Sangam®

ZOOLOGY

PRACTICAL NOTEBOOK

Name _____

Class _____ Sub. _____

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Laboratory Certificae

This is to certify that Smt./Sri _____

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Name of the Candidate _____

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Examination Centre _____

Date of the Practical Examination _____

Sangam®

ZOOLOGY

Practical NoteBook

NAME Dinesh Shrestha

CLASS 11 SEC. Germanium

SUBJECT Zoology

SCHOOL Sushma Godawari

TESTING SOLUTIONS AND STAINS YOU CAN MAKE

1. **Normal saline or salt solution** - (For nonchordates and frog). 7 gram sodium chloride dissolve in 1 litre (1000 c.c) distilled water.
2. **Fehling's solution** - (For simple sugar test) Two types of solutions.

   (a) 35 gram copper sulphate dissolve in 500 c. c distilled water.

   (b) 125 gram potassium hydroxide (KOH) in 173 gram potassium or sodium tartarate dissolve in 500 c.c. distilled water.
3. **Millon's reagant** - (For protein test), Dissolve 100 gram mercury in 200 c.c. nitric acid (specific gravity 1.42). Add 200 c.c. water in the solution.
4. **Scharlach-R** - (For fat test). Mix 500 c.c. acetone in 50 c.c. alcohol (70%) add scharlach-R upto saturation.
5. **Leishman stain** - (For blood corpuscles). Dissolve 1 gram leishman stain (powder) in 250 ml. water and keep for one or two days a maturation.
6. **Borax carmine** - For tissues of frog and bulk staining). Borex 4.0 grams, carmine 1.0 gram distilled water 100 cc.

   Procedure-Dissolve the borax and carmine in water and boil and cool Mix 70% alcohol. Filter the solution and keep in the bottle.
7. **Eosin** - (For animal tissue), Eosin powder is available in the market. Normally 1% eosin is used. Dissolve 1.0 gram eosin in 100 c.c. water or 90% alcohol.
8. **Formaline** - (For Preservation of Animals and their parts). Formaldehyde is available in market which is 40% Solution of Formaldehyde gas in water. Normally 10% Formaline is used Mix 10 c.c. Formaldehyde in 90% distilled water.

PREPARE THE SKELETON OF FROG YOURSELF

Boil the freshly chloroformed from in water containing 5 to 8 tablets of potassium hydroxide (KOH). Tease and separate the muscles with the help of forceps and scalpels. Keep bones in dilute bleaching powder solution for 5 munutes to whitening or keep the bones in hydrogen peroxide (H_2O_2) solution which bleaches and protects the bones from fungus and harmful bacteria. Dry the bones in sun and arrange them in a box in natural order.

SOME HISTOLOGICAL PREPARATIONS

1. **Ciliated epithelium of frog** - Scrape the roof of buccal cavity of frog with scalpel. Transfer the scraping on to the slide. Stain with methylene blue and mount in glycerine.
2. **Squamous epithelium of frog** - Scrape the outer surface of skin of freshly killed frog. Put the scraping on the slide. Stain with haema toxylin for 2 minutes, wash with waters and mount in glycerine.
3. **Striped muscles fibres of frog** - Take a piece of thigh muscles of freshly killed frog. Tease the piece in saline water to separate thin fibres. Stain 5 to 10 thin fibres with eosin for 5 to 8 minutes. Wash with water and mount in glycerine.
4. **Unstriped muscles fibres of frog** - Take a small piece of urinary bladder of freshly killed frog. Tease the piece with the help of two needles to separate' thin fibres. Take 5 to 10 thin fibres. Stain with eosin, wash with water and mount in glycerine.
5. **Blood film of frog** - Dissect the freshly chloroformed frog and puncture the heart. Take two clean glass slides one in each hand. Dip one end of the slide of your right hand in blood and draw it at an angle of 60^0 to the other end of left hand side. Thus blood film is prepared. Dry the blood film for 10 to 15 seconds. Stain with Leishman's stain.

6. **Cartilage of frog** - Take a small piece of xiphisternum of the pectoral girdle or hyoid of frog. Keep the piece in any pith and cut a transverse section with a razor blade. Take 4 to 5 sections, stain with haemotozin, wash with tap water and mount in glycerine.

WHOLE MOUNTS

1. **Septal nephredium of earthworm** - Septal nephredia are attached to intersegmental septa from 14th to last segment. Take a piece of septum belonging to the segment 14th to Last Stain the piece with eosin for 5 to 18 minutes. Wash with water. Tease the septum to separate 4 or 5 nephredia, mount in glycerine.
2. **Setae of earthworm** - Take a piece of body wall of earthworm. Boil in 40% potassium hydroxide (KOH) solution. Boil once only. Allow the skin to stand in hot (KOH) solution till the solution cools down. Wash the skin water and mount in glycerine.
3. **Ovaries of earthworm** - Ovaries are attached to the septum 12/13 Dissect the earthworm and take out both ovaries. Stain with borax carmine, wash, with water and mount in glycerine.
4. **Spermatheca of earthworm** - Take out a spermatheca from any segments - 6, 7, 8 and 9th. Stain with borax carmine, wash with water and mount in glycerine.
5. **Brain-ring with nerve cord** - Take out brain- ring with a small piece of nerve cord, stain with borax carmine for 5 to 8 minutes, wash with water and mount in glycerine.
6. **Mouth parts of cockroach** - Take out 7 mouth parts of cockroach with the help of forceps. Boil once in 40% KOH solution, wash out KOH in tap water. Arrange them in natural order and mount in glycerine with the help of glass fragments (skeletal materials are usually not stained).
7. **Salivary glands of cockroach** - Take out salivary glands, stain with borax carmine - 10 - 15 minutes, wash with water and mount in glycerine.
8. **Trachea of cockroach** - Take out trachea from the neck region, mount in glycerine.

HINTS FOR DISSECTION

1. All invertebrates are dissected from dorsal and vertebrates from ventral side.
2. The animal for dissection must be laid flat in the tray and should be submerged in water.
3. Use forceps and needles for dissecting blood vessels and nerves, use of the scissors must be the least.
4. Never hold the blood vessel or the nerve you are tracing by means of the forceps. Clean the tissues lying over on the sides of the thing you are tracing.
5. Always trace the origin as well as the distribution of blood vessels and nerves.
6. Do not cut out or disrupt other systems while dissecting one system.
7. Keep a rough pencil sketch before you set out for dissection.
8. Veins are dissected best in chloroformed animals.
9. Insects are not dissected in pre served state.
10. For nerves, the animal should be well are served in formaline for about 10 weeks.

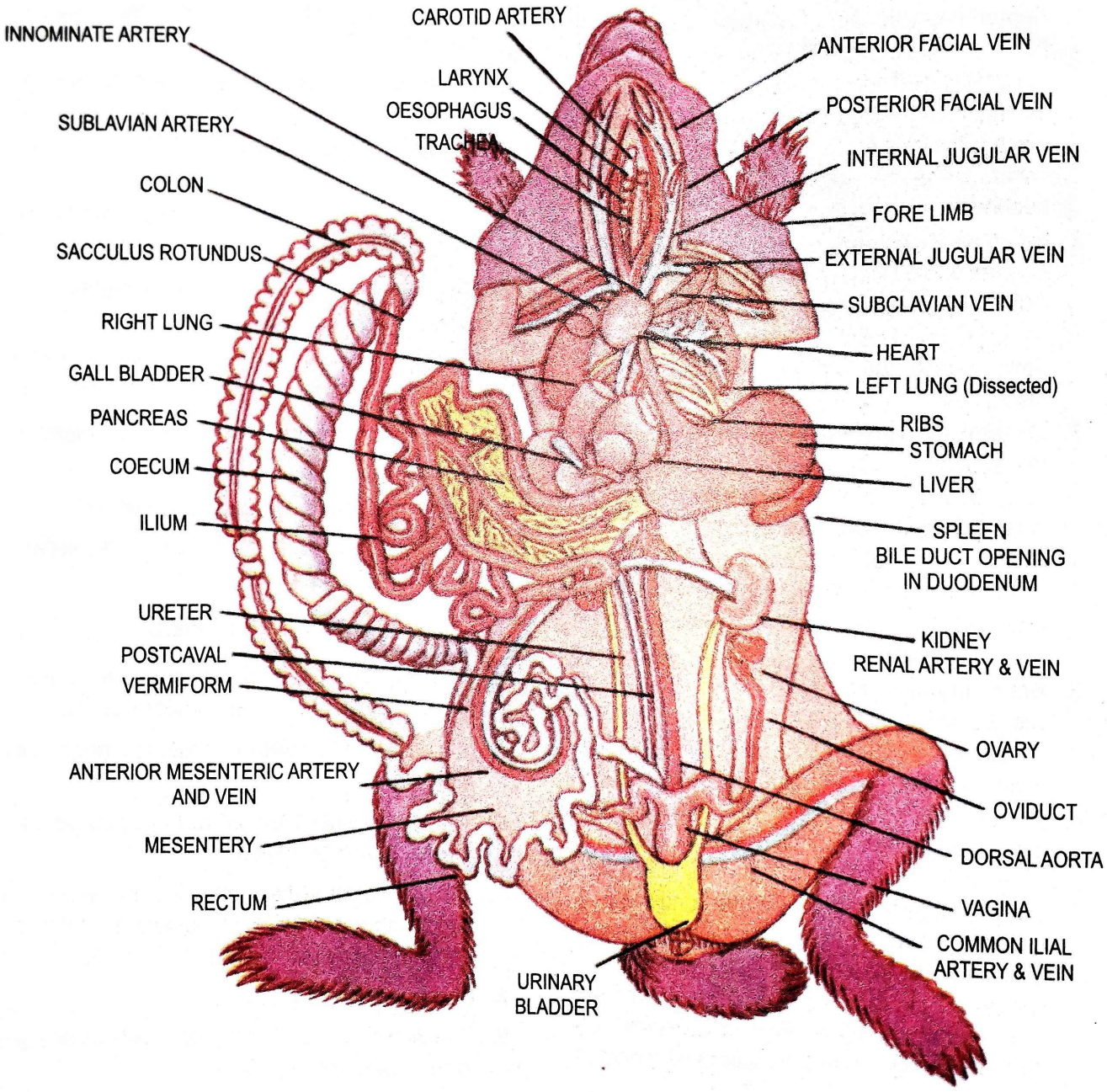
YOUR SKETCHES

Sketches of the practical work done are the most important part of the work. One should remember:

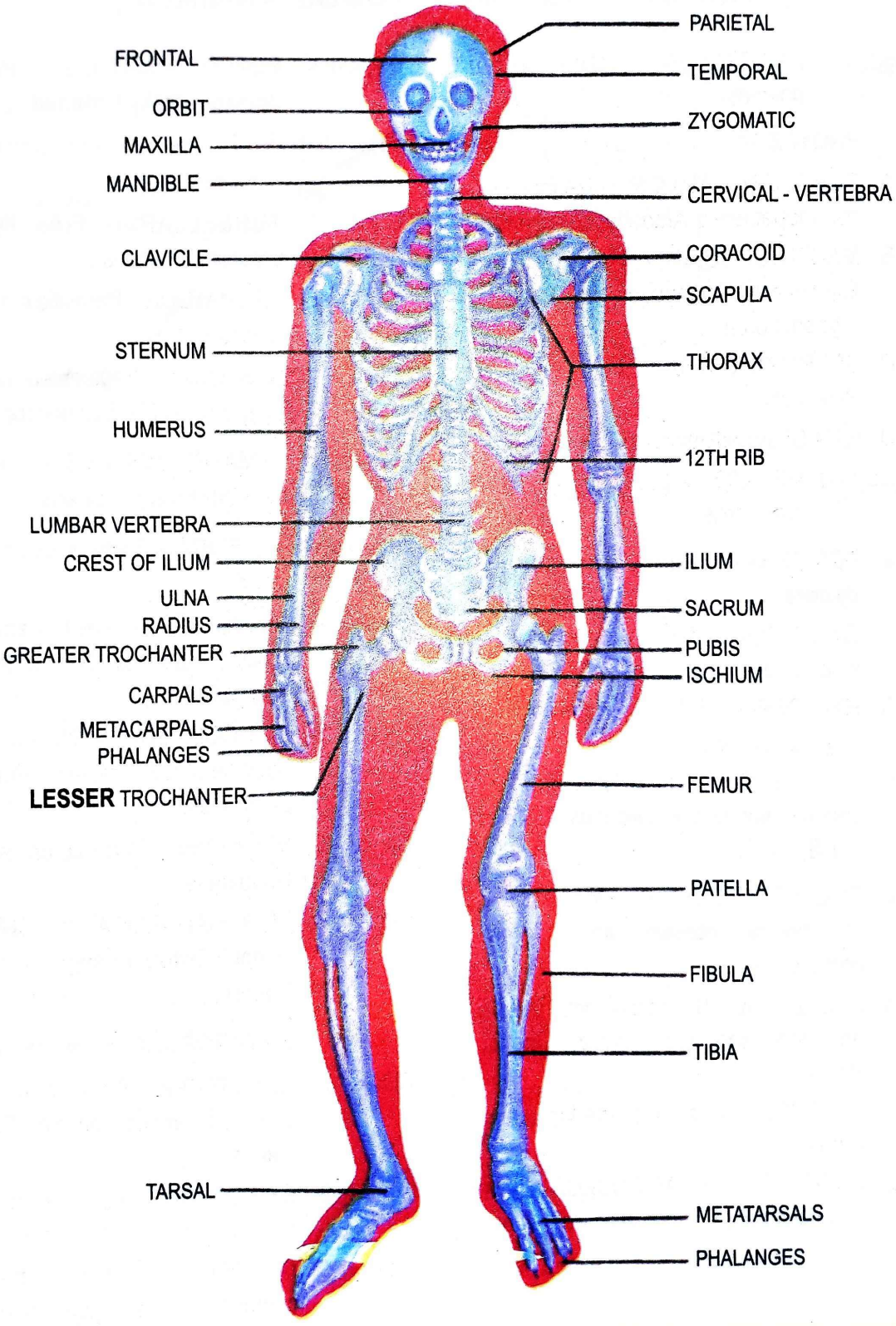
1. Sketches must be drawn on the right hand side page only.
2. Do not use either too hard or too soft a pencil- always use a H or HB pencil.
3. Always draw large diagrams. It is easier to sketch large diagrams to adjust proportions and there is enough space avail able for labelling also.
4. Do not write or draw hard.
5. Draw line diagrams, do not shade. If at all shading is necessary use only dots.
6. Label in straight lines on both sides of the sketch.
7. Label lines should not cross or touch each other.

