

Short Communication

JUVENILES OF PRAWN, *METAPENAEUS MONOCEROS*, FED UPON CHEMICALLY PRESERVED ZOOPLANKTON

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ABSTRACT

Goswami, U. and Goswami, S.C., 1982. Juveniles of prawn, *Metapenaeus monoceros*, fed upon chemically preserved zooplankton. *Aquaculture*, 29: 379–382.

Zooplankton samples preserved in formalin and acetic acid (5%) were fed, after washing in water, to juveniles of prawn, *Metapenaeus monoceros*. The animals accepted the diets and showed K_1 values (gross growth efficiency) within a range of 2.40–26.94% and K_2 (net growth efficiency) between 3.05 and 40% depending upon the form in which the diet was fed.

Live plankton is widely used in intensive fish and prawn culture operations (Cook and Murphy, 1969; Dugan et al., 1975; James and Thompson, 1980, etc.). In view of the practical difficulties involved in exclusive dependence upon live diets, Brown (1972) advocated the use of preserved supplementary feeds for prawn larvae.

We used zooplankton fixed in 5% formalin and 5% acetic acid, after washing with water, to feed juveniles of a prawn, for a future experiment with prawn larvae. The main purpose behind the studies was to find a suitable way of disposing of zooplankton samples regularly being collected for other projects in the Institute.

Accordingly, four series of feeding experiments were performed simultaneously with juveniles of *Metapenaeus monoceros* collected from a local pond. In series I and II zooplankton samples were fed as such after drying at 50°C and wet-frozen, respectively. In series III and IV the samples were drawn into pellets and fed after drying. The pellets comprised 100% zooplankton in series III and 50% zooplankton, 30% mangrove leaves and 20% wheat flour in series IV.

In each series there were three groups of tanks, A, B and C, each containing 10 prawns of approximately the same size. The average length was 4.2 cm in series I, 2.7 cm in series II and 1.5 cm in series III and IV. Animals in groups A and B were fed upon diets made from preserved samples (formalin and acetic acid respectively), whereas group C was fed with a non-

TABLE I

Food conversion efficiency of *Metapenaeus monoceros* juveniles fed upon diets prepared from preserved and non-preserved zooplankton samples (values are in dry wt (g)/animal)

Series	I			II			III			IV		
	A	B	C	A	B	C	A	B	C	A	B	C
Initial weight (W_1)	0.078	0.074	0.078	0.035	0.034	0.030	0.012	0.013	0.012	0.012	0.012	0.008
Final weight (W_2)	0.085	0.081	0.084	0.066	0.064	0.055	0.055	0.075	0.064	0.044	0.048	0.050
Mean weight (W)	0.082	0.078	0.081	0.051	0.049	0.043	0.034	0.044	0.038	0.028	0.03	0.029
Production ($P = W_2 - W_1$)	0.007	0.007	0.006	0.031	0.03	0.025	0.043	0.062	0.052	0.032	0.036	0.042
Relative growth rate/day ($P/W/15$)	0.006	0.006	0.005	0.041	0.041	0.039	0.086	0.093	0.091	0.076	0.08	0.096
Food consumed (C)	0.292	0.195	0.139	0.515	0.477	0.259	0.251	0.239	0.193	0.178	0.168	0.182
Faecal output (F)	0.062	0.048	0.016	0.101	0.113	0.022	0.076	0.063	0.063	0.035	0.028	0.043
Assimilation ($A = C - F$)	0.229	0.147	0.123	0.414	0.364	0.237	0.175	0.176	0.130	0.143	0.14	0.139
Metabolism ($R = A - P$)	0.222	0.14	0.117	0.383	0.334	0.212	0.132	0.114	0.078	0.111	0.104	0.098
Assimilation efficiency (A/C %)	78.53	75.38	88.82	80.38	76.31	91.50	69.72	73.64	67.35	80.33	83.33	76.37
Gross growth efficiency ($K_1 = P/C$ %)	2.40	3.58	4.32	6.019	6.28	9.65	17.13	25.77	26.94	17.97	21.42	22.80
Net growth efficiency ($K_2 = P/A$ %)	3.05	4.76	4.87	7.48	8.24	10.54	24.57	35.00	40.00	22.37	25.71	29.85
Consumption/unit wt per day ($C/W/15$)	0.238	0.168	0.114	0.679	0.648	0.406	0.499	0.360	0.338	0.423	0.373	0.422

preserved control diet. The food was given ad libitum throughout the experimental period of 15 days. Faecal matter and molts were collected daily. The computation of data for food conversion efficiency was made as described elsewhere (Goswami and Goswami, 1979). Replicate experiments were performed for each diet.

The general conditions of the tanks (e.g. size $45 \times 23 \times 30$ cm, depth of water 16 cm, salinity of seawater 15‰ , temperature $27.5 \pm 1^\circ\text{C}$, photo-period 12 h, no aeration) were kept uniform for all series and were maintained throughout the experiment.

Since the use of formalin as a food preservative is prohibited in many parts of the world, the corresponding diets and the animals fed on them were chemically tested at the end of the experiment for the presence of free formalin by resorcinol and thin layer chromatography tests.

The results of the feeding experiments showed that all the diets were acceptable as food to prawns. They were consumed and assimilated well. The non-processed diets showed poor K_1 and K_2 values as compared to the pellet forms (Table I). In each series, although the control group with non-preserved samples showed the highest percentage of gross growth efficiency and net growth efficiency, the differences for preserved diets were not remarkable; e.g. in series III with the best efficiency results, group C showed K_1 and K_2 values of 26.94 and 40.00% respectively, whereas groups A and B respectively showed 17.13% and 25.77% for K_1 and 24.57% and 35% for K_2 . The results in other series were similar. Royan et al. (1977) reported maximum K_1 of 30% and K_2 of 37.9% in *Metapenaeus monoceros* when fed upon *Artemia salina* (adult).

The results of the present experiments have indicated that the preserved zooplankton samples when fed after proper washing with water (12 h) are acceptable as feed to juvenile prawns. Since no trace of chemical was found in the flesh of the animals fed, the feeds can safely be given to prawn larvae.

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REFERENCES

- Brown, A., 1972. Experimental techniques for preserving diatoms used as food for larval *Penaeus aztecus*. Proc. Natl. Shellfish. Assoc., 62: 21-25.
- Cook, H.L. and Murphy, M.A., 1969. The culture of larval penaeid shrimp. Trans. Am. Fish. Soc., 98: 751-754.
- Dugan, C.C., Hagwood, R.W. and Frakes, T.A., 1975. Development of spawning and mass larval rearing techniques of brackish-water shrimps of the genus *Macrobrachium* (Decapoda, Palaemonidae). Florida Mar. Res. Publ. No. 12, pp. 1-23.

- Goswami, U. and Goswami, S.C., 1979. Formulation of cheaper artificial feeds for shrimp culture: preliminary biochemical, physical and biological evaluation. *Aquaculture*, 16: 309—317.
- James, M.C. and Thompson, P.K.M., 1980. Production of copepods in an out-door culture tank. MBAI Symposium on Coastal Aquaculture, 12—18 January 1980, Cochin, India. Abstr. No. 198, p. 116.
- Royan, J.P., Sumitra-Vijayaraghavan and Wafar, M.V.M., 1977. Food conversion efficiency in the shrimp *Metapenaeus monoceros* (Fabricius) fed on different foods. *Indian J. Mar. Sci.*, 6(1): 100—102.