Briefing

January 2016

The threat to bees from neonicotinoid pesticides

We need bees to pollinate most of our food crops and wild flowers, and they play a crucial role in supporting wider biodiversity. In 2012 Defra outlined the severity of the decline of, and threat to, bees to MPs[1]:

> 'There has been a severe decline in the diversity of wild bees in the countryside…England has the greatest decline of anywhere in Europe. Since 1900, the UK has lost 20 species of bees[2]. A further 35 bee species are considered to be under threat of extinction.'

The threat to bees is not restricted to the UK. The European Red List for Bees shows that nearly one in ten species of wild bees are facing extinction[2]. There are several widely acknowledged and inter-linked causes of bee decline including loss of habitat, use of pesticides, spread of pests and diseases and increasingly, climate change.

These were recognised in the **National Pollinator Strategy** (NPS) for England drawn up by the last Government. Friends of the Earth welcomed the NPS as having an important role in delivering action from landowners to help bees. But although the NPS claimed to address all the causes of bee decline it failed to set out effective action to address the use of pesticides[3]. Pollinator plans for Wales and All-Ireland should also be strengthened in this respect.

In addition, the UK Government was one of a minority of Members States to vote against EU restrictions on neonicotinoid pesticides introduced in 2013. The Government says it will listen to the scientific evidence to inform any change in position. Two years on from the ban the scientific evidence of harm to bees, and other wildlife, has stacked up. It is time to make the ban permanent.

We are asking the Secretary of State for Environment, Food and Rural Affairs, Liz Truss MP, to:

- **Recommit to action for bees by publishing a stronger NPS with clear action on pesticides**
- **Support a permanent ban on all neonicotinoid pesticides**
- **Refuse future emergency authorisations for use of neonicotinoid pesticides**
- **Step up research, development and advice on non-chemical alternatives**

[1] Annex 1, paragraph 6, Written evidence to the Environment Committee's insects and insecticides inquiry, December 2012

[2] 'Nearly 1 in 10 wild species face extinction in Europe…' last modified 19th March 2015, http://www.iucn.org/?19073/Nearly-one-in-ten-wild-beespecies-face-extinction-in-Europe-while-the-status-of-more-than-half-remains-unknown---IUCN-report

[3] Bee Coalition (2015) 'Policies for Pollinators' https://www.foe.co.uk/sites/default/files/downloads/policies-pollinators-need-governmentleadership-backing-englands-bees-91211.pdf

Neonicotinoids and current restrictions on use

Pollinator scientists advising Defra list the use of pesticides as one of the key threats to bees[4]. Neonicotinoid insecticides are of particular concern because of the way they act as neurotoxins. Because they are readily absorbed in sprayed plants or plants grown from treated seeds, residues are found in pollen and nectar. When neonicotinoids were approved for use they were not fully tested for long term chronic effects or for impacts on any other bee species other than honey bees.

In 2013 three neonicotinoid insecticides (imidacloprid, thiametoxam and clothianidin) were restricted for use in the EU. This followed a review of evidence by the European Food Safety Authority (EFSA) which found a 'high acute risk' to honey bees when neonicotinoids are used on crops attractive to them. Current restrictions apply to use on crops such as oilseed rape, but not on other crops such as wheat which are not insect pollinated.

The UK must comply with the restrictions. However, despite the EFSA conclusions, and growing evidence of harm since (see below), the UK Government granted an emergency authorisation of two neonicotinoid seed treatments in 2015. Some farmers in Suffolk, Cambridgeshire, Bedfordshire and Hertfordshire were able to plant oilseed rape with neonicotinoid treated seeds in the autumn.

It is worth noting that the current restrictions do not cover all neonicotinoids. For example, there is growing evidence that another neonicotinoid thiacloprid[5] may harm bees.

The latest science on neonicotinoids

Since the restrictions were put in place several studies, including laboratory studies and field trials, have been published, each adding to the weight of evidence that neonicotinoids are harmful to bees, and other wildlife including that there may be greater impacts on wild bees. This is of huge concern given that wild bees do most of the pollination of crops[64] and pesticides are currently only tested on honey bees. Here is a snapshot of the evidence:

In June 2014 the largest global study involving 29 scientists and over 1,000 papers on the effects and risks of systemic pesticides was published by the Task Force on Systemic Pesticides[7]. It concluded that neonicotinoids "are causing **significant damage** to a wide range of beneficial invertebrate species and are a **key factor in the decline of bees".**

In April 2015, the highly respected European Academies Science Advisory Council[8] concluded that there is **clear scientific evidence** for sub-lethal effects on bees and other pollinators exposed to very low levels of neonicotinoids over extended periods.

