

## Book review

**Genetic Ecology of Whales and Dolphins (Special Issue 13).** A. R. Hoelzel (ed.). International Whaling Commission, Cambridge. 1991. Pp. 311, hardback. Price £25.00, plus £5.00 postage and handling. ISBN 0 906975 25 5.

From time to time, the International Whaling Commission publishes special issue volumes, each of which is devoted to a particular aspect of cetacean biology. These have ranged from a bibliography of techniques for killing whales through to reviews of the biology of particular species. This volume is likely to be of greater interest to the readers of *Heredity* because it covers recent research into those aspects of genetic ecology relevant to the group.

It must be particularly daunting to be faced with field work with an organism that can weigh over 150 tonnes, dive to a depth of over 1,000 m, and travel 1,000s of kilometres in a single year. Even more so when the animal never comes to land, and is impossible to immobilize for detailed study. Perhaps not surprisingly, therefore, the book opens with a section on methodology, and in particular on the acquisition and use of skin biopsy tissue samples for genetic analysis. A discussion of the relative merits of the Jennings 'Devastator' and the Barnett 'Commando' leads on to assessments of the reaction of whales to being struck by biopsy bolts fired by these crossbows. The effects of this seem, however, to be minimal. In this section, a paper by Amos and Hoelzel is likely to be of more general interest. They report how samples of skin may be preserved in 2 per cent Dimethylsulphoxide (DMSO) in saturated NaCl, and provide good quality DNA after storage at 20°C for at least 2 years. This will be of particular value to field workers in areas other than cetacean biology who do not have ready access to refrigeration. However, I think that the hazards associated with DMSO should be spelled out; its toxicity and irritant properties make it one of the more spiteful reagents in routine use in our laboratory, and it should be handled with care under field conditions.

The remainder of the book is devoted to case studies of various species of whales and dolphins. These include 'conventional' enzyme electrophoresis, the study of mitochondrial DNA by both restriction fragment length polymorphisms and direct sequencing, and the use of polymorphic minisatellite and VNTR sequences. Some of these surveys are staggering in their scope: Wada and Numachi report on a study of enzyme polymorphisms across four species that involved the analysis of liver samples from

almost 18,000 individuals, including 11,414 Minke Whales from the Antarctic. While the authors may not have been directly responsible, I found the slaughter implicit in this study quite nauseating. The conclusions, incidentally, are that many polymorphisms are in Hardy-Weinberg equilibrium, and that there is differentiation between northern and southern hemisphere stocks that might reflect specific distinctness. The molecular results support these general conclusions. There is variation in the genetic architecture of populations from different provenances in a variety of species that might indicate greater taxonomic distinctness than had previously been believed. Sequence data generated by PCR from skin biopsies, as well as results from RFLP analysis of whales killed by commercial fisheries, both support these conclusions, the former without the need for the sacrifice of the animals themselves.

Another paper of more general interest is one by Waples on the problems of estimating effective population size ( $N_e$ ) indirectly from genetic data. This is a useful contribution because it draws together a series of studies in a particularly readable format. Its conclusion that current  $N_e$  can be better determined from allozyme data, and long-term  $N_e$  from mitochondrial analyses is not new, but is well-presented. It is rather depressing to be reminded that calculation of  $N_e$  by either route depends upon error-prone estimates from field data. However, as the author suggests, effective population size is so important in theoretical genetics, and its direct measurement so difficult, that even an estimate that lies within an order of magnitude of the true figure may be better than nothing.

All in all, this volume draws together a wide range of papers, many of which are very interesting. Some are typical 'proceedings' papers in that they include little that is new, and much that has been published better elsewhere, but the editor is to be complimented on providing an informative group of studies — not least that the 'Commando' is a better bet than the 'Devastator' for hitting a whale with a biopsy dart from the pitching deck of an inflatable Zodiac!

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