Dorylaimida part II: Superfamily Dorylaimoidea

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Freshwater Nematodes

Ecology and Taxonomy

DEDICATION

Over the past decade more than 130 students (including me), mainly from developing countries have been trained in the field of nematology at Ghent University, Belgium, in collaboration with and through the financial support of the government of Belgium.

This book is dedicated to the **Postgraduate International Nematology Course (PINC), Ghent University, all the professors, scientific and technical staff** and especially to two professors, **Dr. August Coomans** and **Dr. Etienne Geraert**. These prominent nematologists initiated the programme, spearheaded its progress over the past decade, guided the research work of numerous students and continue to support this unique international programme that aims at promoting the science of nematology on a global scale.

Eyualem-Abebe

Freshwater Nematodes
Ecology and Taxonomy

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CABI Publishing

CABI Publishing is a division of CAB International

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Tel: +44 (0)1491 832111
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Website: www.cabi-publishing.org

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Cambridge, MA 02139
USA

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E-mail: cabi-nao@cabi.org

A catalogue record for this book is available from the British Library, London, UK.

A catalogue record for this book is available from the Library of Congress, Washington, DC.

Library of Congress Cataloging-in-Publication Data

Freshwater nematodes: ecology and taxonomy/edited by A. Eyualem, I. Andrássy, W. Traunspurger.
p. cm.
Includes bibliographical references and index.
ISBN-13: 978-0-85199-009-5 (alk. paper)
ISBN-10: 0-85199-009-6 (alk. paper)
1. Freshwater nematodes. I. Abebe, E. (Eyualem) II. Andrássy, I. (István) III. Traunspurger, W. (Walter) IV. Title.

QL391.N4F74 2006
592′.57176--dc22 2005010266

ISBN 0 85199 009 6
978 0 85199 009 5

Typeset by SPI Publisher Services, Pondicherry, India
Printed and bound in the UK by Biddles Ltd, King's Lynn

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Preface

Over a decade ago, as a graduate student working on freshwater nematodes and having experienced the difficulty of acquiring up-to-date and singularly comprehensive material, I wrote in my thesis '…*the absence of an organized and comprehensive reference material in this group (freshwater nematodes) has made the task of identification cumbersome. Most of the literature is widely distributed in space and time, and to make it easily accessible it needs, at least, to be compiled together*…' This statement still holds true. Over these past few years, I have received repeated requests from budding researchers for a current and relatively inclusive reference work, and this underlined the widespread need for such a resource. This book, though delayed by a decade since I first thought about it, is an attempt to address the prevailing demand by bringing together in a single volume nearly all the available information on the ecology and taxonomy of nematodes of freshwater bodies.

Nematodes are ubiquitous, the most diverse and numerically dominant metazoans in freshwater habitats, and these properties bestow exceptional significance to their role in the environment. An array of functional roles has been attributed to them: 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. Despite all these claims, their importance is very much masked by their small size. In general, their invisibility to the naked eye has played a pernicious role against a better understanding of their importance. Current research on nematode biology generally follows this unfortunate trend, leaving freshwater forms as the least studied: parasitic nematodes are better studied than (>) free-living; terrestrial > aquatic; and marine > freshwater forms.

Discussion on nematode ecology is conspicuously lacking in most limnological treatises. In spite of some recent works on taxonomy and ecology of this group, the nematofauna of the vast majority of the world's inland water bodies still remains largely unknown. Moreover, currently there is a growing awareness of the loss of biological diversity and environmental degradation. There is an increasing interest

among geneticists, genomic researchers, ecologists and phylogeneticists in knowing more about organisms that can be good model systems for revealing life's basic biological processes. Also, ecologists are hybridizing modern genomic tools with classical experimentation to unravel ecological processes and interactions. Several nematode species have been demonstrated to be useful models.

The fact that one can find a dozen or more nematode species in a spoonful of sediment is interesting and even challenging *vis-à-vis* the currently little understood relationship between biodiversity and ecosystem functioning. Seen in the light of ongoing genetic research on model nematodes, it is plausible to assume that in the future other nematode species too may play a central role as model systems in understanding ecological principles. Besides, the enhancement of future genetic research on these animals necessitates our better understanding of their biology and biological diversity. On the other hand, this growing interest in nematodes as model systems can also have a boosting effect on nematological research in that recent developments in genomic tools can help us understand hitherto little understood ecological processes and mechanisms, e.g. by providing new ways of quantifying the various roles of nematodes in the sediment and facilitating their inclusion in benthic food web modelling; something that is currently missing from trophic studies.

This book aspires specifically to bring this largely ignored group of free-living nematodes to the forefront. The year 2003 was celebrated as the 'International Year of Freshwater', giving much needed recognition to the importance of freshwater resources. Nevertheless, informed decisions about this habitat can be made only if we understand its individual components as well as the whole network of interactions within and outside the system. Recognizing the importance of freshwater bodies but leaving out their most numerous and most diverse metazoan inhabitants, i.e. nematodes, indeed do not go together. I believe that future freshwater research will need to emphatically include these largely ignored animals. Consequently, notwithstanding the paucity of information on some aspects of freshwater nematology, I strongly believe that the information contained in this book will help fill an overdue gap in the literature. I also believe it will help enhance research on freshwater nematodes and other fields of biology by facilitating the accessibility of a first comprehensive synthesis of the widely scattered available literature.

In the various chapters of this book, internationally recognized experts review the distribution, abundance, biomass, diversity, production and size structure of freshwater nematodes, as well as their role in environmental studies, and their adaptations to extreme environments. More general chapters such as those on techniques, classification of feeding habits, and the application of indices address issues with broader implications and will be useful to any ecological research on nematodes. One important group that is not reviewed in depth is the Order Mermithida, my efforts to involve experts in mermithid taxonomy and ecology were not successful, for reasons beyond my control. At the eleventh hour, Drs Holovachov and De Ley managed to provide us with a summary of this group (see Appendix); I am grateful to both.

One of the many challenges I encountered during the course of the work on this book was the decision on the appropriate depth and breadth of the taxonomic component. Finding the right balance between producing an up-to-date reference, which can be of use to a wide group of users, and an all-inclusive book that may require a longer time commitment from contributors, was key in shaping the taxo-

nomic content. I discussed this issue with the co-editors and many contributors extensively, not least during a face-to-face meeting of all prospective contributors in 2002 during the Fourth International Congress of Nematologists in Tenerife. All participants agreed that ideally a book that would enable the identification of any freshwater nematode to the species level, by providing descriptions of all known freshwater species, would be the most complete and most useful material to produce. However, it would also require a significantly longer time than it took us to produce this current one (4 years). In the end, despite the need for species-level descriptions, feasibility dictated that the contributors and I limit the primary purpose of this book to be a starting point for all researchers on freshwater nematodes. To this effect, each taxonomic chapter in the book provides information that enables a genus-level identification, references to important reviews, as well as a list of species reported from freshwater bodies and available ecological information. This first step clearly forebodes that more encyclopaedic completeness is expected from freshwater nematologists in the future.

Another important decision I made was what classification scheme to follow for the presentation of the book; the reasons for such a decision are discussed in depth in the introductory chapter. The choice to follow this most recent classification scheme was openly discussed among the various authors. Seen in light of the different classifications entertained in the nematological literature, I neither expected everyone to agree on a single scheme nor was I naïve enough to assume that this issue could be addressed in depth to the satisfaction of all involved. Notwithstanding these problems, all contributors agreed to use the suggested scheme to the taxonomic category level of order and they used their choice of preference below that level. Although some authors do support the used classification scheme, readers should take note of the fact that authorship in no way implies a *de facto* acceptance of the classification scheme used in the book.

Contributors provided taxonomic diagnosis to categories at the genus level and above, and I have attempted to maintain relative uniformity with regard to content and depth of information provided for these categories. For each genus, a taxonomic diagnosis is provided, accompanied by figures illustrating generic characters and a complete list of those species reported from inland water bodies. However, in some chapters, a full and complete list of species is also provided. The advantages of providing such a complete list of species had to be deferred in some chapters for practical reasons; presenting the information on every species of a group with such a huge diversity in just a single volume would have far exceeded the intended size of the book.

With regard to the style of presentation, I have chosen not to enforce a uniform style of presentation and have left the choice to the contributors to follow their preferences. For example, some contributors have provided dichotomous keys to simplify identification at various levels of taxonomic category in addition to species lists. At the species level, each species name is accompanied by the type of environment/water body, as well as a list of geographical localities it has been reported from, with the relevant references. However, in this accompanying information too, I have encouraged variations in the styles of presentation and the balance between the different authors' emphases on morphology *versus* ecological information.

By providing an overall review of the ecology and taxonomy at genus and higher level taxon category, 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, soil biologists and other researchers whose area of study is closely tied to nematodes but whose interest and attempts to include them in their research were hampered by the inaccessibility of the literature. Despite the fact that fairly detailed microscopic studies are required for nematode identification, line drawings that accompany generic diagnoses, tabulated summaries of characters and character states, and dichotomous keys in the book are intended to help ease the identification process. Be that as it may, nematological research needs to attract a much larger number of students in the next decade to offset current and recent decline of student interest in the field. As I mentioned in my introductory paragraph, for students and budding researchers, finding their way in nematological literature is time-consuming, frustrating and therefore not an easy stumbling block to overcome; it is my sincere hope that this book will reduce this hurdle by providing a starting point of reference and stimulate students enough to plant the seeds of interest in working in the field of freshwater nematology.

Many people have generously extended their assistance to me in various ways from the beginning till the completion of this book. I am deeply indebted to William Kelley Thomas and Thomas Kocher, co-directors of the Hubbard Center for Genome Studies, University of New Hampshire, USA, for allowing me to use the facilities of the centre, especially W.K. Thomas for his encouragement and for providing the necessary time and resources I needed for the editorial work. I also thank members of Thomas' Environmental Genomics Lab: Krystalynne Morris, Darren Bauer, Jobriah Anderson, Rick Roy and Laurie Szilagyi for supporting my editorial work in multiple ways. I thank Mark Blaxter, Institute of Cell, Animal and Population Biology, University of Edinburgh, UK and members of the Blaxter Nematode Genomics Lab for their support during the early phase of this project.

This book took its final form as a result of extended exchanges of ideas with and unreserved input from various co-authors. I thank August Coomans, Ghent University, Belgium, Paul De Ley, University of California, Riverside, USA, Wilfrida Decraemer, Royal Belgian Institute of Natural Sciences, Belgium, Maria Teresa Vinciguerra, Università di Catania, Italy, Reyes Peña Santiago, Universidad de Jaén, Spain, Aldo Zullini, Università di Milano-Bicocca, Italy, and Nic Smol, Ghent University, Belgium, for their many constructive suggestions. I especially thank the first three for their continuous encouragement and support, and for the long and frequent discussions that shaped the content and presentation of this book. All co-authors have carefully read the various versions of their manuscripts and accommodated the suggestions from the editors for change; I thank them all.

The two co-editors, Professor Drs Walter Traunspurger and István Andrássy, generously accepted the responsibility to be co-editors despite their other pressing commitments, and played a central role in enhancing the quality of the manuscripts submitted for the ecological and taxonomic parts, respectively. Both were supportive of the idea of the book from its inception and continued to provide constructive suggestions to me and the other co-authors until its completion. My journey with both from the beginning to the completion of this book has been both enjoyable and highly educational; I am deeply indebted to both. Nevertheless, despite the help I received from these co-editors and other co-authors, the final decision (and any

blame that might derive therefrom) as to the depth of contents of the different chapters in the book was my own and mine alone.

One person who missed the most while I was grappling with the organization and editorial work over the past 3 years was my son, Eyob. I thank him for being extremely patient with me and, hopefully, he will benefit from his patience in the long run.

Eyualem-Abebe

Foreword

In this hectic time new possibilities open up several directions for new research. New scientific results are, with increasing speed, being distributed along electronic channels. Nevertheless books retain their right to exist. They bring together scattered information, may weave it into a general pattern, give more or less complete reviews on literature on any subject, provide syntheses; in short they serve as monuments which cause scientists to sit down and reflect. Thus they act as a necessary counterweight against the ever-increasing stream of new data.

Ecology and taxonomy always have been close allies. In order to understand the position of any animal group in a biocoenosis, it is an absolute prerequisite that the identities of the taxa involved have been established firmly. Nematology is in the happy position that morphology and taxonomy of free-living and plant-parasitic nematodes have developed strongly during the last 50–60 years (T. and J.B. Goodey, Chitwood, Steiner, Thorne and the next generation, consisting of so many investigators that naming some would do others an injustice). Another factor is the rapidly growing information technology providing databases which bring together many facts and enable these to be ordered into a consistent whole. In this way nematode communities can be analysed and their relationships to ecological conditions detected. This in turn might lead to nematode communities being used for characterization of soils and sediments.

What is needed, therefore, is a combination of ecology and taxonomy, and this is what this book gives. Many outstanding ecologists and taxonomists have contributed, and discussed relevant subjects. Also the three editors are well-known authorities in their fields and they are to be congratulated on producing a book of this quality. I am confident that it will act as a potent stimulus for both branches of science.

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Foreword

Freshwater sediments teem with nematodes. Scientists who delve into the mud of ponds, lakes, streams and rivers, find a teeming, fascinating world of microscopic nematodes, one of the most dominant invertebrate groups on earth. Often the scientists are asked by colleagues and non-scientists alike, 'why do you study these creatures?' and 'how do nematodes contribute to ecosystems?' The answers will vary, but for all intrigued by the shapes, sizes, biology and natural histories of nematodes living amongst the diverse freshwater habitats this book is an obvious next step for addressing these questions. Throughout the chapters experts present current scientific information on freshwater nematodes: the methods for extraction from sediments; the taxonomy of the freshwater species; food web relationships; and nematode ecology and biogeography. Additionally, these experts extend their understanding of the animals and their interactions to applications for environmental science. In a way, these chapters also explain why we study nematodes and determine their role in ecosystems: we are captivated by the vast diversity found in tiny representative samplings of the world's freshwater sediments and we are amazed at their many abilities and interactions in the regulation of ecosystem processes, above and below the surface. Learning about nematodes in sediments helps explain how the wealth of biodiversity in freshwater ecosystems operates and how it will need to be sustained in the future.

The themes of this book, ecology and morphology, are at the core of research for current global issues addressing the loss of biodiversity and resulting changes in ecosystem functioning. Biodiversity and ecosystem functioning were considered as separate research disciplines 15 years ago, but that has changed as we have recognized the connections between species and ecosystem processes. Biodiversity, the variability in life across many scales, developed along lines of research exploring morphological and genetic differences between species, their phylogenetic relationships and biogeographical distributions. Taxonomists thus provided the foundation

on nematode identities, associations, types of freshwater habitats and biogeography. Ecologists concentrated their efforts on understanding nematode natural history, food web structure and processes of decomposition, primary production and transfer of nutrients, energy and materials. The result was a clearer understanding of the role of nematodes and nematode trophic groups in critical ecosystem processes. Today, our knowledge of nematode biodiversity and ecosystem functioning are becoming intertwined because we need to know the taxa and habitats within freshwater sediments that are most vulnerable to global changes.

There is global scientific consensus that the biodiversity within Earth's freshwaters and sediments, the ponds, lakes, streams, rivers and groundwater, is degrading, with confounding and potentially devastating impacts for humans. The benefits or services that are provided by the biodiversity within freshwater ecosystems, such as food, clean drinking water, economic livelihood (tourism, fishing, water sports) and the aesthetic and cultural benefits, are becoming recognized by policy makers and the public. With this recognition has been an increased appreciation by scientists for the poorly known invertebrates, such as nematodes, and greater attention to the discovery of needed information on whether hot spots of biodiversity exist on global or local scales, whether there are key species for an ecosystem process, such as predaceous nematode taxa, or how an invasive species may change the rate of carbon mineralization. Nematodes are a major player in biodiversity worldwide. There is an urgency to improve our understanding of the species and how nematodes contribute to and regulate the operation of freshwater ecosystems if we are to meet the challenge of sustaining these ecosystems for the future. This is the reason why this volume is needed and timely.

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II Taxonomy

15 Dorylaimida Part II: Superfamily Dorylaimoidea

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Superfamily DORYLAIMOIDEA de Man, 1876

Diagnosis. Dorylaimina. Cuticle generally smooth or finely transversely striated, sometimes marked with longitudinal ridges. Lip region offset or continuous with adjoining body; lips distinct or fused, bearing two circles of labial papillae. Amphidial fovea stirrup-shaped with slit-like aperture. Odontostyle axial of varying size and shape; odontophore generally rod-like, rarely provided with basal knobs (flanged). Guiding ring appearing single or double. Pharynx generally in two parts: a slender anterior and an enlarged posterior part; their relative length varying in the different taxa. A pre-rectum is always present. Female reproductive apparatus didelphic or monodelphic. Vulva transverse, longitudinal or pore-like. Male reproductive apparatus always diorchic. Spicules generally arcuate, provided with central thickening and a pair of guiding pieces. Before the cloacal aperture a pair of ventral ad-cloacal papillae is always present and, before it, a row of ventromedian supplements, varying in number and arrangement. Tail varying in shape and length, similar or different in the two sexes. The members of Dorylaimoidea are often inhabitants of terrestrial habitats but many species, and in some cases even larger taxa, can live in freshwater.
Additional references: Jairajpuri and Ahmad (1992); Thorne, 1939; Thorne and Swanger, 1936.
Note: Freshwater species of genera reported from both freshwater and terrestrial habitats are marked with an asterisk; the term abw denotes anal body widths.

Families:

DORYLAIMIDAE de Man, 1876
ACTINOLAIMIDAE Thorne, 1939
QUDSIANEMATIDAE Jairajpuri, 1965
THORNIIDAE De Coninck, 1965
THORNENEMATIDAE Siddiqi, 1969
APORCELAIMIDAE Heyns, 1965
NORDIIDAE Jairajpuri & A.H. Siddiqi, 1964
LONGIDORIDAE Thorne, 1935

  Freshwater Nematodes: Ecology and Taxonomy (eds Eyualem-Abebe *et al.*)

CRATERONEMATIDAE Siddiqi, 1969
LORDELLONEMATIDAE Siddiqi, 1969

Key to families of DORYLAIMOIDEA

1. Cheilostome armed with four massive onchia encircling the odontostyle . . . . . ACTINOLAIMIDAE
   Cheilostome without onchia 2
2. Presence of numerous body pores leading to cuticularized ducts . . . . . LORDELLONEMATINAE
   Body pores, if present, indistinct 3
3. Mouth cavity cyathiform, odontostyle guiding sheath anteriorly sclerotized . . . . . CRATERONEMATIDAE
   Mouth cavity tubular; odontostyle guiding sheath not sclerotized 4
4. Large size; odontostyle extremely long and thin with fine lumen and aperture . . . . . LONGIDORIDAE
   Odontostyle not so long and thin or, if thin, small size 5
5. Lip region low, not offset; the two circles of labial papillae close to each other; gubernaculum present . . . . . THORNIIDAE
   Lip region prominent; the two circles of labial papillae far apart; gubernaculum absent 6
6. Labial framework and mouth cavity with sclerotized pieces . . . . . THORNENEMATIDAE
   Lip region without sclerotizations 7
7. Odontostyle slender, more or less long, with narrow lumen and aperture . . . . . NORDIIDAE
   Odontostyle not very long, with wide lumen and aperture 8
8. Female tail elongated to filiform; male tail generally short, rarely as in females . . . . . DORYLAIMIDAE
   Tail similar in both sexes, short conoid or rounded 9
9. Odontostyle aperture longer than half its length . . . . . APORCELAIMIDAE
   Odontostyle aperture not longer than half its length . . . . . QUDSIANEMATIDAE

Family CRATERONEMATIDAE Siddiqi, 1969

Diagnosis. Dorylaimoidea. Cuticle thin. Lip region off set. Lips distinct. Mouth cavity cyathiform. The guiding sheath around the distal end of odontostyle is sclerotized. Odontostyle thin, with small aperture. Pharynx enlarging near middle. Female gonads paired; vulva pore-like; vagina lacking sclerotizations. Male supplements few, spaced; spicula lacking central thickening piece. Tail elongate conoid in both sexes. The species belonging to this family are typical inhabitants of terrestrial habitats.

Family LORDELLONEMATIDAE Siddiqi, 1969

Diagnosis. Dorylaimoidea. Cuticle rather loose. Body pores conspicuous leading to prominent cuticularized ducts. Lip region offset by constriction. Odontostyle with wide lumen and aperture. Odontophore rod-like. Guiding ring single. Female reproductive apparatus amphidelphic or monodelphic. Males rare. Male supplements low,

well spaced. Spicula with or without median piece. Tail short conoid to elongate conoid, similar in both sexes. The species belonging to this family are typical inhabitants of terrestrial habitats.

Family THORNENEMATIDAE Siddiqi, 1969

Diagnosis. Dorylaimoidea. Cuticle smooth. Labial framework and mouth cavity with sclerotized pieces. Odontostyle dorylaimoid; simple or double. Expanded part of pharynx about one-third its length. Second pair of sub-ventral glands and nuclei located far anterior to pharynx base. Female reproductive apparatus amphidelphic or mono–opisthodelphic. Tail similar or different in both sexes. The family includes many genera and species, which are typical inhabitants of terrestrial habitats, even though a few species have been occasionally found in wet habitats.

Family LONGIDORIDAE Thorne, 1935

Diagnosis. Dorylaimoidea. Body slender and large-sized (1–12 mm long). Lip region continuous or offset. Amphids with large fovea and slit- or pore-like aperture. Odontostyle exceedingly long and thin, with fine lumen and aperture. Odontophore rod-like or with basal flanges. Guiding ring simple or double. Anterior part of pharynx tubular, non-muscular; the muscular, expanded posterior part about one-fourth of pharynx length. Female reproductive apparatus didelphic or monodelphic. Spicula dorylaimoid. Tail generally short, conoid or rounded, similar in both sexes. The family includes many genera and species, which are typical inhabitants of terrestrial habitats, in association with plant roots, and virus vectors. Occasionally a few of the numerous known species have been found in wet habitats.

Family DORYLAIMIDAE de Man, 1876 (Andrássy, 1988; Jairajpuri & Ahmad, 1992)

Diagnosis. Dorylaimoidea. Small to large nematodes. Cuticle smooth or finely transversely striated, in a few cases marked by longitudinal ridges. Lip region off set or continuous with the adjoining body. Odontostyle straight or slightly sinuate, with rather wide lumen; its aperture about one-third its length; guiding ring simple or double. Pharynx muscular, expanded posteriorly for about half its length. Pre-rectum distinct. Female reproductive apparatus didelphic; vulva transverse or longitudinal; *pars refringens* of vagina sclerotized. Male reproductive apparatus diorchic. Spicules generally dorylaimoid, with central thickening and lateral guiding pieces, rarely simple (alaimoid) lacking central thickening and lateral pieces; a pair of ad-cloacal papillae and a row of ventromedian supplements present. Tail generally with sexual dimorphism: attenuated or filiform in female; short and rounded in male; in few cases long and filiform in both sexes. Almost all the genera of this family include freshwater or semi-freshwater species.

Subfamilies :
Dorylaiminae de Man, 1876
Prodorylaiminae Andrássy, 1969
Laimydorinae Andrássy, 1969
Afrodorylaiminae Andrássy, 1969
Amphidorylaiminae Andrássy, 1976 (no freshwater species)

Genus *incertae sedis* within the family:
Kunjudorylaimus Dhanam & Jairajpuri, 2000 (no freshwater species)

Key to subfamilies of DORYLAIMIDAE

1. Tail long, filiform in both sexes 2
   Tail almost always with sexual dimorphism 3
2. Spicules simple, alaimoid . . . . . Amphidorylaiminae
   Spicules dorylaimoid . . . . . Prodorylaiminae
3. Cuticle with longitudinal ridges . . . . . Dorylaiminae
   Cuticle without longitudinal ridges 4
4. Pre-rectum very long; sub-medial papillae on male posterior body very small . . . . . Laimydorinae
   Pre-rectum short; sub-medial papillae on male posterior body unusually strong . . . . . Afrodorylaiminae

Subfamily Prodorylaiminae Andrássy, 1969

Diagnosis. Dorylaimidae. Large nematodes. Cuticle without longitudinal ridges. Labial papillae 6 + 10. Odontostyle guiding ring simple. Spicules dorylaimoid. Supplements numerous. Tail long and filiform in both sexes.

Additional reference: Andrássy (1988).

Genera:

Prodorylaimus Andrássy, 1959

Prodorylaimium Andrássy, 1969

Protodorylaimus Andrássy, 1988

Key to genera of Prodorylaiminae

1. Pre-rectum extremely long in both sexes (more than 15 anal body widths); body very slender (a to 80) . . . . . *Protodorylaimus*
   Pre-rectum short in both sexes; body not so slender 2
2. Supplements not numerous, spaced . . . . . *Prodorylaimium*
   Supplements numerous, contiguous . . . . . *Prodorylaimus*

Genus *Protodorylaimus* Andrássy, 1988 (Figs 15.1A–C)

Diagnosis. Prodorylaiminae. Medium–large-sized nematodes. Body exceedingly slender (a = 64–81). Lip region continuous. Odontostyle short and weak; guiding ring single. Pre-rectum in both sexes extremely long (15–25 anal body widths). Female gonads paired. Vulva longitudinal. Supplements numerous, contiguous. Tail long; filiform in both sexes. One of the two described species has been found in a freshwater habitat.

Type species: *P. dalmassoi* (Loof, 1985) Andrássy, 1988 (France, Spain)*

Other species:

P. kazakhstanicus (Sagitov, 1973) Andrássy, 1988 (Kazakhstan)

Additional reference: Andrássy (1988).

Genus *Prodorylaimus* Andrássy, 1959 (Figs 15.1D–F)

Diagnosis. Prodorylaiminae. Cuticle smooth or finely transversely striated. Lip region moderately off set; lips more or less distinct. Odontostyle straight; guiding ring simple, distant from anterior end at least one lip region width. Pharynx enlarging near its middle; pre-rectum rather short (1–4 abw in females and 4–8 abw in males). Female gonads paired; vulva longitudinal or transverse; vagina with sclerotized

Fig. 15.1 A–C: *Protodorylaimus*; D–F: *Prodorylaimus*; G and H: *Prodorylaimium*.

pieces. Supplements numerous (13–31), contiguous. Tail elongate to filiform in both sexes. The species of this genus are frequently found in freshwater habitats.

Type species: *P. longicaudatoides* Altherr, 1968 (Germany, The Netherlands, Hungary, Spain, Russia, Kenya)

Other species:
P. andrassyi (Zullini, 1973) Loof, 1985 (Mexico)
P. brasiliensis (Meyl, 1956) Andrássy, 1959 (Brazil)
P. cantabricus Peña-Santiago, Abolafia & Jiménez-Guirado, 1998 (Spain)
P. dahli (Altherr, 1960) Andrássy, 1964 (Cameroon)
P. depressus Loof, 1973 (Surinam)
P. dolichurus (Loos, 1946) Siddiqi, 1969 (Sri Lanka)
P. donghagens Choi & Khan, 1999
P. eliavai Tsalolikhin, 1977 (Baikal Lake)
P. ensis Kleynhans, 1970 (South Africa)
P. filiarum Andrássy, 1964 (Hungary, Austria, Spain, UK, Russia, Ukraine, The Netherlands)
P. fukushimaensis Khan & Araki 2002 (India)
P. hamatus Loof, 1973 (Surinam)
P. jihuai Ahmad & Ahmad, 2001 (India)
P. kukuy Tsalolikhin, 1977 (Baikal Lake)
P. magnus Alekseev & Dolgova, 1993
P. mas Loof, 1985 (The Netherlands, Switzerland, Germany, Austria, Italy, Hungary)
P. obesus Ahmad & Jairajpuri, 1982 (India)
P. paralongicaudatus (Micoletzky, 1925) Andrássy, 1959 (Kenya, Congo Republic, Tanzania, Angola, Lithuania, Hungary)
P. paraobesus Ahmad & Shaheen, 2004
P. ranzii (Zullini, 1973) Loof, 1985 (Mexico)
P. rionensis (Gerlach, 1954) Andrássy, 1959 (Kenya, Brazil, South Africa)
P. rotundiceps Loof, 1985 (The Netherlands, Switzerland, UK, Hungary)
P. sturhani Ahmad & Ahmad, 2001 (India)
P. taebekensis Choi & Khan, 1999
P. uliginosus Loof, 1985 (The Netherlands, Switzerland, Austria, Germany, Italy)
Additional reference: Loof (1985, 2000) and Andrássy (1988).

Genus *Prodorylaimium* Andrássy, 1969 (Figs 15.1G and H)
Diagnosis. Prodorylaiminae. Cuticle smooth or finely transversely striated. Lip region moderately off set; lips more or less distinct. Odontostyle straight or slightly sinuate; guiding ring simple, distant from anterior end less than one lip region width long. Pharynx enlarging near its middle; pre-rectum 2–3 anal body widths long in females, originating at level of the anterior supplements in males. Female gonads paired; vagina with sclerotized pieces. Supplements few (6–10), spaced. Tail elongate to filiform in both sexes. The species of this genus are frequently found in freshwater habitats.

Type species: *P. brigdammense* (de Man, 1876) Andrássy, 1969 (Europe and Asia, Surinam)

Other species:
P. alpinum Andrássy, 1978 (Nepal, Korea)
P. goaense Ahmad & Jairajpuri, 1985 (India)
P. stenosoma (de Man, 1876) Andrássy, 1973 (The Netherlands)
Additional reference: Andrássy (1988).

