

**P.R.GOVERNMENT COLLEGE (A)**

***DEPARTMENT OF ZOOLOGY***

**ANIMAL DIVERSITY-II  
BIOLOGY OF CHORDATES**

**II SEMISTER  
PRACTICAL MANUAL**

COMPILES BY

***T. VENKATESWARA RAO***  
LECTURER IN ZOOLOGY

I B.Sc II Semester Practical Manual

## Index

### TITLE: ANIMAL DIVERSITY – BIOLOGY OF CHORDATES PRACTICAL SYLLABUS

#### **I. Dissections-**

Scoliodon III, VII, IX and X Cranial nerves (Only Demonstration)  
Mounting of fish scales

#### **III Identification of slides/spotters**

**1. Protochordata:** Herdmania, Amphioxus, Amphioxus T.S through pharynx.

**2. Cyclostomata :** Petromyzon and Myxine.

**3. Pisces :** Pristis, Torpedo, Hippocoampus ,Exocoetus, Echeneis, Labeo, Catla, Clarius, Channa, Anguilla.

**4. Amphibia :** Ichthyophis, Amblystoma, Axolotl larva, Hyla,

**5. Reptilia:** Draco, Chamaeleon, Uromastix, Testudo, Trionyx, Russels viper, Naja, Krait, Hydrophis, Crocodile.

**6. Aves :** Psittacula, Eudynamis, Bubo, Alcedo.

**7. Mammalia:** Ornithorhynchus, Pteropus, Funambulus.

## Model paper for semester End Examination

### I B.Sc., (BZC), SEMESTER-I ANIMAL DIVERSITY-I PRACTICAL MODEL PAPER (AT THE END OF II-SEMESTER)

**Max marks: 50**

**Time : 2Hrs**

- |  |                |
|--|----------------|
| <b>1. Dissect and display the nervous system of Palaemon. Draw a neat labelled diagram</b> | <b>10M</b>     |
| <b>2. Identification of spotters</b>   | <b>4X5=20M</b> |

A)-----

B)-----

C)-----

D)-----

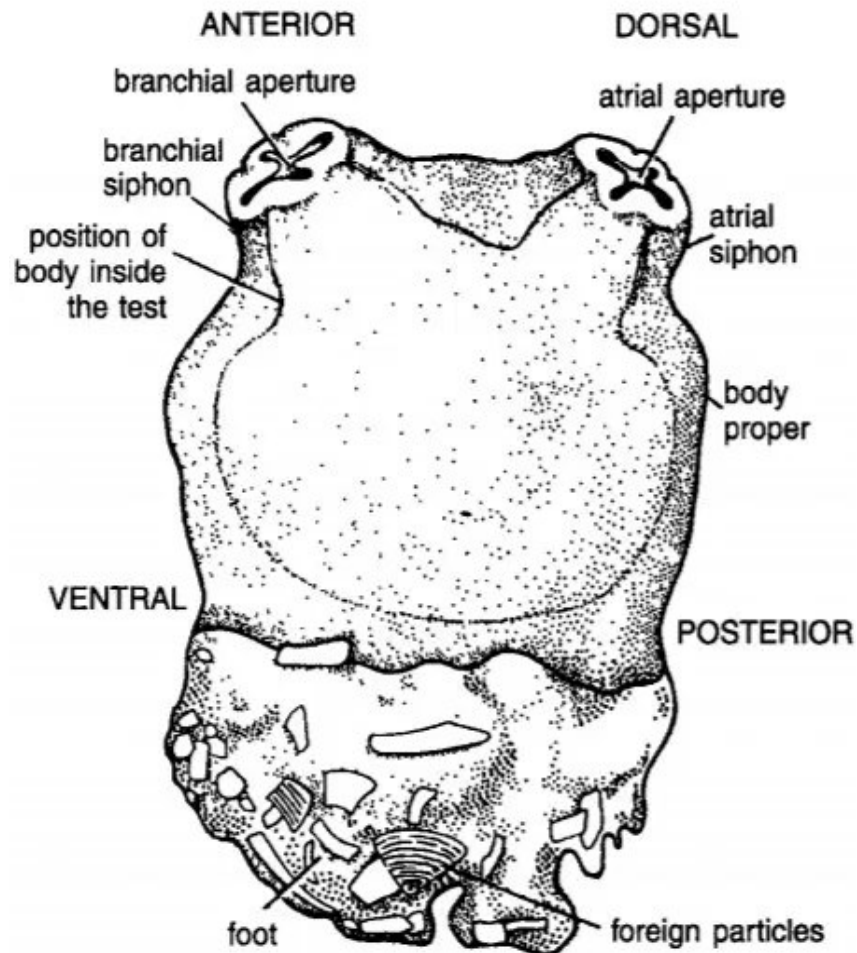
E)-----

|                  |            |
|------------------|------------|
| <b>3. Record</b> | <b>05M</b> |
|------------------|------------|

|  |            |
|--|------------|
| <b>4. Continuous Internal Assessment</b> | <b>15M</b> |
|--|------------|

|              |            |
|--------------|------------|
| <b>Total</b> | <b>50M</b> |
|--------------|------------|

## HERDMANIA



T. Venkateswara Rao, Lecturer in Zoology  
Department of Zoology

## HERDMANIA

### 1 .HERDMANIA

General Name: Ascidian/Sea Squirt

#### CLASSIFICATION

Phylum: Chordata

Sub Phylum: Tunicata/ Urochordata

Class: Ascidiacea

#### HABITS AND HABITAT :

Herdmania pallida is a solitary marine form found in shallow waters along the Indian sea coast. Each animal is found attached to the substratum usually separately, at its postero -ventral end by means of a foot



#### CHARATERISTICS:

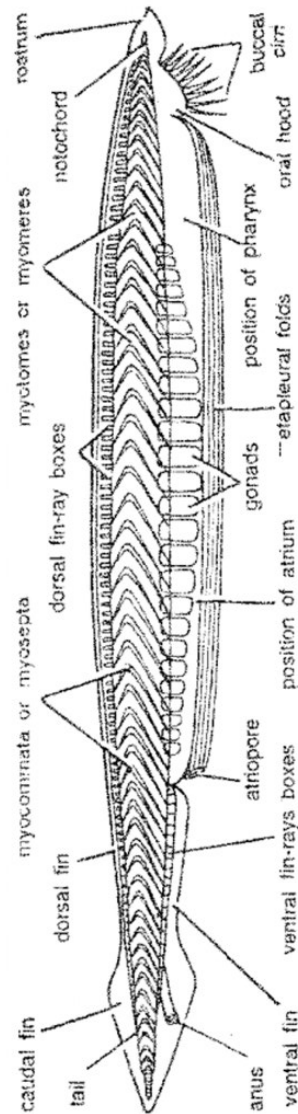
1. Solitary marine sedentary organism found attached to a solid substratum.
2. Body is encircled by a tunicin made test.
3. Free end bears a branchiogenital and atrial openings.
4. Alimentary canal has anteriorly located wide pharyngeal basket with a number of gill slits.
5. Intestine forms a loop and opens into the atrial chamber through anus.
6. Neural gland acts as an organ of excretion and is located just above the ganglion.
7. Bisexual or hermaphrodites enclosing male and female gonads near to the stomach.
8. Food is composed of micro organisms and are collected by using cilia through filter feeding mechanism.
9. Life circle includes a free swimming and well organized tadpole larva having all the important chordate features.
10. Larva undergoes retrogressive metamorphosis and transforms into a lowly or poorly organized adult.

#### IDENTIFYNG FEATURES:

The presence of bright red patches, The test is soft and leathery. It is more or less transparent in a young animal, but in an adult becomes usually opaque.

## BRANCHIOSTOMA

*Branchiostoma (=Amphioxus) : The Lancelet*



*Branchiostoma. Entire animal in right side view.*

.....eswara Rao, Lecturer in Zoology  
Department of Zoology

## BRANCHIOSTOMA

### 2. BRANCHIOSTOMA LANCEOLATUM

General Name: Amphioxus

Habitat, Habit : External  
Features of Amphioxus.  
The lancelet is found in  
shallow coastal waters  
around the Mediterranean,  
the North sea and  
the English Channel.



CHARACTERS:

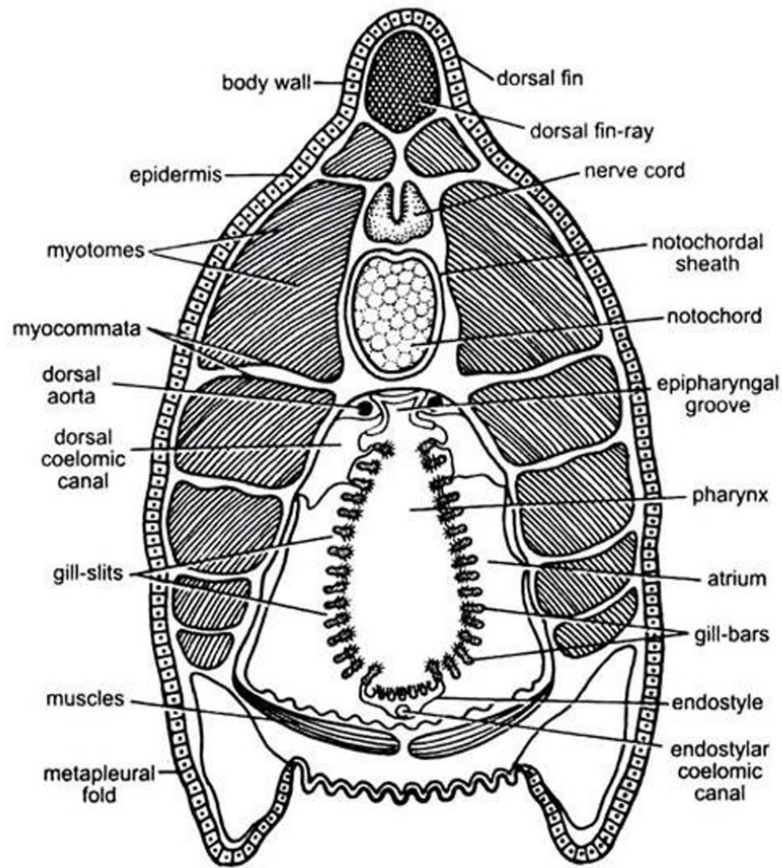
1. Transparent and burrowing fish like organism commonly seen in marine waters.
2. Anteroposteriorly elongated body has lancet( pointed) ends.
3. Body is laterally compressed with organs arranged on bilateral symmetry.
4. Anterior pointed end is the rostrum. Just below to it and towards entrance side is the special tentacular structure called wheelorgan.
5. On either side of the body, the epidermis droops down into the metapleural folds.
6. Internally, an anterioposteriorly elongated flexible rod like notochord lies on the mid dorsal side.
7. Pharynx in the elementary canal is basket like with a number of gill slits and helps in conducting both nutritive and respiratory functions.
8. Body has a dorsal, caudal and a ventral fins in continuation of one another. they also help in locomotion.
9. Ventrally , atrial opening lies in between the metapleural folds through which water and other products of excretion goes out.
10. 21 pairs of gonads are present near to the myotomes.
11. Unisexual organisms without sexual dimorphism. Development is external and life cycle is indirect involving a free swimming larval form undergoing progressive metamorphosis.

Identifying features:

They are grouped in two genera—Branchiostoma (also called Amphioxus) and Epigonichthyes (also called Asymmetron)—with about two dozen species. The chordate features—the notochord (or stiffening rod), gill slits, and dorsal nerve cord—appear in the larvae and persist into adulthood



## Paramecium Binary Fission



T.S. of *Branchiostoma* through pharynx.

## 3. AMPHIOXUS- T.S THROUGH PHARYNX

### Identifying Features:

1. In transverse section, amphioxus appears triangular in outline with a pointed dorsal side and a wide ventral side.
2. Ventrolaterally, epidermis droops has metapleural folds with loose hold of skin inbetween.
3. Epidermis is composed of simple columnar epithelium.
4. On the mid dorsal side, a dorsal fin with fin rays is seen.
5. Muscles are arranged in the form of myotomes extending between dorso-lateral to ventral side of the body.
6. Just below the dorsal fin, the sections of the tubular nerve cord, notochord and dorsal blood vessel are seen lying one below the other.
7. Notochord is composed of vacuolar tissue surrounded by notochordal sheath.
8. Pharynx lying in the space between the myotomes is laterally compressed and possess a number of gillslits.
9. Gonads are present on the ventrolateral sides sides of the pharynx.
10. Atrial cavity encircles the pharynx and gonads on all sides.
11. Coelom extends as dorsal coelomic canals on either side of the supra-pharyngeal groove.
12. Hepatic diverticulum extends below the atrial cavity.
13. Cavity present around the intestinal tube is the atrial cavity.
14. Ectoderm grows as metapleural folds on the ventral side of the animal.



## PETROMYZON

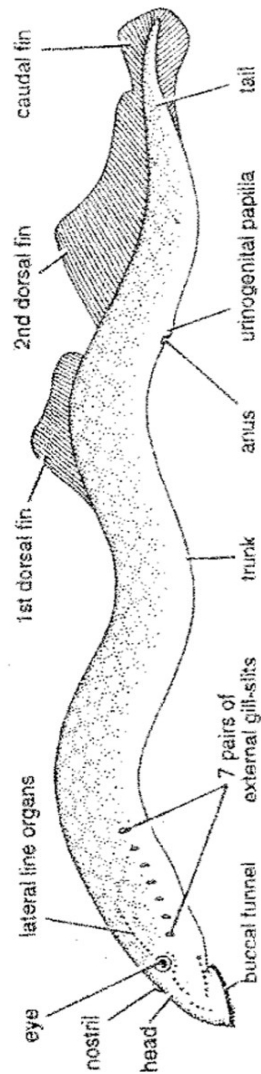


Fig. 1. Sea lamprey *Petromyzon marinus*.

## PETROMYZON

### 4. PETROMYZON MARINUS

General Name: Lamprey

**Classification:**

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Agnatha



**Habit and habitat :**

Hagfishes are exclusively marine and spend most of the time in burrows excavated in sand or mud and usually devour polychaete worms and dead fishes. The sucking apparatus is highly developed in hag-fishes. Hagfishes are nocturnal animals.

