

Advances in Ornamental Fish Food Preparation

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ARTICLE ID: 05

There is a lack of information about the dietary needs of ornamental fish species, and occasionally findings from non-ornamental fish species are extrapolated to fill this knowledge gap. Despite the industry's commercial significance, it can be difficult to get information on nutritional needs. Guppies and goldfish are the freshwater fish species that are studied the most, whereas clownfish are frequently used in nutritional studies on marine species. In their natural habitat Fish are capable of managing and maintaining their food intake and, as a result, their nutritional requirements, which reduces the possibility that they could suffer from nutritional deficiencies. However, a difficulty might be seen when fish are kept in small places. Most of the data does not precisely relate to ornamental fish because it is based on data from farmed fish kept under diverse farming conditions, nutritional demands, feeding patterns, and food types. So on several problems mentioned above, this article will help ornamental fish hobbyists understand several good nutrition practices and options for their fish.

Introduction

It requires patience to feed aquarium fish properly. It is essential to comprehend the different species and their life cycles. How much food is required depends on the type of food, cultural conditions, and individual fish. Newly born larvae may consume almost continuously. Fish typically do not overeat unless they are fed too infrequently. One to two feedings each day are good for most fish. More often for smaller fish and less often for larger fish.

The majority of overfeeding issues arise when discarded food degrades fish tank water quality. Ammonia and other decay-related by-products will deteriorate water quality and encourage pathogenic organisms. The under the gravel of an aquarium with under-gravel filters frequently becomes clogged with leftover food and trash. This problem may be

resolved by routine aquarium care, which includes cleaning the external filters, changing the water, and rearrangement of the aquarium's decorations. Common bottom-feeding species like catfish, loaches, and others may all help maintain the aquarium clean.

Different types of live food organisms as feed on ornamental fish.

A variety of live foods can be utilized to give color to fish and prepare them for breeding. It is doubtful that feeding only a small selection of live items and excluding all other types of food would result in a balanced diet for the fish, and it may even cause nutritional or other internal diseases. Since many live feeds come from ponds, streams, or rivers, they could also contain pests that are harmful to aquarium inhabitants, such as hydras, snails, or creatures that cause illness. The risk of transmitting disease organisms can be reduced by obtaining live food from fresh water, but there is still a potential of introducing aquarium pests. Using live foods that have been cleaned and sanitized may be safer.

There are several types of live foods used for feeding ornamental fish which are described below.

2.1 Earthworms:



All types of fish, including goldfish, like eating live earthworms. Anyone with access to a garden or a piece of wasteland can culture such worms in soil for their fish. The earthworms must be stored in a sealed container for a few days after collection. Little air holes are required in containers so that they can get enough air to survive. During this time, the worms will clear themselves of waste and solid stuff, making them more attractive to fish. Depending on the size of the worm and the fish, the worms can be supplied whole or cut.

2.2 Sludge worms

For people keeping tropical fish as pets, sludge worms like Tubifex and other tubificid worms are typical live food sources. These worms are routinely fed to fish that are spawning. Since tubifex worms are difficult to effectively culture, they are



often purchased from an aquarium store. Unfortunately, the majority of Tubifex used in aquariums are obtained from these unsavoury sources since these worms naturally inhabit contaminated sections of rivers and streams. As a result, tubifex should only be used occasionally rather than as a regular food in the aquarium. The worms should be carefully cleaned in cold, running tap water for a few hours before use. Tubifex worms dwell for a while in a shallow dish of cold water after being washed.

2.3 Water fleas



Small planktonic crustaceans like Daphnia and Cyclops are known as water fleas. They are a well-liked live food among tropical aquarium keepers, much like tubifex. This can be used to prepare adult fish for spawning or a bigger fish fry. Utilizing water fleas as live food, however, carries the risk of introducing unwanted parasites or pathogens. Since Daphnia and related species are

more difficult to sterilize, it is desirable to get them from a safe pond.

2.4 Bloodworms

Bloodworms are the term used for the larvae of two-winged flies. They are challenging to cultivate and are best purchased from aquatic stores. They are especially helpful in the winter when other live feeds may be in short supply.



2.5 Algae



After hatching in fish when the yolk is get absorbed, tiny algae species including *Protococcus*, *Tetrosphaerium*, *Chlamydomonas*, *Chlorella*, *Volvox*, *Eudorina*, *Pandorina*, and others serve as feed for the young hatchlings. It is well

known that some Spirogyra filamentous algae species make excellent nourishment for young fish and fry.

