A PROJECT ON CORAL REEF

(Submitted for partial fulfilment of Bsc. 1st sem Zoology Honours curriculum of D.U)

To,

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CERTIFICATE

This is to certify that the project report entitled 'Coral Reef' submitted for Bachelor of Science, degree course in Zoology to fulfill the curriculum under Dibrugarh University by Limaroshmi Mech, Roll No: 34 under my supervission and guidance. I found her sincerity during the entire period of her experiment. I wish her bright feture.

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Hinaroshmi Mech

CONTENT

INTRODUCTION

Coral reef are living, colourful, multifaceted underwater ecosystems, a home to a diversity of fish, invertebrates, algaes and more. They are underwater communities that never rest. Coral reefs first appeared over four hundred million years ago.

Coral reefs are an underwater marine ecosystems that are colonies of living animals. These colonies are group of individual animals called polyps. The polyps actually secrete a substance that is called calcium carbonate that forms the reef structure upon which they live. Most coral reefs are built from stony corals, whose polyps cluster in groups.

AIM AND OBJECTIVE

Aim : To study about coral and coral reefs. (Structure, Habitat, Types, Their formation, Reproduction, Importance, Damage caused by humans).

Objective : To conserve coral and coral reefs by avoiding the damage caused by humans.

METHOD AND MATERIALS

The study's methods are one of the most important parts used to Judge the overall quality of the paper.

In addition the methods section should give readers enough information so that they can repeat the experiments. I have fallowed direction from books and other research study, site and reference.

Materials I used in making this project are my laptop, some books and articles, wikipedia.

OBSERVATION

Coral reefs are the colonies of tiny living creatures that are found in oceans. They are the underwater structures that are formed of coral polyps that are held together by calcium carbonate. Coral reefs are also regarded as the tropical rainforest of the sea and accupy just 0.1% of the ocean's surface but are home to 25% of marine species.

Coral polyps are the individual corals that are found on the calcium carbonate exoskeletons of their ancestors. Corals can be found in all the oceans but the biggest coral reefs are mostly found in the

clear, shallow waters of the tropics and subtropics. The largest of these coral reef systems, the Great Barrier Reef in Australia, the largest coral reef is more than 1,500 miles long.

Structure : Coral is secreted by some coral forming actinzoa. The skeleton of solitary polyp is known as the Corallite and many corallites combine to form the skeletal mass. The skeleton as a whole is known as the corallum. The structure of a corallum will be clear from the detailed structural organism of a single corallite.

Each corallite consists of a cup containing vertical ridges radiating from the centre to the periphery. The bottom of the cup beneath the polyp is designated as the basal plate. The wall cup enclosing the aboral portion of the polyp is termed as the theca. The ridges of the cup are called the skeletal septa or sclerosepta. The sclerosepta are usually spiny.

Habitat: Coral reefs provide habitat for a large variety of marine life, including various sponges, oysters, clams, crabs, sea stars, sea urchins and many species of fish. Coral reefs are also linked ecologically to nearby seagrass, mangrove, mudflat communities. Coral reefs are underwater structures built by tiny sea animals. Their beautiful shapes and colors are a magnet for divers.

Types of Corals: There are two main types of coral — 1. Hard Corals 2. Soft Corals.

1. Hard Corals: Hard corals create skeletons out of calcium carbonate, a hard substance that eventually becomes rock. Hard corals, like elkhorn coral and staghorn coral, grow in colonies and are often referred to as "reef-building corals." The rock builds up to form the foundation of a coral reef and provides a structure upon which baby corals can

settle. Hard corals depend upon tiny algae called zooxanthellae that live inside them. Together, they share a symbiotic relationship, the corals provide the zooxanthellae with shelter, and in return, the zooxanthellae provide the corals with food.

