Book Reviews

Fox research in the dunes from 1979 till 2000

Vossenonderzoek in de duinstreek van 1979 tot 2000. J. Mulder 2005. Report 2005.72, Society for the Study and Conservation of Mammals (VZZ), Arnhem, The Netherlands. 78 pp. ISBN 90-73162-78-5.

Foxes are one species of wild animals which attract much social attention, and have been the subject of much research, since their presence frequently conflicts with human interests and activities. In the countryside, foxes are black-listed because of the damage they do to poultry, and their role as a competitor with hunters further stigmatises the species. During the second half of the previous century, foxes were identified as the main vector responsible for the spread of sylvatic rabies throughout Europe. While oral immunisation provided a sound solution for this problem, a new and even greater risk to human life has been detected as being linked with foxes: the fox tape worm *Echinococcus multilocularis.* Always a target for hunters and poultry keepers, the threats that foxes pose to human health are often used to strengthen public opposition to the species. And if that is not enough, some conservationists are now drawing increased attention to the possible negative effects that foxes' predatory activities could have within some ecosystems.

For some people all this provides sufficient reason to actively manage the species (by hunting), even in nature reserves. Others emphasise that we should accept the fox as a natural predator, or at least have more patience in judging foxes' impact on the ecosystem. It is unlikely that these two divergent views will ever be reconciled, the positions are too polarised and the debate has been going on for too long, with no resolution. However, through thoroughly studying the ecology of foxes, a better understanding of the technical aspects of different potential management options can be gained.

The present report by Mulder brings together three intensive studies on foxes in the Dutch dunes, dating from between 1979 and 2000. Two of them were conducted by the author himself, and the third by A. Swaan. The report is especially interesting because it covers such a long research period. Short research periods (project research) are an inherently restrictive factor when studying the population ecology of animals that live for a (relatively) long time. Here, by applying modern methods (for the spatial analyses) the earlier research results could be made comparable with those from the more recent studies. In addition these populations are also quite unique in that they have never been hunted, since they became settled in the area at the end of the 1960s.

The report is well structured in ten chapters, which cover two substantive topics: food choice and predation, and habitat use and population dynamics. The chapter concerning food ecology summarises the earlier reports, which comprehensively analysed this issue. In this respect no important new insights are introduced, but the findings are brought together in an accessible overview. The rabbit clearly remains the main prey of the dune foxes, despite an important population decline due to VHS. The arrival of the new predator in the dunes, did coincide with some unmistakable changes in the populations of a number of prey species, but the exact role that foxes played in these changes cannot be so readily defined

Population dynamics are extensively dealt with across five chapters, which provide by far the most interesting new information, particularly through giving consideration to fluctuations over a lengthy period of time. The topics that are highlighted include habitat use, dispersion and itinerant foxes, population composition, population density, reproduction and sex ratio.

Having been started as a new established population, in a suitable habitat and never having been being hunted, the population appears to have remained in a dynamic situation for some decades. Territorial behaviour and the accompany-

ing density-dependent parameters (such as litter size, proportion of females taking part in reproduction, natural mortality, etc.) are convincingly presented as driving forces and limiting factors. However, the question of the precise drivers of these internal dynamics remains, at least, partly unexplained: for example it is unclear whether changes in social organisation (number of animals per territory) are a result or (at least partly) a cause of these changes. The fox continues to challenge scientists, although it is quite acceptable to suppose that the changing density of the main prey (rabbit) plays a key determinant in the population dynamics.

Overall this is a very valuable reference document for everyone dealing with or thinking about fox management. It shows that a population, which is not being hunted, regulates itself perfectly without causing ecological disasters. So, it should be remembered that patience is an honourable human quality.

In summary: foxes will undoubtedly always remain unpredictable up to a certain extent, even to scientists with many years experience in studying them. What holds true in one place or time may not always simply be translated to another place or time. The values of several parameters will differ according to local circumstances. In this respect, note for instance that, in Flanders, the dune area only covers 0.22 % of the total area.

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