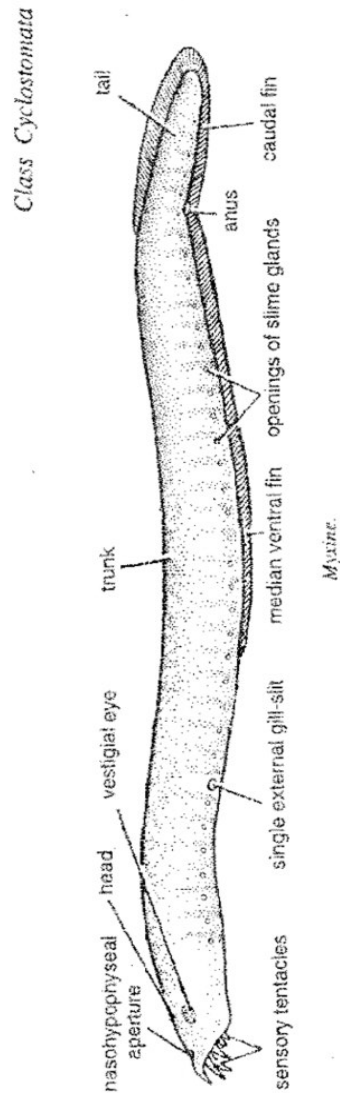
**CHARACTERS:**

1. It is a long, cylindrical, free swimming, marine organism resembling fish.
2. It measures about one meter in length with laterally compressed posterior half of the body.
3. Body is divided into a head, trunk and tail.
4. External surface of the body is smooth & is covered with rich amounts of mucous.
5. Body is dark in colour due to high pigmentation and is devoid of scales.
6. Anterio-ventral side of the head has a buccal funnel. Its rim bears a powerful sphincter muscle.
7. The muscle acts as a sucker and helps in holding to the host firmly.
8. Head grows over the funnel as a lid or cap.
9. A number of horny teeth are present in the buccal funnel. teeth are arranged in circles.
10. A pair of small lateral eyes present over the head are function.
11. A single lateral opening is present at the mid dorsal side of the body.
12. 7 pairs of gill slits are present on either sides of the pharynx. Pharynx with ill slits appears as a pharyngeal basket.
13. The dorsal, ventral and caudal fins are unpaired, undivided and are supported by cartilaginous fin rays.

**Identifying features :**

Hagfish have elongated, eel-like bodies, and paddle-like tails. The skin is naked and covers the body like a loosely fitting sock. Colors depend on the species, ranging from pink to blue-grey

## MYXIENE



## MYXIENE

### 5. MYXIENE GLUTINOSA

General Name: Hag Fish

#### Classification

Phylum: Chordata

Sub-Phy: Vertebrata

Class: Agnatha

#### Habit and habitat :

Found on muddy bottoms where they hide in the mud. Slime is used for defense. Feeds chiefly on dead and dying fish of varying species by boring into the body and consuming viscera and musculature.

Chiefly nocturnal. Its eggs are few in number about 19-30 and large (20-25 mm), the horny shell has a cluster of anchor-tipped filaments at each end.



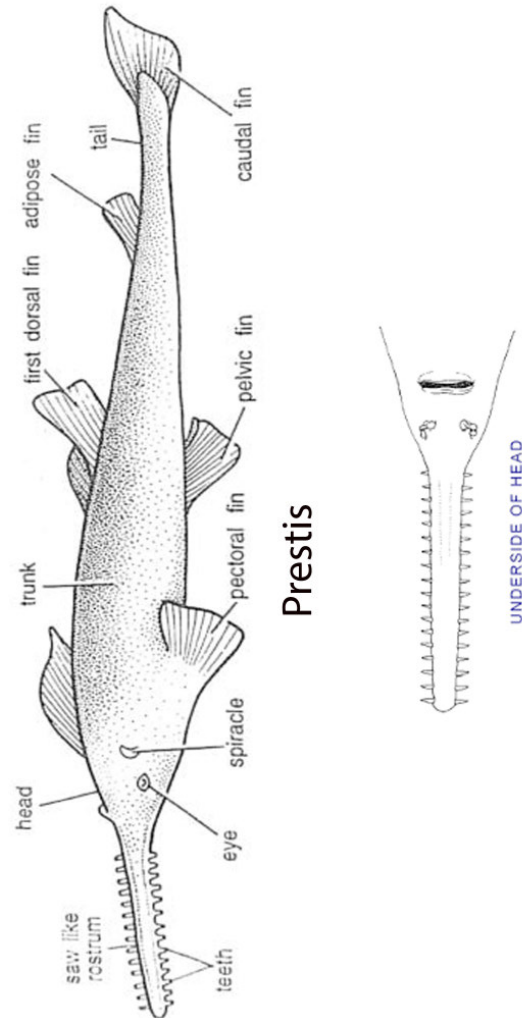
#### CHARACTERS:

1. It is universally distributed nocturnal organism living at the sea bottoms.
2. Body is ribbon like because of laterally compressed body.
3. External surface is smooth and scaleless. It is surrounded by heavy quantities of mucous
4. Mouth at the antero-posterior end bears a pair of soft lips.
5. Neither buccal funnel nor horny teeth are present in the adult organism.
6. Mouth is surrounded by 4 pairs of smooth tentacles supported by gill bars.
7. A single dorsal nasal opening near to the mouth, a pair of vestigial lateral eyes, undivided dorsal, caudal and ventral unpaired fins, mucous opening along the ventrolateral sides of the body, and posterior ventrally located anal opening are the salient external features.
8. Internally, 6 pairs of gill slits on the sides of the pharynx, bisexual nature of the gonad having anterior ovary and posterior testis are the special features.

#### Identifying features :

Jawless mouth, single nasal aperture, only a single pair of external gill openings, no operculum or covering fold of skin. Grayish or reddish brown above, either plain. Variations in color correspond to the color of the sea bottom

## PRESTIS



Prestis

## PRESTIS

### 6. PRISTIS

General Name: Saw Fish

#### Classification

Phylum: Chordata

Sub-Phy: Nathostomata

Class: Chondrichthyes

#### Habit and habitat :

Adults are primarily found in estuaries and marine waters to a depth of 25 m (82 ft), but mostly less than 10 m (33 ft). The species does appear to have a greater affinity for freshwater habitats than the smalltooth sawfish

#### CHARACTERS:

1. Free living marine from commonly occurring in temperate and tropical seas.
2. Grows to a size of 3 to 6m and possess laterally compressed body.
3. Head is flattened dorsoventrally with an elongated rostrum with pointed and sharp teeth.
4. Toothed knife like rostrum is used for protection against predators.
5. Head bears a pair of lateral eyes at the base of rostrum.
6. A pair of branchial openings are present on either side of the pharyngeal region.
7. Tail is provided with heterocercal tail fin.
8. Body has paired pectoral, pelvic fins besides a dorsal, ventral and an adipose fin.
9. This fish is a predator leading viviparous life
10. Oil extracted from the liver of this fish has medicinal value and hence is economically important.

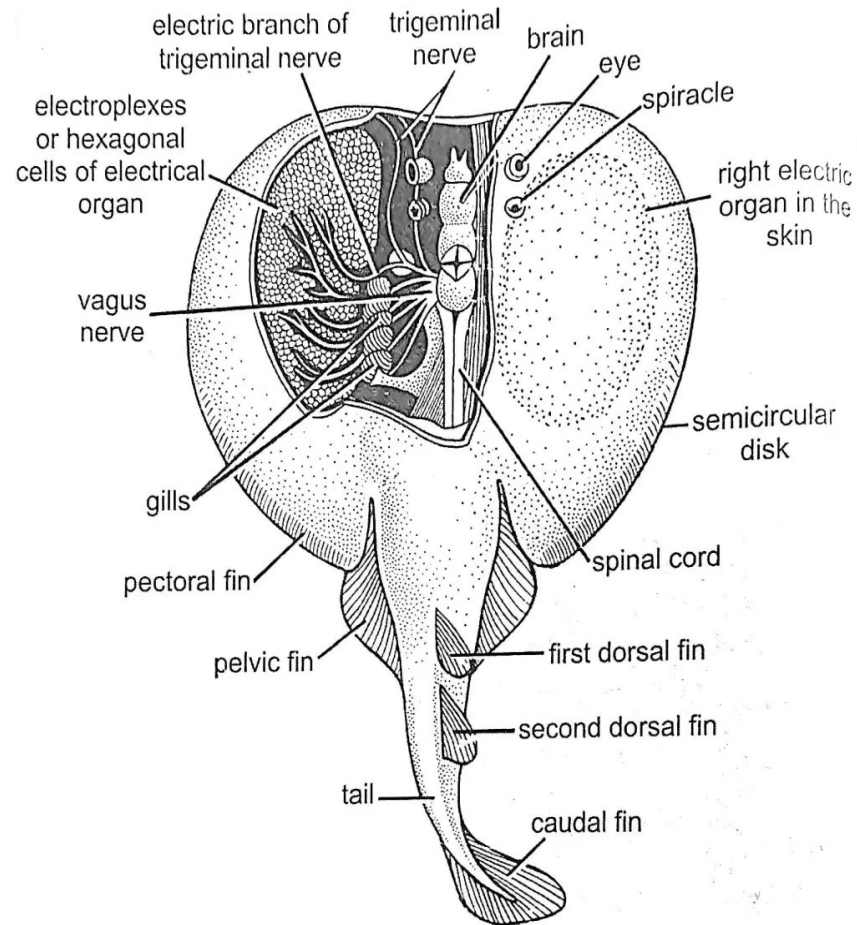
#### Identifying features

The largetooth sawfish is easily recognized by the forward position of the dorsal. The important structure is 'saw-like snout, formed by the elongation and flattening of head and skull. They are flattened in the form of a rostrum, which contains a series of tooth-like 16 to 32 pairs of teeth on the lateral margins. Teeth are fixed in sockets.





## TORPEDO



## TORPEDO

### 7. TORPEDO

General Name: Electric Fish

#### Classification

Phylum: Chordata

Sub-Phy: Vertebrata

Class: Chondrichthyes

#### Habit and habitat :

Electric rays are found from shallow coastal waters down to at least 1,000 m deep. They are sluggish and slow-moving, propelling themselves with their tails, not by using their pectoral fins as other rays do. They feed on invertebrates and small fish. They lie in wait for prey below the sand or other substrate, using their electricity to stun and capture.

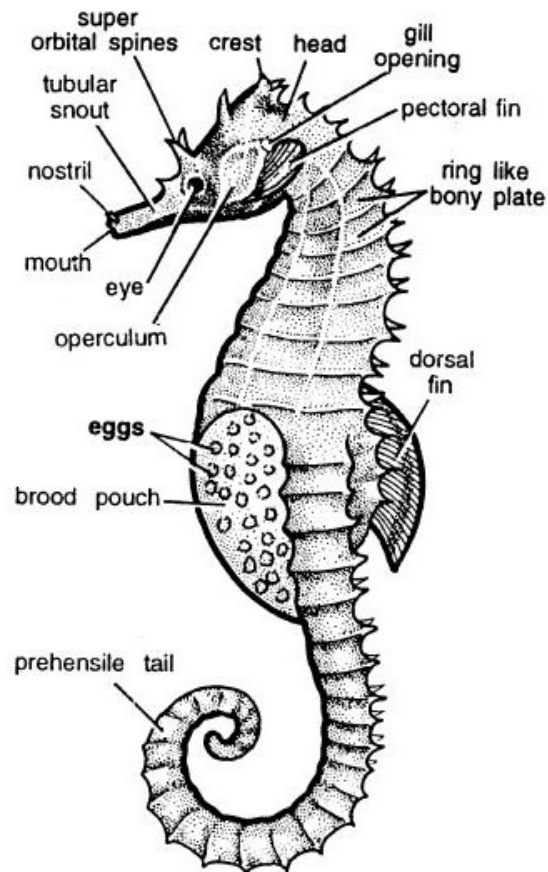
#### CHARACTERS:

1. A common deep water living carnivorous fish seen on the sea bottoms of Mediterranean seas etc
2. Body is compressed dorso ventrally with an anterior half moon shaped disc like head.
3. Body is covered by smooth and unscaled skin.
4. The anterior disc is supported internally by a cartilaginous endoskeleton.
5. Paired eyes and respiratory openings are present on dorsal side.
6. Mouth is a wide transverse on the anteroventral side of the head.
7. A pair of electric organs are present at the base of the eyes on either side of the body.
8. They are innervated by the branches of 7, 9 and 10th cranial nerves.
9. Their dorsal surface acts as a positive pole and ventral side as a negative pole.
10. At the lower margin of the disc lies a pair of pectoral fins.
11. Tail is short and has a tail fins.
12. A pair of dorsal fins are present on the dorsal sides of the trunk.

#### Identifying Features

The anterior disc is supported internally by a cartilaginous endoskeleton. the hexagonal unit of these electric organs are located with mucos and release current to protect themselves from the predators

## HIPPOCAMPUS



*Hippocampus (male)*

## HIPPOCAMPUS

### 8. HIPPOCAMPUS

General Name: Sea Horse

#### Classification

Phylum: Chordata

Sub-Phy: Vertebrata

Class: Osteichthyes

#### Habit and habitat :

Hippocampus has cosmopolitan distribution, found in almost all warm sea waters, specially in India, Japan, China and Malaysian Archipelago. Cretaceous to Recent. It is represented by several species in the Indian Ocean.

They swim upright swaying their tails and gyrating their trunks in graceful manner, holding a weed with their tails.



#### CHARACTERS:

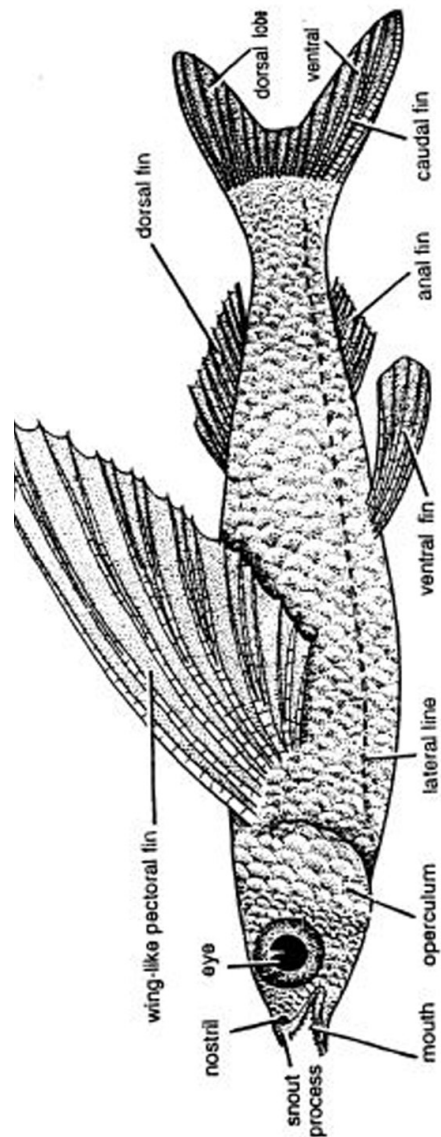
1. Commonly called as sea-horse because its anterior end is shaped like the neck and head of a horse.
2. Body is divided into head, trunk and tail. Size varies from 5 to 17 cm.
3. Gills are covered by the operculum.
4. Body is covered by a rigid exoskeletal armour of ring-like bony plates.
5. Dorsal fin is single, ventral and caudal fins are absent.
6. A small transparent pectoral fin is found on either side of head.
7. Females have a small anal fin.
8. Males contain brood pouches, which carry eggs until they hatch.
9. Tail is prehensile
10. Hippocampus is a vertically swimming fish. It has strongly deviated from fish-like appearance with arching neck and snout like horse, abdomen like pigeon and prehensile tail like Langur monkey.

#### Identifying Features

Since this fish has horse-shaped head and snout and above features, hence it is Hippocampus.



## EXOCOETUS



*Exocoetus*

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Department of Zoology

## EXOCOETUS

### 9. EXOCOETUS

General Name: Flying Fish

#### Classification

Phylum: Chordata

Sub-Phy: Vertebrata

Class: Osteichthyes

#### Habit and habitat :

Exocoetus volitans is present in the tropical and subtropical zones of all the world's oceans. Numerous morphological features give flying fish the ability to leap above the surface of the ocean.



