Infectious Diseases and Arthropods

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This book is affectionately dedicated to my brother and two sisters:
Julian (Hule) Goddard, Cathy Goddard Windham, and Amy Goddard Blassingame

Preface

Infectious diseases are making a strong comeback after a lull in the years immediately following World War II. The ability of microbes to adapt to host immune responses and intense pressure from antibiotic use, combined with societal changes, have contributed to a resurgence of many infectious diseases. In addition, there are now several "new" diseases, including Legionnaires' disease, Lyme disease, ehrlichiosis, toxic shock syndrome, and Ebola hemorrhagic fever. In just the last two or three years we have seen the appearance of a virulent strain of avian influenza that attacks humans, a human variant of "mad cow" disease, and new drug-resistant forms of *Staphylococcus aureus*. These new or emerging infectious diseases have raised considerable concern about the possibility of widespread and possibly devastating disease epidemics.

Many of these emerging or reemerging infectious diseases are vector-borne. Since 1975, dengue fever has surfaced in significant outbreaks in more than 100 countries. The more insidious forms of the disease, dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) with internal bleeding and shock, mainly affect children under age 15, with about 5% of the cases resulting in death. In the 1970s only nine countries had experienced DHF outbreaks; since then, 44 countries have had DHF cases or epidemics. The malaria situation is worsening as well. There are now an estimated 300–500 million cases of malaria each year, with 1–2 million deaths (mostly children). Several factors are responsible for the resurgence of malaria:

1. Insecticide resistance in the vector mosquitoes;
2. Drug resistance in the malaria parasite;
3. Inadequate funding for malaria control;
4. Civil strife with accompanying refugee problems; and
5. Increased travel by nonimmune expatriates.

For example, 2–3 million new cases of malaria have been reported each year recently in Afghanistan as a result of disruption of insect control, civil disturbance, and migration. Plague is also reemerging. In the United States there has been an increasing number of states reporting malaria cases and an eastward movement in human case occurrence toward the 100th meridian. The incidence of cutaneous leishmaniasis is increasing in Central and South America because of road building, mining, oil exploration, deforestation, and establishment of communities adjacent to primary forest. Lyme disease, almost unheard of in 1979, is now the number one tick-borne disease in the United States, with approximately 12,000 cases reported each year. Other tick-borne diseases, such as babesiosis and ehrlichiosis, are also emerging. Several new *Babesia* species infecting humans have been found. Likewise, there are at least two *Ehrlichia* species in the United States that produce spotted-fever like illnesses. Others will likely be found.

It could be argued that at least some of the increase in vector-borne disease is the result of increased recognition and reporting. Specific disease recognition is certainly made easier by such novel technologies as the polymerase chain reaction (PCR). However, such societal changes as population increases, ecological and environmental changes, and especially suburbanization (building homes in tracts of forested lands) are contributing to an increase in the incidence of many of these vector-borne diseases.

In light of this vector-borne disease increase, information about these entities—their distributions, hosts, reservoirs, and vectors—is much needed. Thus, *Infectious Diseases and Arthropods* is intended to provide physicians, as well as entomologists and other interested parties, with a reference on the biological and entomological aspects of infectious diseases. The primary approach has been to present readily accessible information on each of the major vector-borne diseases, with an emphasis on the relevant biology and ecology of each one. Since I am writing as an entomologist, the text obviously leans heavily to the organismal side of each disease, with, in some cases, less emphasis on clinical aspects. No effort has been made to present an in-depth review of each disease; instead, there is a middle-of-the-road consensus of current thought on each subject. It is the author's hope that *Infectious Diseases and Arthropods* will prove a useful adjunct to the clinical texts employed by infectious disease specialists, public health and travel medicine physicians, epidemiologists, and others with duties encompassing vector-borne dis-

eases. Treatments are mentioned (but without specific dosages) for the various diseases, but are only intended as general guidelines. They are in no way intended to be the sole, specific treatment for any particular patient. Physicians should consult clinical texts or drug package inserts for the most current recommendations.

Jerome Goddard

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Some *Infections in Medicine Bug Vectors* columns have been updated and included in this book:

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Eastern Equine Encephalitis, 1996; 13: 670–672, © 1996, SCP Communications
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Tick-borne Viruses, 1997; 14: 859–861, © 1997, SCP Communications
Tick Paralysis, 1998; 15: 28–31, © 1998, SCP Communications
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