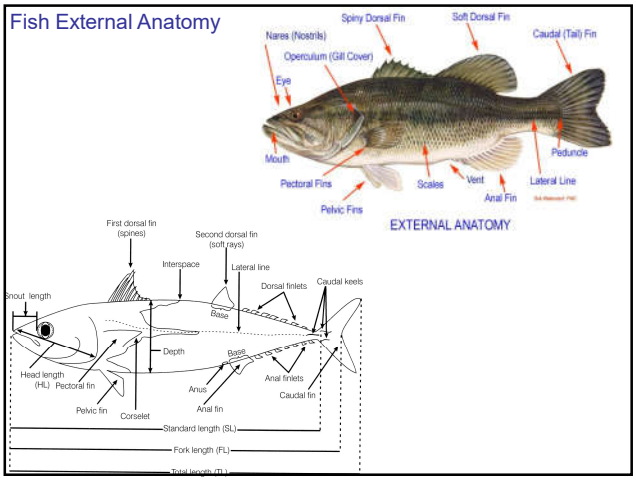
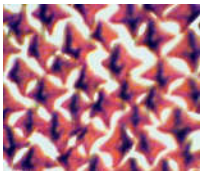
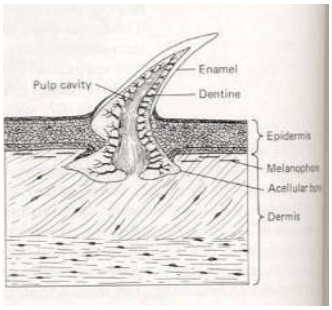
Fish External Anatomy



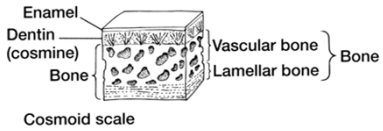
Placoid Scales



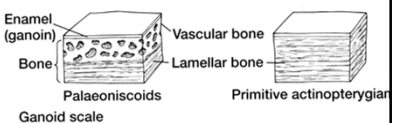


Bony Scales

- Cosmoid scales

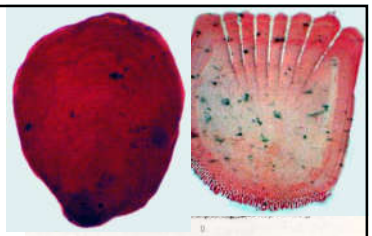


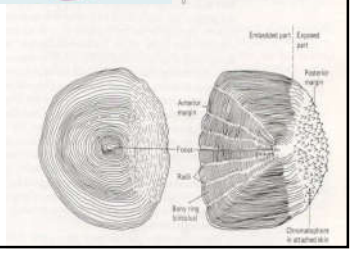
- Ganoid scales

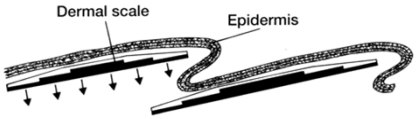


Bony Scales

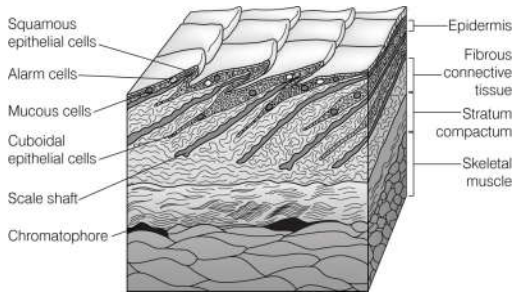
- Most teleosts, secondary loss in some eels, catfish, other taxa







Scale growth is down (direction of arrows), new layers laid at regular intervals.



Skin Specializations

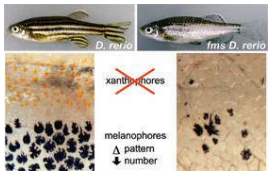
- Breeding Tubercles

- Mucus
  - Functions

- Schreckstoff – "scary stuff"

Fish Color

- Pigments
  - Chromatophores –
  - Amount of color controlled by
    - Named by the pigment contained within
      - melanophores –
      - erythrophores –
      - xanthophores –
      - leucophores –



