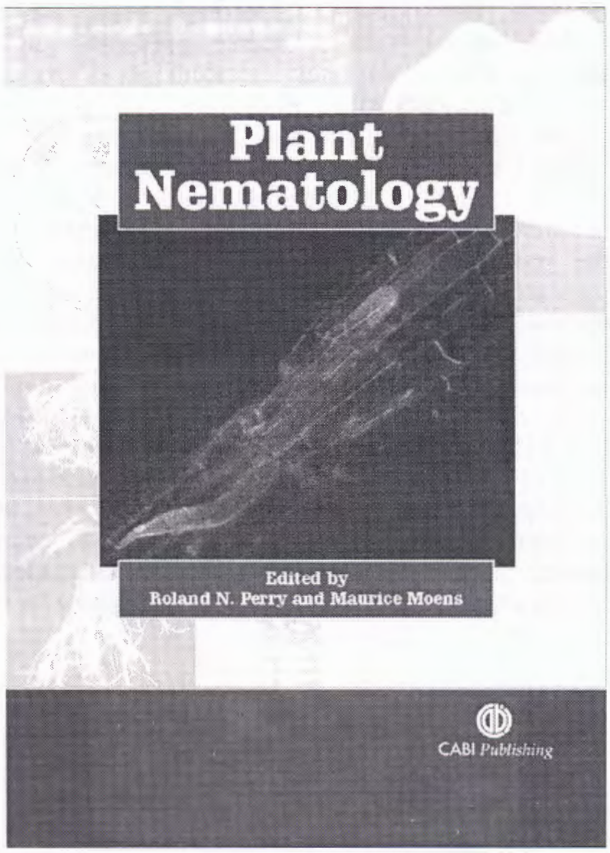
Book review

Roland N. Perry and Maurice Moens (Eds) 2006. Plant Nematology. CABI Publishing, Walingford, UK, 447 pp. ISBN – 1 84593 056 8

Teaching nematology was never easy, as scientific facts about these organisms are scattered between different sources. The science of nematology is separated into a set of autonomous independent domains (such as 'C. elegans science' *vs* 'plant nematology' *vs* 'marine nematology' and even 'entomopathogenic nematode science') and some currently available books do not reflect recent information. With the publication by CABI Publishing of a new introductory book on Plant Nematology at least one part of the bigger nematology picture can be presented to a newcomer as a concentrated collection of facts and ideas. The book has an attractive cover design, which can be interpreted as a symbolic reflection of the purpose of this edition: the nematode as a shining object appearing from the dark background! Sixteen chapters have been authored by the leading specialists in each corresponding area, from morphology and taxonomy to international legislation and chemical control.



In a rather predictable way the book starts from a chapter on morphology and taxonomy. The presentation of nematode morphology (Chapter 1) is done successfully; in the coverage of the main features of nematode morphology the authors have avoided over-detailed narrative, which could have discouraged the unprepared reader. Given the focus of the book, the coverage of nematode morphology is mainly exemplified by the structures of plant-parasitic nematodes but fortunately the presented terminology is relevant for student of nematology who have interests directed to other nematode groups, even animal-parasitic nematodes. Unfortunately for people working in other domains of nematology, the list of taxa (families, subfamilies, genera) at the end of Chapter 1 does not include non plant-parasitic nematodes. The reader finds the new 'cladistic' classification of De Ley and Blaxter (2002) with all Secernentea in a single order, Rhabditida. However, more traditional taxa names, like 'Rhabditia', are occasionally found in the text (p. 15).

Unlike the first chapter, the second one deals with a less traditional topic in nematological education, the application of molecular methods to the taxonomy and phylogeny of nematodes. This chapter is organized in very practical and useful way;examples of problems in nematode taxonomy and phylogeny that have been solved through the application of molecular techniques.

