M. Sc. - II Sem. Interdisciplinary Course ZOO206: Ornamental Fishery & Aquarium

Use of live fish feed organisms

A large number of live foods in case of ornamental fish can be used to add colour and condition fish for culture and breeding. However, feeding a restricted range of live foods and exclusion of all other kinds of foods is unlikely to provide a balanced diet. The feeding may even lead to nutritional or other internal disorders for the fish. Furthermore, as many live foods originate from the ponds, streams, rivers, estuarine and seas. They may bring with them aquarium pests such as Hydra, Snails, or disease causing organisms. The risk of introducing disease organisms can be reduced by collecting live foods from fish free water. But the possibility of introducing aquarium pests still remains. It may be safer to use live foods disinfected before use.

Earthworms are an excellent and often over looked live food for all kinds of ornamental fish including Gold fish. After collection, the earthworms must be kept for a few days in a sealed container. This should have small air holes. During this time the worms will clean themselves of solid and wastes and will then be more palatable for the ornamental fish. The worms can be given as whole or chopped, depending on their size and the size of the fish.

Sludge worms such as Tubifex and other tubifecid worms are a live food familiar to most tropical fish hobbyists. These slim, centimetre-long, maroon worms are often used to tempt fish and are given as a live food to adult breeding fish. Tubifex worms are not easy to culture successfully and so are most often obtained from an aquatic shop. Unfortunately, in the nature these worms live in polluted stretches of wild ponds, rivers and streams. It is form these unsavoury sources that most Tubifex are collected for aquarium use. Therefore, tubifex should be used sparingly in the aquarium only as an occasional food rather than as a staple diet. Before use, the worms should be rinsed gently in cold running tap water for several hours and perhaps a preventive treatment with one of the liquid live food disinfectants would be good. Once cleaned, Tubifex worms live for some time in a shallow dish of cold water.

Water fleas are tiny planktonic crustaceans such as *Daphnia* and *Cyclops* like Tubifex. They are a popular live food among tropical aquarists. This is suitable for larger fish try or to condition adult fish for spawning. However, like Tubifex, using water fleas as a live food may result in the introduction of unwanted pests or disease organisms. Unfortunately, Daphnia and related forms are less easily disinfected than Tubifex, ideally therefore they should be obtained from a safe fish-free pond. Daphnia can be cultured in an old aquarium shop or pond. Fertilize the water with a handful of manure (cow or duck manure) tied loosely in a nylon bag. This will cause the water to go slightly cloudy after a week or so signifying that the microorganisms on which the Daphnia feed have started to build up. Once this has happened, the Daphnia starter culture can be added and over the next few weeks. Their numbers will increase so that they can be sampled several times a week using a fine mesh net (plankton net). Removal of more than about 20% of the Daphnia at any one time, may deplete the culture beyond recovery. Daphnia can be cultured outdoors in containers covered with glass or transparent plastic sheet. They will thrive during the warmer months of the years, although they will go dormant during the winter.

Blood worms are the aquatic larval stage of two winged fly. Difficult to culture, they are best obtained from aquatic shops and are particularly useful in the winter months, when other live foods may be scarce. Since they come from an aquatic environment, the above mentioned health risks also apply to this live food.

In egg-laying fish species, nutrients trapped in the egg sac would be normally sufficient to the hatchlings. Afterwards, the tender hatchlings are fed with green water consisting of microscopic algal species of *Protococcus, Tetrosphaerium, Chlmydomonas, Chlorella, Pediastrum, Volvox, Eudorina, Pandorina, Scenedesmus*, etc. Certain filamentous algal species of *Spirogyra* are known to serve as an ideal food source for the fry and juvenile fishes. The above green water is a viable food source especially during the first two weeks of the growth of ornamental fishes.

Aquarium fish, depending on their feeding habits and preference may be fed with live foods. Such as Mosquito larvae, Fruit flies, Blood worms, Tubifecids, *Cyclops*, Daphnids, Rotifers, Brine shrimps, Earthworms, White worm and microworm or with moist pellets, dry pellets, flakes and chopped bits of fish, shrimp, beef, oyster, crab and liver, spleen, lung, heart and brain of the cattle.