3. Varieties of feeding to larvae of ornamental fish

The smallest feed size in fish is needed for the fry stage. In general, livebearers fry are larger than egg layer fry. After being released from their parents, livebearers immediately begin eating food. When an egg layer hatches, the fry ingests yolk as a source of nutrition. After three to five days when the yolk gets absorbed, they begin to look for food.

3.1 Feeds for fry

The following things can be fed to the fry as soon as they are able to swim freely, or you can feed them all at once.

1. **Mixed algal water:** It is gathered from ponds, tanks, or swimming pools. Green water is created in little pots. Green algae scrapings are inoculated, and fertilizer is supplied in the form of urea and superphosphate.



2. **Infusoria:** It is either cultured or collected in the artificial environment and fed to fry



3. **Baker's yeast suspension:** When yeast is mixed with water, a white slurry is generated that is utilized as feed.



4. **Egg yolk suspension:** Egg yolk is taken from a boiled egg and used as feed for early young fishes. It should not be overused as it leads to the deterioration of water quality.



3.2 Feeding frequency (5-6 times)

For 7 to 10 days, the feeds are maintained. Since cichlid fry and livebearers fry are considerably larger in size, they can be omitted in favor of the following diet items. Daphnia that has just hatched and artemia nauplii can both be administered. Live bearer's fry can be fed finely ground tailored diets for 10 to 15 days starting just after birth. Daphnia, blood worms, earthworms, tubifex, mosquito larvae, artemia, and artificial feed can be given 25 to 30 days after birth.

4. Collection and culture

4.1 Infusoria



Infusoria serves as beginning food for ornamental fish in their early stages. The group of tiny, single-celled organisms that resemble Paramecium is known as Infusoria. They live in ditches, tanks, and ponds. 0.13 mm mesh cloth works well for collecting them. Banana peelings, cabbage, potatoes, hay, and lettuce leaves are used in culture. Any of the ingredients described above are maintained in a water-filled container. The container is covered to keep mosquitoes out. The container is stored somewhere cool.

The water will become milky and smell bad after two days. This is a result of germs multiplying and causing material deterioration. The water's surface will develop a slime coating. The water will become clear and pale yellow in color after around 4 or 5 days. This is due to floating Infusoria spores that have fallen into the water, are consuming the bacteria, and are subsequently multiplying. The surface slime layer of the water will then separate and disintegrate. Now, the culture may be used to feed the young fish larvae. The

culture will continue to develop for another two to three weeks after adding a small amount of milk.

4.2 Daphnia, Moina and Rotifer

Water fleas are a frequent name for daphnia. Cladocerans describe them. Freshwater ponds and tanks are where daphnia may be found. It eats things like germs and algae.

Natural collection:

Pools, ditches, and other areas of still water can all be used to harvest daffodils. Before sunrise, they swim on the water's surface; after sunrise, they descend to the bottom (diurnal migration). Daphnia should thus be harvested in the early morning. With the use of a scoop net with a mesh size of 100–200 microns, daphnia may be harvested.



Stock and pure culture:



Daphnia may be cultivated on a large scale. Daphnia must be gathered, diluted, and taken in a glass beaker to make stock and pure culture. A dropper is used to pick up each Daphnia. Daphnia is given yeast or GNOC daily @ 200 ppm concentration. The feeding of cultures is continued after being transplanted into a 1-liter jar. The jar culture is injected into the

mass culture tanks after five to six days.

a) Mass culture:

Daphnia is grown in tanks made of cement or plastic with capacities ranging from 500 to 20,000 liters, depending on the needs. Filtered freshwater is poured into the culture tanks after they have been completely cleaned. A mass culture's medium is ready before it begins as



follows:

Media preparation:

The slurry is made by combining 250 liters of fresh water, 10 kg of chicken dung, 5 kg of groundnut oil cake, and 2.5 kg of single superphosphate. To allow for fermentation, the release of nutrients, and the escape of undesirable gases, there is steady aeration for three days. Following 3 days, the slurry is used as a fertilization solution in the mass culture tanks. For three to four days, the mass culture tanks are continuously supplied with the medium at a rate of 3 to 4 ml per liter of water. On the fourth day, daphnia is administered at a rate of 50 individuals per liter. In around 7 days, daphnia grows and reaches a density of 10,000 to 25,000 organisms per liter. Using a scoop net with a mesh size of 100 to 200 microns, daphnia is collected in the early morning or late evening when they are on the water surface

4.3 Tubifex

The phylum Annelida contains the tubifex species. Tubifex worms are tiny, 2 cm long, reddish worms sludge and muddy areas. Their posterior end is visible above the mud for breathing, but their front section is hidden inside the mud for feeding. The perfect food for ornamental fishes that want to grow and reproduce quickly is tubifex worms.