Subfamily Dorylaiminae de Man, 1876
Diagnosis. Dorylaimidae. Generally large nematodes. Cuticle marked by longitudinal ridges. Labial papillae 6 + 10. Odontostyle robust, straight; guiding ring double. Vagina with sclerotizations. Supplements numerous, arranged in a single series or in two fascicles. Spicules dorylaimoid. Tail elongate to filiform in females, short and rounded in males. Mainly freshwater species.
Additional reference: Andrássy (1988).
Genera:
Dorylaimus Dujardin, 1845
Ischiodorylaimus Andrássy, 1969

Key to genera of Dorylaiminae
1. Supplements arranged in a continuous series . . . . . .*Dorylaimus*
   Supplements arranged in fascicles . . . . . .*Ischiodorylaimus*

Genus *Dorylaimus* Dujardin, 1845 (Figs 15.2A–C)
Diagnosis. Dorylaiminae. Cuticle thick, marked with longitudinal ridges. Lip region moderately offset; lips distinct. Odontostyle straight, robust, 2–3 times as long as lip region width; guiding ring double. Pre-rectum rather long, beginning well before the supplement series in males. Supplements numerous and contiguous. The representatives of this genus are typical freshwater nematodes, inhabiting water bodies and also wet moss and soil.

Type species: *D. stagnalis* Dujardin, 1845 (cosmopolitan)

Other species:
D. afghanicus Andrássy, 1960 (Afghanistan, Nepal, Singapore, Egypt, South Africa, Hungary)
D. alaeus Thorne, 1939 (USA, China)
D. asymphidorus Andrássy, 1969 (Hungary, Italy, Spain, Sahara, South Africa)
D. baylii Nicholas & Hodda, 2000
D. carinatus Thorne & Swanger, 1936 (USA)
D. conicus Andrássy, 1981 (Nepal)
D. crassus de Man, 1884 (Japan, China, Taiwan, USA, Chile, widespread in Europe)
D. deaconi Botha & Heyns, 1991 (South Africa)
D. fodori Andrássy, 1988 (India)
D. geraerti Baqri & Jana, 1986 (India, Ethiopia)
D. gigas Kleynhans, 1970 (South Africa)
D. helveticus Steiner, 1919 (Russia, Canada, USA, Uzbekistan, widespread in Europe)
D. innovatus Jana & Baqri, 1982 (India)
D. lineatus Altherr & Delamare-Deboutteville, 1972 (Canada, USA)
D. macroproctus Altherr, 1963 (Switzerland, Hungary)

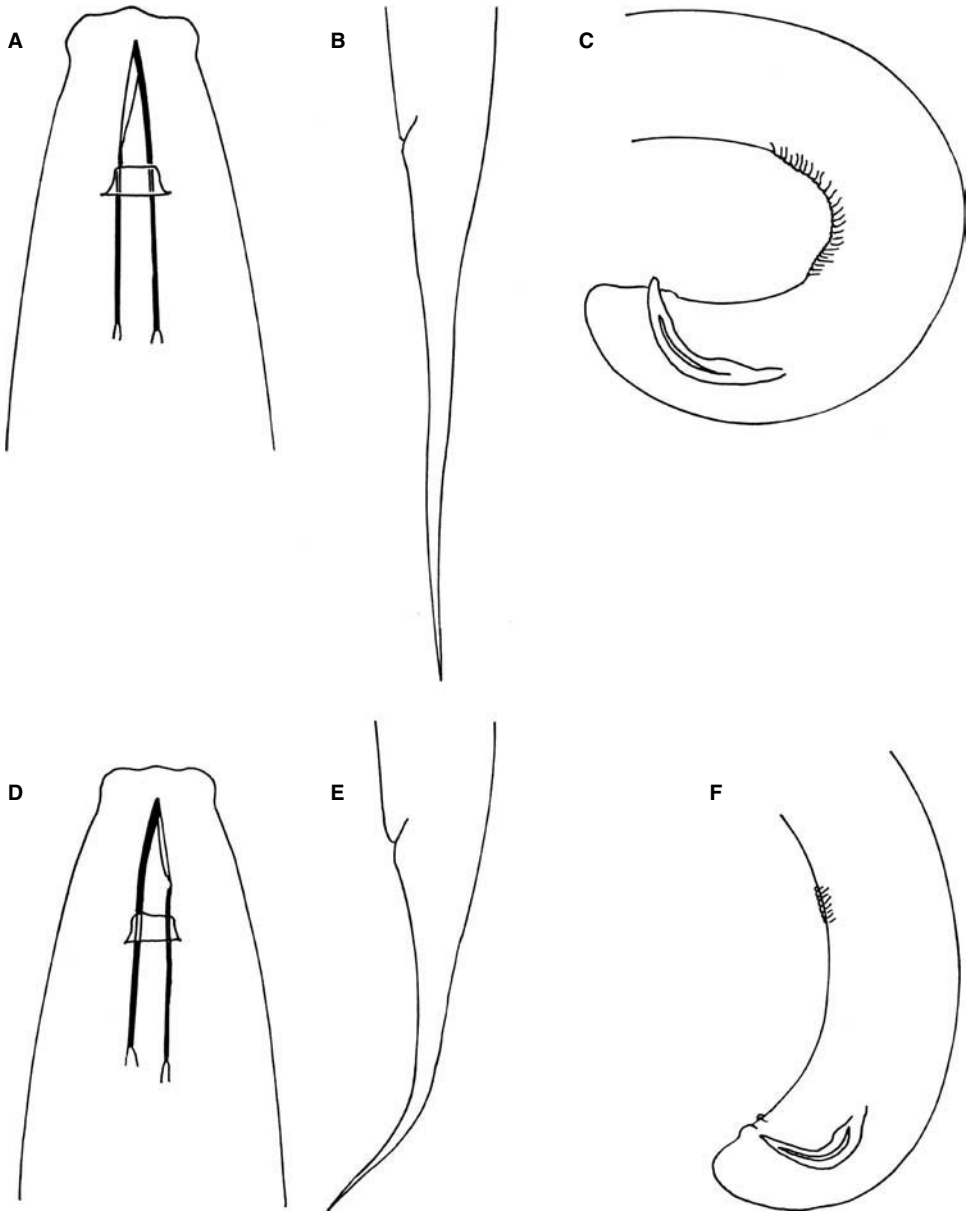

Fig. 15.2 A–C: *Dorylaimus;* D–F: *Ischiodorylaimus.*

D. macrosoma Jiménez-Guirado, 1988 (Spain)
D. montanus Stefanski, 1923 (Switzerland, Poland, Russia, Ukraine, Mongolia, USA)
D. numidicus Andrássy, 1988 (Algeria)
D. pachys Andrássy, 1970 (South Africa)
D. popus Gagarin, 1981 (Tadzhikistan)
D. siddiqii Ahmad & Jairajpuri, 1982 (India)
D. specialis Andrássy, 2003 (Alaska)

D. stekhoveni Baqri & Coomans, 1973 (Congo Republic)
D. stenus Andrássy, 1970 (South Africa)
D. stephani Andrássy, 1969 (Kenya)
D. tepidus Andrássy, 1959 (Switzerland, Hungary, Italy, Moldavia, Uzbekistan, Kenya)
D. unicus Andrássy, 1970 (South Africa)

Additional reference: Andrássy (1988).

Genus *Ischiodorylaimus* Andrássy, 1969 (Figs 15–2D–F)
Diagnosis. Dorylaiminae. Very large nematodes. Cuticle marked by longitudinal ridges. Lip region slightly offset; lips not well distinct. Odontostyle straight, 2–3 times as long as lip region width; guiding ring double. Pre-rectum long; in males beginning far before the supplements. Vulva longitudinal. Male supplements arranged in two fascicles between which there is a small row of separate supplements.
The species of this genus are typical inhabitants of freshwater habitats mostly found in Africa, but present also in Europe and Asia.

Type species: *I. gulliver* (Andrássy, 1964) Andrássy, 1969 (Kenya, South Africa)

Other species:
I. bathypyla Andrássy, 1970 (South Africa)
I. cognatus Andrássy, 1983 (Hungary)
I. loeffleri (Andrássy, 1964) Andrássy, 1969 (Kenya)
I. minimus Khan, Jairajpuri & Ahmad, 1989 (India)
I. novus Baqri & Jana, 1986 (India)
I. paraugandanus Khan & Ahmad, 1994 (India)
I. robustus Zullini, 1974 (Italy)
I. tessares Kleynhans, 1970 (South Africa)
I. ugandanus Andrássy Banage in Andrássy, 1969 (Uganda, Ethiopia)

Additional reference: Andrássy (1988).

Subfamily Laimydorinae Andrássy, 1969
Diagnosis. Dorylaimidae. Cuticle generally smooth, sometimes with annulated subcuticle without longitudinal ridges, (with longitudinal ridges in a single species). Labial papillae 6 + 10. Odontostyle straight; guiding ring simple or double. Spicules dorylaimoid. Supplements contiguous or spaced. Tail attenuated to filiform in female and short and rounded or conoid-rounded in males. Almost all the genera of Laimydorinae include truly freshwater species.
Additional reference: Andrássy (1988).

Genera:
Laimydorus Siddiqi, 1969
Calodorylaimus Andrássy, 1969
Calcaridorylaimus Andrássy, 1986 (no freshwater species)
Crocodorylaimus Andrássy, 1988
Fuscheila Siddiqi, 1982 (no freshwater species)
Halodorylaimus Andrássy, 1988 (no freshwater species)
Idiodorylaimus Andrássy, 1969

Mesodorylaimus Andrássy, 1959
Chrysodorus Jiménez-Guirado & Cadenas, 1985
Miodorylaimus Andrássy, 1986 (no freshwater species)
Namaquanema Heyns & Swart, 1995
Baladorylaimus Andrássy, 2001

Key to genera of Laimydorinae

1. Cuticle distinctly annulated . . . . . *Idiodorylaimus*
   Cuticle smooth or finely striated 2
2. Mouth cavity with sclerotized rods . . . . . *Fuscheila*
   Mouth cavity without sclerotized rods 3
3. Amphidial opening very small; haline species . . . . . *Halodorylaimus*
   Amphidial opening normal 4
4. Male tail conoid, with nipped tip . . . . . *Baladorylaimus*
   Male tail bluntly rounded 5
5. Male pre-rectum very long, beginning far before the supplements 6
   Male pre-rectum shorter, beginning at level of supplements 11
6. Body small, near 1 mm, guiding ring simple . . . . . *Miodorylaimus*
   Body longer than 2 mm, guiding ring double 7
7. Conspicuous yellowish spots around the base of odontostyle; male tail conoid–rounded, ventrally bent . . . . . *Crocodorylaimus*
   No yellowish spots at the odontostyle base; male tail short, bluntly rounded, straight 8
8. Odontostyle with hooked basal processes . . . . . *Namaquanema*
   Odontostyle without hooked basal processes 9
9. Supplements in two groups with some intermediate elements . . . . . *Calodorylaimus*
   Supplements contiguous in a continuous row 10
10. Body very slender (a = 60–92), odontostyle weak and slender . . . . . *Chrysodorus*
    Body not so slender; odontostyle robust . . . . . *Laimydorus*
11. Spicules with small spurs near the distal tip . . . . . *Calcaridorylaimus*
    Spicules without spurs near the distal tip . . . . . *Mesodorylaimus*

Genus *Laimydorus* Siddiqi, 1969 (Figs 15.3A–C)
Diagnosis. Laimydorinae. Large nematodes. Cuticle smooth. Lip region low, not or slightly off set; lips hardly separate. Odontostyle straight, not longer than twice the lip region width; guiding ring double. Pharynx expanding in or behind its middle. Pre-rectum generally very long, in males beginning before the supplements row. Supplements very numerous, contiguous. Female tail attenuated to filiform; male tail short and rounded. The species of this genus are typical inhabitants of freshwater habitats.

Type species: *L. prolificus* (Thorne & Swanger, 1936) Siddiqi, 1969 (USA)

Other species:
L. afer (Andrássy, 1964) Andrássy, 1986 (Kenya)
L. africanus Botha & Heyns, 1993 (South Africa)

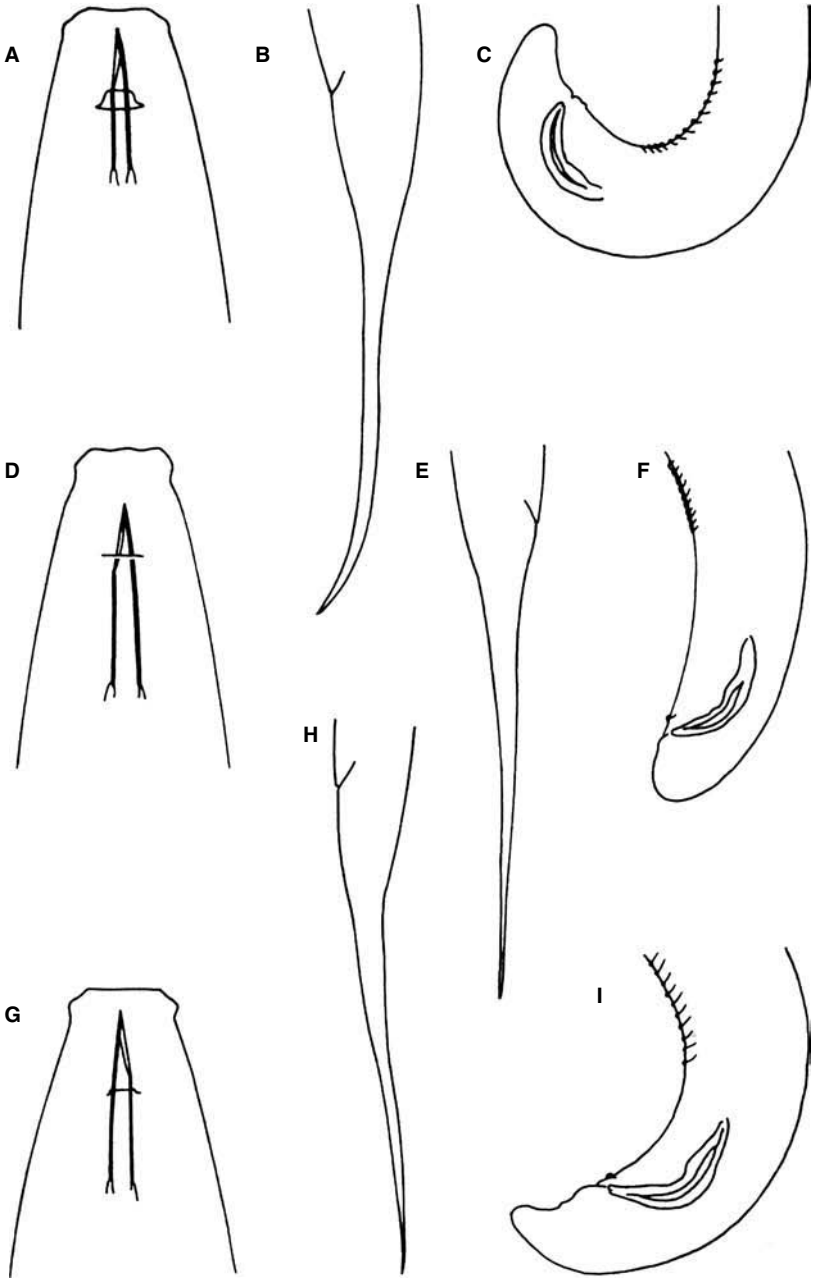

Fig. 15.3 A–C: *Laimydorus*; D–F: *Calodorylaimus*; G–I: *Crocodorylaimus*.

L. agilis (de Man, 1880) Siddiqi, 1969 (USA, Brazil, Russia, Armenia, Lithuania, Northern Russia, Uzbekistan)
L. aquatilis (Skwarra, 1921) Andrássy, 1988 (Germany)
L. baldus Baqri & Jana, 1983 (India)
L. bongersi Loof, 1996 (The Netherlands)

L. constrictus Loof, 1996 (The Netherlands)
L. coomansi Baqri, 1991 (India)
L. coroniceps Loof, 1996 (Brazil)
L. crassoides (Jägerskiöld, 1908) Siddiqi, 1969 (Switzerland)
L. cryptosperma (Loof, 1969) Baqri & Coomans, 1973 (USA)
L. distinctus Dey & Baqri, 1986 (India)
L. doryuris (Ditlevsen, 1911) Andrássy, 1986 (Denmark, Holland)
L. elephas Andrássy, 1988 (USA)
L. esquiveli Ahmad & Shaheen, 2004
L. finalis Thorne, 1975 (India, USA, Russia)
L. flevensis Loof, 1996 (The Netherlands)
L. gazella Andrássy, 1970 (Ethiopia, South Africa)
L. halophilus (Daday, 1897) Andrássy, 1969 (Hungary)
L. keilini (Lee, 1961) Andrássy, 1986 (Nigeria)
L. kherai Baqri, 1985 (India)
L. luettichaui (Meyl, 1957) Siddiqi, 1969 (Tanzania)
L. macrostylus Ahmad & Ahmad, 2002 (India)
L. mangalorensis Ahmad & Ahmad, 2002 (India)
L. massachusetsensis Loof, 1996 (USA)
L. merogaster (Steiner, 1916) Loof, 1996 (Namibia)
L. minimus Baqri, 1991 (India)
L. multialaeus (Khera, 1970) Baqri, 1985 (India)
L. olifanti Botha & Heyns, 1991 (South Africa)
L. oryzae Dey & Baqri, 1986 (India)
L. papillatus Ahmad & Ahmad, 2002 (India)
L. parabastiani (Paetzold, 1958) Siddiqi, 1969 (Europe, Russia, Uzbekistan)
L. partapurii Khaton, Sharma & Singh, 1997
L. pinguis Andrássy, 1988 (USA)
L. proximus (Thorne & Swanger, 1936) Siddiqi, 1969 (USA)
L. pseudostagnalis (Micoletzky, 1927) Siddiqi, 1969 (Italy, Spain, Poland, Russia, Uzbekistan, India, Pakistan, Japan, Ghana, Kenya, Jamaica, Cuba, Ethiopia)
L. reversus Thorne, 1974 (USA)
L. ritae Eyualem-Abebe & Coomans, 1997 (Ethiopia)
L. siddiqii Baqri & Jana, 1983 (India)
L. stenopygus (Andrássy, 1968) Siddiqi, 1969 (Congo Republic)
L. thornei Andrássy, 1969 (Brazil)
L. tropicus Ahmad & Shaheen, 2004
L. unipapillatus (Daday, 1905) Andrássy, 1969 (Paraguay)
L. uterinus Loof, 1996 (Ivory Coast)
L. vacillans Loof, 1996 (Venezuela)
L. vixamictus (Andrássy, 1962) Siddiqi, 1969 (Hungary, Moldavia)
Additional reference: Loof (1985, 2000) and Andrássy (1988).

Genus *Calodorylaimus* Andrássy, 1969 (Figs 15.3D–F)
Diagnosis. Laimydorinae. Body large. Lip region continuous or off set; lips rounded or angular. Odontostyle relatively long and slender, situated further back than

usual; guiding ring thin, situated 1, 5–2 lip region widths from anterior end. Pharynx expanding in or behind its middle. Pre-rectum long, beginning anterior to the supplements in males. Vulva transverse or longitudinal. Spicules long and slender. Supplements numerous, arranged in three groups: two contiguous rows and between them some separate elements. Tail short and rounded in male, long and filiform in female. The species of *Calodorylaimus* live in freshwater habitats.

Type species: *C. octo* Andrássy, 1969 (Ivory Coast)

Other species:
C. andrassyi Baqri & Jana, 1983 (India)
C. chassanicus (Alekseev & Naumova, 1977) Andrássy, 1988 (Eastern Russia)
C. densus Andrássy, 1988 (India)
C. gravidus (Andrássy, 1986) Andrássy, 1988 (Ethiopia)
C. indicus Ahmad & Jairajpuri, 1982 (India)
C. insignis (Gagarin, 1981) Andrássy, 1988 (Tadzhikistan)
C. mongolicus Andrássy, 1988 (Mongolia)
C. parhomalopapillatus (Schuurmans Stekhoven, 1944) Andrássy, 1988 (Congo Republic)
C. wasimi Baqri & Bohra, 2003 (India)
Additional reference: Andrássy (1988).

Genus *Crocodorylaimus* Andrássy, 1988 (Figs 15.3G–I)
Diagnosis. Laimydorinae. Cuticle smooth or finely transversely striated. Lip region continuous with the adjoining body; lips fused. Odontostyle straight, 1.3–2.3 times as long as lip region width. Guiding ring thin. Four spindle-shaped yellowish bodies present near the odontostyle basis. Pharynx expanding near middle. Pre-rectum generally long, in males beginning anterior to the supplements row. Vulva longitudinal or transverse. Spicules massive. Supplements contiguous. Female tail attenuated and long; male tail short, conoid with rounded terminus, ventrally concave. Freshwater or semi-freshwater, widespread in all continents.

Type species: *C. flavomaculatus* (Linstow, 1876) Andrássy, 1988 (Central Europe, Russia, USA, Ethiopia, Sumatra, South Africa)

Other species:
C. aequatorialis Andrássy, 1988 (Ecuador)
C. biserovi Gagarin, 1996 (Russia)
C. dadayi (Thorne & Swanger, 1936) Andrássy, 1988 (Paraguay, Colombia, Russia, Mauritania)
C. dimorphus Andrássy, 1988 (Vietnam)
C. fecundus (Cobb, 1914) Andrássy, 1988 (USA)
C. fusus Andrássy, 1992 (Hungary)
C. maior Andrássy, 1988 (USA, Hungary)
C. paraincae (Thorne, 1974) Andrássy, 1988 (USA)
C. thermalis Andrássy, 1997 (Hungary)
C. vaginatus Ahmad & Araki, 2003 (Japan)

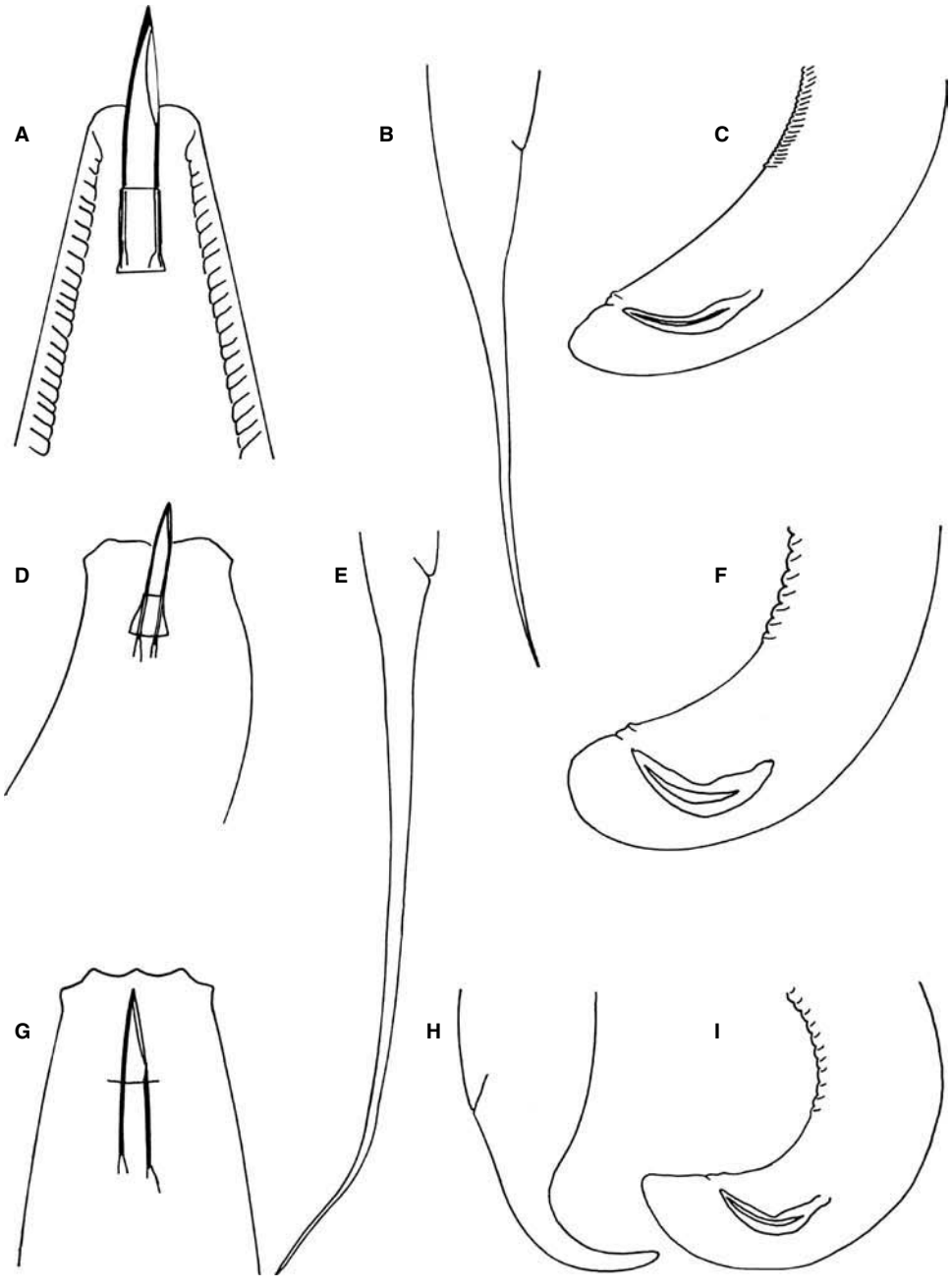

Fig. 15.4 A–C: *Idiodorylaimus*; D–F: *Chrysodorus*; G–I: *Mesodorylaimus*.

Genus *Idiodorylaimus* Andrássy, 1969 (Figs 15.4A–C)
Diagnosis. Laimydorinae. Large nematodes. Cuticle thick, superficially smooth (in one species marked with longitudinal ridges) but distinctly annulated in its inner layer. Lip region not or slightly offset; lips amalgamated. Odontostyle straight, 1.5–2 times as long as the lip region; guiding ring double. Pharynx expanding before the middle. Pre-rectum generally very long, in males beginning far before the supplements row. Vulva longitudinal; vagina with sclerotizations. Spicules large and slender. Supplements contiguous. Tail elongate, conoid to filiform in females, short and bluntly rounded in males. The species of this genus are typical inhabitants of freshwater habitats.

Type species: *I. annulatus* (Daday, 1905) Andrássy, 1969 (Paraguay, Costa Rica, Guatemala)

Other species:
I. annulatiformis Loof, 1973 (Venezuela, Surinam)
I. homalopapillatus (Kreis, 1932) Andrássy, 1969 (Paraguay)
I. kreisi Loof, 1973 (Paraguay)
I. novaezealandiae (Cobb, 1904) Andrássy, 1969 (New Zealand, USA)
I. robustus Gagarin, 1985 (Russia)
I. washingtonensis Loof, 1996 (USA)
Additional reference: Andrássy (1988).

Genus *Chrysodorus* Jiménez-Guirado & Cadenas, 1985 (Figs 15.4D–F)
Diagnosis. Laimydorinae. Body extremely slender. Cuticle thin. Lip region truncate, continuous or offset. Odontostyle weak and unusually slender; guiding ring double. Pharynx enlarging in or behind its middle; pre-rectum very long, in male originating well before the supplements. Vulva longitudinal. Supplements closely packed or contiguous. Tail elongate to filiform in female, short and rounded in male. Freshwater or terrestrial species.

Type species: *C. longicaudatus* Jiménez-Guirado & Cadenas, 1985 (Spain)*

Other species:
C. attenuatus (de Man, 1880) Andrássy, 1988 (Spain, Central Europe, Denmark, Russia, Mongolia)*
C. dhanachandi (Jairajpuri & Ahmad, 1983) Jiménez-Guirado & Cadenas, 1985 (India)
C. filiformis (Bastian, 1865) Andrássy, 1988 (New Guinea, Sumatra, Egypt, widespread in Europe)*
C. lordelloi (Meyl, 1957) Jiménez-Guirado & Cadenas, 1985 (Brazil)
Additional reference: Jiménez-Guirado and Cadenas (1985).

Genus *Mesodorylaimus* Andrássy, 1959 (Figs 15.4G–I)
Diagnosis. Laimydorinae. Cuticle smooth or finely transversely striated. Lip region not or only slightly off set from the adjoining body; lips more or less distinct; odontostyle straight; guiding ring simple, thin. Pharynx enlarging in or behind its middle; at the posterior end of intestine a tongue-like structure often projects into the lumen; pre-rectum varying in length. Vulva transverse or longitudinal; vagina

with sclerotized pieces. Supplements few or numerous, spaced or contiguous. Tail elongate in female: convex–conoid in the anterior part and then slender or digitate, varying in length (1–20 times as long as anal body width); male tail short and rounded. The species of this genus are frequently soil- or moss-inhabiting forms but many of them have been found in freshwater habitats. The latter are marked with an asterisk.

