VIVEKANANDA COLLEGE

(Residential & Autonomous – A Gurukula Institute of Life – Training)

College with Potential for Excellence

Re-accredited with "A" Grade (CGPA 3.59 out of 4.00) by NAAC

Affiliated to Madurai Kamaraj University, Managed by Sri Ramakrishna Tapovanam, Tirupparaitturai, Trichy

Tiruvedakam West, Madurai District-625 234, Tamil Nadu

DBT STAR COLLEGE SCHEME

Department of Biotechnology, Government of India, New Delhi

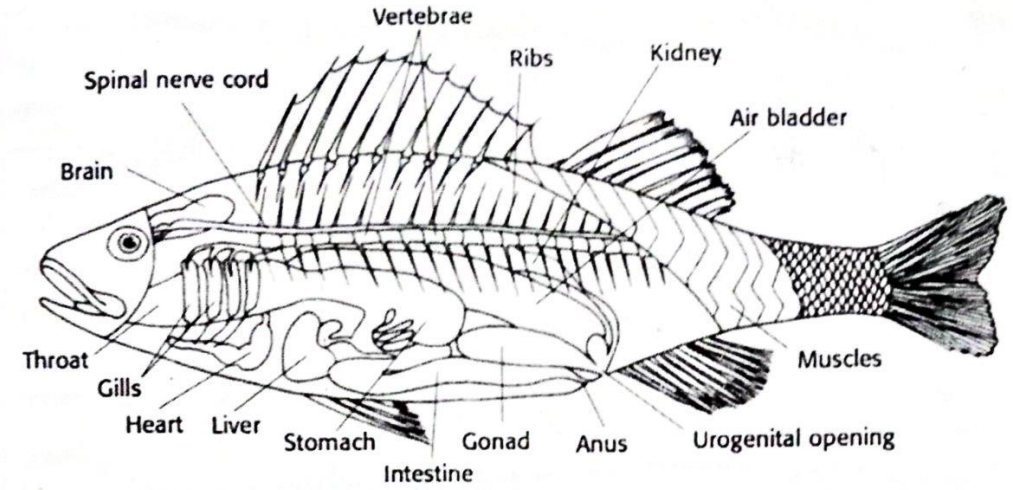
Chairman & Principal : Dr. T. Venkatesan, M.Com., B.Ed., M.Phil., PGDCA., Ph.D

Coordinator & Member Secretary : Dr. G. Ponraj, M.Sc., M.Phil., Ph.D

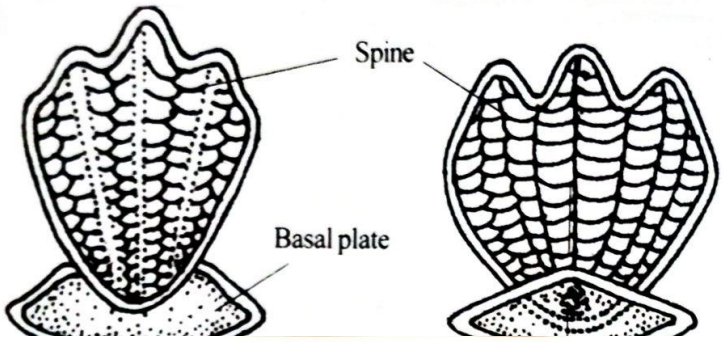
Practical Manual- Chordates

Content

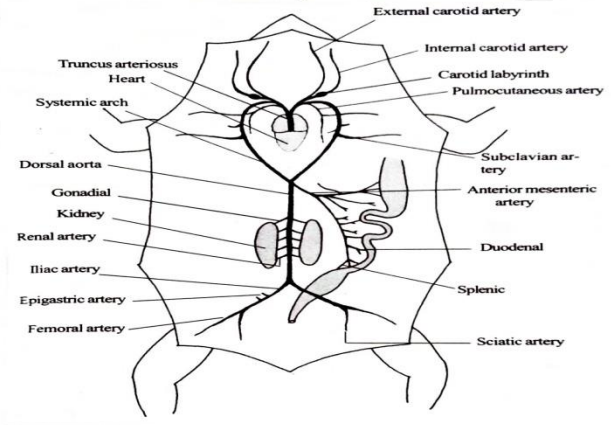
Fish – Dissection and observation of visceral organs



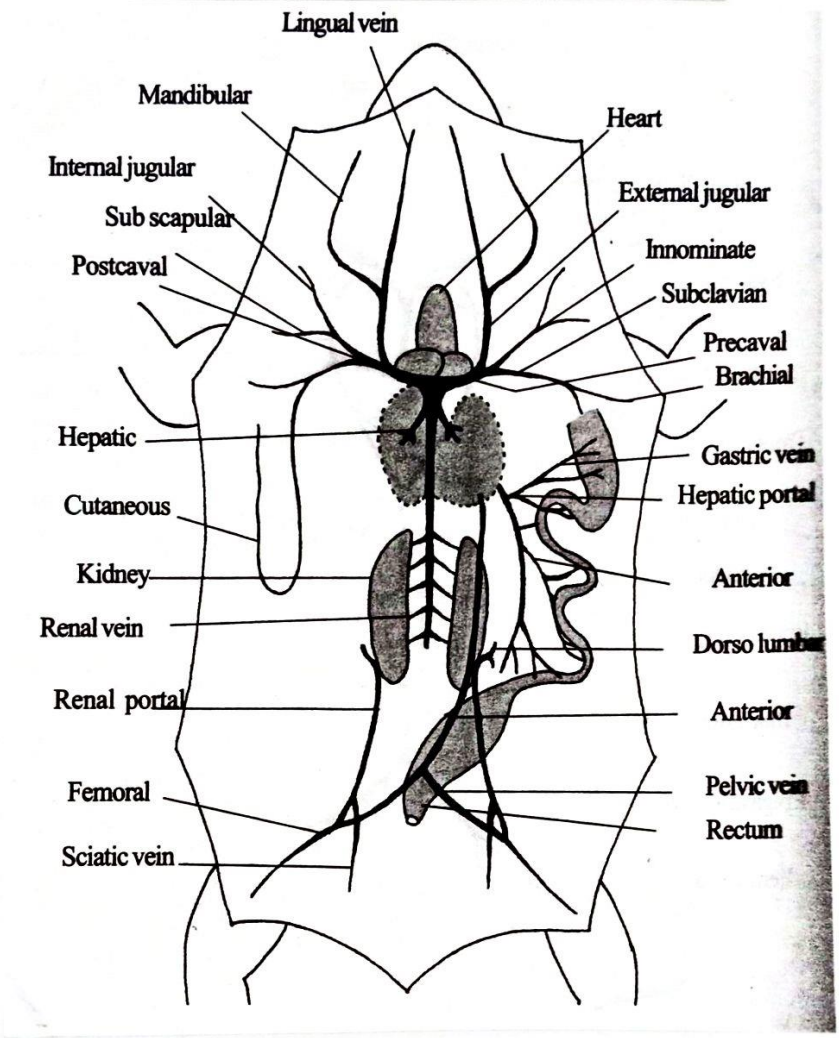
Shark- Mounting of Placoid Scales



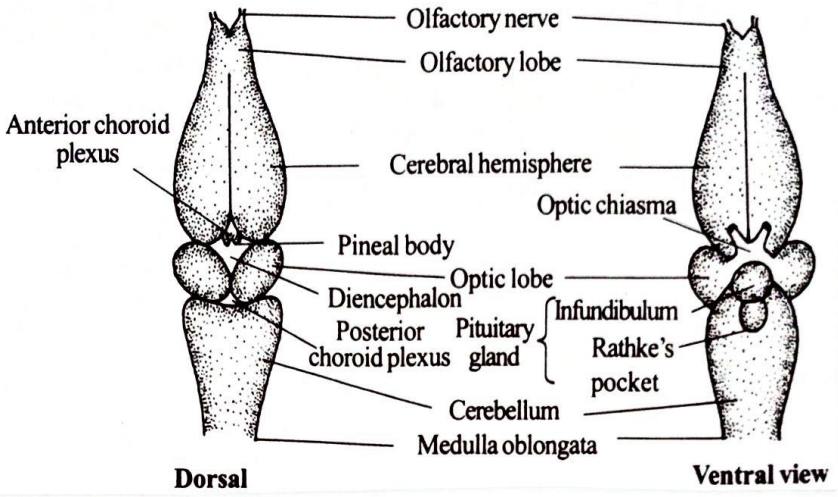
Arterial system of Frog



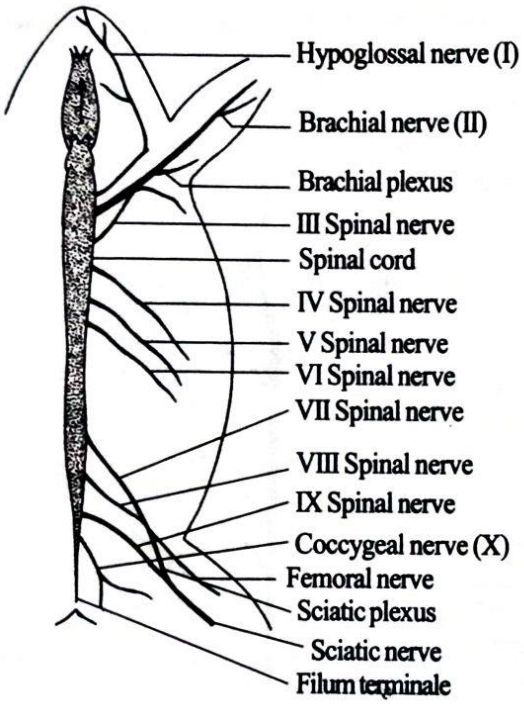
Venous system of Frog



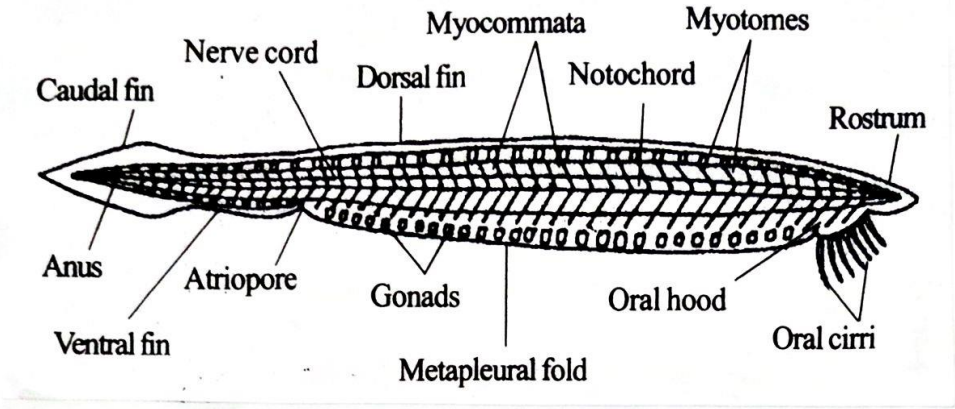
Brain of Frog



Spinal nerves of Frog



Amphioxus



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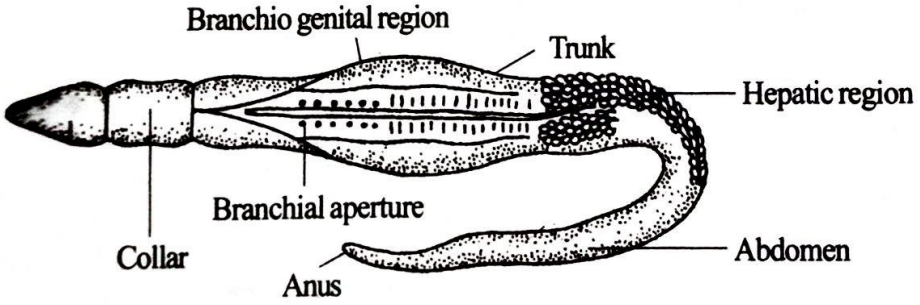
Balanoglossus



Amphioxus

Identification:

The given spotter is Amphioxus.

