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EU Ban on Neonics: Too Little, Too Late

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Neonicotinoids are the most popular – and the most poisonous – insecticides in the world. The large-scale collateral damage caused by neonicotinoids, or 'neonics' in short, on our ecosystem has been suppressed for years by industry spin doctors and intensive lobbying by producers of this agricultural poison. Although the recent EU ban on neonics is an important step it is not yet enough to turn the tide, argues Jeroen van der Sluijs.

This article is also available in audio as part of the *Green Wave podcast.*

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by Green Wave

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In her book *Silent Spring* – published around half a century ago – the American biologist Rachel Carson predicted the nightmare scenario of systemic agricultural poison with prophetic precision. At that time, the technology for the most widely used insect poisons in the world, neonics, was still on the drawing board. In her book, Carson warned that this technology would bring about a world in which the plant sap in forest trees has become poisonous to insects. A world in which a flea drops dead after biting a dog whose blood has been made poisonous. A world in which bees carry nectar from poisoned flowers back to the hive and produce poisonous honey.

In the meantime, Rachel Carson's nightmare has become reality. A recent large-scale study found neonics in three-quarters of all honey worldwide. This agricultural poison is everywhere: in the soil, in our surface water, in the groundwater, in treated sewage water, and even in wildflowers and trees. If your pet has had flea treatments, chances are that your cat or dog's blood is toxic to fleas.

Meanwhile, there is accumulating scientific evidence that the entire insect world is about to collapse. In less than 30 years, three-quarters of Germany's insects have disappeared. The British biologist Dave Goulson speaks of an 'insect armageddon'. Bird researchers are also sounding the alarm that insect-eating birds are disappearing. This silent and creeping disaster is slowly but surely beginning to penetrate the political debate. But what exactly is going on, and what are the political solutions?

Impending pollination crisis

The decline of insects first became clear and visible in connection with the rapid worldwide decline of so-called pollinating insects, such as the bee. Fruit setting and seed formation are only possible through pollination. An estimated 94 per cent of the earth's flowering plants are dependent on animal pollination for reproduction and evolution.

The planet's estimated 25 000 bee species are partially responsible for the pollination of the plant kingdom and agricultural crops. Other pollinators include butterflies, hoverflies, moths and beetles. Agriculture depends on pollinators; the best known are domesticated honeybees and bumblebees, which together account for less than half of all agricultural pollination by animals. Wild pollinators take care of the remaining larger half. Farming as we know it would not be possible with only the honeybee. Around 90 important agricultural crops worldwide depend upon pollinating insects. Together, they account for about a third of total world food production: from fruit and vegetables to oil crops such as sunflowers, nuts and soybeans. Additionally, spices and herbs, coffee and chocolate, fodder crops (including alfalfa), fibre crops (cotton, flax, hemp), biofuel crops (rapeseed), wood (eucalyptus), ornamental plants, and numerous medicinal plants (such as quinine) rely on pollinating insects.

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The decline of pollinators and other insects has a number of mutually reinforcing causes that can all be traced back to modern agriculture. Wildflowers have largely disappeared from the agricultural landscape thanks to scaling up, monoculture and modern agricultural practices. Due to the lack of 'wild' areas, or unused pieces of land, there are no suitable nesting places for various wild bees. Cornflowers are rarely found between the corn. Many harmless field weeds, such as the redshank that grows alongside potatoes, have also disappeared through routine weed control, for example with the weed killer *Roundup*.

Due to persistently high ammonia emissions (from livestock and chicken urea) and the use of fertilisers, more and more so-called 'active nitrogen' is entering the soil in nature reserves via the atmosphere and rain. Many wildflowers that only thrive in poor soil have disappeared due to the resulting nitrogen-rich soil, leaving room for the few plant species that grow well on nitrogen-rich soil, such as nettles. Due to the large-scale use of agricultural poison, insects imbibe a cocktail of toxins all year round. A hive can contain residues of more than a hundred different agricultural chemicals that are used to prevent fungus (fungicides), weeds (herbicides) and insects (insecticides). The most worrying however are the systemic pesticides, which include the neonics. Over the last 15 years it has become increasingly clear that the use of neonics is accompanied by unprecedented collateral damage to the insect kingdom, and also by extension to insect eaters such as birds.

