

Ornamental Fish Management

Proper maintenance is essential for keeping your aquarium healthy and vibrant. Here are some key aspects of aquarium maintenance:

1. Water Quality Management:

- o Regularly test the water parameters, including pH, ammonia, nitrite, and nitrate levels.
- o Perform partial water changes (about 20% of the water) every 1-2 weeks to remove accumulated waste and replenish essential minerals.

2. Filter Maintenance:

- o Clean the filter media (mechanical, biological, and chemical) as needed. Avoid replacing all the media at once.

3. Algae Control:

- o Algae can thrive in aquariums due to excess light and nutrients.
- o Limit the duration of aquarium lighting (8-10 hours per day).

4. Feeding and Nutrition:

- o Feed your fish a balanced diet. Overfeeding can lead to water quality issues.
- o Remove any uneaten food promptly to prevent decay.

5. Plant Care:

- o Trim overgrown aquatic plants to maintain their shape.
- o Fertilize plants with liquid or root tabs if needed.

6. Equipment Inspection:

- o Regularly check the heater, thermometer, and other equipment for proper functioning.
- o Replace any malfunctioning equipment promptly.

7. Health Monitoring:

- o Quarantine new fish before introducing them to the main tank.

8. Medication

Remember, it's important to correctly diagnose the disease before administering any medication. Overuse or misuse of medications can lead to resistance and can harm the biological balance of the aquarium. Always follow the instructions on the medication package for dosage and treatment duration.

Common aquarium medicines used for fish treatment:

Medicine	Purpose	Description
API Stress Coat	Water Conditioner	Removes harmful chemicals like chlorine from tap water and replaces the fish's protective coating that may have been damaged by stress or disease.
API General Cure Powder Medication	Parasitic Infections	Treats a wide variety of parasitic infections. It can be used in freshwater and saltwater tanks to eliminate parasitic fish disease symptoms like gill flukes, holes in the head, and swollen abdomen.
API Super Ick Cure	ick Treatment	Powerful ick cure that quickly kills the parasite within 24 hours of the first dose.
Kordon Methylene Blue	Fungal Infections	Designed to treat a variety of fungal infections. It can be used in freshwater and saltwater tanks.
Aqua-Cura Medicine	Parasitic Infections	It contains genuine praziquantel and has no additional fillers or medicines. It is a great choice to deal with fish with flukes like liver flukes, gill flukes, internal parasites, and worms.

Ornamental Fish Production

Breeding of Ornamental Fishes

1. Selecting Breeding Pairs:

- Choose healthy, mature fish for breeding. Look for vibrant colors, well-formed bodies, and active behavior.
- Consider compatibility between male and female fish. Some species exhibit specific courtship behaviors.

2. Setting Up Breeding Tanks:

- Create a separate breeding tank to encourage spawning.
- Provide hiding places using plants, caves, or artificial structures.
- Maintain stable water conditions (temperature, pH, hardness).

3. Conditioning the Fish:

- Feed the breeding pair high-quality, protein-rich food to enhance their reproductive health.
- Gradually increase feeding to simulate natural abundance.

4. Triggering Spawning:

- Some species require specific triggers (such as temperature changes or water flow) to initiate spawning.
- Observe courtship behaviors (chasing, fin displays) as signs of readiness.

5. Egg Laying and Fertilization:

- The female lays eggs, which the male fertilizes externally.
- Use a spawning mop or fine mesh to collect eggs.



1. Induced breeding

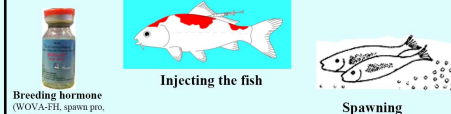
Induced breeding in fishes refers to the process of stimulating captive fish to spawn outside of their natural reproductive cycle, typically for aquaculture or conservation purposes. This technique is employed to control and optimize the timing of reproduction, which is crucial for managing fish populations in captivity. It includes,

a) Selection of Broodstock:

Healthy and sexually mature fish are selected as broodstock. These individuals should be in good condition and free from diseases.

b) Hormonal Manipulation:

Hormones are commonly used to induce spawning in fish. Synthetic hormones, such as GnRH analogs (gonadotropin-releasing hormone), are administered to stimulate the release of reproductive hormones from the pituitary gland.