Structural Colors

- Schematochromes or Iridiophores –
- Predator confusion –
- Crypsis –

- Color Patterns
  - Transparency
  - Countershading

Bioluminescence

- All are marine, most deep water
- Cellular light

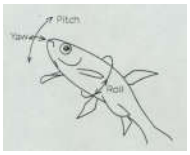
- Bacterial source

- Anatomy
- Functions

Fins and locomotion

- Advantages/disadvantages of water

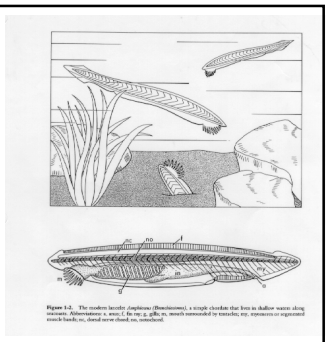
- Effective movement requires
  - Propulsion (forward and/or back)
  - Guidance
  - Braking



Propulsion

- Basic fish body plan
- Early propulsion

- Fin evolution



Myomeres and Vertebrae

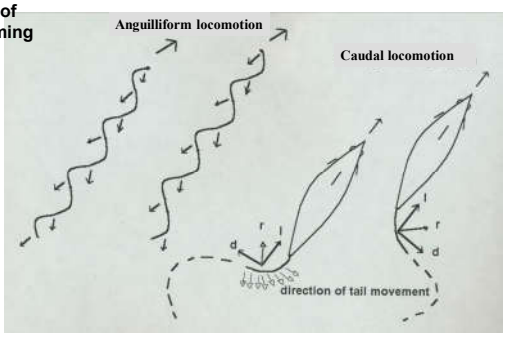
- Evolutionary trend towards fewer segments, more rigid body – Why?

# of myomeres (and vertebrae)

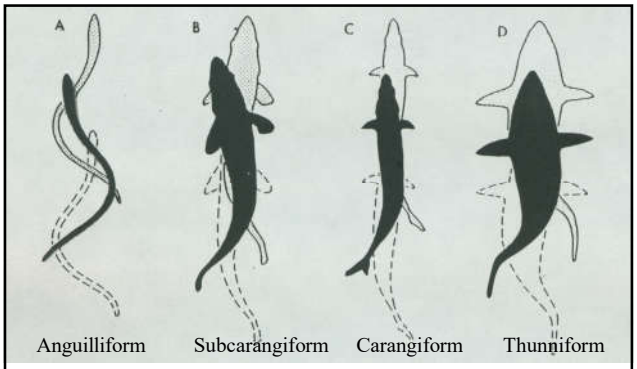
16 - Molidae

600 - Nemichtyidae

Types of Swimming



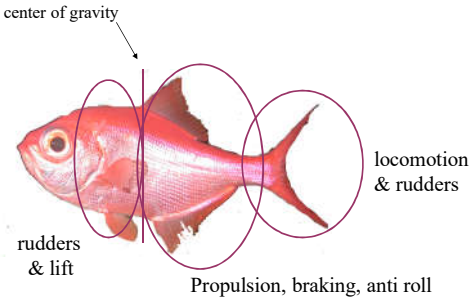
Body undulations ⟶ Caudal locomotion



Fins and Swimming

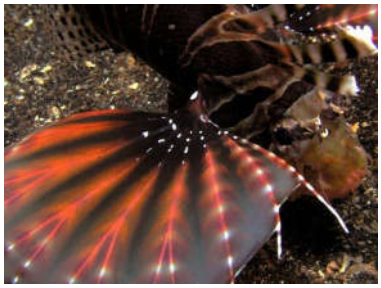
Remember that fish are neutrally buoyant
Position and shape of fin

