

Book Review

Polis, G. A., M. E. Power, and G. R. Huxel, editors. 2004. *Food Webs at the Landscape Level*. University of Chicago Press, Chicago, Illinois, USA.

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Precisely as stated in the title, *Food Webs at the Landscape Level* is about the integration of two major fields of ecology: food web ecology and landscape ecology. The chapters by many authors examine all types of ecosystems, with particular emphasis on how processes that occur among trophic groups are linked with processes that occur at the landscape level. Consequently, it is also a book about scale and how ecologists might begin to consider that parts of food webs can often operate at very different scales. For example, some communities depend on basal resources that originate from places that are different from those in which the focal food web is located, e.g., inputs of nutrients to lakes from the watershed or output of insect prey from rivers to land predators. Other food webs experience occasional inputs of individuals from a higher trophic level because these predatory populations operate at a larger spatial scale than do other members of the food web. With this timely book, ecologists are finally starting to address the fact that food webs are not static in space or time and that what we used to ignore as "transient" species may actually be playing very important functional roles.

This book emerges from a symposium sponsored by the International Association for Ecology in Florence, Italy, in 1998 on food webs and landscapes. This symposium was led by Gary Polis, who died in a boating accident on a research expedition in 2000. It is a testament to his influence in ecology that his work is still being published today. This is perhaps even more surprising because he came to the discipline mostly from an empirical perspective, not a theoretical one. Because he was such a keen observer of the natural world, Polis was able to reorient the field of food web research away

from one in which theory played the dominant role, as it had for several decades, to one in which empirical observations once again led theoretical generalizations. Gary Polis was able to inject food web research with new questions arising from natural history observations and bring it at least one step closer to actual biological functioning. We must thank the co-editors Mary Power and Gary Huxel for ensuring that this worthwhile project was completed. The book is excellently edited, with thorough cross-referencing throughout.

As an obvious outgrowth of Polis' research interests, this book provides an excellent summary of current thinking in the study of food webs and subsidies across space and time. Most chapters provide more of a case study viewpoint than strong theoretical generalizations. However, because the editors have collected together authors from all sorts of ecological systems, generalizations do emerge. Perhaps the most obvious of these is that subsidies or allocthonous inputs to food webs are ubiquitous across ecosystems. Readers will find chapters on the functioning of food webs and their subsidies in reservoirs, intertidal rocky shores, arid islands, streams, lakes, forests, old fields, agricultural lands and the tundra. Because most chapters represent reviews of several years of experiments and observations, this book is an excellent resource for graduate students interested in beginning food web studies. In addition to discussions of particular food webs, there are also chapters that review advances in methodology, such as stable isotopes that have allowed ecologists to begin to take a landscape approach to food webs.

Another generalization that emerges in the book is that a landscape view of food webs will involve

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studying not only flows across systems but also the permeability of habitats and controls over flows. There are several interesting chapters that explicitly discuss flows in terrestrial environments. In yet another merging of fields, this area of research combines physics of movement with ecological dynamics. Interspersed with many relatively empirical chapters are several theoretical chapters that begin the work needed to develop a general framework that explains how subsidies alter predictions concerning the functioning and stability of food webs. New theory in this area will help unify population, community, and ecosystem ecology.

One aspect of the book that I found especially enlightening was the focus on humans as agents of change for the scales and existence of allochthonous inputs to food webs. Through most of our actions on the planet, humans generally act to alter the flows of resources and species in a way that benefits our own productivity, and for some of us more than others. Agriculture is the most obvious form in which this flow alteration occurs, as is discussed in several chapters that will be of special interest to readers of *Ecology and Society*. In addition, there are chapters that deal with some of the unwanted consequences of flow alteration by humans, including global change and the movement of exotic species.

Food Webs at the Landscape Level will be of interest to food web researchers who realize that it is necessary to take into account the scales and sizes of flows between trophic units and habitats. It represents the first step in searching for generalizations in what, until now, has been mainly a series of separate case studies. The book does this by bringing together empirical observations on many systems and by presenting simple mathematical models that help to determine how our current understanding of food webs will change as we include these processes. I do not hesitate to recommend this book to anyone interested in the current status of food web research; in fact, I would require it.

Book Information

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