A Hand Book of
FISHERY SCIENCE
(IInd Edition)

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CONTANTS

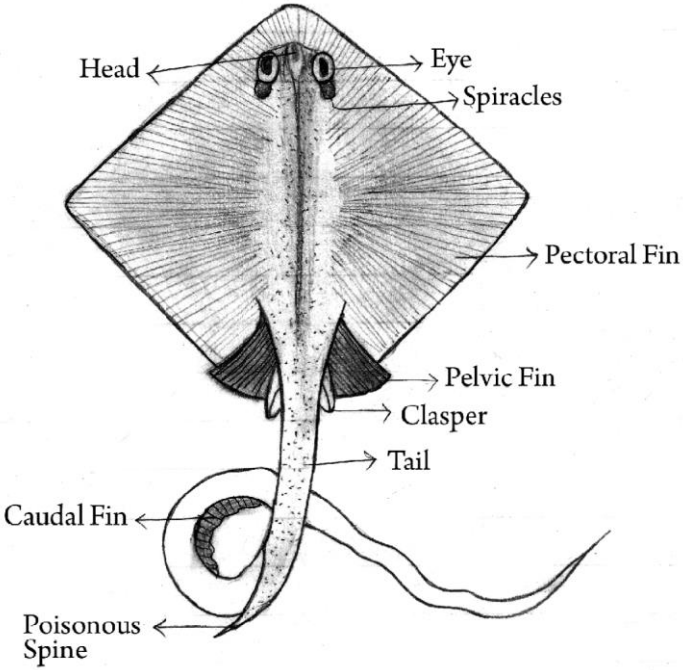
Identification, Classification & Distinguishing character & Adpative features

Identification of Fish Parasite

Identification, Classification & Dignostic Characters of Marine water mollusc

Identification, Classification & Dignostic

CLASSIFICATION	
Series	- *Pisces*
Class	- *Elasmobranchii*
Sub class	- *Sealachii*
Order	- *Rajiformes*
Genus	- *Trygon*



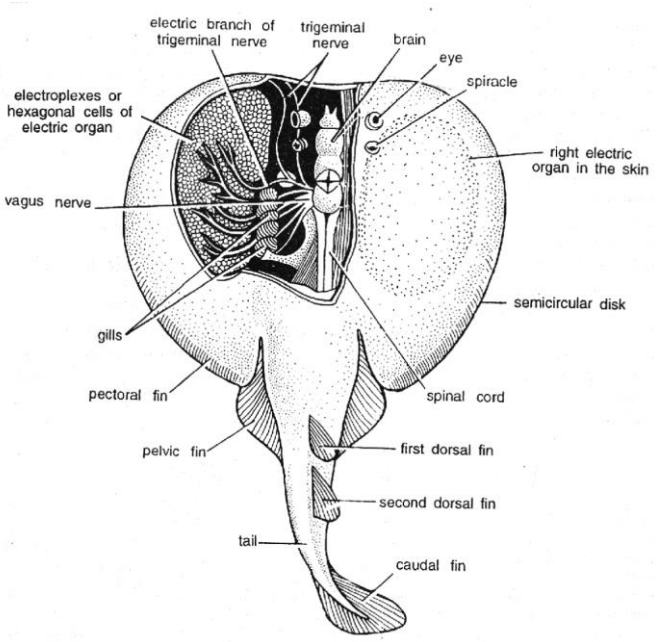
TRYGON

TRYGON

***Comments* :-**

1) Trygon fish is commonly called as Sting Ray or Whip-tailed ray because of 3 stings or spines present on the tail.
2) Body is divided in to three parts
   i) Head ii) Trunk iii)Tail
3) Head & body dorsoventrally compressed, head contains a pair of dorsal eyes
4) Body is fleshy & kit shaped along with tail.
5) It is viviparous.
6) Trygon is bottom dwelling species & it is usually laying in the sea bottoms of black seas.
7) It is carnivorous, feed on small fishes, crustaceans, molluscs, cephalopods, bivalves etc.
8) Tail is well developed long slender.
9) Sting is painful to man because serrated poisonous spines.
10) Trygon fish colour is solid grey, brown, reddish or Olive green above and whitish below with dark fin margin.
11) Young rays may have white spots.
12) This ray is quite large and thick with blunty angular snout.
13) Male claspers are present near the pelvic fin.
14) This species of pectoral fin and wings are sold, smoked or dried and salted it.
15) Five pairs of gills are present on ventral side.
16) Spiracles are present on dorsal side behind the eyes.
17) Mouth is present on ventral side and rectangular in shape, in front of mouth skin has fold known as naso frontal flap.

CLASSIFICATION
Kingdom - *Animalia*
Phylum - *Chordata*
Subphylum - *Vertebrata*
Division - *Gnathostomata*
Superclass - *Pisces*
Class - *Chondricthyes* (*Elasmobranchi*)
Subclass - Selachi
Order - Hypotremata (*Batoidea*)
Family - *Torpidinidae*
Genus - *Torpedo*



TORPEDO

TORPEDO

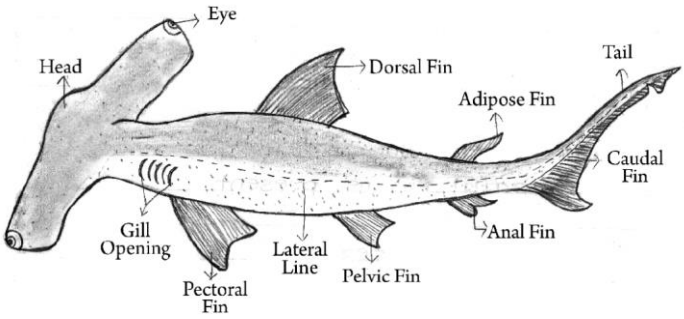
***Comments* :**

1) Torpedo commonly known as electric ray
2) Electric rays are found from shallow coastal waters down to 1000 meters (3,300 ft deep.)
3) They are slow - moving bottom – dwellers depth of 40-50 fathoms.
4) The torpedo is viviparous.
5) Torpedo is a carnivorous fish.
6) Torpedo having a flattened, rounded body and a pair of electric organs used to produce an electric discharge for stunning prey.
7) Torpedo fish having horizontally flattened dishshaped body enlarge wing like pectoral fins and gills on the outer side.
8) Skin is smooth Soft and naked without scales or spines.
9) A Pair of very small eyes and spiracles are present.
10) Pectoral fin joined to head.
11) They feed on Invertebrate small fishes and bony fishes.

***Special Adaptive Features* :-**

1) Torpedo contain a pair of large electric organ and they can produce electricity
2) These organs can generate electric field out side the body.
3) Electric fishes have been divided in to two types.
   1) Strongly electric 2) Weakly electric
   Depending upon the strength of the current.
4) The electric organ are used for paralysing the offense and prey as corgans of defence and they are also used as direction finders.

CLASSIFICATION
Series - *Pisces*
Class - *Elasmobranchii*
Sub class- *Selachi*
Order - *Jaminiformies*
Genus - *Spyrena*
Species - Zygena



SPHYRNA

SPHYRNA

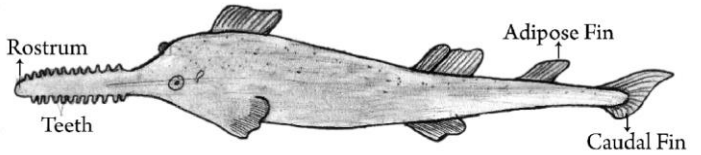
Characters :-

1. It is marine shark commonly called as 'Hammer headed' shark.
2. Body is elongated, measuring about 4 to 5 m in length.
3. Mouth is crycentic & ventral in position.
4. Nostrils lie ventrally at the base of lobe.
5. Five pairs of lateral gill slits are present.
6. Two dorsal fins are present.
7. The first Dorsal fin is situated in front of the pelvic fin & second opposit to anal fin.
8. Spiracles are absent.
9. Vivipaorus.

Adaptive character :-

1. The head is flattened in front and expanded side way into two lateral lobes hence resembling the hammer.
2. Eyes lie on the tips of lateral lobe.
3. Eyes with three eye lids & Nectitating membrane.
4. It attacks on it prey with its head.

CLASSIFICATION
Series - *Pisces*
Class - *Elasmobranchii*
Sub class- *Selachi*
Order - *Rajiformes*
Genus - *Pristis*



PRISTIS

PRISTIS

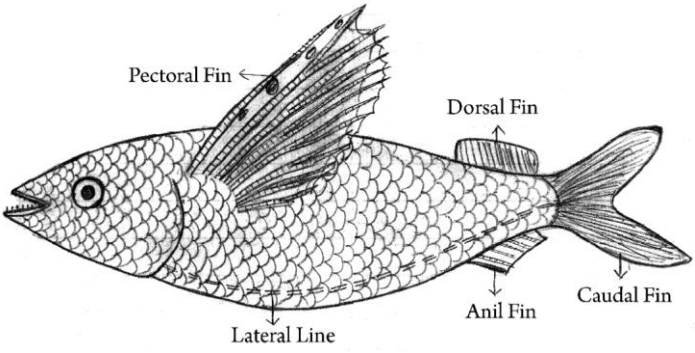
Characters :-

1. It is commonly knows as Saw-Fish.
2. Body is elongated, deepresed shark like & divided into head, trunk & tail.
3. It may be attain the considerable length of 3 to 6 meter or even longer.
4. Head contain a pair of eyes, a pair of spiracles which present behind the eyes.
5. Mounth is transvers slit like and situated ventral side of the head.
6. No rostral tentacle.
7. Dorsal fin are large, first dorsal fin is opposit to the pelvic fin.
8. Tail is well developed & terminating in heterocircal caudal fin.
9. It predacius
10. Food cheifly comprises small fishes & other marine animal.

Adaptive character :-

1. The important structure is saw likes snout which is formed by elongation of head & skull.
2. Saw like rostrum contain a series of tooth like 15 to 16 pair or denticle present of lateral side of margin.
3. The rostrum acts as organs of defense.
4. Prestis also economically Important benificial as its liver oil reach in vitamin.
5. Skin used as making of boards.

CLASSIFICATION	
Phylum	- *Chordata*
S. Play	- *Vertibrata*
Division	- *Gnthostomato*
Series	- *Pisces*
Class	- *Osthichthyes*
Order	- *Cynentognathi*
Type	- *Exocoetus*



EXOCOETUS

EXOCOETUS

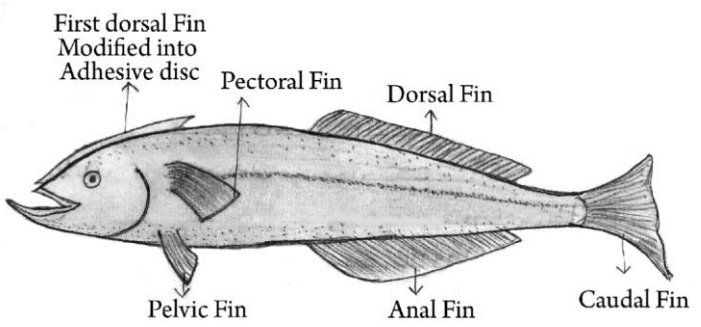
Characters :-

1. Exocoetus is commonly knows as flying fish.
2. The elongated fish with slivery white sides, measurs about 32 to 45 cm. in length.
3. It is divided into Head, trunk & tail.
4. Head contain eyes the upper part of snout is produced into a process.
5. The dorsal fin & anal fin are short & supported by 8 to 16 soft finray in each.
6. The pelvic fin are short & supported by 8 to 10 soft rays in each.
7. The pelvic fin are also develop & adopted for flying the body.
8. Tail is hypoblastic.
9. Ouiparous.

Adaptive character :-

1. The pectoral fins are exceptionaly large, spraid like wings & make gliding flight.

CLASSIFICATION	
Series	- *Pisces*
Class	- *Teleostomi*
Order	- *Echeneformes*
Type	- *Echeneis*



ECHENEIS

ECHENEIS

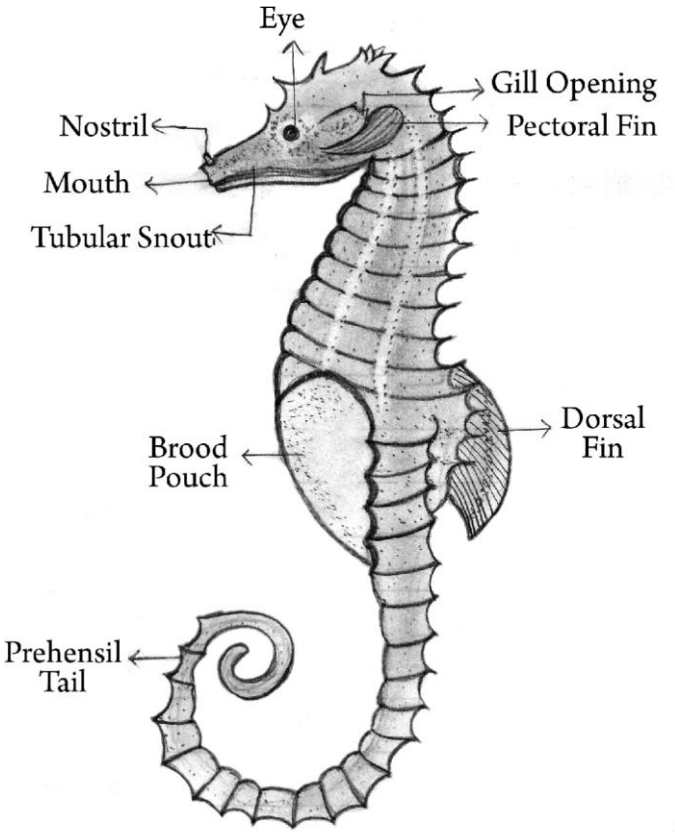
Characters :-

1. It is commonly known as sucking fish.
2. Body is elongated, fusiform & covered with small scales
3. Head is deepressed.
4. Eyes are laterally in position.
5. Mounth is terminal, mouth cleft is wide & deep.
6. Mouth is bounded by two jaw upper jaw & lower jaw.
7. The lower jaw is longer than upper jaw.
8. The second dorsal & anal fins are elongated without spine & opposite to each other.
9. Caudal fin is homocircle.
10. Air bladder is absent.

