

## **Research Article**

### **Observations on Coral Diseases in Marine National Park, Gulf of Kachchh**

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**Abstract:** During the study period preliminary survey on coral diseases was conducted at 11 reef sites in Marine National Park, Gulf of Kachchh. The Line Intercept Transect (LIT) method was employed to quantify the occurrence of coral diseases. The surveyed reefs showed 5 categories of diseases, i.e., White Plague (WP); Pink Spot (PS); Ulcerative White Spots (UWS); Yellow Spot (YS) and Black Band (BB). The highest incidence of infected corals was recorded in Narara reef as compared to other reefs. The White Plague (WP) was the most prevalent syndrome occurred; whereas the other categories were less prevalent in the Marine National Park, Gulf of Kachchh.

**Keywords:** coral disease, Marine National Park, Gulf of Kachchh

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#### **INTRODUCTION**

Coral reef ecosystems around the world are increasingly at risk from numerous anthropogenic stresses and natural factors [1-5]. Among these factors, coral disease outbreaks are having a significant negative impact on the structure and appearance of coral reefs and have contributed to unprecedented declines in live coral cover and productivity of coral reef ecosystems upon which many people depend [6-8]. Infectious diseases in coral, observed in the field as lesions or distinct bands of tissue loss, can be caused by bacteria, viruses, protozoa or fungi. Coral diseases have been widely reported from coral reefs around the world within the last 30 years [9-13]. In areas such as the Caribbean, where coral disease outbreaks were noted as early as 1980, important coral genera such as *Acropora* suffered significant damage, particularly from White Band Disease [14]. Damage to these major reef building corals has the potential to change an ecosystem from one dominated by corals to one dominated by macro algae [14, 15, 11, 16, 13]. Both white band disease and black band disease have been reported in the Caribbean, and the Indo – Pacific [9, 10, 17].

The first study of coral diseases in the Andaman Sea was published in 2008. Three categories of diseases were identified, namely: White Syndrome, Pink Line Syndrome and Black Band Diseases [18]. Quantitative study of coral diseases were conducted in

Mandapam group of islands, Gulf of Mannar [19]. There has been no basic information about the prevalence of the coral diseases in the Gulf of Kachchh. This preliminary study focuses on the occurrence of coral disease in the major reef building coral in the study sites of Gulf of Kachchh.

#### **MATERIALS AND METHODS**

Surveys were conducted during 2012 to 2013. Eleven offshore locations were selected by Marine National Park, Gulf of Kachchh for monitoring the coral reef status. The diseased, infected coral colonies data were collected with the help of Line Intercept Transect (LIT) methods to quantify the prevalence of infected coral colonies. Transects each measuring 2m by 20m were laid on surveyed reefs. Four transects at each site were deployed. The coral diseases were identified based on the Indo – Pacific Underwater ID card [20].

In this study, the number of disease infected coral colonies was recorded. The percent of diseases were calculated as follows:

$$\frac{(\text{Number of diseased colonies})}{(\text{number of total surveyed colonies})} \times 100$$

