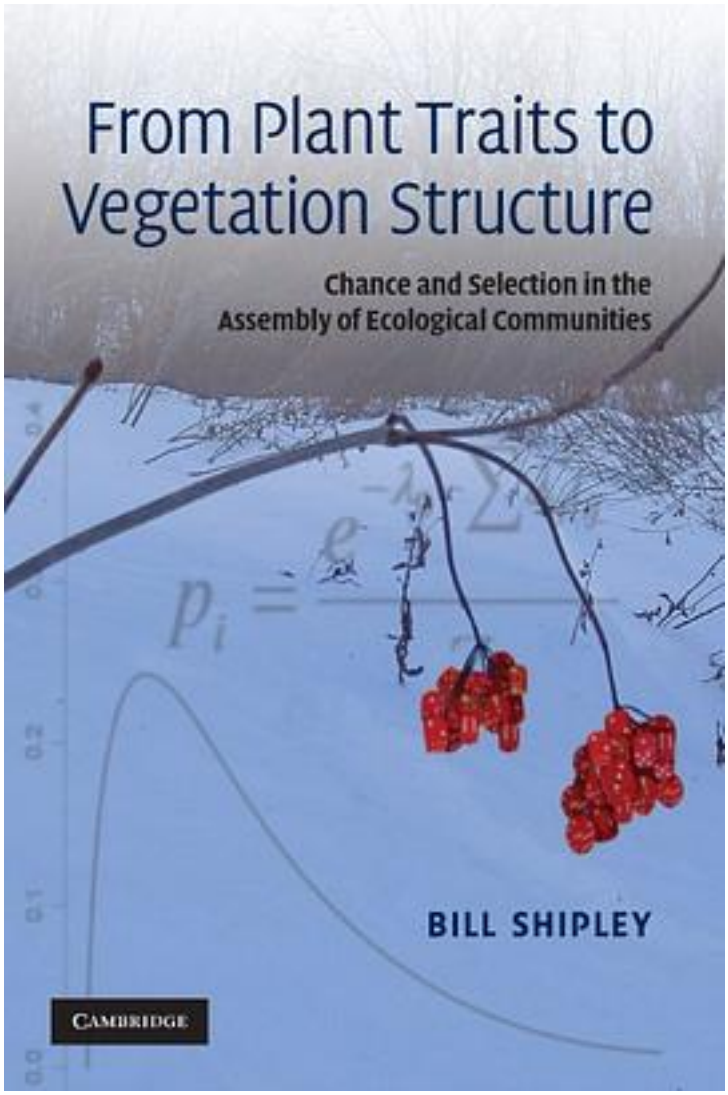
From Plant Traits to Vegetation Structure



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Plant community ecology has traditionally taken a taxonomical approach based on population dynamics. This book contrasts such an approach with a trait-based approach. After reviewing these two approaches, it then explains how models based on the Maximum Entropy Formalism can be used to predict the relative abundance of different species from a potential species pool. Following this it shows how the trait constraints, upon which the model is based, are necessary consequences of natural selection and population dynamics. The final sections of the book extend the discussion to macroecological patterns of species abundance and conclude with some outstanding unresolved questions. Written for advanced undergraduates, graduates and researchers in plant ecology, Bill Shipley demonstrates how a trait-based approach can explain how the principle of natural selection and quantitative genetics can be combined with maximum entropy methods to explain and predict the structure of plant communities.

作者介绍:

目录: Preface
Chapter 1: Introduction
Chapter 2: Population-based community assembly. This chapter compares and contrasts the trait-based model with the more traditional models based on population dynamics.
Chapter 3: Trait-based community assembly. This chapter reviews the notions and empirical results of looking at community assembly through the lens of plant traits rather than plant species.
Chapter 4: Bayesian statistics, information theory and the maximum entropy formalism. This chapter develops the mathematical background to the model.
Chapter 5: Community dynamics, natural selection and the origin of community-aggregated traits. This chapter develops the mathematical links between natural selection (breeder's equation), community dynamics and community-aggregated traits.
Chapter 6: A Mediterranean succession. This chapter presents an empirical application of the model to an old-field secondary succession.
Chapter 7: The statistical mechanics of species' abundance distributions. This chapter extends the model to show how species abundance distributions can be derived directly using the type of model developed in this book.
Chapter 8: Traits are not enough. This chapter considers under what conditions a knowledge of traits is not sufficient, and proposes how to combine aspects of neutral community theory with trait-based environmental filtering.
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标签

生态学

Ecology

评论

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书评

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