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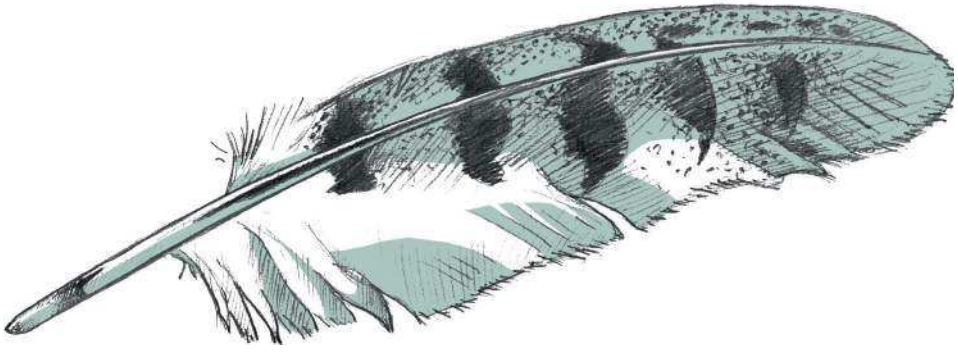
Barn Owls

With heart-shaped face, buff back and wings, and pure white underparts, the barn owl is a distinctive and much-loved bird that has fascinated people from many cultures throughout history. How did the barn owl colonize the world? What adaptations have made this bird so successful? How is the increasing impact of human disturbance affecting these animals? Answering these questions and more, Alexandre Roulin brings together the main global perspectives on the evolution, ecology and behaviour of the barn owl and its relatives, discussing topics such as high reproductive potential, physiology, social and family interactions, pronounced colour variation and global distribution. Accessible and beautifully illustrated, this definitive volume on the barn owl is for researchers, professionals and graduate students in ornithology, animal behaviour, ecology, conservation biology and evolutionary biology, and will also appeal to amateur ornithologists and nature lovers.

Alexandre Roulin is a professor of biology at the University of Lausanne, Switzerland. For three decades, he has studied barn owls to answer evolutionary and ecological questions. His main scientific interests are the adaptive function of melanin-based colouration and negotiation processes taking place in animal societies. Since 2009, he has actively participated in a project that harnesses ecology and farming to promote reconciliation between Israeli, Palestinian and Jordanian communities through nature-based solutions. He strives to reconcile humans with nature and supports interdisciplinary approaches promoting peace and respect for the environment.



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In memory of the late Martin Epars

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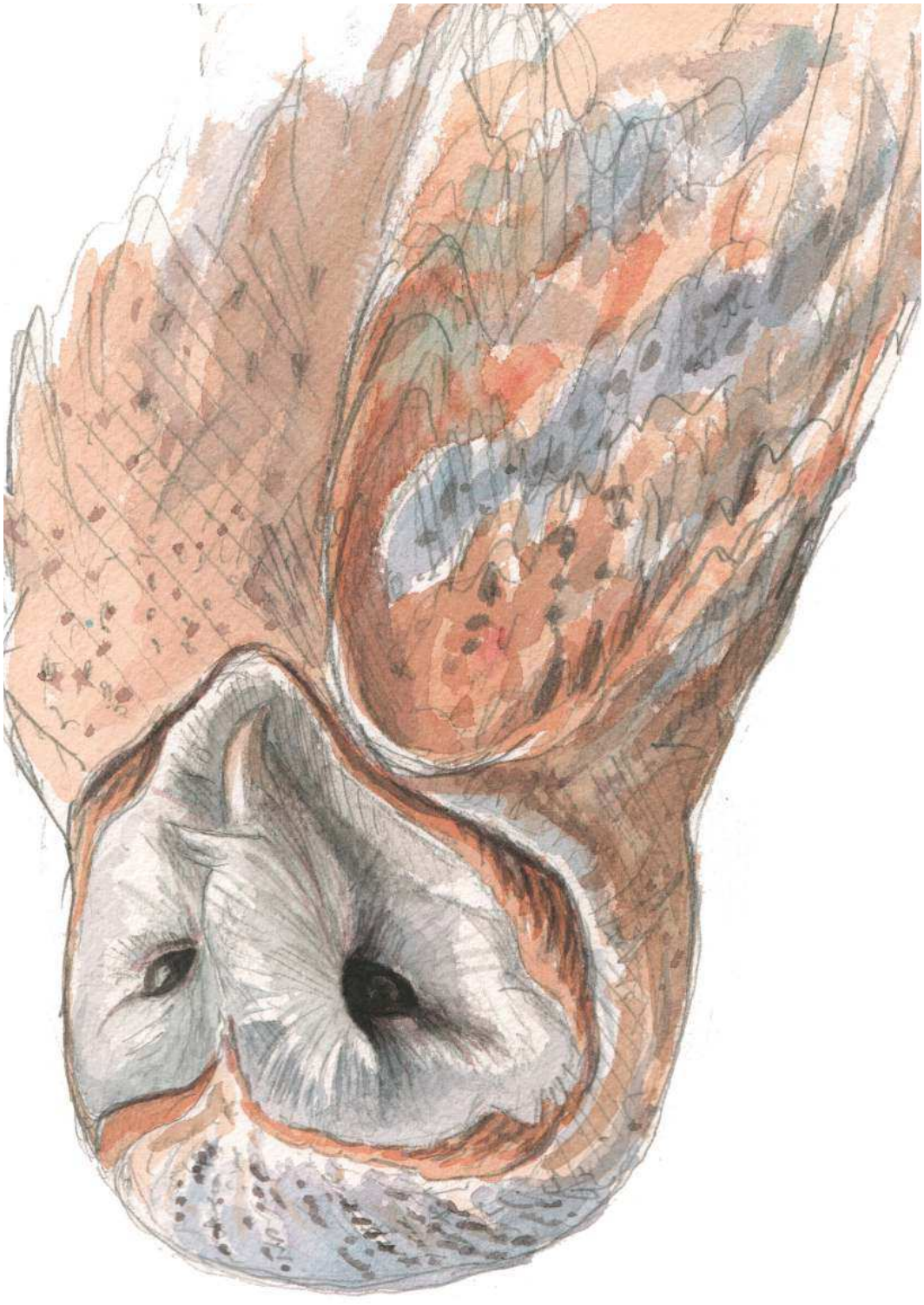

