

# Death of the Birds and the Bees Across America

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*Birds and bees are something most of us take for granted as part of nature. The expression "teaching about the birds and the bees" to explain the process of human reproduction to young people is not an accidental expression. Bees and birds contribute to the essence of life on our planet. A study by the US Department of Agriculture estimated that "...perhaps one-third of our total diet is dependent, directly or indirectly, upon insect-pollinated plants."*<sup>1</sup>

*The honey bee, *Apis mellifera*, is the most important pollinator of agricultural crops. Honey bees pollinate over 70 out of 100 crops that in turn provide 90% of the world's food. They pollinate most fruits and vegetables—including apples, oranges, strawberries, onions and carrots.<sup>2</sup> But while managed honey bee populations have increased over the last 50 years, bee colony populations have decreased significantly in many European and North American nations. Simultaneously, crops that are dependent on insects for pollination have increased. The phenomenon has received the curious designation of Colony Collapse Disorder (CCD), implying it could be caused by any number of factors. Serious recent scientific studies however point to a major cause: use of new highly toxic systemic pesticides in agriculture since about 2004.*

If governments in the EU, USA and other countries fail to impose a total ban on certain chemical insecticides, not only could bees become a thing of the past. The human species could face staggering new challenges merely to survive. The immediate threat comes from the widespread proliferation of commercial insecticides containing the highly-toxic chemical with the improbable name, neonicotinoids. Neonicotinoids are a group of insecticides chemically similar to nicotine. They act on the central nervous system of insects. But also on bees and small song birds. Recent evidence suggests they could also affect human brain development in newborn.

Some five to six years back, reports began to circulate from around the world, especially out of the United States, and then increasingly from around the EU, especially in the UK, that entire bee colonies were disappearing. Since 2004 over a million beehives have died across the United States and beekeepers in 25 states report what is called Colony Collapse Disorder. In winter of 2009 an estimated one fifth of bee hives in the UK were lost, double the natural rate.<sup>3</sup> Government authorities claimed it was a mystery.

And in the USA a fact sheet from the Environmental Protection Agency (EPA) on Bayer AG's Clothianidin, a widely used neonicotinoid, warned:

"Available data indicate that clothianidin on corn and canola should result in minimal acute toxic risk to birds. However, assessments show that exposure to treated seeds through ingestion may result in chronic toxic risk to non-endangered and endangered small birds

(e.g., songbirds) and acute/chronic toxicity risk to non-endangered and endangered mammals.”<sup>4</sup>

## Alarming UK results

A private UK research organization, Buglife and the Soil Association, undertook tests to try to determine cause of the bee death. They found that the decline was caused in part by a group of pesticides called neonicotinoids.<sup>5</sup> Neonicotinoids are “systemic” chemicals that kill insects by getting into the cell of the plant. In Britain it’s widely used for crops like oilseed rape and for production of potted plants.

The neonicotinoids are found in the UK in products including Chinook, used on oilseed rape and Bayer UK 720, used in the production of potted plants which then ends up in gardens and homes around the country. The new study examined in detail the most comprehensive array of peer-reviewed research into possible long-term effects of neonicotinoid use. Their conclusion was that neonicotinoid pesticides damage the health and life cycle of bees over the long term by affecting the nervous system. The report noted, “Neonicotinoids may be a significant factor contributing to current bee declines and could also contribute to declines in other non-target invertebrate species.”<sup>6</sup> The organization called for a total ban on pesticides containing any neonicotinoids.

The president of the UK Soil Association, Peter Melchett, told the press that pesticides were causing a continued decline in pollinating insects, risking a multimillion pound farming industry. “The UK is notorious for taking the most relaxed approach to pesticide safety in the EU; Buglife’s report shows that this puts at risk pollination services vital for UK agriculture,” he said. <sup>7</sup>

Indeed in March 2012 Sir Robert Watson, Chief Scientist at the British Government’s Department of Environment announced that his government was reconsidering its allowance of neonicotinoid use in the UK. Watson told a British newspaper, “We will absolutely look at the University of Stirling work, the French work, and the American work that came out a couple of months ago. We must look at this in real detail to see whether or not the current British position is correct or is incorrect. I want this all reassessed, very, very carefully.”<sup>8</sup> To date no policy change has ensued however. Given the seriousness of the scientific studies and of the claims of danger, a prudent policy would have been to provisionally suspend further use of neonicotinoids pending further research. No such luck.

