Myths and truths about neonicotinoids, chemicals and the pesticides industry

NEONICOTINOIDS AND POLLINATORS

1. MYTH: There is no evidence to show that neonicotinoids are harmful to pollinators.

TRUTH: **There is a considerable and growing body of evidence that neonicotinoids and other systemic chemicals are harming bees, other wildlife and also our soil and water quality.**

In 2014, the findings of a four year evidence review of the effects and risks of systemic chemicals, including neonicotinoids, was published by the Global Taskforce on Systemic Pesticides. The Taskforce, a group of 29 independent scientists, examined over 800 peer-reviewed papers on the effects of neonicotinoids on all wildlife as well as water and soil quality. They determined that neonicotinoids are found worldwide in soil, water, vegetation and air, leading to widespread impacts on wildlife, including bees. The Taskforce report also found that the compounds which neonicotinoids break down into are often as, or more, toxic than the active ingredients.

According to the Taskforce the group most affected by neonicotinoids were terrestrial invertebrates, such as earthworms; the second were insect pollinators, such as bees and butterflies, which are subjected to high-level exposure through air and plants and medium-level exposure through water. Honeybees have been at the forefront of concern about neonicotinoids. The EU Commission's preliminary two-year restriction on some uses of three neonicotinoids represents a major step in the right direction, but additional action to protect honeybees, wild bees and other pollinators has been limited. Furthermore, the ban must be made permanent and - considering the persistence and contamination issues of neonicotinoids as highlighted in the Taskforce report - should be extended to cover non-flowering crops.

In reviewing all the available literature - rather than simply comparing one report with another - the Taskforce found that field-realistic concentrations of neonicotinoids adversely affect how bees navigate, learn, and collect food, as well as being detrimental to their lifespan, resistance to disease and reproduction. In bumblebees, problems related to the overall success of the colonies were found, with contaminated colonies growing more slowly and producing significantly fewer queens.

2. MYTH: All the evidence on bees has been from laboratory studies which do not reflect what happens in the real world.

TRUTH: Lab studies and field trials both contribute important data to the overall wealth of knowledge.

The advantage of lab studies is that conditions can be controlled, allowing scientists to pinpoint exactly what effect neonicotinoids are having while keeping other factors such as climate, food supply and exposure to disease constant. Recent lab studies have been carefully designed to replicate as closely as possible conditions in the outdoors environment: for example the dosage of neonicotinoids administered to bees is chosen to reflect what they might encounter when foraging in a treated crop. Field studies are important in exploring how different factors might interact in the real world. However, it is extremely difficult to design field studies in such a way that statistically robust conclusions can be drawn; there are so many uncontrolled elements to the experiment. This can result in field studies failing to detect effects of neonicotinoids. For example, the UK Government's single flawed field trial using buff tailed bumblebees, one of the more robust species, carried out in 2012-13 http://fera.co.uk/ccss/documents/defraBumbleBeeReportPS2371V4a.pdf claimed to show that the bees were not affected by neonicotinoinds. The Government also sought to claim that its study was superior to others.

However, the Government's study encountered many problems including the fact that even the untreated bee colonies, which were supposed to demonstrate what would happen in the absence of neonicotinoids, were bringing back contaminated pollen to the nest. These problems lead EU regulators to reject this study http://www.efsa.europa.eu/en/efsajournal/pub/3242.htm, saying "due to the weaknesses of the study design and methodology, the study did not allow to draw any conclusion on the effects of neonicotinoids on exposed bumble bee colonies".

Leading bee experts such as Dr Lynn Dicks of the University of Cambridge predicted that the Government's single field trial would be flawed when she first saw how the trial had been designed. On seeing the final results, Dr Dicks described the Government study as "not sufficient to compare the effects of neonicotinoid exposure against control 'untreated' colonies." http://www.valuing-nature.net/blogs/lynn-dicks/defra%E2%80%99s-field-research-neonicotinoids-and-bumblebees-%E2%80%93-what-does-it-tell-us

Dr Dicks has also estimated that scientifically rigorous and robust field trials of neonicotinoids would probably cost about £10 million and take about 5 years to carry out across a range of crops, soil types and insect species. This contrasts with the Government's single field trial which wasted time and money when it could have produced valuable, credible evidence.

