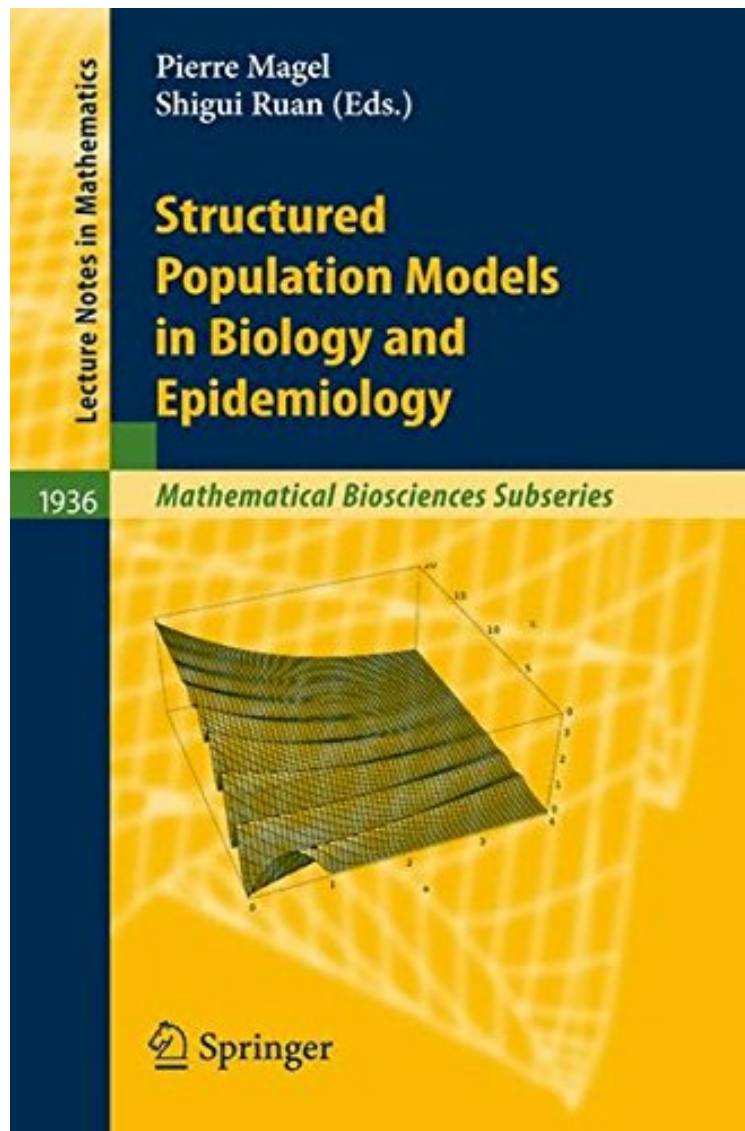


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Structured Population Models in Biology and Epidemiology (Lecture Notes in Mathematics)

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In this new century mankind faces ever more challenging environmental and public health problems, such as pollution, invasion by exotic species, the emergence of new diseases or the emergence of diseases into new regions (West Nile virus, SARS, Anthrax, etc.), and the resurgence of existing diseases (influenza, malaria, TB, HIV/AIDS, etc.). Mathematical models have been successfully used to study many biological, epidemiological and medical problems, and nonlinear and complex dynamics have been observed in all of those contexts. Mathematical studies have helped us not only to better understand these problems but also to find solutions in some cases, such as the prediction and control of SARS outbreaks, understanding HIV infection, and the investigation of antibiotic-resistant infections in hospitals. Structured population models distinguish individuals from one another according to characteristics such as age, size, location, status, and movement, to determine the birth, growth and death rates, interaction with each other and with environment, infectivity, etc. The goal of structured population models is to understand how these characteristics affect the dynamics of these models and thus the outcomes and consequences of the biological and epidemiological processes. There is a very large and growing body of literature on these topics. This book deals with the recent and important advances in the study of structured population models in biology and epidemiology. There are six chapters in this book, written by leading researchers in these areas.

From the Back Cover This book consists of six chapters written by leading researchers in mathematical biology. These chapters present recent and important developments in the study of structured population models in biology and epidemiology. Topics include population models structured by age, size, and spatial position; size-structured models for metapopulations, macroparasitic diseases, and prion proliferation; models for transmission of microparasites between host populations living on non-coincident spatial domains; spatiotemporal patterns of disease spread; method of aggregation of variables in population dynamics; and biofilm models. It is suitable as a textbook for a mathematical biology course or a summer school at the advanced undergraduate and graduate level. It can also serve as a reference book for researchers looking for either interesting and specific problems to work on or useful techniques and discussions of some particular problems.

About the Author Pierre Magal is an Associate Professor of Mathematics at the University of Le Havre, France. He received the Ph.D. degree (1996) in applied mathematics from the University of Pau, France and the HDR (2003) in applied mathematics from the University of Le Havre, France. His research interests include semigroup theory, population dynamics, and mathematical biology. Shigui Ruan is a Professor of Mathematics at the University of Miami, Coral Gables, USA. He received the Ph.D. degree (1992) in applied mathematics from the University of Alberta, Edmonton, Canada. He was a Junior Fellow at the Fields Institute, Toronto, Canada in 1992-1993 and a postdoctoral fellow at McMaster University, Hamilton, Canada in 1993-1994. From 1994 to 2002, he was an Assistant and Associate Professor at Dalhousie University, Halifax, Canada. His research interests are Differential Equations, Dynamical Systems, and Mathematical Biology.