

*Providing Leadership in Environmental Entomology*

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**BUMBLE BEES AS POLLINATORS**

Bumble bees are large, attractive insects that are of interest to children, scientists, beekeepers, naturalists, conservationists, home gardeners, farmers and commercial bumble bee breeders. There are several bumble bee species found in South Carolina which vary in size and coloration. Though bumble bees are highly social insects, their colonies are not perennial in nature as honey bees. They do not store a surplus of honey which can be harvested. Bumble bee populations in nature fluctuate from year to year depending on many factors including weather, parasites and predators.

**Identification.** Bumble bees are large robust insects with black and yellow coloration. The bumble bee has a black or yellow hairy abdomen which is a character that can be used to differentiate it from a carpenter bee which has a black shiny, hairless abdomen. The foraging bumble bee has a large pollen basket on each hind leg that is often loaded with pollen. The bumble bee queens are typically twice as large as workers or males. A female bumble bee has a pointed abdomen with a stinger. Males do not have a stinger and the tip of the abdomen is rounded.



**A typical bumble bee.**  
Photo Source: Dept. of Entomology, University of Nebraska-Lincoln.

**Life Cycle.** The bumble bee colony is made up of three types of individuals (queen, sexually undeveloped female workers, and males). Bumble bees produce annual colonies in South Carolina. Only the mated queens overwinter. Nests are started in early spring by these solitary, fertilized queens. These queens are often seen feeding on spring flowers or searching for a suitable nest site. Normally, nests are established in an abandoned rodent or bird nest in the ground. The solitary queen begins the colony by collecting pollen and forming it into a small lump. She lays 6-8 worker eggs on this pollen. After 4-5 days, the eggs hatch into larvae, which begin to feed on the lump

of pollen. The young larvae receive all the fats, minerals, proteins, and vitamins that are necessary for growth from the pollen. The queen collects more pollen and nectar to feed this first brood cycle. It takes about



**A bumble bee with a full pollen basket.**  
Photo Source: C. S. Gorsuch, Clemson University.

21 days to develop from egg to adult. Once the first brood develops, they take over all the colony duties except egg laying. The adult workers defend the

colony, collect pollen and nectar, and feed the larvae. Nectar is collected and stored in small sac like "honey pots" built from wax and pollen. The workers enlarge the nest and by midsummer the colony will have 20-100 workers. The colony produces reproductives (new queens and males) in late summer. They leave the nest to take mating flights. The successfully mated queens fly to the ground and hibernate 2-5 inches deep in the soil. The production of reproductives signals the end of the colony's life. The overwintering queens emerge the next spring to complete the life cycle.

**Economic Importance.** Bumble bees are found wherever flowering plants are located in South Carolina and contribute immeasurably as pollinators of wild flowers and crops. Much of the pleasure and profit from natural bumble bee activities are difficult to measure in economic terms. Bumble bees pollinate many wild flower species that birds and small mammals rely on for food.

Honey bees are by far the bee species that are most often imported to field crops for pollination. Bumble bees and honey bees are not necessarily interchangeable as pollinators for some plant species. Bumble bees are an effective alternative to labor-intensive manual pollination of greenhouse grown tomatoes, sweet peppers and strawberries. The

bumble bees' longer tongue and wing vibrating tendencies make them more efficient pollinators for some plant species. Bumble bees can forage in cool, unfavorable weather better than other bees. They forage for nectar and pollen earlier in the spring, earlier in the day, and during cloudy weather.

**Bumble Bees for Profit as Commercial Pollinators.** Bumble bees are reared commercially for shipment to growers especially for greenhouse grown crops such as tomatoes which require "assistance" with pollination. Tomato pollen does not loosen easily. Each flower must be vibrated to ensure pollination.

Commercial bumble bee colonies are expensive to produce due to the difficulties and resulting costs of making mature colonies available year round. Colonies do not have a shelf-life and sometimes demand by growers is unpredictable. An additional problem in commercial production of bumble bees is providing colonies of standard quality and strength that make good pollinating units. Queens are artificially overwintered by exposing them to carbon dioxide. This technique makes continuous production of bumble bees possible. Honey bees are placed with the young queens to stimulate early oviposition. Although there is a demand for commercially produced bumble bee colonies for use in greenhouses, there is little use for these colonies in open grown field crops.

One of the major drawbacks of using bumble bees in greenhouses is that people are afraid to work around stinging insects, especially large bees. This initial fear is often overcome quickly after working around the mild mannered bumble bee species that have been selected by breeders.

**Wild Bumble Bee Conservation.** Since bumble bees are excellent pollinators, we should encourage management strategies that help maintain and increase wild colonies.

Bumble bees' natural nesting habitat has been drastically decreased by industrial and residential expansion. Large farm monoculture practices are also detrimental to good nesting sites. A way to encourage bumble bee nesting is to set aside uncultivated farm land or hedge rows that are

attractive to queens searching for nesting sites. Queens are not too selective as long as the potential nesting site is a dark, underground cavity filled with fine plant fiber. Acceptable nest sites include a burrow beneath an old tree stump or an abandoned rodent nest.

**Safety Precautions Around Wild Bumble Bees Nests.** Bumble bees are normally harmless when foraging. A disturbed colony can be nasty. Guard bees stand ready to protect the nest against predators including skunks and man. A worker bumble bee can sting repeatedly without sacrificing her life. Precautions should be taken when working or playing in areas that are likely to be inhabited by bumble bees. This is especially true when mowing fields or trimming weeds around trash or wood piles. A bee veil and hat are highly recommended during summer and fall when doing these activities. If a colony is disturbed, a person should slowly walk away with both hands covering the face. It is best to walk toward dense vegetation or enter a vehicle or building to escape the stinging insects. Swift movements will only attract more bumble bees. Persons highly sensitive to bee stings should always carry a sting treatment kit during outdoor activities. To reduce swelling following a stinging incident, a person may use several sting remedies. A convenient material to place on the sting site is moistened table salt. Mound the salt on the sting entry point and moisten with a few drops of water. Leave the salt on the site for several minutes. This procedure must be applied within 3-4 minutes following the stinging incident to be effective.

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