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Section-A

Visit to Fish Seed Farm

B.Sc. Part-III

Paper-III : PRACTICAL

Max. Marks : 100
Time allowed : 6 Hours
(2 Session M&E)

1. External morphology, identification marks, nature of damage and host of the following pests:-

(i) **Sugarcane** : Sugarcane leaf-hopper, Sugarcance whitefly, Sugarcance top borer, Sugarcane root borer, Gurdaspur borer (any two).
(ii) **Cotton**: Red Cotton bug
(iii) **Wheat** : Wheat stem borer
(iv) **Paddy** : Gundhi bug, Rice grasshopper, Rice stem borer, Rice hispa (any one).
(v) **Vegetables**: *Aulocophora faveicollis, Dacus cucurbitas, Tetranychus tecarious, Epilachna* (any three).
(vi) **Pests of stored grains:** Pulse beetle, Rice weevil, Grain & Flour moth, Rust-red flour beetle, lessergrain borer (any three).

2. Stages of life history of silk moth and honey bee.

3. Identification of *Catle, Labeo rohita, L. calbasu, Cirrhius, mrigala Puntius sarana, Channa punctatus, C. marulius, C. stariatus, Trichogaster fasciata, Mystus seenghala, M. cavasius, M. tengra, Callichrous pabola, C. bimaculatus, Wallago attu, Prawns, Crabs, Lobsters, Calms, Mussles & Oysters.*

4. Chemical analysis of pond water and soil for pH, dissolved oxygen, free CO_2 nitrates, phosphates and chlorides.

5. A study of the slides of fish parasites.

6. A study of the different types of nets, e.g., cast net, gill net, drift net and drag net.

7. A visit to lake/reservoir/fish breeding centre.

8. Adaptative modifications in feet and breaks of birds.

9. Preparation of permanent/temporary slides of developmental stages of frog/mosquito.

10. Study of permanent slides of WM of chick embryo (13-18h, 24-36h, 36-48h, 48-72h).

11. Window preparation and identification of stages of development in chick egg.

12. **Histology:** Preparation of permanent histological slides of testis, ovary, kidney, intestine, live of rat (H and E staining).

B.Sc. Part-III

Guidelines/instructions for practical (Paper-III)

Max. Marks : 100
Time allowed : 6 Hours
(2 Sessions M&E)

1.	Chemical analysis of water/soil	:	10 marks
2.	Identification and Classification of specimens (Eight)	:	16 marks
3.	Ecological note on economically important specimen (two)	:	10 marks
4.	Identification of histological and embryological slides with Reasons of identification (Two): feet and beaks of birds	:	8 marks
5.	Identification with reason feet/beaks of birds	:	3 marks
6.	Permanent preparation of histological slides (a) Section cutting and stretching (b) Staining, mounting, (c) identification & sketch	:	18 marks (6,6)
7.	Field Report	:	10 marks
8.	Practical note book	:	10 marks
9.	Viva-voce	:	15 marks

Note: Field report to be submitted alongwith answer books.

Government College Chhachhrauli, Yamunanagar.

Report File Of Zoology

SESSION-2021-2022

SUBMITTED To :-

Mrs. Sujata Sharma

(H.O.D OF Zoology)

Principal
Govt. College
Chhachhrauli (Yamunanagar)

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ZOOLOGY PROJECT

NAME - Aastha

CLASS - BSC Med (III)

ROLL NO - 3094220003

1910424 19

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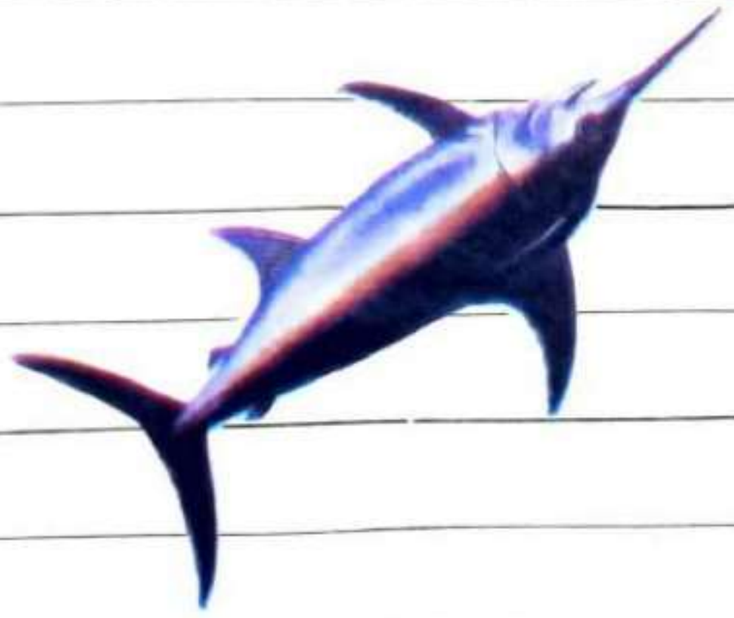
CERTIFICATE

This is to certify that Ms. Aastha Jindal. a student of BSC III Medical Govt. College Chhachhrauli, has successfully completed the project report under my supervision

Signature



Signature

Supta Lauri
Zoology Deptt

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ACKNOWLEDGMENT

It is a privilage for me to submit the project Report on Pond aquaculture and Induced Breeding to the department of Zoology . Govt college Chhachhrauli

I take this opportunity to add a few heartful words for the people who provided me unending support till the successful accomplishment of my project work.

First of all , I would like to convey my thanks to my teacher ' mrs. Sujata Sharma ' for imparting me knowledge and experience during the tenure of my project work.

Secondly , my heartful appreciation to my friends who keep encourgaging me and helped me unconditionally to complete my project work.

Finally to my Parents who give me the financial support to complete this project.

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• AQUACULTURE

- Aquaculture is organised production of a crop in the aquatic medium.
The crop may be that of an animal or a plant.
The whole process of breeding and nursing fish according to nutritional requirements, and an understanding of the principles of operation of capture and culture fisheries forms the basis of aquaculture.

• POND AQUACULTURE

* Ponds are small and shallow water bodies of standing water with slight wind action. No exact limit of size and depth are laid down for a pond.
- The ponds are of three types :-

1) The small water bodies, remnant of lakes earlier.
2) The small shallow water bodies, which did not develop as lake.
3) Those water bodies which are constructed or excavated.

- The ponds are also classified as village ponds, irrigation ponds, spill ponds, moats, rock pools, rain water etc. The ponds are called perennial ponds. If water is always present and if water is always present and seasonally, called temporary ponds.

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- The following fishes are cultured in fresh-water ponds :-

Catla catla, Labeo rohita, L. calbasu, L. fimbriatus, L. Kontius L. gonius, Cirrhinus mrigla, C. reba, C. cirrhosa, Osteochilus thomassi, Barbus carnaticus, B. dubius, Cyprinus carpio, Ctenopharyngodon idella, Eutropius surantenna, Wallago attu, Anabas testudineus, Mystus seenghala, Channa striatus, Heteropneustes fossils etc.

POND REQUIREMENTS AND POND PREPARATION:

- A commercial fish pond is one of the several production units used in fish farming.
- A fish pond is a body of standing, as opposed to free-flowing, water that is big enough to hold a large stock of cultured fish and small enough to be managed for fish culture.
- The physical attributes of a pond, therefore, have a direct influence on achievable levels of production and returns.

SITE SELECTION

POND LAYOUT

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A) SITE SELECTION :-

- Proper site selection is recognised as the first step assuring the ultimate success of any aquaculture pond and forms the basis for the design, layout and management of the pond.
- The following guidelines are generally followed for the selection of a suitable site for fish ponds.

(i) Soil Quality :- Preferably, clay loam, or sandy, clay for water retention and suitability for diking. to prevent problems that results from acid-sulphate.

(ii) Land elevation :- Preferably, site with average elevation are used.

(iii) Vegetation :- Preferably the site should be without big tree stumps and thick vegetation so it involves large large expense for clearing.
The trees and vegetation help the predatory birds to perch and make nest.

(iv) Water supply and quality :- with steady supply of fresh water in adequate quantities throughout the year, water supply should be pollution free and with a PH of 7.8 and 8.5

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SITE SELECTION :-

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(v) Accessibility :- The site should be readily accessible and should be close to sources of inputs such as fry, feeds fertilizers, and markets, fish ports, processing plants, and ice plants and linked by communication facilities to major centres.

(vi) Manpower :- Availability of manpower for construction and operation.

(B) POND LAYOUT :-

- The layout of the pond system depends on the species for culture, and on the size and shape of the areas, which in turn determines and the number and sizes of ponds.
- A fish farm is considered properly planned if all the water control structures, canals and the different pond compartments mutually complement the each other.

• Various Types of Ponds :-

- Breeding / Happa
- Egg Hatching
- Hatching Pond
- Nursery Pond
- Rearing pond
- Stocking pond

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HAPPA

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1) BREEDING / Happa :-

- These are rectangular structures, formed by cloth and supported by the bamboo sticks from the all sides.
- The cloth used is mainly close meshed mosquito net or mylon net cloth.
- The meshes of cloth should be small enough to prevent the escape of egg and spermatozoa.
- This hapa is fixed in pond or at near the banks of river etc.
- The selected breed is held in hand net and introduced in hapa.
- The outer net consists of a fish mesh (0.5 mm) sieve cloth tank about 2m x 1m x 1m in dimension while the inner chamber, made of the same material has a mesh size of 2.0 - 2.5 mm.
- The whole device is placed in a protected water body where the water is well oxygenated.

Advantages :-

- Fry and breeders are easily handled.
- Production on a per unit area is high.
- Minimise loss of fry
- Assurance of uniform fry of relatively of the same age.

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HATCHING POND

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2) Egg Hatching :-

- Hatching pits are also used.
- Hatching pits are a series of pits located very close to the breeding ground.
- The size of the pit is 8 feet × 4 feet × 2 feet.
- Several pits are interconnected so as to allow the water to flow from one pit to another. each pit has
- 3 layers of cloth tanks or hapas of different demensions are tied.
- The outermost cloth tank is about 6 feet × 3 feet × $1\frac{1}{2}$ feet in size and is made up of clean cheap cloth.
- For support 2 bamboo poles are fixed to which these cloth tanks are tied.

3) Hatching Pond :-

- It is also known as Incubation pond.
- Hatching tank is circular in shape and is constructed with cement and bricks.
- It consists of two cocentric circular tanks.
- The two chambers have inside diameters of 1.6 m and 5.0 m
- A water of 0.2 m to 1.0 m depth is maintained by an outlet pipe fitted in the middle of the inner circular tank.

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NURSERY POND

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- The inner circular tank has gaps on its body, through which water passes into the inner space.
- Before the introduction of eggs, the inner wall or chamber is separated from the outer by a fine naylon screen which is stretched and fitted on an iron frame.
- The floor of the outer compartment has a number of diagonally fitted pipes which face in one condition direction, thereby providing the circulation of water (clockwise) when the taps are opened.
- The water - holding capacity of the incubation tanks is about .7m^3 to 10 m^3. and has a relative egg density carrying capacity of about 68 x 104 m^3 to 70 x 104 m^3
- The water flow is maintained at 225 L/min through out the operation except during the period of hatching, when it is maintained at the 250 L/min.

4) Nursery Ponds :-

- Nursery ponds are those ponds where hatchlings and fries are kept for growth.
- These are small water reservoirs near the hapas.
- The ideal size of a nursery pond is 55 ft x 35 ft x 5 ft.

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- Normally nursery ponds are prepared before hatching of the hatchlings.
- In these ponds cowdung and fertilizers like ammonium sulphate, sodium nitrate etc. are used to grow zooplanktons and phytoplanktons.
- These planktons provide food to the hatchings.
- The nursery ponds should be kept free of predatory and weed fishes.
- The water level should be maintained in these ponds.

- **In Nursery ponds heavy mortality of fish juice in observed due to :-**

(a) Lack of suitable food.
(b) Sudden changes in the quality of water.
(c) Decreased O_2 level due to overgrowth of planktons.
(d) Presence of predatory fishes.

- **To Avoid such cases following precautions should be taken :-**

(a) Nursery ponds should be near to the hatching bpas.
(b) The ponds should have no predators.
(c) There should be proper and good supply of food materials.
(d) Water level should be maintained.

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Rearing Ponds

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5) Rearing Ponds :-

- The rearing ponds are to maintain proper growth of fingerlings.
- The rearing ponds are longer and narrower to provide long distance swimming to the fishes.
- It helps in proper growth of fishes.
- Normally the rearing ponds are 6 to 8 ft. deep.
- The food supply should be according to the population of the fingerlings.
- The water supply to these ponds may be seasonal or perennial. These ponds should not have any type of predators.
- When fingerlings attain the size of more than 20 cm, these are transferred to the stocking ponds.
- The transportation occurs in large containers of about 9000 litres capacity.
- To reduce injuries to fingerlings these are given sedatives like sodium amylate and the barbiturate.
- It decreases their movement and consumption of O_2.
- To avoid transportation of parasites antibiotics like methyl blue, copper sulphate, etc are used.

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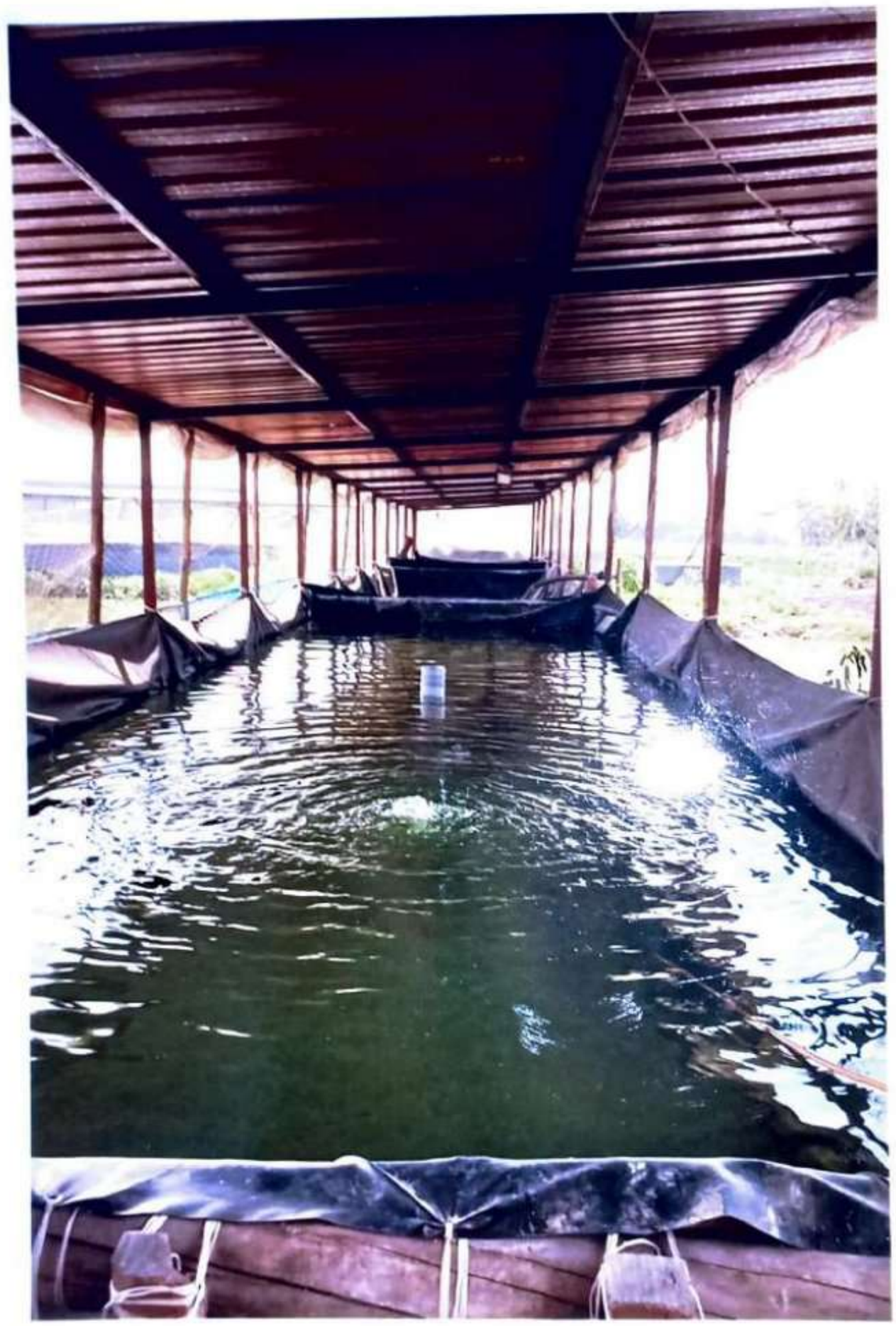

Stocking Pond

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7) Stocking Pond :-

- These are large sized ponds where the fingerlings are allowed to attain full size and kept there till harvesting.
- In these ponds the fishes are provided artificial food in the form of oil cakes, mustard, powdered rice, groundnut etc.
- That food should be easily digestible and economical.
- To increase the production of natural food like plankton, organic manure and inorganic fertilizers are added in the ponds.
- The best time to provide artificial food is the morning.

- As fishes attain maximum size and grow fully, harvesting should be done.

Advantages :-

- Environmentally Balanced
- Help maintain weed problems
- Recreational use
- Stocking ponds are used for both rearing the fry to fingerling and stocking fingerling before its supply to the holders for fish production.

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• Arrangement Of Various Types Of Fish Ponds :-

- The various types of fish ponds are arranged in two systems :-

Rosary System Parallel System

(i) Rosary System :-

- In this system the various types of ponds are constructed in a series. All the ponds are linked by a channel.
- The water is supplied to first pond by water source it is drained by a channel which supplies water to the other pond.
- The latest version of Rosary system has two bypass channels.
- One channels is for supply of water and other for evacuation of excess of water.

(ii) Parallel system :-

- In this type of arrangement, the ponds may be built in a single series or two parallel series. In this system, all the ponds are arranged in parallel lines. But they have separate inlets and outlets.

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• POND MAINTENANCE :-

- The various types of ponds involved in fish culture should be maintained properly by taking the following steps.

1) Over population of the fishes should be checked.
2) Aquatic vegetation growth should be checked.
3) To improve pond bottom, the ponds should be dried periodically and the required repairs should be performe
4) After drying the pond, the lime should be sprayed at the bottom of pond.
5) It is an antiparasitic agent, Kills harmful insects and destroy unwanted stage. algae.
   - It improves PH of soil and neautralises the harmful effect of Na^{+}, K^{++} and Mg^{++} ions.
6) Some organic and inorganic manure may be added to improve soil structure of the pond.
7) Predatory and weed fishes should be checked regularly.
8) Artificial feed should be added if nutritional deficienc occurs.
9) The fishes should be checked regularly to avoid various types of fish diseases.

