

Preface

I have for a number of years taught a course in population genetics for students interested in plant and animal breeding. The objective of the course has been to lay a foundation in population genetics for the concepts of quantitative genetics which are introduced in the last third of the course. I have not been able to find an appropriate text for this purpose.

For a quarter of a century, Falconer's *Introduction to Quantitative Genetics* has been the standard, and excellent, text in that subject. For my purposes, however, this text is not sufficiently detailed in the population genetics basis for quantitative theory.

A number of good texts in population genetics are available, of which Li's *First Course in Population Genetics* is didactically the best. But these texts are directed toward the genetics of natural populations, rather than domestic populations, breeding under human control. They also tend to treat quantitative genetics gingerly, if at all.

I have therefore developed the present text from my teaching notes.

The chapters of this book are labeled "Lectures". Each is intended to correspond approximately to the amount of material which can be covered in a 50-minute lecture. Divisions are, of course, dictated by the natural divisions of the subject matter, and the lectures are therefore not of uniform length. Nevertheless, in so far as possible, an attempt has been made to make the average length a lecture's worth.

Prerequisites for the course from which the book sprang are one course in genetics and one in statistical methods. Review lectures on basic genetic and statistical concepts have been included in the book, for review purposes.

Mathematical formulae engender in many people a near catatonic state of fright, making them impervious to the spoken or written word. There is no way to teach population and quantitative genetics without introducing algebraic expressions. As Earl Green points out in the first chapter of his *Genetics and Probability in Animal Breeding Experiments*, mathematical formulae are merely statements about mathematical relations among entities, written in a shorthand form. To emphasize this, formulae are incorporated into the flow of the discussion in the present text, though usually written on a separate line to enhance clarity. An attempt has been made to introduce formulae as gently as possible, and to explain fully what each means. For a biologist, after all, the importance of a formula is not its algebra, but the biological meaning of that algebra.

At the end of most lectures, one or two exercises have been introduced. Complete and detailed solutions for these exercises are given in an Appendix. The exercises are intended primarily to provide examples of the types of data to which the subject matter of the lecture applies, and to give the student the opportunity to manipulate such data. In a few cases, supplementary points about the theory are introduced via the exercises. The student should be encouraged to work out his own answers to the exercises before turning to the printed solution; this will enable him to gauge his progress in understanding the material.

Countless people have contributed to my understanding of population genetics and to the writing of this book. However, I owe a special debt of gratitude to:

Tom Doolittle and Jan Blackburn for the art work; the staffs of the Joan Staats Library at the Jackson Laboratory, Bar Harbor, Maine, and the Albert Mann Library at Cornell University, Ithaca, New York, for their invaluable assistance in finding references; Drs. Duwayne Engle of Southern Illinois University, Carbondale, and Wyman Nyquist, Purdue University, West Lafayette, Indiana, for reading and commenting upon the text; Dr. James F. Crow of the University of Wisconsin, Lansing, for his very detailed commentary; Dr. C. C. Li of the University of Pittsburgh, Pittsburgh, Pennsylvania, for his comments and encouragement; Dr. Dale Van Vleck of Cornell University for multiple acts of assistance: he introduced me to the publisher, sponsored my sabbatical leave at Cornell, during which most of the writing took place, and improved the text with his comments and suggestions; and to my wife, Maria, for her patience and her proof-reading skills.

Any virtues which this book may possess arise from their help; its faults are my responsibility.

DONALD P. DOOLITTLE