Managing uncropped land to enhance biodiversity

Biodiversity on uncropped land
The EU, the UK Government and consumers expect efficient food production without compromising the health and aesthetics of the countryside. One of the best options for increasing biodiversity in this context is to try and encourage the wildlife species that occur naturally around the farm by using land less suited to efficient food production. Grass margins and well-maintained hedgerows are important but not enough. Alternative vegetation needs to be established to provide shelter, habitat and food for a broad range of species at key times of the year.

What are the requirements for improved biodiversity on-farm?
Farmland wildlife can be encouraged by boosting supplies of food such as flowers, insects and seeds and creating habitats for breeding. Flowers are essential food for insects including bees, butterflies and hoverflies and should be provided for as long as possible over the summer. A range of flower structures are required including legumes, simple flowers (eg yarrow) and more complex flowers (eg knapweed). Many insects require grasses for food whilst tussocky grasses in hedgerows or field margins also serve as overwintering sites for insects and nesting sites for birds.

Invertebrates are an essential food source for most birds, especially the chicks, and so insect-rich areas are needed in spring and early summer. In winter, birds are heavily dependent on crop and weed seeds.

How to provide for biodiversity?
To provide shelter, habitat and food for a broad range of biodiversity throughout the year the following vegetation types need to be established.

Flower-rich grass cover (EF1, EF7, EE3, EE9)*. Contains a range of species that flower for as long as possible over the summer and includes species that are robust and easier to establish: red clover, bird’s-foot trefoil, knapweed, ox-eye daisy and yarrow along with the less competitive fine grasses, such as the fescues. This vegetation will persist for years with the correct management and so is ideally suited to farmland which is difficult to manage with modern machinery. Alternatively, pollen and nectar-rich mixtures (EF4) can be sown alongside, or close to, existing grass-only margins.

Winter bird seed cover (EF2)*. Essential for the survival of some species. Seed mixes can be sown in the early autumn and last for up to 18 months. Alternatively, these may be spring sown and can last for one or two years, depending on the mixture. A range of seed sizes are needed and should include cereals and oily seeds. Of the cereals, winter or spring triticale is best at holding its seed over the winter. Millet provides a smaller seed but can only be sown in the spring. Fodder radish, kale, quinoa or linseed provide oily seeds. Whilst fodder radish is more robust than kale and may hold its seed for longer into the spring, more birds prefer kale. Linseed may be preferred in areas where flea beetle and pollen beetle severely reduce spring sown fodder radish and kale seed production. Spring sown quinoa is easy to grow and produces good quantities of protein-rich seed. Birds may need supplementary feeding in March and April where the seed in the sown mixtures is exhausted.

*ELS options in England that may be appropriate.
Insect-rich cover (EF4, EF10)*. Provides habitat for insects over the summer and therefore food for most birds. This cover can be autumn or spring sown. A cereal component is required to provide shelter but this must have an open/thin canopy to allow access by birds to their insect prey. The other components of the mix could include trefoils, mustard or phacelia or linseed. The preferred cereal is winter or spring triticale, particularly if it is left over winter as an additional source for winter bird seed.

Natural regeneration or fallow after a spring cultivation (EF11, EF13)*. Only provides good value if the existing seeds in the soil are dominated by species that are most valuable to biodiversity including fat hen, common chickweed, fumitory and knot-grass. This will only be the case if spring cropping has been regularly adopted over the last few years. If not, it would be preferable to increase the area of floristically enhanced grass.

How much land is required?

To increase bird numbers the Farm4Bio LINK project suggests that, when equally split between the four covers, a minimum of 4ha of uncropped land (ie land that could otherwise be cropped) in every 100ha of arable land is required. Using fresh ground minimises weed problems.

Where on the farm should the covers be situated?

It is best to encourage species that are already present and which depend on the existing farm landscape. Land least valuable to crop production can be used including very small fields, patches of poor soil, headlands or parts of fields that are awkward for modern machinery. Insects prefer warm, sheltered sites and therefore land devoted to producing flowers is best located on the south side of hedgerows but preferably not alongside woodland. Desirable plants for biodiversity are most likely to persist in those areas with low soil fertility.

Many of the bird species that nest in hedgerows and ditches are territorial and so require their own space. Vegetation that supports insects for bird food over the summer should be established in narrow strips (ie the width of the farm drill) and within the range of movement of the species from the nest. This maximises the number of territories and reduces the distance travelled for food (Table 1). Narrow strips also benefit insects such as butterflies and bees. In contrast, bird species that can flourish in open, sheltered sites and therefore land devoted to producing flowers is best located on the south side of hedgerows but preferably not alongside woodland. Desirable plants for biodiversity are most likely to persist in those areas with low soil fertility.

Table 1. Habitat and nesting preferences and maximum distance travelled from the nest for food for a selection of familiar bird species in summer.

<table>
<thead>
<tr>
<th>Representative species</th>
<th>Open habitats: nesting &amp;/or feeding</th>
<th>Nest in or near hedges</th>
<th>Ground nesting</th>
<th>Range of movement in summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lapwing</td>
<td>❌</td>
<td>✓</td>
<td>Usually &lt; 500m</td>
<td></td>
</tr>
<tr>
<td>Skylark</td>
<td>✓</td>
<td>✓</td>
<td>&lt;&lt; 500m</td>
<td></td>
</tr>
<tr>
<td>Grey Partridge</td>
<td>✓</td>
<td>✓</td>
<td>&lt; 500m</td>
<td></td>
</tr>
<tr>
<td>Linnnet</td>
<td>✓</td>
<td>✓</td>
<td>≥ 500m</td>
<td></td>
</tr>
<tr>
<td>Yellowhammer</td>
<td>✓</td>
<td>✓</td>
<td>&lt; 300m</td>
<td></td>
</tr>
<tr>
<td>Whitethroat</td>
<td>❌</td>
<td>✓</td>
<td>&lt; 200m</td>
<td></td>
</tr>
<tr>
<td>Dunock</td>
<td>❌</td>
<td>✓</td>
<td>&lt; 100m</td>
<td></td>
</tr>
</tbody>
</table>

The above bird species are representative of the range and scale of habitat provision needed (eg yellowhammers need foraging habitat within 300m of their nest site).

Background

The Farm4bio project is funded through the DEFRA’s Sustainable Arable LINK programme. The objectives are to determine whether acceptable levels of biodiversity can be achieved on conventional arable farms through the management of uncropped land and to identify the amount and best arrangement of such land. The project started with baseline monitoring in the summer of 2006 and the first mixtures were sown in spring 2007. The project finishes February 2011.

Research partners include: The Arable Group (TAG), The British Trust for Ornithology, The Game and Wildlife Conservation Trust and Rothamsted Research. The project is sponsored by Bayer CropScience, BASF, Cotswold Seeds, DEFRA, Dow AgroSciences, DuPont, HGCA, PGRO and Syngenta.

Further information

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