## EPA Corruption

In the United States the government agency responsible for approving or banning chemicals deemed dangerous to the environment is the Environmental Protection Agency (EPA). In 2003, over the clear warnings of its own scientists, the EPA licensed a neonicotinoid called Clothianidin, patented by the German Bayer AG together with a Japanese company, Takeda. It is sold under the brand name Poncho. It was immediately used on over 88 million acres of US corn in the 2004 crop and since that time, the shocking death of more than one million beehives across the corn prairies of the Midwest has been reported. <sup>9</sup>

The political appointees at EPA at the time allowed Bayer to receive a license for Poncho despite the official judgment of EPA scientists that Clothianidin was “highly toxic to bees by contact and oral exposure” and that it was “highly mobile in soil and groundwater – very likely to migrate into streams, ponds and other fields, where it would be absorbed by

wildflowers” – and go on to kill more bees and non-target insects like butterflies and bumblebees. The warning, from a leaked EPA memo dated September 28, 2005 summarizes the Environmental Fate and Effects Division’s Environmental Risk Assessment for Clothianidin, which it said “will remain toxic to bees for days after a spray application. In honey bees, the effects of this toxic exposure may include lethal and/or sub-lethal effects in the larvae and reproductive effects to the queen.”<sup>10</sup>

The EPA scientists judged it to be many times more toxic than Bayer’s other nicotinoid, Imidacloprid, sold under the brand name Gaucho, which itself is “7,000 times more toxic to bees than DDT.”<sup>11</sup> DDT was banned in the USA in 1972 after numerous studies proved its toxic effects on both animals and humans.

Then in January of this year another US Government agency, the US Department of Agriculture, published a significant new report from scientists under the direction of Jeffrey Pettis of the USDA Bee Research Laboratory. The study, published in the German scientific journal, *Naturwissenschaften*, was explosive.

The Pettis study concluded after careful control experiments with bees exposed and not exposed to neonicotinoids clearly demonstrated that there was “an interaction between sub-lethal exposure to imidacloprid (Bayer’s Gaucho—w.e.) at the colony level and the spore production in individual bees of honey bee gut parasite *Nosema*.” Moreover, the study went on, “Our results suggest that the current methods used to evaluate the potential negative effect of pesticides are inadequate. This is not the first study to note a complex and unexpected interaction between low pesticide exposure and pathogen loads...We suggest new pesticide testing standards be devised that incorporate increased pathogen susceptibility into the test protocols. Lastly, we believe that subtle interactions between pesticides and pathogens, such as demonstrated here, could be a major contributor to increased mortality of honey bee colonies worldwide.”<sup>12</sup>

Renowned Dutch toxicologist, Dr. Henk Tennekes reported that, unlike claims from Bayer and other neonicotinoid manufacturers, bees living near maize fields sprayed with the toxic pesticides are exposed to the neonicotinoids throughout the entire growing season, and the toxin is cumulative. Tennekes noted, “Bees are exposed to these compounds and several other agricultural pesticides in several ways throughout the foraging period. During spring, extremely high levels of clothianidin and thiamethoxam were found in planter exhaust material produced during the planting of treated maize seed. We also found neonicotinoids in the soil of each field we sampled, including unplanted fields.”<sup>13</sup>

### Effect on Human Brain?

But most alarming of all is the evidence that exposure to neonicotinides has horrific possible effects on humans as well as on birds and bees.

Professor Henk Tennekes describes the effects:

“Today the major illnesses confronting children in the United States include a number of psychosocial and behavioral conditions. Neurodevelopmental disorders, including learning disabilities, dyslexia, mental retardation, attention deficit disorder, and autism – occurrence is more prevalent than previously thought, affecting 5 percent to 10 percent of the 4 million children born in the United States annually. Beyond childhood, incidence rates of chronic

neurodegenerative diseases of adult life such as Parkinson's disease and dementia have increased markedly. These trends raise the possibility that exposures in early life act as triggers of later illness, perhaps by reducing the numbers of cells in essential regions of the brain to below the level needed to maintain function in the face of advancing age. Prenatal and childhood exposures to pesticides have emerged as a significant risk factor explaining impacts on brain structure and health that can increase the risk of neurological disease later in life."<sup>14</sup>

There is also growing evidence suggesting persistent exposure to plants sprayed with neonicotinoids could be responsible for damage to the human brain, including the recent sharp rise in incidents of autism in children.

Tennekes, referring to recent studies of the effects of various exposures of neonicotinoids to rats, noted,

"Accumulating evidence suggests that chronic exposure to nicotine causes many adverse effects on the normal development of a child. Perinatal exposure to nicotine is a known risk factor for sudden infant death syndrome, low-birth-weight infants, and attention deficit/hyperactivity disorder. Therefore, the neonicotinoids may adversely affect human health, especially the developing brain."<sup>15</sup>

Referring to studies recently published in the magazine, Science, Brian Moench noted:

The brain of insects is the intended target of these insecticides. They disrupt the bees homing behavior and their ability to return to the hive, kind of like "bee autism." But insects are different than humans, right? Human and insect nerve cells share the same basic biologic infrastructure. Chemicals that interrupt electrical impulses in insect nerves will do the same to humans. But humans are much bigger than insects and the doses to humans are miniscule, right?

During critical first trimester development a human is no bigger than an insect so there is every reason to believe that pesticides could wreak havoc with the developing brain of a human embryo. But human embryos aren't out in corn fields being sprayed with insecticides, are they? A recent study showed that every human tested had the world's best-selling pesticide, Roundup, detectable in their urine at concentrations between five and twenty times the level considered safe for drinking water.<sup>16</sup>

The most alarming part of the neonicotinoid story is that governments and the EU to date are content to take little or no precautionary steps to stop even suspected contamination from neonicotinoids pending through long-term tests that would determine finally if they are as dangerous as considerable and growing scientific evidence says.

