

Bumblebees; our native pollinators

By Bruce Wenning

Bumblebees (*Bombus* sp.) are large, hairy, robust bees with black and yellow body markings, sometimes with a touch of orange. Bumblebees are native pollinators, well adapted to local conditions, and very efficient because they can pollinate flowers in cool and rainy weather.

North America has 49 species of pollinating bumblebees. Like the honeybee, *Apis mellifera* is in the insect order Hymenoptera; family Apidae, and closely related to the Carpenter bee and Digger bee. However, unlike those solitary bees, bumblebees and honeybees are social insects. They live in a colony with a caste-like division of labor that includes one queen (the largest), many drones (males) and many workers (females that do not reproduce). Members cooperate in raising young bees (larvae) produced only by the queen.

The honeybee was introduced into the United States by Europeans. It is a very efficient and effective pollinator of many agricultural crops. Most honey bee colonies are managed in man-made or domesticated hives, but a few escaped swarms have colonized in the wild.



Bumblebee

Photo: Trounce/Wikimedia

Pollination is an essential process for plant reproduction, and bumblebees and honeybees are the “saviors” of plant reproduction. Male flowers of wind-pollinated plants produce large amounts of light, dry pollen grains, increasing the chance of windborne contact with female flowers. Insect-pollinated plants, in contrast, produce wet or sticky pollen grains that are a bit heavier than the wind pollen (and in lesser

amounts). The advantage of sticky pollen is that it is easily picked up and transferred from flower to flower by bees as they forage.

Bumblebees have longer “tongues” than honeybees and can forage for pollen more efficiently from flowers with narrow corolla tubes such as blueberries, cranberries, and certain kinds of clover. Bumblebees are able to pollinate plants on rainy days, when honey bees are inactive. Bumblebees are active at lower air temperatures (40^{0F}), whereas honeybees need a minimum temperature of 60^{0F} to start the pollination

process. Bumblebees vibrate a flower, causing large amounts of pollen to fall onto its body. This allows a flower to be pollinated in just one visit, whereas a honey bee must visit a flower seven to ten times before it fully pollinates a flower. Bumblebees and honey bees can share the same plants in an orchard, field, grove or farm without undue competition between them for pollen and nectar.

The bumblebee queen is a fertilized female (not a worker bee). She mated with one or more males the year before and has the capacity to store sperm for egg production the following spring. When Spring arrives the queen emerges from a solitary winter rest period (overwintering). She searches for a suitable hole in the ground or cavity in a stump or even a man-made structure to start a colony or nest. Once a nest site is found, she begins foraging for pollen and nectar while visiting many kinds of flowering plants.

The queen lines her nest with pieces of dry grass, moss and shreds of dead vegetation. Then she constructs a "honey pot" out of wax and fills it with regurgitated nectar (honey). The queen also stores pollen that she mixes with moisture-rich nectar, forming a ball ("bee bread") that will serve as an emergency store of food during bad weather, when she cannot forage.

The queen initiates colony development when she lays her eggs. The brood produced at any one time can number up to 20 individuals, all female workers. These worker bumblebees function to enlarge the nest, gather and store food, and feed and protect the larvae of the next generation.

Unlike honeybee hives, which are used year after year, bumblebee colonies are used only once a year. New males will mate with new queens and die, and the new queens will seek out and inhabit a suitable overwintering site. The mated queen will emerge in the spring, colonize a suitable nest site---different from the one she was born into, but often located in the same area---and start the cycle all over again.

Like honeybees, bumblebees are very important pollinators of many plants in the wild as well as agricultural crops. In addition to several clover species, bumblebees are excellent pollinators of almond, apple, blackberry, blueberry, cherry, cranberry, cucumber, melon, pear, pumpkin, raspberry, squash, strawberry, tomato and more. Recently, I observed them pollinating foxglove flowers in a perennial garden in Steuben, Maine. Read more about bumble bees at www.bumblebee.org. For a concise summary of honeybee colony collapse disorder, see Science News, (172:4) 7/28/07.

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