#### CHARACTERS:

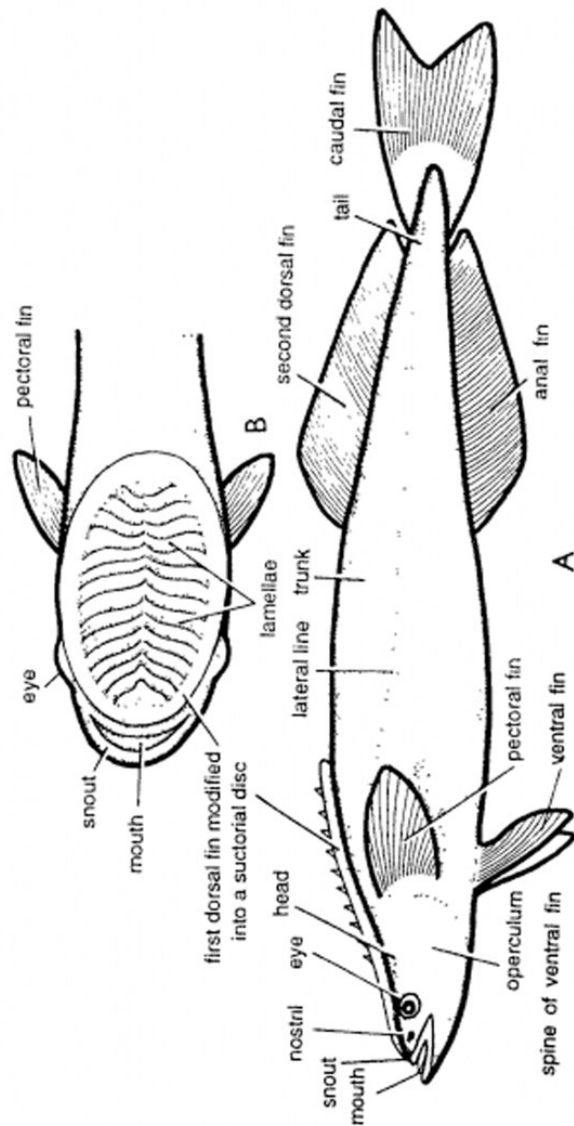
1. It is common in salt waters of Indian ocean; pacific; atlantic.
2. Elongated body with silvery white sides measures 30 to 45 cm in length and divided into head, trunk and tail.
3. Body is long and laterally compressed with a homocercal tail fin.
4. Head at its anteroventral side possess a small mouth supported by toothed jaws.
5. Eyes are conspicuous on either side of the head.
6. Body is covered by cycloid scales. Dorsal and ventral fins are supported by fin rays.
7. Gills are covered by a bony operculum.
8. Pectoral fins are exceptionally large, spread like wings and make gliding flights. The fish can glide over the surface of the water for about 400 metres
9. Pelvic fins also enlarged and helps in lifting the body above the surface of water
10. These fishes have nutritious valve.

#### Identifying features

Exocoetus is a genus of flying fishes. It is a bony fish. The body is covered with cycloid scales. The mouth is wide, and the jaws bear teeth. Since this fish has large pectoral fins and above features, hence it is Exocoetus

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## ECHINEIS



*Echineis*. A. Head in dorsal view, B. Fish in lateral view.

## ECHINEIS

### 10. ECHINEIS

General Name : Sucker Fish

#### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Osteichthyes

#### Habit and habitat :

The fish (Echeneis) is distributed all over the tropical and warm seas. They are found at depths ranging from 20-50 meters, which is where the coral reefs are located. Echeneis is a common marine fish. It swims in water feeding on small fishes.



It attaches itself by means of its adhesive disk to boats, sharks, bony fishes, sea turtles and marine mammals.

#### CHARACTERS:

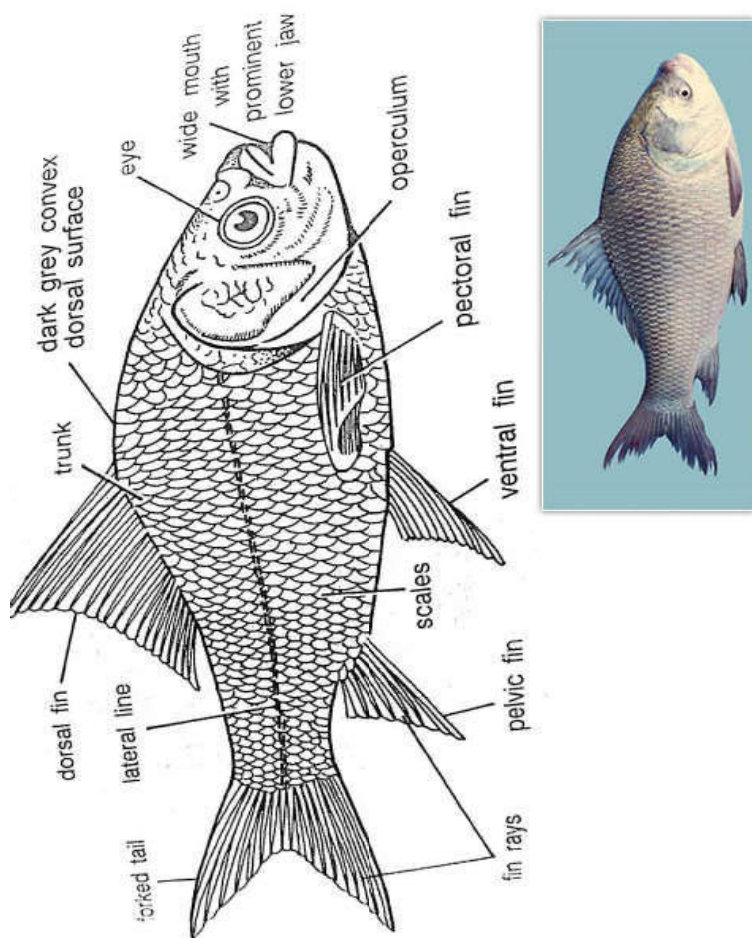
1. Commonly called as sucker-fish. Sucking disk is found on head. The disk develops from a transformed spinous dorsal fins. Fish applies the disk against other fish and creates a partial vacuum by operating the sucking action which permits it to obtain rides on larger animals
2. Body is elongated measuring about 1 metre in length and covered with small scales.
3. Body divided into head, trunk and tail.
4. eyes are small and are lateral on the head and it a pair of terminal nostrils.
5. Mouth is wide opening at the antero- dorsal of the head.
6. Operculum is located at the junction of the head and trunk. A pair of pectoral fins are near the operculum. Pelvic fins are also located at the same region on the ventral side.
7. Tail fin is of homocercal type.
8. These fishes move from place-place by attaching with the larger fishes, logs but they are not parasites.

#### Identifying Features

Since this fish has modified dorsal fin as sucker and above features, hence it is Echeneis

## Cultivable and edible fishes

## Catla catla



Department of Zoology, P.R.G.C., KKD

## Catla catla

**Classification**

Phylum :- CHORDATA ( Notochord and dorsal tubular nerve cord present and gill-slits present).

Subphylum :- VERTEBRATA (Vertebral column present ).

Division :- GNATHOSTOMATA ( Jaws and paired appendages present ).

Super class :- PISCES ( Paired fins , gills and skin with scales)

Class :- OSTEICHTHYES ( Bony fishes ).

SUB-CLASS :- ACTINOPTERYGII ( Ray finned fish ).

SUPER ORDER :- TELEOSTEI ( Bony fish proper).

Order :- CYPRINIFORMES ( Anterior vertebrae fused. Weberian ossicles present between air bladder and ear).

GENUS :- Catla SPECIES :- catla

**Characters**

GEOGRAPHICAL DISTRIBUTION: Catla Catla is Found in northern India, Myanmar, Pakistan and Indonesia.

HABIT AND HABITAT: Catla Catla Fish inhabits lakes and fresh-water.

GENERAL CHARACTERISTICS: Commonly called as botcha in telugu. Fish measures 20 – 30 cm in length and width 4 to 5 cm.

Pigmentation grayish on dorsal side and silvery white on lower side of the abdomen. Fins dark black. Dorsal profile convex.

Scales moderate with six and half rows between lateral line and the base of ventral fin.

Body divided into head, trunk and tail. Head contains wide mouth and eyes

Eyes found in the anterior half of the head, Mouth wide with prominent lower jaw. Barbels absent. Fins are dorsal, pectoral, anal and caudal.

Dorsal fin slightly adverse than ventral fin. Pectoral fin located behind ventral fin which does not extend upto the caudal fin

ECONOMIC IMPORTANCE: Catla Catla has great food value, forming common man's food. The flesh is very delicious.

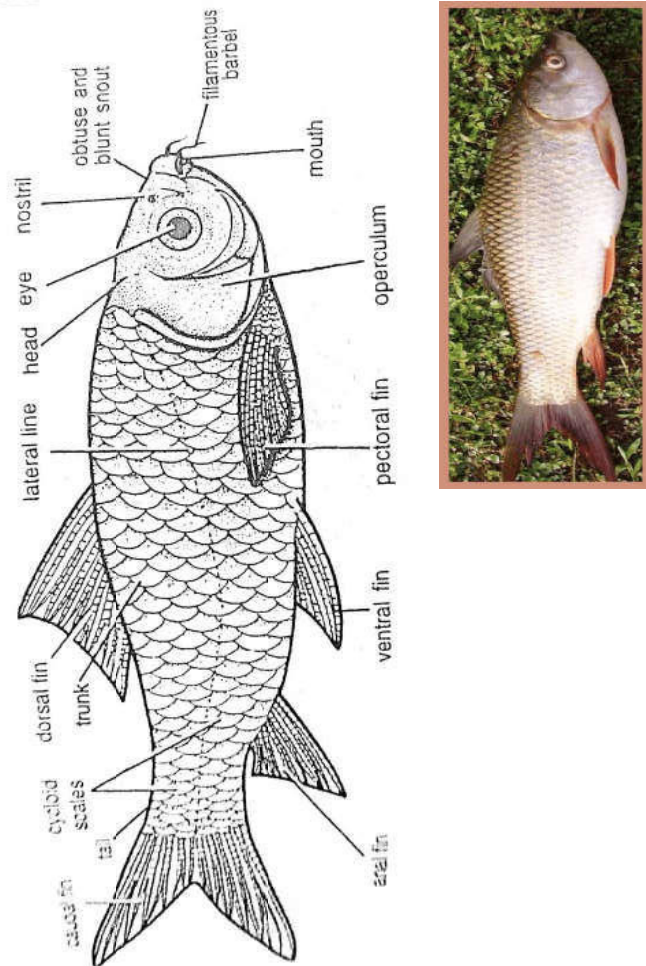
SPECIAL FEATURES: Mouth does not contain teeth. Teeth are found in pharynx only.

**Identification:** This fish has wide mouth and above features, hence it is Catla catla.

III B.Sc Cluster I Practical Manual



## Labeo rohita



Department of Zoology, P.R.G.C., KKD

## Labeo rohita

### Classification

Phylum :- CHORDATA ( Notochord and dorsal tubular nerve cord present and gill-slits present).

Subphylum :- VERTEBRATA (Vertebral column present ).

Division :- GNATHOSTOMATA ( Jaws and paired appendages present ).

Super class :- PISCES (Paired fins , gills and skin with scales)

Class :- OSTEICHTHYES ( Bony fishes ).

SUB-CLASS :- ACTINOPTERYGII ( Ray finned fish ).

SUPER ORDER :- TELEOSTEI ( Bony fish proper).

Order :- CYPRINIFORMES ( Anterior vertebrae fused. Weberian ossicles present between air bladder and ear).

GENUS :- Labeo SPECIES :- rohita

GEOGRAPHICAL DISTRIBUTION: Labeo rohita is widely distributed in tropical and temperate regions specially found in India (Punjab, Assam) and Myanmar.

HABIT AND HABITAT: Labeo rohita is abundantly found in ponds and rivers. Carps are vegetarian and bottom feeders. They can occasionally feed on animal diet.

GENERAL CHARACTERISTICS OF LABEO ROHITA : ROHU Labeo Rohita is commonly known as carp and Seelavathi in telugu. Body compressed, fusiform, about 1 metre in length and weighing about 4 kg.

Colour of the body is bluish or brownish on back and silvery white below. Body covered with large overlapping cycloid scales. Head is depressed and bears a subterminal fringe-lipped mouth bounded by fleshy upper and lower lips. A pair of filamentous barbels arises from upper lip. Scales are flat, bony with rounded edges and are called as cycloid scales. These overlap and form a complete covering.

Dorsal, anal, caudal, paired pectoral and anal fin with soft fin rays present. Caudal fin forked into equal lobes.

ECONOMIC IMPORTANCE: Labeo Rohita has great food value, forming common man's food. The flesh is very delicious.

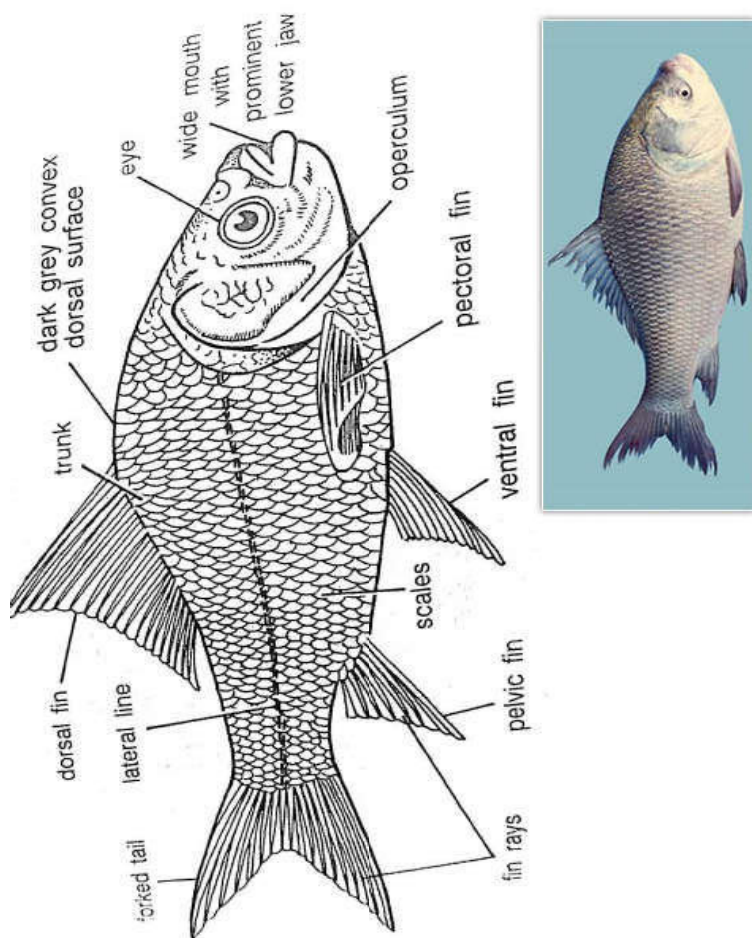
SPECIAL FEATURES: Mouth does not contain teeth. Teeth are found in pharynx only.

