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Abiotic and biotic factors of Marine Ecology

Veerendra Singh*, D.K. Meena**, A.J. Bhatt***, A.K. Singh****

College of Fishery Science, Birsa Agricultural University, Gumla, Ranchi*

ICAR-Central Inland fisheries Research Institute, Barrackpore, Kolkata**

College of Fisheries Science, Kamdhenu University, Veraval, Gujarat***

College of Fishery Science, Birsa Agricultural University, Gumla, Ranchi****

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Marine ecology is the branch of ecology dealing with the interdependence of all organisms living in the ocean, in shallow coastal waters, and on the seashore. The marine environment for all organisms consists of non-living, abiotic factors and living, biotic factors.

Abiotic: The abiotic factors include all the physical, chemical and geological variables that have a bearing on the type of life that can exist in an area. Included are

- Water
- Light
- Temperature
- pH
- Salinity
- Substratum
- Nutrient supply
- Dissolved gases
- Pressure
- Tides
- Currents
- Waves
- exposure to air.

Biotic: The biotic factors are the interactions among living organisms. **Zonation** Two major divisions in the marine world.

- Pelagic zone...waters of the world and benthic zone..the ocean bottom.

The pelagic zone include the productive coastal waters..neritic zone and deep waters of the open oceanic zone. Another division in the pelagic zone is related to light penetration the photic and aphotic zones.

The **benthic zone** extends from the seashore to the deepest parts of the sea. The material that makes up the bottom is the substratum and the organisms living there are the benthos.

Tides uncover parts of this zone and the area uncovered is the intertidal zone, above is the supratidal zone, affected by salt spray but not covered by sea water and below the intertidal zone is the subtidal zone..submerged and extending seaward. The elevation and slope determines the length of time its exposed. This affects organisms living there because some are restricted to zones according to their adaptations to this type of zone (intertidal etc.).

Organisms living in pelagic waters also put up with changes in salinity, temperature etc. and inhabit the coastal areas etc. which fit their adaptations. (can withstand large changes (eury--prefix) and narrow tolerance (steno))

Other zones include the surface waters of the coastal areas called the neritic zone and the waters of the ocean called the epipelagic zone. The open ocean is less productive than the neritic zone which contains plant plankton, fish larva, invertebrate larva that will eventually end up near the coast.

The open ocean is divided into zones depending on the amount of light it receives...from the **epipelagic** layer to the **mesopelagic** zone 200-1000m in which daytime inhabitants migrate upwards during the night, bringing back nutrients and some exhibit bioluminescence (light producing organs called photophores). The deep sea layers **bathypelagic** 1000-4000m and the **abyssopelagic** zone (below 4000m) have limited food supplies although bacteria have been found that can make their own food.

TROPHIC (FEEDING) RELATIONSHIPS: Energy transfer is accomplished in a series of steps by groups of organisms known as autotrophs, heterotrophs, and decomposers. Each level on the pyramid represents a trophic level.

Autotrophs absorb sunlight energy and transfer inorganic mineral nutrients into organic molecules. The autotrophs of the marine environment include algae and flowering plants and in the deep sea are chemosynthetic bacteria that harness inorganic chemical energy to build organic

matter...AUTOTROPHIC NUTRITION..supply food molecules to organisms that can't absorb sunlight.

HETEROTROPHS: Consumers that must rely on primary producers as a source of energy...heterotrophic nutrition. The energy stored in the organic molecules is passed to consumers in a series of steps of eating and being eaten and is known as a food chain. Each step represents a trophic level and the complex food chains within a community interconnect and is known as a food web.

DECOMPOSERS: The final trophic level that connects consumer to producer is that of the decomposers. They live on dead plant and animal material and the waste products excreted by living things. The nutritional activity of these replenish nutrients that are essential ingredients for primary production. The dead and partially decayed plant and animal tissue and organic wastes from the food chain are **DETRITUS**. This contains an enormous amount of energy and nutrients. Many filter/deposit feeding animals use detritus as food. Saprophytes decompose detritus completing the cycle.