STUDY OF LIFECYCLE OF HONEY BEE

Date
12/19

compound eye
forewing
hindwing
antenna
position of egg when cleaning antenna
foreleg
middle leg
hind leg

Fig: worker bee in lateral view

WORKER QUEEN DRONE

Fig: castes of honey bee

23.3.19

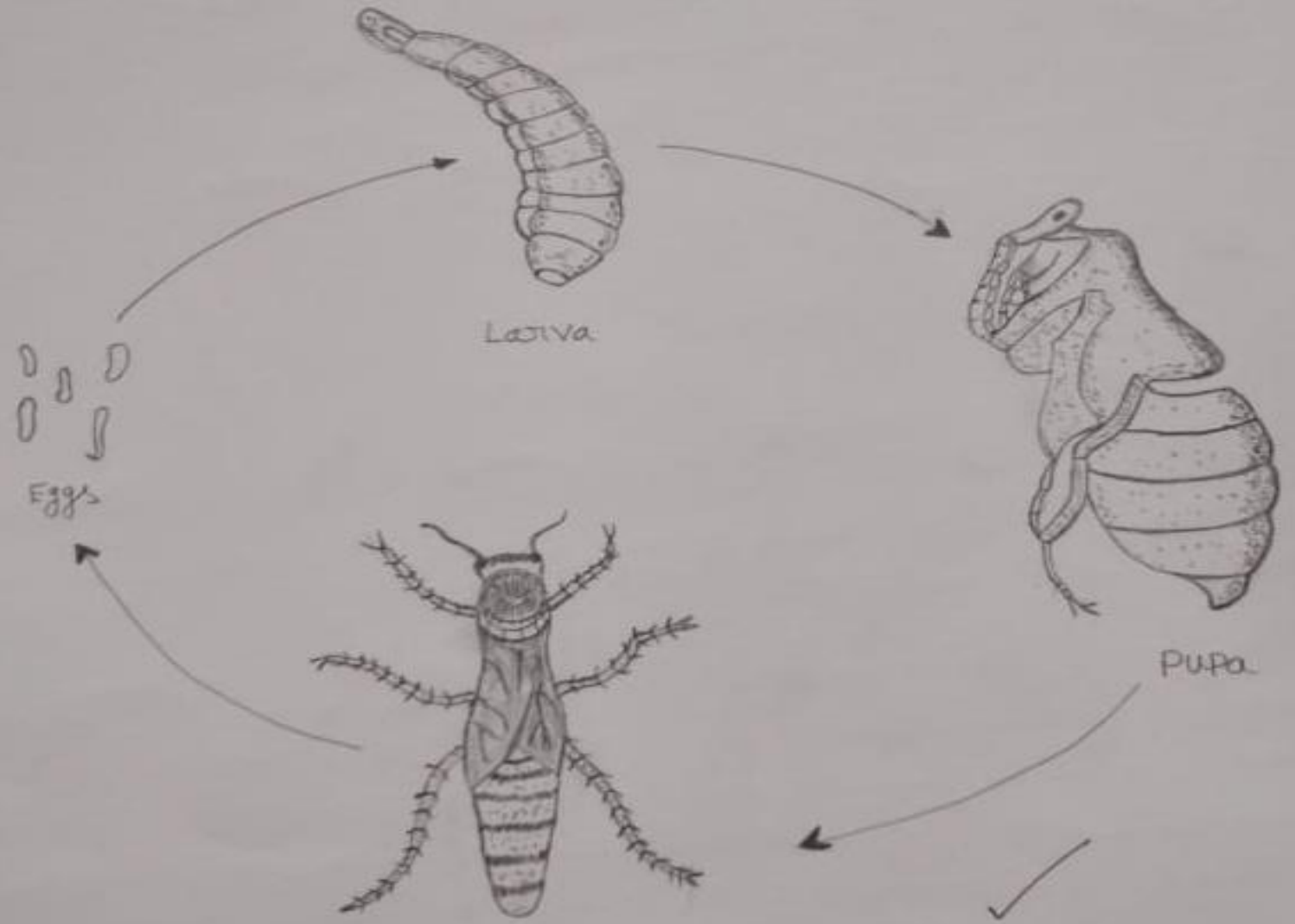
AIM: Study of life history of APIS indica

CLASSIFICATION

Phylum → Arthropoda → Jointed appendages
Class → Insecta → 3 pairs of legs
order → Hymenoptera → 2 pairs of wing
Family → Apidae
Genus → APIS
Species → indica

COMMENTS:

1) APIS (honey bee) is a social insect and lives in a highly organised colony in bee live
2) The various stages in the life cycle of honey bee are egg, larva, pupa, and adult which include worker, drone, queen.
3) Egg Stage:- The queen takes a nuptial flight or mating flight with a number of drones and starts laying egg at the rate of 100 to 200 per day for about five years. The eggs are pinkish, bean shaped ~~and~~ both fertilized as well as unfertilized. It usually lays one egg in one brood cell or chamber of the hive and later sealed it.
4) Larvae :- After 3 days egg hatch into larvae A larva has head and segmental body containing spiracles. The larvae develop into queen or other castes of the colony depending upon the food they take, larvae fed on royel jelly develop into queen and these fed on honey and pollen develop into worker. The drones develop from the larvae which



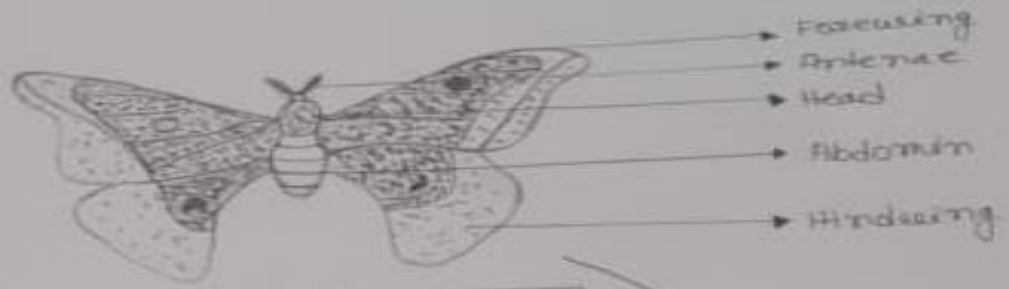
23.3.19.

Fig: Life history of Apis indica

IDENTIFICATION OF SILK WORM

Date
20/02/19

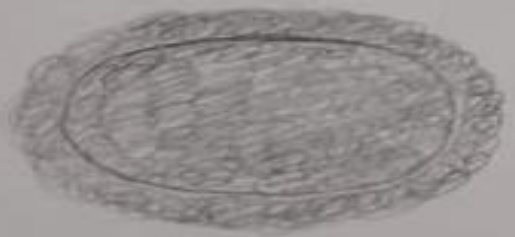
Adult Male



Adult Female

Chrysalis

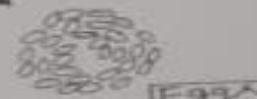
COCOON out open



COCOON

5th instar warm

4th instar warm



Eggs

1st instar warm

2nd instar warm

3rd instar warm

M
2.4.19

Fig. Life history of Antheraea assama

20/02/19

AIM : Study of life history of Antheraea arsama.

CLASSIFICATION :

Phylum ——→ Arthropoda
Class ——→ Insecta
order ——→ Lepidoptera
Family ——→ Saturnidae
Genus ——→ Antheraea
Species ——→ arsama

COMMENTS :

1) Fertilization :- Fertilization of Antheraea arsama is internal proceded by copulation. Just after emergence the male moth copulates with female for about 2-3 hours and if not separated they may die after few hours of copulating with female.

2) Eggs : After fertilization each female moth lays about 250 to 300 eggs. The eggs are small oval and usually white or slightly yellowish in colour. The eggs covered by a smooth hard chitineous shell. The eggs are also called seeds

EXAMINED

3) Hatching :- The eggs after 10 days of incubation hatch into a larva called as caterpillar. After hatching, caterpillar need continuous supply of food because they are voracious feeders.

