
Preface

Why write such a book? After all, modern academic life at a university is not generously favourable to such prolonged activities that do not result in immediate gains for the publication record and that do not lend themselves to impressive reporting of numerous achievements. Yet, there are several good reasons. Over the last decade or so, few areas of biology have seen such an enormous expansion as did the study of host-parasite interactions in the broadest sense. The literature is now enormous and—to make matters worse—covers a very broad range of fields, from the study of behaviour, ecology, genetics, or population dynamics, to the field of immunology and molecular biology. You may think: this is a little bit but one should focus on one field and be good at it. This is true, and successful science works in this way—pick your question and go for it. However, there is also another side of the coin. Parasites infect hosts, establish, grow, multiply, and become transmitted. Hosts in turn suffer from the consequences of being infected, defend themselves, sometimes survive and manage to reproduce. Over ecological and evolutionary time, both parties therefore interact, are selected by the corresponding effects, and evolve. Along the way, many different things happen that are all relevant for many phenomena at ecological and evolutionary scales. In fact, the repercussions of parasitism are far-reaching, from individuals to populations to communities, and many of those affect us as humans.

It is a truism that nature does not care about how we traditionally define fields of research, how departments of universities are organized, or how our academic

curricula look like. The biology of hosts and their parasites, in particular, cuts across many fields, and it is much richer scientifically than a single theme and more relevant than commonly appreciated. For these reasons, it is enormously helpful to know how a problem is embedded in the bigger picture—even if good advice means to not include all of the imaginable complexity into your problem for a start. But eventually such a broader view will become important, yield new insights, and perhaps helps to discover new ground. This is, therefore, what this book hopes to stimulate—an integrated view of host-parasite biology. I think the term 'Evolutionary Parasitology' captures this idea very well, since evolutionary thinking is the major integrating principle across all of biology and since parasitism is the pervasive theme of this book. In this sense, Evolutionary Parasitology is a framework that brings together a range of biological questions that—depending on your taste—do not have any connections with one another at first sight. Examples are immunology and mate choice, the expression of bacterial secretion systems and infective dose, or predation and the evolution of parasite life cycles. Evolutionary Parasitology, therefore, is not just ecological immunology, infection biology, epidemiology, or the study of sexual selection. These fields have developed rather independently and there is justification in pursuing questions in such useful contexts. But these fields also identify themselves as part of a larger approach to understand the role of host-parasite relationships in the big book of nature. Furthermore, some might consider 'Evolutionary Parasitology' to be a modern version of 'Parasitology'

and perhaps get the notion of it being 'old-fashioned'. However, this does not do justice to the field, since the conceptual roots of Evolutionary Parasitology are very different and rather originate from areas such as population biology and genetics, from evolutionary and behavioural ecology, or from comparative and ecological immunology. Lastly, because parasites are not only fascinating and important for biologists, but are also agents of disease for humans, crops, and livestock. Evolutionary Parasitology should also be a relevant discipline for students of medicine and agriculture alike. Hopefully, this book—as imperfect as it might be—can contribute towards these goals and towards a better appreciation of the underlying biological problems that are common to the various quarters.

When writing the text, one guideline was to imagine what students should know when they reach their final year of undergraduate studies and come to a research lab to start their work; for them, the first few chapters will be useful to gain a basic understanding of the questions and to appreciate the diversity of parasites and host defences so as to jump into their own problems. I would hope that advanced students finishing a higher degree and those specializing towards evolution and parasitism would know what is in this book and, in particular, know how to play with this knowledge for their own interests. The book should furthermore be useful for readers that are not just students from, say, evolutionary ecology but also for a range of other disciplines. To help in this agenda, tables and figures illustrate what the typical data look like to answer a particular question. These are always examples and are chosen to show the range of organisms, methods, or findings. None of the tables claims to be a complete overview. Furthermore, some tables and figures attempt to illustrate a particular concept. At this point I must offer apologies to my colleagues from the plant sciences. Although there are plant examples, the plant world is not as well represented as I had hoped in the beginning. This is not a judgement on the quality of the plant work but rather reflects my personal background. Similarly, I had a faint hope to reduce the usage of acronyms in immunology. In vain—immunology does have its own language that needs to be learned at

least to some degree; I hope that the glossary of terms can at least help reduce this pain.

No such work could be written without the help of many colleagues, friends, and co-sufferers. To the latter category no doubt belongs my wife Regula, but also my students who have missed a supervisor for extended periods of time. I am grateful that the students of our lab have nevertheless volunteered as test readers for a previous draft of the manuscript; for this I thank Camillo Berenos, Gabriel Cisarovsky, Vera Gräzer, Niels Kerstes, Hauke Koch, Martina Tognazzo, and Yuko Ulrich. Their input has added important perspectives. I further like to thank a number of colleagues that have read parts or all of the manuscript and offered their advice (in alphabetical order): Seth Barribeau, Roger Kouyos, Joachim Kurtz, Tom Little, Oliver Martin, Andrew Read, Jens Rolff, Ben Sadd Regula Schmid-Hempel, and Mathias Wegner. Special thanks must go to Louis du Pasquier whose enthusiasm, encouragement, input, and encyclopaedic knowledge of immunology was an invaluable asset. All of this help and advice is much appreciated; the remaining errors are of course mine. Thanks also go to Maja Novak for help with the illustrations, to Rita Jenny and Roger Merz for secretarial assistance, and to Ian Sherman and Helen Eaton from OUP for their patience and invaluable assistance during all stages of writing and production. Finally, I would like to mention the focus group on evolutionary immunology that convened for the study year 2006/07 at the Wissenschaftskolleg zu Berlin. The discussions during this year with Robin Bush, Sylvia Cremer, Steve Frank, Joachim Kurtz, Andrew Read, and Hinrich Schulenburg were not only personally enjoyable but influenced many thoughts summarized in this book. I thus gladly extend my thanks to the Wissenschaftskolleg (Institute of Advanced Studies Berlin), which has provided an extremely fruitful ground for reflection in a stimulating environment. The privilege to be a permanent fellow at this institution has served me several times since then. I hope that you, dear reader, will similarly enjoy this work and consider it helpful and perhaps stimulating for your own endeavours.

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