2. Soft corals: Soft corals do not have stony skeletons and are non-reef-building corals instead. They grow wood like cores and fleshy rinds for protection. Soft corals, like sea fingers and sea whips, are soft and bendable and often

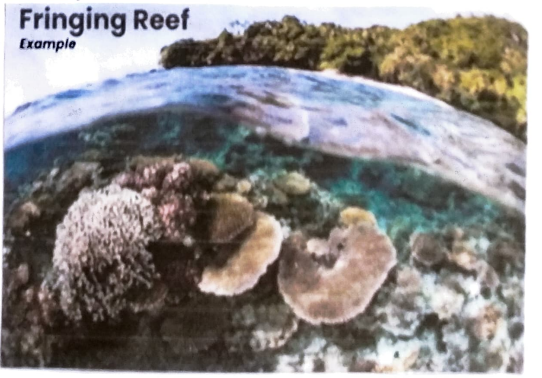
resemble plants or trees. Like hard corals, they tend to live in colonies.

Coral reefs also scientificly divide into three classes : 1. Barrier reef
2. Atolls
3. Fringing reef

1. Barrier reef : Barrier reefs are extensive linear reef complexes that parallel a shore and are separated from it by lagoon. At their shallowest point, they can reach the water's surface forming a "barrier" to navigation. The Belize Barrier reef, the second largest in the world behind Australia's Great Barrier reef and has made Belize a premiere diving and conservation hotspot.

2. Atolls: Atolls are rings of coral that create protected lagoons and are usually located in the middle of the sea. Atolls usually form when islands surrounded by fringing reefs sink into the sea or the sea level rises around them. The fringing reefs continue to grow and eventually form circles with lagoons inside.

3. Fringing reef: Fringing reefs grow near the coastline around islands and continents. Since the grow from the shore that are sometimes referred to as shore reefs. They



are separated from the shore by narrow, shallow lagoons. Fringing reefs are the most common type of reef.

Formation: Many theories have been put forward to explain the formation of coral reefs. Among them two theories are more important.

1. Darwin's Subsidence Theory: According to this theory, reefs start as fringing reefs on the sloping shore of an island. These fringing reefs by the subsidence of the reef flat into lagoon become barrier reefs. Gradually the island is sunk and ultimately vanished and thus barrier reefs become atolls with a central lagoon. The theory is supported by Dana and Davis.

2. Daly's Glacial-Control Theory: In the last glacial period, the formation of ice caps lowered the level of water in the ocean. At that time extreme cold temperatures prevailed. Subsequently, the ice melted and the temperature rose, which is

suitable for the development of reefs. Thus Barrier reefs and Atolls are formed

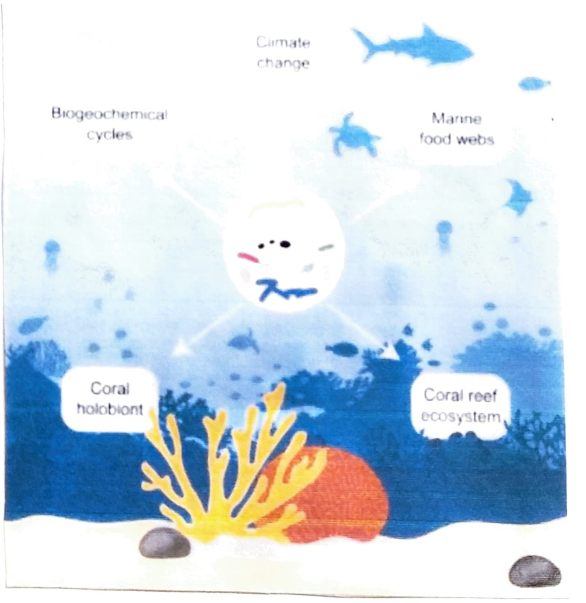
Importance:

1. An important source of Food resource: Reef animals are an important source of protein. Coral reefs provide about 10% of the fish caught worldwide.

2. Important for carbon sequestration: Coral reef are important reservoir of carbon and help sequester ocean carbon, thus are an important part of the carbon cycle.

3. Importance for Medicine: Coral organisms are used in the search for treatments for certain cancers or the aging of cells. The coral's skeleton, for bone grafts is a promising lead for bone regeneration.

4. Economic importance : As per an estimate, the total annual net benefit of world's coral reefs is rupees 29.8 billion. Reefs are the backbone of tropical region's economies, through reef related tourism and marine exports.

