

# Pollinators: Current Challenges & Considerations



# One Current Threat to Pollinators:

## ► **Neonicotinoid Pesticides (Neonics)**

- ❖ Systemic – insect uptake through plant tissues, pollen, nectar.
- ❖ In Ontario, neonicotinoid-treated seeds are often used preventatively, even if there is no evidence of a pest problem. Almost 100% of corn seed and roughly 60% of soybean seed are treated with neonicotinoids. **There is widespread over use of treated seeds.**
- ❖ The Canadian federal Pest Management Regulatory Agency concluded that **the majority of honey bee mortalities in Ontario in 2012 and 2013** were a result of exposure to neonicotinoid insecticides. This is likely due to contaminated dust exposure generated during the planting of neonicotinoid-treated corn and soybean seed.
- ❖ **Effects on European honeybees include:**
  - death due to direct exposure
  - Impacts to hive health through chronic exposure affecting pollen gathering, navigation and reproduction.
  - Neonicotinoid residues brought back to hives are linked to Colony Collapse Disorder (CCD) and other diseases.
- ❖ Ontario Gov't wants 80% reduction in neonicotinoid treated acreage by 2017.

# Systemic Uptake of Neonics and Fungicides and Effects on Pollinators

“These fungicides, in combination with pyrethroids and/or neonicotinoids can sometimes have a synergistic effect hundreds of times more toxic than any of the pesticides individually.”

