

Filling the seed and nectar hungry gaps for birds and bees: lessons from personal experience of agri-environmental schemes since 1992

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Abstract

For small farmland birds, fodder radish (*Raphanus sativus*) is outstanding in ability to provide seed, often well into the January to April hungry gap, and also as a woodpigeon/game bird deterrent for supplementary feeding. Each year, especially when fodder radish was poorly established and weather beaten, supplementary feed was protected by chicory, an area of hedge trimmings or a weldmesh screen. It is suggested that such measures should be added to Defra/RPA Cross-Compliance Rules. For bumble-bees, temporal nectar gaps were seen in Environmental Stewardship sown field margins and meadows, notably in March to April 2011, with a further deficiency in August to September (Bingham, 2012a). The early nectar gaps can be conveniently met by planting areas of goat willow (*Salix caprea*) and blackthorn (*Prunus spinosa*) in field corners. The later gap is mainly a result of wide regional and genetic variation in date of flowering of Common Knapweed (*Centaurea nigra*). It can be met by sowing a later variant selected from Rosie Curston's meadow, typical of Norfolk, which is being multiplied as a seed stock.

Key words: Filling hungry gaps, small farmland birds' seed, bees' nectar

Introduction

Increases of crop yields in the UK have enabled release of land for biodiversity purposes (Bingham 2010). Taking wheat as an example, from 1975 to 1990, the National Average Yield increased by 2.6 t ha⁻¹, i.e. 3.3% per year, attributable equally to plant breeding and agronomy. The increase continued at a similar rate until 1997, despite no further increase in rate of N application. However, average on farm yield has now stagnated for 15 years despite a varietal increase averaging 0.5% per year in National Trials (Mackay *et al.*, 2011). A recent report reviews possible agronomic and climate restrictions (Knight *et al.*, 2012). Hopefully, in the long term, perhaps 20 years, a greater genetic step in yield potential of varieties will be obtained by building in a more efficient photosynthesis system equivalent to that of Maize. Meanwhile, competing uses of land spared from food production include wildlife reserves, environmental stewardship options and, increasingly, the biomass crops willow, *Miscanthus* and, especially, maize (on account of its added rotational benefit).

In effect, land use for biodiversity purposes must be much more efficient. Extensions of wildlife reserves and equivalent restorations have been very successful because the chosen sites and soil types are ideal for the purpose. Such projects involve organisations that are well supported by their members for land purchase and as conservation volunteers; examples include the RSPB

at Lakenheath, the Great Fen Project on formerly drained fen, Norfolk Wildlife Trust reserve extensions on salt marshes and Breckland sands, and the community funded and managed Magog Down on formerly farmed chalkland at Stapleford near Cambridge. Some Stewardship projects fall into this category with similar success; I have three such on farm, natural regeneration of an arable field neighbouring Rosie Curston's Meadow, natural regeneration on a sandy loam hillside following full term set-aside and restoration of a small riverside fen by blocking off deep ditches from a 1950s drainage scheme.

Conservation action that does not involve the protection or restoration of semi-natural habitat areas has proven more difficult and successes tend to be local in scale. In practice, such action commonly entails integration of environmental management with productive agriculture, which has mostly been approached via agri-environment schemes such as Environmental Stewardship. Despite strong uptake, such schemes may fail to deliver their objectives; important examples of this involve food resource provision for seed-eating birds through the winter and nectar for bees in spring and late summer, in each case creating a bottleneck for the relevant population. Filling these seed and nectar hungry gaps for farmland birds and bees using Stewardship options has proven much more difficult and elusive than relatively simple habitat protection. Here, I describe observations from trials of possible solutions on our 100 ha farm in Norfolk, including the Hedgerow Incentive Scheme (1992), Countryside Stewardship Scheme (CSS, 1994) and now Entry-Level (ELS) and Higher-Level Stewardship (HLS).

Farmland Birds

National populations of small birds, like Linnet, Chaffinch, Dunnock and Yellowhammer, have not recovered despite the wide adoption of Environmental Stewardship measures (Davey *et al.*, 2010, Baker *et al.*, 2012). We were fortunate to be a collaborating farm in the BTO research project which identified the January to April hungry gap (Siriwardena *et al.*, 2008).

