Application of moorland plants as seed

In order to diversify an existing sward seed can be added. The species that we have collected seed for are heather *Calluna vulgaris*, bell heather *Erica cinerea*, cross-leaved heath *Erica tetralix*, common and hare's-tail cotton-grasses (*Eriophorum angustifolium* and *E. vaginatum*) and bilberry *Vaccinium myrtillus*.

Seed collection

Depending on the ground topography, the heather species and cotton grasses can be collected by brush harvester. These are towed behind a quad bike or softrac. To collect using a brush harvester, plants need to grow in extensive stands, preferably as a single dominant species. This is most common for heather and common cotton-grass. Cross leaved heath will grow in varying proportions with heather and can be harvested as a mixture.

Figure 1 – Harvesting common cotton grass seed using a brush harvester.

For those locations that cannot be accessed by vehicle (e.g. most slopes with *Erica cinerea*) or berry bearing plants, seed must be collected by hand. This will considerably increase the cost of collecting the seed.
The ideal time for harvesting seed depends on the species and location. For the Dark Peak, times are shown below.

Treatment
The treatment required prior to application will depend on the application method. For application by helicopter suspension hydro-seeding, seed must be completely cleaned to be as fine as possible. This will involve several passes through cleaning equipment. For application with air drill or spinner, the only requirement will be for removal of chaff. For those species that have been collected as berries, seed will require thorough cleaning and treatment with diluted sulphuric acid, to simulate passage through a bird's digestive system.

Application
There are various ways of applying seeds. The dominant species to be used is likely to be heather, which can be applied as a monoculture or mixed with various other species. In order to reduce the cost of mixes, we have applied at a ratio of 90:10 *Calluna : Erica*. Bilberry has not been used extensively by this method, most seed going for cultivation, but has been added at a rate of 5-10 seeds per metre^2 in a *Calluna*: *Erica* mix. The rate for application onto an existing sparse sward should be about 650g per hectare, which equates to approximately 2000 *Calluna* seeds per metre^2.

1. Suspension hydro-seeding – Typically undertaken by helicopter although can be applied by knapsack sprayer or quad applied through spraying equipment, water is applied at the same time. Suspension must be kept well agitated during application to prevent deposition of seed in sprayer and pipes. Approximate cost - £60 per hectare.
2. Helicopter air drill – new technique, currently only 1 operator. Approximate cost - £45 per hectare.

3. Land based air drill – will require less seed than air drill as application can be very focussed to those areas where seed is required. Helicopter application is much less targeted. Approximate cost - £75 per hectare.
4. Traditional spinner drill – either hand held or quad mounted. Will require more seed and only suitable for small areas.

Species name	English name	Harvesting period	Regular collection method	Pre-treatment required	Approximate cost per kg
Calluna vulgaris	Heather or ling	End October-December	Machine	Cleaning	£155
Empetrum nigrum	Crowberry	August-September	Hand	Acid	<£3000
Erica cinerea	Bell heather	October-December	Hand	Cleaning	£1100
Erica tetralix	Cross-leaved heath	October	Machine	Cleaning	£355
Eriophorum angustifolium	Common cotton-grass	July-August	Hand and machine	Cleaning	Not purchased
E. vaginatum	Hare's-tail cottongrass	July-August	Hand	Cleaning	Not purchased
Juncus squarrosus	Heath rush	September	Machine	Cleaning	<£3000
Vaccinium myrtillus	Bilberry	Late July- Early September	Hand	Acid	<£2000
Vaccinium vitis-idaea	Cowberry	Late July- Early September	Hand	Acid	<£3000

Figure 2 – Helicopter suspension hydro-seeding

Figure 3 – Helicopter air drill application