



# Molecular Markers, Natural History, and Evolution

By John C. Avise

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Molecular markers have opened exciting new windows through which to view the natural biological world. This treatment addresses the many applications for genetic markers (from polymorphic proteins and DNA) from the perspectives of population biology, behavioral ecology, organismal evolution, and phylogeny. Opening chapters review the history and purview of molecular approaches, and compare and contrast various laboratory techniques for revealing molecular markers. Subsequent chapters review the extensive scientific literature of molecular ecology and evolution, and describe a cornucopia of captivating discoveries about nature's workings, past and present. The book is taxonomically balanced with numerous examples from plants, animals, and microbes. It is also temporally balanced with examples ranging from assessments of genetic parentage and kinship in the most recent generations to phylogenetic assessments deep in the Tree of Life (and nearly everything in-between). This Second Edition of a seminal work (first published in 1994) brings the reader up-to-date on the many dramatic advances and insights made over the last decade. Furthermore, by retaining descriptions of many pioneering works, this book also traces the empirical and conceptual roots of each subject, and thereby provides a rich sense of the field's history. Appropriate for advanced undergraduates, graduate students, and scientists in such disciplines as ecology, genetics, population biology, ethology, molecular biology, systematics, and conservation biology, this new edition is for anyone interested in the application of molecular markers to organisms in the wild.

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#### Review

...a splendid and timely overview of the impact of molecular techniques on traditional biology --New Scientist

This book will continue to be the reference for graduate students and experienced researchers in the field of molecular evolutionary biology for years to come. With admirable clarity and astonishing breadth and depth, Avise authoritatively reviews the seemingly exponentially increasing literature in fields ranging from molecular phylogenetics and phylogeography to conservation biology and population genetics, some of which the author has shaped and even invented himself. --Axel Meyer, *The Quarterly Review of Biology*

This excellent book is suitable to incite the interest of undergraduate and graduate students for the use of molecular markers. It is also highly useful for experienced researchers to broaden their knowledge and gather ideas beyond their immediate area of expertise, and it is definitely a treasure chest for university teaching. --Dirk Redecker, *Écoscience*

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#### About the Author

John C. Avise is Professor of Genetics at the University of Georgia, USA. His educational background includes a B.S. in Natural Resources from the University of Michigan, an M.A. in Zoology from the University of Texas, and a Ph.D. from the University of California at Davis. His research centres on natural history, ecology, genetics and the evolution of animals in nature, primarily as revealed by molecular markers. He is currently President of the Society for Molecular Biology and Evolution and he has also served as President of the Society for the Study of Evolution and the American Genetic Association. He is an elected

member of both the National Academy of Sciences and the American Academy of Arts and Sciences.

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