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Cultures of Fairy Shrimp (*Streptocephalus sirindhornae*) for Feeding Giant Freshwater Prawn (*Macrobrachium rosenberbii*)

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Abstract The adult fairy shrimps (*Streptocephalus sirindhornae*) of 0.5, 1.0 and 2.0 cm in length are designed as food for different age groups of giant freshwater prawns (*Macrobrachium rosenberbii*). The study was done to evaluate the size and amount of fairy shrimps and suitable ratio of fairy shrimp as substitute pellet for feeding giant freshwater prawn; and determined the growth rate and survival rates of giant freshwater prawn fed with Fairy shrimp. Four age groups of giant freshwater prawn: a group beginning reared in earthen pond (0 month old), age groups reared in earthen pond for 1, 2 and 4 months old were reared in aquarium tanks for 7 days. Completely Randomized Design (CRD) with 3 replications of 3 sizes of fairy shrimps: 0.5, 1.0 and 1.5 cm in length were tested. Three age groups of giant freshwater prawns of 1, 2 and 4 months old were reared in aquarium tanks for 45 days. Completely Randomized Design (CRD) with 3 replications of 5 food rations of fairy shrimps to pellet feeds: 100:0, 75:25, 50:50, 25:75 and 0:100 were tested. The results showed that fairy shrimp of 0.5 cm in length can be used as food for giant freshwater prawns of age 1 month and older. The optimal size of fairy shrimps for feeding giant freshwater prawns of age 1, 2 and 4 months were 0.5, 0.5-1.5 and 0.5-1.5 centimeters in length, respectively. The number of fairy shrimps fed by giant prawns of age 1, 2 and 4 months were 32.09, 32.86-43.57 and 24.3-33.27 individuals per day, respectively. Moreover, fairy shrimps could be used to substitute pellet up to the ratio of 100%.

Keywords: fairy shrimp, giant freshwater prawn

Introduction

Giant freshwater prawns are the most economically important species of Thailand and cultured continuously for more than 30 years. The giant freshwater prawns are good test and can be bred in large quantities.

The giant freshwater prawns productivity in domestic consumption is exported to other countries, which is about 20 % of total production. The

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Department of Fisheries reported that the giant freshwater prawns in the central area are about 80,000 hectares. Shrimps production is about 25,000 - 30,000 tons per year. Prawns feed has high in protein (30-40 %). This is expensive, and the price had been rising steadily inconsistent with prawn, hence making food cost percentage as high as 60-70 % of production cost. The objective were to determine the size, amount of the fairy shrimp and suitable ratio as subsitute pellet for the giant freshwater prawns and to determine the growth rate and survival rates of giant freshwater prawn fed with Fairy shrimp.

Materials and methods

Sirindhorn fairy shrimps with sizes of 0.5, 1.0 and 1.5 centimeter were tested as substitute food for the culture of giant freshwater prawn at 4 age groups. Giant freshwater prawns were reared in ponds 1, 2 and 4 months. The experimental design was CRD with 4 replications. Data on the size and quantity of fairy shrimp from Experiment 1 were used in experiment 2. Fairy shrimp were fed as substitute for pellets with the ratio of 0, 25, 50, 75 and 100. Aquarium measuring 30 × 30 × 30 cm water depth of 10 centimeter for shrimp 0 and 1 month, and 30 × 60 × 30 cm water depth of 20 centimeter for shrimp, 2 and 4 months of age were used. Juveniles (0 and 1 month) were placed at 10 prawns/aquaria and prawns at aged 2 and 4 months at 5 prawns/aquaria. Fairy shrimp pellet was given at ratios of 0, 25, 50, 75 and 100 in the morning and evening. The collections of data were weight and length, pH, oxygen, nitrite, nitrate and alkalinity of water were done every 7 days. The experiments were done at the Department of Fisheries. College of Agriculture and Technology, Danchang Suphanburi.

Results

Study on size and amount of the fairy shrimp, and suitable ratio for the giant freshwater prawn

The used of the Sirindhorn fairy shrimps with sizes 0.5, 1.0 and 1.5 cm were tested. Prawns with 4 age groups started releasing shrimp in earthen pond (0 month), Prawns were grown in earthen pond for 1 month, 2 months and 4 months fed with fairy shrimp for a period of 7 days. The results indicated that the prawns which were just released in earthen pond cannot eat Sirindhorn fairy shrimp of 0.5 -1.5 cm. Meanwhile, the prawns which were grown in earthen pond for1 month, 2 months and 4 months can be eaten by the giant freshwater prawns from 0.5 cm. This was revealed as the appropriate size and the average

number of Sirindhorn fairy shrimp to be served as food for the prawns. The prawns eat each size is shown in Table 1.

