

**PRE-ACANTHOMORPH TELEOSTS**

A CLASSIFICATION OF EXTANT EARLY TELEOST LINEAGES

Division **Teleostei**

Subdivision **Osteoglossomorpha**

Order **Osteoglossiformes**

Subdivision **Elopomorpha**

Order **Elopiformes**

Order **Anguilliformes**

Subdivision **Clupeomorpha**

Order **Clupeiformes**

Subdivision **Euteleostei**

Superorder **Ostariophysi**

Order **Cypriniformes**

Order **Characiformes**

Order **Siluriformes**

Order **Gymnotiformes**

Superorder **Protacanthopterygii**

Order **Salmoniformes**

Superorder **Stenopterygii**

Order **Stomiiformes**

Superorder **Scopelomorpha**

Order **Aulopiformes**

## OSTEOGLOSSOMORPHA

### Osteoglossiformes

- This group is characterized by the **left coiling intestinal tract**, and a **toothed parasphenoid glossohyal**.
- Osteoglossiformes are primarily freshwater fishes with a Holarctic distribution. Two species, the hiodontids (mooneyes), occur in the Nearctic.
- Six families are generally recognized for the extant members of this order: Osteoglossidae (bonytongues), Pantodontidae (butterflyfish, 1 sp.), Hiodontidae (mooneyes), Notopteridae (featherfins, or Old World knifefishes), Mormyridae (elephantfishes), and Gymnarchidae (1 sp.).
- Explain the role of the toothed glossohyal plate and parasphenoid.

## ELOPOMORPHA

- The subdivision Elopomorpha is defined by the occurrence of **leptocephalus larvae**. Some aspects of **spermatozoan morphology** further characterize the group. Elopiformes is a small order within the Elopomorpha.

### Elopiformes

- Mainly marine fishes that occasionally enter freshwater. They are distributed throughout the tropical and subtropical regions of the world's oceans.
- Three extant families are included in the Elopiformes: Elopidae (ladyfishes), Megalopidae (tarpons), and Albulidae (bonefishes).
- Briefly explain the possible adaptive value of leptocephalus larvae.

### Anguilliformes

- Included in the Elopomorpha, the order Anguilliformes is also characterized by the occurrence of **leptocephalus larvae**.
- This order is further characterized by a **reduced body plan, dorsal and anal fins often continuous with caudal fin, cycloid scales deeply embedded or absent, no gill rakers, no pelvic fins**, and a **reduced skeleton**.
- Widely distributed marine and **catadromous** (live in freshwater, breed in the ocean) species.
- Twenty-two recognized families including: Anguillidae (American and European eels), Muraenidae (morays), Congridae (garden eels), and Saccopharyngidae (gulper eels).

## CLUPEOMORPHA

### Clupeiformes

- Clupeiform fishes possess an **otophysic (ear-gas bladder) connection** not seen in any other group, as well as a **characteristic positioning of the pneumatic duct** (usually connecting the gas bladder to the posterior region of the intestinal tract).
- Clupeiformes includes mostly marine fishes, but some engraulids (anchovies) venture into freshwater, and some species of the Clupeidae (herring) and *Denticeps clupeiodes* (denticle herring) are restricted to freshwater. Clupeiformes are found worldwide, although clupeids are found mostly in tropical waters.
- What evidence is there that these fishes evolved together from a common ancestor?

## EUTELEOSEI

### OSTARIOPHYSI

- Ostariophysians form a highly diverse group of primarily freshwater fishes. This superorder dominates the freshwaters of the world. Fishes in this group possess a specialized bony connection between the inner ear and swimbladder, known as the **Weberian apparatus**, and a small pheromone, called **Schreckstoff**, which produces a fright reaction in conspecifics (other members of the same species) or other receptive fishes.
- Distribution is primarily continental freshwater.

### Cypriniformes

- This diverse order contains six families of minnows, suckers, and loaches that have **lost their jaw teeth** and often exhibit **specialization of the lips and pharyngeal teeth**.
- Distribution is confined to North America, Africa and Eurasia.

### Characiformes

- This order includes the tetras, piranhas, and silver dollars. Many popular freshwater aquarium fishes are members of this order. It is loosely characterized by **innovations in feeding structures**, especially jaw teeth. The **teeth are usually well developed**, and **adipose fin is usually present**, and the body is **usually covered with silvery scales**.
- Confined to freshwater habitats of Mexico, Central and South America, and Africa.

## Siluriformes

- This order includes 31 families of catfishes. All members have **barbels** associated with the mouth. An **adipose fin is usually present at the front of the dorsal and pectoral fins**.
- Freshwater and marine worldwide distribution, although the vast majority are freshwater.

## Gymnotiformes

- This order includes six families of knifefishes and the electric eel. It is characterized by an **eel-like body, extremely long anal fin, absent or greatly reduced caudal fin**, and the presence of **elaborate electrogenic and electrosensory organs**.
- Neotropical (Central and South America), freshwater distribution.

## PROTACANTHOPTERYGII

### Salmoniformes

- This diverse order contains fifteen families, including the salmon, trout, pikes, mudminnows, smelts, and slickheads. Most members of this order are characterized by **having teleost characters in the primitive state** (e.g. fin placement, adipose fin, toothed maxilla, cycloid scales, no spines). The adipose fin is lacking in some families (e.g. Esocidae and Galaxidae).
- Worldwide marine and freshwater distribution.

## STENOPTERYGII

### Stomiiformes

- Nine families of deep-sea fishes, including lightfishes, bristlemouths, marine hatchetfishes, and dragonfishes. Characterized by having **elaborate bioluminescent organs and teleost characters in the primitive state**. Most are very toothy.
- Found throughout the deep-sea habitats of the world.

## SCOPELOMORPHA

- This *superorder* contains 14 families, including lizardfishes, greeneyes, tripod fishes, and lantern fishes. These fishes are very similar to stomiiforms (teleost characters in the primitive state), but can be distinguished by having a **toothless maxilla excluded from the gape**. They may, or may not, have bioluminescent organs.
- Found in all the marine habitats of the world.

## **Aulopiformes**

- This order contains twelve families, including the Aulopidae (aulopus), Chlorophthalmidae (greeneyes), and Synodontidae (lizardfishes). Members of this order all possess **specialized gill arches**.
- Demersal, marine, found mostly in the Indo-West Pacific and Indian Oceans, as well as the Red Sea.