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• Pond Maintenance :-

RAS

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• RECYCLED WATER CULTURE :- (RAS)

- The recycled water culture is a technique to conserve water while performing the fish culture.
In this technique, the nursery ponds, rearing ponds and stocking ponds are interconnected by the channels.
- Some amount of water is also transferred from nursery ponds to rearing ponds and from rearing ponds to stocking ponds along with the fishes.
- This technique helps in conservation of water and the pisciculture can be performed with small amount of water available.

* The recycled water culture of the fishes is practised as Recirculation Aquaculture system (RAS)

- The recirculation aquaculture system is a unique method of fish farming. In this method the fishes are cultured in the indoor ponds at the controlled optimum conditions. The recirculating systems filter and clean the water for recycling back through the fish tanks.
- The new water is added to the tanks only to make up for the splash out and evaporation. Some water is, however, out to flush out the waste materials.

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- The functional parts of a RAS include :
- Growing tank
- Sump of particulate removal device,
- biofilter
- oxygen injection with U-tube aeration and
- water circulation pump.

- Fish grown in RAS must be supplied with all the conditions necessary to remain healthy and grow.
- They need a continuous supply of clean water at a temperature and dissolved oxygen content that is optimum for growth.
- A filtering (biofilter) system is necessary to purify the water and remove or detoxify harmful waste products and uneaten feed.
- The fish must be fed a nutritionally complete feed on a daily basis to encourage fast growth and the high survival.
- RAS offer fish producers a variety of important advantages over open pond culture.
- RAS are currently being used to grow catfish, Stripped bass, tilapia, crawfish, blue crabs, oysters, mussels and aquarium pets.

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- In Haryana the first RAS was installed by a very progressive fish farmer of Karnal District, Mr. Sultan Singh.

Mr. Sultan Singh is a progressive farmer and the owner of Sultan fish seed farm situated in Village Butana, Nilokheri (Karnal). He along with his son has done some pioneering work in the field of aquaculture. An internationally acclaimed fish farmer, Mr. Sultan Singh installed an indoor RAS in his farm and is getting some wonderful results.

Advantages :

- There is continuous supply of clean water.
- The optimum temperature is maintained.
- The dissolved oxygen (DO) level is also maintained.
- There is regular detoxification and removal of waste from water.

- Main Advantages are :-

- The fishes can be grown throughout the year.
- There is complete and convenient harvesting of fishes.
- The diseases of the fishes can be controlled easily.
- The location of the fish farm can be near to the large market.

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POLYCULTURE

- Polyculture is also known as mixed fish farming and composite fish culture.
- It is the culture of fast growing compatible species of fishes of different feeding habits or different weight class of the same species in the same pound so as to utilize the various available ecological niches in order to obtain high production per hectare of water body.
- A pond according to its depth can be divided into three distinct zones - Surface zone, Column zone, and bottom zone.
- A particular species exploits food of a particular zone.

For example - Catla catla - Surface feeder
Labeo rohita - Column feeder
Cirrhinus mrigala - Bottom feeder

* In case of single species or monospecies or monoculture only one zone will be utilized or exploited while the other zones would remain unutilized.
- As a result, the entire ecological area would not be exploited and the yield or fish production would be less.
- when different species of fast growing compatible fishes, occupying different ecological niches of a pond or any

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water body are cultured together, they most efficiently utilizes all the food sources available in the pond for fish production without harming each other.

- Composite fish farming has its root in ancient China and India.

The farmers, therefore were forced to rear the different carp species together until they reached fingerling stage.

ADVANTAGES :-

- More and more people are now opting for polyculture because the advantages of polyculture are :

(i) All niches are completely exploited.

(ii) Among different species of fish no competition occurs.

(iii) These fishes are beneficial to each other.

(iv) These fishes help in growth of each other.

(v) The polyculture results in more fish production at low cost eg - a polyculture fish farm produces about 3,000 to 6,000 kg of fish per hectare per year.

DISADVANTAGES :-

- Generally the lesser number of species combinations with clearly understood specific roles are widely accepted. However, in case of larger species combinations, the question has arisen due to the value of some of the species in such

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combinations.

- It is not very easy to adopt supplementary feeding in an economical way.
- Special skilled knowledge and efforts are required by the farmers to produce or purchase the appropriate numbers of seed stocks of the different species selected to maintain optimum balance of the species.
- Additional labour is required for sorting out the different species after harvest.
- In many instances, consumer acceptance of the different species varies in most areas.
- Difficulties have also been experienced in finding markets for certain species like the silver carp.
- Although there are clear cut differences in food preferences in natural conditions, the relevance of such feeding differences is yet to be assessed when the stocks are fed with formulated feeds.

* It has been found and proved that modern medium monoculture with proper feeding can be more productive than polyculture.
* Thus, it is opined that the value of polyculture depends very much on the situation and needs in a particular area. Polyculture probably is not widely applicable as was generally considered.

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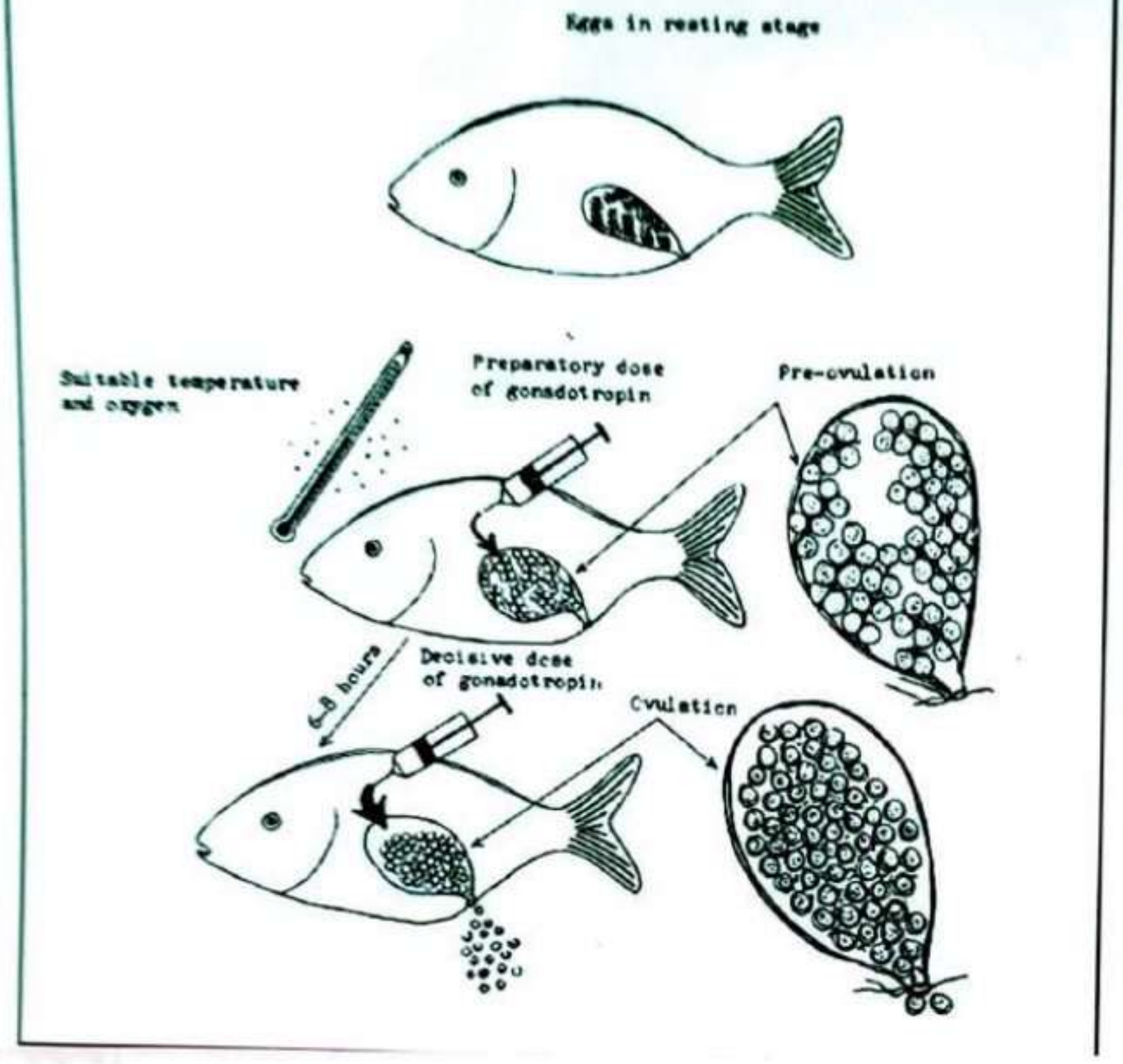
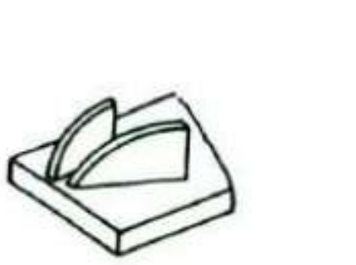
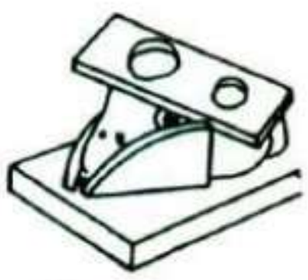




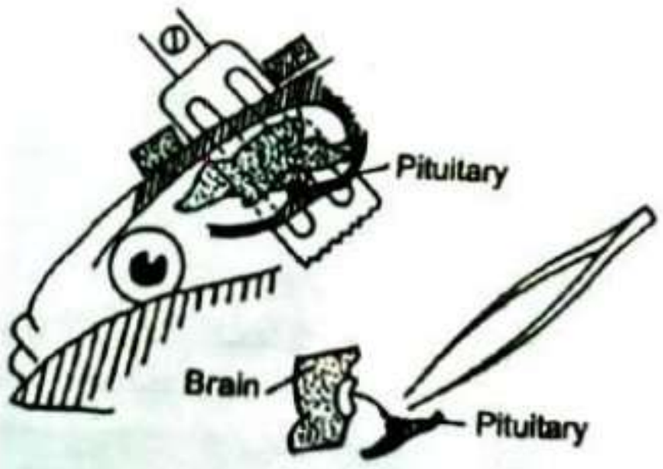
(a) Wooden frame for holding fish

(b) Cutting the head with a fine saw

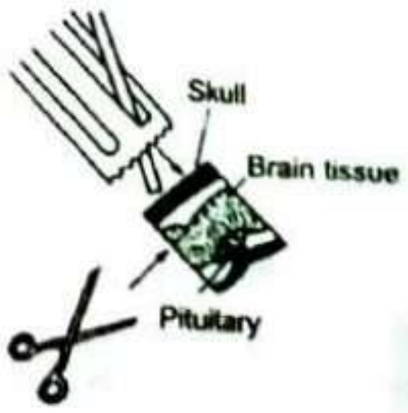


(c) Drill guide

(d) Drill with saw



(e) Drilling through head



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INDUCED BREEDING

- many cultural species of fin fishes (particularly the major carps) under farm culture conditions, do not get the required environmental impetus for spontaneous maturation.

This has led to the development and standardization of a technique, called Induced breeding or hypophysation.

- Here, through the injection of pituitary homogenates or extracts, the natural gonadotropin surge is stimulated, disregarding the environmental impetus. Thus, it has only made the major carps and other fin fishes to breed in confined water under farm conditions but it also has the added advantage of regulating the time of spawning.

- Induced spawning's first trial was carried out in the 1930's in Brazil, where pituitary hormones obtained from cattle and sheep were used to induce spawn in mrigal. In India, the first experiment in induced breeding was made by Hamid Khan (1937) who tried in vain to induce breed mrigal by the injection of mammalian pituitary gland.

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a) HYPOPHYZATION :-

- The pituitary gland is extracted, and can be conserved in either, alcohol or glycerin. Various techniques have been developed particularly for Indian carp culture.

The whole pituitary gland can be used fried or dried, it is ground, placed in a suitable solvent, centrifuged, and the supernatant is injected into the female fish and sometimes the male.

Nowdays purified gonadotrophins from pituitaries are used commercially.

The procedure of collecting pituitary hormone from fish is explained below :

• Collection of Pituitary gland :-

- The fish donating the pituitary gland i.e, the fish from which the pituitary gland is collected is called the donor fish. Several techniques are adopted for the collection of pituitary glands indifferent countries. One technique is in the diagram. India, the commonly adopted technique of gland collection is by chopping off the scalp of the fish skull by an oblique stroke of a butcher's knife. After the scalp is removed, the grey matter and fatty substances lying over the brain are gently cleaned with a piece of cotton. The brain is then carefully lifted out by detaching it

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from the nerves.
The exposed gland so them picked up intact without causing any damage to it because damaged and broken glands result in loss of potency.

- **Preservation of Pituitary Glands :-**

- If the collected glands are not meant for use them and there, they must be preserved.
- The pituitary glands can be preserved by three methods.
  - Absolute Alcohol
  - Acetone
  - Freezing
- Preservation of fish pituitary gland in absolute alcohol is preferred in India.

- **Preparation of Pituitary gland extract :-**

- Preserved glands are then weighed.
- This is essential for accurate determination of the dose to be given according to the weight of the breeders. The pituitary extract should be prepared just before the time of injection. The quantity of gland required for injection is at first calculated from the weight for the breeder to be injected. The glands are then selected and the required quantity of glands is

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taken out of the phials.

- The glands are then macerated in a tissue homogenizer by adding a measured quantity of distilled water or common salt solution or any physiological solution which is isotonic with the blood of the recipient fish.

(b) Technique of Breeding :-

- The induced breeding operation of major carps is taken up when regular monsoon sets in the fishes become fully ripe and water temperature goes down.
- Females having a round, soft and bulging abdomen with swollen reddish vent and males with freely oozing milt are selected for breeding.

• Dosage of Pituitary Extract :-

- The most important aspect of induced breeding of fish is the assessment of proper dosages of pituitary extract The dose of the pituitary gland is calculated in relation to the weight of the breeders to be injected. By careful selection of breeders and administering a known weight of Pituitary gland extract per Kilogram body weight of the breeders, successful breeding can be obtained. Rohu responds well to two injections while catla and mrigla to both one and two injections.

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- An initial dose at the rate of 2-3 mg of pituitary gland per Kilogram body weight of fish is administered to the female breeder only.
- male breeders do not require any initial dose, if they ooze milt on slight pressure on their abdomen.
- Two males against each female make a breeding set.

- **Method of Injection** :-
  - Intra-peritonial injections are usually given through the soft regions of the body, generally at the base of the pelvic fin or sometimes at the base of the pectoral fin.

- **Breeding happa and Spawning** :-
  - After the infection, the breeders are released immediately inside the breeding hapa.
  - A breeding happa is generally made of fine cloth in the size of 3.5 m × 1.5 m × 1.0 m for larger breeder and 2.5 m × 1.2 m × 1.0 m for breeders weighing less than 3 kg.
  - Generally, one set of breeders is released inside each breeding hapa, but sometimes, in order to save on pituitary material, community breeding is also tried by reducing the number of male breeders.
  - After the release of the fish, the opening of the hapa is securely closed so that breeders may not jump out and escape.

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• Advantages of Induced breeding :-

- Induced breeding has many advantages as under :-

(i) Pure and disease free spawn of a desired variety of fish under cultivation can be obtained through induced breeding.

(ii) Induced breeding ensures availability of seeds for fish culture at any time.

(iii) The demand for any specified quality of pure fish seed of a particular species can be met through induced breeding.

(iv) The same fish can be made to breed twice in one year.

(v) The technique of induced breeding is very simple and can be easily handled by a layman without much training.

(vi) The cost incurred for production of a spawn from induced breeding is comparively lower than that of obtaining from natural sources.

• Ecological Factors affecting Induced Breeding :-

- Hydrological factors
- Light Factors
- Nature of Habitat
- Seasonal changes

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Major cultivable fishes

Indian Major Carps

Catla

Rohu

Mrigal

Exotic Major

Silver carp

Grass carp

Common Carp

Topic_____ Date_____

• Major Fishes For Aquaculture At Sultan Fish Seed Farm

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INDIAN MAJOR CARPS

1) Catla Catla :-

- Scientific name - Catla Catla
- Classification :-

Kingdom - Animalia

Phylum - Chordata

Class - Osteichthyes

Order - Cypriniformes

Genus - Catla

- Habitat :- → It is fresh water advanced ray finned bony fish.
- It is largest Indian carp distributed throughout India.
- It is commonly called "Theila" or "Katla"

- Morphology :-
- Body is about 90 cm long, blackish grey dorsally and silvery coloured on the sides.
- Body is divided into 3 parts Head, trunk and tail.
- Trunk bears small - sized pectoral and pelvic fins.
- Caudal fin is deeply forked.

- Economic Importance :-
- Catla is an excellent food fish
- Its meat has a pleasant flavour.

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2) Mrigala :-

- Scientific name - Cirrhinus mrigala
- Classification :-

Kingdom - Animalia

Phylum - Chordata

Class - Actinopterygii

Order - Cypriniformes

Genus - Cirrhinus

- Habitat :-

- Mrigal is the benthopelagic and potamodromous plankton feeder.
- It inhabits fast flowing streams and rivers, but can tolerate high levels of salinity.

- Morphology :-

- Spawning occurs in marginal areas of the water bodies with a depth of 50 to 100 cm over a sand or clay substrate
- Mrigala is a freshwater fish.
- Mrigal is mainly illiophagous, feeding on the bottom on decayed vegetation.

- Economic Importance :-

- Fish have formed an important item of human diet.
- Nearly all fish freshwater and marine are edible and have been an imp. source of protein, fat and vit A and D.

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3) Rohu :-

- Scientific name - Labeo rohita
- Classification :-

Kingdom - Animalia

Phylum - Chordata

Class - Actinopterygii

Order - Cypriniformes

Genus - Labeo

- Habitat :-

- It is bottom feeder fish.
- In the juvenile and adult stages rohu is essentially an herbivorous column feeder.
- During the early stages of its life cycle it eats mainly zooplankton. but as it grows it is mainly vegetarian feeding more on phytoplankton.

- Morphology :-

- Body is divisible into Head, trunk and tail with caudal fin
- Streamlined and laterally compressed body which is grey or black on the dorsal side and silvery on the ventral surface. Size may reach up to 1 mm in length.

- Economic Importance :-

- The rohu is an imp. aquacultured freshwater species in south Asia consumed by a vast population.

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EXOTIC MAJOR CARP

1) Common Carp :-

- Scientific name - Cyprinus carpio / Eurasian carp
- Classification :-

Kingdom - Animalia

Phylum - Chordata

Class - Actinopterygii

Order - Cypriniformes

Genus - Cyprinus

- Habitat :- → Wild common carp live in the middle and lowers streams of rivers, in shallow confined waters, such as lakes and water reservoirs.

- Morphology :-

- common carp has one long dorsal fin which possess 2-3 hard and 17-22 soft rays.
- The first (largest) hard ray is sharp and is serrated on its posterior margin.

