# Fish Body structure:



A spiny-rayed fish, *Sebastes*, naming fins and general body areas.

DORSAL FIN

Origin of Dorsal Fin

Soft-rayed Portion of Dorsal Fin

Insertion of Dorsal Fin

Dorsal Surface, Back

Spinous Portion of Dorsal Fin

LATERAL LINE PORES

TAIL or CAUDAL FIN

CAUDAL PEDUNCLE

ANAL FIN

Diagonal Scale Row Below Lateral Line

VENT or ANUS

PELVIC FIN

PECTORAL FIN

Base of Pectoral Fin

Ventral Surface, Abdomen, Belly

GILL COVER

EYE

CHIN

MOUTH

# Fish description:

## 1) Body profile:



Grouper    Wrasse    Parrotfish    Fusilier    Pufferfish

Surgeonfish    Sweetlips    Damselfish    Triggerfish    Angelfish

Butterflyfishes    Batfish    Snapper    Soldierfish    Barracuda
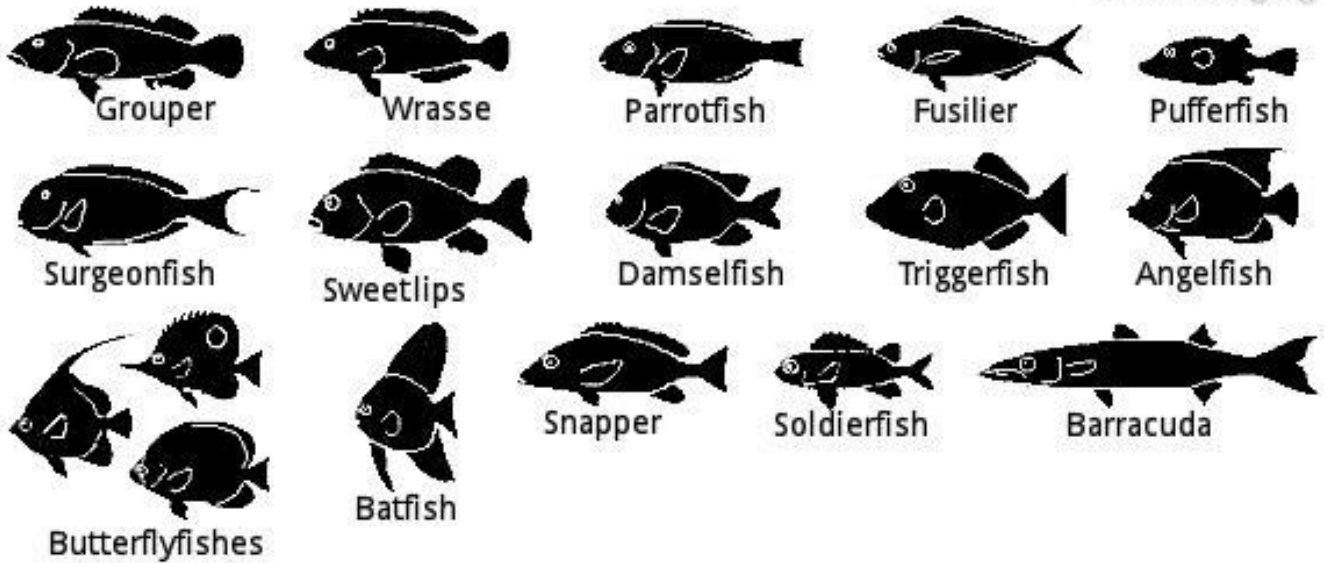
## 2) Body shape:

BODY SHAPE

| Crosssection | Fish | Shape | Locomotion |
|---|---|---|---|
|  | Tuna | Fusiform | Fast-swimming in open water. |
|  | Tautog | Compressiform | Quick speed for short distances. |
|  | Skate | Depressiform | Swims like a flying bird. |
|  | Pipefish | Filiform | Slithers through the water like a snake. |

