Aquarium keeping & Rearing of ornamental fishes

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Fish Aquarium.

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- Importance of Aquarium -

Aquarium is an artificial tank which have a collection of living fishes & other aquatic organisms.

The Aquarium has an economic Importance & also educational importance. In the educational importance it is useful for biological study of fishes.

It is helpful to study the growth behaviour, food & feeding as well as breeding of fishes.

A Well maintained aquarium is a complete habitat. Which helps a studying the relationship between different organisms as well as betn enviourment & living organisms.

It is useful for conttolling breeding of Aquarium fishes to produce more disirable & profitable new varities.

- It also gives employment to people by running following bussiness -

1) Fabrication & selling of aquarium tank.

2) prepairation & supply of food.

3) Breeding of aquarium fishes to produce sufficient no. of fishes for the supply of Aquarium owen

4) purchesing & selling of aquarium fishes :

5) It is an additional source of income.

6) The aquarium is used for ornamentation of homes, hotels, bussiness farm & offices.

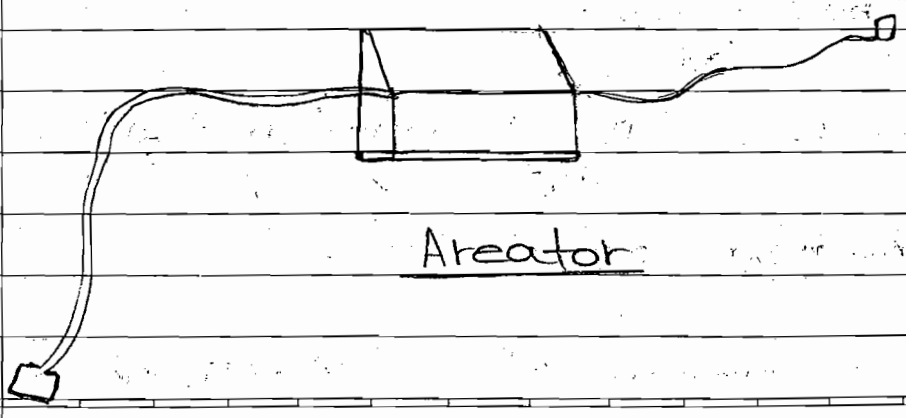
— Acessories of Aquarium –

The aquarium acessories are as follows –

1) **Aerator** –

It is a vibrator electtic maschine. It is connected to the diffuser placed in the aquarium by chemically insert plastic tube. It is used to pump air into the aquarium to maintain level of O_2. inthe water.

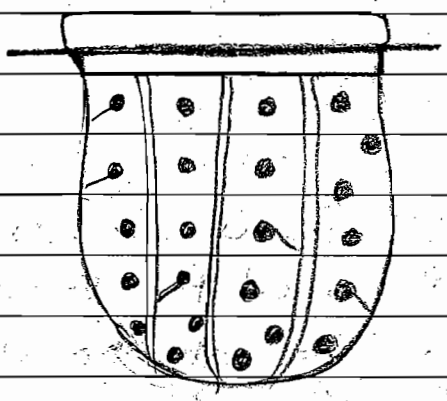
It's circulate water from bottom to surface & surface to bottom & helps to release toxic gases in the atmosphere. It also cools the water.



Areator

2) **Feeding cup –**

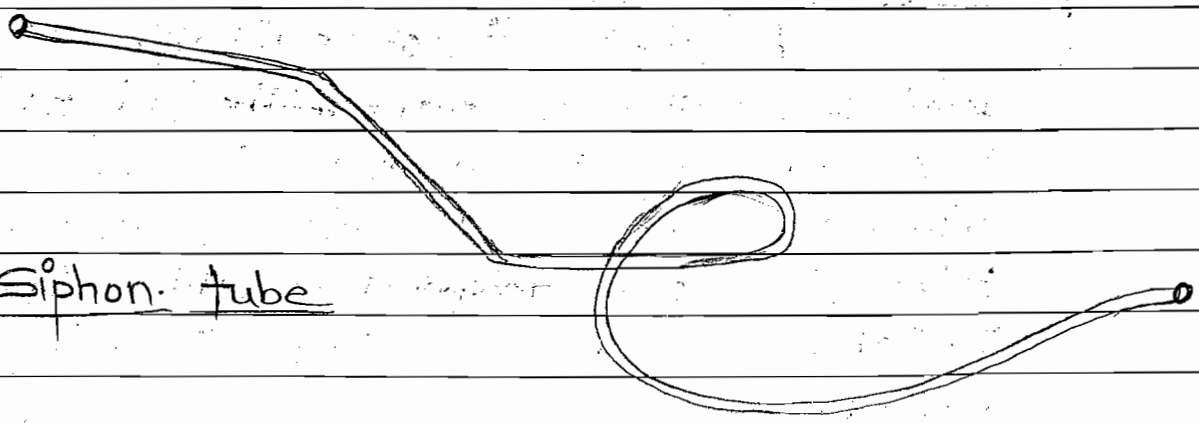
It is a conical plastic cup of 4 cm in diameter. This cup has numerous small holes.
It is used for feeding of tube fix worms to the aquarium fishes. Large number of worms are kept inside the cup & this worms comes out one by one through the holes. & dropped into the water.
Where they are consumed by the fishes.



Feeding cup

3) **Siphon tube –**

It is a rubber tube of suitable length. It is used to remove west water as well as water from the aquarium tank. It is also used to feel water into the aquarium tank.



Siphon tube

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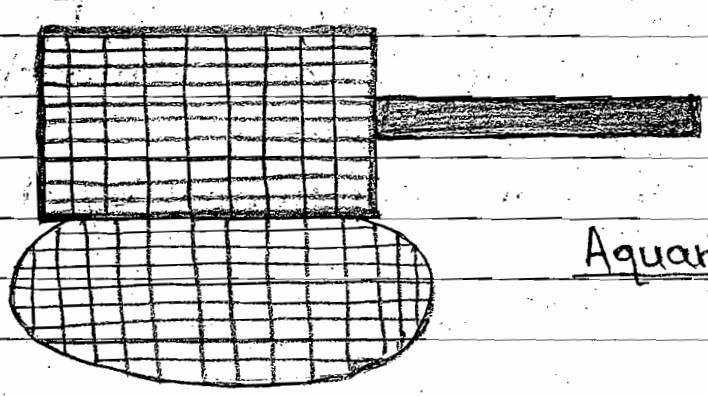
4) Aquarium net –

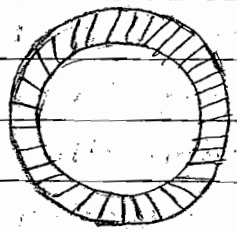
It is a hand net square or conical in shape. It has a handle to one side for the holding. It is used to take out fishes from the aquarium tank. This net is made up of fine meshes.



Aquarium net

5) Feeding ring –

It is a circular, Floating tube of polythene. It is used for feeding fishes with powdered food. The dry powdered food is sprinkled within the ring.



Feeding ring

6) Lid –

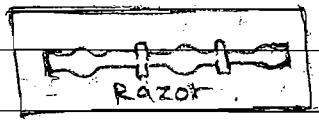
A glass lid of suitable size is kept on aquarium tank. The lid protects the aquarium from dust & domestic animals. Excess feeding & disturbing of fishes is prevented by this lid. It prevents fishes from jumping out of aquarium.

7) **Thermometer** –

It is fixed in the aquarium & is used to measure temperature.

8) **Razor** –

It is used to clean the aquarium glass.



– Setting of Aquarium –

- For the setting of aquarium a suitable site is selected in the house, office, hotels or institution.
- Aquarium should be installed near a window. Before setting a aquarium wash new aquarium tank with common salt & water. To keep harmful germs.
- Do not wash the aquarium tank with ditergent soap. keep the Aquarium tank on a stand or a levelled table.
- It should be against the wall & away from the window so that it does not recieve direct sunlight. Direct sunlight causes heavy growth of green algae & covers the glass of aquarium.
- The sand is required to make the bed at the bottom of aquarium tank. The sand should be washed well to remove the dirt. This cleaned sand is dried in the sun to kill the bacteries & germs.

- After that the sand is covered at the bottom & spread it by giving the slope of the bed towards the front pannel.

