

BOOK REVIEW

Freshwater nematodes: Ecology and Taxonomy

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The book deals with various aspects of modern nematology. Nematodes are ubiquitous, the most diverse and numerically dominant metazoans occurring in various habitats. These properties bestow exceptional significance to their role in the environment, with an array of functional roles in an ecosystem: they are grazers on bacteria and primary producers, regulators of decomposition, predators, prey for other animals and closely associated symbionts of bacteria and other organisms. They also serve as potential indicators of pollution and general environmental disturbance. Current research on nematode biology generally leave freshwater forms as the least studied; parasitic nematodes are better studied than free-living, terrestrial more than aquatic, and marine better than freshwater forms. This book is an attempt to bring together in one volume the currently available information on freshwater nematodes. It addresses the taxonomy of this extremely diverse phylum and provides analysis of their ecology through collaborative participation of 25 nematologists from 12 countries worldwide.

The book is divided into two parts – the first is focused on several aspects of ecology of nematodes, and the second part on taxonomy.

The first part: Ecology, consists of 11 chapters of which the first is the introduction. It summarises the present knowledge and research addressing the ecology and taxonomy of freshwater nematodes, and also gives an overview of the classification of the phylum nematoda. In the second chapter the techniques for processing of freshwater nematodes are presented, with illustrative schemes complementing the text. The third chapter is focused on global and local perspectives of composition and distribution of free-living freshwater nematodes. This chapter involves studies on variability in species composition, local species richness and composition (abundance in various habitats). The whole chapter is completed with a summary of factors that affect species composition, including abiotic and biotic aspects, taking into account horizontal and vertical species distribution.

The dynamics of freshwater nematodes, including abundance, biomass and diversity are the topics of the fourth chapter. Differences in inherent dynamics in limnetic habitats between temperate and tropic habitats are emphasised. The fifth chapter turns our attention to the production of freshwater nematodes, including measuring nematode production and a comparison of their production with other benthic organisms.

The sixth chapter deals with the feeding ecology of free-living benthic nematodes, which is still poorly understood in spite of their ubiquity and abundance. As a taxon, nematodes feed on bacteria, microalgae, detritus, protozoan and metazoan prey, and may even benefit from dissolved organic matter. Yet the quantitative importance of any of these sources in the nutrition of nematodes is largely unknown. The following aspects are mentioned in this chapter: feeding type classifications, feeding selectivity and intraguild diversity, environmental constraints on nematode feeding, food recognition and measuring of feeding rates.

In the seventh chapter the pattern and size structure of freshwater nematode in the lakes Königssee and Brunnsee in Germany is demonstrated. In the eighth chapter the use of freshwater nematodes in the field of ecotoxicology and applied ecology is reviewed. After a general introduction to the

quality assessment of freshwater habitats, the authors try to elucidate the suitability of nematodes in this field of science and its application, describing special methods, such as single-species tests or community level assessment.

Chapters 9 and 10 describe special ecosystems with nematodes, i.e. lotic systems (running freshwater) and extreme freshwater habitats (in terms of temperature, chemical composition, variability and isolation). Attention is paid e.g. to freshwater pools in bromeliads or tree hollows, hot or mineral springs, pools and bogs in polar regions, seasonal lakes or pools, fresh groundwater and caves. The nematode fauna from these extreme habitats is compared with those from more typical freshwater environments and the adaptations to such extreme conditions are discussed.

Chapter eleven concentrates on the computation and application of nematode community indices, because there is increasing interest for using nematode communities as indicators for environmental monitoring of terrestrial communities.

The second part: Taxonomy, provides a detailed description and illustrations of each order, the classification from order down to family and genus is summarized in each chapter. Also, for every genus, a complete, up-to-date list of species, with emphasis on biogeography, is given for primarily freshwater taxa, and a list of only those species reported from freshwater bodies is given for the genera that are considered primarily non-freshwater.

The book also summarizes previous work in the area of nematology and indicates directions of future research. By providing an overall review of the ecology and taxonomy at the genus and higher level taxa, this book is intended to provide a useful reference to a broad user community: students, beginners and established researchers in the field of freshwater nematology, benthologists, invertebrate biologists, limnologists, ecologists, microbiologists and soil biologists.

The book is available from the author of this review.

