Neonicotinoids Affect Hormone Production in Humans

Neonicotinoid pesticides are known worldwide for their negative effects on bee populations, but a new study finds that this popular agricultural chemical may also be responsible for elevated levels of a key enzyme in estrogen production. This is big and scary news, as these chemicals are in a huge portion of the food supply. Nearly a quarter of insecticides sold are neonicotinoids. The majority of corn grown in the United States is treated with these chemicals, and a third of all soybean fields have been treated with them. Neonicotinoids are causing serious health issues in bees and other pollinator populations, and research is confirming that what's bad for the bees and birds is bad for us – in more ways than we had previously confirmed.

Pesticides, Estrogen, and Cancer

This new study focuses on an important enzyme in estrogen production, aromatase (also referred to as CYP19), and how the hormone process is influenced by neonicotinoids, specifically thiacloprid and imidacloprid (both manufactured by Bayer CropScience). Previous research has shown that neonicotinoids act as estrogen disruptors in newly emerged bees and winter bees. There hasn't been much research exploring the link between these pesticides and human health, but Professor Sanderson and Ph.D. student Élyse Caron-Beaudoin from Institut National de la Recherche Scientifique in Quebec have now identified it as an endocrine disruptor. Discussing the study's findings, Caron-Beaudoin says, "Endocrine disrupters are natural or synthetic molecules that can alter hormone function…They affect the synthesis, action, or elimination of natural hormones, which can lead to a wide variety of health effects."

The enzyme in question, aromatase, turns androgens into estrogens. Aromatase levels are susceptible to environmental influences, and higher levels of the enzyme have been linked to unusually early puberty in girls and endocrine disorders boys. Increased aromatase has also been linked to cancer, and this is where Sanderson and Caron-Beaudoin make their most significant conclusion.

> *We demonstrated in vitro that neonicotinoids may stimulate a change in CYP19 promoter usage similar to that observed in patients with hormone-dependent breast cancer.”*

Neonocontinoid Regulation Worldwide

The European Union is doing something about the harm caused by neonicotinoids, banning the use of the insecticide outside in the next six months. This is a more stringent ban than the previous measure, which prohibited the use of neonicotinoids on flowering crops that attract bees. It’s a step in the right direction and good news for European people and pollinators.

On the other side of the pond, the Environmental Protection Agency plans to wrap up an official review of the risk neonicotinoids pose to pollinators by the end of 2018. Studies suggesting the link between the insecticides and bee decline have been available since the 1990s, and evidence linking the two has only grown since then. Despite this, the current EPA is unlikely to find in favor of the bees. In contrast to the European ban on neonicotinoids, Americans will have to wait until the lobbies for almonds and other heavily bee-dependent crops are willing to spend more than Bayer.

A Complete Lack of Surprise

Hindsight can be frustrating, even to the point of rage sometimes. The EPA knew the decline of the bee population was

a definite possibility, thanks to neonicotinoids. Yet they allowed the pesticides to move forward with no special dispensation. The current EPA, while extremely terrible, is of our own making. Big agricultural companies have set the stage for this, and they continue to call the shots. We know that these things are bad for us, but they are accepted as a cost of doing business. Well, guess what…the price keeps increasing. At point will we be unable to pay it?

Sources:

- *Neonicotinoids may alter estrogen production in humans* – INRS
- *Effects of Neonicotinoid Pesticides on Promoter-Specific Aromatase (CYP19) Expression in Hs578t Breast Cancer Cells and the Role of the VEGF Pathway* – Environmental Health Perspectives
- *Neonicotinoids act like endocrine disrupting chemicals in newly-emerged bees and winter bees* – Nature.com
- *EU agrees total ban on bee-harming pesticides* – The Guardian
- *Chemicals Implicated* – Beyond Pesticides