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Coral reefs Ecology in Jazan Region and Suggestions toward Sustainable Conservation

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ABSTRACT

Jazan region is located on the southern part of Saudi Arabia along the coastal line of southern Red Sea. Jazan traditional is characterized by biodiversity and ecology of coral reefs.

The investigation was carried out to evaluate the ecological of coral reefs for site in Jazan city and other one was chosen at offshore of Jazan. Underwater camera was used to assess the live percent of coral. Classification of the substrate type was based on benthic groups and life form categories.

Evaluation of the data obtained revealed that the coral near to the beach has less live coral coverage, whereas live coral coverage in the offshore. Dead corals were dominated in all transects, Acropora spp. is dominant at the study area.

There are many stresses facing coral reefs ecosystem which has negative impact for losing biodiversity and ecology for some sensitive species such as soft coral. Governmental regulations should control the activities in the sea e.g. fishing that is main effect of coral reef ecology.

Key words: *Jazan region, Coral reefs, Red Sea, Fishing*

INTRODUCTION

Mainly, coral reefs ecology in Red Sea found in a good condition and biodiversity, this is one of characteristic of Red Sea environment. More than 300 reef building of coral species[5]. In Jazan region, mainly patchy fringing reefs growing on shallow, gently sloping bottoms[6,7,8].

Massive coral grow slowly whereas *Acropora* spp. is much faster in increasing size[1]. According to (GCRMN Global Coral Reef Monitoring Network 2010), that the coral habitats are in well status. The major distractions are infrastructure along the beach and pollutions. The clear of water and weather characterising Red Sea let the coral reef grow in high saline water reach 40 ppm. Jazan reef building shows around all islands in widespread.

Fringing reefs and coral patches were found in most of the southern part of Red Sea, the most familiar corals, *Stylophora pistillata* and massive *Porites*, and in one reef *Psammocora contigua* was rich[9].

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The significant of coral reefs for marine environments are playing role in productivity and diversity. Many invertebrate and fish are sounding coral reefs. One of the advantages of coral reefs is maintaining coasts from waves and Tsunami. In some countries, environmental tourist e.g Caribbean and Egypt is the source of income. Therefore, protecting coral reefs and biodiversity can be attributed to high abundance of marine animals. The global challenge destroyed many of coral environments e.g. increase temperature. Many of organisms depend on this habitat. Coral reefs are complex environment to any impact direct or indirect, due to the pollution and activities in the sea e.g. fishing still in Jazan region under pressure which effect coral reefs ecosystem. The study purpose is to evaluate the ecology of coral reef and percentage of live coral. On the other hand, suggest some sustainable development measures to protect coral reefs.

MATERIAL AND METHODS

The investigation was done on near coast of Jazan city and offshore site to collect ecological data of coral reefs. On transect have been performed near Jazan city and other transect was at offshore. The survey was used SCUBA diving and snorkels using underwater camera to take some photos for coral species and life form categories. Transects were straight, following the depth contour and were laid down parallel to the reef front. Both edges of transects were marked by hammering iron/steel stakes into the reef framework at useful points for resetting transect and relocate the lines on the second year precisely. Tape measures were laid out between both marks during each survey. Data sheet for coral reef site identification were filled out, for coral reefs ecology assessment, photos were applied[3] and Done[2]. The information was taken to analysis and identification for some groups of coral and life form categories. The life-form categories used in this study were based on English *et al*.[3], see Table 1 for further details.

Table 1: Life-form categories used transects. Slightly modified after English *et al.*[3]

Code	Category	Notes
ACB	*Acropora* Branching	
CB	Corals Branching (Non-*Acropora*)	Mostly *Pocillopora damicornis* and *Stylophora pistillata*
ACT	Tabular *Acropora*	
CE	Corals Encrusting	E.g. *Montipora* spp.; *Pavona explanulata*
CF	Corals Foliose	E.g. *Montipora foliosa* and *Montipora* spp.
CM	Corals Massive	E.g. *Porites* spp.; *Galaxea astreata*; *Goniastrea retiformis*; *Leptoria phrygia*
CSM	Corals Submassive	E.g. *Porites* spp.; *Echinopora lamellosa*; *Echinopora gemmacea*
CMR	Corals Mushroom	
SC	Soft corals	E.g. *Sinularia*; *Xenia*; *Sarcophyton*

Physical parameters were measured at each site of transects. Measurements included temperature (sea surface temperature °C) with digital thermometer, transparency (m) with secchi disk, pH, and salinity with refractometer. There were no extreme physical factors, which affected coral reefs at study area.

RESULTS AND DISCUSSION

Figure (1) shows that the categories of benthic groups of coral reefs with percentage axis.

Generally, the most dominant cover is dead corals in both transects. The offshore site was shown high percentage of live coral compare to Jazan transect. The highest category of live coral was *Acropora* spp. in both sites, whereas the lowest percentage was CSM (Corals Mushroom). Increasing of 18% of dead coral at offshore site and 45% at Jazan related to less stress and human activities in offshore. 10% of *Acropora* spp. which represent the high value in categories referred to adapted of this species to live in difficult climate. However, the other species were shown less percentage in both sites. Millipora and Heliopora were illustrated low percent of live 5% and 6%, respectively. Overall, the offshore site was indicated to good condition in live form of coral reefs categories. In spite of, dead coral was demonstrated the highest percent in all form of coral particularly in Jazan site.