A study[9] by Newcastle University, published in the science journal Nature in April 2015, found that bees preferred to eat solutions containing neonicotinoids, even though the consumption of these pesticides caused them to eat less food overall. It concluded that treating flowering crops with commonly used neonicotinoids "presents a **sizeable hazard to foraging bees**".

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[4] Vanbergen et al (2014) 'Status and Value.' http://randd.defra.gov.uk/Document.aspx?Document=12316_finalreportph0514.pdf

[5] Friends of the Earth (2015) 'Thiacloprid: A Bee Harming Pesticide' https://www.foe.co.uk/sites/default/files/downloads/friends-earth-thiacloprid-pesticide-briefingmarch-2015-76087.pdf

[6] 'Wild bees and not honey bees the main pollinator of UK crops,' last modified 23rd May 2011, https://www.reading.ac.uk/news- and-events/releases/PR367212.aspx

[7] '...Systematic Pesticides Post Global Threat to Biodiversity..' last modified 24th June 2014, http://www.tfsp.info/press/

[8] Ecosystem, Agriculture & Neonicotinoids' http://www.easac.eu/fileadmin/Reports/Easac_15_ES_web_complete.pdf

[9] Newcastle University, 'Bees prefer nectar containing pesticides.' Last modified 22nd April 2015, http://www.nature.com/nature/journal/v521/n7550/full/nature14414.html

A study[10] reporting on field trials in Sweden, also published in Nature in April 2015, found the use of neonicotinoid treated seeds in real field conditions "has **negative effects on wild bees**, with potential negative effects on populations." It also highlighted the impact of neonicotinoid treated seed between wild bees and honeybees, and how they differ.

In August 2015 research was published showing a correlation between **honey bee colony losses** and use of the neonicotinoid imidacloprid in England and Wales[11].

Evidence that neonicotinoids may also be contributing to the **decline of butterflies**[12] was published by the Universities of Stirling and Sussex in November 2015. The research showed that the decline of 15 out of 17 butterfly species monitored correlated with neonicotinoid use.

Crop yields not damaged by neonicotinoid restrictions

There is no evidence of widespread crop failure since restrictions on neonicotinoids were introduced. Oilseed rape yields for 2015[13] **were on average above the previous year nationally** and at or above the ten year average in all regions**.** While there may be cases of oilseed crop losses due to pests, these do not represent the widespread crop devastation which the National Farmers Union predicted. According to media reports[14] one Lincolnshire farmer set an oilseed rape yield world record this year.

Tonnes per hectare

OSR Yields	2014	2015	10 year average
United Kingdom	**3.6**	**3.9**	**3.4**
England	**3.6**	**3.9**	**3.4**
Wales	**3.6**	**3.9**	**3.4**
Scotland	**4.0**	**4.1**	**3.6**
Northern Ireland	**3.6**	**3.9**	**3.4**

(Source: Department of Environment, Food and Rural Affairs, 2015. See number 13 in footnotes)

It is also important to consider the role of bees in improving crop yield and quality. Insect pollination enhances oilseed rape yields[14] - and has also been found to increase the value of two British apple varieties by £37m a year[15]. New research[16] suggests neonicotinoids could be damaging food production. Apples pollinated by bumblebees exposed to neonics were lower quality than neonic-free bumblebees.

Arable farmer Peter Lundgren, who grows oilseed rape in Lincolnshire, recognises the importance of pollinators to his business:

> "So far I am managing well without neonicotinoids and I am constantly looking to improve my system further"…"And the cost to my business of not using neonicotinoid seed treatment is minimal - just £2.20 per hectare. As far as I'm concerned this cost is outweighed by the importance of conserving our pollinator populations."

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[10] Rundolf et al (2015) 'Seed coating with neonicotinoid insecticide…' http://www.nature.com/nature/journal/v521/n7550/nature14420/metrics/news
[11] Cost and Farming Benefits of Neonicotinoid Seed Coatings on Oilseed Rape' Nature 5 http://www.nature.com/articles/srep12574
[12] University of Stirling (2015) 'Neonicotinoid Pesticides linked to Butterfly Declines in the UK' https://www.stir.ac.uk/news/2015/11/butterfly-declines-linked-topesticides/
[13] DEFRA (2015) ' Farming Statistics' https://www.gov.uk/government/statistics/farming-statistics-final-crop-areas-yields-livestock-populations-and-agricultural-workforce-at-1-june-2015-uk
[14] ADAS (2015) 'Harvest Report 7' http://cereals.ahdb.org.uk/markets/market-news/2015/september/10/adas-harvest-report-7-week-9.aspx
[15] 'Europe lacks bees to pollinate its crops,' 9th January 2014, http://www.fwi.co.uk/arable/europe-lacks-bees-to-pollinate-its-crops.htm
[16] Dara et al (2015) 'Neonicotinoid Pesticide Exposure Impairs…' http://www.nature.com/nature/journal/vaop/ncurrent/full/nature16167.html

