

FEEDING EXPERIMENT ON GREY MULLET, *MUGIL CEPHALUS L.*

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ABSTRACT

Fingerlings of the grey mullets *Mugil cephalus* were acclimatized in optimum salinity and then they were fed on different types of artificial food prepared in the laboratory. The fingerlings showed a special liking for groundnut oil cake as compared to the other types of food. Maximum growth rate was observed when they were fed on a mixture of groundnut oil cake and coconut oil cake. The feeding intensity was found to be generally higher during the afternoon than in the forenoon.

Grey mullets contribute one of the important fisheries of estuaries and coastal waters of tropical and sub-tropical seas. Generally, they are capable of tolerating large salinity and temperature changes and have omnivorous feeding habit. Among the grey mullets, *Mugil cephalus*, is perhaps the most important species for pond culture as it grows to a larger size than other mullets. It has been recognised as a very important species for pond culture in Hawaii, Israel, Italy, India, Japan and the Philippines, where they are mainly grown in polyculture with eels, carps, Tilapia and milkfish. Several workers such as Basu (1946), Devasundaram (1951), Pillay (1953), Sarojini (1957, 1958), Tang *et al.*, (1962) and Bardach *et al.*, (1972) have advocated polyculture as a suitable method of pisciculture particularly in coastal and brackish water areas. At the Central Inland Fisheries Research Sub-station, Cuttack (Orissa), Kakdwip and Bakkahali (West Bengal, India), *M. cephalus*, *M. tade*, *M. corsula* and *M. cunnesius* have been successfully cultured along with penaeid prawns and *Chanos chanos* in experimental ponds, (Pakrasi *et al.*, 1975). Therefore, the grey mullet *M. cephalus* is expected to play an important role in the fish culture programme as envisaged under the increased utilization of water areas for culture. Hence, the growth of this species at juvenile stages was studied under laboratory condition using different types of food.

Fingerlings of *M. cephalus* were collected from creeks and channels of Zuari estuary

at Goa-Velha during the low tide using 'beach seine' and 'cast net'. These were transported in plastic buckets or fibre glass tanks to the laboratory about 8 km away. All the fingerlings thus collected were allowed to remain for two hours in the tanks containing 25 litres of brackish water of 24‰ salinity brought from the place of collection. This arrangement helped to select only the healthy fingerlings in the size range of 20-40 mm. In order to determine the optimum salinity for their healthy growth, four grades of salinities (24‰, 15‰, 10‰ and 5‰) were then tried. Salinity changes in the experimental media were introduced by adding the required quantity of natural fresh water. The fingerlings were first kept at 24‰ salinity for 6 hours. They were then divided in several batches and kept at 15‰ for about 12 hours. The surviving fingerlings were again released in more diluted water of 10‰ and 5‰ salinity for 6 hours. Mortality at different salinities was recorded at the end of each experiment. It was found that 24‰ salinity was best suited for these fingerlings. After determining the optimum salinity, the fingerlings were put in fibreglass tanks containing water of 24‰ salinity for determining their rate of growth after giving them different types of artificial foods which were sprinkled over the surface of water in the tanks once every morning.

The faecal matter was removed with a pipette every morning before introducing the food. Every alternate day the water was

changed in the experimental tank and aeration was provided. Growth measurements (both length and weight) were taken at the end of every month.

The foods used were groundnut oil cake (G.O.C.) + rice bran (R.B.); coconut oil cake (C.O.C.); a mixture of C.O.C. + R.B. and G.O.C.; a mixture of G.O.C. + C.O.C. and sea weed-powder; a mixture of sand and detritus taken from the beach at low tide levels and wheat flour (see Table 1). Each type of food was continued for one month.

Experiments with salinity changes showed that 24‰ salinity was more suitable for culturing the grey mullets than the lower salinities. Therefore, in the feeding experiment this salinity was maintained.

Chacko (1949), Devasundaram (1951), Simpson (1951), Thompson (1951), Pillay (1953), Sarojini (1957, 1958), Qasim (1972), Kuo *et al.*, (1973a) and Kurian (1975) have studied the food habits of mullets in nature. The present experiment indicates that a feed consisting of a mixture of G.O.C. and C.O.C. gives the maximum growth rate, as compared to other types of artificial foods. The average growth rates was 20 mm in length and 3.2 g in weight per month (Table 1). However, in the month of August when a mixture of G.O.C. and R.B. was given to the fingerlings, the average growth

in length was 16 mm and growth in weight was about 1.2 g only.

Profitable fish culture necessitates artificial feeding to supplement the natural food available in the ponds. The present experiments clearly indicate that although the mullets are essentially herbivores and largely feed on algae and diatoms in the natural environment, under culture conditions they consume artificial food quite readily. It was observed that small fishes swallowed the food mixtures, very often regurgitated the sand and other unwanted food and brought it out through the mouth. The gut was generally not found to contain sand. The feeding intensity was generally higher during the afternoon than in the forenoon.

Yashouv (1972) reported that the grey mullet in monoculture ponds stocked at the rate of 183 specimens per 0.1 ha, grew in weight from 30 g to 553 g in 197 days. But fingerlings of the present study did not show such a high rate of growth possibly because of limited moving space available in the laboratory tanks.

However, the present observations make it clear that a mixture of groundnut oil cake and coconut oil cake can be utilized as food for raising *M. cephalus* successfully.

Table 1. Results of Feeding Experiment

Month	Type of food	Initial average length/weight		Average Length/Weight after 1 month		Average increase in length/weight of fingerlings per month	
		(mm)	(g)	(mm)	(g)	(mm)	(g)
August 1975	G.O.C. + R. B	24	1.4	40	2.6	16	1.2
September	C.O.C.	40	2.6	54	3.6	14	1.0
October	C.O.C. + R.B.	54	3.6	65	4.9	11	1.3
November	G.O.C.	65	4.9	78	7.8	13	2.9
December	G.O.C. + C.O.C.	78	7.8	98	11.0	20	3.2
January 1976	Sea weed	98	11.0	108	13.1	10	2.1
February	Sand + detritus	108	13.1	119	15.0	11	1.9
March	Wheat flour	119	15.0	131	16.4	12	1.4

G.O.C. = Groundnut Oil Cake.

R.B. = Rice bran.

C.O.C. = Coconut Oil Cake.

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