



# Nature in Como Park

## A Natural History of Bumblebees – Sept to Oct

*By: Deb Robinson Photos & illustration: Deb Robinson & Matt Schmitt*

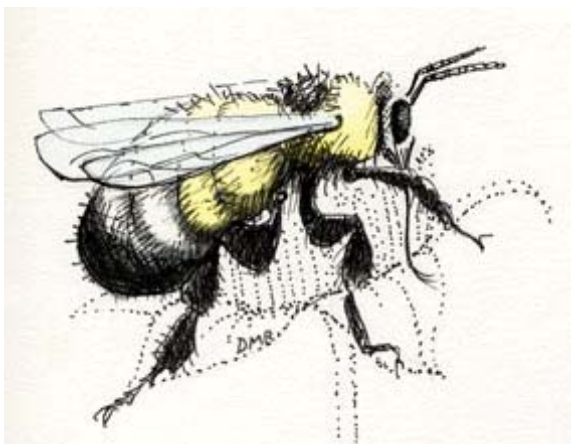
Each summer seems to slip by more quickly than the last. I long to slow down time and make just one perfect September day last a little longer. I can't hold back the first hard frost that will come soon and end the lives of all the tender insects and plants of summer. But I can unwind my own manic sense of time.

Between two garages we tend a modest little raspberry patch – this is where I go to relax while I fill my baskets with fruit and spend quality time with the bumblebees. The bees are my partners in the garden – without the bees there would be no raspberries. As the days shorten and the shadows lengthen, I know my time with the bumblebees and the berries will soon be over. Yet, next year, next summer will likely be much the same as this summer – I can always look forward to spending time again with the bumblebees when summer returns.

What follows is an essay on the Natural History of Bumblebees that I wrote eight years ago (edited here for Como Park Alliance's website).

### **Natural History of Bumblebees, September 17 to October 22, 2000**

As I look out at my backyard garden with satisfaction, I try to recall when I decided to let go of the idea of control. I have let the garden find it's own



equilibrium, without a lot of soil disturbance or pesticide use. A garden should have a place for all manner of living things. In this small garden there are birds of many kinds (humming birds are regular fall visitors), small mammals (the short-tailed shrews and chipmunks are very active), foliage in abundance, and lots and lots of "bugs."

**September 17:** It is late summer and some of the main characters in this backyard drama are, what I believe to be, male

bumblebees. Males (also known as drones) hatch from unfertilized eggs and only carry their mother's genes. The boys are spending these last fine days of summer sipping nectar and cruising for love. For nearly a week now, I have not seen any worker bees with pollen in their baskets. When the reproductive males and queens have hatched, the bumblebee colony will fall into disarray and then die out. The old queen bee and her daughter workers will have entrusted their



genetic future to those new queens (who will survive our Minnesota winter by hibernating underground). These insects are as important to this garden as the flowers themselves.

Flowers and bees are literally made for each other. They have formed a partnership of interdependence. In this arrangement, the flowers provide food for the bees and the bees are the

reproductive go-betweens for the flowers. A bumblebee is particularly well suited for performing its role in this partnership.

The bumblebee belongs to the insect order of Hymenoptera. This order includes all types of bees, wasps, and ants. Nearly all social insects are of this order with the notable exception of termites. The bumblebee's family name is Apidea (all social bees are members of this family). There are two genera: *Bombus* and *Psithyrus*. The *Psithyrus* genus is a social parasite to the *Bombus* genus laying *Psithyrus* eggs in the *Bombus* colony. But, it's the hardworking *Bombus* bumblebees that fascinate me.



Honey bee



Wasp

Robust, hairy, and good-natured – bumblebees are the teddy bears of the insect world. Their bodies have three main parts: *abdomen* equipped with a honey stomach for temporary nectar storage, *thorax* where the six legs and four wings are attached), and *head* with two large compound eyes, two elbow-jointed antennae placed between the eyes, and a hairy tongue, which is folded in a sheath under the body when not being used for lapping up nectar.

A bumblebee's long, thick hair serves the dual purpose of insulation and pollination. Grains of flower pollen are attracted to the bee's hair because of a

static electric charge that is built up during the bee's flight. The colors of the bee's hair are usually black and some shade of yellow or orange. These colors are a warning that the wearer is armed. Of course, bumblebees can sting, but fortunately for us gardeners, they are very hesitant to use their chemical weapons unless they feel their nest is in danger.

