9. Heaters

- Tropical Freshwater fishes are warm water fish. These fish cannot survive in cold waters. They require an optimum water temperature of 26-28^{0}C. Thus heating of the aquarium is required in winter.

10. Gravel

- Gravel is required in an aquarium to provide natural look, hold rooted natural aquatic plants and most importantly it acts as a substrate for proliferation of useful bacteria


11. Aquarium plants

Aquatic plants are used to give the freshwater aquarium

- Natural appearance,
- Oxygenate the water
- Provide shelter
- Spawning
- Food

Types of aquatic plants

- Surface floating-Azolla, Lemna, Eichhornia, Salvinia and Pistia
- Emergent plants- water lilies
- Rootless submerged- ceratophyllum, nitella
- Rooted submerged- vallisneria, hydrilla, limnophila, najas, myriophyllum


Salvinia


Ceratophyllum

12. Decoratives

Background posters, various types of toys, rocks and caves, shells and corals drift wood etc. Are used to decorate aquariums.


Aquarium posters


Caves


Shells

Steps for fabrication of rectangular aquarium

- Select the glass panels, cut them into required sizes, using a glasscutter and a scale.
- Clean all of the edges of glass with acetone or alcohol.
- Spread polythene or old newspaper sheet on the surface of the selected place.
- Place one of the glass panel on a plain surface.
- First, raise the back panel by applying silicon sealant; follow the same process for other side glasses too.
- Tape all the corners from outside to give extra support during setting.
- Smoothen the sealant at the joints with the finger.
- Leave the sealant to get hardened atleast for a day.
- When the tank sets remove the extra sealant, if any with a sharp knife or a blade.
- Finally check the aquarium for any leakages by filling watr.
- Acetic acid is released from settings so tank should be thoroughly washed.

Setting up

- Install the tank on a stand with thermocoal cushion
- Biological filter assembly is arranged on bottom of the tank and sand is spread over the plate
- Aquascaping
- After filling ¾ arrange with plants
- Then completely fill the tanks leaving 5cm at the top
- Keep the tanks with biofilter operation for 10-15 days
- Introduce only compatible species
- Introduce fishes after giving a quarantine period

Maintenance

- Temp, pH, hardness, DO, C02, ammonia, nitrite, nitrate within optimum
- Weekly exchange 10-20% of water
- Siphoned the bottom water
- Slope the bottom gravel –accumulate the wastes at the lowest level
- Tap water – must be kept open for two days
- Introduce scavenger fishes like sucker cat fish e.g.- loaches, corydor
- Fed twice daily in morning and evening

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FRESHWATER ORNAMENTAL AQUARIUM FABRICATION AND MANAGEMENT

भाकृअनुप ICAR

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Introduction

- An aquarium is a glass-sided tank, or bowl, in which fish or other living aquatic animals or plants are kept for recreation.
- Fabrication of an aquarium is not a difficult task and also it does not require any sophisticated equipment, large investment or intensive labour.

Factors to be considered for tank construction

a) Size of the tank
b) Shape
c) Number of fishes
d) Location direct exposure to sunlight is not advisable

Size

Since there is no scope for changing the dimension of aquarium after construction. Some factors to be considered.

Factors

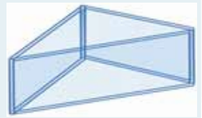
- Number of fishes to be kept- governed by surface area of the tank(L*B), Larger the area less stress to the fishes
- thumb rule – 75cm^2 for 2.5cm of fish excluding tail
- Nature of aquascaping
- Capacity to invest money
- Space available
- Size of fish introduced
- Always better to opt large tank
- In small a tanks water quality parameters will fluctuates
- The ideal ratio of length to height of aquarium tank is 3:2
- The minimum reasonable size of an aquarium tank is 60cm length, 30cm height and 30cm width

