

# POISON PESTICIDES

## The urgent need to protect our pollinators



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Most of your favourite foods would not exist without the work of pollinating insects. The UN Food and Agriculture Organisation (FAO) estimates that, out of over 100 of the most common crops which provide 90% of food for 146 countries, 71 are pollinated by bees.<sup>1</sup> Imagine a world without spaghetti bolognese or apple crumbles; orange juice or cups of coffee; olive oil or avocados. So many of the world's most important food sources are reliant on pollination, it's hard to imagine a world without bees. Even the animals on our farms and the cotton in our clothes require the work of the world's many pollinators. It's easy to take bees for granted, but we can't survive without them.

Yet, in recent decades, bee populations around the world have crashed. Whilst there are likely to be a range of causal factors, a growing body of scientific evidence points to the role of neonicotinoid pesticides in these declines.

The Environmental Justice Foundation (EJF) and Pesticide Action Network UK (PAN UK) are demanding an end to the use of these pesticides and the adoption of better, pollinator-friendly, farming practices to protect our bees, which are vital to farming, food and our wider environment.





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## Why are bees and pollinators so important?

Honeybees produce honey, but they also play a far more important role in creating most of the food on our table<sup>2</sup> and are responsible for one in every three mouthfuls that we eat.<sup>3</sup> When a bee gathers nectar and pollen from a flower, the pollen sticks to its body and is carried to the next flower it visits. This fertilises the crop, allowing fruits, seeds, nuts or grains to grow. Honeybees, bumblebees and many other wild bee species all harvest pollen and nectar from flowers and take it back to the nest to feed their larvae, the colony and the queen.

Two thirds of all our food is produced by flowering crops, including many of the world's most common and nutritious food sources, such as apples, peas, beans, tomatoes and onions; in fact, around 75% of all fruit, nuts and vegetables grown in the USA are pollinated by honeybees.<sup>4</sup> The FAO estimates that of the 100 most common crops, which provide 90% of food supplies for 146 countries, 71 are bee-pollinated (mainly by wild bees), with several others pollinated by wasps, flies, beetles and other insects.<sup>5</sup> Pollination is a vital service provided free by nature and, although it contributes a conservatively estimated £430 million to the UK economy, this is only just being fully recognised.<sup>6</sup> Artificial pollination is a very slow and expensive process that simply cannot compare with natural pollination in terms of scale, efficiency, and cost-effectiveness.<sup>7/8</sup>

## Bee declines

Unusual and dramatic declines in bees have been reported as far apart as North America and Europe since the mid 1960s.<sup>9</sup> Since 1998, individual beekeepers across Europe have been reporting 'unusual weakening and mortality', particularly in the UK, Belgium, Switzerland, Italy, Spain, France, Germany and the Netherlands.<sup>10</sup> In the United States, experts estimated that honey bee colony losses during the autumn/winter periods of 2006-2007 and 2007-2008 were at 31% and 36% respectively, exceeding the 17-20% losses that are considered normal by the US Department of Agriculture as a result of normal over-wintering, mites, disease and stress.<sup>11/12</sup> In the UK, winter-losses have been around 20-40% in the last few years.<sup>13</sup> Beekeepers have also reported abnormal behaviour in worker bees, loss of young queen bees and increased symptoms of ill health.<sup>14</sup> So prevalent has the sudden death or disappearance of bees around the world become, that a new term - Colony Collapse Disorder (CCD) – has come into being to reflect this new phenomenon.<sup>15</sup>

## The causes of bee declines

Scientists have so far been unable to conclusively determine any single cause for the dramatic decline in bee populations, but point to possible causes including pesticides<sup>16/17</sup>, new parasites or pathogens<sup>18</sup>, poor nutrition, overcrowding and contaminated water.<sup>19</sup> Others have blamed habitat loss,<sup>20</sup> intensification of agriculture<sup>21</sup> and the consequent pressure this has placed on biodiversity and availability of resources.<sup>22/23</sup> Bees need a wide variety of different flowers in order to thrive as no single source of pollen or nectar can supply all of the proteins, sugars, vitamins and minerals that bees need.<sup>24</sup>

