Oral region & Associated structures

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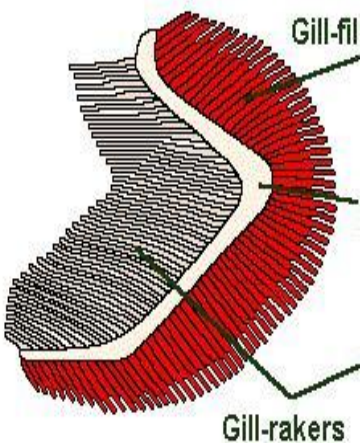


Oral region and Associated structures

- **Adaptations for feeding**

  The diversity in feeding habits that fishes exhibit is the result of evoluation leading to structural adaptation for getting food from the environments.

- The structural adaptation of feeding organs such as

  1) position and shape of the mouth

  2) Presence or absence of “Teeth”

  3) Gap of the mouth

greatly help in predicting the nature of food and mode of feeding of the fish

Major feeding types

1) Predators

2) Grazers

3) Strainers (Filter feeders)

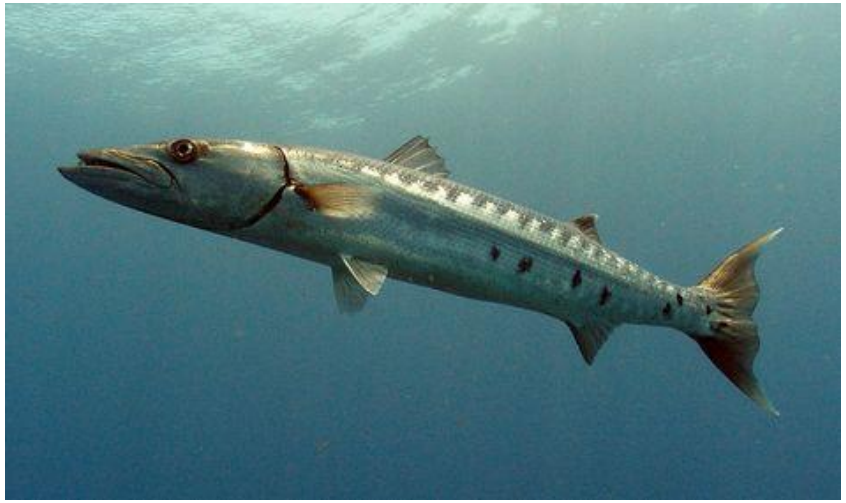
4) Suckers

5) Parasites

Fishes that feed on macroscopic animals. They usually have well developed grasping and holding teeth

Great White Shark

Predators



Barracuds (Sphyraena)

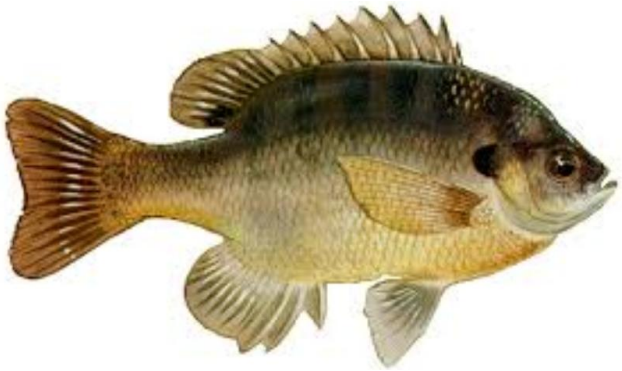
Pike (Esox)

Predators

Gar (Lepisosteus)

Grazers

In Grazing, the food is taken by bites or continual browsing (they mainly feed on planktons or on bottom organisms) and feed in bottom or column



Bluegill (*Lepomis macrochirus*)

Parrot fishes (scaridae)

Butterfly fishes (chaetodontidae)

Other examples: ***Cirrhinus mrigala, Cyprinus carpio, Labeo rohita***

Strainers (Filter feeders)

Filter the water for plankton. Foods are selected by size and not by kind. Example: Herring (clupidae), Gizard, Shads (Dorosoma), Paddle fish, Hilsa, Catla have efficient food straining or filtering adaptation. The principal adaptation for filter feeding or strainers is the developemt of numerous, closely – set and elongated gill rackers.

Shads (Clupidae)

Gizzard

Hilsa

Other Examples:

Calta catla, Gudusia chapra, Hypopthalmicthys molitrix

Suckers: Sucking food or food containing material by bottom feeding fishes such as the sturgeons (Acipenseridae), suckers (catostomidae) and some loaches.

Sturgeons (Acipenseridae)

Parasites

Parasitism is perhaps the most unusual and highly evolved feeding habits among animals. They suck body fluid after rasping a hole in the sides of the body.

Examples: **Lambreys (Petromyzonidae), Sea lampreys (Petromyzon marinus) Pacific lampreys (Lamptra tridentata**

Teeth

- Outstanding among the obvious oral adaptation for feeding in fishes are the teeth. They are thought to have arisen from scales covering the lips, as represented in living sharks (squliformes) where the placoid scales of the skin visibly grade into teeth on the jaws.

- In bony fishes (Osteichthyes) Teeth are of three kinds, based on where they are found **Jaw, Mouth** and **Pharyngeal**.

Jaw Teeth

- Jaw teeth are present on the maxillary and premaxillary bones and classified into five major types:

1) **Cardiform**
2) **Villiform**
3) **Canine**
4) **Incisor**
5) **Molariform**

Different Type of Teeth

- **Cardiform Teeth**
  Cardiform teeth are numerous, short, fine and pointed. Such type of dentition with some variations is found in many fishes that have multiple rowed teeth. For example American catfish (Ictaluridae) perches (percidae) and many sea bases (serranidae).

