OBSERVATIONS OF CORAL DISEASE IN *PORITES LUTEA* IN THE ANDAMAN SEA FOLLOWING THE 2010 BLEACHING

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ABSTRACT: During 2008 - 2009 preliminary surveys on coral disease were conducted at 40 stations from 18 islands throughout the Andaman Sea along the coast of Thailand. The belt transect method was employed to quantify the occurrence of coral diseases. The data indicated that 90% of the surveyed reefs showed 5 categories of disease, i.e., White Syndrome (WS), Ulcerative White Spot (UWS), Focal Bleaching (FB), Non-Focal Bleaching (NFB) and Pink Spot (PS). The PS was the most prevalent syndrome, i.e., it occurred in about 95% of sites visited. Other categories were rare. After the bleaching event in 2010, especially in some areas of Similan Islands and Surin Islands, the UWS syndrome on *Porites lutea* appeared to have increased. In addition, the PS was still the most prevalent disease.

INTRODUCTION

Coral disease has become a phenomenon that has been widely reported from coral reefs around the world within the last 30 years (Green and Bruckner 2000; Porter *et al.*, 2001; Weil *et al.*, 2002; Sutherland *et al.*, 2004). 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 (Aronson and Precht, 2000). 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 (Hughes, 1994; Aronson and Precht, 2000; Porter *et al.*, 2001; Gardner *et al.*, 2003; Sutherland *et al.*, 2004). Both White Band Disease and Black Band Disease have been reported in the Caribbean, and the Indo-Pacific (Rützler *et al.*, 1983; Antonius, 1985; Edmunds, 1991; Kuta and Richardson, 2002). 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 Disease (Kenkel, 2008). However, our understanding of the incidence and spread of coral disease on reefs in Thailand is still very limited. In 2010 corals in the Andaman Sea suffered the most severe bleaching event so far reported in Thai waters. This preliminary study focuses on the occurrence of disease in the major reef building coral in the region, *Porites lutea*, following the 2010 bleaching event.

MATERIAL AND METHODS

In this study, belt transects measuring 2m by 20m were laid on surveyed reefs. Three transects per site were deployed. The number of colonies of *Porites lutea* – categorized into normal colonies and diseased colonies - were recorded. Diseases were identified based on the Indo-Pacific Underwater ID Card (Roger *et al.*, 2008). Percent of disease was calculated as follows:

\[
\text{Percent of disease} = \left( \frac{\text{number of diseased colonies}}{\text{number of total surveyed colonies}} \right) \times 100
\]

Two offshore locations were selected in Thai waters in the Andaman Sea – the Surin Islands and the Similan Islands (Fig. 1). An initial study was carried out in 2008 in the Similan Islands and a further study after the bleaching in 2010. In the Surin Islands an initial study was carried out in 2009 with a follow up study in 2010. In addition, in the Similan Islands 100 diseased colonies affected by Ulcerative White Spot (UWS), were tagged in November 2010. Then 50 colonies at Ba-Ngu Island and western Similan Island were monitored 2 months later.
RESULTS AND CONCLUSIONS

During 2008-2009 disease occurred at 16 stations out of 17 surveyed, with 5 categories i.e. White Syndrome (WS), Ulcerative White Spot (UWS), Focal Bleaching (FB), Non-Focal Bleaching (NFB) and Pink Spot (PS) (Fig. 2). The PS exhibited the greatest prevalence both in the Similan Islands and Surin Islands. There was about 16.4% and 8.5%, respectively at these locations (Table 1). While for UWS, values of 3.6% in the Similan Islands and 0.8% in the Surin Islands were recorded. After the 2010 bleaching event, values for UWS appeared higher in both areas with 4.8% recorded in the Similan Islands and 22.3% in the Surin Islands. Other diseases were still categorized as rare. In addition post-bleaching, the PS was still the most prevalent disease. Preliminary results of monitoring of individual colonies show that there was little visual change in the colonies with all remaining alive and intact (Fig. 3).

There are many factors that contribute to disease including temperature, water pollution, overfishing, water depth, coral diversity, concentrations of orthophosphate and nitrite (Jackson et al., 2001; Kuta and Richardson, 2002; Szmant, 2002). Elevated temperature is a likely significant factor in causing an increase in disease in many areas (Kushmaro et al., 1998; Rosenberg and Ben-Haim, 2002; Jones et al., 2004; Bruno et al., 2007; Selig et al., 2006). Several reviews speculate that there has been an increase in many categories of coral disease since the 1990s (Green and Bruckner, 2000; Porter et al., 2001; Jones, 2004; Sutherland et al., 2004; Willis, 2004). Although there have been few reports on UWS it does appear it results in coral tissue loss (Raymundo et al., 2003). The present study was carried out over a limited time period; nevertheless it does provide a valuable base-line. Continued monitoring is planned to follow the tagged colonies and other corals on the belt transects in order to understand more about the impacts of the various diseases described above.
Figure 2. Five categories of coral diseases found in the Andaman Sea:

a) Pink Spot (PS): Pink colored lesion may be swollen or thickened: Pigmentation may form lines, bumps, spots, patches or irregular shapes. b) White Syndromes (WS): Irregular white lesion shape, with a sharp demarcation between normal tissue and bare skeleton. c) Non-Focal Bleaching (FB): Irregular shape lesion with border between bleached area and tissue with typical coloration being often discrete d) Focal Bleaching (FB): Circular white lesion, or annular margins <3cm diameter e) Ulcerative White Spot (UWS): Circular white spot <1cm diameter. Disease description developed from the Indo-Pacific Underwater ID Card (Roger et al., 2008).
Table 1. The percentage of diseases recorded in 2008-2009 and in November 2010

<table>
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<th></th>
<th>#surveyed</th>
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<th>WS</th>
<th>NFB</th>
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*. after bleaching event

Figure 3. Comparison of development of Ulcerative White Spot on Porites lutea between December 2010 and February 2011 in two colonies shown in upper and lower parts of Figure.

REFERENCE


