

FERTILIZATION AND FEEDING REGIMES IN BROOD PONDS OF INDIAN MAJOR CARPS IN JESSORE AND MYMENSINGH REGIONS OF BANGLADESH

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ABSTRACT

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Hatchery and fish seed production is the rapidly growing industry in Bangladesh. It has specially been boomed in Jessore and Mymensingh regions. Presently about 99 percent of the Indian major carps seed is produced from hatcheries. The seed quality largely depends on brood fish management relating to feeding and fertilization regimes followed by the hatcheries. Feed with proper ingredients is a key factor for attaining desired brood quality. A survey was conducted on Indian major carp brood rearing techniques relating to feeding and fertilization practices in some hatcheries in Jessore and Mymensingh regions. Fertilization of the ponds was found to be done with urea, Triple Super Phosphate (TSP), Muriate of Potash (MP) and mustard oil cake at a comparatively higher rate in Jessore than in Mymensingh. Cow dung was seen to be used higher in amount in Mymensingh than in Jessore region. Percentages of rice bran and fish meal were higher in Jessore region; while wheat bran was used comparatively at higher percentage in Mymensingh region. Mustard oil cake and vitamin premix were found to be used closely similar in amount in both the regions. Some traditional food items were seen to be used in both the regions.

Keywords: *Brood ponds, Indian major carp, Fertilization*

INTRODUCTION

Over the last two decades or so Jessore and Mymensingh areas of Bangladesh have experienced an intense growth of fish breeding industries. The success of hatchery mainly depends on improved brood rearing technique entailing pond management, including liming, fertilization and feeding and water quality management. Fertilization regimes vary with different local conditions such as soil and water condition. Fertilization and supply of artificial feeds along with natural foods have been a common practice in Bangladesh aquaculture. However, the rates quite often vary. There are different recommendations on fertilization and feeding regimes from different extension sources and also the same varies on farmers' own practical experience. Both over-and under-fertilization may cause adverse effects on water quality, pond effluents and fish production. Improper feeding regimes may cause adverse effects on brood fish maturation and gonadal development. There are important references on the use and applicability of inorganic and organic fertilizer in fish ponds by several authors (Jhingran, 1988; Haque, 1991; Knud-Hasen *et al.*, 1991; Haque *et al.*, 1996; Wahab *et al.*, 1995; Islam *et al.*, 2002 and Wu, Zhong Wen. 2001).

Information on the use of different feed sources, their percentage composition and effects on different cultivable species of fish are available from many workers (Watanabe *et al.*, 1984 a b; Springate *et al.*, 1985; Weixin, 1987; Carlos, 1988; Santiago *et al.*, 1988; Blakely, 1989; Paul, 1989; Hague, 1991; Sultana *et al.*, 2001; Islam *et al.*, 2002; Ghosh and Roy, 1992; Haque *et al.*, 1996; and Mollah, 1996).

In the present study efforts were made to survey the different fertilization and feeding regimes as followed in Indian major carps brood rearing in Jessore and Mymensingh regions; these two regions have experienced a boom in Indian major carps' hatchery and seed production industries. For this, Jessore and Mymensingh regions were selected for the study site. The study was based on questionnaire survey and interview of the hatchery owners in the two sites. It was found that Urea, TSP, Muriate of Potash (MP) and mustard oil cake were used comparatively more in quantity in Jessore than in Mymensingh region; cow dung was found to be used lower in amount in Jessore. The hatcheries applied higher amount of rice bran and fish meal in Jessore region as feed, while wheat bran was used comparatively higher in amount in Mymensingh region. The amount of mustard oil cake and vitamin premix were found closely similar in use in both the regions. The study high lighted the characteristic brood management practices involving feeding and fertilization in the two regions that experienced a rapid growth and development of the seed production industry.

MATERIALS AND METHODS

A field survey was conducted on the existing fertilization and feeding regimes as followed in brood ponds of Indian major carps in Jessore and Mymensingh regions of Bangladesh. The study was conducted during July to September, 2004. A total of 20 private hatcheries in Jessore and 18 private and 1 Govt. hatcheries in Mymensingh regions were covered in the survey. The survey was done by filling up structured questionnaires and interviews of the hatchery owners. In Jessore the survey areas were Chanchra, Arabpur and Nazir

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Sankarpur and in Mymensingh the areas were Shambhugonj, Raghobpur, Kaltapara, Gouripur, Dhala, and Laxmanpur.

