

# Sward enhancement: diversifying grassland using pot-grown wildflowers or seedling plugs

**Sward enhancement refers to management techniques which aim to increase the botanical diversity (mainly the wildflower component) of species-poor grassland. Such work can be funded under Environmental Stewardship, in particular Higher Level stewardship. This leaflet describes the use of pot-grown transplants or seedling plug plants to add wildflowers to existing grassland. This technique is recommended only as a supplement to the main methods of sward enhancement which are oversowing or slot seeding with wildflower seed and spreading species rich green hay. These are described in separate information notes.**

## Key points

- Sites must be carefully selected.
- Plug planting is expensive and is best used as a supplementary method of sward enhancement.
- Species and planting locations must be carefully chosen.
- Transplant mortality can be high and careful planting and aftercare is required.
- Subsequent site management is required.

## Introduction

Not all grassland is suitable for plug planting. Sites with high fertility will not be appropriate and neither will areas with archaeological interest, because of disturbance to the soil. For more information see Technical Information Notes TIN061 Sward enhancement: *selection of suitable sites* and TIN062 Sward enhancement: *choice of methods*.

Pot-grown wildflowers and plugs are expensive and are labour intensive in comparison to seed. They are poor value for money when used as the main method of sward enhancement.



Harebell

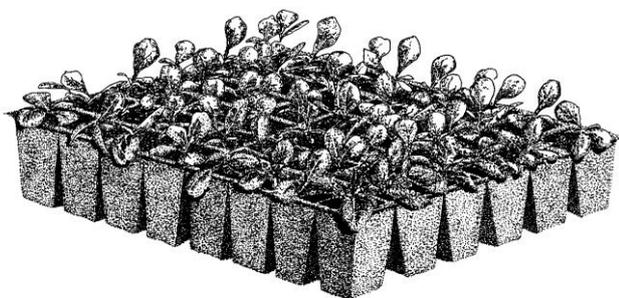
However, they can be useful in the following situations:

- To introduce additional species which are difficult to germinate from seed, and/or mainly reproduce vegetatively.
- To introduce species that have scarce or expensive seed.
- Where there are small scale variations in soil type or soil moisture and species can be specifically selected for those areas.

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- To introduce specific food plants, eg for a particular species of butterfly.

Until their root systems become established pot-grown plants and plugs are susceptible to drought. They are also vulnerable to competition from the existing sward and to damage from slugs and rabbits. Mortality can be high and, once they have established, plants will only spread if the management operations are suitable. Appropriate aftercare and long term management are therefore essential.



Wildflower plug plants

### Species and sources of plants

The species chosen should be appropriate for the area and must be suited to the site conditions. When large numbers of a particular species are required, it may be necessary to set up a contract with a nursery to grow plug plants from seed.

There is little information available on which species establish and persist better when introduced as plug plants rather than as seed. Most plants will establish from seed, in the right conditions.

However, there are some indications that plug plants may be a good choice for the following species:

- bugle *Ajuga reptans*;
- harebell *Campanula rotundifolia*;
- cuckoo flower *Cardamine pratensis*;
- dropwort *Filipendula vulgaris*;
- meadow cranes bill *Geranium pratense*;
- wood cranes bill *Geranium sylvaticum*;
- common rock rose *Helianthemum nummularium*;
- horseshoe vetch *Hippocrepis comosa*;
- field scabious *Knautia arvensis*;
- great burnet *Sanguisorba officinalis*; and
- meadow saxifrage *Saxifraga granulata*.

Plants should be of British native origin and, where possible, they should also be of local origin ie originating from seed collected from grassland close to where they are to be planted. For further information see Technical Information Note TIN038: *Seed sources for grassland restoration and re-creation in Environmental Stewardship*.

### Planting methods

Planting in the autumn is recommended as it allows time for the roots to establish over winter, giving the plants a greater chance of competing with the existing sward in spring. Spring planting is possible but there is higher risk of failure due to drought.

The planting density will vary both between and within sites. This is an expensive method of sward enhancement and a rough guide to the maximum that may be funded under agri-environment schemes is 1 plant per 10 square metres (1000 plants per ha), taken as an average across the whole field.

Planting locations within the site should be carefully chosen, based on the specific ecological requirements for the individual species.

In order to aid cross pollination, assist with relocation and to avoid a regulated appearance plants are best arranged in groups at approximately 30-60 cm spacing.

Plants are often pot bound and vulnerable to drought and they should be watered well prior to transplanting. They should be introduced to bare patches, within a short sward. Where the sward is closed, create bare areas up to 25 x 25 cm by either physically removing a square of turf, or by spot treating in advance with a glyphosate based herbicide.

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It is important to ensure good root-to-soil contact. A specialist dibber may be available from the plant supplier to create a hole identical to the shape of the plug. Ensure that plants are well firmed in.

New plants are vulnerable to grazing damage by rabbits, and they can be pulled straight out of the ground before they establish. Where rabbits are a problem, trimming off the leaves of the new plants can help.

### Subsequent management

Until the plants become established, and particularly when planted in spring, they must be checked regularly for signs of drought stress and where appropriate watered. Temporarily marking the positions of the young plants will help find them for checking.

It is important to keep the sward short in the first spring and early summer after planting, to prevent the plants being shaded out and to reduce the likelihood of slug damage. Regular cutting (with the cuttings removed) or short periods of intensive grazing (subject to the caveats below) will usually be required, unless the site is of very low fertility. Plants may not flower in their first year.

The grassland should not be grazed until the plants are firmly rooted in the sward, and prolonged grazing should initially be avoided in order to reduce the risk of plants being selectively grazed.

In subsequent years, if the field is to be managed as a hay meadow it should be cut late (eg after mid July) with swath turning or tedding undertaken to assist seed shedding. The use of livestock, particularly for aftermath grazing, is important because they create gaps in the sward and they trample in the seed, which helps the introduced species to spread.

Where the field is managed as pasture, plants must be allowed to flower and set seed by reducing the grazing pressure for a period of about eight weeks in spring and summer.

Appropriate long term management is essential for grassland enhancement projects to succeed.

### Further information

Natural England Technical Information Notes are available to download from the Natural England website: [www.naturalengland.org.uk](http://www.naturalengland.org.uk). In particular see:

- Technical Information Note TIN035: *Soil sampling for habitat recreation and restoration in agri-environment schemes*
- Technical Information Note TIN036: *Soils and agri-environment schemes: interpretation of soil analysis*
- Technical Information Note TIN038: *Seed sources for grassland restoration and re-creation in Environmental Stewardship*
- Technical Information Note TIN060: *The use of yellow rattle to facilitate grassland diversification*
- Technical Information Note TIN061: *Sward enhancement: selection of suitable sites*
- Technical Information Note TIN062: *Sward enhancement: choice of methods*
- Technical Information Note TIN063: *Sward enhancement: diversifying grassland by spreading species-rich green hay*
- Technical Information Note TIN064: *Sward enhancement: diversifying grassland by oversowing and slot seeding*

For further information contact the Natural England Enquiry Service on 0845 600 3078 or e-mail [enquiries@naturalengland.org.uk](mailto:enquiries@naturalengland.org.uk).

This note does not supersede prescriptions in agri-environment scheme agreements. If there is any conflict between the information in this note and your agreement please contact your local adviser.

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