- Economic importance :-

- Common carp is considered to be a very important aquaculture species in many Asian and some European countries
- It affects the aerobic decomposition of organic matter and nutrient availability in the water column via bioturbation of benthic sediment during feeding on benthic org

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2) Grass carp :-

- Scientific name - Ctenopharyngodon idella
- Classification :-

Kingdom - Animalia

Phylum - Chordata

Class - Actinopterygii

Order - Cypriniformes

Genus - Ctenopharyngodon

- Habitat :-

- Some Grass carp are usually fed with terrestrial grasses, cassava leaves, banana stems and maize leaves.
- They are bottom feeders.

- Morphology :-

- Light yellow body, green - green back, grey abdomen.
- Dark green dorsal and pectoral fins other fins light grey
- Body of adult fish elongate and sub-cylindrical.
- Abdomen round with no ridge.

- Economic importance :-

- Grass carp is native to southeastern russia and north western china.
- Grass carp is an integral part of fish culture and forms an important source of protein for human consumption.

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3) Silver Carp :-

- Scientific name - Hypophthalmichthys molitrix
- Identification :-

Kingdom - Animalia

Phylum - Chordata

Class - Actinopterygii

Order - Cypriniformes

Genus - Hypophthalmichthys

- Habitat :-

- Silver carp is a freshwater carp living in temperate conditions and its natural distribution is in Asia.
- Silver carp prefer habitat in the standing waters of rivers, canals and lakes.

- Morphology :-

- The silver carp is a deep bodied fish that is laterally compressed.
- They have very tiny scales on their body but the head and the opercles are scaleless.

- Economic importance :-

- It is herbivorous and low in the food chain feeds and fertilizers are therefore easily available at low cost.
- It can be polycultured with some other species, due to its specific habitat.

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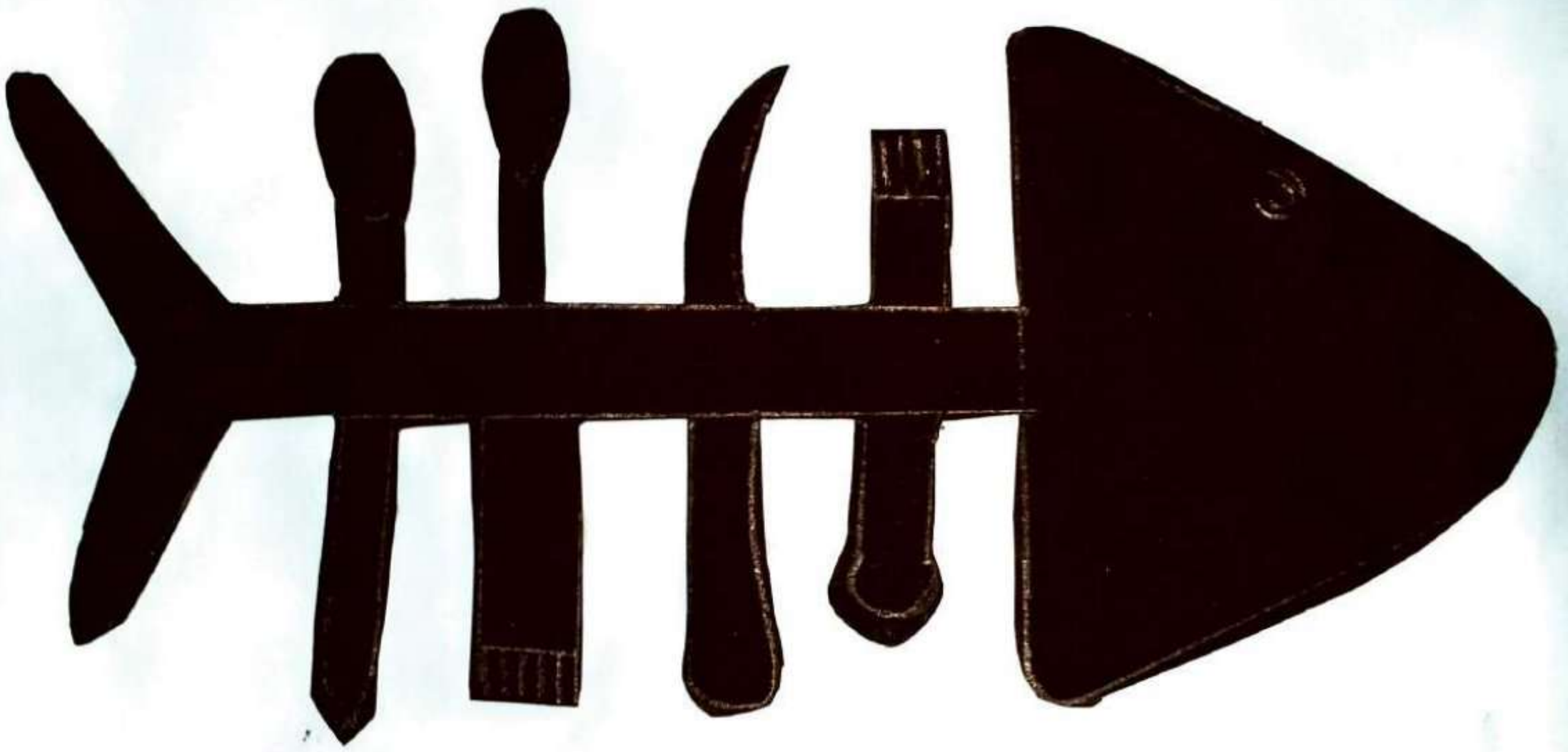

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Fish Feed And Nutrition

- Fish feed on a wide range of food material and obtained their nourishment from plant as well as animals.
- Various kinds of protozoan, micro-crustaceans, microscopic invertebrates, larvae and eggs of various animals from the food of fishes.
- Some species consume unicellular and filamentous algae and parts of higher aquatic plants.
- Sand or mud and detritus also enter into the gut of fishes along with animals and plant items.

* Just like other animals, fishes are herbivorous, carnivorous or omnivorous. Besides these primary groups, the fishes are further divided into several subgroups on the basis of the nature of food consumed by them.

These subgroups may be :-

- **Herbivorous** - Feeding on plant matter to the extent of not less than 75% of the average annual food.

- **Detritophagus** - Fish subsisting mainly on detritus

eg- Labeo fimgusia.

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Herbal Food Plant : Mustard

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- **Planktophagus** :- Fishes which feed on planktons as their main food eg- Silver carp. consumes plankton as their main food.

- **Omnivorous** :- Taking both plant and animal food. Omnivorous fishes may be of two types :-

a) **Herbi- omnivorous** - Fish which feed more on plant food than on other food items eg- Puntiussarana.

b) **Carni- Omnivorous** - Fish which subsisting more on animal food as in the case of Oreochromis mossambicus.

- **Carnivorous** :- Fish which feeds on animal material average annual food.
  These are further classified as :

a) **Insectivorous** - Feeding on insects eg- Glossogobiusgiuris
b) **Piscivorous** - Feeding upon small fish of other species eg- Channastriatus
c) **Carcinophagus** - Feeding on crustaceans
d) **Malacophagus** - Feeding on molluscs eg- Tor tor
e) **Larvivorous** - Eating insects larvae, eg- Gambusia affinis
(f) **Cannibal** - Feeding on their own kind particularly young

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ones. eg- Clarias batrachus.

* The food of fishes is classified in different ways. According to Schaperclaus (1933.) natural food of fish falls in three groups:

(i) Main Food - Main food or natural food is the food which the fish prefers under favourable conditions and on which it thrives best.

(ii) Occasional Food - Occasional food is the food well liked and consumed by the fish as and when available.

(iii) Emergency Food - Emergency food which is ingested when the preferred food items or main foods are not available and which are consumed for their survival.

Similar classification was also made by Nikolsy (1963) based on the relationship between fishes and their food as:

(i) Basic Food - The food which the fish usually consumes, comprising the main part of the gut content.

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(ii) Secondary Food - The food which is found in the gut in small amounts.

(iii) Incidental Food - The food which rarely enters the gut.

(iv) Obligatory Food - The food which is the fish consumes in absence of basic food.

Depending upon the relationship between fishes and their food consumed, Nikolsky (1963) classified the fishes into :-

(i) Monophagic - who are feeding on only single type of food.

(ii) Polyphagic - who are feeding on more than one food.

(iii) Stenophagic - The fishes feeding on a few different types of food.

(iv) Euryphagic - Who are feeding on a variety of food materials.

Thus, most of the fishes fall under the category of euryphagic fishes.

Fishes were also classified according to the feeding affinities to particularly level in water bodies by Das and Moitra in (1963). as :-

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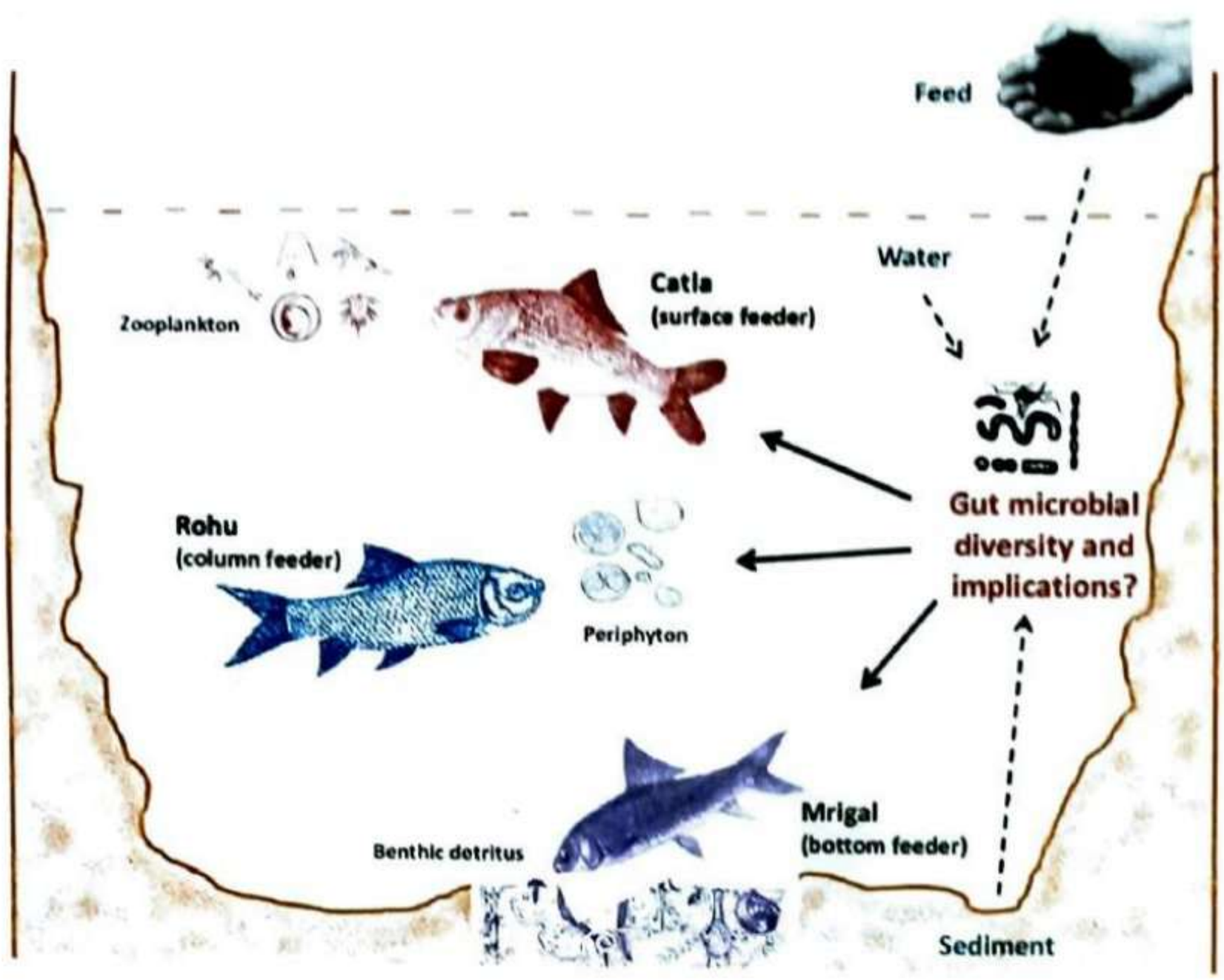

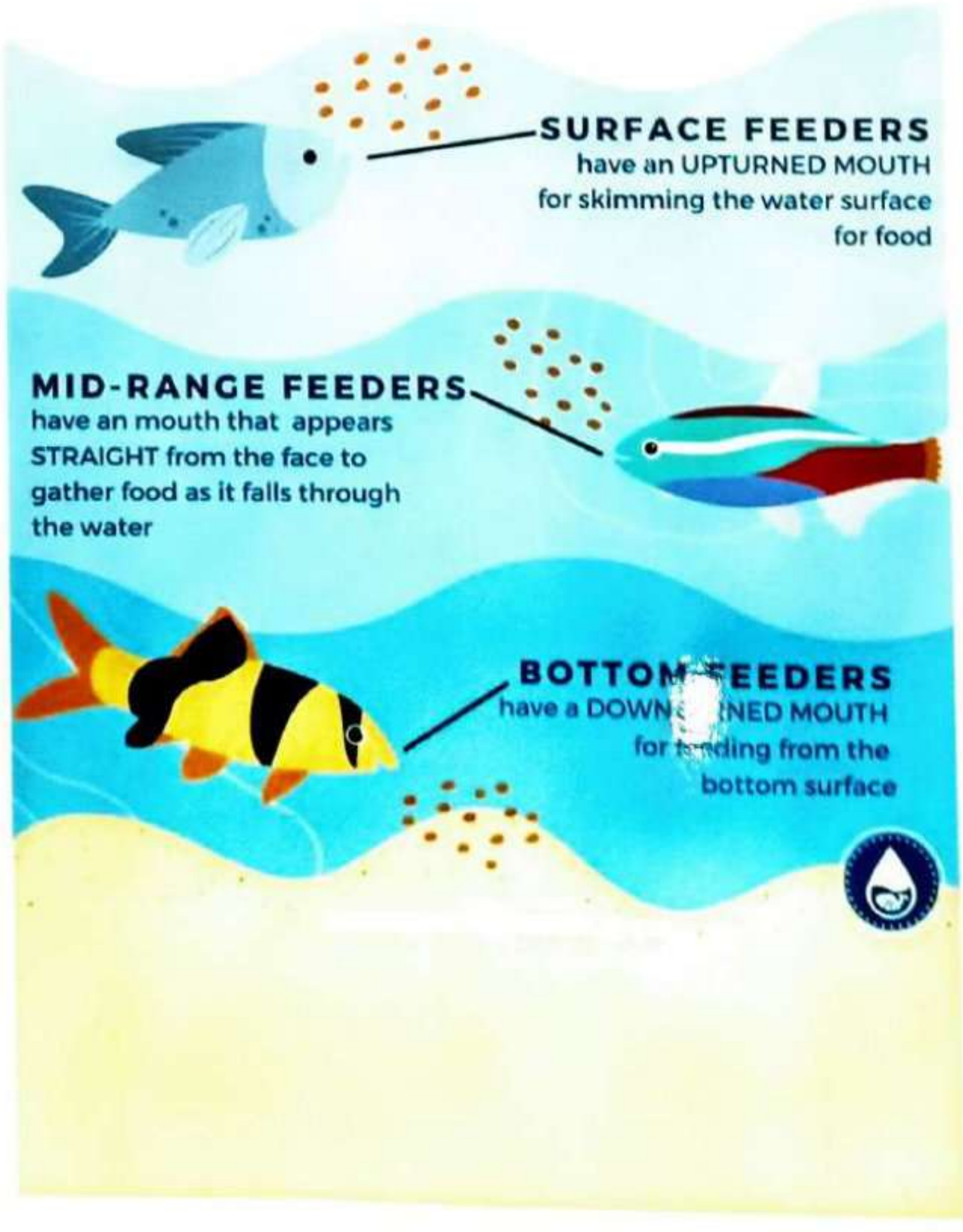

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(i) Surface feeders - The fish eating plankton at the surface
eg - Catla catla, Puntius ticto, Gradusia chapra etc.

ii) Mid feeders or Column feeders - The fishes feeding in the mid water of water body.
- These may be herbivorous, carnivorous or omnivorous
eg - Labeo rohita, Puntius sophore, Grass Carp.

ii) Bottom feeders - The fishes feeding at bottom of water body eg - Cirrhina mrigla, Labeo calbasu, Common carp etc.

- In culture systems, two types of food viz. natural food and artificial food are prevalent.

The System of Production can be defined according to the type of food given to the fish :-

(i) Extensive - Fish production depends entirely on natural food.

ii) Semi-intensive - Fish production depends on both natural food and supplementary feed more fish may be reared in the pond.

ii) Intensive - Fish production depends entirely on complete feed, and the stocking rate no longer depends on food availability but on other factors such as water quality.

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	SPECIES	FEEDING HABIT	FOOD
•	Catla - Catla	Surface Feeder or Planktophagous	Fingerlings, water fleas, algae and vegetable debris. Adult - Algae, crustaceans, some plants, rotifers, insects etc.
•	Channa striatus [ophiocephalus snake Headed]	Carnivorous mainly	Fry water fleas, insects, fish fry and fingerlings, Fingerlings zooplankton, larvae of diptera, fish fry. Adults small fish, tadpoles etc.
•	Ctenopharyngodon idelia [grass crap]	Omnivorous	Fry and fingerlings, unicellular algae, rotifers, crustaceans, chironomous larva Adult aquatic vegetation weeds.
•	Cyprinus carpio [common carp]	Omnivorous	Fry and fingerlings - mostly Nauplius larvae
•	Hypophthalmichthys molitrix [silver carp]	Plankton feeder	Fingerlings unicellular algae Adult - Dinoflagellates, Protozoans, Species of Bacillariophyceae.

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	SPECIES	FEEDING HABIT	FOOD
•	Cirrhinus mrigla	Herbivorous	Angerlings - Algae, vegetable debris, detritus, mud etc Adult - algae, detritus, sand and mud, decayed leaves of aquatic plants etc.
•	Labeo rohita (Rohu)	Herbivorous	Fingerlings - Plants microscopic in size and vegetable debris. Adults - Plants microscopic in size, decaying higher plants, detritus, and mud.
•	Mystus seengbala [cat fish]	Carnivorous or Predaceous	Fry - Insects, fish fry fingerlings, water fleas. Fingerlings - Fish fry, insects and smaller fingerlings. Adult - Insects, tadpoles and fish.

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- It saves a lot of production cost.
- Several types of hormones and their synthetic analogues are used in fish farming either in injection form or by oral administration along with feed.

* The main hormones used are :-

1) Sex Steroids

a) Natural oestrogen and androgens

b) Synthetic analogues like methyl testosterone, demethazine, stanozoid, narethandrolone.

2) Thyroid hormones

3) Growth hormone (Bovine growth hormone)

4) Insulin

* Problem to use hormones as fish Growth diet :-

(i) The hormones like insulin and growth hormones cannot be given orally as these are destroyed by the digestive enzymes of the fish.

(2) The sex hormones can promote growth but such fishes become unfit for human consumption until drug clearance [The hormones are eliminated from the body of the fish] takes place.

