

The Rich Biodiversity of the Red Sea Coastal Cities of Western Saudi Arabia: A Journey through its Flora and Fauna

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Abstract: *The Red Sea coastal cities boasts an incredible array of diverse flora and fauna, making it a paradise for nature lovers and wildlife enthusiasts alike. For scientists and researchers who are researching the ecological and evolutionary processes that form the diversity of life in the sea, the Red Sea's richness serves as a significant source of inspiration. Red Sea's biodiversity should be conserved and preserved for future generations as a precious resource, benefiting the people who depend on it, but also contributing to the health of the world's seas and the survival of numerous plant and animal species. Saudi Arabia has a surprising diversity of Flora and Fauna, with almost 499 species recorded and 107 reptiles, 266 corals, 117 mammals, 1230 fish, eight amphibians, and more than 2400 plants. The Red Sea coastal cities of Saudi Arabia are home to a diverse range of marine plants, fish species, dugongs and Sea turtles that play an essential role in keeping the Red Sea healthy and full of life.*

Keywords: Biodiversity, marine technology, Red sea, costal city, flora, fauna, microbial diversity, Jeddah, Rabigh, Rayis, Umluj, Yanbu [Capital of diving].

1. Introduction

In Saudi Arabia flora components are important for numerous ecosystems and also, they play important role in maintaining environmental stability and balance. Consequently fauna of Saudi Arabia happens to be a continuous series on terrestrial as well as marine zoology of Arabian Peninsula. The history of examining the red Sea marine Flora started as early as the 18th century though the picture is not complete. Still, the regional list has been elaborated. Among all areas of the Arabian Peninsula, Saudi Arabia is termed the most diverse in terms of biodiversity and habitats. The environmental uniqueness of the red sea serves both ecological and scientific importance.

On the other hand, red sea is not left behind as the virtual repository of marine biodiversity in the entire world. Its isolation allowed it to have a unique ecosystem, particularly with reef fish and other reef - associated organisms. Many scholars have published reports concerning Flora and Fauna within Saudi Arabia, showing what people may need to know about the area's biodiversity. However, in Saudi Arabia, I find coastal cities of Jeddah, Rabigh, Rayis, Umluj, and Yanbu more intriguing. A little bit about these alluring cities which I have visited since I was young. From the towering palm trees that line the city's streets to the colorful coral reefs that teem with marine life, Yanbu's [Pearl of Red Sea] coastal ecosystem is a breathtaking tapestry of natural beauty. From migratory birds to sea turtles, the Red Sea coastal city of Jeddah [Bride of the Red Sea] is home to a wide range of fascinating and exotic fauna. Whether you're a seasoned nature enthusiast or a curious first - time visitor, the city of Umluj [Maldives of Saudi Arabia] is sure to offer a memorable and enriching experience. As I frequently visited the place with my parents, the rich biodiversity in the area caught my attention. I became more interested and started to observe life forms and vegetation.

Various environments can be found around the Red Sea. Numerous marine species rely on these ecosystems as crucial breeding and feeding grounds, and they also aid in coast protection. For scientists and researchers who are researching the ecological and evolutionary processes that form the diversity of life in the sea, the Red Sea's richness serves as a significant source of inspiration.

Overall, the Red Sea's biodiversity should be conserved and preserved for future generations as a precious resource. Not only will the Red Sea's biodiversity benefit the people who depend on it, but it will also contribute to the health of the world's seas and the survival of numerous plant and animal species.

2. Literature Review

There is a surprising diversity of Flora and Fauna in Saudi Arabia. There are almost 499 species that have been recorded and 107, reptiles, 266 corals, 117 mammals, 1230 fish, eight amphibians, and more than 2400 plants.^[1] Studies show that Saudi Arabia's biodiversity includes some fascinating animals on earth like Arabian Babbler, living birds that occur in groups and portray social behavior, and some groups of Chimpanzees. Reports show that many scholars concentrate more on earth animals and plants, yet little has been done towards Flora and Fauna along with Yanbu's Red Sea coastal city.^[2] Therefore this gives us a chance to explore and find out what species of Flora and fauna are found along the Red sea coastal of Yanbu, Saudi Arabia.

Flora

The Red Sea has always been essential to Saudi Arabia's coastal inhabitants' way of life. And it's simple to understand why: Due to its unusual warmth, salinity, and protection from external aquatic impact, it has become a rare haven for brilliant reefs brimming with species. It's no surprise that the

old maritime trade route known as the Mare Mecca (Sea of Mecca) has become a sought - after location for fishermen, divers, and marine aficionados all over the world.