Culture of Live Food Organisms

Infusorians

Materials used for culturing infusorians include hay, banana peels, dried beans, lettuce, cabbage, egg yolk, malted milk, skimmed milk (dried), hay seed, dried blood, spinach, dried aquatic plants etc. A medium may be prepared by first boiling any one of the above ingredients. It is then diluted with fresh water kept in a plastic trough or cement tank of 50 to 100 litre capacity. The fertilized water medium may be covered with velon screen for bacterial development, fermentation and subsequent leaching of nutrients. Within four days, the water turns greenish, which indicates the production of infusorians. A mild aeration and alkaline pH may enhance the production of the infusorians.

Zooplankton

Zooplankton organisms such as rotifers, copepods and cladocerans like *Moina* and *Daphnia* are ideal live foods for juvenile ornamental fishes such as fighter fish, angel, Oscar, red tail shark and other baby live bearing fish species.

Rotifers

The common fresh water rotifers are suitable for feeding a variety of ornamental fishes. The mass culture of these rotifers could be under taken in plastic troughs or circular tanks of 250 litre capacity. A mixture of poultry droppings, groundnut oil cake and triple superphosphate is prepared at 150 ppm, 20 ppm and 20 ppm, respectively and are added to the above tanks containing water. The medium is then inoculated with *Brachionus* species on the third day at the rate of 10 to 15 animals per ml. The above liquid manure may also be added in alternate days when the density reaches 1 ml organisms/m³. A bolting silk and plankton net of 50 mm mesh size could be used to sieve out the organisms for feeding the fishes. The harvested rotifers should be washed in freshwater before their use in the feeding the fish fry.

Copepods

Cyclops and Calanoid copepods are also known to be ideal live food organisms especially for feeding the fry and fingerlings of ornamental fish species such as fighter fish, angel, and tetra. The tanks or fish ponds manured with raw cowdung, groundnut oil cake and

super phosphate at 330 ppm, 80 ppm, 60 ppm, respectively and are kept under continuous aeration and inoculated with 50 individuals per litre medium would lead to the production of copepods from third day onward.

Cladocerans

Cladocerans are also known as water fleas, the size of which varies from 0.5 to 1.5 mm. They are very common in seasonal ponds and pools especially after the development of phytoplankton blooms on which they normally feed. The production of cladocerans such as *Daphnia* sp and *Moina* sp is more in ponds receiving liquid organic wastes from cowshed. A liquid manure mixture may be prepared using cow dung, groundnut oil cake and single superphosphate in the ratio of 5:5:1. A culture pond of 30 sq. m. area with 1 metre depth may be filled with water. The liquid manure may be dissolved in the pond so as to give a concentration of 220 ppm. The cladocerans may be harvested from the seventh day onwards in alternate days, when their maximum density is reached. The harvesting is made by using plankton net.

Brine shrimp

Brine shrimp (*Artemia* species) cysts are available in the aquarium shops. Such cysts can be hatched at the time of need and the resulting larvae are fed to the juvenile and adult ornamental fishes. Hatching of *Artemia* cysts may be done as follows- A glass jar of one litre is taken and 35 ppt or 35% salt water is added to it. The water temperature is maintained at 25 to 30 0 C, pH 8.0 to 8.5 and DO 4-5 ppm. Continuous and copious aeration facility should be provided to enable the cysts to float in the water current. The hatching of cysts would normally be completed in 24 to 36 hours. The nauplii could be siphoned out and fed to the fish fry. Adult brine shrimps may also be developed in cement tanks with salt water and organic manure. The brine shrimps serve as potential live food for many species of ornamental fishes grown in tanks or cisterns.

Blood Worm (Chironomus larva)

The intermediate stage of the midge fly is commonly called as blood worms. These worms (*Chironomus*) are ideal live food source to all variety of ornamental fishes.

Tubifecids

The tubifecid worms are annelids which normally dwell inside tubular cases. They are common is sludge banks or silty shores of aquatic areas rich in nutrients. As they are available throughout the year, the supply is not restricted.

Microworms

The microworms are white tiny nematode worms, which also serve as an important live food for ornamental fishes.

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