Semester -III

Paper -C6T

Aquatic Ecology

Symbiosis:

Symbiosis is any type of a close and long-term biological interaction between two biological organisms of different species, termed symbionts, be it mutualistic, commensalistic, or parasitic. In 1879, Heinrich Anton de Bary defined it as "the living together of unlike organisms". The term is sometimes used in the more restricted sense of a mutually beneficial interaction in which both symbionts contribute to each other's support.

Symbiosis can be obligatory, which means that one or more of the symbionts depend on each other for survival, or facultative (optional), when they can generally live independently**.**

Energy flow:

Energy flow is the flow of energy through living things within an ecosystem. All living organisms can be organized into producers and consumers, and those producers and consumers can further be organized into a food chain. Each of the levels within the food chain is a trophic level. In order to more efficiently show the quantity of organisms at each trophic level, these food chains are then organized into trophic pyramids. The arrows in the food chain show that the energy flow is unidirectional, with the head of an arrow indicating the direction of energy flow; energy is lost as heat at each step along the way.

Food chain:

A food chain explains which organism eats another organism in the environment. The food chain is a linear sequence of organisms where nutrients and energy is transferred from one organism to the other. This occurs when one organism consumes another organism. It begins with the producer organism, follows the chain and ends with the decomposer organism. After understanding the food chain, we realise how one organism is dependent upon another organism for survival.

Commensalism

Commensalism is a long-term biological interaction (symbiosis) in which members of one species gain benefits while those of the other species neither benefit nor are harmed. This is in contrast with mutualism, in which both organisms benefit from each other; amensalism, where one is harmed while the other is unaffected; and parasitism, where one is harmed and the other benefits.

The commensal (the species that benefits from the association) may obtain nutrients, shelter, support, or locomotion from the host species, which is substantially unaffected. The commensal relation is often between a larger host and a smaller commensal; the host organism is unmodified, whereas the commensal species may show great structural adaptation consistent with its habits, as in the remoras that ride attached to sharks and other fishes. Remoras feed on their hosts' fecal matter, while pilot fish feed on the leftovers of their hosts' meals. Numerous birds perch on bodies of large mammal herbivores or feed on the insects turned up by grazing mammals.

Parasitism:

Parasitism is generally defined as a relationship between the two living species in which one organism is benefitted at the expense of the other. The organism that is benefitted is called the parasite, while the one that is harmed is called the host.

A few examples of parasites are tapeworms, fleas, and barnacles. Tapeworms are flatworms that are found attached to the insides of the intestines of animals such as cows, pigs, etc.. They feed on the host’s partly digested food, depriving it of the nutrients.

Lagoon:

A lagoon is a shallow body of water separated from a larger body of water by a narrow landform, such as reefs, barrier islands, barrier peninsulas, or isthmuses. Lagoons are commonly divided into coastal lagoons (or barrier lagoons) and atoll lagoons. They have also been identified as occurring on mixed-sand and gravel coastlines. There is an overlap between bodies of water classified as coastal lagoons and bodies of water classified as estuaries. Lagoons are common coastal features around many parts of the world.

Estuary:

An estuary is a partially enclosed coastal body of brackish water with one or more rivers or streams flowing into it, and with a free connection to the open sea. Estuaries form a transition

zone between river environments and maritime environments and are an example of an ecotone. Estuaries are subject both to marine influences such as tides, waves, and the influx of saline water, and to fluvial influences such as flows of freshwater and sediment. The mixing of seawater and freshwater provides high levels of nutrients both in the water column and in sediment, making estuaries among the most productive natural habitats in the world.

Most existing estuaries formed during the Holocene epoch with the flooding of river-eroded or glacially scoured valleys when the sea level began to rise about 10,000–12,000 years ago. Estuaries are typically classified according to their geomorphological features or to water-circulation patterns. They can have many different names, such as bays, harbors, lagoons, inlets, or sounds, although some of these water bodies do not strictly meet the above definition of an estuary and could be fully saline.

Mangrove:

A mangrove is a shrub or tree that grows mainly in coastal saline or brackish water. Mangroves grow in an equatorial climate, typically along coastlines and tidal rivers. They have special adaptations to take in extra oxygen and to remove salt, which allow them to tolerate conditions that would kill most plants. The term is also used for tropical coastal vegetation consisting of such species. Mangroves are taxonomically diverse, as a result of convergent evolution in several plant families. They occur worldwide in the tropics and subtropics and even some temperate coastal areas, mainly between latitudes 30° N and 30° S, with the greatest mangrove area within 5° of the equator. Mangrove plant families first appeared during the Late Cretaceous to Paleocene epochs, and became widely distributed in part due to the movement of tectonic plates. The oldest known fossils of mangrove palm date to 75 million years ago.

Coral reef:

A coral reef is an underwater ecosystem characterized by reef-building corals. Reefs are formed of colonies of coral polyps held together by calcium carbonate. Most coral reefs are built from stony corals, whose polyps cluster in groups. Coral belongs to the class Anthozoa in the animal phylum Cnidaria, which includes sea anemones and jellyfish. Unlike sea anemones, corals secrete hard carbonate exoskeletons that support and protect the coral. Most reefs grow best in warm, shallow, clear, sunny and agitated water. Coral reefs first appeared 485 million years ago, at the dawn of the Early Ordovician, displacing the microbial and sponge reefs of the Cambrian.

Floodplain:

A floodplain or flood plain or bottomlands is an area of land adjacent to a river. Floodplains stretch from the banks of a river channel to the base of the enclosing valley, and experience flooding during periods of high discharge. The soils usually consist of clays, silts, sands, and gravels deposited during floods.

Because of regular flooding, floodplains frequently have high soil-fertility since nutrients are deposited with the flood waters. This can encourage farming; Some important agricultural regions, such as the Mississippi River basin and the Nile River basin, heavily exploit floodplains. Agricultural regions, as well as urban areas, have developed near or on floodplains to take advantage of the rich soil and freshwater. However, the risk of inundation has led to increasing efforts to control flooding.

Coastal Wetlands:

The term coastal wetlands defines an area of land that is permanently or seasonally inundated with fresh, brackish, or saline water and contains a range of plant species that are uniquely adapted to the degree of inundation, the type of water that is present, as well as the soil conditions. In some cases, coastal wetlands can extend across extremely large areas, as is the case for southern Louisiana along the north-central Gulf of Mexico. The importance of coastal wetlands is well known in southern Louisiana because there, like many other places, the coastal wetlands provide important habitat for a wide range of organisms.

Oxbow lake:

Oxbow lake is a small lake located in an abandoned meander loop of a river channel. They are U-shaped or curved bends in a river that are cut off from the main river flow, forming a lake. Every river contains twists and turns or meanders, that cut through the surrounding landscape in a unique way. Due to continuous erosion and deposition along the sides of the meanders, the end of the meander loop comes closer and closer. In due course of time, the meander loops cut off from the river forming a lake called oxbow lake.