IDENTIFICATION: this fish has overlapping scales and above features, hence it is Labeo rohita

III B.Sc Cluster I Practical Manual

## Cultivable and edible fishes

## Catla catla



Department of Zoology, P.R.G.C., KKD

## Catla catla

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Super class :- PISCES ( Paired fins , gills and skin with scales)

Class :- OSTEICHTHYES ( Bony fishes ).

SUB-CLASS :- ACTINOPTERYGII ( Ray finned fish ).

SUPER ORDER :- TELEOSTEI ( Bony fish proper).

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Pigmentation grayish on dorsal side and silvery white on lower side of the abdomen. Fins dark black. Dorsal profile convex.

Scales moderate with six and half rows between lateral line and the base of ventral fin.

Body divided into head, trunk and tail. Head contains wide mouth and eyes

Eyes found in the anterior half of the head, Mouth wide with prominent lower jaw. Barbels absent. Fins are dorsal, pectoral, anal and caudal.

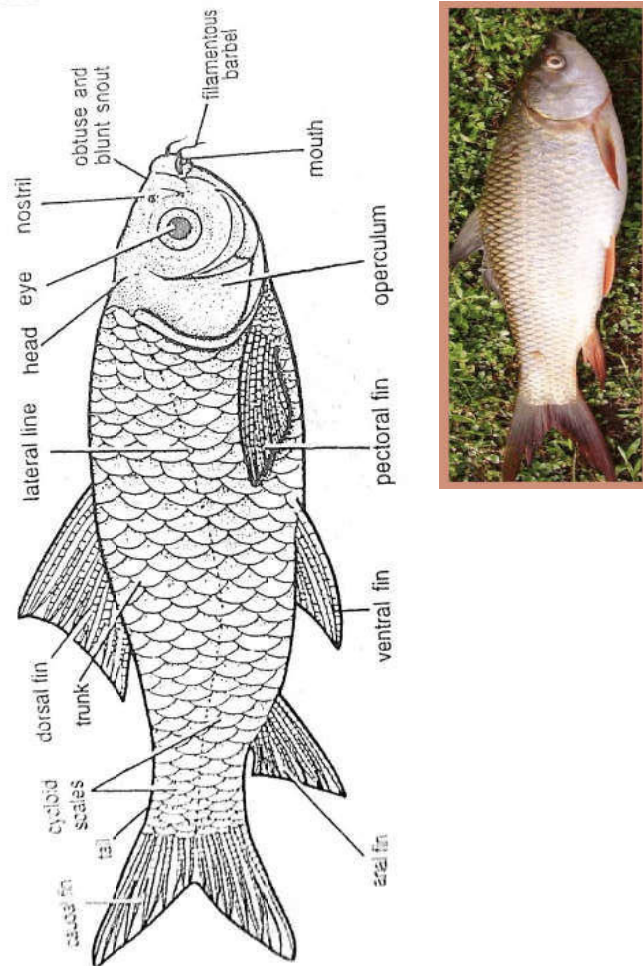
Dorsal fin slightly adverse than ventral fin. Pectoral fin located behind ventral fin which does not extend upto the caudal fin

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## Labeo rohita



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GENUS :- Labeo SPECIES :- rohita

GEOGRAPHICAL DISTRIBUTION: Labeo rohita is widely distributed in tropical and temperate regions specially found in India (Punjab, Assam) and Myanmar.

HABIT AND HABITAT: Labeo rohita is abundantly found in ponds and rivers. Carps are vegetarian and bottom feeders. They can occasionally feed on animal diet.

GENERAL CHARACTERISTICS OF LABEO ROHITA : ROHU Labeo Rohita is commonly known as carp and Seelavathi in telugu. Body compressed, fusiform, about 1 metre in length and weighing about 4 kg.

Colour of the body is bluish or brownish on back and silvery white below. Body covered with large overlapping cycloid scales. Head is depressed and bears a subterminal fringe-lipped mouth bounded by fleshy upper and lower lips. A pair of filamentous barbels arises from upper lip. Scales are flat, bony with rounded edges and are called as cycloid scales. These overlap and form a complete covering.

Dorsal, anal, caudal, paired pectoral and anal fin with soft fin rays present. Caudal fin forked into equal lobes.

ECONOMIC IMPORTANCE: Labeo Rohita has great food value, forming common man's food. The flesh is very delicious.

SPECIAL FEATURES: Mouth does not contain teeth. Teeth are found in pharynx only.

IDENTIFICATION: this fish has overlapping scales and above features, hence it is Labeo rohita

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## Clarias Batrachus (Marpu)

### Classification

Phylum :- CHORDATA ( Notochord and dorsal tubular nerve cord present and gill-slits present).

Subphylum :- VERTEBRATA (Vertebral column present ).

Division :- GNATHOSTOMATA ( Jaws and paired appendages present ).

Super class :- PISCES (Paired fins , gills and skin with scales)

Class :- OSTEICHTHYES ( Bony fishes ).

SUB-CLASS :- ACTINOPTYERGII ( Ray finned fish ).

SUPER ORDER :- TELEOSTEI ( Bony fish proper).

Order :- CYPRINIFORMES ( Anterior vertebrae fused. Weberian ossicles present between air bladder and ear).

Family: Claridae Family: Claridae Genus: Clarias Species: Batrachus

GEOGRAPHICAL DISTRIBUTION: It is distributed through Pakistan, India, Nepal, Sri Lanka, Bangladesh. It is widespread within India, both naturally and due to culturing. Its occurrence in South India is largely due to culturing.

It is usually found in streams including tidal ponds, channels and flooded rice fields. Due to its ability to breathe in air directly, it can live in muddy water. It is found in hills also. They are voracious feeders & mostly stay buried in the muddy bottom. They are quite aggressive & inflict stings by their pectoral fins. Breeding occurs during the months of July to August in flooded rice fields. It attains maturity at the end of one year.

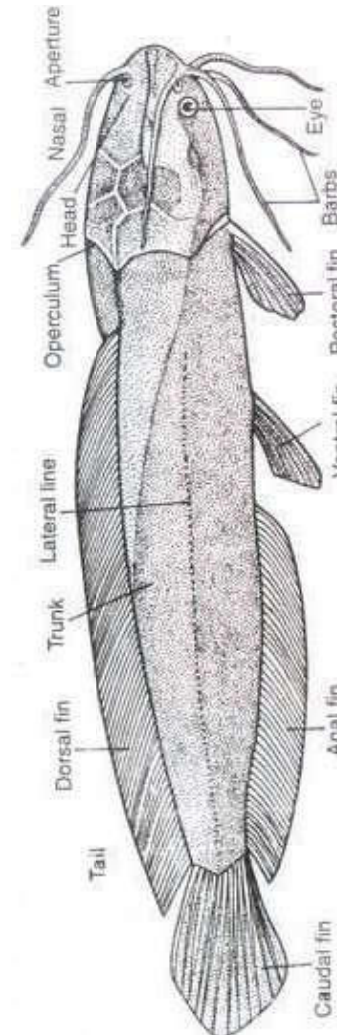
GENERAL CHARACTERISTICS: 1. The body is elongated with laterally compressed head. 2. Body colour is either uniformly reddish-brown or greyish black. 3. It may attain a maximum length of 45 cm.

4. Upper jaw is longer than the lower. 5. Head is sharpened superiorly and is covered with fin granules. 6. Barbles are of four pairs. 7. Dorsal fin is very long commences a little behind the occipital process and ends a bit anterior to the base of the caudal fin. 8. All the fins are covered with thick skin.

ECONOMIC IMPORTANCE: It is very popular food fish and very economic in culture. Hence it is cultured extensively throughout India. The maximum yield can be obtained in experimental farms up to 50 tons. It fetches a good price. It is used as a laboratory animal for biological studies.

IDENTIFICATION: Dorsal fin is very long, Barbles are of four pairs

## Clarias Batrachus (Mangur)



## Channa punctatus

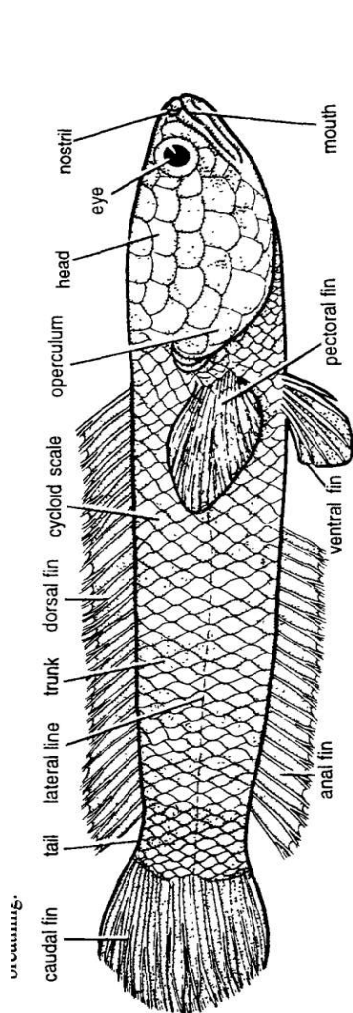


Fig. 40. *Ophiocephalus punctatus*.



## Channa punctatus

### Channa punctatus

#### Classification :

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Osteichthyes

**Geographical distribution :** It is distributed in India, Tropical Africa and Southern Asia.

**Habit and habitat :** Commonly found in fresh-water ponds and rarely in flowing waters. They are able to survive drought in dry mud with the help of an accessory respiratory organs for aerial breathing.

#### Characters:

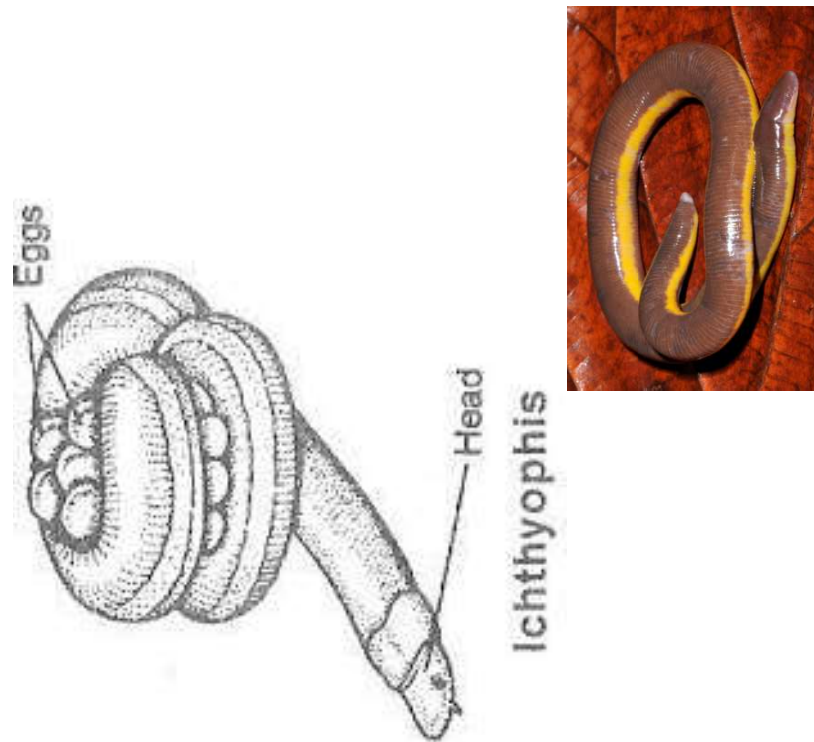
- (1) Commonly referred to as snake-headed fish. Colour of the fish varies with water, with greenish back, yellowish sides and striped abdomen. Some specimens possess scattered dots on the head.
- (2) Body is elongated and cylindrical and differentiated into head, trunk and tail. Head and body covered with cycloid scales. Head contains nostril, mouth and eyes.
- (3) Head triangular, tapers into a pointed snout. It appears like the head of a snake. Hence it is called snake headed fish. Teeth present on jaws and palate. Maxillae excluded from border of upper jaw. Lower jaw protruding beyond upper jaw.
- (4) Dorsal and anal fins are long. Pectoral fins nearer to ventral fin. Dorsal fin extends from near operculum upto near caudal fin.
- (5) Caudal fin is rounded and fan-shaped.
- (6) Lateral line is slightly curved. Air bladder long.

**Economic importance :** *Ophiocephalus* is eaten as food. Its raw flesh is used to cure ulcers.

**Special features:** It can breathe atmospheric air due to the presence of a supra-branchial cavity. The fish acts as a host for camallanid nematodes.

**Identification :** Since this fish has characteristic anal and dorsal fins and the above features, hence it is *Ophiocephalus*.

## Ichthyophis



## Ichthyophis

### Ichthyophis giutinosa

#### Classification :

Phylum: Chordata (Dorsal tubular nerve cord, notochord and gill-slits)

Subphylum: Vertebrata (Cranium with brain present)

Class: Amphibia (Cold blooded. Scaleless glandular skin. Can live in water and land)

Order: Gymnophiona or Apoda (Vermiform Amphibia without limbs)

**Geographical distribution :** Ichthyophis is distributed in tropical regions and found in Sri Lanka, Philippines, India (Mysore) and is the only representative of Gymnophiona living today in tropical countries.

**Habit and habitat :** Ichthyophis lives in burrows and leads a fussyorial life in moist ground. The animal is blind and adapted for burrowing life. It feeds on invertebrates.

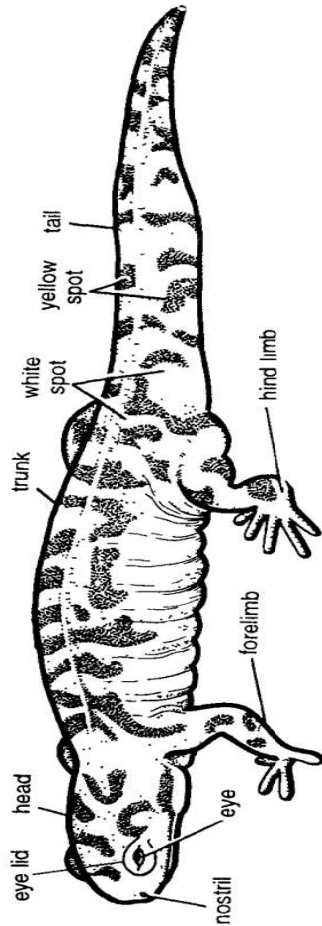
#### Characters:

- (1) Commonly called as caecilian.
- (2) Animal is worm-like and slender, measuring about 30 cm in length. Body divided into head, trunk and tail.
- (3) Body is covered with a smooth, slimy and transversely ringed skin consisting of small calcified scales
- Skin glands in skin discharge an irritating fluid.
- (4) Head contains eyes, nostrils and a pair of sensory tentacles.
- (5) Eyes small, functionless and covered by skin.
- (6) Skull compact, roofed with bone.
- (7) Limbs and limb girdles absent.
- (8) Males are provided with eversible copulatory organ, which shows advanced characters. Fertilization internal. Male's cloaca is everted like copulatory organ. Eggs are laid in moist burrows. Mother coils around eggs till they hatch into tadpoles.

**Special features :** Ichthyophis resembles Amphibia in having a 3-chambered heart, conus arteriosus, urinogenital organs and brain eggs like Amphibia. The animal also shows parental care, as the females take care of the eggs by keeping them in the coils of the body, till they hatch.