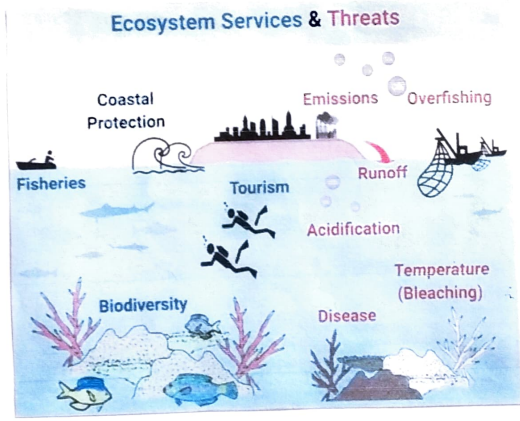


<u>Reproduction</u>: Corals can reproduce either asexually or sexually. In fact, most reef-building corals use both reproduction strategies.

Corals reproduce asexually by either budding or fragmentation. Through budding, new polyps "bud" off from parent polyps to form new colonies after the parent polyp reaches a certain size and divides. This produces polyps that are genetically identical to the parent and continues throughout the coral's life. In fragmentation, an entire colony branches off to form a new colony. This may happen, for example, if a larger colony is broken off from the main colony. However, the fragmented colony needs optimal conditions to settle on a substrate and grow.

In terms of sexual reproduction, coral larvae are either fertilized within the body of a polyp or in the water, through a process called spawning. In some areas, mass coral spawning events occur one specific night per year, determined by environmental cues, such as temperature, day length and lunar cycles. The corals have to coordinate both within its species and amongst other species so that hybridization is limited. This broadcast spawning is an adaptation to the coral's sedentary lifestyle since corals cannot move to make contact with one another and may separated by large distance.

Ecology of coral reefs : Coral ecology is the study of relationships between living organisms found on coral reefs and their interactions with the natural and human environment. All kinds of sea creatures, corals and other invertebrates, fish, algae and ~~sa~~ sea grasses are all integrally linked together and dependent on the hard structure built by corals and coralline algae.



To understand coral reef ecology, we collect a variety of physical, ~~ent~~ environmental and biological information such as:

- The reef structure, types of reefs, different environments or zones within the reef, and factors controlling the development of these aquatic ecosystems.
- The marine biology and life history of coral reef species.
- Patterns of movement of coral reef species within and between reefs and connectivity of these species with other ecosystems and habitats.
- The importance of coral reef to ocean health, the earth and to man, and interactions between humans and reefs.

Coral reef damage by humans : Human - caused

Pollution, overfishing, destructive fishing practices using dynamite or cyanide, collecting live corals for the aquarium market, mining coral for building materials and a warming climate are some of the many ways that people damage reefs all around the world every day.

One of the most significant threats to reefs is pollution. Land - based runoff and pollutant discharge can result from dredging, coastal development, agricultural and deforestation activities and sewage treatment plant operation.

When some pollutants enters the water, nutrient levels can increase, promoting the rapid growth of algae and other organisms that can smother corals.

Coral reefs also are affected by leaking fuels, antifouling paints and coatings and other chemicals that enter the water. Petroleum spills do not ~~at~~ always appear to affect corals directly because the oil usually stays near the surface of the water and much of it evaporates into the atmosphere within days. However, oil spill occurs while corals are spawning, the eggs and sperm can be damaged as they float near the surface before the fertilize and settle.

DISCUSSION

Coral reefs are some of the most diverse and valuable ecosystems on Earth. Coral reefs support more species per unit area than any other marine environment, including four hundred species of fish, eight hundred species of hard corals and hundreds of other species. Thousands of species can be found living on one reef. Corals provide a crucial source of income for millions of people. People depend on reefs for food and protection.

CONCLUSION

Coral reefs live in very precise, fragile and balanced marine environments, even the slightest change can have a huge impact on an entire coral system. Coral reefs require light, oxygen, clear water, special nutrients, stable temperatures and salt content. With all of these specific conditions, we can clearly see that human actions can pose grave threats to coral reefs. Coral reefs are able to endure natural stresses by adjusting, however the present human pressures are destroying the reefs such that they cannot recover.

REFERENCE

- Notes
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- www.nhm.ac.uk
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