

Books

Reindeer on South Georgia: The ecology of an introduced species.

N. Leader-Williams.

Cambridge University Press (Studies in Polar Research) 1988, 319 p. ISBN 0 521 24271 1 (£20, US\$49).

This book by Nigel Leader-Williams achieves far more than the modest title implies. It is a comparative study of the population biology, seasonal cycle of body condition, and associated food relationships of the species *Rangifer tarandus*, reindeer and caribou. From the detailed base of knowledge gained from nearly two and a half years of intensive field studies of the introduced reindeer on South Georgia, the author has made comparisons with reindeer and caribou populations worldwide. By bringing together in one volume much of the existing detailed data on the population biology of the species, and providing comparative analyses and discussion, Leader-Williams has made an important contribution to the literature on wild ungulate ecology.

The South Georgia reindeer were originally introduced as a food source for the whaling stations established there, but with the end of shore-based whaling the reindeer became primarily an object of scientific interest. Thus, it was possible to design and carry out a detailed scientific study, with systematic collections and autopsy of animals, and measurement of most of the environmental parameters influencing the reindeer. The author's approach in analysis of the data was to make comparisons with whatever similar data existed in the literature from other island introductions of reindeer, largely from Alaska, as well as from populations of wild reindeer elsewhere, primarily in Norway, and caribou populations in North America and Greenland. This approach proved particularly effective when comparing the relationship between age, body condition, and fecundity among females.

Species-wide comparative analyses, as employed in this book, offer the opportunity to make broad generalizations, however, the ecologically diverse situations that often characterize a species may be overlooked in the

process. Examples of such unwarranted generalizations are the following paraphrased statements: «bears and golden eagles are of little importance as predators» (pg. 11) (in arctic and alpine tundra areas, in Alaska and Canada bears and eagles can be quite important predators of caribou during calving); «caribou have generally shown major declines in number through most of their ranges due in large part to overhunting . . . even today a number of mainland herds are decreasing in size» (pg. 14) (this rather pessimistic assessment of the status of caribou is not supported by population trends in recent years with major caribou herds in continental North America increasing substantially in number, and this is supported by the data presented in an accompanying table on pg. 15). The summary statement on food habits of reindeer (pg. 122), «However, other common species like rushes, though not selected, also make up a large part of the diet.» is misleading in that the rush *Luzula* may make up a major portion of the later winter diet of reindeer on Svalbard and in other high arctic areas. Furthermore, one questions how any dietary item can make up a large part of the diet without being «selected». The statement that, «Emigration and dispersal is commonly observed among continental herds of *Rangifer*» (pg. 207) is based on published hypothetical models of population dynamics without adequate supporting evidence.

The extensive presentation of the South Georgia data in tabular or graphic form, often with comparative data from other areas, is particularly helpful to the reader in understanding the intended points emphasized by the author. Some minor errors in labeling of figures, however, may present obstacles to the reader (e.g. pg. 121, moss labeled as forbs in the winter diet of Peary caribou, and pg. 209, figure legend erroneously implies histograms compare sex and age ratios of St. Matthew Is. reindeer before and after the population crash). In discussion of irruptions of reindeer in Chapter 8, Leader-Williams classifies the South Georgia reindeer as «food limited» as a consequence of high animal density and overgrazing on the basis of «the unusually large fluctuations in femur marrow fat, the severe depletion of fat reserves and utilization of body protein» and he uses this standard to

extrapolate to other *Rangifer* populations. Peary caribou and Svalbard reindeer may show these characteristics in response to extreme winter conditions, which may be independent of the food resource of the regions as influenced by animal density. Alternatively, less severe nutritional stress, while not necessarily causing death by starvation may «limit» population growth through lowered fecundity and calf survival.

The final chapter on introduced mammals on southern islands appears largely irrelevant to the rest of the book, but provides for interesting reading. The author concludes, on the basis of a correlation between temperature of southern islands and the success ratio of introductions, that temperature is the main factor limiting the success of introduced mammals. Such a correlation may well be spurious since many of the species (particularly ungulates, lagomorphs, and carnivores) have winter thermal-neutral temperatures well below those experienced on southern islands under maritime influence. More likely

food availability in winter is the primary limiting factor.

The book is nicely illustrated with photographs from South Georgia as well as other parts of the world. Those working with *Rangifer*, both domestic and wild, will find this comprehensive work not only interesting reading but a valuable reference on the population biology of the species.

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Nigel Leader-Williams trained as a veterinary surgeon at Liverpool University and undertook a Ph.D. in ecology at Cambridge University. He worked for the British Antarctic Survey from 1973 to 1980 and studied the introduced reindeer of South Georgia. He is now based at the Large Animal Research Group, Department of Zoology at Cambridge where he is studying the endangered black rhinoceros.

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Reindeer grazing on snow-free coastal tussock grass (*Poa flabellata*) on South Georgia. (Photo: N. Leader-Williams).