European Commission

Science for Environment Policy

Plastic mulching reduces farmland bird numbers and diversity

Using plastic sheeting to encourage early growth of crops reduces the number and diversity of farmland birds, new research from Poland suggests. The study shows that this effect continues even after plastic has been removed.

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Plastic 'mulching' is the use of sheets of plastic to cover vegetables after sowing; this controls weeds and increases the soil temperature, allowing faster growth of crops earlier in the year. This practice is now widespread, covering at least 430 thousand hectares in Europe alone. Although studies have examined the effects of this practice on insects and plants, no previous research has been carried out on its effects on farmland birds, which have been rapidly declining over recent decades.

This study, conducted in an agricultural area of southern Poland, is the first to quantify the effects of plastic mulching on numbers and diversity of farmland birds. Researchers analysed four species groups: ground-nesting, non-ground nesting, specialist (birds adapted to farmland in particular) and non-specialist. Bird surveys were carried out at local and landscape scales in a single year, 2011, over two periods: during mulching (April to May), and after the plastic was removed (May to June).

At the local level, the researchers surveyed 100 small sites of 3.14 hectares, half in areas of over 80% plastic mulching, and half in areas with none. They also surveyed 25 larger, landscape-level sites of 100 hectares and measured the percentage cover of plastic, the grassland area and field size in each. To understand what might drive the effects of plastic mulching on farmland birds, the diversity of weeds and the diversity and numbers of butterflies, both of which contribute to the diet of farmland birds, were also recorded.
The results demonstrated that the diversity of species and total numbers of birds were statistically significantly reduced at both the larger and smaller sites, and among all four species groups.

For the small sites, diversity and numbers were higher in the area of no mulching. At the landscape scale, the higher the proportion of plastic cover, the lower the diversity and numbers of farmland birds. Furthermore, although the diversity of species and numbers of birds did increase after mulching had ended, they did not match the levels found in areas where no mulching had occurred, suggesting a lasting effect.

The diversity of species of butterflies and weeds, representing food availability, was also statistically significantly higher in areas where plastic coverage was lower, which may explain the lasting effect of the plastic mulch even after removal. This reduction in different types of food supplies may also explain why it was not just ground-nesting or specialist species that were affected.

The researchers call for regulation of plastic mulches via the Common Agricultural Policy[1], to mitigate their negative impacts on farmland birds in particular. They suggest that farmers should be encouraged to limit the area under plastic mulch, and to cultivate crops which fare well without this practice. However, they add that more specific recommendations will require more detailed studies balancing the profit increase for farmers against the costs of loss of biodiversity and ecosystem services provided by the birds.

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1.See: http://ec.europa.eu/agriculture/cap-overview/2012_en.pdf