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PELLETING

- The dry feed is called pellet.
- The compressed pellets are formed initially by exposure to dry steam and later by moist heat, having temperature around 80-90°C. and humidity 10-15%. The high temperature (125-150°C) and high humidy (20-25%) is required to make the pellet of low carbohydrates and spraying of fat or oil.

- The various types of mechanical feeders are used as distribution of Pellet.
- The mechanical feeder includes a hopper, a motor and device with timer for regulation of supply of pellets to the pond.
- The automatic feeders are used in intensive fish culture techniques.

Use Of Growth Promoting Hormones For fish Growth

- The hormones are also used in modern fish culture to increase the growth rate of fishes.

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(iii) According to dakshmarion et. al (1967) the artificial feed consisting aquatic insects, small prawns and shrimps and cheap pulses in the ratio of 5:3:3 is best for growth and survival.
This feed is also known as NPC mixture.

(iv) The poultry feed consisting of crude protein 16%. ash 3.5% acid insoluble ash 2% phosphate 0.8% moisture 10% other extracts 11% and added vitamin A, B_2, D_3 also gave satisfactory results rearing [Reddi]

(v) The powdered algae and aquatic weeds are also used as artificial feed.

- The artificial feed should have the following characteristic
  - Readily acceptable
  - Easy digestibility
  - High conversion value
  - Abundantly available.
  - Low cost
  - Easy transportation.

Conversion rate = $\frac{\text{Quantity of feed}}{\text{Weight increased}}$

- It is also called food quotient, food coefficient or growth coefficient.

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ARTIFICIAL FOOD (FEED)

- The artificial food is the food products given to different stages of fish, in addition to natural food. Example: just after being stocked, the spawn start feeding voraciously on zooplanktons.
So after 2-5 days of stocking the natural food available in nursery becomes very low. So some supplementary food is required for survival and growth.
It is called ARTIFICIAL FOOD. The commonly used artificial food for carps are rice bran and oil cakes of groundnut, coconut and mustard, etc.

- The artificial feed is of different types:-

(i) The artificial feed of spawn is powdered oil cakes and rice bran.
The feed should be passed through a fine-meshed sieve.
The daily doses of artificial feed should be related to the weight of the spawn.

(ii) The artificial feed of Catla, catla consists of mustard oil cake and rice bran mixture, groundnut oil cake and wheat mixture and silk worm pupae.

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Section-B

Visit to Zoo

B.Sc. Part-II

Paper-III : PRACTICAL

Max. Marks : 100
Time allowed : 6 Hours
(2 Sessions M&E)

1. Classification upto orders, habit, habitats, external characters and economic importance (if any) of the following animals:-

Protochordata : *Molqula, Hetryllus, Pyrosoma, Doliolum, Olikopleura,* and *Amphioxus.*

Cyclostomata : *Myxine, Petromyzon* and *Ammocoetus larva.*

Chondrichthyes : *Zygaena, Pristis, Narcine* (electric ray), *Trygon, Rhinobatus, Raja* and *Chimaera.*

Osteichthyes : *Acipenser, Lepidosteus, Muraena, Mystus, Catla, Hippocampus, Syngnathus Exocoetus, Anabas, Diodon, Ostraczion, Tetradon, Echinus, Lophius, Solea* and *Polypterus.* Any of the Lung Fishes.

Amphibia : *Necturus, Proteus, Amphiuma, Salamandra, Amblystoma, Axolotie larva, Alytes, Bufo, Rana.*

Reptilia : *Hemidactylus, Calotes, Draco, Varanus, Phrynosoma, Chamaeleon, Typhops, Python, Eryx, Ptyas, Bungarus, Naja, Hydrus, Viper, Crocodilus, Gavialis, Chelone* (Turtle) and *Testudo* (Tortoise).

Aves : *Casuarius, Arden, Anas, Milvus, Pavo, Eudynamis, Tyto* and *Alcedo, Halcyon*

Mammalia : *Ornithorphynchus, Echidna, Didelphis, Macropus, Loris, Macaque, Hystrix, Funambulus, Telix, Panthera, Canis, Herpestes, Capra, Pteropus.*

2. Internal anatomy of the following animals:

(i) Computer simulated model/study of :

(a) *Herdmania* : General anatomy

(b) *Rat* : Digestive, arterial, venous and urinogenital systems.

(c) *Hemidactylus* : Digestive, arterial, venous and urinogenital systems

(ii) Demonstration & Study of Internal Anatomy of locally available fish (*Labeo).* Digestive and reproductive systems: cranial nerves, Ear ossicle

3. Study of the skeleton of *Scoliodon, Labeo, Rana* (Frog), *Varanus,* Pigeon or Gallus and *Orcyctolagus*/rat, Palates of birds, skulls of dog & rabbit.

4. Study of the following prepared slides:

Tornaria larva, T.S. *Amphioxus* (through different regions). Oikopleura, Histology of rat (compound tissues), different types of scales.

5. Make permanent stained preparations of the following:
Salpa, Spicules, and Pharynx of *Herdmania, Amphioxus*, Cycloid scales, Zoological excursion and its report is compulsory in the practical examination.

PHYSIOLOGY PRACTICALS:

1. Qualitative tests for identification of simple sugars, disaccharides and polysaccharides.
2. Study of human salivary amylase activity: Effect of temperature, pH, Concentration.
3. Estimation of abnormal constituents of urine (Albumin, sugar, ketonebodies).
4. Use of Kymograph unit & respirometer.
5. Haematein crystal preparation.
6. Estimation of Hb.
7. DLC of Man/RBC count/WBC count.

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Report File
OF
Zoology

Submitted To:- Mrs. Sujata Shauma
(Dept of Zoology)

Submitted By:-
Sonia
BSc IInd 'Medical'
Roll no :- 2010408838
Class Roll no :- 12014503011

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Hippopotamus amphibius

Gallus gallus domesticus

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Topic.....Page No.....
Date.....

CERTIFICATE

This is to Certify that 'SONIA' student of Bsc Medical IInd year of Govt College Chhachhrauli has successfully completed the project report under my supervision

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CHORDATES

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Classification

Phylum – Chordata

Class – Aves

Order – Galliformes

Genus – Pavo

Species – Cristatus

Pavo Cristatus

Topic _____ Date _____

Pavo Cristatus

Classification :-

phylum – Chordata
Class – Aves
order – Galliformes
Genus – pavo
species – Cristatus

Habitat :- It is a terrestrial animal and commonly known as peacock.

Habit :- Diurnal and omnivorous

Morphology :- Body is bright coloured in pedcock while dull coloured in peahen.
It is divided into 4 parts - Head neck trunk and tail

Economic Importance :- It is national bird of India commonly known as Mor or Mayur or pedcock or peafowl
Its feathers have decorative importance.

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Leopard

Phylum - Chordata
Class - Mammalia
Order - Carnivora
Genus - Panthera
Species - leo.

Classification

Phylum - Chordata
Class - Mammalia
Order - Carnivora
Genus - Panthera
Species - Leo

Panthera Leo

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Panthera leo

classification :-

Phylum — chordata
Class — Mammalia
order — Carnivora
Genus — panthera
species — leo

Habitat :- It is a terrestrial carnivore found in gir forest in Gujarat

Habit :- It is diurnal and gregarious Sexes are separate and show sexual dimorphism.

Morphology :- Body is light yellowish-brown coloured and divided into 2 parts upper and lower lip are with vibrissae Male has a many more hair on mane around the neck

Economic Importance :- They are injured for humans and animals

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Designer Sheet

Sakshi

Classification

Phylum – Chordata

class :- mammalia

order :- primata

Genus :- Macaca

Species :- mulatta

Macaca mulatta

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Macaca mulatta

Classification:-

phylum - chordata
class - mammalia
order - primata
Genus - Macaca
species - mulatta.

Habitat:- It is terrestrial gregarious and abnormal primata found in Asian and African countries.

Habit:- Diurnal activity and it is omnivorous.

Morphology:- Body is yellowish-brown coloured and is divisible into 4 parts Head neck, trunk and tail.

Economic Importance:- It is used for human entertainment in Gruu.

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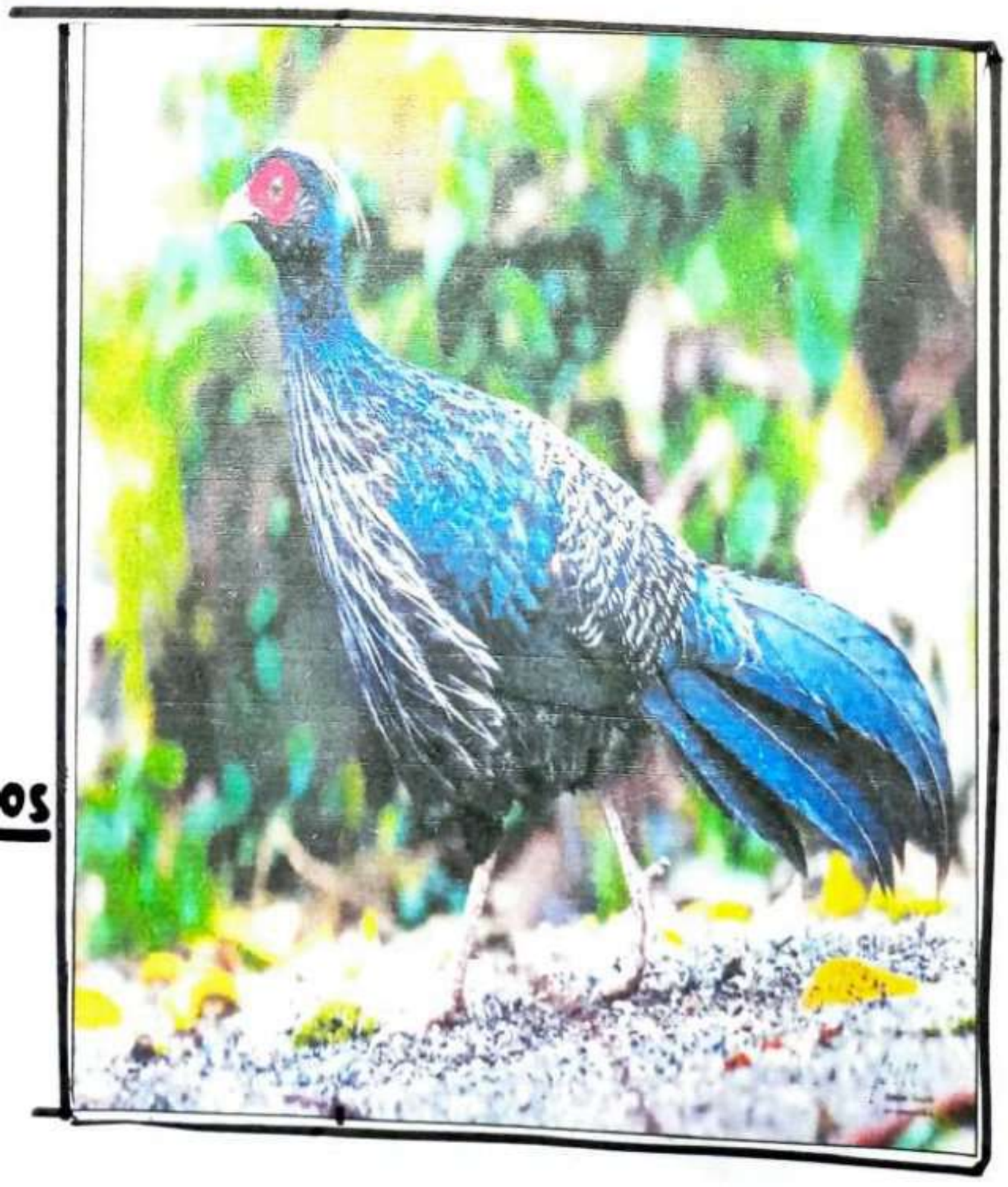
Classification

Phylum :- Chordata
class - Aves
order - Galliformes
Family :- phasianidae
Genus :- Lophura
Species :- leuco-melanous



Lophura leucomelanos

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(Lophura leucomelanos)

Classification

Phylum :- Chordata
Class :- Aves
Order :- Galliformes.
Family :- Phasianidae
Genus :- Lophura
Species :- leucomelanom

Habitat :- It is a found in forests and thickets especially in the Himalayan Foothils. from pakistan to western Thailand.

Habit :→ These pheasants can be both monogamous and polygamous.

Economic Importance :- It is omnivorous it as a use of ~~meditation~~ hunting. It is feeds the Small Insects.

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अंग्रेजी नाम	ब्लैक बक
वैज्ञानिक नाम	Antelope Cervicapra
पहचान	पूरे शरीर का परिधान भूरा और उसमें पीली झलक। सींग 30 से 38 सें.मी. लम्बे। पूंछ छोटी (20 सें.मी. तक) और नीचे की ओर से सफेद।
विवरण	परिपक्व काले हिरण की कुल लम्बाई लगभग 80 सें.मी.। दक्षिण भारत में सींग 50 सें.मी. तक तथा उत्तर भारत में 65 सें.मी. तक लम्बे एवं आकर्षक। शरीर के ऊपरी भाग का रंग काला तथा नीचे का पीला सफेद। बच्चे के शरीर का रंग हल्का पीला। आकर्षक तेज धावक।
भार	40 कि.ग्रा.।
वितरण	भारत के मैदानी क्षेत्र व पाकिस्तान।
आदतें	20 से 30 के समूह में रहता है। दोपहर तक खाता है और उसके बाद आराम फरमाता है।
प्रजनन	वर्षभर। लेकिन मुख्य रूप से फरवरी मार्च। गर्भधारण अवधि 180 दिन। एक वर्ष में एक से दो बच्चे।
भोजन	घास, अनाज, फल और पत्तियाँ।
स्थिति	वातावरण के विनाश के चलते अब संख्या बहुत ही कम।
विशेष	हरियाणा का राज्य पशु।

Ani's ani's

Antelope cervicapre.

Principal
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Chhachhrauli (YNR.)

Classification

Phylum - Chordata

Class - Mammalia

order - Artiodactyla

Genus :- Ani / Antelope

Specie : - Ani / cervicapre

Axis axis

Classification :-

Phylum - chordata
Class - Mammalia
Order - Artiodactyla
Genus - Axis
Species - axis

Habitat: The axis deer occur in India

Habit: They are gregarious in nature

Morphology:- The axis deer of India has a beautiful golden brown coat which covered with white spot

Economic Importance:- Axis deer have become an Important resources for hunting in some countries.

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Classification

Phylum :- Chordata

class :- Aves

order :- Columbiformes

Genus :- Columba

species :- livia

Columba livia (Pigeon)

Columba Livia

Classification :-

Phylum - Chordata
Class - Aves
Order - Columbiforms
Genus - Columba
Species - Livia

Habitat :- Commonly know as Blue - rock pigeon and is gregarious bird.

Habit :- Pigeon is a diurnal Bird and generally grainivorous.

Morphology :- Pigeon is streamlineal or spindle Shaped Body is divided into Head, Neck trunk, tail.

Economic Importance :- feeds the [redacted] grain. It used to for game in India.

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Classification

Phylum :- Chordata

Class :- Mammalia

Order :- Carnivora

Family :- Canidae

Genus :- Canis

Specy :- C. aureus

Canis aureus

Principal
Government College
Chhachhrauli (YNR.)

Canis aureus

Classification :- Phylum :- Chordata

Class - Mammalia

Order :- Carnivora

Family - Canidae

Genus - canis

Species - C. aureus.

Habitat :- The golden Jackal lives in open savannas, deserts and arid grassland

Morphology :- The body length of the Jackal is 70 to 85 cm with a tail length of about 25 cm.

The fur is genrally coarse and not very long

It is monogamous. : Cooperative breeder.

Economic Importance :- It is Play an Important Scavang role by eating garbage and animal carrion towns and villages.

- They are Some hunted for their fur,

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Grey Francolin

Classification

phylum - Chordata

Order - Galliformes

Family - Phasianida.

Genus - Francolinus

Specie - F. Podicerianus

Principal
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Chhachhraul (Yamu.)

Grey Francolin

Classification :-

Phylum :- Chordata

Order :- Galliformes

Family :- phasianida

Genus :- Francolinus

species :- f. Podicerianus

Habitat :- It is also known as Chicken Bird It is found in the plain and dricy part of the Indian subcontinent and Iran

Habit :- It is diurnal and gregarous Sexes are separate and show sexual dimorphism.

Morphology :- A plump grey and brown with a stumpy taid.

Economic Importance :. It has a favorit game bired in the sub-continent and has been hunted for food.

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Crocodile

Crocodiles ambush their prey either in the water or on land. They are carnivores which eat fish, birds, mammals and even smaller crocodiles.

Crocodiles display aggressiveness during the mating season.

Each crocodile jaw carries 64 sharp teeth meant to grasp and crush, not to chew. That's why they swallow stones that grind the food inside their stomachs (the stomach stones also serve as ballast). The teeth are continuously replaced along the crocodile's life. Crocodiles can exert enormous pressure when closing their jaws, but the force for opening them is so weak that an adhesive band is enough to keep a large crocodiles' jaw shut up. The powerful jaws can be extremely delicate, even with the teeth, when removing offspring from the nest.