Type species: *M. mesonyctius* (Kreis, 1939) Andrássy, 1959 (Central Europe, Italy, Russia, China, India, South Africa, USA, Jamaica, Venezuela)*

Other species:
M. aberrans Loof, 1969 (Switzerland, The Netherlands, Yugoslavia, Poland, Hungary, Pakistan, Argentina)
M. adalberti Andrássy, 1963 (Argentina, Russia)
M. aduncus Andrássy, 1986 (Hungary)
M. aegypticus (Andrássy, 1958) Andrássy, 1959 (Denmark, Sweden, Russia, Egypt, South Africa, Brazil, Antarctica)*
M. aequatorialis Andrássy, 1986 (Ecuador)
M. aestuarii (Timm, 1952) Andrássy, 1959 (USA)*
M. alpestris (Thorne, 1939) Andrássy, 1959 (USA, South Africa)*
M. americanus Andrássy, 1986 (USA)
M. andrassyi Ahmad & Ahmad, 2001 (India)
M. angustus Andrássy, 1964 (Kenya)*
M. antarcticus Nedelchev & Peneva, 2000 (Antarctica)
M. arcuatus Andrássy, 1986 (Bolivia)
M. baeticus Peña-Santiago & Abolafia 2000 (Spain)
M. bainsi Basson & Heyns, 1974 (India, Ethiopia, South Africa)*
M. bastiani (Bütschli, 1873) Andrássy, 1959 (cosmopolitan)*
M. bastianoides (Meyl, 1961) Andrássy, 1967 (Germany, Hungary)*
M. bhanselii Baqri & Bohra, 2001 (India)
M. biroi (Daday, 1899) Andrássy, 1959 (Lithuania, Russia, India, Mauritius, Brazil, New Guinea)*
M. brassicus Soni & Nama, 1981 (India)
M. brevicaudatus Abolafia & Peña-Santiago, 1996 (Spain)
M. brevicylindrus Andrássy, 2002 (Hungary)
M. brevidens Thorne, 1974 (USA)
M. brevispicatus (Schuurmans Stekhoven, 1951) Andrássy, 1986 (Congo)
M. brzeskii Abolafia & Peña-Santiago, 2000 (Spain)
M. cardiacus Thorne, 1974 (USA)
M. caudatus Ahmad, 1993 (India)
M. chamoliensis Ahmad, 1995 (India)
M. chekiangesis (Wu & Hoeppli, 1929) Andrássy, 1986 (China)
M. chinensis Wu & Ahmad, 1998 (China)
M. chipevi Nedelchev & Peneva, 2000 (Antarctica)
M. clavicaudatus (Thorne & Swanger, 1936) Andrássy, 1959 (Poland, Spain, India)
M. cognatus Andrássy, 1986 (Ecuador)
M. conurus (Thorne, 1939) Goodey, 1963 (USA, Switzerland, Russia, Kenya)*
M. delicatus Lordello, 1965 (Brazil)

M. derni Loof, 1969 (Germany, The Netherlands, Russia, India, Argentina)
M. deuberti (Andrássy, 1958) Goodey, 1963 (Hungary)*
M. dolomiticus Vinciguerra, 1982 (Italy)
M. dreyeri (Ven der Linde, 1938) Goodey, 1963 (USA)
M. effilatus (Schuurmans Stekhoven & Teunissen, 1938) Andrássy, 1959
M. enigmaticus Ahmad & Ahmad, 2001 (India)
M. erdelyii Andrássy, 1965 (Ghana)*
M. exilis (Cobb, 1893) Andrássy, 1959 (Fiji, Ivory Coast, Surinam)*
M. flagellatus (Williams, 1959) Andrássy, 1960 (Mauritius)
M. flagellifer Andrássy, 2002 (Hungary)*
M. ghanae Andrássy, 1965 (Ghana)
M. globiceps Loof, 1974 (Venezuela)
M. graciosus Andrássy, 1986 (Ecuador)
M. guarani Andrássy, 1968 (Paraguay)
M. harunaglus Khaton, Sharma & Singh, 1997
M. hofmaenneri (Menzel in Hoffmänner & Menzel, 1914) Goodey, 1963 (Germany, Switzerland, Austria, Hungary, France, Spain, Yugoslavia, Russia, USA, Sumatra, Java, Latvia)*
M. ibericus Abolafia & Peña-Santiago, 2000 (Spain)
M. imperator Loof, 1975 (Antarctica)
M. importunus Basson & Heyns, 1974 (South Africa)*
M. indicus Ahmad & Ahmad, 2001 (India)
M. intermedius Dassonville & Heyns, 1984 (South Africa)*
M. intervallis (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Egypt)*
M. japonicus (Cobb in Thorne & Swanger, 1936) Andrássy, 1987 (Japan, USA, Russia, Angola, Congo Republic, South Africa)*
M. johanni Basson & Heyns, 1974 (South Africa)
M. kamandeanus Baqri & Coomans, 1973 (Congo)
M. kauli Baqri & Bohra, 2001 (India)
M. keralaensis Ahmad & Ahmad, 2001 (India)
M. kittenbergeri Andrássy, 1988 (Kenya)
M. kowyni Basson & Heyns, 1974 (South Africa)*
M. lissus Thorne, 1974 (USA, China)
M. litoralis Loof, 1969 (The Netherlands, Germany, Belgium, Spain, Italy, Russia, USA)
M. longicaudatus Ahmad & Araki, 2003 (Japan)
M. loofi Ahmad, 1993 (India)
M. lopadusae Vinciguerra & La Fauci, 1978 (Italy)
M. lourdesae (Lordello, 1955) Andrássy, 1959 (Brazil)
M. luci Brzeski & Szczygiel, 1961 (Poland)*
M. macrofallus Brzeski & Szczygiel, 1961 (USA)
M. macrospiculum Zullini, 1987 (Ethiopia)
M. malacitanus Abolafia & Peña-Santiago, 2000 (Spain)
M. margaritifer Andrássy, 1986 (Hungary)*
M. margaritus Basson & Heyns, 1974 (South Africa)
M. masleni Nedelchev & Peneva, 2000
M. meridianus Andrássy, 1963 (Mexico, Argentina)

M. mexicanus Zullini, 1973 (Mexico)
M. meyli (Andrássy, 1958) Andrássy, 1959 (Germany, Czech Republic, Bulgaria, Russia, Tadzhikistan, Spain)*
M. nevadaensis Peña-Santiago & Abolafia, 2000
M. nigritulus (Schneider, 1937) Andrássy, 1959 (Sumatra)*
M. nipponi Ahmad & Araki, 2003 (Japan)
M. nodicaudatus (Dey & Baqri, 1986) Ahmad, 1993 (India)
M. novus (Dey & Baqri, 1986) Ahmad, 1993 (India)
M. nudus (Thorne, 1939) Andrássy, 1969 (USA, Italy)
M. obscurus Thorne, 1974 (USA)
M. orientalis Andrássy, 1970 (Vietnam)
M. ornativulvatus Abolafia & Peña-Santiago, 1997 (Spain)*
M. paetzoldi Altherr, 1965 (Germany)*
M. palustris Andrássy, 1991 (Hungary)*
M. parabastiani (Paetzold, 1958) Andrássy, 1988 (The Netherlands, Germany, Russia, Moldavia, Uzbekistan, Hungary)*
M. paraguayensis (Kreis, 1932) Andrássy, 1959 (Paraguay, Brazil)
M. paralitoralis Basson & Heyns, 1974 (South Africa)*
M. parapotus Ahmad & Ahmad, 2001 (India)
M. parasubtilis (Meyl, 1957) Andrássy, 1959 (Hungary, Brazil, Venezuela)
M. parasubulatus (Meyl, 1954) Andrássy, 1959 (Mongolia, Germany, Czechoslovakia, Russia)*
M. parvus Ahmad, 1995 (India)
M. paulbuchneri (Meyl, 1956) Andrássy, 1959 (Brazil)
M. pendschipentikus (Tulaganov, 1949) Andrássy, 1959 (Uzbekistan)
M. pizai Lordello, 1965 (Brazil)
M. plicatus Andrássy, 1986 (Ecuador)*
M. potus Heyns, 1963 (Spain, Russia, South Africa)*
M. procerus Andrássy, 1986 (Australia)
M. pseudobastiani Loof, 1969 (Russia, USA)
M. pseudorecurvus Abolafia & Peña-Santiago, 1996 (Spain)
M. pseudosubtilis Basson & Heyns, 1974 (South Africa)*
M. puellae Andrássy, 1963 (Argentina)
M. pulcher Andrássy, 1986
M. pusillus (Cobb, 1893) Andrássy, 1959 (Georgia, Jamaica, Australia)
M. recurvus Andrássy, 1964 (Hungary, Poland, Italy)*
M. rhenanus Altherr, 1965 (Germany)*
M. rotundolabiatus Basson & Heyns, 1974 (South Africa)
M. sanctus Basson & Heyns, 1974 (South Africa)
M. shamimi Ahmad & Araki, 2003 (Japan)
M. similibastiani Zell, 1986
M. simplex Thorne, 1974 (USA)
M. spengelii (de Man, 1812) Andrássy, 1959 (The Netherlands)
M. subtiliformis (Andrássy, 1959) Andrássy, 1959 (Hungary, Romania, Czech Republic, Japan)*
M. subtilis (Thorne & Swanger, 1936) Andrássy, 1959 (The Netherlands, Germany, Yugoslavia, Poland, Israel, Russia, India, USA, Brazil)*

M. subtiloides (Paetzold, 1958) Andrássy, 1959 (Germany)*
M. sveltus (Meyl, 1957) Andrássy, 1959 (Brazil)
M. sylphus (Thorne, 1939) Goodey, 1963 (USA)
M. szechenyii Andrássy, 1961 (Tanzania)*
M. szunyoghyi Andrássy, 1968 (Tanzania)
M. tenellus (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Spain, Czech Republic)
M. thermae (Cobb in Hoeppli, 1926) Goodey, 1963 (USA)
M. tholocercus Andrássy, 1968 (Cuba, Paraguay)
M. thorneiswangerae Andrássy, 1968 (Brazil)
M. transkeyensis Basson & Heyns, 1974 (South Africa)
M. trapaefructus Andrássy, 1986 (Peru)
M. usitatoides De Bruin & Heyns, 1992
M. usitatus Basson & Heyns, 1974 (South Africa)*
M. vulneratus Andrássy, 1986 (Ecuador)
M. vulvapapillatus Bagaturia & Eliava, 1966 (Russia, Georgia)*
M. vulvastriatus Ahmad, 1993 (India)

Additional reference: Andrássy (1988).

Genus *Baladorylaimus* Andrássy, 2001 (Figs 15.5A–C)
Diagnosis. Laimydorinae. Cuticle smooth. Lip region continuous with adjoining body, lips amalgamated. Odontostyle short; guiding ring simple. Pharynx enlarging behind its middle; pre-rectum short. Reproductive apparatus amphidelphic; vulva oval; vagina with sclerotized pieces. Supplements spaced. Female tail filiform; male tail short, conoid, with terminal peg. The only species was found in wet detritus on the edge of Lake Balaton (Hungary).

Type and only species: *B. balatonicus* Andrássy, 2001

Additional reference: Andrássy (2001b).

Genus *Namaquanema* Heyns & Swart, 1993 (Figs 15.5 D–F)
Diagnosis. Laimydorinae. Lip region slightly off set; lips rather amalgamated: Odontostyle of moderate length with hooked basal processes but without sclerotized odontophore; guiding ring double. Pharynx expanding before its middle. Pre-rectum long, beginning far before the supplements in males. Vulva longitudinal, sunken. Supplements numerous, contiguous. Tail short and rounded in male, hemispherical but with a finger-like process dorsally directed in female. The only species was found in the soil of the bank of a stream in South Africa.

Type and only species: *N. hanki* Heyns & Swart, 1993 (South Africa)

Additional reference: Heyns and Swart (1993).

Subfamily Afrodorylaiminae Andrássy, 1969
Diagnosis. Dorylaimidae. Cuticle smooth or very finely striated. Lip region more or less set off; lips slightly separate, labial papillae 10 + 6. Amphids wide. Odontostyle straight or slightly sinuate, at least twice as long as lip region width; guiding ring simple or double. Pharynx enlarging in or behind its middle. Cardia longer than usual. Pre-rectum very short. Male supplements contiguous or spaced; sub-median papillae

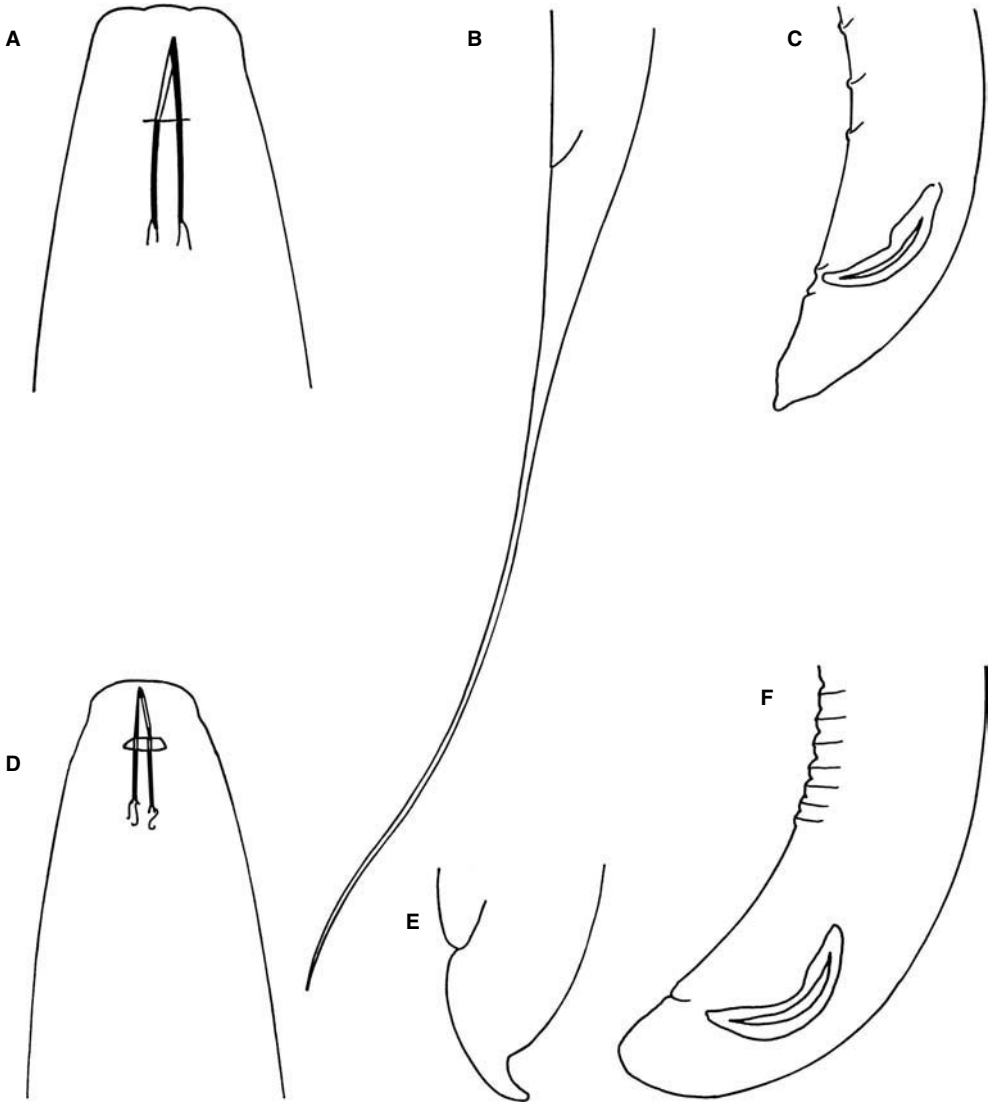

Fig. 15.5 A–C: *Baladorylaimus*; D–F; *Namaquanema*.

on posterior body very prominent. Tail long and filiform in females, variously shaped in males. Mostly freshwater species.
Additional reference: Andrássy (1969).

Genera:[1]
Afrodorylaimus Andrássy, 1964
Drepanodorylaimus Jairajpuri, 1966
Paradorylaimus Andrássy, 1969
Apodorylaimus Andrássy, 1988

[1]The attribution of these genera to Afrodorylaiminae was suggested by Andrássy (personal communication).

Key to genera of Afrodorylaiminae

1. Odontostyle sinuate, male unknown . . . . . *Drepanodorylaimus*
   Odontostyle straight, male generally present 2
2. Male tail short and rounded, guiding ring double . . . . . *Paradorylaimus*
   Male tail filiform or conoid, guiding ring simple 3
3. Male tail short, conoid, ventrally curved, with pointed terminus . . . . . *Afrodorylaimus*
   Male tail filiform as in female . . . . . *Apodorylaimus*

Genus *Afrodorylaimus* Andrássy, 1964 (Figs 15.6A–C)

Diagnosis. Afrodorylaiminae. Cuticle smooth. Lip region moderately off set. Odontostyle straight, with wide lumen, about twice as long as lip region width; guiding ring simple. Pre-rectum short. Tail long and filiform in female, short, conoid, ventrally curved, with pointed terminus in male. The species of this genus are typical inhabitants of freshwater habitats.

Type species: *Afrodorylaimus bwana* Andrássy, 1964 (Kenya, China)

Other species:
A. beaumonti (Altherr, 1952) Andrássy, 1969 (Switzerland)
A. bizane Kleynhans, 1970 (South Africa)
A. geniculatus (Andrássy, 1961) Andrássy, 1964 (Russia, India, Kenya)
A. lambsheadi Ahmad, Bloemers & Wanless, 1996 (Cameroon)
A. mediterraneus Vinciguerra & La Fauci, 1978 (Italy)
Additional reference: Andrássy (1964).

Genus *Drepanodorylaimus* Jairajpuri, 1966 (Figs 15.6D and E)

Diagnosis. Afrodorylaiminae. Cuticle smooth. Lip region moderately offset. Odontostyle about twice as long as lip region width, slightly but clearly sinuate; guiding ring simple. Pre-rectum short. Tail long and filiform in female. The species of this genus lack males and are all parthenogenetic. They are typical inhabitants of freshwater habitats.

Type species: *Drepanodorylaimus filiformis* Jairajpuri, 1966 (India, La Réunion)

Other species:
D. arganoi Zullini, 1973 (Mexico)
D. brevicaudatus Andrássy, 1970 (Vietnam)
D. brzeskii Winiszewska, 1987 (Poland)
D. filicaudatus (Daday, 1905) Andrássy, 1986 (Paraguay, Surinam)
D. flexus (Thorne & Swanger, 1936) Andrássy, 1969 (USA, Spain)
D. maqsoodi Dhanachand & Jairajpuri, 1981 (India)
D. picardi (Altherr, 1963) Monteiro, 1970 (France, Angola, Brazil)
D. renwicki (Van der Linde, 1938) Andrássy, 1969 (USA, Austria, Switzerland, Hungary, Japan)
D. szekessyi (Andrássy, 1960) Andrássy, 1969 (China, Argentina, Brazil, Paraguay)
D. williamsi (Heyns & Kruger, 1983) Andrássy, 1986 (South Africa)
Additional reference: Jairajpuri (1966).

Fig. 15.6 A–C: *Afrodorylaimus;* D and E: *Drepanodorylaimus*.

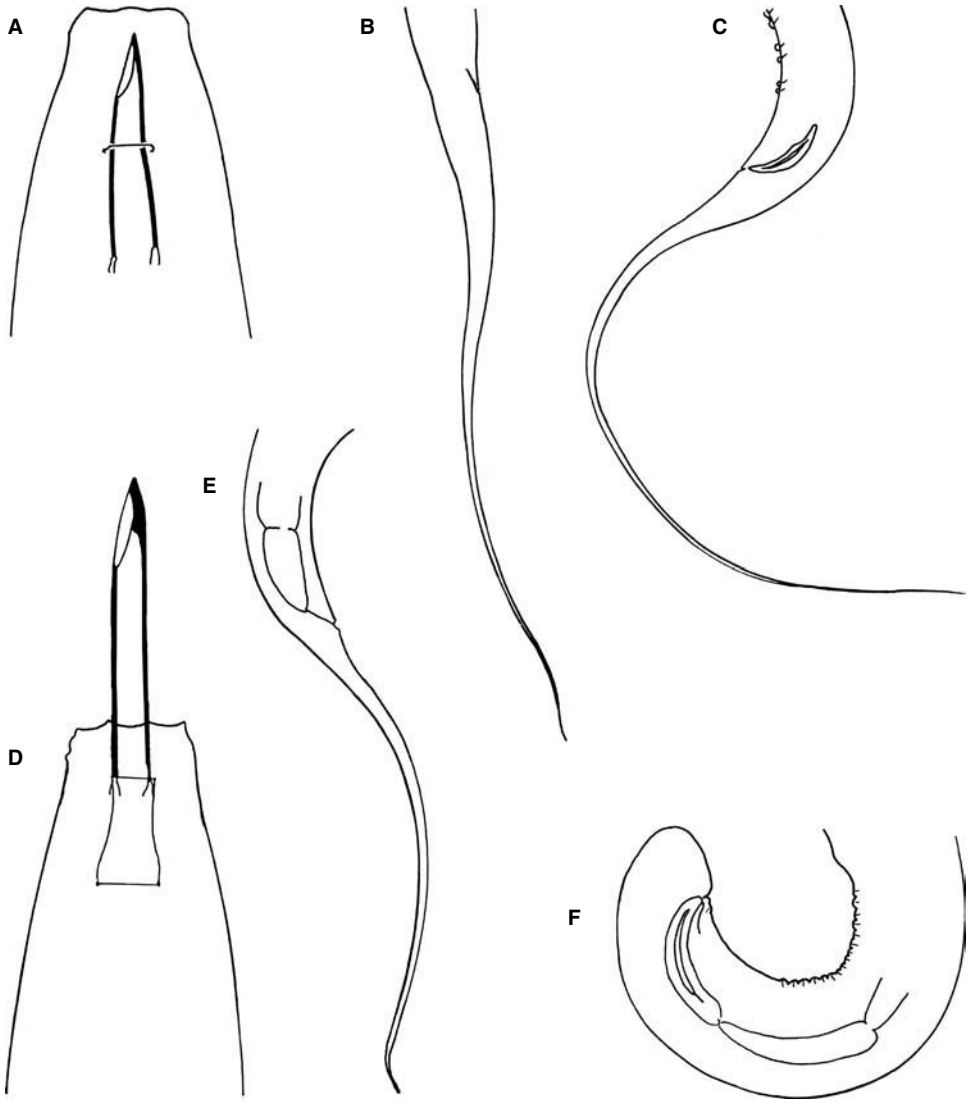

Fig. 15.7 A–C: *Apodorylaimus*; D–F: *Paradorylaimus*.

Genus *Apodorylaimus* Andrássy, 1988 (Figs 15.7A–C)
Diagnosis. Afrodorylaiminae. Cuticle smooth. Lip region moderately offset, lips slightly distinct. Odontostyle straight, with wide lumen, about twice as long as lip region width; guiding ring simple. Pre-rectum short. Vagina without sclerotizations. Spicules lacking lateral pieces and central thickening. Supplements 5–8 arranged two by two. Tail long and filiform in both sexes. Of the two described species one was found in wet soil.

Type species: *A. bini* Andrássy, 1988 (India: marshy soil)*

Other species:

A. congonensis (Andrássy, 1960) Andrássy, 1988 (Congo Republic)

Genus *Paradorylaimus* Andrássy, 1969 (Figs 15.7D–F)
Diagnosis. Afrodorylaiminae. Cuticle smooth, subcuticle often finely striated. Lip region slightly offset; lips distinct. Odontostyle straight, about twice as long as lip region width or more; guiding ring double. Pharynx enlarging in or behind its middle. Pre-rectum short, in males beginning within the range of the supplement row. Supplements 13–18, contiguous. Female tail long, filiform; male tail short and rounded. The species of *Paradorylaimus* are all freshwater.

Type species: *P. parafecundus* (De Coninck, 1935) Andrássy, 1969 (Congo Republic)

Other species:
P. conurus (Thorne, 1939) n. comb. (USA)
P. jankowskyi (Tsalolikhin, 1977) Andrássy, 1988 (Siberia)
P. wilhelmschneideri (Andrássy, 1959) Andrássy, 1969 (Sumatra)
Valid species of Dorylaimidae regarded as *incertae sedis* (according to Andrássy, 1988: insufficient descriptions, or absence of males):
Dorylaimus acris Thorne, 1939 (Central Europe, Italy, USA, Iraq)*
Dorylaimus africanus Daday, 1908
Dorylaimus angusticephalus Steiner, 1914
Dorylaimus aquaticus Eliava, 1978*
Dorylaimus atratus Linstow, 1901
Dorylaimus callosus Skwarra, 1921 (Germany)*
Dorylaimus cashmerensis Altherr & Delamare-Deboutteville, 1972 (USA)*
Dorylaimus exilicaudatus Altherr, 1953
Dorylaimus fastigatus Thorne & Swanger, 1936
Dorylaimus festivus Paesler, 1941 (Austria)*
Dorylaimus gaussi Steiner, 1916 (Denmark)*
Dorylaimus lybicus Pierantoni, 1915 (Lybia)
Dorylaimus longicaudatus Bütschli, 1874 (Croatia, Slovenia, Denmark, Germany, Kenya)*
Dorylaimus maximodorus Schuurmans Stekhoven & Teunissen, 1938
Dorylaimus nyongi Altherr, 1960 (Cameroon)*
Dorylaimus pachydermis Daday, 1908
Dorylaimus pachysoma Linstow, 1876
Dorylaimus paraagilis Altherr, 1953 (Switzerland)*
Dorylaimus polyblastus Bastian, 1865
Dorylaimus serpentinus Thorne & Swanger, 1936 (USA, Spain)*
Dorylaimus sulcatus Cobb in Cobb, 1915 (USA)*
Dorylaimus tenuicaudatus Bastian, 1865
Dorylaimus tenuissimus Stefanski, 1925
Dorylaimus tenuistriatus Schneider, 1933 (West Africa)*
Dorylaimus zograffi de Man, 1885
Laimydorus longissimicaudatus Altherr, 1977 (Brazil)*
Mesodorylaimus argentinus Altherr, 1963 (Argentina)*
Prodorylaimus uliginosus Loof, 1985 (Central Europe, Italy)*
Urolabes palustris Carter, 1859*

Family ACTINOLAIMIDAE Thorne, 1939

Diagnosis. Dorylaimoidea. Cuticle smooth or marked with longitudinal ridges or grooves; lips fused; lip region with an anterior cuticularized ring (vestibular ring) often appearing corrugated; cheilostom wide, armed with four massive onchia encircling the odontostyle, with or without denticles on the stoma walls. Gonads paired and reflexed; Vulva transverse, longitudinal or pore-like; *pars refringens* of vagina with sclerotized pieces. Male supplements arranged in a ventral series or in two or three fascicles. Tail elongate to filiform in both sexes or elongate to filiform in females and short in males (sometimes with a filiform appendix). All the representatives of this family are typical freshwater or semi-freshwater nematodes: they can be found in freshwater bodies and, more frequently, in wet soil and in wet moss. There are 18 genera in this family.

Additional references: Thorne (1967), Vinciguerra (1988), Khan and Jairajpuri (1994) and Vinciguerra and Clausi (2003).

Genera:

Trachactinolaimus Andrássy, 1963
Trachypleurosum Andrássy, 1959
Paractinolaimus Meyl, 1957
Paractinolaimoides Khan, Ahmad & Jairajpuri, 1994
Westindicus Thorne, 1967
Egtitus Thorne, 1967
Scleroactinolaimus Ahmad, Khan & Ahmad, 1992
Afractinolaimus Andrássy, 1970
Neoactinolaimus Thorne, 1967
Mactinolaimus Andrássy, 1970
Metactinolaimus Meyl, 1957
Stopractinca Khan, Ahmad & Jairajpuri, 1994
Actinolaimus Cobb, 1913
Parastomachoglossa Coomans & Loof, 1986
Actinca Andrássy, 1964
Brasilaimus Lordello & Zamith, 1957
Afractinca Vinciguerra & Clausi, 2000
Practinocephalus Andrássy, 1974

Key to genera of Actinolaimidae

1. Tail elongate in both sexes 2
   Tail elongate in female and short in male 3
2. Cheilostom walls with denticles . . . . . *Trachactinolaimus*
   Cheilostom walls smooth or rugose . . . . . *Trachypleurosum*
3. Cuticle without longitudinal ridges 4
   Cuticle with longitudinal ridges 13
4. Cheilostom with four sclerotized vertical plates 5
   Cheilostom without sclerotized vertical plates 6
5. Cheilostom with denticles . . . . . *Paractinolaimoides*
   Cheilostom without denticles . . . . . *Scleroactinolaimus*
6. Onchia basally fused . . . . . *Metactinolaimus*
   Onchia distinct 7

7. Cheilostom walls strongly ribbed, basket-like . . . . . *Westindicus*
   Cheilostom walls not or weakly sclerotized 8
8. Cheilostom walls with denticles 9
   Cheilostom walls without denticles 10
9. Male supplements in series . . . . . *Paractinolaimus*
   Male supplements in fascicles . . . . . *Afractinolaimus*
10. Male supplements in series 11
    Male supplements in fascicles 12
11. Pharynx muscular, in two parts . . . . . *Egtitus*
    Pharynx tripartite, with slender anterior part . . . . . *Stopractinca*
12. Onchia simple . . . . . *Mactinolaimus*
    Each onchium with a small denticle behind . . . . . *Neoactinolaimus*
13. Pharynx muscular, in two parts; vagina with strongly sclerotized pieces . . . . . *Actinolaimus*
    Pharynx tripartite, with non-muscular anterior part, vagina with weakly or non-sclerotized pieces 4
14. Anterior hyaline part of pharynx short, middle part long, odontostyle robust, lip region low . . . . . *Parastomachoglossa*
    Anterior hyaline part of pharynx long, middle part short, odontostyle slender, lip region high 15
15. Cuticle very thick, *pars refringens* of vagina thick walled, wider than *pars proximalis*, lacking sclerotizations . . . . . *Brasilaimus*
    Cuticle not so thick, *pars refringens* of vagina not wider than *pars proximalis*, with weak sclerotizations 16
16. Lip region expanded, cheilostom sclerotizations heavy, male tail with filiform appendix . . . . . *Practinocephalus*
    Lip region narrow, cheilostom sclerotizations weak, male tail without any appendix 17
17. Inner labial papillae external to the anterior sclerotized ring . . . . . *Actinca*
    Inner labial papillae located on the anterior sclerotized ring . . . . . *Afractinca*

Genus *Trachactinolaimus* Andrássy, 1963 (Figs 15.8A and B)
Diagnosis. Actinolaimidae. Cuticle smooth; lip region with vestibular ring appearing corrugated; cheilostom with denticles on the stoma walls. Vulva transverse; *pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in both sexes.