Standard dimensions for rectangular tanks

Length (Cm)	Breadth (Cm)	Height (Cm)	Capacity (L)	Glass thick-ness (mm)
60	30	30	54	4
90	30	38	103	5
120	30	45	162	6
150	45	60	405	10
180	45	60	486	12

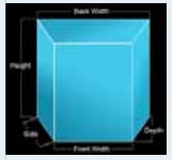
Shape

Rectangular



Triangular

Square



Trapezoid

Global

Hexagonal

Accessories

1. Glass

- Glass panels of required size are cut and cleaned- 4 side panels and 1base panel

2. Cleaning purpose

- Carbon tetrachloride, acetone or degreasing agents

3. Sealing – Silicon sealant

4. Aquarium lamps

a) Light is a stimuli for plant growth (photosynthesis).

Atleast 10-12hr of light period is needed. The most popular- fluorescent lamp and compact fluorescent lamp- gives a cool and effective illumination

b) Imported aquarium lamps(Gro-lux)- enhance the color of fishes

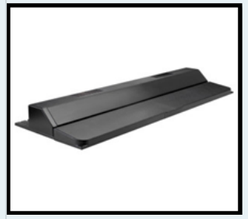
c) For a 48inch*18*12 inch tank, 25W fluorescent white tube is suitable, which would be placed above the water surface leaving a gap 4-6 inch

d) Lamp always fitted in the hood – so no shade falls on the viewing side

e) Necessary to give a ventilation to minimize the buildup of heat in the aquarium

5. Hood

- Improves the aesthetic beauty of the unit
- Protect the fishes and prevents insects, dust falling into the tank
- Evaporative loss is prevented
- Provides base to which light arrangements, aerator can be fitted
- A window is provided in the hood to feed the fishes daily
- Plywood, bamboo ply and wood-ideal materials



6. Stand

- Must be strong enough to support the weight of full tank-gravel, water and accessories

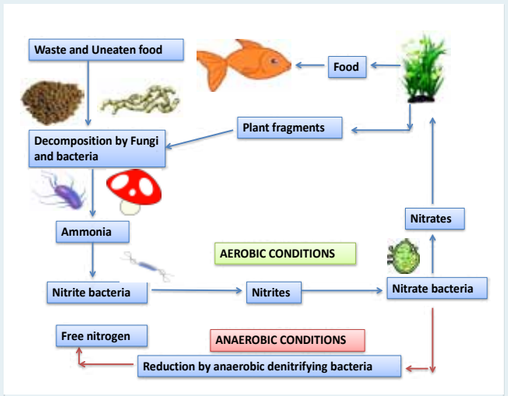
Iron

Wood

Steel

7. Filters

- Ammonia- highly toxic to fishes- accumulates in water – through excretion of fishes, decomposition of faeces, left over feeds and organic matter.
- Filters – mainly mechanical, chemical, biological-for maintaining the water quality
- Mechanical- filter water passes through a filtration material like filter floss, foam material,



- Chemical – filter activated charcoal commonly using
- Biological filters- water passed through a filter bed, and bacteria convert toxic ammonia to less toxic nitrates
- Most commonly used – under gravel biological filters contains a corrugated or indented plastic sheet perforated with fine holes having a vertical pipe at the rear corner
- Gravel of 3-4mm size spread to height of 5cm over the plate
- By means of air pump a column of water moves up the pipe, creates a water recirculation through sand bed
- Downward movement of water through sand bed traps suspended particles
- Efficiency of biofilter can improved by using powerhead
- Power filter- internal filter consists of filter unit attached to powerhead, serves function of biological and mechanical filter
- Bioballs increase the surface area

8. Aerators

- Increase the oxygen content and removes excess carbon dioxide
- Vibrator type is the cheapest and most commonly used
- Aerator must be kept above the water level in order to prevent back sucking of water if the power supply fails
- Air is supplied to aquarium through PVC tubings, airline dividers, flow regulating valves and airstones