RABBIT DISSECTION

(FEMALE)



SKELETON



ANIMAL KINGDOM (KINGDOM ANIMALIA)

Sub-Kingdom A PROTOZOA - (One celled animals)

Phylum 1. PROTOZOA -

Class A SARCODINA - Move and take food with pseudopodia e.g. Amoeba, Entamoeba.

Class B MASTIGOPHORA - Have whiplike flagellum for locomotion e.g. Euglena, Trypanosoma.

Class C SPYROZOA Spore producing e.g. Plasmodium.

Class D ILITA Body is ciliated e.g. Paramecium.

Sub Kingdom B METAZOA - (Body composed of many cells)

Phylum 2. PORIFERA - Body is perforated by pores.

Class A CALCIPONGIAE - Calcarecous spicules e.g. Leucosolenia, Sycon.

Class B HYALOSPONGIAE - Siliceous spicules e. g. Euplectella.

Class C DEMOSPONGIAE - Skeleton of spongin fibres and siliceous spicules e.g. Spongilla.

Phylum 3. COLENTRATE or CNIDARIA Body is like hollow intestine and bearing nematocyst.

Class A HYDROZOA - They have both polyps and medusae e.g. Hydra, Obelia, Physalia.

Class B SCZPHOZOA - have only medusae e.g. Aurelia.

Class C ANTHOZOA OR ACTINOZOA Have only polyps e.g:, Madrepora, Metriaium.

Phylum 4. PLATYHELMINTHES - Helminthes dorsoventrally flattened.

TYHELMINTHES - Helmin thes dorsoventrally flattened.

Class A TURBELLARIA- Free living e.g. Dugesia. (Planaria).

Class B TREMATODA - Parasitic.e.g. Fasciola, Schistosoma.

Class C CESTODA - Segmented ribbon like body e.g. Taenia, Echinococcus.

Phylum 5. NEMATHELMINTHES - Thread like helminthes e.g., Ascaris.

Phylum 6. ANNELIDA - Body is segmented by rings.

Class A POLYCHAETA - Legs (Parapodia) bear many Setae e.g. Nereis (Neanthes) Aphrodire.

Class B OLIGOCHAETA - With few setae on body e.g., Pheretima, Eutyphoeus, Lumbricus.

Class C HIRUDINEA - Parasitic an nelides e.g. Hirudinaria.

Class D. ARECHIANNELIDA or ECHIURIDA - without external segmentation e.g., Bonellia.

Phylum 7 ARTHROPODA - Have jointed legs.

Class A CRUSTACEA.- Body is covered by crust-like exoskeleton e.g., Palaemon, Cancer.

Class B CHILOPODA - Legs one pair in each body segment e.g., Scolopendra. ,

Class C DIPLOPODA - Legs two pairs in each segment e. g" Thyroglutus (Millepede).

Class D INSECTA - Body divided into head throax and abdomen e.g., Musca, Periplanata, Culex, Vespa etc.

Class E XIPHOSURIDA - Aquatic, respiration by gills e.g., Xiphosura (King crab).

Class F ARCHANIDA - Head and thorax fused to form prosoma or cephalo thorax e.g., Palamnaeus.

Phylum 8. MOLLUSCA - Soft bodied animals.

Class A PELECYPODA - Shell is bivalve e.g., Lamellidens, Unio.

Class B GASTROPODA - Stomach is in foot e.g., Pila

Class C CEPHALOPODA - The foot is wraped around head e.g., Octopus, Sepia, Loligo.

Class D AMPHINEURA - Two nerves running down the body e.g., Chiton.

Phylum 9. ECHINODERMATA - Animal bearing spines on their skin.

Class A ASTEROIDEA - Body flattened and star shaped e.g., Asterias Pentaceros.

Class B OPHIUROIDEA - Moving arms look like snakes e.g., Opniothrix.

Class C ECHINOIDEA - Body is globular or disc like e.g., Echinus.

Class D HOLOTHUSOIDEA - Elongated cylindrical body with mouth and anus at apposite ends e. g., Holothuria.

Class E CRINOIDEA - Body is cup or lily like e.g., Antedon.

Phylum 10 CHORDATA - Dorsally situated notochord.

Sub-phylum A HEMICHORDATA - Notochord is present in only anterior half of the body called Stomachord e.g., Saccoglossus.

Sub-phylum B UROCHORDATA - Larvae have notochord in the tail e.g., Herdmonia.

Sub-phylum C CEPHALOCHORDATA-Notochord extends forward into the head e.g., Branchiostoma.

Sub-phylum D VERTEBRATA - Notochord is changed into vertebra.

Class 1. COLOSTOMATA - They have circular mouth e.g., Petromyzon.

Class 2 CHONDRICHTHYES - Cartilaginous skeleton e.g., Scolio don, Torpeda, Trygon.

Class 3 OSTEICHTHYES - Bony Skeleton e.g., Labeo, Hippocampus, Anabas.

Class 4 AMPHIBIA - Animals living both in water and on land.

Order A CAUDATA- Tailed amphibia e.g., Salamandra.

Order B ANURA - Tailless amphibia e.g., Rana, Bufo.

Order C APODA - Limbless amphibia e.g., Ichthyophis.

Class 5 REPTILIA - Terrestrial having rough dry skin covered with horny epidermal scales e.g., Cholonia, Uroma, Stix, Hemidabtylus.

Class 6 AVES - Forelimbs changed into wing e.g., Columba.

Class 7 MAMMALIA - Young ones are nourished by mammary-glands e.g., Homo, Macropus, Pteropus.

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2077/11/25

Date: 2077/09/14

EXPERIMENT NO: 1

NAME OF EXPERIMENT: TO STUDY THE MUSEUM SPECIMEN

Paramecium caudatum
Plasmodium vivax

COMMENTS ON PARAMECIUM

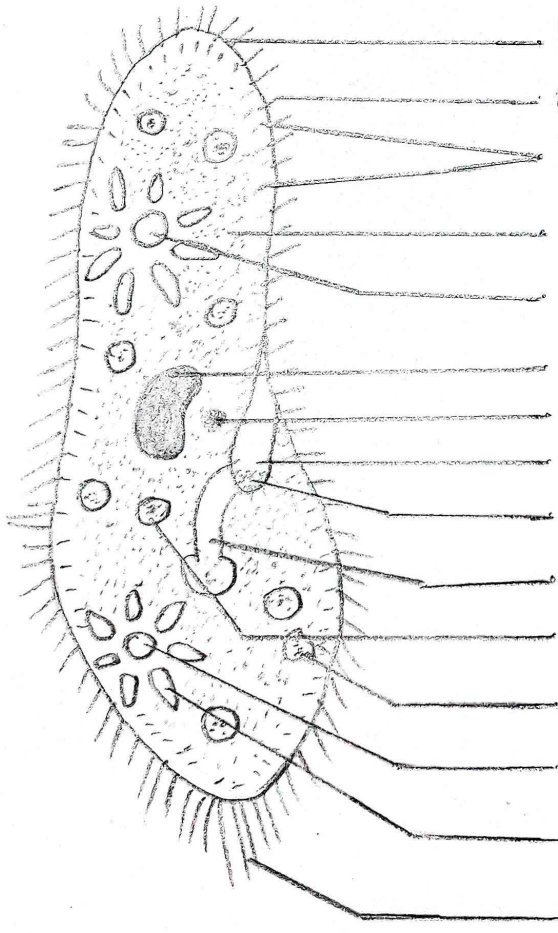
1. Paramecium caudatum ~~fig. (a)~~ is a unicellular microscopic organism found in fresh water pools, ditches, rivers, lakes, canal, ponds rich in decayed organic materials.
2. The organism looks like the sole of a slipper or shoe, hence it is commonly called slipper animalcule.
3. Body is covered by a double-layered thin pellicle.
4. Locomotion is performed by means of lashing movement of cilia.
5. Nutrition is holozoic.
6. Presence of mega-nucleus and micronucleus for different functions.
7. Asexual reproduction by transverse fission and sexual reproduction by conjugation, autogamy, hemixis, cytogamy, etc.

TO STUDY THE MUSEUM SPECIMEN

Role No. 11
Date : 2077/09/14

Classification

Phylum – Protozoa
Class – Ciliata
Genus – Paramecium
Species – caudatum



2077/09/21

fig. Paramecium caudatum

COMMENTS ON SIGNET RING STAGE IN PLASMODIUM

1. Signet ring stage ~~(fig. b)~~ is seen during erythrocytic schizogony. It begins when the red blood corpuscles are attacked by merozoites.
2. In red blood corpuscles, merozoites ~~taken~~ a form of disc-shaped structure with a single large nucleus.
3. This stage is called trophozoite stage which grows at the expense of haemoglobin of blood.
4. A vacuole appears soon in trophozoite stage. As the vacuole increases in size gradually, the nucleus is pushed towards the periphery.
5. The trophozoite having a large vacuole and a characteristic nucleus at the periphery is called signet-ring stage.
6. Usually a solitary ring ~~stage~~ is present inside the same corpuscles.