Type species: *Trachactinolaimus radulatus* Andrássy, 1963 (Angola)

Other species:
T. dominicus (Hunt, 1978) Vinciguerra, 1988 (Santo Domingo)
Additional reference: Coomans *et al.* (1990).

Genus *Trachypleurosum* Andrássy, 1959 (Figs 15.8C and D)
Diagnosis. Syn. *Trachypleura* Thorne, 1939 nec Jackel, 1900

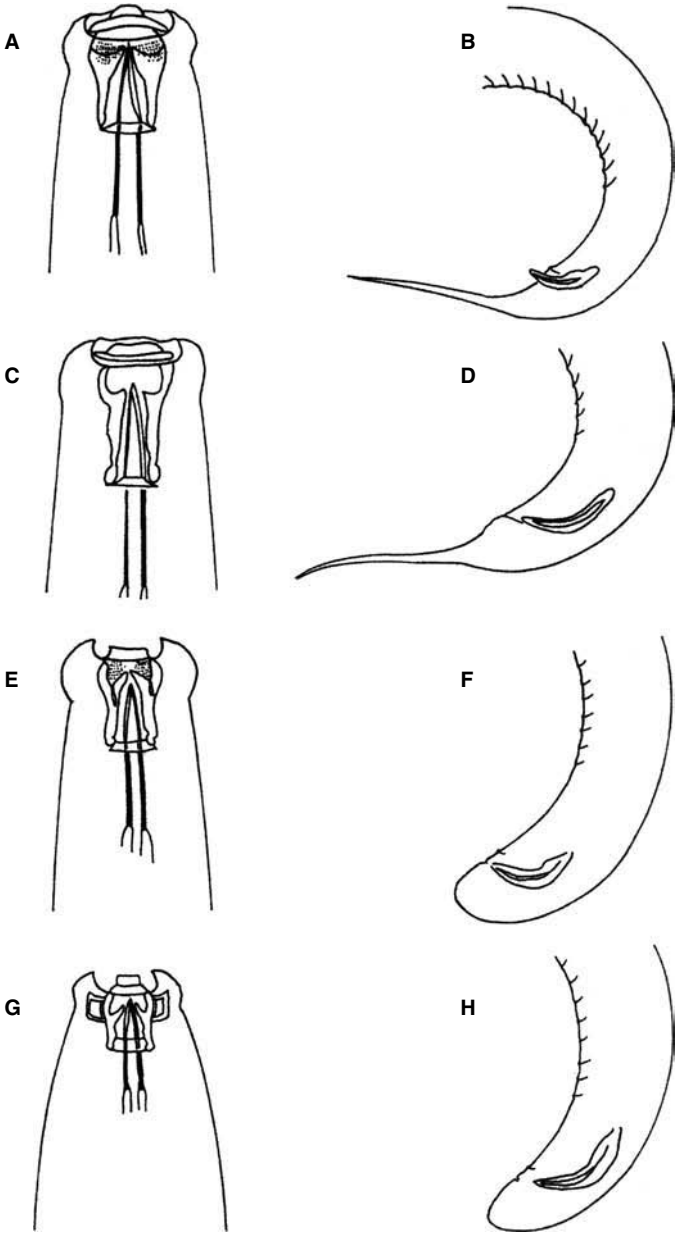

Fig. 15.8 A and B: *Trachactinolaimus*; C and D: *Trachypleurosum*; E and F: *Paractinolaimus*: G and H: *Paractinolaimoides*.

Actinolaimidae. Cuticle smooth; lip region with vestibular ring appearing corrugated; cheilostome without denticles on the stoma walls. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in both sexes.

Type species: *T. conforme* (Schneider, 1935) Andrássy, 1959 (West Africa)

Other species:
T. belforum Bloemers, Ahmad, Wanless & Hodda, 1995 (Cameroon)
T. indicum Ahmad, Khan & Rahman, 1991 (India)
T. karnatakus Khan & Jairajpuri, 1994 (India)
T. labirynthostoma (Cobb, 1893) Andrássy, 1959 (Fiji)
T. venezolanum Coomans, Vinciguerra & Loof, 1990 (Venezuela)
Additional reference: Coomans *et al.* (1990).

Genus *Paractinolaimus* Meyl, 1957 (Figs 15.8E and F)
Diagnosis. Actinolaimidae. Cuticle smooth; lip region with vestibular ring appearing corrugated; cheilostome with denticles on the stoma walls. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in females and short in males.

Type species: *Paractinolaimus micoletzkyi* (Schneider, 1935) Meyl, 1957

Other species:
P. acutus Khan & Park, 1999 (India)
P. aruprus Khan, Ahmad & Jairajpuri, 1994 (India)
P. baldus Thorne, 1967 (Puerto Rico)
P. chandicus Khan & Jairajpuri, 1994 (India)
P. chiki Dhanam, Jairajpuri & Khan, 1994 (India)
P. dhanachandi Khan & Jairajpuri, 1994 (India)
P. elongatus Khan & Jairajpuri, 1994 (India)
*P. filipjev*i (Schneider, 1935) Meyl, 1957 (West Africa)
P. girini Sukul, 1967 (India)
P. indicus Khan & Ganguly, 1988 (India)
P. intermedius Altherr, 1968 (Switzerland, Italy)
P. longidrilus Eveleigh, 1982 (Canada)
P. macrolaimus (de Man, 1880) Andrássy, 1964 (cosmopolitan)
P. microdentatus (Thorne, 1939) Meyl, 1957 (USA, Israel, South Africa, Spain)
P. occalescens (Schneider, 1937) Vinciguerra, 1988 (Sumatra, Java)
P. pachydermis Khan & Araki, 2001 (Japan)
P. parietinus Eroshenko, 1977 (Russia)
P. prodenticulatus Heyns & Argo, 1969 (South Africa)
P. proximus (Yeates, 1973) Vinciguerra & Coomans, 1991 (New Zealand)
P. rafiqi Khan & Jairajpuri, 1998 (India)
P. robustus Thorne, 1967 (Puerto Rico)
P. spanithelus Eveleigh, 1982 (Canada)
P. vulvapapillatus Khan, Ahmad & Jairajpuri, 1994 (India)
P. vigor Thorne, 1967 (Puerto Rico, St. Lucia, South Africa)
P. xosorum Heyns & Argo, 1969 (South Africa)

Genus *Paractinolaimoides* Khan, Ahmad & Jairajpuri, 1994 (Figs 15.8G and H)
Diagnosis. Actinolaimidae. Cuticle smooth; vestibular ring corrugated; cheilostom with four sclerotized plates at level of onchia and mural denticles arranged in several rows. Vulva transverse; *pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in females and short in males.

Type species: *P. unicus* Khan, Ahmad & Jairajpuri, 1994 (India)

Other species:
P. hawangensis Choi, Duan & Baek 1998 (Korea)
Additional reference: Khan *et al.* (1994b).

Genus *Westindicus* Thorne, 1967 (Figs 15.9A and B)
Diagnosis. Actinolaimidae. Cuticle smooth; vestibular ring corrugated; cheilostom walls strongly ribbed, basket-like, with denticles on the walls. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in females and short in males.

Type species: *Westindicus brachycephalus* Thorne, 1967 (Puerto Rico)

Other species:
W. cheongsongensis Choi, Duan & Baek, 1998 (Korea)
W. cinctus (Cobb in Thorne, 1939) Thorne, 1937 (Jamaica)
W. keralaensis Khan, Ahmad & Jairajpuri, 1994 (India)
W. rapax Hunt, 1978 (St. Lucia)
W. senaensis Khan, Park & Choi, 1999 (Korea)

Genus *Egtitus* Thorne, 1967 (Figs 15.9C and D)
Diagnosis. Actinolaimidae. Cuticle smooth; vestibular ring corrugated; cheilostom without denticles on the stoma walls. Vulva transverse or longitudinal; *pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in females and short in males.

Type species: *Egtitus bryophilus* Thorne, 1967 (Puerto Rico)

Other species:
E. andhricus Khan & Jairajpuri, 1994 (India, Korea)
E. cyatholaimus (Daday, 1905) Thorne, 1967 (Paraguay)
E. elaboratus (Cobb, 1906) Thorne, 1967 (Hawaii)
E. itanagrus Khan, Ahmad & Jairajpuri, 1994 (India)
E. japonicus Khan & Araki, 2001 (Japan)
E. kazirangus Khan & Jairajpuri, 1994 (India)
E. koriensis Khan, Park & Choi, 1999 (Korea)
E. lacustris (Loof, 1973) Vinciguerra, 1988 (Surinam)
E. naunii Khan & Jairajpuri, 1994 (India)
E. neocyatholaimus (Kreis, 1936) Thorne, 1967 (India)
E. neoelaboratus (Rahman, Jairajpuri, Ahmad & Ahmad, 1987) Jairajpuri & Ahmad, 1992 (India)
E. nipponicus Khan & Araki, 2002 (Japan)

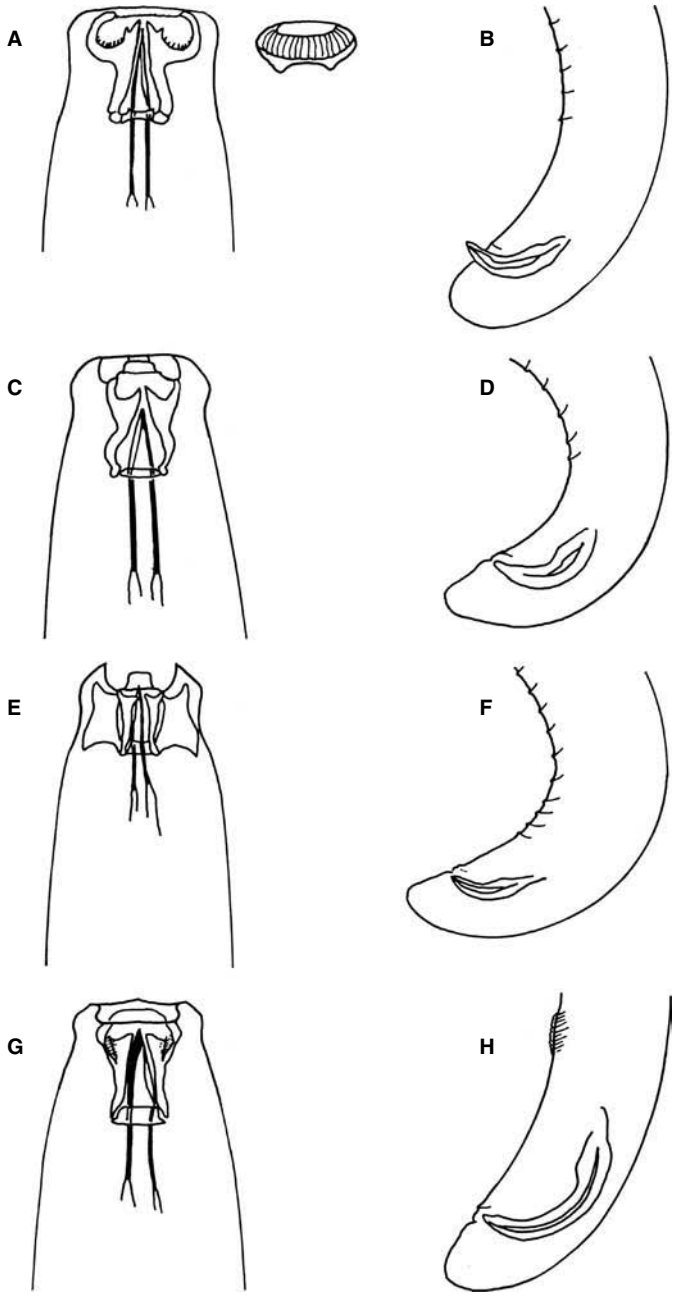

Fig. 15.9 A and B: *Westindicus*; C and D: *Egtitus*; E and F: *Scleractinolaimus*; G and H: *Afractinolaimus*.

E. nudus (Wu & Hoeppli, 1929) Thorne, 1967 (China)
E. proximus (Yeates, 1973) Vinciguerra, 1988 (New Zealand)
E. shillongensis Khan & Jairajpuri, 1994 (India)
E. siddharthi Khan & Jairajpuri, 1996 (India)
E. surinamensis (Micoletzky, 1925) Thorne, 1967 (Surinam, Guyana)
E. zealandicus (Clark, 1963) Vinciguerra & Heyns, 1984 (New Zealand)

Additional reference: Khan and Jairajpuri (1994).

Genus *Scleroactinolaimus* Ahmad, Khan & Ahmad, 1992 (Figs 15.9E and F)
Diagnosis. Actinolaimidae. Cuticle with fine transverse striae. Vestibular ring corrugated; cheilostom with four strongly sclerotized vertical plates, without denticles on the stoma walls. Gonads paired and reflexed; Vulva pore-like; *pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a ventral series. Tail elongate to filiform in females and short in males.

Type and only species: *S. punctatus* Ahmad, Khan & Ahmad, 1992 (India)

Genus *Afractinolaimus* Andrássy, 1970 (Figs 15.9G and H)
Diagnosis. Actinolaimidae. Cuticle smooth. Vestibular ring corrugated; cheilostom with denticles on the stoma walls. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in two fascicles. Tail elongate to filiform in females and short in males.
Additional reference: Ahmed *et al.* (1992).

Type species: *A. megaliesmontanus* (Heyns & Argo, 1969) Vinciguerra & Heyns 1984 (South Africa)

Other species:
A. capensis (Heyns & Argo, 1969) Vinciguerra & Heyns, 1984 (South Africa)
A. minor (Vinciguerra & De Francisci, 1973) Vinciguerra & Heyns, 1984 (Italy)
A. zairensis (Baqri, Coomans & Van der Heiden, 1975) Vinciguerra & Heyns 1984 (Congo, Korea)
Additional reference: Vinciguerra and Heyns (1984).

Genus *Neoactinolaimus* Thorne, 1967 (Figs 15.10A and B)
Diagnosis. Actinolaimidae. Cuticle smooth. Vestibular ring corrugated; cheilostom without denticles on the stoma walls; each onchium with a small denticle behind. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in two fascicles. Tail elongate to filiform in females and short in males.

Type species: *N. agilis* Thorne, 1967 (Puerto Rico)

Other species:

N. africanus (Filipjev, 1929) Thorne, 1967 (Congo, East Africa)
N. attenuatus Khan, Ahmad & Jairajpuri, 1994 (India)
N. barbieri Vinciguerra & Heyns, 1984 (South Africa, Seychelles)
N. brachydorus Vinciguerra & Heyns, 1984 (South Africa)
N. crassidens Heyns & Argo, 1969 (South Africa)

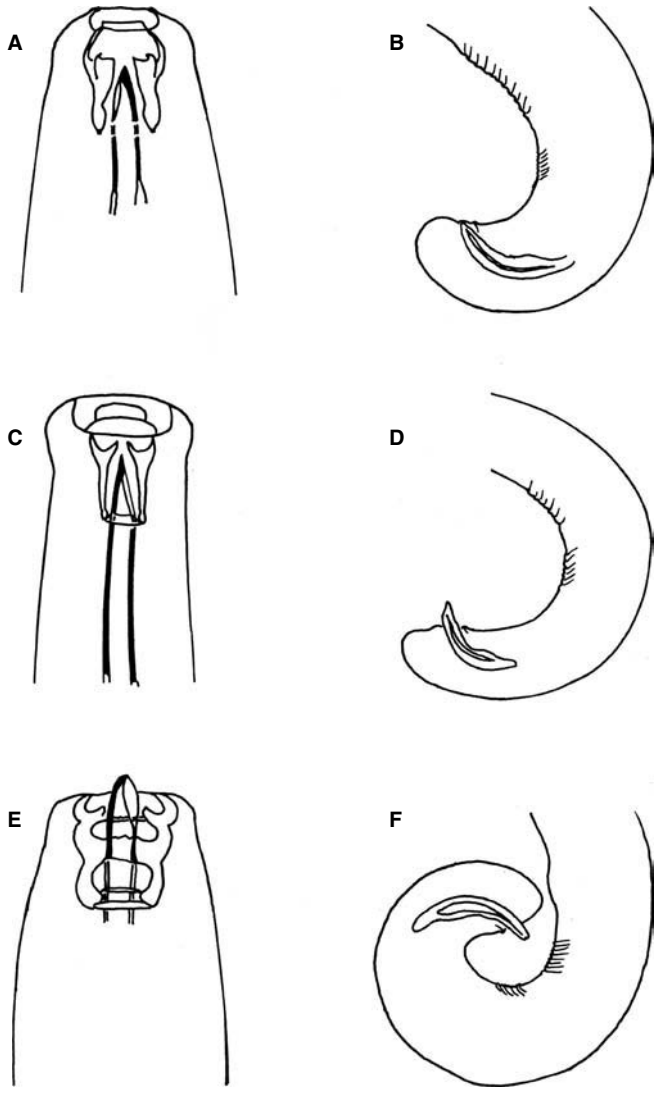

Fig. 15.10 A and B: *Neoactinolaimus*; C and D: *Mactinolaimus*; E and F: *Metactinolaimus*.

N. duplicidentatus (Andrássy, 1968) Andrássy, 1970 (Kenya, Ghana, Uganda, Tanzania, Congo, Hungary, Russia)
N. dzjubani Gagarin, 1979 (Ukraine)
N. gopeshwari Khan & Jairajpuri, 1994 (India)
N. himanicus Khan & Jairajpuri, 1994 (India)
N. imphalensis Khan & Jairajpuri, 1994 (India)
N. hintoni (Lee, 1961) Thorne, 1967 (Nigeria)
N. kosambus Khan, Ahmad & Jairajpuri, 1994 (India)
N. tepidus Andrássy, 1997 (Hungary)

N. thornei Chaturvedi & Khera, 1970 (India, South Africa)
N. vaalensis Andrássy, 1970 (South Africa)

Genus *Mactinolaimus* Andrássy, 1970 (Figs 15.10C and D)
Diagnosis. Actinolaimidae. Cuticle smooth. Vestibular ring corrugated; cheilostome without denticles on the stoma walls; onchia simple without secondary denticles. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in two fascicles. Tail elongate to filiform in females and short in males.

Type species: *M. typicus* Andrássy, 1970 (Congo)

Other species:
M. armatus (Jairajpuri, 1968) Vinciguerra, 1988 (India)
M. birketi (Altherr, 1960) Andrássy, 1970 (Cameroon)
M. chitwoodi (Moorthy, 1937) Andrássy, 1970 (India)
M. hutchinsoni (Filipjev, 1929) Andrássy, 1970 (South Africa)
M. michaelseni (Steiner, 1916) Andrássy, 1970 (South West Africa)
M. omercooperi (Filipjev, 1931) Andrássy, 1970 (Congo, Ethiopia, Sunda)
M. pooensis (Gadea, 1950) Andrássy, 1970 (North-west Equatorial Guinea)
M. tenuis (Schneider, 1935) Andrássy, 1970 (Tanganyika, West Africa)
M. transkeiensis (Heyns & Argo, 1969) Vinciguerra, 1988 (South Africa)
Additional reference: Andrássy (1970).

Genus *Metactinolaimus* Meyl, 1957 (Figs 15.10E and F)
Diagnosis. Actinolaimidae. Cuticle smooth. Vestibular ring corrugated; cheilostome with onchia fused and without denticles on the stoma walls. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in two fascicles. Tail elongate to filiform in females and short in males.

Type species: *Metactinolaimus kreisi* Meyl, 1957 (Paraguay)

Other species:
M. leloupi Meyl, 1957 (Tanganyika)
Additional reference: Meyl (1957).

Genus *Stopractinca* Khan, Ahmad & Jairajpuri, 1994 (Figs 15.11A–C)
Diagnosis. Cuticle smooth. Vestibular ring corrugated; cheilostome without denticles on the stoma walls; each onchium with an additional tooth below. Pharynx tripartite: a slender anterior part, a gradually expanding middle part and a long, enlarged posterior part. A cuticularized tongue-like piece at pharynx base. *Pars refringens* of vagina with strongly sclerotized pieces. Male supplements arranged in a series. Tail elongate to filiform in females and short in males.
Remarks: This genus was considered by Khan *et al.* (1994b) to be related to the genera *Parastomachoglossa*, *Actinca*, *Brasilaimus*, etc. (the so-called brittonems) because of the tripartite pharynx; however, the lack of longitudinal ridges in the cuticle, the low lip region, the robust odontostyle, the vagina with well-sclerotized pieces and the supplements in series show its affinity to the genera described so far.

Type species: *S. orientalis* Khan, Ahmad & Jairajpuri, 1994 (India)

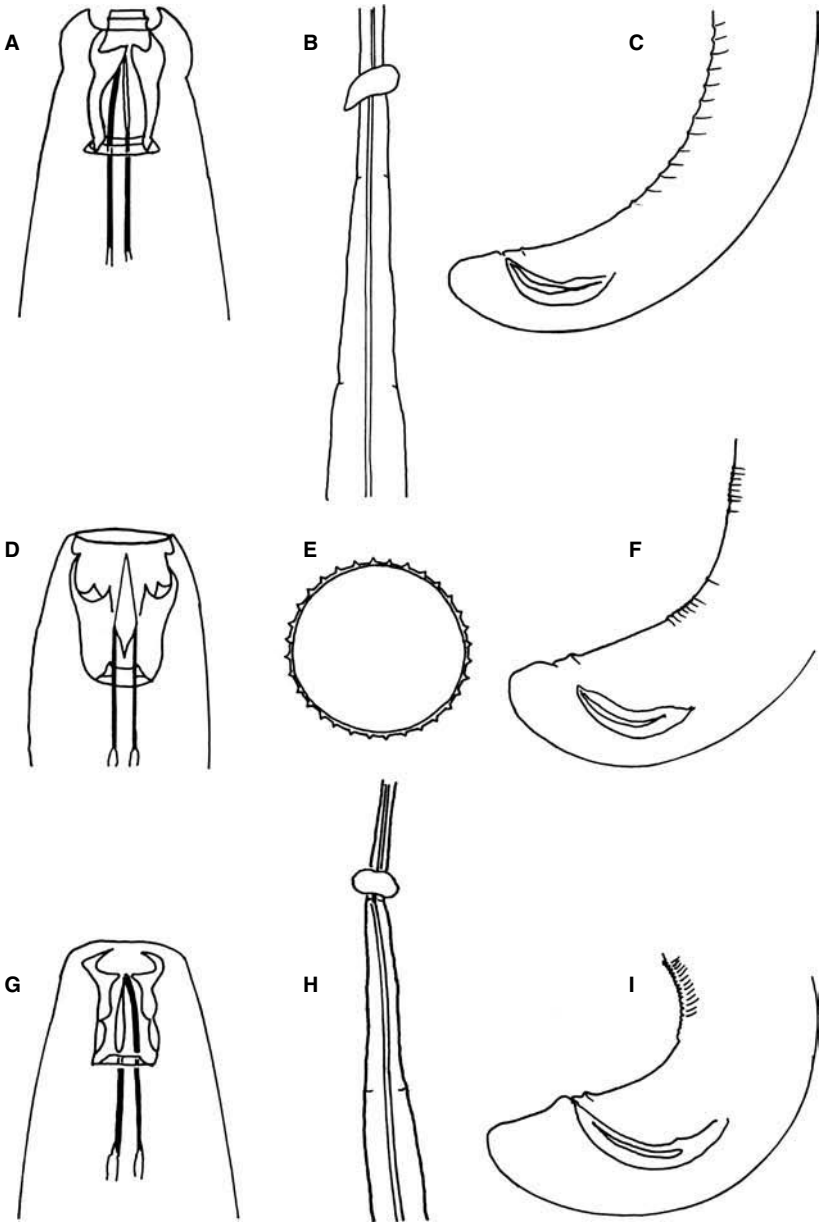

Fig. 15.11 A–C: *Stopractinca*; D–F: *Actinolaimus*; G–I: *Parastomachoglossa*.

Other species:
S. glandulus Khan, Park & Choi, 1999 (Korea)
S. kyotoensis Khan & Araki, 2001 (Japan)
S. malnadensis Dhanam, Jairajpuri & Khan, 1994 (India)
Additional reference: Khan *et al.* (1994a).

Genus *Actinolaimus* Cobb, 1913 (Figs 15.11D–F)
Diagnosis. Actinolaimidae. Cuticle with prominent cuticular ridges; lip region wide and low; vestibular ring sclerotized. Odontostyle robust. Vaginal refractive part with sclerotized pieces; male supplements in two fascicles. Tail elongate in females, short and rounded in males.

Type species: *A. tripapillatus* (Daday, 1905) Steiner, 1916 (Surinam, Paraguay, USA)

Other species:
A. chappuisi Meyl, 1957 (Tanganyika)
A. fritschi Altherr, 1972 (Amazonia)
A. palmaeri Allgen, 1933 (Congo)
A. schuurmansstekhoveni Meyl, 1957 (Kenya, Tanzania, Congo Republic)
A. straeleni Meyl, 1957 (Kenya)

Genus *Parastomachoglossa* Coomans & Loof, 1986 (Figs 15.11G–I)
Diagnosis. Actinolaimidae. Cuticle with prominent cuticular ridges; lip region wide and low; vestibular ring double and sclerotized; the six inner labial papillae external to the ring. Odontostyle robust; in between the four large onchia one to four narrow denticles arise from the same basis. Pharynx tripartite, with an anterior hyaline tube, a median muscular, gradually expanding, middle part and a posterior, evenly enlarged, muscular part; the median portion is longer or as long as the anterior one. Vulva longitudinal; vaginal refractive part with slightly sclerotized pieces; male supplements in two or three fascicles. Tail elongate in females, short and rounded in males.

Type species: *P. costata* (Schneider, 1935) Coomans & Loof, 1986 (West Africa)

Other species:
P. perplexa (Heyns & Argo, 1969) Vinciguerra & Coomans, 1988 (South Africa, Ethiopia)
P. taylori (Meyl, 1957) Coomans & Loof, 1986 (Kenya)
Additional references: Coomans and Loof (1986) and Vinciguerra and Coomans (1988).

Genus *Actinca* Andrássy, 1964 (Figs 15.12A–C)
Diagnosis. Actinolaimidae. Cuticle with conspicuous longitudinal ridges. Lips fused; lip region high; anterior end with a thin sclerotized circular ring slightly protruding, in medial position in respect of the external anterior margin; the six inner labial papillae and the four cephalic papillae are located in the same circle externally to the circular ring. Cheilostom without denticles on the walls. Pharynx tripartite, with long, non-muscular anterior part, short, muscular, expanding middle part and long, muscular, cylindrical posterior part. Vulva longitudinal; *pars refringens* of vagina with weakly sclerotized pieces; males with supplements in two fascicles. Tail elongated in females, short and round in males.

Type species: *A. gracillima* Andrássy, 1964 (Cameroon, Kenya, Uganda).

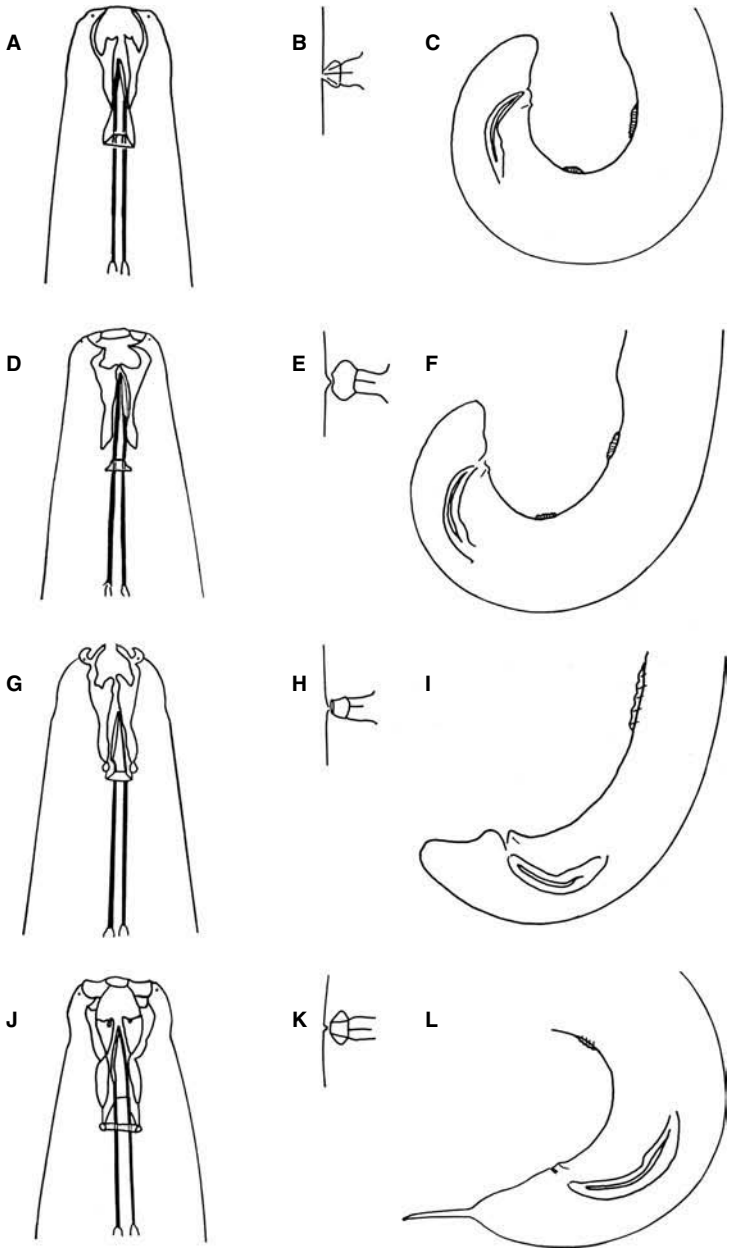

Fig. 15.12 A–C: *Actinca*; D–F: *Brasilaimus*; G–I: *Afractinca*; J–L: *Practinocephalus*.