Adaptive character :-

1. First dorsal fin is modified in to adhesive disc.
2. The adhesive disc is flat oval & transversly furrowed & is an effective organs of attachement.
3. It is leazy fish usually remains attach shark & tertals.
4. The fish is not a parasits & do not suck the blood or eat the flesh of host.
5. It is common marine fish.

CLASSIFICATION	
Series	- *Pisces*
Class	- *Teleostomi*
Order	- *Syngnathoformes*
Genus	- *Hippocampus*



HIPPOCAMPUS

HIPPOCAMPUS

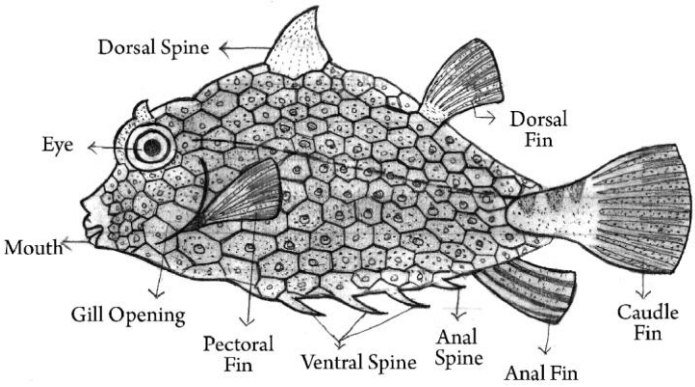
Characters :-

1. It is commanly called as sea horse.
2. Body is more or less elongated having exoskeleton of rings.
3. Mouth is extrimit on elongated tubular snout.
4. Trunk is compressed some what elivated with 10 to 12 rings.
5. Body is divided into head trunk & tall.
6. Anteriorly head is produce into snout & back wardly ito a cryst.
7. Gill cleft are reduce to a small opening.
8. Gills are of special type in the form of special tufts & covered by operculi.
9. Dorsal fin is single & small ventral & caudal fin are absent.
10. A small transferent pectoral fin is found on either side of head.
11. In female their are a small anal fin.
12. Tail is prehensile & covered.
13. Anterior trunk region & tail are in case of bony & ring like plate & due to rigid exoskeleton.
14. The sea horse swims in upright position.

Adaptive character :-

1. It is vertically swimming fish.
2. It was strongly deviatory for fish like appearance with archin neck & snout like horse.
3. Abdomen like pigon & prehensile tall like langoor monkey.
4. Male contain brood pouches, which carry eggs until they hatch.

CLASSIFICATION	
Series	- *Pisces*
Class	- *Ostechthies*
Order	- *Plectognathy*
Family	- *Ostroceontidae*
Type	- *Ostraceon*



OSTRACEON

OSTRACEON

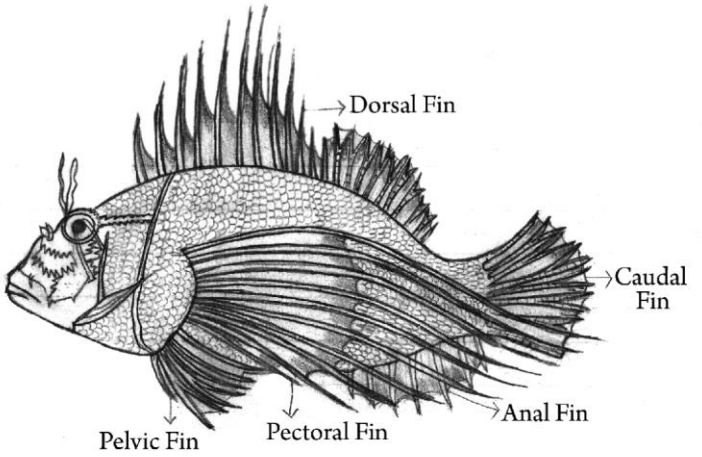
Characters :-

1. It is commonly called as trunk fish or colper fish.
2. Body is roughly tringular & incase in a carapage composed of large (Jaxtaposed) hexagonal honey plate.
3. The carapage is closed behind the anal fin.
4. Fish measures about 60cm in length.
5. The colour of body is olive brown & dark bands, A light blue spot is present in centre of each scoof or bony plates.
6. Post clavicles are much expanded.
7. Teeth insire like palantine immoveble.
8. A compress supraobital point is directed upward or little backward.
9. Spiney dorsal fin & ventral fin are absent.
10. Pelvic fins are entirly absent.
11. Pectoral fin enlarge & helps to found water current.
12. Caudal fin acts as radar during rapid swimming.
13. A compressed & small supra orbital spine is present.
14. Gill are four in number, gillslits is situated near pectoral fin.

Adaptive character :-

1. Trunk fish are known to discharge toxic subturn.
2. Ostracitoxin which kill other fish in water.
3. It is toxic to trunk fish itself.

CLASSIFICATION	
Series	- *Pisces*
Class	- *Osthychthies*
Order	- *Scropaeniformes*
Type	- *Pterois*



PTEROIS

PTEROIS

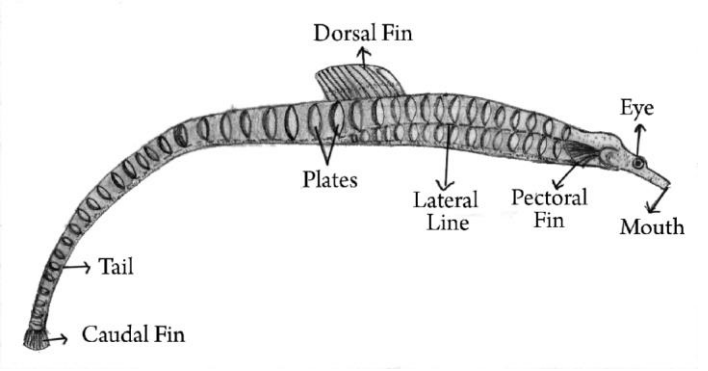
Characters :-

1. It is commonly called as scorpion fish.
2. Body is more or less compressed, elongated & divided into head, trunk & tail.
3. Body is covered with scales.
4. Head is spiney containing large eyes, Nostrils, mouth & is provided with membranous processes & spines.
5. Dorsal fin contain 11 to 17 spines & 8 to 18 soft spine rays. Pelvic fin has 1 spine & 2 to 8 soft rays. Anal fin has 1 to 3 spines, 2 to 5 soft rays & well developed dorsal fin has 15 to 25 rays.
6. Air bladder is phycoclisti.
7. Spiracles absent.
8. Gills are pseudobranchiate.
9. Skeleton is ocificle.

Adaptive character :-

1. It is dangrous, it attack, it's sharp, grood & dorsal spine like hypodermic niddle.
2. It like stinging & paralising venus.
3. Spines include serious & penful wonds.
4. Dorsal, anal & pelvic spines contain venum glands.

CLASSIFICATION	
Series	- *Pisces*
Class	- *Ostechthyes*
Order	- *Solenichthyes*
Family	- *Singnathidae*
Type	- *Syngnathus*



SYNGNATHUS

SYNGNATHUS

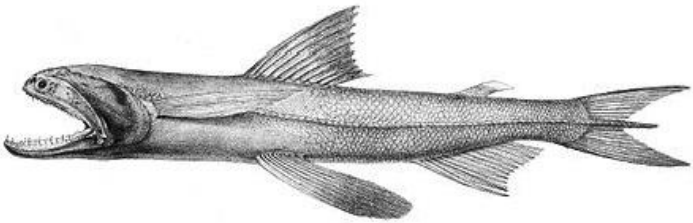
Characters :-

1. It is commonly known as pipe fish.
2. The compressed & elongated fish covered by ring like exoskeleton band.
3. Body is divided into head, neck & trunk & tail.
4. Anteriar half of trunk is produced into snout having mounth & eyes.
5. A fleshy barbels is present at tip of lower jaw.
6. The mouth is toothless & lies at end of snout.
7. Gill are reduced, gill opening are very small, near posterior angle of cover.
8. Dorsal fin present having 10 to 20 rays.
9. Caudal fin present.
10. Tail is long & not prehensile with poorly developed fin.
11. Fish swim in vertical position.
12. Oviparus, fertilization is external.

Adaptive character :-

1. It shows parental care males are provided with brood pounch on ventral side of abdomeon.
2. Turned by fold of skin, the young ones develop in brood pounch till they hatch.

CLASSIFICATION	
Class	- *Teleostomi*
Sub-class	- *Actinopterigii*
Order	- *Scopeliformes*
Family	- *Synodidae*
Genus	- *Harpodon*
Species	- *nehereus*



BOMBAY DUCK

BOMBAY DUCK

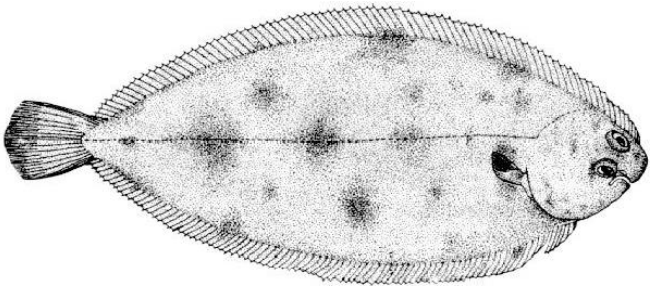
Characters :-

1. Bombay duck is elongated, cylinder soft & gelatinous in appearance.
2. The body possesses phosphorescent in fresh condition.
3. It bears large head, small eyes; cleft of mouth is very wide & deep.
4. Lower jaw prominent, bands of unequal prominent teeth present in the jaws especially teeth are enlarge in lower jaw.
5. Dorsal fin situated midway between the snout & root of the caudal fin.
6. Caudal fin is trilobed.

Commercial Important :

1. Bombay duck is highly perishable fish due to its high water content therefore 80% of catch is sundried & only a small part is used as a food in fresh condition.
2. Dried fishes were then used for food.
3. During the bumper landing some part of the fish catch is used for preparing manure.

CLASSIFICATION	
Class	- *Teleostomi*
Sub-class	- *Actinopterigii*
Order	- *Pleuroniformes*
Family	-*Cynoglossidae*
Genus	- *Cynoglossus*
Species	-*semifasciatus*



SOLE FISH

SOLE FISH

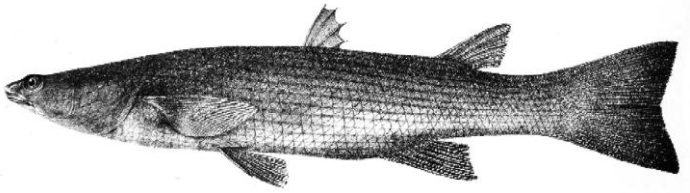
Characters :-

1. This is asymmetrical laterally flattened fish in which one side of body is white & eyeless, while the other side is dark colour and has both eyes.
2. The fish is very flat like sole & lies on the bottom with pale blind side down & dark side up.
3. They swim close to the bottom by undulating movement of the body.
4. Dorsal & anal fins are long & along with the caudal fin encircle the body completely & help in swimming.
5. Fins are without spines, scales minute.
6. Swim bladder is absent body cavity is very small.
7. Larvae are pelagic & bilaterally symmetrical but undergo metamporphosis to give rise to bottom living asymmetrical adults.
8. During this pigmentation cahnges on the two sides & one eye migrates to its final position, close to other eye.

Economic Important :

1. Sole are support an important fishery of along the west coast, south Canada & Kerla, Vishakhapatnam in India.
2. Sole & seldom consumed in fresh condition by most of the people.
3. This fish is used for prepare manure.

