

Handling controversial issues - What's happening to our bees?



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This booklet has been produced to help young people:

- Learn about declining bee populations and consider the use of pesticides, in particular neonicotinoids
- Understand the different problems facing honey bees and wild bees
- Judge the bias and reliability of different sources of information
- Draw their own conclusions having analysed and reflected on their own current views
- Make informed decisions

When handling controversial issues teachers will need to employ approaches that meet the need for balance and objectivity and to ensure avoiding bias. The Oxfam Global Citizenship Guide on Teaching Controversial Issues (2006) contains helpful suggestions on appropriate ways of introducing controversial issues and of managing the responses that result.

These include:

- Setting ground rules e.g. showing respect for the views of others, using appropriate language and giving reasons for having a particular view
- Role of the teacher e.g. objective, devil's advocate or declared interest
- Teaching approaches e.g. group discussion, role-play and community of enquiry

1. Big Bee Quiz

Aim

To establish pupils' understanding of the topic before any research and discussion is carried out.

Resources

Quiz questions (Resource A) and Bee lifecycle PowerPoint presentation (Resource B) (which provides the answers and generates initial discussions).

2. Diamond Activity

Aim

To introduce the work of farmers and beekeepers.

Resources

Key activities of farmers and beekeepers cards.

Instructions

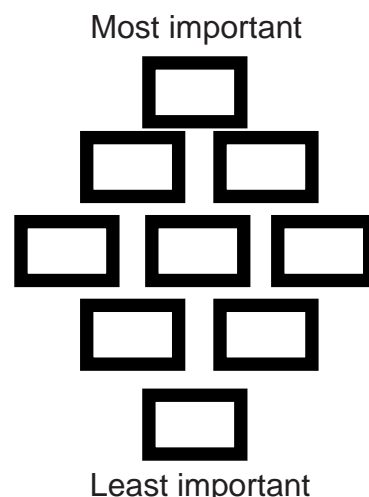
On large pieces of paper or card draw a diamond shape with the words Most Important at the top and Least Important at the bottom.

Copy the key activities of farmers and beekeepers (page 4) and cut up into sets of individual cards.

Split the class in half – one half to consider farmers and the other half beekeepers.

1. In groups, pupils rank the farmer's/beekeeper's activities in a diamond nine [the highest priority at the top, the next two below and so on].
2. Pupils share decisions as a class, and discuss differences of opinion about what is most or least important.

(The outcome of this activity should be to recognise that farmers and beekeepers are not opposed to each other. Indeed, they are working towards the same aims.)



Key activities of farmers and beekeepers cards.

Activities of farmers	Activities of beekeepers
Produce food	Produce food
Care for animals	Care for bees
Run a business	Run a business
Look after the countryside	Look after the countryside
Encourage wildlife	Encourage wildlife
Help the local community	Help the local community
Sell food through e.g. farm shops	Sell food through e.g. farm shops
Provide employment	Provide employment
Offer leisure opportunities	Offer leisure opportunities

3. Attitudes towards bees

Aim

To use photographs to explore pupils' viewpoints

Resources

A selection of photographs of bees, beekeeping, honey, fields of crops, farming activities etc. (See Resource C Photo bank for some examples).

Large sheets of paper

Two colours of sticky notes

Instructions

1. In groups, place photographs on large sheets of paper
2. Use one colour of sticky notes to write negative comments and another colour for positive comments. (You may wish to provide some examples to get started)
3. Pupils add comments to the appropriate picture
4. Display the work and discuss the reasons why the different pictures created different responses

4. Questioning a photograph

Aim

To encourage pupils to generate questions for research and discussion

Resources

Copies of images reflecting different aspects of the bee debate
Large sheets of paper

Instructions

1. In groups, pupils place an image in the centre of a large sheet of paper
2. Around the image pupils write questions about what can be seen. The questions may:
 - Seek clarification e.g. why is the farmer...?
 - Probe reasons and evidence e.g. is there evidence that...?
 - Explore alternative views e.g. what would say?
 - Test implications and consequences e.g. if this took place what would happen next...?
3. Groups share their questions and observations with the rest of the class
4. Groups now highlight a significant question to research further and debate

5. Consequences

Aim

To encourage pupils to consider and discuss the consequences of different actions