Bayer AG and neonicotinoids

In early 2011 the UN Environment Programme (UNEP) published a report on bee mortalities around the world. Bayer neonicotinoids, Poncho and Gaucho, are listed there as a threat to numerous animals.

According to the UN report, "Systemic insecticides such as those used as seed coatings, which migrate from the roots through the entire plant, all the way to the flowers, can

potentially cause toxic chronic exposure to non-target pollinators. Various studies revealed the high toxicity of chemicals such as Imidacloprid, Clothianidin, Thiamethoxam and associated ingredients for animals such as cats, fish, rats, rabbits, birds and earthworms. Laboratory studies have shown that such chemicals can cause losses of sense of direction, impair memory and brain metabolism, and cause mortality.” 17

Yet Bayer AG shows no signs of voluntarily stopping production and distribution of its toxic neonicotinoids.

The German pharmaceutical giant counts among its historic achievements one it prefers today to forget- the first synthesis of something it marketed as cough medicine in 1898 under the trade name, Heroin, taken from the “heroic” feeling it gave to Bayer workers on whom it was tested. 18 According to the German citizen watchdog group, Coalition against BAYER Dangers, Gaucho and Poncho have been among BAYER’s top-selling pesticides: “In 2010, Gaucho sales were valued at US\$ 820 million while Poncho sales were valued at US\$ 260 million. Gaucho ranked first among BAYER’s best-selling pesticide, while Poncho ranked seventh. It is striking that in the 2011 Annual Report no sales figures for Gaucho and Poncho are shown.”19

### Ban in many EU Countries

Unlike the United States, several EU countries have banned use of neonicotinoids, refusing to accept test and safety reports from the chemical manufacturers as adequate. One case in point was in Germany where the Julius Kühn-Institut – Bundesforschungsinstitut für Kulturpflanzen (JKI) in Quedlinburg a state-run crop research institute, collected samples of dead honeybees and determined that clothianidin caused the deaths.

Bayer CropScience blamed defective seed corn batches. The company gave an unconvincing counter claim that the coating came off as the seeds were sown, which allowed unusually high amounts of toxic dust to spread to adjacent areas where bees collected pollen and nectar. The attorney for a coalition of groups filing the suit, Harro Schultze stated, “We’re suspecting that Bayer submitted flawed studies to play down the risks of pesticide residues in treated plants. Bayer’s ... management has to be called to account, since the risks ... have now been known for more than 10 years.”20

Significantly, in Bayer’s home country, Germany, the German government has banned Bayer’s neonicotinoids since 2009. France and Italy have imposed similar bans. In Italy, the government found that with the ban, bee populations returned in number, leading to an upholding of the ban despite strong chemical industry pressure.21

Despite the alarming evidence of links between neonicotinoids and bee colony collapse disorder, as well as possible impacts on human foetal cells and brains, the reaction so far in the European Union Commission has been scandalously slow. Brussels has been so weak in responding that the Office of EU Ombudsman has initiated an investigation into why. European Union Ombudsman Nikiforos Diamandou said he had opened an investigation after a complaint from the Austrian Ombudsman Board, who said the European Commission had failed to take account of the new evidence on the role of neonicotinoids in bee mortality. “In its view, the Commission should take new scientific evidence into account and take appropriate measures, such as reviewing the authorisation of relevant substances,” said a statement from the EU Ombudsman’s office.

The ombudsman has asked the Commission to submit an opinion in the investigation by June 30, after which it will issue a report. Recommendations by the ombudsman are non-binding. The Commission in response has said it has asked the European Food Safety Agency (EFSA) to carry out a full review of all neonicotinoid insecticides by April 30 and that it would take appropriate measures based on the findings.<sup>22</sup>

Giving EFSA final say on food safety for Europe's consumers and insects is tantamount to asking the foxes to guard the hen house today. EFSA is heavily influenced by members with conflicts of interest and dubious ties to the same agribusiness interests represented by Bayer AG and other agriculture chemical multinationals.<sup>23</sup>

Bayer is one of six global companies tied to development of patented GMO seeds and related chemicals, controlling inputs into the entire food chain. As a tightly inter-linked group, Monsanto, Dow, BASF, Bayer, Syngenta and DuPont control the global seed, pesticide and agricultural biotechnology markets. This concentration of power over world agriculture is unprecedented. As one observer noted, it enables them to "control the agricultural research agenda; dictate trade agreements and agricultural policies; position their technologies as the 'science-based' solution to increase crop yields, feed the hungry and save the planet; escape democratic and regulatory controls; subvert competitive markets."<sup>24</sup>

Dutch toxicologist Tennekes and Alex Lu, associate professor of environmental exposure biology at Harvard's Department of Environmental Health are among a growing number of scientists around the world calling for an immediate and global ban on the use of the new neonicotinoid pesticides.<sup>25</sup> Professor Lu calls for a very simple test: "I would suggest removing all neonicotinoids from use globally for a period of five to six years. If the bee population is going back up during the after the ban, I think we will have the answer." That should be more than food for thought in Washington, Brussels and elsewhere.

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