Dorylaimida Mundi (Nematoda)

Checklist of genera and species, with their records

by

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Dedicado a la memoria de mis padres, Juan y Filomena, y
de mi hermano Juan y a mis hermanos Manuel y Mercedes,
por su apoyo a lo largo de toda mi carrera académica.

Preface

This book basically is a compilation, a compendium. It mainly aims to assist and to guide any nematologist interested in the exploration of dorylaimid diversity and its geographical distribution. It is addressed especially, but not only, to young researchers, who very often undergo serious difficulties to find suitable bibliographic references to confirm species identification or simply to access previous records of a particular taxon in a definite territory. Nonetheless, its content may be useful for specialists in other fields too, for instance general zoologists, ecologists and biogeographers, as distribution data represent a considerable part of it.

The reader may assume that this work is not the result of a short-time or punctual project but the achievement of a task conducted for several decades. It is based on the scrutiny of a total of 3385 documents. Many of them, especially those published in the second half of the past century, were obtained by means of endless (reprint) exchange with very appreciated colleagues, some of them already retired (among others, A. Coomans, M.S. Jairajpuri, P.A.A. Loof, M.T. Vinciguerra amd A. Zullini) or sadly deceased (among others, I. Andrássy, V.R. Ferris, J. Heyns, M.R. Siddiqi, D. Sturhan), to whom I will always be extremely grateful.

The book is divided into four recognizable sections. Most content is devoted to provide an updated catalogue of known dorylaimid genera and species, including the literature (papers, books, book chapters) dealing with every taxon. Besides, geographical (country, archipelago, etc.) and environmental (habitat) data about every species are also given. A total of 3453 nominal species (3088 valid, 244 synonymous and 121 *inquirendae* or *incertae sedis*) and 363 nominal genera (285 valid, 75 synonymous, 3 *inquirenda*), which were described until the end of 2020, are included. The second part presents the references mentioned in the main body of the work. The third section offers an alphabetical list of the generic names, whereas the fourth one provides an alphabetical list of the species names.

The author is perfectly aware that this compendium probably is incomplete and that it will contain errors. These 'weaknesses' are due to several causes.

First, some contributions appearing several decades ago might have been omitted as they were published in other than international (*i.e.* national, regional and local) journals. Therefore, they were not incorporated in paper or electronic databases, which made them difficult to find. Second, many works were excluded from the list although they mention a particular dorylaimid taxon because they do not provide any relevant taxonomical or geographical/environmental (but other biological) information. This is usually the case for papers devoted to explain the relation of plant-parasitic forms with their hosts. Third, reiteration is avoided in general when the information about a particular species has been previously compiled, the case of C.H.I. descriptions of plant parasites being a clear example of this. Fourth, and in a few cases, the author was unable to obtain a copy of some rare and/or old publications for their scrutiny. Fifth, and taking into consideration that the literature review has been a toilsome chore, the author does not rule out that some data have been overlooked and/or that they contain small mistakes. On this last concern, I would like to transmit my apologies to the readers in advance, and, at the same time, to ask for their collaboration in detecting (and informing of) any observed fault, including missing references. For this purpose, the readers are encouraged to contact the author by email (rpena@ujaen.es).] And sixth, the compilation was closed at the end of 2020. Thus, it is possible that some contributions which appeared throughout the last months of the year are not included due to their recent publication. All in all, I believe that the information provided will be interesting enough.

Acknowledgements

This book was possible thanks to the help and the collaboration of many people, who facilitated my work in different ways. As already mentioned, appreciated colleagues maintained with me a permanent exchange of reprints and pdf files for several decades. Once more, my most sincere gratitude to them. A particular esteem deserve those who compiled for me papers devoted to explore nematode faunas of their countries and that were not authored by them. This is the case of Dr. Marcel Ciobanu (Cluj Napoca, Romania) and Dr. Vlada Peneva (Sofia, Bulgaria). The assistance of Ms. María del Mar López-Castro, staff member of the Library of the University of Jaén was simply priceless as she looked for and got a myriad of old and/or rare contributions which appeared in many journals everywhere, some of them published in languages using non-Latin alphabets, for instance, Arabic, Chinese, Japanese, Korean and Russian. Ing. Slavka Barláková (Košice, Slovakia), staff member of the Library of the Institute of Parasitology, Slovak Academy of Sciences, very kindly sent me several tens papers dealing with the nematode fauna of her country. To all of them I will always be deeply grateful.

