| **Title** | Effects of set-aside management on birds breeding in lowland Ireland |
|-----------|---------------------------------------------------------------|
| **Author(s)** | Bracken, Fintan; Bolger, Thomas |
| **Publication date** | 2006-11 |
| **Publication information** | Agriculture, Ecosystems & Environment, 117 (2-3): 178-184 |
| **Publisher** | Elsevier |
| **Item record/more information** | http://hdl.handle.net/10197/3619 |
| **Publisher’s statement** | This is the author’s version of a work that was accepted for publication in Agriculture, Ecosystems & Environment. Changes resulting from the publishing process, such as peer review, editing, corrections, structural formatting, and other quality control mechanisms may not be reflected in this document. Changes may have been made to this work since it was submitted for publication. A definitive version was subsequently published in Agriculture, Ecosystems & Environment Volume 117, Issues 2–3 (November 2006) DOI: http://dx.doi.org/10.1016/j.agee.2006.03.032 |
| **Publisher's version (DOI)** | http://dx.doi.org/10.1016/j.agee.2006.03.032 |
Effects of set-aside management on birds breeding in lowland Ireland

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Summary

Farmland birds have suffered a severe decline in recent years throughout Europe including Ireland. Agricultural intensification is believed to be the main cause and this has led to the introduction of agri-environmental schemes, of which set-aside is a part. Bird abundance and diversity were compared between set-aside and adjacent tillage or grassland at 18 locations. The set-aside sites were also assigned to one of four management types: rotational set-aside; non-rotational set-aside; first year set-aside that was productive grassland in the previous year; and long-term set-aside that was grazed by animals in winter. Species diversity and the abundances of skylark, meadow pipit and woodpigeon were significantly greater in set-aside sites. Species diversity was not significantly different between set-aside management types and meadow pipit, skylark, pheasant, house sparrow, magpie, snipe and starling were closely associated with non-rotational set-aside, which also contained significantly larger numbers of these species compared to the other set-aside types. This study shows that set-aside does enhance bird diversity and abundance and that, in Ireland, the most effective form of set-aside is non-rotational. It also shows that the most appropriate form of set-aside will vary from situation to situation and that a one size fits all view should not be taken in the development of agri-environmental schemes.

Key words: birds; set-aside; farm management; agri-environmental scheme;

Redundancy Analysis
Introduction

The decline in farmland birds across Europe is well documented (Donald, Green and Heath, 2001), with many studies focussing on the declines in the UK (Fuller et al., 1995). In Ireland declines in farmland birds have also been severe with many species suffering large range contractions between 1968-72 and 1988-91 including grey partridge *Perdix perdix* L. (-86%), twite *Carduelis flavirostris* L. (-53%), yellowhammer *Emberiza citrinella* L. (-37%) and corn bunting *Miliaria calandra* L. (probably extinct) (Newton et al., 1999; Taylor and O'Halloran, 2002).

Concern about the environmental impact of agriculture in Europe has led to the introduction of agri-environment schemes (Kleijn and Sutherland, 2003). The schemes vary considerably between countries but the main aims include reducing nutrient and pesticide emissions, protecting biodiversity, restoring landscapes and preventing rural depopulation (Kleijn and Sutherland, 2003). Farmers are compensated financially for carrying out these measures.

Set-aside is one such scheme. This was initially introduced to reduce over production and agricultural surpluses in the EU (Buckingham et al., 1999) but it has evolved to become part of some agri-environment schemes (Sotherton, 1998).

Rotational set-aside is set-aside that is rotated amongst field parcels on the farm each year and each year a new section of land is under set-aside. This type of set-aside is usually derived from naturally regenerated over winter stubbles. Non-rotational set-side, on the other hand, is land that is left fallow for several years and may be either sown grass or naturally regenerated vegetation. The differences in the management of these two types of set-aside have resulted in the differences in their usefulness as feeding and breeding habitats for farmland birds.
The aims of this study were: (i) to investigate whether farmland bird species showed preferences for set-aside over tillage and grassland fields in Ireland; (ii) to establish whether some of the main set-aside management regimes in Ireland had different effects on the bird species assemblages. Based on previous studies from the UK, it was hypothesised that more species, especially skylark *Alauda arvensis* L., would show a preference for rotational set-aside over non-rotational.

