Coral Reefs

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- Coral reefs are made of calcium carbonate, or limestone, that is deposited by coral polyps, the living animals inside of a coral reef. Although many corals look like plants, they are in fact animals belonging to phylum Cnidaria .Corals that build reefs are called ***hermatypic*** corals, while those that do not build reefs are called ***ahermatypic*** corals. Examples of ahermatypic corals are soft corals, black corals, gorgonians, precious corals.
- Most hermatypic corals have ***zooxanthellae algae*** living symbiotically inside of the coral polyps. Most ahermatypic corals do not have algae. Zooxanthellae are unicellular, yellow-brown (dinoflagellate) algae which live **symbiotically** in the gastro dermis of reef-building corals.
- The zooxanthellae provide a large input of nutrients that make it possible for the corals to grow and reproduce quickly enough to create reefs. Zooxanthellae provide the corals with food in the form of photosynthetic products.
- In turn, the coral provides protection and access to light for the zooxanthellae. Coral polyps can also obtain nutrition through eating. Coral polyps have long coiled tubes attached to the walls of their gut which can be extruded to grab and absorb food.

Conditions Required for coral formation

- Although corals are found throughout the oceans of the world in polar and temperate waters, as well as in the tropics, it is only in the tropics that reefs are developed (i.e., hermatypic corals are only found in the tropics).
- Coral reefs grow best in clear, shallow waters that remain above 18°C. Reefs are, therefore, only built in shallow tropical waters. Reef building is favored by clear water, and can be adversely affected by sedimentation.
- Corals have a ciliary-mucus mechanism which traps sediment and removes it, but that mechanism can be overwhelmed resulting in smothering of the coral.
- In general, coral reef development is greater in areas that are subject to strong wave action which provides a constant source of fresh, oxygenated water and prevents sediment from settling on the colony.

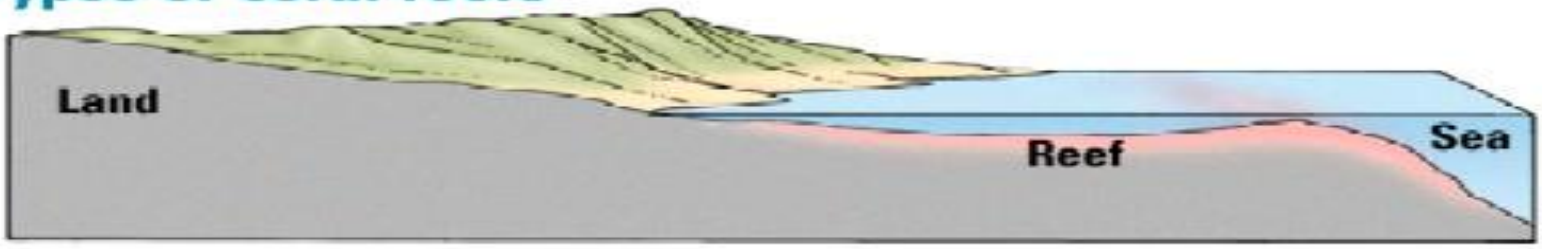
Factors which arrest corals formation

- *Temperature* : are only found in waters bounded by the 20°C isotherm, and cannot develop below 18°C or above 30°C.
- *Depth* : cannot develop in water deeper than 50-70 m, and usually grow in 25 m or less; this is why reefs are restricted to the margin of the continents or islands; due to light restrictions, as sufficient light must be available to the symbiotic zooxanthellae in the coral tissue for photosynthesis.
- *Salinity* : are intolerant of salinities deviating from that of normal seawater (32-35 ppt); thus are not found where inshore waters are subject to continuing influxes of freshwater from river discharge.
- *Exposure to air* : can secrete mucus to prevent desiccation, but are killed by long exposure to air.

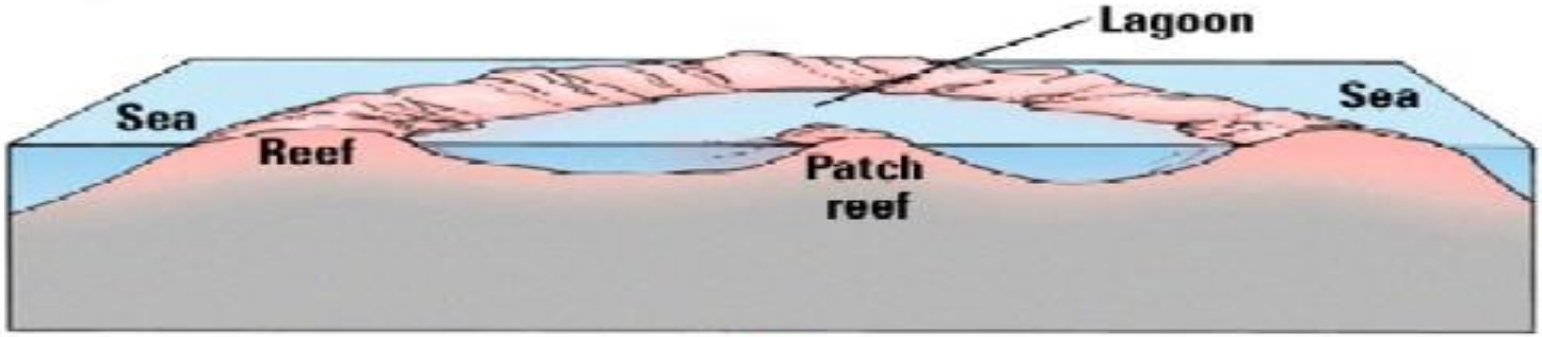
TYPES OF REEFS

- **Fringing Reef – A fringing reef is either attached to, or closely borders, adjacent land. There is no lagoon between the reef and the land. It typically has a flat upper surface, up to 1 km wide, and plunges steeply into deeper water at its seaward edge.**
- **Barrier Reef – A barrier reef is separated from the land by a lagoon that may be of considerable length and width.**
- **Atolls- Atolls are roughly circular reefs enclosing a shallow lagoon. Some atolls have a central island. Atolls are formed as fringing reefs around a central island. As the island is eroded, the reef becomes a barrier reef, and the central lagoon gets broader, until the island is eroded to sea level, forming the atoll.**

Types of coral reefs



Fringing reef



Atoll

Barrier reef

Threats to coral Reefs

- **Coral reefs are ecologically important ecosystems that have a high biodiversity. Coral Reefs are home to over 25 percent of all marine life and are among the world's most fragile and endangered ecosystems. In the last few decades, over 35 million acres of Coral Reefs have been obliterated. Reefs off of 93 countries have been damaged.**
- **Disturbances affecting coral reefs include human caused and natural events. Recent accelerated coral reef decline seems to be related mostly to human impacts – overexploitation, overfishing, increased sedimentation, and nutrient overloading. Natural disturbances which cause damage to coral reefs include violent storms, flooding, high and low temperatures. When corals are stressed by high temperature, ultraviolet light, or other environmental changes, they lose their symbiotic algal cells and appear white**


THANK YOU