Marine algae were observed on the surveyed sites e.g *Macroalgae and Halimeda* spp. The high abundance of macroalgae was Sargassum spp. Soft coral was seen assembly with sponge in both sites.

Offshore site was characterized by a high number of dead corals two times than Jazan site, this could be done to large activities. Coral groups contained large and small amounts of single hard coral colonies, generally growing on rock substrate, rubble or sand. *Acropora* spp. branching was dominated in all sites as patchy distributed Fig. (2, 3). The great relief of coral moved 1 m high. The investigation has shown that on average more than 15 % of the explored area is covered by live corals. Ecologically, coral reefs represent as important habitat for commercially important fish and other organisms. The coral reefs still not clear to understand the variety of living, the complication of ecological relations and the patterns[8]. The photograph method was useful monitoring the status of coral reefs e.g. less time use in the field, taking record for area. However, difficult to determine the life form categories and identification of species.

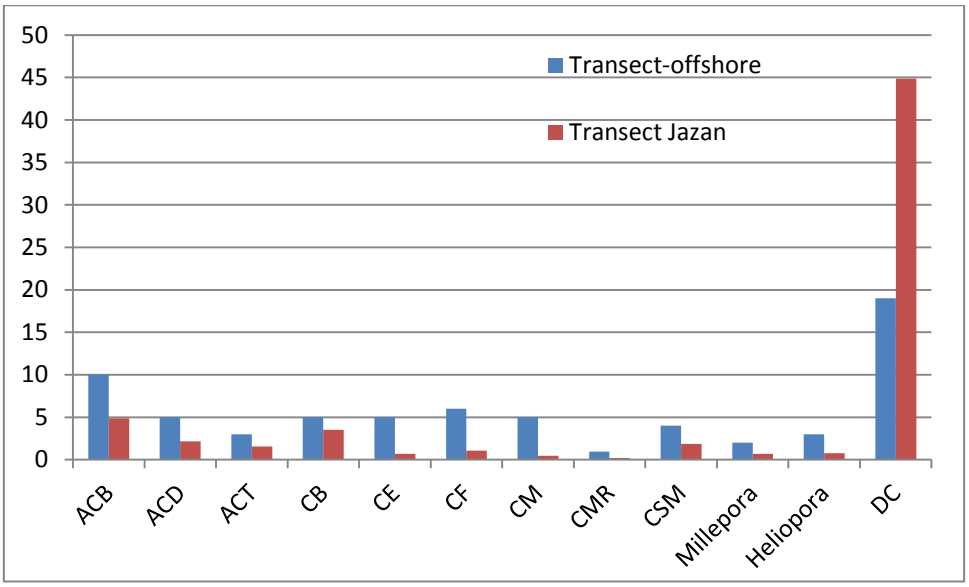

Fig. 1: Percent cover of the benthic groups*:* hard corals, dead corals, at Jazan and offshore sites

Fig. 2: Photo from rubble (dead coral) at the study area

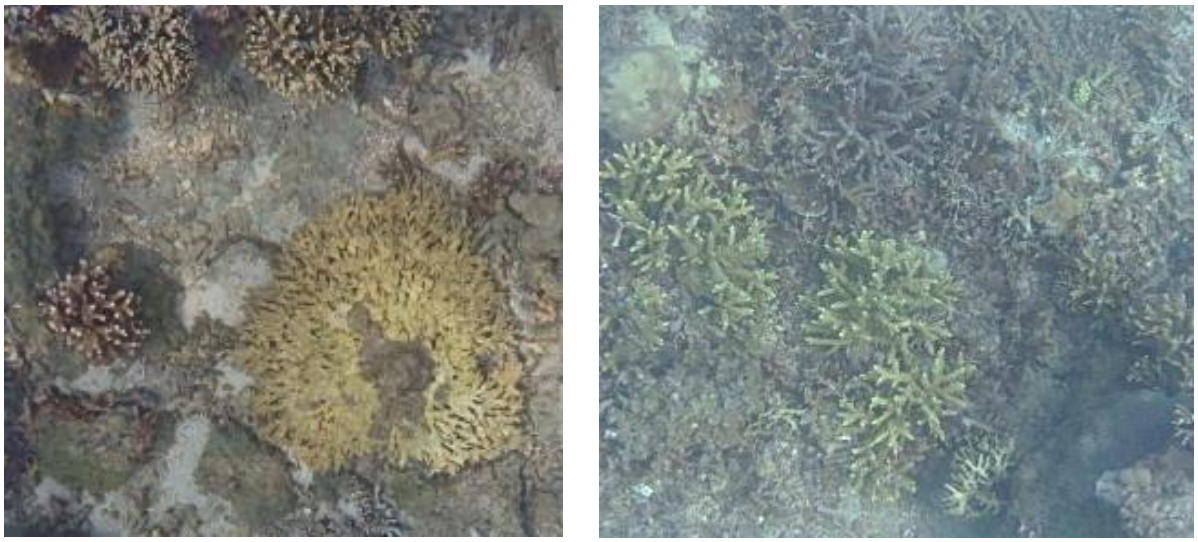

Fig. 3: Photos from benthic communities and life form categories at the study area

CONCLUSIONS

This study showed that coral reefs from ecological and life form categories are suitable. Many dead coral was dominated in both sites Jazan city and offshore. *Acropora* spp. branching was the highest abundance in all sites. The rising of live percent cover of coral was toward offshore.

Regulation and monitoring coral reefs are key point for sustainable development for fish and marine environment. Better understanding for coral reefs ecosystem is observation for long term effects.

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