Comments:

1. Amphioxus is a protochordata.
2. It is commonly called Lancet.
3. It is a marine fish-like burrowing animal.
4. The body is laterally compressed and pointed at both ends.
5. The anterior end has a snout is called rostrum.
6. The body contains a dorsal fin, a ventral fin and a caudal fin.
7. On the ventral side there are two folds of the skin called metapleural folds
8. The myotomes are arranged on both sides and are separated by myocommata.
9. The mouth is situated ventral to the rostrum and is guarded by oral hood bearing numerous oral cirri.
10. A single atriopore lies ventrally at the junction of the metapleural folds and ventral fin.
11. The anus lies on the left side just in front of the posterior end.
12. The sexes are separate.
13. The development is direct.
14. The notochord extends from the anterior end to the posterior end.

Balanoglossus

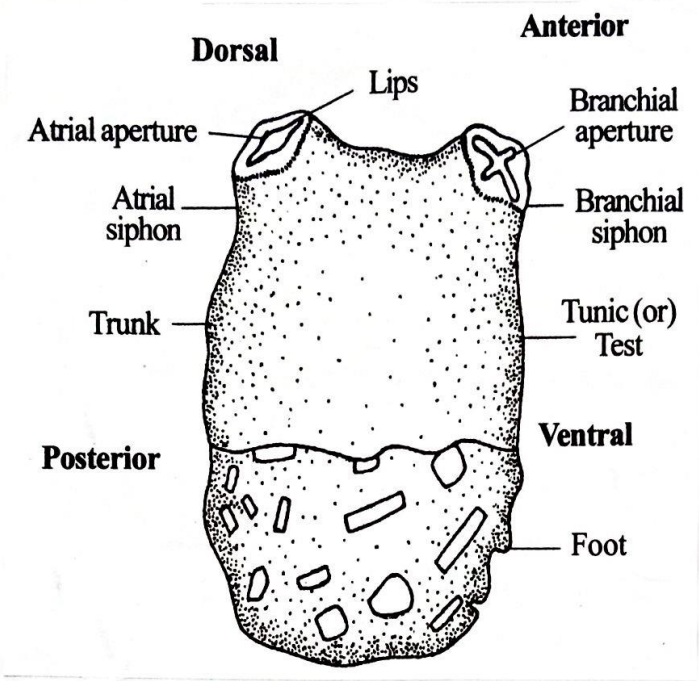
Identification:

The given spotter is Balanoglossus.

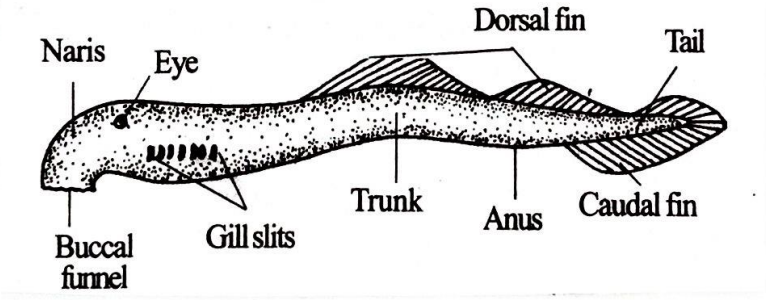
Comments:

1. Balanoglossus is a protochordate and it commonly called acorn worm.
2. It is a marine animal.
3. It is burrowing in habit.
4. It is cylindrical in shape; growing to a length of 10-50 cm.
5. The body consists of three regions namely an anterior proboscis, a collar and a posterior long trunk. The proboscis is conical in shape. It is used for burrowing. The collar connects the proboscis with the trunk.
6. The trunk is long and it is transversely wrinkled. It consists of three regions, namely an anterior branchio-genital region, a middle hepatic region and a posterior abdominal region.
7. The branchial region contains two rows of branchial apertures.
8. The genital region contains gonads.
9. The hepatic region contains hepatic caeca.
10. The mouth is located at the anterior end of the collar.
11. The anus is situated at the posterior end of the abdomen.
12. The notochord is represented by an outgrowth of the buccal cavity called buccal diverticulum.
13. The sexes are separate and fertilization is external.
14. The development is indirect and it includes a larva called tornaria larva.
15. It is a connecting link between invertebrata and chordata.

Ascidian



Petromyzon



Ascidian

Identification:

The given spotter is Ascidian.

Comments:

1. Ascidian (Herdmania) is a prochordate and it is commonly called sea squirt.
2. It is a marine animal.
3. It is a sedentary animal attached to the substratum with the help of a foot.
4. The body is covered by a thick covering tunic or test.
5. The free end of the body is provided with two external opening called branchial aperture and atrial aperture, situated on branchial siphon and atrial siphon respectively.
6. The mouth opens to the outside through the branchial aperture and the anus open to the outside by the atrial aperture.
7. The branchial and atrial apertures have four lips.
8. The alimentary canal is U-shaped.
9. The pharynx contains many pairs of gill slits.
10. They are hermaphrodites.
11. The development is indirect and it includes a free swimming larva called ascidian tadpole.
12. The tadpole contains a notochord in the tail region, but the adult has no notochord.
13. The larva undergoes retrogressive metamorphosis to become the adult.

Petromyzon

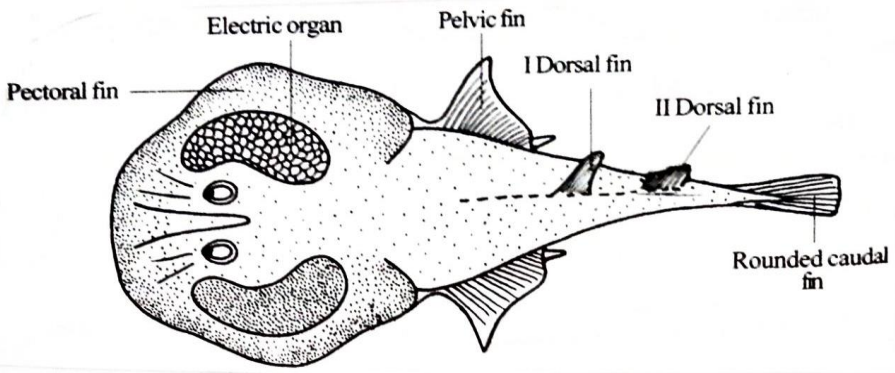
Identification:

The given spotter is Petromyzon.

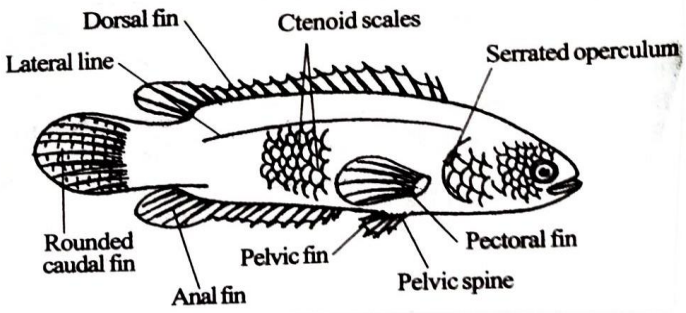
Comments:

1. Petromyzon is popularly known as sea lamprey.
2. *Petromyzon marinus*is a marine. It is an ectoparasite. It sucks the blood of fishes and turtles.
3. It has an elongated cylindrical and eel-like body.
4. The body consists of three regions, namely head, trunk and tail.
5. The head is cylindrical and has a buccal funnel, a mouth a single naris, a pair of eyes and seven pair of gill slits.
6. The mouth is surrounded by a cup like structure called buccal funnel.
7. The centre of the buccal funnel has a circular mouth. A tongue protrudes through the mouth.
8. The tail is laterally compressed. It has a caudal or tail fin. The tail fin is also supported by fin rays.
9. The skeleton is cartilaginous and not bony. It is made up of skull, vertebral column and a set of rods.
10. The Circulatory system is a closed type.
11. The Excretory system is made up of a pair of mesonephric kidneys.
12. The development is indirect. It includes a larva called ammocoetes.

Narcine



Anabas



Narcine

Identification:

The given spotter is Narcine.

Comments:

1. Common ray: Electric ray, Vernacular name (Tamil: Thimili)
2. Narcine is a cartilaginous fish. It ismarine animal.
3. The body consists of a head, a trunk and a tail. The head is disc-shaped and dorso-ventrally flattened. The pectoral fin is extended forward to form the disc.
4. The skin is smooth without scales. Mouth is ventral.
5. Eyes are dorsal. Two spiracles are present behind the eyes. The gill slits are ventral.
6. The trunk has a pair of pelvic fins and two dorsal fins.
7. The caudal fin is rounded.
8. The tail is shorter than the length of disc.
9. It has two large electric organs on the disc. They are kidney shaped. Each electric organ is formed of muscle fibres arranged in blocks and serve as batteries.
10. The muscles are arranged into several rows of hexagonal celled electroplexes which represent the electric plates.
11. The dorsal surface of the electric plates is positive and the ventral surface is negative.
12. The electric current passes form dorsal to ventral surface. The electric organs are used for offense and defence.
13. Each organ is made up of a number of hexagonal columns. Each column is a pile of plates filled with a jelly.
14. The organs are controlled by four pairs of cranial nerve.

Anabas

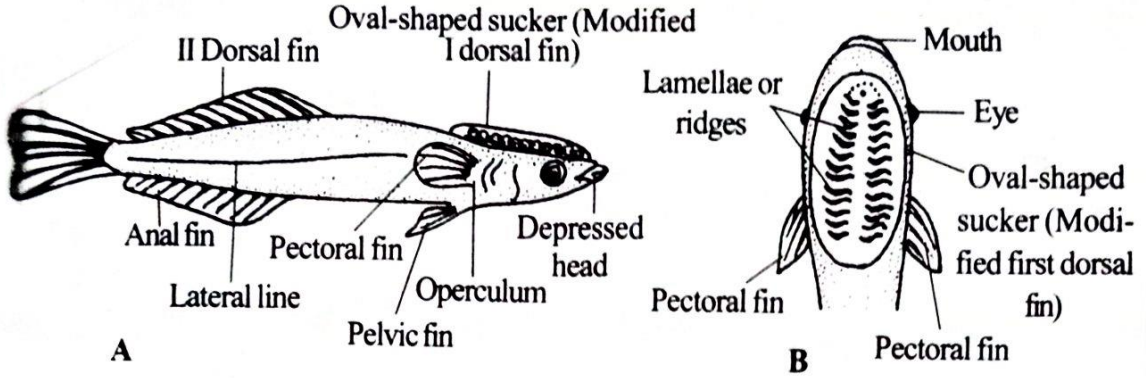
Identification:

The given spotter is Anabas.