Resources

Large sheets of paper on which three concentric circles are drawn

Instructions

1. In groups, pupils to write at the centre of the first concentric circle "Ban neonicotinoids" or "Continue using neonicotinoids"
2. Pupils then discuss what will happen as an outcome of either of the above e.g. lower yields of crops These consequences are written within the second concentric circle
3. Pupils next write in the third concentric circle any further outcomes as a result of the consequences written within the second concentric circle e.g. more expensive foodstuffs for people to buy
4. As a class, pupils share their findings

6. Points of view

Aim

To encourage critical analysis of articles

Resources

Access to a selection of articles representing different viewpoints

Instructions

Where there are reasonable grounds of concern of a serious threat of damage, European Union law states that lack of scientific certainty – something which is often hard to reach in biology – should not be used as a reason for failing to take proportional measures to prevent this threat. This is called the precautionary principle.

Some people feel the precautionary principle applies in the case of neonicotinoids. They believe there is enough evidence to suggest that neonicotinoids are a risk to pollinators and that a permanent ban is justified.

Others disagree – they feel there is not enough evidence to show they are dangerous and are causing harm and believe a ban is out of proportion to the threat. They therefore want neonicotinoids to be used.

a. Using the articles or statements starting on page 9, pairs of pupils answer the following questions:

- Why are bees important and to whom?
- Why are bees in decline and for what reasons?
- How will a decline in bee numbers affect people in the UK?
- Why are neonicotinoids important to farmers?
- What impact does the withdrawal of neonicotinoids have on farmers/beekeepers/the general public?
- What are the solutions to the problem?
- Are the solutions the same for all people?

b. Once pupils have answered the questions, each pair shares their answers which form the basis of a wider discussion.

Neonicotinoids and bee health – a variety of views: statements and web links

1. Neonicotinoids and Bees – why on earth would farmers use a seed treatment?

From Bayer CropScience: one of the world's leading crop science companies in the areas of seeds, crop protection and non-agricultural pest control.

Sometimes it is important to strip down a problem into its constituent parts, and, with an emotive subject such as the neonicotinoids, a pesticide normally used as a seed treatment to control insects that eat a germinating seedling, simplifying the issue can be especially useful.

Farmers essentially run businesses that grow plants to feed people and animals, or to use as animal feed so that they can sell milk or meat, or, in some cases for use as a biofuel. However there are pests and diseases that want to eat the crop and if left to their own devices, will frequently result



Flea beetles eat the oilseed rape seedling as it emerges from the soil

in 40% or more of the crop being lost. There may be weeds that try to out-compete the crop for sunlight and water, fungal diseases that can dramatically reduce the amount and quality of the crop that gets to harvest, and there are insect pests that quite simply eat the crop. In the case of oilseed rape, the seed is crushed and the oil can be used for cooking or as a biofuel, and the remainder is used as animal feed. As a seedling, oilseed rape is particularly susceptible to the cabbage stem flea beetle, an insect only a few millimetres long but which if left uncontrolled, in some years can cause the total destruction of a field.



To the left, oilseed rape with a seed treatment; to the right, no seed treatment

One of the ways of stopping the flea beetle is with

the use of a seed treatment. Imagine an M&M with the seed in the middle. An insecticide such as a neonicotinoid is applied onto the seed and a thin coating on the outside to stop it coming off again. After sowing, the seed germinates and takes up the insecticide into the plant. Any flea beetle that bites into the seedling is killed by the insecticide, and the plant has a chance of surviving the first few critical weeks of germination. So the seed treatment can be seen as a targeted way of controlling a very damaging insect pest.

A classic example is shown in this photo taken by a Cambridgeshire farmer who sowed one half of his field with seed that had been previously treated with a neonicotinoid seed treatment – the other half of the field was drilled with untreated seed. The pest pressure on the non-treated was so high that despite multiple applications of a broad spectrum insecticide spray, the crop on this side of the field failed completely.

