



Marine Fish

- · Marine fish are vertebrates
- Some have vertebra made of cartilage, while others have bony vertebra
- Of the 24,000 known species of fish, about 15,000 species are marine
- Fish are the oldest of vertebrates (found farther back in the fossil record)
- Fish are by far the largest group of vertebrates in terms of species and abundance
- · About half of all vertebrate species are fish

Types of Marine Fish

- 1. Agnatha (jawless fish)
 - Hagfish
 - Lampreys
- 2. Chondrichthyes (cartilaginous fish)
 - Sharks
 - SkatesRavs
 - Rays
 ratfish
- 3. Osteichthyes (bony fish)
 - Lobe-finned fishes
 - Ray-finned fishes

Types of Marine Fish

- Agnatha
 - These jawless fish have a muscular, circular mouth with rows of teeth in rings
 - Long, cylindrical body
 - Lack paired fins and scales seen in other fish
 - Two types of jawless fish exist- hagfish and lampreys

hagfish

- · Also called "slime eels"- they are not eels
- Copious slime may clog gills of predatory fishes
- Skin is used to make wallets and handbags
- <u>http://www.youtube.com/watch?v=vQbGk4</u> <u>sHROg</u>







Types of Marine Fish

- Chondrichthyes General Characteristics of Group: About 1000 species
- Sharks, rays, skates and ratfishes are members of this group
- Skeleton of cartilage (as the name implies)
 Movable jaws with well-developed teeth
 Placoid scales and paired fins
- 5-7 gill slits open directly into the water in most species
- Spiracles in many species (openings on head used to bring water directly in for respiration without opening the mouth)
- Males in most species have projections of the anal fin called claspers that are used in copulation

Types of Marine Fish

- · More specific details about Ratfishes
 - Only about 30 species
 - Mostly are deep water inhabitant
 - They feed on the bottom on crustaceans and molluscs primarily



Types of Marine Fish

- · Osteichthyes, The Bony Fish
 - As the name implies, these fish have a skeleton composed of bone
 - More species that all other vertebrates combined- over 23, 000 species worldwide
 - Gills used for respiration
 - Hinged jaws allow for a variety of different ways of feeding
 - Homocercal tail (two lobes of equal size) provides forward thrust

Types of Marine Fish

Osteichthyes, The Bony Fish

- Flat bony scales (ctenoid or cycloid) protect body
- Bony operculum covers the gills (provides better protection against injury compared to gill slits for each gill)
- Lateral line used in sensory capacity and communication
- Swim bladder used for buoyancy control (some bottom dwelling fish lack swim bladder)
- Variable body plans are adapted for specific environments

Types of Marine Fish

Osteichthyes, The Bony Fish

- Coloration patterns:
- Slower swimming fish often have bars or stripes that help break up the silhouette of a fish (a form of disruptive coloration)
- This helps with predator avoidance
- Some also have coloration that helps them blend in with environment (known as cryptic coloration)

Atlantic bluefin tuna *Thunnus thynnus*

- Can grow >300 cm; 680 kg
- Extremely streamlined, one of the ocean's fastest swimmers, endothermic



Bluefin as food

- 2001 440 pound tuna sold for \$220,000 (\$500/pound)
- Farm in oceanic pens
- Spotter planes and electric harpoons



Bluefin tuna physiology

- Can have muscle temperatures approaching mammalian temperatures
- Muscle glycolytic and aerobic enzyme levels are among the highest on the planet
- Ram ventilation when swimming at high speeds







goosefish

- A type of angler fish
- · Sit and wait predator
- Very small gill surface area
- Very low aerobic muscle, mainly sprint muscle

- <u>http://www.youtube.com/watch?v=DZJFpq</u> <u>AILcU</u>
- <u>http://www.youtube.com/watch?v=KI9iEcZ</u>
 <u>-W0Y</u>





Swimming Patterns

- Fish exhibit an "s-shaped" swimming pattern
- Bands of muscle along the body called myomeres drive this swimming motion
- Depending on the type of fish, different fins may be used primarily for the forward movement





Swimming Patterns

- In sharks, a swim bladder is absent (although there is a large lipid-rich liver to help in buoyancy) – therefore, sharks tend to sink when not in motion and there is no lift from the swim bladder while swimming either
- While swimming, sharks are aided by the "lift" provided by the position and stiffness of the pectoral fins

Swimming Patterns

- In bony fish, pectoral fins are not needed for lift and thus are normally not stiff in construction (exception: fast swimming species like tuna, billfish, etc)
- In contrast, the pectoral fins in many bony fins are flexible and used for maneuverability
- In some slower-swimming species, forward movement is mainly provided primarily by the pectoral fins

Swimming Patterns

- In other species, all the fins may be flexible and highly modified for camouflage (example: sea horses and sea dragons)
- This means that the fins will not allow for significant forward movement