- Than sand is covered by a thin layer of gravel. This well helps to remove the excess food & debris.
- Then place small pieces of stone on the bed. for the decorative purpose.
- The stone should be of medium size because they should not restrict swimming space for fishes.
- The lime stones or calcari stone should not be used. This stones are used by the fishes for hiding places.
- Now feel the aquarium tank with the water about 3/4 of its capacity.
- It is better to use rain water or non polluted water or dechlorinated water.
- While feeling the water into the aquarium tank do not distuib the sand. To avoid the disturbing the sand keep the saucer on the sand & pour the water on this.
- The aquarium is now allowed to stand for a couple of day.
- The Next step is of planktin in the aquarium
- The quick growing aquatic plants such as ceratophylum, vallisneria, Hydrilla, potamogeton, Sagittaria can be used.
- Select half grown, healthy looking plants with abdunt leaves & roots.

- Wash the plants under running water. Remove the discoloured leaves from the plant.
- The plant should be arrenged with shorter plants in the front of the panel & tall at the back.
- Each plant has to fixed firmly deep into the bed of the sand.
- After planting the aquarium should be left without disturbing for a week. before introducing fishes.
- During this period plants roots grows into the bottom.
- The provision of the light is essential because it requires for the photosynthesis of the plant.
- Light Fluorescent tube or bulb can be used.
- The artificial light increases the plant growth as well as decorativeness of the aquarium.
- The temp. of the aquarium ~~tank~~ water Should be maintained.
- In the aquarium tank zooplanktons like cyclops, Daphnia & shrimps & small worms also introduced carefully.
- As they provide natural food to aquarium fishes.
- After complete the setting aquarium the Selected ornamental fishes are introduced into the aquarium.
- The aquarium fishes such as angle fish, guppy, gold fish, zebra fish, Betta splendens, tiger fishes, tiger barb, sward tail, kissing gourami, three spoted gourami, thick liped gourami are

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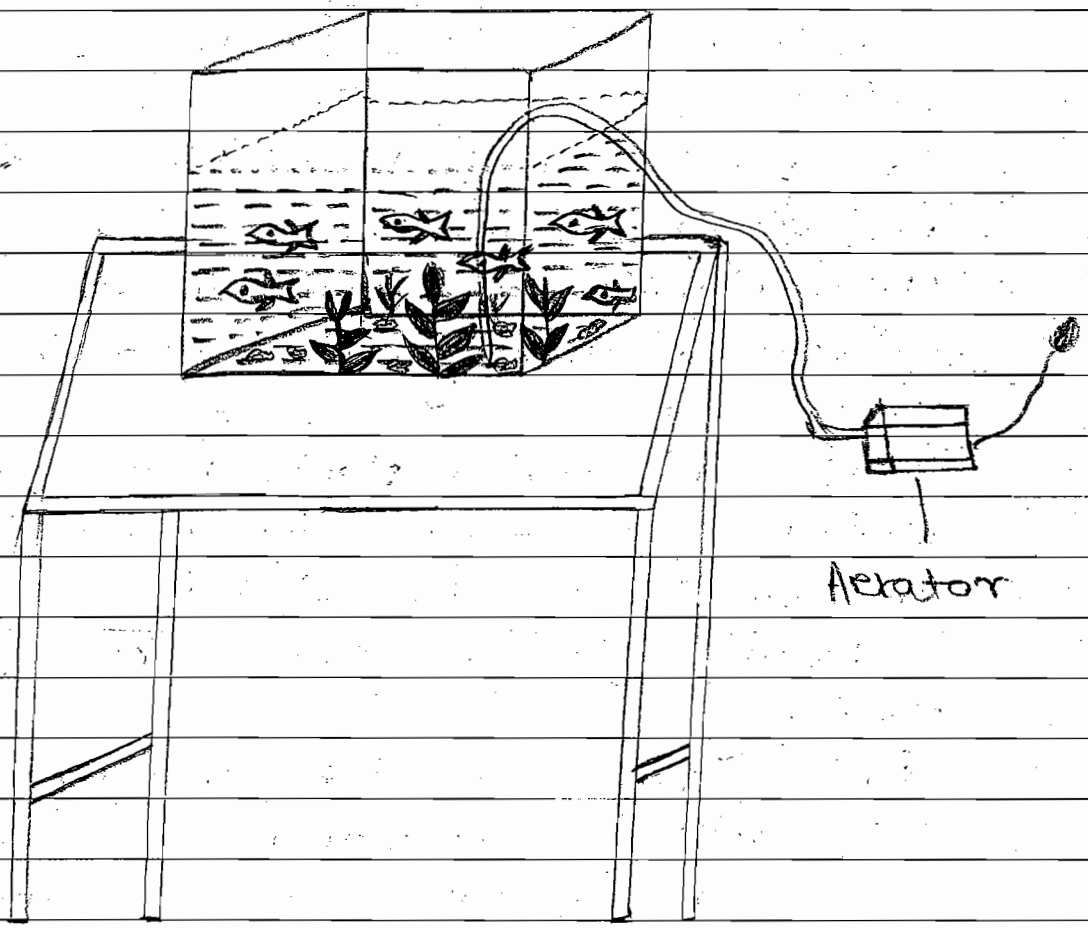
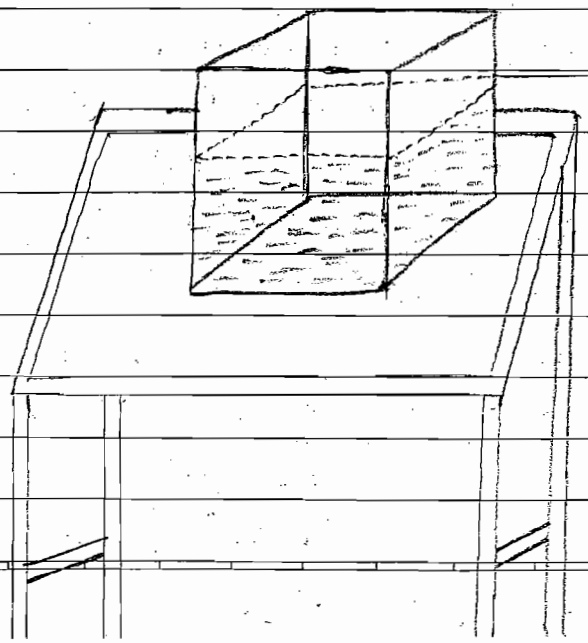
Introduced into the aquarium tank.



Balanced aquarium tank.



Aquarium fabrication

Aquarium Fabrication –

Aquarium Fabrication includes selection of suitable size, prepairation of frame cutting & Fixing of glasses, cleaning & leakage of glass.

Aquarium can be made up of different sizes. It is stated that larger the aquarium easier to maintain it.

The aquarium can be made up of various sizes measuring about 24 X 12 X 15 inches or 36 X 12 X 15 inches. The most popular size of aquarium is 24 X 12 X 15 inches (60 X 30 X 40 cm)

For this aquarium prepairation 1 inch wide Aluminium angel of 1/8 inch thickness is used for the frame & glass of 1/8 inch thickness.

The frame of aquarium tank is usually made up of aluminium or iron.

While making the aquarium of size 24 X 12 X 15 inches, cut four pieces of 16 inches length for up right position. For width of the tank (12 inches). cut four pieces of 11 3/4 inches with the hack saw.

The width are now rivetted to up rights.

After rivetting width, uprights & length of rectangular frame of aquarium is obtained.

After prepairing the frame fix the glass plate of suitable thickness in the frame on all sides except top by using aquarium cement.

The thickness of glass plate depends upon size of aquarium.

The bottom glass should be more thick then the side glass.

The glass should not be touch the frame but is seprated from it by a thin layer of aquarium cement.

If the glass touch to the frame it will be break when the tank is lifted with water.

The aquarium cement should be water resistance it should be not poisons. i.e. it should be harmless to fishes.

The bitumen or silicon glues, are used commonly as aquarium cement.

The order of fitting glass plates into the Frame is first the bottom plate then front then back plate & finally the side plates.

cut the glass of 4 mm less then the total length of tank.

After applying the layer of aquarium cement over the angels. keep the bottom glass over it. & press it gently & allow it to cool.

The fix the front glass by the following the same procedure in this way fix all the glasses in the frame.

After fixing the glass plates apply the cement between the spaces into two glass plates of different sides, so that it will hold glass firmly. Allow it to cool & dry.

After fixing the glass plates keep the tank for a day as it is. Then check it for leakage. If the tank has very slight leakage.

It will stop it self after few days. but it has measure leakage then remove the cement & again add new cement to remove the leakage.