Breeding hormone (WOVA-FH, spawna pro, ovastide etc.)

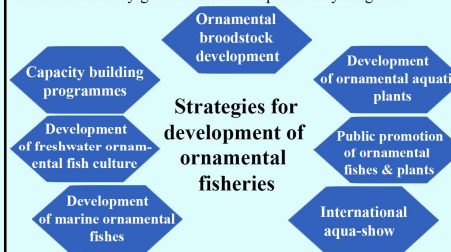
Injecting the fish

Spawning

c) Incubation: Fertilized eggs are incubated under controlled conditions (temperature, oxygen levels, etc.) until they hatch into larvae.

d) Larval Rearing:

Fish larval rearing is a critical stage in aquaculture, requiring meticulous attention to environmental conditions and nutrition to ensure the healthy growth and development of young fish.



Conclusion

Emphasizing best management practices in ornamental fish culture is paramount, especially concerning economic sustainability and livelihood opportunities.

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**Promoting Sustainable
Entrepreneurship in
Ornamental Fish Culture:
Best Management
Practices for Farmers
Welfare**



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Introduction:

An aquarium is a glass container that recreates a simulated natural environment for aquatic organisms, either freshwater or marine, incorporating elements such as plants, rocks, gravels, and artificial decorations. Maintaining the physico-chemical and biological parameters of the water within the aquarium is crucial. Various equipments are employed to control aeration, water movement, temperature, suspended organic matter, and illumination.

Fabricating aquarium tanks involves considering factors like size, shape, glass thickness, water volume, and fish density. The minimum recommended aquarium size is 60x30x30 cm, with considerations for individual fish water volume. Common sizes are 45x25x25 cm and 60x30x30 cm. Fish stocking density should be low to avoid overcrowding, using the formula: Stocking density = (Length x Breadth)/20.

Today, glass and acrylic aquariums are common in households, restaurants, offices, and public spaces. Aquariums come in various shapes beyond the traditional rectangle, including square, triangle, hexagonal, trapezoid, globe, and pyramid shapes. However, not all shapes are suitable for every fish species.

The trend of keeping ornamental fish as a hobby is gaining significant traction across India. Currently, it's estimated that around 1.25% of urban households own aquariums, and the domestic market for ornamental fish is projected to surge by 1200 crores within the next 4-5 years. This rapid growth indicates promising opportunities for entrepreneurship in the ornamental fisheries sector.

Important aquarium Accessories:

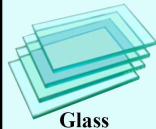
- 1) Glass:** Panels of required size, cut and cleaned - 4 side panels and 1 base panel.
- 2) Substrate:** Typically gravel, pebbles, and small stones (3-5 cm) with white sand, serving as a bed at the bottom for plant growth. Composts must be washed before use.
- 3) Lighting Arrangement:** Aquarium lamps, around 25 W (240 V) fluorescent white tube, suitable for a 48"x18"x12" aquarium. Positioning light above the water surface with a gap of 4-6 inches. Light stimulates plant growth through photosynthesis, requiring a 10-12 hour light period. Popular options include fluorescent lamps and compact fluorescent lamps. Imported aquarium lamps like Gro-lux enhance fish color. The lamp is always fitted in the hood to prevent shade on the viewing side. Ventilation is necessary to minimize heat buildup.
- 4) Thermometer:** Transparent glass/perspex thermometer fixed on the glass surface using a magnet, ensuring optimal thermal conditions for ornamental fishes.
- 5) Heater-Stats (Heaters with Thermostats):** Essential for tropical freshwater fishes, maintaining temperatures between 18°C - 29°C depending on the species. The heater-thermostat system regulates temperature, usually placed either partially or completely submerged inside the aquarium.

6) Aerator: Comprising a regulator, power source, air tubes, and small joints, aerators increase oxygen content and remove excess carbon dioxide. Must be positioned above the water level to prevent back-sucking in case of a power supply failure.

7) Filters: Vital for water quality maintenance, utilizing mechanical, chemical, and biological filters.

