# Using Commercially Reared Bumble Bees for Northern Highbush Blueberry Pollination Services: FAQs

Updated on April 29, 2022 by Laura Johnson, Pollinator Support Specialist


*What do you get when you order bumble bees in the northeast*? A weather resistant box with sugar water and one to four colonies of bees, depending on size ordered. A quad box will weigh about 26 lbs. The commonly sold species in the east is *Bombus impatiens*, also known as the Common Eastern Bumble Bee (pictured on left). There will be one queen per colony, a number of workers, and brood. The expected colony size that comes with an order is variable depending on the source. Colony size can range from 150-500 workers. These workers are the primary gatherers of pollen and nectar.

*Timing for ordering colonies?* Orders should be made 14-16 weeks in advance to guarantee delivery, though orders closer to bloom time may be possible depending on availability. Identify suppliers and talk to them directly about when to place an order. They may ship on only select days of the week, so knowing the supplier shipping plan is critical, especially for last minute orders. Some commonly used suppliers are Cropking, Koppert, and BioBest (distributed in the US by Plant Products). There may be others, so doing a bit of research will help diversify your options.

*Number of colonies per acre*? Generally, the recommendation is 3-4 colonies per acre for northern highbush blueberries if no other commercial bees are being used. This could be variable depending on your wild pollinator population strength and you may decide to adjust accordingly.

*Where and when should I place my newly arrived bumble bee colony?* Place colonies throughout the crop field and well away from honey bee hives if you have any in the area. Bumble bee colonies should be spaced throughout fields not solely placed on field margins[1]. Bumble bees can be placed in fields just before bloom or, ideally, at 5% bloom and before 25% of full bloom to optimize crop attractiveness and foraging activity in the target crop[2]. You can watch and see if active pollination is occurring by observing bumble bees with pollen on their hind legs (pictured on right).


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*How do I protect my bumble bee investment?* There are a variety of protections against weather, pesticide spray, and pests to consider for your bumble bee colonies. Place colonies on something to keep them off the bare ground, like a pallet, to keep them dry. Additionally, put them in an area that is protected from the weather, so they are not exposed all day to full sun, and there is some rain and wind protection. You may choose to use a picnic table or tent two pallets overhead to provide shelter from the elements. If boxes need to be moved for any reason, such as for pesticide application, a door on the box of the quads can be used to collect the bees. Closing the colony entrance should be done after dark to ensure all bees are inside the box.


Image: Laura Johnson

Animal pests may threaten bumble bee activity. If floral resources are limited, nearby honey bees can rob food resources from bumble bee colonies, causing your newly purchased bumble bees to fail. Place bumble bees far from honey bee colonies. It is advisable to install an electric fence around your colonies to deter predators, such as black bear who will seek out the developing bee larvae for food and skunks who will eat flying workers emerging from entranceways.

*How long will they live? What happens to them after pollination is over*? Colonies will provide pollination services for about eight weeks. Eventually, they will follow their natural life cycle and biological instincts and leave the box. Some experts advise burning or freezing commercially reared colonies in a timely manner after crop bloom is over to limit pathogen spill over and forage competition with wild species.

*What if I grow blueberries in high tunnels?* Some growers may choose to grow blueberries in high tunnels. Understanding how bee behavior can change in high tunnel environments is important to consider for ensuring satisfactory pollination. Some factors impacting bee foraging in these protected environments are tunnel size, the type of covering (plastic or glass), ventilation, $CO_2$ levels, and temperature[3,4,5]. It is customary to use ultraviolet (UV) light blocking plastic to lengthen the usable life of the plastic. It also may help decrease certain crop pest populations, like whiteflies, thrips, aphids, and others[6]. However, bees use UV light to navigate and low UV transmission can reduce their foraging activity efficacy, frequency, and duration. At least 4% UV transmission is needed through the plastic and 80% UV transmission through glass for normal bee behavior[3].

In some high tunnels, $CO_2$ levels are artificially increased to stimulate plant growth. Be sure to place any purchased colonies away from gas outlets, as high levels of $CO_2$ found in these areas negatively affect bee colony development and mortality[3]. However, bees may find conditions favorable at $CO_2$ levels of 350 ppm, which increases nectar volume, flower number, and bloom duration[5].

Temperature is another consideration for bee activity. Bumble bees prefer a hive temperature of 86F for optimal activity. If temperatures get too hot, this can cause bees to expend energy cooling their colonies instead of foraging. Bumble bees cannot survive if temperatures surpass 104°F. At about 90°F, their foraging activity will stop, and brood health will be negatively impacted[3].

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