An Introduction to Molecular Ecology

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Preface

What is molecular ecology? As a new scientific discipline, the subject has become increasingly well known in recent years but there have been few attempts at formal definition. Indeed there are those at both ends of the biological sciences spectrum, ecologists and molecular biologists alike, who remain sceptical that molecular ecology is a discrete discipline at all. To those familiar with the history of biochemistry there is a sense of *déjà vu* about this debate. A century or so ago, strongly held opinions were voiced by both physiologists and chemists that 'physiological chemistry' (later to become biochemistry) was a spurious hybrid science that should be strangled at birth. How wrong they were. With the benefit of hindsight we can appreciate how the emergence of biochemistry as a mainstream discipline revolutionized our understanding of the natural world. Only time will tell as to whether molecular ecology will enjoy comparable success, and at this early stage in its history a fully satisfying definition remains elusive.

Molecular ecology as we know it today did not really exist before the mid-1980s, although its foundations go much deeper. The subject area currently encompasses a wide range of research topics including population and evolutionary genetics, behavioural ecology, microbial ecology, conservation biology, the identification and assessment of species diversity, and the release of genetically modified organisms into the environment. Molecular ecology therefore brings together aspects of many sciences including molecular biology, ecology, evolution, behavioural biology, and genetics. The emergence of molecular ecology is clearly reflected in meeting agendas and learned journals, those central bastions of scientific culture. Thus the British Ecological Society, established in 1913 and the oldest ecological society in the world, held a conference on *Genes in Ecology* at the University of East Anglia in 1991. The Spring of 1992 witnessed publication of the subject's first dedicated journal, *Molecular Ecology*. By 2001 this journal expanded to 12 issues a year covering more than 2800 pages, enjoyed among the highest impact ratings of all ecology journals, and had spawned a sister publication *Molecular Ecology Notes*. Examples of molecular ecological research now appear regularly in almost every ecological, behavioural, and conservation biology journal as well as in mainstream evolution and genetics publications. Another sign of the success of molecular ecology has been the recent development of an important sub-discipline, conservation genetics, with its own conferences and another new journal *Conservation Genetics*. There have also been books that deal with various aspects of molecular ecology, but none that cover the topic in its

broad sense at a level suitable for undergraduates or graduates new to the subject. This is the role we hope the present volume will fulfil.

This book contains a glossary in which terms that may be unfamiliar to the reader are defined, and an extensive bibliography where original papers and reviews relating to the main topics of molecular ecology can be found. There are also two appendices that outline the major practical and theoretical aspects of the subject.

There is every reason to expect that molecular ecology will continue to grow for the foreseeable future, and increasingly penetrate important areas such as quantitative genetics and adaptive variation. We may still be at too early a stage for clear definitions, but the excitement of molecular ecology is real enough.

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