

# **GUIDELINES FOR GROWING SEED CROPS TO FEED FARMLAND BIRDS IN WINTER**

## **INTRODUCTION**

These guidelines have been produced using the results of a three-year DEFRA-funded project carried out by the Allerton Research and Educational Trust with the Game Conservancy Trust, which researched the use of seeding crops and other plants by seed-eating birds in winter and also measured seed persistence and depletion rates. Also as part of the project, a large scale survey carried out by the British Trust for Ornithology quantified the value of game crops, wild bird cover on set-aside, and wildlife seed mixtures in the pilot Arable Stewardship scheme. Information from other trials has also been drawn on where relevant.

The work showed that growing crops to feed seed-eating birds over winter can be a valuable way of providing food for these species which can otherwise be scarce on modern farmland. It is thought that lack of food during winter may be an important factor in the decline of seed-eating farmland birds. The crops were also used by predominantly insectivorous birds such as thrushes and the dunnock, and by gamebirds. For these species, the provision of cover and favourable conditions for invertebrates may also be important.

Seed producing crops can be grown on set-aside as “Wild bird cover”, or under a Countryside Stewardship scheme agreement as “Wild bird seed mixtures”. In the latter case, a grant of £510/ha (2002) is payable.

## **CHOICE OF SEED-PRODUCING PLANTS**

### *What type of plants should be grown?*

The greatest seed yields are produced by annual and biennial plants (those that live for one and two years respectively). Because they have no other means of reproducing, these plants put all their resources into seed production. Perennial (long-lived) plants, in contrast, may also be able to reproduce vegetatively, and even those species for which this is not an option have opportunities to reproduce by seed over a number of years so do not need to produce such large quantities each year.

Unfortunately, most wild annuals and biennials which commonly grow on farmland are viewed by farmers as weeds because they have the potential to compete with commercial crops. Furthermore, seeds of these plants often acquire dormancy as a strategy to avoid germination in unfavourable conditions, with the result that their appearance can be erratic. Crops do not usually suffer from this problem as dormancy characteristics have largely been selected out by breeding. Also, they are less likely to cause weed problems, though they can become weeds in some situations. Growing crops to provide food for birds therefore offers a practical solution because:

- ? Farmers are used to growing them and know how to manage them
- ? They are less likely to cause weed problems, and so are more acceptable to farmers and growers
- ? They produce large quantities of seed

Species tested in the research project included arable crops and some which are commonly grown as game crops.

### ***Which species should be grown?***

Choice of crop species depends on :

- i). Number of bird species which will use it
- ii). Conservation status of bird species
- iii). Amount of seed produced
- iv). Seed persistence on the plant

Whilst most crops are used by some birds, certain types stand out as being used by a number of bird species, including declining species. Amongst the annual crops, those used by a wide range of bird species included **quinoa**, **turnips**, and **cereals**. Turnips were particularly favoured by insectivorous species. It is probable that seed-eating birds were attracted by weeds growing with turnips, as the crops themselves would not have been seeding. **Linseed** was also ranked highly for seed-eating passerines (finches, buntings etc), and several species used **oilseed rape**, and **millet**. Sunflowers, borage, buckwheat and phacelia were little used except by greenfinches, which feed selectively on sunflowers and borage. However, as greenfinches are not declining, growing these crops for seed probably has little conservation benefit. Maize is used by gamebirds, particularly pheasants and red-legged partridges, and also woodpigeons, but is not eaten by smaller seed-eating birds.

Of the biennials, **kale** in its second year (it has no seeds in the first year) was the most widely used, and in the large-scale survey was the most highly ranked crop for seed-eating passerines and Biodiversity Action Plan species. **Teasel** and **evening primrose** were especially favoured by goldfinches.

Among bird species using the preferred crops were the following:

Quinoa	Chaffinch, greenfinch, bullfinch, corn bunting, reed bunting, tree sparrow, skylark.
Turnips	Chaffinch, reed bunting, blackbird, dunnock.
Cereals	Yellowhammer, corn bunting, skylark, pheasant.
Linseed	Greenfinch, goldfinch, corn bunting, reed bunting, red-legged partridge.
Oilseed rape	Reed bunting, tree sparrow, woodpigeon, grey partridge.
Mustard	Greenfinch, linnet, reed bunting, corn bunting, dunnock.
Millet	Yellowhammer, reed bunting, tree sparrow.
Kale	Greenfinch, chaffinch, linnet, tree sparrow, bullfinch, reed bunting, blackbird, song thrush, dunnock, woodpigeon, grey partridge, red-legged partridge, pheasant

Crops producing high yields by weight and numbers of seed included cereals (particularly triticale), millet, and quinoa. Triticale also retained its seed longer than other cereals.

## AGRONOMY

### *Sowing dates*

Quinoa	late April or early May (after danger of frost has passed).
Turnips	late April- August.
Cereals	Triticale or wheat can be sown in autumn or early spring (February or March). Autumn sowing is better on heavy soil.
Linseed	Autumn or spring, depending on variety.
Rape	Autumn or spring, depending on variety.
Mustard	May-July.
Millet	late April or early May (after danger of frost has passed).
Kale	March-early May.
Teasel	March-early May.

### *Seed rates*

The following seed rates are approximate and may need to be varied according to soil, and sowing conditions.