Introduction

Dorylaims: general concept

Dorylaims, the members of the order Dorylaimida, with more than 3400 nominal species, probably are the most diverse ordinal taxon within the phylum Nematoda. They are worldwide distributed in continental habitats, dwell both soils and freshwater sediments, reach high levels of abundance and species richness, display a variety of life strategies exploiting several kinds of food resources (predators, omnivorous, phytophagous, fungivorous, etc.), and play an important role in the structure and function of their biological communities, being regarded as good bioindicators of environmental health.

Morphologically, they are characterised by a recognizable pattern, which is defined by five remarkable traits: stoma armed with a protruding structure (either a mural tooth or an axial odontostyle), bipartite or bottle-like pharynx, hindermost section of intestine differentiated in a prerectum, presence of two (one pair) of male pre-cloacal genital papillae, and absence of caudal glands. At least two of these features, namely the prerectum and the male precloacal pair of genital papillae, are interpreted as autapomorphic states of their respective characters, exclusive of the group.

The monophyly of Dorylaimida has been repeatedly tested and demonstrated on the basis of an integrative approach that combines morphological and molecular data. Their evolutionary relationships with other nematode taxa start to be acceptably elucidated as they form part of the subclass Dorylaimia in the class Enoplea, together with other free-living, plant-parasitic and zoo-parasitic nematode orders. Nevertheless, the internal phylogeny of the group is far from being well-established. Thus, and leaving aside its primary splitting into two suborders, Nygolaimina and Dorylaimina, the monophyly of their superfamilies and families has not been confirmed yet and remains subject of controversy.

Our knowledge of diversity and geographical distribution of dorylaimid taxa certainly is still very partial as many unnamed forms are yet to be discovered, and the faunas of vast territories have been poorly explored or are almost

totally unknown. Nevertheless, a very significant and outstanding advance in the field occurred throughout the second half of the past century and the first two decades of the current millennium. Not in vain, more than 2800 species have been described since 1950.

About this book

Available information about dorylaimid taxa and their geographical records have appeared in a myriad of very disperse contributions, mainly journal articles, but also monographs and books. This information was never systematically compiled, in spite of its scientific interest for fundamental and applied studies. There is no doubt that electronic databases, many of them easily available in open access format, provide a huge account of useful data. These, however, are not complete as they have been taken out from discrete elements (titles, abstracts, keywords, list of references), not from the core content of the corresponding publications, and, very often, have not been depurated or refined. Thus, the main aim of this work is 'to fill a gap'. It is not a typical book but a compilation or compendium to be consulted. In this sense, it resembles some historical titles, for instance those by Baker (1962) and Tarjan and Hopper (1974), in presenting updated lists of taxa, but differs from them in covering a more reduced taxonomical spectrum and in providing distribution data. It summarizes nomenclatorial and distribution data of dorylaimid genera and species as well as their synonyms.

Structure of the content

As mentioned, the information compiled in this book consists of two main components. On the one hand, it includes an inventory or checklist of genera and species hitherto classified under Dorylaimida. On the other hand, it provides distribution records of every nominal species.

The compendium is primary organized on the basis of dorylaimid genera, which are alphabetically ordered by their scientific name, with the corresponding authorship. Thus, no taxonomical or systematic information concerning the classification of these taxa is presented. Data referring to every genus consist of four elements:

(i) A list of its synonyms, if these exist. Every synonym is presented with

its generic name and its authorship. Besides, the reference (author/s, year) where the corresponding synonymy was proposed is also provided. When two or more synonyms are known, they are chronologically ordered according to the year of their original descriptions.

(ii) A list of references dealing with every genus. A register of bibliographic sources appears below the name of every nominal (either valid or synonymous) genus. References are chronologically listed, and they include author/s, year, journal or book title in full, volume, and pages where the taxon is treated. Besides, and in brackets, a few keywords (diagnosis, list of species, key to species, taxonomy, revision, etc.), separated by slash/es, show the nature and interest of the reference content. The history of each genus is hence summarized, and the reader will be able to know, for instance, who has published the last revision or the most recent key to species identification.