Agricultural 'poisons of convenience'

Neonicotinoids, a new generation of insecticides, made their appearance in agriculture in the early 1990s. Whereas the old insecticides only poisoned the outside of the crop, neonics work systemically; they are often applied preventatively as a coating for seeds. During growth, the active substance from the seed coating is absorbed by the roots and enters the plant's sap. The plant becomes toxic for insects from the inside out for a long period. Its pollen and nectar also contain traces of the nerve poison, and this is transmitted to bees as they forage.

Neonics are routinely and preventatively applied to a wide range of crops, even when there is no pest to eliminate. The majority of neonic use is completely unnecessary: in most cases, if the crop had not been treated, insect infestation affecting the crops enough to warrant intervention would never have occurred. It is in fact an agricultural poison of convenience. Moreover, many neonic applications are purely aesthetic: killing leatherjackets (the larvae of crane flies) in order to avert yellow spots on golf courses, or avoiding spots on rice grains or the leaves of cut flowers by preventively killing insects that could transmit plant viruses. Preventing a failed harvest is often not even the main goal.

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Neonics are approved in more than 120 countries, and in a very short time have become the world's most widely used insecticide, making up about 40 per cent of the global market. In Europe, five neonics are in use: imidacloprid, clothianidin, thiamethoxam, thiacloprid and acetamiprid. These active substances can be found in thousands of professional and private crop protection products, as well as in biocides (which kill insects in animal stalls, corporate kitchens, trucks and containers for example) and in veterinary medicines (such as flea drops).

Even with coated seeds, only a very small part of the applied poison is taken up by the plant to protect it against insects. More than 80 per cent ends up in the soil and water. Neonics do not break down easily, and thus remain present in the environment for a long time. They are harmful to soil life: earthworms, for example. Since 2004, imidacloprid has consistently hovered at the top of the list of substances that most often transcend Dutch surface water norms. It has been demonstrated that insect numbers in and around surface water decrease by more than 70 per cent as imidacloprid concentrations increase. All insects that live in the water are affected, including a large proportion of the flying insects that start their life cycle in water as larvae: damsels, dragonflies, midges, mayflies, hoverflies and many beetles.

Neonics are over 7 000 times more toxic to bees than DDT, one of the first chemical insecticides. Prolonged exposure to very low doses is ultimately fatal for insects, as the duration of the exposure increases toxicity. Low dosages disturb navigation and flight behaviour, causing bees to get lost, and weakening the entire colony. This in turn opens the door to other causes of death, including varroa mite and infections. The current chemical authorisation tests are highly outdated, and do not adequately take these new properties of systemic insecticides into account.

Leading astray and framing

When the side effects of neonics for bees became known in the 1990s, the producers, following the lead of tobacco industry, successfully launched a heavy lobby for authorisation frameworks that would keep their lucrative panacea on the market. They also systematically investigated all kinds of other causes of bee mortality: so-called ‘red herrings’ to lead people astray. For example, a great deal of the research on bee health – and especially the varroa mite, a parasite that transmits diseases to the honeybee – has been financed by the producers of neonics, mainly Bayer Crop Science and Syngenta. The result is that a search for scientific literature on bee mortality yields a lot of data about varroa and a series of honeybee diseases, and much less about the role played by insecticides. It would then appear that varroa is the main cause. But bee colonies exposed to neonics appear to be considerably more susceptible to varroa infections. What the beekeeper sees is the terminal symptom, the varroa infection, and not the underlying cause that has weakened the colony. A healthy and strong honeybee population can live together with this parasite without collapsing.

The way in which the industry lobby steers the focus of research and debate is even more subtle on the deeper level of the so-called ‘framing’ of the issue. The current dominant focus on the honeybee and the mite is a fundamentally wrong framing of the issue, with the result that the true damage caused by neonics has been effectively and efficiently pushed out of sight. Yet this approach is very pervasive and has determined the debate for a long time.