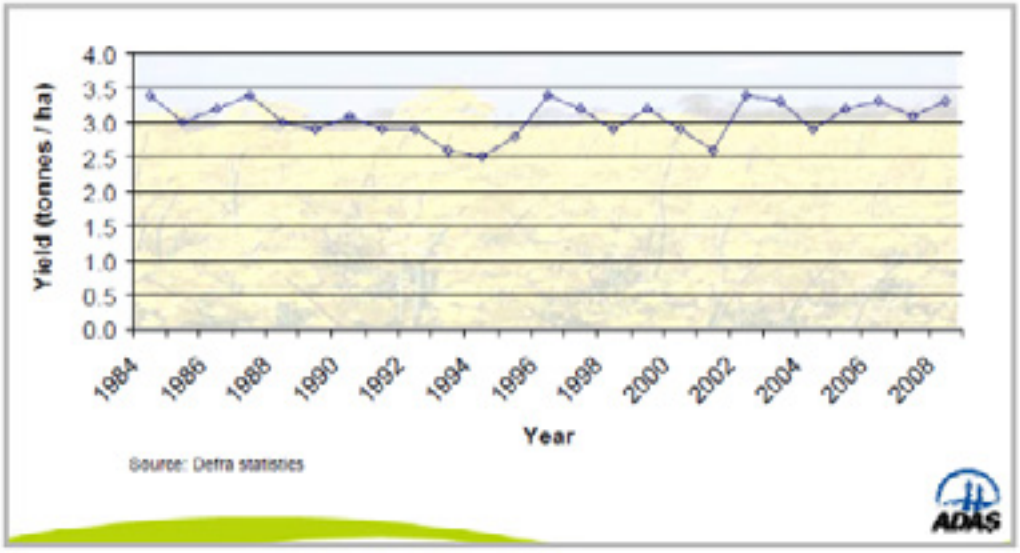
Well-designed field studies are an important part of the evidence base, but peer-reviewed lab studies also have a legitimate role and remain vital. That so many further tests have to be carried out also illustrates the inadequacy of the pesticide testing regime in the past few decades including the reliance on tests carried out by the pesticides industry and which are not openly available for scutiny.

3. MYTH: Farmers need neonicotinoids.

TRUTH: The latest studies indicate that use of costly neonicotinoids rarely helps crop yields.

'Heavy Costs', a review of 19 published studies by the Centre for Food Safety in the USA, concluded that neonicotinoids only rarely increase the yields of treated crops and, even when they do, the increase in yield does not usually compensate for the cost of the pesticide. This is perhaps not as surprising as it first seems: the introduction of neonicotinoids has not significantly increased oilseed rape yields.

Oilseed rape trends http://www.voluntaryinitiative.org.uk/importedmedia/library/1152_s4.pdf



There are alternatives to neonicotinoids for pest control, both chemical (i.e. other pesticides) and non-chemical; including, for example, selecting appropriate crop rotations, cultivation methods and crop varieties. Approaches that use a variety of pest management techniques in a planned way, with careful monitoring of pests and pesticides used only as a last resort, are known as Integrated Pest Management (IPM), which in the EU Sustainable Use Directive is defined to also include organic farming which uses almost no pesticides at all.

A review of the cost effectiveness of neonicotinoids (Goulson 2013) examined a number of published studies comparing neonicotinoid use with IPM approaches or pyrethroids sprayed in response to herbivore levels. Yield benefits with neonicotinoids were rare and the overall conclusion was that IPM and spraying only in response to the presence of pests at damaging levels were more cost-effective than prophylactic neonicotinoid use.

Now, new evidence has come to light from the Environmental Protection Agency (EPA) in the USA. This is a body widely seen as failing to respond to the threat to bees and other wildlife posed by neonic insecticides. However, an EPA review of the use of neonic insecticides on soybean crops has concluded that they provide 'negligible' benefit to crop yields and are in fact no more effective than undertaking no insect control at all. This raises questions about why US farmers have been paying to use them at all.

Farmers have also reported that they can manage their crops without neonicotinoids. Lincolnshire conventional farmer, Peter Lundgren, told a group of MPs that "Since imposing a voluntary neonicotinoid ban on my farm I have not suffered any uncontrollable pest attack or a reduction in expected yield – yields have been as expected or better than expected." http://www.peterlundgren.co.uk/2014/03/19/presenation-to-the-appg-on-agroecology-a-country-side-fit-for-pollinators/

4. MYTH: The varroa mite is the prime cause of bee decline.

TRUTH: Government and leading scientists recognise that bee decline is due to a combination of factors: loss of habitats, insensitive built development, climate change, and farming methods including exposure to chemicals, and pests and diseases. Wild bees and other pollinators that are in decline are not affected by varroa.

