

BIOMASS CROPS AND FARMLAND BIRD POPULATIONS

P.E. Bellamy¹, R. Sage² and R.D. Swetnam¹

¹ NERC Centre for Ecology and Hydrology, Monks Wood, Abbots Ripton, Huntingdon, PE28 2LS, UK. e-mail: pbe@ceh.ac.uk

²The Game Conservancy Trust, Fordingbridge, Hampshire, SP6 1EF, UK.



Long-tailed tit in SRC willow.



Differences in crop structure between wheat, which is short and even density, in the foreground and miscanthus behind, which is taller and heterogeneous in height and density.



Q: What impact will the rapid expansion of biomass crops have on farmland bird populations in the UK?

Background

- Biomass crops grown for energy production, are receiving increasing attention from policy makers, farmers and conservationists. Two main types are grown in the UK: short-rotation coppice willow *Salix spp.* (SRC) and the grass miscanthus *Miscanthus x giganteus*.
- Although currently these crops cover only a relatively small area, they are becoming established in the UK, with >2500ha of SRC willow planted since 1998 and >3300ha of miscanthus planted since 2002.
- However, an estimated 22,700 ha of miscanthus and 15,500 ha of SRC are needed for planned biomass projects (<http://www.nnfcc.co.uk/statistics/uk.cfm>). This represents a significant increase and could potentially lead to notable change in farmland habitat - especially in the south-east of England.
- Over the past 40 years, many farmland birds in the UK, have suffered significant population declines due to changes in land management. Much conservation effort has been put into trying to reverse these declines both by practitioners and policy makers (Gregory et al., 2004). Biomass cropping may create new farmed landscapes and habitat therefore, the impact of such change on farmland birds needs consideration.

Methods

- Firstly, an estimate of potential land cover change due to biomass production was made using the UK Land Cover Map (2000). Both current and planned biomass burning power stations were identified in England and Wales (Fig. 1) and the land cover within a 40km radius of these sites was calculated.
- The anticipated area of biomass crops needed for each power plant was estimated using data given in Lindegaard (2006).
- Changes in bird populations and communities at the field level were taken from studies where biomass crops were directly compared with conventional agriculture during the breeding season (Sage et al. 2006, Bellamy et al. unpublished). The species in each category of birds were those used in national monitoring indices (farmland and woodland birds) or conservation priorities (Red List) (Gregory et al 2004).

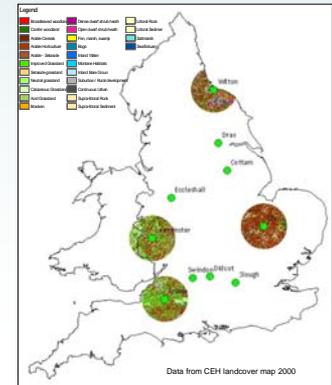


Fig. 1: Power plants using biomass crops for fuel, with examples of landcover data within a 40km radius, which is the area eligible for biomass planting grants in the UK.

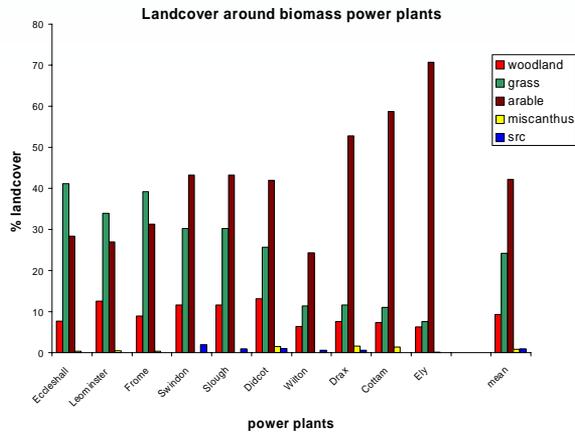


Fig. 2: Proportions of existing land cover in a 40 km radius around biomass power plants and anticipated landcover of biomass crops.

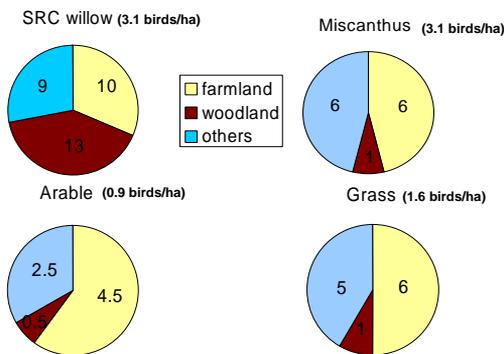


Fig. 3: Total density of birds and the proportions of farmland and woodland species in the bird communities of biomass crops and comparable conventional agriculture. The number of species present from each group is shown on the pie charts. Numbers for arable crops are means from the two studies.

Results

- The proposed areas of miscanthus and short-rotation coppice needed for the power plants are small compared to the amount of existing farmland. Biomass crops are most likely to be planted on arable land or agricultural grassland, and are likely to replace 0.3 – 7 % of existing agricultural land within the 40 km (Fig. 2).
- There are 2-3 times the densities of birds, and twice as many species regularly using biomass crops than on arable or grassland (Fig. 3). Thus, biomass crops have the potential to make a positive impact on farmland bird diversity in the landscape near to power plants.
- A greater number of species of high conservation concern (Red List) were regularly using miscanthus(3) and short-rotation coppice (5) than comparable conventional agriculture (grass 2, arable 2).
- Although numbers and diversity of farmland birds in biomass crops are greater than on conventional agriculture, they can displace some farmland specialists, particularly the yellow wagtail and grey partridge.
- Approximately half of the farmland birds recorded were species of high conservation concern. Reed bunting and linnet were found at higher densities in both biomass crops than in conventional farmland. Yellowhammer was also more abundant in short-rotation coppice.
- In addition to the farmland birds, short-rotation coppice also attracted an equal number of woodland bird species which were rarely found on other crop fields. For example, song thrush which is of high conservation concern. The use of short-rotation coppice fields by woodland birds is likely to also have a benefit to populations in adjacent hedges and woods.

Conclusion: Biomass crops – their potential impact on farmland birds in the UK

Growing biomass crops at the scale anticipated is likely to have more positive than negative effects on farmland bird populations. However, more information is needed on the interaction between the crop and surrounding landscape, and whether growing the crops as large blocks or dispersed fields have an influence on the birds using these crops. One or two farm specialist species which depend on open landscapes may be displaced by energy crops.

References

- Bellamy P.E., Croxson P.J., Heard, M., Hinsley S.A., Hulmes, L., Hulmes S., Nuttall P., Pywell R.F., Rothery P. Miscanthus grown for biomass as a habitat for birds. In Prep.
 Gregory, R.D., Noble, D.G. and Custance, J. (2004) The state of farmland birds: population trends and conservation status of lowland farmland birds in the United Kingdom. *Ibis* 146 Suppl. 2: 1-13.
 Lindegaard, K. (2006) Bioenergy contracts. *Farmers weekly* 28/07/2006 pp. 36-37.
 Sage, R., Cunningham, M. & Boatman, N. (2006) Birds in willow short-rotation coppice compared to other arable crops in central England and a review of bird census data from energy crops in the UK. *Ibis* 148:184-197.