

Preface

Nematology, Advances and Perspectives

During the 20th century, science and technology have developed in an unparalleled manner. This is especially true for nematology. Since Cobb first recognized nematology as an independent discipline during the early part of the century, nematology has made unparalleled advances and become an integral part of the biological sciences. The development of nematology is largely attributed to the discovery of the importance of nematodes in agricultural ecosystems and their impact on society. Nematodes are the most abundant and diversified group in the animal kingdom, and four out of five animals on earth are nematodes. Marine nematology has become an independent discipline and it has been suggested that the secret of the natural history of our planet may lie in the nematodes dwelling deep in oceans. Animal-parasitic nematodes have had great impact on human health and society throughout history. Soil nematodes play important roles in organic degradation, mineralization, and food webs in soil ecosystems. While most nematode species in soil are beneficial, some species are important pathogens of plants and cause severe damage to crops. Worldwide crop yield losses to nematodes have been estimated at approximately \$78 billion annually. The advances in nematology and related disciplines, however, have drastically strengthened our ability to fight this unseen enemy. Thus, over the past century, billions of dollars of crop losses from nematode damages have been prevented.

One of the most exciting and important new fields of nematology includes recent advances made in the use of nematodes as model organisms for basic biological studies, especially in developmental biology, genetics, and cellular and molecular biology. Using *Caenorhabditis elegans* as a model, scientists have unraveled for the first time in history the complete genomic sequence of DNA from a multicellular organism. Also, they have documented cellular development from a single fertilized cell to a fully developed body.

Nematology is one of the most dynamic and exciting disciplines in the biological sciences. It is impossible to cover every aspect of nematology in this book. Furthermore, several topics in nematology reached their climax during

the past century, but interest has now ebbed. The major focus of this book is on topics that have made remarkable advances in the latter part of the century and currently are of primary research emphasis. These topics will relate mainly to free-living, plant-parasitic, and entomopathogenic nematodes.

The following lists of chapters evolved after lengthy discussion and consultation with fellow nematologists. We are pleased that so many renowned nematologists with international reputations and experiences have responded positively to the book proposal and agreed to make authoritative contributions. It is overwhelming to have nematologists around the world making a collaborative effort to produce a quality book. The book is to be published in 2004. Therefore, we shall consider it a memorial to the achievements in nematology in the 20th century and as a beacon for future developments in nematology during the new century. For many reasons, we believe that nematology will become a primary focus in the agricultural sciences during the new century. With the rapid growth of the world's population, food and fiber demands in the next century will increase tremendously. But the task for nematologists is daunting in that funding, personnel in nematology, and graduate education has been sharply curtailed. Also, with the suspensions and phase-outs of many soil fumigants and nonfumigants and the threat for even more suspensions in the foreseeable future, the challenges will become even greater. Increased endeavors in nematode research will be essential to achieve the sustained growth of agriculture in the 21st century.

The objective of this book is to summarize advances in nematology that have been made during the 20th century and to provide perspectives for the development of nematology in the next century. It is aimed at researcher and graduate student communities. The international representation of the science will be a key component of this book. It is our hope that the book will provide a road map to the most important aspects of the science at this time and that it will provide critical thoughts and ideas for researchers and graduate students to carry forward into the next millennium.

The editors are indebted to the authors of the respective chapters for their excellent contributions. We are grateful to the large number of scientists who have provided valuable comments and suggestions during book proposal discussion and reviews of each individual chapter manuscripts. Finally, we express our gratitude to the Tsinghua University Press and CAB International for fulfilling this endeavor.