TO STUDY MUSEUM SPECIMEN

Role No. : 11
Date : 2077/09/14

Classification

Phylum – Protozoa
Class – Sporozoa
Genus – Plasmodium
Species – vivax

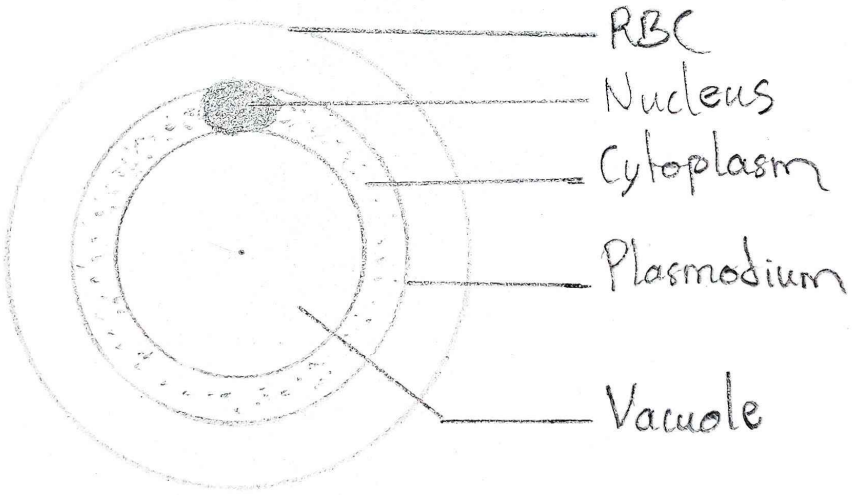


fig. Signet ring stage of Plasmodium vivax

Ragun
2077/09/21

COMMENTS ON SYCON

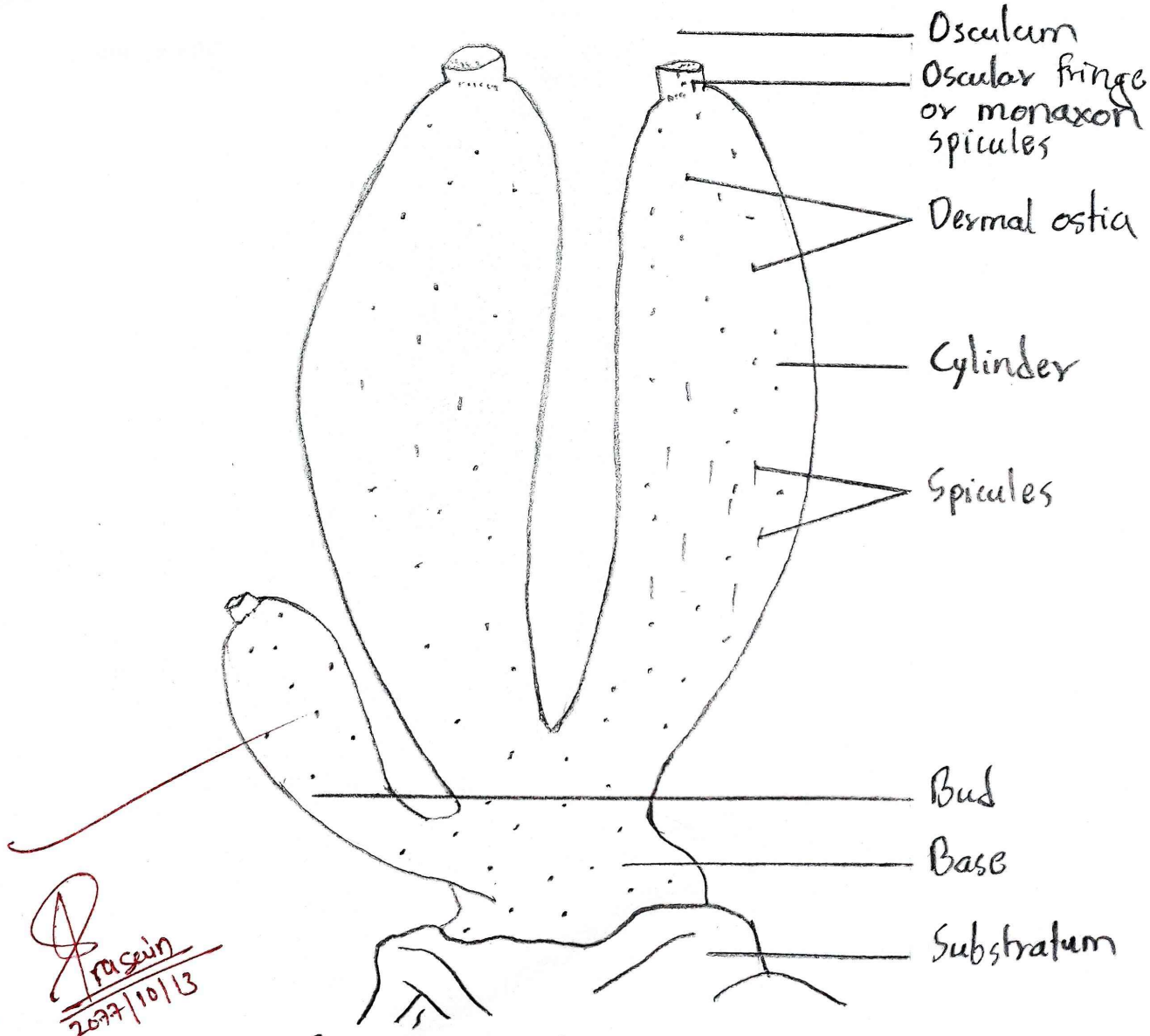
1. Sycon is commonly known as Sponge.
2. It is marine sponge found attached to the rocks or substratum.
3. It is a common solitary or colonial form.
4. Body is vase-shaped perforated by numerous pores called ostia.
5. Body cavity is spongocoel which bulges in the middle and opens to the exterior by an osculum.
6. Skeleton consists of calcarious spicules.
7. Life process is regulated by canal system which is syconoid types.
8. Reproduces asexually with great power of regeneration.

TO STUDY THE MUSEUM SPECIMEN

Role No. : 11
Date : 2077/09/28

Classification

Kingdom	—	Animalia
Phylum	—	Porifera
Class	—	Calcarea
Genus	—	Sycon



Prasun
2077/10/13

fig. Sycon Sp.

COMMENTS ON HYDRA

1. Hydra is a fresh water solitary coelenterate found attached to the leaves of aquatic algae.
2. The body is elongated, radially symmetrical and tissue level of organisation.
3. Body wall is diploblastic, consists of an outer ectoderm and inner endoderm, separated by non-cellular gelatinous mesoglea.
4. Mouth is situated on the conical hypostome at free distal end.
5. Anus is absent and the proximal end of the body is known as basal disc or foot used for attachement.
6. Locomotary organs are 6-10, hollow, slender, finger like projections called tentacles situated around the hypostome.
7. Tentacles are provided with nematocysts modified for capturing the prey like insects, worms, etc.
8. Reproduces asexually by budding or regeneration and sexually by the fusion of gametes.

TO STUDY THE MUSEUM SPECIMEN

Role No. : 1L
Date : 2077/09/28

Classification

Kingdom	– Animalia
Phylum	– Coelenterata
Class	– Hydrozoa
Genus	– Hydra
species	– vulgaris

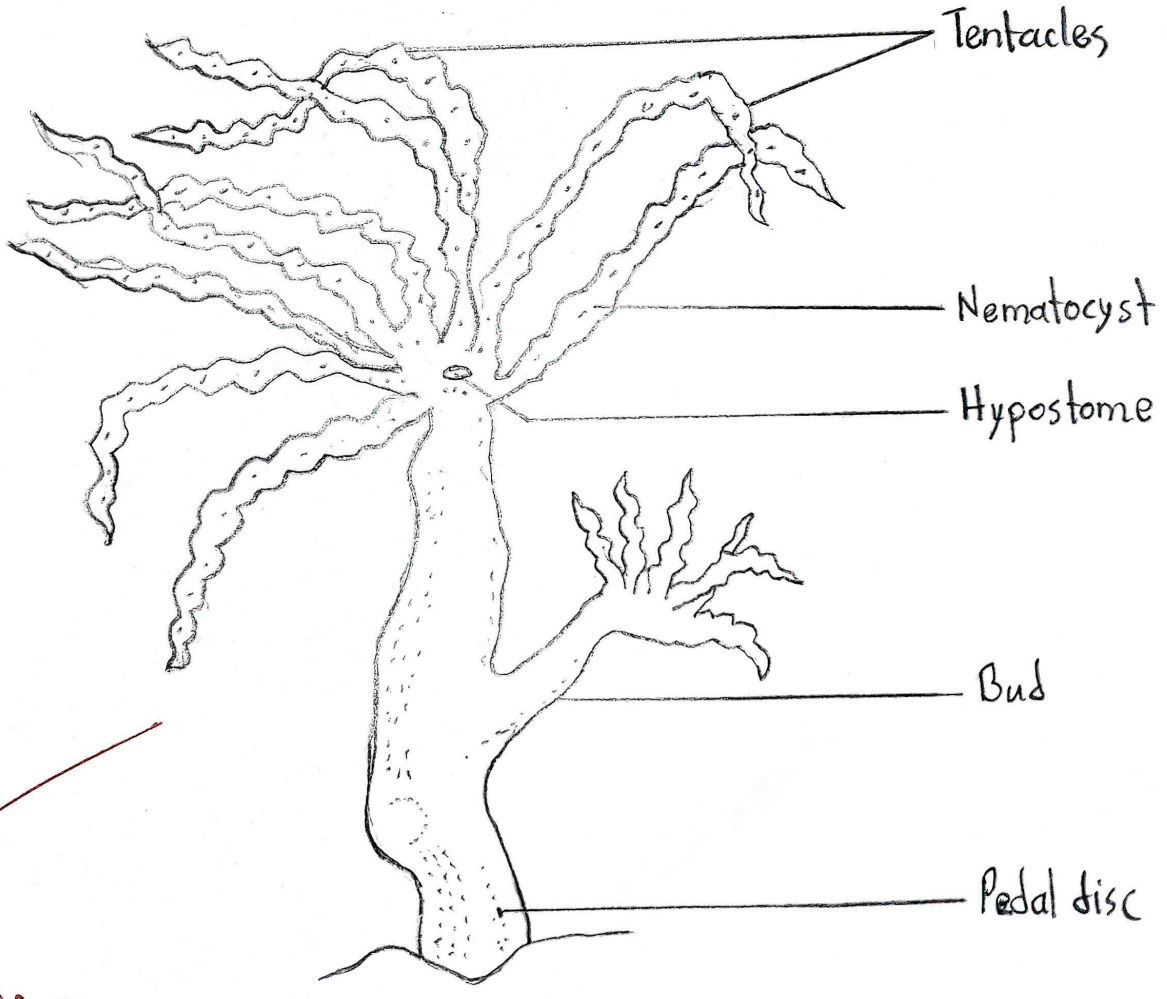


Fig. Hydra vulgaris

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A QUALITY PRODUCT

COMMENTS ON TAPEWORM

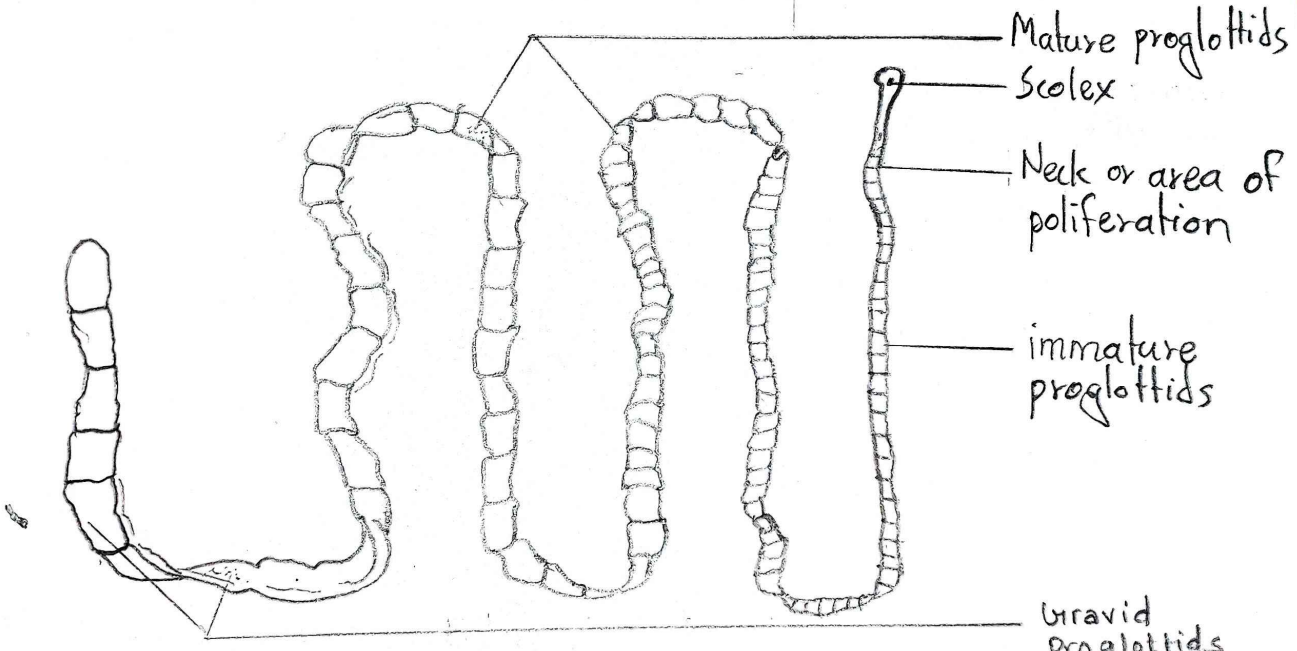
1. It is an endoparasite found in the intestine of man and commonly called Tapeworm.
2. Man is the primary host and pig is the secondary host.
3. Has no digestive sac of its own, absorbs nutrients through the body surface. while in the intestine of the host.
4. Body is long, elongated, dorsoventrally flattened and ribbon like up to 4 metres in length.
5. Body consists of head (scolex), neck and body segments (strobila)
6. Scolex bears four suckers and a rostellum which has about 28-32 chitinous hooks arranged in two rows.
7. Strobila is divided into about 800 segments as immature and mature glottids.
8. Body is hermaphrodite, contains a set of male and female reproductive organs with a pair of excretory and nervous system and a lateral genital opening in each segment.
9. Reproduces asexually as well as sexually and has great power of regeneration.

