



# Food Webs and Biodiversity: Foundations, Models, Data

Axel G. Rossberg

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## DESCRIPTION

Food webs have now been addressed in empirical and theoretical research for more than 50 years. Yet, even elementary foundational issues are still hotly debated. One difficulty is that a multitude of processes need to be taken into account to understand the patterns found empirically in the structure of food webs and communities.

*Food Webs and Biodiversity* develops a fresh, comprehensive perspective on food webs. Mechanistic explanations for several known macroecological patterns are derived from a few fundamental concepts, which are quantitatively linked to field-observables. An argument is developed that food webs will often be the key to understanding patterns of biodiversity at community level.

Key Features:

- Predicts generic characteristics of ecological communities in invasion-extirpation equilibrium.
- Generalizes the theory of competition to food webs with arbitrary topologies.
- Presents a new, testable quantitative theory for the mechanisms determining species richness in food webs, and other new results.
- Written by an internationally respected expert in the field.

With global warming and other pressures on ecosystems rising, understanding and protecting biodiversity is a cause of international concern. This highly topical book will be of interest to a wide ranging audience, including not only graduate students and practitioners

in community and conservation ecology but also the complex-systems research community as well as mathematicians and physicists interested in the theory of networks.

"This is a comprehensive work outlining a large array of very novel and potentially game-changing ideas in food web ecology."

—**Ken Haste Andersen**, Technical University of Denmark

"I believe that this will be a landmark book in community ecology ... it presents a well-established and consistent mathematical theory of food-webs. It is testable in many ways and the author finds remarkable agreements between predictions and reality."

—**Géza Meszéna**, Eötvös University, Budapest

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## ABOUT THE AUTHOR

**Axel G. Rossberg** obtained an M.A. in theoretical physics at the University of Texas at Austin and a Ph.D. in complex-system physics at the University of Bayreuth. Since 2003 he is specializing on food-web theory and community ecology. To foster applications in the management context he recently joined UK's Centre for Environment, Fisheries & Aquaculture Science (Cefas). He is also Senior Research Fellow at Queen's University Belfast and Honorary Lecturer at University of East Anglia, and serves on the editorial board of *The American Naturalist*.

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