CLASSIFICATION	
Class	- *Teleostomi*
Sub-class	- *Actinopterigii*
Order	- *Mugiliformes*
Family	- *Mugilidae*
Genus	- *Mugil*
Species	- *Corsula*



MUGIL CORSULA

MUGIL CORSULA

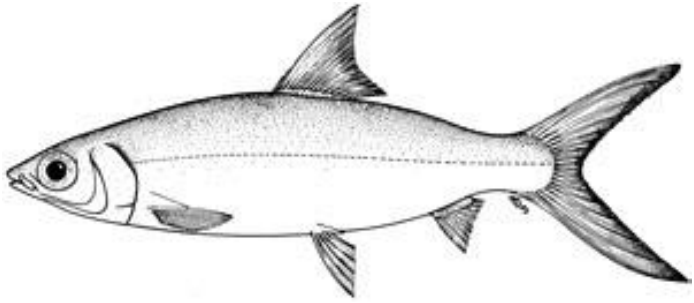
Characters :-

1. Body is rather stout
2. Head is moderate, concave between eyes, mouth is ventral & protrusible.
3. First dorsal fin inserted nearer to the caudal fin base than to the tip of snout.
4. Caudal fin is slightly imarginate.
5. 48 to 52 scales are present int he lateral line.
6. Caudal fin forked, it is dull brown dorsally, silvery below.
7. Fins hyaline with a golden tinge.
8. It is found in India, Bangladesh, Nepal & Burma, inhibits fresh & brackish water.

Economic Importance :

1. This is one of the most common species & used as tasty fish.
2. It is also used for its oil content.
3. The fingerling are used as good bait for catching the other comercial important fishes.

CLASSIFICATION	
Class	- *Teleostomi*
Sub-class	- *Actinopterigii*
Order	- *Gonorhynchiformes*
Family	- *Chanindae*
Genus	- *Chanose*
Species	- *chanose*



MILK FISH

MILK FISH

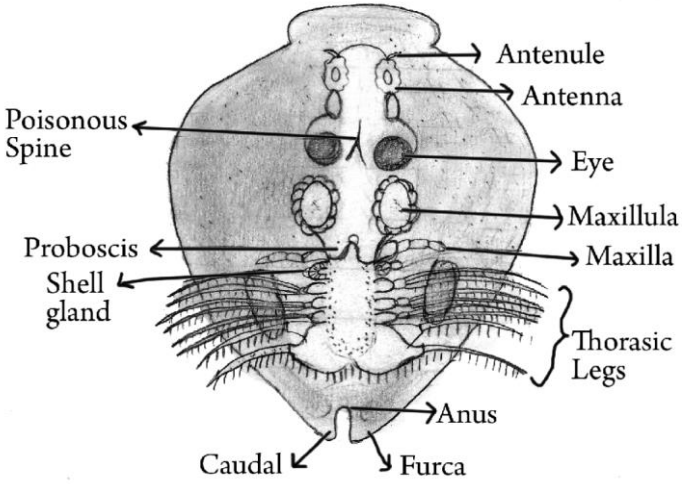
Characters :-

1. Body is torpedo shaped & moderately compressed.
2. Mouth small without teeth, lower jaw with small tubercle at tip, feeding into a notch of upper jaw.
3. Dorsal fin inserted at midpoint of body & fin short, placed for behind dorsal fin base.
4. Scales small cycloid, head necked.
5. Lateral line with 75 to 90 scales.
6. Pectoral & pelvie fin with large axillary scales.
7. It is brilliant silvery, darker dorsally in colour.
8. Caudal & anal fin margin dusky.
9. It is found in Indo-west Pacific inhabits coastal waters, entering estuaries, rivers & lakes.

Economic Importance :

1. The milk fish is of considerable importance as a food fish in south coast Asia.
2. In India this species very popular among fish culturist due to its immense adaptive power & fast growing qualities due to which it forms a great source of economic value.

CLASSIFICATION
Phylum - *Arthropoda*
Class - *Prostasia*
Sub class- *Branchiura*
Genus - *Argulus*



ARGULUS

Identification of Fish Parasite

ARGULUS :-

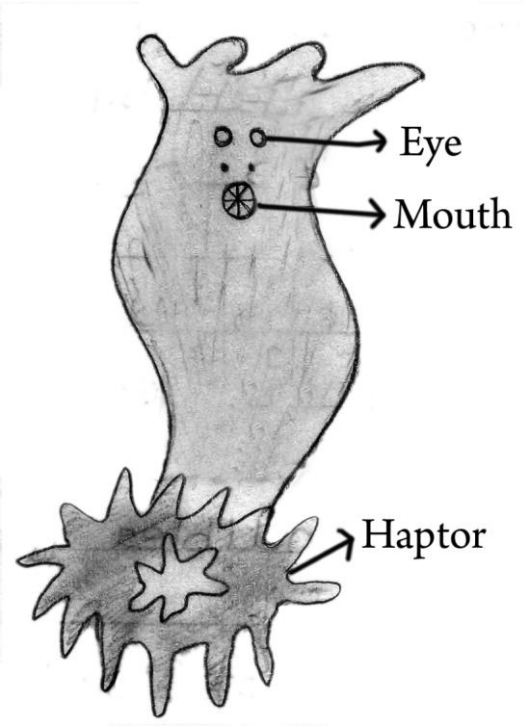
Characters :-

1. Argulus is commonly called as crablic.
2. It is an ectoparasite in the skin or branchial chamber of fresh water fishes.
3. It is not permenantly attach but crawns over the surface of the host.
4. The body consist of ovel flatten cephalothorax & a small bilobed abdomen.
5. Cephalothrus is covered by carapace & bears a single median eye & a pair of latral compound eyes.
6. Mounth is subtorial mandibles & maxillae are piercing organ inclosed in probosis.
7. The apandages comprises of paired antinula, Antina, Mandibles & two pairs of maxillae.
8. There are four pairs of swimming feet or thorasic legs.
9. Genital duct opens on the fifth body segment.
10. The abdomen is bifeed posteriarly.

Treatment :-

1. It is easily removed for foresep or can be paralise by touching strong solution.

CLASSIFICATION	
Phylum	- *Helminth*
Class	- *Trimatoda*
Order	- *Monoginia*
Family	- *Ductirogyridae*



DACTYLOGYRUS

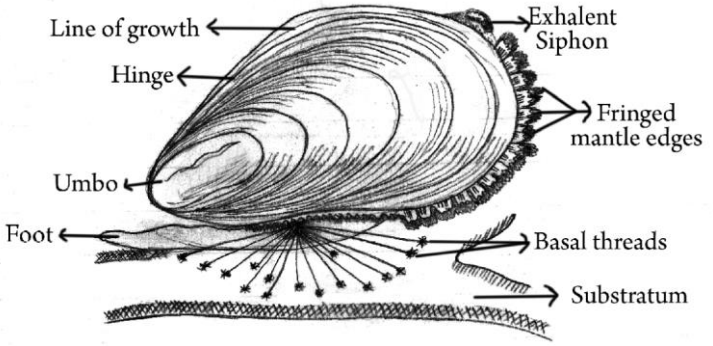
DACTYLOGYRUS

1. It is commonly known as fish fluck.
2. It is found only on the gills.
3. It is common parasite an culturable carps.
4. It consist of two pairs of eyes, pharynx at the anterior end.
5. At the posterior end it is attach to fish by means of the organs of attachement called heptor.
6. Reproductive system is well developed.
7. It lay eggs.

Treatment :-

A good treatment for the fluck is to placed the fish for 1 to 2 min in 1 : 500 solutin of acitic acid.

CLASSIFICATION	
Phylum	- *Mollusca*
Class	- *Bivalvia*
Types	- *Mytilus*



MYTILUS

Identification, Classification & Dignostic Characters of Marine water mollusc

MYTILUS

Habbit & Habbitat :-

1. Mytilus is found at a depth of 2 to 3 fathum in low tide attach to rocks or wooden structure by its byssus thread.
2. It is filter feeder. Filtering planktons from incurrent water.

Distribution :-

It has cosmopality and in distribution specially found in India, Europe, U.S.A. etc.

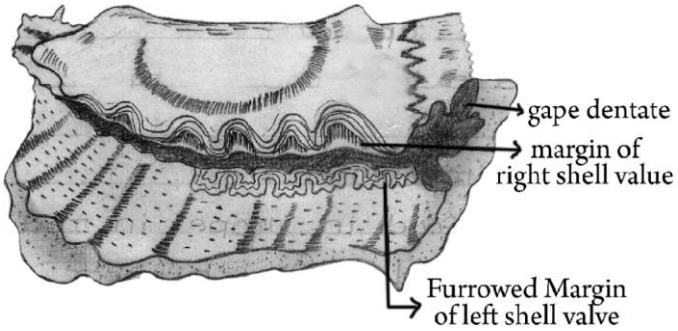
Characters : -

1. It is commonly called as sea mussil shell is elongated equiwalled so with umbo at all near anterior end.
2. Hinge toothless but may bear crinulation.
3. Foot is cyllindrical.
4. Posterior ventrally exhalent edges of archin & post dorsally is exhalent siphon.
5. The shell is marked with lines of growth thread.
6. Byssul filament found in byssul cavity are furmed by byssul gland.
7. After removing shell are seen mental lobes enclosing internal structure such as gill, foot, kidney & heart , alimentry canal etc.
8. The gill are lamella form.
9. The anterior adductor musscle is smaller & posterior it is heteromyarian form.
10. Posterior Mussle is large & anterior musscle is small.
11. Sexes are separate
12. Gonads extend into mental.

Importance :-

1. Used for food in Erope, in India also .
2. They relished as food by poor people living at sea coast.

CLASSIFICATION	
Phylom	- *Mollusca*
Class	- *Pelecypoda*
Order	- *Psudolamillea branchiato.*
Type	- *Oystera*



OYSTERA

OYSTERA

Habbit & Habbitat :-

1. It is sedantary bivalve attach to rock or other shell.
2. Abundently found in shallow & brakish marine water and in all sea except colder one.

Character :-

1. It is commonly called as ediable oyster.
2. The shell wall are irregular & variable in shape.
3. Very thick and often with folded layers.
4. The left wall is large, thick convex & pemenently attach to rock by byssus.
5. The right wall is small & plattend forming head.
6. The surface of shell coars irregular & ruffled.
7. The foot is totally absent.
8. There is a single aductor mussle i.e. just infornt of it.
9. The umbo & hinge at forward end & Harmaphroditic.

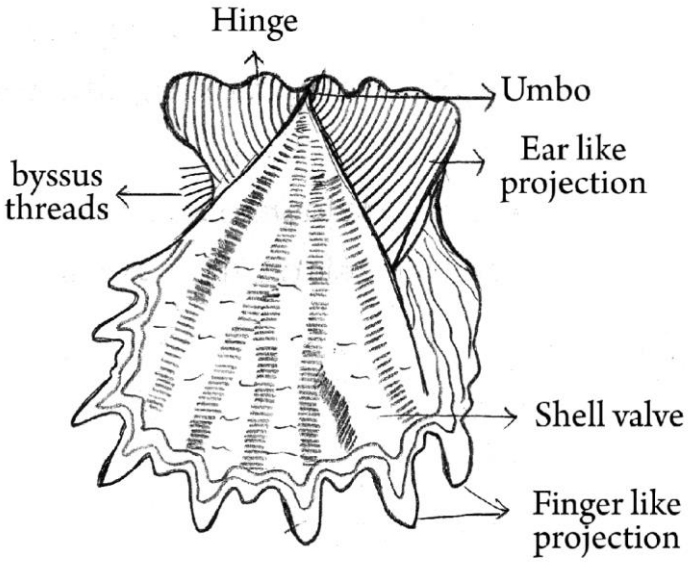
Special Features :-

1. The sex it changable in oysters.
2. Most of young are male but later on half of them change into female.
3. Egg production is very high.
4. Mortality of egg is also high.

Economic Importance :-

1. It is highly valued as food oyster are cultivated by man like other production industry such as chikens.
2. In addition their delashious flesh they are highly nutrius being rich in vitamin & minerals.

CLASSIFICATION	
Phylom	- *Mollusca*
Class	- *Pelicypoda*
Order	- *Psudolomilla branchiatcs*
Type	- *Pinctada Vulgaris*



PINCTADA VULGARIS

PINCTADA VULGARIS

Habbit & habbitat :-

Pinctada live in gulf of california and west Indian sea water.

Distribution :-

1. It has quit distribution except at old zone.
2. It is very common in gulf of kuch.

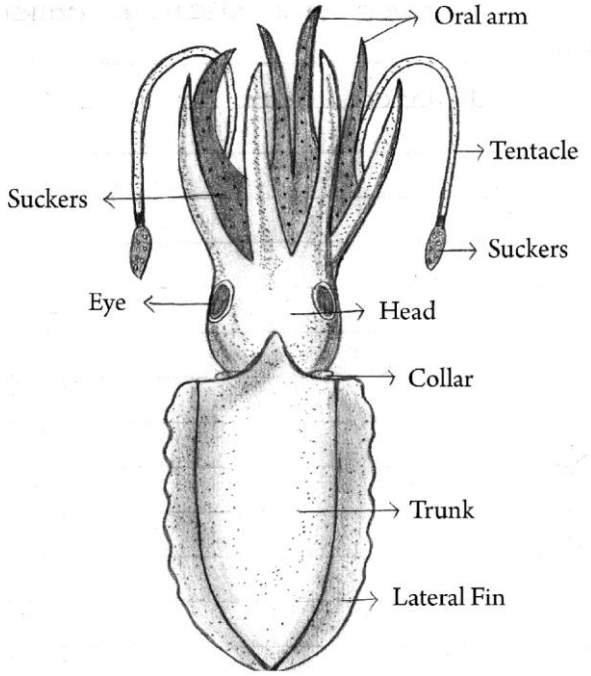
Characters :-

1. It is commonly called as Indian pearly oyster.
2. The shellwalls are uniqual & hinge line is straight produced at each end into shortear or winglike process.
3. The left shell is large, convex & permenantly attach to rocks by strong of bissul thread.
4. The right shell is smaller, thinner & convers visra.
5. The surface of shell is coarse irregular & roughled & bears rediation bands terminating at margin into fingerling like projection which may disappear in order speciman.
6. There is single addutor mussle.
7. The right and left mantal lobes are quite free.