**Materials and Methods**

The study sites comprised of 18 set-aside fields paired with 18 adjacent tillage or grassland fields. All fields were located in Co. Laois and Co. Kildare in central Ireland and occurred within a generally similar agricultural landscape. Four main types of set-aside management were chosen for study:

- **A: Rotational set-aside regenerated from stubble.** In this case the cereal crop had been harvested during the previous summer and the land was left fallow over winter and the vegetation allowed to regenerate naturally (three replicates).

- **B: Non-rotational set-aside (three years or older).** These lands had been left in set-aside for at least three years. The vegetation was either originally sown grass or natural regenerated vegetation. One site was a ninth year set-aside that was burnt off using pesticides in September 2003. The old grass was dead and yellow with vegetation beginning to regenerate. (six replicates).

- **C: First year pasture set-aside.** This type of set-aside was productive grassland in the previous year and was used either to graze animals, cut silage, or both (four replicates).

- **D: Long-term set-aside, which is grazed by animals in winter.** This set-aside land had been in the scheme for three or more years and the farmers grazed their own animals from 1 September to 14 January (five replicates).
Each set-aside field was paired with an adjacent field of tillage or grassland. Ideally, each field contained four sampling points laid out in a 200m square. However, this was sometimes not possible because of the size and/or shape of the field. All tilled fields contained four sampling points while set-aside and grassland fields contained either three or four points. Within each field, sampling points were between 110 and 200m apart.

Between mid-April and early July 2003, four visits were made to each sampling site. Three or four fields (i.e. 12 to 16 points) were sampled each morning. The order in which the points were sampled was reversed on alternate visits so that particular points were not always counted at the same time of the morning. Counts were carried out at dawn or shortly afterwards in dry weather conditions with little wind.

The recorder stood at each point for five minutes during which all birds recorded by sight or sound were noted within 50m of the sampling point. It was assumed that there was equal detectability within the 50m of the sampling points across all these farmland habitats. As far as possible counting the same individuals more than once was avoided and if a bird moved, it was recorded in the distance band in which it was first observed or heard. All adult birds seen or heard, considered to probably be nesting within the site or that use the site for feeding or roosting were recorded. Thus, counts of known juvenile birds or family parties were not included. If a bird was heard singing from several points then it was recorded at the point at which it occurred most frequently.
Species richness, Shannon-Weiner Index (H’) and Simpson’s Index (D) were used as diversity indices and calculated using ‘Species Diversity and Richness’ version 2.1 (Henderson and Seaby, 1998).

The Wilcoxon Sign Rank test and the Kruskal-Wallis test were used to compare the numbers of individual species recorded and diversity indices while Detrended Correspondence Analysis (DCA) and Redundancy Analysis (RDA) were used to assess variations in assemblage structure. DCA is an indirect gradient analysis technique, i.e. an ordination technique that searches for major gradients in the species data irrespective of any environmental variables (Ter Braak, 1988). The length of the gradient derived from DCA is used to determine which method of direct gradient analysis is most appropriate to use on the dataset. The linear context or redundancy analysis (RDA) is most useful when the gradients are short (<3 SD). RDA can be expressed as a constrained form of multiple regression of the species’ responses on the environmental (or explanatory) variables (Ter Braak, 1988). Monte Carlo permutation tests can be used to evaluate the statistical significance of the relationship, given the covariables, between the species and the whole set of environmental variables (Jongman et al., 1987). DCA and RDA were carried out using SAS Version 8.2 (SAS, 2001) and CANOCO Version 4 (Ter Braak and Šmilauer, 1999).

