

This clear, accessible MS is written by two highly respected ecologists who have an excellent track record of writing books that sell. At 638+ pages, the current MS is their Opus, synthesizing decades of collaborative research on a species that might be considered a form of model system for understanding pattern and process in ecological communities. This study of pattern and process historically was treated as integrated, blending two ecological scientific enterprises—the study of local evolutionary ecological interactions among species within communities (population ecology), and the study of species' geographic distributions and abundance (macroecology)—in order to predict how process generates patterns of community structure and dynamics. Sadly, modern ecology has drifted to become largely disintegrated into silos, subdivided between studies of the local and the geographic, with limited exchange between the two enterprises. The intention in writing this MS is to offer conceptual and empirical insights to (re)integrate these subfields, to make community ecology whole again. This is a highly worthy, and in my view necessary, undertaking if ecologists wish to make any significant scientific advances in understanding the complexity of nature and the origin and maintenance of the variety of life on the Earth.

This is an ambitious undertaking and the MS is highly unusual in the way it unfolds. It is a mixture of many things. It offers personal accounts of the thinking behind the research that was undertaken and its execution, along with some philosophizing. It provides a broadly encompassing natural history of the study species—in a classic, almost (and refreshingly) Victorian natural philosophic style of sweeping descriptions of the species' evolutionary history and relatedness to other species, its biogeographical distribution, and its ecology. It teaches with chapters that provide prefatory insights into basic ecological principles and methods in a variety of subdisciplines including bioclimatology, physiology and nutrition, population demography, food web ecology and biogeography. Each subdisciplinary treatment is immediately followed by chapters that offer synthesis of the research that was undertaken, motivated by specific principles and associated methods. And finally, it provides a synthesis of years upon years of research to understand how the study species fits into the natural order of things.

I can appreciate why the authors proceeded in this unusual way. With the siloing of ecology, they face the dilemma that individual researchers will typically not be equipped with the degree of interdisciplinary depth—they are typically not trained to build the interdisciplinarity strengths—needed to comprehend the salient issue of integration and scaling that the authors are confronting in the MS. Doing what the authors are trying to accomplish requires deeper appreciation and understanding of natural history and the diversity of life and landscapes and how different scientific perspectives contribute to providing a holistic picture. And so, I can see the authors' pedagogic reasoning here and I appreciate the quandary that they are trying to overcome. But I don't think it works IFF the intention is to publish it in the Monographs in Population Biology (MPB) series. Readers view MPB books as being something on the pithier side (< 300 pages), offering treatments of cutting-edge theory and empirical work on specific research topics that is more forward looking to inspire new research in other systems. Thus, providing very basic, introductory text-book treatments of most of the theory and concepts addressed in the book will likely not resonate well with a MPB readership. And it is in the many

sections providing the basic treatments of background theory where the book chiefly becomes lengthened. As a consequence, the writing gives the book a feel as though it were a compendium of issues and analyses that are not integrated in the way they need to be if it is to be a forward-looking MPB on how to do scaling.

So, in my opinion the MS as it stands would not fit into the genre of an MPB. It is instead a retrospective, synthetic personal account of doing long-term research aimed at understanding a specific study system from a variety of ecological angles—to develop a holistic picture of the study species. There is nothing wrong with doing this. Providing younger ecologists this kind of perspective is hugely valuable in its own right. However, the way it is written now, this is a stand-alone volume that provides the kind of personal account that shows value in doggedly working in a specific study system to understand how it works. Considering the book this way, it then makes sense to introduce the basic theories that were explored and the ensuing research that was motivated by the theory. It shows the value of not being married to one aspect of a study system but to explore it fully and show that this can be done one or a few individuals (i.e. one doesn't need massive collaborative groups). It also shows the value of having a great working knowledge of a broad range of ecological theory and how to apply it empirically. But the book should be pitched differently so that the reader doesn't think they will come away with new scaling principles that integrate population ecology and macroecology. As a start, it might be re-titled to something like “The ecology of *Sarracenia*: How long-term research informs the distribution and abundance of a carnivorous plant and its inquiline community”, a book that shows how to apply existing theory to develop rigorous empirical understanding.