Other species:
A. bidentata (Loof & Zullini, 2000) Vinciguerra & Clausi, 2003 (Costa Rica)
A. dicastrii Andrássy, 1968 (Paraguay)
A. intermedia Andrássy, 1968 (Tanzania)
A. memorabilis Andrássy, 1968 (Paraguay, Costa Rica)

Species inquirenda: *A. striata* (Thorne, 1939) Andrássy, 1964 (USA)

Species incertae sedis: *A. fusiformis* (Thorne, 1967) Andrássy, 1970 (Puerto Rico)

Additional reference: Vinciguerra and Clausi (2003).

Genus *Brasilaimus* Lordello & Zamith, 1957 (Figs 15.12D–F)
Syn. *Stomachoglossa* Andrássy, 1968
Diagnosis. Actinolaimidae. Cuticle with conspicuous longitudinal ridges; body anteriorly tapering; lips fused; lip region high; anterior end with a thin sclerotized circular ring slightly protruding, in medial position in respect of the external anterior margin; the six inner labial papillae and the four cephalic papillae are located in the same circle externally to the circular ring. Pharynx tripartite, with long, non-muscular anterior part, short, muscular, expanding middle part and long, muscular, cylindrical posterior part; a sclerotized tongue- or rod-like protrusion of the cuticular lining of the pharyngeal lumen is present in the cardia. *Pars refringens* of vagina without sclerotized pieces, thick-walled, wider than *pars proximalis*. Males with supplements in two fascicles. Tail elongated in females, short and round in males.

Type species: *B. subaquilus* Lordello & Zamith, 1957 (Brazil, Costa Rica)

Other species:
B. bryophilus (Hunt, 1978) Vinciguerra, Zullini & Monteiro, 1999 (St. Lucia, Costa Rica)
B. lombardoi Clausi & Vinciguerra, 2003 (Ecuador)
B. pachyderma (Andrássy, 1968) Vinciguerra, Zullini & Monteiro, 1999 (Paraguay)
B. pilatus (Andrássy, 1986) Vinciguerra, Zullini & Monteiro, 1999 (Bolivia)
B. spicatus (Thorne, 1967) Vinciguerra, Zullini & Monteiro, 1999 (Puerto Rico)
B. vinciguerrae Loof & Zullini, 2000 (Costa Rica)
Additional reference: Vinciguerra and Clausi (2003).

Genus *Afractinca* Vinciguerra & Clausi, 2000 (Figs 15.12G–I)
Diagnosis. Actinolaimidae. Cuticle with thick longitudinal ridges: lips fused; lip region high; anterior end externally bordered by a hexagonal thickening on which the six inner labial papillae and the four cephalic papillae are located. Odontostyle long and slender; cheilostom walls without denticles. Pharynx tripartite, with long, non-muscular anterior part, short, muscular, expanding middle part and long, muscular, cylindrical posterior part. Vulva longitudinal; *pars refringens* of vagina with small slightly sclerotized pieces; male supplements in two fascicles. Female tail elongate; male tail short and rounded.

Type species: *A. papillata* (Schneider, 1935) Vinciguerra & Clausi, 2000 (Ivory Coast).

Other species:
A. andrassyi Vinciguerra & Clausi, 2000 (Ivory Coast)
A. heynsi (Coomans & Vinciguerra, 1989) Vinciguerra & Clausi, 2000 (Ivory Coast)
A. irmae (De Ley & Coyne, 1997) Vinciguerra & Clausi, 2000 (Ivory Coast)
Additional reference: Vinciguerra and Clausi (2000).

Genus *Practinocephalus* Andrássy, 1974 (Figs 15.12J–L)
Syn. *Actinocephalus* Thorne, 1967
Diagnosis. Actinolaimidae. Cuticle furrowed by longitudinal ridges; lips fused; lip region high and off set from adjoining body, sometimes swollen or expanded; anterior end with a sclerotized circular ring, in medial position in respect of the external anterior margin; the six inner labial papillae and the four cephalic papillae are located in the same circle externally to the circular ring. Odontostyle long; mouth cavity walls without denticles but with heavy sclerotizations and long and thick postonchial extensions; Pharynx in three parts: the anterior part a hyaline tube, the intermediate muscular part short and the posterior part long and cylindrical. Vulva longitudinal; *pars refringens* of vagina with slightly sclerotized pieces; males with supplements in two fascicles. Female tail elongate conoid to filiform; male tail convex–conoid with a filiform appendix variable in length, shorter than female tail.

Type species: *P. bizarrus* (Thorne, 1967) Andrássy, 1974 (Puerto Rico)

Other species:
P. brzeskii Vinciguerra & Clausi, 2000 (Ecuador)
P. secundus Andrássy, 1986 (Peru)
Additional reference: Vinciguerra and Clausi (2003).

Family QUDSIANEMATIDAE Jairajpuri, 1963
Diagnosis. Dorylaimoidea: Cuticle generally smooth or finely striated; marked with longitudinal ridges in one genus. Lip region generally offset; odontostyle straight, with distinct lumen: its aperture less than 50% its length. Odontophore rod-like. Amphids stirrup-shaped. Posterior expanded part of pharynx about half its length. Pre-rectum distinct. Female genital organs generally didelphic, sometimes opisthodelphic; *pars refringens* of vagina with or without sclerotizations. Testes two; spicules dorylaimoid; a pair of ad-cloacal papillae and a row of ventromedian supplements present. Tail similar in both sexes, generally short, conoid or rounded. Terrestrial, freshwater or semi-freshwater nematodes.
Additional references: Andrássy (1990, 1991) and Jairajpuri and Ahmad (1992).

Subfamilies:
Chrysonematinae Siddiqi, 1969
Discolaiminae Siddiqi, 1969
Carcharolaiminae Thorne, 1967 (no freshwater species)
Qudsianematinae Jairajpuri, 1969
Arctidorylaiminae Mulvey & Anderson, 1979
Paraxonchiinae Dhanachand & Jairajpuri, 1981 (no freshwater species)
Genera *incertae sedis* within the family:
Kittydorylaimus Andrássy, 1999 (no freshwater species)
Kolodorylaimus Andrássy, 1999 (no freshwater species)
Cricodorylaimus Ahmad & Sturhan, 2001 (no freshwater species)

Key to subfamilies of Qudsianematidae
1. Cuticle marked with longitudinal ridges . . . . . .Arctidorylaiminae
   Cuticle without longitudinal ridges 2

2. Body tapering strongly in posterior part of neck, lip region very narrow . . . . . .Paraxonchiinae
   Body regularly tapering in the neck, lip not so narrow 3
3. Vagina not sclerotized; numerous glandular cells and pores in the lateral chords 4
   Vagina with sclerotization; lateral chords without such glands 5
4. Lip region with a heavily sclerotized basket-like structure; cheilostome wall also sclerotized . . . . . .Carcharolaiminae
   Lip region very expanded, lacking such sclerotization . . . . . .Discolaiminae
5. Lips well developed, odontostyle robust with aperture about one-third its length . . . . . .Qudsianematinae
   Lips fused, odontostyle slender with very small aperture . . . . . .Chrysonematinae

Subfamily Arctidorylaiminae Mulvey & Anderson, 1979
Diagnosis. Qudsianematidae. Cuticle marked with longitudinal ridges. Lip region off set from adjoining body. Odontostyle straight, with wide lumen; its aperture shorter than half its length. Female reproductive apparatus didelphic. Tail conoid, similar in both sexes: conoid or rounded.
Remarks: Jairajpuri and Ahmad (1992) considered this peculiar taxon a subfamily of Dorylaimidae, but because of the conoid tail similar in both sexes I prefer to attribute it to Qudsianematidae.
Only genus:
Arctidorylaimus Mulvey & Anderson, 1979

Genus *Arctidorylaimus* Mulvey & Anderson, 1979 (Figs 15.13A–C)
Diagnosis. Arctidorylaiminae. Large nematodes. Lips distinct. Odontostyle aperture about one-third its length; guiding ring double. Expanded part of pharynx more than half its length. Vulva longitudinal. Males with supplements arranged in two groups; two supplements adanal. Tail conoid, ventrally curved, in both sexes. The only species was found in freshwater.

Type and only species: *A. arcticus* Mulvey & Anderson, 1979 (Canada)

Additional reference: Mulvey and Anderson (1979).

Subfamily Discolaiminae Siddiqi, 1969
Diagnosis. Qudsianematidae. Cuticle smooth with numerous glandular cells and pores. Lip region expanded, sometimes discoidal or sucker-like. Odontostyle short, with large opening; guiding ring simple. Vulva transverse; vagina not sclerotized. Tail short, conoid or rounded in both sexes. Mainly terrestrial species. Only a few species found in freshwater.
Additional reference: Andrássy (1990).
Genera:
Discolaimus Cobb, 1913
Discolaimium Thorne, 1939 (no freshwater species)
Discolaimoides Heyns, 1963
Latocephalus Patil & Khan, 1982 (no freshwater species)
Mylodiscus Thorne, 1939 (no freshwater species)

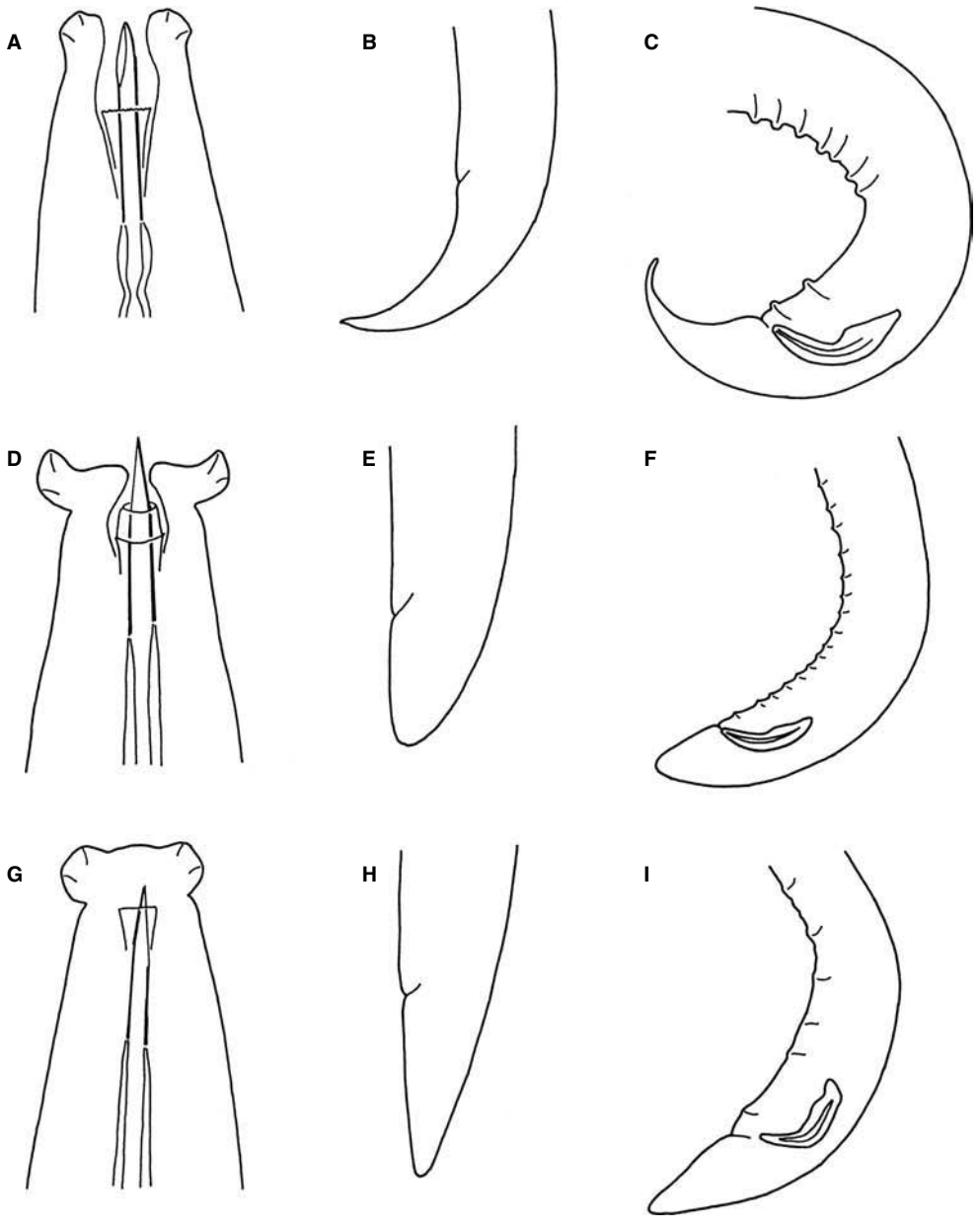

Fig. 15.13 A–C: *Arctidorylaimus;* D–F: *Discolaimus;* G–I: *Discolaimoides*.

Mylodiscoides Lordello, 1963 (no freshwater species)
Filidiscolaimus Siddiqi, 1995 (no freshwater species)

Genus *Discolaimus* Cobb, 1913 (Figs 15.13D–F)
Diagnosis. Discolaiminae. Numerous large glandular bodies in the lateral chords. Lip region very expanded, sucker-like, surrounding the sunken mouth. Odontostyle

robust, with large aperture. Female gonads paired. Tail short, rounded or bluntly conoid in both sexes. Mostly terricolous species, rarely found in freshwater habitats (marked with an asterisk in the list).

Type species: *D. texanus* Cobb, 1913 (USA, Australia, Italy, Spain, Uzbekistan, Central Europe, South Africa)

Other species:
D. acuticapitatus Furstenberg & Heyns, 1966 (South Africa)
D. affinis Loof, 1964 (Venezuela)
D. agricolus Sauer & Annels, 1986 (Australia)
D. albarossicus Merzheevskaja, 1951 (Russia, Belarus, Lithuania, Uzbekistan)
D. auritus Lordello, 1955 (Brazil)
D. bicorticus Furstenberg & Heyns, 1966 (South Africa, Bulgaria)
D. constrictus Heyns, 2001
D. discocephalus Tulaganov, 1949 (Uzbekistan)
D. elegans Sauer & Annels, 1986 (Australia)
D. gossypiorum Karimova, 1957 (Uzbekistan)
D. intermedius Heyns & Lagerway, 1965 (South Africa)
D. krugeri Furstenberg & Heyns, 1966 (South Africa)
D. labiatus Peña-Santiago, Torres, Liebanas & Abolafia, 2002 (Spain)
D. lahorensis Khan, 1998 (India)
D. laksi Khan & Laha, 1982 (India)
D. levinae Furstenberg & Heyns, 1966 (South Africa, Georgia)
D. major Thorne, 1939 (cosmopolitan)*
D. mariae Peña-Santiago, Torres, Liebanas & Abolafia, 2002 (Spain)
D. monoplanus Heyns, 1963 (South Africa, Cameroon)*
D. papillatus Khan, Ahmad & Jairajpuri, 1994 (India)
D. paramajor Coomans, 1966 (Georgia, Congo, Brazil, Italy)
D. perplexans Siddiqi, 1964 (Romania)
D. pizai Monteiro, 1970 (Brazil)
D. rotundicaudatus Khan & Laha, 1982 (India)
D. silvicolus Sauer & Annels, 1986 (Australia)
D. similis Thorne, 1939 (Italy, Uzbekistan, India, South Africa, Venezuela, USA)*
D. tenax Siddiqi, 1964 (India)
D. zicsii Andrássy, 1968 (Congo)
Additional reference: Andrássy (1990).

Genus *Discolaimoides* Heyns, 1963 (Figs 15.13G–I)
Diagnosis. Body very slender; cuticle smooth, subcuticle transversely striated. Lip region well developed, broader than adjoining body, not sucker-like. Odontostyle short, not longer than lip region width. Anterior part of pharynx very slender; dorsal pharyngeal gland far anterior to the expanded posterior part. Pre-rectum with a short caudal sack. Female gonads paired. Ventromedian supplements few, well spaced. Tail conoid or elongate conoid in both sexes. Mostly terricolous species, rarely found in freshwater habitats (marked with an asterisk in the list).

Type species: *D. bulbiferus* (Cobb, 1906) Heyns, 1963 (cosmopolitan)

Other species:
D. arcuatus (Husain & Siddiqi, 1967) Andrássy, 1990 (India)
D. arcuicaudatus (Furstenberg & Heyns, 1965) Das, Khan & Loof, 1969 (South Africa, Egypt)
D. brevicaudatus Vinciguerra & Orselli, 1998 (Italy)
D. discolaimioideus (Andrássy, 1971) Andrássy, 1991 (Italy)*
D. filiformis Das, Khan & Loof, 1969 (India, The Netherlands, Switzerland, Vietnam)
D. florealis Vinciguerra & Orselli, 1998
D. gracilis (Thorne, 1939) Andrássy, 1990 (USA, Venezuela, Italy, Uzbekistan)
D. indicus Thapa & Ganguly, 1993 (India)
D. intrastriatus (Loos, 1945) Loof, 1964 (Sri Lanka)
D. loofi Andrássy, 1990 (Hungary)
D. paraloofi Ahmad, Bloemers & Wanless, 1996 (Cameroon)
D. skrjabini (Tulaganov, 1949) Andrássy, 1990 (Uzbekistan)
D. spatilabium Khan & Laha, 1982 (India)
D. symmetricus Das, Khan & Loof, 1969 (The Netherlands, Great Britain, Hungary, Italy, Egypt)
D. tenuis (Furstenberg & Heyns, 1965) Das, Khan & Loof, 1969 (South Africa, Spain)
D. teres Khan & Laha, 1982 (India)
Additional reference: Andrássy (1990).

Subfamily Qudsianematinae Jairajpuri, 1965
Diagnosis. Qudsianematidae. Cuticle smooth, without glands in the lateral chords. Lip region off set from adjoining body but not wider than it; lips distinct; cheilostome without sclerotization. Odontostyle generally shorter than twice its lip region width; aperture shorter than half its length. Guiding ring simple or, more rarely, double. Pharynx muscular, expanded in its posterior half. Vulva transverse or longitudinal; *pars refringens* of vagina with sclerotized pieces. Female reproductive apparatus generally didelphic, mono–opisthodelphic in one genus. Tail rather short, similar in both sexes, conoid or rounded. Most species of the 14 genera are terrestrial but quite a few species have been found in freshwater habitats.
Additional reference: Andrássy (1991).
Genera:
Labronema Thorne, 1939
Eudorylaimus Andrássy, 1959
Torumanawa Yeates, 1967 (no freshwater species)
Ecumenicus Thorne, 1974
Takamangai Yeates, 1974
Pachydorylaimus Siddiqi, 1983
Labronemella Andrássy, 1985
Microdorylaimus Andrássy, 1986
Allodorylaimus Andrássy, 1986
Kallidorylaimus Andrássy, 1986 (no freshwater species)
Epidorylaimus Andrássy, 1986
Skibbenema Van Reenen & Heyns, 1986 (no freshwater species)

Gopalus Khan, Jairajpuri & Ahmad, 1988
Baqriella Ahmad & Jairajpuri, 1989 (no freshwater species)
Talanema Andrássy, 1991 (no freshwater species)
Crassogula Andrássy, 1991
Boreolaimus Andrássy, 1998
Amblydorylaimus Andrássy, 1998 (no freshwater species)
Inbionema Loof & Zullini, 2000 (no freshwater species)

Key to genera of Qudsianematinae

1. Female gonad mono–opisthodelphic . . . . . *Ecumenicus*
   Female gonads didelphic 2
2. Odontostyle weakly sclerotized, irregular in shape . . . . . *Amblydorylaimus*
   Odontostyle well sclerotized 3
3. Posterior part of tail appearing empty; a single anterior sub-ventral gland nucleus in the pharynx . . . . . *Boreolaimus*
   Posterior part of tail never empty, one pair of anterior sub-ventral gland nuclei in the pharynx 4
4. Tail rounded or bluntly conoid, about as long as anal body width 5
   Tail conoid or convex–conoid, clearly longer than anal body width 11
5. Presence of a constriction between the thinner anterior and the expanded posterior part of pharynx . . . . . *Skibbenema*
   No constriction between the two parts of pharynx 6
6. Cardia provided with three glands . . . . . *Torumanawa*
   Cardia without glands 7
7. Vulva longitudinal, supplements contiguous . . . . . *Labronema*
   Vulva transverse, supplements not contiguous 8
8. Odontostyle very slender, 10–15 times as long as wide; mouth sunken, surrounded by inner liplets . . . . . *Labronemella*
   Odontostyle not so slender, mouth not sunken, liplets absent 9
9. Anterior part of pharynx strongly muscular; sperm very small . . . . . *Crassogula*
   Anterior part of pharynx thin, weakly muscular; sperm not very small 10
10. Guiding ring single, tail subdigitate . . . . . *Talanema*
    Guiding ring double, tail broadly rounded . . . . . *Takamangai*
11. Tail longer than three anal body widths 12
    Tail shorter, 1–3 anal body-widths long 15
12. Odontostyle very thick and short; odontophore flanged . . . . . *Pachydorylaimus*
    Odontostyle normal; odontophore rod-like 13
13. Outer margins of lips forming a flap over oral area, inner margins sunken . . . . . *Baqriella*
    Lips normal 14
14. Female tail straight; a single supplement in male . . . . . *Kallidorylaimus*

Female tail ventrally curved; more than four supplements in male . . . . . *Epidorylaimus*
15. The most posterior supplements well anterior to the spicules . . . . . *Eudorylaimus*
The most posterior supplement in the range of the spicules or just before it 16
16. Very small size, body length less than 1 mm; pharynx relatively long, posterior expanded portion two-fifths of its length . . . . . *Microdorylaimus*
Larger size; pharynx expanded at about half its length 17
17. Odontostyle about as long as lip region width . . . . . *Allodorylaimus*
Odontostyle at least twice as long as lip region width 18
18. Odontostyle about twice as long as lip region width . . . . . *Inbionema*
Odontostyle more than three times as long as lip region width . . . . . *Gopalus*

Genus *Labronema* Thorne, 1939 (Figs 15.14A and B)
Diagnosis. Qudsianematinae. Rather large nematodes. Cuticle thick, finely transversely striated. Lip region offset, lips well developed; six small inner liplets around mouth. Odontostyle at least as long as lip region width or longer; guiding ring double. Female gonads paired; vulva longitudinal; vagina with sclerotization. Male supplements numerous, contiguous. Tail rounded in both sexes, never longer than anal body width. Most species are terricolous but some have been found in freshwater habitats. The latter are marked by an asterisk.

Type species: *L. ferox* Thorne, 1939 (USA, Spain, Nepal)

Other species:
L. alticola (Menzel in Hofmänner & Menzel, 1914) Thorne, 1939 (Switzerland)
L. andrassyi Gagarin, 1993 (Russia)*
L. angeloi Vinciguerra & Clausi, 1994 (Italy)
L. arenicola (Altherr, 1958) Andrássy, 1986 (Germany)*
L. baqrii Khan, Jairajpuri & Ahmad, 1989 (India)
L. bathybium (Daday, 1906) Andrássy, 1962 (Switzerland)*
L. bicuticulum Furstenberg, Heyns & Swart, 1993 (Seychelles)
L. brevicauda Furstenberg, Heyns & Swart, 1993 (Madagascar)
L. carusoi Vinciguerra & Orselli, 1998 (Italy)
L. chilense Andrássy, 1967 (Chile)
L. confusum (Jana & Baqri, 1983) Andrássy, 1991 (India)
L. corii (Liebermann, 1928) Andrássy, 1960 (Czechoslovakia)*
L. deoriaensis Khan, Jairajpuri & Ahmad, 1989 (India)
L. digiturum Vinciguerra, 1984 (Italy)
L. diversum Andrássy, 2002 (Chile)
L. fimbriatum Thorne, 1939 (USA, China)
L. fluviatile Altherr, 1958 (Germany)*
L. glandosum Rahman, Jairajpuri, Ahmad & Ahmad, 1987 (India)
L. goodeyi Altherr in Altherr & Delamare-Debouteville, 1972 (Russia, Ethiopia, USA)

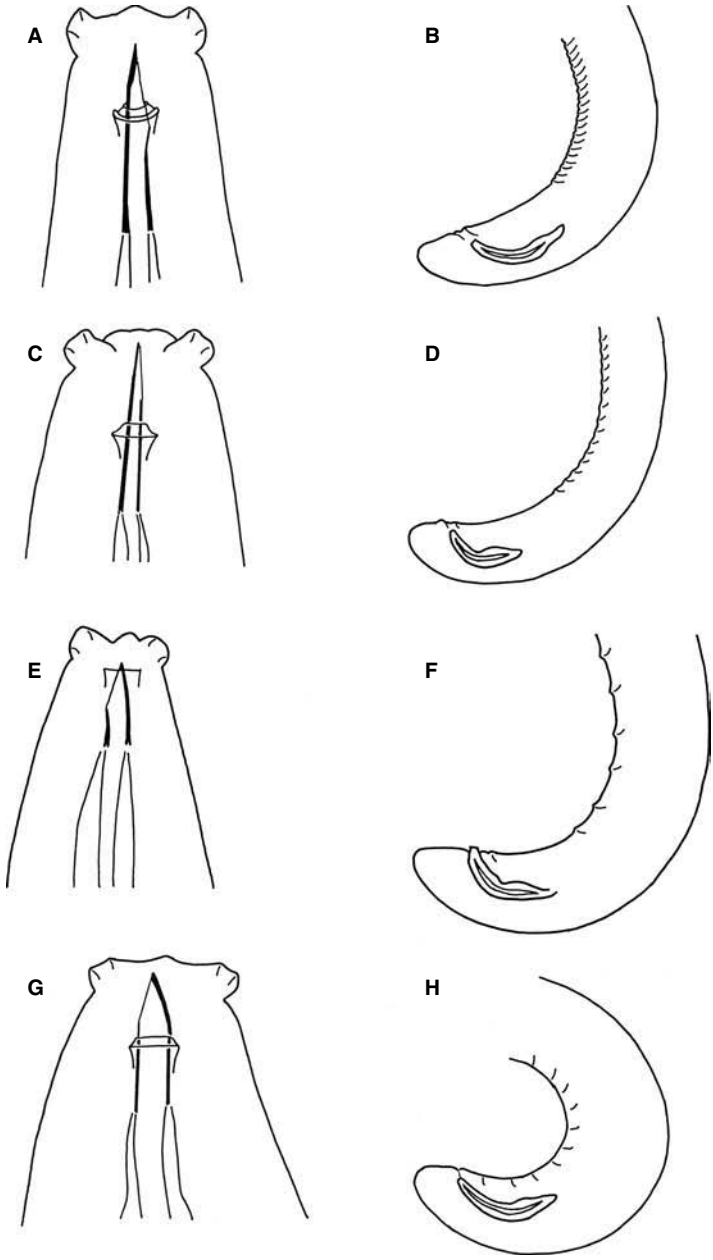

Fig. 15.14 A and B: *Labronema*; C and D: *Labronemella*; E and F: *Takamangai*; G and H: *Crassogula*.

L. ibarakiense Khan & Araki, 2002 (Japan)
L. hyalinum (Thorne & Swanger, 1936) Thorne, 1939 (Mauritius, USA)
L. khazariensis (Chesunov, 1985) Andrássy, 1991 (Caspian Sea)*
L. korandrum Choi, Khan & Choi, 2001

L. latum (Cobb, 1891) Andrássy, 1986 (Russia, Australia)
L. loeffleri Andrássy, 1978 (Nepal, Russia)*
L. magnum Altherr, 1972 (Sweden)*
L. malagasi Furstenberg, Heyns & Swart, 1993 (Madagascar)
L. mangalorense Ahmad & Ahmad, 2002 (India)
L. neopacificum Rahman, Jairajpuri, Ahmad & Ahmad, 1987 (India)
L. nepalense Ahmad & Jairajpuri, 1982 (Nepal)
L. obesum Thorne, 1974 (USA)
L. pacificum (Cobb, 1906) Thorne, 1939 (Mauritius, Jamaica, Hawaii, New Caledonia)
L. papillatum Khan, Ahmad & Jairajpuri, 1995 (India)
L. pulchrum Vinciguerra & Zullini, 1980 (Italy, Spain)
L. rapax Thorne, 1974 (USA, Canada, Spain)
L. rikia Yeates, 1967 (New Zealand)
L. seychellense Furstenberg, Heyns & Swart, 1993 (Seychelles)
L. sphinctum Mohilal & Dhanachand, 2001
L. stechlinense Altherr, 1968 (Germany, Russia, Alaska)*
L. thornei Ferris, 1968 (USA)
L. varicaudatum (Thorne, 1929) Thorne, 1939 (USA, Spain)
L. virgo Monteiro, 1970 (Brazil, Spain)
L. vulvapapillatum (Meyl, 1954) Loof & Grootaert, 1981 (The Netherlands, Belgium, Germany, Italy, Hungary, Spain)*
Additional reference: Andrássy (1991).