The varroa mite is a problem in managed honey bees but it is not robust to claim that it is the main cause of problems in all bees and pollinators.

Although varroa mites and the viruses they transmit are among the stressors facing honeybees, this does not absolve neonicotinoids as another key factor in pollinator declines. For example, varroa mite is not present in Australia; however, commercial beekeepers there have recorded problems maintaining hive strength required for pollination services: "Our bees are continually in contact with neonicotinoids from the agricultural environment. We are finding it very difficult to maintain our hives at pollination strength, requiring an increase in use of young queens and replacement nucleus hives to maintain our hives".
http://www.aph.gov.au/parliamentary_business/committees/house_of_representatives_committees?url=/pir/honeybee/chapter2.htm

It is also necessary to consider declines in wild pollinators including hoverflies, bumblebees, solitary bees and others which are as, if not more, important for pollination than managed honeybees. Studies have shown a decrease of bee diversity of between 52-67% in the UK and the Netherlands, though most wild bees are not affected by varroa or its associated viruses. There are some concerns about the potential for diseases in managed colonies of honeybees to 'spill over' into the wild bee population, but this is another area lacking adequate research.

5. MYTH: Neonicotinoid seed treatments are better for wildlife because they are more targeted than pesticide sprays.

TRUTH: The majority of the neonicotinoids in seed coatings end up in soil and water, not in the crop.

In Europe and North America, neonicotinoids are typically applied as a coating on the seeds, rather than sprayed over the growing crop which tends to happen more in developing nations.

Studies suggest that only between 1.6 and 20% of the active chemical in a seed coating is actually absorbed by the crop [Sur, R. & Stork, A. (2003) Uptake, translocation and metabolism of imidacloprid in plants. Bulletin of Insectology, 56, 35–40], making seed dressings less targeted than many sprays. Of the 80-98% that does not enter the crop, a small proportion may be lost as dust during sowing, which is dangerous to pollinators present at the time, and can be deposited on vegetation in the field margins, contaminating these habitats with neonicotinoids.

The vast majority of the neonicotinoid enters the soil, where earthworms and other soil invertebrates may encounter it. The length of time neonicotinoids persist in soil varies according to local conditions, but can be as high as 1000 days. Neonicotinoids are water soluble and may end up in waterways, putting aquatic wildlife at risk.

THE WIDER PESTICIDES INDUSTRY

6. MYTH: The crop protection industry is being held to a "higher standard of proof" than other industries.

TRUTH: **Regulation on pesticides is slowly improving but still inadequate to fully protect the environment and human health.**

Some voices in Europe are calling for a lower standard of proof of safety for plant protection products. This often comes in the form of a call for a more 'risk-based' approach to pesticides - which wrongfully gives the impression that the current approach does not consider risk - such as how unlikely it is for wildlife to actually be exposed to a pesticide that may otherwise be toxic.

However, such calls do aim to erode the precautionary principle. This principle however lies at the centre of all EU safety regulations. It ensures that potential risks are investigated, understood and minimised before new technologies with the potential to impact the environment are approved. EU and national controls of pesticides as they currently stand are still far too little and far too late. Eroding the use of the precautionary principle by attempting to privilege economic considerations through selective interpretation of the principle would worsen things. This is demonstrated by the fact that over the past 60 years, many pesticides declared safe for human health and wildlife have subsequently been found to be dangerous and were banned. DDT is one high profile case, but there are many other examples, including endosulfan, heptachlor and parathion.

Neonicotinoids are a more recent example - it is inconceivable that a genuinely independent and science-based safety regime could have cleared for use in Europe neonicotinoid coated seeds on the understanding that the risk of exposure to wildlife is low. 0.5% to 1% of those seeds will remain on the surface of a field after they are sown (up to 500 Maize seeds per hectare), which is enough to kill up to between 25 and 50 English Partridges. Contrary to earlier understanding, these chemicals also contaminate soils and watercourses.