## 3) Body patterns:



vertical    horizontal    diagonal    chevron    spotted or false eye
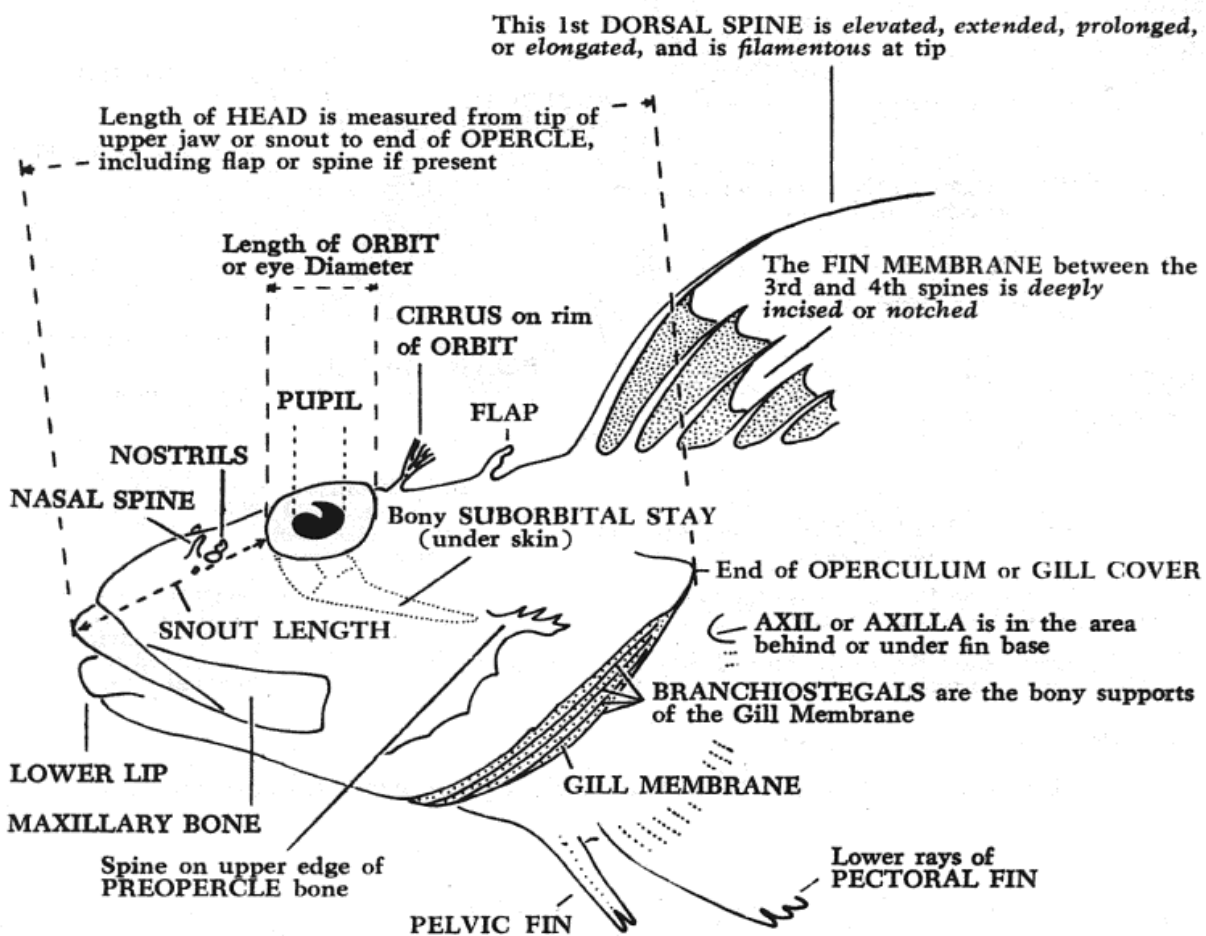
saddled    banded    spotted    blotched    painted
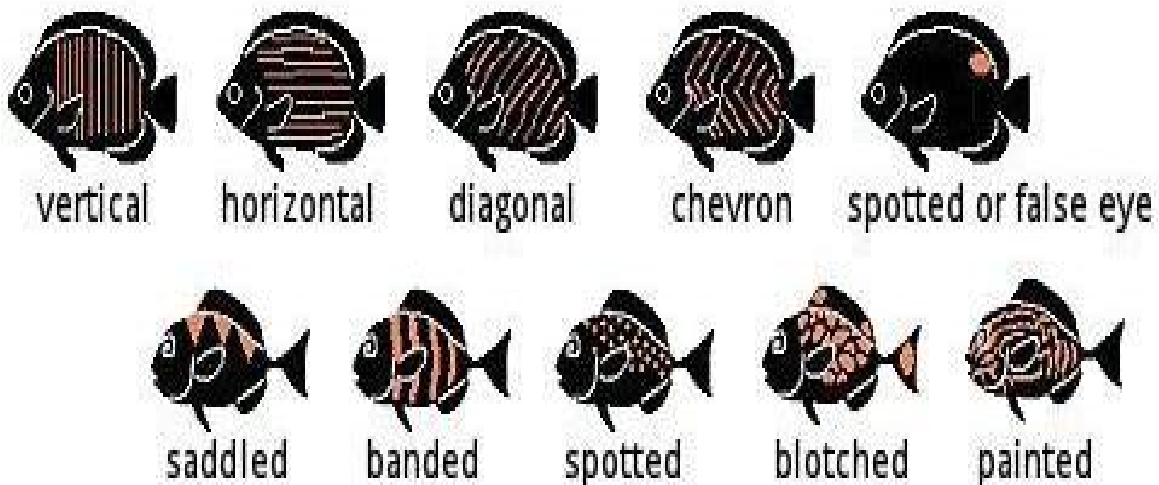
## 3) Body color:

a- The color is descripted from both dorsal side and ventral side.

b-If fish have several colors indifferent body parts, the color is described in each body part



This 1st DORSAL SPINE is *elevated, extended, prolonged, or elongated,* and is *filamentous* at tip

Length of HEAD is measured from tip of upper jaw or snout to end of OPERCLE, including flap or spine if present

Length of ORBIT or eye Diameter

The FIN MEMBRANE between the 3rd and 4th spines is *deeply incised* or *notched*

CIRRUS on rim of ORBIT

PUPIL    FLAP

NOSTRILS

NASAL SPINE

Bony SUBORBITAL STAY (under skin)

End of OPERCULUM or GILL COVER

SNOUT LENGTH

AXIL or AXILLA is in the area behind or under fin base

BRANCHIOSTEGALS are the bony supports of the Gill Membrane

LOWER LIP

GILL MEMBRANE

MAXILLARY BONE

Spine on upper edge of PREOPERCLE bone

Lower rays of PECTORAL FIN

PELVIC FIN

# 4) Head description:

**Head Shape:** (Compressiform, Depressiform, Cylindrical)

a) **Head size according to the other body parts:** (Small, medium, large)

b) **Mouth:**
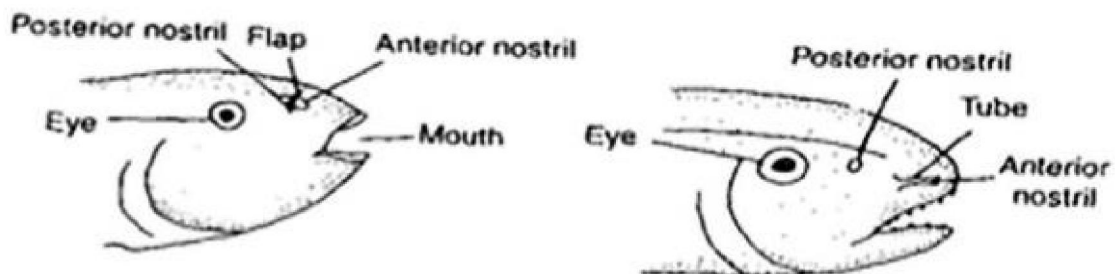


superior    terminal    subterminal    inferior
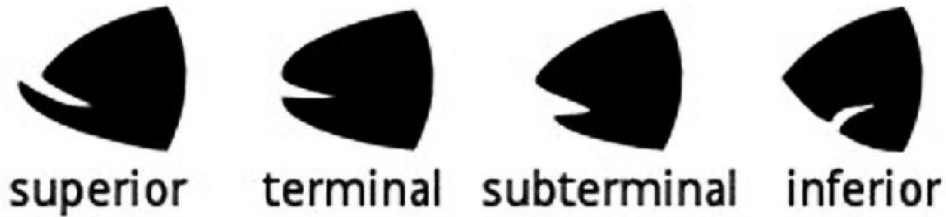
- Mouth positions:
- Mouth protrusibility: protrusible & non protrusible
- Moth opening:
  - Small, moderate in size, large
  - Wide, Narrow
  - Shape: oval, spherical, slit-like, … etc.

d) **Snout:**

- Small, moderate in size, large according to the head.

