

# In peace and in war

Robert D. Holt

**Natural Enemies: The Population Biology of Predators, Parasites and Diseases.** Edited by M. Crawley. Blackwell Scientific: 1992. Pp. 576. £32.50, \$69.95 (pbk).

IN a 1946 review of predation and vertebrate populations, the wildlife biologist Paul Errington mused, "Whatever else may be said of predation, it does draw attention". In the near-half-century since, there has been an enormous amount of research on interactions between natural enemies (defined to include parasites, pathogens and herbivores, as well as predators) and their victims. It is easy to see why, for the *pas de deux* between enemies and victims permeates all levels of biological organization, from energy flow through ecosystems to the moulding of individual behaviour by natural selection, and is moreover central to many applied ecological problems.

Michael Crawley, the editor of this fine, timely volume, has assembled a roster of distinguished authors to examine our current understanding of the ecology of natural enemies. A core set of questions ties their contributions together. How do the behaviour, life histories and guild structure of natural enemies reflect their dependence on victims for sustenance? How important are natural enemies in limiting and regulating prey populations and in moulding prey phenotypes over evolutionary time? How often do such interactions foster dynamic stability, as opposed to cycles, chaos or local extinction? How are interactions between enemies and victims influenced by the broader web of interactions in the community?

Space precludes my dwelling on the virtues of each chapter, which are all well written and present fresh insights even when reviewing familiar material. A quartet of conceptual chapters sets the stage. Crawley lays out the basic elements of natural enemy-victim population dynamics, with enough background to make the volume accessible to students. Three chapters crisply outline the main tools used in evolutionary analyses of enemy-victim relationships: optimality models, comparisons among taxa and coevolutionary models. The book's core is a rich smorgasbord on the population dynamics and evolutionary ecology of a wide range of natural enemies. There are four chapters that deal with vertebrate predators, one with marine invertebrates, three with arthropod predators and parasitoids, two with parasites, and one with the three-way interaction between bloodsucking arthropods, vertebrate hosts and their

shared parasites.

There is much fascinating natural history here, replete with cogent reexaminations of many standard topics. I was particularly taken by S. Northridge and J. Beddington's reinterpretation of large size and blubber in marine mammals, the implications of these traits for whale species' coexistence, and how these ideas echo I. Hanski's elucidation of competition between shrews. There is also a chastening recognition of limits to our understanding. For instance, M. Hassell and C. Godfray succinctly review the literature on insect host-parasitoid dynamics and ruefully conclude that the "role of parasitoids in the regulation of natural insect populations remains uncertain".

Despite the great deal now known about natural enemy-victim interactions, my feeling is that we are still far from a general theory that would let us gauge accurately the ecological and evolutionary role of natural enemies in the play of life. This book reveals substantial agreement among ecologists as to the elements needed to address the above organizing questions, but in no empirical case are all the requisite components fully

understood. Yet some pointers toward a general theory do emerge, particularly in the concluding synthetic chapters, which emphasize the need for a better understanding of the mechanistic behavioural underpinnings of predator attack and prey defence, as well as the community context of these interactions. Two chapters underline the importance for human affairs of the material in the volume. The editor tops it all off with an overview of tentative generalizations and suggestions for future research.

I am struck by how certain themes pervading this volume reflect broader currents in ecology as a whole: the significance of scale and heterogeneity; the modest aim of developing contingent theory, tailored to particular systems, rather than a quixotic search for universal ecological principles; and the importance of broadly comparative, evolutionary perspectives in analyses of ecological systems. The book should be read, savoured and digested by all professional ecologists and applied biologists interested in its principal ecological theme, and particularly by conservationists concerned with the preservation of predators or their victims. For, as Finley Peter Dunne once said, "Life'd not be worth livin' if we didn't keep our inimies" (*Mr Dooley in Peace and in War*, 1898). □

Robert D. Holt is at the Museum of Natural History, University of Kansas, Lawrence, Kansas 66045-2454, USA.



**Web of intrigue** — an adult female garden spider (*Argiope appensa*) eating a honey-bee while a smaller male spider waits nearby. The picture is taken from *Hawaiian Insects and Their Kin* by F. G. Howarth and W. P. Mull, which contains over 200 colour photographs of such Hawaiian peculiarities as predatory happyface spiders and 'singing' tree snails. University of Hawaii Press, \$19.95.