After checking leakage the tank should washed & cleaned. Remove the excess bitumen & keep the tank on a stand.

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Care & maintainance of Aquarium -

A carefully prepaired aquarium required very little maintainance.

The aquarium fishes never be handled with hand or cloth. because this may cause damage to the mucus coating on their body so handle them with scoop net do not put hand in the tank unless it is essential.

Fishes should not be disturbed unnecessary while neting out of the fishes from the tank. bring them in the cornet & lift them safely.

Clean the glass panels of front side regularly so as to keep free from algae.

Algae which is present on the back panel, on the stone should be left undisturbed because it serves as an O_2 producer.

The wastematter is removed by siphoning. Water level in the aquarium tank should be maintained by adding water level.

The water which is added must have the same temp. as that all ready in tank.

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The pond water or river water should not be used to maintain the water level because such water contains parasites.

Always use dechlorinated water. some of the water must be replaced once in a month. check the temp. of water every day & maintain it.

Maintain sufficient light in the tank. two main types of algae develops in the tank. The green algae & brown algae.

The green algae develops excess of light where as brown algae develops in the poor light. Hence excess light should be avoided.

Fish health depends on supply of adequate quantity of suitable dite.

over feeding with dry food gives milky appearance to the water. so this can be avoided by giving live food & also by removing little water from the tank & adding fresh water in it.

The fishes should not be fed on dry food continously, Hence dry food must be provided alternatively.

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The rice bran, wheat bran, small pieces of worms can be used as artificial food. While cyclops, Daphnia, small worms, Infusoria can be used as live food.

Maintain the O_2 content of water by using aerator. keep the lid over the tank, it will protect the aquarium from dust, domestic animals cat, Dogs.

It also prevents jumping of fishes.

- Food For Aquarium Fishes. -

The Aquarium fishes are fed with live food as well as dried food. (Artificial food)

The live food of aquarium fishes consist of organisms which are available in natural habitat.
for eg; Daphnia, cyclops, Artemia, Rotifer, Diatoms, Algae, tubi fex worms, mosquito larvae, etc.

The live food increase the growth & survival rate of the fin fishes.

The planktons forms the live food & the planktons are of two types i.e. phytoplankton & Zooplankton.

The phytoplanktons includes volvax, chalmydomonas, oscillatoria, nostoc, while the zooplankton includes cyclops, Daphnia, Artemia, paramecium, Moina, Verticilla, Tubi Fex worms, mosquito larvae, earth worms etc.

live Food -

1) Tubi Fex worms -

This are small reddish brown worms available in the morning hours in the sewage waters. with organic material.

They should be washed carefully in clean water & then given to aquarium fishes as live Food.

2) Mosquito larvae -

Mosquito larvae are found in stagnant water. They can be collected by mosquito hand net. Before giving to the aquarium fishes they should be washed.

3) planktons -

It includes zooplanktons like cyclops & Daphnia. cyclops are obtained from the stagnant water or can be cultivated in Cemented tanks by adding cow dung in the water. It is given as live Food to aquarium fishes.

Daphnia - They are found in stagnant Fresh water they are given as live food to all developing stages of adult Fishes.

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Daphnia can be cultivated in cement tank by adding cow dung in the water.

4) Earth worm :-

Earth worm is one of the best of all foods for aquarium fishes. It is rarely eaten by all fishes. It may be obtained in all times of the year. Large size of worms are killed by droping it into boiling water. Then they are cut into suitable sizes & given to fishes.

Small pink & red worms found on the lawns are the best food for aquarium fishes. The earth worms obtained from the compost & heavily manured soil should not be given to the fishes.

Dry Food or Dried Food :-

Variety of Dry food are available in the market best food is a mixture of many ingrediants like proteins, minerals, salts & carbohydrates.

A very good food may be made by mixing togethere one cup of dried caught fish, shrimp, Daphnia, spinach & wood meal Floar, two tea spoon full of Agar agar mixed it throwly into a stif pest with a beten egg & little milk.

The pest is than dried in slow oven after it, It is crushed into graded suitable sizes.

Rice bran, wheat bran all cakes i.e. ground-nul oil cake & Mauha oil cake & dried prawns are the best food for aquarium fishes.

The rice bran & all cakes contains carbohydrate & protein while dried & powder prawns is the best source of animal proteins.

Aquarium plants -

Different types of plants are used as the aquarium plants they are as follows -

1) Hydrilla
2) Vallisneria
3) potamogeton
4) ceratophyllum.
5) Fontinalis
6) spiky bush
7) Sagittaria
8) Laceleaf plant.
9) cabomba

These are the quick growing aquatic plants For the setting in the aquarium half grown plants are selected, healthy looking plants with abdunt leaves & roots are selected. These plants are handled delicately.

The discoloured leaves are removed from the plants before plantation each plant is fixed firmly deep into the bed of the sand of aquarium.

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1) Hydrilla —

It is a rooted submerged aquarium plants. It has green stem with nodes & internodes. Entire plant is covered with mucilage. It forms food for herbivorous species. It provide spawning beds to aquarium fishes. It helps to maintain oxygen percentage in the water of aquarium. It makes aquarium decorative.

2) Vallisneria —

It is a aquarium plant it is rooted submerged aquatic plant. It grows under the water & rooted in the bottom. It serve as spawning beds for aquarium fishes. It provides hiding places of to aquarium fishes. It maintain proper oxygen percentage (%) It reduces carbon dioxide level in the water its make aquarium decorative.

3) Ceratophyllum —

It is an aquarium plant. It is submerged unrooted aquatic weed. The stem is long & branched. Branches arises at nodes. Leaves arises in whorles of 6-10 & are rigid & olive green in colour. The leaves are more crowded towards the apex than towards the base. The flowers are solitary.

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4) potamogeton –

potamogeton is a genus of freshwater aquatic plants in the potamogetonaceae. potamogeton species are found worldwide in many aquatic ecosystem.
Height is strongly influenced by environmental conditions, particularly water depth.
All the species are technically perennial.
A large number of asexually produced resting buds called turions. Turions may be borne on the rizome, on the stem or on stolons from the rhizome.
The leaves are alternate. All potamogeton have a delicate membranous sheathing scale, the stipule at the leaf axil.
The stems have small scales. The flowers, which are often looked, are greenish brown & are composed of four rounded segments borne in a spike.
The most are known by the common name pondweed.

5) Spiky bush –

Spiky is Asiatic plant & grows 2-10 cm tall. Best described as christmas moss 'big brother' it is bigger & forms many deep green, branched shoots.
spiky moss does best on vertical surfaces where as branched shoots will show. It grows fast & thrives at a