Worldwide, there are at least 300 described species of the humble bumblebee. They are considered common throughout North America with 24 species found in our Eastern Nearctic Region. By virtue of their thick insulating hair and their ability to shiver their flight muscles to warm themselves up, these burly bees are well adapted to living in northern climates. They are some of the first pollinator insects to emerge, making themselves indispensable by pollinating early blooming fruit trees.

It is hard to know where to start a story about a lifecycle. It is, as the name implies, a circle. Many of the details of the bumblebee's lifecycle may vary from species to species, but the basic story is pretty much the same. A freshly hatched queen-bee is a symbol of renewal and a good place to start.



**October 2:** This is the interlude between two seasons. And I believe I have seen a new queen. She is very big compared to the average worker bee, and her plumb body looks bright and new. She has been visiting my late blooming nicotiana; I can tell by the little holes she leaves in the tops of the flowers. Even from a foot away, I can hear her bite through the sides of the trumpet shaped blooms. This type of flower is designed for a moth not a bee. This queen bee is not pollinating this flower – she is stealing its nectar. She took honey with her when she left her mother's colony, but she needs more energy as she searches

for an underground place to hibernate through the winter. However, she may have to dig this cell herself.

In early spring, the large new bumblebee queens emerge to renew the bumblebee lifecycle. The new queens are so voluptuous that they appear to not be flight-worthy. On unsteady wings, she goes in search of a proper home for her new colony. I have read from numerous sources that mouse holes are highly prized nest sights. In early May, when I am newly emerged myself and cleaning out my garden beds, I have seen and heard these new queens hovering low and occasionally landing on the ground for a little reconnaissance on foot as they look for that perfect place for a nest. When she finds it, she may have to fight another queen to keep it. Once she has secured the location, she still has to make her new home fit for a queen.

Most queens start their domestic life by gathering soft grasses for the inside of their nests. She then builds a wax honey pot (near the nest entrance) where she will store the nectar that she collects. The queen bee uses wax secreted from between the last four segments of her abdomen.



Adult bees can live on nectar, but developing larvae need protein. Flowers, once again, provide the required substance: pollen.



Female *Bombus* bees have combs on their legs for removing pollen grains from their hair. They pack the pollen in their pollen baskets, located on their hind legs. The pollen baskets are used to store the pollen only during the foraging trip. The new queen must gather pollen to make beebread (a ball of pollen made moist with nectar). She will lay several eggs on this pollen ball and then cover it with wax. In a few days the larvae will hatch from these first eggs. The mother bee will brood her larvae to keep them warm and feed them nectar and pollen for

about a week. The larvae pupate and are transformed into adult worker bees, and within a few days they will take over the queen's job of gathering pollen and nectar. The bumblebee queen will spend the rest of her life inside the colony, laying eggs and doing household chores.

I am conflicted on the subject of how the queen dominates the workers in her colony. Does she achieve this by pure physical aggression or does she use chemicals called pheromones? Bumblebees do use chemicals to mark flowers that they have visited, but it is believed that pheromones are not as important to bumblebee communication as they are to the highly social honeybees.

As summer progresses the size of the colony grows. The number of individual bees per colony can be anywhere between 30 to a few thousand depending on the species of bumblebee. The average worker bee will only live for about month during the height of their summer foraging. Because the bumblebee colony will not survive the winter, as honeybee colonies do, the bumblebees do not produce large honey stores. The workers store just enough food for the summer with a little extra for their newly emerged reproductives: the new queens and males.

In the autumn, the reproductives leave the nest after consuming most of the stored food. The old queen loses control over the workers, and it's every bee for itself. All the members of the colony will die with the exception of the new queens – only they will survive the winter to continue the lifecycle of the bumblebee.



**October 20:** It is autumn, the leaves are off the trees and the growing season is coming to a close. The garden is looking sparse. There have been frosts that have silenced the crickets, but the chrysanthemums and mints are still blooming. Late blooming flowers like these provide nectar for a few hardy insects.

There is one tired bumblebee worker, slowly foraging on the mums. She looks weak and her wings are tattered and worn out. However, she can still walk from flower to flower. She is one of the last living members of her tribe. Many entomologists would say that one worker bumblebee is not an individual, but a component of a super-organism: the colony. If that is the case, then her future lies safely asleep underground with next year's queen bees.

I go into the house and bring out a drop of honey on a toothpick and feed it to the failing bumblebee worker. The effect on the bee is immediate. With this high-octane fuel the old gal is able to get airborne and she flies off. For one brief moment it feels like summer again.



To contact writer: [dmrobinson@bitstream.net](mailto:dmrobinson@bitstream.net)

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