Genus *Labronemella* Andrássy, 1985 (Figs 15.14C and D)
Diagnosis. Qudsianematinae. Cuticle transversely striated. Lip region markedly offset, with sunk, plate-like oral field and conspicuous inner liplets. Odontostyle very slender, longer than lip region width; guiding ring double. Pharynx expanded near middle. Female gonads paired. Vulva transverse; vagina with sclerotizations. Male supplements low, closely spaced. Tail short, rounded in both sexes. Freshwater, semi-freshwater or terrestrial nematodes.

Type species: *L. labiata* Andrássy, 1985

Other species:
L. andrassyi (Baqri & Khera, 1975) Andrássy, 1985 (India)
L. czernowitziensis (Micoletzky, 1922) Andrássy, 2002 (Germany, Denmark, Austria, Romania, The Netherlands, Hungary)*
L. georgiensis Eliava & Kuchava, 2001
L. hemicaudata Baqri, 1991 (India)
L. loofi (Ahmad & Jairajpuri, 1983) Andrássy, 1985 (India)
L. octodurensis (Altherr, 1950) Andrássy, 1991 (Switzerland, Russia)
L. ruttneri (Schneider, 1937) Andrássy, 1985 (Sumatra)*
Additional reference: Andrássy (1991).

Genus *Takamangai* Yeates, 1967 (Figs 15.14E and F)
Syn. *Thonus* Thorne, 1974
Diagnosis. Qudsianematinae. Cuticle smooth. Lip region generally offset; lips separate. Odontostyle about as long or slightly longer than lip region width; guiding ring

simple, thin. Pharynx enlarged in its posterior half. Female gonads amphidelphic; vulva transverse; vagina sclerotized. Male supplements spaced; pre-cloacal space between the most posterior one and the ad-cloacal papillae present. Tail short, rounded or conoid–rounded in both sexes. Most species are terricolous but some have been found in freshwater habitats. The latter are marked by an asterisk.

Type species: *T. waenga* Yeates, 1967 (New Zealand)

Other species:
T. balda (Thorne, 1974) Andrássy, 1991 (USA)
T. brachycephala (Thorne & Swanger, 1936) Andrássy, 1991 (USA, Georgia)
T. circulifera (Loof, 1961) Andrássy, 1991 (The Netherlands, Germany, Spain, UK, Poland, Italy, USA)*
T. confusa (Thorne, 1939) Andrássy, 1991 (USA, Uzbekistan)
T. cylindrica (Thorne, 1974) Andrássy, 1991 (USA, India)
T. dogielii (Tulaganov, 1949) Andrássy, 1991 (Poland, Georgia, Uzbekistan, Kazakhstan)
T. elegans (Thorne, 1974) Andrássy, 1991 (USA)
T. eroshenkoi Andrássy, 1991 (Russia, Hungary)
T. ettersbergensis (de Man, 1885) Andrássy, 1991 (cosmopolitan)*
T. goaensis (Ahmad, 1993) n. comb. (India)
T. goldeni (Khan & Fatima, 1980) Andrássy, 1991 (Pakistan)
T. gracilis (Eroshenko, 1976) Andrássy, 1991 (Russia)
T. himala (Jairajpuri & Ahmad, 1983) Andrássy, 1991 (India, Hungary)
T. insignis (Loos, 1945) n. comb. (Sri Lanka)
T. kaszabi (Andrássy, 1959) Andrássy, 1991 (Poland, France, Yugoslavia, Italy)
T. laticollis (de Man, 1907) Andrássy, 1991 (The Netherlands, Denmark, Georgia, Congo)*
T. lauta (Andrássy, 1959) Andrássy, 1991 (Hungary, Uzbekistan)
T. major (Thorne, 1974) Andrássy, 1991
T. mediana (Eroshenko, 1976) Andrássy, 1991 (Russia)
T. minima (Steiner, 1914) Andrássy, 1991 (Switzerland, Australia)
T. nothus (Thorne & Swanger, 1936) Andrássy, 1991 (USA, Poland, Hungary, Sweden, South Africa, Czech Republic)
T. parvula (Thorne & Swanger, 1936) Andrássy, 1991 (Russia, USA)
T. pavlovskii (Tulaganov, 1949) Andrássy, 1991 (Uzbekistan)
T. porosa (Zell, 1986) Andrássy, 1991 (Germany)
T. pumila (Andrássy, 1963) Andrássy, 1991 (Hungary)
T. pusilla (Andrássy, 1985) Andrássy, 1991 (Hungary, Italy)
T. rhopalocerca (de Man, 1880) Andrássy, 1991 (cosmopolitan)*
T. saccata (Thorne, 1974) Andrássy, 1991 (Pakistan, USA)
T. steineri (Thorne & Swanger, 1936) Andrássy, 1991 (Switzerland)
T. tropica (Jana & Baqri, 1981) Andrássy, 1991 (India)
Additional reference: Andrássy (1991).

Genus *Crassogula* Andrássy, 1991 (Figs 15.14G and H)
Diagnosis. Qudsianematinae. Cuticle smooth. Lip region markedly offset; lips separate. Odontostyle slightly longer than lip region width; guiding ring double but thin.

Pharynx gradually expanded, unusually thick and muscular also in the anterior part. Female gonads paired; vulva transverse; vagina sclerotized. Male supplements numerous, minute and very close to each other. Pre-cloacal space present. Tail broadly rounded in both sexes, shorter than anal body width. The single species known so far is freshwater.

Type and only species: *C. torosa* Andrássy, 1991 (Ecuador)

Additional reference: Andrássy (1991).

Genus *Eudorylaimus* Andrássy, 1959 (Figs 15.15A and B)
Syn. *Qudsianema* Jairajpuri, 1965; *Witoldinema* Brzeski, 1960
Diagnosis. Qudsianematinae. Cuticle smooth or finely transversely striated. Lip region offset, lips distinct. Odontostyle about as long as lip region width or slightly longer, its aperture less than half its length; guiding ring simple. Pharynx expanded near middle or slightly behind. Female reproductive apparatus didelphic. Vulva transverse, rarely longitudinal; refractive part of vagina well sclerotized. Males frequent; supplements variable in number, not contiguous; pre-cloacal space present; sperm fusiform. Tail conoid, straight or ventrally bent, in both sexes. Most species are terricolous but some have been found in freshwater habitats. The latter are marked by an asterisk.

Type species: *E. carteri* (Bastian, 1865) Andrássy, 1959 (cosmopolitan)*

Other species:
E. acuticauda (de Man, 1880) Andrássy, 1959 (cosmopolitan)*
E. acutus (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Georgia, Romania, Russia)
E. altherri Tjepkema, Ferris & Ferris, 1971 (USA, Romania)
E. amabilis (Jairajpuri, 1965) Siddiqi, 1966 (Botswana, India)
E. andersoni Khan, 1989
E. antarcticus (Steiner, 1916) Yeates, 1970 (Antarctica)
E. aquilonarius Tjepkema, Ferris & Ferris, 1971 (USA)
E. arcus (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Poland, Italy, Russia, Uzbekistan)
E. arenarius Bussau, 1991 (Denmark)
E. badensis Zell, 1986 (Germany)*
E. bombilectus Andrássy, 1962 (Germany, Hungary, Spain, Russia, Mongolia, Uzbekistan)*
E. brevidens (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Czech Republic)
E. brevis (Altherr, 1952) Andrássy, 1959 (France, Spain, Switzerland, Italy, Bulgaria, Poland, Czech Republic, Sweden, USA, Russia)*
E. bureshi (Andrássy, 1958) Andrássy, 1959 (Poland, Bulgaria, Czech Republic, France, Lithuania, Cuba)*
E. centrocercus (de Man, 1880) Andrássy, 1959 (widespread in Europe and in Asia, Congo, Ivory Coast, Kenya)*
E. chauhani (Baqri & Khera, 1975) Andrássy, 1986 (India)
E. coloradensis Loof, 1971 (USA)
E. confusus Thorne, 1974 (USA, Canada, Uzbekistan)
E. conicaudatus Thorne, 1974 (USA)

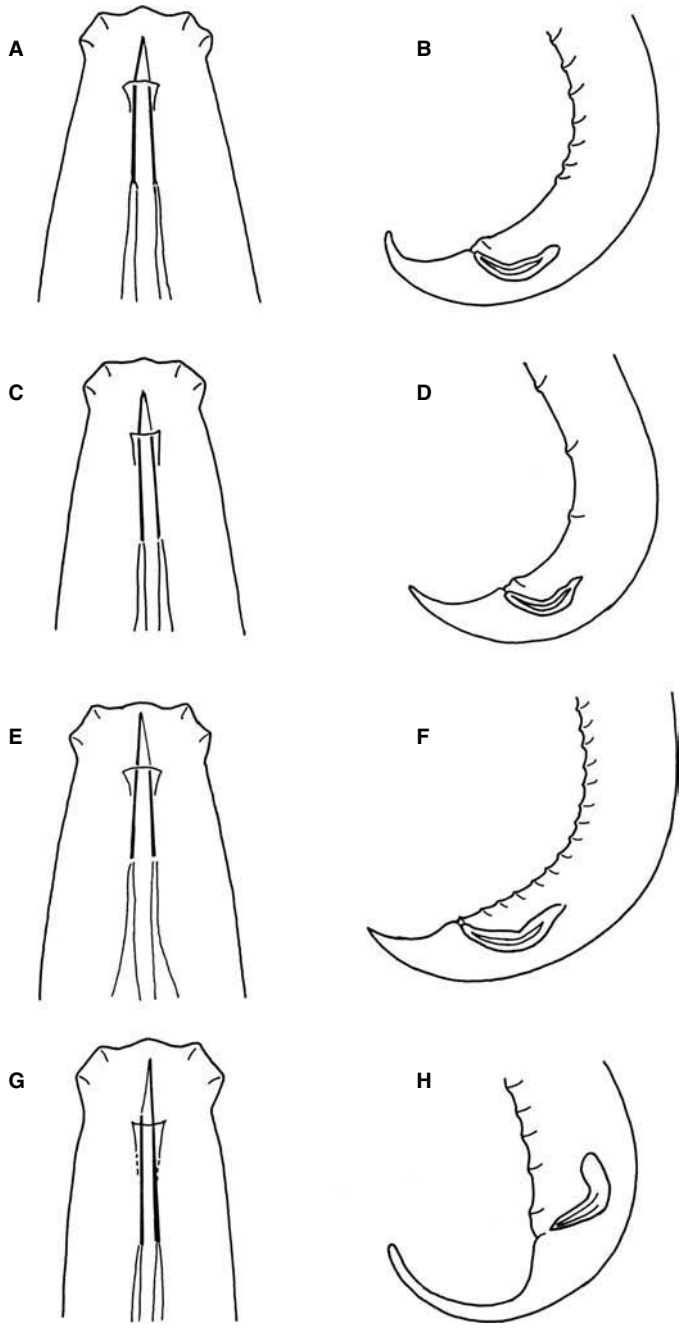

Fig. 15.15 A and B: *Eudorylaimus*; C and D: *Microdorylaimus*; E and F: *Allodorylaimus*; G and H: *Epidorylaimus*.

E. coniceps Loof, 1975 (Antarctica)
E. dermatus (Thorne, 1939) Andrássy, 1959 (USA)
E. discolaimioideus (Andrássy, 1958) Andrássy, 1959 (Bulgaria, Germany, Spain, Uzbekistan)*
E. dubius Thorne, 1974 (USA)
E. eremitus (Thorne, 1939) Andrássy, 1959 (USA, Uzbekistan)
E. eudorylaimoides (Geraert, 1962) Andrássy, 1991 (Russia, Uzbekistan, Cuba, Congo)
E. familiaris Winiszewska-Slipinska, 1987 (Poland)*
E. fransus Heyns, 1963 (South Africa)
E. franzi Andrássy, 1967 (Chile)
E. ibiti Lordello, 1965 (Brazil)
E. imitatoris Gagarin, 1982 (Mongolia)
E. indicus Soni & Nama, 1980 (India)
E. iners (Bastian, 1865) Andrássy, 1959 (Congo, Egypt, Australia, widespread in Europe and in Central Asia)*
E. isokaryon Loof, 1975 (Antarctica)
E. japonicus Khan & Araki, 2000 (Japan)
E. junctus (Cobb in Thorne & Swanger, 1936) Andrássy, 1959
E. juniperi Andrássy, 1987 (Hungary, Italy)
E. jurassicus (Altherr, 1953) Andrássy, 1959 (Switzerland, Czech Republic, Spain)
E. leuckarti (Bütschli, 1873) Andrássy, 1959 (Central Europe, Spain, France, Russia, Kazachstan, Ghana, Alaska)*
E. liangii Ahmad, Wu & Shaheen, 2002
E. lindbergi Andrássy, 1960 (Sweden, Russia, Afghanistan, Mongolia)*
E. longicardius Thorne, 1974 (USA)
E. lotharingiae Altherr, 1963 (France)*
E. magistri Andrássy, 1986 (USA)
E. maritimus (Ditlevsen, 1913) Andrássy, 1959 (Greenland)
E. maritoides Zell, 1986 (Germany)
E. maritus Andrássy, 1959 (Moldavia, Russia)
E. megadon Loof, 1971 (Spitzbergen)*
E. meridionalis Tjepkema, Ferris & Ferris, 1971 (USA, Russia)*
E. minutus (Bütschli, 1873) Andrássy, 1959 (Germany, The Netherlands, Czechoslovakia, Russia, Spain, Georgia, Uzbekistan, Kyrgyzstan, USA, Jamaica, Venezuela)
E. nitidus (Cobb in Thorne & Swanger, 1936) Andrássy, 1959 (Spain, Venezuela, USA)
E. nodus (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Czechoslovakia)
E. novus Vinciguerra & Orselli, 1998 (Italy)
E. nudicaudatus Heyns, 1993 (South Africa)
E. opistohystera (Altherr, 1953) Andrássy, 1959 (Switzerland, Czech Republic, Italy, Romania, Georgia)
E. paesleri Andrássy, 1954 (Hungary)
E. parabokori Altherr, 1974 (Germany)*
E. paradiscoalimioideus Altherr, 1976 (Austria)
E. paramonovi Eliava & Bagaturia, 1968 (Georgia)
E. paucipapillatus Andrássy, 1986 (USA)
E. pectinatus Mukhina, 1970 (Russia, Belarus)
E. perspicuus (Andrássy, 1958) Andrássy, 1959 (Romania, Bulgaria)

E. productus (Thorne & Swanger, 1936) Andrássy, 1959 (USA, Uzbekistan, Spain, Central Europe)
E. pseudobokori Zell, 1986 (Germany)
E. pseudocarteri Loof, 1975 (Antarctica)
E. pussulosus Andrássy, 1991 (Hungary)
E. quadramphidius Andrássy, 1973 (Argentina)
E. retractus Thorne, 1974 (USA)
E. rugosus (Andrássy, 1957) Andrássy, 1959 (Hungary, Poland, Spain)
E. saxifragae Popovici, 1995
E. schraederi Altherr, 1974 (Germany)*
E. shirasei Kito, Shishida & Ohyama, 1996 (Japan)
E. silvaticus Brzeski, 1960 (Poland, USA, Georgia)*
E. similis (de Man, 1876) Andrássy, 1959 (Central Europe, Russia, Belarus, Kazakhstan, Georgia, Uzbekistan)*
E. sodakus Thorne, 1974 (USA)
E. solus Andrássy, 1962 (Hungary)
E. spaulli Loof, 1975 (Antarctica)
E. spongiophylus Batalova, 1983 (Siberia)
E. stefanskii (Brzeski, 1960) Andrássy, 1991 (Poland)
E. subdigitalis Tjepkema, Ferris & Ferris, 1971 (USA, Italy)
E. subjunctus Loof, 1971 (Spitzbergen, Sweden, Pakistan)
E. subulophilus Tjepkema, Ferris & Ferris, 1971 (USA, India)
E. thorneanus Andrássy, 1990 (USA)
E. truncatus (Cobb in Thorne & Swanger, 1936) Andrássy, 1959
E. turkestanicus Eliava, 1978 (Turkestan, Sweden)
E. unicus Khan & Araki, 2000 (Japan)
E. vanrosseni Loof, 1971 (Spitzbergen)
E. verrucosus Loof, 1975 (Antarctica)
E. vestibulifer (Micoletzky, 1922) Andrássy, 1959 (Austria, Czech Republic)
Additional references: Andrássy (1986, 1991).

Genus *Microdorylaimus* Andrássy, 1986 (Figs 15.15C and D)
Diagnosis. Qudsianematinae. Very small nematodes, not reaching 1 mm in length. Body rather plump. Cuticle smooth. Lip region offset; lips distinct, with prominent papillae. Odontostyle about as long as lip region width. Pharynx about one-third as long as body length, expanded in its posterior two-fifths. Female gonads paired. Vulva transverse; vagina weakly sclerotized. Males rare. Supplements spaced; no pre-cloacal space between the most posterior one and the ad-cloacal papillae. Tail conoid, straight or ventrally bent, in both sexes. Most species are terricolous but some have been found in freshwater habitats. The latter are marked by an asterisk.

Type species: *M. parvus* (de Man, 1880) Andrássy, 1986 (widespread in Europe and Asia)*

Other species:
M. angelus (Thorne, 1974) Andrássy, 1986 (USA, Spain)
M. diminutivus (Thorne & Swanger, 1936) Andrássy, 1986 (USA)

M. drepanoideus (Eroshenko, 1976) Andrássy, 1991 (Russia)
M. dubius (Thorne, 1974) Andrássy, 1991 (USA)
M. longicollis (Brzeski, 1964) Andrássy, 1986 (Poland, Hungary, Spain, Italy, Georgia)
M. minor (Cobb in Thorne & Swanger, 1936) Andrássy, 1986 (Georgia, Japan, USA, Venezuela, Brazil)
M. minusculus (Loos, 1946) Andrássy, 1986 (Sri Lanka)
M. miser (Thorne & Swanger, 1936) Andrássy, 1986 (USA, Venezuela, Hungary, The Netherlands, Italy)*
M. modestus (Altherr, 1952) Andrássy, 1986 (The Netherlands, Spain, Italy, UK, Georgia, USA)
M. modicus (Kirjanova, 1951) Andrássy, 1986 (Uzbekistan)
M. parvissimus (Bagaturia & Eliava, 1968) Andrássy, 1986 (Georgia, Canada, USA)
M. profestus (Andrássy, 1963) Andrássy, 1986 (Argentina)
M. rapsoides (Heyns & Lagerway, 1965) Andrássy, 1986 (South Africa)
M. rapsus (Heyns, 1963) Andrássy, 1986 (South Africa, India, Japan, Poland, Spain, Italy, USA)
M. thornei (Tjepkema, Ferris & Ferris, 1971) Andrássy, 1986 (USA, Spain)
Additional references: Andrássy (1986, 1991).

Genus *Allodorylaimus* Andrássy, 1986 (Figs 15.15E and F)
Diagnosis. Qudsianematinae. Cuticle smooth or finely transversely striated. Lip region offset, lips distinct. Odontostyle about as long as lip region width; guiding ring simple. Pharynx expanded in its posterior half. Female gonads paired; vulva transverse or longitudinal; vagina with sclerotizations. Male supplements spaced; no pre-cloacal space between the most posterior one and the ad-cloacal papillae. Tail conoid or convex–conoid, straight or ventrally curved, in both sexes. Most species are terricolous but some have been found in freshwater habitats.

Type species: *A. uniformis* (Thorne, 1929) Andrássy, 1986 (Austria, Russia, Germany, Georgia, USA, Nepal)*

Other species:
A. aljabaranus Quijano, Peña-Santiago & Jiménez-Guirado, 1991 (Spain)
A. allgeni (Andrássy, 1958) Andrássy, 1986 (Sweden, Romania, Bulgaria)
A. alpinus (Steiner, 1914) Andrássy, 1986 (The Netherlands, Switzerland)
A. americanus Andrássy, 1986 (USA)
A. andrassyi (Meyl, 1955) Andrássy, 1986 (The Netherlands, Germany, Russia, Israel, Spain)*
A. bokori (Andrássy, 1959) Andrássy, 1986 (Hungary, Russia, Georgia)*
A. diadematus (Cobb in Thorne & Swanger, 1936) Andrássy, 1986 (Italy, Yugoslavia, UK, Georgia, South Africa, Jamaica, Venezuela, Brazil))*
A. digiturus (Thorne, 1939) Andrássy, 1986 (Holland)
A. ferrisorum Andrássy, 1986 (USA)
A. granuliferus (Cobb, 1893) Andrássy, 1986 (USA, Spain, Switzerland, Poland, Czech Republic, Mongolia, Japan, Java, Sumatra, Fiji, Mauritius, Hawaii, Trinidad, Surinam, Venezuela, Brazil, Paraguay)

A. holdemani (Andrássy, 1959) Andrássy, 1959 (Bulgaria, Italy, Spain, Nepal)*
A. husmanni (Altherr, 1972) Andrássy, 1986 (Sweden, Hungary)*
A. infundibulicaudatus Andrássy, 1991 (Hungary)
A. irritans (Cobb in Thorne & Swanger, 1936) Andrássy, 1986 (Jamaica)
A. kosambaensis Khan, Ahmad & Jairajpuri, 1995 (India)
A. meridianus Andrássy, 1991 (Ecuador)
A. paragranuliferus Quijano, Peña-Santiago & Jiménez-Guirado, 1991 (Spain)
A. parasimilis (Kreis, 1963) Andrássy, 1986 (Iceland)
A. piracicabensis (Lordello, 1955) Andrássy, 1986 (Brazil)
A. rarus Gagarin, 1999 (Siberia)*
A. robustus (Thorne, 1974) Andrássy, 1986 (USA)
A. santosi (Meyl, 1957) Andrássy, 1986 (Brazil, USA)
A. septentrionalis (Kreis, 1963) Andrássy, 1986 (Spitzbergen, Iceland, Hungary)
A. tarkoenensis (Andrássy, 1959) Andrássy, 1986 (Hungary, Lithuania, Spain)
A. thimophilus Quijano, Peña-Santiago & Jiménez-Guirado, 1991 (Spain)
A. uniformis (Thorne, 1929) Andrássy, 1959 (Austria, Georgia, Nepal, Northern Russia)*
A. vellus Khan, Ahmad & Jairajpuri, 1995 (India)
Additional references: Andrássy (1986, 1991).

Genus *Epidorylaimus* Andrássy, 1986 (Figs 15.15G and H)
Diagnosis. Qudsianematinae. Cuticle smooth. Lip region offset; lips distinct. Odontostyle variable in length, up to 1.5 times as long as lip region width. Guiding ring simple. Pharynx enlarged in its posterior half. Female genital apparatus didelphic; vulva longitudinal or pore-like, generally pre-equatorial; vagina with sclerotization. Males rare. Supplements spaced; no pre-cloacal space between the most posterior one and the adcloacal papillae. Tail elongate conoid, ventrally curved, in both sexes. A few species of this mainly terrestrial genus have been found in freshwater habitats.

Type species: *E. lugdunensis* (de Man, 1880) Andrássy, 1986 (Central Europe, Greenland, Spitzbergen, Russia, USA, Alaska)*

Other species:
E. agilis (de Man, 1880) Andrássy, 1986 (The Netherlands, Austria, Ireland, Sweden, Spitzbergen, Russia, Armenia, Uzbekistan, Brazil, USA)*
E. angulosus (Thorne & Swanger, 1936) Andrássy, 1986 (Poland, Hungary, Romania, Serbia, Spain, USA)
E. consobrinus (de Man, 1918) Andrássy, 1986 (The Netherlands, Belgium, Czech Republic, Hungary, Norway, Spain, Russia, USA, Kenya)*
E. filicaudatus (Tjepkema, Ferris & Ferris, 1971) Andrássy, 1986 (USA, Poland, Italy)
E. humilior (Andrássy, 1959) Andrássy, 1986 (Hungary, Romania)
E. humilis (Thorne & Swanger, 1936) Andrássy, 1986 (USA, Yugoslavia, Bulgaria, Romania, Spain, Uzbekistan, Jamaica, Venezuela, New Hebrides)
E. leptosoma (Altherr, 1963) Andrássy, 1986 (Switzerland)
E. mellenbachensis (Altherr, 1974) Andrássy, 1986 (Germany)*
E. muchabbatae (Tulaganov, 1949) Andrássy, 1986 (Uzbekistan)
E. muscorum (Skwarra, 1921) Andrássy, 1986 (Germany, Spain, Romania)*
E. pseudoagilis (Altherr, 1952) Andrássy, 1986 (Switzerland, Romania, Italy, Spain)*
E. rivalis Gagarin, 1991 (Russia)*

Additional references: Andrássy (1986, 1991).

Genus *Pachydorylaimus* Siddiqi, 1983 (Figs 15.16A and B)
Diagnosis. Qudsianematinae. Body short and plump. Cuticle thick, finely striated. Lip region expanded, truncate. Amphidial aperture oval, small. Odontostyle very short and thick walled, with small aperture; odontophore with sclerotized basal flanges. Pharynx enlarging at about its middle. Female reproductive apparatus didelphic. Vulva transverse. Male supplements few, spaced. Tail elongate conoid with pointed terminus, similar in both sexes. All described species of *Pachydorylaimus* come from the South American rain forest; one of them was found in freshwater.

Type species: *P. furcatus* Siddiqi, 1983 (Colombia)

Other species:
P. aequatorialis Andrássy, 1997 (Ecuador)
P. andreasi Andrássy, 1997 (Ecuador)*
P. longicaudatus Siddiqi, 1983 (Colombia)
P. notabenus Siddiqi, 1983 (Colombia)
P. pachyvulvus Siddiqi, 1983 (Colombia)
P. schizodontus Loof & Zullini, 2000 (Costa Rica)
Additional reference: Siddiqi (1983).

Genus *Ecumenicus* Thorne, 1974 (Figs 15.16C and D)
Syn. *Indokochinema* Darekar & Khan, 1979
Diagnosis. Qudsianematinae. Cuticle smooth. Lip region moderately offset; lips distinct. Odontostyle about as long as lip region width; guiding ring simple. Pharynx enlarged in its posterior two-fifths. Female genital apparatus mono–opisthodelphic; vulva transverse, sclerotized, pre-equatorial. Male supplements six or seven, spaced. Tail conoid, ventrally curved, or convex–conoid, straight, similar in both sexes. Generally soil- or moss-inhabiting nematodes, one species also known from freshwater habitats.

Type species: *E. monohystera* (de Man, 1880) Thorne, 1974 (cosmopolitan)*

Other species:
E. conicauda (Darekar & Khan, 1979) Andrássy, 1991 (India)
E. parvus (Thorne, 1939) Andrássy, 1991 (USA, Hungary)
E. proprius Andrássy, 1991 (New Caledonia)
Additional reference: Andrássy (1991).

Genus *Boreolaimus* Andrássy, 1998 (Figs 15.16E and F)
Diagnosis. Qudsianematinae. Cuticle thin, smooth, exceptionally with some superficial striation. Lip region offset, lips distinct, angular. Buccal cavity around odontostyle unusually wide and large. Odontostyle longer than lip region width; its aperture about a third of its length. Guiding sheath long, tubular, with widened anterior ring. Pharynx muscular, gradually widening near middle; only a single anterior sub-ventral gland nucleus present. Pre-rectum with short caudal sac. Female gonads paired; vulva transverse. Male not known. Tail conoid, straight or ventrally curved, with rounded tip, 2–5 times as long as anal body width; Distal part

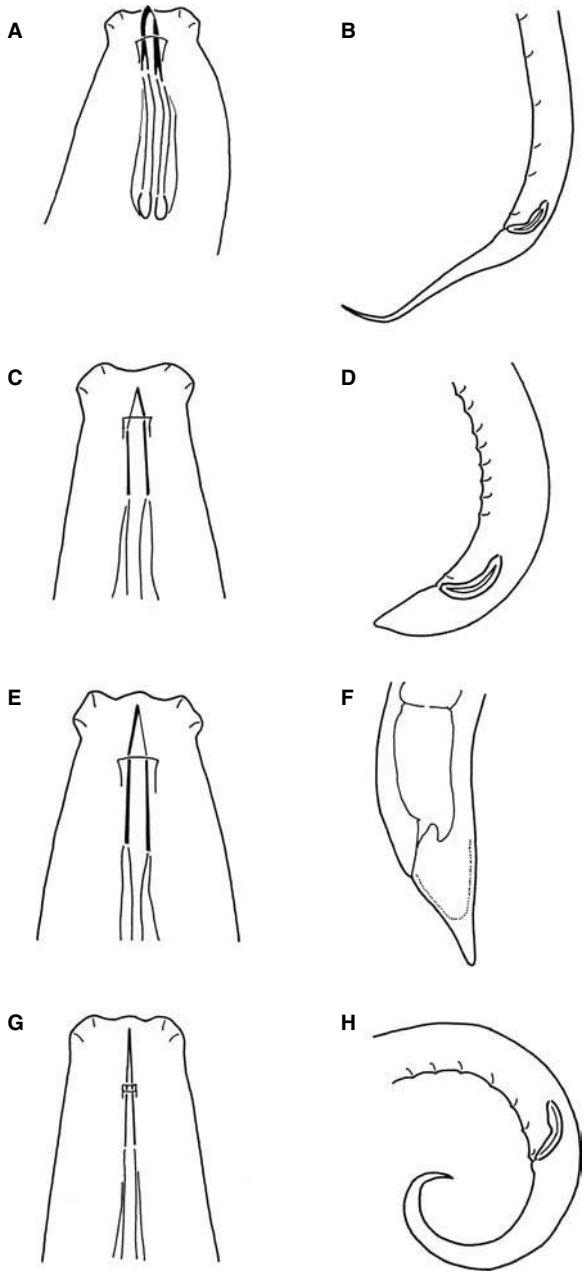

Fig. 15.16 A and B: *Pachydorylaimus*; C and D: *Ecumenicus*; E and F: *Boreodorylaimus*; G and H: *Chrysonema*.

of tail appearing 'empty'. All the species of *Boreolaimus* have been found in groundwater along river banks or lake shores in the northern part of Scandinavia, north to the Arctic Polar Circle.