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Evolution and Ecology

ALEXANDRE ROULIN
University of Lausanne, Switzerland

Artwork by Laurent Willenegger

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Grass owl in Taiwan, November 2014. © Yi-Shuo Tseng

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FOREWORD

Large owls are top predators that are often portrayed as magnificent, regal and powerful, while smaller owls are considered handsome and cute. Therefore, members of the public are interested in owls not only in the wild but also as pet animals.

Both large and smaller owls capture mainly small mammals, particularly mice, rats and voles. These rodents are considered pests, because they damage crops on agricultural land and in gardens, and saplings in forestry plantations. Traditionally, several rodenticides have been used to prevent or at least diminish economic losses caused by small-rodent damage, but these often impose mortality not only on the target pest animals but also on their predators, including owls. From the 1990s onwards, a substantial body of observational and experimental studies showed that owls and other predators can limit or even control population densities of small rodents. They can thus probably be used as biological pest control agents to reduce damage from small rodents to agricultural crops and saplings. This exemplifies the extent to which owls are useful to humans and should be protected.

That we know so much about secretive owls is a credit to many dedicated fieldworkers and field scientists, along with academics. In particular, the population dynamics, demography and diet composition of owls have been the subjects of many long-term studies in temperate, boreal and arctic regions – requiring great physical effort – but less so in the tropics. Because of intensification of forest management and agricultural practices, the habitats of forest-dwelling and open-country owls – such as Tengmalm's owls, spotted owls, short-eared owls and barn owls – have been degraded over the past fifty years. In addition, climate change has imposed habitat loss and thus declines of many owl species in boreal, arctic and arid regions. As a result, populations of several owl species have declined drastically, to the point that many are currently vulnerable or even close to extinction.

Barn owls are found nearly all over the world apart from in my home country and other northern European countries. Barn owls have high reproductive potential, and their social behaviour, wide colour variation and cosmopolitan distribution offer unique systems for studies on population dynamics and evolutionary ecology. I have followed the long-term research conducted and hundreds of scientific papers published by the research team led by Professor Alexandre Roulin over the past thirty years with great interest. His team has been and still is one of the leading research groups on owls worldwide and has continuously published high-quality scientific papers in international journals. He and I have similar backgrounds in the sense that we both started as keen amateur ornithologists studying owls long before becoming academics. We have put much effort into collecting long-term observational data on owl populations over large areas, and have subsequently planned and conducted field experiments to better test the hypotheses formulated on the basis of accumulated data.

For more than thirty years, Professor Roulin's team has studied population dynamics, demography, cooperation and conflict among siblings and parents, as well as melanin-based plumage colouration and its connections with behaviour including mating systems and parental care in barn owls. As a result of his work, barn owls have become one of the most important model species in studies of how natural selection operates in the wild, by producing various colour types with behavioural and physiological differences. It is truly wonderful that Alexandre Roulin has now been able to summarize his excellent studies on barn owls and their allies in this seminal book, which is intended not only for academics but also for amateur birdwatchers, nature lovers and conservationists. I have really enjoyed reading this comprehensive and comprehensible book with its gorgeous artwork.

