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Book Review

How and why do birds migrate?

Berthold, P., Gwinner, E. & Sonnenschein, E. (eds.) 2003: Avian Migration. — Springer. 610 pp. (ISBN 3540434089; € 168)

The study of avian migration has proceeded rapidly since the founding of Vogelwarte Rossitten, the first ornithological-biological observation station in the world, situated on the south-eastern coast of the Baltic Sea. Johannes Thienemann started the large-scale bird-ringing there in 1903, and the first experimental studies on the orientation of migratory birds by releasing marked birds in the 1930s. After the Second World War research expanded into new directions such as radar ornithology, ecophysiology and hormonal control mechanisms, studies of evolution, genetics, telemetry, etc.

The research on migration of birds has grown extremely rapidly during the recent decades, and in spite of international symposia and conferences, and several books on the various topics of this field of ornithology, one feels that research goes on more and more rapidly, and the books are out of date even at the time of publication.

A conference on all aspects of modern migration research was held in 2003, commemorating the 100th Anniversary of the Vogelwarte Rossitten, which started its activities anew in 1946 in a new site, southern coast of the Lake Bodensee, southern Germany. The main lectures of this conference have been published in this most modern review of bird migration.

The first theme covers evolution of migration, genetics and related behavioural aspects. Andreas Helbig reviews phylogenetic and biogeographic perspectives on the evolution of bird migration. Wolfgang Fiedler writes on recent changes in migratory behaviour of birds, based on field observations and ringing data. John Rappole and Karl-L. Schuchmann report their studies on ecology and evolution of hummingbird population movements and migration. Francisco Pulido and Peter Berthold describe quantitative genetic analysis of migratory behaviour.

Although the physiology and ecophysiology of migration has been studied for decades, new laboratory methods have allowed more detailed studies on them. Articles of this second topic include e.g. circannual and cirdadian contributions to the timing of migration by Eberhard Gwinner and Barbara Helm, life history and ecophysiological adaptations to migration in Australian birds by Ursula Munro, and a review on behavioural and physiological reactions to environmental variation in bird migration by Lukas Jenni and Michael Schaub.

Bird structure indicates in many ways adaptations to the migratory life. In the third section Bernd Leisler and Hans Winkler review morphological consequences of migration in passerines. Ian Newton discusses geographical patterns in bird migration, and Marcel Klaassen writes on relationships between migration and breeding strategies in Arctic birds, among others.

Strategies of migration, stopover biology and nutrition is the topic of the fourth section, starting with Thomas Alerstam's review on the speed of migration. Five other researchers present their views on energy metabolism and nutritional strategies in various types of migratory birds.

The next section includes seven articles on modern research approaches, techniques and conservation of migratory birds. Radar seems to play an important role in the modern study, including the orientation of pelagic birds in their extreme environments (by Francesco Bonadonna and others).

The last section of the book reviews newest results on the orientation and flight of migratory birds. Roswitha and Wolfgang Wiltschko have studied the mechanisms of navigation for decades. Susanne Åkesson reports interesting new experiments on long-distance navigation, and Roland Sandberg discusses the relationship between stored fat and migratory orientation. This and other sections have also several other well-written and concise reviews of more or less detailed problems in avian orientation and flight.

The articles of the book are well written and concise, as well as fairly easily understandable for all interested in bird research, with short summaries and conclusions. The references show clearly the original sources of knowledge, and much of the original data has been presented in tables and diagrams. Some of the articles deal with more narrow themes than the others, but the general titles cover most aspects of questions the reader may imagine of migration. The first article by Helbig indicates that migratory birds may be fairly adaptable to man-made rapid environmental changes, including climatic warming, which is good news for those worrying the future fate of especially long-distance species.

In summary, the book is the best review of what is known on bird migration at present. The editors have done a marvellous job by compiling this book on migration in a concise manner. Migration is a strategy of bird life raising more questions among the lay persons than perhaps any other part of the avian annual cycle. However, for them (or even for keen amateur bird-watchers), the descriptions of methods and hypotheses may be too technical. A more introductory, thought-provoking and general description of migratory birds could have raised even more interest in *Avian Migration*.

Pertti Koskimies