(iii) A list of species included in the genus. The name of each valid species is presented with the initial of the genus, followed by the specific epithet, and the authorship (author/s, year). Valid species of the genus are alphabetically ordered by their specific epithet, which is written in bold. The corresponding synonyms of each valid species are presented below the name of the valid species, preceded by the symbol =, and chronologically ordered. The names of the synonyms are written in full (binomen, author/s, year). The reference (author/s, year) where the synonymy was proposed is given too. If they exist, a list of *species inquirenda/ae* and/or *species incertae sedis* follows that of valid species. In general, the reference (author/s, year) in which each species was proposed as *inquirenda* and/or *incertae sedis* is given too.

(iv) A compilation of literature dealing with each species. A register of bibliographic references appears below the name of every nominal (either valid or synonymous) species. References are chronologically listed, and include author/s, year, journal or book title in full, volume, and pages where the taxon is treated, and figures (illustrations) if these are available. Besides, and in square brackets, additional information is provided by means of simple terms separated by slash/es. The first term always refers to the geographical record (country, region, archipelago) reported in the corresponding bibliographic reference. The second term presents the habitat (forest, cultivated plant, sand dune, moss, freshwater, etc.) where the species was found, which can be identified by means of its vernacular (maize, oak) or scientific (*Glicyne max, Quercus* sp.) name of the dominant plant species. Occasionally, one or two additional terms may appear,

giving complementary data, for instance SEM (scanning electron microscopy images available in the corresponding bibliographic reference), and Mol (molecular data). Some references are preceded by an asterisk (*), which means that such references provide no taxonomical information (description, measurements, iconography) but only offer distribution data. Other references may be preceded by a question mark (?), which means that the identity of the recorded species in the corresponding references is doubtful.

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Acephalodorylaimus Ahmad & Jairajpuri, 1983

Ahmad and Jairajpuri (1983). *Nematologica,* 28(1982): pp. 234 & 236. [Diagnosis]
Baqri (1991). *Records of the Zoological Survey of India,* 128: p. 51. [Diagnosis]
Jairajpuri and Ahmad (1992). *Dorylaimida*: p. 175. [Diagnosis / List of species]
Andrássy (2009). *Free-living nematodes of Hungary, III*: p. 529. [Diagnosis]

*A. **attenuatus*** Ahmad & Jairajpuri, 1983

Ahmad and Jairajpuri (1983). *Nematologica,* 28(1982): pp. 236-238, Fig. 2. [Malaysia, India-Manipur / Grass]
Baqri (1991). *Records of the Zoological Survey of India,* 128: pp. 49-50, Fig. 19. [India-Sikkim / Citrus]
Baniyamuddin and Ahmad (2007). *Journal of Nematode Morphology and Systematics*, 10: p. 92. [India-Arunachal Pradesh / Forest]

= *Oriverutus prodelphus* Dhanachand, Mohilal & Joymati, 1992, syn. by Ahmad and Peña-Santiago (2001)

Dhanachand *et al.* (1992). *Current Nematology*, 3: pp. 151-152, Fig. 2. [India-Manipur / Champaca]
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Actinca Andrássy, 1964

***Actinca* Andrássy, 1964**

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Vinciguerra (1988). *Nematologica*, 33(1987): p. 273. [List of species]
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***Actinca* (*Actinca* Andrássy, 1964)**

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*A. **bidentata*** (Loof & Zullini, 2000) Vinciguerra & Clausi, 2003

Vinciguerra and Clausi (2003). *Journal of Nematode Morphology and Systematics*, 5: p. 56.

= *Brasilaimus bidentatus* Loof & Zullini, 2000

Loof and Zullini (2000). *Nematology*, 2: pp. 619-621, Figs 9 & 10. [Costa Rica / Rainforest]

*A. **dicastrii*** Andrássy, 1968

Andrássy (1968). *Opuscula Zoologica Budapestinensis*, 8: pp. 291-293, Fig. 50. [Paraguay / Freshwater]

= *Actinca (Actinca) dicastrii* Andrássy, 1968 (Coomans & Loof, 1986)

Coomans and Loof (1986). *Revue de Nématologie*, 9: p. 230.

= *Brasilaimus dicastrii* (Andrássy, 1968) Vinciguerra, Zullini & Monteiro, 1999
Vinciguerra *et al.* (1999). *Journal of Nematode Morphology and Systematics*, 2: p. 28.

