Hvid, S.; Nielsen, G. (1977): Esterase isoenzyme variants in barley. Hereditas **87,** 155–162
Johansson, H. (1969): Multiple forms of enzymes in rye (Abstr.). Hereditas **63,** 458
Kahler, A.L.; Allard, R.W. (1970): Genetics of isoenzyme variants in barley. I. Esterases. Crop Sci. **10,** 444–448
Schmidt-Stohn, G. (1979a): Eine Methode zur isoelektrischen Fokussierung von Proteinen in Flachgelen für Serienuntersuchungen in der Genetik und Züchtungsforschung. Z. Pflanzenzücht. **83,** 81–90
Schmidt-Stohn, G. (1979b): Genetische Analysen von Esterase-Loci beim Roggen (*Secale cereale* L.) mit Hilfe der isoelektrischen Fokussierung in Flachgelen. Z. Pflanzenzücht. **83,** 155–162
Schwartz, D. (1960): Genetic studies on mutant enzymes in maize: synthesis of hybrid enzymes by heterozygotes. Proc. Natl. Acad. Sci. USA **46,** 1210–1215
Shaw, C.R. (1969): Isozymes: classification, frequency and significance. Int. Rev. Cytol. **25,** 297–332
Tanksley, S.D.; Rick, C.M. (1980): Genetics of esterases in species of *Lycopersicon*. Theor. Appl. Genet. **56,** 209–219
Wricke, G. (1969): Untersuchungen zur Vererbung und Selbstfertilität beim Roggen (*Secale cereale*). Theor. Appl. Genet. **39,** 371–378

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Book Reviews

Hecht, M. K.; Wallace, B.; Prance, G. T.: Evolutionary Biology. Vol. 14. New York, London: Plenum Press 1982. i–xiii + 445 pp., several figs., several tabs. Hard bound $ 39.50.

This volume 14 of the well-known series "Evolutionary Biology" (edited by M. K. Hecht, B. Wallace, and G. T. Prance) turns out to be in line with the general objectives and standards of these publications: To provide a stimulating and critical forum for extensive review articles, commentaries, original papers concerning essential new results and controversies in evolutionary biology.

Usually these different contributions are given by leading experts from a variety of biological disciplines. But the basic idea of showing the coherence of all the different topics has been always focussed on the conviction that evolution represents a unifying principle in the life sciences. Therefore data from studies of man, animals, plants and microorganisms had been included simultaneously.

The present volume 14 proves to be in accordance with these aspects and requirements. But nevertheless some critical comments must be assigned. But before, we will give some references to the classification and content of the book, which contains a collection of the following six papers: 1. Genetic Relationship and Evolution of Human Races (M. Nei and A. K. Roychoudhury).

The study of the evolution of human races by using measurements of genetic distance between populations requires gene frequency data from many loci. Several years ago Nei and Roychoudhury (1972, 1974) analysed the three major races of man (Caucasoid, Negroid and Mongoloid) applying Nei's new measure of genetic distance. Because in the past five years the amount of gene frequency data has almost doubled the authors have reanalyzed the degree of genetic differentiation among the three major races of man using updated data. Additionally the analysis has been extended to various other races to get some insight into the pattern of racial evolution in man. The major purpose is to understand the genetic relationship and evolution of human races on a global basis. Therefore almost no attention has been paid to the genetic differentiation of local populations within races. The authors are interested in relating the extents of genetic differentiation of representative human races in five major geographic areas on earth.

2. Classifications of Selection-Migration Structures and Conditions for a Protected Polymorphism (S. Karlin).

It is a basic idea in evolutionary biology that levels and forms of genetic variability can be related to temporal and spatial patterns of environmental heterogeneity. In studying genetic polymorphisms under conditions of variable selection and migration three major classes of migration patterns have been used in theoretical population genetics (island model, stepping-stone model, migration matrix model). In this article the author gives a general classification and discussion of migration structures to study the effects of different types of spatially and temporally varying selection regimes associated with migration patterns on the existence and properties of polymorphisms. The conditions for the existence of a protected polymorphism (no allele becomes extinct even when initially rare) have been established for a hierarchy of migration patterns.