**Identification :** Since the animal is limbless, contains calcified scales and vestigial tail and above features, hence it is Ichthyophis

## Amblystoma



## Amblystoma

*Amblystoma trigrinum* Tiger Salamander

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Amphibia

**Geographical distribution :** Adult Ambystoma is terrestrial, found in North America, Central Mexico and the United States. Upper Cretaceous to Recent.

**Habit and habitat :** Adults are terrestrial.

**Characters :**

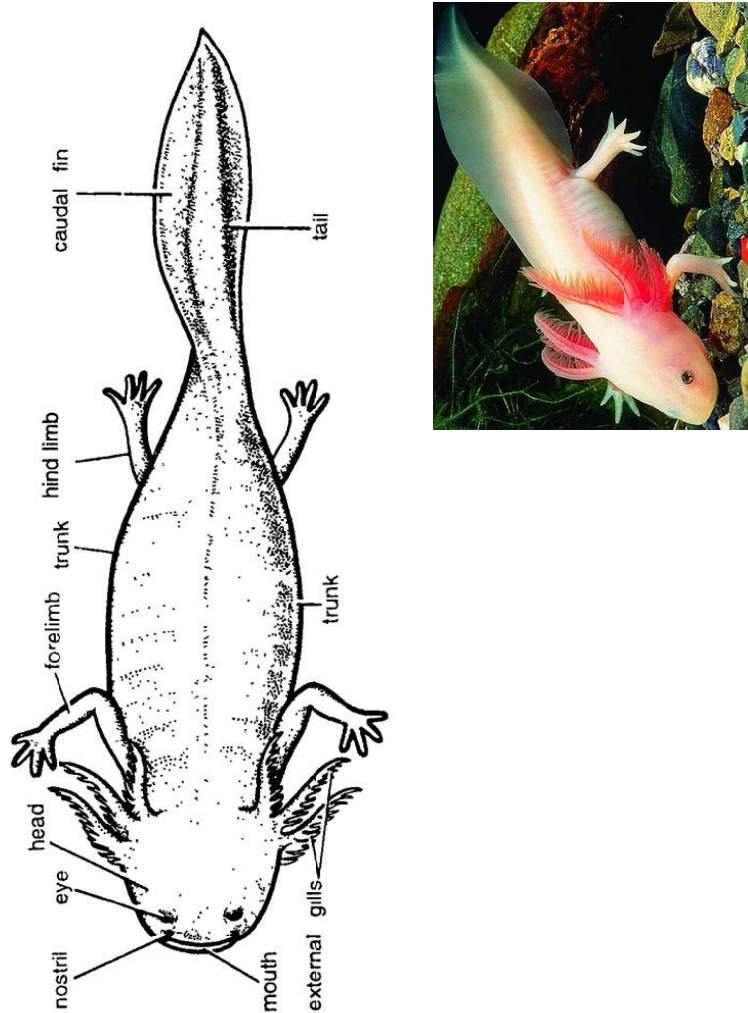
- (1) Commonly known as Tiger salamander or Spotted salamander.
- (2) Body is lizard-like, has transverse grooves and measures 18 to 20 cm in size. Body divisible into head, trunk and tail.
- (3) Tiger salamander (*A. trigrinum*) has more spots extending over belly. Skin poisonous.
- (4) Head is depressed with large mouth and contains eyes and a pair of poison glands called paratoids. External gills and tail fin are absent.
- (5) Limbs well-developed. Forelimbs and hind limbs contains 4 and 5 digits, respectively.
- (6) Prevomers short and devoid of posterior processes, teeth across rear margins of vomers. No teeth
- (7) Sexes are separate. Fertilization internal. Fertilized egg develops into an Axolotl larva.

**Special features :** The axolotl larva is famous for neoteny in which larva develops gonads and breeds like metamorphosed mature adult.

**Identification :** Since this amphibian contains spotted skin and above features, hence it is *Ambystoma trigrinum*



## Axolotl larva



## Axolotl larva

Axolotl Larva

Classification: Same as that of Ambystoma.

### Characters :

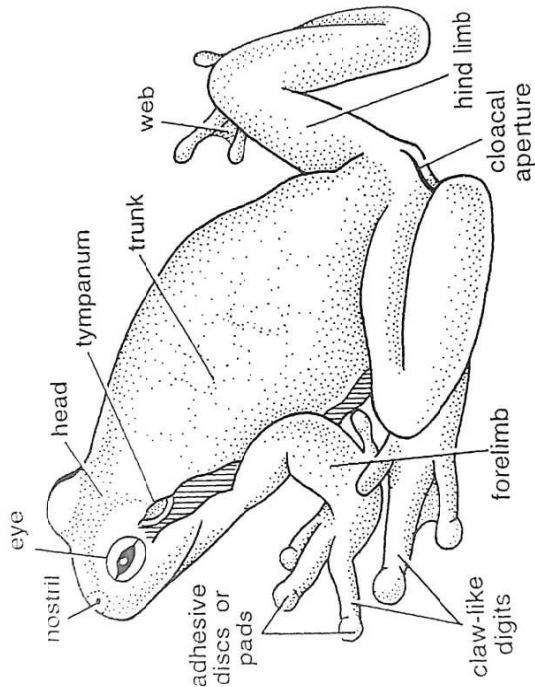
- (1) The Axolotl larva was previously considered as adult form and called Siredon. Later on it was found to be larva of Amblystoma.
- (2) It has 3 pairs of crimson coloured external gills and 4 pairs of open gill clefts. Head contains eyes, nostril and mouth.
- (3) Larva is perennial. Body measuring about 27 cm in length is divided into head, trunk and tail. Tail is provided with caudal fin. Forelimbs and hind limbs present.
- (4) It becomes sexually mature and lays eggs.
- (5) Axolotl larva in captivity metamorphoses to adult. Metamorphosis can be induced by injecting thyroid injections into Axolotl larva. Axolotls of six months or more are easily induced for metamorphosis. Metamorphosis to adult becomes difficult as the larva grows older.

**Special features :** Axolotl larvae of Ambystoma do not undergo metamorphosis if there is abundance of nutrition and oxygen supply and they develop gonads like adult to breed sexually. The phenomenon of neoteny or paedogenesis is either due to lack of iodine or heredity and environment.

A. mexicanus is supposed to be genetically neotenic.

**Identification :** Since this larva has 3 pairs of gills and above features, hence it is Axolotl larva. limbs are underdeveloped and possess long, thin digits.

## Hyla



## Hyla

**Hyla arborea** Tree Frog

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Amphibia  
 Family: Hylidae

**Geographical distribution** : Hyla is commonly distributed in India, China, United States, Africa and Canada.

**Habit and habitat** : Hyla is arboreal in habit, living on trees and rocks.

### Characters :

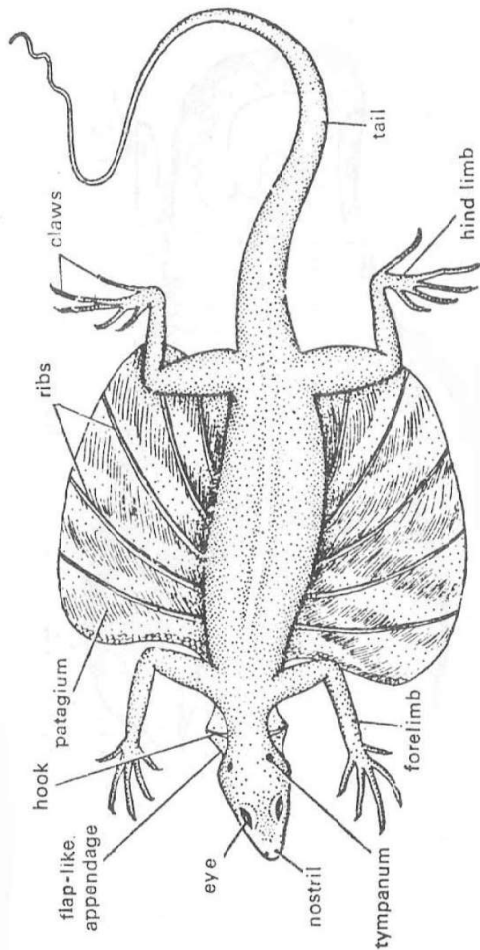
- (1) Commonly known as tree frog.
- (2) Body measuring 3 to 8 cm in size and divided into head and trunk.
- (3) Head contains eyes and nostrils.
- (4) Forelimbs and hind limbs adapted for arboreal life. Terminal base of each digit is claw shaped and toes contain expanded adhesive discs or cushions which are used to climb trees.
- (5) Eyes well developed with horizontal pupil. Tympanum distinct. Voice often loud.
- (6) Skin of belly contains hygroscopic glands which help in adhering the frog with leaf, twigs or stem.
- (7) Upper jaw toothed, lower jaw without teeth (edentulus).
- (8) Transverse processes of sacral vertebra are dilated.
- (9) Fertilization external. Eggs are laid in water. Development includes tadpole larva. Study of Museum Specimens

**Special features** : Hyla arborea is a tree-living frog, and adapted from amphibious to arboreal life. They also change their colour according to their environment and show camouflage or mimicry. Hyla faber shows peculiar parental care. It comes down from the tree. Females dig up mud of shallow pond, make small nurseries, and eggs are laid in them. The larvae hatch and go into submerged water.

**Identification** : Since this Anura contains adhesive discs in limb toes and above features, hence it is Hyla.



## Draco



## Draco

Draco volans : Flying Lizard

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Reptilia  
Order Squamata

**Habit and habitat :** Draco is arboreal, living on trees. It feeds on small insects.

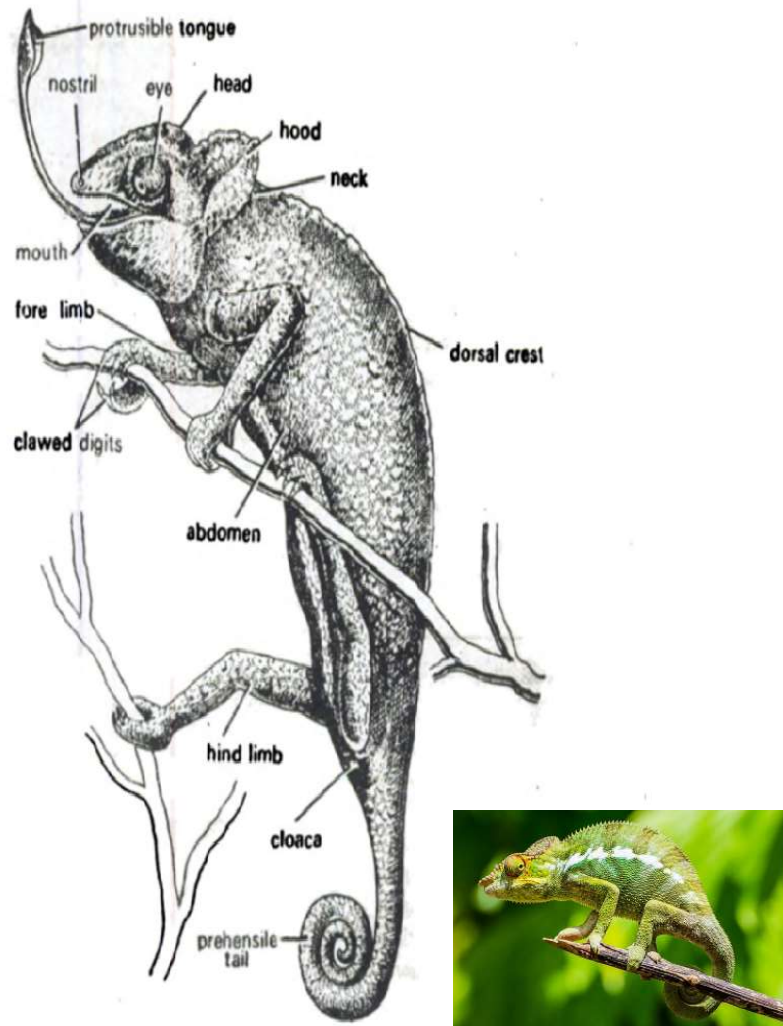
### Characters :

- (1) Commonly known as Dying dragon or flying lizard.
- (2) Body is dorsoventrally compressed, measuring 15 to 22 cm in length ; divided into head, neck, trunk and tail.
- (3) Head is more or less triangular and contains eyes, tympanum behind eye and nostril. Eyes are small with eyelids. Teeth heterodont and attached to the edges of the jaws.
- (4) Tongue is thick and short. Some animals have thoracic sac or dorsal spiracles.
- (5) Neck contains three hooks forming flap like appendages. Below the neck there are sac-like structures known as gular pouches, which are larger in males than females and they help in copulation.
- (6) Forelimbs and hind limbs normal.
- (7) On both sides of the body wing or patagium formed by extension of skin is present. Patagium is supported by lateral ribs.
- (8) Tail long, slender and whip-like.

**Special features :** Draco shows extreme adaptation for flying life and thus avoids its enemies on the ground. Most significant structures are membranous wings or patagia, which allow it to glide from a height. Flying lizard is adapted for climbing and gliding from higher to lower branches. Draco is brilliantly and beautifully coloured like flowers of trees in which it lives and thus it shows camouflage (mimicry).

**Identification:** Since this lizard contains patagium and above features, hence it is Draco.

## Chameleon



Department of Zoology, P.R.G.C., KKD

## Chamaeleon

### Chamaeleon vulgaris

#### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Reptilia  
 Order Squamata

**Geographical distribution:** Chamaeleon has world-wide distribution. It is found in Africa, Europe, Asia, India and Sri Lanka.

**Habit and habitat :** It is arboreal and feeds on insects.

#### Characters :

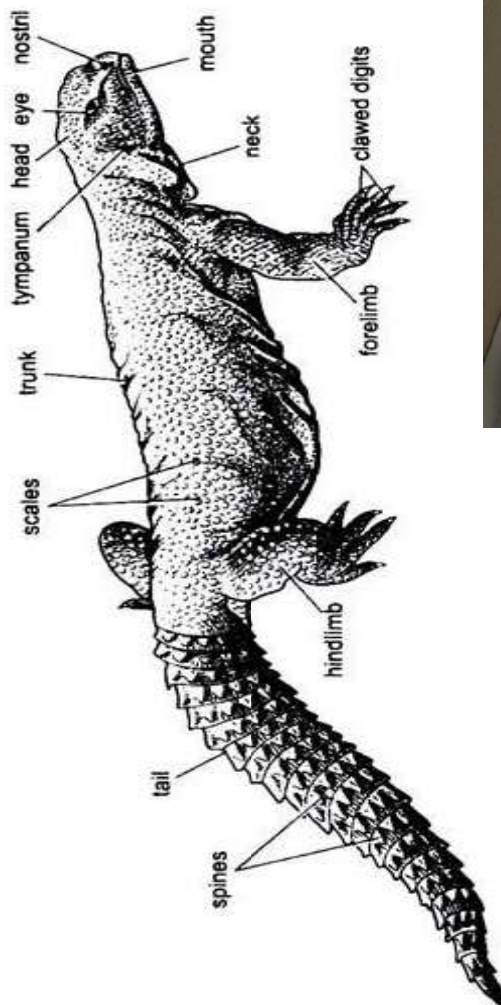
- (1) Chamaeleon has a compressed body covered with scales and divided into head, neck, trunk and tail.
- (2) Trunk region occupying most part of the body is slightly bent and contains row of spines or crest along mid-dorsal line.
- (3) Head has wide mouth, large eyes, and helmet like appearance
- (4) Eyes are large and adapted for binocular vision; they work independently while catching insects.
- (5) Tip of tongue club-shaped and mucus-coated. Tongue is projectile and can be shot several inches beyond head to catch prey.
- (6) Acrodont teeth are found on maxillaries and mandible.
- (7) Both forelimbs and hind limbs well developed. The toes are opposed (2 versus 3) for grasping branches of trees.
- (8) Tail prehensile and meant for coiling round branches of trees.