*A. **gracillima*** Andrássy, 1964 (type species)
Andrássy (1964). *Acta Zoologica Hungarica*, 10: pp. 53-55, Fig. 24. [Kenya / Freshwater]
*Jacobs (1984). *Hydrobiologia*, 113: p. 280. [Kenya, Cameroon / Freshwater]

= *Actinca (Actinca) gracillima* Andrássy, 1964 (Coomans & Loof, 1986)
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= *Brasilaimus gracillimus* (Andrássy, 1964) Vinciguerra, Zullini & Monteiro, 1999
Vinciguerra *et al.* (1999). *Journal of Nematode Morphology and Systematics*, 2: p. 28.

= *Actinolaimus papillatus apud* Altherr (1960), *nec* Schneider (1935), syn. by Andrássy (1964)
Altherr (1960). *Bulletin de l'Institut Français d'Afrique Noire*, 22: pp. 784-785, Fig. 8. [Cameroon / Freshwater-river]
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*A. **marisae*** Andrássy, 2010
Andrássy (2010). *Opuscula Zoologica Budapestinensis*, 41: pp. 175-178, Figs 1 & 2. [Brazil-Paraná / Freshwater-rivulet]

*A. **memorabilis*** Andrássy, 1968
Andrássy (1968). *Opuscula Zoologica Budapestinensis*, 8: pp. 289-291, Fig. 49. [Paraguay / Freshwater]
?Altherr (1972). *Amazoniana*, 3: pp. 156-160, Fig. 6. [Brazil / Freshwater-river]
?*Altherr (1977). *Amazoniana*, 6: p. 148. [Brazil / Freshwater-river]

= *Actinca (Actinca) memorabilis* Andrássy, 1968 (Coomans & Loof, 1986)
Coomans and Loof (1986). *Revue de Nématologie*, 9: p. 230.

= *Brasilaimus memorabilis* (Andrássy, 1968) Vinciguerra, Zullini & Monteiro, 1999
Vinciguerra *et al.* (1999). *Journal of Nematode Morphology and Systematics*, 2: pp. 29-30, Fig. 2. [Costa Rica / Rainforest]
*Esquivel (2003). *Nematropica*, 33: p. 139. [Costa Rica]

*A. **tenuiaculeata*** (Kreis, 1924) Andrássy, 1964
Andrássy (1964). *Acta Zoologica Hungarica*, 10: p. 53.

= *Dorylaimus tenuiaculeatus* Kreis, 1924
Kreis (1924). *Annales de Biologie Lacustre*, 13: p. 130, Fig. 6. [Surinam]

= *Actinolaimus tenuiaculeatus* (Kreis, 1924) Micoletzky, 1925
Micoletzky (1925). *Zoologischer Anzeiger*, 64: pp. 2 & 24-25, Fig. 10. [Surinam, Kenya]
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= *Actinca (Actinca) tenuiaculeata* (Kreis, 1924) Andrássy, 1964
Coomans and Loof (1986). *Revue de Nématologie*, 9: p. 230.

= *Brittonema tenuiaculeatum* (Kreis, 1924) Thorne, 1967
Thorne (1967). *University of Puerto Rico Agricultural Experiment Station, Technical paper* 43: p. 8.

= *Brasilaimus tenuiaculeatus* (Andrássy, 1968) Vinciguerra, Zullini & Monteiro, 1999
Vinciguerra *et al.* (1999). *Journal of Nematode Morphology and Systematics*, 2: p. 29. [*Species inquirenda*]

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*A. **striata*** (Thorne, 1939) Andrássy, 1964
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Vinciguerra (2006). *Freshwater nematodes: Ecology and Taxonomy*: p. 428. [*Species inquirenda*]

= *Actinolaimus striatus* Thorne, 1939
Thorne (1939). *Capita Zoologica*, 8: p. 75, Plate XI-Fig. 88. [USA-Virginia / Freshwater-stream bank]

= *Paractinolaimus striatus* (Thorne, 1939) Meyl, 1957
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= *Actinca (Actinca) striata* (Thorne, 1939) Andrássy, 1964
Coomans and Loof (1986). *Revue de Nématologie*, 9: p. 230.

= *Brasilaimus striatus* (Thorne, 1939) Vinciguerra, Zullini & Monteiro, 1999
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Species incertae sedis:

*A. **fusiformis*** (Thorne, 1967) Andrássy, 1970
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