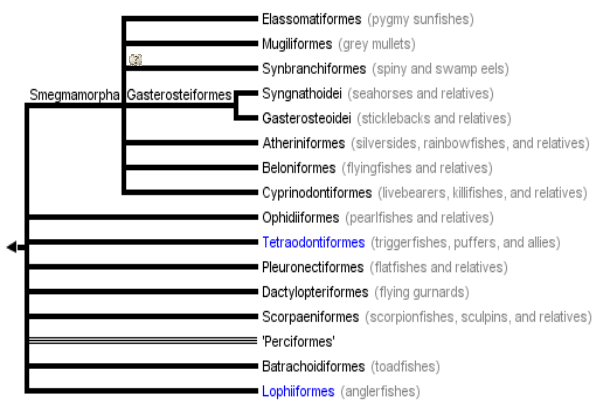


ACANTHOPTERYGII = Mugilomorpha (mullet) +  
Atherinomorpha (silversides) + Percomorpha

- **Superorder Acanthopterygii**
- **Mugilomorpha**
  - **Order Mugiliformes:** Mullet
- **Atherinomorpha**
  - **Order Atheriniformes:** Silversides and rainbowfishes
  - **Order Beloniformes:** Needlefish, Halfbeaks, and Flyingfishes
  - **Order Cyprinodontiformes:** Killifishes, guppies, swordtails + ricefishes (Medaka)
- **Series Percomorpha**
  - **?Order Stephanoberciformes:** Pricklefish, whalefish
  - **?Order Bercyiformes:** Squirrelfishes, redfishes, Pineapple fishes, flashlight fishes, Roughies, Spinyfins, Fangtooths
  - **?Order Zeiformes:** Dories, Oreos, .
  - **Order Gasterosteiformes:** Pipefish and seahorses, sticklebacks
  - **Order Synbranchiformes:** Swampeels
  - **Order Scorpaeniformes:** *Scorpanfish*
  - **Order Perciformes:** Many many
  - **Order Pleuronectiformes:** Flounders and soles
  - **Order Tetraodontiformes:** Triggers and puffers etc

Acanthopterygii Phylogeny – Johnson and Wiley



### Seven “Super Orders”

- 7) Superorder Acanthopterygii
- ‘Three ‘Series’
- 1) Mugilomorpha – mullets – 66 species, economically important; leap from water.??



## Seven “Super Orders”

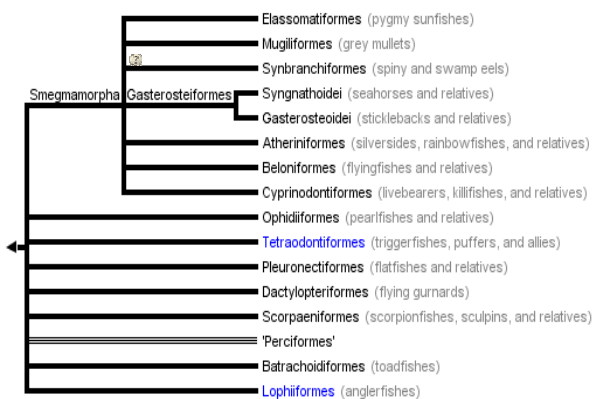
- 7) Superorder Acanthopterygii - 3 'Series'
- 2) Atherinomorpha – Surface of water.
- a) Atheriniformes - silversides, rainbow fish, 285 spp.;
- b) Beloniformes = needlefishes, flying fishes, include Medakas (ricefish *Oryzias* - used in labs; first to have sex in space); and
- c) Cyprinodontiformes = Poeciliids – mollies, guppies, swordtails; Killifish, pupfish etc. – highly salt tolerant and extreme environments; Annual aplocheilid rivulines. *Rivulus marmoratus* only self fertilizing fish; Anablepid – four eye fish. Species flock of *Orestias* in Lake Titicaca (4570 m).