Chapters 3-6 of the first part of the book are devoted to separate groups of plant nematodes: root-knot nematodes (*Meloidogyne*), cyst nematodes (Heteroderinae), migratory endoparasitic nematodes (*Pratylenchus*, *Radopholus* etc.) and ectoparasitic nematodes (longidorids and Tylenchoidea+Criconematoidea). All these chapters are organized in a similar manner: a precise list of the taxa under consideration (in shaded information boxes), followed by sets of data on life cycle, ecology, host range, diagnostics (including molecular approaches) and control. The illustrations deserve special praise; ink drawings, light microscopy and SEM microphotographs are supplemented by gel images, pictures of affected plants, and photo and schematic representation of feeding events on a cellular level. What is especially pleasing is that all the crucial information is summarised in very accessible way. A few hours of pleasant reading will ensure that the newcomer is in command of all the basic facts. Well selected references, not excessive in number, provide links for further self-education.

The second part of the book contains chapters dealing with 'modern' nematology. Probably not every student of nematology will relish reading through pages filled with facts about biochemistry and electrophysiology, for example, but all such facts are presented in a simple, readable style that is not intimidating for the reader; instead, these chapters provoke inspiration when the reader is able to understand detailed phenomena behind some well known plain facts. The first chapter of this part (Chapter 7) starts with the topic, which can frighten even mature nematologists, on reproduction patterns in nematodes: amphimixis, parthenogenesis and hermaphroditism. Nematode development is presented in probably too laconic a way but necessary links to *C. elegans* studies are included. The chapter culminates in a section describing survival mechanisms in plant-parasitic nematodes: anhydrobiosis, diapause and hatching adaptations. The flow diagram of hatching in *Globodera rostochiensis* depicts this cascade-like process. Chapter 8, about behaviour and sensory perception, is interesting reading, returning us in some places back to the morphology and anatomy of nematodes but relating it to a functional level. Described patterns of nematode behaviour are analysed in the context of stimuli acting in plant-nematode interactions (from the simplest attractant, such as carbon dioxide, up to complex plant attractants and pheromones). The schematic diagrams on pages 229 and 237 attract attention, as differences in feeding sites between plant nematodes are immediately obvious.

The next chapter (Chapter 9) is about molecular aspects of plant-nematode interaction and links with the final chapter of the second part of the book about genetic engineering of plant resistance to nematodes. In the former chapter, two main approaches to gene identification and gene functional analysis, ESTs and RNAi, are explained briefly. The authors discuss molecular aspects of the separate stages of plant-nematode interactions: nematode migration toward the target plant, invasion and host plant response, development of feedings sites, resistance and avirulence genes. Chapter 10, about genetic engineering for plant resistance, presents such fantastic approaches as plants producing short double-stranded RNA to suppress nematode genes responsible for parasitism, prevention of feeding-site formation, and proteins inactivating ribosomes.

The third part of the book is about quantitative nematology. This is divided into chapters 11- 16, with the first one describing quantitative aspects of nematode infection of plants, like pre-plant density (Pi), growth reduction in infected plants and the levels of tolerance. The next chapter is about counting nematodes in field infestations and sampling strategies. Chapter 13 is about international rules that ensure the protection of plant health. Quarantine nematodes are listed, and international documents and important websites are provided. The three remaining chapters are about nematode control. The trinity of approaches is covered in each separate chapter: biological and cultural management, the use of resistant cultivars, and chemical control. The knowledge from hundreds of research projects and an even greater number of publications is summarised very effectively in these three chapters. The book ends with references, presented as combined list for all the chapters (special thanks to the editors for this), an index and a glossary, where one can finally discover is the meaning of appressorium or SAR.

This is a very useful book, important as a text book to answer the interests of young colleagues and to provide reference to nematological facts that are well known for experienced nematologists but need explaing to non-nematologists. What is especially pleasing to note is that the information, style and objectives of nematological education developed in the MSc Nematology course at the University of Ghent are presented now to a wider audience in this hard-copy volume.

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