The argument against the use of neonicotinoid seed treatments is that the insecticide can be found much later in the season when oilseed rape is flowering – despite the fact that it is clearly not controlling insect pests by this point in time (it has been diluted or broken down in the plant) – some people are concerned that the concentrations of the insecticide are high enough to cause low level or sub lethal effects on useful insects such as bees. These concerns have been magnified by some reports which indicate that bees do show symptoms when they are fed relatively high levels of neonicotinoids in a laboratory set up. Others however argue that such laboratory experiments, whilst simpler to do than in real conditions, are very artificial and that only when the doses are very high are effects seen. In real field conditions – bees living in real hives in real fields and



A honey bee infected with Varroa. The mites suck the blood of the bee and spread lethal viruses

looked after by real beekeepers – there is little or no evidence of a problem. Further evidence for this is that whilst poor bee health is prevalent in honey bees, there is no correlation between exposure to neonicotinoids and colony losses, but very

good correlation between poor bee health and problems with controlling predatory Varroa mites which infect the hive. Banning the use of neonicotinoids, as they have in France for over ten years has not improved bee health, yet where Varroa is not present, such as in Australia, they have the healthiest bees on the planet despite widespread use of neonicotinoid seed treatments

So not having Varroa, very healthy bees, ban neonicotinoids, no effect...
And in the end, in the absence of the neonicotinoid seed treatment, farmers still have to control the flea beetle if he or she is to be able to grow an important crop such as oilseed rape. Since the restriction of the use of neonicotinoids in bee-attractive crops, farmers have had no choice but to return to the old ways of controlling the insect pest; a huge rise in the spraying of broad spectrum insecticides has resulted. Is that really what those who called for the restrictions wanted?

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2. Bumblebee Conservation Trust position on pesticides and the use of neonicotinoids

From the Bumblebee Conservation Trust: founded in response to concerns about the 'plight of the bumblebee' and aiming to prevent further declines, and to raise awareness of the problems bumblebees face.

The Bumblebee Conservation Trust is calling for the ban on neonicotinoid pesticides to be extended indefinitely. Since the ban began on 1st December 2013, a large body of evidence has accumulated which suggests neonicotinoid pesticides are having a detrimental impact on a wide range of non-target organisms, including bumblebees. This evidence includes comprehensive findings from semi-field and laboratory studies, and whilst each particular experiment, looked at singularly, can be debated with regards to its merits and flaws, it is clear when looking at the evidence base as a whole, that neonicotinoids pose an additional threat to our wildlife.

Pesticide exposure is not the only threat to our wildlife. Bumblebee populations are threatened by multiple, interacting factors, including pesticide exposure, but also habitat loss, the importation of parasites and diseases, and the potential effects of climate change. Neonicotinoid exposure interacts with these other threats and exacerbates them, bees poisoned by neonicotinoids are less able to combat disease and forage for food, and therefore less likely to produce a successful colony. Of all the interacting drivers of bee declines, pesticide exposure is potentially one of the easiest for us to reverse.

From 1st January 2014 it has been a requirement under the EU Sustainable Pesticide Directive, that all agricultural professionals in each of the EU member states adopts the principles of Integrated Pest Management. These principles require farmers to minimise chemical inputs, opting for the least environmentally damaging options in the first instance, with pesticides being used as a last resort. These very principles are in direct opposition to the way in which neonicotinoids have been used in the past, where they have been used as seed coatings in a prophylactic manner - as a first case scenario, with or without any indication of pests.

We understand that there has to be a balance. We need to be able to manage pests and grow food, but we need to do so in a sustainable way. We believe that the adoption of Integrated Pest Management is a good move and one which will help

steer us away from automatically opting for the chemical approach. We are calling for manufacturers to develop alternative pest control technologies which have less impact on non-target organisms and are both easy and cost-effective for farmers to use.

We believe the question of whether or not neonicotinoids are safe for our wildlife and wider ecosystems has been answered. We now call for the questions regarding the economics of neonicotinoid use to be answered. Is there a good economic argument for continuing to use neonicotinoids, and if so what will be the cost to our environment? What are the risks and costs associated with not using neonicotinoids, and what will be gained in terms of ecosystem services?