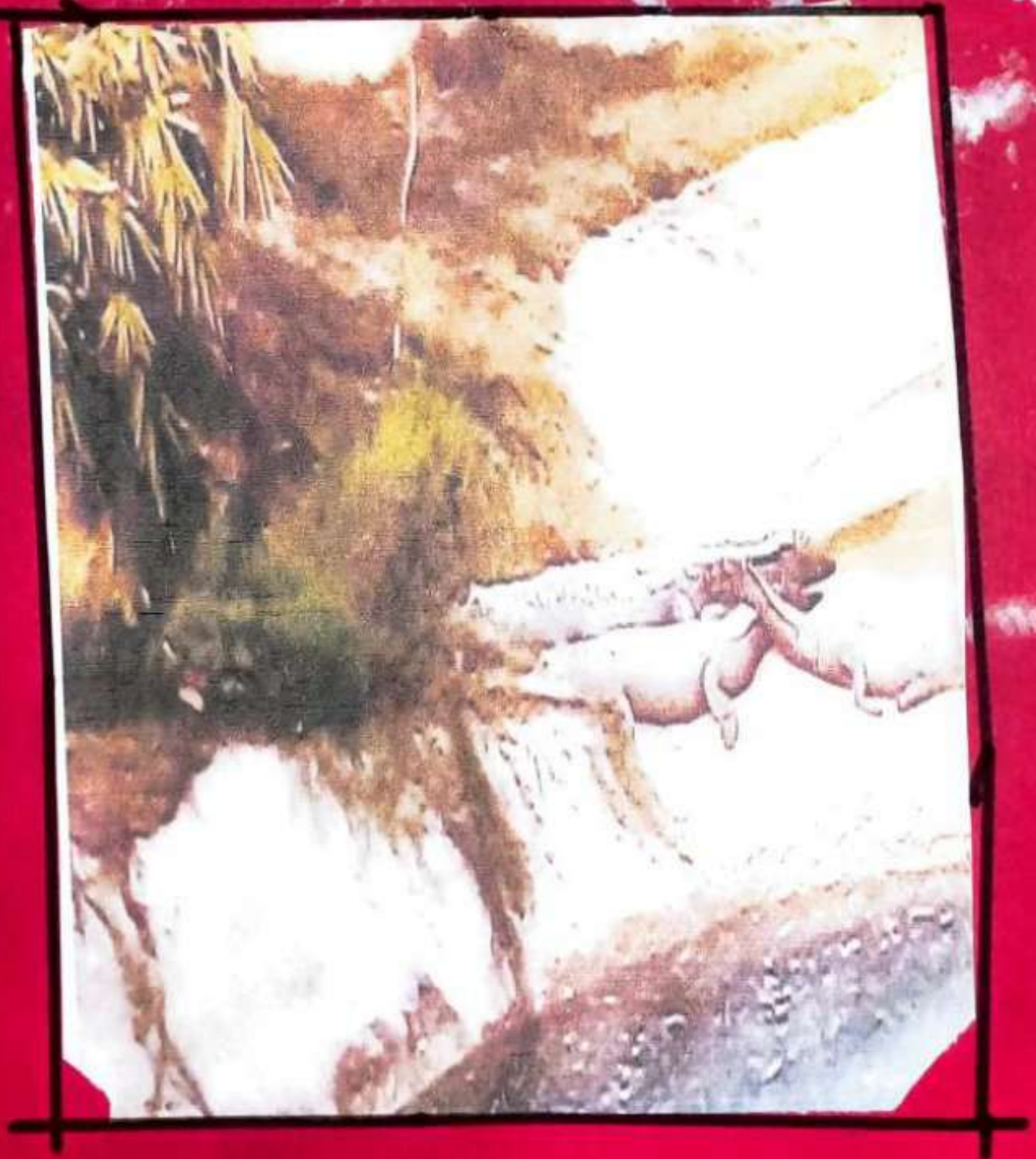
Many times crocodiles stay on the river banks mouth wide open. this is a sign of [illegible], they [illegible] through the mouth'

The crocodiles have a four chambered heart like in birds and mammals for [illegible] life. But on diving, the heart behaves like a three chambered reptilian heart, enabling them to stay more under water.

To "cry crocodile tears" is a common expression which is used for depicting false sadness. It has its origins in the myth according to which reptiles weep while eating humans. But, believe it or not, crocodiles really do weep while feasting. due to physiological reasons than remorse. Their eyes can froth and bubble during [illegible]ding. Air pushed through the various could even with tears in the animal's lacrimal (tear) glands and the whole [illegible]ment could be emptied into the eye, resulting the "false" tears.

Crocodiles have very slow metabolisms and can survive months together w[illegible]

As we know, due to climate change, a significant portion of crocodiles' [illegible] [illegible]



Crocodilus.

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Chhachhrauli (YNR.)

Crocodylus palustris

Classification:-

Sub - Phylum - Vertebrata

Section — Gnathostomata

Super class — Tetrapoda

Class — Reptilia.

Species — Crocodylus palustris

Habitat: It is largest amphibious reptile commonly found in the rivers ponds, tanks and marshes of India, Sri lanka.

Habit :- It is diurnal. walking type in land and Swimming type in water. with webbed toes It is carnivorous.

Morphology :- Body is dark grey. Body is divisble in 4 parts! head neck trunk and tail.

Economic Importance. Its skin is used for preparing leather goods.

It is also serious threat to humans.

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Classification

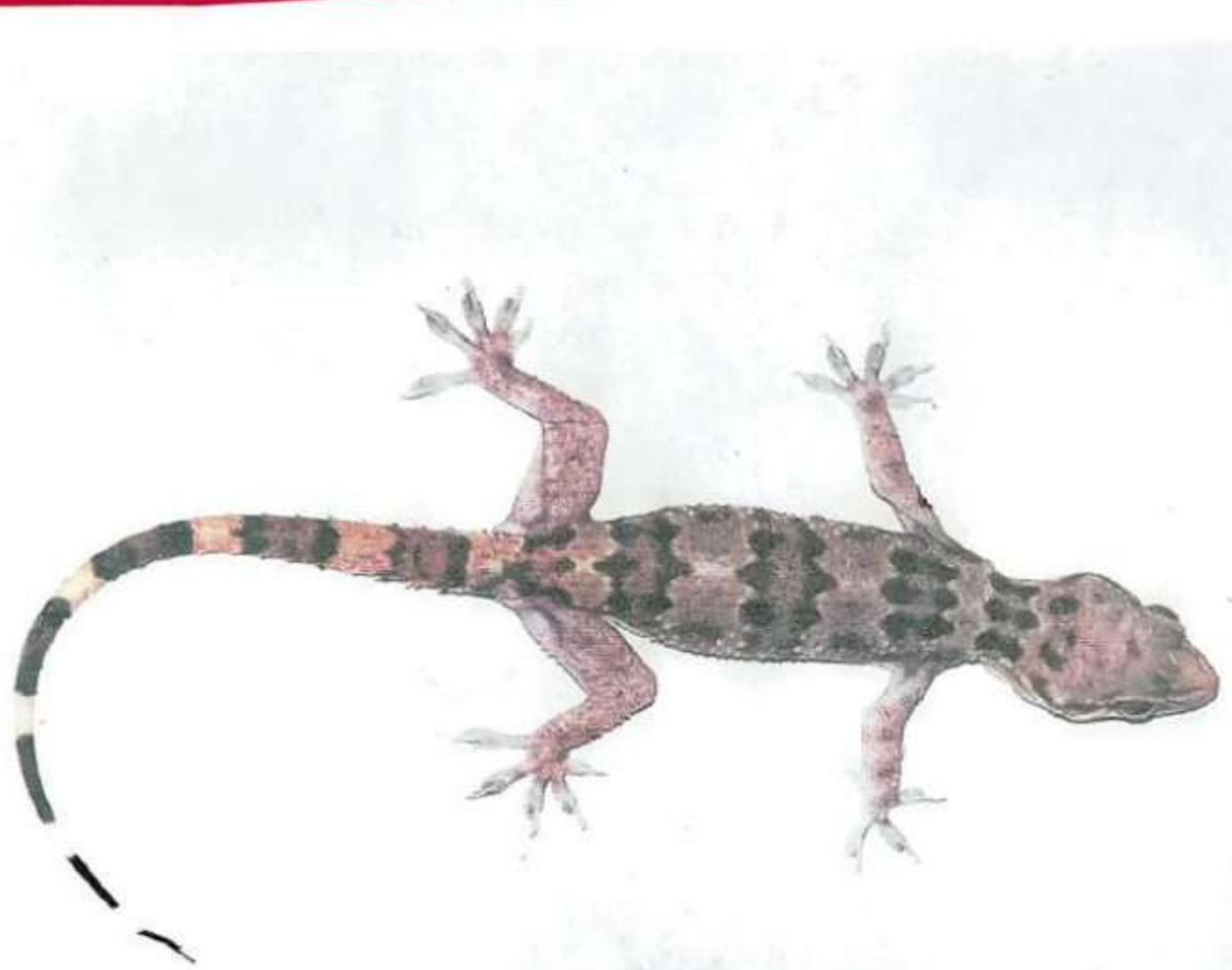
Phylum :- Chordata

Class - Reptila

Order :- Squamata

Genus :- Hemidactylus

Species :- Hemidactylus



Hemidactylus

Principal
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Chhachhrauli (YNR.)

Hemidactylus

classification :- phylum - chordata
class - Reptilia
order - Squamata
Genus - Hemidactylus.

Habitat :- It is terrestrial and commonly found on wall of houses.

Habit :- It is nocturnal
It is carenivorous and Insectivorous.

Morpholog':- Body is elongated and depressed
It is divided into 4 pars - Head, neck, Trunk and tail

Economic Importance:- It is useful lizards as control the insect population.

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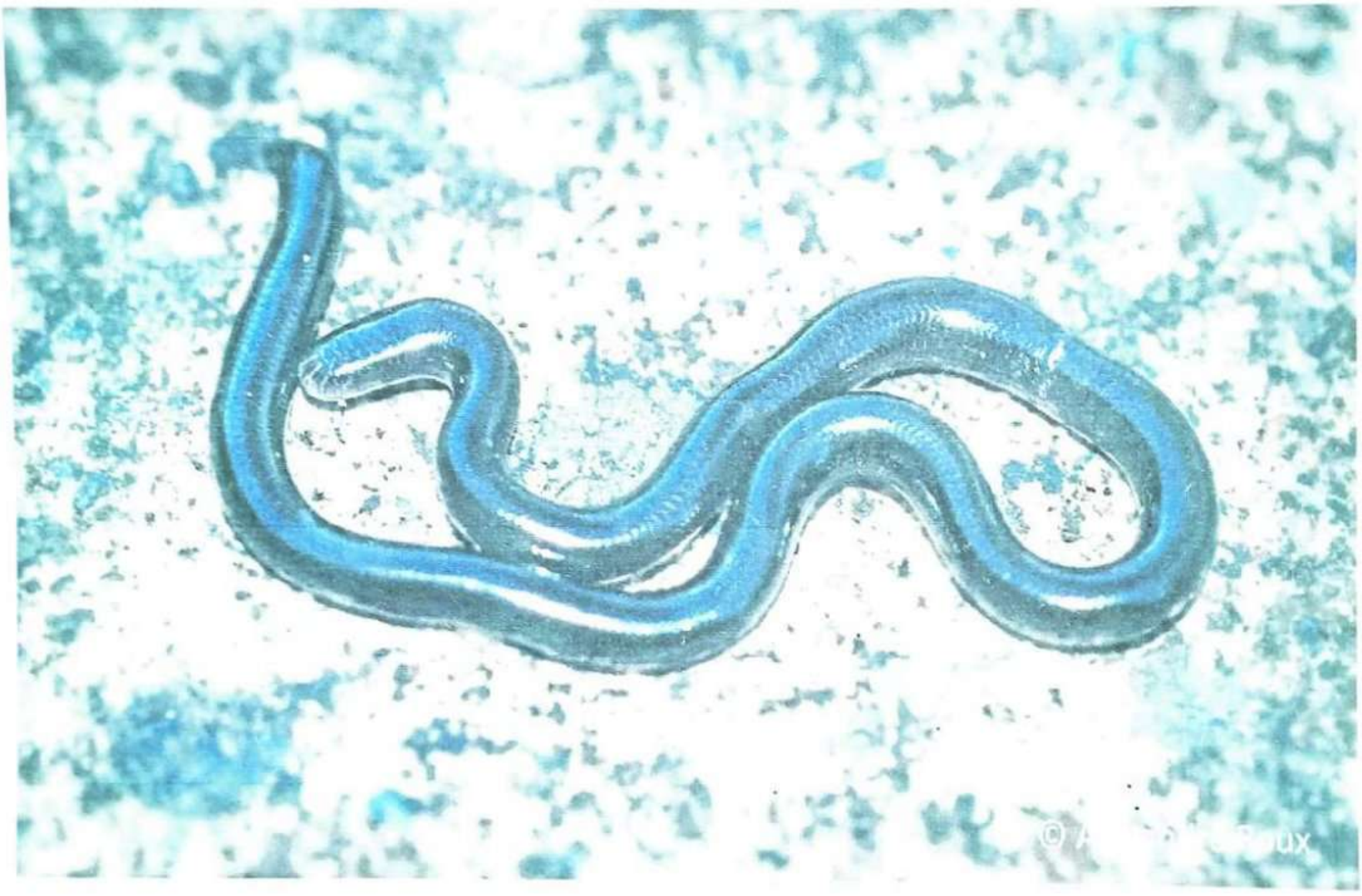
Classification

Phylum – Chordata
Class – Reptila
order – Squamata
Genus – Typhlops
species – braminus



Typhlops braminus

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Government College
Chhachhrauli (YNR.)

Typhlops braminus

classification :- phylum :- chordata
class - Reptila
order - Squamata
Genus - Typhlops
Specie - braminus

Habitat :- It is an fossorial ophidian. It is commonly known as blind snake.

Habits :- It is nocturnal, it is carnivorous Sexes are dioecious or unisexual.

Morphology :- Body is long and cylindrical as in earthworm.
Whole body have minute scales.

Economic Importance :-

It is non-poisnous.

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Thank You

Principal
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Section-C

Herbarium Report

B.Sc. 2nd year (Medical)

B.Sc. 3rd and 4th Semester

PAPER -III PRACTICALS

Max. Marks- 80+20
Time- 6 Hrs. (2 Sessions)

Biology and Diversity of Seed Plants, Plant Anatomy and Plant Embryology

1. Describe/compare the given flowers A and B in semi-technical language giving V.S. of flowers, T.S. of ovaries, Floral Diagrams and Floral Formulae. Identify and assign them to their respective families giving reasons. 20
2. Identify, classify and write morphological notes on the given specimens C and D '(from Gymnosperms) 10
3. Cut Transverse Section and prepare a double-stained permanent mount of the given material (from angiosperms/gymnosperms). Identify giving reasons and show it to the examiner. 12
4. Identify, giving the important characters of identification, the spots 1 and 2 (one material/slide each from gymnosperms and embryology of angiosperms). 10
5. Write morphological notes on the specimens E and F (from angiosperms). 10
6. Dissect out the globular/heart-shaped embryo from the given material. 4
7. Note-book, Collection and Collection Report. 12
8. Viva-voce. 12

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SEMESTER-V

Topic _____ Date _____

Government College, Chhachh - Rauli

Report File of HERBARIUM

Submitted to :- Mrs. Komal Saini 25.06.2022
(Dept of Botany)

Submitted By :- Sonia
BSc. IInd (Medical)
Univ. Rollno :- 19042402
College Rollno :→ 309421001

Principal
Government College
Chhachhrauli

Designer Sheet

Sakshi

AIM :- To collect Gymnosperm and Angiosperm specimens.

Date of Collection :- 2

Name :- Sonia

Class :- BSc Medical 2nd year (4th sem)

Rollno :- 20104083

Place of collection :- Herbal park, Yamunanagar.

Principal
Government College
Chhachhrauli (YNR.)

Topic _____ Date _____

Certificate

This is to certify that "Sonia", a student of B.Sc. IInd "Medical" Govt college Chhachhraul, has successfully completed the project report under my supervision.

25.06.20

Signature.

Principal
Government College
Chhachhrauli (YNR.)

Acknowledgement

It is a privilage for me to submit this project report on Gymnosperm and angiosperm to the Dept. of Botany, Govt College chhachhrouli.

I take this opportunity to add a few heartful word for people who provided me this wondering support till succesful accom-plishment of my project work.

First of all. I would like to Convey my thanks. to my teacher Mrs. Komal Saroha. for Imparting me Knowledge and experience during the tenture of any project work.

Secondaly, my hearted appreciation to my friends who kept encouraging me and helped me unconditionally to complete my project work

Finally to my parents who gives me the financial support to complete this project

Principal
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Topic _____ Date _____

Contents :-

(1) Field work.
(2) Collection tour.
(3) preparation of herbarium sheets.
4. List of plants.
5. Introduction.
6 Gymnosperms.
(i) Cycas
(ii) Pinus.

(7) Angiosperms.

- Lamiaceae
- Malvaceae
- Poaceae
- Solanaceae
- Amaranthaceae
- Asteraceae
- Apocynaceae.
- Portulacaceae.

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Field work

Field work is one of the most essential part in the botanical study. It present to come across many type of plants not seen and available in the laboratory. It is therefor advise to go around many localities and explore their vegetation organised excesion or outgoings. led by experienced persons. add to the Knowledge of common plants. in nature.

After collecting the plant. It was immediately preserved or pressed to avoid its ratting and dehydration.

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Topic _____ Date _____

Collection Tour

A one day class trip to near by parks was organised on _____ respectively to collect specimens belonging to Gymnosperm & Angiosperm. Teacher Incharge were Mrs Komal Saxena of Dept. of Botany of Government College Chachhrauli

Most of collection of Gymnosperms were done and Angiosperms was collected in nearby parks and ~~road~~ road side, College campus and chhachhrauli area.

for description of species, the following books were consulted.

Pradeep Botany Vol. III
Modern Botany Vol III

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Preparation of Herbarium sheets

(1) equipment :- on excursion for the collection of plants several item required to be carried includes.

Collecting sheets.

field plant press

Mounting sheets.

Gum, callotaps, fevicol, notebook, pen, pencil etc

(2) Collecting and pressing :- Collected plants are placed in the collection sheets. After specimens has been collected and placed in collecting sheet, it has kept in a pad of dry newspaper and a flat trunk was placed newspaper were changed daily for 2 weeks and then weekly.

(3) Mounting :- When completely dried the specimens were mounted on herbarium sheets with fevicol. gum etc.

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Topic _____ Date _____

Introduction

Gymnosperms :-

The word Gymnosperms is derived from Gymno (naked) and sperm (seed), that means plant with naked seeds
The Gymnosperm have their freshly exposed and attached on open megasporophyll.
These plant are phanerogams without ovary.

Angiosperms :- Angiosperms are not highly involved and dominant among our present day flowers of the would. One of the most characteristic features of Angiosperms in the formation of their reproductive organs in the forms of the flowers. The Angiosperms flower are characterised by presence of carpels terminal in stigma and ovules envolved in ovary.

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Topic _____ Date _____

#

#mospermms

#gymnosperms

#

#

Cycas

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Topic _____ Date _____

Cycas

Division: Spermatophyta.
Class Cycadopsida
Order Cycadales.
Family Cycadaceae.
Genus Cycas

Diagonastic features and occurance:-

Cycas sporophyte is an evergreen palm-like tree that attains height of 0.4 to 2.0 mt.
Sporophyte is dioecious i.e male and female plants are separate Both the plant Body is differentiated into root, stem and leaves.

They are found in tropical and subtropical part of the earth.

Economic Importance:-

→ They are highly valued for their ornamental leafs, and hence grows in home and garden as an ornamental plant.

→ Seed of some specals of cycas are used as fodder for animals.

