In 2013, following a thorough scientific review by the European Food Safety Authority (EFSA) and a vote by Member States, the European Commission restricted the use of three neonicotinoid pesticides which posed a “high acute risk” to honey bees. The current restrictions are unlikely to be changed before 2017, at which time they could be made permanent. It is vital that effective alternatives that do not harm bees or other biodiversity are widely available and promoted to farmers.

Background

Friends of the Earth believes the evidence was more than sufficient to justify the restrictions in 2013. And since they came into place a substantial body of evidence from independent, peer reviewed science and authoritative studies clearly show the negative impacts of neonicotinoids on a range of bee species – especially bumblebees and solitary bees - in both controlled laboratory and large-scale, real world, field-trials.

Other studies indicate harm to butterflies, earthworms and birds indicating that neonicotinoids could be harming wider biodiversity including species that farmers rely upon for improving soil health and for natural pest control.

Insect pollination is crucial to many crops. It enhances oilseed rape yields - and has also been found to increase the value of two British apple varieties by £37m a year. New research suggests neonicotinoids could be damaging food production. Apples pollinated by bumblebees exposed to neonicotinoids contained fewer pips, indicating lower quality than those pollinated by bumblebees not exposed to neonicotinoids.

Dr Jean – Marc Bonmatin of the National Centre for Scientific Research in France, who was one of lead authors of a global study into systemic insecticides commented that, “Far from protecting food production the use of neonic is threatening the very infrastructure which enables it, imperilling the pollinators, habitat engineers and natural pest controllers at the heart of a functioning ecosystem.”

In April 2015 the European Academies Science Advisory Council concluded that widespread use of neonicotinoids is inconsistent with the basic principles of integrated pest management and constrains the potential for restoring biodiversity in farmland.

The National Farmers’ Union (NFU) predicted widespread crop losses without the use of neonicotinoids, especially predicting a problem with oilseed rape. Fortunately this has not proved to be the case.
Have crops failed without neonicotinoids?

There is no evidence of widespread crop failure since restrictions on neonicotinoids were introduced. Oilseed rape yields for 2015 were on average above the previous year 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 one Lincolnshire farmer set an oilseed rape yield world record in 2015.

<table>
<thead>
<tr>
<th>OSR Yields</th>
<th>2014</th>
<th>2015</th>
<th>10 year average</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3.6</td>
<td>3.9</td>
<td>3.4</td>
</tr>
<tr>
<td>England</td>
<td>3.6</td>
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<tr>
<td>Wales</td>
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<td>Scotland</td>
<td>4.0</td>
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<tr>
<td>Northern Ireland</td>
<td>3.6</td>
<td>3.9</td>
<td>3.4</td>
</tr>
</tbody>
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(Source: Department of Environment, Food and Rural Affairs, 2015. See number 8 in footnotes)

The main concern, that farmers would not be able to control damage from the cabbage stem flea beetle (CSFB) has not been the case in most parts of the country. Initial assessments from the Agriculture and Horticulture Development Board (AHDB) shows that there has been no significant problem nationally with cabbage stem flea beetle losses in 2015, when farmers could not use neonicotinoids. There are some local issues, especially in Buckinghamshire, but nationally CSFB losses were at 1 per cent, a third of the rate of loss in 2014. Even where farmers experienced a high degree of damage there is no reason to assume this would not have occurred with access to neonicotinoid treated seed. Agronomists reported that susceptibility to damage was related to a range of factors including drilling time, soil type, weather and proximity to fields where oilseed rape was grown previously.

In 2015 more significant losses occurred as a result of damage by slugs – 3 per cent of the crop – which would not have been controlled by neonicotinoids. In fact neonicotinoids could have made the problem worse by killing the predatory ground beetles that would otherwise reduce slug abundance.

Are neonicotinoids effective?

A recent study into the benefits of neonicotinoid seed coatings, published in Nature, showed “no consistent effect of imidacloprid seed coating on yield”. The same study noted that applying a neonicotinoid seed coating costs farmers over three times more than a single foliar insecticide spraying.

In addition, studies suggest that only between 1.6 and 20 per cent of the active chemical in a seed coating is actually absorbed by the crop making seed dressings less targeted than many sprays.
**What are the alternatives to neonicotinoids?**

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 pyrethroids on oilseed rape following the neonicotinoid restrictions, research\(^\text{13}\) 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 not a good response for biodiversity or farmers. 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.

Instead the focus should be on disseminating advice on existing strategies to reduce pest damage, and the development of new strategies. Four years ago, when investigating solutions to growing resistance to pyrethroids, researchers at Rothamsted concluded that developing better monitoring, trap cropping and conservation biological control would “offer a far greater prospect of achieving long-term sustainability of oilseed rape production” than insecticides such as neonicotinoids\(^\text{14}\). Had these options been better developed and promoted instead of the prophylactic use of neonicotinoids our bees and farmers could be benefiting now.