- Shape:



Normal    tubular    elongated
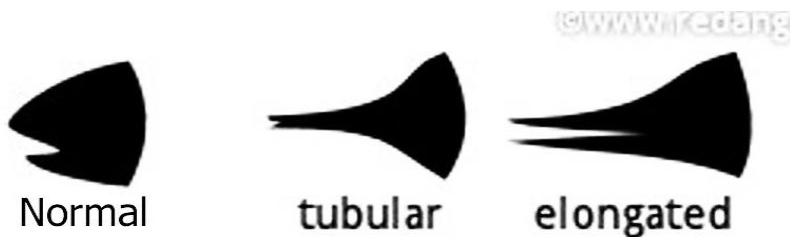
e) **Nostrils:**

- Position: [ventral in cartilaginous fishes & Dorso-lateral in bony fishes]
- Number: One [Opening & Pair] on each side
- Size (Small, moderate in size, large)
- Wide, Narrow
- Shape: oval, spherical, slit-like, … etc.
- Any appendage are described.

## f) Eyes:

- Size (Small, moderate in size, large)
- Wide, Narrow
- Shape of eye orbit: oval, spherical … etc.
- Position relative to mid-body line; [Dorsal, Dorso-lateral, Median]



Dorso-lateral        Median        Dorsal
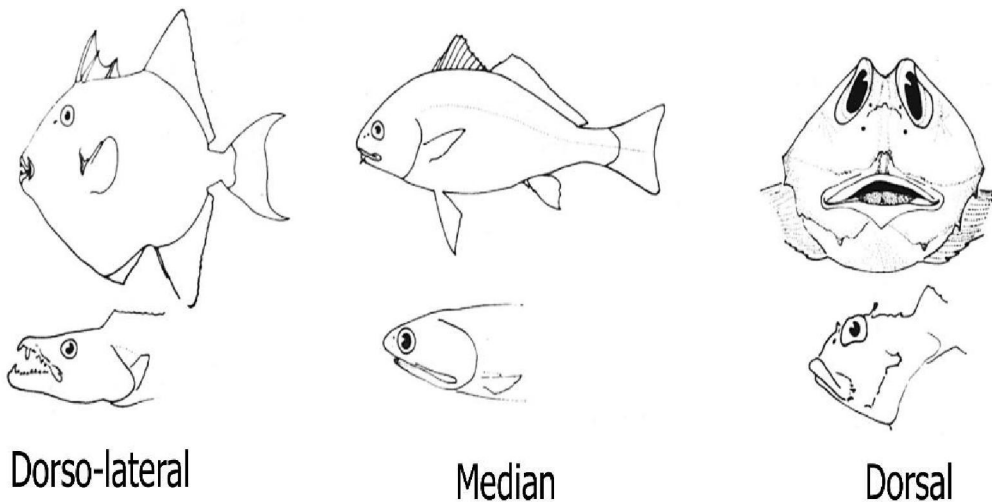
## g) Operculum or Gill-slits:

## 1- Gill-slits; [One in bony fishes *vs* 5-7 in cartilaginous fishes]
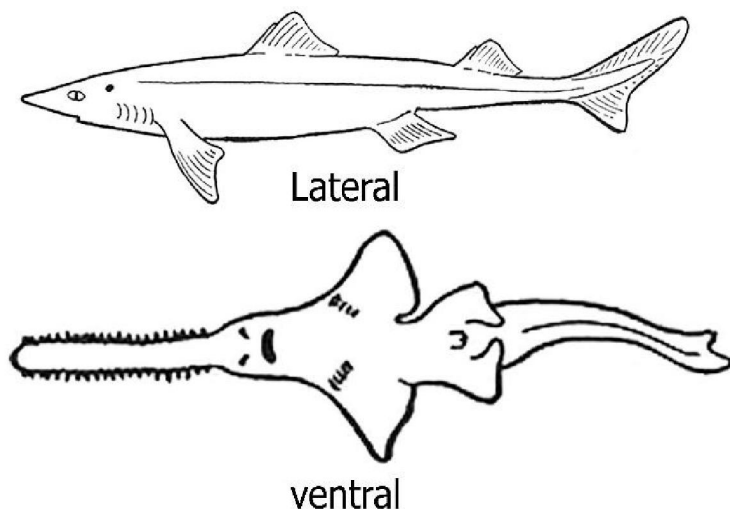


Lateral

ventral

- Number & Size.
- Position:
    - lateral [vertical & obliquely vertical]
    - ventral [transversal & obliquely transversal]

## 2-Operculum; (in bony fishes only)
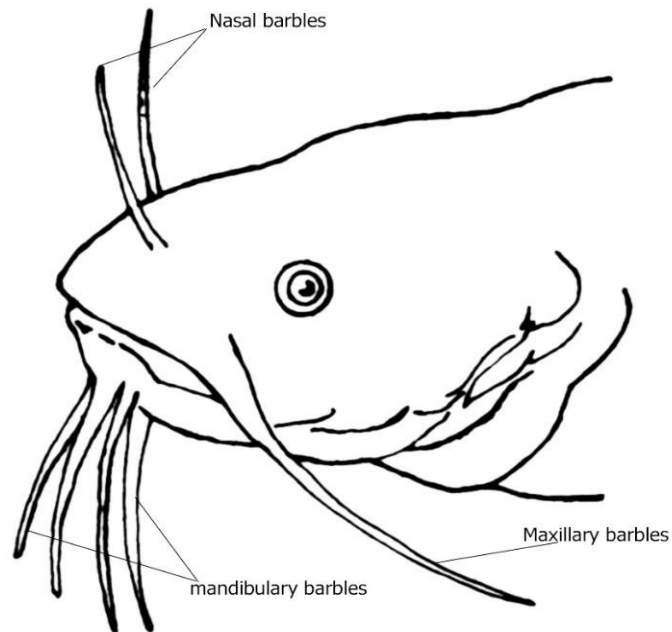
- Size
- Range of connection with isthmus:

If the gill membranes free, not joined to isthmus or each other, the two operculum are checked for overlapping (overlap each other or not)..
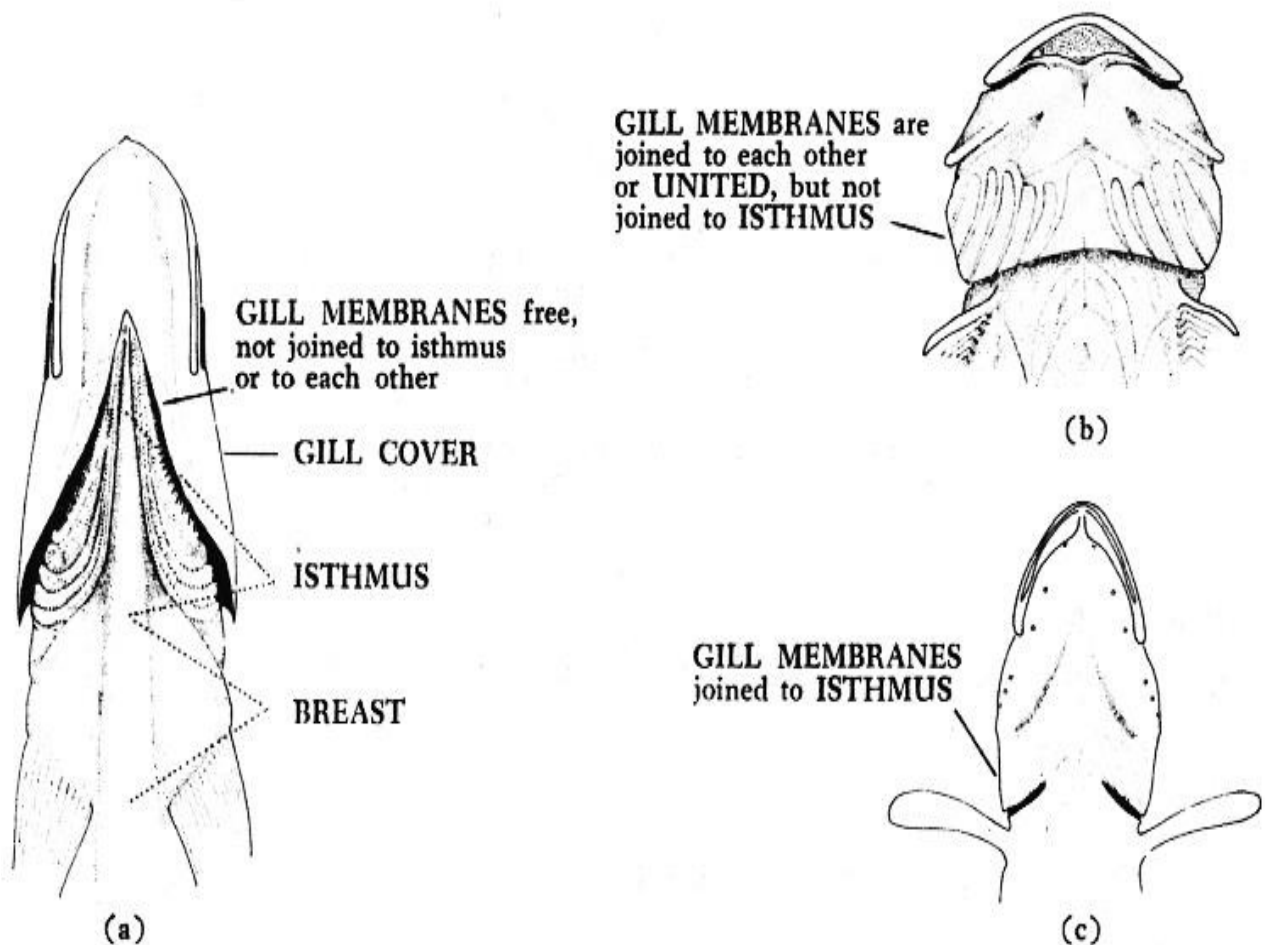


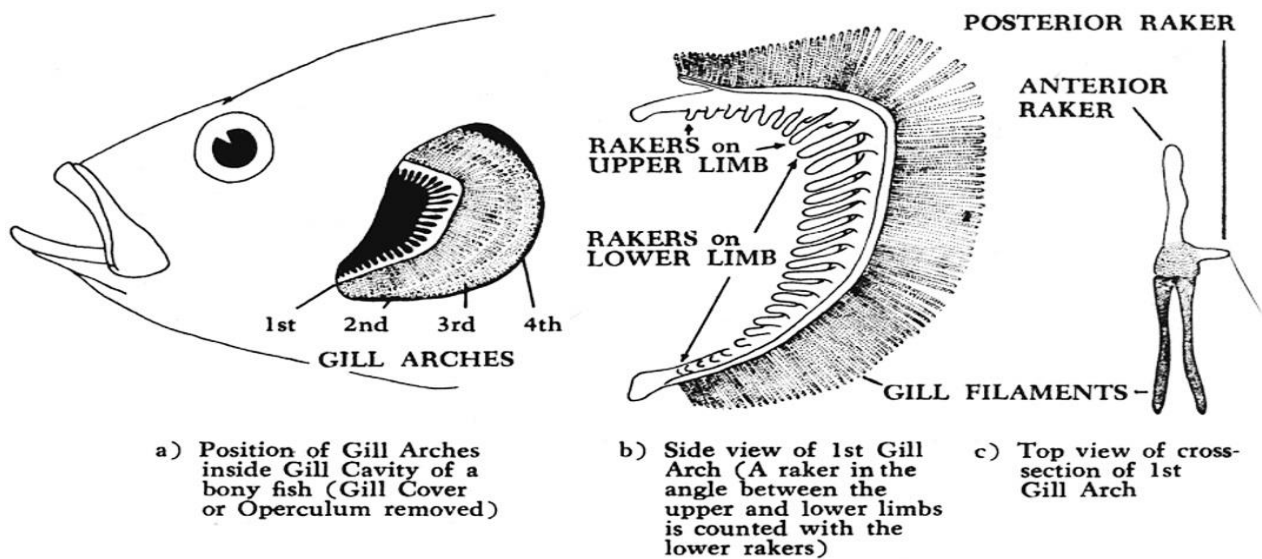Gill membranes and their attachment (Ventral view of: a, *Spirinchus starksi*; b, *Clinocottus globiceps*; c, *Anoplarchus purpurescens*).

## G) Barbles:

o **Absent**
o **Present**



- **Types:** (Nasal, Maxillary & Mandibular)
- For each type of barbles: (Long & Short), (Thick & Thin) & (Branched & Not branched)
- Length of each barble relative each other.
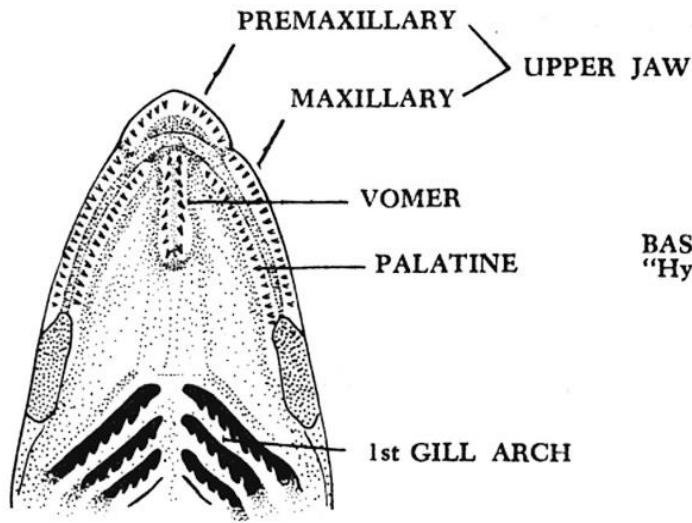
## H) Gill rakers & Gills



