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MOLLUSC

DISEASES

RALPH A. ELSTON

GUIDE

FOR THE

SHELLFISH

FARMER



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Ralph A. Elston

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ABOUT THE GUIDE

The preparation of this guide to the important known infectious diseases of molluscs of commercial importance is the result of many requests from shellfish growers for information on the risks, distribution, prevention and management of diseases. As husbandry for any species or type of animal develops, the significant role of infectious diseases in decreasing productivity and product quality is increasingly recognized. Numerous examples worldwide demonstrate that entire shellfish industries in large coastal regions can be eliminated as the result of shellfish diseases.

The purpose of this guide is to enable shellfish farmers to educate themselves with regard to important diseases of the molluscs they culture and to develop an approach for the control of these diseases. Often, shellfish and fish farmers speak of "natural mortality." Many times this natural mortality may reach a level of 50% of the standing crop of animals within one year. The concept of natural mortality is really nothing more than the acceptance of deaths of animals as a phenomenon over which the farmer has no control. Every death of an individual farmed animal has some biological explanation, although we are not always perceptive enough to discern the cause. So, in fact, there is no such thing as natural mortality. Large-scale deaths of farmed animals are often due to infectious diseases—that is, due to diseases caused by microorganisms such as viruses, bacteria, fungi, or parasites. Many of these deaths can be prevented or managed. It is to this concept that this guide is dedicated.

By familiarizing themselves with the concept of infectious diseases and the way such diseases can be spread by poor practices and prevented or managed by good practices, shellfish farmers can improve the productivity and profitability of their operations. In some cases, this requires that the farmer take the long-term view and sacrifice short-term gains. For example, in some cases, it is wiser to farm indigenous strains of shellfish than to risk introduction of infectious diseases by importing exotic shellfish. On the other hand, it is the responsibility of those of us practicing shellfish pathology to find solutions for problems posed by infectious diseases.

Along these lines, it is the philosophy of this guide that moving shellfish from one geographic area to another, often necessary in their commerce, can frequently be done with little risk of spreading infectious disease if certain precautions are taken. The enforcement of precautionary measures is usually the role of state, provincial, or federal government. However, government and industry should have a similar, if not an identical, objective with respect to infectious diseases of molluscs: the preservation and productive use of shellfish, free of the potentially devastating effects of disease.

This objective can be met only if government and industry recognize that they share a common goal. It is clear that government regulations regarding the control of shellfish diseases are essentially unenforceable and useless unless the industry supports them. Thus, it is the responsibility of government to develop workable policies

and effective means of implementation; it is the responsibility of individuals in industry to understand the potential consequences of infectious diseases and to promote this recognition throughout the industry.

Organization of the Guide

This guide does not mention all of the known infectious diseases of molluscs. It does provide a summary of the major facets of the most important diseases. The emphasis is on bivalves, the primary group in commercial cultivation today. The guide is organized by species and by disease. Each treatment of a major disease includes an historical summary, information on its geographic distribution, which species it infects, mortality rate, environmental factors, seasonality, diagnosis, and, most important, prevention and management. Not all of this information is available for each disease, because the science of health management and disease control of bivalve molluscs is in a relatively primitive state today. As the industry develops, the science and knowledge base for health management will also increase.

Because so little is known about some diseases, they are treated in an abbreviated form. Abalones, for example, are increasingly important but little is known about the diseases of these animals. Some diseases are important only from historical interest or because of their impact on an unfarmed natural population of molluscs. Short summaries of some of these diseases are included for general background information in the "miscellaneous diseases" section. Technical references are given after each section. The literature can be retrieved from most university libraries if it is needed for further reference.

I have omitted from the guide many diseases that are mentioned only briefly in the technical literature, particularly those that affect wild, unfarmed species. Since so little is known about these, including them would complicate the simplicity that I believe is necessary to make this guide useful.

There is one last point on this subject. Because no diseases are reported for a particular species does *not* mean that the species has no important diseases. It probably means that the species has only recently been farmed and that its diseases have not been studied. Although many diseases exist in wild populations of molluscs, they are often not recognized until someone attempts to farm the mollusc.

The guide contains several figures on the anatomy of bivalve molluscs. A knowledge of the anatomy is invaluable in understanding biology and disease processes.

Hatchery managers can do much to prevent disease or mitigate its effects in hatchery operations. In addition to the sections on prevention and management specific to discrete diseases, the guide offers general guidelines for preventing and managing disease and detailed instructions for bacteriologic sampling throughout the hatchery system to test for the presence and abundance of bacteria.

Accurate diagnosis of shellfish diseases often depends on the services of a pathologist. The section on professional assistance describes the way to prepare, preserve, and present diseased animals or animal tissues for laboratory investigation and lists the pathology services now known to be available.

A glossary at the end of the guide defines some of the terms common to disease management and pathology. Pathology, like any discipline, uses many terms that can intimidate the uninitiated but, in reality, represent easily understood concepts.

The references at the end of each section are the scientific foundation from which each section was written. Thus, each discussion of a particular disease represents many years of research effort by the scientists listed in the references.