**Monitoring/threshold levels**

AHDB recommend monitoring to assess beetle numbers and damage to leaf area in order to determine whether spraying is necessary. The thresholds were recently revised upwards following research by agricultural consultancy ADAS which found that oilseed rape plants can compensate for substantial levels of damage by regrowth.

ADAS concluded\(^\text{15}\) that: “once above ground, oilseed rape has significant inherent ability to compensate for loss of leaf area. Tolerance to loss of green area has the potential to limit unnecessary applications of insecticides, which improves the cost effectiveness of growing oilseed rape and also minimises impacts on non-target species. It is important to understand that crop damage does not necessarily adversely impact yield”.

Advice from Rothamsted on thresholds is available at [https://croprotect.com/pests/cabbage-stem-flea-beetle](https://croprotect.com/pests/cabbage-stem-flea-beetle). Wide dissemination of this advice could help reduce unnecessary spraying.

**Companion planting/trap cropping**

Ten years ago researchers at Rothamsted published research\(^\text{16}\) into trap cropping demonstrating that using turnip rape as a trap crop – to attract the pest away from the main crop - had good potential to protect oilseed rape from infestation by CSFB. Later research\(^\text{17}\) showed that turnip rape has good potential as a trap crop to protect oilseed rape from pollen beetle attacks, reduce the number and area of insecticide applications and slow the development of insecticide resistance. Researchers at Rothamsted are now looking again at trap cropping as a way of controlling CSFB.

More recently trials of companion planting\(^\text{18}\) – where for example a vetch and berseem clover mix is planted alongside the oilseed rape – by Agrovista in the UK have had considerable success, with good yields, and significant reduction in slug damage.
The results from trap cropping are particularly encouraging considering that slugs caused more damage to oilseed rape in 2015 than CSFB. In France trials, also run by Agrovista, have resulted in reduced spraying to control CSFB. The UK trials are also encouraging for their wider benefits with impressive nitrogen trapping, improvements to root systems and soil structure. Agrovista concluded that “Increasing organic matter in our soils is vital if we are going to increase yields, and companion plants and cover crops could be a very good way of achieving this and bringing some resilience back to our soils”.

Individual farmers are also reporting success with trap cropping and companion planting via social media and farming forums.

**Beneficial insects**

AHDB recommends using the wasp *Tersilochus microgaster* to control CSFB but warns that it is vulnerable to pyrethroids. It also advises minimum cultivation after rape to help survival of beneficial parasitoids such as the *Tersilochus microgaster*. Other natural enemies of the CSFB listed by AHDB include spiders, ground beetles and rove beetles.

Research by the Game and Wildlife Conservation Trust has warned that taking out beneficial insects is an unintended consequence of farmers using pesticides – and surprisingly this was found to be the case even on farms which were not farmed intensively. GWCT recommends increased measures to encourage beneficial insects including more beetle banks, wildflower margins, hedgerow management, and avoiding complete weed control.

**Commitment to non-chemical control is needed now**

The correct response to the withdrawal of neonicotinoids is to promote existing best practice of agronomic methods and non-chemical methods of pest control and to increase R&D into improving these and developing new and innovative ways to protect crops. The examples above focus on ways to control CSFB in oilseed rape as the main concern being expressed by farmers since the restrictions on neonicotinoids. These methods also have the potential to bring wider benefits such as control of other pests, reduction in pesticide use, and improvements to soil health. Other options should also be considered including conventional breeding for crops that are resilient to damage and not dependent on intensive systems.

The decision on whether to make changes to the current restrictions on neonicotinoids may not happen until 2017. At that point the restrictions could be expanded to cover other crops. Farmers need the Government to step up efforts to find safe and effective non-chemical means of control now.

This should happen in the context of a wider commitment to minimise pesticide use and promote integrated pest management, so that chemical controls are used as a last resort, not a prophylactic treatment.

Non-chemical means of pest control should also be considered alongside pesticide products in applications for emergency authorisation of restricted product. According to EU rules derogations should only be granted if there is a “danger which cannot be contained by any other reasonable means”.

Ultimately, the future of farming depends on reducing the environmental effect of recent farming practices and farmers being enabled to grow food in ways we can trust does not harm wildlife, cause pollution of waterways or degradation of soils.
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10 Evidence for Pollinator Cost and farming benefits of neonicotinoid seed coatings on oilseed rape, August 2015, http://www.nature.com/articles/srep12574
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