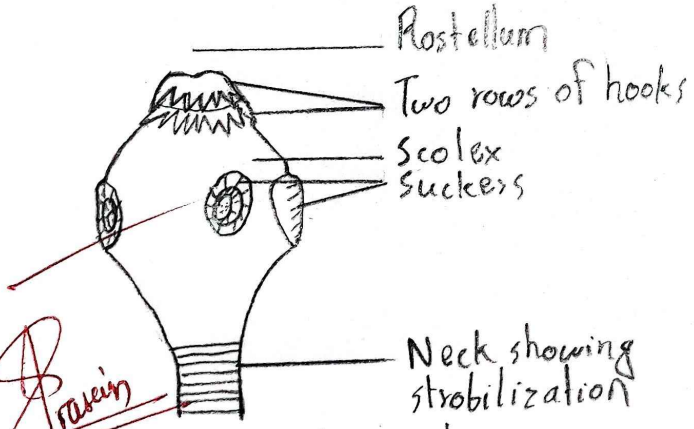
TO STUDY THE MUSEUM SPECIMEN

Role No : 11
Date : 2077/09/28

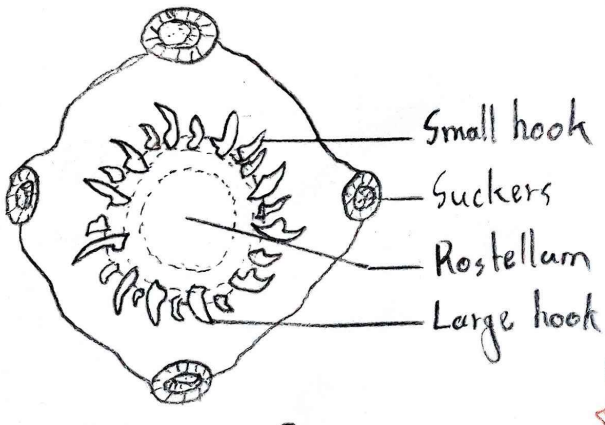
Classification

Kingdom	–	Animalia
Phylum	–	Platyhelminthes
Class	–	Cestoda
Genus	–	Taenia
Species	–	solium





Scolex and neck in side view



Scolex in en-face view

Fig. Taenia solium

COMMENTS ON ROUND WORM

1. It is an endoparasite found in the small intestine of man and commonly called round worm.
2. Unsegmented body is rounds, tube like or wormlike.
3. Triploblastic having three germ layers and body cavity is a pseudocoel.
4. Bilaterally symmetrical, elongated worms pointed at both ends.
5. Alimentary canal is complete with well developed mouth and anus.
6. Body wall is covered by a tough cuticle.
7. Excretory system consists of protone-phridia and canals to remove the wastes from the body.
8. Exhibits distinct sexual dimorphism i.e. sexes are separate. Male bears penial setae with cloacal ~~app~~ aperture.

TO STUDY THE MUSEUM SPECIMEN

Role No : 11
Date : 2077/09/28

Classification

Kingdom	–	Animalia
Phylum	–	Nemathelminthes
Class	–	Nematoda
Genus	–	Ascaries
Species	–	lumbricoides

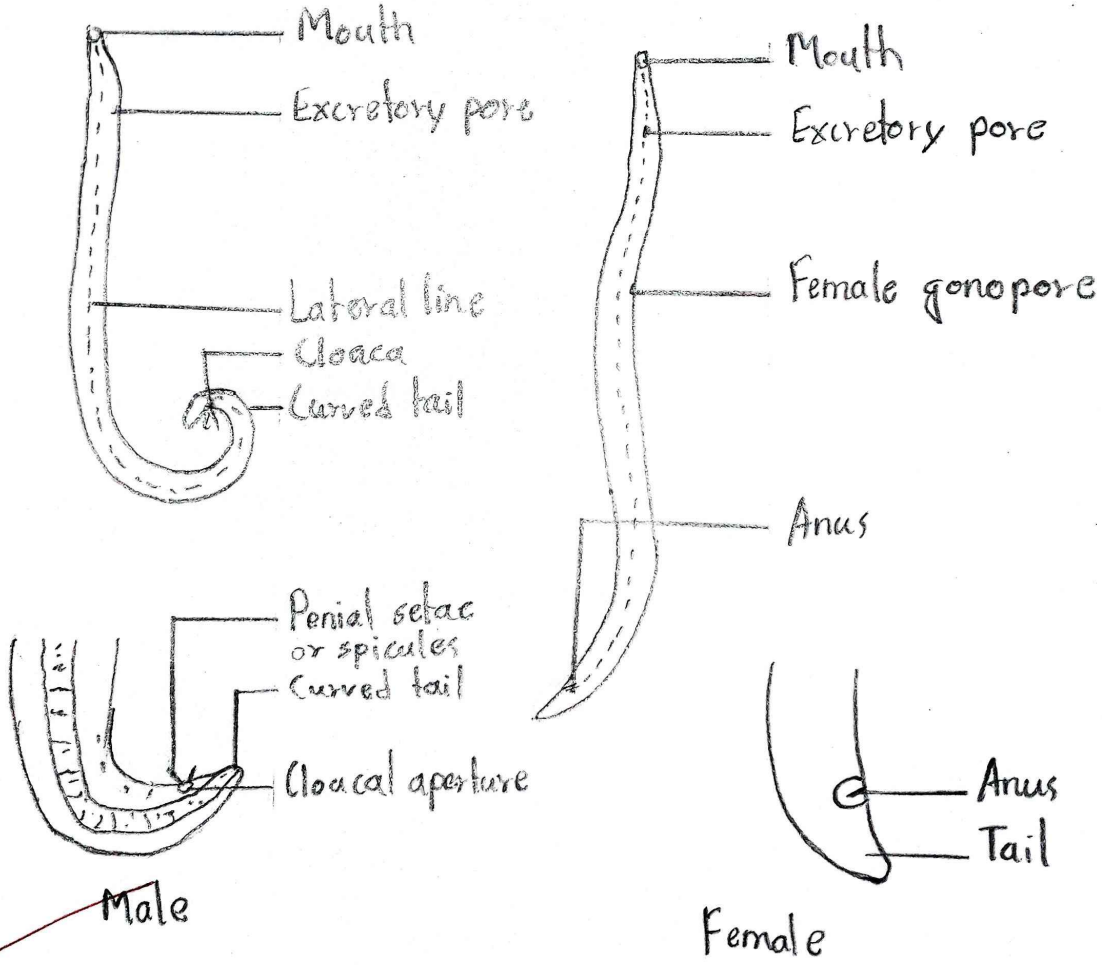


fig:- Ascaris lumbricoides

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COMMENTS ON EARTHWORM

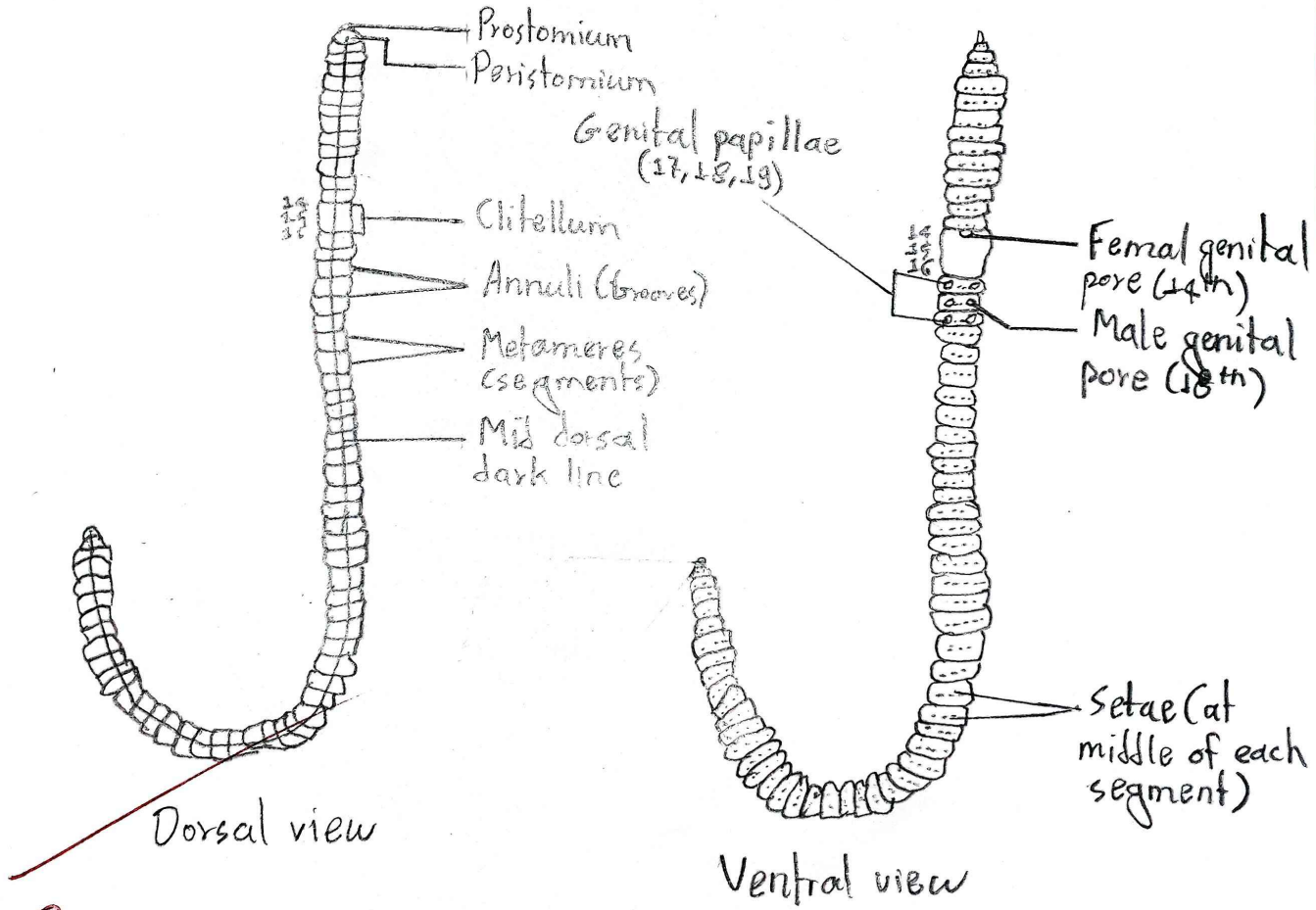
1. Pheretima is triploblastic, bilaterally symmetrical metamerically segmented body found in the moist soil and commonly called Earthworm.
2. Mouth is crescentric aperture situated at the anterior end ventral to the prostomium and anus lies at the posterior most end of the body.
3. There is a circular band of glandular tissue present in 14th, 15th and 16th segment called clitellum.
4. Locomotion is carried by setae embedded in the setal sac in each segment except first, clitellar and last segment.
5. Body is covered by a transparent non chitinous cuticle sec-rected by ectoderm.
6. Coelom is well developed and have coelomic fluid for turgidity.
7. Body is hermaphrodite i.e. a pair of male genital pore is situated ventrally in the 18th segment and female genital pore lies on the ventral surface in the 14th segment.

TO STUDY MUSEUM SPECIMEN

Role No. : 11
Date : 2077/09/28

Classification

Kingdom	–	Animalia
Phylum	–	Annelida
Class	–	Oligochaeta
Genus	–	Pheretima
Species	–	posthuma



Prakash
2077/10/20

Fig. Pheretima posthuma

COMMENTS ON LEECH

1. Hirudinaria granulosa is commonly called cattle leech.
2. Body is dorsoventrally flattened and elongated.
3. Body segment number is definite i.e. 33.
4. Well developed anterior and posterior suckers present.
5. Five pairs of eyes are present on the first five segments.
6. Alimentary canal is straight tube.
7. Seventeen pairs of segmentally arranged nephridia are on 6-22 segment.
8. Hermaphrodite
9. Sexual reproduction is common.

