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Current status of coral research in Pakistan

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Abstract

Coral reef ecosystems are found in the tropical Oceans around the world. The ecosystem of the corals reefs known as house of the Animals of invertebrate and vertebrates. Coral reef in Pakistan is mainly distributed in southeastern part of the Arabian Sea. Ecosystem, conservation, diversity and management of the coral reef are attractive and hot research areas. Coral reef biodiversity of the Pakistan coast is reducing, mostly due to anthropogenic activity and also due to natural disasters. The aim of the present research was to summarize the progress of coral research in Pakistan which is discussed and suggestions are given for further research in this region.

Keywords: Coral reef, diversity, conservation, Pakistan

1. Introduction

Coral reef is the combination of the many billions of connected polyps of calcium carbonate cups^[1]. Coral reef buildup by deposition of shells, bones and calcium carbonate^[2]. Polyps are the building blocks of corals as polyps are those tiny individuals which form corals. The appearance of polyp is like a bag or a sac filled with fluid having a ring of tentacles around its mouth and it resembles a tiny anemone. Inside the colony, polyps are connected with each other by living tissues and also the polyps can share their food with the help of these connecting living tissues. Sea is the sources for the extraction of calcium carbonates form where the polyps extract CaCO₃ and discharge it as a form of bottom half of the body like a mug. These cups offer waterfront to the polyps. Whenever polyps feel threat they can hideaway themselves into the safety of the hard cup^[3]. Coral reefs of the world cover a total area of 600000 km²^[4,5]. There are four main biogeographic regions of the tropical oceans; the Indo-West Pacific, Western Atlantic, Eastern Pacific and the Eastern Atlantic. The Indo-West Pacific and WA have only one hermatypic coral species in common^[6]. The Western Atlantic has the second uppermost reef community species diversity of the biogeographic regions, there are ten times more scleractinian coral species, order Scleractinia, which includes almost the entire reef building coral species, in the Indo-West Pacific compared to the Western Atlantic. The Indo-West Pacific reefs soft corals are abundant and diverse, whereas Caribbean reefs have more gorgonians and sponges than the other regions^[7]. The Indian Ocean coral reefs are found in East Africa, the Red Sea and throughout the Indo-Pacific area as far east as Hawaii^[8]. The first records of living corals are reported from at the eastern part of Karachi in the Gulf of Kutch (Port Okha, Pirotan Island), Sindh^[9]. According to^[10] the divers observed in large amounts of living corals between the Churna Island (at the coast of Balochistan) and Cape Monze Island. (25 km. east of Karachi city, Sindh coast). Up to 1988, coral reefs were considered absent in Pakistan and the coastal environment of Pakistan was considered not favorable for the growth and formation of coral reefs^[11, 12]. The aim of the present research is to summarize the progress of coral research in Pakistan is discussed here and suggestions are provided for further research in this region.

2. Pioneer Taxonomic Study on Corals in Pakistan

The Department of Zoology, University of Karachi is the first Educational Institute in Pakistan where the work on the taxonomy of corals began on 17 July 2005 under the supervision of Associate Professor of Zoology and formerly Taxonomist in the department Dr, Rukhsana Perveen. The collection of the corals of Arabian Sea, Persian Gulf, Indian Corals, originally collected by James A Murray, was present in Zoological Museum and Geological Museum of the University of Karachi. This collection was unidentified since 1952.

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Raza pioneering worker on the taxonomy of corals in Pakistan, identified the corals collected by James A Murray and placed them in 3 families of scleractinians from the coast of Pakistan. He described 37 mainly genera and 54 species ^[13].

2.1 Research Progress on Corals

Coral reefs are one of the most biologically diverse ecosystems on earth and can provide several ecosystem services important for human welfare (i.e. fisheries, tourism aesthetic and culture values ^[14]. 29 species of soft and hard corals reported from the north-eastern Pakistan ^[15]. The Centre Excellence in Marine Biology, University of Karachi conducted a surveyed and 14 species of fossilized corals were identified belonging to 2 families and 8 genera from Jiwani, Balochistan, Pakistan ^[16]. Pakistan Wetlands Programme (PWP) conducted a survey of the Baluchistan coast; lead University of London, Millport Laboratory, UK, in 2006 identified the first ever coral reef ecosystem near Astola Island. Before this discovery, it was blindly believed that coral reefs do not exist in Pakistan's jurisdiction of the Arabian Sea. Encouraged by this breakthrough and on the basis of information collected about coral reef associated fish species from the fishing areas near Gwadar, an expedition team encompassing divers from PWP and Pakistan Navy conducted a survey of the possible coral sites in February, 2011 and discovered large area of deep sea corals near Gwadar, 17 species of hard and soft corals and about 25 species of coral associated fish species have been recorded in the investigated coral reef ecosystem ^[17]. A new record of Scleractinian coral species *Galaxea fascicularis* (Linnaeus, 1767) belonging to the Family Oculinidae (Gray, 1847) has been reported from Paradise Point on the Arabian Sea, a beach located at 31 km west of Karachi city, Sindh, Pakistan ^[18].

2.2 Causes for Degradation of Coral Reef ecosystems in Pakistan

Corals reefs can provide several ecosystem services important for human welfare (see above). The causes for degeneration of coral reefs in Pakistan are summarized as follows: Most of the *Acropora* corals in Pakistan Sea suffer greatly from human destruction and activity as different species are harvested from Baluchistan coast and being sold at Karachi coast, particularly at Clifton site. Many are utilized in making coral jewelry and are marketed at several jewelry shops. Besides these *Acropora* collected from the Baluchistan Coast are also used in several Greek or ayurvedic medicines that are sold in local markets. Unabated harvesting of these coral species has resulted in the decline of species richness, population size and distribution of reef-living associated animal species.

3. Recommendations

It is necessary to strengthen the environmental education to citizens. It is necessary to raise public awareness of environmental protection of coral reef ecosystems, and to strengthen community involvement. The environmental protection departments should implement stricter standards for emission of industrial wastewater and pollutants, build-up monitoring and management of pollutants, and control the transport of a variety of sediments. Local governments should also strictly control the exploitation of coral reef-related resources.

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