



### **Bumblebees complement honeybee pollination!**

*Proper pollination is essential for optimal fruit set and maximum production. The window of opportunity for pollinating one individual flower lasts 2 to 3 days. That's why it is extremely important to have pollinators in place when they are needed the most.*

## **Welcome to Biobest® 4-Pak™**

**4-Pak is specifically designed for bumblebee pollination of outdoor crops.** It is made of white, water-resistant materials designed to reflect sunlight and protect against inclement weather.

### **Contents and benefits of 4-Pak**

- Contains 4 bumblebee hives, each hive consisting of a brood and a mother queen.
- Each hive is equipped with a food source to sustain travel time hives should be introduced into the crop as soon as possible.
- Easy to operate, with a flight dial opening that allows bumblebees to fly in and out.
- Each hive has a queen excluder installed to eliminate wild queens from entering the hive and the mother queen from escaping.
- Provides approximately 6 weeks of high-performance pollination.
- Works as a complement to existing pollination strategies. Bumblebees complement honeybee pollination!

## **Benefits of Biobest® Bumblebees**

- Optimal fruit set, fewer aborted fruits, better fruit shape and size.
- Bumblebees are excellent pollinators even in inclement weather. They remain active in low temperatures, light rain, wind and cloudy days.
- Bumblebees focus on the targeted crop.
- Bumblebees pollinate more flowers per minute than honeybees; they work longer, from dawn to dusk.
- Bumblebees use buzz pollination (ability to vibrate flowers), helping them overcome pollination difficulties such as shape of flowers and pollen weight.

## Upon Arrival

Inspect 4-Pak for damage. They should not be leaking sugar or be crushed in any way. 4-Pak should be placed in the crop as soon as possible. If 4-Pak must be stored, place in a cool area 55-59°F (13-15°C) and speak with your Plant Products representative.

## Timing and Rates

4-Pak should be introduced into the field when crops are starting to bloom (5% bloom). In general, Biobest recommends 4 hives per acre. This means each 4-Pak will cover 1 acre. This rate could vary depending on factors such as: crop variety, plant and flower density, and presence of other pollinators (honeybees or wild bees).

## How to Place 4-Pak™

4-Pak should be placed on a skid or pallet to protect them from low laying water. One 4-Pak per skid is recommended. Open the hive by turning the flight dial to the in-out position. A Bee-Safe sticker covers the exit point of each hive. Do not remove the sticker. The bees will chew through the sticker to exit. This allows you to open 4-Pak safely. The process of chewing through the label is a good indication that the colonies are healthy and ready to forage. If the bees do not chew through the label within 24 hours, this may indicate a problem occurred during the shipping process. In this case, contact your Plant Products advisor immediately.

***In field crops, it is always recommended to space 4-Pak in a checkerboard pattern, due to the foraging behavior of bumblebees.***

***In cranberry bogs, it is recommended to space 4-Pak evenly around the outside of the bog. Placing one 4-Pak per pallet is important to increase pollination coverage over the entire bog.***

## How to Operate the Flight Dial



### In-Out



**To open** the hive, turn the bee lock to this position.

### In-Only



**To collect** the bumblebees, turn the bee lock to this position.

### Closed

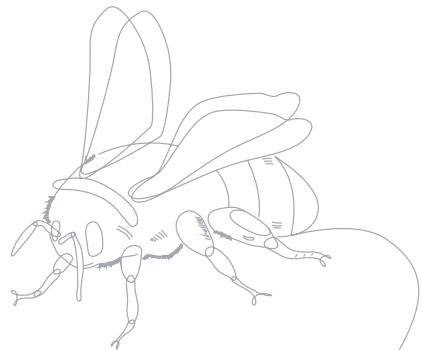


**To close** the hive, turn the bee lock to this position.

- ! If the hive is temporarily removed after closing (e.g. for chemical application), make sure to re-install the hive to its original position and orientation.



Do not push back or pull out cotton coming out of the flight opening. This is a sign that the bumblebees are very active.



