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Efficacy of a formulated pellet feed for grow-out of the blue swimming crab *Portunus pelagicus* (Linnaeus, 1758)

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Methods for seed production of the blue swimming crab *Portunus pelagicus* have been developed at the Mandapam Regional Centre of CMFRI and grow-out techniques are being developed. The major constraints observed in the culture of these crabs are the high rate of cannibalism and the lack of an appropriate feed to accelerate growth under controlled conditions. A compounded pellet feed developed using locally available ingredients at the Kovalam Field Laboratory, Research Centre of CMFRI, Chennai, was used in experimental studies for rearing of the blue swimmer crabs in larger holding systems.

Feed composition and properties:

The main ingredients of the feed were animal protein meal-30% (paste shrimp powder 15%; shrimp head powder-15%, sardine meal-20%. and silver belly, lizard fishes, flat fishes, trash crabs etc. mixture-50%), plant source-soya meal-40% and wheat gluten 20%, lipids. mineral and vitamin mix-6% and binders-4%. The pellets were extruded and sieved uniformly into 4.0 cm long and 2 mm diameter. The colour of the feed was brownish mottled leaf yellow with a strong flavour. The sinking rates of the pellets were very good and the binding tests showed that the pellets remain in shape for 20 minutes after being broadcast into the rearing system.

Feed Preparation

All the ingredients after sufficient grinding and sieving were mixed thoroughly using a mixer (only wheat gluten was made into a paste and then added). The mixture was then blended properly with the

gluten paste and heated slightly and immediately extruded by pressing through a manual pelletiser. The pellets thus prepared were dried in hot air oven at 60°C and stored in air tight polythene bags.

Rearing system

The crabs were stocked in a square cement tank (3.5x3.5m) with fluidized bed substrate filter recirculatory system having a water height of 0.7 metres and filter bed height of 0.25 m. The bed filter comprised of layers of shells, charcoal, sea sand and nylon screens. The surface of the filter bed was provided with enough hide outs (vertical standing black meshed nylon screens with sinkers on the base and floats on the top line) and sea sand 2" depth for the crabs to burrow during day. The water column above the substrate was maintained at 75 cm. The tank was housed in a shed with asbestos roofing. The gap between the roof of the shed and the tank was covered with suspended opaque FRP sheets and thereby a dark environment was maintained. Water was exchanged at the rate of 20-30% daily and weekly once 70% was replaced.

Water quality

The mechanically graded and sand filtered sea water was stored in an over head tank and used as and when required. The following water quality parameters were maintained throughout: salinity 36±1 ppt; temperature 27-29°C; pH 8-8.2; dissolved oxygen 4-5mg/l; ammonia <0.1 ppm; nitrite <0.01 ppm. The pH was maintained using dry lime, zeolite and sodium carbonate.

Stocking details

Seventy five crabs were stocked @ 6 no./ sq.m (floor area). The total biomass at the time of stocking was 0.828 kg. The sex ratio was 30 males: 45 females. Details of the length and the weight of males and females are given below.

	CL range (mm)	CW range (mm)	Weight range (g)
Males	15-34	36-67.5	5.3-23.9
Females	18-31	35-72	3.8-19.6

The crabs were grown for 60 days.

Feeding and schedules

Feeding was done in the evening hours only (1700-1900 hrs). The pellet feed was fed at the rate of 3% of the biomass of nearly 850 g of crab stocked, gradually increasing the quantity with the growth of the crabs. Biomass was estimated every fortnight by collecting all the crabs using small scoop nets. The daily feed offered ranged from 25 g to 85 g during the experiment. The total feed consumed was 3.27 kg for the entire culture duration. The weight gain recorded in spite of the cannibalism was 1.77 kg. The apparent FCR for the pellets worked out to 1.9:1 (1.9 kg of feed for production of 1 kg of crab).

Harvest details

A total of 45 (60%) crabs (26 males and 19 females), survived at the end of the experiment and showed good growth rates. A total biomass of 2.597 kg was realized from the experiment. Only four deaths were recorded initially in the system mainly due to cannibalism. No disease or stress deaths were recorded in the system. The sizes recorded at the time of harvest are given below:

	CL range (mm)	CW range (mm)	Weight range (g)
Males	41-55	79-110	25-82
Females	41-53	84-110	36-73

The survival rate was higher for males than the females. This is also corroborated by the observations on the thin shelled females produced and their much delicate attacking chelipeds suggesting that the females are more vulnerable at the time of moulting. Thus the sex ratio is important for stocking in a pond and a ratio of 1:1 at the stocking time is ideal for a better survival. The growth rate of approximately 0.4 mm CL per day recorded is comparable with the rates observed in the earlier experiments fed on clam, prawn and egg. If the cannibalism rates could be reduced by improved substrate interventions the results would be more encouraging.