———————— **Book review** ————————

Hedrick, Ph.W.: Genetics of Populations. Boston: Science Books International/New York: Van Nostrand Reinhold Comp. 1983. xvi + 629 pp., several figs. and tabs.

This new textbook on population genetics is designed for advanced undergraduates and beginning graduate students with some basic knowledge in genetics and evolution as well as mathematics and statistics. The author's aim is to coordinate empirical and experimental population genetics with theory. In particular, methods of estimation for population genetics parameters are discussed. A second main purpose for the conception of this book was to relate as much as possible population genetic models to the relevant aspects of evolutionary processes and to population ecology. Additionally, recent advances in molecular genetics have been integrated.

First, some comments concerning the classification and content of this book shall be given: It has been divided into 14 chapters covering all the well-known topics from population genetics. No details referring to these topics shall be given here in this review, a restriction to the chapter-headings (together with an enumeration of the separate sub-chapters) enables a sufficient insight into the content of the different chapters. Chap. 1: "The Diversity of Genetic Variation" (Electrophoretic Variation; Red Blood Cell Loci; Visible Polymorphisms; Chromosomal Variation; Mutants, Lethals, and Fitness Modifiers; Polygenic or Quantitative Traits). Chap. 2: "Measures of Genetic Variation" (The Hardy-Weinberg Principle; Different Frequencies between the Sexes; Estimates of Allelic Frequency; Testing Hardy-Weinberg Proportions; Measures of Genetic Variation; Measures of Genetic Distance and Identity). Chap. 3: "Mating and Reproductive Systems" (Inbreeding; Asexual or Apomictic Reproduction; Assortative Mating). Chap. 4: "Selection: An Introduction" (The Basic Selection Model; Relaxing Some Genetic Assumptions). Chap. 5: "Selection: Other Models and Estimation" (Fitness Components; Zygotic Selection; Sexual Selection; Gametic Selection; Fecundity Selection; Estimation of Selection). Chap. 6: "Selection: Ecological Models" (The Effect of heterogeneous Environments; Frequency-dependent Selection; Density-dependent Selection; Age-dependent Selection). Chap. 7: "Finite Population Size and Genetic Drift" (The Effect of Genetic Drift; Population Size and Absolute Density; Effective Population Size; Selection in Finite Populations). Chap. 8: "Migration and Population Structure" (Population Structure; Estimation of Migration and Population Structure; Selection and Migration; Population Structure and Finite Population Size). Chap. 9: "Mutation" (Types of Single-Gene Mutations; Allelic Frequency Change Due to Mutation; Mutation-Selection Balance; Estimation of Mutation Rates; Mutation in a Finite Population). Chap. 10: "Multiple Gene Models" (Gametic Disequilibrium; Factors Other than Selection Affecting Gametic Disequilibrium; Multilocus Selection; Genetic Hitchhiking; Estimation of Gametic Disequilibrium; Evidence of Gametic Disequilibrium; Estimation of Epistasis). Chap. 11: "Quantitative Traits and Evolution" (The Nature of Quantitative Variation; A Quantitative Genetics Model; Estimation of Genetic Variance and Heritability; Selection Experiments; Estimation of Selection in Natural Populations). Chap. 12: "The Maintenance of Molecular Variation and Molecular Evolution" (Theories of the Maintenance of Molecular Variation; Support and Evidence for Selectionism and Neutrality; Molecular Evolution; Regulatory Gene Adaptation). Chap. 13: "Population Genetics and Evolutionary Biology" (Adaptation; Speciation Models; Chromosomal and DNA Evolution; Sociobiology, Kin and Group Selection; The Evolution of the Genetic System; The Evolution of Ecological Factors). Chap. 14: "Population Genetics and Human Concerns" (Genetic Counseling; The Incidence of Genetic Disease; Population Genetics and Agriculture; Race and Intelligence). An extensive bibliography of approximately 750 titles provides the reader's possibility for further and extended studies. Additionally, a glossary gives a general definition for terms important in population genetics and some indices (index of symbols, author index, subject index) have been included at the end of this book.

Numerous examples using actual data to illustrate the concepts developed in the text have been incorporated throughout all the chapters. Each chapter ends with a compilation of problems and questions related to the discussion of the preceding chapter – with answers to the numerical problems given at the back of the book. Dealing with these questions and solving these problems would be a useful supplement to the content of the preceding chapter on the one side and an excellent test to prove one's understanding on the other side. Just because of these two final aspects: numerous examples using actual data illustrating the theoretical concepts and extensive lists of problems with solutions the present textbook can be used very effectively in courses on population genetics.

Finally, two brief appendices have been included: First, statistical and mathematical techniques and second, a series of computer programs to illustrate computer simulation of population genetics processes. But, in my opinion, these appendices are shortened to such an extent that they are almost worthless for practical use. Particularly, this proves right for the statistical and mathematical appendix.

The book has been written in a very informative and lucid style with a comprehensible concentration on the main ideas and deductions. The numerous tables are entitled with clear and descriptive headings. The same is true for the extensive number of figures. These have been carefully designed either by the author himself making frequent use of shaded regions or borrowed from other authors, for example Crow's unpublished three-dimensional representation of the 64 combinations of the genetic code and the resulting amino acids. The author succeeded in keeping the mathematics and statistics involved on a relatively moderate level.

There are many textbooks on population genetics available, but, in my opinion, the new book of Hedrick is one of the best. It can be recommended without any restriction for courses on population genetics for advanced undergraduates and beginning graduate students.

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