Gill rakers and gill arches of a bony fish.
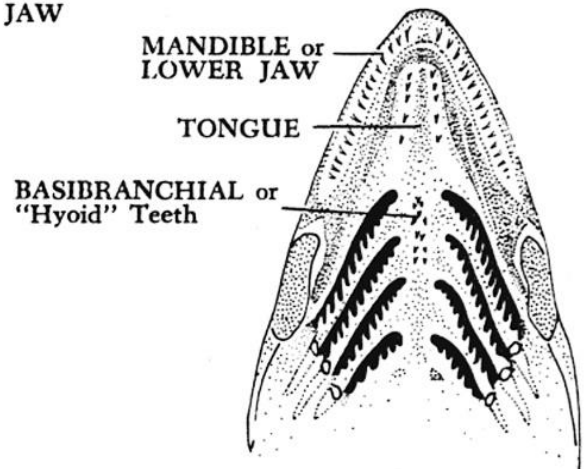
1) Gills; Number and Size

2) Gill rakers; Number and Size, shape, (straight & curved), (hard & soft).
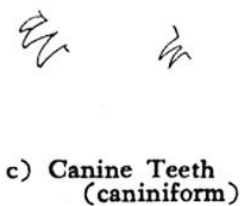
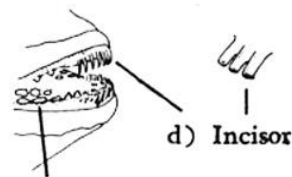**h) <u>Teeth:</u>**

- <u>Absent</u>
- <u>Present:</u>



a) Roof of Mouth showing bones with Teeth

b) Floor of Mouth showing bones with Teeth and Tongue

c) Canine Teeth (caniniform)

d) Incisor

e) Molarlike

Bones and teeth inside mouth or bucal cavity.

- o <u>Position:</u>
- o Type; Canine, Incisor & Molarlike.
  .If Canine :( unicuspid, bicuspid, tricuspid & polycuspid)
- o Numbers, Size, shape, (straight & curved) & (hard & soft) for each teeth position.

# 4) <u>Trunk description:</u>

**a) <u>Trunk Shape:</u>** (Compressiform, Depressiform, Cylindrical).
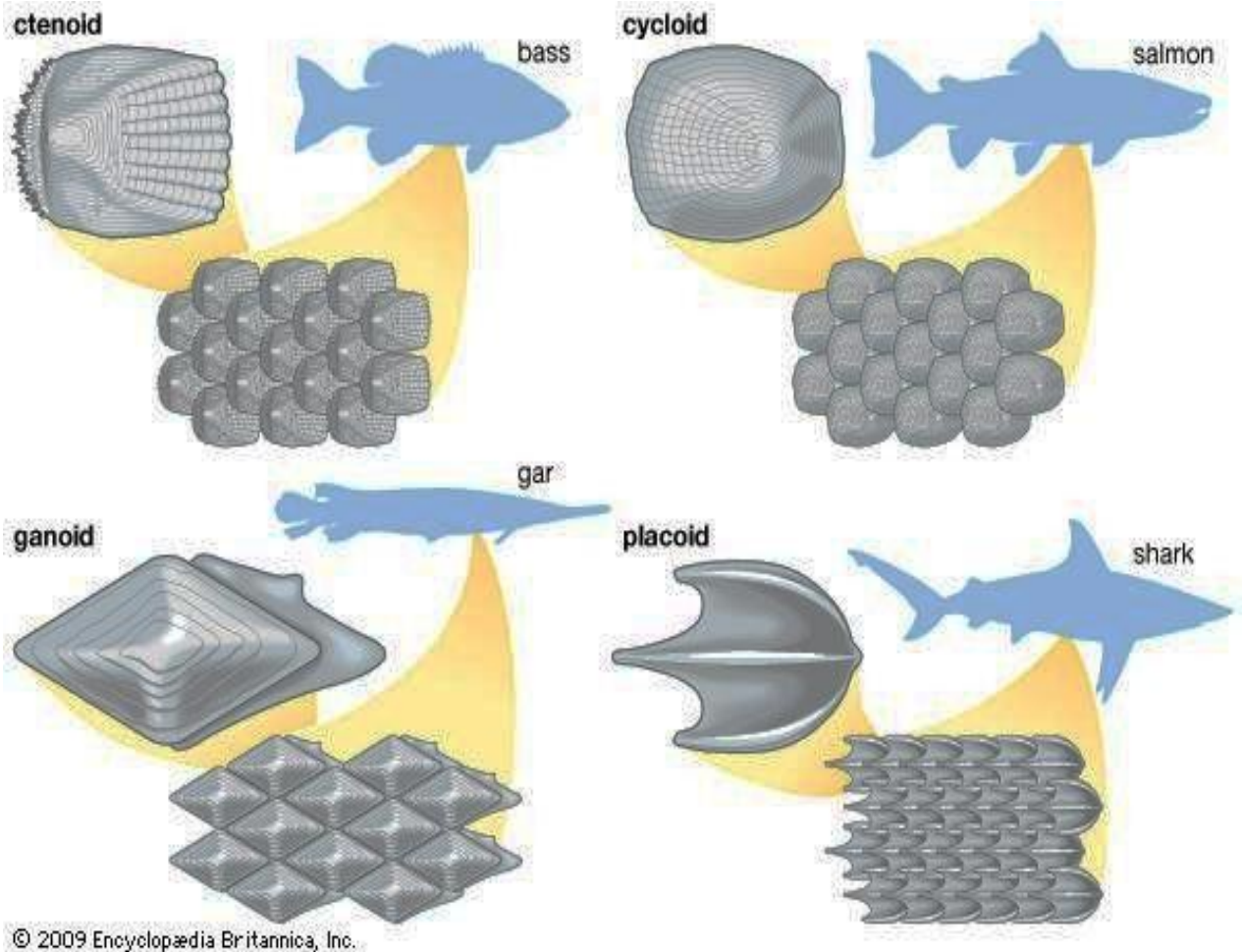
**b) <u>Trunk size according to the other body parts:</u>** (Small, medium, large).

**c) Scales:**
- **Absent or Present**
- **If, present:**
    - **Distribution on body surface**
    - **Size**
    - **Type:**



ctenoid — bass

cycloid — salmon

ganoid — gar

placoid — shark

© 2009 Encyclopædia Britannica, Inc.