4) Caterpillar :- These are minute structures hatched out from to eggs. After hatching the larvae start crawling in search of food. They prefer tender leaves to eat. Larva are voracious and rapid growth occurs within a short period. The

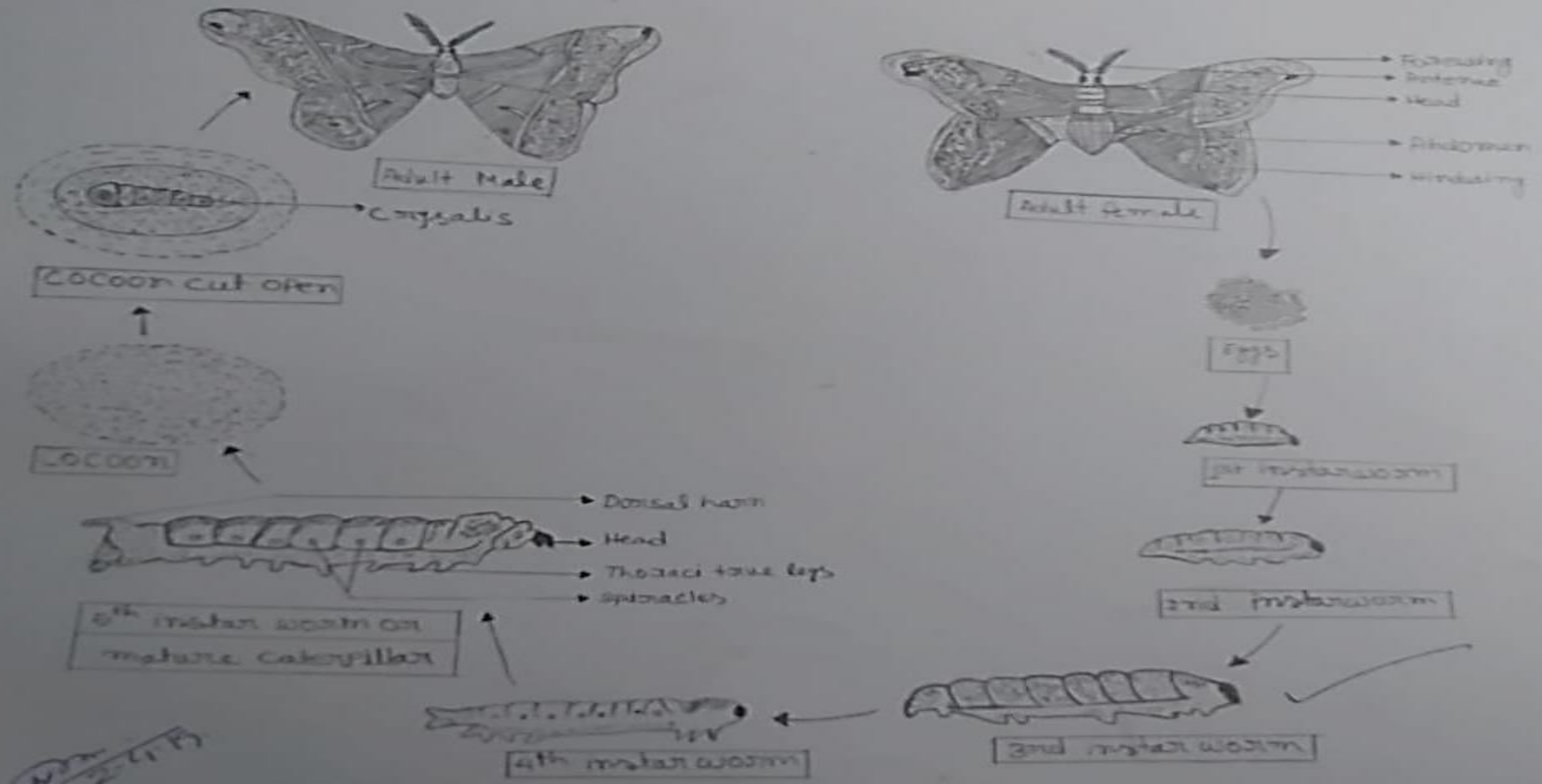


Fig : Life history of Philosamia ricini

Date 22/08/15

AIM: Study of life history of Philosamia ricini

CLASSIFICATION:

Phylum → Arthropoda → Jointed appendages
Class → Insecta → 3 pairs of legs
Order → Lepidoptera → Scale wings
Family → Saturnidae
Genus → Philosamia
Species → ricini

COMMENTS:

1) Fertilization: Fertilization of Philosamia ricini is internal preceded by copulation. Just after emergence, male moth copulates with female for about 2-3 hours and if not separated they may die after few hours of copulation with female.

2) Eggs: After fertilization each female moth lays about 300 to 400 eggs. The eggs are small oval and usually white or slightly yellowish in colour. The eggs covered by a smooth hard chitinous shell. The eggs are also called as seeds.

3) Hatching: The eggs after 10 days of incubation hatch into a larva called as caterpillar. After hatching, caterpillars need continuous supply of food because they are voracious feeders and non adequate food supply cause problems in growth of caterpillars. It is recorded that in uni-voltine race hatching of eggs takes one month after laying.

4) Caterpillar: The newly hatched caterpillar is about 0.3cm in lenght and is pale yellowish - white in colour. The caterpillars are provided with well developed mandibulate type of mouth parts, adapted to feed easily on the leaves. As they are voracious feeders, they grow rapidly which moult by 4 moulting. After 1st, 2nd, 3rd, 4th moulting

Date
22/02/19

Adult female

Adult male

COCOON cut open

COCOON

1st instar larva

2nd instar larva

3rd instar larva

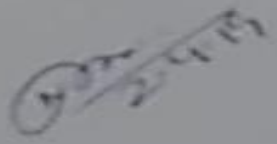


Fig: Life history of Bombyx mori

AIM: Study of life history of Bombyx mori

CLASSIFICATION:

Phylum → Arthropoda
Class → Insecta
Order → Lepidoptera
Family → Bombycidae
Genus → Bombyx
Species → mori

COMMENTS:

1) Fertilization:- Fertilization of Bombyx mori is internal preceded by copulation. Just after emergence, male moth copulates with female for about 2-3 hours and if not separated they may die after few hours of copulating with female.

2) Eggs: After fertilization, each female moth lays about 300 to 400 eggs. The eggs are small oval and usually slightly yellowish in colour. The egg covered by a smooth hard chitinous shell.

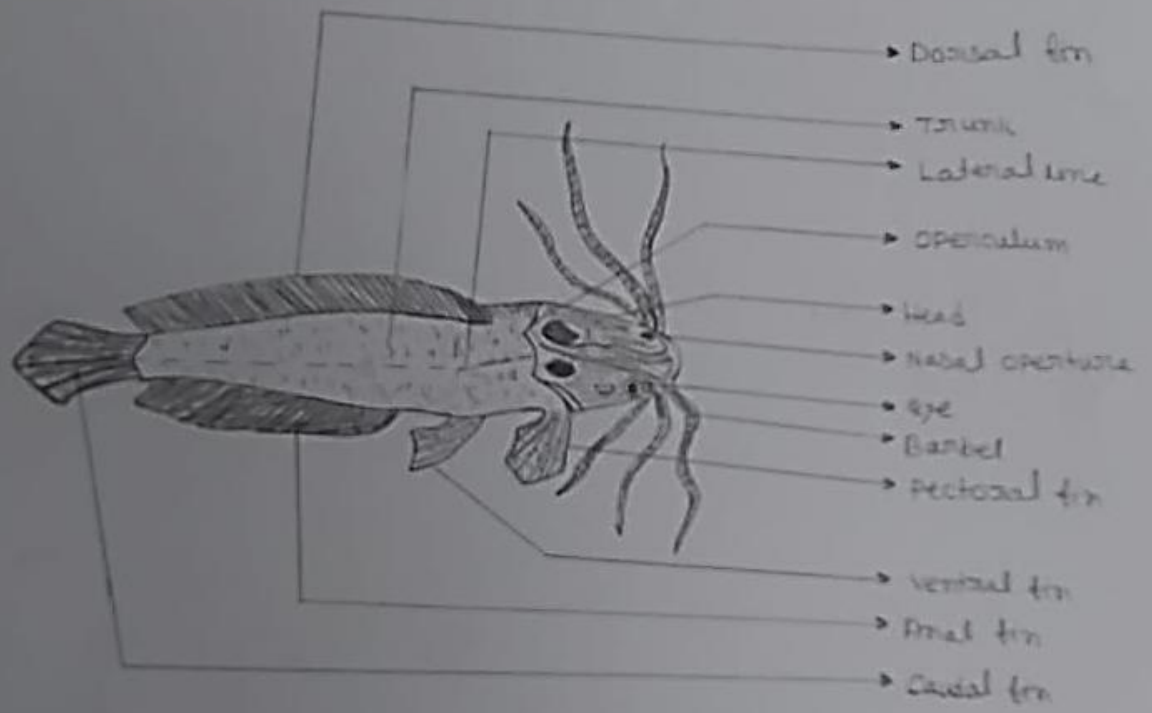
3) Hatching: The eggs after 10 days of incubation hatch into a larva called as caterpillar. After hatching caterpillars need continuous supply of food because they are voracious feeders. It is recorded that in multivoltine race hatching of eggs takes one month after laying.