However, since 1999, an increasing body of scientific evidence has pointed to the role of neonicotinoid pesticides in bee-deaths, including their effect on reproduction, disease resistance and navigation. <sup>25/26/27/28/29/30/31/32</sup>

Neonicotinoids are a relatively new type of insecticide used since the 1990s to control a variety of pests, such as aphids, leaf-feeding beetles and root-feeding grubs.<sup>33</sup> In the UK today crops sown using neonicotinoid seed-coatings cover more than 2.3m acres.<sup>34</sup> These systemic pesticides are also applied as granules, sprays and soil drenches, on fields and orchard crops; used on garden-centre plants, on trees in public parks, gardens and streets, as well as domestic lawns, golf courses and playing fields. Reliance on neonicotinoids has increased in recent years, with many farmers and other users applying them proactively as 'insurance' over vast areas every year – regardless of whether the insect pests they want to control are actually present or at levels that will cause economic losses.<sup>35</sup> Neonicotinoids comprise a large and rapidly growing sector, accounting for 24% of the total market for insecticides, which stood at €6.33 billion (£5.10 billion) in 2008.<sup>36</sup> In 2009, imidacloprid was German chemical giant Bayer's top-selling insecticide, earning £510m.<sup>37</sup>

Neonicotinoids can be applied as a coating to seeds before sowing, to growing roots and can be sprayed onto the crop foliage. They are systemic pesticides, able to be absorbed and transported to the leaves and flowers where they remain active for several weeks, killing insects throughout the life of the plant. As a seed-coating, the toxin can contaminate the nectar and pollen, which bees gather and carry back to their hive as food. This can affect the nurse bees, the larvae and the queen.<sup>38</sup>

As well as being in widespread use, neonicotinoids pose particular risks to bees and other pollinators due to their:

- Unintended presence in pollen and nectar
- Persistence in soil and water for up to 1,200 days and contamination of field edge flowers<sup>39</sup>
- Potency at extremely low concentrations.<sup>40</sup>

Bees and other pollinators may be killed by acute exposure to neonicotinoids in pollen and nectar. However, sub-lethal poisoning is a more likely scenario. Doses as low as 0.1 parts per billion have been found to cause behavioural disturbances in honeybees, including:<sup>41</sup>

- Inability to navigate or fly back to the hive
- Reduction of foraging and food collection
- Impairment of memory and ability to learn
- Impairment of communication with nest mates, a disaster for social insects.<sup>42</sup>

Chronic exposure can also compromise the immune system and cause increased susceptibility to diseases and pathogens.<sup>43</sup> The sub-lethal effects of regular exposure to very low doses of neonicotinoids on individual bees and their colonies have been largely ignored by the risk assessment processes of the UK and EU regulatory authorities.<sup>44</sup>

## UK's position vs. Europe's position

Despite growing scientific evidence, UK regulators continue to insist that neonicotinoids pose no risks to bees 'if used properly'.<sup>45</sup> In 2012, three scientific studies – by French scientists<sup>46</sup>, researchers from University of Stirling<sup>47</sup> and the US Government's Chief bee researcher<sup>48</sup> – looked at the impacts of exposure of bees to neonicotinoids. The first two studies showed strong evidence from field-realistic studies that low dose exposure can cause sub-lethal effects, which affect colony survival and/or reproduction. The US Pettis lab study showed that pesticide exposure can increase the level of bee disease. These three important studies, including two field experiments, provide convincing evidence that neonicotinoids can play a significant role in affecting the health and viability of honeybee and bumblebee colonies at doses found in nectar and pollen.<sup>49</sup> Despite these findings, the UK's Department for Environment, Food and Rural Affairs (DEFRA), as well as the Chemicals Regulation Directorate and Advisory Committee on Pesticides, refused to act and responded by asserting that more research was necessary.<sup>50</sup>