Further information for teachers:

Peer reviewed evidence update/summary

- There have been a few major studies published recently. The most noteworthy was from Rundlöf et al. (2015) who conducted a large field study in Sweden. This examined eight pairs of oil seed rape fields, of which one of each was treated with the commercially available Elado containing the neonicotinoid Clothianidin and the non-systemic pyrethroid β -cyfluthrin. The results found that treated fields caused a significant reduction in wild bee numbers, solitary bee nesting and bumblebee colony growth/reproduction. These results were not seen in honeybee colonies indicating that care should be taken when extrapolating the effects of pesticides on honeybee colonies to other bee species.
- A lab experiment conducted by Kessler et al. (2015) found that foraging age bumblebees and honeybees cannot control their intake of pesticides, and when given the choice – prefer to consume sucrose solutions containing neonicotinoids. This is contrary to thoughts that bees may be able to self-regulate their diets as a means of avoiding negative effects.
- A semi-field experiment by Dively et al. (2015) found that honeybee colonies foraging performance and colony health were not effected in the short-term when fed large doses of the neonicotinoid imidacloprid. They did find negative effects in the long term to colonies exposed to high concentrations of imidacloprid, these colonies suffered higher overwintering mortality rates, a greater number of Varroa mite infestations and were more likely to lose queens. These effects were not seen at lower exposure levels which the authors considered to be realistic, they concluded that neonicotinoid exposure was unlikely to be the most important cause in honeybee colony collapse.

- Conversely, a recent study from the Food and Environment Research Agency (FERA) has found a correlation between honeybee colony losses and the usage of the neonicotinoid imidacloprid on OSR over an 11 year period. This study is also the first to assess the economic argument for neonicotinoid use, it found no increase in yield associated with neonicotinoid usage as opposed to non-neonicotinoid foliar insecticide spraying techniques, however farmers did profit financially from neonicotinoid usage because it is less costly/labour intensive than foliar insecticide spraying.
- Interestingly in an unrelated assessment of global pollinators, Kleijn et al (2015) found that common bumblebee species should be considered as the most important pollinators in Europe and North America. This is relevant as much of the focus throughout the investigation into neonicotinoids, and also pesticide testing in general, focusses on honeybees as test subjects. There are significant gaps in the research as a result.
- In April 2015 the European Academies' Science Advisory Council (EASAC) released a comprehensive assessment of neonicotinoids, agriculture and ecosystem services. They came to the following conclusions:
 - o Ecosystem services provide significant economic benefits to agriculture. Maintaining strong functional ecosystem services is a critical part of a sustainable agricultural system.
 - o Biodiversity has significant positive impacts on the provision of ecosystem services but is also an objective in its own right under global and European international agreements.
 - o Insects providing ecosystem services have shown major declines in recent decades (pollinating wild bees, natural pest control providers, etc.).
 - o Protecting honey bees is not sufficient to protect pollination services and other ecosystem services. Honey bees have been the main focus in assessing the risks from neonicotinoid use, and much debate has focused on whether honey bee colonies are being affected. Yet the honey bee colony structure provides an exceptionally resilient buffer against losses of its foragers and workers. In contrast, bumble bees have just a few hundred workers at most, while solitary bees and other insects have no such buffering capacity.
 - o There is an increasing body of evidence that the widespread prophylactic use of neonicotinoids has severe negative effects on non-target organisms that provide ecosystem services including pollination and natural pest control.
 - o There is clear scientific evidence for sublethal effects of very low levels of neonicotinoids over extended periods on non-target beneficial organisms. This should be addressed in EU approval procedures.

- o Current practice of prophylactic usage of neonicotinoids is inconsistent with the basic principles of integrated pest management as expressed in the EU's Sustainable Pesticides Directive.
- o Widespread use of neonicotinoids (as well as other pesticides) constrains the potential for restoring biodiversity in farmland under the EU's Agri-environment Regulation.

3. Bee health

From IBRA: the world's longest established apicultural research publishers, promotes the value of bees by providing information on bee science and beekeeping.

Bees are important because they pollinate many of the crops that we grow, especially fruits and nuts, but they are also needed to produce vegetable seeds. Recently there has been concern that bee populations are in decline across the world. Many species have become rare or locally extinct, and even common species are less abundant than they used to be. Scientists agree that the long term cause of these declines is changes in land use which mean less food for bees, and fewer places for them to nest. Short term changes from year to year are also caused by the weather. On top of this are many other interacting factors such as pests and diseases, especially the varroa mite which harms honey bees, and other factors such as the use of pesticides and climate change.

Norman Carreck, Science Director, International Bee Research Association,
University of Sussex

4. Looking at the full picture: the neonicotinoid debate

From the Soil Association, the UK's leading membership charity campaigning for healthy, humane and sustainable food, farming and land use.