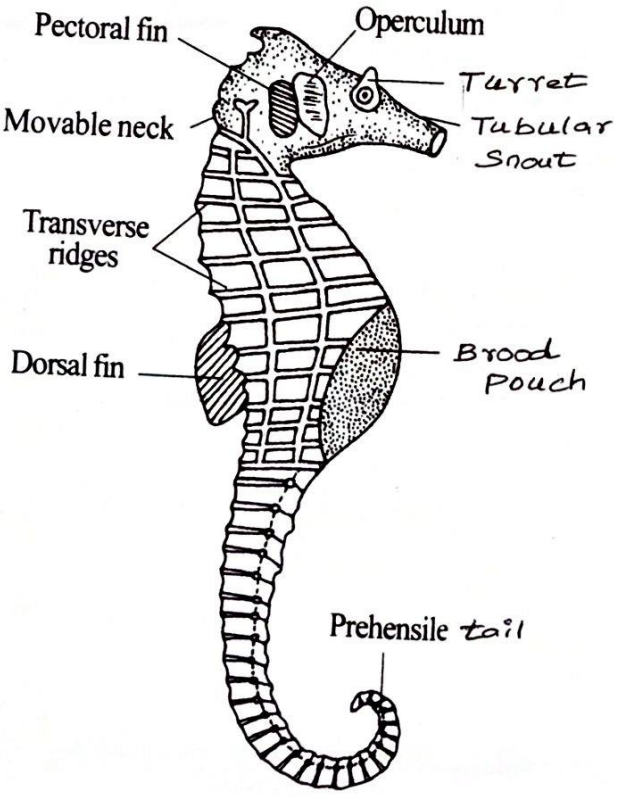
Comments:

1. Common name: Climbing perch.
2. Vernacular name: (Tamil: Panai- yeri- kendai)
3. It is a bony fish.
4. Dorsal fin single with greater spinous part and shorter soft part. Anal spines numerous but less than the dorsal.
5. The body is laterally compressed and covered with ctenoid scales.
6. Pelvic fin with one spine and five rays. Caudal fin rounded
7. Labyrinthine organs for breathing air.
8. It walks on land using its pectoral and gill covers from pond to pond, especially after a shower of rain at night (Horo,1935)
9. It is a predatory fish.
10. The name climbing perch is a mere legend. This fish cannot climb a tree. This due to faulty observation. It may be occasionally seen in the forked branches of palm trees. They actually dropped or placed by kites which catch ‘Stranded fish’ in drying ponds (Das,1940)
11. The accessory respiratory organs are well developed.

Echines



Hippocampus



Echines

Identification:

The given spotter is Echines.

Comments:

1. Common name: Remora, sucker fish, shark sucker.
2. Vernacular name: Tamil- Urikkutti.
3. Echines is commonly called sucker fish.
4. The body is elongated and cylindrical.
5. The pelvic fin thoracic, scales are small.
6. The head is dorso ventrally flattened.
7. The head contains on its dorsal side a sucker. The sucker is the modified first dorsal fin. It is flat and oval in shape. It consists of a number of transverse ridges called lamellae. The sucker is used for attachment. With the help of the sucker the fish is attached to the boats, sharks, turtles, and the aquatic mammals and is carried from place to place free of cost.
8. The second dorsal and anal fins are long.
9. The tail is homocercal.
10. In Africa, it is used for catching turtles.
11. It is an example for commensalism where the sucker fish is benefitted and its partner is not harmed.

Hippocampus

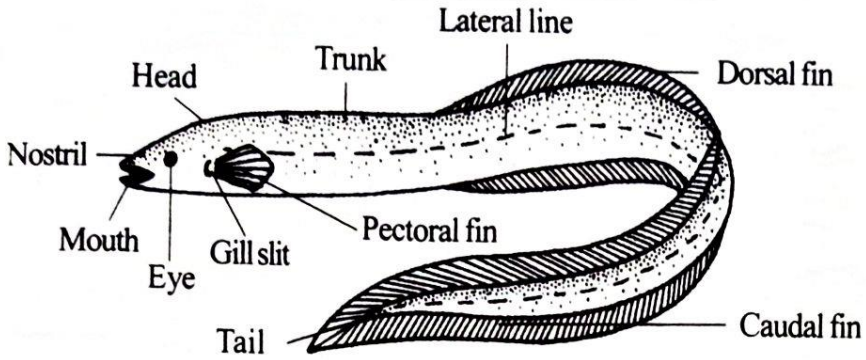
Identification:

The given spotter is Hippocampus.

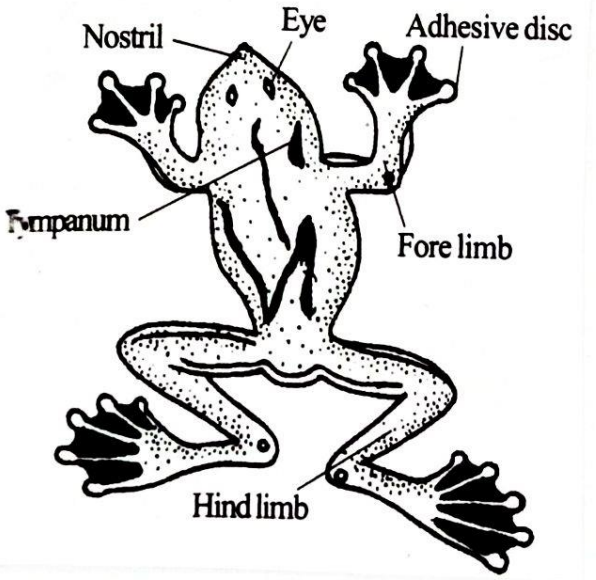
Comments:

1. Hippocampus is commonly called sea horse. It is a bony fish, it is marine fish.
2. The body consists of a head, trunk, and a tail; the body is covered with dermal scutes.
3. Body marked with circular and transverse ridges on which there are bony swellings.
4. The head is like that of a horse. The head contains a rostrum, a mouth, a pair of eyes and a pair of operculum. The rostrum is tubular. The mouth is located at the terminal end of the rostrum.
5. The trunk bears a pair of pectoral fins, a dorsal fin and a brood pouch (only in the male).
6. The tail is prehensile and without caudal fin.
7. The male has a brood pouch in the trunk. It is a modified pelvic fin. The eggs are retained in the brood pouch until they are hatched. Thus male hippocampus exhibits parental care.
8. It swims in an upright position.
9. It exhibits mimicry resembling seaweeds by developing cutaneous filaments. It is carnivores**.**
10. Sea horse has the head of a horse, the tail of a monkey, the pouch of a kangaroo, the hard outer exoskeleton of an insect. The independently moving eyes of a chameleon. But there is no suitable comparison for the labour pains of the father.

Eel



Rhacophorus



Eel (Anguilla)

Identification:

The given spotter is Eel.

Comments:

1. Vernacular name (Tamil): Vilangoo or pampoomeen.
2. It lives in fresh water and brackish water.
3. It has a snake like body with dark brown colour.
4. Scales are minute and are present inside the skin.
5. The dorsal and ventral fins are long and are continuous with the caudal fin.
6. The pectoral fins are small, the pelvic fins are absent.
7. The gill opening near the base of pectoral fin.
8. It lives in the coasts of India. A food fish.
9. Its skin is involved in respirationboth in the air and the water.
10. It is capable of catadromous migration i.e., migration from fresh water to sea for breeding.
11. After spawning, both the male and the female die in the sea.
12. Its life history includes two larval forms, namely the leptocephalus larva and the elvers larva. They live three years in the sea and then march towards fresh water.
13. It flesh has a pleasant taste and a high medicinal value.
14. Tail with a rounded caudal fin.
15. Predatory fish preying upon shrimps, ostracoderms and gastropods.
16. Body is laterally compressed and covered with cycloid and ctenoid scales.

Rhacophorus

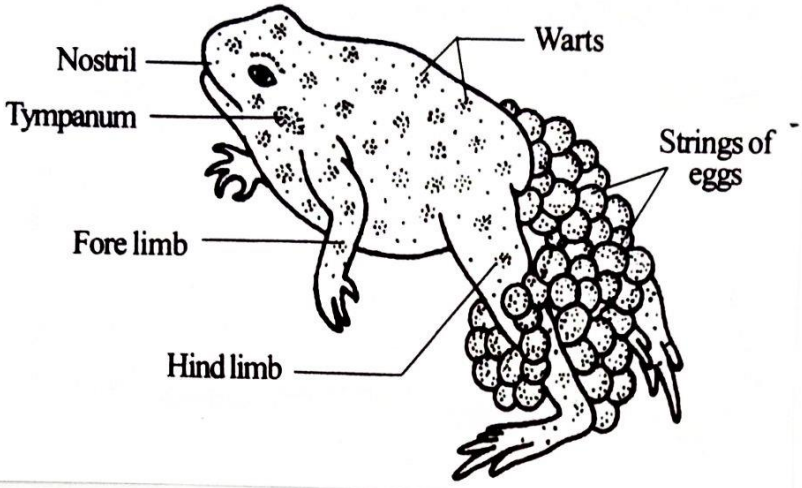
Identification:

The given spotter is Rhacophorus.

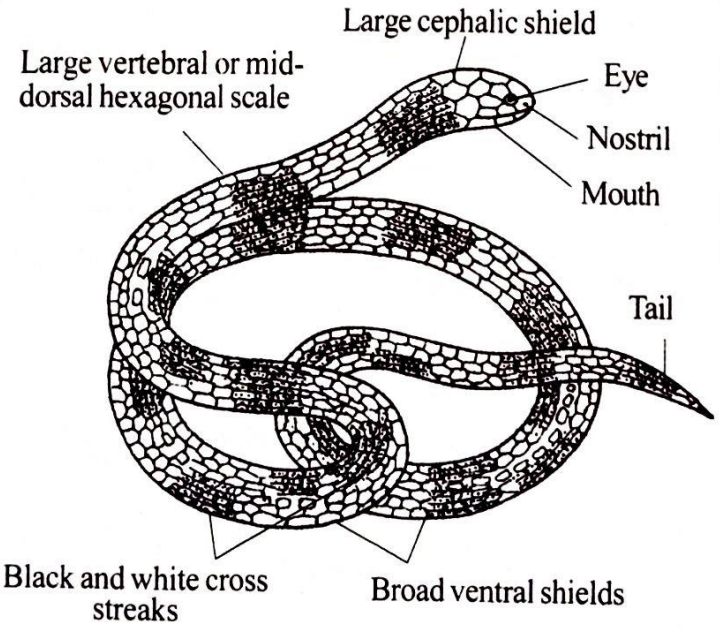
Comments:

1. It is commonly called tree frog.
2. It is an anuran amphibian.
3. Limbs long and slender.
4. The limbs are pentadactylous.
5. Both fingers and toes are webbed.
6. Fingers and toes are tipped with adhesive discs. They are used for climbing trees, walls, etc.
7. It also exhibits parental care by depositing eggs in the nests near water.
8. It has the capacity to change the colour rapidly.
9. The digits are webbed. The webbed limbs function as parachutes for gliding.
10. Skin on the dorsal surface show fine granulation and skin on the ventral surface shows coarse granulation.
11. It is found in Otacamund, Anaimalai hills (Tamilnadu) and Malabar hills (Kerela).
12. Ranids might have given rise to rhacophorids whereas Bufonids might have given rise to hylids (Young,1981).