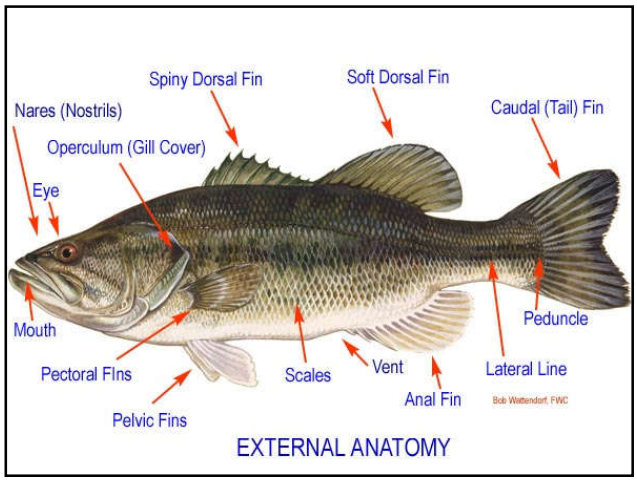
Secondary functions –



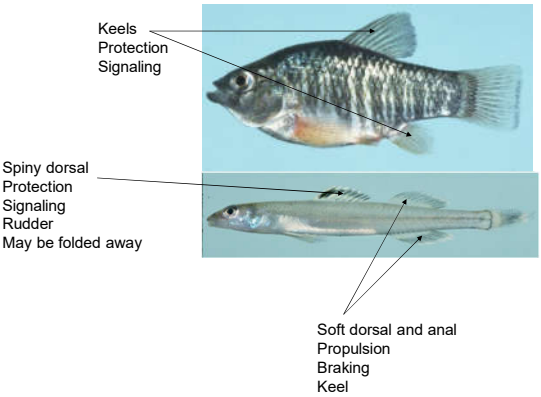
Spines and Rays

- Spines
- Rays





Dorsal and Anal Fins



Paired Fins

- Pectoral, Pelvic serve to guide, steer and in some cases propel

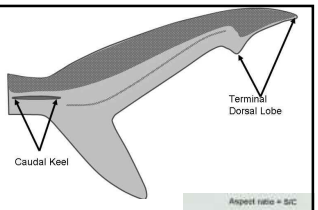
- More maneuverability
- Other modifications

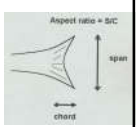
Less maneuverable, faster

More maneuverable, slower

Caudal Fin

- Homocercal vs. heterocercal
- Aspect ratio
- In faster swimming fishes

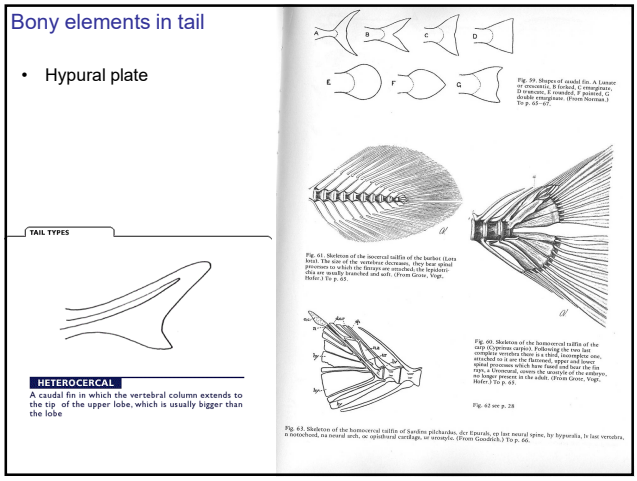


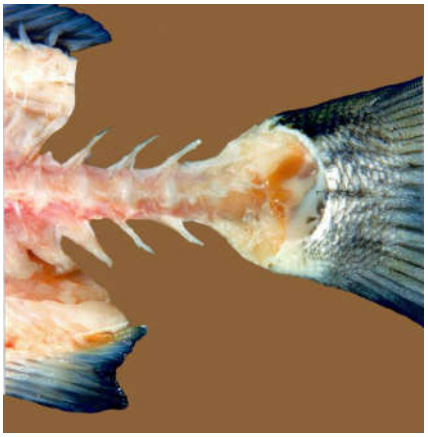


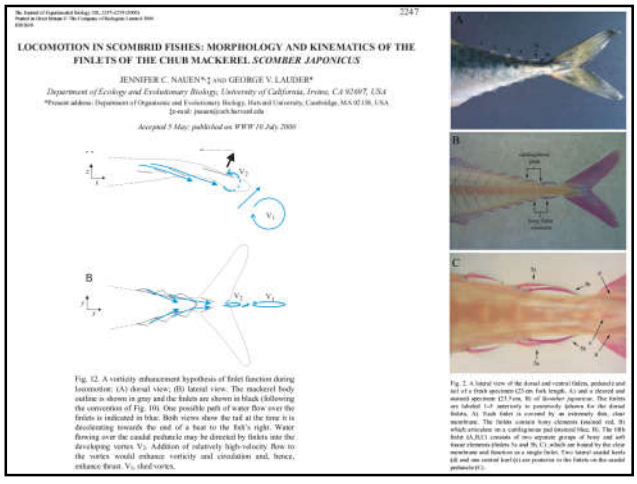
Increased swimming speed

Bony elements in tail

- Hypural plate

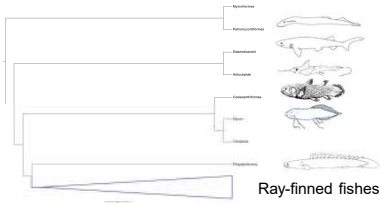






Evolutionary trends

- Less anguiliform and more caudal swimming
- Reduction of bony elements in tail
- For increased speed
- Accessory functions of spines



Ray-finned fishes (including mudskipper)