The Red Sea is home to a diverse range of marine plants, including seagrasses, algae, and mangroves. Some of the common marine plants found in the Red Sea include:

Zostera marina: This seagrass is found in shallow, sheltered waters throughout the Red Sea. It is an important food source for many marine animals, including fish, crabs, and sea turtles.^[3]

Halophila ovalis: This seagrass is found in shallow, coastal waters throughout the Red Sea. It is an important food source for many marine animals, including fish and crustaceans.^[4]

Caulerpa lentillifera: This alga is found in shallow, coastal waters throughout the Red Sea. It is often used in aquariums and is known for its bright, colorful appearance.^[5]

Sargassum horneri: This alga is found in the open ocean throughout the Red Sea. It is an important food source for many marine animals, including fish and turtles.^[6]

Avicennia marina: This mangrove is found in the coastal areas of the Red Sea. It provides habitat for a variety of marine animals, including fish, crabs, and shrimp.^[7]

Fauna

Fish Species –There are over 1230 species, 10% of which exist nowhere else in the world present in the Red Sea. This is by far one of the Red Sea's exclusive attractions with a myriad of thriving colorful fish. The abundance of coral reefs allows for juvenile fish to grow and thrive into adulthood.^[8]

Dugong - Estimates put the total Dugong population at 4, 000 in the whole of the Red Sea, with only 7 documented along the southern Red Sea coastline. The Red Sea is believed to host the world's third largest population of Dugongs, after Australia and the Arabian Gulf.^[9]

Turtles - Four species of turtles can be found in the Red Sea: *Chelonia mydas*, *Eretmochelys imbricata*, turtles that nest and feed on the coast; *Dermochelys coriacea*, called the gentle giant and the *Lepidochelys olivacea*, the smallest of the turtle species and which prefers to stay far from the coast. A fifth species *Caretta*, is known for its big head. At present, the International Union for nature conservation lists them as critically endangered.^[10]

Sea turtle: Sea turtles play an essential role in keeping the Red Sea healthy and full of life. Green turtles, also known as “sea cows”, maintain healthy seagrass beds which host spawning fish, their juveniles and a great number of other invertebrates like mollusks and crustaceans that are at the bottom of the food chain. Hawksbill turtles feed on corals and sponges and they help keeping a balance between these two populations. This balance has proven to be critical for healthy coral reefs. So sea turtle conservation is not just about turtles, but also about protecting all the habitats they

use and that human beings enjoy as well, like the coral reefs. A healthy sea turtle population depends on us and how we use the resources we share with these animals.^[11]

Factors that contribute to the unique Flora and fauna and analysis of the impact of human activities

Regarding the elements influencing the distinctive flora of the Red Sea, it is home to a wide variety of marine life because of its position and geographical characteristics. The Red Sea, one of the saltiest bodies of water in the world with a salinity level of about 35%,^[8] is surrounded on both sides by deserts. It is thought that one of the causes of the emergence of unusual marine organisms that are adapted to this environment is the high salt level.

The seclusion of the Red Sea from other bodies of water has also aided in the growth of its distinctive vegetation. Since there is no outflow to the ocean from the Red Sea, it is a closed basin. Due to this seclusion, endemic species—species that can only be found in the Red Sea and nowhere else on Earth—have developed.

Overfishing, pollution, and habitat degradation are three human - caused actions that have the greatest negative effects on the marine life of the Red Sea. Fish stock depletion brought on by overfishing may have a domino impact on the marine ecosystem as a whole. Oil spills and chemical runoff are two examples of pollution that can harm or kill marine flora and animals. Pollution can also make the water too poisonous for other marine life to thrive. The Red Sea's marine plants can also be significantly impacted by habitat loss, such as the destruction of coral reefs, which are a vital habitat for many marine organisms.

Ecological Significance

Many threatened and endangered species inhabit the area, and have established breeding grounds across it – highlighting the importance of environmental protection and regeneration efforts in the region. There is clear evidence that the Red Sea area includes important nursery habitats for the species. Although smaller in area than The Red Sea, habitats still contain many impressive reefs, with coral cover averaging 21.5 percent and highest cover at any site being 57.2 percent.^[12]

The Red Sea has been an important area for the development of marine technology due to its unique characteristics and biodiversity. The Red Sea is known for its biodiversity and is well - studied in terms of its marine - derived bioactive metabolites^[14]. It has been recognized that securing the Red Sea ecosystems' future must occur in synergy with continued social and economic growth, and an action plan has been developed for the conservation, restoration, and growth of marine environments of the Red Sea^[13]. The Red Sea has also been recognized as a rich source of microbial diversity with unique metabolites that can be of pharmaceutical and medicinal importance^[17]. Furthermore, the Red Sea has been explored for its potential in bioremediation technology for the control of marine pollution^[16]. The development of water tourism in the Red Sea has also been explored as an important possibility for the area^[15]. The Red Sea has also been studied for its potential in the extraction of marine resources and minerals

from the seabed, as well as for technological solutions aimed at ensuring the implementation of the concept of sustainable development in the course of economic activities at sea^[18]. Overall, the Red Sea's unique characteristics and biodiversity have made it an important area for the development of marine technology.

3. Conclusion

The Red Sea has been an important area for the development of marine technology due to its unique characteristics and biodiversity. It is known for its biodiversity and is well-studied in terms of its marine-derived bioactive metabolites. It has also been recognized as a rich source of microbial diversity with unique metabolites that can be of pharmaceutical and medicinal importance. It has also been explored for its potential in bioremediation technology for the control of marine pollution, the development of water tourism in the area, and the extraction of marine resources and minerals from the seabed. Overall, the Red Sea's unique characteristics and biodiversity have made it an important area.

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