Alytes



Krait



Bungarus.

Alytes

Identification:

The given spotter is Alytes.

Comments:

1. Common name: Obstetical toad, midwife toad.
2. It is an anuran amphibian.
3. Smaller form with rough skin.
4. Eyelids present, tympanum distinct.
5. Non-protrusible round tongue.
6. Strings of eggs around the hind limbs of male.
7. It is more terrestrial.
8. It is found in Italy and France.
9. Male exhibits parental care, male wraps strings of eggs about his body and hind limbs. Father takes care of the young ones until they take care of themselves.
10. Vocal sacs are absent.
11. Fore-limbs with four fingers and hind limbs with five toes.

Krait

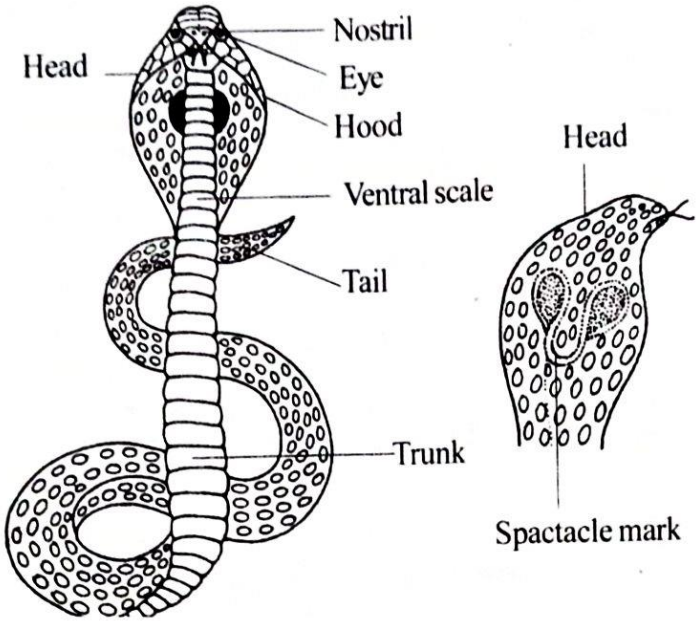
Identification:

The given spotter is Krait.

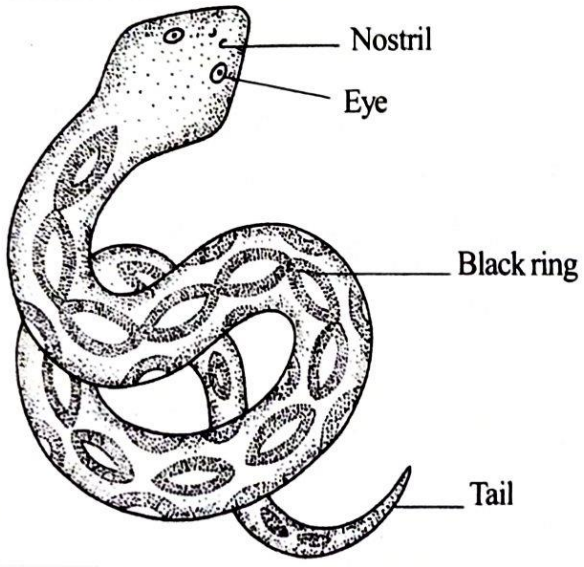
Comments:

1. Bungarus is commonly called Krait.
2. It is highly poisonous and the poison is a neurotoxin affecting the respiratory system.
3. It is a nocturnal in habit and very often comes near human dwellings.
4. The body is steel black colour with thin white cross bands. The bands are more distinct in the tail region and they gradually fade towards the anterior region. The neck and head are without cross bands.
5. It grows to a length of four feet.
6. It feeds on toads, mice and small snakes.
7. The head is not distinct from the body.
8. The head is covered with shields, the fourth infra labial is enlarged.
9. The vertebral are large and distinct.
10. The ventral are broad.
11. The sub-caudals are single.

Cobra



Viper



Vipera russelli (Russel's Viper).

Cobra

Identification:

The given spotter is Cobra.

Comments:

1. It lives in burrows, deserted, hills of termites, heaps of stones and stacks of woods.
2. It is brown or black in colour and grows to length of six feet.
3. It feeds on frogs, lizards, rats, and small birds.
4. When disturbed, it raises its head and spreads its neck as a hood. The hood is supported by cervical ribs.
5. It sways its head and hood to the right and left, backwards and forwards, makes a hissing sound in anger and gets ready to strike or bite.
6. The hood has a characteristic spectacle mark on a dorsal side and a pair of black patches on the ventral side.
7. The head is not distinct from the body.
8. The head is covered by shields. The third supra labial shield touches the eye and the nostril.
9. It is highly poisonous. The poison is a neurotoxin. The poison is a single cobra can kill fifteen persons at a time.
10. It has two poison gland and two fangs.
11. The ventrals are enlarged the sub-caudals are doubled.
12. Cobras are oviparous. The female lays 12-13 soft shelled eggs and the female incubates.

Viper

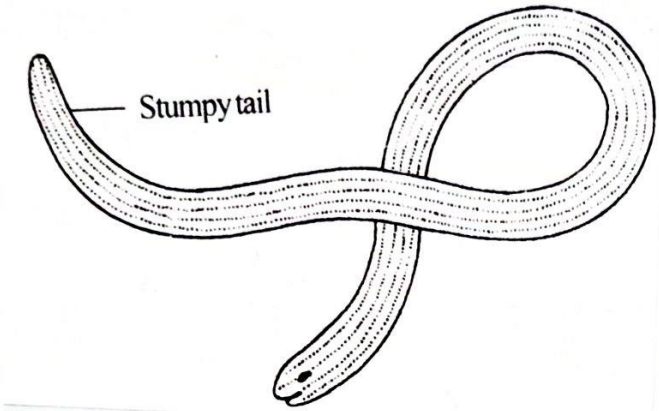
Identification:

The given spotter is viper.

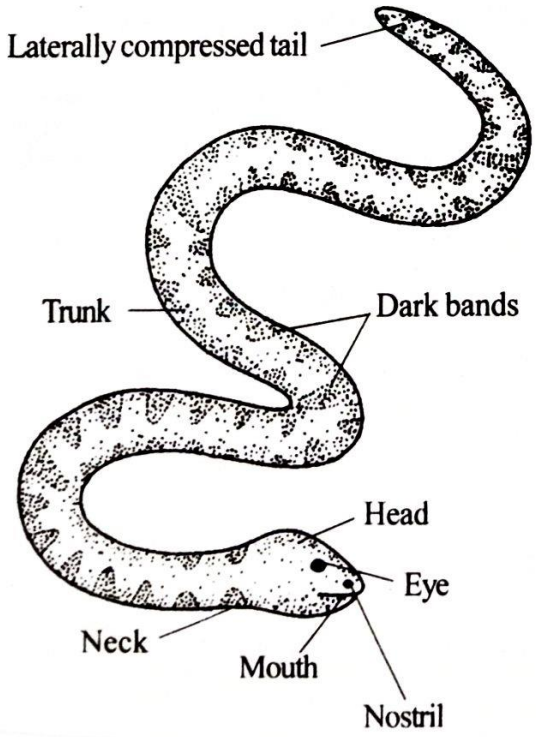
Comments:

1. Commonly known as Russell's viper or pit less viper.
2. It is highly poisonous and the poison is a haemotoxin.
3. It is nocturnal in habit.
4. It grows to length of five feet.
5. It brown in colour with three longitudinal rows of diamond-shaped spots on the dorsal side.
6. Each spot is black in colour and bordered with white. These give a beautiful look to the snake.
7. The head is distinct and is triangular in shape.
8. Eyes with golden iris are present.
9. The head is covered with scales.
10. The head bears a distinct V-shaped mark with the point of "V" looking forwards.
11. Ventrals are broad.
12. Sub-caudals are double.
13. It is viviparous giving birth to 30-40 young ones at time.
14. Carnivorous, feeds on mice, rat, lizard and frogs.
15. Venom is haemotoxic.

Typhlops



Enhydrina



Typhlops

Identification:

The given spotter is Typhlops.

Comments:

1. It is commonly called blind snake.
2. It is burrowing in habit.
3. It is cosmopolitan in distribution.
4. It is a non-poisonous snake.
5. It has a worm- like body.
6. The body is covered with scales.
7. The pelvic girdle is vestigial. The head is indistinct.
8. The eyes are small and covered by scales.
9. It is carnivorus in habit.
10. It is oviparous.
11. Sebaceous glands are present on the body.
12. It is brown in colour.
13. Head indistinct, tail is short, blunt and rounded.
14. Few teeth are present in the upper jaw only.

Enhydrina

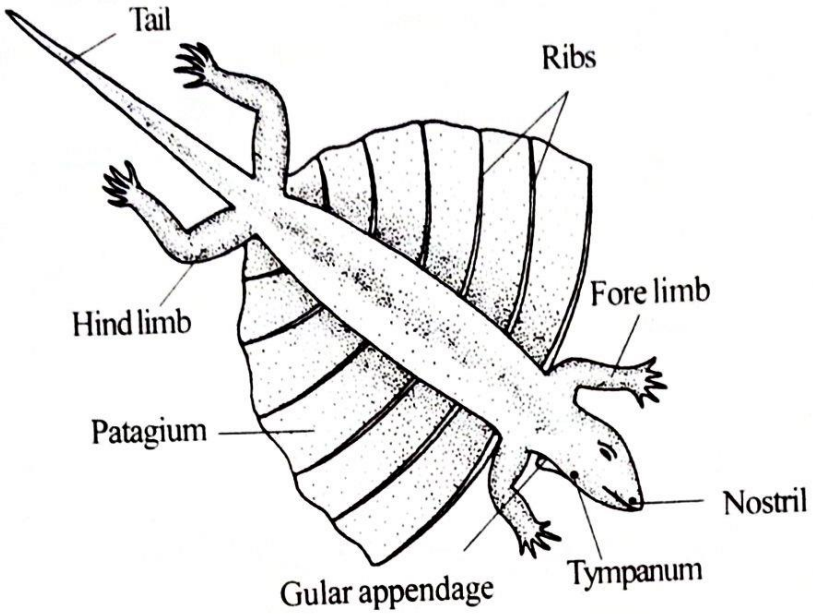
Identification:

The given spotter is Enhydrina.

