

Hay meadow management for birds

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Summary

Hay meadows play host to a wide variety of birds whose species composition changes with the seasons. On the Thames, hay meadows are particularly important for curlew (*Numenius arquata*) and other species such as corn bunting (*Miliaria calandra*) and yellowhammer (*Emberiza citrinella*). The timing of the summer cut and botanical species composition will impact on the breeding and chick-feeding habitat available. In winter, periodic flooding will enable waterfowl such as teal (*Anas crecca*) and wigeon (*Anas penelope*) to feed on the fields.

The paper aims to review the importance of hay meadows to birds, highlighting the impact of management activities on the birds that use them, using research carried out on various sites across England and Scotland.

The value of hay meadows for birds

A large proportion of bird species in Britain uses grassland at some time during the year and many species show preferences for this habitat (Vickery *et al.* 2001). Flood or hay meadows (MG4/5 grasslands) provide three key factors to their success:

- Summer feeding
- Nesting habitat
- Winter feeding habitat

The switch from hay to silage has facilitated many changes in grassland management. Intensification has contributed to a reduction of seed available to granivorous birds (Vickery *et al.* 2001) due to the early cutting dates. These earlier cutting dates (changing from July/August to April/May) has impacted on many ground nesting species, one notable example is the corncrake (*Crex crex*) in Britain (Barnett *et al.* 2004).

Summer feeding birds

Unimproved grasslands associated with the meadows (in this case MG4 grassland) are classed as species-rich grassland. This botanic diversity ensures that a wide variety of seeds are available for seed eating or granivorous birds (such as yellowhammers and linnets (*Carduelis cannabina*)).

Hay meadows provide important habitat for invertebrates; a key food source for many of the birds utilising the grassland. A varied sward structure provides increased habitat for surface invertebrates. The well-structured soils associated with hay meadows are rich in earthworms and other soil organisms, providing food important for breeding waders such as lapwing (*Vanellus vanellus*) and curlew. The damper meadows provide good feeding habitat to a wide assemblage of wetland birds such as redshank (*Tringa totanus*), snipe (*Gallinago gallinago*) and yellow wagtail (*Motacilla flava*).

Nesting habitat

Ground nesting birds, which require cover, are attracted to fields shut up for hay or silage. They then need time to complete incubation and for chicks to be able to be moved out of the field before mowing, which will vary between species. Most

breeding waders such as curlew require a 30-day incubation period (between April and June), while multi brood species such as skylark need as little as ten days.

In Oxfordshire, hay meadows provide important nesting habitat for species such as lapwing, curlew, redshank, yellow wagtail and skylark. The damper riverside meadows are particularly important for waders.

The varied sward structure creates good nesting habitat for a variety of ground nesting birds. The critical factor is the cutting date, for example species such as curlew, which are later nesting, are often subject to nest disturbance or destruction from May or early June cutting.

Corncrake started declining in Western Europe in the mid 19th century coinciding with the start of the mechanization of the agricultural systems and earlier cutting of the hay. Since the 1950s the rate of decline has accelerated, coinciding with a period when a majority of hay fields were changed to silage production, which allowed even earlier cutting dates, and often production of two crops from a field (Green *et al.* 1993).

Wintering habitat

A study on unimproved hay meadows in Oxfordshire found that they support higher numbers of soil invertebrate feeders when compared with improved fields (Barnett *et al.* 2004). These fields are heavily utilised by redwings, starlings, and lapwing, and also snipe, which are more often associated with wetter fields. The fields closest to the river occasionally flood, providing excellent feeding habitat for dabbling ducks such as teal, which feed on the seeds floated up by the water. Grazing wildfowl such as wigeon will come to graze on the banks. Several of the flood meadows along the Thames and other river valleys support large numbers of lapwing and golden plover with peak counts in some areas exceeding 4000 for each species.

Hay from the meadows also benefits birds away from the fields. Feeding out-wintered livestock with feedstuffs such as seed rich hay can provide important food for over-wintering granivorous birds such as yellowhammers and reed buntings.

Case study: Curlew in Upper Thames Tributaries Environmentally Sensitive Area

Natural England has been working with farmers to improve the habitat for ground nesting birds and hay meadows in the Upper Thames Tributaries Environmentally Sensitive Area. In 1997, an option was introduced to delay the cutting of hay until 30th June. Curlew nest between late April and the end of June with an incubation period of 30-31 days, so this delayed cut provides extra time for curlew chicks, and other later nesting birds, to hatch and fledge, decreasing the risk of clutches being destroyed by the cutting. Since then, the Curlew population has grown from 15 pairs in 1997 to 63 pairs in 2005 (McVey 2005). During the 2005 survey curlew were recorded on 95% of the sites with this option on the land. All curlew records occurred on silage or hay cut fields highlighting the limited suitable habitat available and their strong habitat preference for these old meadows (McVey 2005).

This area has the highest population of inland, lowland curlew in southern England, with a population density of 1.42 pr/km², which is 4.5 times more than the national average of 0.29 pr/km². Of the 14 SSSIs designated for high botanical interest and MG4 (meadow foxtail – great burnet) meadows, 12 supported breeding curlew.