Erkki Korpimäki
Professor of Animal Ecology, University of Turku, Finland

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ACKNOWLEDGEMENTS

This book is largely based on the synthesis of thousands of publications on the barn owl and its relatives. I am greatly indebted to the Swiss Ornithological Institute (die Schweizerische Vogelwarte Sempach), which was instrumental in providing access to this knowledge-base, as well as to the numerous colleagues who sent me publications I could not obtain directly. I am also grateful to the financial support provided by the following organizations: Fondation Bataillard (through my friend Professor Daniel Chérix), Fondation Chuard Schmid of the University of Lausanne, Fonds du Dr Rub of the Faculty of Biology and Medicine of the University of Lausanne, Hilfsfonds of the Swiss Ornithological Institute, as well as the Swiss National Science Foundation and the University of Lausanne for their continuous support of my research.

I thank the following colleagues for their iterative feedback while I was writing this book: Hugh Brazier, Alexandre Chausson, Luis San José Garcia, Andrea Romano, Amélie Dreiss, David Ramsden, Jeff Martin, Rohan Bilney, Pauline Ducouret, Vera Uva, Richard Prum, Martin Paeckert, Yoav Motro, Inês Roque, Rui Lourenço, Hermann Wagner, Michael Wink, Daniel Osorio, Laura Hausmann, Franck Ruffier, David Eilam, Olivier Krüger, Thomas Bachmann, Madeleine Scriba, Peter Sunde and Res Altwegg. I would also like to thank the numerous photographers whose photos I was unfortunately not able to incorporate owing to space limitations. The maps were drawn by Alexandre Hirzel with the help of Olivier Brönnimann. This book was in part written at the Wissenschaftskolleg zu Berlin.

My biggest thanks go to Laurent Willenegger, with whom I worked for more than four years to achieve a marriage of text and illustrations. I am proud to have this book illustrated by such a master.

Finally, and most importantly, I thank the barn owl as a flagship species for peace and biodiversity.

Alexandre Roulin

A NOTE ABOUT THE ILLUSTRATIONS

When I was a teenager in the 1990s, I started watching barn owls. From an early age, ringing sessions provided an ideal way to study this secretive bird. And then, in 2014, Alexandre Roulin and I started to collaborate on this book. I accompanied his team in the field to observe the barn owl again. However, most of the drawings and paintings for this book were done not in the field (something I usually do) but in the studio to produce the necessary illustrations to complement the text. This work is based on my own experience with the bird, supplemented by information gathered in books or from the internet, and by material provided by Alexandre and his team. Some of the illustrations are done in watercolour, some with a pencil, and some have been produced digitally.

I hope that you have enjoyed the drawings and paintings. If you want to know more about my work, you can contact me via my website at www.wildsideproductions.ch.

Laurent Willenegger

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WHY THIS BOOK?

The barn owl and its relatives (grass, masked and sooty owls) are emblematic for ornithologists and the lay public alike. Many aspects of the lifestyle and life history of the barn owl, including its high reproductive potential, complex social behaviour, pronounced colour variation and cosmopolitan distribution, make this bird a fascinating creature. It is no surprise then that the barn owl has been widely studied by scientists. A search of the *Web of Science* in 2018 revealed 1228 papers published on the genus *Tyto*, compared with 273 papers on Tengmalm's owl, 701 on the European kestrel and 3832 on the great tit, a species studied by many professional and amateur ornithologists.

Several books are dedicated to the barn owl. However, because the literature on the barn owl encompasses many topics, an updated review of worldwide knowledge about its evolutionary ecology is necessary. Although I have studied this bird for the last thirty years and have published a number of papers, this book is not just a summary of my own studies and ideas. My aim is to highlight the facts in a concise and objective way. I have been careful to avoid relying solely on literature about European or North American barn owls, as I find this approach very restrictive. For instance, the names 'barn owl' and 'effraie des clochers' ('owl of the churches') are very European-centred and do not at all characterize the Tytonidae living in Australasia or the Caribbean, where these owls often exploit forests.

This book is for anyone interested in barn, grass, masked and sooty owls, as well as in birds and nature in general. Having originally been an enthusiastic amateur ornithologist before becoming an academic, I have deliberately adopted a less formal writing style than academics are used to. I have simplified concepts without (I hope) losing their essence, to offer an opportunity to nature lovers to gain an insight into the daily life of owls as seen by academics. In an attempt to value the approach taken by people who contemplate nature from a non-research perspective, the book includes photographs obtained from a number of ornithologists, as well as drawings and paintings by an accomplished artist, Laurent Willenegger.

Alexandre Roulin

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