

Book reviews

Ecology and Evolution of Darwin's Finches. Peter R. Grant. Princeton University Press, Princeton, NJ. 2000. Pp. 492. Price £14.50, paperback. ISBN 0 691 04866 5.

Being old enough to remember the era of vinyl record albums, in which record companies often repackaged the same songs in reissues which usually differed only in the album cover, I was transported back to those days by this book. Not because Peter Grant has suddenly become a country-and-western singer, but because Princeton University Press has copied the recording industry's tactics of the 1970s by reissuing his 1986 classic book on Darwin's finches, complete with new cover and the equivalent of 'liner' notes in a foreword by Jonathan Weiner.

The prominent billing of Weiner on the cover might lead the cynic to conclude that the Press reissued this book in part to try to cash in on the popular success of Weiner's *The Beak of the Finch* (Knopf, 1994), an account of Peter and Rosemary Grant's research written for a lay audience. This edition differs from the original only in having Weiner's three-page foreword (mostly taken from his book) and a new preface and 'afterword' by Grant. The afterword is written as a supplement to revise, correct, or elaborate on points in the original book, based on the Grants' and others' continuing research on the Darwin's finches. Being positioned in the back of the book, it requires a lot of flipping back and forth to find the original text and then match it with the relevant passages in the afterword. Only 24 pages in length, the afterword is too brief to fully discuss the many interesting issues it raises, although much of the updated information does not seem to appreciably alter the general conclusions in the original edition.

The new text does serve as a handy guide to the newer work on Darwin's finches that has appeared in the 13 years since the 1986 book was published. The first edition of *Ecology and Evolution of Darwin's Finches* was a classic study of evolutionary mechanisms at work in the Galapagos and how those mechanisms interacted with ecology to produce the fascinating diversity among this group of birds. This work continues to have a major impact on our understanding of microevolutionary processes. In Grant's added text in this edition, the following new empirical advances stand out. A molecular phylogeny of the Darwin's finches is now available, and it suggests that the group's mainland ancestor was a grassquit, possibly in the genus *Tiaris*. This work has also led to the splitting of the warbler finch clade (*Certhidea*) into two species, resulting in an increase from 14 to 15 of species of Darwin's finches. The group is much older than originally believed, with evolution within the group occurring over periods of time at least three times longer, and perhaps as much as seven times longer, than initially thought. The ancestral finches apparently fed on arthropods and berries, with seed-eating and associated heavier bills coming later. Additional field work has uncovered more examples of hybridization between species; in the

original book, Grant was unsure whether such hybrid offspring were at a disadvantage and thus whether hybridization was costly. Now it is known that hybrids survive and breed as successfully as non-hybrids, leading to the conclusion that there is no genetic incompatibility that weakens them. Grant suggests that speciation involves the origin of pre-mating barriers to gene exchange (song is important), with postmating (genetic) barriers arising only much later when interbreeding has ceased.

The classical view of evolution in the Darwin's finches (and endorsed by Grant in the first edition) is that of a Galapagos archipelago with numerous niches just lying there waiting for the arrival of the first colonists, which then blossomed into an extraordinary array of species. In the new text, Grant paints a much different picture. Palaeoclimatic data suggest that the Galapagos underwent repeated periods of temperature and wet-dry fluctuations, with resulting changes in the altitudinal distribution of vegetation. The first finches encountered a different and more restricted environment than the present one, and it gradually changed. Finch evolution occurred in response to climatically driven changes in addition to differences among islands in vegetation and food supply, and additional islands appeared. The discovery of substantial environmental change during the period of finch diversification is the single most important new result since the first edition of the book, in my opinion, and Grant highlights the need to better reconstruct palaeoenvironments as a key challenge in the future.

While a purist might wish for a completely revised edition of this book, having this 'annotated' reissue is the next best thing, as this will hopefully increase its odds of reaching a new generation of students of evolutionary biology. If you own the original, buying the reissue for the new 24 pages might not be cost-effective, but if you own neither and have any interest at all in evolution at any level, this book is essential reading.

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Techniques in Animal Cytogenetics. Paul Popescu, Hélène Hayes and Bernard Dutrillaux (eds). Springer Verlag, Heidelberg. 2000. Pp. 229. Price £44.50, hardback. ISBN 3 540 66737 7.

This book covers a wide range of techniques in cytogenetics from basic chromosome preparation from easily accessible tissues of man, other mammals, birds and *Drosophila*, through comprehensive banding techniques and *in situ* hybridization, preparation of meiotic chromosomes and amphibian lampbrush chromosomes to flow cytometry of mammalian chromosomes. Each chapter has some accompany-