A comment on Humphrey’s ‘Benefits to biodiversity from developing old-growth conditions in British upland spruce plantations: a review and recommendations’ with reference to red squirrel conservation.

P.W.W. Lurz
IRES, Devonshire Building, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, England

Red squirrel (Sciurus vulgaris L.) decline has been linked to the spread of the introduced North American grey squirrel (Sciurus carolinensis Gmelin). A detailed review of the mechanisms of replacement of reds by greys is given by Gurnell et al. (2004). Replacement is thought to occur through disease and competition. The growth rate of juvenile red squirrels and their recruitment are both reduced in grey squirrel presence (Wauters et al., 2000). In addition, grey squirrels have been observed to steal the seed caches of red squirrels in areas of overlap during spring and this may lead to reduced body mass in red squirrels and concomitant negative effects on their reproductive success (Wauters et al., 2002a, b).

Grey squirrels are also considered to be more efficient at exploiting acorns than red squirrels (Kenward and Holm, 1993) and reproduction and survival of grey squirrels is positively linked to the size of acorn crops (Gurnell, 1996). This may explain the replacement of red by grey squirrels in broadleaf forests dominated by oak (Quercus spp.), where observed decline has been fastest (Kenward and Holm, 1993; Skelcher, 1997).

As a consequence, conservation planning for red squirrels has focused on the management of large conifer forests (>2000 ha) that ideally are surrounded by a 3-km buffer zone of unsuitable habitat (Gurnell and Pepper, 1993). Squirrel abundance is linked to tree seed availability (Gurnell, 1983). In order to provide mature cone-producing conifer habitat, Gurnell and Pepper (1993) suggest a forest age structure of plantations of: 30 per cent of trees 0–15 years old, 30 per cent 16–30 years old and 40 per cent of trees >30 years old. The composition of tree species in red squirrel conservation areas is also an important consideration: large-seeded broadleaves, such as oak, should be avoided and plantations dominated by Sitka spruce (Picea sitchensis authority) should also contain other conifers (e.g. larch, pine species) to provide a more dependable seed crop (Gurnell and Pepper, 1993, Lurz et al., 1998).

Humphrey (2005) suggests that the structural complexity of old conifer stands may be beneficial to invertebrates, birds and mammals, and that the increased levels of cone production associated with mature trees would be beneficial to red squirrels. Humphrey also suggests that retained stands of conifer provide crucially important habitat for red squirrels due to being out-competed by grey squirrels in native broadleaf woodlands. However, this is too simplistic and the conclusions in Humphrey (2005) are not supported in the paper of Lurz et al. (2003) as cited. Studies in Sweden (Andrén and Lemnell, 1992) indicate that red squirrel densities are actually higher in medium-aged than in old conifer forests. In addition, red squirrels track seed crops and their population dynamics is linked to these patterns (see Gurnell, 1983, 1987). While red squirrels will certainly use retained stands of old-growth conifers because they provide food, our work clearly indicates that old-growth habitats are not necessary for red squirrel conservation (Lurz et al., 1995, 2000). Red squirrels maintain viable and thriving populations in production conifer plantations and simply track the seed crops in mature stands across the forest (Lurz, 1995; Lurz et al., 1997, 2000). There is also no shortage of nesting areas in production conifer plantations as red squirrels have been shown to use several dreys at any given time (Lurz and Garson, 1997).

Our experience from working on red and grey squirrel ecology in the UK in Kielder Forest District, Northumberland, since 1991 shows that management of red squirrel refuge areas should focus on providing a dependable food supply (Gurnell and Pepper, 1993; Lurz et al., 1998; Pepper and Patterson, 1998). This may be achieved through a number of silvicultural options which will depend on a range of factors, such as soil type, slope, aspect, wind hazard class and economics. There is a need for ecologists and foresters to work together to develop successful site-specific solutions. Developing old-growth conditions is therefore a welcome option in some locations but should not be viewed as a pre-requisite for red squirrel conservation.

References


