

**ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN**

**PALANI**

**PG DEPARTMENT OF ZOOLOGY**

**LEARNING RESOURCES**

**ORNAMENTAL FISH CULTURE**

## **AQUARIUM FISHES**

Aquarium fishes are broadly grouped into 2 categories on the basis of their breeding behaviour, viz., egg-layers (oviparous) and livebearers (ovo-viviparous). Egg-layers are further classified as egg-layers with no care (non-guarders), egg-layers with care (guarders), egg buriers, mouth-incubators, nest-builders and egg-carriers on the basis of parental care.

### **Egg layers**

Important group of egg-layers are barbs, rasboras, goldfish, tetras, danios, betas, angelfish and gouramis. Among them barb is one of the most important groups. Barbs of Indian origin are rosy barb, striped barb and aruli barb. The major group of danios includes gaint danio, pearl danio and zebra danio. Among rasboras slender rasbora, glowlight rasbora and scissortail are the important ones. Goldfishes are the most preferred fish for the aquarium keepers. Some common varieties being comet, lion head, oranda, red cap, veil tail, shubunkin, bubble eye etc. The fish grows up to 20 cm in length, but starts breeding when it is only 6 cm long.

The tetras are small fishes of 3-8 cm length that originated from South America. Most common varieties are the black widow tetra, flame tetra, neon tetra and cardinal tetra. The species, *Betta splendens*, popularly known as Siamese fighter, occurs in varied colours. The males become aggressive in presence of other males. Angelfish is an important group of aquarium fish with different varieties such as black, veil tail, marble and albino. Among gouramies, three-spot gourami, pearl gourami, moonlight gourami, giant gourami and kissing gourami are the important species.

### **Live bearers**

They give birth to young ones and reproducing only a few numbers of offspring in comparison to egg layers. Their breeding is relatively easy and development of young ones takes place inside the female, which are released after about 4 weeks. The common livebearers include guppy, black molly, swordtail, and platy. The number of offspring produced by livebearers is between 50-100. If properly fed with natural food, supplemented with better artificial feed, the mortality caused by predation/cannibalism could be checked thereby survival rate of these offspring can be increased.

### **Breeding Egg layers**

Separate male and female hormones are produced in fishes. During spawning period the female releases eggs in the water and the male simultaneously release milt close to the eggs. The eggs are thus fertilized outside the body of the female (external fertilization). Based on the type of incubation egg laying fishes are further classified into five

### **Egg scatterers laying non-adhesive eggs**

Zebra fish (*Danio spp.*) is considered as egg scatterer, which lays non-adhesive eggs. Like many aquarium fishes, zebra fish also eats away its own eggs and spawn after breeding. As

the precautionary measure, the bottom of the aquarium should be loaded with a layer of round pebbles of about 6-8 cm diameter. The breeding pair has to be well fed with live food like small zooplanktons.

During breeding the male female ration should be maintained at 2:1 or 3:1. The female is introduced in the breeding tank one day earlier than the males. The eggs require 2-3 days hatching time, if the temperature is favourable. As soon as the tiny hatchlings are seen in the aquarium tanks the parents are to be removed. The hatchlings take 2 days to absorb their yellow yolk sac. After 2 days, they are fed with infusorians for 4 days. Subsequently rotifers and smaller zooplanktons can be fed for 1 week, after which they can be provided with powdered formulate feed.

## DISEASE MANAGEMENT

Aquarium fishes develop diseases due to poor environmental condition. Preventing disease is much more economical than providing expensive treatments following disease outbreak. Following steps can be taken to prevent fish diseases.

- Provide adequate and non-polluted water
- Provide sufficient space
- Provide adequate and balanced feed
- Prevent high temperature fluctuations
- Remove dead fish, faecal matter routinely
- Intermittently clean and disinfect the system
- Always maintain compatible species
- Avoid unnecessary handling
- Control internal and external parasites
- All new incoming fishes should be quarantined from resident stock
- Separate the infected fishes
- Provide adequate nursing for diseased fishes

### Common disease of ornamental fishes and their treatments

Symptoms	Disease	Causative agent	Treatment	Observations
Pinhead size white spots on the body and fins	Ichthyophthyrriasis	Protozoan parasite ( <i>Ichthyophthirius</i> )	Increase the temperature and treat with 5% methylene blue (1 drop/litre), treat the fish for 1 week	Contagious, observed during sudden drop of water temperature
White spots smaller than above	Oodinium	Unicellular parasite (mono flagellate)	Copper sulphate 0.1 mg/litre for 10-15 min bath	Contagious
White clumps with cotton like appearance	Saprolegniasis	Fungi including <i>Saprolegnia</i>	1 tsp salt/2 litres water, 1-2 drops of 5% methylene blue or malachite green 2 mg/litre for 30 min dip or 0.1 mg/litre for permanent bath	Favoured by wounds
Swollen eyes	Exophthalmus	Bacteria, virus, fungi, sometimes together	1% silver nitrate on popped eyes followed by 1% potassium permanganate	Treatment is difficult

Gradual disintegration of fins	Pseudomoniasis	Bacterial disease	Surgical removal of ragged portion by a fine sterilized scissors, paint the cut wounded portion by iodine solution. Repeat the same at 12 & 24 hr	Unusual swimming behavior
Swollen abdomen erected scale	Dropsy	Bacterial disease	No known cure. Antibiotics may be tried.	Contagious, difficult to treat
Opercula sticking out, unusual swimming, tiny flukes on the gills	Gyrodactyliasis	Parasite fluke, <i>Gyrodactylus</i>	Formaldehyde 5-6 drops/litre water dip treatment for 10 min. Repeat for 3 days	Not easy to detect
Red patch in the body	Argulosis/ <i>Lernaeasis</i>	<i>Argulus/ Lernaea</i> ectoparasite	Physical removal of parasites, 15 min bath in 1-2% potassium permanganate, painting the region with iodine soln. Repeat the same after 12 & 24 hr	Violent rubbing due to irritation

### Chemicals used in treatment

**Iodine:** Diluted by addition of an equal amount of water to produce a half-strength solution.

**Malachite green:** Stock solution prepared from zinc-free grade by adding 500 ml distilled water to 1 g malachite green.