Economic Importance :-

1. Oysters shells secreats pearls when over any insects enter the shell & causes erriation.
2. They are cultivated pearl oysters industry.

CLASSIFICATION
Phylum - *Mollusca*
Class - *Cephalopoda*
Sub class- *Dibrachia*
Order - *Dicapoda*
Type - *Sepia*



SEPIA

SEPIA

Habbit & habbitat :-

1. Sepia is also a marine cepalopod found along with loligo (animal) in coast water.
2. It is usually swim at night & rest flat on bottom during day time.
3. It is carnivorous, living small fishes crusteceans & other animal.

Distribution :-

It has cosmopolitant in distribution but, specially found in India, Europe.

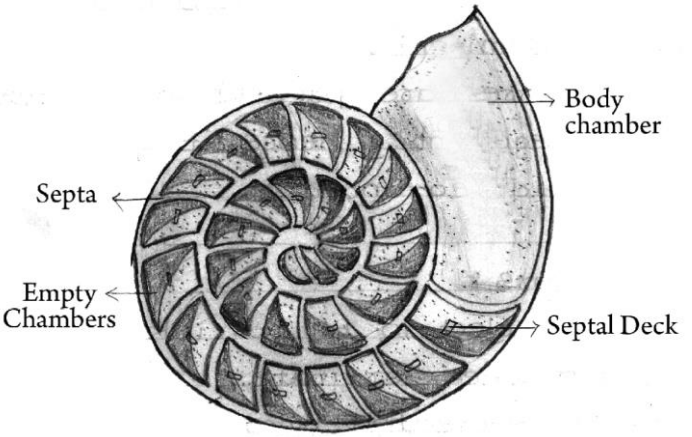
Characters : -

1. It is commonly called as cattle fish.
2. The body is fleshy, brownish & different into head & visral hump or trunk.
3. The colour is brownish with white spot and strips.
4. The fins are violet.
5. The head region contain syphan and eight arms having sevral rows of stocked sucker & two large tentacle with sucker only at tip.
6. Syphan tentacle & arm respresent foot, eyes are prominant.
7. Trunk is fleshy & dorsoventrally flattened & pointed posterioly & containing extention of mantal along in firm of lobe like structure called as lateral fin.
8. Head & trunk join by narrow neck.
9. Sepia is Jumisent.
10. Charomatophores are present in deeper layer of integument & hence it give a pigmented appearance.

Special Features : -

1. The animal eject ink by its ink gland in sea water when erritate.

CLASSIFICATION
Phylum - *Mollusca*
Class - *Cephalopoda*
Sub class- *Terabranchata*
Type - *Nautilus*



NAUTILUS

NAUTILUS

Habbit & habbitat :-

Nautilus is noturnal deep sea form crauling over the bottom in troops at night time in serch of animal food comprises crabs and shell fish.

Distribution :-

Commonly found in Indian & Pasific ocean.

Characters : -

1. It is popular known as pearly nautilus.
2. Body of animal lies in flat & spirally coiled shell in one plain which is internally divided into various chember by septa which bears septal necks.
3. The chember increase in size from inner to outer side of spiral i.e. outer most chember is largest.
4. Shell measures upto 25cm.
5. The shell is differenciated into large body chember containing head & tentacles and several small coiled chember are empty & containing visral mass called syphuncle.
6. The body proper lodges in arges chember while other chember are remain empty or filled with gas which helps in floating.
7. It is tetrabranchiate sexes are separate the tentacle are about 60 to 90 prehensile & redially arrenged arround the mouth.
8. The syphandl funnel is firmed out to separate folds.
9. The Eyes are open without cornia or less.

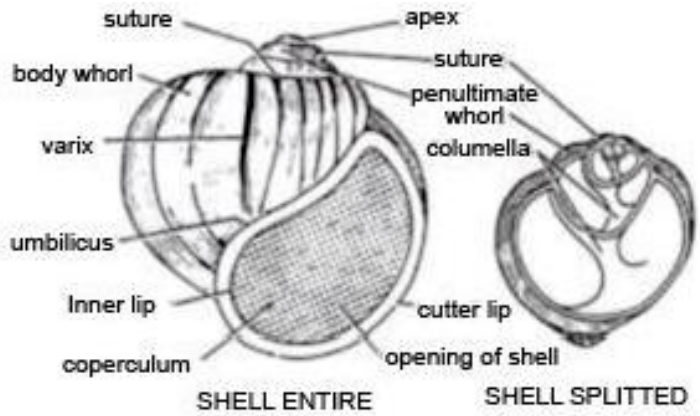
Special Features :-

Nautilus is only cephalopod having extermnal shell.

Economic Importance :-

The body is used for food & shell is extensivly employed for oranamental & useful proposes.

CLASSIFICATION
Phylum - *Mollusca*
Class - *Gastropoda*
Sub-class- *Prosobranchia*
Order - *Mesogastropoda*
Genus - *pila*
Species - *globosa*



PILA

PILA

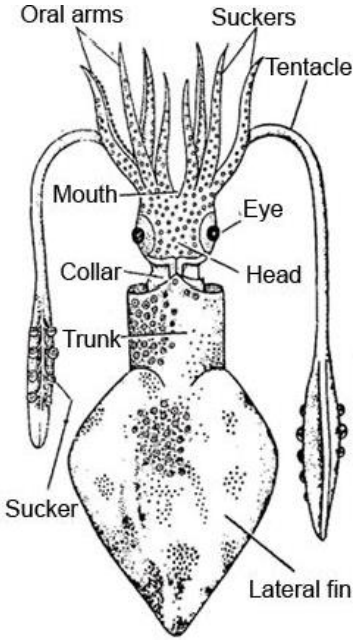
General Characters :-

1. Pila globosa is one of the largest fresh water gastropod, abundantly found in ponds, tanks, rice field & water bearing succulent vegetation.

Economic Importance :

1. The utilization of gastropods for food purpose.
2. They are found in sandy beaches in the intertidal areas in large numbers.
3. They are gathered, bailed & the soft body is pulled off with the help of needle for making in into a curry.
4. The shells of the pila are used as a seed for forming pearl.
5. The pila are exported to the foreign countries & a good amount of exchange can be get.
6. The waste material is used as food for chickens i.e. in poultry farming as it contain high amount of proteins.
7. It is also used as menure in the fields.
8. It has the great medicinal value.

CLASSIFICATION
Phylum - *Mollusca* **Class** - *Cephalopoda* **Sub-class**- *Dibranchiata* **Order** - *Decapoda* **Type** - *Loligo*



LOLIGO

LOLIGO

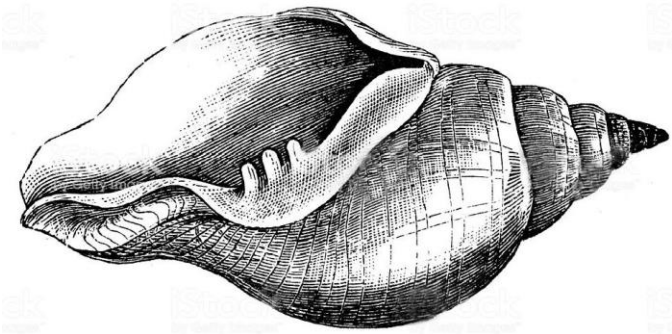
General Characters :-

1. Loligo is found in warm seas as coastal shallow & deep water.
2. It has cosmopolitan distribution.

Economic Importance :

1. Loligo has good amount of proteins, so it has got food value.
2. The Juveniles of loligo are used as good bait for catching fishes.
3. The wastes formed form the loligo are used as manure in the field.
4. The animal ejects ink called as loligo ink in its defence.

CLASSIFICATION
Phylum - *Mollusca* **Class** -*Gastropoda* **Genus** - *Turbinella* **Type** - *Chank* **Species** - *T. pyrum*



CHANK

CHANK

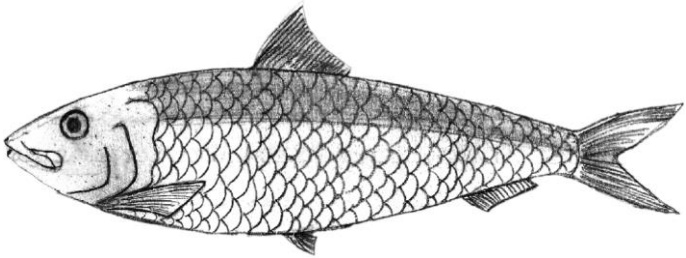
General Characters :-

1. The xancuspyrum the sacred chank has restricted distribution being found only along the coasts of India & SriLanka.
2. A distinct variety of this species occurs in Anadaman Waters.
3. The chank shell is elegant, massive conical pear shaped with a conical spairs & a wide aperture drowns in to a narrow spount.
4. The shells are formed of calcium carbonate deposited in an organic matrix of concholine.
5. The shells structure or texture is durable & lends to be cut to any desire shape & polisher.

Economic Importance :

1. The shell much is demand for the manufacture of bangles.
2. It is used in ornamental & with has the good economic value.
3. The shells are used as a decoralize item in the house.
4. The export value of shell forms a good source of foreign exchange.

CLASSIFICATION	
Species	- *Longicepeps*
Class	- *Teleostomi*
Sub class	- *Actinopterygii*
Order	- *Clupiformes*
Family	- *Clupeadi*
Genus	- *Saradinella*



OIL SARDINE

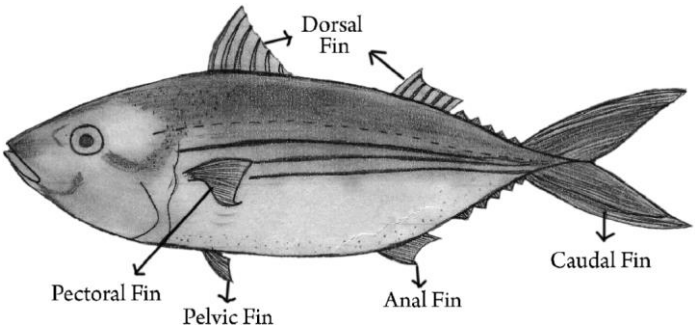
Identification, Classification & Dignostic character of Marine water fishes

OIL SARADINE

Characters :-

1. It is marine water fish.
2. It is commonly called as Indian Water Saradine.
3. Body is elongated dorsal & ventral both profiles are convex.
4. Eyes are large rounded covered by eyelids.
5. Dorsal fin nearer to caudal than to snout.
6. Ventral fin rise behind middle of dorsal.
7. Caudal fin is well forked, lobes are pointed two large alar scales present at the base of fin.
8. Dorsal side blueish green in colour with golden reflection, abdomen is silvary with pinkish ting. Fins are pale, caudal fin dusty tips of lobe & fork back.
9. It is very important fish. It is not feverable fish but serve as source of valuable biproduct like saradine oil use to several industryes fish meals for cattle & poltry feeds & guano as manual to coconut, coffee, tea plantation.

CLASSIFICATION
Class - *Teleostomi*
Sub class- *Actinopterygii*
Family - *Scombridae*
Genus - *Rastrelliger*
Species - *Kanagurta*



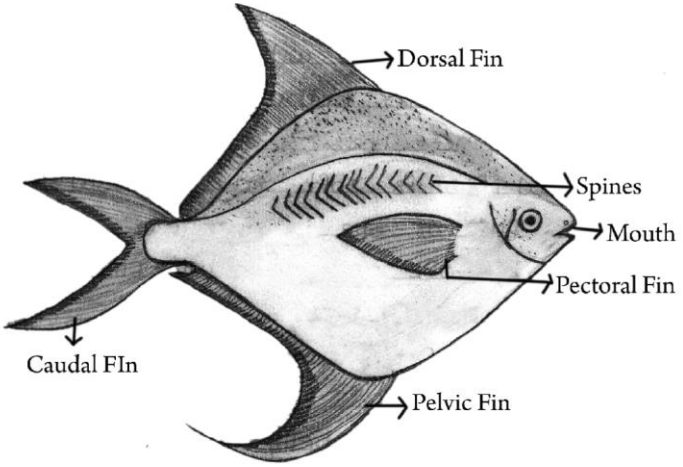
MACKREL

MACKREL

Characters :-

1. It is marine scomber fish.
2. Commonly known as Mackerel.
3. Body is laterally compressed.
4. Head is some what large bears pointed snout.
5. A pair of eyes with thick adipose eyelids.
6. Mouth is large oblique with deep cleft.
7. The first dorsal fin spinus.
8. The fish spine shorter than second spine.
9. Second dorsal fin is soft ray. Dorsal, Anal finlets are five or six in number.
10. Pectoral fins is soft ray & pelvic fins with one spine & five soft ray.
11. Caudal is deeply forked with pointed lobles.
12. Body is bluish green towards grey above & yellow belly at side with above three greyish longidudnary strips along upper half of the body.
13. It forms important fishery along east cost of India.
14. It is excelant food fish.