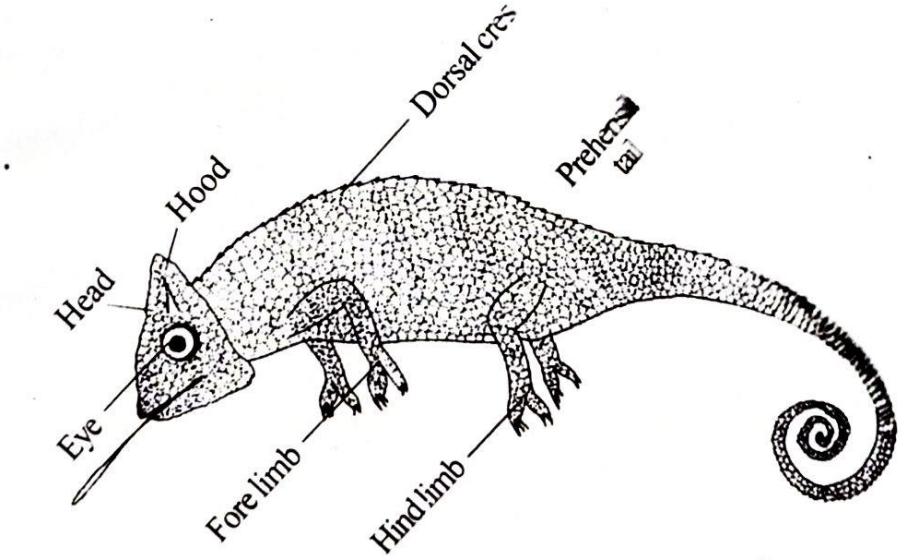
Comments:

1. Enhydrina is commonly called sea snake.
2. It is distributed from Persia to Malay island.
3. It found in sea.
4. Body colour is olive or dark grey with black transverse bands are present.
5. Body covered with small scale with tubercles.
6. Ventral scales are very small.
7. The eyes are small with round pupils.
8. It is a poisonous snake.
9. The poison fangs are attached with maxillary teeth by small grooves.
10. The poison is neurotoxin.
11. It is carnivorous, feeding mainly on fishes.
12. It is ovoviviparous, producing about five young ones at a time.

Draco



Chameleon



Draco

Identification:

The given spotter is Draco.

Comments:

1. It commonly called flying dragon.
2. It lives on trees.
3. Its body is covered with scales.
4. The body is divisible into a head, a neck, a trunk and a tail.
5. The head bears a mouth, nostrils, two eyes and tympanum.
6. The neck bears three gular appendages used for climbing trees.
7. The trunk has a pair of wing like structures called patagia. They are expansions of the skin and are supported by six ribs. The patagia can be stretched or folded. They are used for gliding from branch to branch.
8. Carnivores, feeds on insects.
9. On the throat three pointed hooks are present.

Chamaeleon

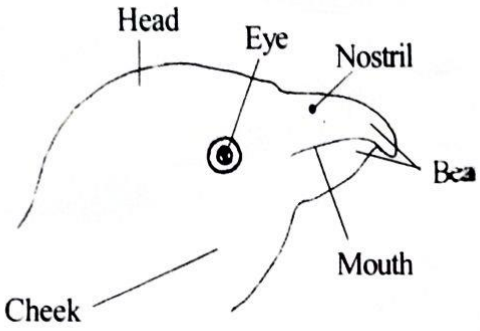
Identification:

The given spotter is Chamaeleon.

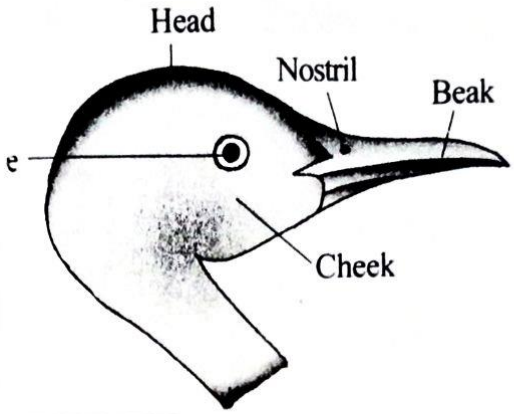
Comments:

1. Chamaeleon is a tree lizard.
2. The Body is laterally compressed.
3. The head has a pair of helmet-like crests.
4. The tongue is club-shaped, protrusible and sticky.
5. The digits are fused in two groups of three and two digits. The fusion of digits into group is called syndactyly.
6. The toes are opposable.
7. The eyes show independent movement.
8. The tail is long and prehensile.
9. The lungs are providing with air sacs.
10. It has the power of changing its colour very often.
11. It can produce hissing sound and it can swell its body when it is approached by an enemy.
12. It is an insectivorous animal.
13. Skin covered with minute tubercles.
14. It is viviparous.
15. Limbs are selectivelylarge and very slender.

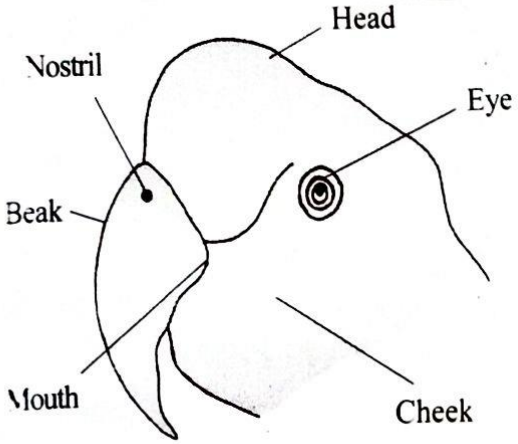
Beaks in birds



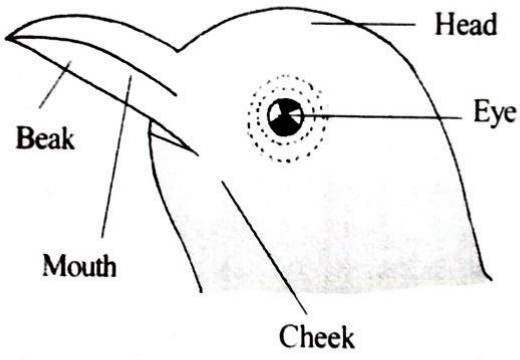
Seed eating beak - Sparrow



Fish catching beak-



Fruit eating beak - Parrot.



Insect eating beak - Robin.

Beaks in birds

1. Beaks are the horny projections of the jaws of birds. They are also called bills. It is covered by a horny covering called rhambhotheca.
2. Functions of beak: The beak is formed of an upper jaw and a lower jaw. The beak functions as the hand and mouth of the birds. They do the following function:
   a) To obtain food.
   b) To handle food.
   c) To breen the feathers.
   d) To collect the nest materials.
   e) To build nest.
   f) To feed the young ones.
   g) For defence.
   h) For courtship.

Types of Beaks

The beaks of birds are modified according to the type of food and mode of feeding. They are the following

1) Seed eating beaks:

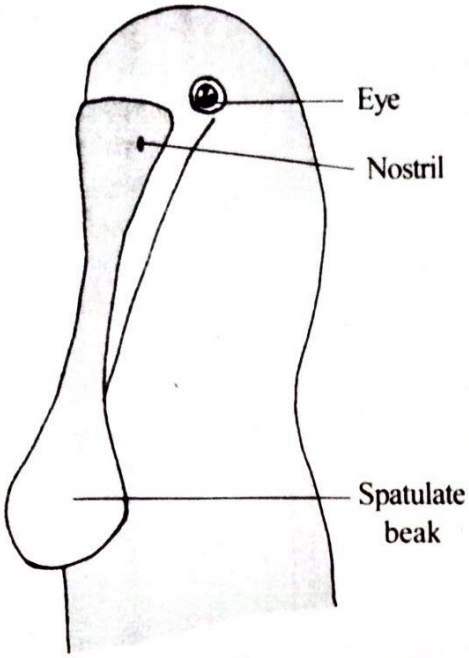
- Seed eating beaks are stout and conical.
- They are used for crushing large and hard-shelled seeds.
- Eg. Sparrows, Finches.

2) Cutting Beaks:

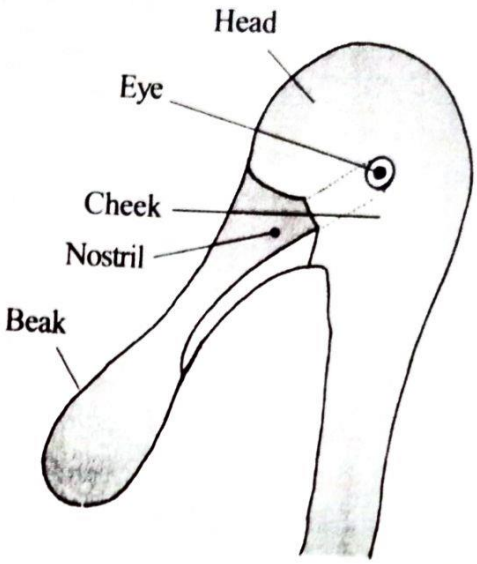
- Cutting beaks are stout and sharp.
- They are used for tearing prey, breaking eggs, cutting fruits.
- Eg. Crows.

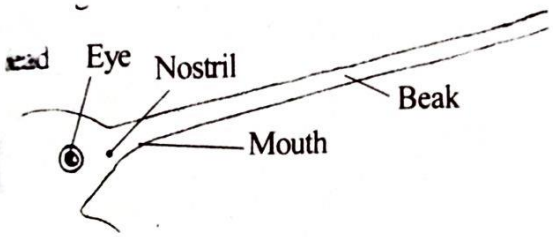
3) Fruit Eating Beaks:

- Fruit eating beaks are sharp, stout and curved.
- They are used for cutting fruits and breaking hard seeds.
- Eg. Parrots and Cross bills.

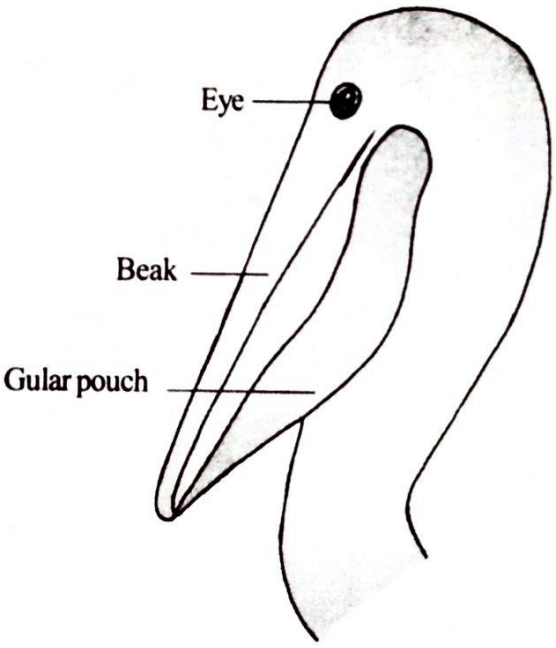


Prey eating beak - Spoon bill.





: *Flower probing beak-Humming bird.*



Pouched beak - Pelicans.

4) Insect Eating Beaks:

- Insect eating beaks are small, short and slender.
- They are used for catching insects.
- Eg. Swallows, Swifts and Robin.

5) Prey Eating Beaks:

- Prey eating beaks are stout, tapering and long.
- They are used to capture prey in water.
- Eg. King fisher and Spoon bill.

6) Pouched Beaks:

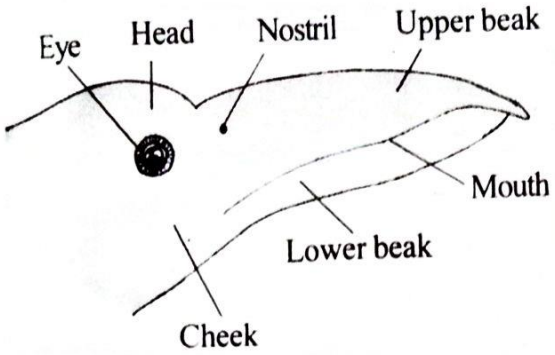
- Pouched beaks are stout, long with an elastic skin bag on the lower beak.
- They are used for catching the fishes.
- Eg. Pelicans.