4) Caterpillar: The newly hatched Caterpillar is about 0.3 cm in length and is pale yellowish-white in colour. The caterpillar are provided with well developed masticatory type of mouth parts adapted to feed easily on the mulberry leaves. As they are voracious feeder, they grow rapidly moult by 4 moultings.

IDENTIFICATION OF COMMERCIALLY IMPORTANT FISHES

ORDER- Siluriformes

Date
08-02-19



8/2/19

Fig. Clarias batrachus (Magur)

Date
[illegible]-15

AIM : To identify the given fish

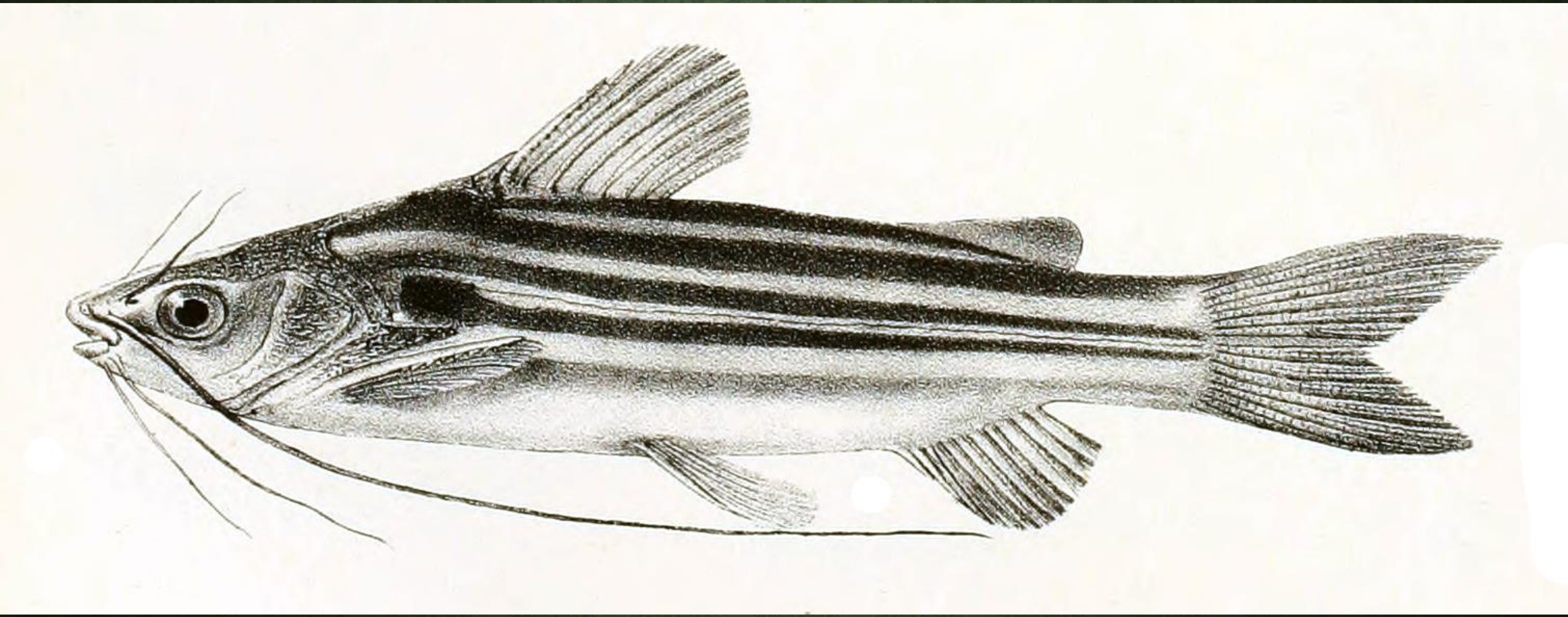
CLASSIFICATION :

- Phylum → Chordata
- Group → Craniata
- Subphylum → Vertebrata
- Superclass → Pisces
- Class → Osteichthyes
- Superorder → Teleostei
- Order → Siluriformes
- Family → Saccobranchidae
- Genus → *Clarias*
- Species → *batrachus*

COMMENTS :

1) It is characterized by its spikeless dorsal fin.
2) Head is flat with four pairs of non contractile and sensory barbels.
3) The pectoral and ventral fins are closely placed.
4) Body is covered by scaleless and naked skin.

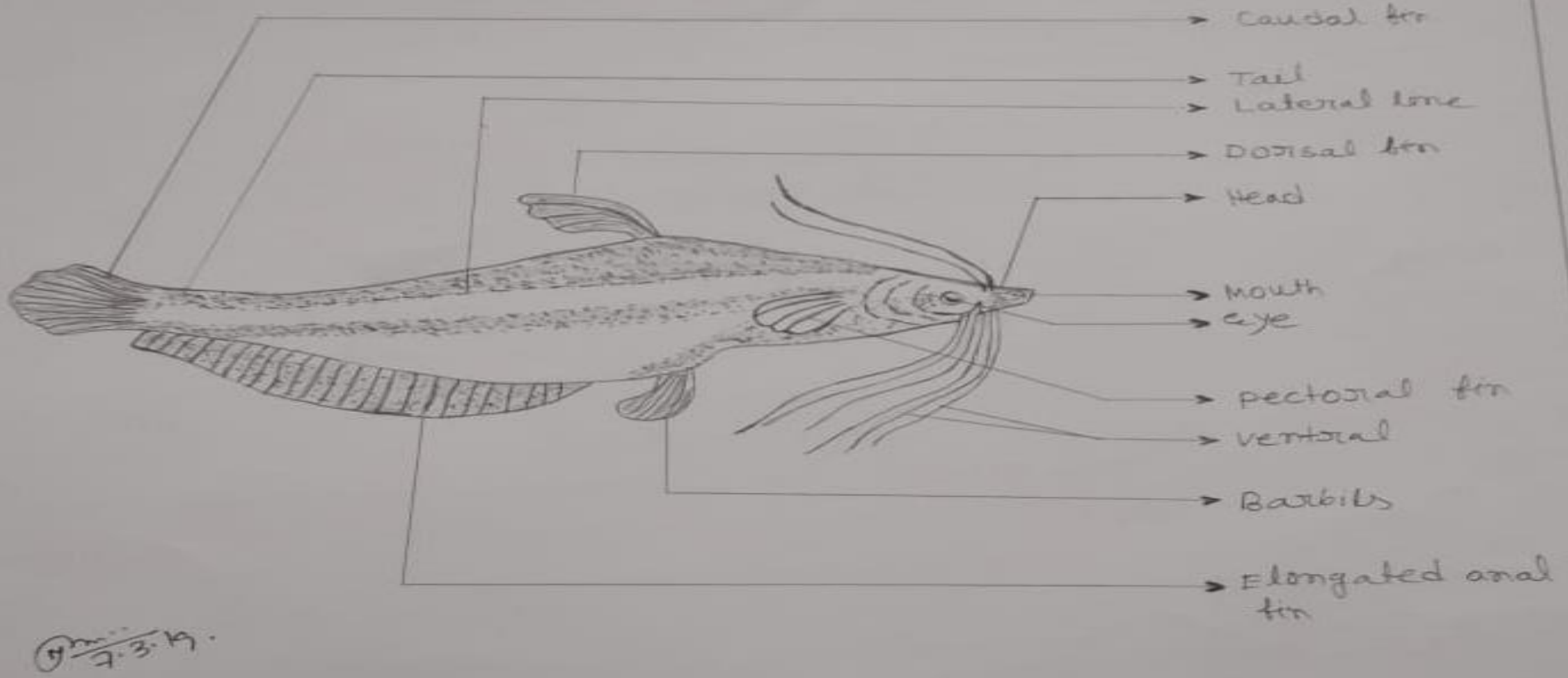
IDENTIFICATION : Since the given fish has particular dorsal fin, barbels and all the above characteristics, hence it is identified as *Clarias batrachus*



Mystus vittatus

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Siluriformes
Family:	Bagridae
Genus:	*Mystus*
Species:	***M. vittatus***



7.3.19.

Fig: Heteropneustes fossilis

Date
08-02-19

AIM : TO identify the given fishes.