Data Analysis

All the information and data collected were analyzed, compared and interpreted through applying simple statistics of measures of central tendencies and dispersions.

RESULT AND DISCUSSION

Application of rotenone and 1-2 days after that use of lime was the common scenario of pond preparation in the study areas. Liming of pond was seen as a routine activity in both the regions. Though the rate of liming does depend upon p^H of the pond water, most of the farmers were not aware of it. The application was found not to have any fixed rate in both the regions. The doses were found to be ranged from 500-700gm dec^{-1} and 600-800gm dec^{-1} in Jessore and Mymensingh regions respectively. Farmers mostly applied lime at the time of drying the pond. They also did spray diluted calcium carbonate on the surface of pond water during rearing when the water quality got deteriorated, however the dose used was always lower than the dose used in pond preparation. Liming was normally done at a rate of 1012 gm dec^{-1} (Haque, 1991 and Mazid, 1992). Chakraborty, (1979) reports liming dose at 600 -1200 gm dec^{-1} in India.

The strategy of fertilizer use in fish ponds was all the same in both the regions; using mostly at preparation stage and if necessary during rearing. Use of both inorganic and organic fertilizers was also the common tradition in the regions as else where in the country. The inorganic fertilizers used were Triple Super Phosphate (TSP), Urea, Muriate of Potash (MP), mustard oil cake and organic fertilizers were cow dung and compost. The percentages of fertilizers used in brood ponds in Jessore and Mymensingh regions are shown in Figures 1 and 2.

The differences in the rate of fertilizer application in the two regions was ascertained to be based on the species combination, soil fertility, water quality and on the farmers' own experience on culture practices. Most of the farmers were seen using fertilizers at near optimum rates; only a few were using at very low levels. In general, however, the amount applied by the farmers in Jessore region was higher than the amount applied by the farmers in Mymensingh region and this was ascribed to the differences in soil and water quality; quality of soil and water of Jessore was not as good as in Mymensingh region. The rates of application followed in the two regions were again different from that of the rates applied in other parts of the country (Islam *et al.*, 2002).

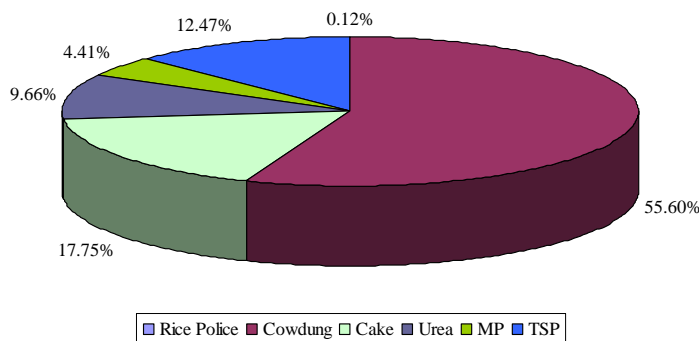


Figure 1. Fertilizers (gm dec^{-1}) used in brood ponds in Jessore area

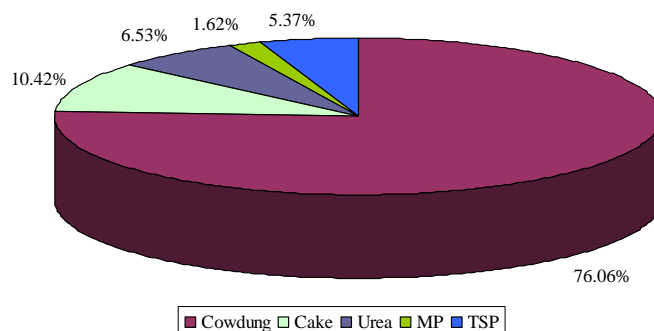


Figure 2. Fertilizers (gm dec^{-1}) used in brood ponds in Mymensingh area

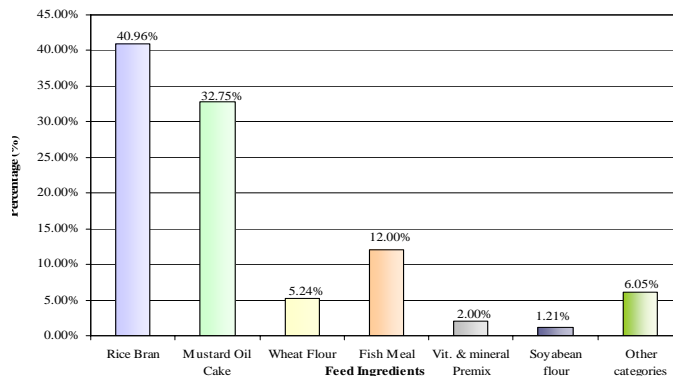


Figure 3. Food ingredients (gm dec^{-1}) used in brood ponds in Jessore region

Mode of application was same in both the regions; every time TSP and oil cake were soaked in water a night before application. As else where in the country, pulling of hora in the pond was still another common practice in the regions to get rid of the obnoxious gases that form in the pond bottom.