Real Solutions

There are concerns that farmers have responded to the restrictions on neonicotinoids by using pyrethroids – insecticides which are also harmful to wildlife. But pyrethroid sprays were already widely used on crops grown from neonicotinoid treated seeds. Although some farmers increased autumn use of pyrethriods on oilseed rape following the neonicotinoid restrictions, research[17] shows that there has been no increase in use during spring flowering, (the time of highest risk to bees).
Replacing neonicotinoids with other pesticides is the wrong response as it will do little to combat pests which might be resistant to pyrethroids. It could also kill beneficial insects which will prey on the pests and need to be encouraged in order to help farmers replace neonicotinoids and reduce insecticide use.

The near universal use of neonic seed treatments for oilseed rape has proved completely unnecessary. The correct response to the withdrawal of these chemicals is to promote existing best practice of agronomic methods and non-chemical methods of pest control and increased R&D into improving them and developing new ones.

This includes spreading existing advice from sources such as HGCA[19] and Rothamsted Institute[20] about better monitoring of pest threats so sprays are only used when absolutely essential and the use of nonchemical means of control such as promoting natural predators (including wasps and spiders) and planting trap and companion crops. There have been some encouraging yield results with **companion planting**[21]. At the same time there is a lack of evidence that neonicotinoids are delivering effective crop protection. One study[22] found no consistent benefit to crop yield from using treated seeds.

The widespread use of pesticides is a key threat not just to bees but to farmland biodiversity – the real solution is to minimize their use.

What happens next?

A review of the scientific evidence on neonicotinoids is currently being conducted by EFSA and is expected to report in late 2016 after which Member States may vote to make changes to the restrictions, which will otherwise remain in place indefinitely.

There is now a strong case for the restrictions to not simply be extended but also applied to all crops. Since the restrictions came into force neonicotinoids have now been found in wildflowers[23] next to fields of treated oilseed rape and wheat. Research from Canada[24] found that neonicotinoids remain much longer than expected in soil dust, and that the dust is dispersed widely. So bees are being exposed to higher amounts of neonics than previously thought – and through a variety of routes – not just via the crops like oilseed rape to which the current restrictions apply.

When will the UK Government back a permanent ban on neonicotinoids?

The Defra Secretary of State, Liz Truss MP, has repeatedly said that decisions on restricting pesticides must be based on science. Friends of the Earth agrees. The overwhelming scientific evidence shows the need for a permanent ban, applied to all crops.

The UK Government should set out a clear position to support this now.

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[17] Budge et al (205) 'Evidence for Pollinator Cost and Farming Benefits of Neonicotinoid Seed Coatings on Oilseed Rape' *Nature 5* http://www.nature.com/articles/srep12574

Contacts at Friends of the Earth:

- Dave Timms, Campaign Lead for the Bee Cause: dave.timms@foe.co.uk
- Sandra Bell, Campaigner for the Bee Cause: sandra.bell@foe.co.uk

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[19] HGCA https://www.nfuonline.com/assets/44446
[20] Cook.S. (2015) 'Alternative Strategies for control of CSFB…' www.rothamsted.ac.uk/sites/default/files/groups/Rothamsted_Research_Association/S.%20Cook.pdf
[21] Farming Online, last modified Fri 27th November 2015, http://www.farming.co.uk/news/article/11915
[22] Budge et al (205) 'Evidence for Pollinator Cost and Farming Benefits of Neonicotinoid Seed Coatings on Oilseed Rape' *Nature 5* http://www.nature.com/articles/srep12574
[23] Botias et al (2015) 'Neonicotinoid Residues in Wildflowers…' *Environmental Science* *http://www.researchgate.net/publication/282760486_Neonicotinoid_Residues_in_Wildflowers_a_Potential_Route_of_Chronic_Exposure_for_Bees*
[24] Limay-Rios et al; (2015) 'Neonicotinoid Insecticide Residues…' http://www.ncbi.nlm.nih.gov/pubmed/26395849