**Special features :** Chamaeleons are famous for changing their colour of the skin according to the surrounding. Protective colouration.

**Identification :** Since this reptile contains hood, syndactyl limbs, prehensile tail and all above features, hence it is Chamaeleon

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## Uromastix



## Uromastix

*Uromastix hardwickii*

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Reptilia  
 Order: Squamata

**Habit and Habitat:** Uromastix is commonly called spiny-tailed lizard/Desert Lizard. They tend to establish themselves in hilly, rocky areas with good shelter. They are regularly eaten, and sold in markets, by local peoples. Uromastix tend to bask in areas with surface temperatures of over 50 °C. Uromastix are primarily herbivorous, but occasionally eat insects. Uromastix are burrowing lizards.

**Geographical Distribution:** Uromastix inhabit a range stretching through most of North and Northeast Africa, the Middle East, and Asia.

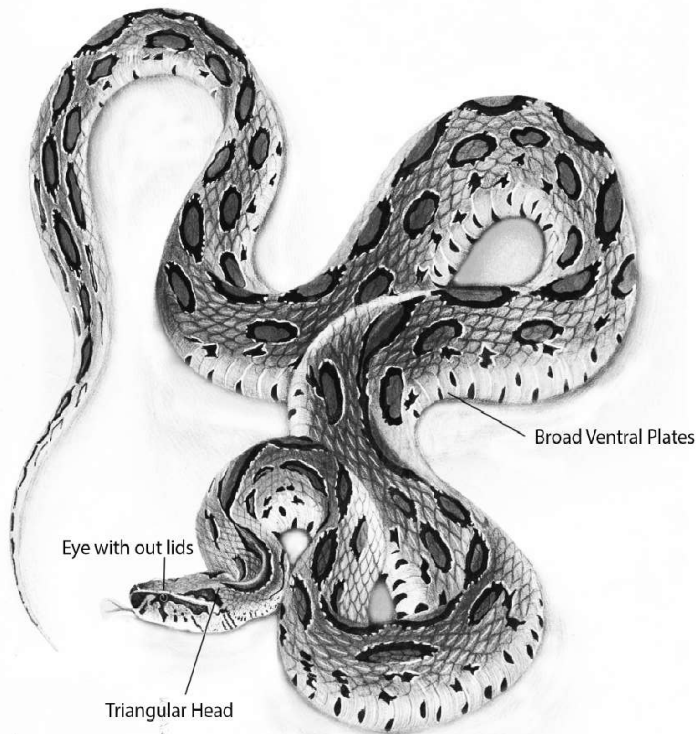
### Characters

1. It is a common lizard seen in sandy areas and deserts.
2. It resembles the wall lizard except for the presence of spinous tuft over the tail. The size ranges around 25 cm.
3. Body is divided into a head, neck, trunk, and tail. Cloaca is a transverse slit at the junction of the trunk and tail. Their spiked tail is muscular and heavy.
4. Tail can regenerate when lost.
5. Skin is dry, rough, and covered by ectodermal scales.
6. It can withstand higher temperatures of the environment and is poikilothermic in nature.
7. Skull is of diapsid type and jaws are toothed.
8. Oviparous organism. A female Uromastix can lay anywhere from 5 to 40 eggs.
9. Wild female uromastix are smaller and less colorful than males.

### Identifying features

Their spiked tail is muscular and heavy, and can be swung at an attacker with great velocity, usually accompanied by hissing and an open-mouthed display of (small) teeth. Dry skin, diapsid skull, toothed jaws are the other features.

## Russel's Viper



Department of Zoology, P.R.G.C., KKD

## Russel's Viper

*Vipera russelli*

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Reptilia  
 Order: Squamata

**Geographical distribution:** Vipers are Old World snakes except Madagascar. Viper has been reported from Europe, Asia, Sri Lanka, Burma and India.

**Habit and habitat:** It is found in rocky and bushy regions. It feeds on mice, rats, lizards and birds

### Characters:

1. Viper is commonly called in telugu as Podapamu
2. Vipera russelli is also a common poisonous snake and is often called as pitless viper. Head Is Triangular And Is Covered By Ovoid Scales.
3. Body measures 2 meters in length. Head large, flat, triangular and covered with small scales.
4. A 'V' mark placed overhead. Sub Caudals Are Divided
5. Colour is brownish . Body is covered with keeled scales.
6. Facial bones movable, contains long and movable poison fangs with canals.
7. No pit between nostril and eye.
7. Ventral Scales Are Wide And Cover The Entire Ventral Surface.

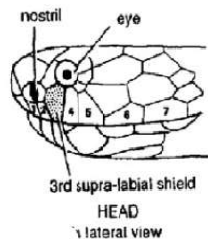
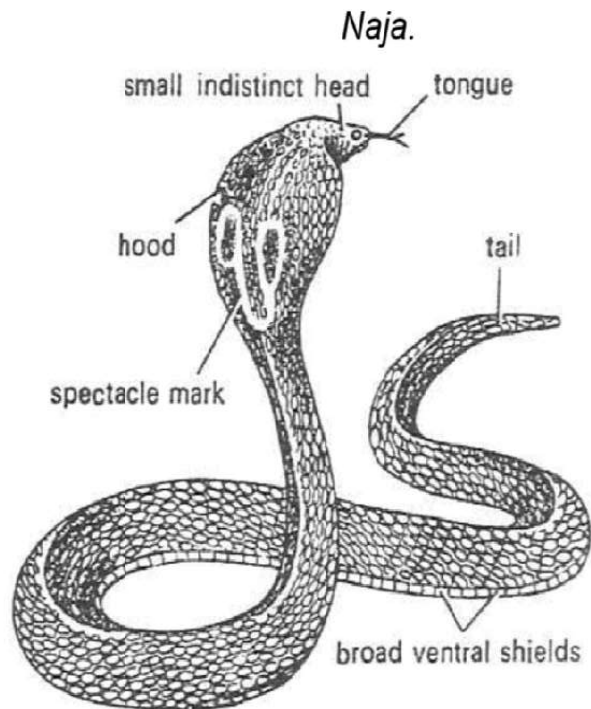
**Special features.** The snake remains coiled with the head in the centre of the coil tongue is protruded, body rhythmically swells and hissing sound is produced. Its bite is fierce and is fatal to man.

**Identification.** The Head Is Flattened, Triangular. the snake contains characteristic ventral shields and above features, hence it is Vipera.

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## Naja naja



Department of Zoology, P.R.G.C., KKD

## Naja naja

*Cobra: Naja naja*

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Reptilia  
Order: Squamata

**Geographical distribution :** Naja has wide distribution, found in India, Africa, China, Australia, New Guinea and Egypt.

**Habit and habitat:** Cobra is diurnal, shy, living in holes, under stones, mud walls and in thick vegetation. It is oviparous, carnivorous and feeds on frogs, rats, lizards and other snakes. Three varieties of cobras are found in India : (i) Binocellate form having spectacle-like mark, found in Maharashtra, Andhra Pradesh (ii) Monocellate with single oval mark surrounded by ellipses found in Bengal, (iii) Non-cellate without mark found in Rajasthan, Gujarat and Madhya Pradesh.

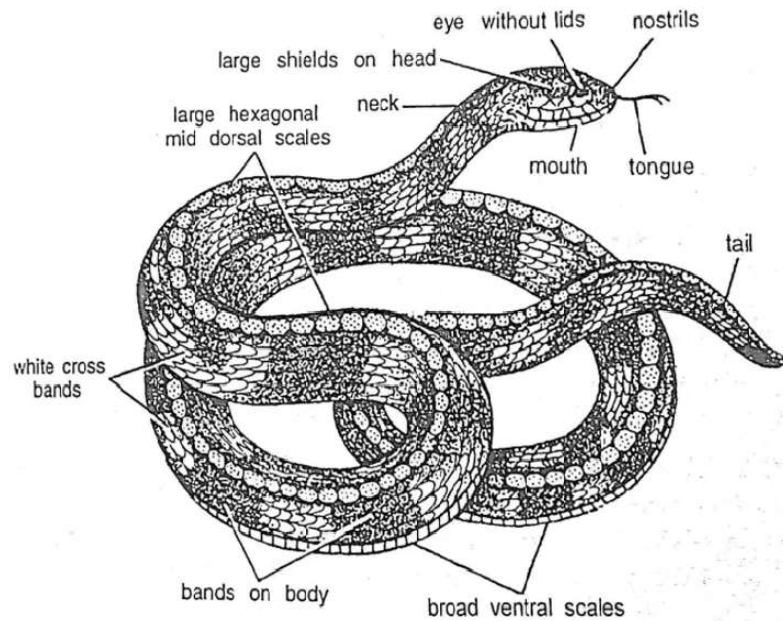
### Characters :

- (1) Commonly known as cobra. Naja naja is Indian cobra or Nagu/trachu pamu in telugu.
- (2) Body measures 2 to 3 metres in length and is wheatish in colour.
- (3) Body divided into head, neck, trunk and tail. Head contains mouth, eyes and head hood
- (4) Neck region is dilatible with elongated ribs. It expands to form hood which contains binocellate mark on dorsal surface.
- (5) Third shield of upper lip (supralabial) is large and extends from ocular (Eye) to nasal shield. (Nostril)
- (6) Tail shields on the undersurface of the tail are in a double row.
- (7) Body is covered by smooth oblique scales
- (8) Poison fangs are followed by 1-3 small teeth.

**Special features :** Cobras are deadly poisonous snakes. They rise their hood when alarmed and the hood sways back and forth for striking the object. During this period it produces hissing sound. The snake-bite cases should be immediately attended by medical persons. Naja hanna is called as King cobra because it eats other cobras.

**Identification :** Since this snake has characteristic hood and its mark hence it is Naja naja

## KRAIT



Department of Zoology, P.R.G.C., KKD

## KRAIT

*Bungarus bungarus* Krait

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Reptilia  
Order: Squamata

**Geographical distribution :** Bungarus is found in South East Asia, all over India and Malaysia.

**Habit and habitat :** It is a common snake, found in the crevices of walls, under the logs and stones. It is nocturnal and feeds on smaller snakes, toads and mice. It is shy and considerate. It attacks only when disturbed or trodden with foot.

### Characters :

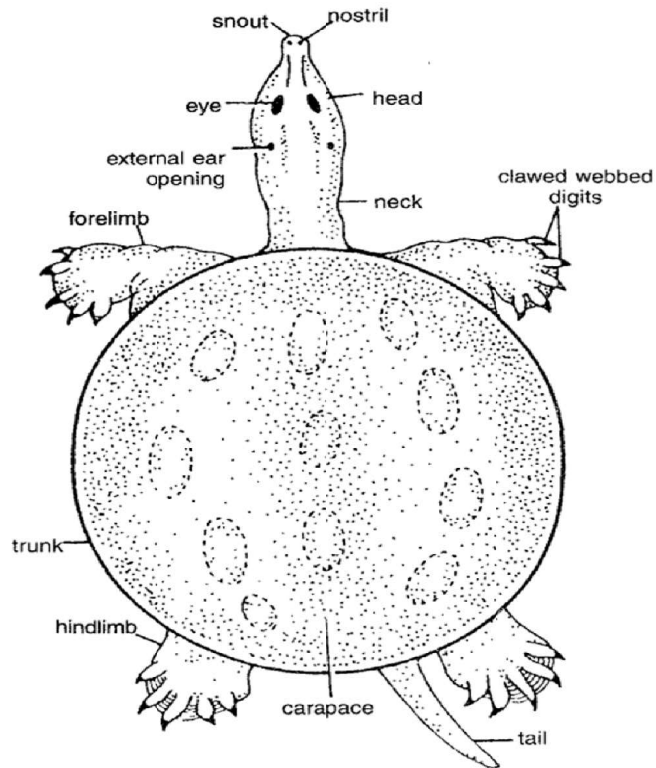
- (1) Commonly called as Krait.
- (2) Body is elongated and cylindrical, measuring one metre in length. Body divided into head, neck, trunk and tail.
- (3) Colour of body steel-blue and dark-blue. Dark-blue, patches alternate with white cross bands.
- (4) Head is not differentiated from the neck. Loreal absent. Fangs small. Head contains eyes, nostrils, bifid and protrusible tongue.
- (5) Eyes are of moderate size with round pupils.
- (6) Head is covered by plates. Fourth sub labial is large. Ventral side is light white in color
- (7) Large mid-dorsal hexagonal scales are present. Ventral scales beyond the anal region are in a single row.
- (8) Oviparous. Female shows parental care.

**Special features :** Bungarus is a deadly poisonous snake, its venom being more poisonous than that of cobra. Its venom is neurotoxic affecting brain. After an hour of the bite, the victim feels sleepy and if immediate antivenom is not given, the patient may die.

**Identification :** Since this snake contains hexagonal scales on body on dorsal side and above features, hence it is Bungarus



## Trionyx



Department of Zoology, P.R.G.C., KKD

## Trionyx

*Trionyx gangeticum*

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Reptilia  
Order: Chelonia

**Geographical distribution :** Trionyx is widely distributed in India, North America, Africa, Asia.

**Habit and habitat :** Trionyx gangeticum is a common fresh-water and pond terrapin.

### Characters

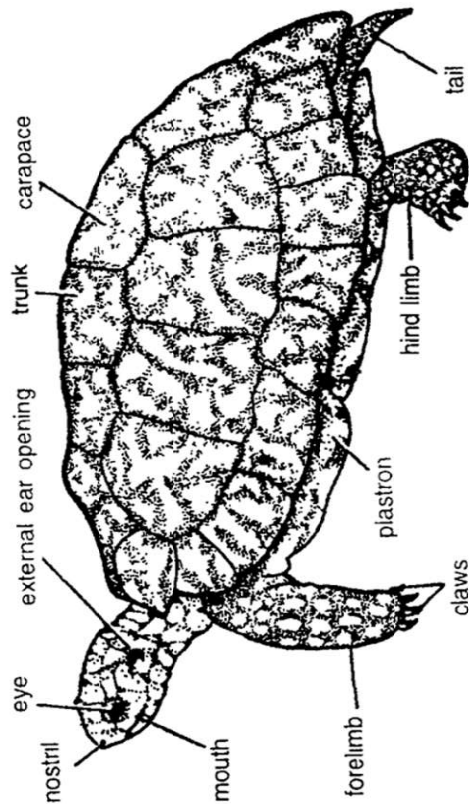
- (1) Commonly called as torto or soft river terrapin.
- (2) Body is flat, oval and encased in bony shell. Skin is smooth and leathery. Body divided into head, neck, trunk and tail.
- (3) Head is pointed with greenish or blackish longitudinal streaks. Lips are fleshy.
- (4) Head contains, eyes, mouth and nostrils. Behind eyes are external ear opening.
- (5) Dorsal surface is olive to yellowish
- (6) Carapace is fused with vertebral column and ribs.
- (7) Lateral parts of carapace are composed of 8 costal plates.
- (8) Plastron best seen in inner surface consists of a pair of epiplastron, a median entoplastron and paired xiphiplastron.
- (9) Only neck and tail vertebrae are movable. Feet are broadly webbed and only three digits are clawed.

