

BREEDING TECHNIQUES FOR TROPICAL FISH

Breeding

Breeding aquarium fish is one of the steps to becoming a skilled aquarist. Once fish are kept healthy enough to spawn, the novice knows that they can attempt to keep more challenging fish. In order to breed a species, the aquarist usually needs to be able to distinguish between the sexes and to be able to recreate natural conditions to stimulate spawning. Always record your successes and failings in a notebook.

Sexing Fish

Determining the sex of a fish is an important step in knowing whether one has a pair. Most fish can be classified as sexually dimorphic or sexually isomorphic. In sexually dimorphic species, the sexes can be easily distinguished by primary (shape of sex organs) and secondary differences (size, shape, color [sexual dichromatism], finnage). Males are frequently more colorful, larger, and have more elaborate finnage. Among the more brilliant outstanding of sexual dimorphism can be found in Lake Malawi cichlids, Killifish, and Livebearers. In sexually isomorphic species, there are minute, if any, apparent sexual differences. Often, the only way to distinguish between the sexes is the shape of the genital papilla, which is only visible around spawning times. In some isomorphic species, the males are slightly larger and the females are slightly rounder in the belly. Some sexually isomorphic species have no known external sexual differences.

Selecting the Parent Fish

Once males and females have been distinguished, a suitable pair or spawning group should be chosen. There are several important traits to seek in choosing the parent fish.

1. Choose fish that display good markings and color, that should produce attractive young.
2. Only use mature, healthy fish for spawning because unhealthy fish, if they will spawn, may produce unhealthy or deformed young.
3. Be sure that the pair is compatible. Many species cannot be put together in a breeding tank and expected to get along and produce young. In fact with many cichlids, pairs form only after a group has been raised together for months if not years. In certain species, one partner will bully the other to death if there is not compatibility.
4. Avoid crossing different strains or color forms because the young are often unattractive.
5. Make sure that the pair are both of the same species because hybrids are sterile. With some cichlids and Killifish, females of different species look similar.

Reproductive Strategies Egg-layers

The majority of aquarium fish are egg-layers with external fertilization. Egg-layers can be divided into five groups: egg-scatterers, egg-depositors, egg-buriers, mouth-brooders, and nest-builders.

Egg-scatterers: These species simply scatter their adhesive or non-adhesive eggs to fall to the substrate, into plants, or float to the surface. These species do not look after their brood and even eat their own eggs. These, often schooling, fish may spawn in groups or in pairs. Often there are a large number of the small eggs laid. The fry hatch quickly.

Egg-depositors: These species deposit their eggs on a substrate (tank glass, wood, rocks, and plants). Egg depositors usually lay fewer eggs than egg-scatterers, although the eggs are larger. Egg-depositors fall into two groups: those that care for their eggs,

and those that do not. Among egg depositors that care for their eggs are cichlids and some catfish. Egg-depositors that care for their young can be divided into two groups: cavity spawners and open spawners. Cavity spawners lay their eggs in a cave, while open (shelter) spawners lay their eggs on an open surface. These fish form pairs and have advanced brood care where the eggs are defended and cleaned. The eggs take a few days to hatch, and the fry are often guarded by the parents. Various catfish, Cyprinids, and Killifish make up the majority of egg-depositors that do not care for their young. These species lay their eggs against a surface, where the eggs are abandoned. These species do not usually eat their eggs.

Egg-buriers: These species usually inhabit waters that dry up at some time of the year. The majority of egg buriers are annual Killifish which lay their eggs in mud. The parents mature very quickly and lay their eggs before dying when the water dries up. The eggs remain in a dormant stage until rains stimulate hatching.

Mouth-brooders: Are species that carry their eggs or larvae in their mouth. Mouth brooders can be broken up into ovophiles and larvophiles. Ovophile or egg-loving mouth-brooders lay their eggs in a pit, which are sucked up into the mouth of the female. The small numbers of large eggs hatch in the mother's mouth, and the fry remain there for a period of time. Fertilization often occurs with the help of egg-spots, which are colorful spots on the anal fin of the male. When the female sees these spots, she tries to pick up the egg-spots, but instead gets a mouthful of sperm, fertilizing the eggs in her mouth. Many cichlids and some labyrinth fish are ovophile mouth brooders. Larvophile or larvae-loving mouth-brooders lay their eggs on a substrate and guard them until the eggs hatch. After hatching, the female picks up the fry and keeps them in her mouth. When the fry can fend for themselves, they are released. Some earth eaters are larvophile mouth brooders.