The analyses were carried out on the average number of individuals of each species per site per visit.

Results

Species diversity, assessed using all three indices, was significantly higher ($P < 0.05$) in the 18 set-aside sites compared with their paired grass or tillage sites. Species richness was greater in set-aside sites with an average of 12.8 (s.e. 1.1)
compared to 9.2 (s.e. 1.2) in grassland and tillage sites. Shannon-Weiner and Simpson’s Indices were also greater in set-aside than non-set-aside sites with means for set-aside of 2.1 (s.e. 0.1) and 7.4 (s.e. 0.8) respectively and 1.8 (s.e. 0.8) and 5.8 (s.e. 0.6) for grassland and tillage sites.

The abundances of meadow pipit *Anthus pratensis* L., skylark, and woodpigeon *Columba palumbus* L. were all significantly greater in the set-aside areas (Table 1). DCA indicated that linear forms of ordination were appropriate for the dataset (length of the first gradient = 3.383) therefore RDA was used to analyse the composition of the bird assemblages in set-aside and/or grass/tillage habitats. The RDA ordination showed that the vast majority of the bird species showed a preference for set-aside sites over productive agricultural sites (grass/tillage). The first canonical axis divided the birds preferring grass or tillage on the positive side of the diagram (right-hand side) from those showing a preference for set-aside on the negative side (left-hand side). The significance of the first axis was tested using a Monte Carlo test constrained for paired sites, defined by covariables, and it was found to be significant (*P* = 0.025). The covariables explained 59.9% of the variance in the species data. The difference between set-aside and non-set-aside explained only 7.1% of the variance in the species data. The remaining 33% of the total variance was unexplained.

No species was significantly more abundant in the non-set-aside areas but the RDA indicated that six species, whitethroat *Sylvia communis* L., goldcrest *Regulus regulus* L., blackcap *Sylvia atricapilla* L., stonechat *Saxicola torquata* L., tree sparrow *Passer montanus* L. and treecreeper *Certhia familiaris* L., favoured these sites. Fifteen goldcrests and eight whitethroats were recorded in all non-set-aside sites over the four visits, compared to 11 and two respectively for set-aside. However,
these species, with the exception of tree sparrow, are more likely to be influenced by hedgerows than field-ward management.

There were no significant differences between set-aside types in terms of diversity as assessed by species richness, Shannon-Weiner or Simpson’s indices. Species richness was on average 14.67 for non-rotational set-aside sites, while 1st year pasture had the second highest species richness (13.25 species) (Table 2). Long-term/grazed set-aside had the lowest species richness with only 11 species on average recorded per site (Table 2).

The total species richness for each set-aside type was calculated by summing the total number of species present in all the individual sites of each set-aside type. Thus 30 species were present between the six sites of non-rotational set-aside (Table 2). Only 21 different species were found in the three rotational set-aside sites (Table 2).

RDA showed a significant difference between the four set-aside types in bird assemblage composition (Fig. 1), in particular the assemblage structure in non-rotational areas were different to those found in the other types ($P = 0.005$ for first canonical axis). Among the more abundant species there were significantly larger numbers of skylark, meadow pipit, house sparrow *Passer domesticus* L. and starling *Sturnus vulgaris* L. in the non-rotational areas and although significantly larger numbers of magpie *Pica pica* L., pheasant *Phasianus colchicus* L. and snipe *Gallinago gallinago* L. were also found, their abundances were very low (Table 1). The second canonical axis divided 1st year pasture set-aside on the positive half of the diagram from long-term/grazed set-aside on the negative half of the diagram. All of the canonical axes were significant ($P = 0.005$) and explained 65.1% of the variance of the species data and 100% of the variance of the species-environment relation.
Meadow pipit, skylark, pheasant, magpie, house sparrow, snipe, linnet *Carduelis cannabina* L. and starling were closely associated with non-rotational set-aside (Fig. 1, see Appendix 1 for a list of all abbreviations). Chaffinch *Fringilla coelebs* L. and sedge warbler *Acrocephalus schoenobaenus* L. showed an affinity for rotational set-aside (type A). Hooded crow *Corvus corone* L. showed a preference for long-term/grazed set-aside. Goldcrest was strongly associated with 1st year pasture set-aside. First year pasture set-aside showed strong associations with robin *Erithacus rubecula* L., blackcap and willow warbler *Phylloscopus trochilus* L.