7) Mud Straining Beaks:

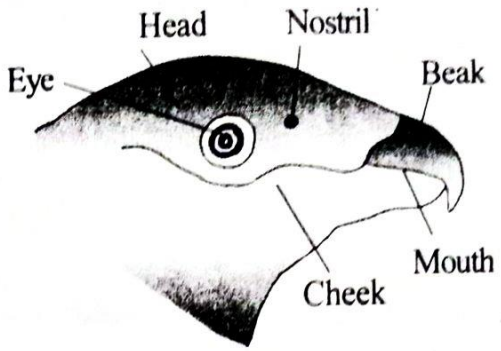
- Mud straining beaks are stout, broad and flat with horny serrations.
- They are used to sieve small molluscs and crustaceans from the mud.
- Eg. Ducks, Geese and Flamingos.

8) Wood Chiselling Beaks:

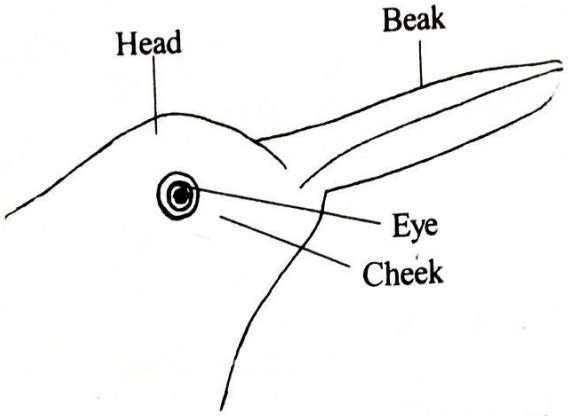
- Wood chiselling beaks are stout, long and straight.
- They are used for drilling the barks or wood to get insect larvae or for nest construction.
- Eg. Wood peckers.



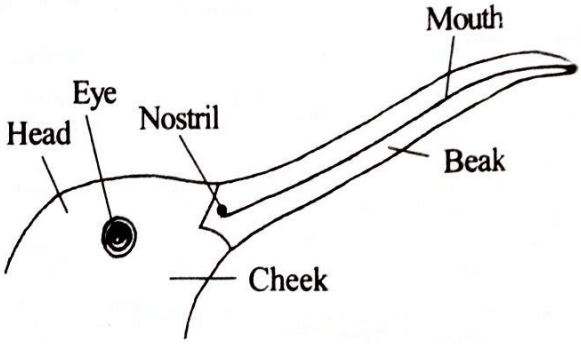
Cutting beak - Crow.



Piercing and Tearing beak-



:Wood chiselling beak - Wo



Mud probing beak - Sti

9) Mud Probing Beaks:

- Mud probing beaks are long and slender.
- They are used to probe into soft mud for worms, molluscs and insects.
- Eg. Sand-piper, Stilts and Snipes.

10)Fish Catching Beaks:

- Fish catching beaks are long, narrow and serrated.
- They are used to capture fish, frogs and tadpoles.
- Eg. Cormorants, Herons and Storks.

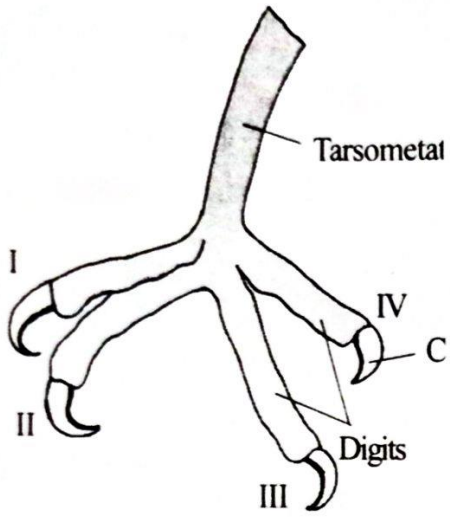
11)Flower Probing Beaks:

- Flower probing beaks are long, narrow and pointed.
- They are used for drawing nectar form the flowers.
- Eg. Sunbird and Humming bird.

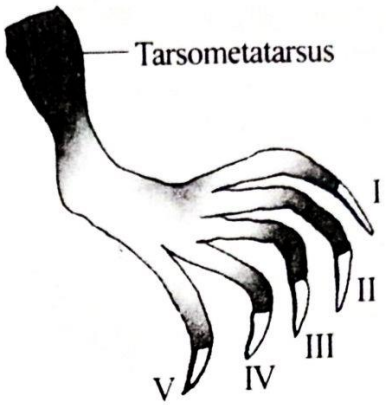
12)Pierching and Tearing Beak:

- Pierching beaks are short, hooked and powerful.
- They are used to pierce and tear small or large prey.
- Eg. Eagles, Owls and Vultures.

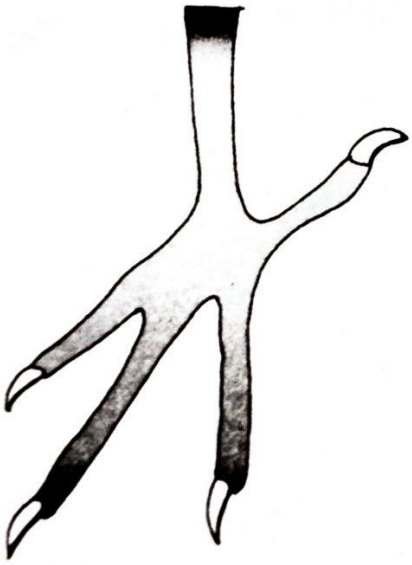
Feet in birds



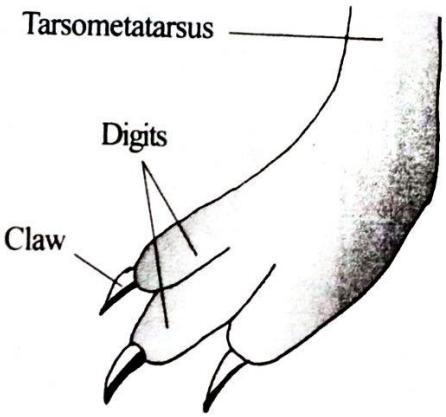
Climbing feet - Parrot



Clinging feet - Swifts.



Wading Feet - Heron.



Thermoregulatory feet .

Feet in Birds

Feet are the lower end of the hind limbs. They are used for locomotion and for various purposes. In birds it is variously modified.

Functions of Feet:

1) Locomotion
2) Collection
3) Building
4) Offence
5) Defence

Types of Feet

Climbing Feet:

- Climbing feet are used for climbing on trees.
- They are Zygodactylous.
- In zygodactylous feet, the first and fourth toes are directed backwards and the second and third toes are directed forwards.
- This helps grasping twigs and climbing vertical trunks.
- Eg. Wood peckers and Parrots.

Clinging Feet:

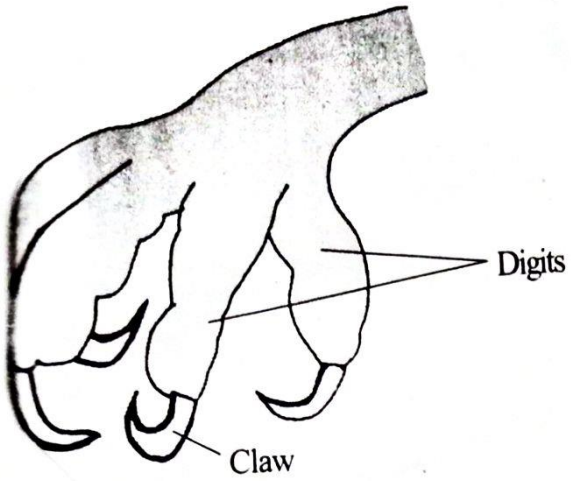
- Clinging feet are used for clinging to cliffs or under caves, walls.
- All the four toes are directed forward. They have sharp and curved claws.
- Eg. Swifts and Humming birds.

Scratching Feet:

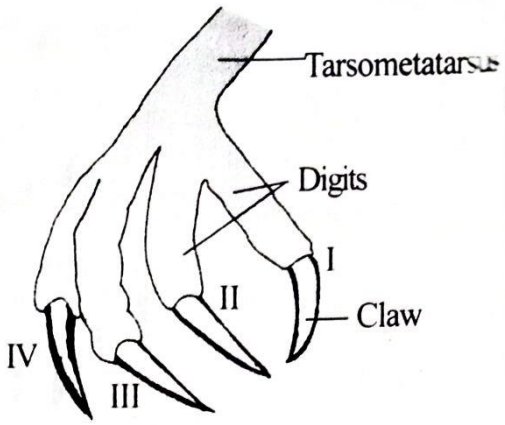
- Scratching feet are used for walking and scratching the soil in search of food.
- The feet are stout and bear strong claws.
- The foot of male bird has a pointed spur for fighting.
- Eg. Fowls, Quails, Peafowls and Pheasants.

Perching Feet:

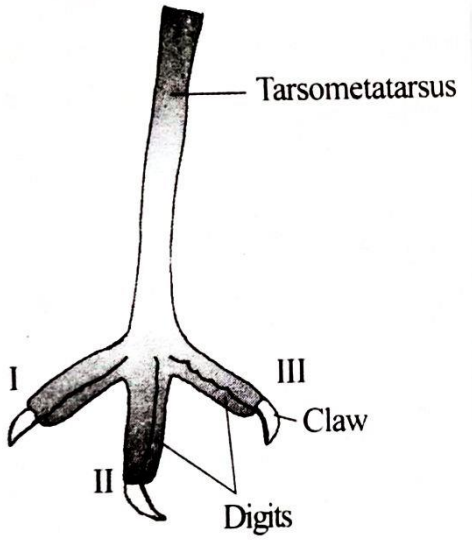
- Perching feet are used to grasp a branch or a perch.
- Three toes are anterior and slender and posterior toe is strong.
- Eg. Sparrows, Crows, Bulbuls, Koels, Mynas, Robins, Finches, Sunbirds.



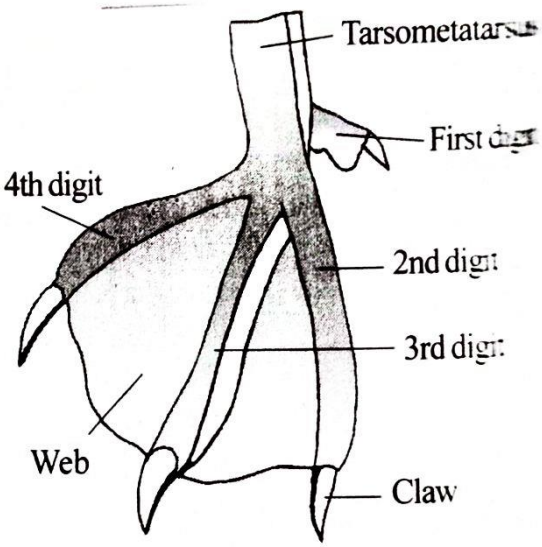
Grasping feet - Hawk.



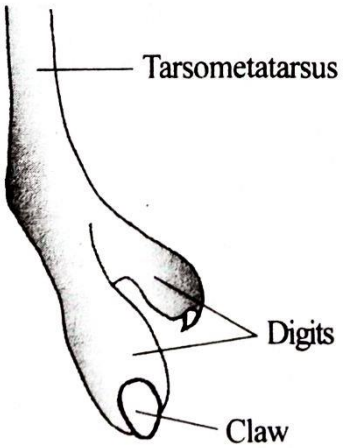
Pearching feet- Sparrow.