CLASSIFICATION :

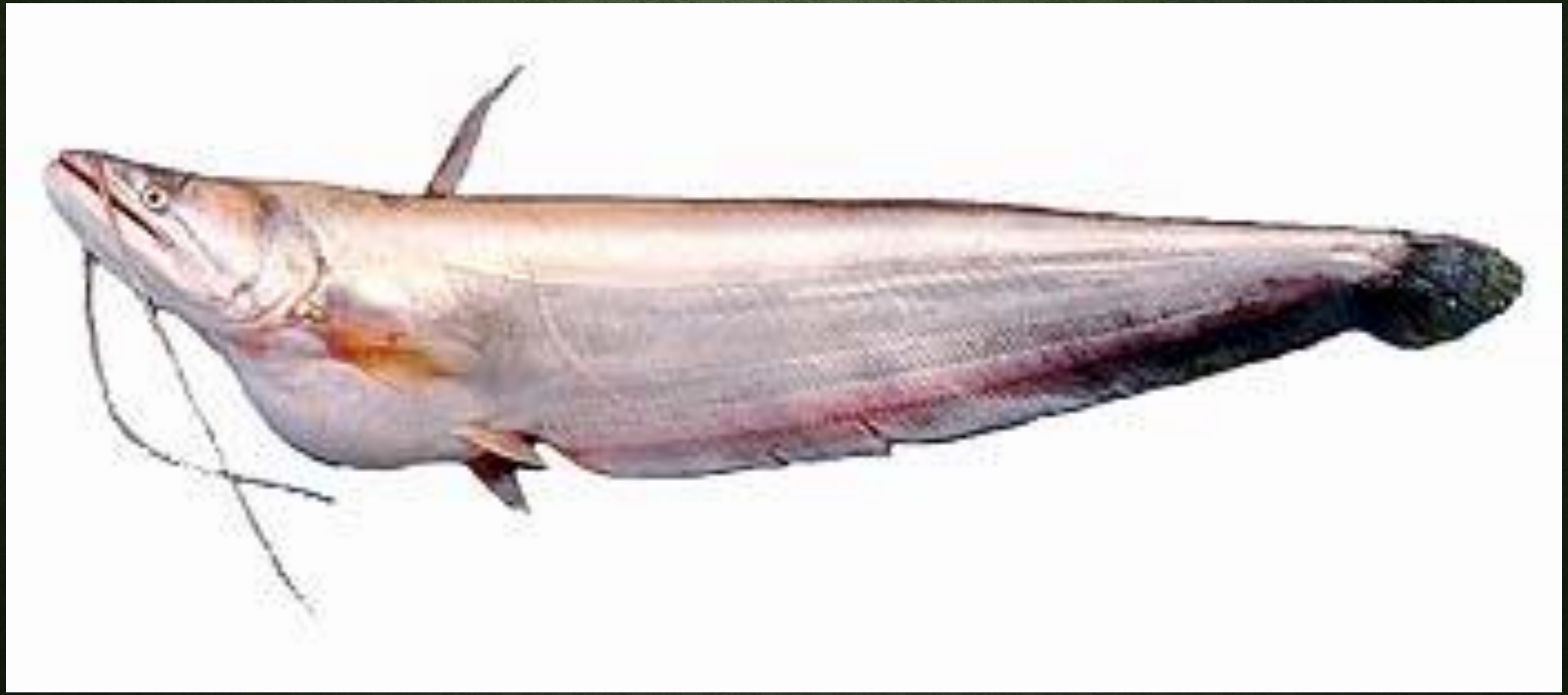
Phylum ⟶ Chordata
Group ⟶ Craniata
Sub-Phylum ⟶ Vertebrata
Super Class ⟶ Pisces
Class ⟶ Osteichthyes
Superorder ⟶ Teleostei
order ⟶ Siluriformes
Family ⟶ Saccobranchidae
Genus ⟶ Heteropneustes
Species ⟶ fossilis

EXAMINED

COMMENTS :

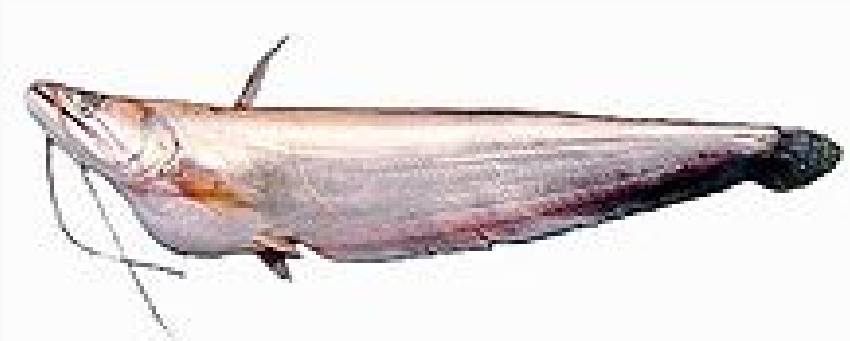
1) Head is depressed and covered by a thin skin.
2) Head contains transverse mouth, eyes and 4-pairs of barbels.
3) Dorsal fin is located in anterior third of the body.
4) ventral fin is found just below the dorsal fin.
5) Anal fin is long and confluent with caudal fin about separated by a notch.

IDENTIFICATION : Since the given fish possess long and fin and all the above characteristics, hence it is identified as Heteropneustes fossilis.



