

KADALEKUM KANIVUKAL

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SUPPLEMENTARY FEEDING IN AQUACULTURE

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Farming of fish scientifically requires adequate basic knowledge regarding stocking of fingerlings and providing them with requisite environment and feeding. In order to achieve production at a viable level certain fundamental aspects of fish nutrition and on-farm fish feed production should be followed.

There are many types of fish farming in our country. Depending upon the type of waterbody in which the fish is farmed, it can be classified as fresh water fish culture, brackish water fish culture and mariculture. Depending upon the type of the organism cultured we can classify aquaculture as shrimp culture, carp culture and so on. However, in all forms of aquaculture, we generally tend to alter the natural environment in which the fish grows by increasing the number of fish per unit area of water. Under such circumstances supplementary feeding of fish is required to achieve adequate growth.

For commonly cultured food fish such as the common carp, catla, rohu and mrigal, a protein requirement of 45% and a carbohydrate requirement of 26% is reported for their optimum growth from fry to fingerling stage. Beyond this stage a protein requirement of 30% is reported to be adequate.

Even though the nutritional requirement of fish is high, when they are cultured in natural impoundments, the aim of the fish farmer should always be to reduce supplementary feeding by exploiting the natural food production in the pond. The farmer should have the knowledge of the following.

Firstly, the area of the pond in which fish is cultured should be known. Secondly, the number of fish fry or fingerlings deposited initially in the pond should also be known. It is also important to know the number of fish fry that survive

after a month. By making periodical cast-net sampling, growth and general health of the fish cultured and their survival rate can be ascertained. Increase in weight of the fish and difference in their number over a fixed period of time gives a fair picture of the growth and survival rates. These two aspects are essential not only to ascertain the profit from fish culture, but also to decide an appropriate feeding regimen.

Now, we shall examine the conditions under which the fish have to be fed and the foodstuff used. The most commonly cultured fish such as the common carp, catla, rohu and mrigal feed naturally upon phytoplankton, zooplankton and several such small organisms found in the water column. By depositing more number of fish the natural food organisms in the pond decline as they are consumed by the fish. Fertilizing the pond bottom prior to stocking and addition of fertilizers at fixed intervals during the culture period help to promote phytoplankton growth which in turn is helpful in promoting zooplankton growth. Thus, in aquaculture, fertilization of the pond indirectly helps fish nutrition. Rates of fertilizer application vary with local conditions and it is advisable to get technical guidance from books published by reliable agencies or through consultation with experts.

In supplementary feeding, food conversion ratio (FCR) is an index which will help the farmer to know whether his crop of fish has been economical or not. This is the ratio between the feed provided and weight gain in terms of fish growth. For e.g., during a culture period, if 500 kg feed was provided to produce 500 kg fish the FCR is 1:1; or in other words, for one kg of fish production one kg of feed is required. It is important for the farmer to have the information on the total stock and their growth and survival rates to calculate FCR. By careful management of the culture system the FCR can be improved.

The feeds and the feedstuffs used in fish culture vary with the species. In carp culture, fishes can be fed with feed materials ranging from kitchen garbage to factory-made feed pellets. Depending upon the nature of the fish pond, number of fish stocked and availability of feed materials, an appropriate feeding regimen can be worked out by the farmer. In the composite culture of carps, generally the culture duration ranges from ten to twelve months. Within this period the average fish weight gain is about 500 g for which

supplementary feeding is necessary. During the first two months, if the density of stock does not exceed 2.5 per square metre, supplementary feeding is not required. The plankton growth can be stimulated by using organic fertilizer. A simple feeding tray with nylon bottom submerged in the water helps to aggregate algae, periphyton and zooplankton on which the fingerlings actively feed. Similarly, feeding trays suspended in the water column can be used to administer pelleted feeds, to monitor feed consumption and avoid water pollution. The details regarding preparation of the tray is available in the Handbook on aquaculture published by the Kerala State Fisheries Department.

For feeding carps, floating pellets are considered to be the most suitable form. However, floating feed pellets are expensive in our country because production of pellets requires a special technology called extrusion. Such pellets are fed only in intensive fish culture systems.

At present the most prevalent practice is to use wet feed balls. The feed balls are made using an equal mixture of groundnut oil cake and rice bran. This feed mixture is not only nutritionally inadequate but also unstable in water. Major portion of the nutrients in these feed balls leach into the pond water. Besides leaching loss, such feeds decay and pollute the water. In case the farmer prefers to use wet feeds their nutritional quality can be improved by adding 10-15% good quality fish meal or powdered weed fish. Addition of gelatinised starch helps to increase water stability.

The best way of feeding fish in culture fields is to use farm produced pellets. The feed can be made using simple kitchen machinery including a dry grinder and noodle or cutlet making machine. Even though a standard feed mixture cannot be recommended for all types of fish culture the following formula can generally satisfy the requirements.

Groundnut oil cake	-	35%
Rice bran	-	35%
Fish meal	-	10%
Fish oil or vegetable oil	-	5%
Tapioca/wheat flour	-	15%

The ingredients are dried and powdered and then mixed with gelatinised starch. This mixture is pressed through noodle making machine with 2 mm diameter die. These pellets can be dried in the sun or using an electric dryer.

The optimum quantity of feed required is 2-2.5% of the body weight. Periodical monitoring of growth and survival helps to regulate the quantity and check water pollution caused by excess feed.

Though feed making and feeding of fish are important aspects in scientific aquaculture, practices such as pond preparation, water management, fertilization, feeding and harvesting also should be given attention. The success of fish culture thus rests upon choosing the most appropriate practices and modifying them to suit the local conditions.