Natural collection:



Ditch and canal areas are good places to find them. For the purpose of drying the water, the mud and tubifex are gathered and stored in a large bucket. Due to a shortage of oxygen during drying, the worms will gather on the surface. They are

then gathered and cleaned to eliminate any remaining muck that has adhered to the body. They should be maintained beneath the water stream so that any remaining mud in their intestines may be flushed out. However, they may still be carrying mud in their stomachs from previous foods. They are fed to fish after being cleaned appropriately.

Culture:

Method – 1:

Cement tanks are one option. Pond or canal mud is limited to a maximum of 5 cm. 5 cm of



water is filled to the top. Spread over the top, the rice bran is then allowed to ferment for three days. The Tubifex worms are injected three days later. Pond muck should not be allowed to totally dry out. After the filling, the worms will congregate on the mud's surface, where they may be easily removed. The procedure may be repeated a few days later.

Method – 2:



Tubifex worms may be grown in any container that has a 5 cm layer of pond mud on the bottom, along with decomposing plant matter, rice bran, and bread. The container must have an appropriate drainage system in place to sustain a constant, gentle water flow. After that, tubifex worms are

injected. Clusters of Tubifex worms appear after 15 days.

4.4 Bloodworms

Chironomus larvae are another name for blood worms. Blood worms are the popular name for the midge fly's intermediate larval stage. They are members of the phylum Arthropoda's family Chironomidae. Typically, they are crimson in color. Bloodworms are preferred favorably by fish like Arowana and catfish.

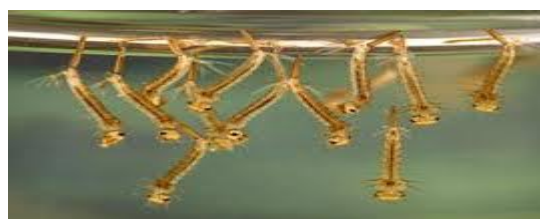
Culture:

Trays that are flat serve as containers. To entice chironomid flies to lay eggs in the water, soil, compost bovine dung, and water is first filled. Approximately 20000 eggs, which hatch in about three days, are laid by each female. Before being fed to the fish, the larvae are plucked, carefully cleansed, and then held for conditioning to empty their guts.



4.5 Mosquito larvae

It belongs to the Arthropoda subphylum. They reproduce in bodies of still water. The culture medium for mosquito larvae is cow



dung. Scoop net can be used to gather them.

5. Preparation of artificial feed

5.1 Types of feeds

a) **Dry feed:** Dry feed generally contains 8-10 % moisture. There are of various types described below:



i) **Pellets:** Pelleted feeds are available as sinking or floating type.



ii) **Flakes:** Flakes are flattened in form. It first floats while gradually sinking. It comes in a variety of colors.



- iii) **Freeze-dried feed:** Freeze-dried feeds have a major advantage that they stored for a prolonged period of time without compromising any nutritional value. These come in cubes that attach to glass tanks. As it disintegrates, fish eat on it.



- iv) **Tablet form feed:** It may become trapped at various water depths.



- v) **Granular or crumble feed:** small particles suitable for larvae.



- b) **Moist feed:** It may be prepared daily and fed to fish. The feed has 35% moisture content. It can't be kept for very long because of the high moisture content.



- c) **Semi-moist /paste feed:** This may be fed to young fish by squeezing through the mash.



Conclusion

Generally, feed practices in various aquaculture should follow the right nutritional requirements. Before rising ornamental fish, one must about its feeding patterns and food kinds. this article will aid hobbyists who raise ornamental fish in understanding various options and proper eating techniques. In the ornamental fish industry, a wide range of foods and feeding methods can be employed. For the first few days of a fish's lifespan, live food—which is referred to as the "living capsule"—should be favoured. After sufficient acclimation, artificial feeds can be added. If the proper ratios of nutrients are given, the overall health of ornamental fish can enhance, eventually complementing the appearance of your aquarium with a healthy population of fishes.