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Conservation and evolution

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Preface

In this book we attempt to bring together the genetic principles for the conservation of all forms of life, wild or domesticated, lions or lizards, oaks or orchids, cattle or ducks, rice or potatoes. The unifying factor underlying survival and adaptation, in time and in space, is genetic diversity; and the nature, distribution and preservation of genetic diversity is the central theme of this book.

Clearly, the subject itself is of immense diversity, and we attempt to present the underlying biological principles, irrespective of the diversity of breeding systems, life tables or ecological conditions and associations. Yet while we stress the essential unity of conservation genetics, the intensity of the human impact separates the domesticates from the mainstream of organisms which survive and reproduce within more or less natural communities of which they form a part. To a greater or lesser degree man provides an environment for domesticates in which to live, reproduce and die according to human precepts. He assembles and activates genetic diversity and is the arbiter in the evolutionary process. Yet the key to the system is the availability of the genetic building materials, the genetic resources, which alone make it possible to continue and advance the adaptive process on which evolutionary success, and indeed man's survival, depend.

Wild biota depend on their own genetic resources for survival and adaptation. Man can reduce or extend these resources, largely by manipulating the living space available to a species, but the scope for direct participation is limited indeed. Yet the principles derived from population and quantitative genetics govern sampling in domesticates and the minimal population size in nature reserves. Indeed, there are many cross-links. They are most patent in the preservation of the wild plants used by man in forestry or in pastures or range lands, and in the breeding of crops.

At first sight it may appear that this book really consists of two books, one dealing with wild biota (chapters 2–5), the other with domesticates (chapters 8–10), with the zoological and botanical gardens (chapters 6 and 7) in between. The difference is not restricted to the subject, wild versus domesticated, but extends to the treatment. In the former, no comprehensive

statement had been available. The issue of a genetic component of nature conservation had been raised (Frankel, 1970b) but not fully examined. On the other hand genetic conservation of domesticated plants – though not of animals – had been the subject of two books (Frankel and Bennett, 1970b), and Frankel and Hawkes, 1975) and while we raise and discuss many aspects which previously had not been considered, this book consolidates concepts and principles which had been examined previously. Hence the second part contains a good deal of detailed discussion of techniques and procedures which would not have been possible in the first part.

The book is the result of joint planning, and all chapters bear the marks of consultation, critical exposure, and constructive comment. However, chapters 2–6 are mainly the work of M.E.S., chapters 7–10 that of O.H.F.

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