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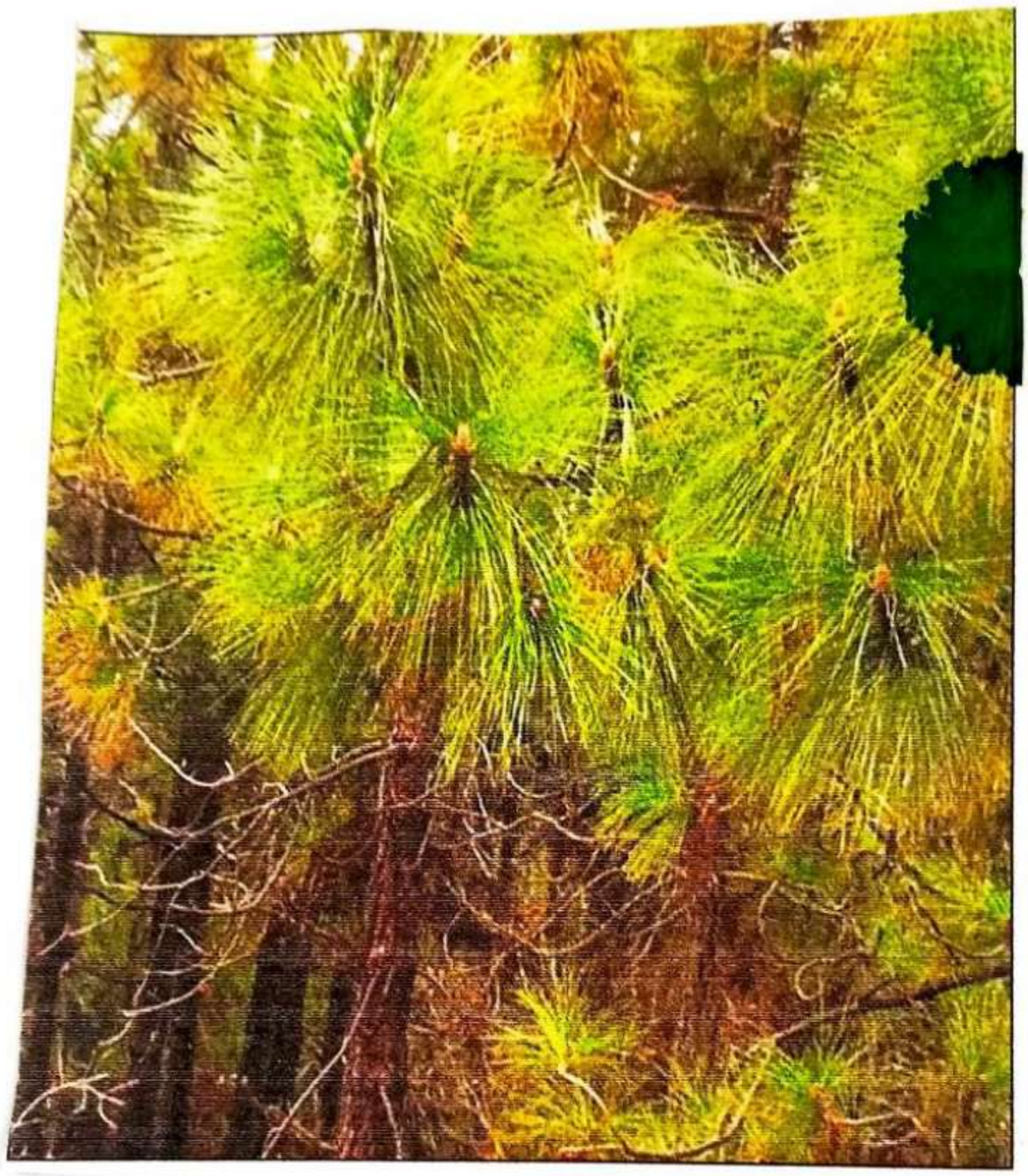

Pinus

Topic _____ Date _____

PINUS

Division :- Coniferophyta
Class :- Coniferopsida
Order :- Coniferales.
Family :- pinaceae
Genus :- pinus.

Diagonostic features and occurance.

- Plants are tall trees to reach upto height of 50-60 m.

→ They are perennials, evergreen and xerophyte pinus seeds are associated with fungus
The stem is erect, tall, cylindrical, needle woody branched.

→ The branches are dimorphic (long shoot + dwarf shoot)

→ These are 2 types of leaves (scale + foliage)

→ Pinus plants are heterospores.

Economic Importance.

→ The wood of pinus roxburghii and P. wallichiana is used making sleepers of railway packing cases etc. It also produce turpentine.

→ The seed of P. gerardiana are economically.

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Topic_____ Date_____

Specimens

Angiosperms

Coleus plant

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Topic

Date

Lamiaceae

Class - Dicotyledonae
Order - Lamiales.
Family - Lamiaceae

Diagonostic features :-

→ plants generally herbs or shrubs.
- stem herbaceous, woody, erect, etc.
→ leaves opposite and decoglate.
- Inflorescence verticillectles.
- Flower zygomorphic. bilabiate, hypogynous. Complete
- Sepal 5. bilabiate inferior.
- petal 5. bilabiate. Singent
- Stamen 4, didynmous. epipetalous.
- Bicarpellary. syncarpous, axile placentation gynobasic style

Economic Importance :-

Perfersery (O. Kilimandscharicum piperita) Medicinal (Thymus vedgenis) (Beinum-sanctum) ornamental. (Ajuga, Orimum, Thymus etc.)

Specimen Collected :-
Coleus plant, Melissa officinalis

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Abelmoschus esculentum

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Chhachhrauli (YNR.)

Topic _____ Date _____

Malvaceae

Class :- Dicotyledonae
order :- Malvales
Family :- Malvaceae

Diagnostic features :-

- Herbs, shrubs, tree young plant stellate, mucilage ether.
- leaves primetdy lobed, palmety veined or palmately compound stipulate.
- flowers solitary axillary.
- flower are complete, hypogynous.
- petals, twisted.
- syncarpous gynoecium with axile placentation.
- Berry, capsule type fruit.

Economic Importance :-

Hibiscus rosa sinensis - used as ornamental
Abutilun Indicum — used a wild medicinal plant.

Specimen collected :-

Abelmoschus esculentus.

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Dactyloctenium aegyptium

Pennisetum Chandestinum

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Chhachhrauli (YNR.)

Topic _____ Date _____

Poaceae

Class :- Monocotyledones.
order :- poales
Family :- poaceae.

Diagnostic features :-

- stem cylindrical, jointed, hollow, internodes.
- leaves distribution distichous, ligulate simple
- spikelet Inflorescence.
- flower is sessile, bisexual, zygomorphic hypogynous, complete.
- perianth 2-3 and cladicules.
- Anther · divorsicate and versatile
- fruit caryopsis (grain)
- gynoecium monocarpellary, unilocular and ovary.
- Two feathery stigma appears.

Economic Importance :-

Edible

Specimen collected :-

Dactyloctenium aegyptium, pennisetum clandestinum.

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Designer Sheet

Sakshi

Solanum nigrum

Topic _____ Date _____

Solanaceae

Class :- Dicotyledones
Order :- polymiconiales
Family :- Solanaceae.

Diagnostic features :-

→ Aerial part hairy
- stem usually with bi collateral vascular bundles.
- leaves alternate becoming opposite in floral region.
- flower actinomorphic, hypogynous.
- sepal 5, gamosepalous.
  petal 5, gamopetalous.
  stamens 5, polyandrous, alternipetalous and epipetalous.
- fruit Body or capsule.

Economic Importance :-

food yielding plant (S. tuberosum, S. melongena)
Medicinals. (Atropa belladena, Datura)
ornamental plants. (Nicotiana, Datura, petunia).

Specimen collected :-

Solanum nigrum.

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Designer Sheet

Sakshi

Amaranthus viridis

Principal
Government College
Chhachhrauli (YNR.)

Topic _____ Date _____

(Amaranthaceae)

Class :- Dicotyledanes
Series :- Corolliphyllales
Family :- Amaranthaceae

Diagonstic Characters :-

→ The plants are mostly annual or perennial Trees.
- Tap root present.
- Inflorescence simple or branchial spike.
- flower bisexual Usually unisexual, hypogynous actinomorphic pentamerous, incomplete apetalous.
- perianth 5-6, free slightly fused at the base
- Seed small, Instricular

Economic Importance :

Ornamental (celosia cristata) (Amaranthus Caudatus)
Edible plant (A. blitum)
weeds (Amaranthus Aurida)

Specimen Collected

Amaranthus Viridis

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Conyza bonariensis

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Chhachhrauli (YNR.)

Topic _____ Date _____

Asteraceae

Class - Dicotyledone
Order - Inferae
Family - Asteraceae

Diagnostic feature:-

- Tap root, sometime modified into tubers
- petiolate simple rarely compound.
- Hairy
- Herbaceous erect, branchial stem.
- Pendunde are flat, enid. flowat arranged in centripetal fashion.
- sepals are in form of scales, bristles.
- stamen 5. epipatalous, etc.
- Bicarpellary. Syncarpous unilocular with single ovule.
- ovary inferior.

Economic Importance:-

Ornamental - Aster, Dahlia etc.
edible - leaves of lactuca sativa are eaten as raw as salad

Specimen collected:-

Sonchus oleraceus. Gnaphallium Canyza bonaerensis.

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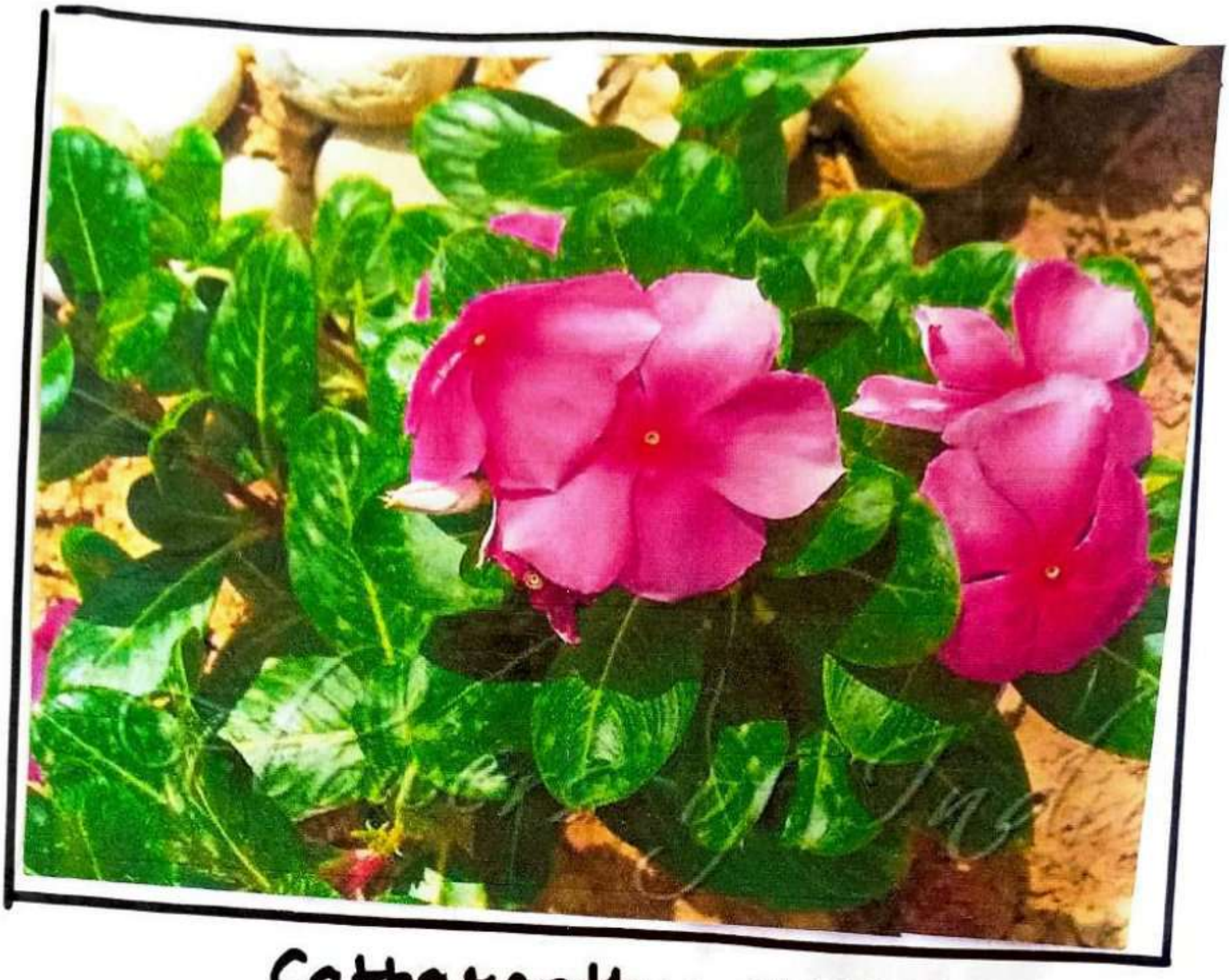
Designer Sheet

Saks
A Trusted



Catharanthus roseus

Calotropis gigantea

Topic

Date

Apocynaceae

Class - Dicotyledones
Series - Gamopetalae
Order - Apicyales
Family :- Apocynaceae

Diagnostic character :-

- leaves are simple opposite.
- plant part with white latex.
- stamen 5, epipetalous
- Corolla . convolute.
- Gynoecium . bicarpellary, apocarpous or syncarpous
- ovaries free, style united.

Economic Importance.

→ Plant of strophanthus can be are poisnous, used as arrow poision.

→ Bark of Alstonia scholaris is febrifuge.

specimen collected.

Catharanthus roseus . Calotropis gigantea.

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B.Sc. Ist years (Medical)

PAPER – III PRACTICALS

Max. Marks -80+20*
Time- 6 Hrs. (2 Sessions)

1. Identify, classify and write short morphological notes giving well labelled relevant

   26

   diagrams on the given specimens **A, B, C** and **D** (one each from Algae, Fungi, Bryophytes and Pteridophytes).

2. Prepare the root smear and find out two different stages of Mitosis. Identify

   10

   and show it to the examiners. Also give characters of identification.

3. Numerical regarding Genetics (Mendelian Inheritance or Gene Interaction) as per syllabus.

   10

4. Identify giving two important characters of identification on spots **1, 2, 3** and **4** (one slide
5. or material each from Algae, Fungi, Bryophytes and Pteridophytes).

   20

6. Note-book, collection and collection report.

   12

7. Viva-voce.

   12

LIST OF PRACTICALS (Semester I & II)

1. Stages of Mitosis from Material (Onion-root tips).
2. Experiments on Monohybrid and Dihybrid ratios.
3. Gene Interactions and modified Dihybrid ratios.
4. Chi-square analysis.
5. Type study- Specimens from Algae, Fungi, Bryophytes and Pteridophytes as per theory syllabus.
6. Field tour of an area rich in diversity of Archegoniates for collection of plants, plant diseases and preparation of Herbarium.
7. Preparation of Survey/Collection Report.

Principal
Government College
Chhachhrauli (YNR)

HERBARIUM REPORT

(Session - 2021-22)

SUBMITTED TO → MRS. KOMAL

SUBMITTED BY → SAKSHI

CLASS - BSC 1ST (MED)

ROLL NO-1211451030009

Principal
Government College
Chhachhrauli (YNR.)

Aim → To collect ~~by~~ Algae, Fungi, Bryophytes, Pteridophyte

Date of collection :→ 12-05-2022

Name :→ Sakshi

Class :→ BSC Medical I^st Year.

Roll No :→ 12114510 30009

Place of collection :→ Herbal Park, ~~Road Side~~ of Ch. Devi lal, Chuharpur & nearby areas. ~~College Campus~~ Chhachhrauli, Yamunanagar

Principal
Government College
Chhachhrauli (YNR)

CERTIFICATE

This is to certify that Sakshi, a student of B.Sc 1st Year "Medical". Government College Chhachhrauli has successfully Completed project report under my supervision.

Signature. 26/05/2022

Principal
Government College
Chhachhrauli (YNR.)

ACKNOWLEDGEMENT

It is a privilage for me to submit this project report on algae, Fungi, Bryophytes and pteridophytes to the Department of Botany, Govt. College Chhachhrauli.

It takes this opportunity to add a few heartful word for people who provided me this wondering Seep- port till successful accomplishment of my project work.

Secondly, my heartful appreciation to my friends who kept encouraging me and helped me unconditionally to complete my project work.

Finally to my parents who gives me the financial support to complete this project.

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FIELD WORK

Field work is one of the most essential part in the botanical study. It is present to come across many types of plants not seen and available in laboratory. It is therefore advisiable to go around many localities and expore their vegetation organised excession or outgoings, led by experienced person, add to the knowledge of common plants in nature.

After collecting the plants, it was immediately preserved or pressed to avoid its rotting and dehydration.

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COLLECTION TOUR

one day class trip to nearby parks - Herbal park was organised on 12-05-2022. respectively to collect specimens, belonging to algae, fungi, Bryophytes and pteridophytes. Teacher incharge was Mrs. Komal Saroha of Dept. of Botany of Government college chhachhrauli

Most of collection were collected in Herbal park and roadside of college campus and chhachhrauli area.

For description of species, the following books were consulted:

Pradeep's Botany - I vol.

Modern's Botany - I vol.

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PREPARATION OF HERBARIUM SHEETS

1.) Equipments :→ On excursion for the collection of plants served item required to be carried includes :-

Collecting sheets
Field plant press
Mounting sheets
Gum, cellotape, fevicol, notebook, pen, pencil etc.

2.) Collecting and pressing :→ collected plants are placed in the collection sheets. After specimens has been collected and placed in collected sheet, it has kept in a pad of dry newspaper and a flat trunk was placed newspaper and a flat trunk was placed newspaper were changed daily for 2 weeks and than weekly.

3.) Mounting :→ when completely dried the specimens were mounted on herbarium sheet with fevicol, gum etc.

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VOLVOX

Systematic Position

Division :→ Thallophyta

Sub-division :→ Algae

class :→ Chlorophyceae

order :→ Volvocales

Family :→ Volvocaceae

Occurence :→

It is a fresh swimming fresh water green algae volvox inhabits profusely in the ditches or low lying areas. It is a polyfilitic (consist of more than one ancestor). colonies of volvox are spherical to ellipsoidal in shape and they contain 50 to 50,000 cells.

Economic Importance :→

volvox can be found in ponds, puddles and bodies of still fresh water throughout the world. As autotrophs they contcibute to the production of oxygen and serve as food for a number of aquatic organisms, especially the microscopic invertebrates called rotifers.

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NOSTOC

Systematic Position

Division :- Thallophyta

Sub-division :- Algae

Class :- Cyanophyceae

Order :- Nostocales

Family :- Nostocaceae.

Habitat :→ Nostoc can be found in a variety of environments, both terrestrial and aquatic, depending on the species. It may be attached to the substratum or free floating in stagnant pond waters.

Economic Importance:→

Nostoc increases the fertility of soil by fixing atmospheric nitrogen.

The blue green algae add organic matter to the soil and increases fertility.

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ANABAENA

Systematic Position

Division - Bacteria
class - Cyanophyceae
Order - Nostocales
Family - Nostocaceae

Morphology

Anabaena has uniseriate, straight, curved or coiled trichomes that may be constricted at the cell wall. The blue green to yellow - green coloured cells may be spherical, ellipsoidal, cylinderical, or bent, but overall look much like a string of beads.

Economic Importance

Azolla and the blue green alga Anabaena azolla maintain a symbiotic relationship: the alga provide nitrogen to the fern, and the fern provides a habitat for the alga. This property of nitrogen fixation has made Azolla extremely important economically in the cultivation of rice, particularly in Asia.

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MUCOR

Systematic Position

Kingdom - Mycota
Division - Eumycota
Sub-division - Zygomycotina
class - Zygomycetes
order - Mucorales
Family - Mucoraceae.

Morphology :→

Mucor is a microbial genus of approximately 40 species of moulds in the family Mucoraceae. species are commonly found in soil, digestive system, plant surface etc.

Economic Importance :→

M. pusilus causes mycosis of internal organ in human beings. Most species of Mucor are responsible for rotting of fruits and vegetables. M. javanicus is used commercially for alcoholic fermentation.

