Wintering Corn Buntings

Title
Wintering Corn Bunting 1992/93

Description and Summary of Results
The Corn Bunting *Emberiza calandra* is one of a number of farmland birds which showed a marked decline in numbers and contraction in range in the British Isles after the mid-1970s. The decline was most severe in western and northern parts of Britain and in Ireland, and it also declined across much of its range in central and western Europe. By the early 1990s the species was virtually extinct in western Scotland, Wales, Ireland and southwestern counties of England, areas where it had been common or abundant at the start of the 20th Century.

More specifically by 1991 the BTO's Common Birds Census (CBC) index stood at less than a third of what it had been in 1970, although this might have underestimated the decline because of the southeasterly bias in the distribution of CBC plots. There was also a 35% decline in the number of occupied 10-km squares in Britain and Ireland between the two breeding atlases of 1968-1972 and 1988-1991.

Several theories have been put forward to explain the decline, most relating to changes in agricultural practice, although climatic factors may have played a part, the most important of which seemed to be a general change towards the autumn sowing of cereal crops, leading to a reduction in the area of stubble available for feeding birds in the winter.

Stubble fields have long been known to hold high densities of several farmland seed-eaters during the winter, with frequent references in the historical literature to the abundance of Corn Buntings on such fields. The habitat requirements of Corn Buntings in winter had received little attention and the importance of winter stubbles for them had not previously been investigated.

The survey was set up to examine habitat selection by Corn Buntings in winter at regional, landscape and field scales. Such an investigation was important if the potential effects of recent changes in farming policy (particularly the introduction of rotational set-aside and the banning of stubble-burning) were to be assessed.

A total of 1313 completed survey cards with sufficient habitat details was received. This was 66% of all randomly selected land-based tetrads, but coverage was poor in parts of SW Scotland, NE England and the East Midlands. Overall 160 (12.2%) tetrads held Corn Buntings, with the "best tetrads" holding a higher proportion of positive returns than any group of randomly selected tetrads. A total of 2909 birds was recorded in 222 flocks (which included single birds) with an average of 1.4 flocks per occupied tetrad.

Randomly selected tetrads in 10-km squares which lost breeding Corn Buntings between the two Breeding Atlases contained more woodland, moorland and heathland than those in 10-km squares which retained them and were significantly higher in altitude, but they contained less weedy stubble, winter wheat, brassicas, bare earth and human habitation. Squares which retained breeding Corn Buntings contained less moorland than squares in which birds appeared during the inter-Atlas period. Tetrads in newly occupied 10-km

squares were at lower altitudes and contained more winter wheat than tetrads in squares which lost breeding birds.

Half the flocks and 60% of all birds recorded by the survey were found on stubble, and weedy stubble held approximately twice the numbers of flocks and birds as clean stubble. However, this does not take account of the availability of different land-use types. Preference indices revealed a strong preference for stubbles and an avoidance of winter cereals in all cases. Improved grassland was also avoided, and only 14 (8.8%) of occupied tetrads held no stubble.

The median flock size was 6, and the mode was 2 (with 32 flocks). The largest was 130 birds and only one other held more than 100. The largest were on stubble but there were no significant differences in median flock sizes between field types despite the obvious differences in preference. There were no significant differences in median flock sizes between the three broad geographical regions.

Methods of Data Capture

The survey was based on visits to a mixture of randomly selected tetrads (2 x 2km squares) and tetrads selected by local organizers as being most likely to hold Corn Buntings.

One tetrad was randomly selected for coverage in every 10-km square (1466) in which the species had been recorded in either or both of the Breeding Atlases. This covered 97% of the 737 10-km squares in which Corn Buntings were recorded in Britain during fieldwork for the Winter Atlas as well as a further 751 10-km squares in which birds were not recorded during fieldwork for the Winter Atlas. Eleven additional tetrads were included in the survey because some 10-km squares were split between regional organizers and tetrads were chosen in both parts. One hundred and thirty-five randomly selected tetrads fell entirely at sea and were excluded from the analyses, and the remaining ones were classified into one of three categories depending on the pattern of occupancy over the two breeding atlases. Local survey organizers were also asked to select the tetrad which in their opinion was most likely to hold Corn Buntings in the 921 10-km squares in which birds were recorded in the Second Breeding Atlas. The number actually included in the survey was 936 again because of squares split between organisers. Data from these 'best tetrads' were used to increase the sample size of landuse types on which birds were actually recorded but not included in analyses which might be biased by observer choice. Local organizers were asked to give priority to covering randomly selected tetrads (rather than selected 'best tetrads'). Further if a shortage of observers precluded coverage even of all the randomly selected tetrads in their regions, organizers were asked to ensure that there was no bias towards those which looked most likely to hold birds.

