Bangladesh J. Fish. Res., 9(1): 21-23

Development of low cost feed using local ingredients for culture of freshwater prawn, *Macrobrachium rosenbergii* in ponds

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Abstract
Two experiments were conducted to formulate and evaluate test diets using locally available ingredients to find out suitable diets for mono and polyculture of *Macrobrachium rosenbergii* in ponds. The first experiment was conducted from 1 July 2003 to 29 September 2003 in 12 experimental ponds each measuring 30 m^2 behind the Fisheries Faculty Building, BAU campus, Mymensingh. Three experimental diets containing 30% protein were formulated using fish meal, meat and bone meal, mustard oilcake, sesame meal and rice bran and assigned to treatments 1, 2 and 3, respectively. A special shrimp feed (Starter-II) from Saudi-Bangla Fish Feed Ltd. was assigned to treatment 4 (Control). Each treatment had three replications. Juveniles of *M. rosenbergii* (2.90±0.81g) were stocked at the rate of 4/m^2. Prawns were fed three times daily at the rate of 15% of their body weight at the beginning, which was gradually reduced to 10% and 5% for the last two months. There was no significant ($P>0.05$) difference between the weight gains of prawns fed diets 1 and 4 (control), but they were significantly ($P<0.05$) higher than those of diets 2 and 3. The FCR values of diets ranged between 2.61 to 3.36 with diets 1 and 4 showing significantly ($P<0.05$) lower FCR values. The survival rate of prawns ranged between 68 to 78% with prawns fed diets 1 and 4 showing significantly higher survival rate. The production of prawn ranged from 921 to 1,428 kg/ha/90 days and diet 1 gave the highest production. Treatment 1 gave the highest net profit of Tk. 161,980/ha/90 days. The second experiment was conducted from December, 2003 to April, 2004 to see the growth of over wintered *M. rosenbergii* juveniles in polyculture with indigenous major carps (catla and rohu) in ponds using formulated diets. Three isoenergetic experimental diets formulated using fish meal, meat and bone meal, mustard oil cake, rice bran, wheat bran and molasses, and a shrimp feed 'Golda special feed' from Saudi-Bangla Fish Feed Ltd. were assigned to treatments 1, 2, 3 and 4 (control), respectively, each treatment had two replications. Eight experimental ponds each measuring 80 m^2 in the Field Laboratory Complex of the Faculty of Fisheries, BAU campus, Mymensingh were used. The mean initial weights of *M. rosenbergii,* catla and rohu were 1.60±0.01, 30.0±0.09 and 25.0±0.08 g, respectively. A total of 160 fish and prawn (20,000/ha) were stocked in each pond at the ratio of 2:1:1 (prawn: catla: rohu). Fish were fed at the rate of 3-5% of their body weight. Prawns fed diet 1, 2 and 4 showed higher weight gains compared to diet 3. The weight gain of catla was significantly higher in T_1 while in case of rohu was higher in T_1 and T_4, respectively. There were no

significant differences (P>0.05) in the survival rate of fish as obtained from different treatments. The overall total fish production ranged from 2196 to 2679 kg/ha/5 months. The highest production and the highest profit (Tk. 56,531/ha/5 months) was obtained from T_1 and the lowest (Tk. 24,932/ha/5 months) from T_4.

Key words: *Macrobrachium rosenbergii*, Low-cost feed, Local ingredients, Culture

Research findings

- There was no significant (P>0.05) difference between the weight gains of prawn fed test diet 1 and special shrimp feed (Starter-II) of Saudi-Bangla Fish Feed Ltd.
- The maximum net profit as obtained from diet 1 was Tk 161,980/ha/90 days while that of Saudi-Bangla special shrimp feed (Starter-II) was Tk. 39,683/ha/90 days only.
- The diet containing 20% fish meal, 10% meat and bone meal, 15% mustard oilcake, 15% sesame meal, 35% rice bran, 4% molasses and 1% vitamin premix (diet 1) was found to be the best for monoculture of *M. rosenbergii* in ponds.
- It is possible to culture *M. rosenbergii* with Indian major carps, the highest profit of Tk. 56,531/ha/5 month was obtained from treatment 1 while the lowest (Tk. 24,932/ha/5 months) from treatment 4.
- Supplemental feed consisting of 25% fish meal, 10% meat and bone meal, 15% mustard oilcake, 20% rice bran, 20% wheat bran and 5% binder was the best for polyculture of *M. rosenbergii* with Indian major carps.

Policy implications

- Culture of golda, *M. rosenbergii* in freshwater ponds should be encouraged and availability of the golda PL/Juveniles should be ensured through government initiatives.
- Cheaper feed using local feed ingredients as developed through the present study should be made available to the rural farmers who can not afford to buy costly commercial feeds.
- For profitable golda farming, farmers can also use over-wintered *M. rosenbergii* juveniles for polyculture of golda with indigenous major carps in ponds.
- The government and non-government agencies involved in the fisheries development should take initiatives to motivate the rural farmers to incorporate golda in the carp polyculture system.

Livelihood implications

The present study has great implication on poverty reduction and livelihood improvement of the rural farmers by introducing golda farming in ponds. The use of locally available feed ingredients for formulating diets for the monoculture of *M. rosenbergii* in pond farmers can maximize their profit margin because such feeds are much cheaper than the commercial feeds. The other positive approach is the incorporation of over-wintered golda juveniles in the carp polyculture system in ponds. As the hatchery operators in Bangladesh do not get proper price for the PLs they produce in the later stage of the production cycle and some times they can not even sell them, so they are compelled to rear them at high stocking densities during the winter months. So, introduction of over wintered golda juveniles in the carp polyculture in ponds can utilize the lately produced PLs, which have a positive livelihood implication for the hatchery operators as well as for the rural farmers.