

Oceanic Nekton Part One: The Fishes

COVID VERSION

Nekton

- Nekton are organisms capable of sustained locomotion against the water motion. This group includes fish, mammals, reptiles and birds.
 - Holoeipelagic organisms spend their entire lives in the epipelagic
 - Meroepipelagic organisms spend only part of their lives in the epipelagic, usually spawning in coastal waters.

Adaptations: Buoyancy

- The upward force of a fluid is the buoyant force. The buoyant force on an object is equal to the weight of the fluid displaced by the object. This is called Archimedes Principle.
- The most significant adaptation of nektonic animals is that which keeps the animals suspended.
 - Most fishes have swim (gas) bladders, in which they can regulate the amount of gas to change their buoyancy

Adaptations: Locomotion

- The adaptations of nekton related to moving through the water fall into two categories:
 - creation of propulsive force
 - reduction of frictional resistance and drag.
- Fast swimming fishes typically have a fusiform body with lunate (deeply forked) tail and small caudal peduncle. The speed is generated by muscle contraction waves pass down the body.
- Slow swimming fishes typically have a deep and laterally compressed body with broad tail and large caudal peduncle.

Defense and Camouflage

- Camouflage is the most common defense mechanism in nekton. Cryptic coloration often involves a blending of colors to match the background of the organism. Countershading involves lighter colors on the ventral (bottom) side and darker colors on the dorsal (top) side.

Sensory Systems

- Most sensory information by nekton are similar to land animals. There are, however, some additional senses:
 - All fish have lateral lines, which are sensitive to pressure changes in the water.
 - Sharks and rays have the Ampullae of Lorenzini, which are sensitive to minute electric currents.

Reproductive Generalizations

- Most pelagic bony fish are broadcast spawners, producing immense numbers of eggs that float and are subject to huge losses. Sharks and rays have internal fertilization.

Trophic Structure of the Pelagic Zone

- In cold polar waters, the top carnivores are marine mammals.
- In warm tropical waters, the top carnivores are various fishes.
- In temperate waters, the top carnivores are sharks and marine birds and mammals.

Major Nekton Phyla

- Chordata (phylum)
 - Pisces (superclass)
 - Actinopterygii (class) – ray-finned fishes
 - Elasmobranchii (class) – sharks, rays & skates
 - Holocephali (class) - chimaeras
 - Sarcopterygii (class) – lobe-finned fishes

Fish Fins to Know

Dorsal Fin Pectoral Fin Pelvic Fin Anal Fin Caudal Fin

Marine Organisms of the Day

- 1. Manta Ray (*Manta birostris* and *Manta alfredi*):** There are two species of Manta Ray, the reef manta and the giant manta ray. Mantas, along with the nine species of devil ray, are the only rays that evolved to be filter feeders.
<http://www.bbc.com/earth/story/20150512-watch-these-giant-rays-fly> (3:12)
- 2. Sailfish (*Istiophorus platypterus*):** Sailfish can swim up to 68 miles per hour, which is one of the highest speeds recorded for an aquatic organism. They can change their color in order to confuse prey and signal other sailfish.
https://www.youtube.com/watch?v=spkjQ3c_AjU (2:35)
- 3. Leafy Seadragon aka Glauert's Seadragon (*Phycodurus eques*):** The Leafy Seadragon is a rare species found in the southwestern coastline of Australia. To buy one (*don't*) costs around \$10,000 to \$15,000. Unlike other seahorses, they cannot curl their tails and hold on to sea grasses to stay safe so they wash up on shore after big storms.
<https://www.youtube.com/watch?v=Dul4ncViU4Y> (5:25)
- 4. Flying Fish (Family Exocoetidae):** There are 64 species of flying fish in seven genera. They are notable due to their powerful leaps out of the water followed by long gliding flights, which means that they do not technically fly.
<https://www.youtube.com/watch?v=bk7McNUjWgw> (3:20)
- 5. Giant Oarfish aka Ribbonfish aka Streamer Fish (*Regalecus glesne*):** The Giant Oarfish is the longest teleost fish up to 36 feet. This fish has no swim bladder, no anal fin, no teeth, and no scales. It's internal organs are located towards the head, so it can survive losing large sections of its tail.
<https://www.youtube.com/watch?v=y5E9QkyB27k> (4:45)
- 6. (Anchor) Hammerhead Shark (Family Sphyrnidae):** The ten species of hammerhead shark are bottom-dwellers and their heads have lateral projections which gives them their signature flattened head shape. As of 2013, there have only been 33 attacks by hammerheads ever recorded, and never any casualties have occurred.
<https://www.youtube.com/watch?v=YCZwTJ-AFeA> (2:15)
- 7. Tiger Shark (*Galeocerdo cuvier*):** Tiger Sharks eat pretty much anything, and aren't likely to swim away after biting a human. They are known to eat sea turtles by cracking their shells open, as well as stingrays, sea snakes, and among other things, even license plates and tires.
<https://www.youtube.com/watch?v=QTKzqSIVizA> (1:45)
- 8. (Destiny, *Finding Dory*) Whale Shark (*Rhincodon typus*):** Whale sharks are not whales (mammals), they're fish. The average male whale shark is about 31 feet long and weighs about 20,000 pounds, with a mouth that can be about 5 feet wide. Whale sharks are filter feeders and they mainly eat plankton. They are live and migrate in tropical oceans and not usually found in water with a temperature lower than 72°F.
https://www.youtube.com/watch?v=a2uN0Z_U2Qg (3:53)
- 9. (Chum) Shortfin Mako Shark (*Isurus oxyrinchus*):** The Shortfin Mako is the fastest shark, reaching speeds of 43 mph. They achieve this with a fusiform body, hydrodynamic snout and powerful, crescent-shaped caudal tail.
<https://www.youtube.com/watch?v=v5fo19s4aAc> (2:17)
- 10. Hairy Frogfish (*Antennarius striatus*):** Frogfish are a type of anglerfish, using a modified dorsal fin as a lure to attract prey. They are ambush predators with an attack speed as fast as 6 milliseconds. They can't swim much and walk around on the seafloor.
<https://www.youtube.com/watch?v=bJ3FC3ISQvk> (2:48)

Finding Nemo Clips for This Exam