

3.1 Increasing Dwarf Shrub Cover

If the answer to any of the questions below is yes, this guidance could help you. *Consult the fact sheets on mat grass and purple moor-grass for further detail on these species.*

- Do you want to increase your dwarf shrub¹ cover?
- Have you already got some dwarf shrubs that could spread or recover?
- Have you lost nearly all dwarf shrubs to purple moor-grass, mat grass or cottongrasses?

The problem

Dwarf shrubs have declined in many areas through many (possibly over 100) years of heavy grazing, possibly too frequent burning (e.g. annually on some rough grassland areas), pest outbreaks such as heather beetle, wildfire where all the vegetation may have been destroyed in hot dry summers, or possibly from increased atmospheric deposition where some grasses may respond better to nitrogen deposition and outcompete the slower growing dwarf shrubs. The result is grasses, rushes or sedges replacing dwarf shrubs in many areas from a small to a very large scale and in extreme cases, heath or bog has been transformed to acid grassland of low biodiversity value.

If you want to restore patches of purple moor-grass or mat grass-dominated areas see Fact sheets 3.2 and 3.3.

The way forward

The key is to be able to control the factor(s) that have caused the reductions of dwarf shrubs. If the shrubs have been lost, then some re-introduction of species may be needed. This guidance focuses on how these can be achieved.

¹ See The Vegetation Overview for a definition of dwarf shrubs in the moorland

Options for Grazing Management

Grazing effects

Grazing effects are complex and dependent on

- vegetation type and proportion of more preferred forage and its location. Some dwarf shrubs are grazed more than others. Crowberry and cross-leaved heath are not generally grazed unless there is nothing else of better value to eat
- grazing regime – summer only, all year, reduced numbers in winter, when stock are off the site;
- livestock types (sheep or cattle, or ponies, and the individual breeds);
- other management e.g. burning, size and age of burnt areas;
- local site conditions such as aspect, altitude, distance from water (for cattle especially)

In general, heavy grazing reduces dwarf shrubs and increase grasses (especially unpalatable ones) whereas cessation of grazing results in an overall increase in biomass with a possible loss of plant and animal diversity in the longer term. Moderate levels of summer grazing can reduce grass competition and encourage dwarf shrub regeneration.

Impacts vary among dwarf shrub species, with their abundance and distribution and the composition of the surrounding vegetation. Heather is most sensitive to heavy grazing in spring and autumn but is also vulnerable in winter when fewer alternative palatable species are available. Bilberry is selectively grazed by sheep in autumn, whereas *Empetrum* is less favoured by livestock. Dwarf shrubs suppressed by heavy grazing can be rejuvenated by reducing livestock numbers but this can also increase competition from grasses. Cattle are more likely than sheep to graze mat-grass or rank purple moor-grass but can also damage dwarf shrubs if no other forage is available.

Burning with Grazing

Burning *Calluna* on dry heath, if done correctly, can encourage regeneration from stem bases and seed. Effects of burning and grazing interact and need to be planned together. However, old or heavily grazed *Calluna*, mosaics of *Calluna* and grass, other dwarf shrubs and wet heath or bog should not normally be burnt.

Establishing new dwarf shrub species

Where some or all of dwarf shrubs have been lost, they will need to be added to the vegetation. Some may colonise unaided, but only if there is a nearby source, and there are small gaps in the vegetation where seeds can establish.

Heather seed can be collected on a large scale, bell heather and cross-leaved heath seeds can be collected by hand for small scale introduction. Bilberry, crowberry and cowberry are more difficult to establish. Crowberry takes well as cuttings if plants can be inserted.

To add seed, or to expose a buried seedbank of desirable species bare ground (on a small scale) is essential to enable the seed to germinate.

Creating bare ground

The aim is to create small pockets of bare ground (about 10% of the area) leaving the rest of the vegetation intact (*Pictures of rotavated and trampled ground could be inserted*). If the site has previously been heavily grazed, there may be sufficient colonisation gaps at the time that grazing is reduced. Seed should be added at this time to these gaps.

Litter (dead plant material) should not cover the bare ground, although some of the litter created during these methods will blow away.