Wallago attu

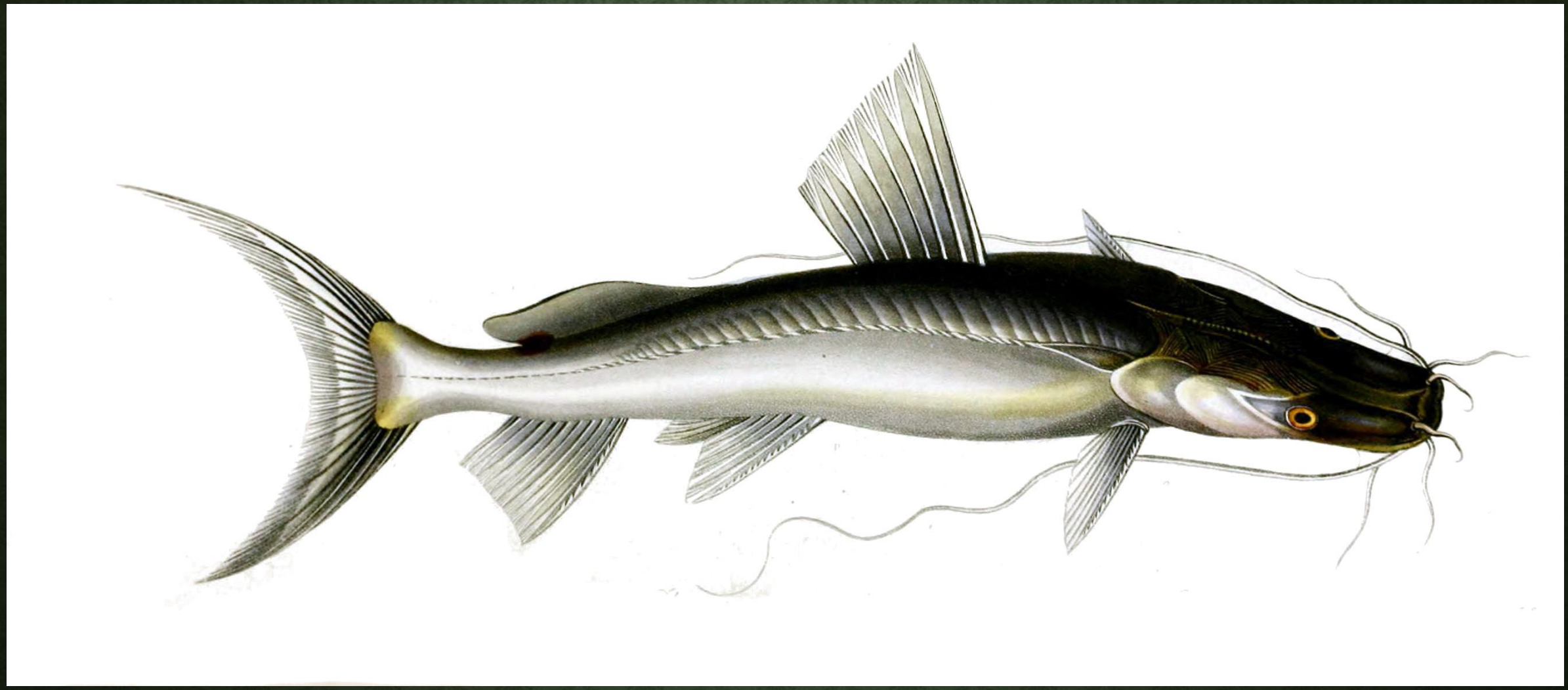
Wallago



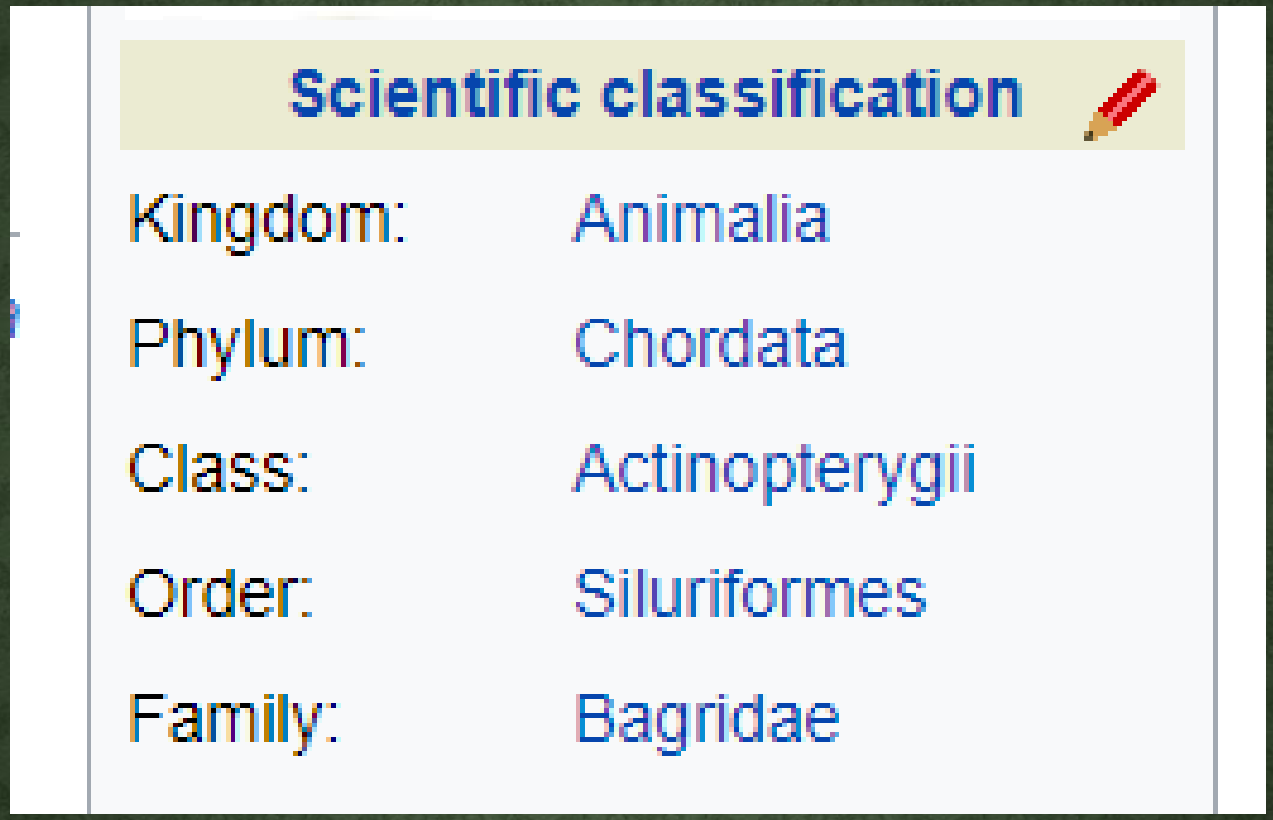
Wallago attu

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Siluriformes
Family:	Siluridae
Genus:	***Wallago***
	Bleeker, 1851



Aorichthys seenghala



Genus: Aorichthys
Species: seenghala

ORDER- Clupeiformes

Date
08-02-19

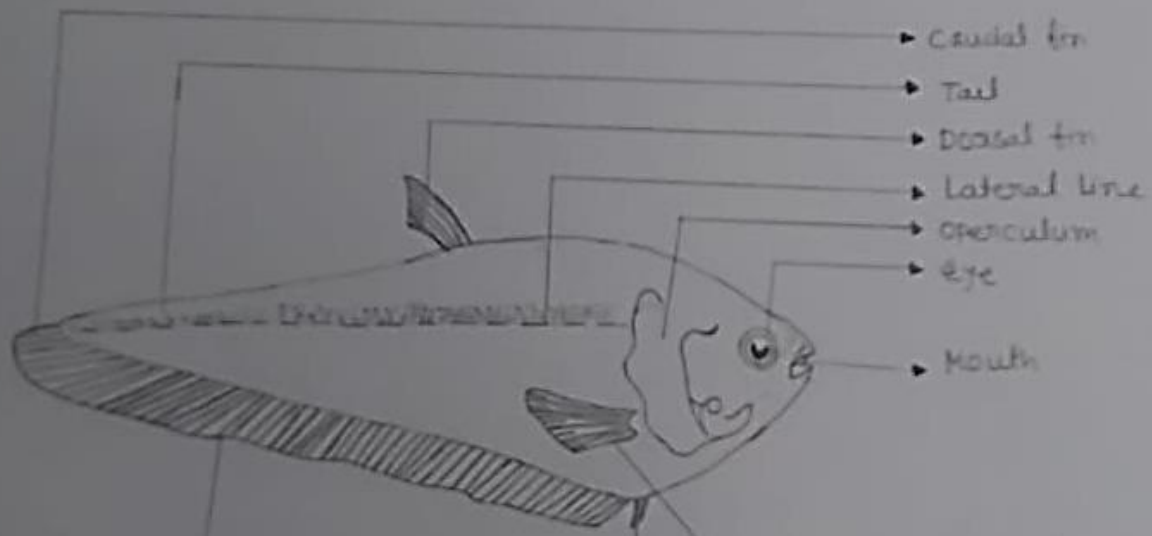


Fig Notopterus notopterus

AIM: To identify the given fish.

CLASSIFICATION:

Phylum ⟶ Chordata

Group ⟶ Craniata

Sub-Phylum ⟶ Vertebrata

Super Class ⟶ Pisces

Class ⟶ Osteichthyes

order ⟶ Clupeiformes → Fins with soft rays, Pelvic fin abdominal

Family ⟶ Notopteridae

Genus ⟶ Notopterus

Species ⟶ notopterus

COMMENTS:

(1) Body is very strongly compressed with a short pre-caudal region.

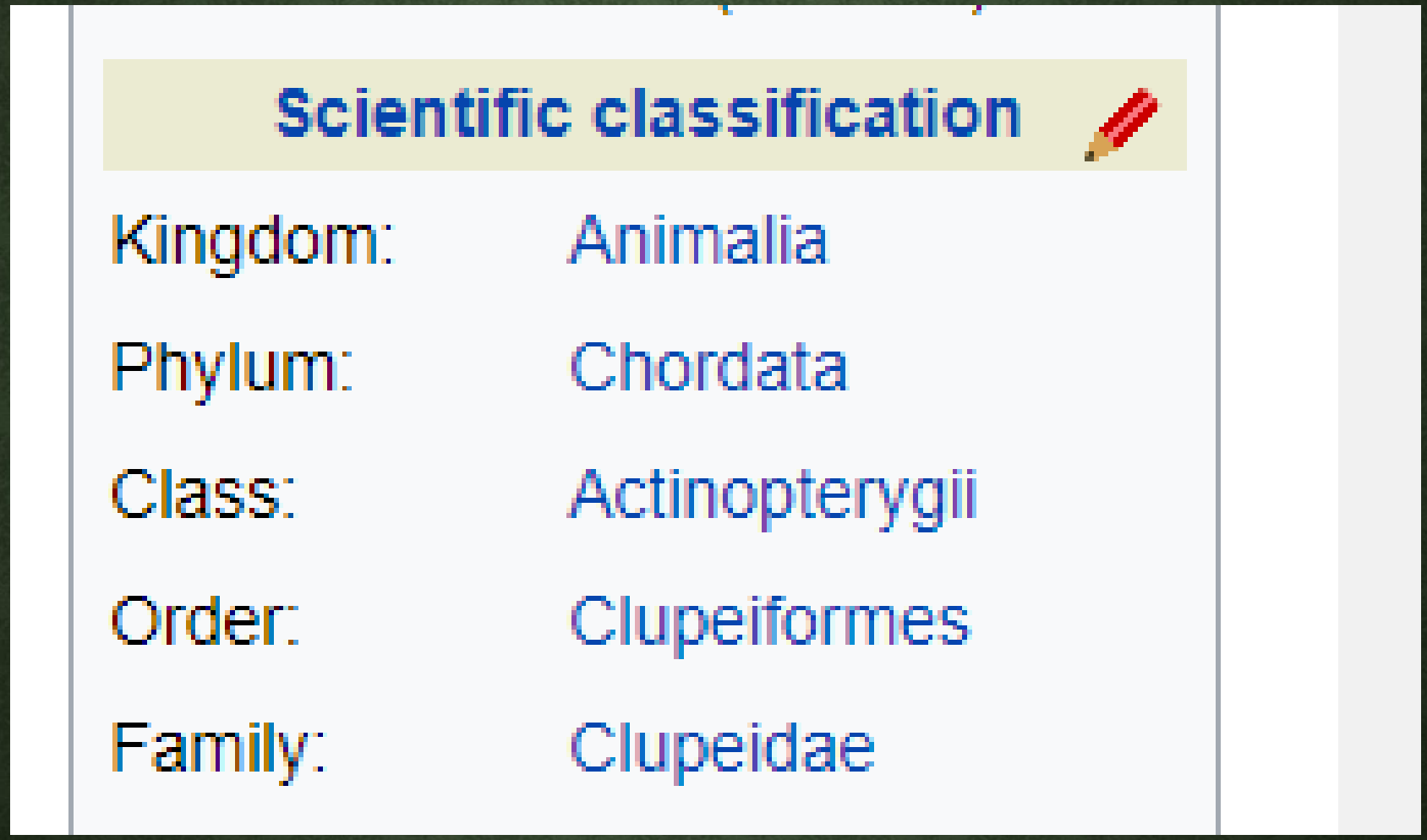
(2) Head contains large and oblique mouth, whereas eyes and nostrils

(3) Dorsal fin is short and ventral fin very much reduced or absent.