CLASSIFICATION	
Class	- *Teleostomi*
Family	- *Stromotoidae*
Genus	- *Pampus*
Species	- *Argenteus*



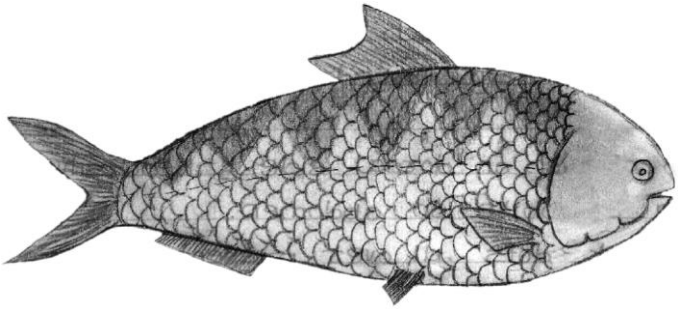
POMPUS ARGENTEUS

POMFREET

Characters :-

1. Commonly known as silver pompus.
2. Body is laterally compressed.
3. Five to ten blade like spines are present in front of dorsal & anal fin.
4. Gill opening is verticle slit like.
5. Dorsal fin is single but dorsal & anal fins are large extends upto base of caudal fin but not attach to it.
6. Caudal is deeply forked, lower lobe is longer.
7. Body is greyish on dorsal side & head silvary tending to white on abdomen.
8. Small block dots all over present.
9. Dark on upper part of opercle is also present.
10. Pomfreet are excelent table fish.
11. It is highly cost or prize due to it suffer important fishery along both cost of India.
12. The demand is high for pomplet because is sold in market in fresh condition.

CLASSIFICATION
Series - *Teleostomi*
Sub class- *Actinopterygii*
Order - *Clupeiformes*
Genus - *Hilsa*
Species - *ilisha*



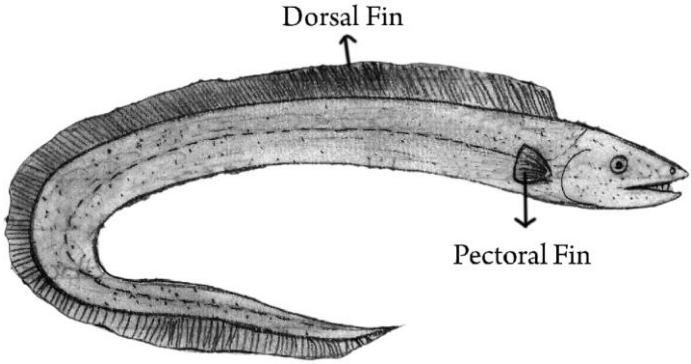
HILSA ILISHA

HILSA ILISHA

Characters :-

1. It is commonly called as Hilsa.
2. Body is latterally compressed & covered by silvary scale.
3. Verticle darker bars across the back & upper part of sides.
4. Dorsal fin, Pectoral fin, anal fin, pelvic fin, caudle fin are present.
5. Caudal fin is deeply forked & partialy covered by the scales.
6. Belly posses saw like edges.
7. This fish is economically important because it forms the delicius fish for those people who eats fish.

CLASSIFICATION
Class - *Teleostomi*
Sub class- *Actinopterygii*
Order - *Perciformes*
Genus - *Trichiurus*

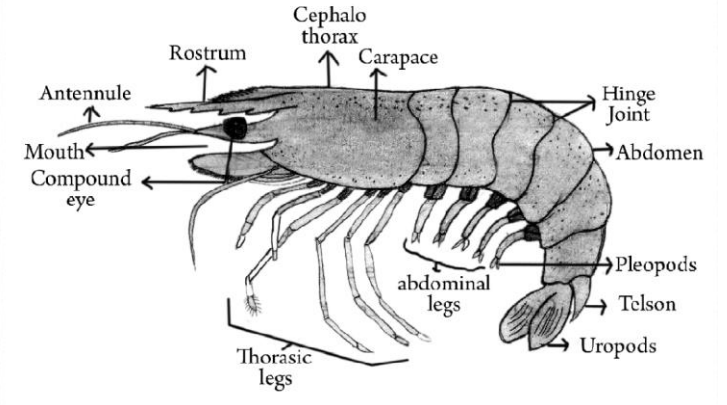


TRICHIURUS

TRICHIURUS (RIBBON FISH)

Characters :-

1. Trichiurus is commonly known as ribbon fish.
2. Body is elongated very thin, ribbon shape flatten from side to side.
3. It grows upto 30cm in length.
4. Scales are absent.
5. A single long dorsal fin extending the whole length of back.
6. Pectoral fins are inverted down the side.
7. Tail is tapring caudal fin is absent.
8. Lateral line is seen clearly.
9. These fishes are mostly sundried for the market.
10. Well developed teeth are present on the Jaws. (Prominent teeth.)



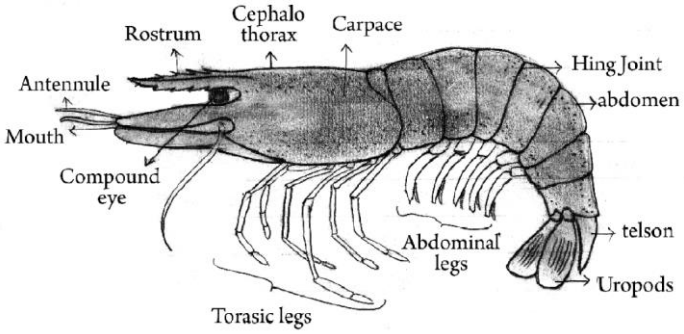
PENAEUS INDICUS

Identification, Classification & Dignostic character of Marine water erustanceans

PENAEUS INDICUS

Characters :-

1. It occur along both the cast & west coast of India.
2. It grows 200 to 230 mm in length.
3. The rostrum is long & cylinder with double curve with 7 to 9 dorsal teeth & 4 to 5 ventral teeth.
4. In males the endopodiets of 1st pair of abdomeanal apendages beering hooks middely join togeter to form a structure known as petasma which serve to tranfer the spermatophorses to femal during mating.
5. The sternum of last thorasic segment in females have a characteristic out growth called thelyum enclosing a space for the resoption of spermatophores form males.
6. The petasma is rounded & its distal margin is serreted with 12 calcified teeth.
7. The median process the thelycum is small & semicircular with minute apical spines on it border.
8. The colouration is whitish & translusent with scattered chromatophore which are brownish or greyish spred over body & apendages.
9. The antenular & flagella are bounded lemon yellow.
10. The thelycum & europods are deeply pigmented brown.



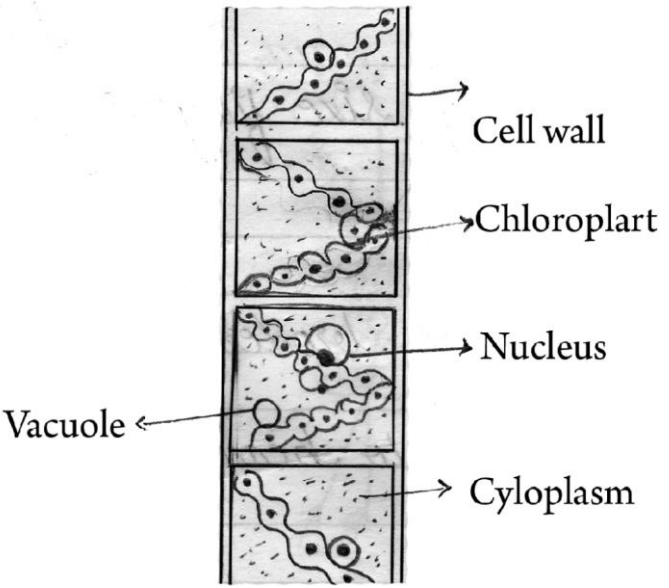
PENEAUS MONODOM

PENEAUS MONODOM

Characters :-

1. This is the largest of marine prowns growing to a maximum length of 320 mm in length & is known as jumbotiger prawns, tiger prawn, black tiger, joint tiger prawn in different contries of endopasific region.
2. In India it occurs in brakish water , esturies & in insure & deeper water of the east coast & west coast.
3. Rostrum is long, sigmoid with 7 to 8 dorsal teeth & 2 to 3 ventral teeth.
4. Exopodies of the Vth walking leg is absent.
5. Petasma with median anterior lobe small & not reaching the length of lateral lobes the later without distal cetae but with distolateral osscicles.
6. The seminal receptacal in thelycum is circular.
7. General colouration is dark blue to almost black with dark band across carapace abdomen.
8. Plucopodes & uropodes tiped blue.

CLASSIFICATION	
Kingdom-	*Planatae*
Division -	*Chlorophyta*
Class	*-Zygnematophyceae*
Order	- *Zygnematolus*
Family	- *Zygnemataceae*
Genus	- *Spirogyra*



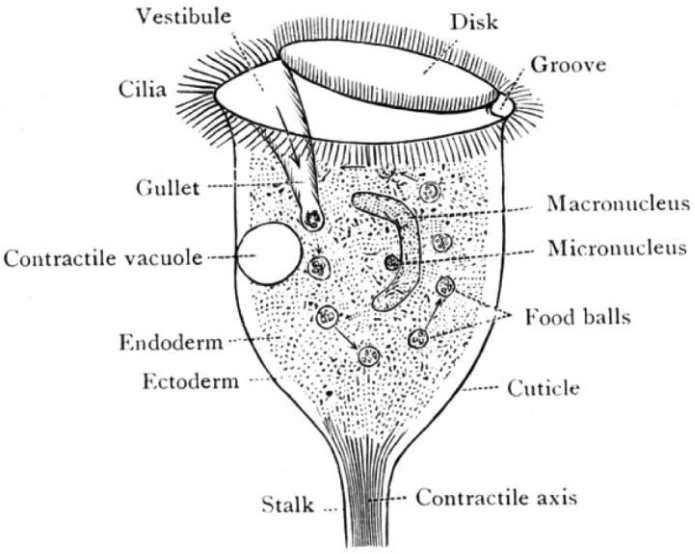
SPIROGYRA

SPIROGYRA

Characters :-

1. There are commonly found in fresh water.
2. There are more than 400 Species of Spirogyra.
3. It measures approximately 10 to 100 mm in width .
4. It grows under water in spring & when there is enough sunlight they produce large amount of oxygen.
5. It can reproduce both asexually & sexually.
6. It's filament is very slimy due to presence of mucilage sheath that lines the whole body.
7. Each unbranched filament of Spirogyra consists of a number of elongated, cylindrical cells of similar type joined end to end.
8. The cell wall surrounds the protoplast, is protective and consist of two layers one is inner cellulose layer and outer pectose layer.
9. It lacks a motile variant at all stages of its life history.
10. It is not possible to distinguish virtually but certain filaments in large parallel bundle assume female & others are male
11. Central portion of it shows nucleus and chloroplasts.
12. It is green alga, and having central portion of very fine bright dark green filaments moving gently.
13. Chloroplast is spiral and ribbon shaped.

CLASSIFICATION
Phylum - *Ciliophora*
Class *Oligohymenophorea*
Subclass - *Peritrichia*
Order - *Sessilida*
Family - *Vorticelliadae*
Genus - *Vorticella*



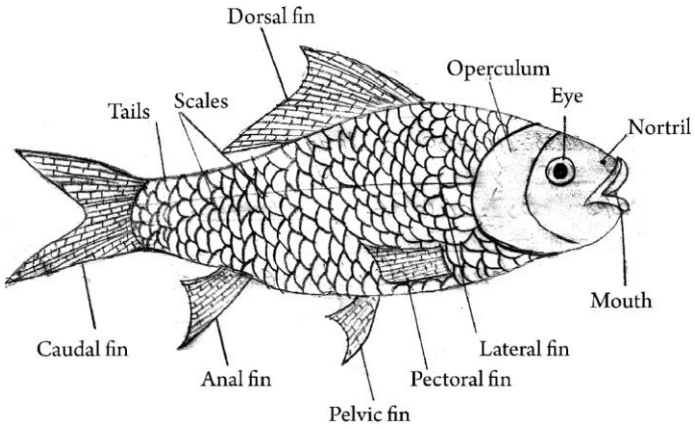
VORTICELLA

VORTICELLA

Characters :-

1. It is genus of protozoa with over 16 species.
2. They are bell shaped ciliates.
3. They mainly live in running freshwater.
4. It reproduces by budding.
5. They are also reproduce by fission.
6. Vorticella is solitary or colonsal species (some time they found in clusters or sometime they are single)
7. In conjugation one small special migrant finds an attached vorticella.
8. Vorticella is a solitary species in that cells do not form colonies.
9. The stalk consists of an external sheath that contains a fluid and a spirally arranged contractile thread.
10. This is one of the first free living Protozoa to be described.
11. Vorticella and similar filter feeding ciliates are used to clarify sewage in water treatment plants.
12. Threre are also green varieties of vorticella which establish a symbiotic relationship with unicellular algae.

