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BOOK REVIEW

Wise, D. H. 1993. Spiders in Ecological Webs. Cambridge University Press. ISBN 0-521-32547-1 (Price $79.95)

In this 328 page book, David Wise offers a comprehensive discussion of the literature on the use of spiders to test ecological models and theories. Until now, most books on spiders have been edited volumes that bring together the ideas of many others (e. g., Nentwig 1987; Shear 1986; Witt & Rovner 1982); equally valuable are the more general discussion of spiders (Foelix 1982) and taxonomic catalogs (Platnick 1989, 1993). David Wise's book is a welcome addition to this growing literature because he brings the focus of a single author while summarizing and providing a critique of the work of many researchers. His emphasis is on describing and critiquing field experimentation (especially in the context of studying competition), and on studying spiders both as predators and as models of generalist predators in terrestrial systems. He takes a look at spiders in agricultural systems as well. Wise brings his considerable experience as a community spider ecologist to his discussion and review of this literature.

There are nine chapters in this book, starting with one entitled "The Spider in the Ecological Play", which sets spiders as terrestrial, generalist predators onto the center stage of the ecological and evolutionary drama. This is followed by a progression of chapters first on hungry spiders (the importance of food limitation) and then series of chapters on competition: competitionist views of spider communities, failure of the competitionist paradigm and how (some) spiders may avoid competition. Following this explicit look at competition, there are chapters on the impact of spiders on insect populations, "anchoring the ecological web" (subtitled "refining the metaphor–the web's non-trophic threads" which is a look particularly at the architecture of the vegetation and leaf litter and how these factors affect the abundance of spiders), "untangling a tangled web" (in which Wise addresses "indirect factors" that help to structure complex communities, including intraguild predation), and finally, one entitled "spinning a stronger story" where Wise closely scrutinizes his own biases in the book.

Wise recognizes the limitation of the metaphor of spinning and webs that he uses throughout the book even as he attempts to use the metaphor to tease apart the threads of community structure. Each chapter begins with a 1–2 page introduction and concludes with a synopsis of the main ideas. The format makes the information in the book easily accessible. And while the book "hangs together" nicely as a whole unit, it is also easy to focus on one chapter at a time. I was able easily to go back to different chapters and find specific information.

The reference section includes 462 works. The literature spans from 1815 to 1992 with the bulk of the citations (249 entries) from the 1980's. Also included is a name index (for authors) and a subject index (with spider names and topics interspersed). The indexes are useful: the subject index includes family names, genus-species names and common names for the spiders. The name index works for second and third authors as well as for first authors.

Spiders in Ecological Webs will be of interest to a wide variety of ecologists, arachnologists and other biologists. I will use examples from this book in my 200-level Ecology class and will buy it for my school's (undergraduate) library. It will be useful to all researchers interested in spiders and/or interested in field experimentation. Wise's critiques of methods and statistics will be helpful to graduate students, professional ecologists and anyone planning field experimentation. For a variety of reasons, many researchers (including Wise, in his earlier days) have fallen into the trap of "pseudoreplication" in planning and carrying out field studies – Wise provides a particularly useful and extensive discussion of this problem. Because of this critique, *Spiders in Ecological Webs* will be useful in Biostatistics courses or in Research Methodology courses as well.

This book has several strengths. Clearly one of these is the detailed attention to studies of spiders in competition and studies of competition in which spiders play a big role. Wise clearly

shows through this discussion how ideas about competition have changed dramatically in the last few decades. He very capably discusses the question "Is there evidence that spiders compete or that competition is important in structuring ecological communities?" A second major strength of the book is Wise's attention to field studies and field manipulation and experimentation. This emphasis makes this work useful to a wide range of ecologists, even those without an interest in arachnids. However, the central strength of the book lies in Wise's willingness to present a wide variety of studies, critique them closely, reanalyze data if need be and show how (even with a particular study's weakness), insights can be gleaned from it. For example, the study by Clarke & Grant (1968) (discussed on pp. 147ff) is a classic study in leaf litter ecology and probably introduced the idea of field manipulation to many ecologists. This study has been cited to support the idea that spiders have a significant impact on insect populations in leaf litter ecosystems. While this is an important and classic paper, Wise explains its flaws in terms of experimental design (in this case, primarily a lack of replication). This study has been followed by a variety of manipulative field experiments by Bultman & Uetz, Wise & Wagner and Kajak & Jakubczyk, among others. I think some of the manipulations done by later researchers would have amazed Clarke and Grant.