(4) Anal fin is very much elongated confluent with reduced caudal fin.

(5) Paired pectorals and ventral fins closely placed.

IDENTIFICATION: Since the given fish bears confluent anal and caudal fins and all the above characteristics, hence it is identified as Notopterus notopterus

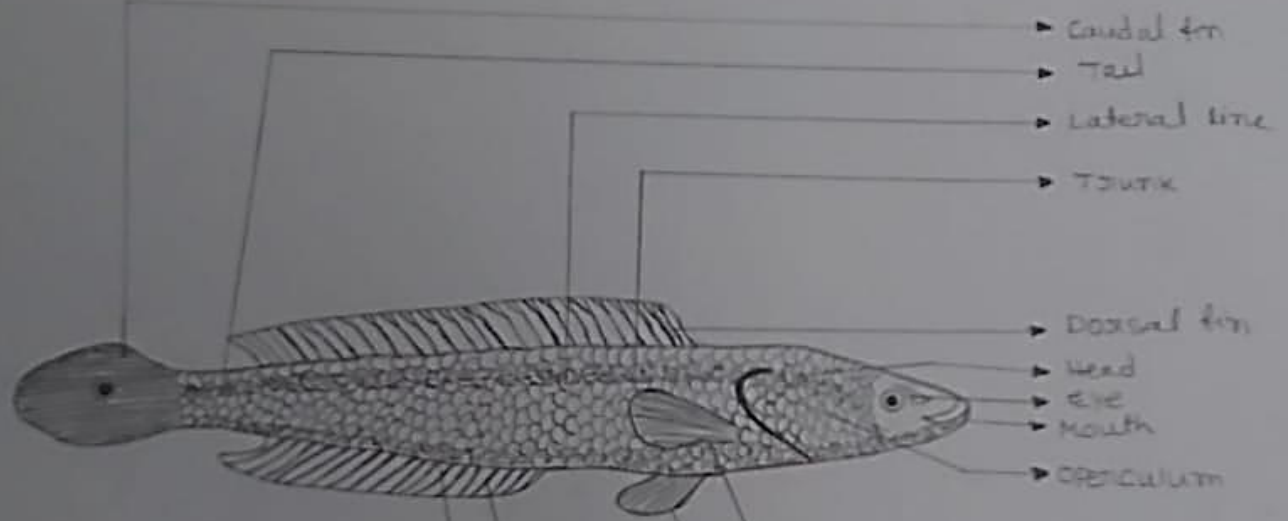


Genus : Hilsha

Species: ilisha

ORDER- Channiformes

Date
08-02-19



2.3.19.

Fig: Channa marulius

AIM: TO identify the given fish

Date
08-04-19

CLASSIFICATION:

Phylum → Chordata
Sub-Phylum → Vertebrata
super-class → Pisces
class → Osteichthyes
order → Channiformes
Genus → Channa
Species → marulius

COMMENTS:

1) The body is elongated, anteriorly cylindrical and posteriorly compressed.
2) The body is covered with cycloid scales.
3) The head is depressed and covered with large cycloid scale.
4) The dorsal and anal fins are single, long and without spines.
5) Pectoral fins are near pelvic fins.
6) Caudal fin is rounded and fan-shaped.

IDENTIFICATION: Since the given fish bears all the above features, hence it is identified as Channa marulius

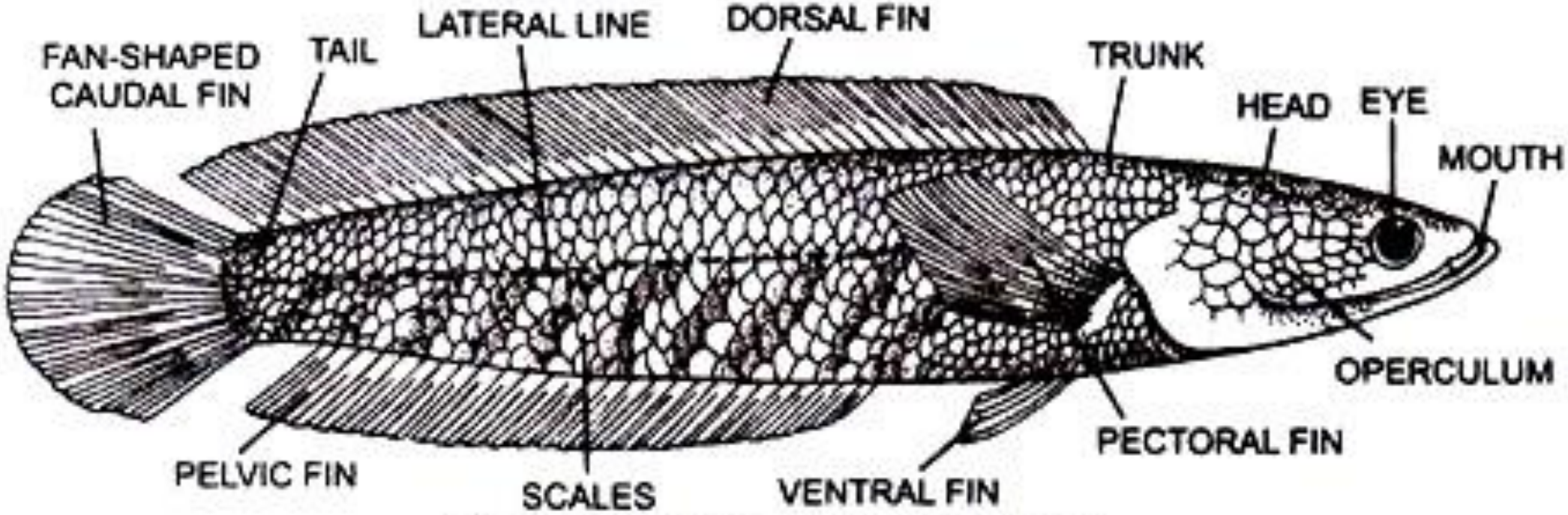


Fig. 9.10. Channa striatus (Sowra)

ORDER- Cypriniformes

Date
03-02-19

Caudal fin
Tail
Dorsal fin
Lateral line
Eye
Mouth
Operculum
Pectoral fin
Pelvic fin
Anal fin

Fig: Labeo Bonnus

Date
08-02-19

AIM : TO identify the given fish

CLASSIFICATION :

Phylum → Chordata
Sub-Phylum → Vertebrata
Super-class → Pisces
Class → Osteichthyes
Order → Cypriniformes → Anterior vertebrae fused whereas ossicles present between air bladder & ear.
Family → Cyprinidae
Genus → Labeo
Species → gonius

COMMENTS :

(1) The body is elongated and its dorsal profile is more convex than that of ventral
(2) The mouth is blunt, narrow and subinferior.
(3) Eyes are moderate and not visible from underside of head
(4) Dorsal fin is inserted and pectoral fin is long as head.
(5) The caudal fin is deeply forked.

IDENTIFICATION : Since the given fish possess all the above characteristics, hence it is identified as Labeo gonius. ✓

Date
8-01-19

Caudal fin
Tail
Dorsal fin
Eye
Mouth
Pectoral fin
Lateral line
Trunk
Pelvic fin
Anal fin

Fig. Cirrhinus reba

AIM: To identify the given fish

CLASSIFICATION:

Phylum → Chordata
Sub-phylum → Vertebrata
Super class → Pisces
Class → Osteichthyes
Sub class → Actinopterygii
order → Cypriniformes
Genus → Cirrhinus
species → reba

COMMENTS:

(1) The body is elongated and laterally compressed
(2) The body is covered with hexagonal scales and dark pigments
(3) Dorsal profile more convex than that of abdomen
(4) The mouth is inferior and a pair of nostral barbels

IDENTIFICATION: Since the given fish possess all the above features hence it is identified as Cirrhinus reba

Dak
8/12/13

Page No :-
Date :-

Nostril
Eye
Operculum
Dorsal fin
Trunk
Caudal fin
Tail
Anal fin
Lateral line
Pelvic fin
Pectoral fin

Fig: Puntius sophore

AIM: To identify the given fish.