Nest-builders: Nest builders build some sort of nest for their eggs. The nest is usually in the form of bubble-nest formed with plant debris and saliva-coated bubbles (labyrinth fish, catfish), or a excavated pit in the substrate (cichlids). Nest builders practice brood care.

Livebearers

Livebearers are fish that bear live young. There are two types of livebearers: ovoviviparous, where the eggs form and hatch within the female before birth; and viviparous, where no eggs are formed, and the young are nourished through an umbilical-like cord or from secretions by the female. Livebearers are often prolific, easily bred species.

Conditioning the Parent Fish

Before placing the parent fish together for spawning, they should be conditioned. Conditioning is feeding the fish a variety of healthy foods to get them in top condition for spawning. Many species can be conditioned using a well-balanced flake food, though others should be conditioned on live foods such as brine shrimp, insect larvae, and flying insects. The parent fish can be while conditioning. This way, when the fish are reintroduced, they are eager to spawn.

Spawning Tank

Though some species readily spawn in the aquarium, the eggs or fry often do not survive because of predatory parents or other fish. Often the fry die because of unfavorable, unclean water conditions. Many species that practice brood care will harm other tank mates in attempting to guard the eggs. Because of all these problems; most aquarists

who breed fish use a separate spawning tank. The spawning tank should be like the hospital tank with protected heater so the fish are not burned; a slow-moving filter (sponge filter), so the eggs or fry are not sucked up; and good aeration. Depending on the spawning method, the spawning tank can be set up in a number of different ways.

Egg-scatterers: Because egg scatterers often eat their own eggs, the spawning tank has to be set-up so the eggs fall out of the reach of hungry parents. A 5-10 gallon tank is sufficient for spawning for most eggs scatterers.

For egg scatterers like barbs and danios, which lay non-adhesive eggs, the spawning tank can be furnished with a substrate consisting of two layers of marbles or a nylon netting just above the tank floor. As the eggs are laid, they fall through the marbles or the netting out of the reach of the parents. After spawning is over, the eggs or the parents can be removed.

For egg scatterers that lay adhesive eggs like tetras, the spawning tank should be furnished with a substrate. The tank should be planted with fine-leafed plants. The eggs are laid amongst plants, and adhere to the fine-leaves. The parents should be removed after spawning.

Rainbowfish also lay adhesive eggs; however, most species spawn continuously over a period of several weeks. Thus, the eggs or the plants that the eggs are attached to, should be removed daily and placed in the rearing tank. Larger rainbowfish require a spawning tank of 20-30 gallons.

Egg-depositors: Depending on the type of egg depositor, the tank should be furnished differently. For those egg-depositors that care for their young, the parents can remain in the tank after spawning. Substrate spawners, depending on the species, should be given a tank furnished glass panes, broad-leafed plants, or flat stones for spawning sites. Some species such as Discus and Angelfish prefer vertical surfaces. For cavity spawners, flower pots turned on their side, coconut shells, and rocky caves are suitable spawning sites. The tank should be furnished with either live or plastic plants to give the fish a sense of security.

Egg-depositors that do not care for their young, should be given a tank furnished with fine and broad-leafed plants, Java Moss, or artificial spawning mops. After spawning, the parents or plants with the eggs should be removed. If the plants containing eggs are removed, new plants should be placed in the tank for future spawnings. Killifish eggs often develop best when they are kept in a shallow dish.

Egg-buriers: A peat-moss substrate is one of the best substrates for egg-burying species. The peat moss can be removed after spawning and placed in a plastic bag to be stored for weeks to months (depending on the species). A new peat moss substrate can be placed in the tank for further spawnings. In order to initiate hatching, the stored peat can be immersed in soft water.

Mouth-brooders: Ovophile mouth-brooders can be bred in the main aquarium because the eggs are protected in the mouth cavity. However, it is better to separate mouth-brooders with eggs because of their potentially aggressive behavior. There are no special breeding tank requirements other than the usual tank set-up for the species.