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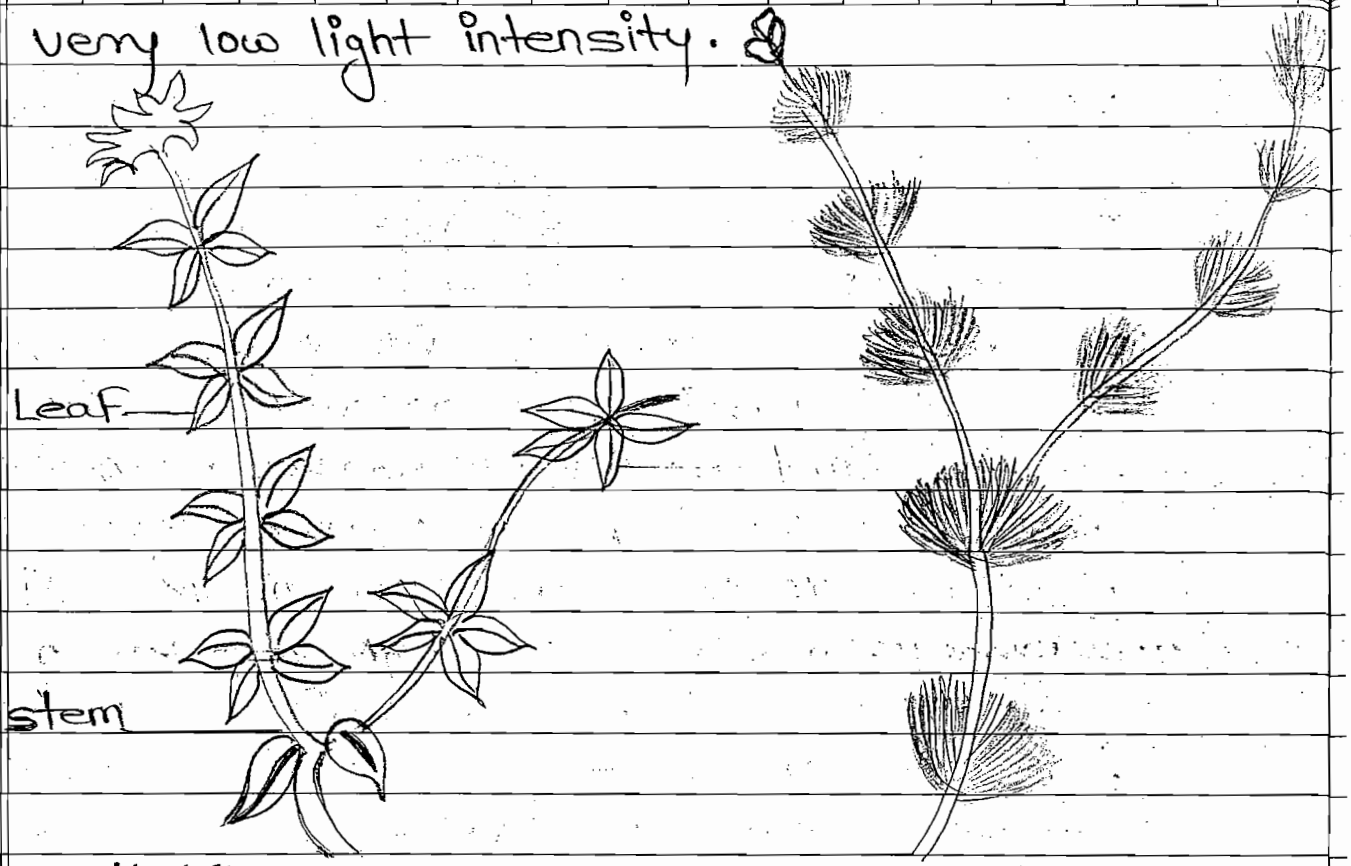
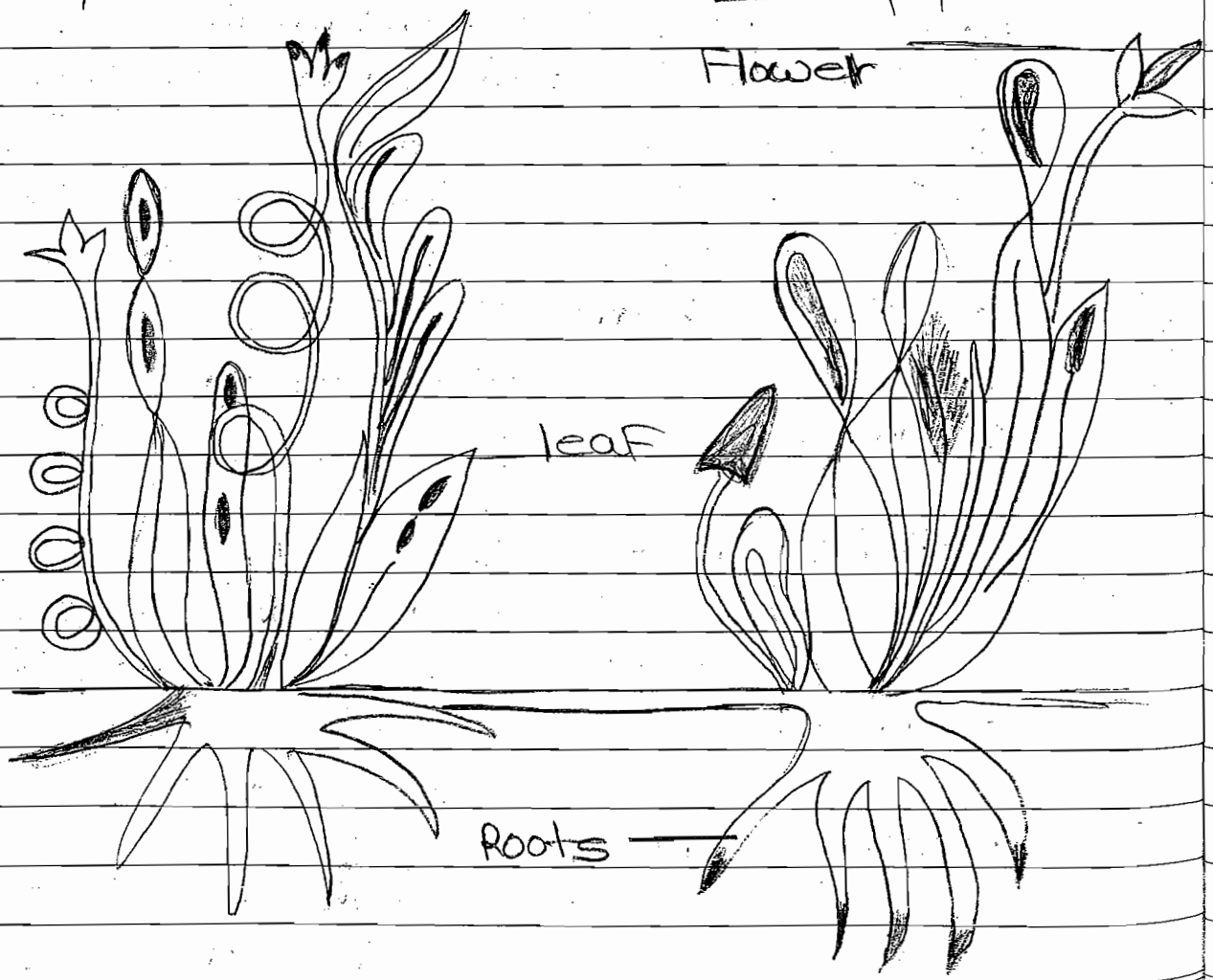
very low light intensity.



Hydrilla

ceratophylum



Vallisneria.

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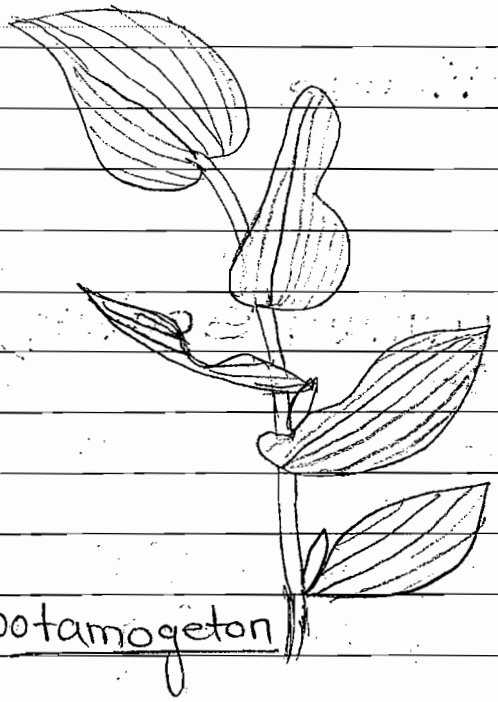

- potamogeton

moss

spiky bush

UNIT – III

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– Study of ornamental fishes –

I) Egg Layers –

1. Angel Fish – (pterophyllum scalari)

- **General characters –**

– Angel Fish is a popular aquarium fish.
– It is slow moving & egg laying aquarial fish.
– The body of this fish is disc shaped laterally compressed.
– It measures about 11 cm in length.
– The dorsal fin & anal fin are high & have equal length & are more pointed.
– The caudal fin is triangular & ventral fins have elongated bony rays.
– Vertical strip of coloured are present on the both sides of the body.
– Natural colour of the fish is silver with four vertical dark black bars.
– Different colour varieties like all black, half black, marbled blushing & gold are developed.
– This fish required deep tank with tall plants for breeding.
– Angel fish is a oviparous fish deposits eggs on clear vertical surface.
– A female as ovipositors & can be lays eggs about 400 adhesive eggs.

- It breeds at the temperature of 24 to 28°C.
- The male angel fish has shorter body as compaired to female.
- In male fish the fins are large, well expanded & pointed at the tip.
- Where as in female angel fish the fins are well expanded but small sized with blunt ends.
- The first strip is a straight in the male fish & passes through the eye while in female fish the first strip is slightly curved & then passes through eye.
- In male fish at the maturity the operculum region becomes rough & in female it becomes very smooth & slavy & fleshy.