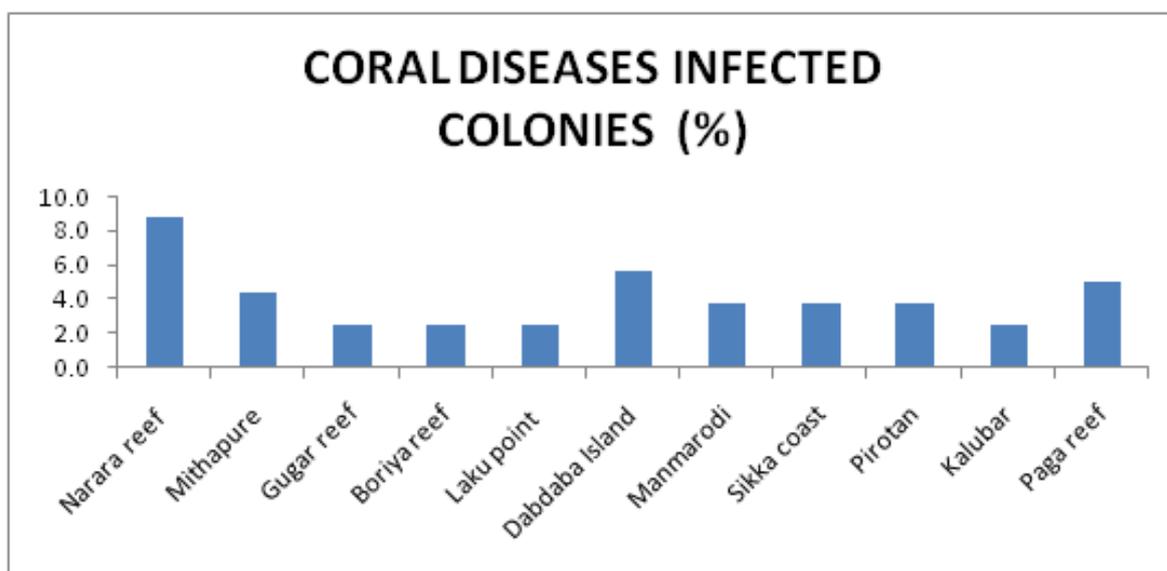
**RESULTS AND DISCUSSION**

The overall disease prevalence in the 11 study sites were explored during August 2012 to April 2013. Five categories of diseases were observed, i.e., Pink Spot (PS); White Plague (WP); Ulcerative White Spots (UWS); Yellow Spot (YS) and Black Band (BB). The corals in Narara reef were most affected with 8.8%, followed by Dabdaba Island (5.6%), Paga reef (5%), Mithapur reef (4.4%), Manmarodi Island (3.8%), Sikka reef (3.8%), Pirotan Island (3.8%), Ashaba Gugar reef (2.5%), Boriya reef (2.5%), Laku point (2.5%) and Kalubar Island (2.5%). Five different disease states were documented from the 11 study sites in the Marine National Park, Gulf of Kachchh. The coral genera *Porites* was highly affected compared to other genera (Figure 1 and 2).