TO STUDY THE MUSEUM SPECIMEN

Role No. : 11
Date : 2077/10/27

Classification

Phylum	—	Annelida
Class	—	Hirudinea
Genus	—	Hirudinaria
Species	—	granulosa

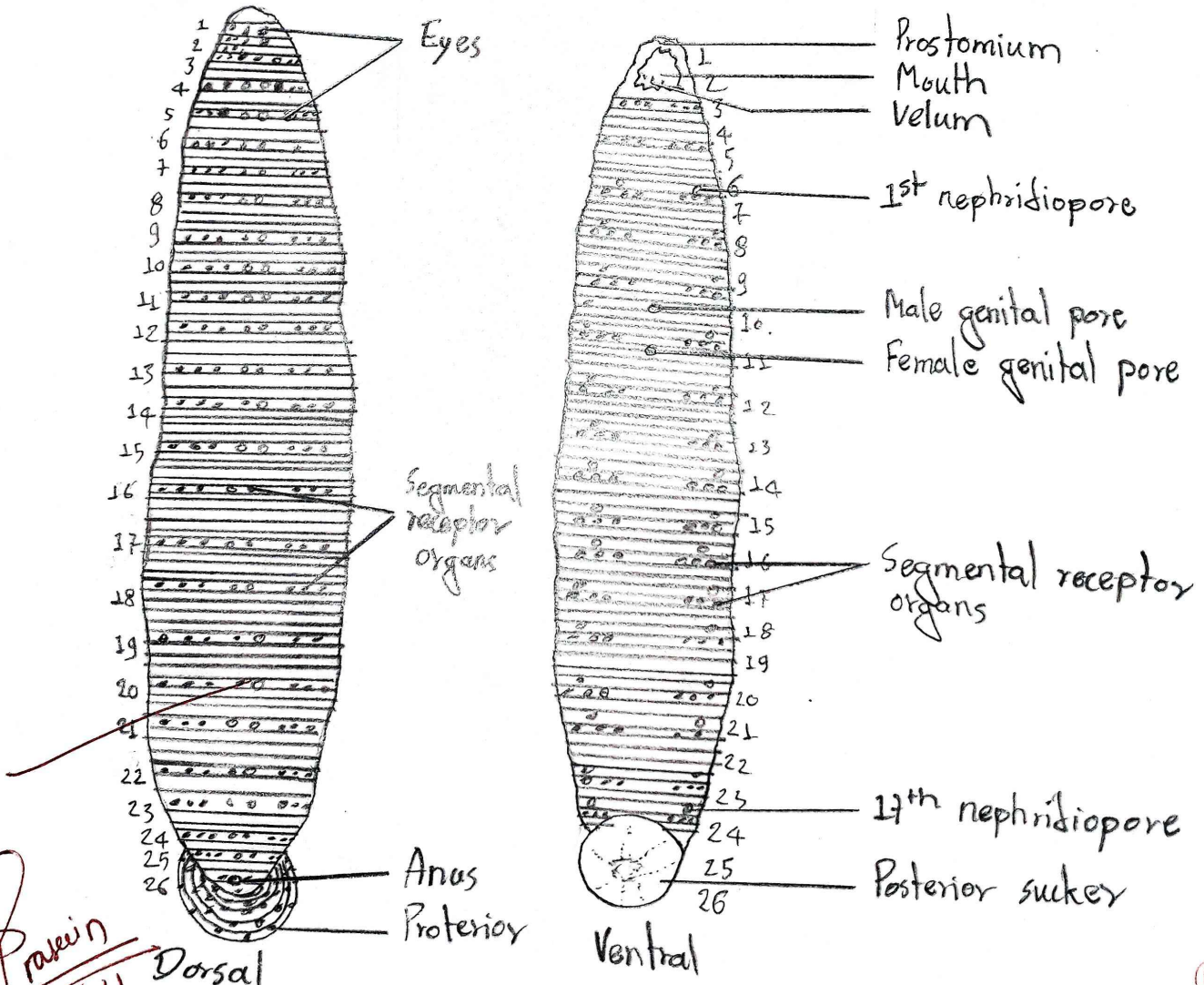


fig. Hirudinaria granulosa

2077/11/11

COMMENTS ON PRAWN

1. Macrobrachium rosenbergii is commonly known as prawn.
2. Body is divisible into cephalothorax and abdomen.
3. Bilaterally symmetrical, elongated spindle shaped.
4. Cephalothorax large, unsegmented and covered with carapace.
5. Cephalothorax prolongs into a saw-toothed rostrum, anteriorly.
6. Presence of stalked compound eyes.
7. Abdomen comprises moveable six segments and a terminal pointed piece, telson.
8. There are 19 pairs of appendages, each segment of the body bears a pair of jointed appendages.
9. Cephalic appendages include a pair of maxillae, a pair of antennae, a pair of antennules, a pair of maxillulae and a pair of mandibles.
10. Thoracic appendages comprise ~~three~~ five pairs of walking legs. and three pairs of maxillipedes.
11. Abdomen bears six pairs of biramous pleopods.
12. Species of macrobrachium are found in fresh water, ponds, rivers, lakes, reservoirs, stream but macrobrachium rosenbergii is found only in cultivated form in Nepal.

TO STUDY THE MUSEUM SPECIMEN

Role No. : 11
Date : 2077/10/27

Classification

Phylum	– Arthropoda
Subphylum	– Mandibulata
Class	– Crustacea
Genus	– Macrobrachium
Species	– rosenbergii

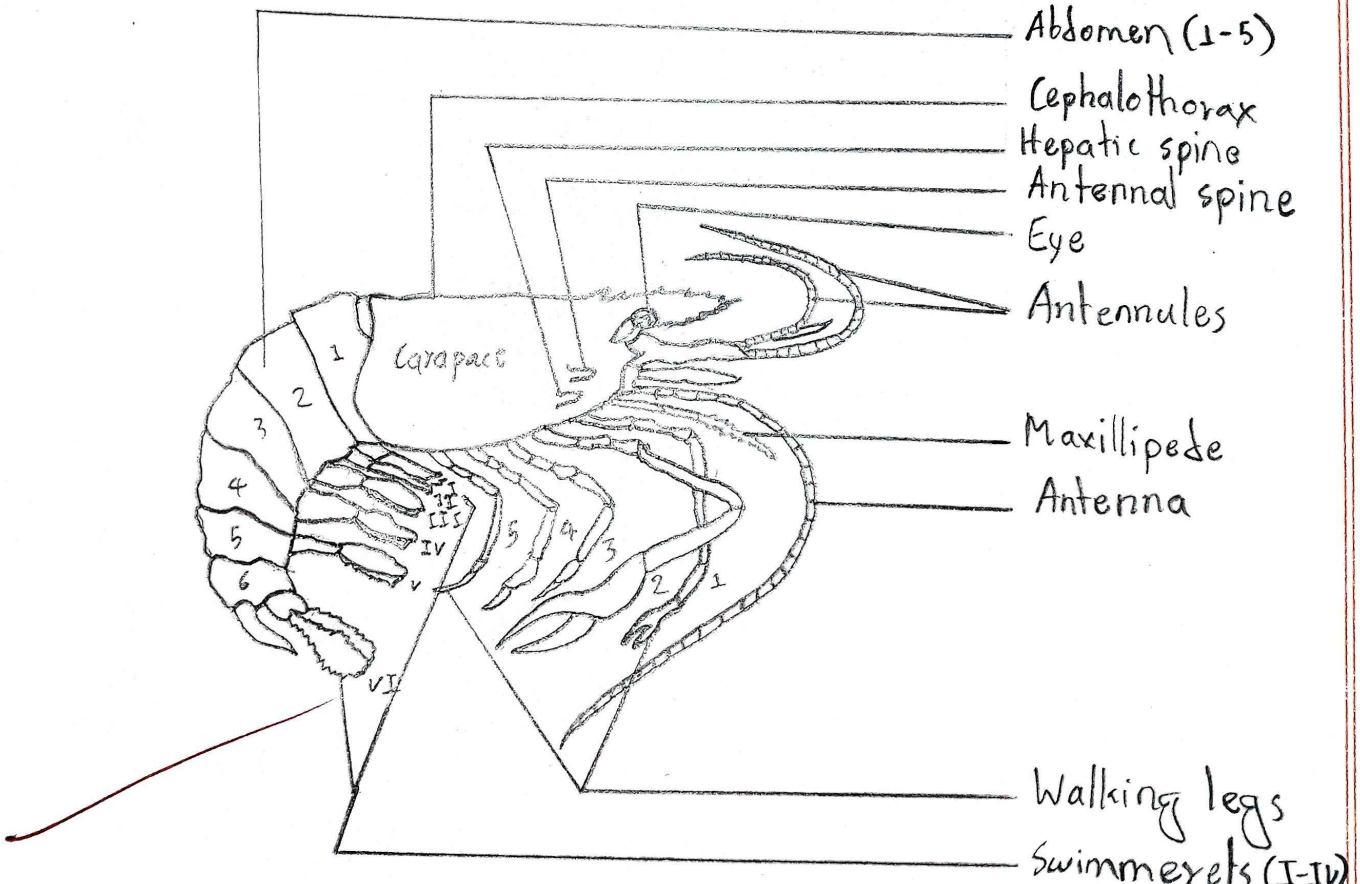


fig. Macrobrachium rosenbergii

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2077/11/11

COMMENTS ON MOTH

1. It is small sized slender body, measures 15 mm long. It is creamy-white or yellow in colour with hairy body.
2. The body is divided into three parts – head, thorax and abdomen.
3. It is small, bears a pair of compound eyes. The antennae are short and feathery.
4. Mouth parts consists of proboscis for sucking up the nectar of flower.
5. Thorax consists of three segments – prothorax, mesothorax and metathorax. Each thoracic segment bears a pair of legs.
6. Wings are two pairs, membranous and heavily covered with scales. Wings are marked by several faint or brown lines. At rest, these wings are held horizontally.
7. Abdomen is broad, segmented and hairy.
8. Respiration takes place by tracheal system (trachea, tracheoles and spiracles).
9. Circulatory system is open type consisting of perivisceral and pericardial sinuses. Blood vessels are absent.
10. Excretion takes place by malphigian tubules.
11. Sensory organs include antennae and compound eyes.
12. They are unisexual i.e. male and female sexes are separate. Fertilization is internal.
13. Metamorphosis is complete and the larva is called the caterpillar.

TO STUDY THE MUSEUM SPECIMEN

Role No : 11
Date : 2077/10/27

Classification

Kingdom	–	Animalia
Phylum	–	Arthropoda
Class	–	Insecta
Genus	–	Bombyx
Species	–	mori

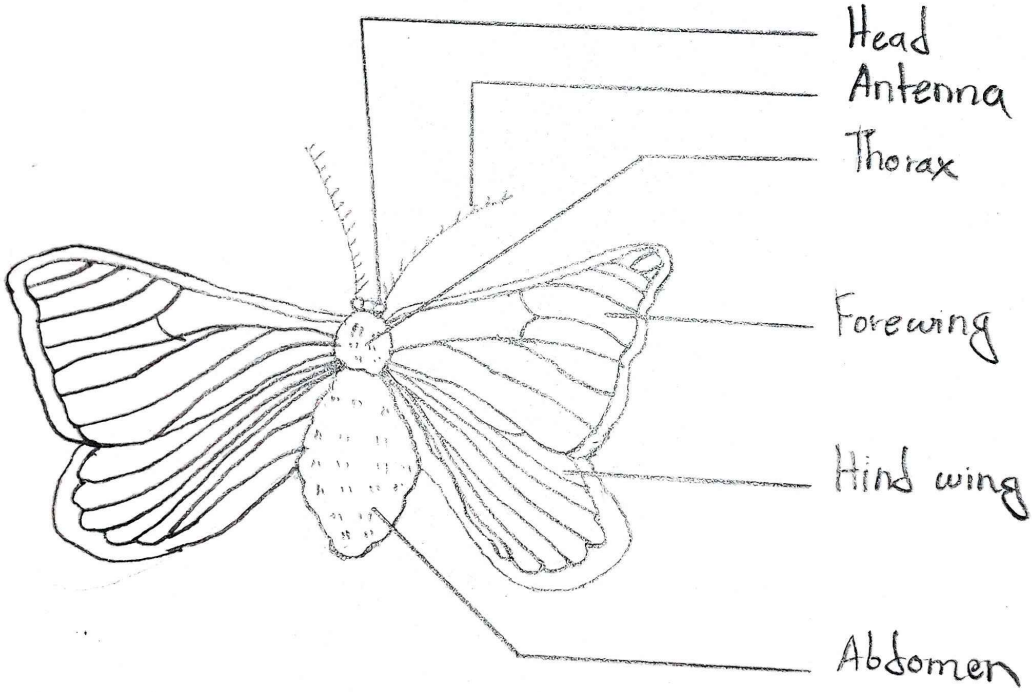


fig. Bombyx mori

2077/11/11

COMMENTS ON GARDEN SNAIL

1. Lissachatina fulica is commonly known as garden snail.
2. They prefer humid places.
3. Nocturnal, spend day time under the logs, stones, bricks, even on the vegetation.
4. They climb vertical walls, trees upto the height of about 19 feet.
5. They aestivate during summer to avoid desiccation.
6. The head is comparatively long, bears two pairs of contractable tentacles. Larger tentacles bears eyes at ends.
7. Operculum is absent
8. Genital aperture is located at the right side posterior to the hed.
9. Digestive system comprises alimentary canal and digestive glands.
10. Respiration by pulmonary sac.
11. Sexes are united, hermaphrodite.
12. Herbivore, the worst pest of vegetables, flowers etc and the worlds worst invader.
13. It is an alien invasive species to Nepal. It is native to east Africa.