- MARYANN FRAZIER, PSU

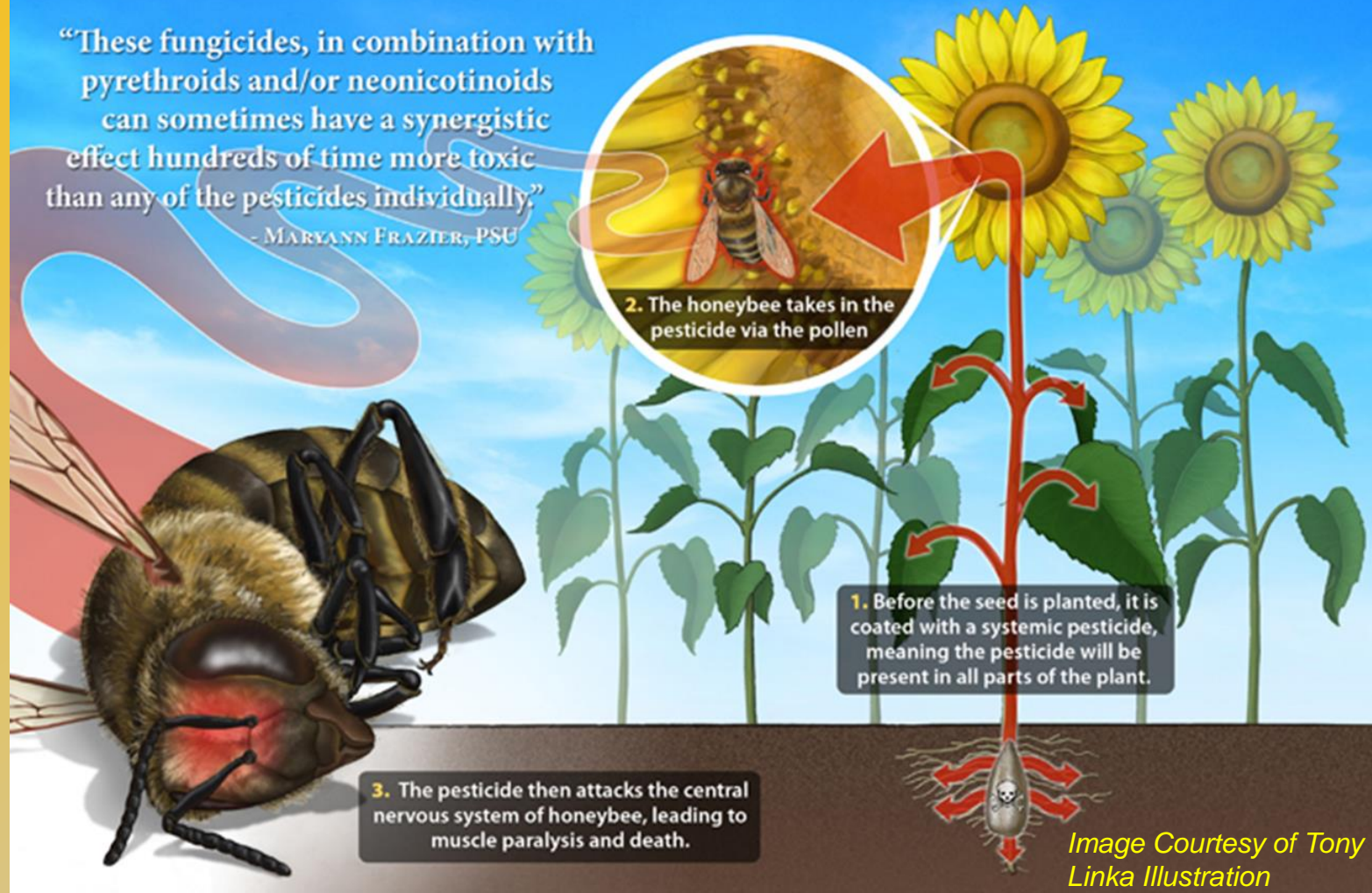


Image Courtesy of Tony Linka Illustration



- ▶ Neonicotinoid effects on **honeybees** have been studied extensively.
- ▶ Honeybees form large colonies and honeybee behaviour encourages worker bees to gather from productive nectar source areas that may have been treated or contaminated by neonicotinoids. This means whole colonies may be weakened or die due to single source exposure.



So What's the Message?

# Increase Biodiversity! Go Wild!

- **Eggs in One Basket Syndrome** - Depending on only one type of pollinator isn't wise.
  - **Native pollinators** have been proven to be more efficient than European honeybees. Studies at Cornell University are finding **native pollinators are up to three times more efficient!**
  - **Habitat and plant diversity will attract a diversity of native pollinators and other beneficial insects. Soil conservation, nutrient loading, environmental and personal health, and farm aesthetics are also positive outcomes of planting native species in marginal or fringe areas of low return.**
  - Once proper native forage plants and nest areas are in place these pollinators, and all the other beneficial insects attracted, are **cost and effort free.**
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- **Increased biodiversity allows crop farmers to maintain or even increase their productivity.** If one pollinator is impacted by something (pesticide, weather, disease etc.), others are available that are less affected



