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## **Impact of Pesticides to Pollinators**

The health demise of honey bees and native pollinators began before varroa mites. It began with mono-agriculture. It began with the love affair with lawns. It began with the unaware, over-use of pesticides. It began with the lack of concern about global pest and disease transmission through the introduction, intentional and non-intentional, of species from across oceans.

The media, who did not understand the factors impacting pollinator health, adopted the use of “three letters: CCD” to explain the unseasonal death of honey bee colonies. The pesticide industry, and policy makers, adopted the promotion of the “three letters,” even though the pesticide product labels clearly state the products are toxic to bees, and other invertebrates . . . and birds and fish . . . and humans, depending on the product.

Whether it is 1948<sup>1</sup>, 1973<sup>2</sup>, 2013<sup>3</sup>, or 2017<sup>4</sup> mono-agriculture and pesticides kill bees and their forage<sup>5</sup>. However, to be clear:

- insecticides, labelled bee toxic, kill bees;
- herbicides, which research is showing affect the memory and learning of bees, and therefore damage the super organism called the bee colony;
- fungicides, which are not tested on bees prior to EPA registration, but university research is showing are harmful to a bee colony;
- adjuvants, surfactants and “other ingredients” that accompany each insecticide, fungicide, and herbicide active ingredient are NOT tested by EPA prior to the product registration for their impact on anything; and,
- mixing any combination of insecticide, herbicide, or fungicide together creates all new chemistry, increasing the toxicity of the individual products and kills bees. <sup>6</sup>

There is no mystery to what is killing honey bees and native pollinators. Just like the long practiced misdirection that nicotine is not addictive, but when more chemicals are added to the tobacco the addiction, and detriment to health, increases. The tank mix of chemicals in and on the tobacco severely impact the health of the user (smoker), and those within breathing range of the user. We could refer to second hand smoke as “drift.”

Just like second hand smoke, pesticides drift. When a pesticide is applied it does not stay put.<sup>7</sup> Pesticide drift, like second hand smoke, impacts the health of non-target plants and insects. Pesticide drift makes bee forage, blooming plants, toxic. Pesticide drift kills the forage on which bees need to feed to sustain themselves and the bee colony.

In a large-scale assessment of the distribution of glyphosate and AMPA in European agricultural soils, research found *“The presence of glyphosate and AMPA in agricultural soils may not only form a risk for soil health but also a potential risk of further spreading of these compounds across land, water, and air domains. Indeed, besides potential effects on local edaphic communities and on humans, that can be exposed to these substances by inhalation of contaminated dust particles, dermal contact, or ingestion of contaminated surface water, wind and water erosion have the potential to transport contaminants to all the environmental compartments: atmosphere, other soils and surface waters.”*

Insecticides meant to kill one pest, can drift and kill dozens of species of beneficial insects. Herbicides meant to suppress weeds in a field or roadside ditch, eradicate bee forage or drift onto bee forage making it toxic. Fungicides, not even tested for their impact on bees prior to EPA registration, when applied to blooming plants are carried back to the hive on the pollen and fed to the next generation of honey bees, killing them.

When any pesticide is injected into a plant, or coated onto a seed, the pesticide makes the plant toxic to insects. However, that pesticide does not stay put, and does not stay within the plant. The pesticide translocates into the pollen and nectar of the plant, the very food pollinators eat. The pesticide coated on the seed, injected or drenched into soil impacts ground dwelling beneficial insects. These same ground nesting bees, and soil organisms support the health of the plant, the root system of every plant, and help prevent soil erosion. Ground nesting bees, and other beneficial insects eat the pest insects, but only if the beneficial insects are allowed to live.

