

CAUSES OF CHANGE IN MOUNTAIN HEATHS: THE CULARDOCH STUDY

Scottish montane ecosystems occur above the natural tree-line. They have a high conservation value due to the rare arctic alpine-species of plants, lichens and birds that occur there.

They are also important because the water draining from montane soils makes a significant contribution to the quality of Scottish headwaters which are key breeding areas for salmon and trout.

Montane ecosystems are important indicators of human impacts on the environment because of their sensitivity.

STUDY SYSTEM

The site was established in 1999 in the Cairngorms within an area of heath at 750m above sea level.

This project aims to investigate the response of a typical montane heathland community to four impacts -nitrogen pollution, fire, grazing and climate change.



The Culardoch site in winter

MEASUREMENTS

Monitoring of ecosystem response includes recording the type and growth of plants, and the chemistry of the heather tissue, soil and soil water.

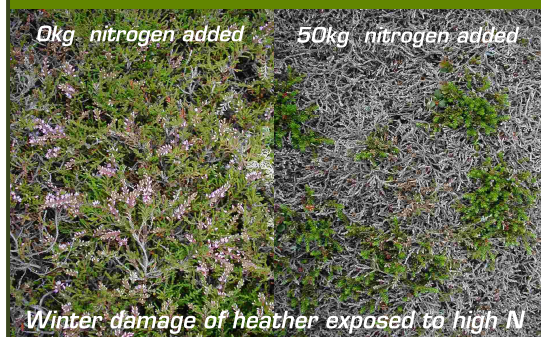
Weather data is recorded by an automatic weather station. Nitrogen pollution is also monitored regularly. Monitoring has taken place for 7 years and will continue until at least 2011.

KEY FINDINGS TO DATE

Pollution at current rates (10 kg N ha yr) is causing nitrogen accumulation in plants and soils, effectively fertilizing upland areas.

This contributes to biodiversity loss, with lichens and mosses particularly affected.

This saturation of upland areas results in harmful amounts of excess nitrogen leaking into our rivers, thereby reducing water quality for both wildlife and people.



Winter damage of heather exposed to high N

CLIMATE CHANGE EXPERIMENTS

Experimental chambers were established in August 2004. The chambers modify air temperature by 1-2°C and reduce wind speed.

We predict that climate warming will:

- lead to further loss of important montane lichen species.
- increase the positive effect of nitrogen on dwarf shrub growth.
- increase flower and fruit production.
- reduce winter injury in plants exposed to high N levels.