## Seven “Super Orders”

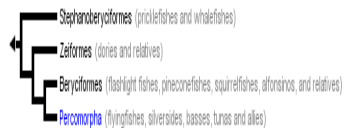
- 7) Superorder Acanthopterygii – 13,500 species in 251 families.
- 3) Percomorpha 12,000 species with anteriorly placed pelvic girdle that is connected to the pectoral girdle directly or by a ligament; pelvic fin w/ anterior spine and usually five soft rays

### Acanthopterygii Phylogeny – Johnson and Wiley



## Percomorpha

- Defined - Anteriorly placed pelvic girdle connected to pectoral directly or by ligament; not well defined group



### Basal Orders

- Stephanoberyciformes (gibberfishes & whalefish)
- Zeiformes - dories
- Beryciformes - orange roughy & squirrelfishes, soldierfish



## Percomorpha


Basal Orders

- Gasterosteiforms – dermal armor plates, small mouths; sticklebacks, sea horses, sea moths, pipefish, sea dragons, - only verts - male pregnant; trumpetfish & cornet fish.
- Synbranchiforms – Swamp Eels - palatoquadrate attaches at two points on skull = amphystylic suspension.
- Scorpaniformes – scorpionfish, rockfish and sculpins; only freshwater = sculpins



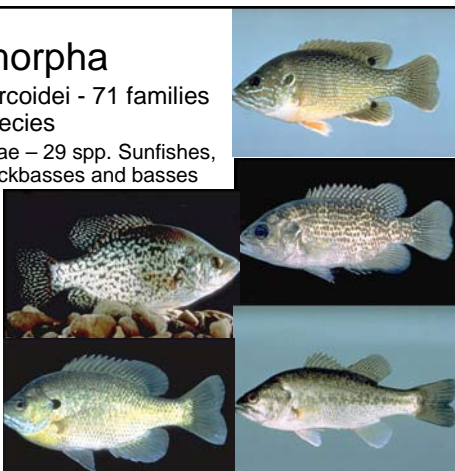
## Percomorpha

- Order Perciformes – 148 families and 9300 species
- Suborder Percoidei - 71 families with 2860 species
  - Centropomids – snooks, barramundi, Nile Perch etc
  - Serranidae – sea basses, 450+ species – 3 spines on opercle; 3 subfamilies inc. mamlets, groupers, soapfish, etc. Many are hermaphrodites – start female become male = PROTOGYNY




## Percomorpha

- Suborder Percoidei - 71 families with 2860 species
  - Centrarchidae – 29 spp. Sunfishes, crappies, rockbasses and basses



## Percomorpha

- Suborder Percoidei (many families) – 71 families with 2860 species
  - Grammatidae – basslets
  - Percidae – yellow perch and walleye and darters (162+ species)
  - Cardinal fish (Apogonids) – 320+ spp. Nocturnal reef fish w/ big eyes
  - Tilefishes (Malacanthids) – marine burroughs, move shells, rocks w/ mouth
  - Nematistidae – remoras – first dorsal fin modified as sucking organ; - sometimes combined w/ next four as carangoids



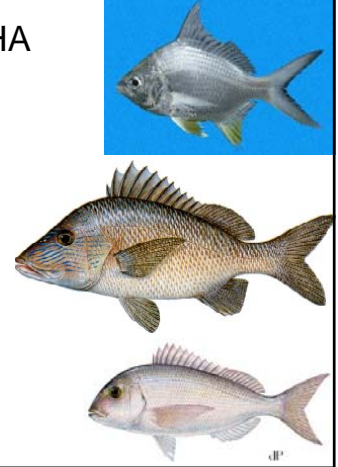
## PERCOMORPHA

- Cobia – monotypic – looks like ramora but no disk often w/ manta rays
- Dolphin fishes (dorado) - - 2pp. – sexual dimorphism in skulls
- Jacks – Carangids – 140 + species of predators – good swimmers – carangiform locomotion.
- Lutjanids – snappers 125+ spp.
- Lobotid tripletails – dorsal anal and caudal fins



