help of Sedgwick-Rafter cell. Correlation between physico-chemical and biological parameters was determined.

RESULTS AND DISCUSSION

Observations on physico-chemical parameters and plankton population in the ponds treated with the three organic manures are reported in Table 1 and Fig. 1.

The amplitude of variation in water temperature was 9^0C with minimum 23 ^{0}C and maximum 32^0C observed during September to December. Water transparency varied between 15-27 cm. in all the treatments during the whole experimental period. It was higher in initial periods and lower towards the end of the experiment. Less visibility in vermicompost (24.0 cm) and poultry manure (19.6 cm) treatments was observed due to good number of plankton population. Whereas, transparency was high in ponds treated with raw cowdung (28.7 cm). Sinha and Shrivastava (1989) and