The Importance of Pollinators

Greg Wechgelaer

Senior Naturalist Educator and Apiarist at the Greenburgh Nature Center

Worldwide Pollination

- Though some plants are pollinated by wind or water, it is estimated that between 75-90% of all plant species need some form of animal assistance for pollination.
- There is an estimated 200,000 different species of animals that act as pollinators. While the vast majority are invertebrates, such as bees and butterflies, there are over 1000 species of vertebrates, like various bats and birds, that also act as pollinators.
- Globally, it is estimated that the contribution of animal pollination is approximately $170 billion dollars annually.

(USDA 2015)

New York Pollinators

- 450 wild bee species which includes six of the seven families of bees recognized worldwide
- The honey bee is NOT native to the United States, having arrived from Europe during colonization over 400 years ago.
- Beetles, due to their abundance, are estimated to pollinate over 90% of the worlds flowering plants, though they aren't considered primary pollinators.
- Globally there are 2000 species of bird that help with pollination, though here in New York, it's primarily the ruby-throated hummingbird.
- Numerous Butterflies, Moths, Wasps and Flies.

(USDA and Forest Services 2015)

Orchard Mason Bees

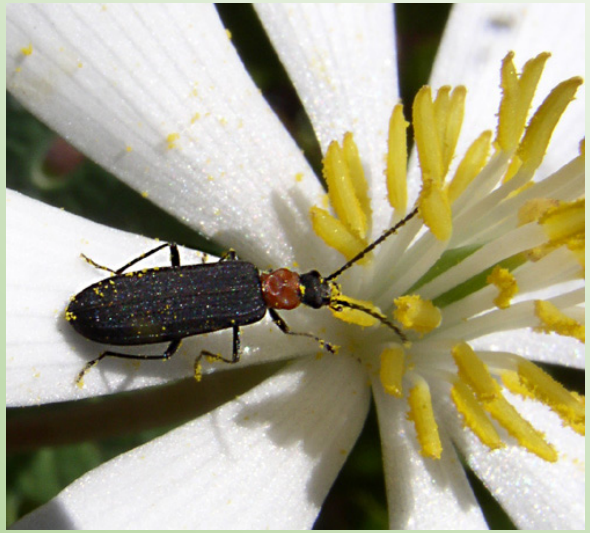
- Roughly 7% of bees in New York are mason bees which are solitary bees that make their homes above ground in hollow cavities.
- They get their name from the practice of laying their eggs in holes and covering the egg chamber with mud.
- Research at Cornell University suggests that Mason bees are better pollinators on a bee to bee basis compared to honey bees. Mason bees are pollen collectors while honey bees primarily collect nectar. Honey bees are also more systematic and tend to go from flower to flower on the same plant, where mason bees fly erratically from plant to plant, helping with cross pollination.

Squash Bees

- Squash bees are highly selective pollinators, only gathering pollen from squashes, pumpkins, gourds, and melons. They are solitary bees that build their homes underground.
- Squash bees are faster flyers than honey bees and wake up earlier, before sunrise, allowing them more hours of productivity during the day.
- They are extremely hairy, and have a larger body than honey bees, providing more surface area for pollen to collect on.

Bumble Bees

- Like honey bees, bumble bees are social and live in colonies. However, those colonies are usually built underground. While a typical honey bee hive might contain 15000-50000 bees, bumble bee hives rarely contain more than 300 individuals.
- Bumble bees vibrate their wing muscles so strongly, they actually shake pollen from flower anthers without having to touch them. This makes them particularly good at pollinating tomatoes, peppers, and eggplants.
- Used in greenhouse pollination due to their small colony size and contained travel distance. Generally, bumble bees don't travel more than 300 meters from their nesting site.



Beetles

- Beetles are one of the most ancient pollinators, showing up in the fossil record on flowering plants nearly 200 million years ago, longer than bees by nearly 50 million years.
- While not considered primary pollinators for most plants, due to the sheer number of beetles on the planet, it is estimated that they at least partially help to pollinate 90% of the worlds flowering plants.
- Here in New York, beetles are known in particular to pollinate Magnolias, Spice Bush and Pawpaw.

Flies and Gnats

- Plants with unusual smells attract other pollinators.

Pollinator Impact on New York Ecosystems

- The broad diversity, span, and variety of nesting and foraging habits of New York's native pollinators presents challenges for research efforts. For many years, native pollinators have been overlooked, with basic knowledge regarding their lifecycles, habitat requirements and economic and environmental value lacking. (USDA 2015)
- We know very little about the conservation status of most bee species in New York State because there is no long-term monitoring program for wild bees. (Cornell University)

Bees are a Keystone Species

- a species that has a disproportionately large effect on its environment relative to its abundance. Such species are described as playing a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community

United States Agriculture

- Over 90 crops in the U.S., including almonds, tree fruits, cotton, berries, and many vegetables, are dependent on insect pollinators for reproduction.
- Pollinators provide more than 24 billion dollars a year to the U.S economy.
- Honey bee pollination makes up the largest portion of that money, contributing 15 billion dollars.

(USDA 2013)

New York Agriculture

- New York has more than seven-million acres in agricultural production. Almost all production is reliant on animal pollination.
- With over 35,500 farms, New York ranks in the top ten nationally for the production of several crops, including apples and berries.

Apples 250 million/year

Squash and Pumpkins 74 million/year

Tomatoes 47 million/year

Cherries 3 million/year

Pears 2.5 million/year

Strawberries 7 million/year

(Cornell University)

Food Statistics

- Bee-pollinated crops account for 15% to 30% of the food we eat (USDA 2013).
- Although not completely dependent on insect pollination, crops such as apples, cherries, strawberries, onions and pumpkins greatly benefit from bee pollination, with higher yields and larger produce.

Importance of Managed Pollinators

- Though many pollinators can “out pollinate” honey bees on an individual basis, few species can match the sheer workforce of a honey bee colony that averages between 15-50 thousand bees.
- Due to monoculture farming practices, we’ve created vast areas of food desert that can only be sustained through migratory beekeeping.

Some crops, such as almonds, are almost exclusively pollinated by honey bees. California’s almond industry requires the pollination services of approximately 1.4 million beehives annually—60% of all U.S. beehives—yielding 80% of the worldwide almond production worth 4.8 billion dollars each year.

Winter Loss is Springtime Trouble

Honey bee colonies for operations with five or more colonies in New York State from January 1st 2015 to January 1st 2016

- January 1st 2015 27,000 Hives
- April 1st 2015 24,000 Hives
- July 1st 2015 44,000 Hives
- October 1st 2015 45,000 Hives
- January 1st 2016 31,000 Hives 31% Winter Loss to Date