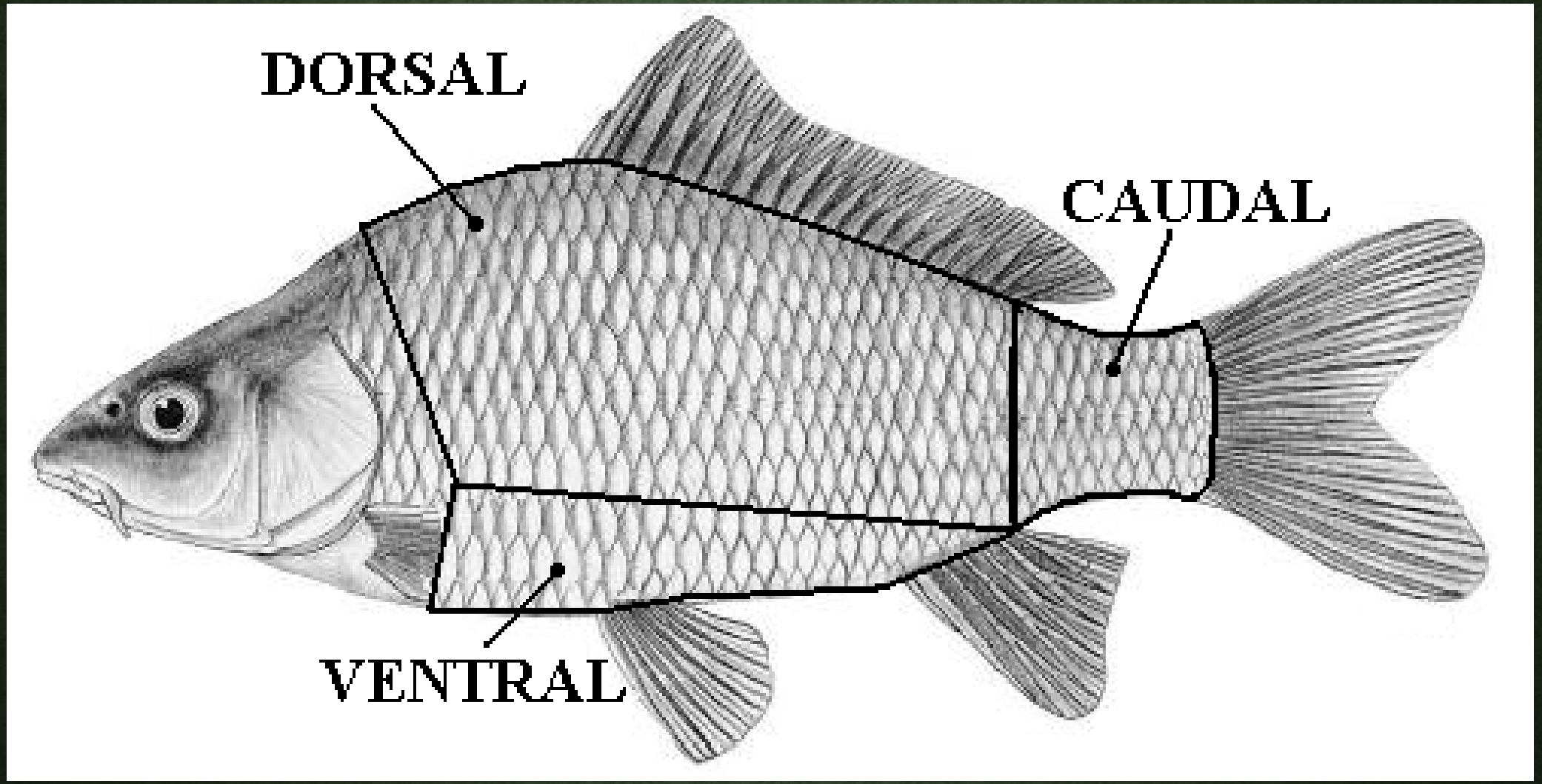
CLASSIFICATION:

Phylum → Chordata
Sub-phylum → Vertebrata
Super-class → Pisces
Class → Osteichthyes
Order → Cypriniformes
Family → Cyprinidae
Genus → Puntius
Species → sophore

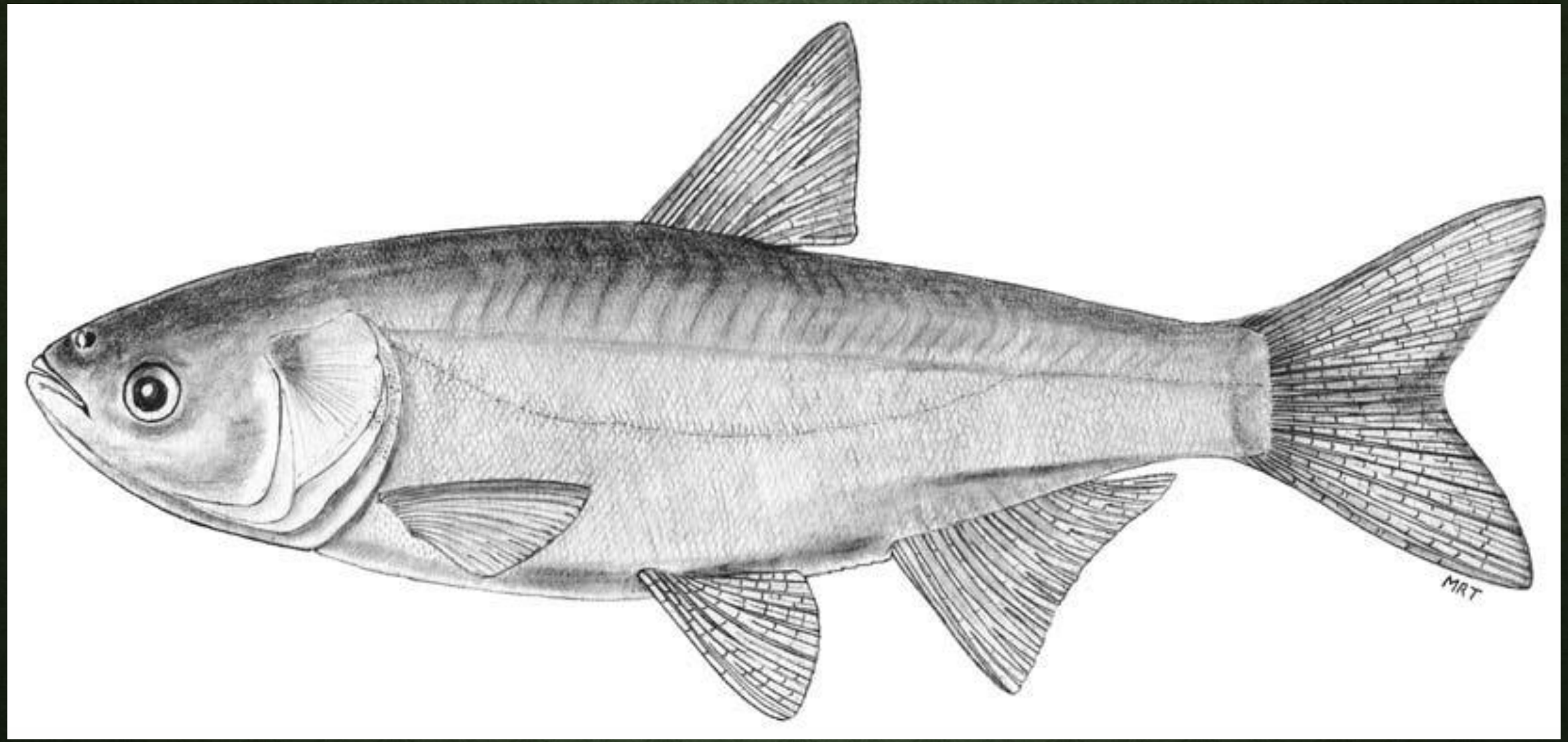
COMMENTS:

1) Body is moderately compressed.
2) A dark spot is present at tip of tail
3) The lateral line is complete.
4) The mouth is small, terminal and upper jaw is slightly longer. barbels are absent.
5) Pectoral fin is as long as head excluding snout.

IDENTIFICATION: Since the given fish possess all the above characteristics, hence it is identified as Puntius sophore.