Create bare ground by;

- Light rotavation with spikes and then a chain harrow to bundle up the litter. This ensures that not all the bare ground is covered with litter. This should not be conducted where the cover of dwarf shrubs is already significant (say a 25% or more cover), or only in the patches where they are absent where mat grass is dominant
- By trampling with cattle or horses. Trampling is less successful than rotavating for creating bare ground on purple moor-grass dominated sites. Both methods can be equally successful on mat grass and fine leaved grass sites. In small areas, sufficient cattle trampling may be achieved by penning the cattle on the area and herding them round the pen. Larger areas may be trampled by keeping a herd of cattle on the moor for a short time. The aim is to cut through the vegetation and litter to make many small areas of bare soil, a few square centimetres at a time. Great care is needed to avoid too much trampling and poached areas, especially on deeper peat. Areas where dwarf shrubs already form some 25% or more of the vegetation should not be treated in this way

Heather Seed Addition

- Heather seed should be added if there is no or a very small heather seedbank. If there are clumps of flowering heather in the vegetation then you can assume there is a seedbank present and only disturbance to create bare ground is required²
- Sow heather seed in the early spring (March) or autumn (September/October) as soon as possible after the disturbance treatments have been carried out. It is essential to sow seed before the remaining vegetation begins to cover the bare ground. Spring sowing is not recommended in areas with low summer soil moisture (and rainfall) as the seeds will germinate but die when the top few mm of soil dry out

² See Overview of vegetation for how to sample the seed bank

- Sow the heather and other dwarf shrub heath species as capsules as collected from the plants at a rate of about 17kg/ha (collected weight, not dried), or, clean the collected seed and sow at about 0.8-0.06kgs/ha. The higher rate was used on this project, whereas the lower rate has been used on large scale restoration projects. The amount needs to balance the existing heather cover, the desirable amount of heather, and the likely seed content of the seed bank
- Seed can be sown using a hand held fiddle for small areas (1ha or less), a modified spray boom or a rotating fertiliser spreader on the back of a tractor is suitable for larger areas however mixing heather seed with silver sand will aid an even sowing
- Heather seedlings will establish in grazed areas, but their survival and growth is very limited if the grazing intensity is too high. Establishment is much faster if there is no grazing for 3-4 years. In general, cattle only grazing is more successful than cattle plus sheep or sheep only. Sheep suppress young heather plants by grazing, or pull out seedlings

Grazing management for optimum heather establishment

- **Molina dominated grasslands:** Grazing of 1.5 ewes/ha, 1.5 ewes/ha plus 0.75 cows (June –August)/ha and 0.66 ewes/ha plus 0.75 cows (June –August)/ha were all found to be too high for the growth of heather seedlings. Some seedlings will survive the above grazing intensities for a couple of years as browsed small seedlings but it is unlikely that they will develop into mature bushes. Cattle will knock down the *Molina* vegetation and reduce competition for the heather but, if sheep are also grazing the area, they will selectively browse/pull up the seedlings. Cattle only grazing may be an option but this was not examined in this study. In ungrazed areas heather seedlings have been shown to successfully establish and grow, although there is a risk of the *Molina* shading out the heather if the site is left ungrazed for more than 4 years
- **Nardus/Agrostis/festuca grassland:** Heather seedlings have been shown to successfully establish and grow with cattle grazing (0.5 cows/ha) for 2 months of the year. Experiments have shown that three years after sowing, there is a 90% chance of *Calluna* seedlings surviving under cattle only grazing, 80% under a sheep plus cattle grazing and only a 50% under sheep only grazing. Heather seedlings will successfully grow in ungrazed areas and there is little or no risk of the grass shading out or out competing the heather

Changes in vegetation composition

- The bare ground created by rotavating/trampling will disappear after 1-2 years. The increase in litter (created by the rotavating/trampling) will decline in the first year
- The rotavating/trampling has little impact on most of the vegetation, but does cause a decline in *Vaccinium* cover
- Heather seed addition changes the community composition

Other Options and Information Sources

- More specific measures can be taken to reduce competition from *Molinia* and *Nardus*. [see *Molinia* & *Nardus* fact sheets]
- Feed blocks can be used to reduce sheep grazing pressure in spring and to attract sheep away from vulnerable areas of *Calluna* [see *Nardus* fact sheet]
- Cutting can be used instead of burning but is less effective and requires even, dry ground for access

See also:

[English Nature Upland Management Handbook: Chapter 6. Moorland](#)

[Heather & grass burning code for England and Wales](#)

[Scotland's Moorland Forum: Principles of Moorland Management](#)

[Defra funded ADAS Technical Guideline: No. 3. Approaches for enhancing heather cover on degraded upland moor](#)

[Defra funded ADAS project reviewing literature on factors influencing the growth of *Calluna*](#)

A Project funded by Defra, English Nature and Countryside Council for Wales undertaken by ADAS, CEH, IGER, RSPB, Scottish Agricultural Colleges, University of Newcastle and Penny Anderson Associates Ltd.