CLASSIFICATION
Phylum - *Chordata*
Class - *Actinopterygii*
Order - *Cypriniformes*
Family - *Cyprinidae*
Genus - Catla
Species - *catla catla*



CATLA CATLA

CATLA CATLA

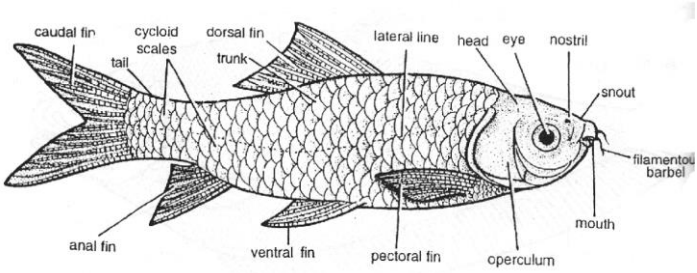
Catla catla

Binomial Name :- *Catla catla*

Characteristics :-

1) This species has the fastest rate of growth among the Indian Major carps.
2) *Catla* matures when they grows 2 years old.
3) It is one of the most important fresh water species in South Asia.
4) Catla consumed & sold fresh water fish locally & regionally.
5) *Catla* fish with large and broad head, upturned mouth and a large protruding lower jaw.
6) *Catla* is a surface & mid water feeder which feeds on phyto plankton.
7) The body of fish is covered with broad scales and grey in colour.
8) Fecundity of catla fish varies from 100000-2000000 kg, depending on fish length and weight.
9) Barbles are absent, fins are dorsal, pectoral, anal and caudal.
10) Head contains wide mouth and eyes.
11) Lateral line complete originating from the upper margin of the gill cover.
12) Fin formula : - D, 19.19 (3/15-16 ; P-19 ; V-9 ; A.8(3/5) ; C 19

CLASSIFICATION	
Kingdom	- *Animalia*
Phylum	- *Chordata*
Subphylum	- *Vertebrata*
Superclass	- *Pisces*
Class	- *Osteichthyes*
Sub class	- *Actinopterygii*
Order	- *Cypriniformes*
Family	- *Cyprinidae*
Genus	- *Labeo*
Species	- *rohita*



LABEO ROHITA

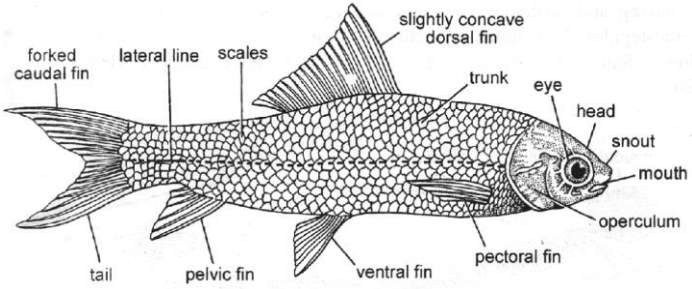
LABEO ROHITA

Biblonial Name **:** *Labeo rohita.*

Characteristics **:-**

1) *Labeo rohita* is the most famous in fresh water carp and commonly called as "Rohu" in Hindi.
2) It is column feeder found in mid-water region.
3) Body is elongated and streamline
4) *Labeo rohita* reaches sexual maturity within two years.
5) In case of breeding when cultured, it does not breed in lentic environments then that time induced spawning becomes necessary.
6) Rohu having a gills for exchange of gases (Respiration) in aquatic medium.
7) Rohu have paired and unpaired fins supported by a soft spiny rays. It is useful for swimming .
8) Body is covered by scales, it is Brownish coloured on dorsal side & ventral side silvery mark on each side.
9) Lateral line system is helpful for sensation in aquatic environment.
10) Air Bladder is present In bony fishes for buoyancy.
11) Body is divided in to head, trunk and tail.
12) A pair of filamentous barbles originates from upper lip.
13) Large operculum hangs on either side enclosing gills and branchial chamber.
14) Mouth does not contain teeth. Teeth are found in pharynx only.
15) Kidneys are mesonephric.
16) Fin formula :- D.16 (3/13) ; P 17 ; V 9 ; A 7 (2-5)

CLASSIFICATION	
Phylum	- *Chordata*
Sub phylum	- *Vertebrata*
Super Class	- *Gnathostomata*
Class	- *Teleostomi*
Sub class	- *Actinopterygii*
Order	- *Cypriniformes*
Family	- *Cyprinidae*
Genus	- *Cirrihinus*
Species	- *Cirrihinus mrigal*



CIRRHINUS MRIGALA

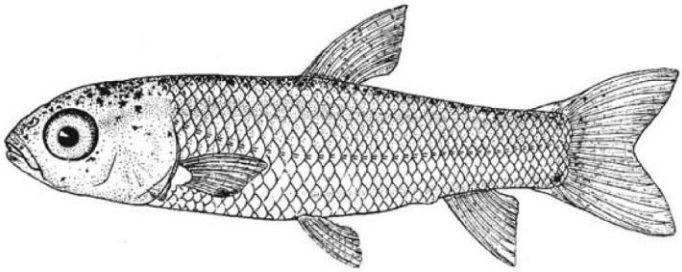
CIRRHINUS MRIGALA

Binomial Name – *Cirrhinus mrigala*

Characters :-

1) This carp is known as Mrigal.
2) Mrigal is a species of ray- finned fish in the carp family.
3) Cirrhinus mrigala's maximum length is 1 m (3.3 ft.)
4) In south Asia Mrigal is a popular food fish and important aquaculture fresh water fish.
5) Body divisible in to head, trunk and tail.
6) Lower lip may or may not cover the lower jaw.
7) Head contains mouth, eyes and Snout.
8) Eyes are golden coloured and located in anterior half of head.
9) *Cirrhinus mrigala* body colour is a silvery dark and grey on dorsal side and whitish is on abdomen.
10) Caudal fin deeply forked.
11) Fins are slightly orange coloured.
12) Lateral line present and complete with about 40-45 scales.
13) It is feed on both natural and supplementary feeds.
14) It is often used as game fish in Bangladesh but widely used as a food in other countries.
15) It is widely farmed as a component of a poly culture system**.**
16) Fin formula : D.16 (3/13) ; P 18 ; V.9 ; A.8 (2/16); C.15.

CLASSIFICATION	
Phylum	- *Chordata*
Subphylum	- *Vertebrata*
Division	- *Gnathostomata*
Class	-*Actinoptergii*
Order	- *Cypriniformes*
Sub family	- *Leuciscinae*
Genus	-*Ctenopharyngodon*
Species	- *idella*



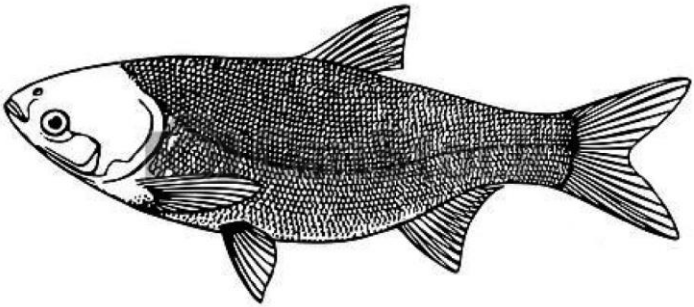
GRASS CARP

GRASS CARP

***Comments* :-**

1) It lives in pools, ponds, lakes, backwater of large rivers.
2) Barbles are absent in *c.idella*.
3) Anal fin is located closer to tail.
4) Their dorsal fin is small in size.
5) Adult fish is about 1 to 1.2 meters in length.
6) Grass carp near about 18 kgs in weight.
7) Their average age is about 5-9 yrs.
8) It is very fast growing fish.
9) Its mouth is terminally located on head and eyes are small.
10) Dorsal fin having 8-10 soft rays.
11) They plays a vital role in controlling aquatic weeds.

CLASSIFICATION	
Phylum	- *Chordata*
Subphylum	- *Vertebrata*
Division	- *Gnathostornata*
Class	-*Actinopterigii*
Order	- *Cypriniformes*
Family	- *Cyprinidae*
Genus	- *Hypophthalmichthys*
Species	- *molitrix*



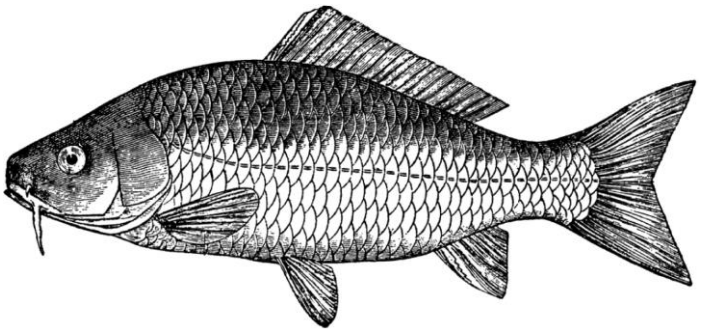
SILVER CARP

SILVER CARP

***Comments* :-**

1) The silver carp is laterally compressed.
2) They are silvery in colour when they are young and they turn to greenish when they are get older.
3) They have a large mouth without any teeth in jaw.
4) Its eyes are situated far forward on the middle line of the body and are slightly turned down.
5) They are mostly available in eastern part of asia or china.
6) There are fairly uniform in color with irregular dark blotches on its back.
7) Its dorsal fin originate slightly behind the ventral fin.
8) Its head is pointed, snout blunt & round in shape.
9) It is fastest growing fish and good in taste.
10) It found approximately 45 kg in weight.
11) Gill rackers are long, thin, fused, porous and sponge like.
12) It is surface feeder fish.

CLASSIFICATION	
Phylum	- *Chordata*
Subphylum	- *Vertebrata*
Division	- *Gnathostomata*
Superclass	- *Pieces*
Class	- *Actinopterygii*
Order	- *Cypriniformes*
Family	- *Cyprindae*
Genus	- *Cyprinus*
Species	- *Corpio.*



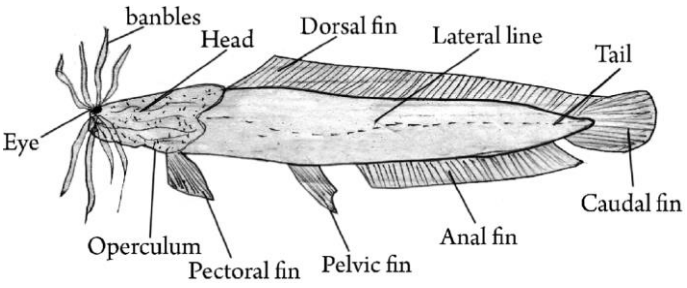
COMMON CARP

COMMON CARP

Comments :-

1) There are two types common carp.
   [a] Mirror carp- which has much larger scales.
   [b] Leather carp- has no scales except near dorsal fin.
2) It has two barbels like scale on upper lips.
3) It lives in lakes, ponds & rivers.
4) Its body is dark, olive colored back. belly is yellowish.
5) They have a larger dorsal fin.
6) They are introduced in America from Asia.
7) People put it in ponds on purpose to control plants that spread too quickly including algae.
8) They have good eyesight &they are sensitive.
9) They have sensitive taste organs in and around it's snout.

CLASSIFICATION	
Phylum	- *Chordata*
Group	- *Pisces*
Class	- *Osteichthys*
Order	- *Silluriformes*
Family	- *Clariidae*
Genus	- *Clarius*
Species	- *Batrachus*



CLARIUS BATRACHUS

Predatory Fishes

CLARIUS BATRACHUS

Defination :-

Predator fishes are carnivorous in nature & predate on spawn, fry, fingerlings of Indian major carp.

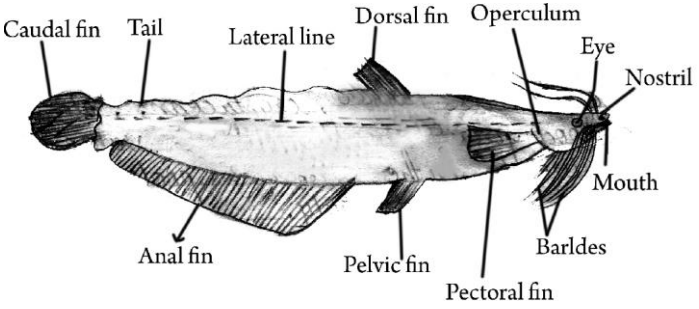
Identification:-

1) It is commonly called as 'Mangri' in Hindi.
2) Body is elongated, with laterally compressed head.
3) Scale less and measuring upto 45 cm in length.
4) It is predatory in nature.
5) The general colour of the body is uniform brown or greyish black.
6) Sensory barbels are four pairs.
7) Dorsal fin is long and without spines, extending from the neck of the caudal fin.
8) Anal fin also long. No adipose fin.
9) Caudal fin more or less rounded, pectoral fins are provided with spines.
10) Acessory respiratory organs are branceed tree like especially designed to take in oxygen from air.
11) The Air-bladder is connected with internal ear by weberian ossicle.
12) It is highly nourishing and estimated as food.