## Activity Evaluation

- Activity should be assessed between 10:30 a.m. and 3 p.m.
- When temperatures are equal to or greater than 59°F (15°C) and the winds are less than 20 kph (12 mph).
- Count the number of bumblebee entries and exits in a colony over a period of five minutes; repeat this three times per colony.
- Calculate the average of data obtained and divide it by three to get the number of entries per minute.
- An average of 0.5 entries per minute a few days after the introduction to the field is acceptable.
- Activity should increase in the following weeks.
- A decrease in activity when temperatures exceed 79°F (26°C) is likely due to the bumblebees cooling the colony.

## Chemical Application

Closing the bees in the brood box is mandatory for the health of the colony. On the afternoon before the chemical application, turn the flight dial to the in-only position. In the evening or after dark, turn the flight dial to the closed position. The bees should remain in the brood box until it is safe to release them again. *If a chemical application is necessary during the pollination period please refer to: Biobest Side Effects App available in the App Store and Google Play.*

## Moving 4-Pak™

If you need to move 4-Pak to a new location, this can be done by turning the flight dial to the in-only position. Do this on the evening before the move is scheduled. The next day, turn the flight dial to the closed position. Move the hives to the new location and leave the hives closed until dark. After dark turn the flight dial to the in-out position. In the morning the bumblebees will exit the hive, orientate their new position and be on their way.

## Disposal Instructions

***Proper hive disposal is important to protect the environment. Please check with local regulators to ensure that the following instructions align with local guidelines.***

- Wearing long gloves or a bee suit may be necessary if the box has been damaged or the structural integrity of the box has been compromised
- Turn rotating dial to the “in only” position
- After 24 hours turn the dial to the “closed” position
- Remove hives from the crop
- Place hives in a freezer for 24 hours at -20°C or 5 days at -11°C
- There should be no bee activity in the box when removed from the freezer
- Hives should be bagged before going to the landfill
- Send hives to recycling plant/landfill. Please consult with your local recycling service provider.

## FAQ and Side Effects

### **Why should I buy Biobest 4-Pak?**

Biobest 4-Pak is the best way to ensure your pollination. Over the past few years we have taken the time to improve our genetics to deliver you the best quality hive possible. Upon delivery, each hive is complete with a brood of workers and a mother queen. Bumblebees are the most efficient pollinators on the planet and work in poor weather conditions when honeybees are less active.

### **What is a queen excluder?**

A queen excluder is a component added to each hive that prevents wild queens from entering the Biobest brood box. This will also keep the mother queen inside each hive.

### **How long do the hives last?**

Biobest 4-Pak is guaranteed for 5-8 weeks of pollination.

### **How many hives should I use?**

For best results, Biobest recommends one 4-Pak per acre.

### **When do I place 4-Pak in the field?**

4-Pak should be placed in the field at **5% bloom**. If this is not possible, earlier is better than later. As soon as 4-Pak is placed in its designated location, turn the flight dial to the in-out position. A Bee-Safe sticker covers the exit point of each hive.

### **What is a Bee-Safe sticker?**

The Bee-Safe sticker is a food grade sticker that delays the egress of the bumblebees. This allows you and your staff plenty of time to open the hives safely before the bumblebees chew their way out.

### **How close can I place 4-Pak to my honeybees?**

4-Pak should be placed 80-100 yards away from the honeybee hives.

### **How high should 4-Pak be placed in relation to the ground?**

4-Pak can be placed directly on the ground away from low laying water or on a pallet.

### **Which direction should 4-Pak openings be oriented?**

No studies recommend any orientation; however, preliminary results suggest that activity is greater when the colonies are positioned in an east-west orientation.

### **What should I do if 4-Pak is delivered before the blooming period?**

It's preferable to receive 4-Pak early. This allows you to have complete control over the time of introduction to the production site. It is possible to take advantage of the extra time to strengthen the bumblebees by placing them in proximity to wild flowers. Once flowers account for **5% bloom**, 4-Pak can then be placed in the field.

### **Can I store 4-Pak?**

Best practice is to introduce into the field as soon as possible. Resources are limited inside the hive and foraging should not be delayed. Reach out to your Plant Products representative if more information is needed.

DISCLAIMER: These are general guidelines. For questions and/or recommendations, please contact your local advisor.

# www.PlantProducts.com

## ***Bombus impatiens***

A.k.a. Common Eastern bumblebee

Native to: Eastern North America



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*All hives are produced with utmost care. They are manually chosen so that you receive the very best quality. If for any reason there is a problem or concern, please contact your local Plant Products advisor or contact customer service.*