
Animal Parasites

Heinz Mehlhorn

Animal Parasites

Diagnosis, Treatment, Prevention

 Springer

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Cover illustration: Left: Scanning electron micrograph of the anterior end of the hookworm *Ancylostoma caninum* showing typical teeth. Right: Scanning electron micrograph of the anterior end of a tapeworm of the genus *Taenia* showing a species specific crown of hooks besides the suckers. Photos Heinz Mehlhorn

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The Structure of the Book and How to Use the Diagnostic Keys

Contents

Chaps. 1–3 explain what parasitism means, where such animals live and how they can be diagnosed most easily.

Chaps. 4–6 present the most important parasites of animals. Using the tables in Chap. 2, where the different parasites are listed according to their **site of occurrence**, it becomes easy to find the relevant chapter in the book where a detailed description is given in addition to **micrographs** and **summarizing tables**.

How to Use the Diagnostic Keys

In several chapters, a key is provided, which helps to diagnose some important parasites. The keys should be used as follows:

- The user of the book gets in general 2 (rarely 3) choices of answers on questions related to morphologic aspects of a given parasitic stage (explained in the text and/or shown on micrographs).
- If the user has decided, he/she finds at the right side of the question a number in bold appearance.
- Then he/she goes to the next question written behind this number in the next line and so on. It is, however, important to read always all possible answers before a decision is made!
- If at the right side the name of a parasite or a group of parasites occurs, the diagnosis is completed and the user follows to the given page number, where the searched parasite is described in detail.

Text

The parasites of all animals in the close surroundings of humans are described in detail in Chaps. 4–6, which are presented in a sequence with respect to their organization as **protozoans, worms (helminths) and ectoparasites**. Each parasite and its closely related groups are described in the following subheadings:

1. **Name:** The origin of the species names is explained in order to understand the often complicated names.
2. **Geographic distribution/epidemiology:** This section gives insights into where the parasite occurs (worldwide, locally, etc.), and it is shown whether they are of high or low importance.
3. **Biology/morphology:** This section covers aspects of the appearance and reproduction of the parasites.
4. **Symptoms of disease:** The most important symptoms of disease introduced by this parasite are listed.
5. **Diagnosis:** This topic contains information how to find most easily a supposed parasite in the body of a host or in its feces, etc.
6. **Pathway of infection:** This section describes how the host can be infected with a supposed parasite.
7. **Prophylaxis:** This section gives short information about how infections with the diagnosed parasite can be avoided.
8. **Incubation period:** This is the period ranging from the day of infection until first symptoms of disease occur.
9. **Prepatent period:** This is the period from the day of infection with the diagnosed parasite until first parasitic stages can be diagnosed, which can be transmitted. The prepatent period is often shorter than the **incubation period** so that other hosts can be infected without knowing it.
10. **Patency:** Period during which a parasite can be transmitted to another host.
11. **Therapy:** Presentation of methods/compounds that are in common use to treat infections. **Note:** Medication may differ in different countries due to local laws.
12. **Further reading:** This section gives some rather new and/or older but important papers, which help to approach relevant literature concerning a diagnosed parasite.

Addenda

Addendum A: Antiparasitic Drugs Used for Animals

This addendum contains tables where different medicaments are listed that can be used for the treatment of infections occurring in the different host groups. It gives more details than in the special Chaps. 4–6.

Addendum B: Diagnostic Stages

This addendum encloses comparative tables with additional micrographs of stages of several parasites of the different hosts.

Addendum C: Questions to Test Obtained Knowledge

This addendum lists 100 questions concerning important animal parasites offering always five potential answers, but only one of them is correct. This allows us to control our own knowledge and is recommended especially for students before examinations. Correct answers are listed at the end of this addendum.

Addendum D: Origin of Figures

The origins of the macro- or microscopical figures of the parasites used in this book are listed.