Larvophile mouth-brooders should be placed in a breeding tank because the eggs are not protected in the mouth, but laid on a surface where they are open to predators.

Nest-builders: Nest-builders should be provided with material with which to build their nests. For bubble-nest builders, fine leafed and floating plants should be provided, and the tank

should have no water current to disturb the nest. Species that build nests in the substrate should be given fine gravel or sand.

Livebearers: Small livebearers can be bred in breeding traps where the newborns fall out of the reach of the mother. However, a more preferable set-up is a separate, heavily planted tank. As the female releases the young, she can be fed so that she is not to eat the fry. As soon as all the young are born, remove the mother.

Stimulating Spawning

One of the best ways to induce fish to spawn, especially difficult-to-spawn species, is to simulate natural conditions. Among factors that encourage fish to spawn are the environment, the food, and the rainy season.

Water Conditions:

The right water conditions are among the most basic requirements in spawning fish. Thus the water conditions should be similar to those in the natural environment of the species. By following the suggestions under “breeding” or “water” in the species descriptions, approximate natural water conditions can be found. Another important environmental condition is the the right tank set-up including hiding places, spawning sites, lighting, water current, and social conditions (schools).

Food:

The right foods are important to encouraging spawning. Without proper foods, natural conditions cannot be entirely recreated. Some of the live foods that often can make a difference in spawning success are mosquito larvae and fruit flies.

Stimulating the Rainy Season:

Many fish species spawn during the rainy season in nature. By simulating the rainy season in aquaria, difficult-to-spawn species can be induced to spawn. Rains affect the water chemistry, the water height, and the water temperature.

In order to simulate rainy conditions, the tank level should be reduced to half its normal height. Each day add 5% of the tank volume. The water added should be very soft and slightly cooler than the tank temperature. To simulate the rain, use a drip system or spray bar for several hours a day and simulate storms by flashing light in a dark room. Thunder can be created by playing a recording of a storm, a recording of music with bass, or a recording of rattling thin metal cake pans.

The process can be repeated until the fish show signs of spawning preparation. In addition to the “storms,” the fish should be fed heavily with mosquito larvae, shrimp, and flying insects.

This process will stimulate some hard-to-spawn species, but not all. Many species will respond to just one altered water condition, such as a series of water changes with soft water replacement, or a decrease in the water temperature.

Target Fish:

“Target fish” can be used to help strengthen the bond between a fish pair. Target fish can be another of the same species or a similar species that is placed in the tank with the breeding pair. This third fish will serve as an object of the aggression of the pair. The pair will work together to chase off the target fish and not fight between themselves. Only use the target fish method in a large tank with plenty of hiding places, so that the target fish is not harmed.

The Rearing Tank

A rearing tank is not required with species that take care of their young, although they are still recommended. For species that do not take care of their young, the rearing tank can be the same tank as the spawning tank as long as the parents are removed.

The rearing tank should have a protected heater, a sponge filter or a filter with a sponge on the intake, and plastic or live plants. In addition, three of the tank sides should be covered with black paper, because a light can encourage fungal infections and cause discomfort for the fry.

The water in the rearing tank should be similar to the water used for spawning.

Raising the Fry

The fry develop in a number of minutes (livebearers) to a number of weeks. When the eggs hatch, the larvae that emerge look nothing like the parent fish. Instead, the larvae have a large, yellow yolk sac and are barely able to move, let alone swim. The larvae will feed off the egg sac until all the yolk is gone. Once the yolk sac is gone, the hungry fry will begin to look for food. The fry of small fish can be first fed infusoria, "green water," or egg yolk. Later these fry can be fed larger foods like whiteworms, Daphnia, Artemia nauplii, and ground flakes. These foods are good as a first food for slightly larger fry such as those of cichlids. Once the fish grow larger, larger foods like brine shrimp, larger Daphnia, flakes, insect larvae, and chopped Tubifex worms are accepted.

25-50% of the water in the rearing tank should be changed daily. Be sure that the "new" water added has characteristics like the water taken out, because fry are sensitive to sudden changes in the water chemistry. The fry should be fed several times a day. Many species need periodic sorting by size, so that larger fish do not cannibalize smaller fish.

With favorable water conditions, regular water changes, and generous feeding, the fry should grow quickly. Cull unhealthy and deformed fish.