Management of hay meadows for birds

Soil and nutrient management

Fertilised sward provides very different feeding and nesting habitats for birds compared with unfertilized sward (Bunce *et al.* 1998). The addition of nitrogen fertilizers encourages the growth of competitive plant species, reducing the variation in sward structure and species diversity (Vickery *et al.* 2001). These high inputs can severely reduce botanical diversity in species-rich grasslands (Marrs 1993) and the numbers and diversity of grassland and other soil invertebrates particularly earthworms (Edwards and Lofty 1975). This reduction in invertebrate numbers and the rapid increases in sward height in spring negatively affect the foraging ability and availability of nest sites for waders (Vickery *et al.* 2001).

However, well-rotted farmyard manure can be applied at low levels (12.5 tonnes/ha), as recommended by Natural England under the countryside stewardship scheme, some recommended up to 20 tonnes/ha (Winspear and Davis 2005). This will improve the invertebrate populations, which support a wide range of bird species such as yellow wagtail, snipe and lapwing, without having adverse effect on the botanical richness of the site.

Soil structure is an important factor on any site, influencing water movement and plant growth. Soil compaction will reduce invertebrate biomass and plant growth while limiting water movement. This will also affect the penetrability of the soil and influence species such as curlew and snipe directly while also affecting various other insectivorous birds.

Harvesting

To ensure the greatest opportunity for breeding success the hay cut should be as late as possible, ideally late July in southern England (Winspear and Davis 2005). Curlew, skylark and yellowhammer are all late nesting species that require a late cut when broods have fledged or are more mobile. Ideally, landowners should avoid mowing inwards as this often leads to chicks and small mammals becoming trapped in the middle of the field; cutting from side to side is recommended. This method has proved successful in Scotland in reversing the decline of corncrake (Green and Stowe 1993). A delayed cut will also benefit some late flowering plants and invertebrates such as marbled white butterfly.

Cutting removes a large source of seeds, nectar and pollen from the field. This may re-enter the system as winter-feed. However, in most cases this will be lost from the field. Where feasible, leaving a field margin uncut in rotation will benefit invertebrates, wintering birds and feeding habitat for small mammals.

Other mechanical operations on grassland such as muck spreading, rolling, topping and harrowing can be particularly damaging to ground-nesting birds during spring.

Wherever possible, they should be timed to take place before or after the breeding season in fields with breeding birds.

Grazing

Grazing can impact on bird populations through a number of mechanisms. Aftermath grazing with cattle in autumn and sheep in winter is the most commonly practised tradition on many of the flood meadows in Oxfordshire. This aftermath grazing benefits most bird species by improving access to their invertebrate and seed food.

Cattle are generally better suited to wet conditions than sheep. Cattle are unselective grazers and will create a varied sward structure, which creates increased invertebrate habitat and increased nesting habitat as suggested by Benstead *et al.* (1997). Being heavier animals, cattle may cause poaching which needs to be watched, particularly in wet conditions. Small levels of poaching will create regeneration niches for wildflowers and bare ground for insects, which subsequently provide feeding habitat for birds. A natural tendency to avoid grazing near cowpats to reduce parasite burdens also helps to create the tussocky sward that benefits numerous invertebrates, mammals and birds.

Compared with sheep, cattle also support more flies and dung invertebrates, which are a direct food source for many birds. (Skidmoor 1991).

In some cases sheep are used to aftermath graze. Sheep by contrast, are quite selective grazers, favouring the most nutritious and palatable vegetation in a sward. While at low densities, they maintain some areas closely cropped and palatable, other areas become long and coarse and are increasingly avoided. At higher stocking rates, they tend to produce short, dense, uniform swards as grasses tiller, and lower growing plants are favoured. Sheep selectively favour flower heads, generally reducing nectar sources and seed production. Sheep are used in winter to ensure the sward remains short and assist the forthcoming hay crop, this will reduce their impact on the botanical diversity while ensuring the sward is at the desired height at the start of the breeding season.

Dung from livestock adds significantly to the invertebrate interest of a field, benefiting numerous birds and mammals. However, a build up of anthelmintics (long lasting chemicals given to control internal worm parasites of livestock) needs to be avoided as this has a negative impact on soil invertebrate populations. (Webb 2004)

Conclusions

Hay meadows provide key habitat for a variety of birds. They offer important nesting and feeding habitat for birds, particularly ground nesting and overwintering species. The soil and hydrological cycles and management of the field will determine what wildlife gains the most from the field. Cutting dates, nutrient management and grazing are all key aspects in getting the most from flood meadows for birds.

Cutting before the end of June will increase the chance of nest failure and should be avoided. Nutrient management influences the botanical and invertebrate composition of the field, impacting on birds' food sources. Grazing assists the formation of a

suitable sward structure to allow birds to nest and feed while also increasing the invertebrate food source.

While much of the management requirements for birds will also benefit other wildlife such as invertebrates, other management requirements may not benefit all aspects of the field. Care must be taken to avoid management for a particular species if the situation is not appropriate for them. Many of our flood meadows have developed their special wildlife interest due to the historical management of the site and any changes in management must consider the implications for existing wildlife.

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