<b>Crop</b>	<b>Seed rate kg/ha</b>
Quinoa	7-10
Turnip	3-6
Cereals, autumn sown	100-120
Cereals, spring sown	140-160
Linseed	50-80
Rape	9
Mustard	9
Millet	15-20
Kale	3
Teasel	1

### *Sowing method*

Cereals and kale should be drilled, cereals at normal row spacing, kale at 40-50cm row spacing. Other seeds may be drilled or broadcast, but care should be taken with small seeds such as quinoa, millet and teasel not to sow too deeply or the crop may fail to emerge. Where a mixture is being sown, small seeds should be broadcast first and then larger seeds drilled so that the resulting soil disturbance helps to incorporate the broadcast seeds into the surface. If more than one crop is to be drilled in the same ground, it is better to overdrill the second with the rows offset rather than mixing in the drill, to avoid competition in the rows. Alternatively, drilling alternate strips avoids competition between the crops and makes subsequent crop management easier. Millet in particular is a poor competitor and so tends to perform poorly when grown with other crops.

## ***Mixtures***

Kale can be mixed with cereals or quinoa to provide a two-year mixture, but if mixed with cereals it should be sown in March, whereas mixtures containing quinoa should be sown later as quinoa is not frost hardy. Thus a three-way mixture of kale, quinoa and cereal is unlikely to be practical in most cases. Adding teasel will provide additional food for goldfinches in the second year.

Triticale is the best cereal to grow, as it is more competitive, grows better under conditions of low fertility, and most importantly, stands better and retains its seed for longer than other cereals. If triticale is not available, wheat should be the second choice.

For an annual mixture, triticale can be sown with linseed or rape. However, if sowing in autumn, mixtures with rape need to be sown early to ensure establishment, and if sowing after early September, linseed is a better companion.

## ***Fertiliser***

As for any crop, residual fertility from previous cropping should be taken into account. Where soil is reasonably fertile, little fertiliser may be necessary, but where fertility is low, especially where seed crops have been grown for several years, additional fertiliser may be essential to establish a worthwhile seed crop. In such situations, lack of fertiliser can result in little seed being produced, or even total crop failure. It is recommended that 30kg/ha of nitrogen should be applied to all crops, and more if necessary. Kale in particular requires adequate fertility, and at least 90kg/ha of nitrogen may be required to ensure adequate seed production.

## ***Weed control***

It is not necessary to keep seed crops totally weed free. In fact many species of weeds provide a source of food for birds in their own right and so add to the feed value of the crop. Particularly useful are the *Polygonum* weeds such as knotgrass, redshank and black bindweed, and others such as fat hen, and chickweed.

However, if the weed seed bank is large, some weed control may be necessary to allow crop establishment. This is more difficult in mixtures, though a cereal/linseed mixture can be treated with metsulfuron-methyl to control broadleaved weeds and selective control of grass weeds is possible in cereals other than oats, and in broadleaved crops. Where perennial weeds such as couch, dock and thistle become established, consider treating with glyphosate before resowing. This may mean re-drilling in the following autumn rather than spring in order to allow enough leaf to form to provide a target.

If weed become a serious problem, it may be better to move seed crops to new areas rather than sow successive crops on the same ground.

### ***Pest control***

Insecticides are best avoided if possible. However, kale, quinoa and linseed are very susceptible to flea beetle attack as seedlings, and treatment may be necessary to avoid crop failure. If treatment is essential, a non-persistent product should be chosen and great care taken to avoid drift onto other crops or habitats.

Pigeons can be a problem, particularly where brassicas such as kale and rape are grown. "Humming tape" has been used successfully to control pigeon damage.

Rabbits can also be damaging and should be controlled if necessary. Hares often use areas of seed crops, but observations have shown that they do not usually feed on the seed crop, but eat grasses and weeds growing with it. Hares do eat cereals, but these can withstand some grazing. Hares will nip the tops off sunflower seedlings, but a multi-headed variety exists which appears to be resistant to hare grazing.

### ***Plot size***

Plots should be at least 0.4 ha (1 acre), to ensure that weed is available throughout the winter. Crops should be left *in situ* until the end of March, as late winter is the time when food is most scarce. If the same area is to be used for seed cropping in successive years, it is useful to allocate a larger area and split it into two or three sections. This has a number of advantages:

- ? Where kale is grown, crops can be sown on different sections each year to ensure that seed is produced on one or other each year;
- ? If spring cereals are to be sown, a previous crop can be left in place and a second area cultivated for the new cereal crop.
- ? Where perennial weeds become established, the crop can be left for a further season to allow control with glyphosate, and re-sown in autumn or the following spring; meanwhile crops on the other sections will provide seed.
- ? On heavy land, it is usually better to carry out ploughing in the autumn, as soil is often too wet in spring. This allows the soil to weather to a tilth for spring sowing. Dividing the area into sections means that seed production can continue on the other section(s).
- ? Different crops can be grown on different sections alternately, thus avoiding excessive build-up of weeds and diseases which thrive in one particular crop.

### ***Location***

More birds of several species were found to use seed crops where they were positioned adjacent to hedges; these included pheasant, dunnock, song thrush, blackbird, linnet, greenfinch, chaffinch and yellowhammer. Tree sparrow, greenfinch and linnet were more common by taller hedgerows. Locating crops near hedges will therefore benefit the greatest number of birds. However, corn buntings were more common where there were fewer hedges and lower hedges, and skylarks tend to avoid field boundaries, preferring open landscapes. Plots or strips sited away from hedgerows and other cover are more likely to benefit these species.

N.D.Boatman  
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