The following comments and observations are by way of "operational research". Since 1970, the adverse consequences of more winter cropping have been accentuated by great increases in the numbers of woodpigeons, pheasants and red-legged partridges competing for seeds. Woodpigeon numbers are up nearly three-fold, while the numbers of pheasants and red-legged partridges released for game have risen by about 5% per year to more than 25 million and 3 million respectively. Moreover, the body weight of a woodpigeon at approximately 500 g is about 15 times that of a yellowhammer and 30 times that of a linnet. My observations strongly suggest that such large birds must be excluded from food resources intended for smaller species if the latter are to be fed adequately. Cropping and supplementary seed delivery systems are needed that promote such exclusion and are also robust or adaptable to contrasting weather conditions, such as between the winters of 2011–12 and 2012–13.

Effectiveness of fodder radish

Among potential seed crops, fodder radish is outstandingly the most suitable species, capable of holding seed in good condition for 6 months or more, protected by the indehiscent pods and pithy filling. Moreover, its dense and rather bristly growth effectively deters woodpigeons, pheasants and partridges. On our farm, we have grown fodder radish in bird cover plots for 4 years. From January to the end of March 2012, one of our areas carried a flock of more than 500 Linnets. However, like many seed crops, fodder radish success is highly variable with weather conditions. For example, during winter 2012–2013, I have seen two good areas of fodder radish but, like many others, ours is thinly established and weather beaten, so a supplementary seed resource is essential.

Supplementary feeding

As some ground feeding birds may be unable to access the seed on the plant, we regularly spread a small amount of supplementary seed into fodder radish crops. An alternative would be to flail a marginal strip well into the standing crop with a forage harvester. Direct flailing onto the ground

immediately attracts woodpigeons. Poor crop establishment means such supplementary feeding is still more essential to maintain seed supplies. We are using a mixture of wheat (75%) and oilseed rape (25%), avoiding millets because they are liable to contamination with alien grass weeds (see Discussion).

Woodpigeons are the main problem, immediately descending on supplementary feed spread into thin birdseed crops or on to a hard standing. We have tested four other methods that have proven successful, listed below, in ascending order of practicality:

- Feeding in a dry former marlpit, originally dug by hand for lime. Pigeons are wary of entering as it has not been trimmed since 1970 and is now covered by overhanging bush and tree branches.
- Feeding within a fairly dense, low pile of hedge trimmings along a field boundary, which is effective but the trimmings are laborious to move to a new site, so feeding along the coppiced hedge from which the trimmings are cut is preferable. Note that small birds are mostly hidden from view while feeding.
- Feeding within a second year crop of strongly-standing perennial chicory beside an arable field grass margin, as suggested in a leaflet distributed at Cereals 2012 (Bingham, 2012*b*).
- Feeding within a galvanised weldmesh frame with openings of 72 mm × 72 mm, made from mesh originally used in the 1970s for a grain silo with hessian lining. The top is 1050 mm × 2100 mm with sides 500 mm high, hinged on with plastic ties for ease of folding and transport. A greater area can be covered by joining such frames end to end.

These frames exclude pigeons but are freely entered by small birds, blackbirds, starlings and even jays. In a test, Pigeons entered through a single opening enlarged to 100 mm × 100 mm, proving that the standard 75 × 75 mm (3 inch) mesh is the size to use.

Nectar for Bees and Other Insects

This section reports on progress since Bingham (2012*a*). Floristically Enhanced field margins and meadows in Environmental Stewardship typically have few nectar species in March or April, an abundance of them in May to July, but then often disappointingly few again in August.

The early nectar gap is commonly due to an absence of ground ivy (*Glechoma hederacea*), red deadnettle (*Lamium purpureum*) and white deadnettle (*Lamium album*), which occur more frequently on naturally regenerating areas of low soil fertility, sometimes in partial shade. On farm, a practicable countermeasure could be to plant patches of goat (pussy) willow (*Salix caprea*) and blackthorn (*Prunus spinosa*) in Environmental Stewardship field corners. Goat Willow grows vigorously on most soil types, it is not water dependent, and takes readily from cuttings; if it is already on farm, tagging male and female bushes in March will provide a known mixture for cuttings. Blackthorn suckers all too readily, but can be contained as a small thicket by flailing the excess annually, so avoiding the punctures associated with hedge margins; we have three such areas.

The deficiency in late nectar provision is commonly associated with early flowering forms of common knapweed (*Centaurea rigra*), a mainstay species for bees as evident from frontispiece photographs on numerous publications. I was surprised to see it in flower at Haddenham railway station on 18 June 2012, when attending the AAB/BES conference. The variation is genetic, so selection and multiplication for seed can be critical. Emorsgate Seeds, Lincolnshire, now have a vigorous 30 m × 30 m area of the late-flowering Norfolk form, selected from Rosie Curston's SSSI meadow in 2011.