**d) Fins:**

**A) Frist type (Doubled fins):**

**1) Pectoral fin:**
- Position relative to body: (Dorso-lateral, median & Ventro-lateral)
- Size,
- Fin spines: shape (sharp& blunt), (Soft & hard) & (long & short)
- Fin rays: (branched or not) & (long & short)
- Numbering of fin (spines & rays):
    - Spines numbers are represented by capital roman letters (I, II…)
    - Branched fin rays take small roman letters (i, ii, v, xii…).
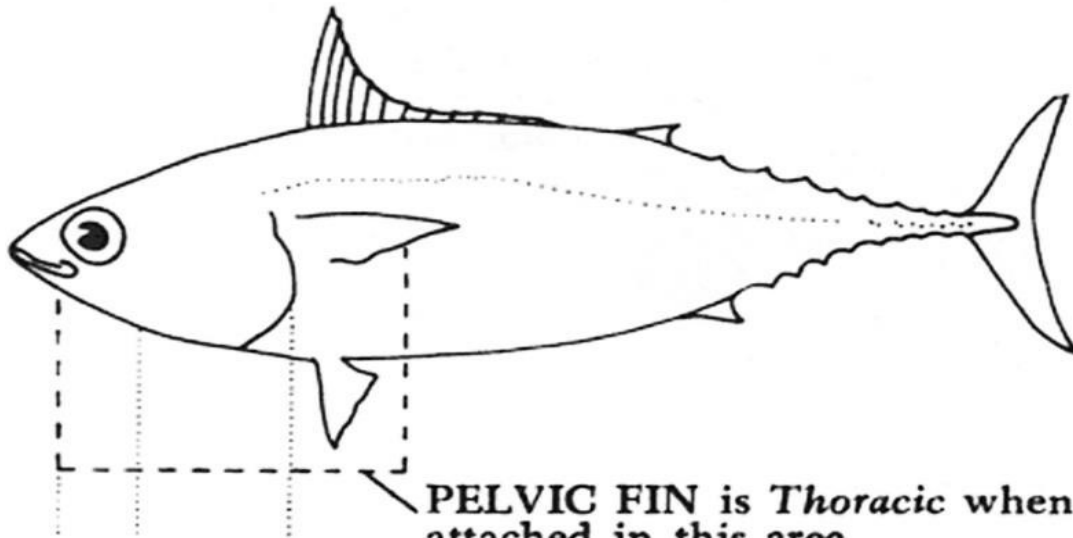    - Unbranched fin rays take Arabic letters (1, 2, 5…).

## 2) **Pelvic fin:**

- Size
- Position relative to Pectoral fin position: (abdominal, thoracic, jugular & mental)
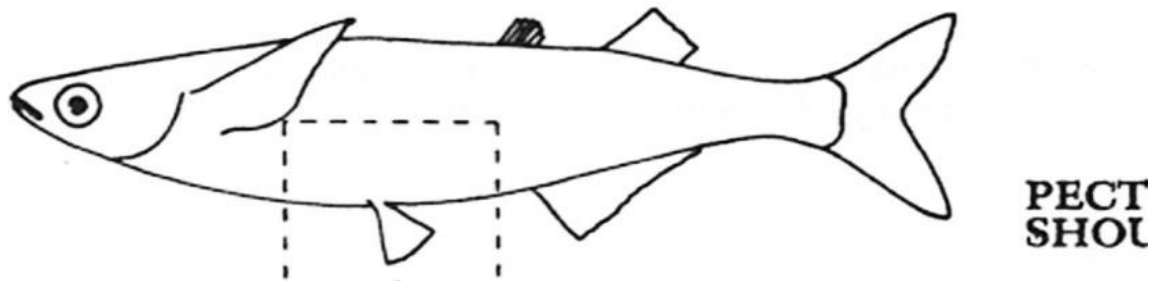


a) Topsmelt

PELVIC FIN is *Abdominal* when attached in this area

PECT
SHOU

PELVIC FIN is *Thoracic* when attached in this area

A *Thoracic* Pelvic Fin is also termed *Jugular* when under the Gill Cavity

A *Thoracic* Pelvic Fin is also termed *Mental* when attached under the Chin or Eye

- Fin spines: shape (sharp& blunt), (Soft & hard) & (long & short)
- Fin rays: (branched or not) & (long & short)
- Numbering of fin (spines & rays):
  - Spines numbers are represented by capital roman letters (I, II…)
  - Branched fin rays take small roman letters (i, ii, v, xii…).
  - Unbranched fin rays take Arabic letters (1, 2, 5…).

**B) Second type (Single fins):**

### 1) Dorsal fin

- One or two parts:
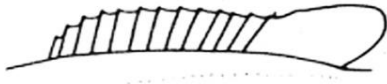


Dorsal Fin *Continuous*

Dorsal Fins *Contiguous* (slightly joined to or adjacent to each other)



ADIPOSE FIN

notched (spiny)    continuous    separate dorsal fin

- Fin spines: shape (sharp& blunt), (Soft & hard) & (long & short)
- Fin rays: (branched or not) & (long & short)
- Numbering of fin (spines & rays):
  - Spines numbers are represented by capital roman letters (I, II…)
  - Branched fin rays take small roman letters (i, ii, v, xii…).
  - Unbranched fin rays take Arabic letters (1, 2, 5…).

### 2) Anal fin:

- Size
- Fin spines: shape (sharp& blunt), (Soft & hard) & (long & short)
- Fin rays: (branched or not) & (long & short)
- Numbering of fin (spines & rays):
  - Spines numbers are represented by capital roman letters (I, II…)
  - Branched fin rays take small roman letters (i, ii, v, xii…).
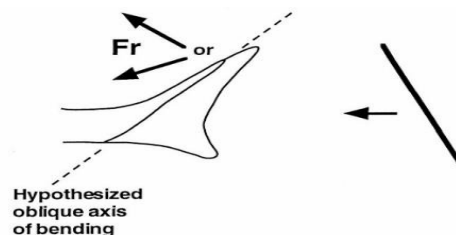  - Unbranched fin rays take Arabic letters (1, 2, 5…).