- **Food & Feeding** –

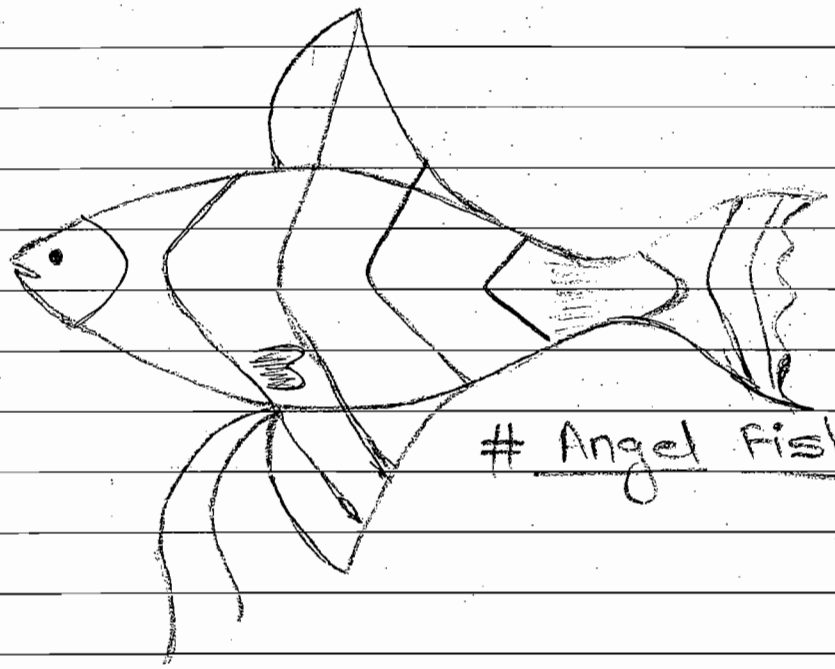
It feeds on variety of food it gives more referance to insect larvae.

- **Breeding habits** –

It is a oviparous fish i.e. egg laying aquarium fish. It is breeds at the age of 2nd or 3rd year.
For the breeding of this fish large sized aquarium tanks of 20 gallon capacity should be used.
The aquarium tank should contains tall plants like sagittaria, vallisnaria, etc.

- Aquarium bed should made up of gravel. In the aquarium tank the individual select there own pair & scraches a strip or cleans the surface of leaves for egg deposition.
- As they decides on with slet the eggs are to be the deposited they goes over & cleaned of that surface finally the female swims over the lives by touching its belly to it the ovipositer of the female becomes apparent & used to place string of eggs.
- Male swims close behind the female & sprayes sperms over eggs through the ovipositor.
- The female fish stuck string of eggs to the surface of lives & male fertilizers it.
- When the spawning is finished the pair will go to there work.
- Both the parent circulates fresh water over the fertilized egg by waying there wings.
- Fishes can identify the unfertilized eggs & picking them out. The youngones hatches out 24 to 36 hours. under the temp. of 26°c - 30°c.
- Newly hatched youngones carried in mouth of the parents. where they are left hanging.
- Later they are removed to clean shallow dipression duck in the sand.

When a week old youngones will swims with the help of parents. The young fishes can be fed on powdered food (dried shrimps & rotifers).



Angel fish.

2) Gold Fish – (caracious aurates):

- General characters –

- It is an aquarium fish. It is a egg laying fish or oviparous.
- It has a specific golden colour hence called gold fish.
- It has a large fin & transperant.
- It is a omnivorous fish feed on animal & vegetable material.
- Females lays eggs on plants.
- It is easy to breed hence a new strain of fishes or hybrid veriety can be produced & hybridization.

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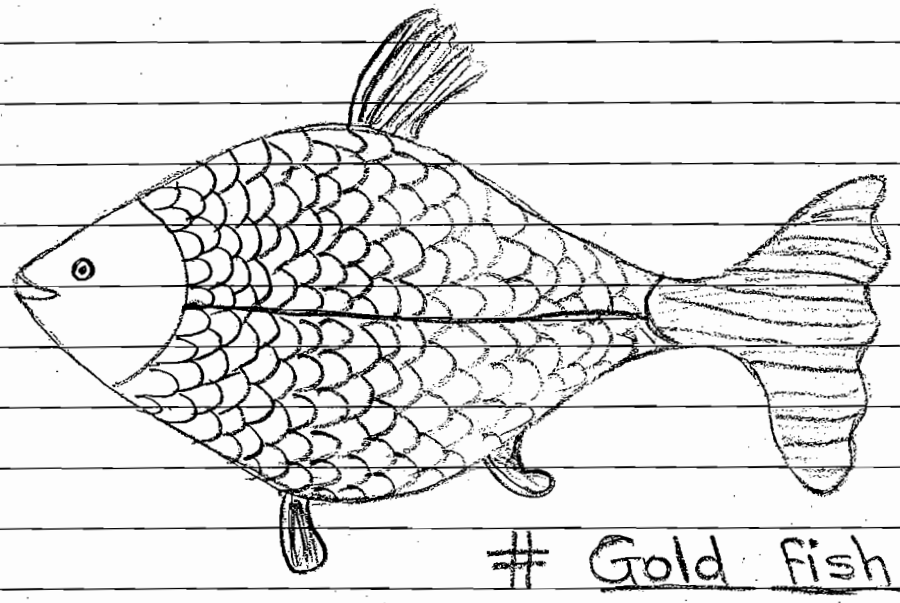
- The males at a time of spawning have pairty formation called breeding tuberculosis.
- The males are shorter than female.



Gold fish

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B. Live Bearers –

1) Guppy fish – (poeullia reticulata)

- General characters :

- It is an ornamental fish. Guppy fish is most famous live bearer fish.
- It is easily available & easy to keep & breed.
- Due to its voracious character of feeding on mosquito larvae. It is used for controlling of mosquitoes.
- Guppy fish is a fresh water fish.
- The colour of the body is iregular black. having black spots or patches on the body.
- Females are yellowish grey having the size 6 cm in length & males are 3 cm in length.
- They more colourful than females.
- males have gonopodium which is an copulatory organ.
- In female fish few colour spots are present in the tail region. gonopodium is absent in females.
- A black spot is developed above the anal fin in the females & this spot becomes clear in the gravid females.
- Guppy fish has upturned mouth & large eyes.

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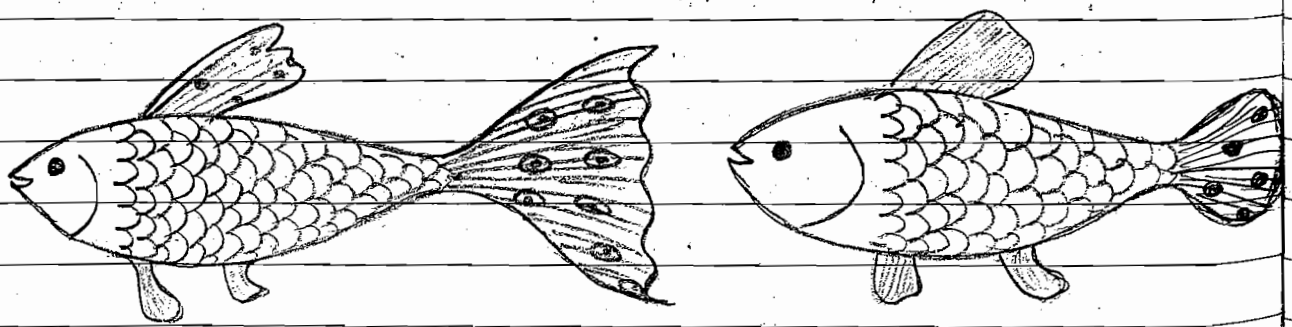
Breeding habits –

- Guppy fish breeds when it is of 2 or 3 months old.
- Medium sized aquarium tank should be used for breeding of guppy fish.
- The water should have plenty of aquatic plants to maintain temp.
- Guppy fish is very easy to breed.
- Introduced mature males in the same tank.
- The males mostly chasing the females in search of willing female.
- The male apporches the female & he chases her for some time.
- Then he turns away from her. but at the same time making 'S' shaped motion. To hold her attraction.
- If female is respective she follows him & keeps on spawning until they are paralled to each other at this time a spot appears in the male fish.
- He soon makes a look by swimming behing her & the male releases the sperms in the genitle opening of female with the help of gonopodium.
- The copulation is always not sucessful so that court sheep is repeated several time.
- After mating the males should be remove from tanks.