Given the millions of pounds invested by companies such as Bayer and Syngenta in neonicotinoids products – matched against Britain's love for our bees – it is not surprising that the debate over neonicotinoids has been so fierce. One issue has been that conflicting messages are being given, and often, the complete picture is not given. This is problematic if you want to make your own opinion by weighing up the risk and benefits. We have therefore tried to base our position on the full facts.

In terms of the impacts on pollinators, representatives of the pesticide industry have said that on real life farms (as opposed to lab tests) there is little or no evidence that neonicotinoids harm bees. This isn't the case. A recent statement on all the available scientific evidence was requested by the government and undertaken by independent scientists – this concluded that there is enough evidence to establish that neonicotinoid levels in farms are bad for bees. But that isn't to say uncertainty doesn't remain. The report said that scientists have not done research which would show whether or not these impacts are so big they actually reduce populations of bees – something which is extremely hard to study. One field trial in Sweden which did attempt this however, suggests neonicotinoids do cause population declines – but for scientists to say they are sure, more studies (replication) would be needed. Importantly, the evidence suggested that neonicotinoids do have a negative impact on populations of wild bees and bumblebees, and that the evidence is not so clear for honeybees (although colony declines have nonetheless been correlated with neonicotinoid use). Those in favour of neonicotinoids appear to only want to discuss honeybees, however our other pollinators are crucial to our farmland ecology and food, and 1 in 10 currently faces extinction in Europe. Research has concluded that wild pollinators like bumble bees and butterflies are now responsible for between around 70-90% of UK pollination.

What about how useful neonicotinoids are to farmers?

Surprisingly, a lack of independent studies means we don't really know how well they actually work. We can look at how oilseed rape farmers have fared without neonicotinoids during the ban. Examples of farmers who have lost some or their entire yield have been highlighted in the media – but these are the exceptions and we don't know if the cause was indeed the lack of neonicotinoids. Overall

government data suggests that oil seed rape yields in the UK have actually been above the 10 year average – suggesting that these insecticides are not vital for farmers to grow oil seed rape as a crop.

But is this because farmers have resorted to alternatives that are worse for wildlife?

Pesticide companies argue neonicotinoid seed treatments are highly targeted and therefore less damaging to wildlife than alternative, broad-spectrum pesticide spraying. Scientists have however found that neonicotinoids, which move from the seed into every part of the plant, are highly contaminating to our countryside. Only 5% of neonicotinoid seed treatments remain in the crop, 1% is lost as dust, 94% goes into soils and streams. Any growing plant can take these chemicals up into their leaves, stems, flowers and fruits and scientists have now found neonicotinoids at high doses inside the pollen of wildflowers, such as poppies and hedgerow blossom. As seed treatments, neonicotinoids are used prophylactically, in case of a pest outbreak. This is bad farming practice – it's a bit like taking a paracetamol every day in case you get a headache. You take more than you need, and over time you stop it working so well when you need it to.

But are farmers using alternative pesticides in place of neonicotinoids? One recent study suggests neonicotinoids reduce the use of other pesticides in autumn, but not during flowering when bees and other pollinators could be exposed to them. Furthermore, these broad-spectrum pesticide sprays have been used too often and pests have become resistant to them. Instead the main alternatives to neonicotinoids are not pesticides but agroecological techniques that are used as part of Integrated Pest Management – a way in which farmers can produce food, whilst drastically reducing pesticide use and ensuring that they can keep farming into the future. One innovative farmer has been trialling the use of mixed companion crops to help promote the natural predators that kill oil seed rape pests. Other methods include growing a greater variety of crops to break up the cycle of pests that have developed.

The Soil Association's position is that a permanent ban on neonicotinoids is necessary; there is enough evidence to show that neonicotinoids are harming our pollinators and little evidence to show that farmers need neonicotinoids, with support for agroecological farming practices being the way forward. Whilst we don't know just how much neonicotinoids harm pollinator populations, we think it is sensible to put the bees first, and accept that these chemicals may weaken already vulnerable

populations, acting as the last straw. Bees have suffered greatly from intensive farming practices, leaving them with drastically fewer flowers to feed on, new diseases to cope with and exposing them to not only neonicotinoids, but a whole cocktail of chemicals applied to crops. We are therefore campaigning to improve farming practices as a whole, so that we can help promote healthy populations of bees that are more resilient to what life throws at them.

