

To bee or not to bee

by Ole Hendrickson
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Modern industrial agriculture is caught on the horns of a dilemma. It tries to reduce costs and maximize the food grown in a given area by eliminating all species other than the desired crop plant. But this decreases populations of earthworms and other soil animals that break down crop residues and maintain soil fertility, and of beneficial insects that limit pest outbreaks.

If these species disappear, the ecosystem services they provide must be replaced. This requires fertilizers and insecticides. These are produced and applied using increasingly expensive fossil fuels. The cost of food goes up with the price of a barrel of oil.

Crop pollination is another ecosystem service that is being put at risk by industrial agriculture and linked to the price of oil.

Modern beekeepers and their honeybees travel around the continent. A West Coast beekeeper might truck hives to California for almond pollination in February, to Washington for apple pollination in March, and North Dakota for honey production in July. An East Coast beekeeper might travel between Florida vegetable fields in winter and Maine blueberry fields in summer.

Many beekeepers make more money from pollination than from honey. Now, however, their honeybees are dying at unprecedented rates - a phenomenon known as "colony collapse disorder". Queen bees are vanishing. Hives do not survive the winter.

Honeybees and native insects pollinate well over half the plant species we eat. Although wheat, corn and other grains have wind-blown pollen, our diets would be very poor without the many plant species that rely on insects to transport their pollen. These include almonds, apples, beans, blueberries, cabbage, carrots, coffee, coconuts, onions, oranges, sunflowers, and strawberries - to name only a few.

Without insects, farmers would have to pollinate each individual flower by hand. About twenty years ago, Sichuan Province in southern China lost its pollinators to excessive pesticide use. Now, thousands of villagers climb apple and pear trees each spring, dipping brushes made of chicken feathers and cigarette filters into plastic bottles of pollen, and dabbing them on each tree's blossoms.

Imagine how much food would cost if this were done in North America.

Lawrence Harder of the University of Calgary co-authored a 2011 study based on United Nations Food and Agriculture Organization data for 1961–2008. He found that although yields of pollinator-dependent food crops were increasing, their increase was less than the average for other crops, and varied more from year to year. To compensate for relatively low and unpredictable yields of insect-pollinated crops, farmers had to cultivate more land. The authors noted that "growth of the human population imposes major challenges for meeting increasing global demand for diverse nutritional diets, despite worsening environmental degradation."

Must we accept a future where insect-pollinated foods are available only to the rich, and the poor suffer the negative health impacts of nutritionally deficient diets? And why are bees dying?

There is no single cause for pollinator death. Honeybees are experiencing disease epidemics caused by mites, fungi and viruses. But what is compromising their immune systems? Earlier this year the European Food Safety Authority examined neonicotinoid pesticides, which are widely used on grains such as corn whose pollen and nectar are important food resources for bees. It concluded that "A high risk was indicated... for honey bees for some of the authorised uses..."

Native pollinators can generally substitute for honeybees and save the costs of trucking hives around the continent. But the hedgerows and shelterbelts that provide habitat for native pollinators are being cut down and plowed to compensate for declining gains in yield of pollination-dependent crops. And large-scale planting of neonicotinoid-coated, genetically-modified, herbicide-resistant seeds poisons corn pollen and nectar, while leaving no weeds to provide safer alternate nectar sources for hungry insects.

Agriculture need not sow the seeds of its own destruction. Our food system can reward organic farmers who work in harmony with nature, drawing on an understanding of ecosystem services such as soil formation, natural pest control, and pollination.

Ole Hendrickson is a forest ecologist and current president of the Ottawa River Institute a non-profit organization based in the Ottawa Valley.