Distribution :

Clarius is distributed in India, Burna, Sri Lanka.

CLASSIFICATION	
Phylum	- *Chordata*
Group	- *Pisces*
Class	- *Osteichthys*
Order	- *Silluriformes*
Family	- *Hetropneustidae*
Genus	- *Heteropneusts*
Species	- *fossils*



HETEROPNEUSTS FOSSILS

HETEROPNEUSTS FOSSILIS

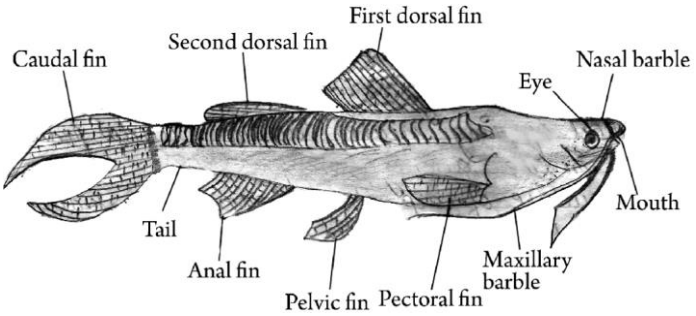
Identification :-

1) It is commonly called as 'Singhi' in Hindi.
2) Its body is elongated and laterally compressed measuring about 30 cm in length.
3) Skin without scales.
4) It is predatory in nature.
5) Head flattened, eyes with free circular margins.
6) Barbles long and four pair.
7) Dorsal fin is short without spine, ventral fin situated at the level of the dorsal fin.
8) Pectoral fins are strong with poison spine.
9) Anal fin is enlongated, reaches upto the caudal fin seperated from it by a notch.
10) Air-bladder absent.
11) Accessory breathing organs are present.

Distribution :

Heteropneustes is found in fresh water of India and Burma.

CLASSIFICATION	
Phylum	- *Chordata*
Group	- *Pisces*
Class	- *Osteichthys*
Order	- *Silluriformes*
Family	- *Bagridae*
Genus	- *Mystus*
Species	- *seenghala*



MYSTUS SEENGHALA

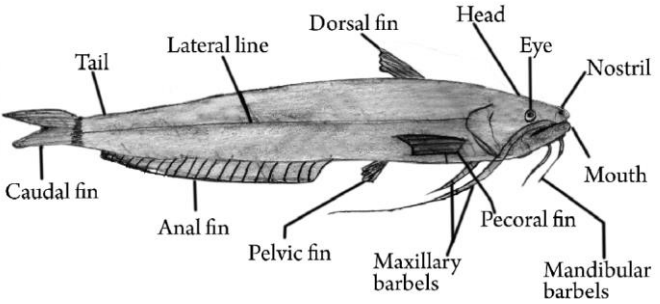
MYSTUS SEENGHALA

1) Body is brownish on the dorsal surface and siler on sides.
2) Eyes are small.
3) Barbles are well developed by which they make a good vision and found their way.
4) It attains a length of about 46cm.
5) This fish is predatory, feeds on small carps, other fishes and prawns and also feed on some insects larvae, crustaceans, aquatic weeds.
6) This fish provides a good nutritive value.
7) It breeds in the rivers and pools and the breeding season is April to July.

Distrubution :-

This fish is found in riverine system like Ganga and Jammuna and also inhabitants in small reservior.

CLASSIFICATION	
Phylum	- *Chordata*
Group	- *Pisces*
Class	- *Osteichthys*
Order	- *Silluriformes*
Family	- *Silluridae*
Genus	- *Wallago*
Species	- *attu*



WALLAGO ATTU

WALLAGO ATTU

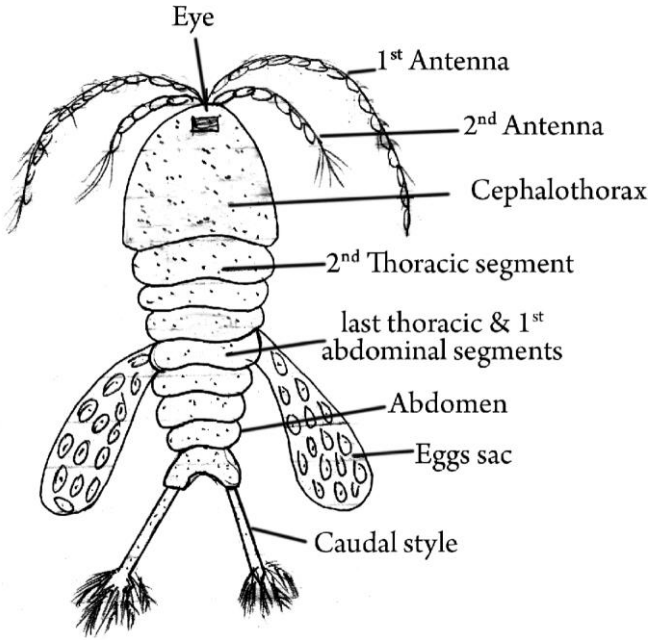
Identification :-

1) Commonly known as Freshwater Shark.
2) This is one of the largest fresh water catfish.
3) It attains a maximum length about 183 cm. but usually 61 to 91 cms long.
4) It is predatory in nature.
5) They are provided with large mounth and sharp teeth healpful for predatory action.
6) Breedings takes place in rainy season.
7) This fish is used as food.

Distribution :-

Found in fresh water in India, Pakistan, Burma and Indonesia.

CLASSIFICATION	
Phylum	-*Arthropoda*
Class	-*Crustacia*
Order	-*eucopepoda*
Type	-*Cyclops*

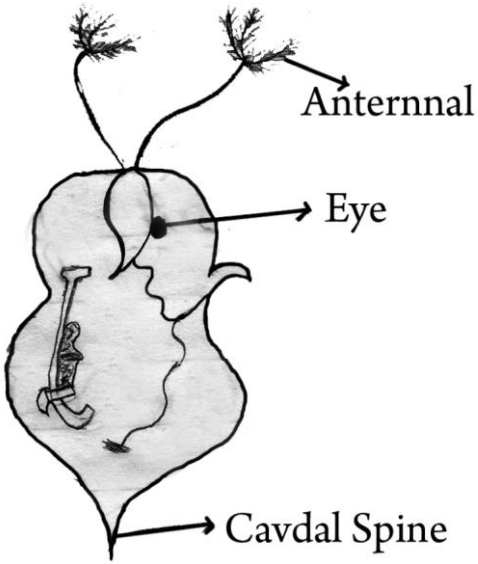


CYCLOPS

CYCLOPS

1) It if freshwaterzooplantons.
2) It is the most familier fresh water. Copepods found in ponds, pools, ditches, lakes and also in brackish water.
3) Body is elongated, some what broad enteriorly and narrow posteriorly.
4) Body differentiated into cephalothorax and abdomen.
5) The head and first thoracic segment fused and from cephalothorax.
6) Cephalothorax is covered by a large plate like carapace.
7) Presence of a single median eye dorsally on the carapace.
8) It consists of 5 thoracic and 5 abdominal segments.
9) 4th abdominal segments bears a caudal style or forked tail & anus dorsally.
10) Male is easily identified by the absence of ovisac.
11) Sexes are separate.
12) It's serve as food for allturable fishes.

CLASSIFICATION	
Phylum	-*Arthropoda*
Class	-*Crustacia*
Order	-*Cladocera*
Type	-*Daphnia*

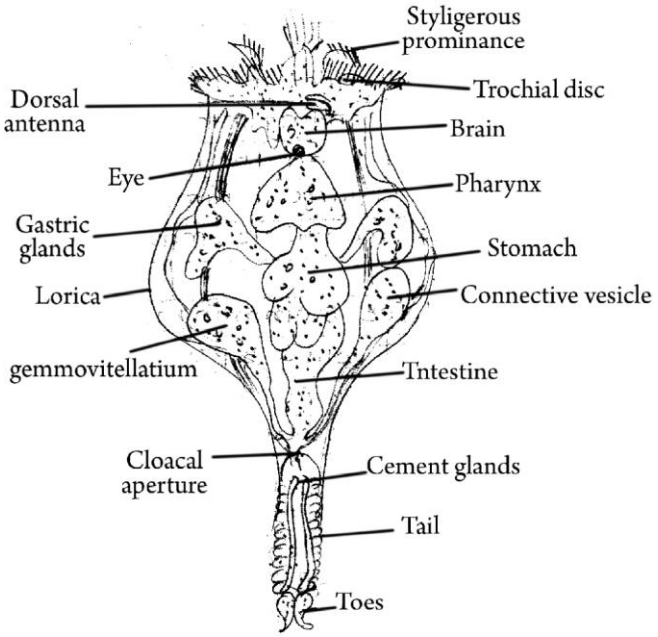


DAPHNIA

DAPHNIA

1) It is fresh water zooplanktons.
2) Commonly found in ponds, ditches, lakes.
3) It is commonly known as 'waterflea'.
4) Body is bilaterally compressed covered by bivalve vestigial carapace.
5) Carapace enteriorly provided into backwardly directed rostrum and posteriorly ending into a spine.
6) Head is not separated from the body but it is rounded and bears a large biramous antane, injointed antanules, mandibals, maxillulae and large sessile eyes.
7) Antenae are useful for swimming, abdominal appendages are absent while 5 parts of leaf like thoracic appendages are present.
8) Thoracic appedages are useful for capturing the food.
9) Posteriorly female carries a brood pouch containing various developing embryoes in brood pouch.
10) It is also serves as food for fish seed and culturable fishes.
11) Sexes are separate.

CLASSIFICATION	
Phylum	- *Rotifira*
Class	- *Monogonodon.*
Order	- *monogonta/ploina*
Type	- *Brachionus*

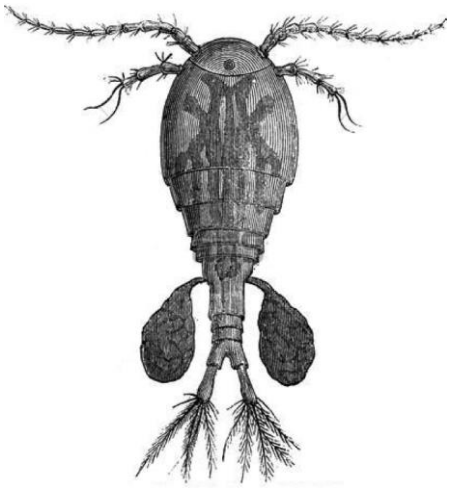


BRACHIONUS

BRACHIONUS

1) In both male and female body is divided into anterior trunk and posterior foot.
2) Trunk bears 3 ciliated lobes resting on circumapical ciliated band.
3) Eye sport are present anterorly.
4) Food is wrinkled very retractile ending in a 2 toes.
5) Sexes are separate.
6) It is one of the commenest fresh water rotifer found in pond , ditches etc.
7) It is also form imp. food of fishes.