Discussion

Small farmland birds

After more than 20 years of clearly stated objectives and stewardship options, with limited success in practice, Defra and Natural England should reaffirm their determination and accept the need

for novel solutions in methods and ensure they are widely applied. It is important to remember that having 70% of farmland under ELS is not an indicator of success in respect of farmland birds in itself. However, ELS management can have positive effects (Baker *et al.*, 2012) and broader population recovery should be possible, as some committed individual farmers are showing.

I contend that the hungry gap can be widely met only by a well-targeted addition to the Defra/RPA 2013 Guide to Cross Compliance in England, akin to those so effective for water quality that Otters have returned and private fisheries need fencing.

As a farmer I would welcome clear, new guidelines under Cross Compliance, possibly as new, compulsory “Farmland Birds Rules”. The measures could be relatively simple compared to those presently applied to RPA payments and certification of crops for sale.

In summary, I suggest:

- Accept that methods must be physically separated from those supporting pheasants and partridges, in addition to excluding woodpigeons.
- Accept that currently marketed ELS/CFE dual purpose game/wild bird seed mixtures are of limited value, not only for small birds due to little or no fodder radish, but also for game birds due to absence of maize and sorghum.
- Plant designated areas of fodder radish with a small proportion of sunflowers and, separately, for agronomic reasons, strips of triticale and perennial chicory. Aim to sow mainly in spring, with an autumn sown section to counter the risk of poor establishment due to weather or difficult soils, acknowledging that the crop may then take two years in a rotation. Fodder radish is said to be frost susceptible, although in February 2013, ours sown in autumn 2012 is satisfactory. Triticale should then be a winter variety.
- Supplementary feed from January to April, as detailed above, widely into fodder radish if standing well, alternatively chicory, and also into areas covered by hedge trimmings or weldmesh frames. These covered areas should be within a few metres of a tall hedge, uncut for two or more years, with occasional trees for refuge and weather shelter. 1 × 2 m frames are practicable, maintain lines of sight to facilitate predator avoidance and suit the birds’ behaviour of frequent flocking to refuge; place several end-to-end and parallel to the hedge if more space is needed. Point source ground feeders are a less effective but sensible standby.
- Ornithologists and wildlife organisations should also consider establishing farmland bird nature reserves, which can be remarkably effective in providing for the needs of birds and enjoyment of visitors. A very well known one near Norwich, (High Ash Farm, Caistor St Edmund), frequently has flocks of more than 10,000 birds in winter and, on Boxing Day 2012, about 1,000 people appreciating a convenient car park and permissive pathways.

Nectar for bees and other insects

Deficiencies of nectar are more readily surmounted than winter feed for birds, simply because insects hibernate or are otherwise inactive overwinter. The best partner to late flowering common knapweed would be an earlier flowering greater knapweed (*Centaurea scabiosa*) to avoid cross hybridisation. Field scabious (*Scabiosa arvensis*) is also favoured but would benefit from discovery of a more competitive variant for sowing in mixtures. These three species all provide a stable easily worked platform for bees, unlike birds foot trefoil (*Lotus corniculatus*) which, due to its weak stem, is clearly less steady.

Purity of seedstocks

In 2012, I have seen three bird seed areas swamped by an alien bristle grass (*Setaria pumila*) and two contaminated by cockspur grass (*Echinochloa crus-galli*). These are both weeds of warmer climates, including Southern Europe and New Zealand, although susceptible to current graminicides they are vigorous with the potential to be serious weeds in future. It is likely that these arrived via contaminated millet seed supplies. Seed stocks should be purified and possibly so certified; meanwhile I hesitate to use millets as supplementary feed.

Plant breeding opportunities

Joint projects between ecologists and geneticists could result in more effective plant types, for example perennial triticale. It might also be possible to develop a perennial fodder radish on evidence of the related *Brassica* genus. I have grown wild perennial cabbage (*Brassica oleracea*) but seed release was in September–October, so too early for winter bird feeding. Shatter-resistant varieties of oilseed rape are becoming available, so represent a possibility for late season seed retention. Overall, this makes a strong case for research into developing new crop varieties to provide bird seed effectively throughout the winter.

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