TO STUDY MUSEUM SPECIMEN

Role No. : 11
Date : 2077/10/27

Classification

Kingdom	–	Animalia
Phylum	–	Mollusca
Class	–	Gastropoda
Genus	–	Lissachatina
Species	–	fulica

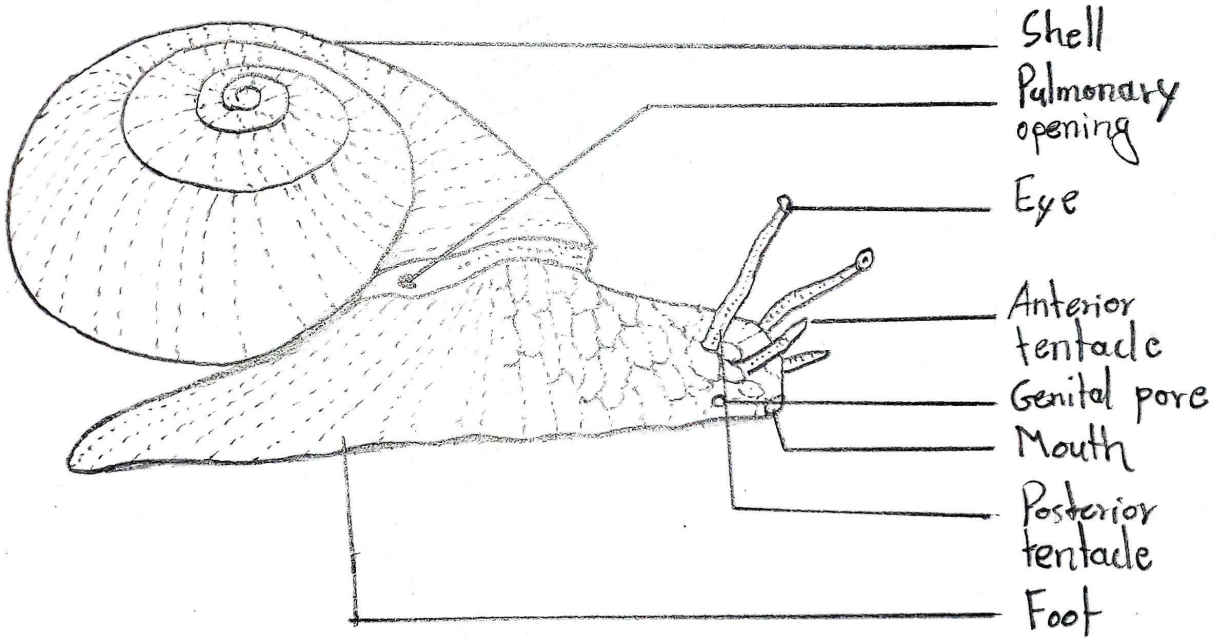


fig. Lissachatina fulica

2077/11/11

COMMENTS ON STARFISH

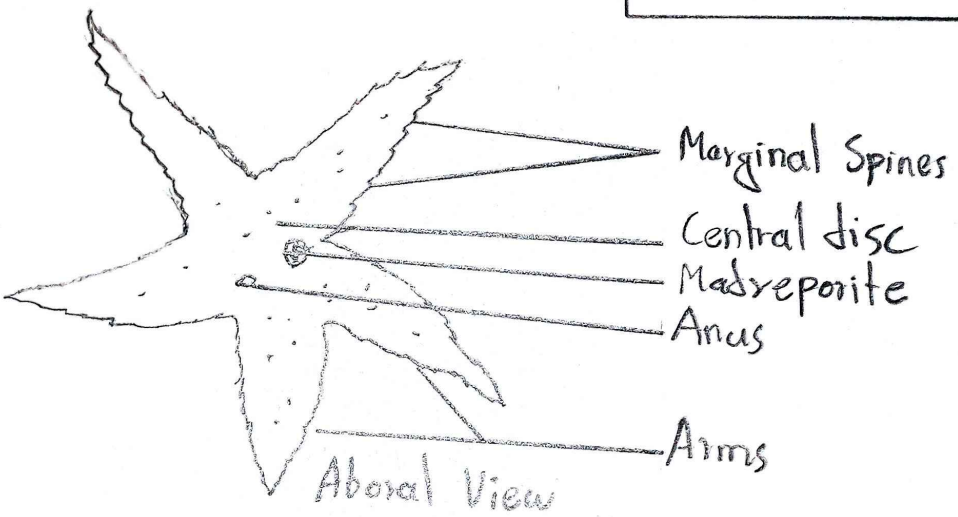
1. Astarias sp. is commonly known as starfish or sea star.
2. Body is radially symmetrical with a central disc, five radiating arms. Arms are broad at their proximal ends and tapered at distal ends.
3. Oral and aboral surfaces are distinct.
4. Madreporite is situated on the aboral surface in between the bases of two arms.
5. Ambulacral grooves are bordered laterally by two or three rows of movable calcareous spines or ambulacral spines.
6. Each ambulacral groove is provided with two rows of tube-feet which serve as locomotary organs.
7. Pedicellariae are microscopic structures present all over the ~~world~~. body.
8. Water vascular system is well developed.
9. Sexes are separate. Fertilization is external.
10. Development includes free swimming bipinaria larva.

TO STUDY THE MUSEUM SPECIMEN

Role No. : 11
Date : 2077-10-27

Classification

Kingdom	–	Animalia
Phylum	–	Echinodermata
Class	–	Asteriodea
Genus	–	Astarias



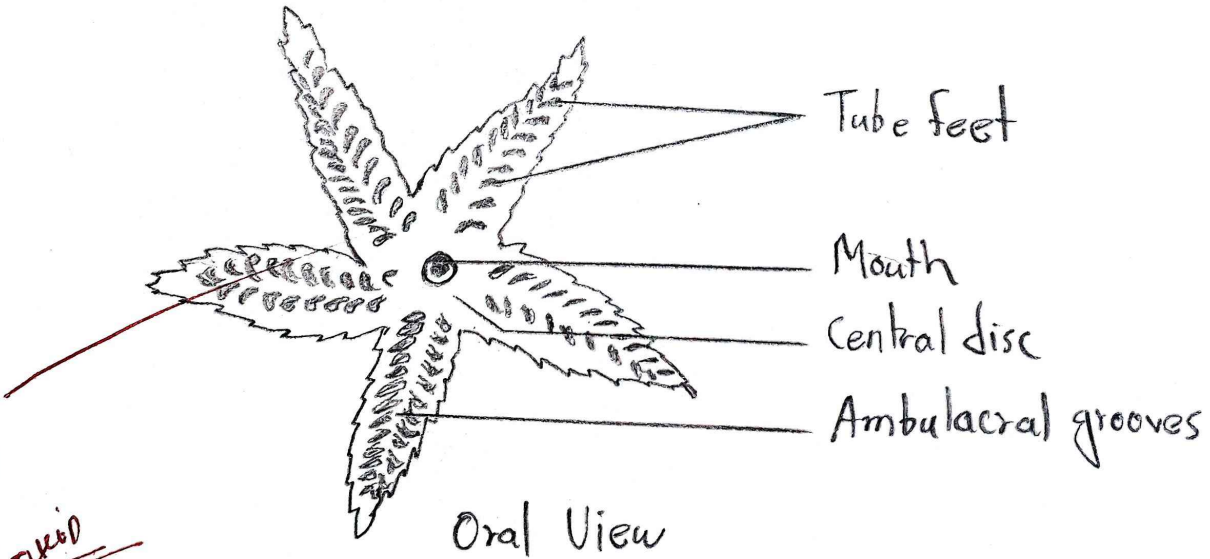


fig. Astarias

Page :
Date: / /

COMMENTS ON HONEY BEE

1. Apis spp. are called honey bees as they collect nectar from flowers and produce honey.
2. They are social colonial and polymorphic insects that live in hive in the areas where flowering plants are abundant.
3. Each colony contains three types of bees - the queen bee (fertile female), the worker bee (infertile female) and the drone (fertile male). Their body parts are modified as per their food habits and social life.
4. They are oval in shape with golden-yellow colour and dark brown bands. They are about 10-15 mm in length (worker bee).
5. Body of honey bee can be distinguished into three parts - head, thorax and abdomen.
6. Head bears a pair of antennae, a pair of compound eyes and three ocelli (simple eyes) which perceive a degree of light.
7. Thorax consists of three segments: prothorax, mesothorax and metathorax.
8. Each thoracic segment bears a pair of legs (total 3 pairs of legs). The hind legs of worker bees have pollen baskets on them.
9. Each meso and metathorax, bears a pair of wings (total 2 pairs of wings). For wings are stronger than hind wings. Legs and wings are locomotary organs.

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 11
Date: 2077/11/18

Phylum	–	Arthropoda
Class	–	Insecta
Family	–	Apidae
Genus	–	Apis
Species	–	melifera

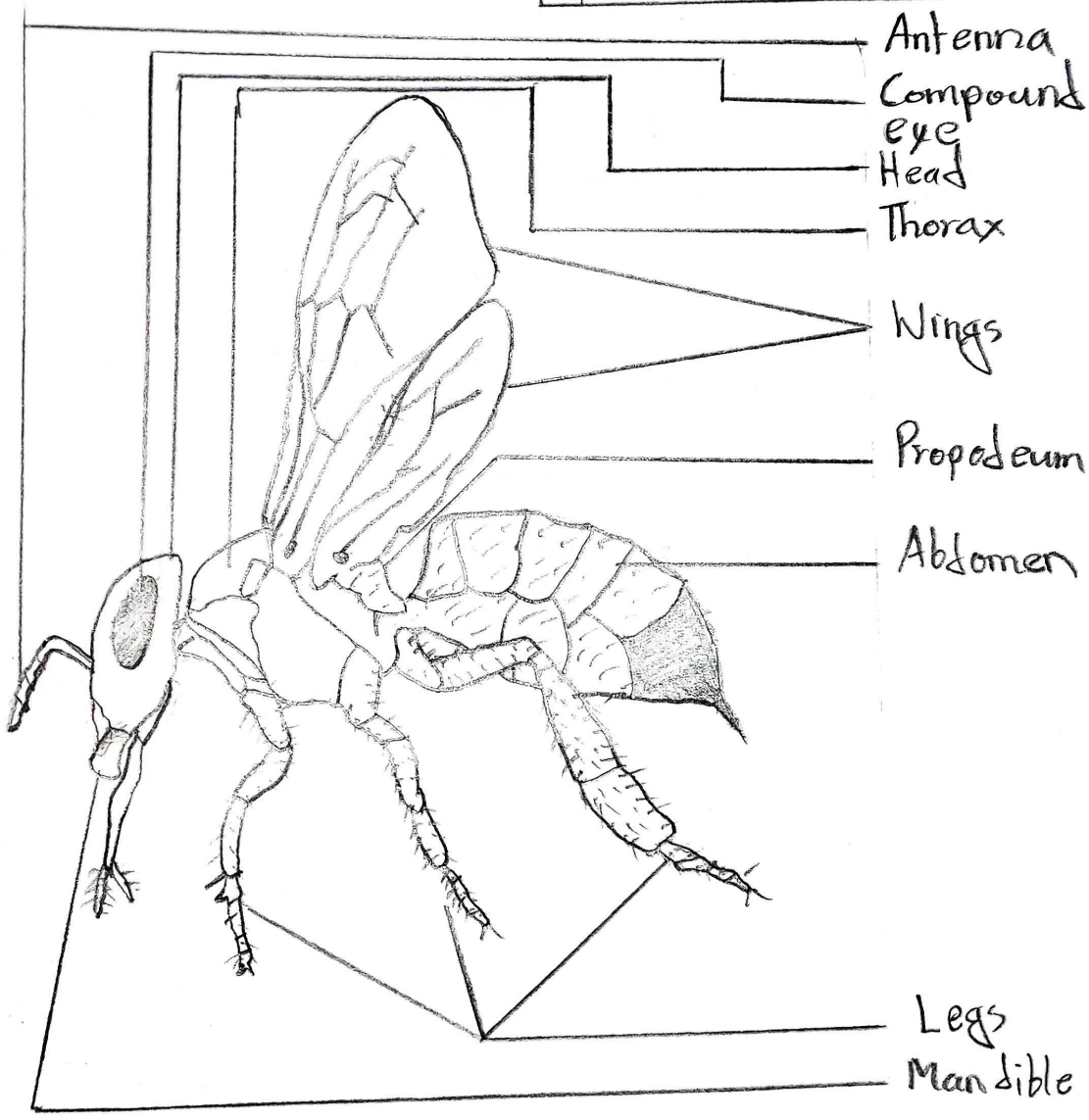


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fig. Apis melifera

COMMENTS ON ROHU

1. Labeo rohita is commonly known as rohu.
2. Body is elongated with rounded abdomen.
3. Colour is brownish grey to black dorsally and white ventrally.
4. Scales are larger.
5. Head is prominent and snout is blunt.
6. Mouth is transverse and semi-oval.
7. Lips are thick covering the jaws.
8. A pair of small maxillary barbless are present.