## PERCOMORPHA

- Lobotid tripletails – dorsal anal and caudal fins
- Gerreidae – mojarras – common inshore
- Haemulidae (grunts) – coral reef – pork fish
- Sparidae (Porgies)
- Polynemid threadfins



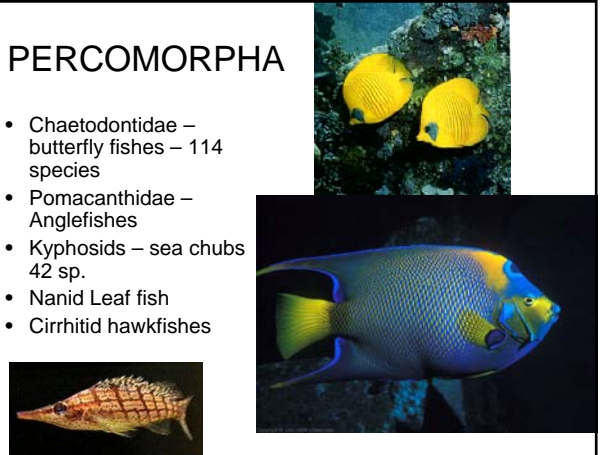
## PERCOMORPHA

- Sciaenid Croakers – 270+ species - Totoaba – sound & large otoliths and extensive lateral lines.
- Mullid (goatfishes)
- Monodactylid fingerfishes
- Toxotid Archerfishes – shoot water eyes submerged



## PERCOMORPHA

- Chaetodontidae – butterfly fishes – 114 species
- Pomacanthidae – Angelfishes
- Kyphosids – sea chubs 42 sp.
- Nanid Leaf fish
- Cirrhitid hawkfishes



## PERCOMORPHA

- Suborder - Elasmobranchs – shark and rays
- Suborder - Labroidae – surgeonfishes
- Suborder - Labroidei – species flocks and explosive speciation  
Cichlidae, Pomacentridae, Labridae, Scaridae, Embiotocidae & Odacids

## PERCOMORPHA

- Suborder - Zoarcoidei – eelpouts, wolffishes, wolf eels, gunnels
- Suborder - Notothenioidei – icefishes, glycoprotein antifreeze
- Suborder - Trachinoidei – stargazers, sand divers, sand lances, weeverfishes (venomous w/ stargazers)
- Suborder - Icosteioidei, Gobiesocoidei, Callionymoidei – ragfish, clingfish, Dragonet (popular aquarium)
- Suborder - Blennioidei – Blennies
- Suborder - Gobioidae – Gobies

## PERCOMORPHA

- Suborder Kurtoidei – Kurtids, males care eggs w/ attachment to supraoccipital crest
- Suborder Acanthuroidei – Acanthurids (72 spp), rabbitfishes, spadefishes, Louvar (female w/ 50 million eggs), Moorish Idol
- Suborder Scombroidei – weird gas bladder that has projections, monotypic



## PERCOMORPHA

- Suborder Scombroidei – Mackerels, tunas, Barracudas, cutlass fishes, Xiphiid swordfish, spearfish and marlins
- Suborder Stromateoidei – medusafishes, squaretails, driftfishes, butterfishes





## PERCOMORPHA

- Suborder Anabantoidei – labyrinth fishes – auxiliary breathing structure – betas and gouramis
- Suborder Channoidei – snakeheads



## PERCOMORPHA

- Order – Pleuronectiformes – pelagic symmetric larvae, metamorphose into adults that lie on bottom, Soles (usually right eyed), flounders, halibut (righteye flounder), tonguefishes.



## PERCOMORPHA

- Order - Tetradontiformes – triggerfish, filefishes, boxfishes, puffers, Mola Ocean Sunfishes lots of cartilage in skull, up to 1000 lbs.