Type species: *B. borealis* Andrássy, 1998 (Norway)

Other species:
B. alaskanus Andrássy, 2003 (USA)
B. arcticus Andrássy, 1998 (Norway)
B. enckelli (Andrássy, 1967) Andrássy, 1998 (Sweden, Lapland)
B. lapponicus Andrássy, 1998 (Finland, Sweden, Norway)
B. norvegicus Andrássy, 1998 (Norway)
B. septentrionalis Andrássy, 1998 (Sweden, Lapland)
Additional reference: Andrássy (1998).

Subfamily Chrysonematinae Siddiqi, 1969
Diagnosis. Qudsianematidae. Body slender, cuticle finely annulated. Lips barely distinct. Odontostyle small and slender, often needle-like; guiding ring simple. Female reproductive apparatus didelphic. Vulva transverse; vagina not sclerotized. Supplements not very numerous, spaced. Tail conoid to elongate conoid, ventrally arcuate, in both sexes. Terricolous and freshwater nematodes.
Additional reference: Andrássy (1998).
Genera:
Chrysonema Thorne, 1929
Oonaguntus Thorne, 1974 (no freshwater species)

Genus *Chrysonema* Thorne, 1929 (Figs 15.16G and H)
Syn. *Chrysonemoides* Siddiqi, 1969
Diagnosis. Chrysonematinae. Body very slender. Cuticle thin, finely annulated. Lip region barely off set, lips round, fused. Odontostyle small and thin, about as long as lip region width. Guiding ring thin. Pharynx expanding at about its middle. Vagina swollen. Male supplements not numerous, spaced; no pre-cloacal space. Tail elongate conoid in both sexes, provided with conspicuous sub-ventral papillae in males, arranged in pairs. The species of this genus are freshwater and/or terrestrial.

Type species: *C. aurum* Thorne, 1929 (USA)

Other species:
C. distinctum (Jana & Baqri, 1985) Andrássy, 1990 (India)
C. holsaticum (Schneider, 1925) Andrássy, 1990 (Central Europe, Russia, Australia)
C. limigenus (Siddiqi, 1969) Andrássy, 1990 (Poland, India, Surinam)
C. lozovense (Nesterov, 1976) Andrássy, 1990 (Moldavia)
C. maksymovi (Altherr, 1963) Andrássy, 1990 (France, Poland)
Additional reference: Andrássy (1990).

Family APORCELAIMIDAE Heyns, 1965
Diagnosis. Dorylaimoidea. Medium to large-sized nematodes. Cuticle thick, smooth or finely transversely striated, often with criss-cross lines or punctations and with

numerous body pores. Lip region clearly set off from the adjoining body; lips separate. Amphids often with sclerotized median support, fovea often duplex. Odontostyle robust, relatively short, generally axial, rarely as a mural tooth set on ventral wall of mouth cavity; its aperture longer than half its length. Guiding sheath without sclerotized fixed ring; its anterior margin widened and often plicated. Female gonads paired; vulva transverse, longitudinal or pore-like. Males with dorylaimoid spicules and spaced ventromedian supplements. Tail similar in the two sexes, generally short, conoid; long, filiform in one genus. Mostly terrestrial nematodes, but some species have been found also in freshwater habitats.
Additional references: Heyns (1965) and Jairajpuri and Ahmad (1992).

Subfamilies:
Aporcelaiminae Heyns, 1965
Sectonematinae Siddiqi, 1969
Key to subfamilies of Aporcelaimidae
1. Odontostyle axial, with wide aperture . . . . . .Aporcelaiminae
   Odontostyle a mural tooth . . . . . .Sectonematinae

Subfamily Aporcelaiminae Heyns, 1965
Diagnosis. Aporcelaimidae. Cuticle thick, often showing criss-cross lines or punctations on its surface. Lip region well off set. Lips distinct or amalgamated. Odontostyle with very large aperture; guiding ring plicate. Pharynx expanding gradually; dorsal pharyngeal gland nucleus far from its orifice; first pair of subventrals widely separated. Tail short conoid or filiform in both sexes. The representatives of the family are mostly soil inhabitants; four out of nine genera include some freshwater species.
Additional reference: Heyns (1965).
Genera:
Aporcelaimus Thorne & Swanger, 1936
Aporcelaimellus Heyns, 1965
Makatinus Heyns, 1965
Metaporcelaimus Lordello, 1965 (no freshwater species)
Akrotonus Thorne, 1974 (no freshwater species)
Aporcedorus Jairajpuri & Ahmad, 1983 (no freshwater species)
Epacrolaimus Andrássy, 2000
Tubixaba Monteiro & Lordello, 1980 (no freshwater species)
Aporcella Andrássy, 2002 (no freshwater species)

Key to genera of Aporcelaiminae *with freshwater species*
1. Lip region only slightly off set from the adjoining body . . . . . .*Makatinus*
   Lip region strongly off set 2
2. Lips provided with protruding inner liplets, vulva with wrinkled cuticle . . . . . .*Epacrolaimus*
   Lips without inner liplets, vulva with smooth cuticle 3
3. Very large nematodes, cuticle with criss-cross lines . . . . . .*Aporcelaimus*
   Medium-sized nematodes, inner layer of cuticle finely striated . . . . . .*Aporcelaimellus*

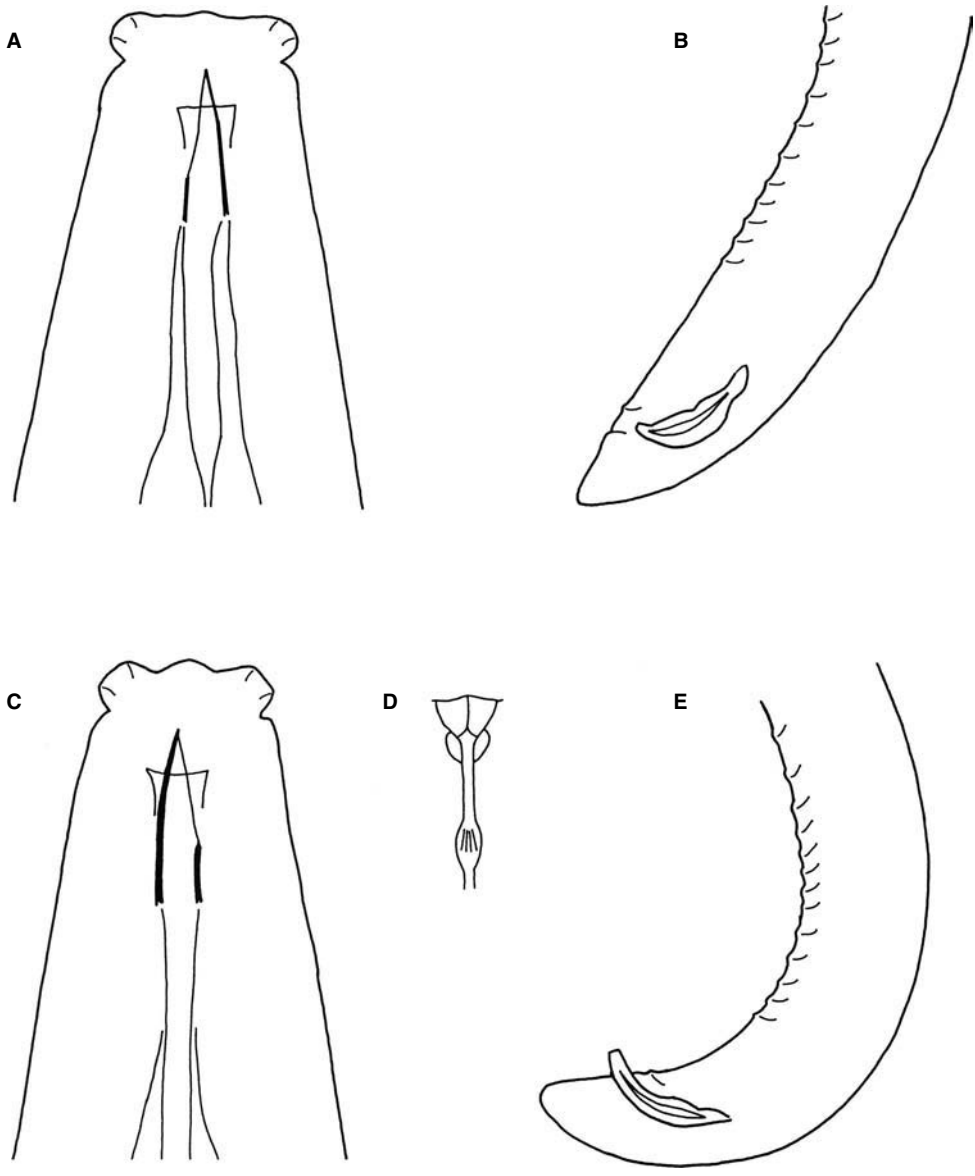

Fig. 15.17 A and B: *Aporcelaimus*; C–E: *Aporcelaimellus*.

Genus *Aporcelaimus* Thorne & Swanger, 1936 (Figs 15.17A and B)
Diagnosis. Aporcelaiminae. Large nematodes, 3–10 mm long. Body strongly tapering towards the anterior end. Cuticle thick, marked with criss-cross lines. Lip region offset by a deep constriction; lips rather amalgamated. Mouth a dorsoventral slit. Odontostyle about as long as lip region width; aperture occupying more than half its length. Amphids with fine median support. Pharynx expanding before its middle. Vulva transverse; vagina generally with sclerotized pieces. Spicules of two types: either

slender, dorylaimoid or strongly swollen. Tail similar in the two sexes, short and rounded or conoid–rounded, in some cases subdigitate. The species of *Aporcelaimus* are widespread in terrestrial habitats but some species have been found in freshwater habitats. The species listed are those considered as definitely belonging to the genus by Andrássy (2001b).

Type species: *Aporcelaimus superbus* (de Man, 1880) Goodey, 1951 (widespread in Europe; Uzbekistan, Kazakhstan)*

Other species:
A. americanus Thorne & Swanger, 1936 (USA, The Netherlands, France, Poland, Hungary)
A. bestiarius Isatullaeva, 1967 (Kazakhstan, Germany, Hungary)*
A. boreus Andrássy, 2000 (Alaska, USA)
A. brzeskii Andrássy, 2000 (Alaska, USA)
A. caesar Andrássy, 2000 (Hungary)
A. cobbi Thorne, 1937 (Italy)
A. digiticaudatus Andrássy, 2001 (England, Holland)
A. eurydoris (Ditlevsen, 1911) Thorne & Swanger, 1936 (USA, Canada, widespread in Europe)*
A. femineus Andrássy, 2000 (Alaska, USA)
A. fortis Gagarin, 1992 (Russia)
A. ingens Andrássy, 2000 (USA)
A. litchi Srivastava, Rawat & Ahmad, 2000 (India)
A. macrohystera Altherr, 1974 (Germany, Norway, England, USA)*
A. pachydermus Thorne, 1937 (Gemany, Hungary, USA)*
A. paraspiralis Thorne & Swanger, 1936 (Austria, Romania)
A. polaris Andrássy, 2003 (Alaska, USA)
A. pseudospiralis Botha & Heyns, 1990 (South Africa, Sumatra)
A. sicus Gagarin, 1992 (Russia)
A. subdigiticaudatus Altherr, 1965 (Germany)*
Additional references: Heyns (1965) and Andrássy (2001a).

Genus *Aporcelaimellus* Heyns, 1965 (Figs 15.17C–E)
Diagnosis. Aporcelaiminae. Cuticle thick, with two well distinct layers (besides the thin exocuticle): the outer one hyaline, the inner one finely striated. Lip region offset by a deep constriction; lips prominent, more or less amalgamated. Odontostyle short and thick, its aperture about half its length. Amphids with or without median support; fovea sometimes duplex. Vulva transverse or pore-like. Vagina with sclerotized pieces. Spicules dorylaimoid; supplements spaced. Tail short, rounded, bluntly conoid or subdigitate, similar in the two sexes. The species of *Aporcelaimellus* are widespread in terrestrial habitats but some species have been found in freshwater habitats.

Type species: *A. obtusicaudatus* (Bastian, 1865) Heyns, 1965 (cosmopolitan)*

Other species:
A. adriani Botha & Heyns, 1990 (South Africa)
A. alius Andrássy, 2002 (Hungary)
A. amplexor (Nesterov & Lisetskaya, 1965) Heyns 1965

A. amylovorous (Thorne & Swanger, 1936) Heyns, 1965 (Hungary)
A. baqrii Ahmad & Jairajpuri, 1982
A. chauhani Baqri & Khera, 1975
A. cocophilus (Loos, 1949) Andrássy, 2001
A. conoidus Thorne, 1974
A. dubius (Thorne, 1974) Andrássy, 1986
A. duhouxi (Altherr, 1963) Baqri & Khera, 1975 (France)*
A. estonicus (Krall, 1957) Andrássy, 1990
A. faridpuriensis Singh, Sharma & Khataou, 2002 (India)
A. futeii Khan & Araki, 2002 (Japan)
A. gerlachi (Meyl, 1956) Heyns, 1965
A. glandus Botha & Heyns, 1965 (South Africa)*
A. goldeni Khan & Fatima, 1980 (Pakistan)
A. heynsi Baqri & Jairajpuri, 1968
A. hylophilus Tjepkema, Ferris & Ferris, 1971
A. index (Thorne, 1939) Andrássy, 1986
A. jairajpurii Singh, Sharma & Khataou, 2002 (India)
A. kikereensis Baqri & Coomans, 1973
A. krygeri (Ditlevsen, 1928) Heyns, 1965 (Russia, Hungary)*
A. macropunctatus (Heyns, 1967) Jiménez-Guirado, 1994
A. maitai Yeates, 1967 (New Zealand)
A. malagasi Heyns, 1966
A. medius Andrássy, 2002 (Hungary)
A. micropunctatus Botha & Heyns, 1990 (South Africa)*
A. nawabganjense Singh, Sharma & Khataou, 2002 (India)
A. nivalis (Altherr, 1952) Heyns, 1965
A. odhneri (Allgén, 1951) Andrássy, 1990
A. papillatus (Bastian, 1865) Baqri & Khera, 1975
A. paracentrocercus (De Coninck, 1935) Baqri & Coomans, 1973
A. paraconicaudatus (Meyl, 1956) Heyns, 1965
A. parapapillatus Botha & Heyns, 1990
A. productus (Thorne & Swanger, 1936) Baqri & Khera, 1975
A. propinquus (Thorne & Swanger, 1936) Tjepkema, Ferris & Ferris, 1971
A. punctatus Altherr in Altherr & Delamare-Deboutteville, 1972
A. pycnus (Thorne, 1939) Baqri & Khera, 1975 (Hungary)
A. samarcandicus (Tulaganov, 1949) Baqri & Khera, 1975 (Hungary)
A. saprophilus Gagarin & Gusakov, 2001 (Russia)*
A. seinhorsti (Meyl, 1957) Heyns, 1965
A. stilus (Kirjanova, 1951) Andrássy, 1986
A. taylori Yeates, 1967 (New Zealand, USA, Germany)*
A. tritici (Bastian, 1865) Andrássy, 1986
A. vitrinus (Thorne & Swanger, 1936) Baqri & Khera, 1975
Additional reference: Heyns (1965) and Andrássy (2002).

Genus *Makatinus* Heyns, 1965 (Figs 15.18A and B)
Diagnosis. Cuticle with two distinct layers (besides the exocuticle); the inner layer often radially striated. Lip region hardly off set; lips rather amalgamated.

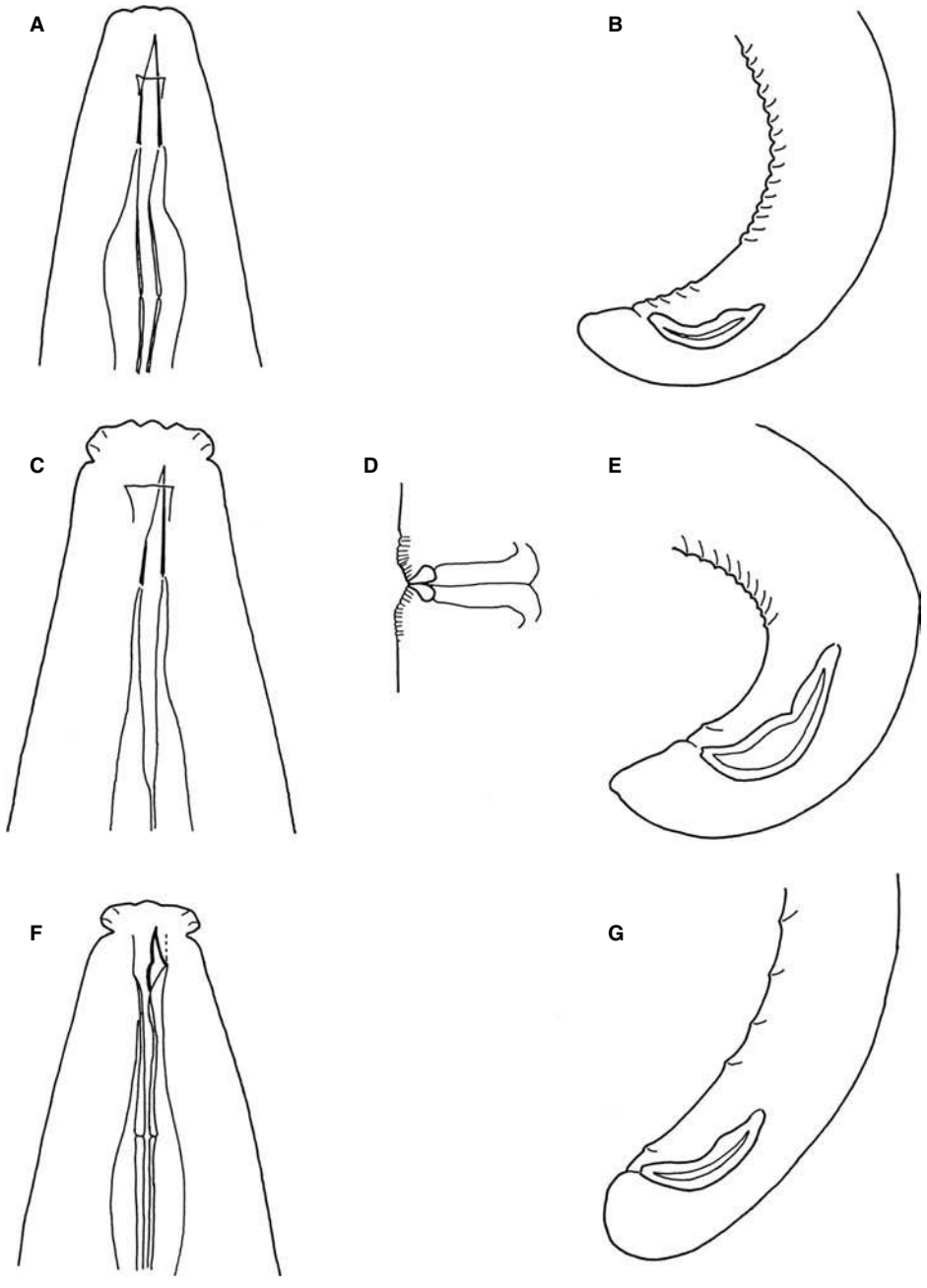

Fig. 15.18 A and B: *Makatinus*; C–E: *Epacrolaimus*; F and G: *Sectonema*.

Odontostyle aperture occupying about half its length. Amphidial fovea not divided. Cardiac disc absent. Female gonads paired. Vulva longitudinal, sunken; vagina with sclerotized pieces. Male supplements numerous, diverging into double row near anus (2–5 pairs). Tail short, convex–conoid in both sexes. Mainly terrestrial nematodes, a few species have been found in freshwater habitats.

Type species: *M. punctatus* Heyns, 1965 (South Africa)

Other species:
M. aquaticus Jiménez-Guirado, 1994 (Spain, Hungary)*
M. capensis Heyns, 1965 (South Africa)
M. crassiformis (Kreis, 1924) Andrássy, 1986 (Surinam)*
M. goodeyi Jiménez-Guirado, 1994
M. heynsi Ahmad & Ahmad, 1992 (India)
M. micropunctatus Ahmad & Ahmad, 2002 (India)
M. minor (Loos, 1945) Ahmad, 1997 (Sri Lanka)
M. simus (Andrássy, 1958) Andrássy, 2002
Additional references: Heyns (1965) and Andrássy (2002).

Genus *Epacrolaimus* Andrássy, 2000 (Figs 15.18C–E)
Diagnosis. Aporcelaimidae. Very large size (7–9 mm). Cuticle thick, marked with fine criss-cross lines. Lip region sharply set off by a deep constriction; lips distinct, each provided with a protruding inner liplet. Odontostyle with very large aperture, arched inward. Pharynx muscular, gradually expanding far before the middle. Female reproductive apparatus didelphic; vulva transverse with wrinkled cuticula; vagina with sclerotized pieces. Supplements spaced. Tail similar in both sexes, short, convex–conoid with bluntly rounded or subdigitate terminus. Of the two species known so far one has been found in both freshwater and terrestrial habitats.

Type species: *E. declinatoaculeatus* (Kreis, 1924) Andrássy, 2000 (Central Europe, South Africa, USA)*

Other species:
E. imperator Andrássy, 2000 (Alaska)
Additional reference: Andrássy (2000).

Subfamily Sectonematinae Siddiqi, 1969
Diagnosis. Aporcelaimidae. Large nematodes. Cuticle thick. Lip region offset; lips distinctly separate and prominent. Odontostyle as a mural tooth set on the ventral wall of the cheilostome. A conspicuous disc at the pharyngeal–intestinal junction. Female gonads paired.
Only genus: *Sectonema* Thorne, 1930
Additional reference: Siddiqi (1969).

Genus *Sectonema* Thorne, 1930 (Figs 15.18F and G)
Syn. *Aporcelaimoides* Heyns, 1965
Diagnosis. Sectonematinae. Mural tooth dorsally grooved and with basal projections diverging. Amphids with strong median support; fovea duplex. Vulva transverse; vagina with cuticularized pieces. Spicules dorylaimoid; supplements irregularly arranged. Tail short, conoid to hemispheroid, in both sexes.

Mainly terrestrial nematodes; some species have been found in freshwater habitats.

Type species: *S. ventrale* Thorne, 1930 (USA)

Other species:
S. amazonicum Siddiqi, 1995 (Brazil)
S. anisonchum Siddiqi, 1984 (Colombia)
S. barbatum Heyns, 1965 (USA)
S. brevicauda Heyns, 1965 (South Africa)
S. barbatoides Heyns, 1965 (The Netherlands)
S. basilgoodeyi Heyns, 1965 (England)
S. californicus (Heyns, 1965) Siddiqi, 1995 (USA)
S. conicaudatum Siddiqi, 1995 (Samoa)
S. deltatum Siddiqi, 1995 (Cameroon)
S. demani Altherr, 1965 (Germany, The Netherlands, Hungary)*
S. heynsi Altherr, 1968 (Germany)*
S. macbethi Heyns, 1965 (Venezuela, Colombia)
S. macrospiculum (Altherr, 1958) Heyns, 1965 (Germany)*
S. moderatum Siddiqi, 1995 (Cameroon)
S. mucrodens Siddiqi, 1984 (Colombia)
S. paramonovi (Eliava, 1966) Eliashvili, Aliev & Eliava, 1977
S. probulbum (Heyns, 1965) Siddiqi, 1995 (South Africa, India)
S. procta Jairajpuri & Baqri, 1966 (India)
S. pseudoventrale Heyns, 1965 (South Africa, Hawaii, The Netherlands)
S. rotundicauda Goodey, 1951 (England)
S. sica Clark, 1964 (New Zealand)
S. transsilvanicum Popovici, 1978 (Romania)
S. truxum Siddiqi, 1984 (Colombia)
Additional references: Heyns (1965) and Siddiqi (1995).

Family NORDIIDAE Jairajpuri & A.H. Siddiqi, 1964

Diagnosis. Dorylaimoidea. Cuticle smooth or very finely transversely striated. Lip region continuous with adjoining body or offset; lips distinct or fused. Odontostyle slender, attenuated, generally long, with narrow lumen and aperture; guiding ring single or double; odontophore rod-like or flanged. Pharynx muscular expanding behind its middle. Female reproductive apparatus generally didelphic, sometimes monodelphic; vulva transverse; refractive part of vagina with sclerotized pieces. Tail similar in the two sexes, short and rounded or elongate to filiform. The representatives of the family are mainly terrestrial, soil- or moss-inhabiting nematodes but several species have been found in freshwater habitats.
Remarks: Jairajpuri and Ahmad (1992) recognized five subfamilies: Cephalodorylaiminae, Nordiinae, Pungentinae, Actinolaimoidinae and Helmabiinae. The last subfamily, with the single genus *Helmabia*, is not considered to be related to the Nordiidae.
Additional reference: Jairajpuri and Ahmad (1992).

Subfamilies:
Nordiinae Jairajpuri & A.H. Siddiqi, 1964
Pungentinae Siddiqi, 1969

Cephalodorylaiminae Jairajpuri, 1967 (no freshwater species)
Actinolaimoidinae Jairajpuri & Ahmad, 1992 (no freshwater species)

Key to subfamilies of NORDIIDAE

1. Labial papillae prominent, clearly protruding above lip contour . . . . . Cephalodorylaiminae
   Labial papillae normally developed 2
2. Odontostyle not very thin, odontophore often flanged . . . . . Pungentinae
   Odontostyle very thin, odontophore never flanged 3
3. Body plump; odontostyle very thin, more than three lip region widths long . . . . . Nordiinae
   Body slender; odontostyle less than three lip region widths long . . . . . Actinolaimoidinae

Subfamily Pungentinae Siddiqi, 1969

Diagnosis. Nordiidae. Cuticle finely transversely striated. Lip region continuous or off set from body. Amphids located at level of lips or behind them. Odontostyle varying in length, but never longer than 2–3 lip region widths, slender, with narrow lumen and aperture; guiding ring single or double; odontophore with or without basal flanges. Female reproductive apparatus generally amphidelphic, rarely mono–opisthodelphic. Vulva transverse. Male supplements spaced. Tail hemispheroid to long, filiform, similar in both sexes. The majority of species of this family are typical inhabitants of terrestrial habitats (soil, moss) but some species belonging to five genera have been found in aquatic habitats and one monospecific genus, *Lanzavecchia* Zullini, 1988, has been found exclusively in freshwater.

Additional reference: Jairajpuri and Ahmad (1992).

Genera:
Pungentus Thorne & Swanger, 1936
Enchodelus Thorne, 1939
Kochinema Heyns, 1963 (no freshwater species)
Lenonchium Siddiqi, 1963
Rhyssocolpus Andrássy, 1971
Enchodorus Vinciguerra, 1976 (no freshwater species)
Dorydorella Andrássy, 1987
Lanzavecchia Zullini, 1988

Key to genera of Pungentinae

1. Tail short, rounded or conoid 2
   Tail long, filiform 7
2. Amphids very anterior, at lip level . . . . . *Kochinema*
   Amphids post-labial 3
3. Sclerotized platelets around stoma . . . . . *Pungentus*
   No sclerotized platelets around stoma 4
4. Mouth cavity with massive hyaline wall, very large size (7–8 mm) . . *Lanzavecchia*
   Mouth cavity with thin wall, relatively small size 5
5. Cuticle coarsely striated near vulva . . . . . *Rhyssocolpus*
   Cuticle near vulva smooth 6

6. Odontophore with basal flanges . . . . . *Enchodelus*
   Odontophore simple . . . . . *Dorydorella*
7. Odontostyle very short, odontophore flanged, supplements few, spaced . . . . . *Enchodorus*
   Odontostyle not very short, odontophore rod-like, supplements numerous . . . . . *Lenonchium*

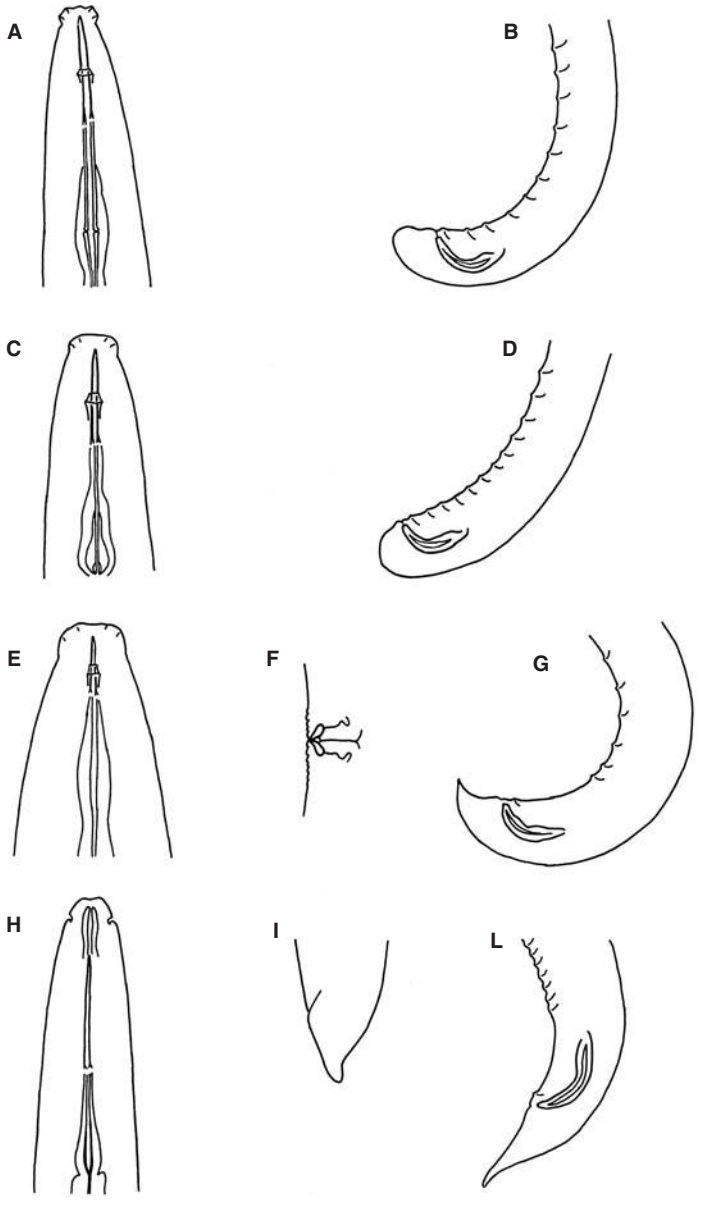

Fig. 15.19 A and B: *Pungentus*; C and D: *Enchodelus*; E–G: *Rhyssocolpus;* H–L: *Lanzavecchia*.

