



Lichens and deer exclosures in Scotland

Erecting **exclosures** around large areas of land to prevent mammal herbivory and encourage tree regeneration is a common form of management. However, exclusion of large herbivores, such as red deer *Cervus elaphus* (Figure A), is just as unnatural as having an excess of these animals, and dense woodland regeneration can shade out important lichen species that normally grow as epiphytes on mature trees in open woodland (Coppins, 2003).

The **management strategy** of creating these exclosures has been shown, through monitoring, to be far from an 'easy win'. Moore & Crawley (2014) found cover of Lobarion lichens (for which the UK has an international responsibility) on lower trunks of trees in Atlantic oak woodland is low in recent (~20-year-old) exclosures, due to shading. Although woodland regeneration is important for the long-term survival of the Lobarion lichen assemblage, and this involves managing herbivory, the policy of complete exclosure might, in this specific case, be counter-productive. This demonstrates the inherent complexity of natural systems and the importance of monitoring.

Intervention thinning of saplings around mature trees holding good assemblages of Lobarion lichens inside exclosures might be one way of addressing this problem (Moore & Crawley, 2014). Erecting numerous smaller deer exclosures around three or four seedlings in strategic locations throughout the woodland, rather than using fewer large exclosures might be another useful approach. A management initiative has already been launched following regular monitoring of important lichen assemblages within

the exclosure at nearby Rassal Ashwood, Wester Ross, where cattle have been introduced at an appropriate density in the hope this will reduce the density of the regeneration. Monitoring will continue to assess the effects of this intervention.

A rather quirky example of the importance of monitoring as a management tool was demonstrated by surveying the lichen diversity of a long-established deer fence (before it was due to be removed) around one of their woodlands at the Beinn Eighe National Nature Reserve. Over 40 species of lichen were recorded, including some nationally rare and ancient woodland indicator species. As a result of this monitoring, only the wire was removed, and the fence posts were left to serve as a source of lichen propagules for the developing woodland within.

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REFERENCES

- Coppins, B.J. (2003) Lichen conservation in Scotland. *Botanical Journal of Scotland*, Volume 55, 27–38.
- Moore O. & Crawley M.J. (2014) Effects of red deer exclusion on the corticolous and terricolous cryptogam community of Atlantic woodland. *Forestry*. DOI: 10.1093/forestry/cpu022. Available at: <https://academic.oup.com/forestry/article/87/5/618/571676/Effects-of-red-deer-exclusion-on-the-corticolous>



Online Case Study 3 Figure A Grazing by red deer *Cervus elaphus* has an important effect on upland ecosystems.

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