¹Godfray et al (2015) 'A restatement of recent advances in the natural science evidence base concerning neonicotinoid insecticides and insect pollinators' <http://rspb.royalsocietypublishing.org/content/282/1818/20151821>

²Rundlöf M et al (2015) 'Seed coating with a neonicotinoid insecticide negatively affects wild bees' doi:10.1038/nature14420

³Budge et al (2015) 'Evidence for pollinator cost and farming benefits of neonicotinoid seed coatings on oilseed rape' <http://www.nature.com/articles/srep12574>

⁴<http://www.bbc.co.uk/news/science-environment-31963056>

⁵<http://planetearth.nerc.ac.uk/news/story.aspx?id=>

⁶<http://cereals.ahdb.org.uk/markets/market-news/2015/september/10/adas-harvest-report-7-week-9.aspx>

⁷Goulson (2015) 'The Environmental Fate of Neonicotinoids' http://www.nature.com/nature/journal/v511/n7509/fig_tab/nature13642_F1.html

⁸Botias et al (2015) 'Neonicotinoid Residues in Wildflowers, a Potential Route of Chronic Exposure for Bees' <http://pubs.acs.org/doi/abs/10.1021/acs.est.5b03459>

⁹Budge et al (2015) 'Evidence for pollinator cost and farming benefits of neonicotinoid seed coatings on oilseed rape' <http://www.nature.com/articles/srep12574>

¹⁰Jake Freestone 'Oilseed Rape with Companion Cropping' <https://www.youtube.com/watch?v=c2M5MMKBCek>

5. The use of pesticides

From the Crop Protection Association (CPA), the key voice of the UK plant science industry. Its members are involved in the development and manufacture of a wide range of plant science technologies, including crop protection products such as pesticides.

There's been a great deal of debate recently about food security and agricultural production, and the role of technology and innovation in providing an adequate supply of safe and affordable food. In particular, there has been considerable interest in the use of pesticides and declining populations of bees and other pollinators, an issue that divides opinion and attracts controversy.

Pesticides are a fundamental part of modern food production and are often subject to a great deal of misunderstanding. The vast majority of UK farms, approximately 97%, are conventional and use pesticides to help protect their crops. These pesticides are essential because without them crops across the globe would have to compete with 30,000 species of weeds, 10,000 species of insect pests and countless diseases. Without pesticides our regular supply of food would reduce by about a third, at a time when we need to increase our food production to cope with a ballooning global population set to reach 9 billion by 2050.

Crop protection products are amongst the most heavily regulated chemicals in the world, which means that companies have to observe strict rules and requirements before they can bring a product to market – a process that, on average, takes 10 years and costs £160 million. The majority of that time and cost is to demonstrate that approved pesticides are safe and do not pose an unacceptable risk to human health and the environment.

Pesticides and pollinator health

We have seen declining numbers of bees and other wild pollinators since the 1950s, yet neonicotinoids (a class of insecticide) have only been in use for around 20 years. It is widely accepted that bee health is affected by a number of factors, the most significant of which are habitat loss, climate change, the Varroa mite, viruses and diseases. The European Commission themselves admitted that their recent restriction on the use of neonicotinoids on bee attractive crops was not because they were the main threat to bee health, but because they were “the only factor that could be quickly regulated”.

Nevertheless, various studies have implicated some neonicotinoids in the decline of bee and pollinator populations. It is claimed that current regulatory practices do not adequately assess the long-term and sub-lethal effects of such pesticides. However, the majority of these studies have taken place in laboratories under artificial conditions, and other studies have found no effect on bees when neonicotinoids are used in normal field situations.

This is an important point. Insecticides are, after all, intended to harm insects, and so laboratory studies may often identify harm to pollinators. The crucial issue is whether they cause harm when used in real world conditions, as they would be on a farmer's field. After almost 20 years of research into the effects of neonicotinoids on bees, studies conducted using field-realistic exposure scenarios have failed to demonstrate significant adverse effects to honeybee colonies where neonicotinoid based products are applied correctly.

In October 2015 a comprehensive [restatement](#) of the evidence by Professor Charles Godfray at the Oxford Martin School concluded that; "the evidence so far points to a lack of effect on honeybee colonies from neonicotinoids" and that the populations of both managed honeybees and wild pollinators were declining before the widespread use of neonicotinoids, with habitat change and honeybee disease thought to be particularly important causes.

