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Ecological Genetics for the 21st Century

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Ecological Genetics. Leslie A. Real, editor. 1994. Princeton University Press, Princeton, NJ. 238 pages. $49.50 (cloth), $24.95 (paper).

In the spring of 1991, the University of North Carolina hosted a series of seminars on the topic of ecological genetics. Five distinguished researchers, Montgomery Slatkin, Sara Via, Michael Lynch, Janis Antonovics, and Joseph Travis, were each invited to present two talks: one a general overview of a research area in contemporary ecological genetics, and a second on a specific research topic. The ten chapters of *Ecological Genetics* are based on those presentations.

Ecological genetics uses the combined techniques of ecological fieldwork and laboratory genetics to study evolutionary processes in natural populations. The field, which had its inception in the 1920's with the work of researchers such as G. Turreson and J. H. Gerould, was defined by the publication of E. B. Ford's classic *Ecological Genetics* in 1964. The body of research catalogued by Ford, and much of the work published in the ensuing 30 years, documents the action of natural selection. Real's *Ecological Genetics* carries the field to new heights by expanding the definition of ecological genetics to include a comprehensive list of evolutionary forces acting in populations, including population structure, genetic drift of neutral alleles, and mating systems.

This book presents a modern, synthetic, exciting view of ecological genetics. In his introduction, Real briefly comments on the contributions each chapter makes to the field. The topics covered include gene flow and population structure, cladistic analysis of DNA sequence data, the evolution of phenotypic plasticity, population structure and local adaptation, neutral models of phenotypic evolution, ecological genetics of metapopulations, and ecological genetics of life-history traits.

Readers of *Ecological Genetics* should be familiar with modern topics in population genetics and evolutionary biology. The papers are well written but not always easy to read because of the complex subject matter. Readers will encounter subjects such as the norm of reaction, effective population size, mitochondrial DNA, isolation by distance models, and pleiotropic effects, with little explanation of their meanings. In contrast, in her description of experimental studies of local adaptation in pea aphids, Via presents a useful table that lays out complex analysis of variance (ANOVA) models and the meanings of the *F*-tests generated during the analysis. This table is likely to become a useful reference for students who use but are not fluent in the language of ANOVA.

The book is well suited for a graduate course or seminar for students with a strong background in population genetics. Students will be introduced to current theoretical issues, experimental research, and ideas for the future direction of the field. Professionals in the field also will benefit from the thorough presentations. The ideas should stimulate research in ecological genetics well into the next century.—*Bonnie S. Bowen, National Biological Service, Northern Prairie Science Center, Jamestown, ND 58401.*