Table 1. Size and average number of Sirindhorn fairy shrimp ate by each size of prawn for 7 days

Age of prawn (month)	**Average number of Sirindhorn fairy shrimp consumption (per day)**		
	size 0. 5 c.m.	size1 . 0 c.m.	size 1. 5c.m.
0	-	-	-
1	32.09	17.47	10.27
2	38.62	43.57	32.86
4	28.4	33.27	24.3

The use of fairy shrimp substitution pellet food

The ratio use of fairy shrimp substitution pellet food of 0, 25, 50, 75 and 100 in 3 age groups of prawn for 45 days. The results were as follows;- water quality of the cultures with similar values are considered to be suitable for the growth of aquaculture. The pH 8.05-8.82, Ammonia 0 mg/l , Nitrate 5-40 mg./l, Nitrite 0.02-1-N/L and Alkalinity 85-153 mg/l in experiment and pH 8.71-8.08, Ammonia 0 mg/l , Nitrate 5-20 mg./l, Nitrite 0.02-0.01-N/L and Alkalinity 102-119 mg/l in experiment 2.

Table 2. The daily length and weight gain of prawn at initial age 1, 2 and 4 months for 45 days

Fairy shrimp :Pellet food	**Age of prawn**					
	1 month ns		2 month ns		4 month ns	
	Length	weight	Length	weight	Length	weight
0:100	.0903±.018	.0603±.010	.0513±.020	.0267±.004	.0740±.047	.1500±.059
25:75	.0703±.009	.0500±.011	.0507±.025	.0413±.007	.0590±.019	.1527±.057
50:50	.0803±.017	.0440±.015	.0363±.018	.0240±.013	.0637±.013	.1267±.003
75:25	.0813±.013	.0440±.007	.0593±.024	.0283±.010	.0617±.035	.1457±.066
100:0	.0823±.004	.0503±.004	.0420±.009	.0267±.006	.0563±.008	.1170±.005

Ns= no significant difference statistically significant (p> 0.05).

Figure 1. Giant freshwater prawn 1 month old at the end of the experiment. A) Giant Freshwater Prawn fed with commercial feed. B) Giant Freshwater Prawn fed with commercial feed and supplemented with Sirindhorn fairy shrimp.

Figure 2. Giant Freshwater Prawn 4 month old at the end of the experiment. A) Giant Freshwater Prawn fed with commercial feed. B) Giant Freshwater Prawn fed with commercial feed and supplemented with Sirindhorn fairy shrimp.

Discussion

Prawns released to earthen pond (0 month) can not eat fairy shrimps having size 0.5-1.5 cm. The small prawns that had been cultured in an earthen pond can not be eaten by the giant freshwater prawns. This was due to the fact that juvenile crust aceans such as shrimp are small and only weighs 0.0025 grams per individual on their early age. It has small nipper and unhealthy. Swimming to catch Sirindhorn fairy shrimp at 0 .5 centimeter cannot also be possible. Meanwhile, prawns aged 1 month, a with 3.0-4.0 cm in length and weigh from 0.4 to 1.14 grams have already strong nippers and can swim better. These features enabled them to catch fairy shrimps to be eaten as food. The fairy shrimp larger than 0.5 cm are strong and agile enough. However, the Prawn at 2 and 4 months of aged with 1.0 centimeter size were eaten by the prawns. This is may be because it was not too small and not too big to be eaten and caught. The size of 1.5 centimeter was eaten less, probably because the size was quite larger. Fairy shrimps with lengths of 1.0 and 1.5 centimeter with a weight of 0.05 and 0.67 grams, respectively were eaten fully and easily.

Using renewable Sirindhorn fairy shrimp in the ratio of 0, 25, 50, 75 and 100, fed to prawn at initial age 1, 2 and 4 month with sizes of 0.5, 0.5-1, and 1 cm, respectively, were found to be the appropriate renewable food. This is

consistent with studies of Nukul *et al.* (2551) who reported that Thai fairy shrimp can be used as a meal replacement food for angel fish at 100%. The larvae can replace up to 75 %. Also Velu (2001), Pasarth *et al.* (1994) and Meade & Bulkouslc - Cummings (1987) reported that the fairy shrimps can be used for feeding aquatic animals and compared the results as to live food for different species. The study found that aquatic animal fed by fairy shrimps can grow as well as or better than those fed with other life forms. The commercial feed is based on the nutritional value of food and the type of fish. And often cause problems between the rearing. Sirindhorn fairy shrimp sized of 0.5 cm can be used for feeding Prawn with ages ranging from 1 month up to. Size of Sirindhorn fairy shrimp was suitable for 3, age 1, 2 and 4 months. The length were 0.5, 0.5-1.5, and 0.5-1.5 cm. Giant Freshwater Prawn can eat per day at the rate of 32.09, 32.86. 43.57 and 24.3 to 33.27 per day. Rearing giant freshwater prawn can used Sirindhorn fairy shrimp as a meal replacement commercial foods at 100%. Rearing giant freshwater Prawn should be fed with commercial food and Sirindhorn fairy shrimp as a supplement.

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