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GROW-OUT CULTURE IN SEA CAGES

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Introduction

For the grow-out trials, circular cages of diameter ranging from 6-15 meters have been tried by CMFRI. However, cage diameter 6-10 is recommended for the culture of Mullet, Cobia, Pompano, Sea bass and Pearl spot. The grow-out of candidate species in caged enclosures requires proper planning and management. The critical inputs like right kind of seed, nutritionally balanced feed and routine cage maintenance activity decide the success of grow-out production. Unlike closed or semi-closed culture systems, marine environment is more diverse and dynamic, thus did not offer much scope for the environmental as well as biological manipulations. After proper site selection and cage installations, cages should be stocked with recommended numbers of seed depending upon water volume/ cage area.

The post-stocking cage management primarily involves proper feeding, net exchange and health care. The biomass of fish is estimated through fortnightly/monthly sampling and the daily feed requirement is calculated as follows:

Feed requirement/day= Estimated fish biomass in the pond × % feeding rate

Where,

a. Biomass= Average Body Weight of fish× total number of fish stocked × % survival. Survival % of about 90-95% can be considered for estimation of biomass in enclosures systems.

The health management is an important aspect of cage reared species, especially densely stocked aquatic animals to prevent the occurrence of diseases. The health of caged fish is mainly influenced by the complex relationship between the fish, the pathogen and the environment. Therefore, cage reared fish should be sampled once in a fortnight and should be checked for their general health conditions, external appearance such as body color, fouling, gill choking, and growth in terms of weight or length. Moreover, day-to-day observations should be noted during feeding such as sign of air engulfing, feeding response, fish behavior, algal blooms and feeding trends. Such observations recorded at regular intervals would help to take preventive measures against disease occurrence.

The maintenance of cage structures is an importance aspect of the grow-out technology. The cage frame and cage nets (outer and inner) must be routinely inspected. Weekly cleaning of the cage frame and cage nets minimizes settlement of fouling organisms. Depending upon fouling intensity, monthly exchange replacement of net should also be carried out, as this ensures a good water exchange in the net, which removes the feces, uneaten feed and also assists in minimizing the impact of fouling. Further, necessary repairs and adjustments to anchor ropes and net-cages should be carried out whenever required.

Grow-out culture of Asian Sea bass (*Lates calcarifer*)

The growth is highly variable and depends on various factors including temperature, feeding rate, feed quality and stocking density. Generally, fish grows from fingerling to 300-500g in 6-12 months and to 3kg in 2 years.

The stocking larger size seed fish attains greater individual and total weight per cage than smaller ones. Sea bass size range from 10-17cm in length is suitable for culturing in cages with grow-out at 6- 7 months.

The main problems in grow-out culture are feeding and prevention of cannibalism in young fishes. In order to reduce losses due to cannibalism, grow out is performed in two phases, viz. nursery phase up to a size of 20g in nursery ponds/cages and grow out phase. The size of the feed must be suitable for the size of the mouth of the fish. The farmers should feed fish slowly and watch them. The feeding should be stopped when the fish no longer come up to the surface which indicates that the amount of feed is enough for them. The food conversion rates of Sea bass also depend on the quality and quantity of trash fish. Normally, Seacbass can grow at an average of 1 kg/yr. The survival rates for marketable fish culture are about 80-95 percent in normal culture conditions.

Grow-out culture Cobia (*Rachycentron canadum*)

The grow-out culture was carried out by Mandapam RC of CMFRI in circular floating sea cages of 6 meter diameter. The cage frames were made up of HDPE pipes or GI pipes. The handrail was fixed at half meter height from the base. The space between the inner and outer rings of the cage was kept as one meter. The net cages fabricated with HDPE ropes of 2.5 mm thickness and mesh size of 40 mm for inner net cage and 60 mm for outer net cage was used. The depth of the net cages was maintained at 4.0 meters from the base. The shape of the net cages was maintained with circular ballast. The cages were floated and moored as mentioned in nursery phase 2.

The juveniles from nursery phase 2 were transferred to these grow-out sea cages. The stocking density at this phase was maintained at 3.0-5.0 kg/m3 or 750 nos. of juvenile cobia per cage. The juveniles were fed @ 5% total biomass of fish with chopped low-value fishes (sardine, lesser sardine, rainbow sardine, etc.) once daily. Net cages were changed based on the subjective assessment of fouling of the net in order to have sufficient water exchange. Random sampling was carried out at monthly interval with the sample size of 30 nos per cage. The entire grow-out culture was carried out for a period of 6-7 month. The fingerlings stocked in indoor nursery at around 2 grams and attained an average weight of 45 grams in 6 weeks, followed by about 70 grams in another 4 weeks of outdoor nursery rearing. The juveniles reached an average weight of 1.0 kg in 4 months and 2.5-3.0 kg in 6-7 months of grow out culture in sea cages. The grow out fishes reached an average weight of 7.0 kg with a maximum weight of 8.0 kg within the culture period of one year, which was almost 100 times the initial weight.

Once the juveniles reach a size of 15cm they are ready to stock in sea cages or land based ponds for grow-out farming. Trials on sea cage farming carried out at Mandapam showed that the fishes attained an average weight of 2.5 kg in six months and 7.3 kg in twelve months. The species can be grown in salinity as low as 15 ppt and our experiments revealed that growth and survival at 15 ppt is comparable to that in seawater.

Lobster fattening in cages

The juveniles of lobsters caught in the wild fetch low price or are not accepted legally for export, for short period until they attain legal size. These lobsters could be held in tanks, ponds or cages and fed with natural or artificial feed. Since live lobsters fetch high market value, they should be marketed in live conditions.

The CMFRI, Mumbai research centre has conducted a preliminary experiment with wild caught juvenile lobsters *Panulirus polyphagus,* which were grown in 3 m diameter circular GI cages at Kalamb, district Thane in Maharashtra state. The cage was stocked with 200 numbers of juvenile lobsters weighing about 50 gm and were fed daily with locally available trash fish viz. *Sepiella inermis*, *Sardinella longiceps*, *Sardinella* spp., *Acetes* spp. @ 10% of body weight, daily twice a day at 10:00 and 20:00 hrs. Monthly observations were made on the growth and health of stocked lobsters and to change the feeding regime in accordance to biomass by lifting the net. The nets were cleaned weekly to remove the unconsumed feed, clogging with silt and fouling with barnacles. After four months of culture

period, a 79% survival was observed with an average weight gain of 201%. The mean final body weight of harvested lobsters was 152 g.

References

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