J. mar. biol. Ass. India, 1993, 35 (1 & 2) : 175-179

GROWTH OF *METAPENAEUS MONOCEROS* SUPPLEMENTED WITH LIVE-FEED

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ABSTRACT

Water quality management is the priority problem in the prawn culture industry to achieve better return. Usually water quality of a culture system deteriorate mainly by dissociation of compounded feed and discharge of excretory and metabolic products. In order to overcome the sestonic load due to compounded feed, present work on live feed supplementation was experimented over a period of 50 days. For this the abundantly available and untaped potential live-feeds such as *Cerithidium fluviatilis*, *Culex sitiens* larvae, *Orchestia* sp., *Ceratonereis casta* and mixed feed (above live feeds on rotation) were tried at 4% food provision. Among all, polychaete feed showed higher growth followed by mosquito larvae, mixed feed, intertidal snail and amphipod feed. The moulting frequency were also observed to behave in the same order and the food conversion ratio (FCR) behaves inversely.

INTRODUCTION

BRACKISHWATER prawn culture is the fast growing, lucrative coastalboard industry widely sponsored by the Government for rural upliftment. Many private owners also initiated this venture with huge investment. The success of this concern, concerned with the key factors such as assured seed supply, nutrition, soil type and water quality management. The need for adequate quality feed supply is a priority problem in most countries, undertaking intensive culture operation, where natural production is supplemented by addition of synthetic or prepared feed.

Albeit, many synthetic diets have been produced commercially to triger the prawn production, the acceptability of those feed depends on the quality of animal matter in that. Thus it is a dire necessity to include fish, crustacean or molluscan meat as an ingredient in the synthetic feed preparation to enhance the palatability. Many countries use fertilisers (to produce natural feed) rather than pellet feed for intensive aquaculture. The accumulated uneaten synthetic feed deteriorate the water quality by way of hydrogen sulphide production, beside enhance the particulate suspended materials (turbidity) leads to oxygen depletion. It may also cause eutrophication as a result of bloom formation in excessive nutrients dissociated from the feed in the confined culture system, these effects and cause will superimposed on the cultivating organisms which reduces the growth, easy susceptibility to disease and cannibolism all reflected in low production. Therefore, supplement of live feed along with synthetic feed is an emerging interest in aquaculture venture. Moreover, prawns readily respond to live-feed. Pertaining the abundantly available and hither to unutilised resources such as amphipod (*Orchestia* sp.), mosquito larvae (*Culex sitiens*), polychaete worm (*Ceratonereis casta*) and the

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intertidal snail (*Cerithidia fluviatilis*) were tested in this experimental series to raise the prawn *Metapenaeus monoceros*.

The authors wish to thank Prof. K. Krishnamurthy, CAS in Marine Biology and Authorites of Annamalai University for facilities provided.

raising medium was continuously aerated and was replenished with filtered same salinity water in every 24 hrs. The volume of water was kept constant in all the experimental study period. Duplicate of experiment with the above five feed (feeding rate 4% of body weight) and control were run simultaneously, the control was fed with chopped fresh clam meat (*Katelysia*

TABLE 1. *Dietary budget of* Metapenaeus monoceros *fed*

Food type	Initial weight W1	Final weight W2	Mean weight $W = \frac{W1 + W2}{2}$	Production $P = W2 - W1$	Moult weight 'P1'	Food consumed 'C'
Katelysia opima (Control) ..	900	1160	1030	260	90	900
Cerithidia fluviatilis ..	920	1690	1305	770	100	2480
Culex sitiens ..	830	1630	1230	800	155	2350
Orchestia sp. ..	830	1480	1155	650	125	2200
Ceratonereis casta ..	850	1670	1260	820	215	2400
Mixed feed (rotation of all feed) ..	840	1620	1230	780	130	2340

MATERIALS AND METHODS

Metapenaeus monoceros juveniles were collected from Vellar Estuary using push net and maintained for two days in the aquarium for acclimation. Experimental raising of *M. monoceros* juveniles were conducted in the laboratory after 24 hr initial starvation (in order to empty their stomach). Three types of live feed (Amphipod, Polychaete and Mosquito larvae), one prepared feed (chopped fresh meat of *Cerithidia* sp.) and a mixed feed (above feed on rotation) were used. Duplicate of experiments were conducted in 2.0 l cylindrical fibre glass containers filled with 1.5 l of glass wool filtered estuarine water of 20‰ salinity. The bottom of the container was left bare. The *opima*) of 2% body weight. These experiments were carried out in laboratory room temperature of 28±2°C. The dietary feeding experiments were run for a period of 50 days. Length and weight measurements were carefully made in every 10 days. Pooled mean growth data in each feed was utilised for drawing the growth curves (Fig. 1). Energy transformation and budget were calculated following the procedure of Crisp (1971). However energy utilised for respiration, gonadial development and release of urine and other soluble materials are not directly considered here. Being the prawns are cold blooded organism, energy loss due to thermoregulation is also negligible.

Results and Discussion

Supplementation with live feed is an emerging interest in the field of aquaculture industry as a measure to manage the water quality. In this connection the abundantly available and untaped potential feed resources of the brackish-water region such as intertidal snails, mosquito larvae, polychaetes and amphipods were tested in this experimental service. The snail *Cerithidia* forms 40% among the mud bank dwelling organisms of Sunderbans, 600 individual/m² in the Krishna Delta and at some places of Vellar region its population density rose upto 12,000/m² (Sreenivasan, 1984). The mosquito larvae were found abundant in almost all the stagnant water bodies around the estuarine and mangrove biotopes of Parangipettai. Srikrishnadhas (1978) recorded 120-712 polychaete worms/m² in the shallow water spread areas in the Vellar Estuary. Peethambaran Asari (1980) reported 315-675 amphipods in 100 gm of algal mat in the intertidal region of Vellar Estuary and this reveals the availability of above rich untaped live feed resource.

