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Preliminary studies on growth and survival of *Penaeus japonicus* postlarvae fed with *Tapes* and commercial formula feed

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Mass seed production of the prawn *Penaeus japonicus* up to the postlarval stages P₂₀₋₃₀ has become routine. During the postlarval stages feeding is shifted to either clam meat or formula feed. Chopped meat of live bivalve shells such as the short-neck clam *Venerupis philippinarum*, the little-neck clam *Tapes philippinarum* and the mussel *Mytilus edulis* has been used as feed for shrimp. This feed has high food efficiency and appealing flavor (Shigueno, 1975; Dashimaru and Shigueno, 1972). However, clam meat requires a considerable amount of processing which causes loss in its nutritive value. Processed meat is composed mainly of parts of the muscle and mantle, while the visceral parts, soft in texture and carrying nutritive elements are washed out. The processed material amounts to only 3% of the raw material (Shigueno, 1975). Another drawback is that the supply of fresh mollusks is frequently limited and unpredictable both seasonally and regionally. Therefore, formula feed and compounded diets have been developed and tested for prawn (Kanazawa et al., 1970, 1971; Dashimaru and Shigueno, 1972; Liao and Huang, 1972; Shigueno, 1975).

Growth and survival of *Penaeus japonicus* postlarvae were studied using *Tapes philippinarum* and commercial formula feeds. The chemical composition of Diet-B is shown in Table 1. The postlarvae were maintained in 5-liter round plastic aquaria and provided with aeration for a 28-day feeding period.

The results of the feeding experiment of prawns maintained on the seven different feeds are presented in Table 2. After a 28 day feeding period, the highest survival rate of 100% was obtained in prawns receiving Diet-B, followed by those on *Tapes* and Kyowa Hakko shrimp meal with survival rates of 80.0 and 76.7%, respectively. The lowest survival rate of 48.3% was obtained among postlarvae fed with squid meal. In this lot cannibalism was observed which resulted in low survival.

Growth, measured in terms of weight and length increases, was highest in the postlarvae fed with Kyowa Hakko and mysid feeds. Diet-B gave a slightly lower weight increase than Kyowa Hakko but gave similar gain in length. Considering that a 100% survival rate was obtained using Diet B, a lower gain in weight might be expected since more animals are feeding on the same amount

of feeds as in Kyowa Hakko and mysid feeds. Nonetheless, the difference in weight increase compared to Kyowa Hakko and mysid feeds is insignificant.

Using clam meat feed, *Tapes philippinarum*, as control, this experiment showed that Diet-B, Kyowa Hakko, and mysid feeds resulted in similar or better growth and survival rates. Diet-B and Kyowa Hakko feeds are good food for *Penaeus japonicus* postlarvae during the fattening stage in the pond. More feeding trials, however, should be conducted with the chemical analysis of the feeds.

Table 1. Composition of the artificial diet, Diet-B (Kanazawa et al., 1970)

Ingredient	% in dry diet
Glucose	5.5
Sucrose	10.0
Starch	4.0
Glucosamine	0.8
Casien (Lipid and vitamin free)	50.0
Na-citrate	0.3
Na-Succinate	0.3
Pollack residual oil (powder) ^{a/}	8.0
Cholesterol	0.5
Mineral mixture ^{b/}	8.6
Vitamin mixture ^{c/}	2.7
Cellulose powder	9.3
Agar	3.0
Water	130-135 ml

^{a/} Residual oil obtained by distilling away Vitamin A from pollack liver oil.

^{b/} K_2HPO_4 2.000, $Ca_3PO_4)_2$ 2.720, $MgSO_4 \cdot 7H_2O$ 3.041, and $NaH_2PO_4 \cdot 2H_2O$ 0.790 g/100 g dry diet.

^{c/} p-Aminobenzoic acid 10.00, Biotin 0.40, Inositol 400.00, Nicotinic acid 40.00, Ca-Pantothenate 60.00, Pyridine-HCl 12.00, Riboflavin 8.00, thiamin-HCl 4.00, Menadione 4.00, B-carotene 9.60, -Tocoperol 20.00, Cyanocobalamine 0.08, Calciferol 1.20, Na-Ascorbate 2000.00, Folic acid 0.80, and Choline chloride 120.00 mg/100 g of dry diet.

Table 2. Growth and survival rate of *Penaeus japonicus* postlarvae given different feeds.

	Fresh Tapes	Squid meal	Kyowa Hakko feed	Diet-B	Mysid meal	Mysid- squid meal	Mysid- fish meal
Days of feeding	28	28	28	28	28	28	28
No. of postlarvae before feeding	60	60	60	60	60	60	60
No. of postlarvae after feeding	48	89	46	60	43	43	43
Survival rate (%)	80.0	48.3	76.7	100.0	71.7	71.7	71.7
Ave. body weight before feeding (mg)	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Ave. body weight after feeding (mg)	17.68	17.04	25.89	19.95	22.61	17.93	18.31
Gain in weight (mg)	11.43	10.79	19.64	13.70	16.39	11.68	12.06
Gain in length (mm)	5.10	4.15	6.60	6.55	6.65	4.75	4.40
Temperature °C							
Mean	23.7	23.5	23.8	23.9	24.1	23.4	23.5
Range	20.4 to 27.2	20.2 to 27.0	20.5 to 27.0	20.9 to 27.2	21.2 to 27.0	20.0 to 26.5	20.5 to 26.5

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