Research Update 2008

Focus on Coral Disease

Coral reefs are under increasing stress from a number of causes, including global warming, poor water quality, habitat degradation and over-fishing.

Coral diseases worldwide have increased in both frequency and severity, especially in the Caribbean over the last three decades. Disease outbreaks have resulted in loss of coral cover and species diversity, as well as significant changes in community structure of reefs. However, we are just beginning to understand what is driving these dramatic increases in disease.

The CRTR Coral Disease Working Group (DWG) is funded by the Coral Reef Targeted Research & Capacity Building for Management Program (CRTR) to advance understanding of coral disease in key areas. Their research effort will provide more insight into the ways in which coral diseases can alter reef function and the conditions under which outbreaks may occur. With this information more appropriate management options can be made for a given situation.

The DWG aims to fill critical information gaps about coral reef disease, build capacity internationally and develop situations for managing and conserving reef ecosystems.

Major areas of investigation are:

1. Global impact of coral disease
2. Global warming and local human inputs that can facilitate disease
3. The causes, reservoirs and vectors of coral disease
4. Coral resistance to disease
5. Capacity Building

To date, the DWG has addressed many pressing issues such as identifying several disease syndromes which are infectious; measuring baseline levels of many disease worldwide at each of the Centres of Excellence; identifying which Centres of Excellence are the most suitable for identifying local factors that might drive disease; and investigating whether climate factors affects coral disease levels. The DWG has also sponsored graduate students and post-doctoral fellows from Palau, Puerto Rico, Mozambique, Mexico, the Philippines and the USA. Recent research highlights are detailed below.

Impact of fish farms on coral health

Effluent from coastal fish farms has been linked to reduced water quality and increased abundances of microorganisms in the water column. Therefore aquaculture may play a role as an incubator, conveyor and facilitator of disease into natural populations.

As part of its study of the impact of local environmental factors on coral health, the DWG has found that the fish pens in Bolinao Bay (Philippines) have a strong influence on the bacteria population, nutrient input, primary production and the patterns of energy and carbon flux in the surrounding waters. In addition, the DWG is investigating whether these changes in water quality influence response to disease and the coral innate immunity.

Students being trained in coral disease assessment methods in the Zaragosa Marine Protected Area, Central Philippines. Photo: L. Raymundo

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WORKING GROUP

The Coral Reef Targeted Research & Capacity Building for Management Program (CRTR) is a leading international coral reef research initiative that provides a coordinated approach to credible, factual and scientifically-proven knowledge for improved coral reef management.

The CRTR Program is a proactive research and capacity building partnership that aims to lay the foundation in filling crucial knowledge gaps in the core research areas of Coral Bleaching, Connectivity, Coral Diseases, Coral Restoration and Remediation, Remote Sensing and Modeling and Decision Support.

Each of these research areas are facilitated by Working Groups underpinned by the skills of many of the world's leading coral reef researchers. The CRTR also supports four Centers of Excellence in priority regions, serving as important regional centers for building confidence and skills in research, training and capacity building.

The CRTR Program is a partnership between the Global Environment Facility, the World Bank, The University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA) and approximately 50 research institutes and other third parties around the world.

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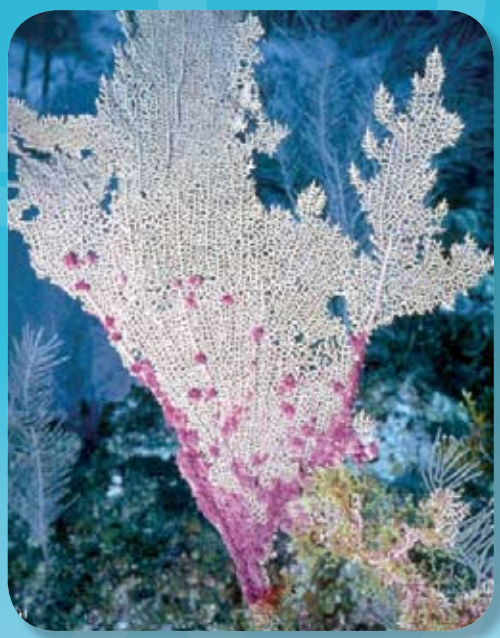
In partnership with the Bolinao Center of Excellence and the Restoration & Remediation Working Group, this investigation aims to produce significant new scientific knowledge that might feed directly into policy relating to the sustainability of aquaculture adjacent to coral reef systems.

