Game Cover Crops

Title
Crops for wintering birds (Game Cover Crops) 1998/99-2000-01

Description and Summary of Results
In the late 1990s there was various evidence linking changing bird populations or bird survival rates on farmland with the availability of food in winter. This had promoted a developing interest in the provision of food to birds, not least in the form of specialist 'winter bird crops'. For many farmland birds, mortality following the breeding season had been found to be significant in driving population declines and, for seed-eating passerines, measures to increase food availability in winter had been recommended in many agri-environment initiatives. For example field-stubble prescriptions within the Arable Stewardship schemes, such as weedy cereal stubbles, were strongly advised for the future recovery of some species in arable areas.
In Britain, regional success had been achieved for the Cirl Bunting *Emberiza cirlus* by farmers retaining winter cereal stubbles with a high weed-seed content, on which this species depends. At a national level, there had been less success where a large increase in the year-round availability of fallow land, as set-aside for example, had not been reflected in trend reversals among populations of declining farmland birds. Another option was to manage strips or field margins appropriately. In favourable conditions, many bird species, including several of high conservation concern, such as Grey Partridge *Perdix perdix*, Song Thrush *Turdus philomelos*, Tree Sparrow *Passer montanus* and Linnet *Carduelis cannabina*, will forage along field edges at densities exceeding those in open field areas.
Many farmers and landowners in the UK who are interested in shooting already grow “wild bird crops” designed to provide winter food and cover for game birds (Pheasants *Phasianus colchicus*, Grey Partridge and Red-legged Partridge *Alectoris rufa*). These crops are often grown along field edges and their variable content of maize, millet, cereals, kale, mustard, and other exotic seed-producing plants, can be adapted to attract indigenous seed-eating passerines as well as the game birds, for which they are primarily grown.
Some winter bird crops were eligible within the set-aside scheme (as “wildbird” mixtures), a condition for which participating farmers received arable area payments. However, it was very unclear how much if any benefit such crops actually produced for the non-game birds. So a survey was organised to compare the densities of bird species found on a variety of winter bird crops across England with densities on conventional crops.
Over three winters, data were collected from 192 farm plots on 161 individual farms across England with 122, 130 and 82 farm plots surveyed in the three winters respectively. Significant responses to crop type were recorded for 18 bird species, of which six are subject to national Biodiversity Action Plans (BAPs), and 11 contribute to the national farmland bird index. For most, the densities on winter bird crops exceeded those on conventional crops, but Skylark, Rook *Corvus frugilegus*, Grey Partridge and Reed Bunting *Emberiza schoeniclus* were more prevalent on conventional crops. Across all 18 species, kale, particularly in its second year, was consistently within the top three crops preferred by birds, especially for seed-eating and BAP species. Turnips were preferred by the

insectivorous Dunnock *Prunella modularis* and Blackbird *Turdus merula*, and seed-eating Chaffinch *Fringilla coelebs*, Reed Bunting and Yellowhammer *Emberiza citrinella*, and Quinoa was especially important for Greenfinch *Carduelis chloris*, Bullfinch *Pyrrhula pyrrhula*, Corn Bunting *Emberiza calandra* and Tree Sparrow. Some preferences were shown for stubble or seeding cereals and oilseed rape (buntings), linseed (finches and buntings), canary grass (specialist interest to Song Thrush, Pheasant and Yellowhammer but otherwise less use), sunflowers (Greenfinch), but buckwheat and phacelia were consistently less preferred. Among gamebirds, maize was especially important for Pheasants and Red-legged Partridges but it also attracted Woodpigeons *Columba palumbus*.
Overall therefore, relatively simple crop mixes that include seeding cereals, brassicas (kale, rape, turnips and mustard), quinoa or linseed and especially if they are 'weedy' are the most effective for attracting the widest range of bird species to arable farmland. Bird densities peaked in December and in late winter there was greater contrast between crops in their support of birds, although kale, cereal stubbles and maize remained the most preferred. The position of winter bird crops near field boundaries was a significant factor in the occurrence of some species and some had higher densities in crops grown by higher hedgerows. However Corn Buntings preferred crops grown by open boundaries and lower hedges.

