Pesticides and Pollinators

Pesticides, alone and in combination with other factors, have had a devastating effect on honeybees and wild pollinators. Pesticides commonly found in lawn and garden products and used in agriculture are known to be hazardous to bees –some killing bees outright and others with subtle effects that reduce a bee's ability to thrive.

Approximately 90 percent of all flowering plants require pollinators to survive. In agriculture, nearly a third of pollination is accomplished by honeybees. Cucumbers, almonds, carrots, melons, apricots, cherries, pears, apples, prunes, plums, cantaloupe, onions, avocados, kiwi, blueberries, cranberries and more depend on honeybee pollination.

Wild pollinators

Pollinators are "a bellweather for environmental stress as individuals and as colonies." Honeybees are perhaps the best known pollinators in the world and the primary managed pollinators, but they are by no means solely responsible for the pollination of all flowering plants. Both in non-agricultural settings and in agricultural crops, wild, native pollinators play an essential role in plant reproduction and food production.

Wild pollinators, which include bees, wasps, beetles, flies, butterflies, moths, birds, bats, and even some non-flying mammals, have suffered "multiple anthropogenic insults" in the last several decades. These include habitat destruction and fragmentation, pesticide use, land management practices and the introduction of non-native species and pathogens, all of which collectively threaten their existence. Pollination is a reminder that ecosystems, including agricultural ecosystems, are comprised of a series of interdependent relationships.

What is threatening pollinators?

Entomologists suspect that lethal and sublethal effects of pesticides are one of the many "anthropogenic insults" threatening pollinators. Pesticide risk mitigation measures intended to protect honeybees do not always constitute risk mitigation for other pollinators such as bumblebees because they have different foraging practices, social structures and genetics.

For example, spraying pyrethroid insecticides in the early morning or late afternoon, when honeybees are less likely to be foraging, is considered a risk mitigation measure for honeybees, but it actually endangers wild pollinators such as bumblebees, which are particularly important in light of the current honeybee crisis because they pollinate many of the crops that honeybees do. These distinct differences must be taken into account when considering pesticide risk assessments and risk mitigation measures.

How do pesticides affect pollinators?

- **Lethal effects.** Many pesticides are acutely toxic to bees and result in death. Carbamates, organophosphates, synthetic pyrethroids, chlorinated cylcodienes and neonicotinoids are highly toxic to bees.
- **Sublethal effects.** Pesticide levels that do not kill bees at significant rates may nonetheless have effects on performance that inhibit tasks such as olfactory learning, foraging, and reproduction, which affects hive survival.
- **Synergistic effects.** Often pesticides have more toxic effects in combination than alone.
- **Food availability.** Herbicides used in fields, along rights-of-way and in forests tend to reduce the number of flowering plants. This reduces the amount of food available for native pollinators, making their survival more difficult. This has effects throughout the food chain, as reduced pollination leads to reduced fruit on which birds and other creatures depend.

Colony Collapse Disorder (CCD)

Colony Collapse Disorder is unlike other ailments that have affected honeybees in the past because worker bees simply disappear rapidly, never returning to the hive where the queen still lives with a small cluster of bees amidst pollen and honey stores in the presence of immature bees (brood). It has been reported that losses of honeybee colonies across 21 states in the winter of 2007-8 averaged 35%.

Many indications point to CCD being induced by pesticides, especially neonicotinoid insecticides, as well as pathogens, nutritional deficits and environmental stresses. Ongoing reasearch into the cause of CCD at Penn State University has identified more than 120 different pesticides contaminating hive samples from 23 states. While none of the chemicals themselves were at high enough levels to kill bees, the researchers believe the combination and variety of pesticides may play a role, but a mechanism has not been determined. Continued debate about the cause of CCD threatens to induce "paralysis by analysis" in a situation that necessitates action.

Pesticides are likely to be a part of the CCD equation and a precautionary approach must be taken. Solutions to the loss of bees are clearly within our reach if we engage our communities and governmental bodies. We know how to live in harmony with the ecosystem through the adoption of sustainable practices that simply do not allow toxic pesticide use. Because our survival depends on healthy pollinators, we must do everything in our power to solve this problem.

Solving the Crisis

The forces affecting both honeybees and wild pollinators are numerous and complex. A multi-faceted approach to ensure a healthy and diverse pollinator community, which will in turn contribute to a sustainable food system, must look at the effects of pesticide use on pollinators. From the use of neonicotinoids that are implicated in CCD, to the synergistic effects of certain pesticides on honeybees and the reduced food availability for native pollinators as a result of herbicide use, pesticides have taken a toll on both honeybees and wild pollinators.

The situation necessitates a multi-pronged strategy to address honeybee health and encourage native pollinators —from planting backyard gardens that encourage pollinators and getting neighborhoods to end toxic pesticide use and fixing a flawed federal regulatory process. The CCD crisis provides the perfect opportunity to exercise what many have long advocated as the proper approach to pesticide regulation —the precautionary principle. CCD may well be the result of a combination of factors, but certain pesticides' documented toxicity to bees calls for severe caution.

Going Organic to Protect Pollinators

Protecting pollinators is just one of the many reasons to eat orgainc food. Beyond Pesticides' *Eating with a Conscience* database shows that nearly all conventional crops may be treated with pesticides known to kill bees and other wildlife. View this information by crop at www.EatingWithAConscience.org. Follow the links to detailed information about individual pesticides on the Gateway on Pesticide Hazards and Safe Pest Management at www.beyondpesticides.org/gateway.

For more information on the impact of pesticides on pollinators, as well as information on backyard beekeeping, contact Beyond Pesticides, 202-543-5450. A fully cited version of this brochure is available online at www.beyondpesticides.org/infoservices/pesticidesandyou.

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Protecting honeybees and wild pollinators

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