Among the above feed provided, the polychaete and mosquito larvae were highly preferred and readily accepted by the prawn juveniles. It is limpidly reflected in the food efficiency as well as growth of prawns (Table 1). Ration was restricted to 4% body weight and was provided in two instalments a day. Therefore uneaten food was observed nil or not visible in the mosquito and polychaete feed and was very less in *Cerithidia* and amphipod feeds. The percentage gain in body weight was observed to be higher in polychaete feed than mosquito, cerithidium and amphipod feed (Fig. 1). The mixed feed always occupied a transient position between the readily accepted (Polychaete and Mosquito larvae) and accepted (*Cerithidia* and amphipod) feed in response to feed efficiency and body weight gain. The moulting frequency also followed the same trend of food preference (consumption unit). With mosquito feed they moult at 13.75 days polychaete 15.6 days, mixed feed 18.2 day cerithidium 20.0 days and amphipod 22.0 days ntervals. Thus the growth potential of the experimental prawn were influenced mainly by

on different diets (mg wet weight per animal)

Feacal output 'F'	Relative growth rate P/W/50	Assimilation $A = C-F$	Metabolism $R = A-P$	Assimilation efficiency A/C %	Growth efficiency K1 = P/C%	Net growth efficiency K2 = P/A %	Consumption unit wt/day = C/W/50	Food consumption ratio FCR = $\frac{C}{P}$	Gross conversion GCR = $\frac{C}{P+Pl}$
155	0.00505	745	485	82.78	28.89	34.90	0.0175	3.462	2.57
730	0.0118	1750	980	70.56	31.05	44.00	0.0380	3.22	2.85
855	0.0130	1495	695	63.62	34.04	53.51	0.0382	2.94	2.46
590	0.0113	1610	960	73.18	29.54	40.37	0.0381	3.38	2.84
760	0.0130	1640	820	68.33	34.17	50.00	0.0381	2.93	2.32
780	0.0127	1560	780	66.67	33.33	50.00	0.0380	3.00	2.57

quality of food. Through this dietary experiment it is evident that 27 to 37% of consumed food go as feacal output. Among the absorbed food material only 40 to 54% was transformed to animal tissue (inclusive of casted exoskeleton). The remaining 46 to 60% can be utilised for respiratory metabolism, movement and other physiological and locomotory activities.

Welch (1968) comparatively analysed different dietary works and found a range of variation (15 to 35%) in gross growth efficiency (K1) and (20 to 90%) in net growth efficiency (K2). With this he also postulated that carnivores have relatively high assimilation efficiency and low K2 values, whereas herbivores and detritus feeders have low assimilation efficiency and high K2 values. Present dietary study with *M. monoceros*, the estimates of gross and net growth and assimilation efficiency fall within the acceptable limits of Welch (1968). Further, the low K2 values reflected the food source are all mainly of animal origin. The conversion efficiency decreased as the weight of the animal increased.

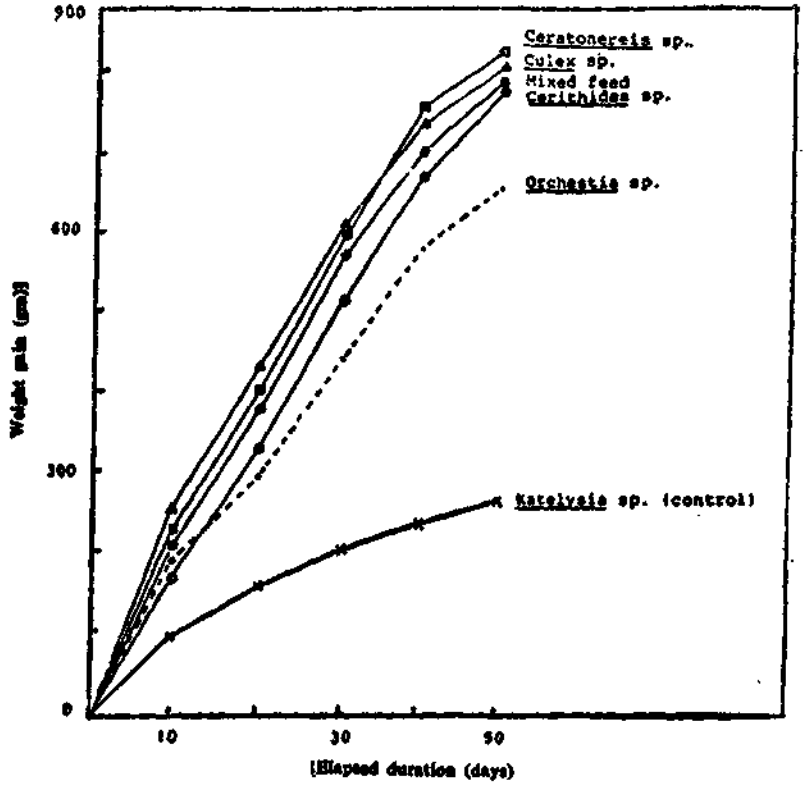

FIG. 1. Mean growth of *Metapenaeus monoceros* fed with different live and freshly prepared food.

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