

ORIGINAL INVESTIGATION

Red and sika deer in the British Isles, current management issues and management policy

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Abstract

The red deer (*Cervus elaphus*) is one of the most widely distributed species of deer in Europe. Due to its economic value as game species or its negative impacts on forestry, agriculture and conservation areas, most populations are currently managed, with strategies and intensity of the management varying between countries. In Britain, and less certainly in Ireland, red deer have been continuously present since the end of the last glaciation and constitute the largest population of red deer in Europe. Although they thrived in the past when forests were abundant, the current distribution of red deer in the British Isles is uneven, with the largest numbers being found in Scotland and few and more localised populations in England, Wales and the Republic of Ireland. In the British Isles, as in many other parts of Europe, there is a long history of man interacting with deer populations including local extinctions, multiple translocations and introductions of exotic species of deer. Among introduced exotic species of deer, the Japanese sika (*Cervus nippon*) is the one of most concern. After introduction of small numbers at multiple locations in Britain and Ireland from 1860 onwards, sika have increased in population number and range in areas with good forest cover, and where they overlap with red deer there is a risk of hybridisation. Due to recent increases in numbers and range of red and sika deer, both species pose a range of management challenges which are not easy to solve. In this review we summarise the history and status of these two species in Great Britain and Ireland, describe current management and discuss management options for the future.

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Introduction

The red deer (*Cervus elaphus*) is a widely distributed native species throughout much of Europe. While in many countries it is an economically important game species (reviewed in Apollonio et al. 2008), where local densities are high it may also cause significant economic

damage to agriculture and forestry, or have undesirable impacts on habitats of conservation importance (Reimoser and Putman 2009). Management approaches in different countries reflect the differing balance of economic value and impact (Apollonio et al. 2008).

In some parts of Europe, red deer occur in sympatry with populations of the congeneric Japanese sika

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(*Cervus nippon*), an exotic species introduced from Asia. Naturalised populations of sika occur in several European countries. In many instances these populations are quite small and local in distribution, but more extensive populations are established in Germany, the Czech Republic, the United Kingdom and the Republic of Ireland. Where sika reach high densities, they can also be implicated in significant economic damage to agriculture (e.g. Putman and Moore 1998; Rutter and Langbein 2005) and commercial forestry (e.g. Ratcliffe 1989; Chadwick et al. 1996). Both species, red and sika deer, at high densities, can also have negative impacts on habitats of natural heritage importance, for example preventing the regeneration of native woodlands (e.g. Scott et al. 2000). The presence of deer near urban areas also have further risks in terms of vehicle collisions (Langbein and Putman 2006) and the risk of disease spread to livestock (Böhm et al. 2007). Additional concerns arise because sika and red deer can mate to produce fertile hybrids, so that introgression may compromise the genetic integrity of native red deer stocks, and potentially reduce the trophy value of red deer (since sika have much smaller antlers than red deer). Hybridisation between red and sika has been documented in both the United Kingdom and the Republic of Ireland (e.g. Harrington 1973; Putman and Hunt 1994; Abernethy 1994; Goodman et al. 1999; Díaz et al. 2006; Pemberton et al. 2006; Senn and Pemberton, in press) and in the Czech Republic (Bartoš et al. 1981; Bartoš and Žirovnický 1981; Zima et al. 1990), and there is concern about the potential for hybridisation elsewhere in Continental Europe (Wotchikowsky 2009; Bartoš 2009).

Britain perhaps has the greatest experience of the problems associated with expanding populations of sika, and it is suggested that an exploration of current problems and policies within the British Isles may be helpful in guiding policy elsewhere in Europe where sika populations are currently on the increase. In this paper we review the present status and distribution of red and sika within the British Isles including the genetic provenance of the different populations. Current management approaches and the impacts of both species on agriculture, forestry and conservation habitats are also discussed. Particular attention is paid to hybridisation between red and sika deer and the changing attitudes of statutory authorities to the best management approaches for the future.

Red deer: history and current status in the British Isles

History

The red deer has been continuously present in Britain since the end of the last glaciation (c. 11,000 years BP) and was widely distributed when forested areas were

abundant in the past (Lister 1984). Deer, especially red deer, were extensively hunted by Mesolithic man in Europe (including Britain) to provide food, skins and tools (Jarman 1972). Although the red deer evolved as a species occupying low-ground habitats (heaths, forests or forest edges), with the development of farming cultures during the Neolithic (c. 5000 years BP), populations of red deer declined and were gradually concentrated into remaining forests and more remote upland areas, for example in Scotland (Whitehead 1964; Lister 1984). In Norman Britain (11th Century) some areas, for example the New Forest, Hampshire, in southern England, were designated as royal forests where deer were protected from poaching in order to provide royal hunting. Thirty-one deer parks were documented in the Domesday Book (1086), an inventory commissioned by William I containing records of all settlements in England. Deer parks became very common after the Norman Conquest, with over 700 marked on Saxton's maps of 1575 and 1580, and 334 listed by Shirley (1867). Early parks would only have contained red deer, but the Normans introduced another herding deer species, the fallow deer (*Dama dama*), and these two species remain the commonest park species today, when just over 100 parks survive (Hingston 1988). Deforestation and over-hunting continued during the 16th–18th Centuries, with numbers of wild red deer at a minimum by the second half of the 18th Century when they were extinct in most of England, Wales and lowland Scotland (Clutton-Brock and Albon 1989; Harris and Yalden 2008). In Ireland, numbers of red deer also declined as a consequence of deforestation and human disturbance with all populations except those in the south-west being extinct by the end of the 19th Century (Harris and Yalden 2008). Despite these large declines, some quite substantial populations of red deer are thought to have survived in more inaccessible areas (such as the Scottish Highlands: Sinclair 1814; Black and Black 1861; Whitehead 1960 1964; Clutton-Brock and Albon 1989). In the 19th Century, the range and abundance of wild red deer rose again, due to a growing interest in deer hunting coupled with a decrease in profits from sheep rearing, which allowed large areas of land to be re-colonised by red deer, especially in Scotland (Lowe and Gardiner 1974; Clutton-Brock and Albon 1989). Although translocations of red deer between European countries have probably occurred since Roman times (Long 2003), it was during Victorian times (19th Century) that more significant introductions and translocations of red deer into Britain began due to an interest at improving body and antler size for trophy hunting (Whitehead 1960, 1964). In some cases these introductions were made to existing populations of deer but some current populations are entirely the result of introductions following local extinction (Whitehead 1960, 1964; Lowe and

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