**Why neonicotinoids are bad for bees**

Bee numbers are rapidly dropping and there have been many explanations given for this. There is strong evidence that neonicotinoids – a class of pesticide first used in agriculture in the mid 1990s at exactly the time when mass bee disappearances started occurring – are involved in the deaths. The evidence against these chemicals is strong enough that they have been banned or suspended in France, Germany and Italy – but not yet in the UK. In April 2013 the EU decided to suspend three types of neonicotinoid pesticides - clothianidin, imidacloprid and thiametoxam. The suspension will be implemented for two years from December 2013.

**Useful documents**

* The Soil Association submitted evidence to the UK Environmental Audit Committee's inquiry into Insects and Insecticides in November 2012. The submission provides a useful summary of the evidence against neonicotinoids. [View the paper submitted here](http://www.soilassociation.org/LinkClick.aspx?fileticket=lEFGyyWI1Ws%3d&tabid=439).
* Pesticide Action Network have produced a series of factsheets which can be viewed [here](http://www.pan-uk.org/news/new-bee-and-pesticide-fact-sheets).

**How neonicotinoids work**

Neonicotinoids work as an insecticide by blocking specific neural pathways in insects’ central nervous systems. The chemicals impair bees’ communication, homing and foraging ability, flight activity, ability to discriminate by smell, learning, and immune systems – all of which have an impact on bees' ability to survive.

It seems bees genetic make up makes them particularly vulnerable to neonicotinoids. Recent mapping of the bee genome has revealed that bees’ capacity to detoxify chemicals is much lower than other insects. Instead bees have two strategies to protect themselves. On the first day of foraging in a new area, scout bees are sent out first to taste the nectar and pollens – if any are adversely affected they will be expelled from the hive immediately, and the colony will avoid the area.

In addition, once foraging begins, nurse bees in the hive clean foragers each time they return. These strategies protect the colony from mass exposure to lethal doses of chemicals, but they do leave honey bees particularly susceptible to sub-lethal exposures to any contaminants they encounter.

The other really important factor is the complex behaviour of honeybee colonies. For example, the 10,000 forager bees in a typical hive need to co-ordinate their quest for nectar – and they do this through the famed ‘waggle dance’, which communicates the flight direction and distance to sources of nectar. The complexity and precision of these dances is breathtaking, and success relies on the integrity of a nervous system where each synapse is crucial. It is no surprise then that honey bees have been shown to have a higher number of neurological receptors than other insects.

Honey bees live and work as a colony, not as individuals; what seems to be happening is that the cumulative impact of small doses of nenoicotinoids on thousands of bees over time is affecting individual bee's ability to work and communicate effectively as part of a colony. Because lots of bees in each colony are behaving sub-optimally this can lead to the sudden, and devastating, outcomes that we've been witnessing in recent years.