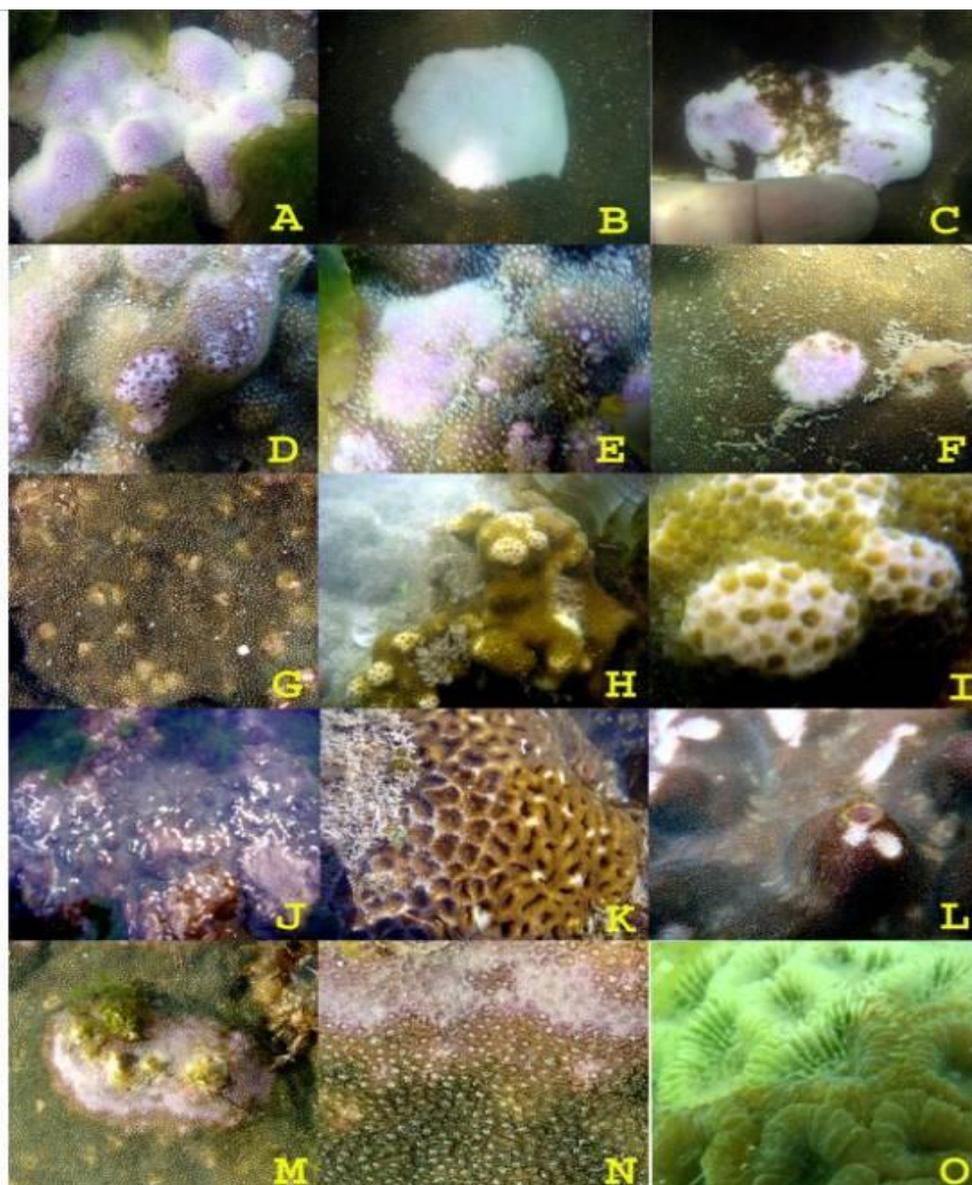
Worldwide coral reefs have been under several stresses from natural and anthropogenic causes. There are many factors that contribute to diseases, including temperature, water pollution, overfishing, water depth, coral diversity, concentrations of nutrients [21-24]. Elevated temperature is a likely significant factor in causing an increase in diseases in many areas[25-27]. Several reviews speculate that there has been an increase in many categories of coral diseases since the 1990s[6,13, 26, 28]. Global warming can be correlated with the recent increased diseases incidence of because warm temperature anomalies may facilitate the

emergence and spread of pathogens or spread of other stressful agents that could affect the natural resistance or could stimulate other bacteria living in reef sediments into becoming virulent[29-30]. Although there have been few reports on UWS, it does appear that it results in coral tissue loss[31]. White pox diseases are caused by a fecal enteric bacterium of possible human origin [32] and human sewage marker is strong on coral surfaces in near shore waters of the Florida Keys National Marine Sanctuary. Bacterial associated with human fecal contamination have been found within the microbial mat that causes black band diseases of corals[33].

The present study revealed that corals of all the reef sites have been affected by diseases. However, the percentage of infection was highest in Narara reef which is very close to ESSAR and Kandla Port Trust (KPT) jetty and subsea oil pipelines. Coral disease, infections were lowest in Ashaba Gugar reef, Boriya reef, Laku point and Kalubar Island as these reef sites are far away from the industrial belt, which had lowest microbial load and minimum impact. The study was carried out over a limited time period; nevertheless, it does provide valuable baseline information for continuous monitoring and research on this line in the Gulf of Kachchh for better management of health of coral reefs.



**Fig-1: Percentage of diseases infected colonies coverage of Gulf of Kachchh during the study period (August, 2012 to March, 2013)**



**Fig-2: Under water photos of five types of coral diseases in Gulf of Kachchh**

A-C White plague in *Porites* sp.; D-F Pink Spot in *Porites* sp.; G-I Yellow Spot in *Porites* sp.; J – L Ulcerative White Spot (J and L *Porites* sp. and K *Favites* sp.); M-O Black Band (M - N *Porites* sp. and O *Favia* sp.).

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