CLASSIFICATION
Phylum - *Arthropoda*
Subphylum - *Crustacea*
Class - *Maxillopoda*
Subclass - *Copepoda*
Order - *Cyclopoida*
Genus - *Cyclopoda*



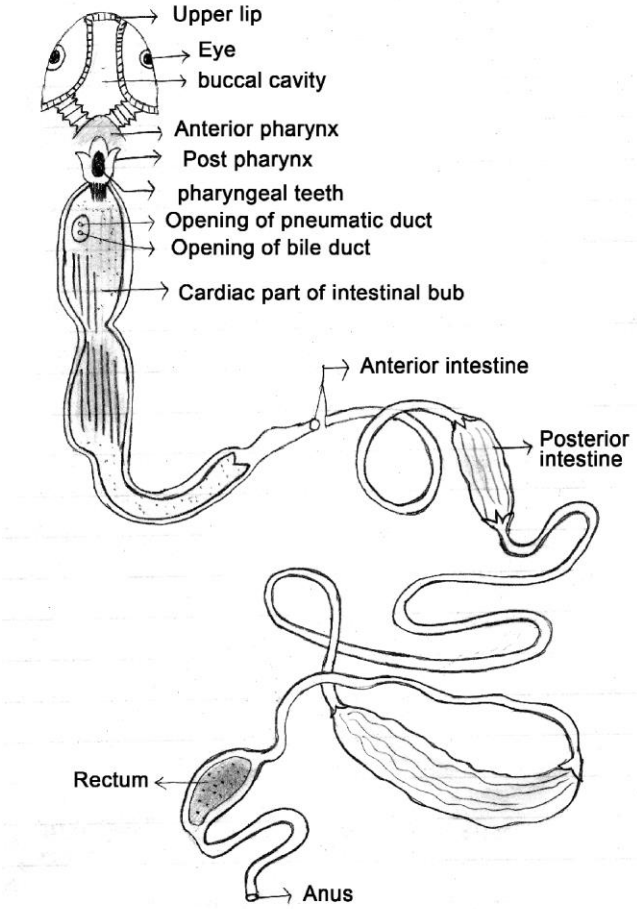
ZOOPLANKTON (CYCLOPODA)

ZOOPLANKTON (CYCLOPODA)

Characters :-

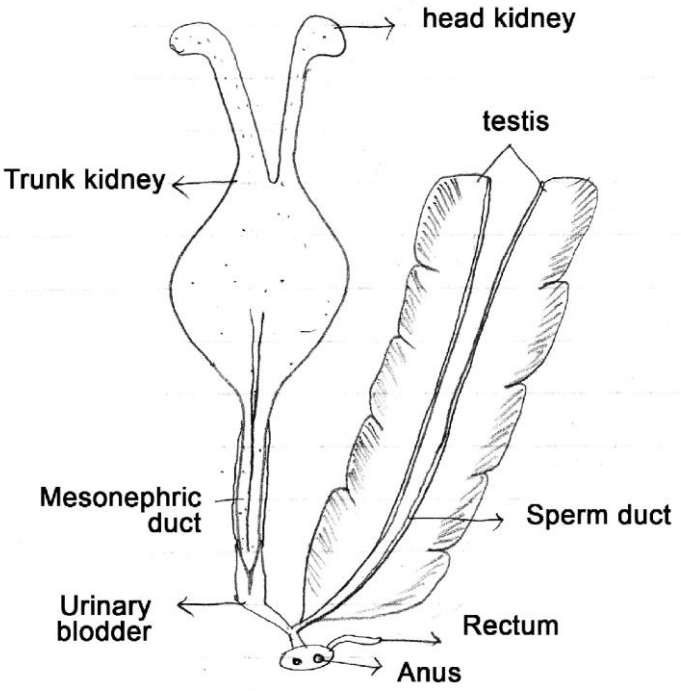
1. They are small cruestaceans from subclass copepod.
2. They are capable of rapid movement.
3. They are distinguished from other copepods by having first antennae. Shorter than length of head & thorax.
4. Their larval development is metamorphic.
5. Its embryos are carried in paired or single sac.
6. The main joint lies between 4th & 5th segments of the body.
7. It's usual range of length of is from 0.5 to 2.0 mm.
8. They are primarily benthic.
9. Within larger water bodies cyclopods biodiversity tends to be highest in littaral Zone.
10. It play an important role in aquatic food.
11. They are also an important source of food for larval, Juvenile and adult fish.
12. They are intermediate hosts of many parasitic worms.
13. Some species occur in brackish water and saltwater as well as in freshwater.
14. It can grows upto 1.2-3 mm in length.
15. Their larval development is metamorphic.

DIGESTIVE SYSTEM OF LABEO



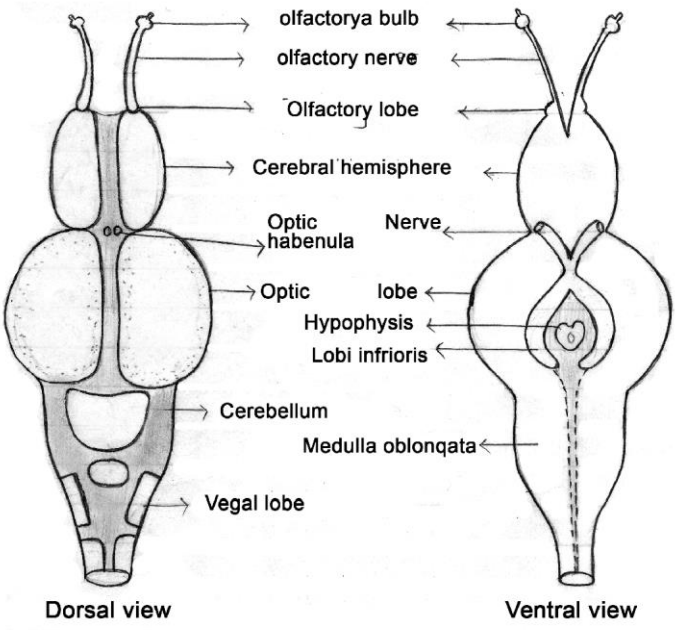
Digestive System of labeo

REPRODUCTIVE SYSTEM OF LABEO



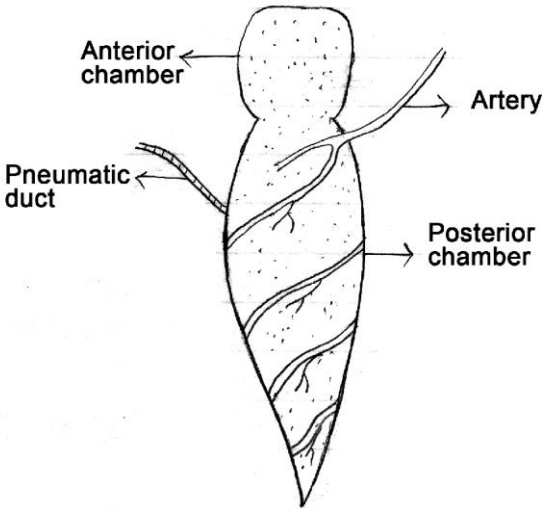
Reproductive System of labeo

BRAUIN OF LABEO



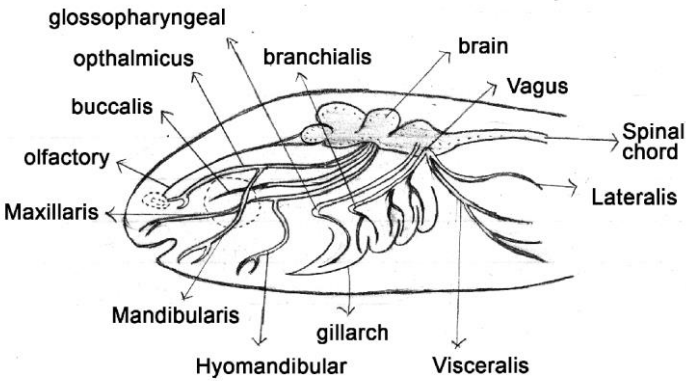
Brauin of Labeo

AIR BLADDER OF LABEO



Air bladder of labeo

CRANIAL NERVES OF LABEO



Cranial Nerves of labeo

STUDY OF FISHING CRAFTS AND GEARS

Fishing Crafts :

1. Catamaron:

1. It is a miple crafts is a like a circular basket with a wide mouth of about 4 m in dimeter.
2. The frame of the basket is made up of bamboo and covring by leather.
3. This is mostly used for fishing in river and reservoirs.
4. Primitive type of another craft is made by tying together slerval logs of woods.
5. The size of the Catamoron varies depending upon the no. of logs used which may be 4-7.
6. The logs of the sides are kept slightly raised so as to form a depression in the middle.
7. A catamoron may be like a small craft or accessory pipecs may be attached to larger one to give it a boat like shape.
8. A Triangular or bladed paddels are provided for purpulsion.

CATAMARON

2. Masula Boat

1. It is a frameless doulbe ended and keelless boat .
2. It is constructed from mango plants.ickhed together with palm leaf fibres.
3. Masula boats are 8-12 m in length and are of weak contruction it is operated near the shore.
4. The small masula boad are extensively used in gill net fishing . Bar boat of orisa and Andra coast.

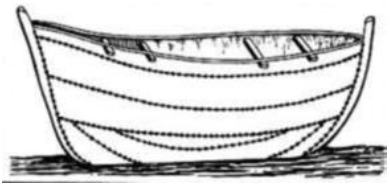


Fig. Masula Boat

3. Dug-out canoes

1. These are made from large logs of woods by scooping out inner part.
2. The bottom or keel portion being thicker than the side.
3. It is popular on the kerala and cocan coast.
4. The large sized one called 'Vanchi' and 2nd is 'odem' are 10-20 m long and operate a large variety of nets.
5. The Smaller ones knowns as 'Theoenies' are used for till net or 'drift net fishing.

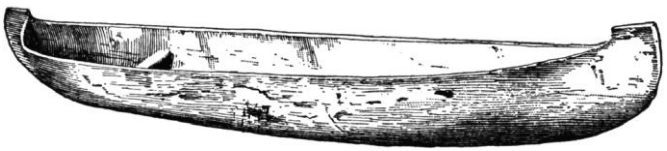


Fig. Dug-out canoes

4. Coracle

1. It is a simple type of bat made up of bamboo sticks.
2. It is insulated from the lower side of the bottom so that water will not enter.
3. It is mannualy operator in reservoir for fishing.

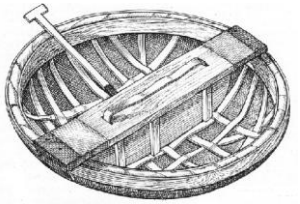
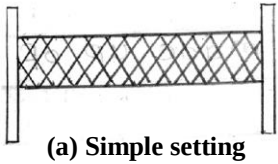


Fig. Coracle

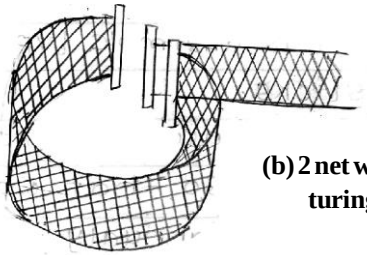
5. Crafts

1. Crafts are most primitive type of boat.
2. It is constructed from various indigenous material.
3. In waste bengal and some parts of Madras the stem of banan trees are tide together to form a floating plat form.
4. In parts of Bihar on the river Ganga erthern pots are tide together to support a light platform of bamboo.

Fig. Crafts



(a) Simple setting



(b) 2 net with a turing

Fig. Stationary nets

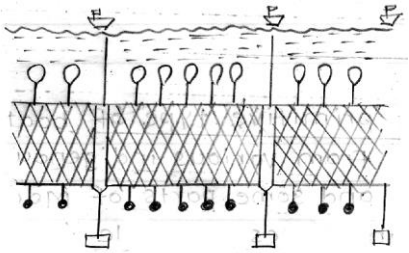


Fig. Floating gill net

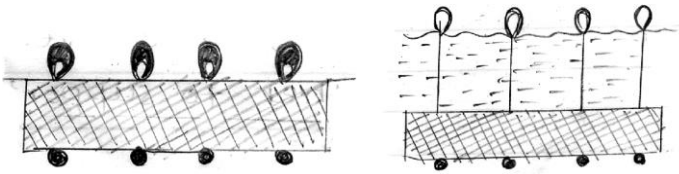


Fig. Drift nets

FISHING GEARS

1. Gillnet:

1. Gill net are wall like nets with floats attached to the head rope and sinkers fixed to the foot rope.
2. They are made up of cotton or Hemp of various size of mesh.
3. The net is set in transverse direction of fishes so that when the fish tries to swim through a net wall the mashes from a round it's head and the fish is cought .
4. As the fish tries to escap it gets stuck a behind the operculum. hence tese nets are called 'gill net'

These are 3 types of gill nets.

Stationary nets :

Set on the bottom between the anchor.

Floating gill net :

These nets are not firmly fixed to pools but are simple anchored on the bottom & are suspended by floats on the surface of water .

Drift nets:

It is laid in water and allowed to drift freely with the current on the bottom for sometimes

2. Cast net:

1. It is circular net having a shape of a large umbrella a strong cord is attached to the apex of the umbrella and a no of lead and iron wts are fixed around all the margin.
2. The fisherman throws the net fully spread over the water keeping the long rope in his left hand.
3. This has to done very carefully so that, the net falls on the surface of the water fully expanded.
4. The net sinks to the bottom and circumference close due to the weights, attached to it.
5. All kinds of small sized fish are entangled in the net which is them pull out by means of the cord.
6. The cast net is extensively used in ponds & rivers & all along the sea coast.
7. Cast net cannot be used in places full of weeds or with rocky bottom.

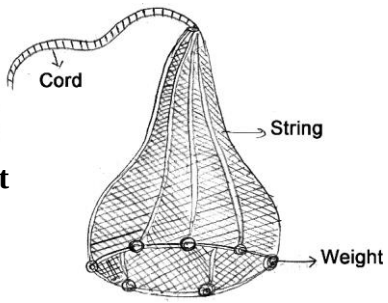


Fig : Cast net

3. Drag net:

1. It is the large sized net and active fishing type net.
2. Ne consists of foot rope, head rope and pieaces of webb.
3. Size and length of net is depend upon are of fishing and type of fish.
4. The size of mesh is less than the gill net.
5. The net is works on the principle of surrounding the poetion of water with wall of net.
6. Then water is filled by collecting the net near the fishes and are caught by conc. in the centre.

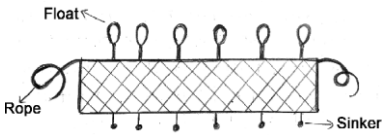


Fig : Drag net