

Conserving Important Arable Plants on Chalk and Limestone Soils

Introduction

Many plants once typical of cultivated land now have a greatly reduced distribution and in some cases, they are on the edge of extinction. As they are plants of disturbed and cultivated land, farmers are best placed to conserve them. With the status of many arable plants being of national concern, there is the opportunity for farmers and growers to help rare species on even small areas of land. Suitable conditions for these plants can also benefit a wide range of other farmland wildlife such as Brown Hare, Grey Partridge, Skylark, Turtle Dove and solitary bees.

The reasons for the decline of arable plants are varied, but being associated with farmed land the major changes to crop management over the last century have had a dramatic effect. However going forwards it is very easy to implement management that can bring these plants back from the brink of extinction and benefit all of the wildlife on arable fields.

Why are chalk and limestone soils so important?

It is thought that farming was introduced to Britain somewhere between 5000 and 4500 BC. Before then, species now regarded as arable plants would have survived in bare ground arising from natural disturbance, herbivore poaching and naturally infertile areas, where they co-existed with grassland plants.

Early farmers, having only primitive ploughs, favoured lighter and therefore more easily cultivated, chalk and limestone soils. Rising land

was also more easily defended, meaning that these locations were preferred by early settlers. With the arrival of permanent settlements, much larger areas of cultivated ground were created and “arable” plants spread. With only natural fertilisers and a longer growing season they quickly adapted and thrived within agriculture for thousands of years.



Cornflower and Common Poppy © Cath Shellswell

Where can arable plants be found?

Modern crop management and earlier harvests make it impossible for rare arable plants to survive and set-seed within most crops, nevertheless they can persist in the seed bank or within peripheral areas. Arable plants tend to grow along the fringes of arable crops, in cultivated uncropped field-corners, within game covers and on bare ground following excavations. On rolling chalk and limestone the field edges tend to be particularly infertile either naturally or because the upward slope means fertiliser applications have not reached the field edge. These locations are well worth searching for arable plants and considering for targeted management, either on a voluntary basis or within an agri-environment option.

Depending on the type of 'host' crop, and the agronomy applied, rare arable plants can sometimes also be found growing within the crop although the timing of harvest may prevent successful seed-set.



Venus' looking-glass © Cath Shellswell

What options and opportunities are there alongside modern farming?

With lighter soils being marginal at world prices, it may be more economic for areas to be uncropped and managed as fallow. This could be to simply avoid applying inputs to areas with low yield potential or to receive environmental payments through existing or future schemes.

Benign arable plants can be successfully conserved through several agri-environment options. Cultivated uncropped margins and low input cereal are the best options, but arable plants are also found within other options such as under-sown spring cereals, wild bird seed mixtures and over-wintered or spring fallows.

How can weed burdens be avoided?

Aggressive weed species are obviously a major headache for farmers, affecting the quality of crops, competing for light and nutrients, and acting as disease bridges through the rotation. The build-up of pernicious weeds can also threaten localised populations of less competitive rare species and undermine the viability of suitable options. However, there are ways to reduce the risks of pernicious weeds establishing and control outbreaks.

Key management principles to benefit rare arable plants and avoid pernicious weeds:

- Consider arable plants to be a 'crop' rather than a separate part of the arable field. The aim is to create an area with a range of annual flowers that will be home for invertebrates and provide a seed source for small mammals and farmland birds.
- Select autumn or spring cultivation to favour the target species and ensure that the management will fit with your cropping regime. Rotate this around the farm so that areas are not continually autumn or spring cropped. This can help control some pernicious weeds, such as autumn germinating grasses and Bristly Oxtongue.



On thinner and less fertile headlands targeted fallow can produce an abundance of arable plants. As well as benefiting a wealth of insects and bird species, such strips can be striking, and good PR for the farming industry. This strip has been managed as non-rotational for over 10 years without a significant build-up of aggressive weeds and yet the adjacent crop of spring barley has been kept very clean.