Disease in a warming ocean

Ocean temperatures are predicted to rise considerably as the global climate warms, with serious implications for coral health.



Sea fan affected by Colored Band Disease (Purple Spots).
Photo: Ernesto Weil

The DWG has made significant discoveries in Australia and the Caribbean regarding the potential impacts of climate warming events on the outbreak of coral disease.

In collaboration with the Remote Sensing Working Group, the DWG developed several new models to predict disease outbreaks by integrating baseline monitoring data from Australia and the Caribbean with satellite temperature data. The models use predicted sea temperature data and can therefore identify the potential efficacy of various management strategies for future scenarios.

In other news…

The DWG continue their annual surveys to assess the global disease prevalence in Australia, the Philippines, Guam, Mexico and the Caribbean. The DWG has also investigated the role that Marine Protected Areas have on the health of coral reefs and coral disease dynamics. These surveys provide invaluable information on the temporal and spatial changes in coral community structure, and disease prevalence and severity.

The DWG has made progress on determining the causative agents of numerous coral diseases. Several papers on skeletal eroding band, brown band and white syndrome are published or in review. They have also developed several of new methods to measure coral immunity, and these tools are currently being used to understand how the coral immune response functions during disease and environmental stress.

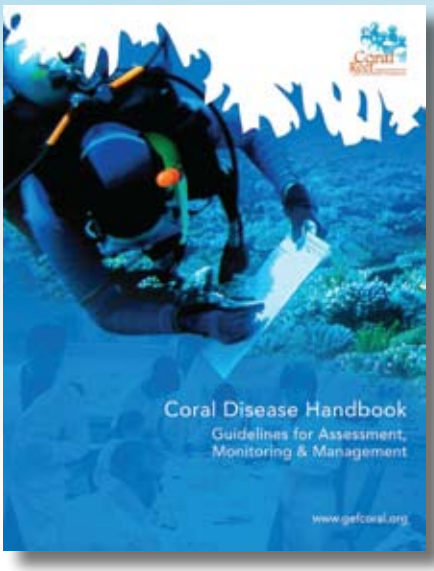
On-site resources for reef managers

Coral reef managers and researchers now have access to new resources to identify and address coral disease – *the Coral Disease Handbook: Guidelines for Assessment, Monitoring and Management* and two sets of *Underwater Cards for Assessing Coral Health on Indo-Pacific* and *Caribbean Reefs*.

Launched at the 11th International Coral Reef Symposium in July, the Handbook provides coral reef managers with a 'how to' approach for recognizing coral syndromes and other compromised states of health, quantifying these impacts through assessment and monitoring, and recognizing potential outbreak situations.

With the rise in disease prevalence worldwide, coral diseases can been easily misidentified as knowledge is still very limited. There are few individuals throughout the world trained to recognize disease on coral reefs, therefore this manual brings together what is currently known about coral diseases, how they are studied and what options are available for managing them.

The Handbook is supplemented by underwater coral disease identification cards for the Indo-Pacific and Caribbean. Extensively illustrated, the cards include a decision tree to quickly identify coral diseases in the field, and underwater slates for data recording. The next step is to establish a central web-based data collection system where users of the cards can disseminate their data to others.



The *Coral Disease Handbook: Guidelines for Assessment, Monitoring and Management* and two sets of underwater identification cards are available separately ($US20 each) or as a set.
To order, visit www.gefcoral.org/publications

Further Information

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