**Special features :** Oviparous. Eggs are laid outside water. Because of rigid shell the breathing movements are produced by protrusion of the head, movements of girdles, limbs

**Identification :** Since this terrapin contains clawed digits, webbed feet and longitudinal streaks over head and above features, hence it is Trionyx. Their spiked tail is muscular and heavy, and can be swung at an attacker with great velocity, usually accompanied by hissing and an open-mouthed display of (small) teeth. Dry skin, diapsid skull toothed jaws are the other features.

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## Testudo



*Testudo.*



## Testudo

### *Testudo elegans*

#### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Reptilia  
 Order: Chelonia

**Geographical distribution :** Testudo is widely distributed in Galapagos Islands, Africa, Europe, India and Sri Lanka. Testudo is commonly called land tortoise.

**Habit and habitat :** Testudo is found in fresh-water or on land. It feeds on small worms and insects. It also hibernates during winter season.

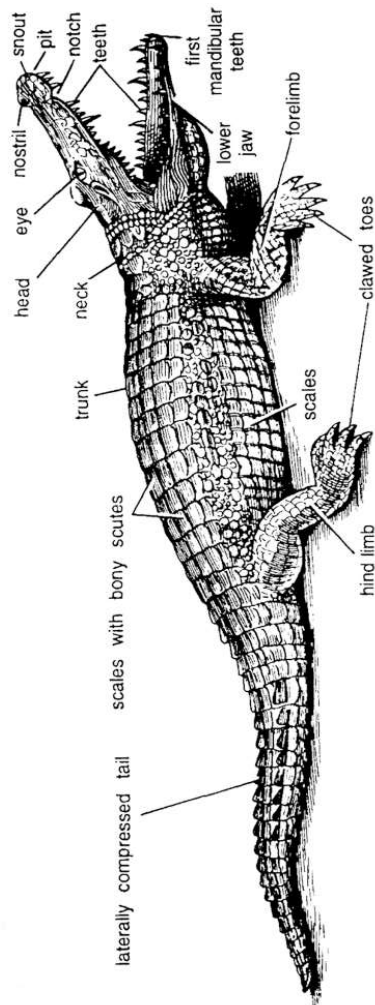
#### Characters :

- (1) Commonly known as Giant turtle. Body divided into head, neck, trunk and tail.
- (2) Body is encased in an oval shell consisting of closely sutured plate-like bones. Over the shell is a layer of leathery skin. Dorsal convex portion is called carapace and the flatter ventral portion is called plastron. These two are joined on sides by skin.
- (3) Head, mounted on retractile neck, tail, and limbs protrude between two parts of the shell and in most species can be withdrawn completely within the margins of the shell. Head contains mouth, nostril and eyes. Behind eye is external ear opening.
- (4) Jaws lack teeth but bear stout cornified sheaths to crush their food.
- (5) Thoracic vertebrae and ribs attach to the bony carapace.
- (6) Feet are stumpy. Toes end in horny claws that are useful in crawling and digging.
- (7) They are uricotelic.
- (8) Male has an erectile penis
- (9) Oviparous.

**Special features :** The feet are adapted for walking on land. The limbs are massively built. The clawed digits contain only two phalanges. Eggs are laid in holes (nests) in ground, dug and covered by females.

**Identification :** Since this tortoise contains polygonal scales and above features, hence it is Testudo. The shell is ovoid with well-developed horny scales, when withdrawing its head into the shell, the neck is bent like an S.

## Uromastix



Department of Zoology, P.R.G.C., KKD

## Crocodylus

*Crocodylus porosus* - Mugger

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Reptilia  
 Order: Crocodylia

**Geographical distribution:** *Crocodylus* is found in Southern Asia, Africa, Australia, Central America and India. Triassic to Recent

**Habit and habitat:** It lives in saltwater habitats and brackish wetlands of India's east coast across Southeast Asia and Africa. It is among the largest crocodiles and regarded as dangerous by people who share the same environment. It was hunted for its skin. It is carnivorous and highly predacious

### Characters

1. *Crocodylus porosus* is commonly known as Crocodile or Mugger
2. Strong and heavy or robust body measuring about 12-13 feet in length and Body is divided into head, trunk and tail.
3. Surface covered by leathery armour of scutes arranged in transverse rows.
4. Upper part of the body is dark olive brown.
5. Its head long and triangular and narrows towards snout. Jaws are long, powerful. Jaws possess thecodont and pointed, sharp homodont teeth.
6. Ear opening small and protected by a small flap of skin.
7. Tail long, heavy and laterally compressed.
8. Fore and hind limbs short and pentadactyle, s, ending in claws and with webs.
9. Cold blooded organisms having diaphragm
10. Heart 4-chambered with separate ventricles. Bladder is absent

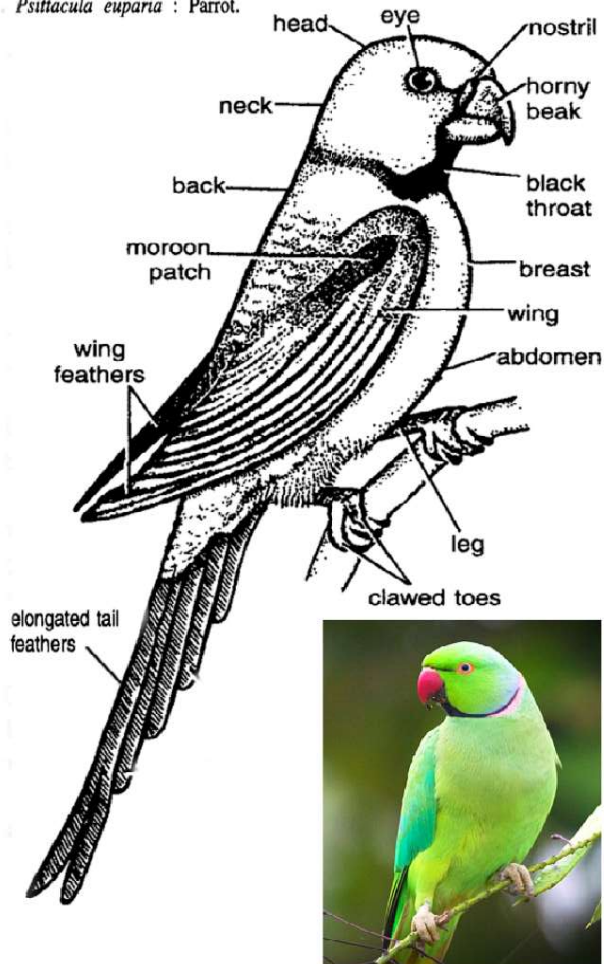
**Special features:** Crocodile is fourchambered heart and thecodont dentition.

**Identification:** Since this reptile has long and pointed snout with conical teeth and with the above features, hence it is *Crocodylus*.

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## Psittacula

*Psittacula euparia* : Parrot.



Department of Zoology, P.R.G.C., KKD

## Psittacula

*Psittacula euparia* : Parrot

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Aves  
 Order: Psittaciformes

**Geographical distribution** : *Psittacula euparia* is found in India, Pakistan, Myanmar, Sri Lanka and the United States.

**Habit and habitat** : It is found on tall trees in flocks in city as well as in villages. It is also commonly found in the fruit trees, ripe crops and in jungles. Gregarious with loud voices. Feeds on fruits and crops.

### Characters

- (1) Commonly called as Indian parakeet or parrot. Telugu name is Ramachiluka
- (2) It has brilliant blue-green plumage with massive, deeply-hooked red bill
- (3) Body is divisible into head, neck, back, breast and abdomen. Head contains eye, nostril and horny beaks.
- (4) Beak stout, narrow, red in colour sharp edged and hooked at the tip and adapted for fruit eating.
- (5) Syrinx is well adapted for producing sweet sound and even it can speak on training.
- (6) Feet adapted for grasping, holding and climbing. the I and IV digits are directed backwards and II and III forward to provide a firm grip on the branch of the tree.
- (7) Tail feathers elongated. Maroon patches on wing feathers.
- (8) Flight is graceful and voice powerful.
- (9) Sexual dimorphism is present. Female is green all over, but the male has a rose pink and black neck collar ring.
- (10) Nesting season December to April.

**Special features** : Parrot is a popular domesticated cage bird, found almost in every home and it copies and speaks some words like man. It is a serious agricultural pest to the cultivators and food growers. It causes enormous harm to standing crops and ripening orchard fruits. It eats maize, pulse, groundnuts and sometimes does considerable damage in newly sown fields. Its voice is sharp

**Identification** : Since this bird has green plumage and all above features, hence it is *Psittacula*

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## Bubo



Department of Zoology, P.R.G.C., KKD

## Bubo

Bubo bubo - OWL

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Aves  
Order: Strigiformes.

**Geographical distribution:** Bubo bubo has worldwide distribution, specially found in India, Pakistan and Burma.

**Habit and habitat:** Bubo bubo is a nocturnal bird, living in woody places and avoids heavy forests. In day time, they live in bushes and amongst the tree branches. It feeds on small mammals, rodents, birds, lizards and other animals. It hides in retreat in day.

### Characters

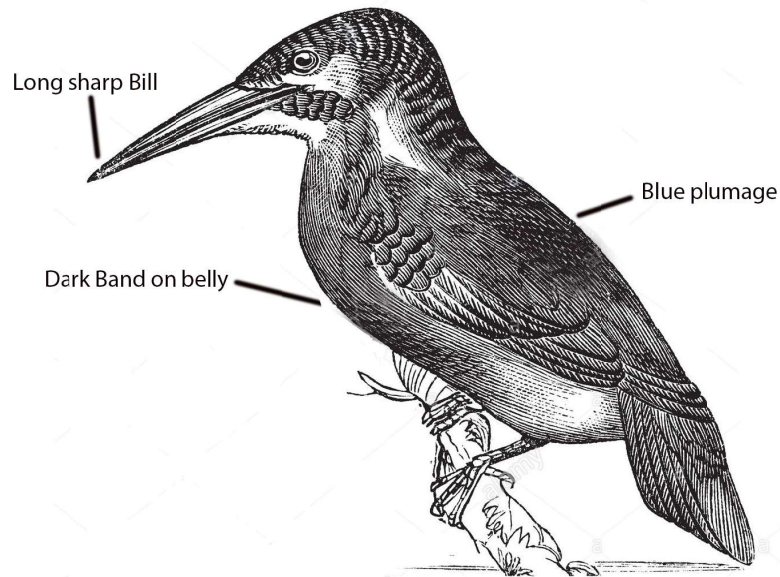
1. Bubo is commonly called the great horned owl. In telugu it is known as gudlaguba
2. It is a fierce looking large owl with large rounded head, huge orange gold eyes and long horns or ears. Plumage soft textured.
3. Bird is heavily built with dark brown back and spotted with buff. The dark brown underside is streaked.
4. Beak is short. Eyes are large, yellow and forwardly directed, each in a disk of radial feathers.
5. Ear opening is large, often with flap-like cover
6. Legs are fully feathered. Feet adapted for grasping; claws sharp.
7. Nesting season November to April.
8. It can stand erect on its hind legs

**Special features:** Bubo bubo is of great economic value to mankind by destroying the harmful animals like rats and mice and these birds need careful protection. Soon after sunset, they produce deep soothing prolonged sounds. females can grow to a total length of 75 cm

**Identification:** Since this bird has large forwardly directed eyes and above features, hence it is Bubo.

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## Alcedo



## Alcedo

Kingfisher - Alcedo atthis

### Classification

Phylum: Chordata

Sub-Phy: Vertebrata

Class: Aves

Order: Coraciiformes

**Geographical distribution** : Common kingfisher is found throughout Europe and Asia as far east as Japan. They are also found in Africa India and Burma.

**Habit and habitat** : Common kingfisher is commonly found by streams, village tanks, roadside puddles, kutclui wells, brackish backwaters. Common kingfisher is a omnivores bird. They feed on fishes, aquatic insects, prawns, crabs, tadpoles, water beetles and crustaceans, including freshwater shrimps. The nesting and breeding season is between March to September.

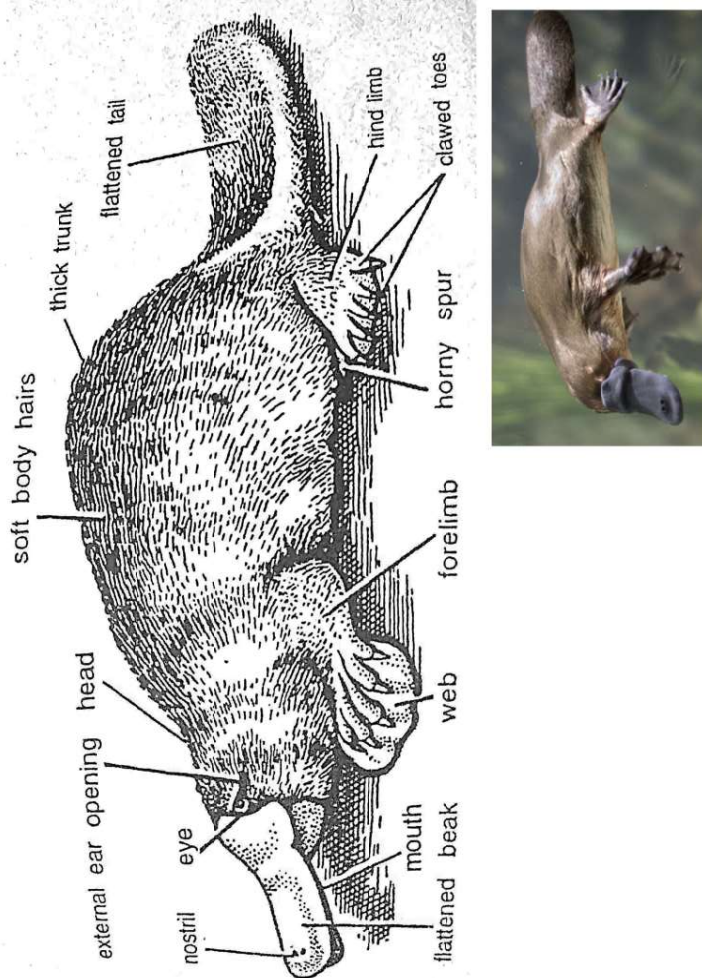
### Characters

1. Common kingfisher is a medium sized colorful bird. Upper parts are bright metallic blue, including the head.
2. They are omnivores. Both sexes are very similar, but the male's bill is all bluish black while the female's is black with orangish red on the lower mandible.
3. They have small red feet. Their beaks are long, sharp and strong for the purpose of catching and holding prey.
4. Mating only occurs in the warmer months of the year, starting in April and ending sometimes as late as October.
5. common kingfishers can live for as long as 15 years.
6. Kingfishers are a good indicator of ecosystem health. Because kingfishers eat small aquatic animals, they are severely effected by toxins in the water. A strong kingfisher population usually means a healthy enviroment.
7. Feet have three forwardly directed and one backwardly directed fingers such feet help in holding the branches with a firm grip
8. Both parents will raise and feed the young. However, the female will do most of the work. Common kingfishers will brood 2 to 3 clutches a year. These clutches consist usually of 6 or 7 eggs

### Identifying features:

This sparrow-sized bird has the typical short-tailed, large-headed kingfisher profile; it has blue upperparts, orange underparts and a long bill.