- The sperms are retained in the genitle tract of Female & the eggs can be fertilized.
- The justation period last for 4 to 6 weeks.
- The female can gives birth to 20 to 100 youngones or even more.
- Than the females are removed from the breeding tank after giving to birth to young ones. other wise it will eat the young ones.
- As the youngones they swims actively they start immediately.
- The young fishes feed on newly hatched shrimps & worms togethere.
- Guppy fish grows rapidly & becomes sexually matured in 2 months but riches to full growth in 6 months.

- Food & Feeding -

Guppy fish is a omnivorus feeder it feeds on newly hatched shrimps, worms, mosquito larvae & a mixture of powdered dried food zooplanktons & phytoplanktons.



(Male) Guppy fish (Female) Guppy fish

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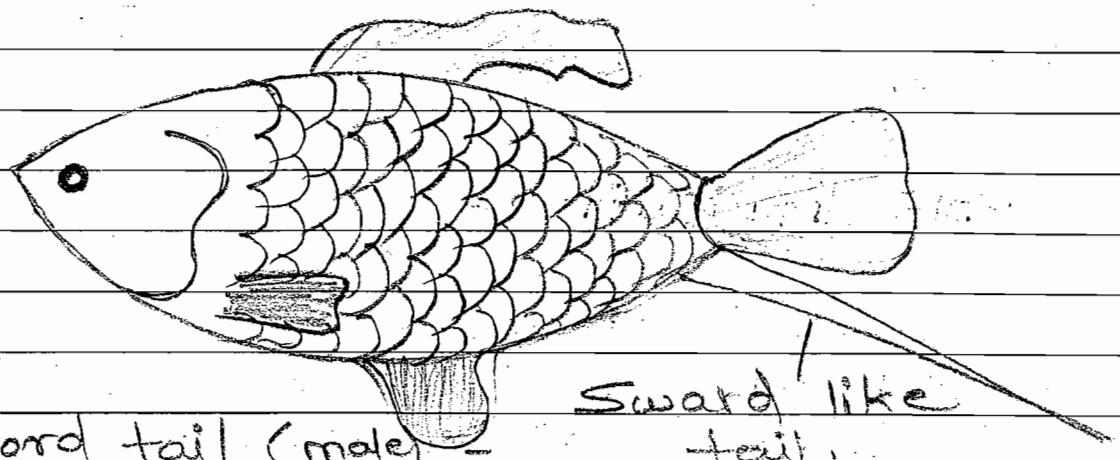
Sword tail – (xiphophorus helleri):



– Sword tail (male) –

• General characters –

– It is an ornamental fish.
– It is viviparous i.e. live Bearer fish.
– It is small fish with bulky body.
– The male fish has sword like tail & a gonopodium is present in the male fish.
– The male fish grows upto 8 cm in length & female grows upto 12 cm in length.
– The colour of the body is olive green along the back side & greenish yellow at the lateral side & yellow at the belly.
– The female fish gives birth to 200 to 240 youngones.
– In the female fish sword tail is absent.
– male fish has different intence colour.

– Food & Feeding –

– The sword tail fishes feeds on both

live & dried food, such as zooplanktons, phytoplanktons, worms, rice bran, wheat bran, oil cake mixture, powdered shrimps, etc.

- Breeding habits -

- Sword tail fish is a live bearer.
- It requires maximum area for active swimming & hiding places.
- Water should be slightly alkaline.
- When the imatured pair of male & female is introduced in the breeding tank containing few water plants.
- They starts swimming actively.
- When a well ripened female crosses the male the male fish erects his fins & shows brighter colour.
- The male fish swims very actively around the female & hold her attations towards him.
- Than the female follows the male & moves along the side of male.
- While swimming along with male, pushes her abdomen by his mouth to excite the female.
- The male injects spermatic fluid by the gonopodium.
- In the genitle opening of female.
- This copulation is repeated for several times, to ensure the fertilization of eggs.

- The eggs are fertilized in 4 to 6 week.
- Depending upon the size & age. female can gives birth to 20 to 240 youngones.
- As the parents if there youngones. they should placed in the breeding tank.
- At least 8 day before the birth of youngones
- The youngones takes the food immediately so feed the youngones with powdered shrimps & plant food.
- The sword tail fish attains sexual maturity at the age of 6 to 8 months & are ready to breed after 10 months.

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- egg layers -

3) Koi carp Fish -

- General characters -

- It is an ornamental fish.
- It is a oviparous fish i.e. it lays eggs.
- It is an omnivorous feeder.
- This fish have different colours they may be white, black, red, yellow, blue, cream, etc.
- It measures about 25 cm long. when fully matured.
- The youngones of three months measures about 3 inches, i.e. 7.3 cm.
- koi fish matures when they are about 3 yrs old.

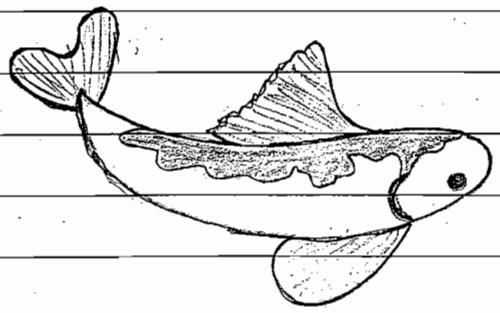
• Food & Feeding -

- koi fish is a omnivorous feeder. Feeds on phytoplanktons, zooplanktons, small shrimps artificial food such as oil cake of ground-nut, mahua oil cake, etc.
- The koi fish also feeds on whole meal bred, oranges, lettuce, pistia are the nutritional food options of this fish.

• Breeding habits -

- choose the koi fish that are at least 3 years. old. koi fish does not sexually mature until they are about 3 yr old.

- koi fishes aquires 10 inches length when they are three years old.
- The male & female fish are introduced in the tank the male & female fish generally looks quites similar.
- The female fish lays the eggs. & male fish releases the sperms.
- The scum appears on the top of water this indicates that are the spawn is released & this spawn is immediately Fertilized by the releasing sperms on the ovas.
- The eggs will hatch after 4 days.
- IF you are breeding the koi fish for profit remove the parents out of the tank.
- The adult koi will it many of the eggs of the tank if they are not removed.
- Feed the youngones as much as they can finish the food in 5 min.
- As the youngoney of the koi fish starts growing the parent koi becomes friendly with there offsprings.



koi carp fish

UNIT - IV

Disease management of ornamental Fishes

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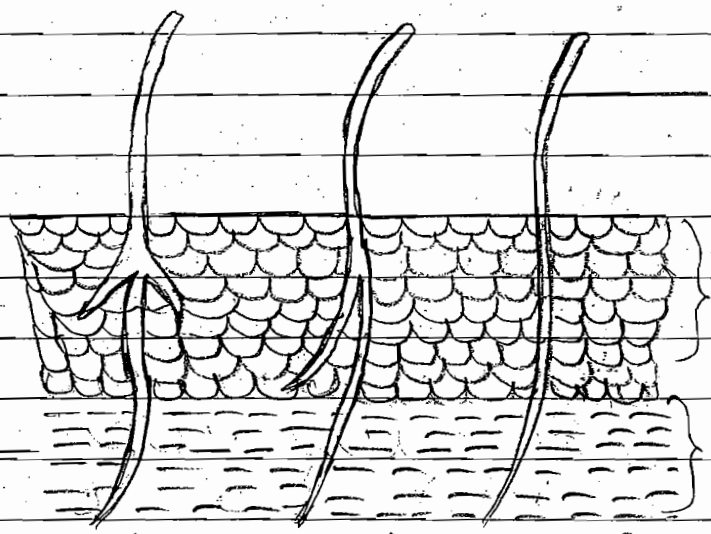
- Fungal Disease -



(Section of skin showing fungal infection)

→ Like other organisms fishes also suffer from disease. They are also attacked by parasites & become diseased.

- This is also most important problem in the fish culturist. It is therefore important to keep the fishes in healthy condition by keeping them in healthy waters.

- The disease cause due to fungal infection is called fungal disease".
- The fungal diseases are widely spread in natural environment & infect fish eggs, fry, fingerlings & adults.

- They grow particularly on that area where there is loss of slime due to netting or on that regions which where allready infected.
- The fungal Disease is of two types -

1) Dermatomycosis -
2) Branchiomycosis -

1) Dermatomycosis :-

In the Dermatomycosis the fungal infection is on the skin of the fish & in the Branchiomycosis the fungal infection is on the gills.