It was thought that a reason for the difference between first year pasture set-aside and other set-aside types was the high number of woodland species in one of the type C sites. Therefore the RDA ordination was repeated with blackcap, bullfinch *Pyrrhula pyrrhula* L., goldcrest and willow warbler removed. However, even with these woodland species removed the relationship between the set-aside types remained the same as in Fig. 1.

The RDA of set-aside management was repeated for field bird species only. These species were hooded crow, jackdaw *Corvus monedula* L., kestrel *Falco tinnunculus* L., magpie, rook *Corvus frugilegus* L., starling, woodpigeon, meadow pipit, snipe, pheasant and skylark. The habitats utilised by bird species in the breeding season were taken from Chamberlain, Wilson and Fuller (1999) with additional species information from Snow *et al.* (1998) and expert opinion. This was very similar to that seen for all birds indicating that it was the field species, which were determining the differences between the set-aside types in relation to bird species composition. The 1st canonical axis was again very significant (*P* = 0.005) and represented the difference between non-rotational set-aside on the positive side of the diagram and rotational, 1st year pasture set-aside and long-term/grazed set-aside on
the negative side. The second canonical axis divided 1st year pasture set-aside on the positive half of the diagram from long-term/grazed set-aside and rotational set-aside on the negative half of the diagram. All of the canonical axes were significant ($P = 0.005$) and explained 81.2% of the species variance and 100% of the species-environment variance.

As in the previous section, meadow pipit, skylark, pheasant, magpie, snipe, and starling were closely associated with non-rotational set-aside. Hooded crow and rook showed a preference for long-term/grazed set-aside. Jackdaw showed some association with 1st year pasture set-aside.

A similar analysis to those above was also carried out where the other species were included and field species were excluded. However, this analysis was not significant which indicates that the potential boundary effects were less significant than the land management effects.

**Discussion**

This study showed that, as expected, the vast majority of the bird species recorded exhibited a preference for set-aside over non-set-aside fields (*i.e.* grass and tillage sites combined). The set-aside contained a significantly higher diversity of birds. The results also showed that the type of set-aside management was important with non-rotational set-aside having greater abundances of species such as skylark and meadow pipit.

Studies from the UK, Sweden, Denmark and Switzerland have already shown that, in summer, diversity and abundance of many farmland bird species were greater in set-aside than in neighbouring productive agricultural fields and that many bird species preferred set-aside (Berg and Part, 1994; Watson and Rae, 1997; Henderson *et al.*, 2000a, b). Pheasants, little bustards, linnets and skylarks preferred set-aside as a
feeding and/or breeding habitat (Martínez, 1994; Sotherton et al., 1994; Eybert, Constant and Lefeuvre, 1995; Eraud and Boutin, 2002). This arises because set-aside contained higher densities of indigenous weed seeds, plants and invertebrates than crops, which resulted in increased foraging opportunities (Henderson and Evans, 2000). However, not all set-aside fields were equally utilised by birds, as those with a heterogeneous mix of vegetation types and ground cover were preferred. This is due to there being a trade-off between the presence of a potential food resource (e.g. invertebrates) and access to the resource (i.e. amount of bare ground), which may limit the usefulness of some fields to various bird species (Henderson and Evans, 2000). In addition, a recent meta-analysis of 127 published studies from North America and Europe found that set-aside unequivocally enhances farmland biodiversity (Van Buskirk and Willi, 2004). This analysis was based on studies from many different European countries including Spain, France, the Netherlands, Germany, Switzerland and the UK. In Europe, set-aside land was beneficial for most of the studied bird species, of which almost all were declining.