## Ornithorhynchus



## Ornithorhynchus

Duck-bill - Ornithorhynchus

### Classification

Phylum: Chordata  
 Sub-Phy: Vertebrata  
 Class: Mammalia  
 Order: Monotremata

**Geographical distribution :** Found in South Eastern Australia and Tasmania.

**Habit and habitat :** It is a native of rivers, pools and creeks. It burrows to 12 to 15 metres along the river banks. It feeds on fresh-water invertebrates

### Characters:

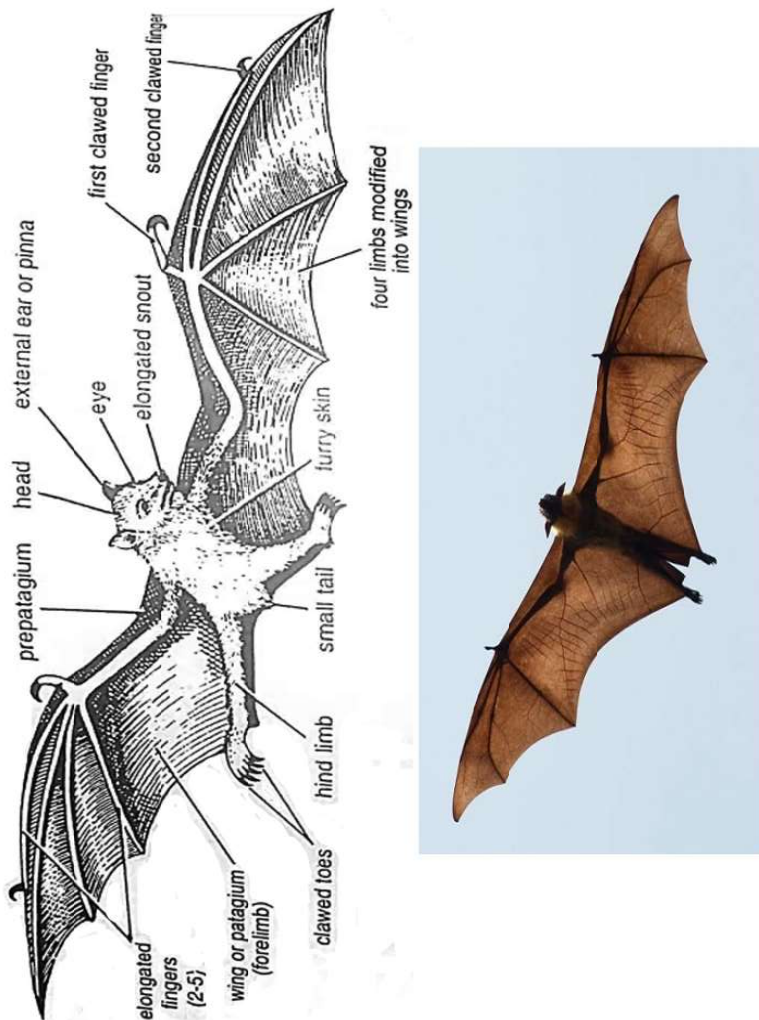
- (1) Commonly called as duck-billed-platypus.
- (2) It measures about 50 cm in length having fine short fur, dark brown colour and combines the characters of a duck with a mammal.
- (3) Body is divided into head, thick trunk and tail. Body and tail contain soft hairs.
- (4) Head distinct. Upper jaw produced to form a flattened beak which is covered with a smooth, hairless skin that forms a free fold at the base of the beak. Head contains nostril, mouth and external ear opening.
- (5) Adult has no teeth. Jaws covered with horny plates. Pinnae absent.
- (6) Forelimbs and hind limbs have 5 digits, web and clawed toes. Hind limb has horny spur. Tail is flattened and adapted for swimming.
- (7) Coracoid and precoracoid present. T-shaped interclavicle.
- (8) Eyes small having nictitating membrane. Mammary glands without nipples.
- (9) Cloaca present. Ureters open in dorsal wall of urinogenital passage.
- (10) Female makes nest out of roots and leaves during spring in burrows, lays 1-3 eggs. About 0.5 cm long young one is hatched. It nurses by lapping up milk secreted by scattered mammary glands on the abdomen of female.

**Special features:** Ornithorhynchus is an egg-laying mammal and exhibits reptilian, mammalian and intermediate characters. Reptilian features are urinogenital system, precoracoids, absence of pinna and corpus collosum. Mammalian features include hair, diaphragm, 4-chambered heart, 3-ear ossicles, etc. Intermediate features include mammary glands without nipples, acromion spines in the scapulae and body temperature between 25 - 28°C is imperfect thermoregulator. .

**Identification :** Since this mammal has flat bill and above features, hence it is Ornithorhynchus



## Pteropus



Department of Zoology, P.R.G.C., KKD

## Pteropus

Pteropus = Cynopterus : Flying Fox

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Mammalia  
Order: Chiroptera

**Geographical distribution :** Found in South Eastern Asia, especially in India.

**Habit and habitat :** Adapted for arboreal and aerial mode of life. Live in groups and feed on fruits (frugivorous) and often damage orchards. They sleep by day on tree branches.

### Characters :

- (1) Commonly called Fruit bat or Flying fox and in telugu gabbilam
- (2) Body is dark-brown coloured and shoulders are golden yellow. Body divisible into head, neck, trunk and tail and patagium.
- (3) It is capable of true flight. The forelimbs are modified into wings.
- (4) Each wing formed by a fold of skin or patagium supported by elongated forelimb and 2nd to 5th fingers. Only 1st and 2nd fingers bear claws.
- (5) Hind limbs and tail also included in patagium. Before patagium is prepatagium. Hind feet small with sharp and curved claws. Tail small and stumpy.
- (6) Head small having small external ears, large eyes, snout and small teeth.
- (7) During sleep, head hangs downwards with wings folded clock-like around body.

### Special features :

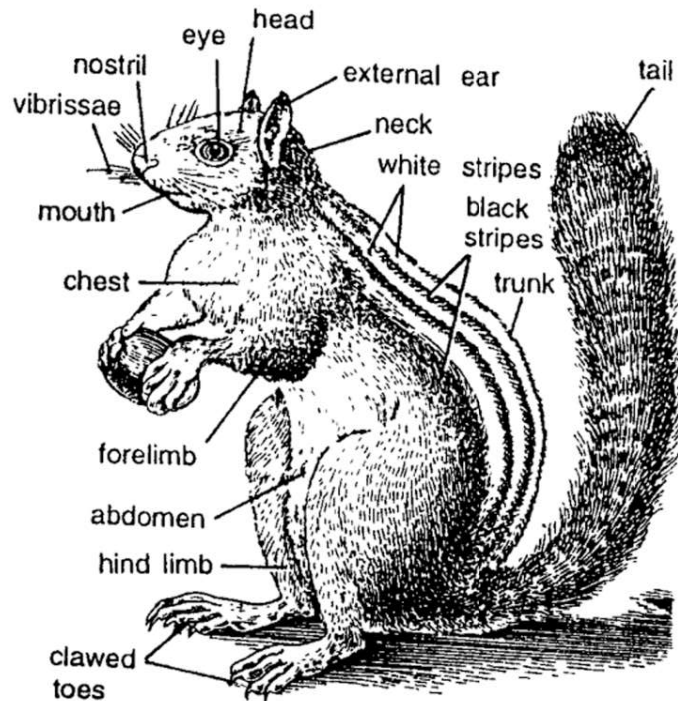
- (i) They have phylogenetic significance with insectivores,
- (ii) They are the only flying mammals,
- (iii) They are used for experimental purposes
- (iv) Feces of bats are used as fertilizer,
- (v) Bats have highly developed Sonar or Echoapparatus, a kind of radar. While flying they constantly send out ultrasonic sound waves consisting of periodic clicks, which strike on objects or wire and are reflected back to bat. Rate of click increases 50-150 seconds as the object is approached. Ultrasonic sounds are produced from the vocal cords.

**Identification :** Since the animal has patagium and above features, hence it is Pteropus

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## Funambulus



*Funambulus* : Squirrel.



## Funambulus

Funambulus - Squirrel

### Classification

Phylum: Chordata  
Sub-Phy: Vertebrata  
Class: Mammalia  
Order: Rodentia

**Geographical distribution :** Funambulus has world-wide distribution. It is found on all continents and islands.

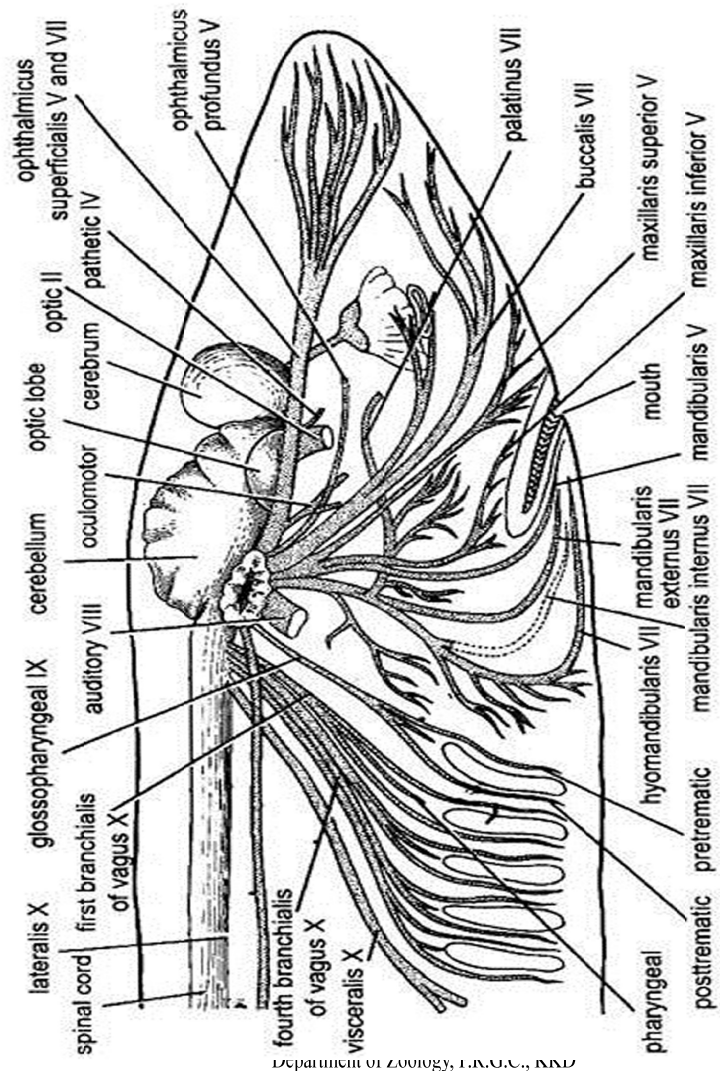
**Habit and habitat :** It lives on trees, ground and is fast runner. It feeds on fruits and seeds. It builds nest of twigs and leaves. It is diurnal.

### Characters :

- (1) Commonly called as squirrel and in Telugu Udutha
- (2) Body contains three white and grey stripes on dorsal side, absent on neck. Body divisible into head, neck, trunk or back, chest, abdomen and tail.
- (3) Ventral side and limbs covered by small grey hairs.
- (4) Head contains snout with moustaches nostrils, large eyes and well developed pinnae.
- (5) Forelimbs and hind limbs well developed with clawed toes. Tail elongated and bushy.
- (6) Incisors are chisel-like, grow continuously, There is a gap between incisors and cheek teeth. Canines are absent. Palate narrow.
- (7) Squirrel is also used for experimental ,mrposes. It is largely used in cancer studies.
- (8) Squirrel destroys fruit crops.

**Identification :** Since this mammal has bushy tail, stripes and above features, hence it is Squirrel

## Scoliodon III, VII, IX and X Cranial nerves



DEPARTMENT OF ZOOLOGY, F.A.U.C., BND

Scoliodon. A side view of the brain and cranial nerves.

## Scoliodon III, VII, IX and X Cranial nerves

Procedure. Make a longitudinal incision in the middle of head from the gill cleft region up to the snout and also make transverse incisions on one side up to the lower edges. Remove the flap of skin. There are 10 pairs of cranial nerves emerging from the cranium as given in the following table :

Cranial Nerves of Scoliodon.

| Name of the Nerve               | Originates from                                    | Nature  | Innervation   |
|---------------------------------|--|---------|---|
| I. Olfactory                    | Olfactory lobe                                     | Sensory | Nose epithelium   |
| II. Optic                       | Optic thalamus                                     | Sensory | Retina  |
| III. Oculomotor                 | Ventral surface of mid-brain                       | Motor   | Eye muscles (anterior rectus, superior and inferior recti and inferior oblique) |
| IV. Pathetic                    | Dorso-lateral side of mid-brain                    | Motor   | Superior oblique muscle of eye  |
| V. Trigeminal                   | Side of medulla just below corpora restiformis     | Mixed   |   |
| It has 5 branches :             |  |         |   |
| (a) Ophthalmicus profundus      | —  | —       | Olfactory capsule and dorsal skin of snout                                      |
| (b) Ophthalmicus superficialis  | —  | —       | Skin of snout   |
| (c) Maxillaris superior         | —  | —       | Skin of upper jaw   |
| (d) Maxillaris inferior         | —  | —       | Posterior part of upper lip   |
| (e) Mandibularis                | —  | —       | Muscles of lower jaw  |
| VI. Abducens                    | Ventral side of medulla                            | Motor   | Posterior and external rectus muscles of eyes                                   |
| VII. Facial                     | Cranium  |         |   |
| It has the following branches : |  |         |   |
| (a) Ophthalmicus superficialis  | —  | —       | Sense organs of snout   |
| (b) Ramus buccalis              | —  | —       | Infra-orbital lateral line organ  |
| (c) Ramus hyomandibularis       | —  | —       |   |
| It has 3 branches :             |  |         |   |
| (i) Mandibularis externus       | —  | —       | Mandibular canal  |
| (ii) Mandibularis internus      | —  | —       | Mucous membrane of buccal floor   |
| (iii) Hyoidean                  | —  | —       | Muscles of hyoid arch   |
| (d) Ramus palatinus             | —  | —       | Roof of pharyngeal and buccal cavity  |
| VIII. Auditory                  | Side of Medulla close to V and VIII cranial nerves | Sensory | Internal ear  |
| IX. Glossopharyngeal            | Ventro-lateral side of medulla                     |         |   |
| It has 2 branches :             |  |         |   |
| (a) Pre-trigeminal              | —  | —       | Mucous membrane 1st gill-slit & pharynx   |
| (b) Post-trigeminal             | —  | —       | Muscles of pharynx  |
| X. Vagus                        | Side of medulla                                    |         |   |
| It has 3 branches :             |  |         |   |
| (a) Branchialis                 | —  | —       | Gills   |
| (b) Visceralis                  | —  | —       | Visceral organs   |
| (c) Lateralis                   | —  | —       | Lateral line of trunk   |