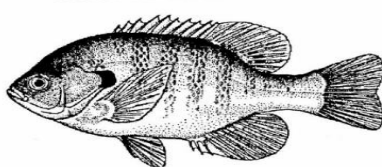### 3) Caudal fin:

A-Heterocercal:

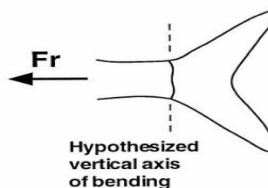  - Fin rays: numbers, (branched or not) & (long & short)
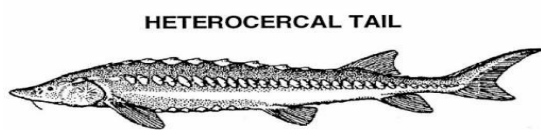


HETEROCERCAL TAIL

Fr or

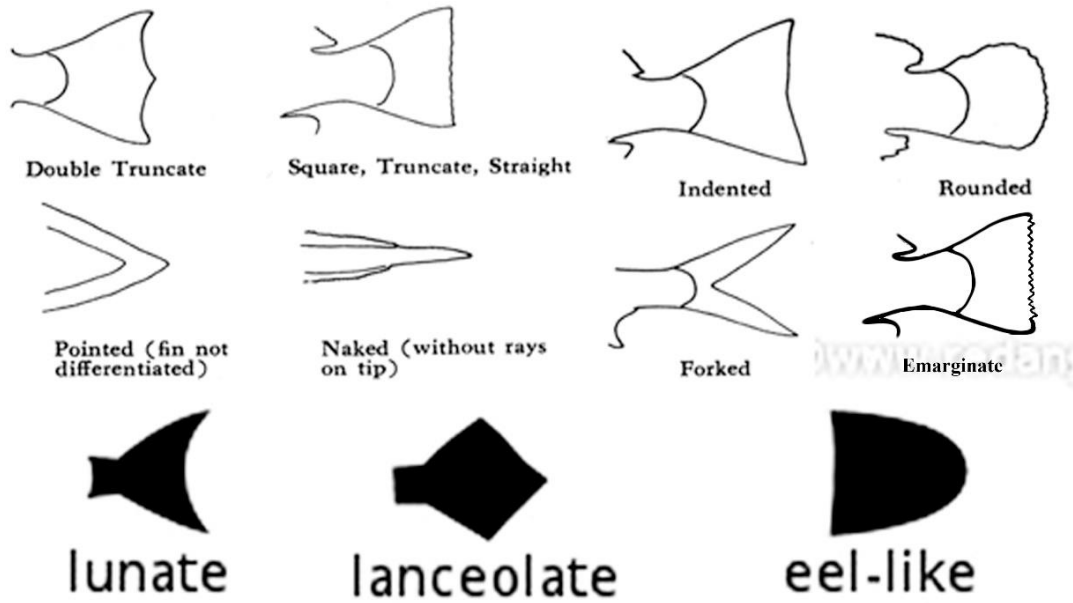Hypothesized oblique axis of bending

HOMOCERCAL TAIL

Fr

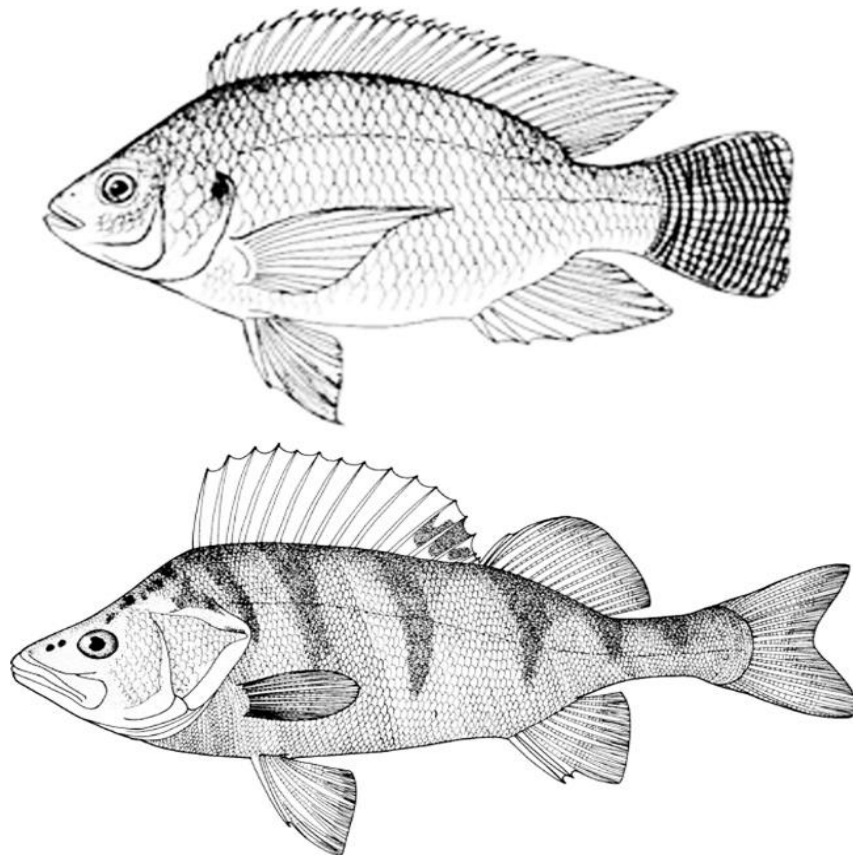Hypothesized vertical axis of bending

Trailing edge (posterior view)

B-Homocercal:
- o Fin rays: numbers, (branched or not) & (long & short)



Double Truncate     Square, Truncate, Straight     Indented     Rounded

Pointed (fin not differentiated)     Naked (without rays on tip)     Forked     Emarginate

lunate     lanceolate     eel-like

**e) Lateral line:**
- o **Absence**
- o **Present:**



- ▪ One (line & pair) on each boy's side.
- ▪ Position of line relative to the mid-body line
- ▪ Continuous line or separated pits.