However, the four set-aside management regimes studied (rotational, non-rotational, 1\textsuperscript{st} year pasture and long-term/grazed set-asides) all contained characteristic bird species assemblages. There was a difference between recently grazed set-aside (types C and D) and set-aside which had not been grazed for at least three years (i.e. non-rotational set-aside). Meadow pipit, skylark, pheasant, magpie, house sparrow, snipe, linnet and starling were closely associated with non-rotational set-aside. Hooded crow showed a preference for long-term/grazed set-aside, while robin, blackcap and willow warbler showed strong associations with first year pasture set-aside.
An important point is that both skylark and meadow pipit were very closely associated with non-rotational set-aside. Meadow pipit and skylark are ground-nesting birds and, as such, actually utilise the set-aside fields as both foraging and breeding habitats. This result is in contrast to most of the other studies cited earlier where skylark was reported to prefer rotational set-aside to non-rotational (Watson and Rae, 1997; Henderson et al., 2000a, b and 2001). Van Buskirk and Willi (2004) also show that bird species richness declined significantly with age of set-aside from their analysis of many European set-aside studies. However, Poulsen, Sotherton and Aebischer (1998) found that non-rotational sown set-aside in its fourth year was preferred by skylarks to winter cereals, spring barley or silage grass. Species richness was greater in non-rotational set-aside compared to the other set-aside types, including rotational. Thus the expectation that more species, especially skylark, would show a preference for rotational set-aside over non-rotational was not true and instead in Ireland non-rotational set-aside was most beneficial to birdlife.

The arable landscape in Ireland may be more heterogeneous than in England and areas, which are predominantly arable, still have pockets of grassland mixed in the habitat mosaic, while in England vast areas are devoted almost totally to tillage. Also, the switch from spring-sown to autumn-sown cereals in England is far more pronounced than in Ireland with five times the Irish proportion of winter to spring barley area in England. This may help explain why rotational set-aside was not as important in Ireland as in England. Because in parts of England the cereals are virtually all autumn sown there is an absence of over winter stubbles, which are important feeding areas for birds (Wilson et al., 1996; Buckingham et al., 1999). Thus, rotational set-aside reintroduces winter stubbles into the farmland landscape in these regions of England. However, in Ireland much of the cereal production remains
spring sown (61% in 1997 according to Taylor and O’Halloran, 2002) so there is still a substantial amount of winter stubbles available to birds without the introduction of stubbles as rotational set-aside, even if this area is smaller than anticipated because, in many areas, the stubbles are burnt or ploughed back into the soil during the winter (Taylor and O’Halloran, 2002). Therefore because more winter food may be available in Ireland without rotational set-aside, many birds may prefer the established non-rotational set-aside, as it is a more permanent habitat and they do not have to seek out new areas of rotational set-aside each breeding season. The desirable features of non-rotational set-aside in Ireland would seem to include a relatively long period in set-aside and a relatively open sward. Therefore a balance has to be maintained between sward closure and time in set-aside, as often if the land is left for many years in set-aside the vegetation can become very dense and inhibit foraging and breeding of birds. This balance could be achieved by either managing the set-aside through methods such as scarification, or by changing the location of the set-aside land within the farm on an approximately five year basis, which is the common practice on many farms in Ireland.

In conclusion, in lowland farmland in Ireland the type of management of set-aside was important in determining the bird species found utilising the set-aside field. Thus the most suitable type of set-aside management for farmland bird conservation appeared to vary depending on the circumstances and care should be taken in taking these circumstances into account in prescribing the most appropriate type of set-aside management for a given area.

This information should be incorporated into future changes to agri-environmental schemes, so that if set-aside land is to become an important feature of these schemes then the management practices of maximum benefit to farmland birds
will be applied. In the wider context, this study showed that the response of farmland birds to set-aside management in one European country may be very different to another, even countries with similar faunas such as Ireland and the UK. Thus, care must be taken in designing agri-environment schemes that management practices for set-aside within the scheme are tailored for the individual country or region and are not just copied exactly from another country/region, as this management practice may not also maximally benefit farmland birds in the second country/region.