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MARCHANTIA

Systematic Position

Division :→ Bryophyta
Class :→ Hepaticopsida
Order :→ Marchantiales
Family :→ Marchantiaceae

Occurrence :→ The genus is cosmopolitan in its distribution. It includes 117 species. All species are terrestrial and cosmopoliton in distcibution. These species prefer to growing moist and shady places like wet open woodlands, banks of streams, wood rocks or as shaded rocks. Some of the common Indian species are M. palmata, M. polymorphat etc.

Economic Importance :→

Marchantia has been used to care pulmonary tuberculosis and affliction of liver. The decoction of dried sphagnum is used in the treatment of acute haemorrhage and eye infections.

FUNARIA

Systematic Position

Division - Bryophyta
class - Musci
order - Funariales
family - Funariaceae.

Occurence :→

The genus is cosmopolitan in its distribution. F. hygrometric is the most common moss which is found all over the world. The moss grow luxuriantly in human. soil and on the soil burnt by fire. They grow well on damp, rocks and wall. The green protonema grows on the newly ploughed field while some are epiphytic and grows well on tree trunks.

Economic Importance :→

It is often used as a soil conditioner because it increases the soil's water holding capacity as well as capacity to hold nutrients.

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ADIANTUM

Systematic Position

Division - Pteropsida
Class - Leptosporangiopsida
order - Filicales
Family - Polypodiaceae.

Occurrence :→

Adiantum is known as 'maiden hair fern' or 'walking fern'. They are distributed in the trophical and temperate regions of the world. Some of the Indian species include A. capillus-veneris, A. pedatum and A. vemestem.

Economic Importance :→

The traditional uses of Adiantum species, commonly known as maidenhair ferns are known to be for respiratory problems such as cough. cold, fever, pneumonia and mucous formation.

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EQUISETUM

Systematic Position

Division - Pteridophyta
Sub-division - Sphenopsida
order - Equisetales
family - Equisetaceae.

Occurrence :→

Equisetum is represented by more than 25 species. They found distributed all over the world except Australia and New Zealand. Equisetum species are commonly called as "Horse tails" and "Swimming rushes". They found on wet places like ponds and marshes or along stream banks, damp and shady places, alongside of river banks, exposed dry places like sandy roadsides and railways tracksides.

Economic Importance :→

Equisetum is of economic Importance to the stock farmers as it is poisonous when consumed in large quantities, the toxic principle probably being the enzyme thiaminase that destroys Vitamin B1.

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Section-D

Practical File of EVS

Practical File

of

E.V.S

Submitted by: ASHU

Ref No- 21205963

Class → B.A. II

Roll no- 3320819

REG No- 20-DE-5431

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STUDENT

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Date 12/8/21

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Teacher's Signature

वन क्षेत्र का दौरा :-

1. वन क्षेत्र का नाम नोट करें, वनों के प्रकार आर्थिक तथ्यों को अधिकारियों से समझें।
2. क्या वन क्षेत्र जैव संरक्षण स्थल है या राष्ट्रीय पार्क है।
3. वनों का ढांचा :- वन अधिकारियों की सहायता से सर्वेक्षण करके वन की मुख्य विशेषताओं को नोट करें। इससे मुख्यतः पाए जाने वाले वृक्षों के नाम, वन घना है। वन में पाए जाने वाले विभिन्न प्रकार के पक्षियों, पशुओं व कीटों की सूची बनाएं।
4. वन का वार्षिक व्यय आय :- वर्तमान से प्राप्त होने वाले संसाधनों तथा वन में होने वाली गतिविधियों की सूची बनाएं तथा वन में होने वाली गतिविधियों की जानकारी एकत्रित कीजिए।
5. वन क्षेत्र के उपरोक्त स्थान के पारितन्त्रीय उपयोगों को नोट कीजिए।
6. गाँव वासियों द्वारा किन-किन वन उत्पादों का प्रयोग किया जाता है सूची बनाएं।
7. वन पर्यावरण पर मानवीय प्रभाव :- वन क्षेत्र में हो रही किसी विनाशकारी गतिविधि जैसे वनों की कटाई, चराई या लकड़ी काटना आदि को नोट करें। यदि ऐसा है तो वन पर इसका क्या प्रभाव होगा।

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Physics

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- शहर का नाम :- सिरसा (हरियाणा)।
- पर्यवेक्षण क्षेत्र :- मेला ग्राउंड, वेगु रोड सिरसा।

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(क) स्थानीय प्रदूषित स्थान का दौरा - शहरी :

1. पर्यवेक्षण क्षेत्र का नाम, शहर या बस्ती का नाम नोट करें।
2. प्रदूषित क्षेत्र का अवलोकन करें व निम्नलिखित प्रश्नों के उत्तर तलाशें।
   (क) क्या यहां गंदा पानी जमा है और अगर जमा है तो उसका रंग कैसा है व बदबूदार है?
   (ख) जमा हुआ पानी बारिश का है या सीवेज का।
   (ग) क्या क्षेत्र में कचरे के ढेर लगे हैं।
   (घ) क्या प्रदूषित पानी से सतह की मिट्टी भी प्रदूषित हो गई।
3. यातायात के विभिन्न साधनों जैसे बस, ट्रक, स्कूटर व कार आदि द्वारा किए जा रहे वायु व ध्वनि प्रदूषण को नोट करें।
4. कस प्रदूषित स्थानों के पास रहने वाले लोगों के स्वास्थ्य पर पड़ने वाले प्रभावों को नोट करें।
5. कस क्षेत्र को कैसे प्रदूषण से मुक्त किया जा सकता है, अपने सुझाव दें व लोगों को इसके बारे में जागरूक करें।
6. प्रदूषित क्षेत्र का धरातलीय चित्र बनाएं व रिपोर्ट तैयार करें।

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• गाँव का नाम :- मानहारी (सिरसा)।

• जिले का नाम :- सिरसा (हरियाणा)।

Polluted Site Rural (प्रदूषित क्षेत्र ग्रामीण)

Polluted Site Rural (प्रदूषित क्षेत्र ग्रामीण)

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(ख) स्थानीय प्रदूषित स्थान का दौरा मुआयना :-

1. गाँव, तहसील व जिले का नाम नोट कीजिए।
2. गाँव के पर्यावरण के अध्ययन के लिए निम्नलिखित जानकारियाँ एकत्रित कीजिए —

(क) क्या गलियों में गंदा पानी खड़ा हुआ है।

(ख) क्या लोग अपने घरों का कूड़ा-करकट गलियों में फेंकते हैं।

(ग) खाना पकाने, दूध गर्म करने व पानी गर्म करने के लिए किस प्रकार के ईंधन का प्रयोग किया जाता है।

(घ) क्या मंदिरों व गुरुद्वारों में लाउड स्पीकरों का प्रयोग किया जाता है।

(ङ) क्या गेहूँ की खेती से फसल काटने के बाद उन्हें अग्नि लगा दी जाती है और धुआँ पास के क्षेत्र को प्रदूषित करता है।

3. एकत्रित आकड़ों का विश्लेषण कीजिए व पता लगाइए कि क्षेत्र प्रदूषित है या नहीं, यदि प्रदूषित है तो अपने सुझाव दें व लोगों को जागरूक कर ताकि वे अपने क्षेत्र को साफ-सुथरा व प्रदूषण मुक्त रखें।

4. क्षेत्र के कुछ छायाचित्र लेकर व रिपोर्ट तैयार करें।

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marks .....

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- सर्वेक्षण क्षेत्र का नाम :- सिस्सा शहर के आस-पास का क्षेत्र।
- Aim :- सामान्य गेहूं व धान का अध्ययन।

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(क) अपने क्षेत्र के सामान्य पौधों का अध्ययन :-

1. क्षेत्र का नाम तथा भौगोलिक स्थिति।
2. क्षेत्र का मानचित्र बनाइये या प्राप्त कीजिए।
3. अपने प्राध्यापक की सहायता से क्षेत्र में पाए जाने वाले पौधों के वैज्ञानिक नाम नोट कीजिए।
4. पौधों के प्रचलित नाम, उनके वैज्ञानिक नाम तथा उनके कुल की सूची बनाएं।

सामान्य महत्वपूर्ण पौधे :-

1. **गेहूँ :-** गेहूँ भारत में अत्यधिक उगाया जाता है। इसके आटे का प्रयोग रोटी, केक, बिस्कुट तथा पेस्ट्रीज बनाने में किया जाता है। गेहूँ में ग्लूटिन व आयोडिन नामक दो एंजाइम पाए जाते हैं। गेहूँ का प्रयोग बीयर तथा अन्य मद्य पेय तथा Alchol बनाने में भी किया जाता है। इसका चोकर उच्च कोटी का पशु आहार होता है। इसके जूस का प्रयोग बेकरी की बनी कुकीज, ब्रेड की सजावट करने और कलिन, हेट तथा टोकरियाँ बनाने में किया जाता है।
2. **चावल :-** चावल विश्व की एक महत्वपूर्ण स्वादिष्ट अन्न है। जिस काटने के बाद प्रयोग में लाया जा सकता है। इसका साधारणतः उबाल कर खाया जाता है। डोसा, इडली, पुलाव तथा खीर कुल्थादि सभी चावल से बनाए जाते हैं। चावल के जूस का प्रयोग केक, जूते व कई अन्य वस्तुएँ बनाई जाती है।

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Potato (आलू)


Tomato (टमाटर)


Peas (मटर)

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इसके चोकर के तेल को कीटनाशक के रूप में प्रयोग किया जाता है। इसके साथ-साथ इसका प्रयोग वस्त्र चमड़ा शोधन तथा साबुन बनाने में किया जाता है।

3. आलू :- आलू एक प्रमुख सब्जी है। विश्व भर में एक मुख्य खाद्य के पौधे के रूप में प्रचलित है। एक आलू के पौधे की सबसे महत्वपूर्ण संरचना इसकी जमीन के नीचे उगी हुई खाद्यांश है। 'जन्ह एवं कन्द' कहते हैं। इससे कोई स्वादिष्ट व्यंजन जैसे आलू कटलेट, चिप्स, तथा पापड़ बनाये जाते हैं। ताजे आलू से हमें प्रचुर मात्रा में vitamin B, C तथा कुछ मात्रा में प्रोटीन प्राप्त होते हैं। इसका उपयोग alcohol बनाने में भी किया जाता है।

4. टमाटर :- टमाटर को सामान्यतः कच्चे सलाद के रूप में या पका कर खाया जाता है। इनका उपयोग चटनी, कचअप, टमाटर जूस आदि बनाने में किया जाता है। इन्हें सब्जी के रूप में भी प्रयोग किया जाता है। टमाटर में अधिक मात्रा में विटामिन विशेष रूप से विटामिन C पाया जाता है। टमाटर के बीज जीवाणु रोधी प्रकृति के होते हैं।

5. मटर :- मटर का पौधा ऊपर चढ़ने वाला होता है। सामान्यतः मटर हरे ही खाया जाता है। इसे सब्जी के रूप में भी प्रयोग किया जाता है।

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Expt. No. 3

Date 5/10/21

Haldi (हल्दी)

Ginger (अदरक)

Neem (नीम)

Principal
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6. हल्दी :- हल्दी को एक रंजक के रूप में प्रयोग किया जाता है। इसकी जड़ें एक एक पीला रंजक पदार्थ पैदा होता है। जिसका प्रयोग भारत व चीन में रंगने में किया जाता है। मक्खन, पनीर, आचार व अन्य पदार्थों को रंगने में भी किया जाता है। इसका मसाला सब्जी, मीट व मटर्ची बनाने में किया जाता है। जोड़ - फ्रैक्चर के उपचार में भी इसका प्रयोग किया जाता है। हल्दी के ताजे वृक्ष के प्रयोग से अनका चर्म रोग दूर होता है।

7. अदरक :- यह पौधे की जड़ से भूमि के नीचे से प्राप्त किया जाता है। अदरक का प्रयोग पेय व सेंट आदि में एवं मसाले के रूप में होता है। इसके अतिरिक्त इसका प्रयोग बड़े पैमाने पर स्वयं, पुडिंग, अचार, भोजन व कढ़ी आदि में होता है ताकि इनमें स्वाद आ सके।

8. नीम :- पेट के कीड़ों के लिए इसके पत्तों का प्रयोग किया जाता है। शहद में इसके पत्तों को मिलाकर प्रयोग करने से पीलिया में लाभ होता है। इसकी पत्तियां अनेकों चर्म रोग, घावों व सूजन में गुणकारी है। इसके फलों का प्रयोग मूत्ररोग, बवासीर, पेट के कीड़ों के लिए होता है। इसकी टहनियों को लोग दांत साफ करने हेतु दातुन के रूप में प्रयोग करते हैं।

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Papaya (पपीता)

Sugarcane (गन्ना)

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9. पपीता :- पपीता सतंरी - पीले रंग का गूदेदार फल है। इसका स्वाद मीठा तथा गंध कस्तूरी होता है व इसे कच्चा खाया जाता है। बिना पका फल भोजन में पकाया तथा संरक्षित किया जाता है। इसका उपयोग जूस, आचार व जैली आदि बनाने में किया जाता है। इसके फल व अन्य भागों को काटने पर मोद जैसा पदार्थ निकलता है। इसमें एक पाचक तत्व (पापेरिन) पाया जाता है। जिसका औषधीय महत्व है।

10. गन्ना :- गन्ना विश्व में चीनी का मुख्य स्त्रोत है। इसका प्रयोग कई प्रकार के खाद्य पदार्थों को मीठा करने में किया जाता है। इसके बचे हुए भाग को ईंधन के रूप में प्रयोग किया जाता है। इसका प्रयोग। कागज बनाने तथा फाइबर के बोर्ड के एक तत्व के रूप में किया जाता है। इसके अपशिष्ट पदार्थ के उपयोग शराब बनाने, हॉकी तथा खेल में किया जाता है। यह पशुओं के, अत्यंत चारे के साथ-साथ रोगों के रूप में भी प्रयोग होता है।

11. सरसों :- सरसों के छोटे पत्ते का प्रयोग सब्जी के रूप में किया जाता है। इसके बीजों से प्राप्त तेल का उपयोग खाना पकाने, दिए जलाने, साबुन बनाने, (कॉस्मेटिक्स एवं मालिश) करने के काम आता है। इसके अपशिष्ट का प्रयोग। पशुओं को खिलाने में किया जाता है।

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- मच्छर क्षेत्र का नाम :- गाँव खैरपुर (सिरसा))
- Aim :- क्षेत्र में पाए जाने वाले कीटों का अध्ययन।

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(ख) सामान्यत: अपने क्षेत्र मे पाए जाने वाले कीट का अध्ययन :-

	सामान्य कीट	
	मच्छर :-	ये गली व दलदली स्थानो पर पाए जाते है। मच्छर घरो, शहरो, खेतो व गाँवो क्षेत्रो मे रहते है। वसन्त व वर्षा ऋतु के पश्चात ये अधिकता मे पाए जाते है। इनकी मादा रात को खाने की खोज मे होती है। नर फल और फूलो का रस चूसता है और मादा मनुष्यो व अन्य जन्तुओ का खून चूसती है। मादा के इस स्वभाव के कारण ये विषाणुओ कीटाणुओ तथा प्रोटोजोन को एक स्थान से दूसरे स्थान पर फैलती है। ये रात मे सक्रिय होते है। इसका मुख छेदने और चूसने वाला होता है। इसकी टाँगे लम्बी और पतली होती है। मादा मच्छर मलेरिया फैलाती है।
1.		
	मक्खी :-	मक्खियाँ हमारे घरो मे आमतौर पाई जाती है। ये ग्रीष्म ऋतु व वर्षा ऋतु मे बहुत सक्रिय होती है। यह एक सकीय कीट है। जो एक जगह से दूसरी जगह आसानी से उड़कर कचरे पर बैठी रहती है। इसकी लम्बाई 8mm तथा यह काले व भूरे रंग की होती है। इसका शरीर सिर, वक्ष व पेट आदि भागो मे बटा होता है। यह एक खतरनाक घरेलू कीट है। क्योकि इससे चिड़चिड़ापन होता है। और कई जानलेवा बिमारियाँ जैसे - हैजा
2.		

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Cockroach (काकरोच)

Bedbug (खटमल)

Spider (मकड़ी)

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आदि की कीटाणुओं को फैलाने में सहायता करती है।

3. **कॉकरोच :-** कॉकरोच सक्रिय व रात्रिचर प्रकृति के हैं। यह बहुत तेज भागते हैं। कॉकरोच उन जगहों पर मिलते हैं जहां गर्मी, नमी एवं पर्याप्त भोजन जैसे रसोईघर, बेकरीज, रेस्तरां व ड्रेनेज आदि में अधिक मात्रा में जाते हैं। यह गहरे भूरे रंग के हैं। इसका शरीर मुख्यत: तीन भागों सिर, मध्य तथा पेट में बंटा होता है। ये सर्वभक्षी होते हैं। कॉकरोच कपड़ा, जूतों, किताबों आदि को हानि पहुँचाते हैं व बदबू फैलाते हैं।

4. **खटमल :-** यह विश्वभर में पाया जाता है। ये छोटे परभक्षी होते हैं जो मानव रक्त पर निर्भर रहते हैं। खटमल मानव आवासों में पास जाते हैं। ये प्रकृति से रात्रिचार होते हैं व रात के समय सक्रिय होते हैं। इनका शरीर चपटा व अण्डाकार होता है। जिसकी लम्बाई 5mm व चौड़ाई 3mm होती है। इनका रंग बादामी भूरा होता है व रक्त चूसने के पश्चात् बैंगनी या लाल हो जाता है।

5. **मकड़ी :-** यह सामान्यत: हमारे घरों व बगीचों में और सर्वत्र पाई जाती है इसका शरीर द्विखण्डीय व ऑपिस्थोसोमा अग्र भागों में बंटा जाता है। ये दोनों भाग आपस में एक छोटे व पतली कमर से जुड़े होते हैं जो जाला बुनने एवं शिकार करने के काम आते हैं।

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- पर्यवेक्षण क्षेत्र का नाम : गाँव के जंगल। (सिरसा) के आस-पास।
- Aim : क्षेत्र मे पाए जाने वाले पक्षियों का अध्ययन।

Pigeon (कबूतर)

Parrot (तोता)

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(ब) सामान्यत: अपने क्षेत्र में पाए जाने वाले पक्षियों का अध्ययन :-

सामान्य पक्षी

1. कबूतर :- यह दिनचर पक्षी है और दिन में सक्रिय होता है। ये अनाज, दाल, बीजों पर आश्रित होते हैं। ये आमतौर पर अनाज-मंडी, अनाज गोदामों, Railway stations, पुरानी इमारत और पत्थर के सराय के लिए खान आसानी से प्राप्त हो सके। इसका शरीर सिर, गर्दन, धड़ व पूंछ में विभाजित होता है। यह स्लेटी रंग के साथ चमकदार हरे रंग का होता है। जिसकी गर्दन तथा छाती गहरे गुलाबी रंग की होती है। यह अपना घोंसला पेड़ से तिनकों से किसी संकुल स्थान पर बनाता है। दोनों माता पिता अपने-अपने दायित्व का निर्वाह करते हैं।