**f) Cloacal aperture:**
- Small, moderate in size, large
- Wide, Narrow
- Shape: oval, spherical, slit-like… etc.
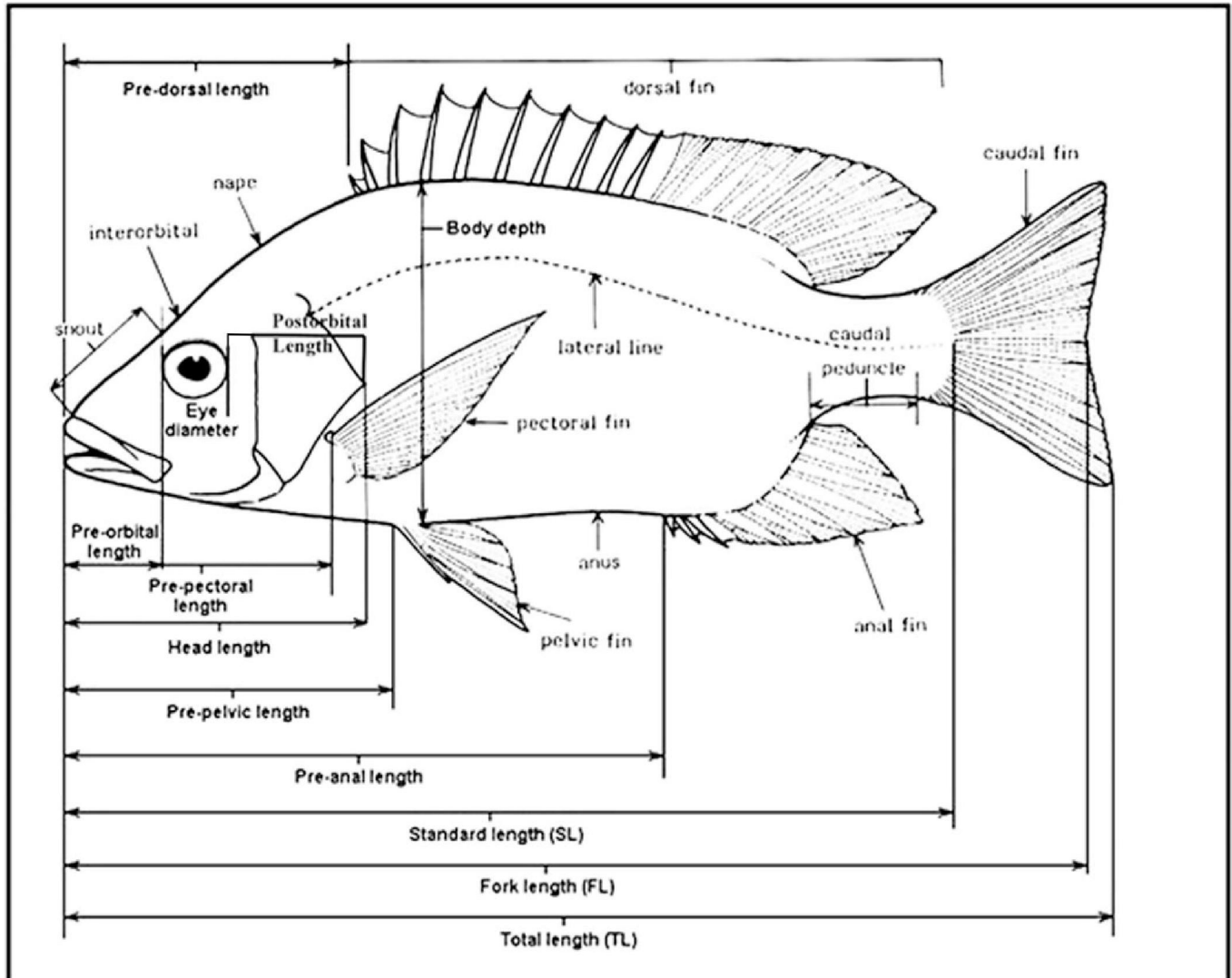- Narrower to (Pelvic fin OR Anal fin).


# 5) Tail description:
**a) Tail Shape:** (Depressiform, Cylindrical).
**b) Tail size according to the other body parts:** (Small, medium, large).

# Fish Measurements:

## 1) Lengths:

Also, Body width



## 2) Relative length of gut (RLG):

**RLG**= (Absolute length of gut/Slandered length of the body) × 100.

## 3) Gono-somatic index (GSI):

It is a tool for measuring the sexual maturity of animal.

GSI = (Gonads weight $_{gm}$/fish weight $_{gm}$) × 100.

## 4) Fulton condition factor (K factor):

It is a tool for determination of population health and food supply.

K= (fish weight $_{gm}$/ (Forked length)$^3$. If no forked length, we use the total body length.

## 5) Scales numbering:

- 1= Number of scales along pre-dorsal fin line
- 2= Number of scales along caudalfin length
- 3= Number of scales along distance from lateral line to the beginning of anal fin
- Number of scales along body width = b + c.
- Scale formula (Sf): a (b/c) where; [a] number of scales in lateral line, [b] number of scales above lateral line & [c] number of scales below lateral line.
- Scale numbers = SF × a.
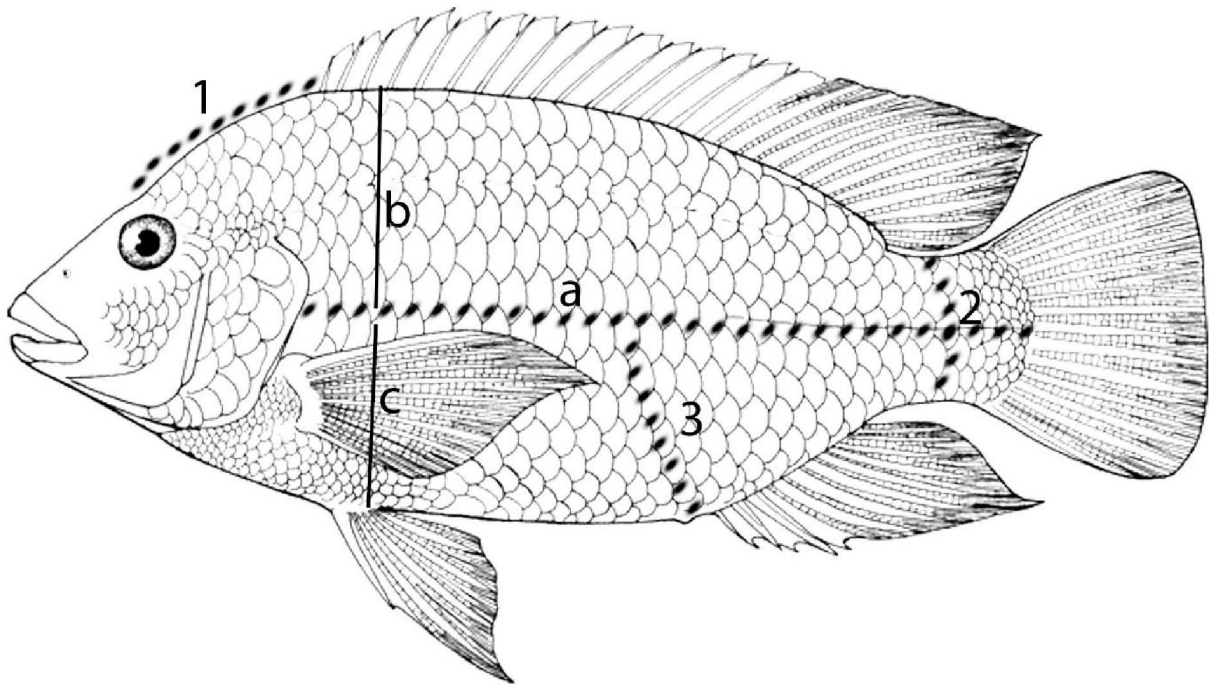


## Fish Ecology:

1. Habitat
2. Feeding and food
3. Oviparity or oviparity
4. Adaptations
5. Behavior
6. Economic importance (positive & negative).

﴿تم بحمده تعالى﴾