TO STUDY THE MUSEUM SPECIMEN

Role No : 12
Date : 2077/11/18

Classification

Phylum	- Chordata
Subphylum	- Vertebrata
Group	- Gnathostomata
Class	- Pisces
Genus	- Labeo
Species	- rohita

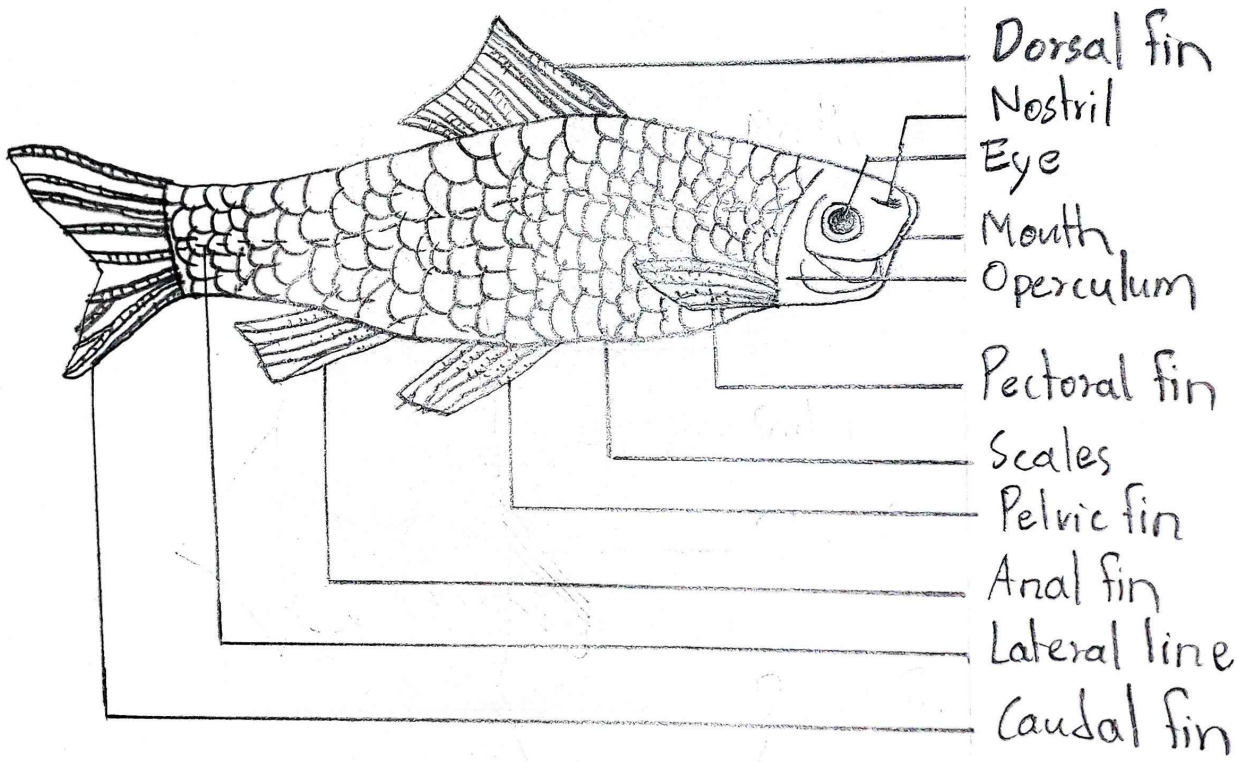

fig. Labeo rohita

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COMMENTS ON DOG FISH (SHARK)

1. Scoliodon sp. is commonly called dog fish.
2. Body is elongated, laterally compressed and tapering at both ends.
3. It measures below 30 to 60 cm in length.
4. The colour is dark grey on the dorsal and lateral surfaces and light yellow on the ventral side.
5. The body is divisible into head, trunk and tail.
6. The head is dorso-ventrally compressed.
7. Eyes are larger and laterally situated.
8. Mouth is wide and crescentic.
9. A pair of external nostrils are present in front of the eyes.
10. Five pairs of pharyngeal gill slits are present behind the eyes.
11. The median (unpaired) fins comprise two dorsal one caudal and one anal or ventral.
12. The lateral (paired) fins comprise a pair of pectoral and a pair of pelvic.
13. In male, each pelvic fin has a copulatory organ called connected with its inner edge.
14. A faint line runs on either side of the body extending from head to tail, called lateral line.

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 11
Date: 2077/11/18

Classification

Phylum	– Chordata
Subphylum	– Vertebrata
Infraphylum	– Gnathostomata
Superclass	– Chondrichthyes
Class	– Chondrichthyes
Genus	– Scoliodon
Species	– laticaudus

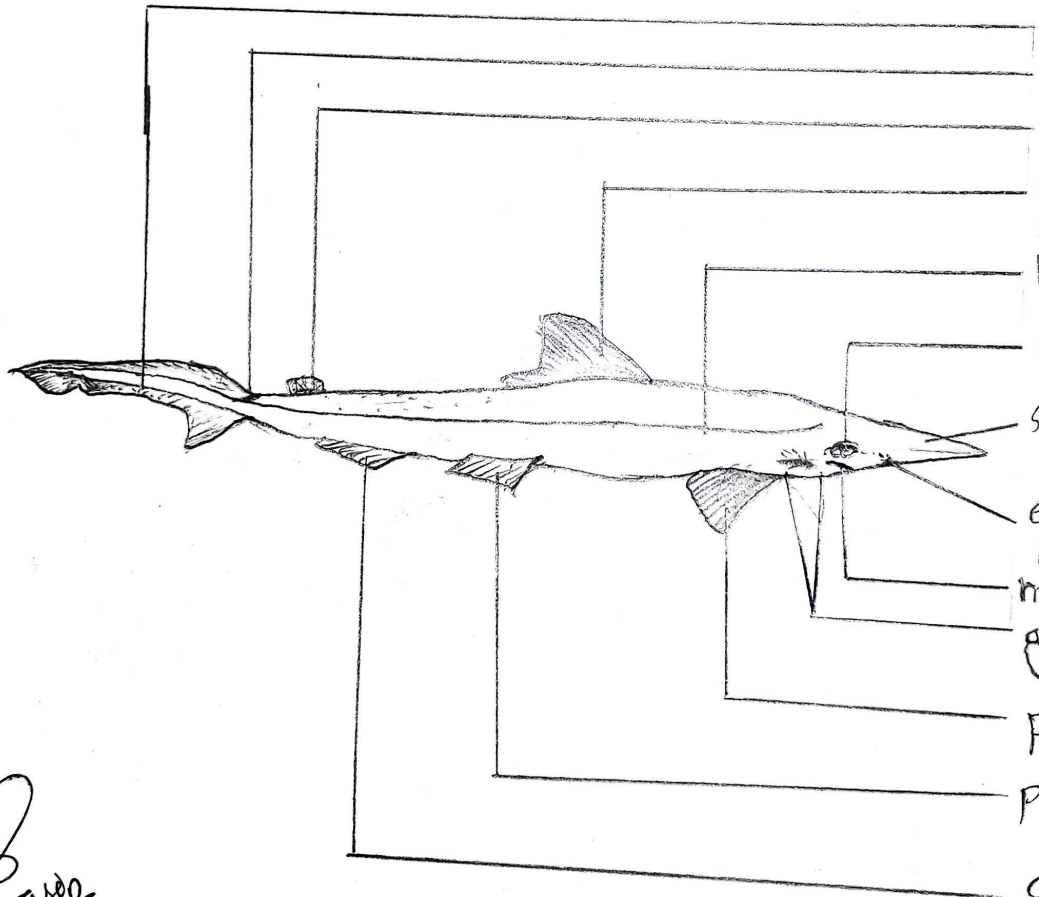

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fig. Scoliodon laticaudus

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COMMENTS ON FROG

1. Hoplobatrachus tigerinus is commonly known as Indian bull-frog.
2. Body is green with dark patches dorsally and pale yellow ventrally. A median yellow line extends from snot to vent on the dorsal surface.
3. Head is triangular and dorsoventrally compressed.
4. External nostrils are present on the snout, one on either side of the median line.
5. Bulging eyes are present on the top of the head, behind the nostrils. They are protected by nictitating membranes and eye lids.
6. Tympani (ear drums) are present, one on either side of head behind the eyes.
7. Limps are pentadactyle. Fore limbs bear four digits and hind limbs bear five digits provided with webs.
8. Maxillary teeth (on upper jaw) and vomerine teeth (on vomer bones) are present. Lower jaw has no teeth.
9. Tongue is bifid, sticky and retractile. It is anteriorly attached and posteriorly free.
10. Carnivorous in feeding habit.

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 1L
Date: 2071/11/18

Classification

Phylum	–	Chordata
Subphylum	–	Vertebrata
Group	–	Gnathostomata
Division	–	Gnathostomata
Superclass	–	Tetrapoda
Class	–	Amphibia
Genus	–	Hoplobatrachus
Species	–	tigerinus

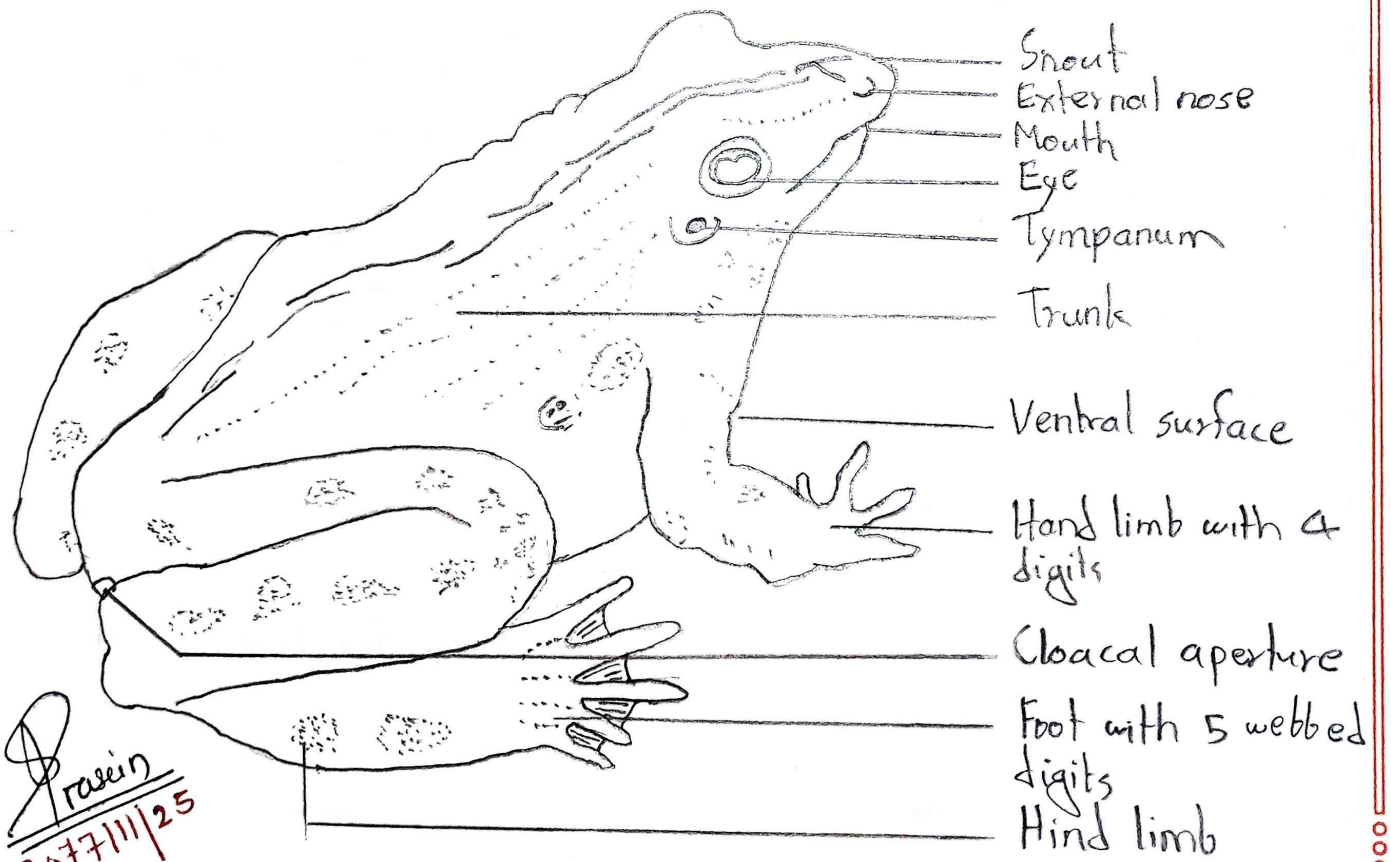

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Fig. Hoplobatrachus tigerinus