**Methylene blue:** A stock solution is made by adding 1 g medical grade methylene blue to 100 ml warm distilled water.

## AQARIUM TANK

### Different types of ornamental fish tanks

Aquarium can be made of materials like glass, concrete, wood, fiberglass acrylic sheet etc., depending on its location, cost and durability.

#### Glass tank

They are either all glass tanks or metal framed ones. In the metal (steel or iron) framed tanks glass panels are held in place with putty (battery compound). On the other hand in all glass tanks, glass walls are fitted together edge-to-edge using silicone rubber adhesive. Nowadays, all-glass tanks have completely vanished due to the popularity of metal-framed tanks, which are known for their slim appearance and suitability for keeping marine fishes also.

#### Shape of aquarium tanks

The shape of the aquarium tank may be circular, square, rectangular, oval, hexagonal or octagonal. However, rectangular tanks are preferred as they provide sufficient area for free swimming of the fishes.

### Construction of all glass aquarium tank

These are constructed with only glass sheets. Rectangular all glass tanks are made with a glass wall thickness of 5 – 10 mm. In all glass tanks, the cut glass walls are fitted together with synthetic rubbery sealant called silicone gum. Prior to fabrication of the tank, sidewalls of the tank are arranged so as to have the desired shape. The glass walls are tied with a rope in order to keep the correct shape of the tank. Then the bottom sheet of the tank is kept flat below the arranged sidewalls so as to get the desired and correct shape of the tank. A cut thermocol sheet is kept at the bottom to rest the temporarily tied glass sheets. Now the silicone sealant is evenly applied all along the inner vertical and horizontal cut ends with the help of a hand applicator. Care must be taken to see that the joining ends of the glass pieces are free of oil, moisture or stains. A good sealant compound binds the glass walls in 10 to 20 minutes. However, a curing time of about 10 hrs is required to keep the set tank in position and water should be poured only after 24 hours.

#### Seating the tank

Soon after curing, the tank is kept on a firm wooden or slotted iron stand. The base of the stand should be even and smooth, as irregular placing of the stands would break the tank bottom. A uniform sized thermocol is also used in between the tank and stand surface to safeguard the tank from pressure.

## Food / feed production units

For the production of live food organisms, cement tanks and FRP tanks of assorted size will be beneficial. To prepare fish feed pellets, mixers, grinders, steaming devices, pelletizers, driers, etc., are needed in commercial ornamental fish farms. To produce pure algal culture (single cell food needed for baby ornamental fish), algal culture units with air conditioned facilities, illumination system, containers, autoclave etc, may be needed in large scale intensive aquarifarm.

## Types of Aquarium plants

### 1. Floating plants :

Plants have their foliage (leaves) above the surface of water with roots hanging free. Ex. *Eichornia*, *Pistia*, *Spirodela*, *Lemna*, *Azolla*, *Wolffia*, *Salvinia*, *Riccia sp.*

### 2. Emergent plants :

Plants having their leaves and flowers above the water surface but rooted in the bottom. Ex. *Nymphaea*, *Nelumbo*, *Nymphoides*.

### 3. Submerged plants :

Leaves are submerged in the water, may or may not be rooted. Ex. *Hydrilla*, *Ceratophyllum*, *Myriophyllum*, *Ottelia*, *Bacopa*, *Ludwigia*, *Saggitaria*, *Aponogeton*, *Cabomba*, *Limnophila*, *Ceratopteris*.

*Rooted plants* : *Hydrilla*, *Najas*, *Ottelia*, *Vallisneria*, *Potamogeton*, *Lagarosiphon*, *Chara*, *Nitella*.

*Devoid of roots* : *Ceratophyllum*, *Utricularia*.

### 4. Marginal plants :

They are growing in the shallow areas of the water body (near shore). Ex. *Typha*, *Cyperus*, *Ipomea*, *Eleocharis*, *Cryptocoryne*, *Echinodorus*.

## Live food organisms

A number of live foods can be used to add colour and to condition the fish for breeding. Feeding a restricted range of live foods, and exclusion of all other kinds of foods, is unlikely to provide a balanced diet, and may even lead to nutritional or other internal disorders for the fish. As many live foods originate from ponds, streams or rivers, 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, live food for all kinds of fish, including goldfish. Anyone, who has access to a garden or patch of waste ground should be able to collect enough for their 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 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 tubificid worms, are a live food familiar to most tropical fish *hobbyists*. These slim, centimeter-long, maroon worms are often used to tempt fish such as Discus to feed, 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 nature these worms live in polluted stretches of rivers and streams, and it is from 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. 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 fry 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 causing organisms. Unfortunately, *Daphnia* and related forms are less easily disinfected than Tubifex, ideally therefore they should be obtained from a safe fish-free pond.

Bloodworms are the aquatic larval stage of a 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.

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*, *Tetrasphaerium*, *Chlamydomonas*, *Chlorella*, *Volvox*, *Eudorina*, *Pandorina*, 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 growth.



Aquarium fish, depending on their feeding habits and preference may be fed with live foods. Such as mosquito larvae, fruit flies, bloodworms, tubificids, *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 cattle.