The brood fish feeding was done with home made feeds in both the regions. The feeding practice followed in the two regions was broadly similar both in the type of ingredients used and percentage of composition. The figure 3 and 4 show the type of ingredients of feed used and the percentages of composition adopted in Jessore and Mymensingh regions respectively. The percentage of rice bran used in Jessore region was higher than in Mymensingh region; the rate of fish meal was found higher in Jessore region. On the other hand the percentage of wheat bran was seen to be higher in use in Mymensingh region. The other ingredient type viz., mustard oil cake, vitamin and mineral premix, soybean flour and the type “other category” were all found to be used with similar proportions in both the regions. Haque (1991) and Islam *et al.*, (2002) suggest the use of similar composition and proportions for brood of Indian major carps in Bangladesh. In both the region the ingredient type “other category” was consisted of varied food items ranging from maize, molasses, course flour, cooked rice, egg yolk, meat bone, chicken liter, di-calcium phosphate and salt etc. The proportion of the items in the feed did not have a fixed scale and depended on the experience of the individual hatchery owners. They did not have strict idea as to the protein and lipid content of the feed either and claimed for 25-30% protein on assumption. Protein and lipid requirement for warm water omnivorous species were given by FAO, (1983); the Indian major carps and grass carp require 30% protein and 6% lipid.

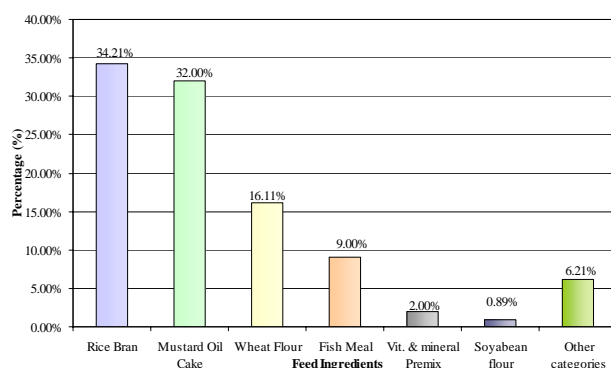


Figure 4. Food ingredients (gm dec^{-1}) used in brood ponds in Mymensingh region

Feeds were applied both in dough and pellet forms. In case the feeds were applied in dough, the feed mixture was soaked in a concrete pit, a night before. Then the soaked feed materials were made into dough with dry fish meal and thrown into a definite point of the pond. For pellet preparation, the oil cake was soaked in water a night before preparation. The dry ingredients were mixed with soaked oil cake and molasses and extruded into pellets. The pellets were dried in sun before application. In dough feeding it was obvious that there were utilization losses of feed and the unused feed was added to the effect of fertilization of the pond. Islam *et al.*, (2002) and Haque (1991) report similar practices of feeding of Indian major carps.

The rate and frequency of feeding of brood fish in the two regions were seen to vary. In the Jessore region the fishes were fed at 3-4% of body weight, 5-6 days in a week; in Mymensingh region the rate was found to be at 4-5% of the body weight, 5-6 days in a week. These rates were followed in the initial stage of brood preparation, however, as the breeding season approached, the rates were decreased to 1-1.5% of body weight, 3-4 times per week in Jessore and 1.5-2.0% of body weight, 3-4 times per week in Mymensingh region. The feeding rates were found to depend on species combination.

Brood pond management relating to fertilization and feeding is the prime consideration for producing quality broods and that in turn allows the availability of good seed for successful aquaculture in the country. Jessore and Mymensingh are the two regions in the country which have come out as the most promising areas in hatchery technology of Indian major carps. Thus it was important to get an idea about the practice of brood rearing especially relating to pond fertilization and feeding of broods in the two regions. The practices followed in the regions were broadly similar however; there are some variations in the rates of ingredients of both fertilizer and feed in the regions. There is difference in feeding rates and frequencies in the two regions also. The differences in both the practices were ascribed to the differences in soil and water quality, species combination and individual farmer's experience.

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