Cyprinus carpio

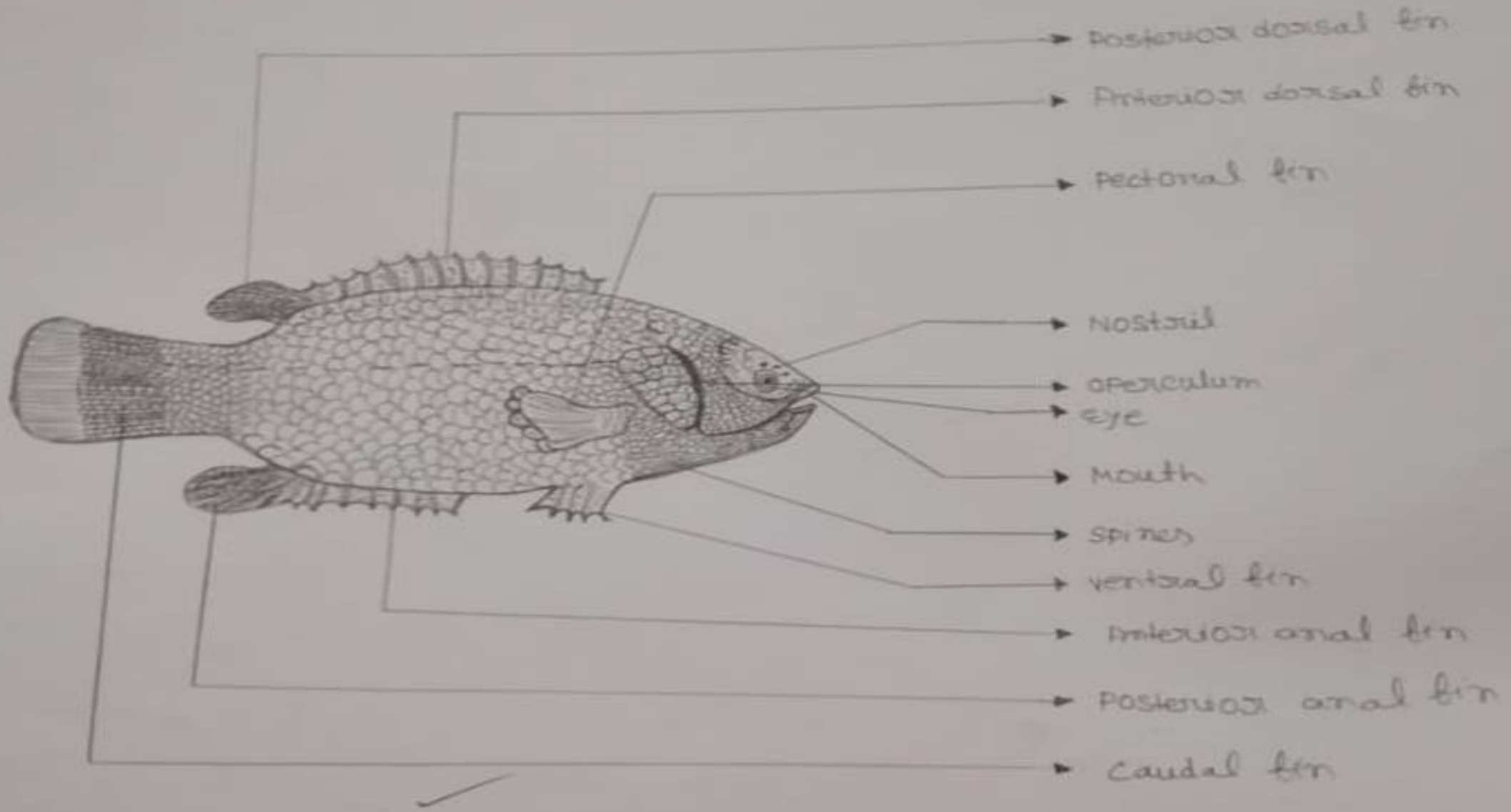


H. molitrix

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Cypriniformes
Family:	Cyprinidae
Subfamily:	Xenocyprinae
Genus:	*Hypophthalmichthys*
Species:	***H. molitrix***

ORDER- Perciformes



7.3.19

Fig: Amabas testudineus.

AIM : TO identify the given fish.

CLASSIFICATION :

Phylum ——→ Chordata → Dorsal tubular nerve cord, notochord and gill-slits.

Group ——→ Craniata → Definite head, cranium and brain.

Subphylum ——→ Vertebrata → Vertebral column present.

Super-class ——→ Pisces → Paired fins, gills and skin with scales.

Class ——→ Osteichthyes → Bony fishes

order ——→ Perciformes → Perches. Dorsal and anal fins with spiny and soft fin rays.

Genus ——→ Anabas

Species ——→ testudineus.

COMMENTS :

(1) The body is laterally compressed.
(2) The body is covered by ctenoid scales.
(3) The operculum bears the backwardly directed spines.
(4) Pectoral and pelvic fins are smaller and possess anterior spines.
(5) The lateral line is not continuous.
(6) Tail is perfectly symmetrical.

IDENTIFICATION : Since the given fish possess dorsal and fin rays and all the above characteristics, hence it is identified as Anabas testudineus.

STUDY OF IMPORTANT PEST

Fig Leptocorisa varicornis (Rice Gundhi Bug)

Fig Hieroglyphus nigrorepletus (Grass hopper)

AIM: To identify the collected specimen (Paddy pest)

CLASSIFICATION:

Phylum ——→ Arthropoda
Class ——→ Insecta
Order ——→ Hemiptera
Family ——→ Coreidae
Genus ——→ Leptocorisa
Species ——→ varicornis

COMMENTS :-

1) The head region is provided with well defined rostrum
2) They emits a strong unpleasant smell
3) They are very active in the morning and evening hours.
4) The body is spindle shaped.

IDENTIFICATION :- since the given specimen possess all the characteristics hence it is identified as Leptocorisa varicornis (Rice gandhi bug).

AIM: To identify the collected specimen (Paddy pest)

CLASSIFICATION:

Phylum ——→ Arthropoda
Class ——→ Insecta
Order ——→ Orthoptera
Family ——→ Acrididae
Genus ——→ Hieroglyphus
Specimen ——→ Nigrorepletus

COMMENTS:

1) There are three black lines running laterally on either side of the thorax.
2) Strong well developed mandible is present for feeding.
3) Comparatively large sized eyes present.

IDENTIFICATION :- since the given specimen possess all the above characteristics hence it is identified as Hieroglyphus nigrorepletus (Grasshopper).

Date
5/03/19

Fig: Sitophilus oryzae (Rice weevil)

20-4-19.

Fig: Pieris brassicae (pest of cabbage)

AIM: To identify the collected specimen (stored grain pest)

CLASSIFICATION:-

Phylum ——→ Arthropoda
Class ——→ Insecta
order ——→ coleoptera
Family ——→ Curculionidae
Genus ——→ Sitophilus
Species ——→ oryzae

COMMENTS:-

1) The head is provided with well defined rostrum.
2) A pair of stout mandibular jaws are present at the extremity of the rostrum.
3) Adult males are smaller than the females.
4) The adult is bearing 4 yellowish spots on its back.

IDENTIFICATION:- Since the given specimen bears all the above features, hence it is identified as Sitophilus oryzae (Rice weevil)

AIM: To identify the collected specimen (vegetable pest)

CLASSIFICATION

Phylum ——→ Arthropoda
Class ——→ Insecta
order ——→ Lepidoptera
Family ——→ Pieridae
Genus ——→ Pieris
Species ——→ brassicae

COMMENTS:—

1) The body is covered with short hairs.
2) 4 pairs of true legs are present.
3) The abdominal region contains 4 pairs of Pseudo legs.

IDENTIFICATION: Since the specimen bears all above the characters, hence it is identified as pieris brassicae (pest of cabbage)

Date
6/07/19

Fig : Callosobruchus chinensis

Fig Trogoderma granarium

AIM:- TO identify the collected specimen (stored grain pest).

CLASSIFICATION:-

Phylum ⟶ Arthropoda
Class ⟶ Insecta
order ⟶ coleoptera
Family ⟶ Bruchidae
Genus ⟶ Callosobruchus
Species ⟶ chinensis

COMMENTS:-

1) The adult beetle is provided with elongated serrated antennae.
2) Absence of snout.
3) The abdomen of the female is slightly longer.

IDENTIFICATION:- Since the specimen possess all the above characters, hence it is identified as Callosobruchus chinensis.

AIM:- TO identify the collected specimen (stored grain pest)

CLASSIFICATION :-

Phylum ⟶ Arthropoda
Class ⟶ Insecta
order ⟶ coleoptera
Family ⟶ Dermestidae
Genus ⟶ Trogoderma
Species ⟶ granarium

COMMENTS:-

1) The head is small and deflexed with antennae.
2) The adults are covered with hairs.
3) The females are longer than the males.

IDENTIFICATION:- Since the specimen bears all the above features, hence it is identified as Trogoderma granarium.

EXAMINED

THANK YOU