However, if the goal is to publish this MS as part of the MPB series then I feel that the book needs some major restructuring and additional rewriting. as follows:

- 1) At the very least, remove the chapters that present the basic textbook level theory from the book. If there is a strongly-held sense that the information needs to be accessible in the book, put all that prefatory material (or the salient parts of it) in an appendix and refer to it in the main body of the text. MacArthur did something like this in his book “Geographical Ecology”. The point is, as a reader I want the book to get me to the point quickly throughout, to tell me what the authors did in their own work, not digress from the authors' story about their system.
- 2) Chapter 1 presents various theories and viewpoints on different ways to approach the issue of scaling. But the material is presented as just that—a description of different theories and ideas. I was hoping to see more of a philosophical perspective on why we should even care about scaling, and if it is deemed important. I'd like the authors to present more on their own worldview on how to go about doing this. That is, tell the reader how you have come to understand how to distill all of the different scaling perspectives to build an integrative picture of *Sarracenia* and its place in the natural world. This will give the reader a better sense of the rationale behind the specific aspects of *Sarracenia* biology and ecology that are addressed in the book. This kind of philosophizing is rarely done. As a consequence, researchers don't have good

perspectives and models for doing integrative work with the default that they remain in their silos. I feel like there is a missed opportunity here by not spending effort to present a worldview.

- 3) I appreciate the importance of understanding natural history in informing research. It is something I practice in my own work. But the 40+ page natural history section is rather long and a bit dry for an MPB readership. It is organized as subsections presenting fact after fact (with data tables and figures) on different aspects of the species' natural history. I began wondering why I need to know this or that fact (especially about its taxonomy and systematics). And my question wasn't answered. I think a more effective treatment of natural history could involve presenting it in a way that directly informs the scaling that needs to be done. For instance, I can image first addressing the bigger picture—the amazing fact that this species is broadly distributed geographically, yet that it lives in a narrow set of environmental conditions across its geographic range. Here is an opportunity to show that explaining this pattern requires first appreciating its phylogenetic history, but that history should be presented in a way that highlights better why the species evolved to use a narrow range of conditions in the first place. How populations thrive in the narrow conditions then requires an understanding of the species' autecology and the traits that enable it to function the way it does. But there is still spatial variation among populations, which requires understanding the expression of species' functional traits in different spatial contexts, which in turn requires understanding nutritional ecology and stoichiometry, etc. etc. That is, use the natural history chapter to gather the different threads in a way that builds on an articulation of a scaling worldview presented in the previous chapter. Presenting the natural history more strategically by sketching a caricature of how holism (evolutionary history, biogeography) is linked to reductionism (autecology, ecophysiology) in this species can then help the reader anticipate the chapters of the rest of the book.
- 4) I think the salient chapters in the rest of the book should be Chapters 4, 5, 7, 8, 10, 11, 13, 14. But more needs to be done to make sure there is coherence. One thing that struck me is that the particular challenge with this system is that it can't simply be about scaling the functional biology and autecology of *Sarracenia* to explain its broader geographic pattern and then treat the inquiline communities within each plant separately. This is because there is scaling within scale owing to the fact that each plant harbors inquiline food webs that are effectively microcosm ecosystems, such that the population of individual *Sarracenia* plants within a geographic location forms a meta-ecosystem complex. The crux of the scaling issue is the interplay—perhaps tension--between understanding how to scale from individual whole plants comprising populations to explain *Sarracenia* population structure in different geographic locations *all the while explicitly integrated* with an exploration of the local-to-regional spatial scaling of the food webs in the meta-ecosystems that come along with the plants across geographic locations. What is missing here is an explanation of how to scale within scale: how that meta-ecosystem structure scales across geographic spaces as a consequence of how the population structure of the whole plant scales. Right now, the book treats the science of pattern and processes involving the whole plant and pattern and process in the inquiline community as rather disjoint subjects of study. The real

opportunity here is to answer the metaphoric question: what if we were able to experimentally take an entire natural meta-ecosystem complex and move it from one place to an altogether different geographic location? Would we see the same level of functioning? If so, why? If not, why not? Does it involve feedbacks between changes in the autecology of the individual plant that impacts its associated local food web; or does the autecology of the plant (local ecosystem) stay the same but members of each plant-contained food web have different coping abilities and so are filtered out at the new site to change the overall meta-ecosystem structure? Or is there regional filtering of the food webs that comprise different local meta-ecosystems across geographic locations?

To me this is the kind of exploratory analysis of a model system that would inspire a new way of thinking about how to wrestle with spatially structured ecosystems more broadly. I know that revising the MS to do this would be a tall order, to get the integration right. The authors however are among a few in ecological science today that have the intellectual capacity to pull it off. And if it were done well, I could imagine it becoming a classic in the MPB series.

So I guess it comes down to deciding what kind of form the book should take. The first form (stand alone) would certainly sell as something providing interesting and useful information about a species. I'm not sure how broad the audience would be. I won't be inclined to buy such a book for my own use and teaching. The second form (part of the MPB series) would be more compelling to me, offering the next generation of scholar a new way to think about nature. And, given its broadly encompassing conceptual reach, it would probably be of interest to a wide range of ecologists, evolutionary biologists and environmental scientists.