According to the restatement there are still "major gaps in our understanding" and therefore it is important that researchers continue to gather evidence on the impact of neonicotinoids so that a proportional and informed decision on their use can be made. The independent Centre for Ecology and Hydrology (CEH) has been commissioned by the government to conduct large scale field trials in the UK, Germany and Hungary monitoring the effects of neonicotinoids on bees. In addition, scientists will sample residues of neonicotinoids in the soil and plant tissue, nectar, pollen, wax and honey. These trials should provide policymakers and regulators with independent, high quality scientific evidence on which to base their decisions.

Should neonicotinoids be banned as a precautionary step?

Calls for bans have often been made on the basis of the "precautionary principle", claiming that the lack of evidence should mean we "play it safe" and stop using these insecticides because of a theoretical risk. However, banning products can

also have a big impact. The most recent survey from the Agriculture and Horticulture Development Board (AHDB) found that in Autumn 2014, approximately 5% (around 30,000 ha) of the original planting area of oilseed rape planted in England had been lost to Cabbage Stem Flea Beetle following the 2013 moratorium which meant farmers could not use neonicotinoids that year. The regions reported as worst affected were the East and South East where about 8% and 4% respectively of the crop was lost and not successfully replanted.

Independent experts have continually advised the UK government on the safety of neonicotinoid pesticides; it is this scientific advice upon which the government has resisted calls to support a permanent ban from campaign groups who are often fundamentally opposed to the use of any pesticides in food production. It is vital that any decisions government takes regarding pesticides are based on sound science and the expert technical advice of the regulator.

We should be very careful about banning a product for precautionary reasons. Banning neonicotinoids would have a big impact on farmers' ability to produce crops, as well as on one of the major sources of forage for bees in the UK. We have already seen less oilseed rape being planted in the UK since 2013, partially due to the neonicotinoid ban, and many beekeepers are concerned that this will reduce the amount of oilseed rape pollen available for their bees in the spring. This is a good example of why any action we take needs to be properly thought through and taken on the basis of reliable evidence. As a society, we need to take a sensible approach that strikes the right balance between protecting the environment and producing an adequate supply of safe and affordable food.

6. British Beekeepers Association:

Importance of bees

http://www.bbka.org.uk/kids/importance_of_bees

7. NFU:

Bees and neonicotinoids - what's it all about?

<http://www.nfuonline.com/science-environment/bees-and-pollinators/bees-and-neonicotinoids-whats-it-all-about/>.

Why the National Farmers' Union has asked for emergency use of neonicotinoids?

<http://www.nfuonline.com/news/press-centre/why-the-nfu-is-applying-for-a-neonicotinoid-derogation/>

A view that bumble bees are in decline because of climate change

<http://www.nfuonline.com/news/latest-news/climate-change-making-bumblebees-homeless/>

8. Bayer Crop Science:

Reasons for the decline in bee health

<http://www.bayercropscience.co.uk/tools-and-services/stewardship,-food-and-environment/bee-health-and-neonicotinoids/>

9. The Guardian:

Presentation of different views about the lifting of the ban on neonicotinoids

<http://www.theguardian.com/environment/2015/jul/23/eu-suspends-ban-pesticides-linked-serious-harm-bees>

10. Bumblebee Conservation Trust:

Trust's views on ban on neonicotinoids

<http://bumblebeeconservation.org/news/statement-on-the-governments-decision-to-allow-the-emergency-use-of-neonico>

<http://bumblebeeconservation.org/news/update-on-bbct-position-on-pesticides-and-the-use-of-neonicotinoids>

Extension activities

1. Watch the film 'Why do bees matter' <http://www.wildlifetrusts.org/bees-needs>. This has been produced through a process of discussion and consensus by all the parties interested in this issue. These are the five simple actions people can take <http://www.wildlifetrusts.org/bees-needs/fivesimpleactions>.
2. Invite a beekeeper into school to bring beekeeping equipment and demonstrate the work of a beekeeper. The British Beekeepers' Association may be able to help you find a local beekeeper.
3. Provide a selection of different types of honey for tasting. (Check for allergies before you set up this activity.) Consider the different aromas, colours and tastes.
4. Establish a bee garden with pollen rich flowers!