Acknowledgements

We are extremely grateful to all of the farmers who gave permission for the survey to be conducted on their land and also to John Challoner and Hugh McCreavey of Teagasc who assisted with site selection. We would also like to thank Dan Chamberlain for his helpful comments and suggestions on an earlier draft of this paper. This project was funded predominantly through the BioAssess project: Energy, Environment and Sustainable Development Programme Project No. EVK2-CT1999-00280.

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Table 1. The mean number of individuals (± s.e.) of the 20 most abundant species encountered in the study and the significance level for the comparisons of Set-aside versus Non-set-aside and of Non-rotational Set-aside versus Other Set-aside Types (n.s.= not significant; * = P ≤ 0.05; ** = P ≤ 0.01).

| Species     | Set-aside    | Non-Set-aside | Non-Rotational | Other Set-aside |
|-------------|--------------|---------------|----------------|-----------------|
| wren        | 2.116 ± 0.389 | 1.843 ± 0.328 | 2.000 ± 0.967  | 2.17 ± 0.371    | n.s.           |
| meadow Pipit| 3.037 ± 1.035 | 0.792 ± 0.410 | 7.500 ± 2.123  | 0.806 ± 0.321   | **             |
| yellowhammer| 1.028 ± 0.316 | 1.060 ± 0.243 | 0.583 ± 0.234  | 1.205 ± 0.454   | n.s.           |
| blackbird   | 1.194 ± 0.210 | 0.773 ± 0.212 | 1.444 ± 0.445  | 1.069 ± 0.229   | n.s.           |
| robin       | 0.838 ± 0.195 | 0.819 ± 0.272 | 0.567 ± 0.255  | 0.972 ± 0.261   | n.s.           |
| dunnock     | 0.829 ± 0.178 | 0.718 ± 0.146 | 1.000 ± 0.407  | 0.743 ± 0.183   | n.s.           |
| skylark     | 1.028 ± 0.476 | 0.347 ± 0.230 | 2.417 ± 1.208  | 0.333 ± 0.249   | *              |
| chaffinch   | 0.778 ± 0.138 | 0.551 ± 0.141 | 0.736 ± 0.300  | 0.799 ± 0.154   | n.s.           |
| woodpigeon  | 0.653 ± 0.147 | 0.259 ± 0.078 | 0.708 ± 0.239  | 0.625 ± 0.192   | n.s.           |
| blue Tit    | 0.565 ± 0.170 | 0.222 ± 0.078 | 0.611 ± 0.441  | 0.542 ± 0.152   | n.s.           |
| house Sparrow| 0.579 ± 0.347 | 0.069 ± 0.039 | 1.569 ± 0.950  | 0.083 ± 0.083   | *              |
| jackdaw     | 0.630 ± 0.450 | 0.014 ± 0.014 | 0.597 ± 0.484  | 0.646 ± 0.646   | n.s.           |
| greenfinch  | 0.319 ± 0.150 | 0.208 ± 0.100 | 0.667 ± 0.375  | 0.146 ± 0.109   | n.s.           |
| goldcrest   | 0.171 ± 0.083 | 0.231 ± 0.130 | 0.042 ± 0.042  | 0.236 ± 0.120   | n.s.           |
| linnet      | 0.231 ± 0.111 | 0.153 ± 0.076 | 0.472 ± 0.299  | 0.111 ± 0.067   | n.s.           |
| willow Warbler| 0.250 ± 0.077 | 0.102 ± 0.075 | 0.139 ± 0.090  | 0.306 ± 0.106   | n.s.           |
| swallow     | 0.185 ± 0.059 | 0.139 ± 0.076 | 0.306 ± 0.119  | 0.125 ± 0.061   | n.s.           |
| song Thrush | 0.176 ± 0.068 | 0.130 ± 0.047 | 0.264 ± 0.159  | 0.132 ± 0.067   | n.s.           |
| starling    | 0.241 ± 0.140 | 0.042 ± 0.030 | 0.667 ± 0.375  | 0.028 ± 0.028   | *              |
| coal Tit    | 0.194 ± 0.106 | 0.083 ± 0.045 | 0.167 ± 0.167  | 0.208 ± 0.141   | n.s.           |
Table 2. The mean species richness per site (+/- s.e.) and the number of species in all sites for each set-aside type.

