



Pollinators

2. Bumble Bees

(Scientific name: *Bombus spp.*;
Family: Apidae; Order: Hymenoptera)

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Better Pollinators than Honey Bees For Some Crops Bumble bees can be better pollinators than honey bees in many aspects. First, they fly at cooler temperatures and work at earlier and later hours than honey bees. Two, they have a special mode of pollination behavior called "buzz pollination" in that they vibrate their body in high frequency to shake the pollen loose from flowers. This behavior is more efficient and almost required for pollination in some crops such as eggplants, tomatoes (both solanaceous plants) and blueberries. Honey bee workers do not exhibit this behavior. Thirdly, they seem much better than honeybees in getting home when inside enclosures. The buzz pollination and homing ability makes them the ideal pollinator for greenhouse plants (mainly cucumbers and tomatoes). Honey bees can hardly perform in a green house setting because they get confused and would repeatedly bump into the invisible (to them) glass ceiling and cannot find their way home.

Bumble bees also work on flowers much faster than honeybees. In a three-year study (1992-94), Javorek, MacKenzie and Vander Kloet reported that a bumble bee worker pollinated twice as many lowbush blueberry flowers as a honey bee in the same amount of time, they also pollinated in 80 percent of their floral visits while honeybees only about 25 percent, they also deposited 34 tetrads (four pollen grains are fused together in blueberries) per visit while honeybees only 13. This makes a bumble bee about 24 times more efficient than a honey bee, on a worker for worker basis, for blueberry pollination. Some blueberry growers are using bumble bees as alternative pollinators.



Above: A bumble bee queen (*Bombus impatiens*) foraging on a flower near Boston, MA. Notice the pollen on her pollen baskets on her hind legs. Queens would forage during early spring, then stop working outside when workers emerge to help her.



A peek inside a bumble bee nest, the larger bee in the center is the queen. Workers of different sizes are seen incubating brood cells. The open cells are honey pots. Photographed indoors at a commercial bumble bee supplier. Photos by Zachary Huang

Rearing and Management Bumble bees can be successfully reared indoors, however this feat has only been achieved in a small scale by a few scientists for study purpose, or in a large scale by commercial bumble bee producers. The procedures from the later has remained proprietary largely. There are currently two large bumble bee producers worldwide. One is Koppert International (<http://www.koppert.nl/english/>), based in Holland, but has a laboratory near Ann Arbor, Michigan. The prices range from \$70 to \$150 per box depending on season and bee condition. Another company, Biological Systems (<http://www.bio-bee.com>) is based in Israel. Once purchased, the bumble bee colony is disposable, meaning that you cannot reuse them the next year because new queens will mate and finding places to hibernate during winter and the old queen and workers and drones will all die during winter. What one can do is to prolong the colony as long as the flowers are in bloom to maximize their pollination services. This may include replenishing pollen and honey water and guard against diseases and pests.

Disclaimer: This fact sheet is for information only. Mention of products does not indicate endorsement. Prepared by Zachary Huang, Department of Entomology, Michigan State University, East Lansing, MI 48824, USA. email: bees@msu.edu.

url: <http://cyberbee.msu.edu/column/pollinator/bumblepoll.pdf>