Diseases of Coral

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Book Review

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Diseases of Coral. By Cheryl M. Woodley, Craig A. Downs, Andrew W. Bruckner, James W. Porter, and Sylvia B. Galloway. John Wiley & Sons Inc., Hoboken, New Jersey, USA. 2016. 582 pp. ISBN: 978-0-8138-2411-6. US $249.95 hardback; $199.99 digital version.

Review by Michelle M. Dennis

Coral reefs are one of the most biodiverse ecosystems, supporting nearly a quarter of all marine life. They are highly productive natural food sources, sustain valuable recreational industries, and provide much-needed shoreline protection. Sadly, in recent decades, coral reefs have catastrophically declined around the world, and disease has been a major contributor (Carpenter et al. 2008). Yet, coral diseases are poorly described and their causes remain unknown for the most part (Work and Meteyer 2014). It follows that only a few text books have addressed coral disease, mainly comprising compilations on select topics or standalone chapters addressing major disease examples. Consequently, those interested in coral disease have eagerly awaited the publication of the first edition of *Diseases of Coral*.

This text is an extremely ambitious undertaking. The editors have effectively compiled subject matter written by more than 70 contributing authors and experts in the field, many of whom are well published in the literature or have previously authored other reference materials on the subject. *Diseases of Coral* successfully presents a distilled body of knowledge that brings attention to critical knowledge gaps. The text is distinguished by its sole focus on coral disease, the breadth of diseases reviewed, and its suitability to a wide readership of varying professional backgrounds. Additionally, it has a comprehensive approach to the discipline, including broader concepts and methods necessary to studying coral disease. It contains a large number of high-quality color illustrations. The number of field photos of corals showing macroscopic lesions is a highlight, and excellent color photomicrographs detail microscopic anatomy and pathology.

The book opens with "primer" chapters that cover basic topics essential to studying coral disease. Readers who are not especially well versed in animal disease investigation may particularly benefit from the chapters focusing on epidemiology, pathology, and etiology (including a comprehensive review on causal reasoning). Additionally, chapters focusing on coral anatomy, reproduction, nutrition, immunology, and coral disease history may be especially advantageous to those already well experienced with disease investigation in animals other than corals.

The bulk of the text comprises expositions on specific coral diseases or syndromes. Some chapters focus on lesion type or pattern (e.g., "white syndromes," bleaching, colored band diseases, skeletal growth anomalies), select etiologies (e.g., carallivory, vibriosis, serratiosis, cyanobacteriosis, *Halofolliculina* ciliates, and viruses), or specific disease entities (e.g., dark-spots disease, pink-line syndrome, white plague type II). Most of the diseases reviewed are specific to free-living hard corals. Additionally, sea fan aspergillosis is addressed, and two chapters are dedicated to diseases of

octocorals and deep-water corals, but no chapters are dedicated to aquarium corals.

The final chapters of the book explore novel methods relevant to coral disease investigation, including coral cell culture, coral tissue culture, coral regeneration assay, and pulse amplitude–modulated chlorophyll fluorometry, among other methods. It is hoped that adaptation of such techniques will help encourage innovation and advancement in coral disease research. These chapters will certainly be enlightening to the novice coral disease investigator and perhaps inspiring to experts in the field. However, chapters dedicated to fundamental methods relevant to coral disease investigation, such as assessing and monitoring coral diseases in the field, or special approaches to laboratory diagnosis in corals (e.g., histopathology or microbiology sampling and processing) are not included in *Diseases of Corals*. These are topics that a coral disease investigator should master to undertake effectively investigations emulating the standardized biomedical approach but will need to learn elsewhere.

My expectations for *Diseases of Coral* are probably biased by my familiarity with other "Diseases of ..." textbooks published by Wiley-Blackwell, which are commonplace among the reference collections of veterinary diagnosticians. A popular framework of such textbooks is to organize diseases according to etiology (such as bacterial, fungal, parasitic, nutritional, toxicological) and to section chapters by diagnosis and prevention and/or treatment. However, this traditional approach is challenging for coral diseases because many are of unknown cause or have not been described comprehensively. Likewise, there is some inconsistency between chapter layouts and some redundancy of material covered. Additionally, although each chapter effectively pulls together what is known on its subject, the case definitions for many diseases remain unclear. From a veterinary pathologist's perspective, I hoped for greater clarification on gross and microscopic pathology that would allow a specific disease to be diagnosed, especially because many coral diseases lack distinguishing characteristics and are named after rather nonspecific visual appearances (e.g., "white band disease"). The shortage of these details is a reflection of our present knowledge of coral diseases, rather than an editorial oversight. Perhaps one day we will bridge the gaps in our understanding of coral diseases such that later editions of this text can provide more clarity here. In the meantime, *Diseases of Coral* has effectively teased apart a confusing mass of multidisciplinary literature in which a variety of names may be used to refer to the same disease, or in other instances, the same disease name has been used to refer to a variety of different diseases.

The editors must also be commended for catalyzing the process of developing a standardized vocabulary for coral diseases. The textbook's introduction wisely describes this as an essential step for scientific advancement of a new field. However, it is no small undertaking in a textbook involving so many contributing authors or in a subject area notorious for inconsistent use of language. The textbook's glossary, aimed at comprising a "full lexicon" of coral disease terminology, is all-inclusive and likely to be useful regardless of a reader's professional background. Readers can still expect some inevitable minor inconsistencies in vocabulary used among chapters; for example, some authors referring to "ectoderm" rather than "epidermis," "clinical (or gross) signs of disease" rather than "macroscopic lesions," or "epizootiology" rather than "epidemiology," despite a case made for universally using the term "epidemiology" in the epidemiology chapter.

While the field of coral pathology remains in its infancy, this textbook is a critical step forward, a milestone for the growth of our rudimentary collective understanding of coral diseases. *Diseases of Coral* is now an obvious first choice reference for getting quickly up to speed on most topics pertinent to diseases of free-living corals. The textbook succeeds in highlighting knowledge gaps and providing eager investigators with perspective and tools to get started. As a diagnostic pathologist with special interest in aquatic animals, I regard *Diseases of Coral* as a great accomplishment and an essential library reference for those investigating coral disease. I expect it will remain a foremost resource on coral disease,

and I hope it continues to evolve as our knowledge of coral disease broadens in the decades to come.

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