The value that pollination services bees provide to the UK economy is estimated at £430m a year. Whilst it is problematic to estimate the global economic value of the pollination services provided by managed species, recent estimates range between € 22.8 to 57 billion.<sup>51/52</sup>

In 2010, around 30% of Britain's cropland (3.14m acres) was reported to have been treated with neonicotinoid insecticides.<sup>53</sup> By contrast, France has to date restricted three neonicotinoids: in 2000, imidacloprid a seed treatment in sunflowers was the first restriction; most recently, in 2012 a restriction on thiamethoxam (a seed treatment for oilseed rape), was imposed after scientists confirmed that this toxin can damage bees' ability to navigate to their hive.<sup>54</sup> The Dutch Parliament and the European Parliament both recently called for an EU-wide ban on neonicotinoids and Austria is considering a ban, following a three-year study which linked their use to bee-deaths.<sup>55</sup> Three other EU countries – Italy, Slovenia and Germany – have all imposed partial restrictions on some neonicotinoids, mainly suspending their use as seed treatments for maize. In Italy, winter deaths of honeybees were halved after restrictions were introduced on three neonicotinoid products used for treating maize seed. Maize farmers have not suffered loss of yield and maize pest problems have not increased, showing that much of the neonicotinoid use was not necessary.<sup>56</sup>

Recent studies by the European Environment Agency and the European Food Safety Authority (EFSA) have both concluded that the use of imidacloprid, clothianidin and thiamethoxam was 'unacceptable' in crops 'attractive to honey bees' given the risk they pose from exposure to pollen and nectar.<sup>57</sup>

## What will happen if we don't protect our bees?

If we do not take urgent action to protect our bees and other pollinating insects, it could be more than honey that disappears from our menus. Dozens of foods including apples, pears, peaches, plums, blueberries, almonds, asparagus, cashews, tea, cocoa and raspberries could decline or disappear along with the important insects that pollinate them. The loss of 71 of the world's 100 most common food crops would have a devastating effect on human health, rural economies and potentially to our shared food security.



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# Action needed:

## UK GOVERNMENT AND LOCAL AUTHORITIES:

- Ban neonicotinoids.
- Fund truly independent studies of the impacts of neonicotinoids and other pesticides on plant pollinators and make the findings public.
- Develop incentives and support for farmers to adopt pollinator-friendly farming methods: crop rotation, organic farming and integrated pest management.
- Stop using neonicotinoids on public land and designate 'Bee Friendly Zones' in public parks, golf courses, school grounds.

## EU COMMISSION AND PARLIAMENT:

- Strengthen regulatory controls; impose better Risk Assessments with complete life-cycle studies. Mandate pesticide labels to include specific risks to bees.
- Open public access to the findings from eco-toxicology dossiers submitted by the pesticide manufacturers.<sup>58</sup>

## INDUSTRIES:

- Gardening sector: Undertake an immediate voluntary ban on sales of neonicotinoid products to the public.
- Food retailers: Put neonicotinoids onto pesticide-restricted lists throughout their supply chains.
- Farmers: Stop the use of all systemic-neonicotinoids and aim to reduce all pesticide use through use of crop rotation, integrated pest management and biological controls.

## INDIVIDUALS:

- Write to your MP to demand tighter pesticide controls and immediate restrictions on neonicotinoid pesticides.
- Use clean, pesticide-free and organic seeds and do not use pesticide sprays in your garden.
- Support pollinator-friendly farming methods; buy organic produce.
- Create Bee-Friendly Zones; if you have a garden, plant native wildflowers and choose garden varieties which produce abundant pollen and nectar for bees; many hybrids do not.
- Boost local biodiversity by sowing bee and pollinator friendly plants in your neighbourhood.

## FOR MORE INFORMATION VISIT:

[www.ejfoundation.org/bees](http://www.ejfoundation.org/bees) and [www.pan-uk.org](http://www.pan-uk.org)

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The Environmental Justice Foundation is a UK-based NGO working internationally to protect the natural environment and human rights. EJF is a charity registered in England and Wales (No. 1088128).