



PhD Exit Seminar Invitation

"The Ecology & Biology of Coral Disease on the Great Barrier Reef"

Presented by: *Cathie Page, PhD Student, James Cook University*

Where: ARC Centre of Excellence for Coral Reef Studies Conference Room, JCU. TBC - video link to Centre for Marine Studies Conference Room, UQ.

When: Thursday 28th June 2007, 10.00am

Abstract: Despite the dramatic impacts of coral diseases on Caribbean coral reefs, disease on Indo-Pacific reefs, including the Great Barrier Reef (GBR), has received relatively little attention to date. Emerging evidence of novel disease types, increasing disease abundance, and epizootics on Indo-Pacific reefs highlights the need for a greater understanding of the ecology and biology of coral disease in this region. This study focuses on determining environmental drivers of coral diseases on the Great Barrier Reef using large-scale and seasonal surveys of disease prevalence and on the impacts of diseases on coral populations by examining their lethal and sub-lethal impacts on coral colonies.

Surveys spanning two sectors along a 500 km north-south axis and three cross-shelf positions along an inner-outer shelf gradient revealed that coral disease is ubiquitous throughout the GBR. Moreover, all seven coral diseases recognised are widely distributed. Both the number of disease types and the relative susceptibility to disease varied consistently among scleractinian families. Hierarchies in disease susceptibilities among families were consistent both spatially and temporally, indicating that susceptibility was not influenced by variability in coral community composition as a consequence of either sector or cross-shelf location. Variation in disease susceptibility appears to reflect variation in life-history strategies, particularly investment in resistance mechanisms, with fast-growing branching corals in the families Pocilloporidae and Acroporidae being the most susceptible. The prevalence of most diseases was positively correlated with the densities of highly susceptible coral taxa, typically life-forms of acroporid, pocilloporid and poritid corals, which were typically higher in density on northern Cooktown and outer-shelf reefs.

At the population level, rates of partial and whole colony mortality differed among three common coral diseases: black band disease (BBD), skeletal eroding band (SEB) and tumours. These measures of disease impact were greatest for BBD and least for tumours. In contrast, sub-lethal impacts were greatest for SEB, with linear growth rates being up to two-fold lower for diseased ($0.35 \pm 0.1\text{mm}^{-\text{day}}$) than for healthy ($0.67 \pm 0.1\text{mm}^{-\text{day}}$) colonies in summer (November 2004 to January 2005). However, in cooler months, growth rates did not differ significantly between diseased and healthy colonies. Overall, BBD and tumours did not reduce linear rates of coral growth in this study. In general, disease reduced the reproductive output of corals. Predicted increases in disease with ocean warming and anthropogenic impacts pose the greatest threat to the persistence of the highly disease susceptible acroporid and pocilloporid corals, given both the lethal and sub-lethal impacts of diseases highlighted in this study and the double jeopardy represented by their high vulnerability to other disturbances including cyclones, bleaching and crown-of-thorns outbreaks.