



# Pollinators in Peril

The Cold Creek Report by Gordon Craig



Throughout the spring, summer and fall, the pollinators dart from flower to flower transferring pollen from anther to stamen in the fertilization of fruits, vegetables, grains and a host of native plants that flower in one season or another. Some plants self-pollinate but 90% of angiosperms (fruiting plants) benefit from biotic (insects, bats, birds and some mammals) pollination. Insects are the major pollinators and the best known are bees.

Pollination improves the quality and abundance of fruits and seeds in 70% of tropical crops and 85% of temperate zone crops worldwide, making the role of pollinators essential to important for present agricultural productivity. Interestingly, while cross-pollination is important to biological hybrid vigour, only 10% of commercial fruit and seed crops are wholly dependent on pollinators and they account for only 2% of global agricultural production. However, while global impacts of pollinator loss might be minimal, local impacts could be major. Reductions of coffee or blueberry plant-specific pollinators are good examples – little global impact; catastrophic local impact. Aizen et al. (2009), examining the effects of pollinator loss on agricultural productivity, claim that the compensatory effect of increasing agricultural land at the expense of natural habitat might be the greater threat to biodiversity and the remaining pollinators.

What about the most important pollinators, the bees? There are some 730 bee species indigenous to Canada. Bees are actually digger wasps that have changed their diets from animal prey (other insects and larvae) to pollen and nectar. They evolved with flowering plants during the Cretaceous period 146 to 74 million years ago. Most bee species are mass provisioners providing the egg/larvae with sufficient pollen and nectar to complete pupation and emergence without parental intervention. Bumble bees are the

only Canadian species that provide larvae with food throughout their development. Some bee species collect pollen from only specific plants while other species will visit a variety of pollen and nectar sources. Most bees nest in-ground, depositing brood cells along the side of tunnels. Aggregates of nests and brood cells can be dense or diffuse in different topographies of hard soil to dense grasses. Other species deposit eggs in the woody stems of berry canes or the pithy hollow of a tree or shrub. Most bees are solitary with the females using leaf litter, mud, plant hairs, or tree resin to build nests.

The commercial honey bee, *Apis mellifera*, was introduced to North America from Europe in 1622 originating from eastern tropical Africa. The honey bee was transported across the Rocky Mountains in the 1850s by Mormon pioneers. It is a highly socialized bee cultivated for its honey and wax.

Challenges for native bee survival and insect pollinators in general include loss of habitat, infestation of mites, predators, bacteria, viruses, and the use of insecticides. A recent controversy has been the development of neonicotinoids, a group of systemic crop insecticides, that represents a considerable improvement over historic insecticides like persistent chlorinated organics (DDT) or broad-spectrum neural toxicants like organophosphates and carbamates. These new insecticides, applied as a foliar spray, soil drench or seed coating can result in contact toxicity as well as be present in pollen and nectar of commercial crops. Exposure through flowers and droplet excretion along plant leaf edges can have lethal or sublethal effects on visiting pollinators. The impact is dependent on the frequency of visits to treated crops, the potency of the neonicotinoid and the sensitivity of the pollinator. Honey bees, the sentinel for insect pollinators, have experienced a significant decrease in colonies and product when hives are close to neonicotinoid-treated crops. Solutions for the competing demands of increased crop production with insecticides and protection of pollinators will require difficult decisions. **M**



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Cold Creek Conservation Area is a natural preserve that protects native species and provides a range of habitats for our indigenous pollinators. Visit [ColdCreek.ca/cool-stuff](http://ColdCreek.ca/cool-stuff) for more information on the perils of present day pollinators.

## References

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- United Nations Environment Programme (UNEP). 2010. UNEP Emerging Issues: Global Honey Bee Colony Disorder and Other Threats to Insect Pollinators.

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