

Soay Sheep

Dynamics and Selection in an Island Population

Soay Sheep synthesises the results of a unique study of population dynamics, selection and adaptation in a naturally regulated population of mammals. Soay sheep were first introduced to the St Kilda archipelago in the Bronze Age, and to the island of Hirta in 1932, where their numbers are naturally regulated by the availability of resources. Unlike most other large mammals, their numbers show persistent fluctuations, sometimes increasing or declining by more than 60 per cent in a year. *Soay Sheep* explores the causes of these fluctuations and their consequences for selection on genetic and phenotypic variation within the population, drawing on nearly twenty years' study of the life-histories and reproductive careers of many individuals. The study provides important insights into the regulation of other herbivore populations and the effects of environmental change on selection and adaptation. It will be essential reading for vertebrate ecologists, demographers, evolutionary biologists and behavioural ecologists.

TIM CLUTTON-BROCK is Professor of Animal Ecology at the University of Cambridge. His research has explored the evolutionary causes and ecological consequences of animal breeding systems. He has worked with primates, ungulates and carnivores, and has been responsible for establishing several long-term studies where recognition of individuals made it possible to explore the interface between population dynamics and natural selection.

JOSEPHINE PEMBERTON is Reader in Molecular Ecology at the University of Edinburgh. Her research uses modern molecular techniques to help understand the ecology and evolution of natural populations. She specialises in applying DNA profiling to long-term studies of individuals, yielding insights about breeding systems, the consequences of inbreeding and host-parasite coevolution.

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Dynamics and Selection in an Island Population

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T. H. Clutton-Brock
University of Cambridge
and
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Research on the dynamics of fluctuating vertebrate populations has a long and distinguished history and we are well aware that we stand on the shoulders of giants. Much of the original stimulus for our work on St Kilda came from studies of unstable or cyclical populations of grouse, voles, lemmings and lagomorphs and we have important debts to Charles Krebs, Tony Sinclair, Adam Watson, Sam Berry, Bob Moss, Ilka Hanski, Peter and Rosemary Grant and Norman Owen-Smith for pointing the way. In addition, we are very conscious of the influence of the work of David Lack and, later, of Graeme Caughley. Our choice of Soay sheep on St Kilda as a system was inspired by a previous, ground-breaking study of the sheep led by Peter Jewell and John Morton Boyd that culminated in the 1974 book *Island Survivors*, which demonstrated that it was feasible to examine the causes and consequences of population fluctuations at the level of individual animals. Ten years after the publication of *Island Survivors*, Peter Jewell introduced us to St Kilda and helped us to establish and develop the work described here.

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St Kilda is owned by the National Trust for Scotland and, for most of the project to date, managed by Scottish Natural Heritage (SNH) in partnership with NTS. It is one of the most heavily designated protected areas in the world, being a National Nature Reserve, a Site of Special Scientific Interest, a National Scenic Area, a Special Area of Conservation, a Special Protection Area, a World Heritage Site and (in parts) a Scheduled Ancient Monument. Into this jewel come sheep researchers wanting to stay in the limited accommodation, set traps to catch sheep, tag sheep, sample vegetation with the help of temporary exclosures, put up weather stations and many other potentially disturbing practices. We are extremely grateful to NTS and SNH for permission to research on the island and to members of the SNH South Uist office (especially Rhodri Evans, John Love, Anne MacLellan (née Shepherd) and Mary Harman) and various NTS offices (especially Anne May, Alasdair Oatts, Philip Schreiber and Robin Turner) for their help and support. In addition, we thank the succession of wardens on the island for their support and contributions to our work: David Miller, Peter Moore, Jerry Evans and Jo Babbs, Jim Ramsay, Steve Holloway, Jim Vaughan, Paul Tyler, Stuart Murray and Andy Robinson. Stuart Murray deserves especial mention for extracting sheep counts of other islands from the warden's filing cabinet and establishing more rigorous count methods. We also thank Historic Scotland (especially Sally Foster) for permission to set up our catch-up and site weather stations in Village Bay, and a succession of archaeology wardens for their tolerance of our activities: Lorna Innes (née Johnstone), Marcia Taylor and Susan Bain.

The island would be impossible to get to and hard to live on, were it not for the infrastructure provided by the missile tracking

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When we want to reach the island with larger teams, for catching up the sheep or conducting behavioural studies in the rut, we have chartered boats from Oban. Many of these voyages have been epics in their own right, and it was not until the converted lifeboat MV Poplar Diver came on the scene that we consistently arrived on the day we expected: many thanks to former owner Bob Theakston and his crew Norman Temby and to her present operators at Northern Light charters.

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