- Arable plants respond better to ploughing than minimum tillage. As minimum tillage does not disturb the soil sufficiently to trigger many arable plant seeds to germinate, and without herbicide sprays a cover of grass will eventually shade-out more diminutive arable plants.
- Plan and manage the option with the same care as you would a commercial crop. Cultivating the plot to a fine tilth - as if the area was being cultivated for a cereal crop - gives arable plants the best growing medium to germinate. Remember that these are plants of cultivated and disturbed land. Without cultivation the arable plants will not be triggered to germinate, and some weeds, such as Creeping Thistle, can establish and start to dominate.
- Use cultural control, such as rotating the plots or autumn or spring cultivations, ahead of the ideal germinating period.
- Creating sterile seedbeds and using glyphosate to control areas with high levels of weeds may be necessary especially where there are reasons for not rotating plots.

A West Sussex Case Study – Peppering Farm

Peppering Farm is situated in the South Downs near the town of Arundel. The soils are principally chalk downland with some areas of clay cap with flints over chalk. The rotation is for seven years and includes winter wheat, winter barley, winter oilseed rape, combinable peas, and spring barley for malting. A second spring barley is under-sown with a two-year grass ley using a short term mixture including chicory, and is grazed by sheep from the first autumn.

Unharvested conservation headlands have been grown for over 10 years with agri-environment funding as part of a large-scale Grey Partridge Recovery Project. Two-year grass / clover leys are integrated within the arable rotation by under-sowing the third and fifth year of cereal helping to create a diverse landscape. Conservation headlands are included within the arable cropping to ensure there is widespread and consistent coverage of this valuable habitat.

The headlands at Peppering Farm are managed flexibly while still meeting the conservation objectives and prescriptions. The farm delays the drilling of the headlands around winter crops by several weeks and then drills with farm-saved seed to reduce costs as these areas are not harvested and thus do not form part of the commercial revenue of the farm. This delay allows a sterile seed bed to be created and treated with glyphosate where required, which has proved very effective in countering the weed threat. The choice of herbicide with active ingredients that can be used during the spring is limited, and this management means that spring herbicides do not need to be applied.

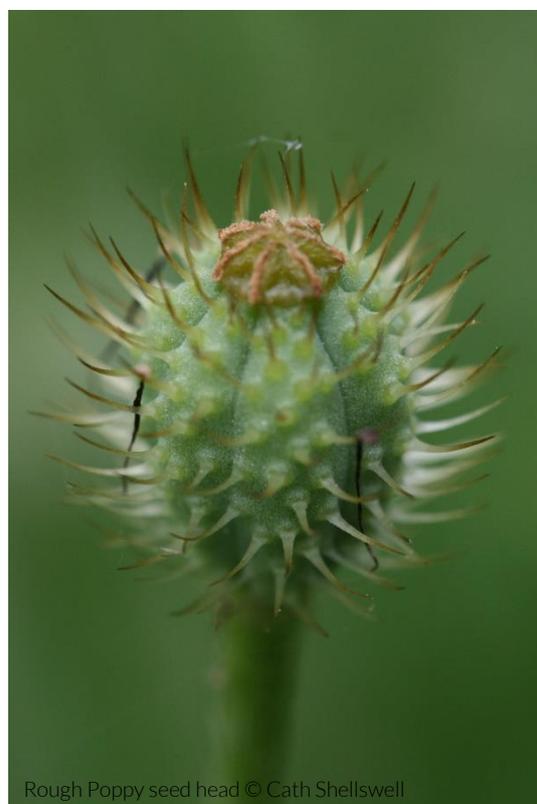
A wide range of indicator species are found in the headlands plus several uncommon and rare ones which, in 2018, included Dwarf Spurge, Prickly Poppy, Night-flowering Catchfly, Venus'-looking-glass and in places abundant Narrow-fruited Cornsalad. Cornflower and Rough Poppy have been recorded in previous years.

Cornflower and Common Poppy, shown on the first page of this leaflet, are in a cultivated fallow plot. This area has been retained as fallow for several years under an ELS / HLS agreement and has encouraged a wide range of arable plants including Common Fumitory, Venus'-looking-glass and Small Toadflax. Plots like this are also well used by species such as Grey Partridge, Brown Hare and Corn Bunting.