Our honey bees and native pollinators have been suffering since the introduction of pesticides—synthetic or natural. If you want to kill a soft-squishy insect you consider a “pest,” you will also kill honey bees and other soft-squishy beneficial insects. No pesticide is “safe.” All pesticides (insecticides, herbicides, fungicides) are meant to kill. It is the dose, the time of day, weather conditions, and method of application—all defined by the “directions for use” that are supposed to mitigate the risk to “non-target organisms” when pesticides are applied. In other words, it is how humans use the products; and we use them very poorly. But as the label clearly states under the *Important: Read Before Use* section, “All such risks shall be assumed by the user or buyer.”<sup>8</sup>

There is no mystery to what is killing honey bees and native pollinators. Three letters, CCD, are just an easy answer for the media, a misdirection from the Environmental Hazard / Bee Hazard statement on pesticide labels, and denial of humans who want an easy excuse to misuse and over apply any pesticide. Insects matter in the health, sustainability, and viability of the ecosystem. Just because you do not like insects does not mean they have no value. Even if we eradicated mosquitoes, the disease vectors that adapted to live in the guts of mosquitoes would find another critter to help it spread, to help it live. Want to get rid of mosquitoes near you? Get rid of standing, stagnant water. One cup of water holds a thousand mosquito eggs.<sup>9</sup> Pesticides which kill mosquitos, kill honey bees and native pollinators when they are sprayed on standing water, on blooming plants, and when bees are active.

There is no mystery to what is killing honey bees and native pollinators. There are solutions, but they involve humans changing their behavior. Like the regulation of cigarette smoking,

pesticides too are being regulated to less and less places to use them, and less people who can use them. Corporations and communities are beginning to make change driven by consumer demand for change: (this is not a complete list, for more information go to <https://www.ncel.net/neonicotinoids/> )

Scotts Pollinator Promise <http://pollinatorstewardship.org/index.php/pollinator-promise/>

Kroger releases new policy to limit bee-killing pesticides on garden plants,  
<https://foe.org/news/kroger-releases-new-policy-limit-bee-killing-pesticides-garden-plants/>

Woolworths to stop selling pesticide linked to global bee decline  
*Australian grocery giant will join Bunnings to withdraw Yates Confidor from sale*  
<https://www.theguardian.com/environment/2018/jan/23/woolworths-to-stop-selling-pesticide-linked-to-global-bee-decline>

Costco releases new policy to limit toxic pesticides to protect pollinators  
<http://pollinatorstewardship.org/wp-content/uploads/2018/06/June-22-2018-Pollinator-News.pdf>

European Union expands ban of three neonicotinoid pesticides,  
<http://www.sciencemag.org/news/2018/04/european-union-expands-ban-three-neonicotinoid-pesticides>

Eugene's Neonic Ban First of Its Kind in Nation, <http://www.beyondtoxics.org/work/save-oregons-bees/accomplishments-of-the-save-oregons-bees-campaign/eugenes-neonic-ban-first-of-its-kind-in-nation/>

Maryland Will Be The First U.S. State To Ban Bee-Killing Pesticides For Consumer Use,  
<https://www.collective-evolution.com/2017/07/20/maryland-will-be-the-first-u-s-state-to-ban-bee-killing-pesticides-for-consumer-use/>

Portland, ME Becomes an Organic City, Banning Toxic Pesticides on Public and Private Property <http://pollinatorstewardship.org/wp-content/uploads/2018/05/feb.-2-2018-newsltr.pdf>

What is killing honey bees and native pollinators? Direct applications of pesticides to pollinators, pesticides causing the loss of, or making forage toxic, and pests, and pathogens to pollinators the effects of all exacerbated by each other, are eradicating these beneficial insects. All living creatures have another creature trying to kill it, eat it, or use it as a host—even humans. Long before varroa mites were introduced to the USA, pollinators still were impacted severely by loss of forage, and pesticide exposure. We knew the loss of forage was a factor, we knew the industrialization of agriculture was a factor impacting our bees, and our soil health. We knew the free pollination services provided by native pollinators was being reduced as pesticide use increased and bee forage was reduced. Research is now showing the impact of the bee pest, the varroa mite, increases when the honey bees are exposed to pesticides.<sup>10</sup> The mite

has a greater impact because of the pesticides. Only when humans admit they have a problem, and that their actions are causing the problem, and humans change their actions, will health and balance be restored to pollinators and the agricultural ecosystem. There is no mystery to what is killing honey bees and native pollinators: it is us.