3. Regulatory Mutations and the Development of New Metabolic Pathways by Bacteria (R. P. Mortlock).

In this paper the author gives an extremely thorough and comprehensive description of new experimental results concerning microbial evolution based on Horowitz' original idea that new metabolic pathways might have arisen by a process of 'retrograde evolution'. Many of these experiments challenging microorganisms to acquire new metabolic abilities under laboratory conditions have been done using specific bacteria known to be versatile in their existing abilities to utilize a wide variety of substrates as carbon and energy sources for growth. Such studies have shown the great importance of mutations in regulation if new compounds are to be metabolized by the cells.

The final papers 4, 5 and 6 deal with different topics from the evolution and genetics of Drosophila:

4. The Yeast Flora Associated with the Decaying Stems of Columnar Cacti and Drosophila in North America (W. T. Starmer, H. J. Phaff, M. Miranda, M. W. Miller, and W. B. Heed).

The decaying stems of columnar cacti provide habitats for yeasts and drosophilae (Flies: using the yeast-rich necroses for feeding and breeding; yeasts: dependency on the flies for dispersal). This ecological system is amenable to the study of evolution, ecology and adaptation and an investigation of host-plant-relationships. The present paper deals with the realignment of the results of the extended survey of the cactus yeast community (1976 – expedition to the Baja California peninsula of Mexico) with the present state of the taxonomy and present data pertinent to the ecology and evolution of cactus-inhabiting yeasts.

5. Evolutionary Ecology of Australian Drosophila (P. A. Parsons).

This paper gives an extensive species analysis of Australian Drosophila. The endemic Drosophila fauna is largely restricted to rain forests, where environmental stresses are minimal compared with habitats outside. But in the temperate south with lower heat stresses flies occur in undisturbed damp habitats. Many well-known theoretical facts from general evolutionary theory can be experimentally confirmed in this special field, for example: The Drosophila fauna's dependence upon a series of gradients: climates, soils, the floristic characteristics of forests and hence resources or the decrease of the average geographic range of a species comprising a community with increasing community-diversity.

The detailed species descriptions (using numerous qualitative as well as quantitative characteristics) are based upon a large number of field collections carried out over the period 1974–1980.

6. Behavioral Biology and Evolution of the Hawaiian Picture-Winged Species Group of Drosophila (H. T. Spieth).

The picture-winged species group of Hawaiian Drosophila consists of 106 species, which can be divided by the aid of male-genitalia-morphology and the polytene chromosomes into 11 subgroups each of which is descended from a single ancestral population. In this paper the author gives a detailed description of each of these subgroups successively including the topics: behavior and biology of the subgroups, history of the subgroups, geographical origins of the subgroups and sites and rates of speciation. The major part of the paper deals with the behavior and biology of the subgroups. For each subgroup this discussion has been concentrated on the following headings: agonistic behavior; lek behavior; male secondary sexual characters; ovipositional behavior; basic courtship pattern and evolutionary history.

After reviewing the main contents of this Volume 14 of 'Evolutionary Biology' some critical remarks shall be added: First a minor and formal comment: Some of the articles (Mortlock, Spieth) are written without any summary. As we know from experience this will be a remarkable disadvantage with regard to several aspects. Second, all the articles are extremely specialized in such a way that only a relatively small number of experts working in just the same specific field would be able to follow them completely. For example, Karlin's paper can be only read by a mathematician and statistician with special knowledge and experiences in population genetics. For all other research scientists with an interest in evolutionary biology coming from a variety of biological disciplines like anthropology, biochemistry, developmental biology, ecology, genetics, molecular biology, paleontology, physiology, demography, plant and animal breeding this paper's interesting results would remain inaccessible.

These considerations mentioned above with regard to Karlin's paper are also valid in a completely analogous manner for the three Drosophila-articles and the paper on new metabolic pathways.

Only the article by Nei and Roychoudhury must be excluded from this criticism. The authors present an excellently written paper understandable to all readers with an interest in evolutionary biology without going into mathematical and statistical details concerning genetic distances and the construction of evolutionary trees.

These critical comments, however, should in no way narrow the value of this recommendable collection of relevant papers from evolutionary biology. It is greatly welcome for all specialists working in just the same specific fields of research. But in my opinion all other readers with a general interest in evolutionary problems would hardly profit very much by studying this volume.

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