Scratching feet - Pheasants.



Swimming feet - Ducks



Running feet - Ostrich

Swimming Feet:

- Swimming feet are used for swimming. The toes are webbed in swimming birds.
- In diving birds the web is lobate and the toes are free.
- Eg. Pelican, Ducks, Cormorant.

Grasping Feet:

- Grasping feet are used for capturing and carrying the prey.
- The four toes are very strong, stout and sharp with curved claws.
- Eg. Owls, Hawks, Eagles, Kites.

Running Feet:

- Running feet are used for running. The legs are powerful, long tarsometatarsal and relatively short and fewer digits.
- Eg. Ostrich, Emu, Rhea, Cassowary.

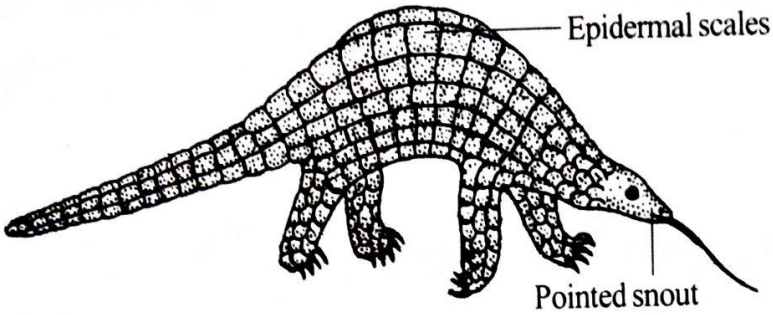
Wading Feet:

- Wading feet are used for walking on mud in water.
- The trasometatarsal and toes are very long and slender.
- Eg. Herons, Egrets, Snipes.

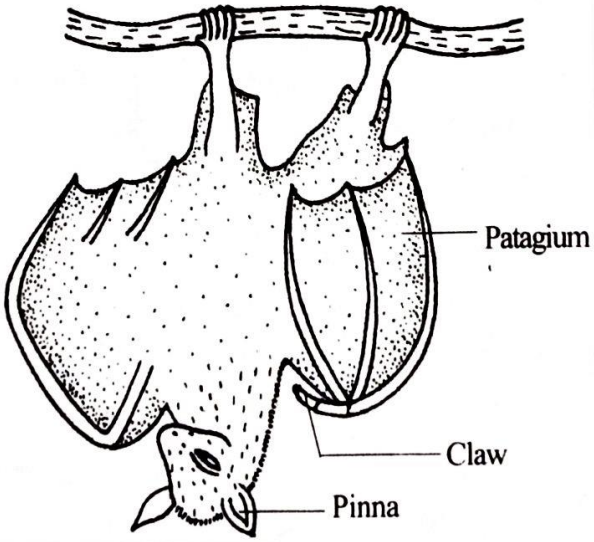
Thermoregulatory Feet:

- Thermoregulatory feet are adapted for running. They are covered with feathers to check loss of heat.
- Eg. Sand-grouse, Ptarmigan.

Ant eater



Bat



Pteropus.

Manis (Anteater)

Identification:

The given spotter is Anteater.

Comments:

1. The dorsal side of the body is covered with imbricate epidermal scales.
2. Hair is present inbetween the scales. The scales cover the head, trunk, tail and even limbs.
3. The head is produced into a short pointed snout.
4. Teeth are absent and the tongue is long, viscous and extensible and adapted for feeding on ants and termites.
5. The limbs are short and provided with powerful claws for digging.
6. The tail is long and prehensible.
7. It is nocturnal in habit and insectivorous in diet.
8. It has the habit of rolling into a ball as a protective measure.

Pteropus (Bat)

Identification:

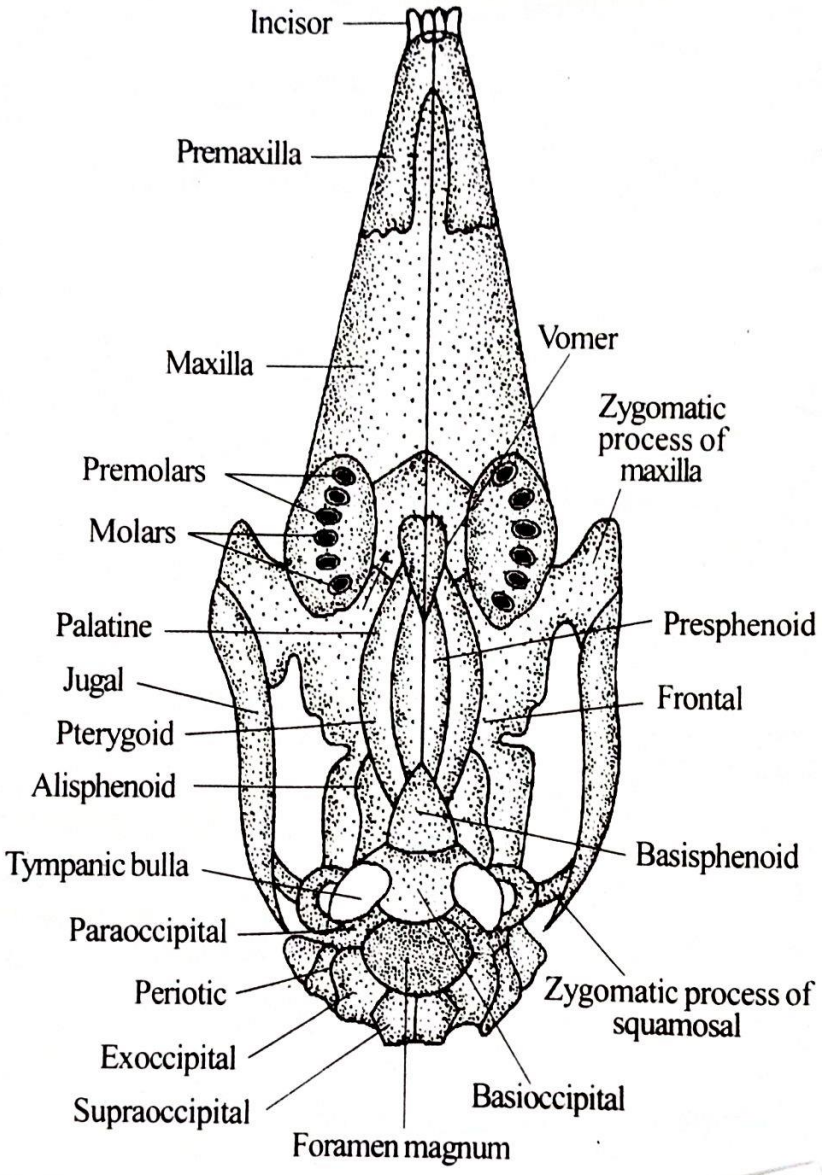
The given spotter is Bat.

Comments:

1. It is commonly called flying fox.
2. The body is covered with brown fur.
3. The snout is long and nose leaf is not present.
4. The wing or patagium is a fold of skin that extends between the limbs and body.
5. The patagia are supported with 2^{nd}, 3^{rd}, 4^{th} and 5^{th} digits of the forelimbs. The thumb or $1^{st}$and 2^{nd}digits have claws.
6. The pinnae are comparatively small.
7. The tail is not included in the interfemoral membrane.
8. It feeds on fruits like guavas, bananas and mangoes.

Osteology of Rabbit

Skull of Rabbit



Osteology of Rabbit

Skull

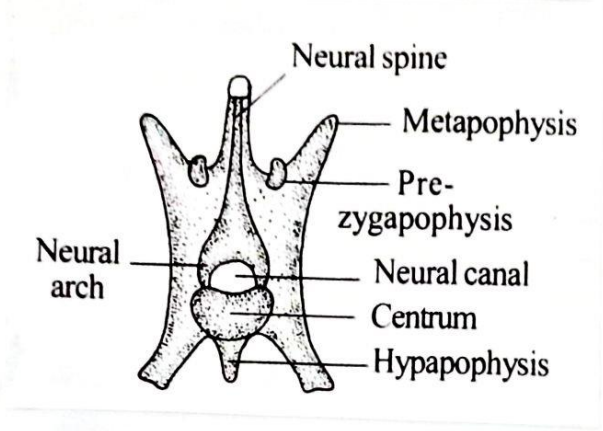
Identification:

The given spotter isSkull.

Comments:

1. Skull is an axial skeleton.
2. The skull of rabbit is bony in nature.
3. The skull is dicondylic.
4. It is a craniostylic skull as the mandible articulates with squamosal.
5. The skull consists of a cranium, auditory capsules, optic capsules, olfactory capsules, upper jaw, lower jaw, hyoid apparatus and ear ossicles.
6. The posterior region of the skull has an opening called foramen magnum.
7. The foramen magnum is surrounded by 4 bones, namely a dorsal supraoccipital, a ventral basioccipital and two lateral exoccipitals.
8. The roof of the cranium is formed of parietal and frontal.
9. The floor of the cranium is formed of basisphenoid and presphenoid.
10. The roof of the olfactory capsule is formed of nasals and floor is formed of vomers.
11. The auditory capsule is formed of periotic and tympanic bones.
12. The upper jaw is formed of 5 bones, namely premaxilla, maxilla, jugal, pterygoid and palatine.
13. The maxilla has a process called zygomatic process.
14. The zygomatic process of maxilla, the jugal and squamosal together form an arch called zygomatic arch.
15. The lower jaw is formed of a single bone called dentary.
16. The hyoid apparatus consists of a basihyal and two pairs of cornua.
17. The ear ossicle consists of three bones, namely malleus, incus and stapes.

Typical Vertebra of Rabbit



A Typical Vertebra (Lumbar Vertebra)

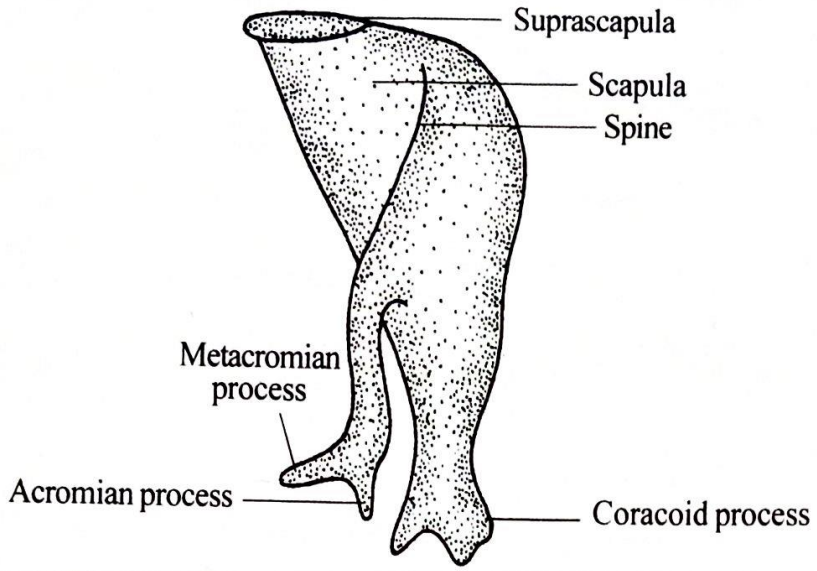
Identification:

The given spotter isLumbar Vertebra.