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The varroa mite only appears on honeybees kept by humans. The honeybee is not a wild animal and can barely survive in the wild without a beekeeper. As a comparison: just as the laying hen is not a good measure of the condition of farmland birds, the honeybee is not a good measure for all bees. For instance, in the Netherlands, there are 358 different bee species, including brown-banded carder bumblebees, mason bees and mining bees. The varroa mite occurs in only one of these 358 species – the honey bee – although most bee species as well as many other insects are going downhill. In other words, the varroa mite plays a possible role in the mortality of only 0.3 per cent of all bee species occurring in the Netherlands, and even then, more as a terminal symptom than as the cause. Varroa does not occur in the other 99.7 per cent of these species; in other words, they do not host this parasite. Meanwhile, 181 of these species are on the red list, either threatened with extinction or already lost. Nevertheless, the fairy tale woven by the industry's spin doctors of the varroa mite as *the* cause of bee mortality echoes endlessly in the social and scientific debate. And for this reason, the ministry has spent almost all of its research money on honeybee health in the past years, and specifically on one symptom: the varroa mite.

EU ban: too little, too late

After a request for examination by the European food watchdog EFSA resulted in the conclusion that normal use of the three most problematic neonics causes unacceptable collateral damage to bees, the EU decided in April 2018 to prohibit its use in all outdoor crops. However, the ban applies to only three of the five neonicotinoids in use: clothianidin, imidacloprid and thiamethoxam. In 2013, the use of these three neonics was banned in connection with the outdoor cultivation of flowering crops. In practice, it was observed that growers switched en masse to thiacloprid, another neonicotinoid. This neonic is somewhat less deadly, but it still ensures that bees lose their navigational skills. In effect, jumping from the frying pan into the fire.

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And despite the ban, our environment is still being polluted by the three banned neonics. They are still permitted on a large scale in greenhouse horticulture. Fortunately, greenhouses are now required to have water purification systems, which means that most pesticides are filtered out before drainage water is discharged into ditches. But if the greenhouse overflows due to extreme rainfall – which happens more and more often in the west of the Netherlands where there are many greenhouses – this surplus water is pumped directly from the greenhouse into the surface water, poison and all. Furthermore, greenhouses cannot be hermetically closed; pollinating insects simply fly inside. In addition, many greenhouse crops also need to be pollinated. In this light, the reasoning behind the exception for greenhouses is incomprehensible.

Imidacloprid in particular is also widely used beyond crop cultivation for so-called 'biocide applications'. These applications fall outside the ban, but they are just as polluting for the environment. Imidacloprid (bayt spray) is routinely sprayed up to five times per year on the walls and floors of cow, pig and chicken stalls in order to kill flies; it eventually ends up in the slurry pit. The resulting poisoned manure, traditionally the breeding ground for a wealth of flying insects (and thus food for many farmland birds such as swallows), is then spread out over the land. It is beyond belief that this practice is not a matter of discussion.

What must change in agriculture?

We have been spinning around on a carrousel of pesticides for 60 years. During this period, successive generations have been brought onto the market and then banned about 20 years later when they prove to be harmful to the environment. Each time they are replaced by something new, and each new group of chemicals brings new, unexpected and serious collateral damage. It is time to jump off this carrousel: we must focus on a transition to an agro-ecological model of agriculture in which we work *with* instead of *against* nature. The use of agricultural poisons must be reduced to a minimum. The authorisation policy for these poisons must become independent and transparent. The use of preventive substances in the current chemical-based agriculture, for example for coatings on seeds, can be stopped now if the political will exists. The alternatives – such as organic and integrated pest control, crop rotation, permaculture, and collective insurance to provide more economic certainty for individual farmers – are already there. The preventive use of agricultural poisons, such as in seed coating, is a wonderful business model for industry because it leads to the unnecessary, large-scale use of substances. Poison has thus become a convenience rather than a last resort for dealing with actual pests. In fact, preventive use itself has become the real plague: a plague for our crumbling ecosystem.

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