Within the same headland less common species like Rough Poppy (right) have appeared. Note the characteristic round, spiky, seed pods and crimson petals.



Rough Poppy © Cath Shellswell



Rough Poppy seed head © Cath Shellswell

As techniques for encouraging rare arable plants are usually separate to crop management, their establishment and location must be carefully planned. This cultivated fallow strip in the Cotswolds has also buffered and complemented the adjacent hedgerow and woodland.



© Peter Thompson

Typical benign “indicator” species of chalk and limestone arable soils:

Stinking Chamomile	<i>Anthemis cotula</i>
Small Toadflax	<i>Chaenorhinum minus</i>
Fig-leaved Goosefoot	<i>Chenopodium ficifolium</i>
Common Cudweed	<i>Filago germanica</i>
Dense-flowered Fumitory	<i>Fumaria densiflora</i>
Sharp-leaved Fluellen	<i>Kickxia elatine</i>
Round-leaved Fluellen	<i>Kickxia spuria</i>
Henbit Dead-nettle	<i>Lamium amplexicaule</i>
Venus’-looking-glass	<i>Legousia hybrida</i>
Field Pepperwort	<i>Lepidium campestre</i>
Bugloss	<i>Lycopsis arvensis</i>
Corn Mint	<i>Mentha arvensis</i>
Annual Mercury	<i>Mercurialis annua</i>
Common Broomrape	<i>Orobanche minor</i>
Yellow-juiced (Babington’s) Poppy	<i>Papaver lecoqii</i>
Cornfield Knotgrass	<i>Polygonum rurivagum</i>
Small-flowered Buttercup	<i>Ranunculus parviflorus</i>
Rough Poppy	<i>Roemeria hybridum</i>
Field Madder	<i>Sherardia arvensis</i>
Corn Parsley	<i>Sison segetum</i>
Knotted Hedge-parsley	<i>Torilis nodosa</i>
Green Field-speedwell	<i>Veronica agrestis</i>
Grey Field-speedwell	<i>Veronica polita</i>

Rare arable species of chalk and limestone arable soils:

Corn Chamomile	<i>Anthemis arvensis</i>
Rye Brome	<i>Bromus secalinus</i>
Field (Corn) Gromwell	<i>Buglossoides arvensis</i>
Cornflower	<i>Centaurea cyanus</i>
Dwarf Spurge	<i>Euphorbia exigua</i>
Broad-leaved Cudweed	<i>Filago pyramidata</i>
Fine-leaved Fumitory	<i>Fumaria parviflora</i>
Red Hemp-nettle	<i>Galeopsis angustifolia</i>
Henbane	<i>Hyoscyamus niger</i>
Wild Candytuft	<i>Iberis amara</i>
Blue Pimpernel	<i>Lysimachia foemina</i>
Perfoliate (Cotswolds) Pennycress	<i>Microthlaspi perfoliatum</i>
Cat-mint	<i>Nepeta cataria</i>
Prickly Poppy	<i>Roemeria argemone</i>
Shepherd’s-needle	<i>Scandix pecten-veneris</i>
Night-flowered Catchfly	<i>Silene noctiflora</i>
Cut-leaved Germander	<i>Teucrium botrys</i>
Spreading Hedge-parsley	<i>Torilis arvensis</i>
Narrow-fruited Cornsalad	<i>Valerianella dentata</i>
Hairy-fruited Cornsalad	<i>Valerianella eriocarpa</i>
Wild Pansy	<i>Viola tricolor</i> subsp. <i>tricolor</i>

Further Recommended References:

Rare arable flowers app (2015) Centre for Ecology and Hydrology, Botanical Society of Britain and Ireland, Plantlife, Joint Nature Conservation Committee, Biological Records Centre and Natural England.

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Night-flowering Catchfly © Cath Shellswell



Dwarf Spurge © Cath Shellswell



Narrow-fruited Cornsalad © Cath Shellswell