Observers made a single visit to each tetrad during December 1992 or January 1993 and were asked to try to get within 200m of all areas within the tetrad and if possible to walk field margins looking for birds. No time limit to a visit was imposed. The recording cards carried a map of the tetrad upon which 20 evenly spaced habitat recording points were marked. Habitat at these 20 points was recorded using codes adapted from the BTO standard (Crick) system. There were fewer non-farmland and more farmland codes so as to include classes for different cereal and grassland types and to include classes for two categories of stubble ('weedy', with over 20% weed cover and 'clean', with less than 20%). The size and location of any flocks of Corn Buntings were recorded on the map and the

habitat on which birds were seen was also recorded using the same habitat codes. Observers were asked to make a separate note of roosting flocks although such flocks were not included in analyses of feeding habitat preference. The presence or absence of stubble in the tetrad was recorded specifically so that its presence could be established even if none of the 20 sampling points fell on stubble.

Purpose of Data Capture
To identify which are the important habitats used by Corn Buntings during the winter.

Geographic Coverage
All of Britain. A random and 'potentially the best for Corn Buntings' tetrad was selected for survey in each 10-km square which had contained Corn Buntings in either or both of the two breeding atlases.

Temporal Coverage
One count in each selected tetrad in December 1992 or January 1993.

Other Interested parties
The survey was funded by the Joint Nature Conservation Committee (JNCC) on behalf of English Nature (now Natural England), Scottish Natural Heritage and the Countryside Council for Wales (now Natural Resources Wales) and under contract to the Department of the Environment (Northern Ireland).

Organiser(s)
Paul Donald

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Publications
The main report of the survey is:
Donald, P.F. & Evans, A.D. 1994. Habitat selection by Corn Buntings *Miliaria calandra* in winter. *Bird Study* 41: 199-210.
The survey was noticed in *BTO News* numbers 178 and 189.

Available from NBN?
No.

Computer data -- location
BTO Windows network central area.

Computer data -- outline contents
The data files contain the full data set, a list of the 10-km squares in which tetrads were selected, the habitats Corn Buntings were recorded on and flock sizes in each.

Computer data -- description of contents
The files contain the following:

DATA is the full data set with the following variables for each tetrad covered in the survey:

Cols 1-2: county (2-letter code); 4-7: 10-km grid square; 8: tetrad (letter); 10-12: altitude (m); 14-15: kind of tetrad code (first character: R = tetrad was randomly-selected, or B = tetrad was selected 'best'; second character: pattern of occupancy in the breeding atlases -- B = present in both, O = present only in first, N = present only in second); 17: unknown (contains S T 0 or .); 19: stubble was present (Y) or not (N) or unknown (.); 21-22: number of habitat points visited in the tetrad (max. of 20);

Cols 23-115: the number of records of each of the following habitats (each is 3 cols right justified): 23-25 woodland, 26-28 scrub, 29-31 downland, 32-34 heath, 35-37 semi-natural grassland, 38-40 moorland, 41-43 bog, 44-46 dry grassland, 47-49 farmland, 50-52 improved grassland, 53-55 unimproved grassland, 56-58 tilled land, 59-61 hay, 62-64 silage, 65-67 cereals, 68-70 bare till, 71-73 root crops, 74-76 brassicas, 77-79 wheat, 80-82 barley, 83-85 grazed land, 86-88 other farmland, 89-91 clean stubble, 92-94 weedy stubble, 95-97 human habitats, 98-100 urban, 101-103 suburban,104-106 rural, 107-109 freshwater, 110-112 saltwater, and 113-115 rock;

Cols 116-121: the count of Corn Buntings.

CBSURVEY is a list of the 10-km squares in which tetrads were selected with county names and patterns of occupancy as recorded by the atlases.

FLOCK.SIZES lists the habitats Corn Buntings were recorded on and a list of flock sizes for each habitat.

MEANS.SAS is an example of a SAS programme used to read in the file DATA.

WINTER.DAT is the raw data, each tetrad having 5 lines: top line: header, with information on grid square, tetrad code etc as in the file DATA; next four lines: habitat data from each of the 20 habitat sampling points -- the codes are as on the back of the survey cards; at the end of the file are the tetrads holding corn buntings - flock size and the habitat the birds were recorded on are appended to the habitat lines in the relevant 1-km square in the tetrad.

Information held in BTO Archives
4 Transfer Cases containing data and letters. All data have been scanned.

Notes on Access and Use

Other information needed

Notes on Survey Design

Specific Issues for Analysis

In the analyses, 32 different land-use types were considered. These were not necessarily mutually exclusive because, for example, a record of stubble with weeds contributed towards the farmland, tilled land, stubble and weedy stubble categories. If fewer than 20 habitat records were entered on a card, the numbers of completed records of each land-use type were scaled up in proportion, although over 90% of cards were completed fully. Cards with fewer than 10 completed habitat records were excluded from the analyses. The altitude of the highest point in each tetrad was extracted from maps. Habitat data from all completed returns were analysed to identify significant differences in the extent of each of the 20 most frequently recorded land-use types between the 3 classes of random tetrad, thus allowing an assessment to be made of differences in the winter habitat composition of 10-km squares which lost breeding birds between the two Breeding Atlases, 10-km squares which retained breeding birds and 10-km squares which gained breeding birds. Similar analyses were used to identify differences in the extent of each habitat between those tetrads holding Corn Buntings during winter 1992/93 and those where no birds were found. Differences in flock size between habitats and regions were quantified. Finally, a series of rank correlations were used to determine whether the actual numbers of birds recorded were correlated with the frequency of any land-use type.