# Native Plants for Native Pollinators

*Clump plantings of native species on marginal or fringe areas of low return.*

FENCELINE	Native Plant	Pollinators Attracted	Soil Type	Growth Conditions	Flowering Timeline
	American Pasqueflower <i>Anemone patens</i>	Honey Bee, Large Mining Bees, Syrphid Flies, Bee Flies, Sweat Bees	Sand to Loam	Sun to part sun, mesic to dry soil	Mid-March to May
	Prairie Phlox <i>Phlox pilosa</i>	Peck's Skipper, many other Butterflies, Clearwing Moth, Green Sweat Bees, Small Carpenter Bees, Yellow-Faced Bees, Leafcutter Bees, Bumble Bees, Syrphid Flies, Hummingbird	Sand to Clay Loam	Sun to part sun, wet-mesic to dry soil	April to June
	Butterfly Milkweed <i>Asclepias tuberosa</i>	Honey Bee, Green Sweat Bees, Small Carpenter Bees, Small Resin Bees, Sweat Bees, Leafcutter Bees, Cuckoo Bees, Ants, Soldier Beetles, Milkweed Leaf Beetle, Monarch Butterfly, Sulphur Butterflies, Crescent Butterflies, Great Spangled Fritillary Butterfly, Thread-Waisted Wasps, Paper Wasps, Hummingbird	Sand to Loam	Sun, mesic to dry soil	June to August
	Yellow Coneflower <i>Ratibida pinnata</i>	Many beneficial predatory insects, Honey Bee, Mining Bee, Bumble Bees, Long-Horned Bees, Sweat Bees, Green Sweat Bees, Cuckoo Bees, Mint Moths, Wavy-Lined Emerald Moth, Azure Butterflies, Syrphid Flies, Soldier Beetles	Sand to Clay Loam	Sun to part sun, wet-mesic to dry soil	Mid-June to September
	Wild Bergamot <i>Monarda fistulosa</i>	Honey Bee, Bumble Bees, Sweat Bees, Green Sweat Bees, Small Resin Bees, Wool Carder Bees, Long-Horned Bees, Cuckoo Bees, Great Black Wasp, Eastern Tiger Swallowtail Butterfly, Silver Spotted Skipper Butterfly, Monarch Butterfly, Great Spangled Fritillary Butterfly, Snout Moths, Hummingbird Clearwing Moths, Soldier Beetles, Banded Long-Horned Beetle, Hummingbird, many other Butterflies and Moths	Sand to Clay Loam	Sun to part sun, wet-mesic to dry soil	July to September
WOODLAND EDGE	Native Plant	Pollinators Attracted	Soil Type	Growth Conditions	Flowering Timeline
	Wild Geranium <i>Geranium maculatum</i>	Honey Bee, Bumble Bees, Small Carpenter Bees, Sweat Bees, Mason Bees, Mining Bees, Cuckoo Bees, Syrphid Flies, Thick-Headed Flies	Sand to Clay Loam	Part sun to shade, wet-mesic to dry soil	April to June
	Smooth Solomon's Seal <i>Polygonatum biflorum</i>	Bumble Bees, Small Carpenter Bees, Sweat Bees, Digger Bees, Green Sweat Bees, Hummingbird	Sandy Loam to Clay Loam	Part sun, wet-mesic to mesic-dry soil	May to July
	Large-Leaved Aster <i>Eurybia macrophylla</i>	Honey Bee, Bumble Bees, Yellow-Faced Bees, Sweat Bees, Green Sweat Bees, Mining Bee, Syrphid Flies	Sand to Clay	Part sun to shade, wet-mesic to mesic-dry soil	July to mid-September
	Zigzag Goldenrod <i>Solidago flexicaulis</i>	Honey Bee, Sweat Bees, Yellow-Faced Bees, Green Sweat Bees, Mining Bees, Bumble Bees, Brown Hooded Owllet Moth, Mason Wasps, Thread-Waisted Wasps, Carrot Wasps, Paper Wasps, Yellowjacket Wasps, Syrphid Flies, Soldier Beetles	Sandy Loam to Clay Loam	Part sun to shade, wet-mesic to dry soil	Mid-August to October
WETLAND, POND or STREAM EDGE	Native Plant	Pollinators Attracted	Soil Type	Growth Conditions	Flowering Timeline
	Marsh Marigold <i>Caltha palustris</i>	Sweat Bees, Green Sweat Bees, Mining Bees, Syrphid Flies, Ants	Sandy Loam to Clay	Sun to part sun, wet-mesic soil	April to mid-May
	Canada Anemone <i>Anemone canadensis</i>	Mining Bees, Small Carpenter Bees, Sweat Bees, Yellow-Faced Bees, Green Sweat Bees, Syrphid Flies, Long-Horned Beetles, Fruitworm Beetles, Tumbling Flower Beetles	Sand to Clay	Sun to part sun, wet to mesic soil	May to August
	Swamp Milkweed <i>Asclepias incarnata</i>	Bumble Bees, Yellow-Faced Bees, Sweat Bees, Green Sweat Bees, Small Resin Bees, Leafcutter Bees, Honey Bee, Paper Wasps, Great Black Wasp, Yellowjacket Wasps, Great Golden Digger Wasp, Square-Headed Wasps, Monarch Butterfly, Red Admiral Butterfly, Great Spangled Fritillary, Skipper Butterflies, Sulphur Butterflies, Swallowtail Butterflies, Hummingbird Clearwing Moth, many other moths, Tachinid Flies, Bee Flies, Syrphid Flies, Soldier Beetles, Long-Horned Beetles, Banded Long-Horned Beetles, Hummingbird	Sand to Clay	Sun to part sun, wet to mesic soil	July to August
	Spotted Joe Pye Weed <i>Eutrochium maculatum</i>	Bumble Bees, Long-Horned Bees, Leafcutter Bees, Cuckoo Bees, Honey Bee, Monarch Butterfly, Eastern Tiger Swallowtail Butterfly, Azure Butterflies, Skipper Butterflies, Tortoiseshell Butterflies	Sand to Clay	Sun to part sun, wet to mesic soil	July to September
	Common Boneset <i>Eupatorium perfoliatum</i>	Bumble Bees, Green Sweat Bees, Sweat Bees, Yellow-Faced Bees, Mining Bees, Sand Wasps, Paper Wasps, Bald-Faced Hornets, Potter Wasps, Beetle Wasps, Bee Wolves, Grass-Carrying Wasps, Thread-Waisted Wasp, Thynnid Wasps, Cuckoo Wasps, Tachinid Flies, Syrphid Flies, Thick-Headed Flies, Bee Flies, Monarch Butterfly, Swallowtail Butterflies, Virginia Creeper Clearwing Moth, Soldier Beetles	Sand to Clay	Sun, wet to mesic soil	July to October

Plants listed are suited for soils and growth conditions found in the McGregor Creek subwatershed area.  
This list is also applicable to most locations in Southern Ontario.



