

The Outside Story

Queen Season: Bumble Bees in Spring

By Kenrick Vezina

Hear ye, hear ye! The queens have emerged! We're talking about bumble bees (genus *Bombus*). For several weeks each spring, any bumble bee you see is a queen – and very hard at work. She must construct her kingdom.

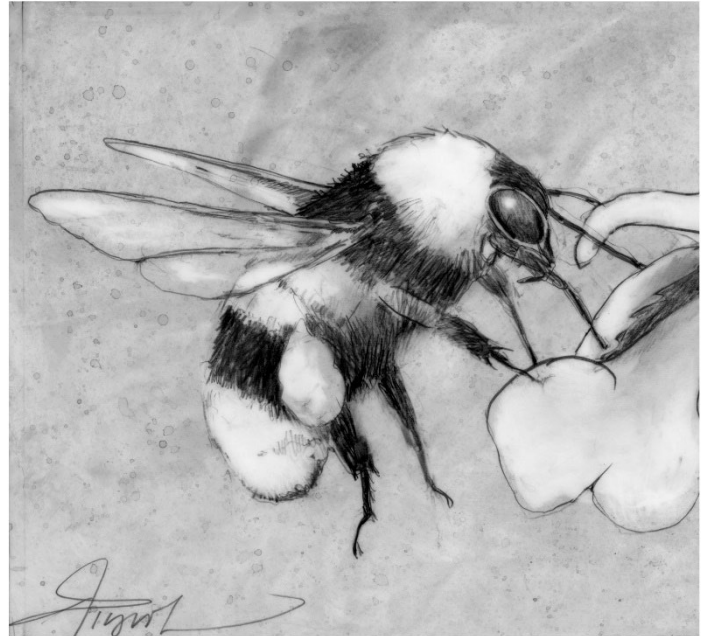
Her mother (the previous queen), and most of her siblings will have perished. Unlike honey bees, bumble bees cannot overwinter as an entire colony. Only the nascent queens – called *gynes* – pass through winter's veil. Roused by rising temperatures, their first priority is food. Early-blossoming plants such as pussy willows, wild geraniums, and dandelions allow them to replenish their bodies and sustain the next phase of their royal work.

Once sated, a queen-to-be begins searching for the perfect place to found her kingdom. She sweeps across fields and gardens, scanning the terrain for a suitable cavity, usually low to the ground. I recently watched a queen carefully inspect the eroded crevice beneath our raised garden bed. Anything from old mouse burrows to abandoned birdhouses to overturned flower pots can work.

After finding the perfect spot, she will build a few pollen-filled wax pots. On top of these, she lays her first small batch of eggs, fertilized using the sperm stored from last fall's mating. For several days, she'll alternate between incubating the eggs – shivering her powerful flight muscles to generate heat as needed – and gathering food. These eggs hatch into bee larvae, little more than translucent, wriggling ovals. At first, they subsist on the store of pollen; as they develop, the queen will also feed them regurgitated nectar. After about two weeks, the larvae spin cocoons and begin the final stage of their metamorphosis. Now that they no longer require her direct attention, the queen lays a second set of eggs, and begins the process again.

It takes four or five weeks for the first subjects of a queen's new kingdom to emerge as adult bees. These first generations are made up entirely of female workers. Incapable of reproduction, they exist only to serve queen and colony by foraging, tending the young, and maintaining the hive.

Poet Walt Whitman called May "the bumble-bee month," and this is when colonies really get rolling. The ghost-white blossoms of our blueberry bush inevitably summon a glut of buzzy guests: the first workers of



the year, vanguard of the new bumble-kingdoms. Watching them shove their way into the delicate bells, it's easy to see why bumble bees are great pollinators: those bulbous bodies and thrumming wings knock pollen loose to be caught in the bees' fuzz. It's not unusual to see a bee's entire body dusted with motes of gold.

Every kingdom's golden age, however, must come to an end. In late summer, successful colonies start to produce reproductive males and females. Until now, the queen has been laying eggs fertilized internally; now she will also lay unfertilized eggs that develop into male drones. Meanwhile, some of the larvae that would usually become workers instead develop into much larger, fertile females – next year's crop of queens, technically called *gynes*. Scientists are still investigating the exact mechanism that transforms larvae from workers to gynes, but it likely depends on the chemical composition of the regurgitated substance fed to larvae by the other bees.

Shortly after emerging, the males head out and don't look back. Their only goal is to mate in the few weeks before cold overwhelms them. In practice, they're much like the pollen they're reared on: scattered into the wind in the hopes of carrying the colony's genes forward.

Throughout fall, the queenlings will continue to share in the resources of their colonies while they're courted by drone suitors from abroad. As the season wanes, nights get colder, and the available supply of flowers dwindles. Their birth colonies begin to die off. After mating, the gynes will forage as long as they can to build up energy stores. Eventually, they'll seek a place to burrow. Underground, they pump their bodies full of an antifreeze chemical that will keep ice crystals from shredding their cells, and their metabolism slows to the barest minimum.

Every fall, dozens of bumble bee kingdoms perish, their queens dying with them. But beneath the earth, the destined queens rest: royal seeds, waiting to start the cycle anew come springtime.

Kenrick Vezina is a freelance writer, naturalist, and raconteur based in the Greater Boston area. Illustration by Adelaide Murphy Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine and sponsored by the Wellborn Ecology Fund of the New Hampshire Charitable Foundation: www.nhcf.org.

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PO Box 270, Lyme, New Hampshire 03768
mail@northernwoodlands.org / 603-795-0660
www.northernwoodlands.org

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