Nonetheless, prompted by independent peer-reviewed research and rising public concern, the regulatory environment is slowly improving; at least, to the extent that dangerous pesticides are being removed from use slightly faster than was the case in the last century.

Any calls for 'a risk, not hazard based approach' or 'the removal of the precautionary principle' would reverse this trend. It is clear that regulation has a valid role in ensuring that the most toxic pesticides are removed from the market.

7. MYTH: EU guidance and regulation is proliferating and constantly shifting.

TRUTH: Rules on testing of chemicals have not changed substantially for many years. Far from having a robust testing regime the public could have confidence in, products have been approved without proper testing.

The neonicotinoids issue has exposed that the way chemicals are tested is far from robust, for example with pesticides being approved for use even though they were not tested on wild bees. It is only because independent peer-reviewed tests have been carried out that the fundamental flaws in the approvals process for pesticides and, in particular, the role of neonicotinoids in bee and pollinator decline came into focus. The investigations revealed that pesticides were passed for use without being tested on wild species. This is important because wild bees have a very different biology from managed honey bees.

While the objectives of testing - to protect the environment and human health - should remain constant, it is entirely appropriate for the testing regime itself to be updated according to the latest scientific knowledge.

8. MYTH: The likely loss of 'crop protection products' resulting from EU regulations will mean 35,000-40,000 job losses.

TRUTH: Banning the most dangerous chemicals will benefit jobs and the rural economy.

There is no plan to lose the full range of existing products available to farmers; the proposal is to remove some and to improve or replace others. Losing the most dangerous and damaging chemical sprays would create jobs in the countryside, rather than destroy them.

The existing, damaging trend of fewer and larger farming operations – a system propped up by the use of many of the worst offending pesticides - has drastically reduced jobs in the agricultural sector during the past 60 years.

The removal of these pesticides would reduce mono-cultures of maize and oilseed rape designed for industrial uses and encourage more diverse cropping of foods, which would increase jobs not just in British farming, but also in local food processing and distribution.

Reduced reliance on pesticide products could also be a catalyst for the development of alternative and innovative products, including new technology to forecast and monitor pests and disease so that control is only used when it is needed, and new conventionally bred varieties of crop that are more resistant to attack.

9. MYTH: The likely loss of 'crop protection products' due to EU regulations will result in lower yields, ranging from 4-50%, and revenue losses at £1.73bn.

TRUTH: These estimates do not reflect the costs of damage caused by pesticides, nor the versatility and adaptability of farmers.

To accurately model the impact of losing the most dangerous and damaging chemical sprays, calculations need to include their knock on impacts. This includes the millions of pounds in public money currently spent on trying to reverse or mitigate the damage caused by pesticides – such as the catastrophic impacts of chemical intensive farming on farmland wildlife, and the hefty cost to the public's water bills due to the industrial cost of removing pesticides from water.

This calculation also underestimates the alternatives to pest control that would be developed and taken up more widely. All previous claims about reductions in crop yields as a result of restrictions on pesticides have proved to be wildly exaggerated. For example, when the latest EU law on pesticides (the Sustainable Use Directive) was being drawn up, the chemical industry predicted that farmers would no longer be able to grow crops such as carrots, and that many yields would be cut by 50% or more. In practice, farmers are skilful and adaptable, something that is not factored into any of these predictions. Indeed, it is likely that the removal of pesticides would be replaced by a move towards more agroecological farming methods, as well as a refocusing of agricultural research on new, non-chemical methods of pest control - a trend that is already being seen in many EU member states.

10. MYTH: It is the EU's moral duty to make full use of pesticides to maximise agricultural output, to help feed the 842 million people in the world who lack enough to eat.

TRUTH: The EU's most important role in tackling hunger is to help build a socially, economically and environmentally sustainable food system.

It is true that many people around the world continue to go hungry, and the EU clearly has a responsibility to address this. Ending hunger cannot be achieved, however, by further intensifying food production in Europe.

The world produces more than enough food for all its citizens: people are malnourished because they lack economic or physical access to food, not because there isn't enough to go around. The EU has a key role to play in building a fairer global economy, and in reducing waste and encouraging the take up of more sustainable diets at home, including lower meat consumption. Pesticides may play a part in the equitable, productive, wildlife-friendly farming systems of the future. This does not negate the need to remove the most dangerous chemicals from the market now.