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Autore	Rossberg Axel G. <1969->
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Nota di contenuto	Food Webs and Biodiversity: Foundations, Models, Data; Contents; Acknowledgments; List of Symbols; Part I: Preliminaries; 1 Introduction; 2 Models and Theories; 2.1 The usefulness of models; 2.2 What models should model; 2.3 The possibility of ecological theory; 2.4 Theory-driven ecological research; 3 Some Basic Concepts; 3.1 Basic concepts of food-web studies; 3.2 Physical quantities and dimensions; Part II: Elements of Food-Web Models; 4 Energy and Biomass Budgets; 4.1 Currencies of accounting; 4.2 Rates and efficiencies; 4.3 Energy budgets in food webs 5 Allometric Scaling Relationships Between Body Size and Physiological Rates 5.1 Scales and scaling; 5.2 Allometric scaling; 6 Population Dynamics; 6.1 Basic considerations; 6.1.1 Exponential population growth; 6.1.2 Five complications; 6.1.3 Environmental variability; 6.2 Structured populations and density-dependence; 6.2.1 The dilemma between species and stages; 6.2.2 Explicitly stage-structured population dynamics; 6.2.3 Communities of structured populations; 6.3 The Quasi-Neutral Approximation; 6.3.1 The emergence of food webs;

6.3.2 *Rana catesbeiana* and its resources

6.3.3 Numerical test of the approximation  
6.4 Reproductive value; 6.4.1 The concept of reproductive value; 6.4.2 The role of reproductive value in the QNA; 6.4.3 Body mass as a proxy for reproductive value; 7 From Trophic Interactions to Trophic Link Strengths; 7.1 Functional and numerical responses; 7.2 Three models for functional responses; 7.2.1 Linear response; 7.2.2 Type II response; 7.2.3 Type II response with prey switching; 7.2.4 Strengths and weaknesses of these models; 7.3 Food webs as networks of trophic link strengths; 7.3.1 The ontology of trophic link strengths

7.3.2 Variability of trophic link strengths  
8 Trophic Niche Space and Trophic Traits; 8.1 Topology and dimensionality of trophic niche space; 8.1.1 Formal setting; 8.1.2 Definition of trophic niche-space dimensionality; 8.2 Examples and ecological interpretations; 8.2.1 A minimal example; 8.2.2 Is the definition of dimensionality reasonable?; 8.2.3 Dependencies between vulnerability and foraging traits of a species; 8.2.4 The range of phenotypes considered affects niche-space dimensionality; 8.3 Determination of trophic niche-space dimensionality; 8.3.1 Typical empirical data  
8.3.2 Direct estimation of dimensionality  
8.3.3 Iterative estimation of dimensionality; 8.4 Identification of trophic traits; 8.4.1 Formal setting; 8.4.2 Dimensional reduction; 8.5 The geometry of trophic niche space; 8.5.1 Abstract trophic traits; 8.5.2 Indeterminacy in abstract trophic traits; 8.5.3 The D-dimensional niche space as a pseudo-Euclidean space; 8.5.4 Linear transformations of abstract trophic traits; 8.5.5 Non-linear transformations of abstract trophic traits; 8.5.6 Standardization and interpretation of abstract trophic traits; 8.5.7 A hypothesis and a convention  
8.5.8 Getting oriented in trophic niche space

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## Sommario/riassunto

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

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