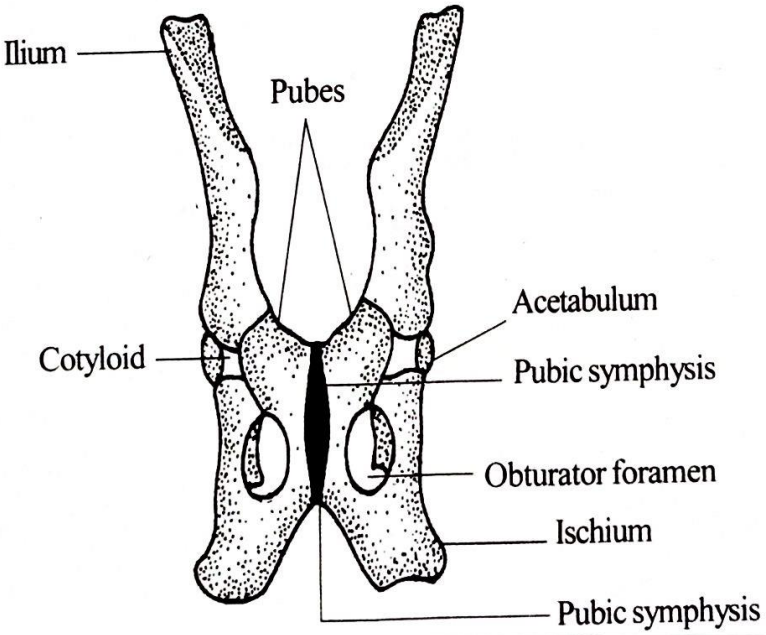
Comments:

1. Each vertebra has a solid body called centrum.
2. The centrum is flat both anteriorly and posteriorly. Hence the vertebra is said to be amphiplatyan or acoelous.
3. The centrum is provided with a small flat bone called vertebral epiphysis at its end.
4. Inbetween the centra, there is a cartilaginous disc called intervertebral disc.
5. Dorsally the centrum bears an arch called neural arch.
6. The neural arch bears a neural spine at its apex. The dorso-lateral side of the centrum bears a pair of transverse processes.
7. The anterior side of the neural arch bears a pair of articulating surfaces called pre-zygapophyses.
8. Another pair of processes called metapophyses arises from the neural arch just behind the pre-zygapophyses.
9. The posterior surface of the neural arch bears another pair of articulating surfaces called post-zygapophyses.
10. Another pair of processes called anapophyses is present at the base of post-zygapophyses.
11. The centrum bears a median ventral process called hypapophysis.
12. The neural arch encloses a cavity called neural canal.

Pectoral girdle of Rabbit



Pelvic girdle of Rabbit



Pectoral Girdle of Rabbit

Identification:

The given spotter isPectoral Girdle of Rabbit.

Comments:

1. The pectoral girdle articulates the fore limbs with the body.
2. It is an appendicular skeleton.
3. It is formed of two halves.
4. Each half of the pectoral girdle has a broad flat bone called scapula.
5. At its broad base the scapula bears a thin strip of cartilage called suprascapula. It is triangular in shape.
6. The outer surface of scapula bears prominenet ridge called spine. The spine terminates in a knob called acromian process.
7. The acromian process produces a spinous process called metacromian process.
8. Near the acromian process, there is another process called coracoid process. It represents the coracoid.
9. The clavicle is slender and it is extended between the acromian process and the sternum.
10. The apex of the scapula bears a glenoid cavity with which the humerus is articulated.

Pelvic Girdle of Rabbit

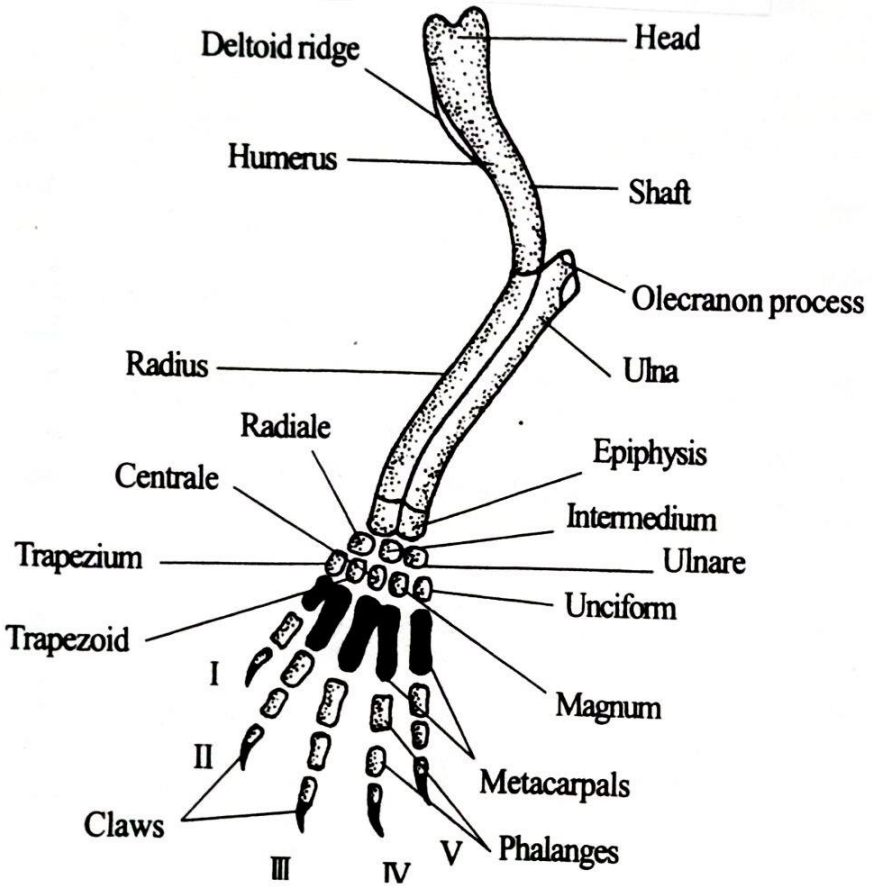
Identification:

The given spotter isPelvic Girdle of Rabbit.

Comments:

1. The pelvic girdle articulates the hind limbs with the body.
2. It is formed of two halves called os-innominatum.
3. Each os-innominatum is formed of three bony elements, namely ilium, ischium and pubis.
4. The ilium is situated posteriorly. Ischium is located on the outer side and the pubis is situated on the inner side.
5. The pubes of the two halves meet and fuse together in the median line to form the pubic symphysis.
6. The pubic symphysis is formed of cartilage.
7. A large opening called obturator foramen is situated between the ischium and the pubis.
8. At the junction of ilium and ischium there is a cavity called acetabulum with which the femur is articulated.
9. Between the acetabulum and the pubis, there is a small bone called cotyloid bone.

Fore limb of Rabbit



Fore Limbs of Rabbit

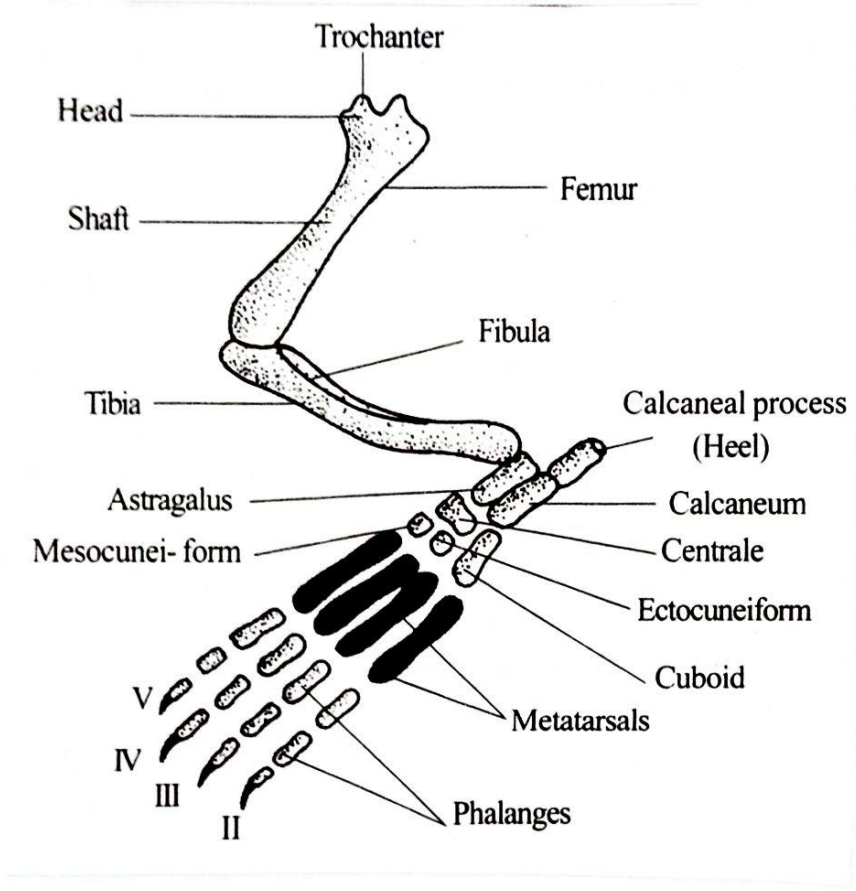
Identification:

The given spotter isFore Limbs of Rabbit.

Comments:

1. The fore limb has three main divisions, namely the upper arm, the fore arm and the hand.
2. The upper arm is supported by a large bone called humerus.
3. The main body of humerus is called shaft.
4. The proximal end is called head. It is formed of two projections called lesser and greater tuberosities.
5. The groove remaining between the two tuberosities is called bicipital groove.
6. Below the head, the shaft bears a ridge called deltoid ridge.
7. The distal end of humerus is provided with a pulley-structure called trochlea enclosing a groove called olecranon fossa.
8. The fore arm is supported by two bones namely the radius and the ulna.
9. At the proximal end the ulna bears an olecranon process which articulates with the humerus.
10. The olecranon process forms the elbow.
11. The hand is formed of the wrist, the palm and the digits.
12. The wrist is supported by eight bones arranged in two rows.
13. The proximal row is formed of three bones, namely the radiale, the ulnare and the intermedium.
14. The distal row is formed of five bones, namely the trapezium, the trapezoid, the central, the magnum and the unciform.
15. The palm is supported by metacarpals. There are five metacarpals.
16. The digits are supported by phalanges. The first digit has two phalanges and the remaining digits are provided with three phalanges each.
17. The last phalanx ends in a claw.
18. The phalangial formula is 2, 3, 3, 3,3.

Hind limb of Rabbit



Hind Limbs of Rabbit

Identification:

The given spotter isHind Limbs of Rabbit.

Comments:

1. The hind limb is formed of three regions, namely the thigh, the shank and the foot.
2. The thigh is supported by a large bone called femur.
3. The main body of femur is called shaft and the proximal end is called head.
4. The head bears three projections called trochanters.
5. The distal end also bears two projections called condyles.
6. The condyles enclose a groove called patellar groove.
7. The shank is supported by two bones, namely tibia and fibula.
8. Tibia is the inner bone and fibula is the outer bone.
9. The foot is formed of three regions, namely the ankle, the sole and the digits.
10. The ankle is supported by six bones called tarsals.