



*Hornero* 28(1):39–40, 2013

## MIGRATION ECOLOGY OF BIRDS

---

NEWTON I (2008) *The migration ecology of birds*. Academic Press, London. 984 pp. ISBN: 978-0-12-517367-4. Price: US\$ 160 (hardback)

---

For centuries, bird migration captivates people's curiosity and has been leading huge research efforts to untangle the mechanisms underlying this phenomenon. After years dedicated to research the ecology of migratory raptors and finches, Ian Newton has become an authority on the subject. This is only part of his background and enough reason to consider his book a landmark on bird migration ecology.

There are a number of previous publications on bird migration, yet this is the first of its kind with a simultaneously broad and deep ecological approach. Newton's long-standing experience on bird migration ecology allowed him to weave uncountable examples from worldwide species and migratory systems with each theoretical aspect he discuss along the book. It is noteworthy he intentionally provides precise amount of details to ensure understanding of the theories as well as to tempt the reader to look out for complementary information in the literature, starting with the gigantic list of about 2500 references cited along the book. From my point of view, this strategy not only ensures easy understanding, but also makes a pleasant and fruitful reading.

This piece of work of almost 1000 pages is arranged in five sections and 28 stand-alone read chapters. The book starts by introducing basic terminology and concepts, and some field and laboratory techniques most used to study bird migration. Besides, it is complemented by a broad glossary at the end. Chapters 3–10 (section 1) are on "the migratory process" itself and present the mechanisms underlying the migratory behaviour and strategies birds use to perform such incredible journeys. This section deals on sub-

jects such as the strategies surrounding the flight itself and the influence of weather and energetics (physiology, morphology, and behaviour) on the migratory journey. Moreover, Newton describes here some of the most incredible long-distance migrations to the reader, plus a special chapter on raptor's migration and an ecological review on orientation and navigation skills of migrants.

Section 2 ("the timing and control of migration") is the shortest one and mainly presents the physiological aspects of migration. Its first chapter (chapter 11) is a major review on annual cycle of migrants (e.g., molting, breeding, and migratory schedules) and is followed by a chapter that details the mechanisms controlling the migratory behaviour. In chapter 12, Newton presents findings from field and laboratory studies, providing an integrative approach of both environmental and endogenous factors (including hormonal) related to various stages of the annual cycle of migrants (e.g., spring and autumn migration, and breeding).

Chapters 13–19 compose the third and largest section of the book, focused on the "large scale movement patterns". It starts with a very holistic comparison of migration among hemispheres, with an interesting review on migration within the Southern continents, plus latitudinal and altitudinal migration worldwide. Then, the book follows with a discussion on arrival dates of migrants to the breeding areas, focusing especially on the consequences of early and late arrivals. Chapter 15 goes along how age, sex, dominance behaviour, and body size can affect birds' migratory patterns and behaviour within species. The next chapter presents a miscellaneous of movement behaviours somehow connected to migration. It starts with a discussion on a well-known behaviour called "molt migration" followed by an introduction to some less common ones, such as the "itinerant breeding behaviour" of

some multi-brooded species. The next topic in this chapter is dedicated to within non-breeding season movements and reasons leading to it: food availability, weather conditions, and natural/human environmental disturbances. The chapter ends up with a brief discussion on nomadic movements, which are thoroughly addressed in further chapters. Chapter 17 briefly reviews the existing knowledge, to that time, on site-fidelity and its costs and benefits to the migrant. Moreover, it presents and gives plenty of examples on natal and breeding dispersal, an important ecological aspect for migratory bird conservation. As stated previously, chapters 18 and 19 deal with nomadic movements (i.e., irruptive migrants). The reader will find in there a number of examples and results of previous studies focusing on this unique migratory movement, plus a discussion on the environment and endogenous factors as drivers of such behaviour. Since there are some major groups of irruptive birds, the author discusses the movements of seedeater species in chapter 18 and large predators and waterfowl in chapter 19.

In the fourth section of the book ("evolution of movement patterns"), Newton discusses the external and internal adaptations that birds developed to perform migratory journeys in chapter 20. Moreover, he also presents and discusses data on the origin of partial migration and roles of genetics on migration control. Considering "migration is a dynamic phenomenon, subject to continual change in response to prevailing conditions", chapter 21 contains various examples of changes in migratory behaviour. Then, a discussion on their causes and consequences is followed by an interesting discussion on how selection could act along the years on such altered behaviours and lead to a genetic incorporation of such changes. Following, Newton discusses the underlying influences of biogeographical events on migration. For instance, he shows how past glaciation events explain some current migratory patterns (e.g., partial and loop migration and the existing routes between distant wintering and breeding grounds) and highlights how gradual behavioural changes can explain them. Closing this section, chapter 23 presents multiple examples of "distribution patterns", focusing mostly on migrants' latitudinal and longitudinal distribution, and connecting it with the many

existing migratory strategies (e.g., leap-frog, and chain migration). To explain the geographical occurrence patterns of closely related species and populations, competition and resource availability are some of the background theories and aspects considered.

In the last section of the book ("migration system and population limitation"), the first chapters are dedicated to some of the main known migratory systems: the Palearctic–Afrotropical and the Asian–Australasian (chapter 24), and the Nearctic–Neotropical (chapter 25). Both chapters present descriptions of the species, the geography, and general ecological aspects of the main wintering and breeding areas that compose each system. They also contain a discussion on the occurrence and causes of population declines in each system, but this subject is deeply discussed in the next two chapters as populations of migrants can be limited by a number of variables. While chapter 26 focuses on the influences of the conditions faced by migrants at the breeding and wintering areas, chapter 27 emphasizes the stopover sites and the migratory journey itself. As usual in the whole book, many examples, case studies, and graphs of conceptual models are provided to illustrate the subjects under discussion. Finally, chapter 28 presents additional information on the costs of migration by addressing situations that can cause mass mortality of migrants, such as natural (climatic) phenomena and human-induced events.

Overall, I consider Ian Newton wrote a masterpiece on bird migration ecology. The lack of examples and theories developed using South American birds and the Neotropical–Austral migratory system as models might be disappointing to readers interested on bird migration within South America. However, I consider the book as one of the greatest stimulus for local researchers to join forces, establish collaborative research, and collect good data and analyze it to put to the test the existing theories and hypotheses on bird migration discussed along the book.

ANDRÉ DE CAMARGO GUARALDO

*Laboratório de Ecologia e Conservação de Aves,  
Depto. Zoologia, Universidade de Brasília  
Campus Darcy Ribeiro, 70910-900 Brasília DF, Brazil  
ac@guaraldo.bio.br*