- The Fungus filaments grows into the subcutaneous tissues. The fungal disease is caused by the fungus saprolegnia parasitica
- This disease is characterised by the growth of thin threads on the skin of the fish.
- The fungus growth is abdunt & are like root toughs of cotton wool.
- The fungus is due to the molde which attacks only fishes which have been wounded or weakned by other parasites.
- This filaments grows into the subcutaneous tissue causing death of surrounding tissue.
- This fungus molde consist of threads called hyphae which are branched.
- The lower part of hyphae or thinner & grows into the substratum like roots.

- This part of the fungus is called mycelium.
- The fungus saphroleghia attaches to fish skin by means of root like filaments or hyphae.
- The fungus attacks on the surface of the body including skin, gills, fins, mouth & eyes of fish.
- In the several cases the penitration of this fungus may be deep to infect the bones
- They infect eyes & infection of eyes extends further upto brain through various codes of eye ball, duting the penitration the fungus gives hyphae that disttroyes the surrounding tissue.

- **Symptoms** -

- This disease is diagonoised at an early stage by fine hairs like toughs hanging form infected areas.
- The fish becomes weak & gradually dies by ulceration of skin followed by exposure by jaw bones blindness.

- **Treatment**

- IF only a small part of skin is covered with a fungus. fish can be taken out from water & affected part is touched with ~~this~~ disinfectant.

- A soln of 1% potassium dichromate is used for disinfectant, after this fish can be put in a tank containing 1:2500 soln of potassium dichromate for 1 week.
- Another method is to deep fish a 3% salt soln until it shows sign of this stress.
- A new drug phenoxythol is also used to get read of fungus.

2) Branchiomycosis (Gill rot) –

It is a fungal disease of Gills caused by fungus Branchiomycel demigrans & Branchio-mycel sunguinis.

The tubules of fungus grows into respiratory epithelium of gills causing inflamation & damage to there blood vessels.

The blood supply is stoped to the infected area this disease is not curable.

- Symptoms –
  hairs like
- Fine ↑tufs are hanging from infected area
- Fish becomes weaks.
- alceration causes blindness & finally fish dies.

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ii) Bacterial disease –

- The bacteria & viruses attack fishes causing number of disease in them.
- This infection occures in the internal organs, musscle, skin or fins.
- 'The disease caused due to bacterial infection is termed as bacterial disease'.
- The diseases caused by the bacterial infections as following.

1) Dropsy –

- This disease is caused by the pathogenic bacteria i.e. bacterium psedomonos punctate. This disease is characterised by the accumulation of the liquid in some internal organs.
- The liquid is yellow coloured which is present inside body cavity.
- In many cases the liquid accumulates in the belly, intestine is highly inflammed liver is badly inflamed infected this disease a contangious.
Due to this disease heavy mortality is observed in carps.

- **Symptoms –**

- The infected fish shows swallon belly.
- yellow fluid is accumulated in the internal organs.

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- **Treatment –**

The fish can be cured by treating with antibiotic chloromycitin.

– This drugs is dissolved in the water & fish is kept without food till a recovering.

– In acute cases liquid is first removed from belly with the help of seringe before starting treatment.

– The fish can be cured by deeping the fish in potassium permagnate soln for 2 min.

– The bacteria may be killed by supplying streptomycin along with food.

– Complete distruction & removal of fishes is followed by draining & disinfecting pond with quick line.

2) **Furunculosis –**

– This disease appears in those fishes. which are living in dirty waters containing large amount of decaying water.

– This disease is caused by bacterium aeromonas salmanicida.

– This disease is common in Salmon & trout.

– It is a contagious disease.

– This disease is marked by appearens of bloody boils on skin which contains pus like substance.

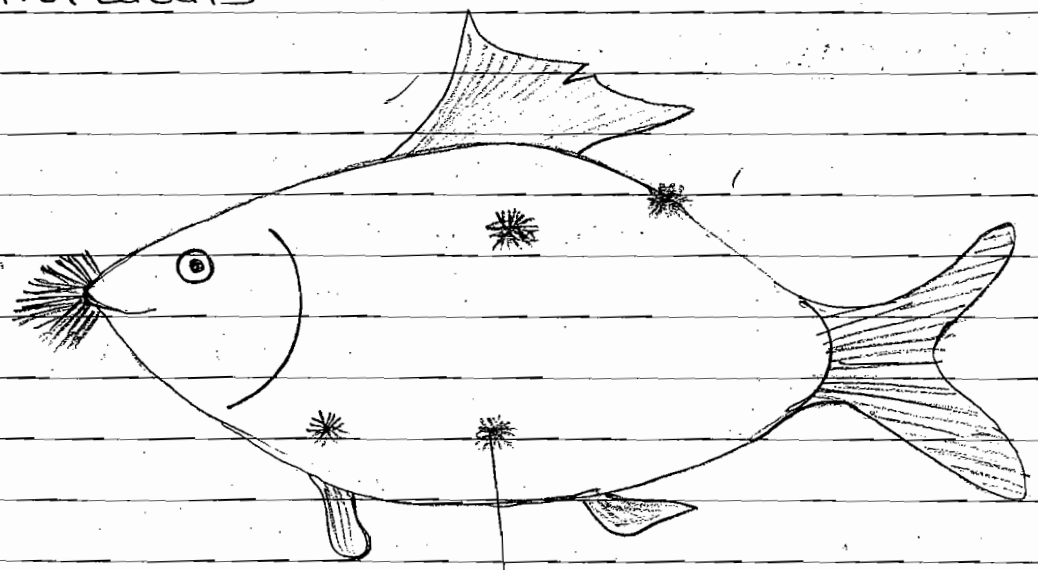
- brusting of boils allows spread of this disease among the fishes & also occures suitable site for the growth of fungus.
- Severe infection of this disease results in the death of fish.

- Symptoms -

The infected fish shows the appearens of bloody boils on the skin.

- Treatment -

The treatment is done by removal of several infected fishes from the pond & this fishes are treated by suppling food which contain Anti biotic line sulphano amides. & nittrofurans



Fungal infected fish.

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3) Tail rot / Fin rot disease —

- This disease is caused due to bacterial infection. but protozoan & fungi may also involved due to this infection there occures puttreification of tail & other fins.
- This disease is characterised by the appearens of white line along the margin of fins.
- This lines moves gradually towards the base of fin the fin at first becomes brittle & later breaks down.
- leading complete distruction of fins.
- Fins becomes torn & distroyed by bacterial activity.
- A more or less distinct white line is seen on the outer surface of fin in early stage of disease.
- The infection may spread on the body of fish

• Symptoms —

A white line is seen on outer surface of fin in early stage & fin becomes torn & latte completely destroyed.

• Treatment —

In early stage of infection fish can be cured by treatment with 1:2000 soln of copper sulphate for about 2 min. ($CuSO_4$).

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- In seviour infection the affected part is surgically removed by & fishes are kept in 1: 25000 soln of potassium dichromate for about a week.

- During this period, wound heals up & fins regenerate.
- The Antibiotics like Neuomycin, chloroampheni-col, oxytetracylin may be given in fish food.

protozoan disease -

- "The disease caused due to the protozoan infection is called as the protozoan disease."

- The diseases caused due to the protozoan infection are given as belows -
  i) Ichtypothiriasis (white spot disease).
  ii) costasis

i) Ichthypothiriasis - (white spot disease).

This disease is also called as 'Ich' disease.
It is a very common among fresh water fishes.
It is characterized by the appearance of white spot on the skin & on the fins of fishes.

- This disease caused due to the protozoan Ichthyopthiriasis.
- Each spot is actually small bladder containing protozoans. This protozoans are fairly in large size about 1mm spherical or oval in shape.
- It is covered by fine hairs like cilia.
- The young paracite swims in the water & when comes in contact with the fish it boars into the epidermis.
- Due to this the irratation occures & proflifer-ation of epidermal cells takes place.
- This paracite than grows rapidly & appears a small white spot. when they fully grows. the paracite drops to the bottom & forms a cysts. & then multiply is rapidly to form large no. of youngones.
- This youngones liberate from cyst & attack from new host.

• Symptoms –

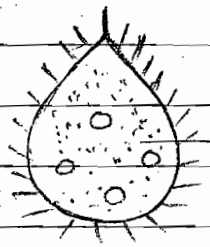
- A white spot appears on skin & fins of fishes.