# Some of the Many Native Bee Pollinators Attracted



Blue Orchard Bee



Mining Bees



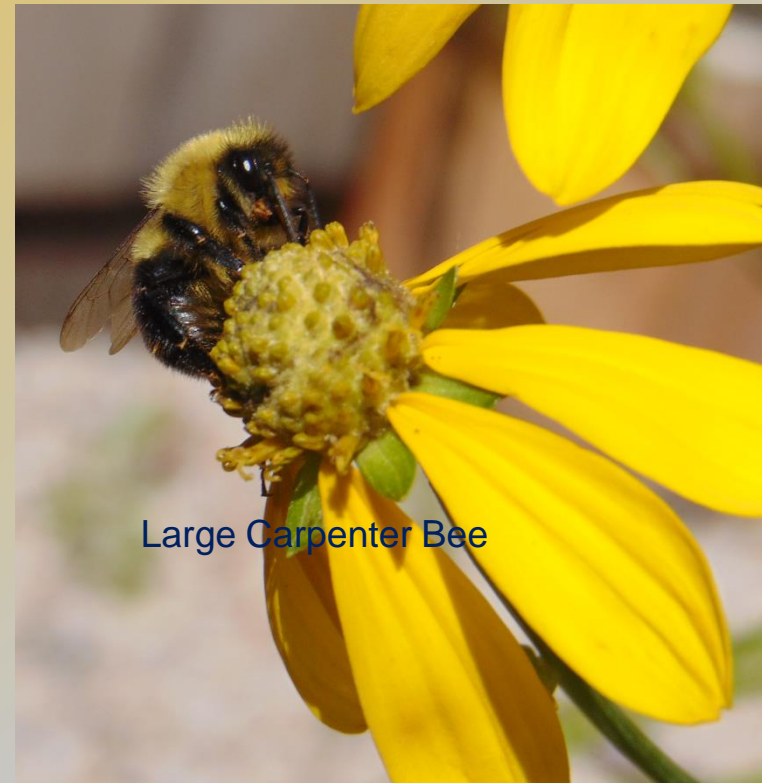
Yellow-faced Bees



Small Carpenter Bee



Leafcutter Bees



Large Carpenter Bee

# Native Non-Bee Pollinators

- Results of 39 field studies on five continents were synthesized to determine the contribution of non-bee pollinators to crop pollination. Non-bees performed 25-50% of the flower visits and while being less efficient pollinators than bees, they made twice as many visits thereby compensating for pollination ability.
- Non-bee insects are not as reliant as bees on the presence of remnant natural or seminatural habitat in the surrounding landscape. This means as long as native habitat areas are available, these productive insects are not as dependant on land use changes, probably allowing them to keep pollinating crops. (Berenbaum, M.R. Editor et al. University of Illinois 2015)





# Other Beneficial Insects Attracted

- ▶ **PREDATORS!** Biological Control for FREE! The following depict just a short example of predatory insects attracted.
- ▶ Prey on caterpillars, grasshoppers, crickets, mealybugs, whitefly, drosophila flies, aphids etc..



## Syrphid fly

- Larvae look like small caterpillars.
- Eat aphids, scale insects, mealybugs, thrips, corn borers or corn earworms and other soft bodied insects.
- Adults are great pollinators



# Other Beneficial Insects Attracted



## Ladybird Beetles

- Larvae and adults prey on aphids, scale insects, mites, mealy bugs, whiteflies, thrips, and the eggs of other insects.



## Lacewings

- Larvae and adults prey on aphids, immature caterpillars and other insects.

# Other Beneficial Insects Attracted

- ▶ **Parasitoids** – Many wasps and flies use native plant habitat. Their larvae parasitize the larvae and nymphs of moths, butterflies, sawflies, beetles, bugs and grasshoppers.



## Braconid Wasps

- Lay eggs inside host insect larvae.
- Eggs hatch and wasp larvae eat host causing death, then wasp larvae pupate.



## Tachinid Flies

- Lay eggs on prey, larva burrows into host.
- Flies pollinate flowers to obtain nectar.



# Having Areas of Native Plant Habitat on Our Farms Makes Sense.

- ▶ **Increase** native pollinator numbers and diversity.
- ▶ **Reduce** reliance on a single pollinator's presence/health.
- ▶ **Improve** productivity and profits through more efficient and cost effective pollination.
- ▶ **Attract** natural pest control.
- ▶ **Decrease** soil loss to erosion.
- ▶ **Decrease** nutrient and sediment loading to our streams, rivers and lakes.

It's a win – win!



# Funding Opportunities Exist!

- ▶ **The Ontario Soil and Crop Improvement Association (OSCIA)** can provide funding through the **Great Lakes Agricultural Stewardship Initiative (GLASI) Farmland Health Incentive Program**.
- ▶ Farm businesses can have a **free assessment** performed by a Certified Crop Advisor to determine necessary improvements or BMPs and funding opportunities.

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# THE END