- a) Mechanical:** Filtration material like filter wool traps particulate waste.
- b) Biological:** Bacteria in a filter bed convert toxic ammonia to less toxic nitrates through the nitrogen cycle.
- c) Chemical:** Water filters through activated carbon (charcoal), eliminating dissolved wastes. Some treatments may be neutralized. Under-gravel and reverse-flow filters are also recommended.

8) Hood (Cover) and Stand: The hood prevents dust, fish jumping, reduces heat loss, and evaporation. It can be a plain glass sheet, plywood, or metal hood, enhancing the unit's aesthetic beauty. The stand should be sturdy enough to support the tank's weight, including gravel, water, and accessories, made of wood or metal (iron, steel).



Glass



Pebble



Sand

Substrate



Lights



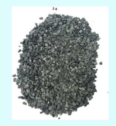
Thermometer



Heater-Stats



Aerator



Filters

9) Aquarium Plants: They contribute to a natural appearance, provide oxygen, serve as shelter and food for aquarium fishes, and create an ideal environment for fish spawning. Plants can be surface/free-floating, rootless submerged, or rooted submerged plants, such as Lemna sp., Pistia sp., Salvinia sp., Riccia sp., Azolla pinnata, Eichhornia, Ceratophyllum sp., Myriophyllum sp., Nitella sp., Cabomba sp., Limnophila sp., Hygrophila sp., Vallisneria sp., Hydrilla sp., Najas sp., Potamogeton sp., Cryptocoryne sp., and Sagittaria sp.



Vallisneria



Cabomba



Hydrilla



Sagittaria

Aquatic Plants

Nutrition and feeding

Fish require essential nutrients such as proteins, lipids, carbohydrates, vitamins, minerals, supplements (pro-biotics and pre-biotics), and water. Different fish species have various feeding adaptations, including carnivorous, herbivorous, and omnivorous habits, with diverse feeding patterns like surface, column, and bottom feeding. Diets must be formulated with the right balance of nutrients to ensure effective consumption.

The mouth's position is crucial in the digestive system, with carnivorous fish typically having a terminal mouth, while bottom feeders may have subterminal mouths. Teeth in fish serve specialized functions; for example, predatory catfish have small, sharp teeth.

The digestive process varies among fish species, but there are common elements. Oxygen consumption rate often depends on weight and temperature. Some fish rely on natural feed, while others thrive on formulated artificial feed containing macro-nutrients, vitamins, and trace elements. Properly formulated diets enhance nutrient digestibility, meet metabolic needs, reduce maintenance costs, and minimize water pollution in ornamental fish. Adjusting aquarium conditions to mimic their natural habitat, including temperature, light, salinity, oxygen, pH, and hardness, encourages natural feeding behavior.

Feed preparation



Live feed



Artemia



Moina



Daphnia



Blood worms

Live feeds are essential for fishes during its early larval stages

Nutritional requirements of fishes

Ornamental fish share nutritional needs with food fish, with the distinction that ornamental fish prioritize optimal growth less than food-focused species. Complete artificial diets are prepared to provide essential protein, fats, carbohydrates, vitamins, minerals, and trace elements necessary for the overall health, reproduction, and well-being of ornamental fish.

Composite diets, preferred by ornamental fish, typically consist of 15-50% protein, 10-25% lipid, 10-25% carbohydrates, 5-10% ash, and an additional 5% of other elements like trace elements, vitamins, minerals, and supplements (probiotics, prebiotics, and enzymes). The nutritional value of dietary ingredients is assessed based on their ability to supply energy, with average physiological fuel values of 4 kcal/g for protein, 4 kcal/g for carbohydrates, and 9 kcal/g for lipids.

Efficient nutrient use by ornamental fish aids in formulating appropriate diets and varies as mentioned:

- **Herbivorous and omnivorous juveniles,** grower, and brood stock: 30-40% protein from sources like soybean meal, mustard meal, groundnut meal, and wheat gluten.
- **Carnivorous species** (e.g., cichlids): Above 45% protein from fish meal, squid meal, shrimp meal, clam meat.
- **Larval stages:** Above 50% protein, typically derived from natural/live feed.

The suitable feed for ornamental fishes is determined by their feeding habitat:

- **Surface feeders:** Dry mash/meal.
- **Column feeders:** Mixture of dry/moist feed.
- **Bottom feeders:** Moist/wet/paste feed.