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BOOK REVIEW

Tomatoes

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Tomatoes are one of the most widely produced and consumed vegetables in the world, both for the fresh fruit market and the processed food industries. This book is divided into 10 chapters and provides a concise review of our knowledge of the scientific principles underlying the biology and production of the tomato crop. Our understanding of these aspects has increased rapidly in recent years and new areas such as genetic modification and biological pest control have been developed.

In the first chapter the general characteristics of tomato from taxonomical and agricultural points of view are given. Some of the history of tomato cultivation is presented. An overview of the recent tomato industry on all continents includes the most important tomato producers worldwide.

Chapter 2 is focused on genetics and breeding, including a treatise about genetic variability within the genus *Lycopersicon*. Cultivated tomato (*Lycopersicon esculentum*) is a predominantly inbreeding species, and its genetic variation tends to decrease, leading to a severe genetic bottleneck. As a consequence, genetic variation in the cultivated tomato is limited. The attention of breeders has necessarily turned to a study of wild relatives in the genus *Lycopersicon*, from which *L. peruvianum* has the widest genetic variation. The next part of this chapter describes goals in tomato breeding, among them high yields of high quality fruits with inputs as low as possible and also resistance to biotic (various pathogens and pests) and abiotic stress rank first. The end of the chapter remarks on biotechnology and transgenic or genetically modified crops, including tomatoes. However, transgenic tomato cultivars have not been released frequently until recently.

The third chapter includes a detailed description of developmental processes of tomato plants (including germination of seeds, leaf and stem growth, root development, flowering, pollination and fruit development). Inflorescence formation, flower development, fruit set and fruit ripening have a major and strong impact on tomato yield, which is determined by both number and mass of individual fruits. All stages of plant growth are considered from biological and ecological points of view, i.e. attention is focused on the effect of various environmental conditions (temperature, light, water supply) on particular growth stages.

Chapter 4 briefly describes crop growth and yield, which is mainly determined by biomass production. The processes that determine biomass production are considered in detail, with emphasis on the influence of environmental factors (light, CO₂ concentration, temperature, humidity) and cultural practices (hydroponics, plant density, intercropping). In the final part of this chapter, crop growth models are described by using examples from two case studies.

The fifth chapter is focused on fruit ripening and fruit quality. Recently, multiple harvests are required to pick the fruits as they mature and ripen over a long period of time. The uniform maturity and ripening of a large proportion of the fruits on a plant allows a single pick and mechanical harvesting to be economical. Methods to judge and measure fruit ripeness, quality characteristics (pigments, size and shape, surface appearance, firmness, composition and flavour, vitamins) as well as description of physical disorders of fruits are mentioned here.

The principles of water and fertilizer management are discussed in Chapter 6. More precise information is available on irrigation and fertilization requirements in soil-less culture than is presented for field crops. This chapter highlights the water and fertilization requirements of the tomato plant at various stages of development, interactions between nutrients and interactions between watering and fertilization regimes as they relate to various physiological disorders (blossom-end rot, goldpot, oedema, fruit cracking and russetting). Additional fertilization recommendations are available also in Chapters 8 and 9.

Chapter 7 turns the attention to crop protection. All agents which negatively influence tomato production are described – e.g. weeds, viral, bacterial and fungal pathogens, insects that damage the foliage, and fruit and root nematodes. The methods of integrated pest management with its possible combinations of agronomical, biological and chemical techniques are mentioned here.

Chapters 8 and 9 give practical recommendations for growing tomatoes in the open field (Chapter 8) and greenhouses (Chapter 9). Both chapters are similar in structure, including description of environmental requirements for growing, crop management, irrigation and fertilization. Chapter 9 also includes a complete description of greenhouse structure.

Chapter 10 is focused on the last important aspects of tomato production – on post-harvest biology and handling. It thus includes methods of harvesting (by machine, and by hand), packaging, description of processes during ripening and factors that influence ripening.

In conclusion, this book is an excellent and comprehensive overview of recent and important information about the biology, genetics and breeding, growing, diseases and pests, harvest and post-harvest technology of tomatoes. The contents of the book are well arranged and easy to read and understand. The book is aimed at advanced students and postgraduates of plant biology, agriculture and horticulture, as well as at scientists and professionals in horticulture and tomato growers.

The book is available from the first author of this review.

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