- **Villiform teeth**
  Villiform teeth are more or less elongated cardiform teeth. For example : Needlefishes (Belonidae) and Lion fishes as (Pterois).

- **Canine teeth**
  Canines are dog like tooth (long pointed tooth) . They are elongated and sub-conical, straight or curved and are adapted for piercing and holding . For example: Alska pollock. In certain fishes such as moreys (muraenidae) the canines are hinged (the hook) like.

- **Incisors teeth**
  Incisors are sharp edged cutting teeth. In some fishes incisors fuse together in cutting beak as in parrot fishes (scaridae).

- **Molariform teeth**
  Molariform teeth are used for crushing and grinding the food thus flat in shape with protruding denticles on the surface. These teeth are found in bottom dwelling fishes like skates and rays and drums.

Oral adaptation for feeding

Lips

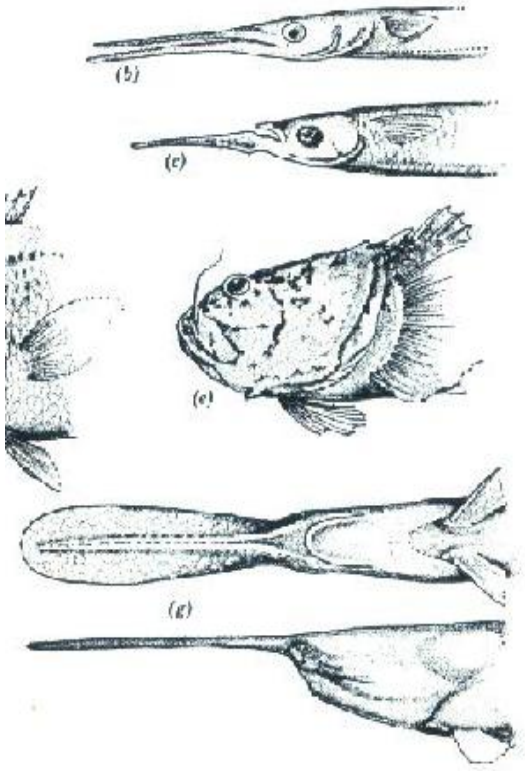
Suctorial feeders have an “inferior mouth” and fleshy modification of lips. Notable among these are the sturgeons (Acipenseridae) and suckers (catastomidae). The lips of strurgeons and suckers are mobile and described as “Plicate” (having folds) or papillose (having small tufts of skin). Many suctorial feeders also have well developed barbells bordering the mouth.

Modifications in the shape of mouth

- Among the grazers and suctorial feeders, mouth parts also modify to support feeding.

- The Trumpet fishes (Aulostomidae), the cornet fishes (Fistularidae) and the pipe fishes (syngnanthidae) as well as many butterfly fishes (chaetodontidae) of coral reefs, have mouths that resemble **elongated beaks**. This adaptation is achieved by a protraction of the hypomandibular bone.

- A peculiar structure among mouth modification has arisen in the half beaks (Hemiramphidae) where the lower jaw projects into a beak often a third of the length of the fish itself, with the mouth opening above it. Half beaks are usually surface feeding fishes.



Adaptation in Gill Rakers

Besides protecting the tender gill filaments form abrasion (a rubbing off or scrap) by ingested materially that are coarse in texture, gill rakers are specialization in relation to food and feeding habits. They are very stubby (short and thick) and unornamented in most omnivores for example sunfish (Lepomis cynellus).

In many plankton feeders, the gill rakers are elongated, numerous are variously lamellate or ornamented to increase efficiency of filtering. Simple but very numerous rakers are possessed by gizzard shads (Dorosoma) and paddlefish (polyodon) .

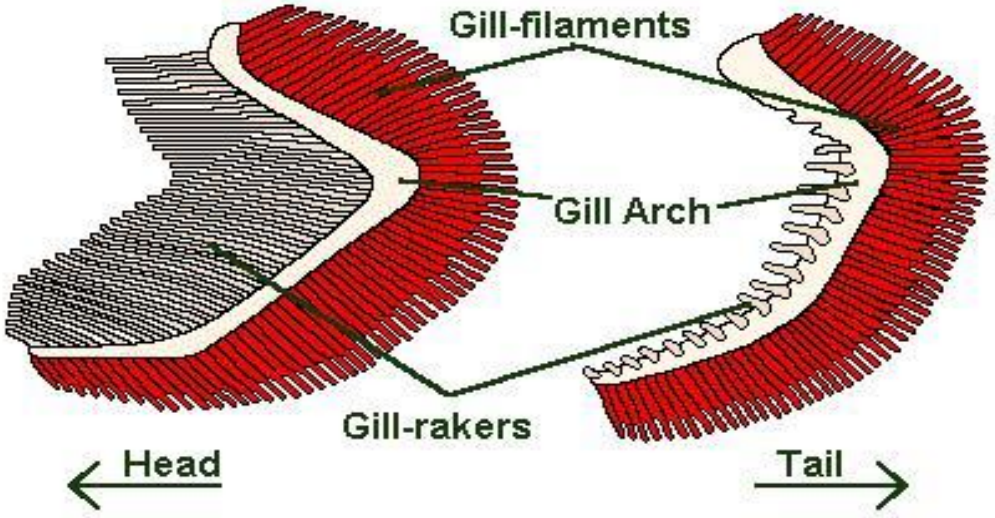


Fig. : Diagramatic representation of Gill rakers