Methods of Data Capture

Farms were selected randomly from arable and mixed farming regions across lowland England. On each allocated farm an observer sampled a survey plot comprising one pre-selected winter bird crop (normally a strip or area near the edge of a field) and two to four nearby conventional fields. On each farm, an observer was asked to walk, once in each month from October to March, around the perimeter of the area of winter bird crop and then a transect through the crop where this was possible. The observer then walked the perimeter of each conventional field before walking a transect across the middle of that field. The location of all birds seen or heard on the fields or in the field boundaries was recorded along with field content, an estimate of crop height (cm), whether the crop was weedy (non-crop plants occupying at least 50% of the intra-crop spaces) or weed free, the proportion of each field boundary that comprised a hedge or wood edge, an estimate of its average height, and a count of mature trees (> 5m height) in each boundary. Individual birds were recorded in the first field or boundary in which they were sighted. Visits were made throughout the day but not in heavy rain or in wind greater than force four. Conventional crops were scored as: bare soil; cereal stubbles; grassland -- improved or permanent, and grazed or ungrazed; non-cereals -- in practice potatoes, carrots and legumes; sugar beet; or winter cereals -- wheat, barley or oats. Winter bird crops were: buckwheat; canary grass (*Phalaris* spp); cereal; kale; linseed; maize; millet; mustard and related “Texsel Greens”; *Phacelia*; quinoa; rape; sorghum; sunflower; teasel; turnip. About half the plots counted were mixed and, although the analysis was designed to find out the preferences for individual species of crop many of the data from mixed stands could be used by associating bird densities with the presence or absence of a particular crop within the mixes.

Purpose of Data Capture
To determine the use made by birds of "winter bird crops" compared to that of nearby fields and their potential effects on reducing winter mortality.

Geographic Coverage
Farms containing one or more 'winter bird crop' plots were selected randomly from arable and mixed farming regions across lowland England.

Temporal Coverage
One visit per month from October to March in the three winters 1998/99-2000/01. Nearly half the sites were visited in at least two of the three winters.

Other Interested parties
The survey was run jointly by the BTO with the Game Conservancy (now the Game and Wildlife Conservation Trust). Funding for the survey came from the Ministry of Agriculture, Fisheries and Food (now known as Defra).

Organiser(s)
Ian Henderson for the BTO, with some staff from the Game Conservancy especially Peter Thompson.

Current Staff Contact
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Publications
The main survey results are reported in:
Henderson, I.G., Vickery, J.A. & Carter, N. 2004. The use of winter bird crops by farmland birds in lowland England. *Biological Conservation* 118: 21-32.
They had appeared a little earlier as a BTO Research Report:
Henderson, I.G., Vickery, J.A. & Carter, N. 2001 (published 2003). The relative abundance of birds on farmland in relation to game-cover and winter bird crops. *BTO Research Report* 275: 1-30.
The survey was noticed in *BTO News* number 232.

Available from NBN?
No.

Computer data -- location
BTO Windows network central area.

Computer data -- outline contents
The data are held in one large (11Mb) text file. Other files are various electronic copies of reports and some preliminary analyses.

Computer data -- description of contents
The data file (grcoverall.txt) contains columns:
1-3 -- Site Number; 5 -- Year (1 2 3 for the 3 winters); 7 -- Visit (1-6); 9 -- temp ?? (contains 0 1 5); 11 -- Field letter (A - E?); 13-14 -- Crop type (coded); 17-19 -- area (hectares); 21-22 -- 2-letter species code; 24-26 -- count of species in the field; 28-30 -- count of species in the boundary; 32-33 -- W=weeds occupying >50% of intercrop area, WF=<50%; 35 -- setaside (Yes/No); 37-39 height of crop (cm); 41-43 -- hedge (proportion of boundary that was hedge or wood edge); 45-46 -- height of hedge (m); 48-50 -- tree (count of mature trees); 52 -- whether crop was seeding or not at time of count; 54-55 57-58 60-61 63-64 66-67 69-70 72-73 75-76 -- other crops; 78 -- number of crop types in field.
Also the SAS program used to generate this data file from the original input.
Other directories contain various reports, papers etc and a series of Excel files containing preliminary graphs etc.

Information held in BTO Archives
1 archive box containing all the data and maps of the sites used.

Notes on Access and Use

Other information needed

Notes on Survey Design

Specific Issues for Analysis
In mixed winter bird crops the true association of birds with individual component crops was not known, therefore the total number of birds of a species recorded on the whole crop was divided by the number of component crops. This allowed the data to be used without pseudo-replication of the total bird count for that crop. However, this method also assumed that the area covered by each component crop was equal, and that birds were evenly distributed throughout the mix. It therefore placed equal weight on each of the component crops and was thus conservative in detecting differential preferences for crops by birds.