Genus *Pungentus* Thorne & Swanger, 1936 (Figs 15.19A and B)
Syn. *Pungentoides* Altherr, 1950; *Paramonovia* Eliava, 1973
Pungentinae. Lip region more or less set off; labial papillae prominent. Four cuticularized platelets surround the mouth. Odontostyle varying in length, sometimes slightly curved; guiding ring double; odontophore rod-like. Female reproductive apparatus generally mono–opisthodelphic, amphidelphic in a few species. Vulva transverse; vagina with sclerotized pieces. Supplements spaced. Tail short, hemispheroid, sometimes clavate or conoid, similar in both sexes. Mostly inhabitants of terrestrial habitats; some species have been found in freshwater.

Type species: *P. pungens* Thorne & Swanger, 1936 (Canada, USA, Romania)

Other species:
P. angulatus Jairajpuri & Baqri, 1966 (India, Hungary)
P. angulosus Thorne, 1939 (Canada, USA, The Netherlands, Romania, Georgia, India)
P. brevidentatus Thorne, 1939 (USA)
P. clavatus Ahmad & Jairajpuri, 1979 (Canada, Poland, India, Italy)
P. crassus Thorne, 1974 (USA)
P. engadinensis (Altherr, 1950) Altherr, 1952 (Central Europe, Italy, USA, Canada, Iraq)*
P. eroshenkoi Eliava & Eliashvili, 1990 (Russia)
P. fagi Vinciguerra & Giannetto, 1983 (Italy)
P. gracilis Eroshenko, 1976 (Russia)
P. granosus Eroshenko, 1976 (Russia)
P. juglensi Mahajan, 1972 (India)
P. macrostylus Ahmad & Sturhan, 2000 (Turkey)
P. mahunkai Andrássy, 1968 (Paraguay)
P. maorium Clark, 1963 (New Zealand)
P. marietani Altherr, 1950 (Germany, Poland, Serbia, Slovakia, Macedonia, Switzerland, Italy, Canada)
P. microdentatus Thorne, 1939 (Canada, USA, Poland, Uzbekistan)
P. monohystera Thorne & Swanger, 1936 (USA, Canada, Argentina, Hungary)
P. mosellae (Altherr, 1963) Andrássy, 1986 (France)*
P. obscurus Thorne, 1939 (USA)
P. ortocephalus Eroshenko, 1976 (Russia)
P. parapungens Gagarin, 1985 (Russia)*
P. parvus Thorne, 1939 (USA, Canada, Russia)
P. porosus Ebsary, 1983 (Canada)
P. projectus (Thorne, 1939) Andrássy, 1991
P. roposus Zell, 1987
P. silvestris (de Man, 1912) Coomans & Geraert, 1962 (Central Europe)*
P. sparsus Thorne, 1939 (USA)
P. sublatum Eroshenko, 1976 (Russia)
P. textilis (Thorne & Swanger, 1936) Thorne, 1939 (USA)
P. vesiculosus Eroshenko, 1976 (Russia)
Additional reference: Ahmad and Jairajpuri (1979).

Genus *Enchodelus* Thorne, 1939 (Figs 15.19C and D)
Diagnosis. Pungentinae. Lip region more or less offset; labial papillae prominent. Odontostyle generally long; guiding ring double; odontophore with basal flanges, rarely

rod-like. Female reproductive apparatus amphidelphic. Vulva transverse; vagina with sclerotized pieces. Supplements spaced. Tail short, hemispheroid or conoid, similar in both sexes. Mostly inhabitants of moss or soil, a few species have been found in freshwater habitats.

Type species: *E. macrodorus* (de Man, 1880) Thorne, 1939 (cosmopolitan)*

Other species:
E. altherri Vinciguerra & De Francisci 1973 (Italy)
E. analatus (Ditlevsen, 1927) Thorne, 1939 (Greenland, Spitzbergen, Romania)
E. arcticus Nesterov, 1976 (Moldavia)
E. arcuatus Thorne, 1939 (USA, Bulgaria)*
E. brevidentatus Thorne, 1939 (USA)
E. conicaudatus (Ditlevsen, 1927) Thorne, 1939 (Greenland, Spitzbergen)
E. constrictus Jairajpuri & Loof, 1969 (India)
E. coomansi Nicholas & Stewart, 1984 (Australia: brackish water)*
E. distinctus Ahmad & Jairajpuri, 1980 (India)
E. faeroensis (Ditlevsen, 1928) Thorne, 1939 (Faroe Islands)*
E. geraldi Winiszewska, 1985 (Poland)
E. groenlandicus (Ditlevsen, 1937) Thorne, 1939 (Greenland)
E. hedickei (Paesler, 1941) Andrássy, 1960 (Germany)
E. hopedoroides Altherr, 1963 (Switzerland, Georgia, Nepal)
E. hopedorus (Thorne, 1929) Thorne, 1939 (USA, Poland, Uzbekistan)
E. irregularis Altherr, 1972 (Sweden)*
E. laevis Thorne, 1939 (Korea, USA)*
E. liangi Ahmad, Wu & Shaheen, 2002 (China)
E. longidens Jairajpuri & Loof, 1968 (India)
E. lucinensis Popovici, 1968 (Romania)
E. lushani Ahmad, Wu & Shaheen, 2002 (China)
E. magnificus (Altherr, 1952) Altherr, 1963 (Switzerland, Austria)*
E. maximus Baqri & Jairajpuri, 1974 (India)
E. microdoroides Baqri & Jairajpuri, 1974 (India, Korea)
E. montanus Bagaturia, Eliava & Eliashvili, 1979 (Georgia)
E. morgensis Loof, 1989 (Germany, Austria, Switzerland, The Netherlands)*
E. nepalensis Zullini, 1973 (Nepal, China)
E. parateres Baqri & Jairajpuri, 1974 (India)
E. parvus Loof, 1971 (Spitzbergen)
E. ponorensis Popovici, 1995 (Romania)
E. satendri Baqri & Jairajpuri, 1974 (India, China)
E. saxifrage Popovici, 1995 (Romania)
E. signyensis Loof, 1975 (Signy Island: South Orkneys, UK)
E. southeyi Jairajpuri & Ahmad, 1986 (India, China)
E. striatus Thorne, 1939 (USA)
E. teres Thorne, 1939 (USA, Italy, Uzbekistan)
E. thornei Baqri & Jairajpuri, 1974 (India)
E. vestibulifer Altherr, 1952 (Switzerland)
E. vesuvianus (Cobb, 1893) Thorne, 1939 (Italy, Poland, Hungary)
E. zonatus Jairajpuri & Loof, 1968 (India, Egypt)
Additional reference: Ahmad and Jairajpuri (1980).

Genus *Rhyssocolpus* Andrássy, 1971 (Figs 15.19E–G)
Diagnosis. Pungentinae. Lip region more or less off set. Odontostyle small, about one lip region width long; guiding ring double; odontophore with basal flanges. Female reproductive apparatus amphidelphic. Vulva transverse; cuticle anterior and posterior to vulva coarsely wrinkled; vagina with sclerotized pieces. Supplements spaced. Tail short, conoid, in both sexes. The few species of this genus live in terrestrial and in freshwater or semi-freshwater habitats.

Type species: *R. vulvostriatus* (Stefanski, 1924) Andrássy, 1971 (Poland, Denmark, Italy)

Other species:
R. alleni (Brzeski, 1962) Andrássy, 1986 (Spitzbergen)
R. aquilonius Andrássy, 2003 (Alaska, USA)*
R. arcticus Ebsary, 1984 (Canada)
R. brasiliensis (Meyl, 1957) Andrássy, 1971 (Brazil)
R. fluviatilis Gagarin, 1985 (Russia)*
R. iuventutis Andrássy, 1984 (Hungary)*
R. microdorus (Schiemer, 1965) Andrássy, 1971 (Austria, Italy)*
R. paradoxus (Loof, 1975) Andrássy, 1986 (Orkney Islands, UK)
R. repis (Brzeski, 1992) n. comb. (Korea)
Additional reference: Andrássy (2003).

Genus *Lenonchium* Siddiqi, 1965 (Figs 15.20A–C)
Diagnosis. Pungentinae. Large nematodes. Cuticle with fine striae; subcuticle loose. Lip region continuous or offset; lips amalgamated. Odontostyle very slender, with narrow lumen and small aperture; guiding ring single or double. Odontophore rod-like, basal region swollen. Pharynx expanded at about its middle. Female reproductive apparatus didelphic. Vulva transverse or longitudinal. Supplement numerous, contiguous. Tail long, filiform in both sexes. Mainly terrestrial nematodes; some species have been found in freshwater.

Type species: *L. oryzae* Siddiqi, 1965 (India)

Other species:
L. asterocaudatum Choi & Jairajpuri, 1998 (Korea)
L. denticaudatum (Imamura, 1931) (Japan, The Netherlands)* (*species inquirenda*)
L. fimbricaudatum Swart & Heyns, 1991 (South Africa)*
L. longidens (Furstenberg & Heyns, 1965) Jairajpuri, 1966 (South Africa)
L. macrodorum Ahmad & Jairajpuri, 1988 (India)
Additional reference: Swart and Heyns (1991).

Genus *Dorydorella* Andrássy, 1987 (Figs 15.20D–F)
Diagnosis. Pungentinae. Lip region offset, lips prominent. Odontostyle slender, 1.3–2.0 lip region widths long. Pharynx expanded behind its middle; pre-rectum short. Vulva transverse; vagina with sclerotized pieces. Tail short, conoid, almost straight in both sexes. The few species live in terrestrial or freshwater habitats.

Type species: *D. bryophila* (de Man, 1880) Andrássy, 1986 (The Netherlands, Germany, Austria, Hungary, Sweden, Spain, France, Russia, Moldavia, Uzbekistan, Kazakhstan, USA)*

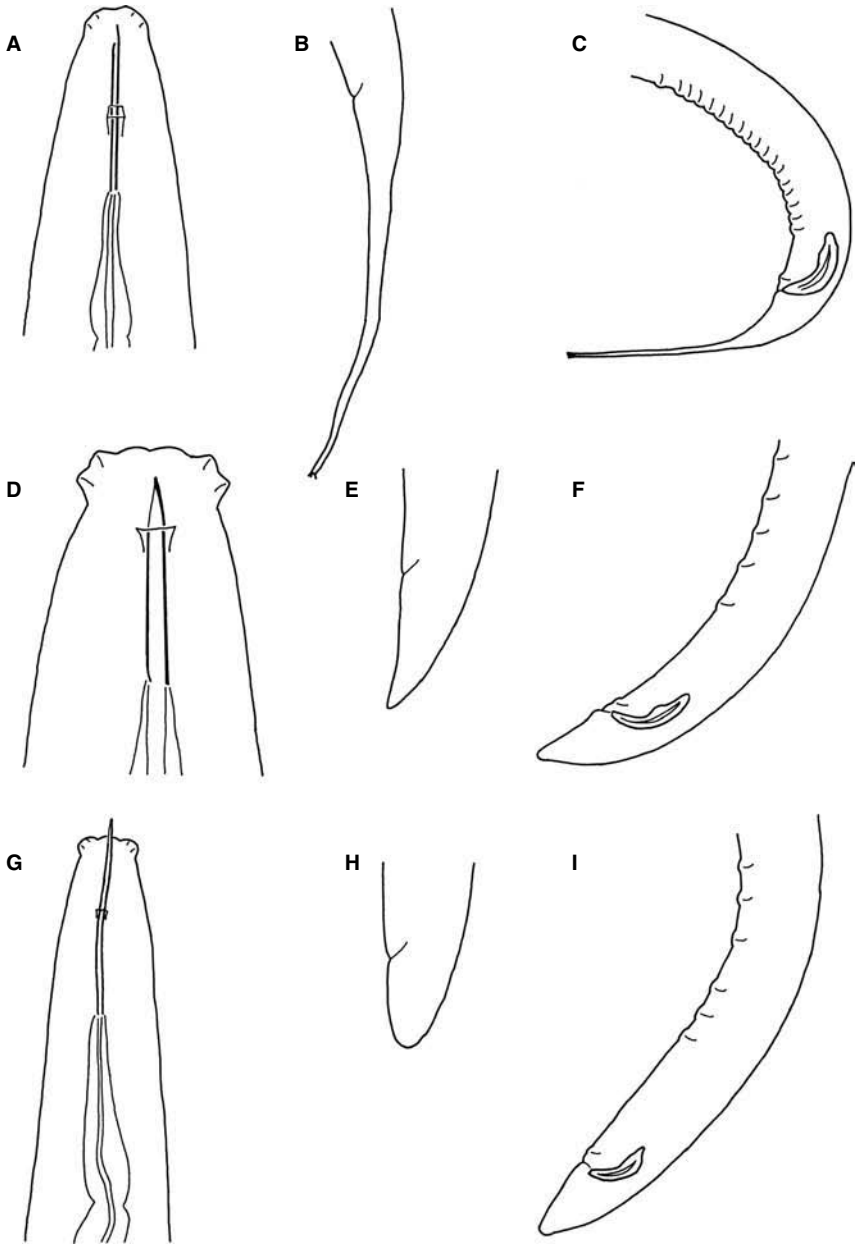

Fig. 15.20 A–C: *Lenonchium*; D–F: *Dorydorella*; G–I: *Longidorella*.

Other species:
D. pratensis (de Man, 1880) Andrássy, 1986 (cosmopolitan)*
D. tenuidens (Thorne & Swanger, 1936) Andrássy, 1987 (cosmopolitan)
Additional reference: Andrássy (1987a).

Genus *Lanzavecchia* Zullini, 1988 (Figs 15.19 H–L)
Diagnosis. Pungentinae. Very large nematodes. Cuticle smooth or faintly dotted. Lip region slightly off set. Amphid wide, stirrup-shaped. Mouth cavity surrounded by thick hyaline wall. Odontostyle more than two times as long as lip region width, narrow, slightly bent. Guiding ring simple. Odontophore with moderately developed flanges. Pharynx gradually expanding at about half its length. Female reproductive apparatus didelphic; gonads reflexed; spermatheca present. Vulva longitudinal. Supplements numerous. Tail conoid, subdigitate, in the two sexes. The single species described was found in an Ethiopian lake.
Type and only species: *L. fafner* Zullini, 1988 (Ethiopia)
Additional reference: Zullini (1988).

Subfamily Nordiinae Jairajpuri & A.H. Siddiqi, 1964
Diagnosis. Nordiidae. Body short and robust. Lip region more or less off set. Odontostyle very slender; with very narrow lumen, 3–5 times as long as lip region width. Odontophore rod-like, as long as odontostyle. Pharynx expanded behind its middle. Female reproductive apparatus didelphic or mono–opisthodelphic. Tail short, conoid, ventrally bent or sub-cylindrical, similar in the two sexes. Mainly soil inhabiting species; some of them have also been found in freshwater habitats.
Additional reference: Jairajpuri and A.H. Siddiqi (1964).
Genera:
Longidorella Thorne, 1939
Acunemella Andrássy, 2002 (no freshwater species)

Key to genera of Nordiinae
1. Posterior two-thirds of body strongly twisted, spring-like;
   body strongly tapering towards the anterior end . . . . . *Acunemella*
   Body not twisted and regularly tapering . . . . . *Longidorella*

Genus *Longidorella* Thorne, 1939 (Figs 15.20G–I)
Syn. *Nordia* Jairajpuri & A.H. Siddiqi; *Enchodorella* Khan, 1964; *Thornedia* Husain & Khan, 1965; *Saevadorella* Siddiqi, 1982
Diagnosis. Nordiinae. Lip region continuous with the adjoining body or off set from it. Odontostyle long, at least three times the lip region width, thin, sometimes slightly curved. Pharynx about a third of body length long. Female reproductive apparatus generally amphidelphic, rarely monodelphic. Tail mostly conoid, ventrally bent in both sexes. The species of *Longidorella* may be found in different terrestrial habitats; a few species have been found in freshwater.

Type species: *L. parva* Thorne, 1939 (USA, India, Japan, China, Venezuela, Ghana, Belgium, Poland, Romania, Spain, Italy, Moldavia, France)*

Other species:
L. acutis (Jairajpuri & Siddiqi, 1964) Jairajpuri & Hooper, 1969 (India)
L. arenicola Vinciguerra & Zullini, 1980 (Italy)
L. caudata Suryawanshi, 1971 (India)
L. cuspidata (Andrássy, 1964) Jairajpuri & Hooper, 1969 (Mongolia)
L. europaea Dalmasso, 1966 (France, Germany)
L. frontiniani (Dalmasso, 1966) Jairajpuri & Hooper, 1969 (France)
L. hastata (Andrássy, 1963) Jairajpuri & Hooper, 1969 (Angola)

L. longicaudata Orselli & Vinciguerra, 1999 (Italy)
L. macramphis (Altherr, 1950) Altherr, 1952 (Switzerland, Hungary, The Netherlands, Germany, Spain, UK)*
L. magna Loof, 1971 (Spitzbergen, Alaska)
L. microdora (de Man, 1880) Goodey, 1963 (The Netherlands, Austria, Italy, USA, India)*
L. morbida (Loof, 1964) Jairajpuri & Hooper, 1969 (Venezuela)
L. multipapillata (Schuurmans Stekhoven & Teunissen, 1938) Siddiqi, 1962 (Congo)
L. murithi Altherr, 1950 (Switzerland, Hungary, USA, Chile, Italy)*
L. mustafi (Husain & Khan, 1965) Jairajpuri & Hooper, 1969 (India)
L. obtusicaudata Orselli & Vinciguerra, 1999 (Italy)
L. okhlaensis (Jairajpuri & A.H. Siddiqi, 1964) Jairajpuri & Hooper, 1969 (India, USA, Brazil, Hungary)
L. opistodelphis Jairajpuri, 1964 (India)
L. parvibulbata Orselli & Vinciguerra, 1999 (Italy)
L. penetrans (Thorne & Swanger, 1936) Goodey, 1963 (USA)
L. perparvula Monteiro, 1970 (Brazil)
L. perveeni (Khan, 1964) Jairajpuri & Hooper, 1969 (India)
L. solani (Husain & Khan, 1965) Jairajpuri & Hooper, 1969 (India)
L. suwiswa Patil & Khan, 1982 (India)
L. tredecima (Andrássy, 1964) Jairajpuri & Hooper, 1969 (Hungary)
L. xenura Khan & Siddiqi, 1963 (India, Venezuela)
Additional references: Jairajpuri and Hooper (1969) and Jairajpuri and Ahmad (1992).

Family THORNIIDAE De Coninck, 1965

Diagnosis. Dorylaimoidea. Small to medium-sized nematodes. Cuticle smooth, thin. Lip region low, rounded, generally continuous with the adjoining body; lips fused. The two circles of labial papillae more or less close to each other. Odontostyle small, rather weak, often narrowing at its posterior end; guiding ring simple, thin. Pharynx expanding near or behind its middle. Pre-rectum short. Both female and male gonads paired. Vagina with or without sclerotized pieces. Spicules of two types: simple, short and straight (alaimoid) or longer and arcuated (dorylaimoid). Gubernaculum small. A pair of ad-cloacal papillae is present; only one or few supplements present or none. Tail in both sexes cylindrical, broadly rounded. The representatives of this family are predominantly freshwater.
Additional reference: Andrássy (1987b).

Subfamilies
Thorniinae De Coninck, 1965
Thorneellinae Andrássy, 1987

Key to subfamilies of Thorniidae
1. The two circles of labial papillae close to each other, odontostyle narrowing posteriorly . . . . . Thorniinae
   The two circles of labial papillae not so close; odontostyle cylindrical . . . . . Thorneellinae

Subfamily Thorniinae De Coninck, 1965
Diagnosis. Thorniidae. The two circles of labial papillae are very close to each other. Odontostyle narrowing towards its posterior end. Spicules alaimoid or dorylaimoid. One, four or no supplements present.
Additional reference: Andrássy (1987b).
Genera:
Thornia Meyl, 1954
Nygolaimoides Meyl in Andrássy, 1960
Thorniosa Andrássy, 1996 (no freshwater species)
Sphaeroamphis Ahmad & Sturhan, 2000 (no freshwater species)

Key to genera of Thorniinae
1. Spicules dorylaimoid 2
   Spicules alaimoid; no supplement present 3
2. Amphidial aperture pore-like; only one supplement . . . . . *Nygolaimoides*
   Amphidial aperture slit-like; four supplements . . . . . *Sphaeroamphis*
3. Lip region offset, six inner liplets besides the lips, vagina not swollen . . . . . *Thorniosa*
   Lip region continuous, liplets absent, vagina swollen . . . . . *Thornia*

Genus *Thornia* Meyl, 1954 (Figs 15.21A–C)
Syn. *Timminema* Khera, 1978
Diagnosis. Thorniinae. Small to medium-sized nematodes. Lip region not off set. Pharynx expanding near or behind its middle. Vagina strongly swollen, without sclerotized pieces. Spicules alaimoid. Gubernaculum very thin; no supplement is present. Tail varying in length from shorter than anal body width to three times as long as anal body width; tail length slightly different in both sexes. Mainly freshwater nematodes, occasionally terrestrial.

Type species: *T. steatopyga* (Thorne & Swanger, 1936) Meyl, 1954 (USA, Paraguay, The Netherlands, Switzerland, Hungary, Italy, Russia)*

Other species:
T. goffarti (Meyl, 1953) Meyl, 1954 (Italy, Czechoslovakia)*
T. hirschmannae Andrássy, 1966 (Germany, Hungary)*
T. juvenilis (De Coninck, 1935) Meyl, 1954 (Congo)
T. magna (Paetzold, 1958) Andrássy, 1968 (Germany)*
T. parathermophila (Meyl, 1953) Meyl, 1954 (Italy, Russia)
T. pithecusana Meyl, 1954 (Italy)
T. propinqua (Paesler, 1941) Andrássy, 1957 (Germany, Hungary, The Netherlands, Czech Republic, France, Italy, Russia, India)*
T. rhopalocercoides (Schneider, 1937) Meyl, 1954 (Sumatra)*
T. steineri (Schneider, 1925) Andrássy, 1957 (Germany)*
T. thermophila (Meyl, 1953) Meyl, 1954 (Italy)
Additional reference: Andrássy (1987b).

Genus *Nygolaimoides* Meyl in Andrássy, 1960 (Figs 15.21D–F)
Diagnosis. Thorniinae. Small to medium-sized nematodes. Lip region not offset. Pharynx expanding behind its middle. Vagina swollen, without sclerotized pieces.

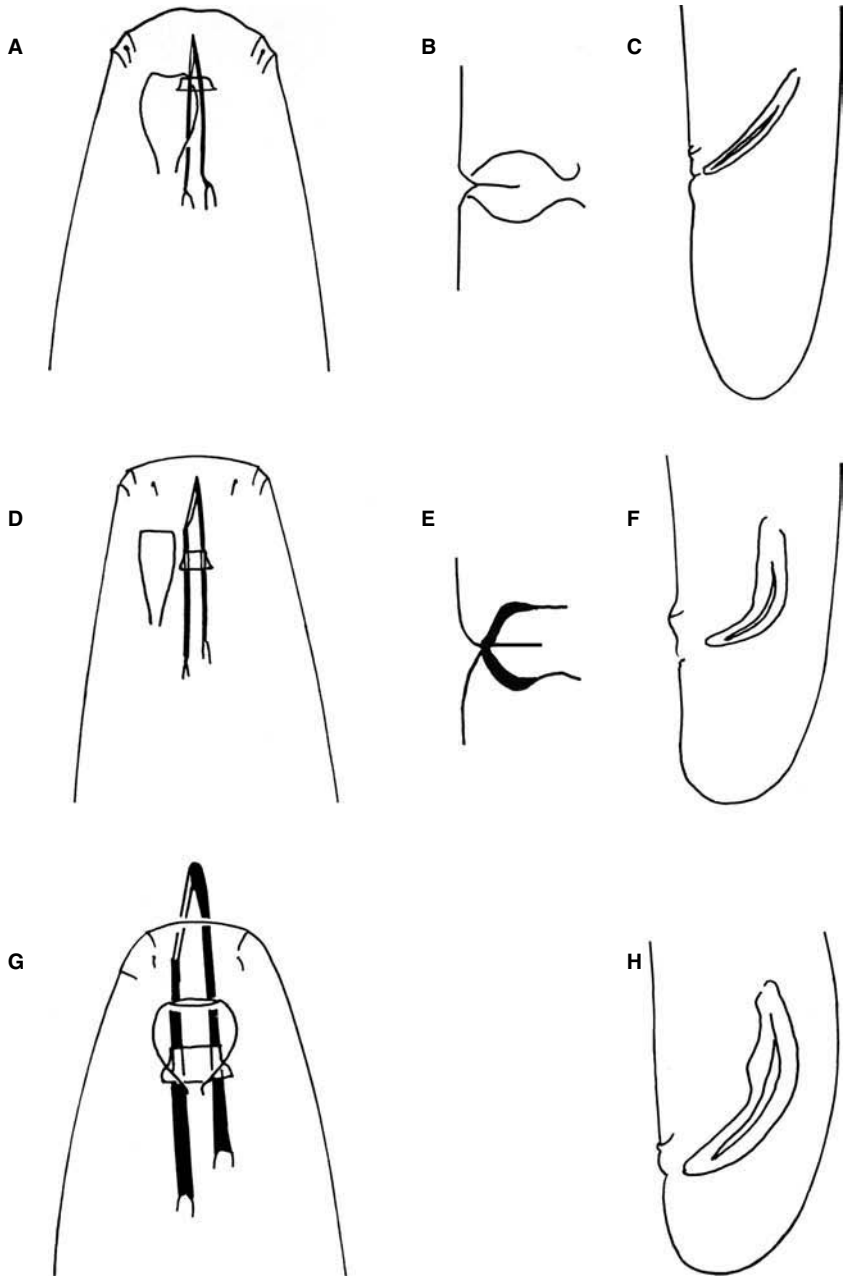

Fig. 15.21 A–C: *Thornia*; D–F: *Nygolaimoides*; G and H: *Thorneella*.

Spicules alaimoid; gubernaculum absent; one large supplement is present. Ad-cloacal supplements at different levels. Tail in both sexes shorter than anal body width. Mainly saprobic forms; few freshwater species.

Type species: *N. borborophilus* (de Man, 1876) Meyl in Andrássy, 1960 (Central Europe)*

Other species:
N. andrassyi Ahmad, Okada & Araki, 2003 (Japan)
N. fraternus Andrássy, 1987 (Hungary)
N. gubernaculifer (Andrássy, 1957) Andrássy, 1987 (Hungary, Germany)*
N. pusillus Andrássy, 1987 (Congo)
Additional reference: Andrássy (1987b).

Subfamily Thorneellinae Andrássy, 1987
Diagnosis. Thorniidae. Lip region with the two circles of labial papillae far apart. Odontostyle cylindrical. Spicules dorylaimoid. No supplements in male.
Additional reference: Andrássy (1987b).
Only genus: *Thorneella* Andrássy, 1960

Genus *Thorneella* Andrássy, 1960 (Figs 15.21G and H)
Diagnosis. Thorneellinae. With the characters of the subfamily. Cuticle smooth. Odontostyle straight, as long or slightly longer than lip region width; guiding ring thin. Pharynx enlarging at or behind its middle. Pre-rectum short. Female gonads paired. Spicules dorylaimoid; gubernaculum absent. Only the ad-cloacal pair of papillae present. Tail short and rounded in both sexes. The species of *Thorneella* live in wet soil.

Type species: *T. teres* (Thorne & Swanger, 1936) Andrássy, 1960 (USA)

Other species:
T. aculeata (Cobb in Thorne & Swanger, 1936) Andrássy, 1960 (Jamaica)
Additional reference: Andrássy (1987b).

Acknowledgements

I wish to express my gratitude to Prof. István Andrássy, University of Budapest (Hungary), who has revised the manuscript improving it with suggestions, comments and new information; to Prof. Reyes Peña-Santiago, University of Jaen (Spain), for having shared with me his bibliographical research on freshwater species; and to Drs Mirella Clausi and Lara Orselli, University of Catania (Italy) for having actively helped me to finish the manuscript in time.

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