

Assessing the impact of increased maize cropping on pollinators: a summary

November 2016

This document summarises the findings of a pilot research study undertaken by the Greater Lincolnshire Nature Partnership (GLNP) and completed in late 2016.

The full report can be found on the GLNP website: www.glnp.org.uk



Introduction

Between 2010 and 2013 the area cropped with maize in Lincolnshire increased by 99% and in North and North East Lincolnshire by 726% (Defra, 2013). The main reasons for the rise are widely considered to be providing a feedstock for anaerobic digestion (AD) plants together with a desire for more varied crop rotations and more spring cropping options.

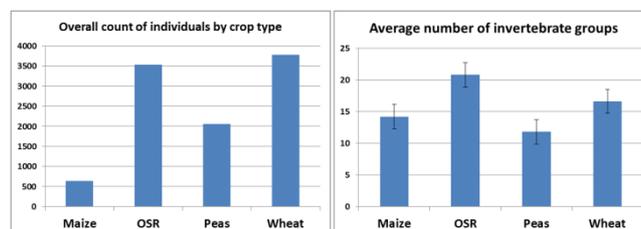
With such significant increases the GLNP wanted to understand more about how insect pollinators use arable crops. This would enable assessment of the potential impact of increased maize cropping and help inform efforts to support pollinators in the farmed environment.

Field surveys were undertaken in the summer of 2016 in winter wheat, oilseed rape, maize and peas across five farms in Lincolnshire. Detailed analysis of the results was then undertaken.

What did we find?

More than 10,000 individual invertebrates were recorded during the course of the study. Just 41 of those were bumblebees, honeybees or solitary bees.

Lowest overall numbers of individuals were recorded in maize however analysis by groups of invertebrates showed the community present was relatively varied in maize in comparison with other crops:



Four factors were found to be having a significant influence on pollinator communities: crop type, the amount of cultivated land within 500m of the survey site, temperature and insecticide. Furthermore maize, oilseed rape and marrowfat peas all demonstrated distinct pollinator communities while the population found within winter wheat appeared to be much more generalist in nature.

Significant relationships were found between surrounding land use (e.g. grassland, woodland, cultivated land etc) and a number of different invertebrate groups. Significant negative correlations were also found between applications of insecticide and four

Achieving more for nature

GLNP Banovallum House, Manor House Street, Horncastle, Lincolnshire, LN9 5HF
T: 01507 528398 E: info@glnp.org.uk www.glnp.org.uk



Assessing the impact of increased maize cropping on pollinators: a summary

groups: carabid ground beetles and more specifically species of *Pterostichus*, diamond-back moths and weevils.

Bare ground in maize fields demonstrated it may have importance for basking invertebrates. Surveys found seven times more individuals on the ground than on the plant a few weeks after drilling when vegetation was short but the opposite was found later in the growing season with more found on the plants.

What does this mean?

This study has highlighted the importance of having both a variety of habitats within the landscape to support a wide ranging pollinator community and the need to have a variety of different crop types. This is particularly relevant in terms of maize as block cropping in proximity to AD plants (for logistical reasons) has the potential to impact on both pollinator numbers and community variation unless carefully managed.

Rotations need to consider which crops are being displaced by maize as our research suggests that pollinator communities of oilseed rape may be less able to adapt to maize than those of winter wheat.

Bee pollinators were notable for the very low numbers recorded even in mass flowering oilseed rape and anecdotally, our surveyor noted that pollinators including bees were more abundant in the margins. Consideration therefore needs to be given of how best to support bee pollinators at a landscape scale as their presence within margins is not currently translating into a greater abundance within adjoining crops.

The study has provided a valuable dataset for those interested in biological pest control measures and in particular the impact of insecticide applications on non-target species. It is likely that certain predator species are being affected by ingesting poisoned prey at lethal levels and this should be a consideration for Integrated Pest Management.

If well managed to protect soils, bare ground within maize could potentially provide important habitat for invertebrates at a time of year when other crops are at more advanced growth stages.

How can you help?

This study has produced valuable results and the GLNP will seek opportunities to explore some of the findings in more detail.

There are a number of ways you can help to support pollinators in the farmed environment however, and you may wish to consider applying some of these methods on your own land:

- **Countryside Stewardship contains a number of options for pollinators including flower-rich margins, nectar mixes and legume fallows**
- **Low budget options could include: low maintenance mixes on reservoir banks, reducing the cutting frequency of farm tracks and even tolerating small patches of weeds such as nettles or thistles in unproductive areas**
- **Seek opportunities to link up landscape features and provide habitat corridors across your farm**
- **Where viable, provide a variety of different crop types within your rotations**

Defra's Bees' Needs initiative provides further advice on managing agricultural land for pollinators. Click [here](#) for more information.



We are grateful to Defra for providing funding support for the research and to David Sheppard for undertaking the pollinator surveys. Also to Beeswax (Rainbow) Farming Ltd, Blankney Estates Ltd, E. M. Howard Ltd, F. G. Battle and Sons Ltd and Patrick Dean Ltd for providing access to their land for surveys and to Michael Gillman from the University of Lincoln for assistance with the analysis of the data collected.

Achieving more for nature

GLNP Banovallum House, Manor House Street, Horncastle, Lincolnshire, LN9 5HF
T: 01507 528398 E: info@glnp.org.uk www.glnp.org.uk