2. बतख :- यह झील व सहरों में आमतौर पर पाया जाने वाला पक्षी है। नर बत्तख की गर्दन पर एक गहरे गुलाबी रंग का छल्ला मिलता है। जो की मादा में नहीं पाया जाता है। ये अनाज, दाले आदि पर आश्रित होते हैं। इनकी चोंच सख्त तंग, नुकीली व ऊपरी हिस्से से मुड़ी हुई होती है। यह फसलों व फलों के बाग के लिए अत्यधिक नुकसानदायक होता है। जितना फल यह पक्षी खाता है, उससे ज्यादा व्यर्थ कर देता है। यह पिंजरे में रखने वाला लोकप्रिय पक्षी है।

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Peacock (मोर)

Myna (मैना)

Owl (उल्लू)

Principal
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Teacher's Signature

मोर :- ये दिन में सक्रिय होता है। यह हमारा राष्ट्रीय पक्षी है। इसकी एक अति सुंदर पूँछ होती है जो 1m से 1.5m तक लंबी होती है और यह अपने आस-पास अपनी पंखों से ढकी रहती है। सामान्यतः इसे मोर या मयूर कहा जाता है। नर मोर का रंग चमकदार होता है। जबकि मादा का रंग चमकदार नहीं होता। दिन के चारों ओर एक बहुरंगीय द्युतता होता है। यह मुख्यतः अनाज, सब्जियों के तने कीट। छिपकलियाँ और साँप खाता है।

मैना :- मैना एक जाना माना भूरे रंग का पक्षी है। इसकी चोंच चमकीली पीली टांग और आँखें एक चारों ओर नंगा मास होता है। यह दोनों कलों कीटों कच्चों को अपना भोजन बनाते हैं। दोनों मांस और पेड़ अपने बच्चे दायित्व को पूरा करते हैं।

उल्लू :- यह एक रात्रिचर पक्षी है। इसकी बड़ी गोलाकार सिर होती है। इसके चारों ओर एक पंखों का कठोर कालर सा बना होता है। इसकी शक्तिशाली टांगे व पंजे और मुड़ी हुई नुकीली चोंच होती है जो शिकार को पकड़ने व चीरने के काम आती है। उल्लू दिन ढलने के बाद बाहर आता है और जोर से चिल्लाता है शांति से उड़ता है एवं चूहे तथा सूखों का शिकार करने के कारण इसका आर्थिक महत्व अधिक है।

Teacher's Signature

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Pond Ecosystem (तालाब पारिस्थितिक तन्त्र)

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तालाब पारिस्थितिक तंत्र का अध्ययन :-

1. तालाब का नाम नोट कीजिए जहां आप आए है।
निर्जीव तथा सजीव तत्वो का अध्ययन कीजिए
2. (क) निर्जीव तत्व :- जल की गुणवत्ता नोट कीजिए तालाब के पानी का नमूना लेकर उसकी रसायनिक संरचना का अध्ययन कीजिए। तालाब के पानी का pH व तापमान मापिए।
(ख) सजीव तत्व :- पादप, जन्तु उत्पादक, अपघटक आदि होते है।
उत्पादको मे प्लवक व पानी की सतह के नीचे वाले हरे पौधे शामिल होते है। पौधो के नाम अध्यापक की सहायता से नोट कीजिए।
अपघटको मे जीवाणु व कवक शामिल किए जाते है।
3. संग्रहित आकड़ो का विश्लेषण करे व इन्हे अपनी पुस्तिका मे अंकित करो।
4. अन्त मे तालाब के दृश्यचित्र खीचिंए व अपनी रिपोर्ट तैयार कीजिए।

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- नदी का नाम : बनास नदी।
- पर्यावरण ज्ञान : सिरसा शहर के निकट तथा सोमड़ा के पास।

River Ecosystem (नदी पारिस्थितिक तन्त्र)

Principal
Government College
Chhachhrauli

Teacher's Signature

नदी पारिस्थितिक तंत्र का अध्ययन :-

1. नदी का नाम नोट करे जहां आप आए है।
2. निर्जीव व सजीव तत्वों का अध्ययन कीजिए पहाड़ी ढलान पर नदी की गति अधिक होने के कारण वनस्पति वृद्धि दर कम होती है। अपेक्षाकृत समतल क्षेत्र में पानी साफ होता है परंतु मैदानी क्षेत्रों में पौधों के विकास के कारण धीमा हो जाता है। यहाँ जल प्रवाह भी धीमा हो जाता है। मैदानों में नदी-जल ज्यादा प्रदूषित होता है। पहाड़ पर कम होता है।
3. निर्जीव तत्व :- नदी के विभिन्न स्थानों से पानी के नमूने लेकर उनका रसायनिक विश्लेषण कीजिए जैसे - PH value or Temp.
4. सजीव तत्व :- इन तत्वों में उत्पादक, उपभोक्ता, अपघटक आदि शामिल होते है।
5. अपघटकों में जीवाणु व कवक आदि शामिल है।
6. एकत्रित किए गए आकड़ो का विश्लेषण कीजिए व अपनी पुस्तिका में अंकित कीजिए अन्त में नदी के विभिन्न हिस्सों से दार्शनिक रेखाचित्र व रिपोर्ट तैयार कीजिए।

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STUDENT

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Hill Slopes Ecosystem (पहाड़ी ढलान पारिस्थितिक तन्त्र)

Hill Slopes Ecosystem (पहाड़ी ढलान पारिस्थितिक तन्त्र)

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Teacher's Signature

पहाड़ी ढलान पारिस्थितिक तंत्र का अध्ययन :

1. पहाड़ी ढलान का नाम नोट कीजिए।
2. पहाड़ी ढलान पारिस्थितिक तंत्र के निर्जीव व सजीव तत्वों का अध्ययन कीजिए।
3. पहाड़ी ढलानों पर पाए जाने वाले उत्पादकों में वृक्ष, घास व झाड़िया आदि होती है।
4. उपभोक्ताओं में पशु जैसे कीट, कृतरन वाले जीव खेत्र खादन वाले, जीव एवं विभिन्न प्रकार के पक्षी आते है।
5. अपघटकों में जीवाणु व फंफूद शामिल है।
6. संग्रहित आकड़ो का विश्लेषण कीजिए व इन्हे अपनी पुस्तिका में नोट करें।
7. अंत में पहाड़ी ढलान के कई दृश्यचित्र खींचिए व रिपोर्ट तैयार कीजिए।

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[illegible] (YAMUNANAGAR)

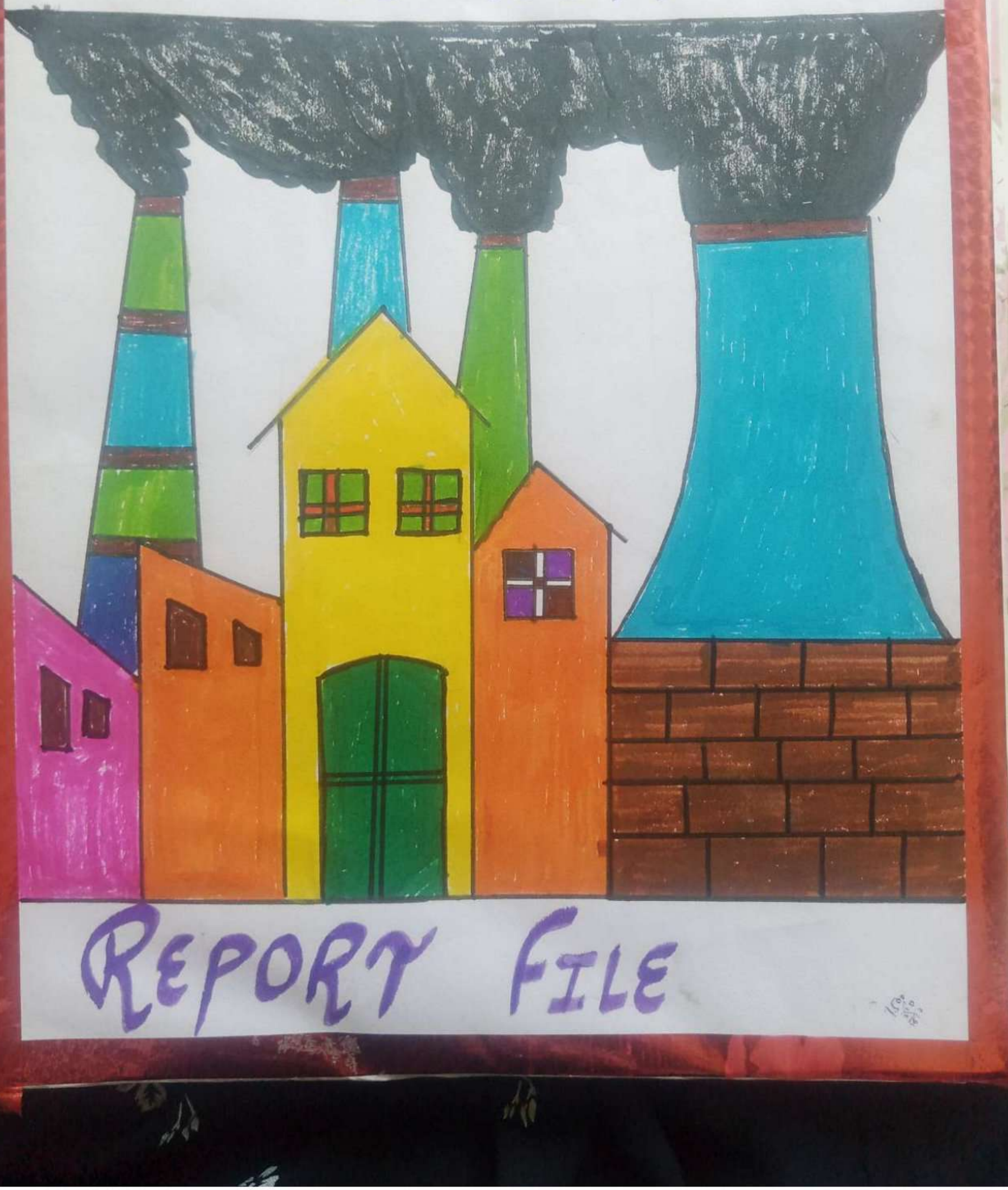
Teacher's Signature .....

Section-E

Botany Report File

Visit to sugar mill industary

POLLUTION



REPORT FILE

List of Practicals

A. Physiology/Biochemistry

1. Demonstration of Imbibition by plaster of Paris method.
2. Demonstration of Osmosis by potato osmoscope method.
3. Demonstration of Plasmolysis and Deplasmolysis
4. To study the Structure of stomata (Dicot & Monocot)
5. To study the Osmotic pressure of onion scale/ Rhoeo leaf peel by plasmolytic method.
6. Comparison of Stomatal and Cuticular Transpiration by four leaf /Cobalt chloride method.
7. Demonstration of transpiration by Ganong's/ Farmer's potometer.
8. To separate of photosynthetic pigments by thin layer/paper chromatography.
9. Demonstration of Ascent of sap/Transpiration pull.
10. To study the rate of photosynthesis under varying CO_2 concentration using Wilmott's bubbler.
11. To study the effect of light intensity on oxygen evolution during photosynthesis using Wilmott's bubbler.
12. Demonstration of aerobic respiration.
13. Demonstration of anaerobic respiration.
14. To study the evolution of heat during respiration
15. Demonstration of Manometric determination of R. Q.
16. Demonstration of phototropism, geotropism and hydrotropism.
17. Determination of peroxidase activity.
18. Simple tests for the detection of Carbohydrates(Monosaccharides, Disaccharides and Starch); Proteins and Fats.

B. Ecology

1. Determination of pH of soil and water samples by using Universal Indicator.
2. Study of physical properties of soil-soil density, water holding capacity etc.
3. Study of community structure by quadrat / line transact method.
4. Determination of density, abundance and frequency of species by quadrat method.
5. Morphological and anatomical features of hydrophytes, xerophytes and parasites in relation to their habitats.
6. To prepare a report on local visit to an industry to identify the source and types of Pollutants.

B. Utilization of plants & Applied Botany

1. Study of plant parts / products from the point of view of economic importance (as per theory syllabus).
2. To prepare any one of the tissue culture medium.
3. To prepare the slants and Petri plates for plant tissue culture.
4. Study of techniques of sterilization, culturing and sub-culturing of cell, tissues and organs.
5. Demonstration of anther culture, protoplast isolation and culture using suitable models / charts / photographs etc.
6. Brief introduction to the components and working of the instruments (oven, autoclave, incubator, centrifuge, laminar air flow and spectrophotometer)

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B.Sc. IIIrd (Medical)

Paper-III Practicals : Plant physiology,
Biochemistry,
Biotechnology, Ecology, &
Economic Botany.

Int. Assessment-20
Max. Marks - 80
Time- 6 hrs. (Two Sessions)

1. Devise an experiment to demonstrate the physiological process (as per the list). Perform it and show it to the examiners. 15

2. Comment on the physiological/Biochemistry experiment (Specimen/ set-up / Model / Chart). 10

3. Test for carbohydrates / Proteins / Fats / Peroxidase activity. 4

4. Ecological experiment/Ecological Specimens A & B (as per the list) 8

5. Identify and Classify spots 1, 2, 3, and 4 from the point of view of economic importance and morphology of the plant part used. 16

6. Applied Botany experiment (as per the list). 6

7. Note Book, Collection and field report. 6 + 6 = 12

8. Viva-voce. 9

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Botany Report File (Session - 2021-22)

Submitted To

Komal Mam

Designer

Submitted By

Aastha

BSc Med III

094220003

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Certificate

This is to certify that 'Aastha Jindal' a student of BSC IInd 'Medical, Govt. College Chhachhrauli, has successfully completed the project report under my supervision

Signature

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Designer

SSM

सरस्वती शुगर मिल्स लिमिटेड

(डिस्टलरी यूनिट)

POLLUTION

File On

SUGAR

INDUSTRY

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INTRODUCTION

- The analysis of the present project report is divided into two parts.
- The first part deals with the various kinds of environmental pollution in sugar industry.
- Pollution may be of any kind and it is the by product of production process.
- A brief analysis of the growth of industry is essential to study the pollution control methods of an industry.
- This can be used to evaluate the contribution of the industry to the economic growth of a country
- So before passing on to the analysis of the impact of pollution abatement costs of the sugar factories.
- It is essential to know the various kinds of pollution in Sugar Industry.
- The second part briefly discusses the sources and characteristics of sugar effluents. minimal national standards for effluents in the Sugar industry.

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Various Kinds Of Pollutio
In Ty Sugar Industr
y.

Air Pollution :-

- The main source of air pollution from sugar industry is the bagasse fired boiler.
- The major pollutants are sulphur dioxide, nitrogen oxide and carbon monoxide.
- The level of emission depends on the type of boiler and operational practices.
- The opportunity for reducing pollution by proper control of operating conditions is enormous, at the same level.

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- Cane wash water

This is generated only if the cane is washed.

The suspended solid content of cane wash water is high. It may also contain considerable amounts of sugar.

- Mill House Effluent

Large amounts of water are used for cooling the bearings of Milling Machines. It also includes spillovers and floor washes.

- Filter Press Cloth wash water

The clothes of filter Press are washed.

Periodically to remove the Mud clogging in the Pores.

- Effluent from Evaporation

Cooling and condenser waters are the wastes from this section.

- Boiling House Effluent

Mostly generated by leakage from centrifuges and Periodical floor washings. This water has an extremely high BoD though small in volume.

- Spray Pond overflow

The cooling waters are recycled from the Pond.

However excess waters is let out as waste which Possess low BoD.

- Boiler House Effluent

Like other industries boilers blow down also contribute to effluent, but the volume is much less.

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Characteristics Of Sugar Industry

- The different components of water pollution from a sugar mill are :

° colour of wastewater ° bad odour ° PH value ° total dissolved solids, total suspended solids, BOD, COD total nitrogen, total phosphate and oil and grease.

- The immediate oxygen demand of sugar factory effluents cause rapid depletion of the dissolved oxygen of receiving streams resulting in the anaerobic conditions.

- This results in the release of foul odours and in the production of hydrogen sulfide which precipitates iron as black sulfide leading to unsightly appearance.

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Main Source Of ORGANIC Pollution

- The main source of organic pollution is generated from the water in evaporators and vaccum pumps.
- The washings of filter clothes after sludge clarification results concentration of suspended solids and BOD of the effluents.
- The most polluting fraction of effluents in the form of High BOD is from the leakages from pipes, pumps, evaporators, crystallizers and Periodic washing of floor.
- Apart from these high pollution load effluents are possible from the intermittent mature of blow off wastewater from boilers, and leakages and overflow of molasses storage tanks.

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General Pollution Parameters

rs,

1) PH VALUE :-

- It is the measure of the acidity of alkalinity of a substance based on the no. of Hydrogen ions in a lt of solution.

2) Bio-Chemical Oxygen Demand (BOD) :

- It refers to the amount of oxygen used for bio-chemical oxidation by a Unit volume of water at a given temperature and for a given time. This measure represents the degree of water pollution.
- The more organic mater the sample contains the more oxygen is used by its micro-organisms. If the BOD value of waste water is high, the degree of pollution is more.

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WATER POLLUTION

- Water Pollution May also be defined as a Natural (or) Induced change in the quality of water which renders it unstable (or) dangerous as regards, food human and animal health, Industry, agriculture, fishing (or) leisure Pursuits.

- Effluents Treatment Plant (ETP) Plays an important role in Protecting Environment. In this aspect, effluent treatment Plant is necessary.

Sources And Characteristics Of Waste Water in Sugar Industry

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3) Chemical Oxygen Demand [cod] :-

- This is another parameter of water pollution used to assess the strength of trade wastes of effluents.
- It is the weight of oxygen taken up by the organic matter in a sample of water, expressed as parts per million (PPM) of oxygen taken up from a solution of boiling potassium dichromate in two hours.

4) Total Suspended Solids :-

- These are the small particles of various solids distributed through the wastewater from the industry.

5) Total Dissolved Solids :-

→ These are the solids that are dissolved in water during the manufacturing process

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Environmental pollution from

Sugar Industry :-

- The worst effect of environmental Pollution is the development of obnoxious odour in the contaminated stream. The bad odour, if inhaled by humans and animals, is inflicting to serious health effect.
- The septic condition of contaminated water, seen in black colour due to precipitation of iron by hydrogen sulphide, Produces hydrogen sulphide gas which is bad for the surroundings.
- The high level of BOD in the untreated effluents results in depletion of oxygen content, Making water unfit for fish and other aquatic life. There is also loss of fertillity of the soil and Productivity of lands due to the direct outlet of effluents.

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Conclusion

→ Effluents produced from sugar industry have adverse impact on ecosystem and environment.

→ In order to reduce pollution hazards, industry is implementing pollution abatement methods to improve economic and environmental performance of sugar processing unit.

References :-

- Industrial safety and pollution control handbook.

- Guide for treatment and disposal of effluents of sugar industry.

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THANK

YOU