Preface

Parasites endanger not only the health of humans but also that of animals which live together with humans in homes and on farms. Many groups of parasites are in addition transferable from animals to humans and back. The pathways of transmissions of endoparasites and ectoparasites have obtained increasing importance in our days of **globalization** and **global warming**. While globalization offers easy transportation of agents of diseases from one end of the world to the other, global warming increases the chances of many parasites (especially ectoparasites) to enter new biotopes in formerly cold regions. Before this background, it seems necessary to stabilize and to increase the knowledge on parasites with respect to occurrence, transmission and control. Thus, the contents of this volume are addressed to veterinarians and students of veterinary medicine but also to all people who keep farm animals and especially to those who are owners of pet animals.

In order to make it easy to find the wanted information, the book presents the relevant knowledge on each parasite under the following 12 subheadings:

1. Name
2. Geographic distribution/epidemiology
3. Biology/morphology
4. Symptoms of disease
5. Diagnosis
6. Pathway of infection
7. Prophylaxis
8. Incubation period
9. Prepatent period
10. Patency
11. Therapy
12. Further reading

The correct **diagnosis** of the different parasitic stages of animals is not only possible by the description of the relevant methods but also supported by more than 600 micrographs, by many diagrammatic representations as well as by comparative tables. The listed control measurements represent the actual knowledge in the year of the appearance of this book and should always be checked.

Each chapter on a given parasite ends with the presentation of some recent papers, which allow a retrospective of important features of the parasite.

Hundred questions—each with five choices—allow personal control of our own knowledge. They had been tested in many student examinations to confirm a solid knowledge.

This book represents the first English edition after seven previous ones in German.

Düsseldorf, Germany
June 2016

Heinz Mehlhorn

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The representation of a book such as this one, considering a broad spectrum of many features of the same topic, is not possible without the help of experienced colleagues and friends. Thus, this book is based on common books and articles published with renowned colleagues such as Dieter Düwel, Dieter Eichenlaub, Alfred Otto Heydorn, Thomas Löscher, Werner Peters (†), Gerhard Piekarski (†), Wolfgang Raether and Eberhard Schein (†). Furthermore, I am deeply indebted to my colleagues Johannes Eckert (Zürich), Axel Haberkorn (Bayer Leverkusen), Heinz Hänel (Hoechst AG, Frankfurt), Alfred Otto Heydorn (Berlin), Sven Klimpel (Frankfurt), Gerd Lehmann (Aalbaum), Brigitte Loos-Frank (Stuttgart), Gerhard Piekarski (†) (Bonn), Rainer Pospichel (Bayer AG), Regine Ribbeck (Leipzig) and Eberhard Schein (†) (Berlin) for their contribution of beautiful pictures, their advices and/or nice glass slides to prepare rare aspects of parasites. Dr. Volker Walldorf (Düsseldorf) and Mr. Fried Theissen (†) (Essen) contributed nice drawings especially prepared from drafts.

My son Tim, Mrs. Diehl and my wife Birgit helped in translating the text into English. The preparation of the text was done by Mrs. Inge Schaefers and Mrs. Susanne Walter. Presentation of the figures was accomplished by Mrs. Isabelle Mehlhorn, Mrs. Susanne Walter and Mr. Bernd Prümm.

The staff at Springer Heidelberg (Drs. Andrea Schlitzberger and Lars Körner) finished this book in its hopefully very useful and agreeable final version.

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About the Author



Prof. Dr. Heinz Mehlhorn has investigated parasites, their transmission pathways and significant control measures for over 40 years. He has published more than 20 books and 250 original publications and received 25 patents on antiparasitic drugs, some of which he uses at his university spin-off company Alpha-Biocare (founded in 2000). As a university instructor, he had the pleasure to introduce many students to the topics in parasitology. Many of them are now professors or in leading industrial positions. In television and radio broadcasts, he regularly informs the public about relevant parasitological problems in our days of globalization and global warming.