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The Eurasian red squirrel

By Stefan Bosch & Peter W.W. Lurz

Publisher: Die Neue Brehm-Bücherei; NBB English Edition, Vol. 1 (2012), 206 pp.

Paperback ISBN: 10:3-89432-258-6.

This book is an excellent and complete monograph of the biology and ecology of the Eurasian red squirrel *Sciurus vulgaris*, in which the authors have consulted and reported nearly all the existing scientific literature to date. However, the book is more than that. Being a key conservation species on the British Isles and in Italy, this book also illustrates how the introduction of the alien Eastern grey squirrel *Sciurus carolinensis* and/or other exotic tree squirrel species are threatening the long-term survival of our native squirrel species. Hence, the link is quickly made with the world-wide trade in animals and how the introduction and establishment of alien species is the second-most important cause of loss of biodiversity on our planet. Therefore the book is not only a must for people working on or interested in red squirrels, but also for wildlife managers and animal welfare activists who can learn important lessons from the competitive replacement of red by grey squirrels in particular, and gain more knowledge about the mechanisms behind threats posed by alien species for species and habitat conservation.

The book starts with a short chapter on taxonomy and the evolutionary history of tree squirrels. In the second chapter on distribution, the issue of introductions is addressed, underlining that alien tree squirrels are very successful invaders and that the pet trade plays an important yet negative role, with captive animals being released or escaping and forming new populations.

Chapter 3, on body form and function, produces an excellent description of the (functional) morphology of all parts of the body, linking body structure and shape to the arboreal way of life of the squirrel. The paragraph on sensory organs is very interesting, particularly the section about vibrissae (i.e. tactile hairs). Here the authors use publications often not consulted by behavioural ecologists to describe and explain how red squirrels 'feel' their immediate surroundings, including the food they are manipulating. This chapter also touches on energetics, an important aspect to explain and/or study activity and behavioural patterns, food choice and habitat use. The paragraph on genetics gives a thorough overview of current knowledge and illustrates its importance for squirrel management and conservation.

In Reproduction and development (Chapter 4), the fascinating mating system and behaviours involved in it are described in detail. The extrinsic factors (e.g. food resources) and intrinsic phenotypic parameters (e.g. female age and body mass) that affect variation in both male and female reproductive success are discussed. This chapter neatly illustrates how strongly space use, social organisation and reproductive success are interconnected.

In the chapter (5) on behaviour, descriptions of the major types of behaviour are linked with their ecological context. This chapter is complete, although parts on dietary choices, optimal foraging and caching behaviour have some lacunes. I had expected to find here a

discussion on the relation between squirrel feeding and caching and seed fate. Arguments of seed dispersal are taken up again in Chapter 6.6, but the link to seed-fate is still not treated in depth.

Chapter 6, on Ecology, comprises many aspects of squirrel biology from space use over population dynamics to predators, parasites and diseases. The subdivision is logical, and I greatly enjoyed the complete coverage of red squirrel parasites and diseases, a hot topic in current research on red-grey squirrel interactions and red squirrel conservation. Some minor improvements could have been made. I would have preferred to see a larger Table 9 with extra data from fragmented woodlands in Belgium and subalpine forests in Italy to show how extreme variation in home-range size can relate to habitat composition and structure. Chapter 6.6 on seed dispersal could have gone into more detail on the Arolla pine-nutcracker-red squirrel system, since this pine species depends completely on these two species for seed dispersal and subsequent seedling establishment from seed caches not recovered by the seed predators.

Chapter 7, on Threats and conservation, gives a complete account of the risk status of the red squirrel in different parts of its range and examples of conservation efforts/projects and different scales, referring to its legal status in many European countries. The strategies and actions for red squirrel conservation on the British Isles are thoroughly discussed.

Chapter 8 reviews the different methods to survey and study tree squirrels and discusses their pros and cons as well as legal aspects (permits) required for methods which include handling animals. Some well-known methods are not described in detail, but reference is made to papers that describe their methodology. This chapter is very useful to everyone who wants to start monitoring or studying squirrels to have a clear overview of methods and materials used in previous studies in relation to the study aims.

The book finishes with an obligatory chapter on 'Squirrel and people', in which both the past and present modes of how we 'interact' with these appealing animals are illustrated. This goes from hunting for fur and meat, to hand-feeding red squirrels in parks where they are used to people, to squirrel hiking trails and bank advertisement using the caching squirrel as a symbol for (good) money investment strategies. 'Squirrels in the classroom' underlines that "squirrels are model organisms and an ideal subject to introduce a range of current and fascinating (ecological) topics to different age groups at school". With this statement, I want to underline that teaching our children not to fool with nature and that we are responsible for solving the problems we have created by introducing animals (grey squirrels), is the only way we can hope to save our Eurasian red squirrel from wide-scale extinction in Great Britain, Italy and in a 'not too far future', many parts of its European range.

In conclusion, this book is a very exhaustive review of everything that is presently known about the biology and ecology of the red squirrel. It is well written, and I especially enjoyed Chapters 2, 3, 6 and 7. The book is a must for all those, professionals and amateurs, who are interested in the ecology of our native mammals; for those who plan to start studying these fascinating animals as well as for the experienced researcher already studying red squirrels. Finally, I would like to recommend it for biologists involved in wildlife management and conservation.

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