• Treatments –

- The conttol of these paracite is not easily possible by the treatment with chemicat.
- At remains surrounded by tissue of host

but the paracite can be killed when they are not embeded in skin.

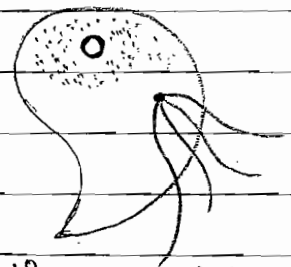
- 30 % Salt soln or Formalin is effective.
- 1 : 100000 soln of quinine soln is used to kill paracite in 1 to 2 weeks.
- 1 : 5000 soln of acetic acid is also very effective in killing paracite.
- A pure methylene blue may be added to the aquarium water & fish is kept in that soln For long time.



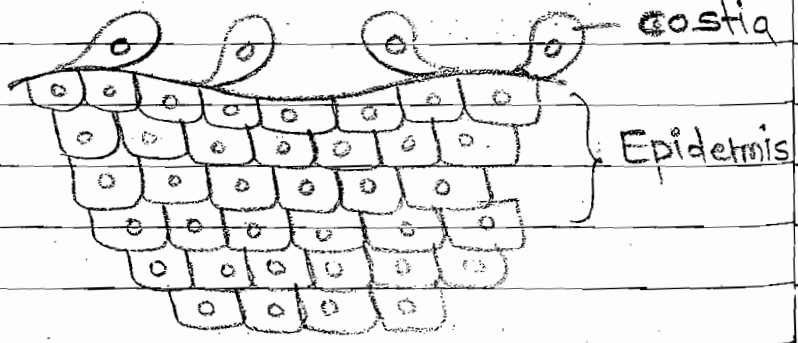
Ichthyopthirus.

2) Costiasis -

'This disease is caused due to costia necatris'.



Costia necatris



Caustia attached to epidermis of fish

It is ectoparacitic protozoan. This disease is characterised by appearance of light bluish & greish film of mucous over body of fish.

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Due to this infection fishes loose apetite & becomes weak & dies after some period.

This paracite beats 2 pair of flagella, it lives on skin & gills of fishes & destroys epidermal cells & feed on them.

- **Symptoms** –

– light blueish & greish film of mucous over body of fish.
– Fishes loose apetite & becomes weak.

- **Treatment** –

– The infected fish is kept in 3% salt soln for about 10 min.
– The infected fish kept in 1 : 25000 soln of For - malin for about 1 hour.
– 1 : 500 soln of acetic acid is also used to cure this disease.

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Helminths disease.

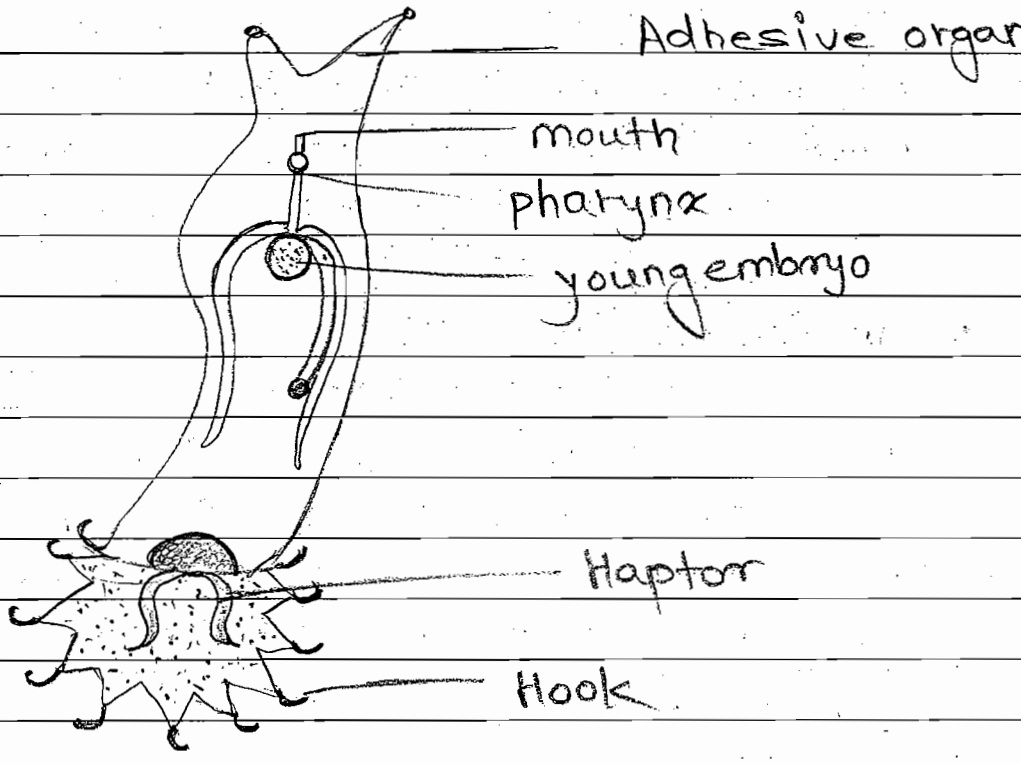
'The disease caused due to different flukes & worms to fishes is called as Helminths disease'.

- This disease described as follows -
i) Gyrodactylus.
ii) Dactylogyrus.

i) Gyrodactylus -

These are very common on the skin & gills of fresh water fishes.
Gyrodactylus elegans is common parasite of elegans is common parasite of trouts & carps
They are found on fins & gills.
The affected surface becomes covered by bluish slime due to increased secretion of mucus.
When infection is heavy colour of fish become fade & pale. The skin becomes more slimy, the fins becomes torn. (फटना)
Gyrodactylus can be easily seen by scraping mucus & examined it under microscope.
The infected fishes are seen by rubbing their body against sites or bottom of aquarium or to the hard substratum in pond. to get rid off these parasite.
Gyrodactylus has 2 conical projections at anterior end. which bears opening of glands producing sticky liquid to adhere to skin. or gills of fish.

At the hind / posterior end, strong disc like organ is present for attachement which hooks & is called as Hapter eyes are absent. It is viviparus.



Fig; Gyrodactylus

2) Dactylogyrus –

Trematode belong-ing to family Gyrolodactylity These are very common on the skin & gills of fresh water fishes.
Dactylogyrus is found only on gills & can be distinguished from gyrodactylus by the presence of 2 pairs of eyes at anterior end Gyrodactylus lays eggs i.e. it is oviparous.

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- **Symptoms –**

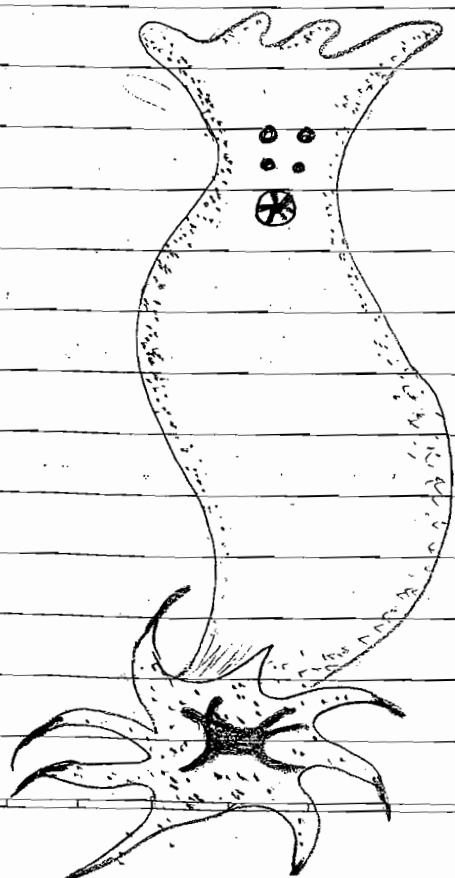
In infected fish affected surface is covered by bluish slime. The colour fades & fish becomes pale.

- Fin torns & movement becomes difficult.
- Gill covering become stretched open & gillsare expanded. The infected fish respond by rubbing their body against sand or other object present in pond or aquarium.

- **Treatment –**

Deep infected fish for five min. in 5% common salt soln.

- Deep fish in 1:5000 soln of acetic acid or by placeing the fish in 1:2000 soln of NH_3.
- The best method is to treat fish for longer time in 1:4000 soln of formalin.



Dactylogyrus