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COMMENTS ON WALL LIZARD

1. Hemidactylus flaviviridis is commonly called wall lizard.
2. It is pale yellow in colour.
3. Skin is provided with minute and smooth scales.
4. Body is divisible into head, trunk and tail.
5. Eyes are protected by eye lids.
6. Ear opening is vertical.
7. Tongue is sticky, notched and protrusible.
8. Claws are present at the tip of the digits.
9. Two rows of transverse lamellae are present on the ventral surface of each toe which help in attachment.
10. Tail is long and breakable. This phenomenon of breaking off tail itself is called autotomy.
11. Oviparous. It lays hard shelled eggs.
12. Male has temporal pores on the thigh.
13. Poikilothermic.
14. Insectivorous

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 11
Date: 2077/11/28

Classification

Phylum	–	Chordata
Subphylum	–	Vertebrata
Group	–	Gnathostomata
Superclass	–	Tetrapoda
Class	–	Reptilia
Genus	–	Hemidactylus
Species	–	flaviviridis

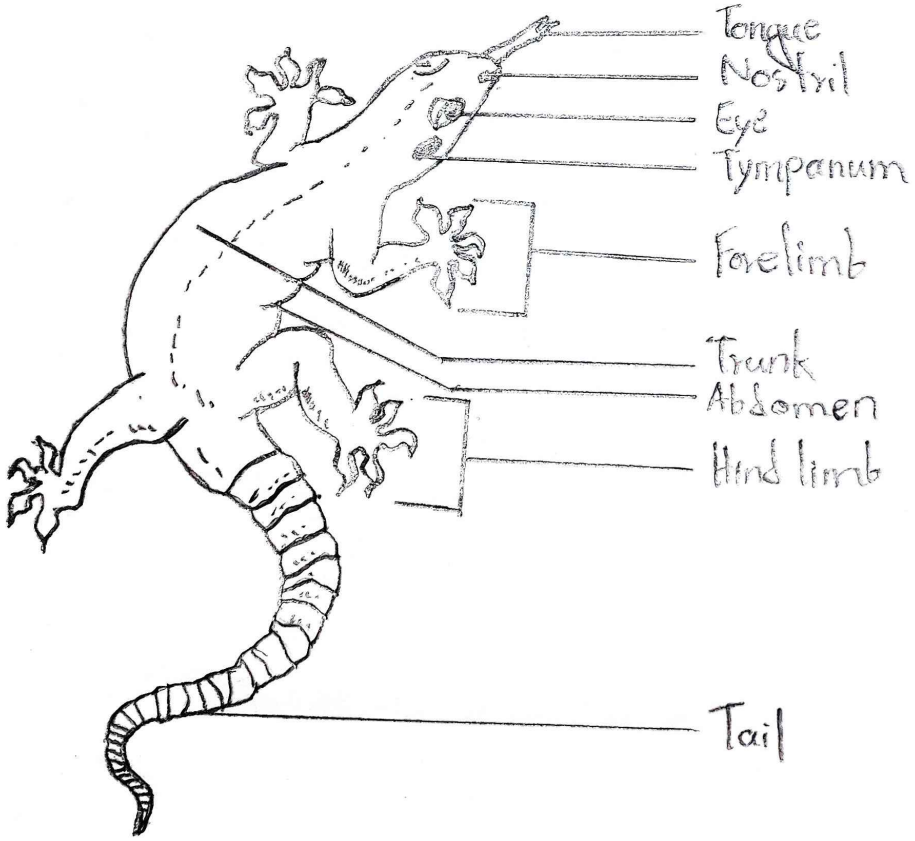

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fig. Hemidactylus flaviviridis

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COMMENTS ON PIGEON

1. Columba livia is commonly called Blue-rock pigeon.
2. The colour is slaty-grey with glistening metallic green, purple and magenta sheen on the neck and upper breast region.
3. Two dark bands are present on the wings.
4. Beak is short, stout and conical adapted for eating seeds.
5. Eyes are protected by eye lids.
6. It has acute vision.
7. The epithelial lining of ~~crop~~ crop secrets a milky substance called pigeon milk.
8. Hind limbs are adapted for walking and perching.
9. Flight muscles - pectoralis major and the pectoralis minor.
10. Sexual dimorphism is distinct.
11. Oviparous.

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 11
Date: 2077/11/18

Classification

Phylum	–	Chordata
Subphylum	–	Vertebrata
Group	–	Gnathostomata
Superclass	–	Tetrapoda
Class	–	Aves
Genus	–	Columba
Species	–	livia

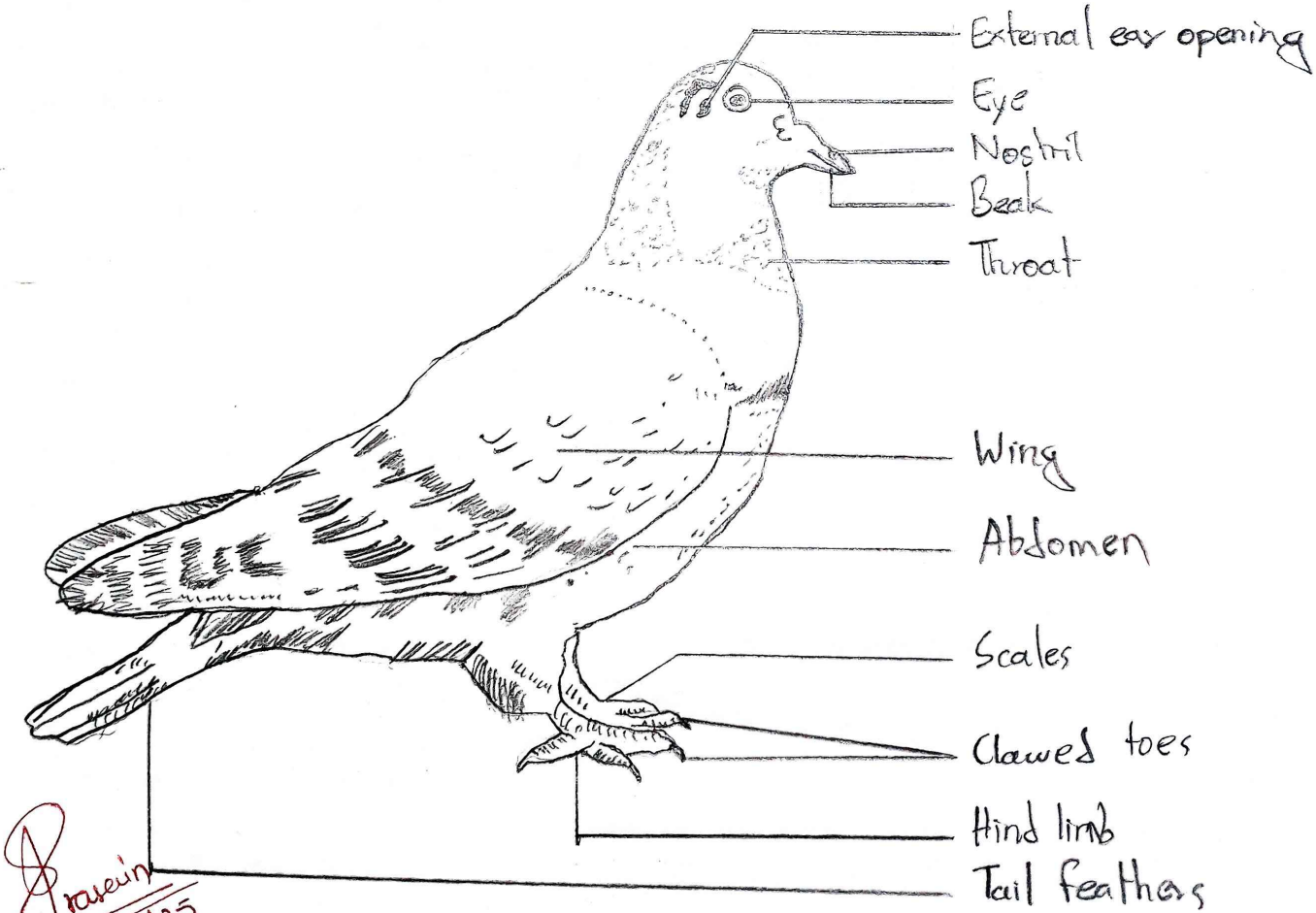

fig. Columba livia

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2077/11/25

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COMMENTS ON RABBIT

1. Oryctolagus cuniculus is commonly called rabbit.
2. It is about 40 cm in length from mouth to anus.
3. Body is covered with thick hair.
4. The body is divided into four parts: head, neck, trunk and tail.
5. The head bears mouth, a pair of external nares, vibrissae, a pair of eyes and a pair of long movable pinnae.
6. Skin has sebaceous and sweat glands.
7. There are 4 to 5 pairs of nipples in females.
8. Fore limbs are shorter and hind limbs are longer and stronger for jumping.
9. Fore limbs bears 5 digits whereas hind limbs bears only 4 digits. The digits are clawed.
10. Tail is short and hairy.

TO STUDY THE MUSEUM SPECIMEN

Roll No.: 11
Date: 2077/11/18

Classification

Phylum	– Chordata
Subphylum	– Vertebrata
Group	– Gnathostomata
Superclass	– Tetrapoda
Class	– Mammalia
Genus	– Oryctolagus
Species	– cuniculus

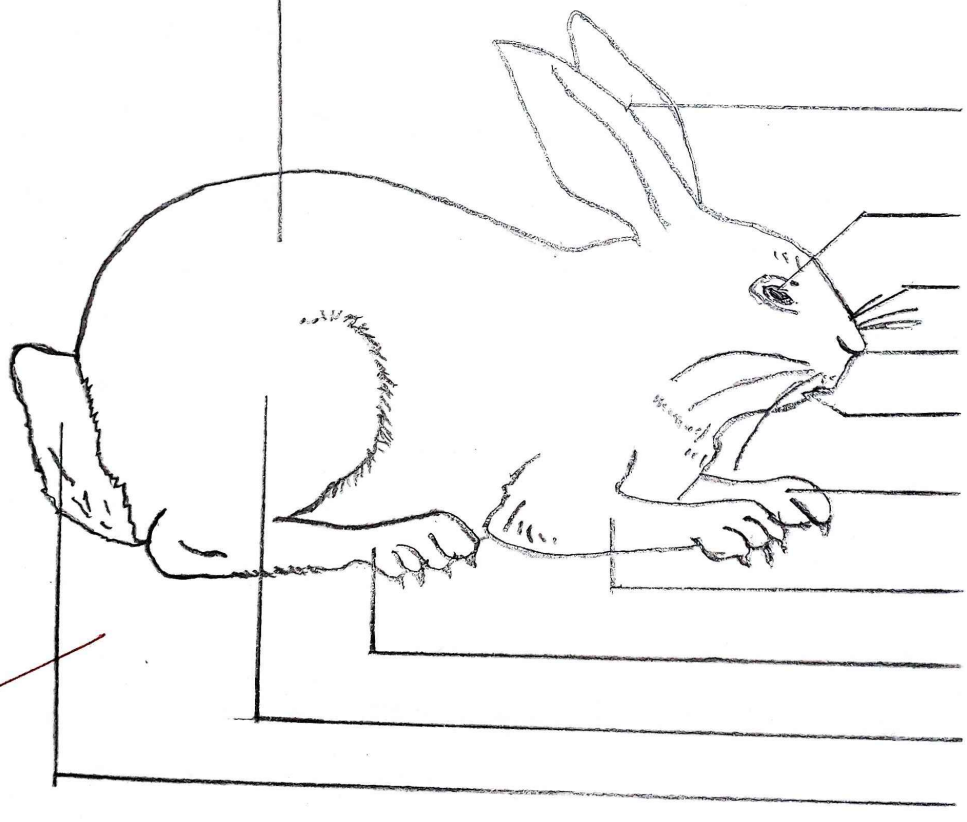

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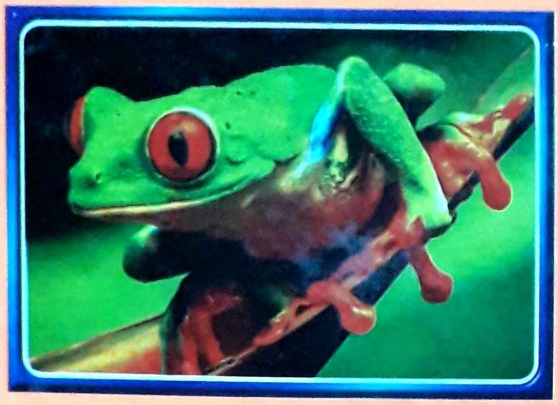
fig. Oryctolagus cuniculus



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