Throughout reading the book, I felt a sense that there really is progress in science. You can see through the reviewed literature that studies *have* been done more and more carefully and researchers *have* learned what is necessary to tackle a problem appropriately and in many cases have designed and executed experiments that ecologists didn't even imagine 20 years ago as in the case with Clarke and Grant.

To his credit, Wise does not hesitate to criticize his own research. In Chapter 5, "How spiders avoid competition," he reworks much of his own data and in some cases, comes to different conclusions. For example, following his reanalysis, he finds that contrary to his earlier assertions, there is no evidence that intraspecific competition affects fecundity in spring maturing filmy dome spiders. To me, this is the epitome of science – when an individual synthesizes from his/her own work and from the work of others and moves forward in understanding a particular system.

Wise does not cover the extensive and growing literature on spider behavioral ecology, nor does he attempt to cover the realms of spider evolutionary ecology or sensory ecology. Tackling these broad topics would have completely changed the nature of the book and probably would have made it prohibitively large. Other books on these topics remain to be written.

Although there is some discussion of cursorial spiders, Wise emphasizes web building spiders in the northern hemisphere probably because many ecological studies have been on web builders in the northern hemisphere. Something Wise does *not* do in this book is to remind the readers of the number of terrestrial ecosystems that have not been studied as extensively by field experimentalists. I wonder what a "model spider" would be in a tropical system where the vast majority of collected spiders are "singletons"? Such systems are much more difficult to manipulate, yet because of the vastness of the tropical biome, generalities without considering it are problematic. I think it is always useful to put our knowledge in context – to remind ourselves of the bigger picture and what and how much we do *not* know. It is also worth mentioning that we probably still know only a fraction of the all of the spider species. What is a "general spider" (a term Wise uses), and can we know if, as Coddington & Levi (1991) suggest, only 20% of the world's spider fauna is known? There are more species of Salticidae than any other family, and among the six most speciose families, there are more species of non-web builders (8800 species) than there are of web building spiders (8500 species) (Coddington & Levi 1991). Perhaps a "general spider" should be a salticid spider from a tropical biome.

Some of Wise's terminology is problematic. For example, his use of the group "cribellate spiders" (p. 6) is unfortunate as this no longer a valid grouping (Coddington 1990). Also unfortunate is Wise's groupings of "closely related species" –such as the Agelenidae and the Lycosidae (p. 8) – two families that are not particularly close (Coddington & Levy 1991). Wise only briefly touches on the very interesting phenomenon of sociality in spiders, particularly in tropical areas. Perhaps that will be covered in a another book on evolutionary ecology in spiders.

While I was bothered at first by Wise's attempt to generalize a single "spider persona", I found myself enjoying the book more and more as I read through it. I particularly enjoyed being able to trace a series of papers done by one person

(or group of persons) and be able to see the evolution of thinking in various spider ecologists. It was also very helpful to see how frequently many researchers have tackled a particular problem; and taken together, we really do have a lot of insight on particular questions. I got a sense of continuity from this and satisfaction that I could go to one source and find such useful summaries and find so many references.

On the whole this is a welcome addition to both the spider literature and the ecological literature. I think Wise's goal of introducing spiders to a wider ecological audience will be met in this book. It will also make accessible a large ecological literature to other arachnologists. The book left me hopeful on several counts – I hope that the momentum of research of the 1980's continues through the 1990's and into the next century. I hope future editions will take into account more from tropical ecosystems – and that there will be more research to report and summarize from other regions. And finally, I hope there will be other books on spider behavioral ecology and evolutionary ecology. It is an exciting time to be working on spiders.

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Gail E. Stratton. Dept. of Biology, Albion College, Albion, Michigan 49224 USA

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