| Set-aside Management Type       | No. of Sites | Mean Species Richness per Site | Number of Species in All Sites |
|---------------------------------|--------------|---------------------------------|-------------------------------|
| A: Rotational                   | 3            | 11.33                           | 21                            |
| B: Non-rotational               | 6            | 14.67                           | 30                            |
| C: 1st Yr. Pasture              | 4            | 13.25                           | 23                            |
| D: Long-term (Grazed)           | 5            | 11                              | 23                            |

Fig. 1: Redundancy analysis (RDA) of all birds recorded in four types of set-aside. P ≤ 0.005 for all axes. First two axes account for 36.7% of the variance in the species data. (See Appendix 1 for a list of species names for all abbreviations).
## Appendix 1. List of the bird species abbreviations, British Trust for Ornithology (BTO) species codes, included in Figure 1 with their common and scientific names.

| BTO Species Code | Common Name         | Scientific Name          |
|------------------|---------------------|--------------------------|
| B.               | Blackbird           | *Turdus merula*          |
| BC               | Blackcap            | *Sylvia atricapilla*     |
| BF               | Bullfinch           | *Pyrrhula pyrrhula*      |
| BT               | Blue tit            | *Parus caeruleus*        |
| BZ               | Buzzard             | *Buteo buteo*            |
| CC               | Chiffchaff          | *Phylloscopus collybita* |
| CD               | Collared dove       | *Streptopelia decaocto*  |
| CH               | Chaffinch           | *Fringilla coelebs*      |
| CT               | Coal tit            | *Parus ater*             |
| D.               | Dunnock             | *Prunella modularis*     |
| GC               | Goldcrest           | *Regulus regulus*        |
| GO               | Goldfinch           | *Carduelis carduelis*    |
| GR               | Greenfinch          | *Carduelis chloris*      |
| GT               | Great tit           | *Parus major*            |
| HC               | Hooded crow         | *Corvus corone*          |
| HS               | House sparrow       | *Passer domesticus*      |
| JD               | Jackdaw             | *Corvus monedula*        |
| LI               | Linnet              | *Carduelis cannabina*    |
| M.               | Mistle thrush       | *Turdus viscivorus*      |
| MG               | Magpie              | *Pica pica*              |
| MP               | Meadow pipit        | *Anthus pratensis*       |
| PH               | Pheasant            | *Phasianus colchicus*    |
| PW               | Pied wagtail        | *Motacilla alba (yarrelli)* |
| R.               | Robin               | *Erithacus rubecula*     |
| RB               | Reed bunting        | *Emberiza schoeniclus*   |
| RO               | Rook                | *Corvus frugilegus*      |
| S.               | Skylark             | *Alauda arvensis*        |
| SG               | Starling            | *Sturnus vulgaris*       |
| SL               | Swallow             | *Hirundo rustica*        |
| ST               | Song thrush         | *Turdus philomelos*      |
| SW               | Sedge warbler       | *Acrocephalus schoenobaenus* |
| WH               | Whitethroat         | *Sylvia communis*        |
| WP               | Woodpigeon          | *Columba palumbus*       |
| WR               | Wren                | *Troglodytes troglodytes*|
| WW               | Willow warbler      | *Phylloscopus trochilus*  |
| Y.               | Yellowhammer        | *Emberiza citrinella*    |