Additional data and resources cited:

<sup>1</sup> **Soil Conservation and Honey Bees Circa 1948** <http://pollinatorstewardship.org/wp-content/uploads/2018/07/May-15-2016-Pollinator-News.pdf>

<sup>2</sup> **The Indispensable Honey Bee,** <https://www.beeeculture.com/?s=Splevin> )

<sup>3</sup> **Colony Collapse Disorder Is a Fraud: Pesticides Cause Bee Die-Offs** <http://www.greenmedinfo.com/blog/colony-collapse-disorder-fraud-pesticides-cause-bee-die-offs>)

<sup>4,10</sup> **It's the mites because. . .** <http://pollinatorstewardship.org/wp-content/uploads/2018/06/Sept.-29-2017-Pollinator-News.pdf> )

<sup>5</sup> **Pollinator Habitat Is Disappearing At Rates Usually Reserved For Descriptions Of Amazon Rain Deforestation,** <https://www.beeeculture.com/glyphosate/>

<sup>6</sup> **Spray Toxicity and Risk Potential of 42 Commonly Used Formulations of Row Crop Pesticides to Adult Honey Bees (Hymenoptera: Apidae)** <https://academic.oup.com/jee/article-abstract/108/6/2640/2379815?redirectedFrom=fulltext>

<sup>7</sup> **Dicamba Drift Puts Natural Areas at Risk, Environmental Groups Warn** <https://www.agriculture.com/crops/dicamba-drift-puts-natural-areas-at-risk-environmental-groups-warn>

<sup>8</sup> **Allegiance-FL label,** [https://assets.greenbook.net/18-15-46-07-03-2018-Allegiance\\_FL\\_Seed1\\_Treatment\\_Fungicide\\_Label.pdf](https://assets.greenbook.net/18-15-46-07-03-2018-Allegiance_FL_Seed1_Treatment_Fungicide_Label.pdf)

<sup>9</sup> **We Can Protect Public Health and Protect Pollinators. Bees shouldn't be sprayed, and beekeepers should control mosquitoes,** <https://www.beeeculture.com/catch-the-buzz-we-can-protect-public-health-and-protect-pollinators-bees-shouldnt-be-sprayed-and-beekeepers-should-control-mosquitoes/> )

**New Science Shows Bee-Killing Pesticides Are Unnecessary on Most Farms** <https://civileats.com/2018/03/28/new-science-shows-bee-killing-pesticides-are-unnecessary-on-most-farms/>

**Year-round presence of neonicotinoid insecticides in tributaries to the Great Lakes, USA**  
<https://www.sciencedirect.com/science/article/pii/S0269749117344962>

**Distribution of Glyphosate and Aminomethylphosphonic Acid (AMPA) in Agricultural Topsoils of the European Union,**  
<https://www.sciencedirect.com/science/article/pii/S0048969717327973>

**State medical society voices concern over pesticides' safety**  
<http://www.telegram.com/news/20180514/state-medical-society-voices-concern-over-pesticides-safety>

**Regenerative agriculture: merging farming and natural resource conservation profitably**  
<http://pollinatorstewardship.org/wp-content/uploads/2018/05/March-16-2018-PSC-newsletter.pdf>

**Farms could slash pesticide use without losses, research reveals,**  
<http://pollinatorstewardship.org/wp-content/uploads/2018/05/Feb.-2-2018-newsltr.pdf>

**Avoid Tank Mixing Insecticides with Fungicides, Not all fungal diseases can be controlled by fungicides,** <https://www.beeeculture.com/the-pollinator-stewardship-council-feb-2015/>

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