

Release Instructions for Bios

Biological control agents are living organisms with specific requirements for release and survival. Biobest products are produced and shipped using the highest quality standards. See instructions below for best results, proper handling and utilization of products upon receipt.

General Guidelines

- Open shipped boxes and product packages immediately upon arrival.
- Inspect the product and report any issues within 24 hrs of receipt.
- Release product as soon as possible.
- Store only when absolutely necessary at the temperature indicated by the icon on the product label. (Refer to the icon guide at the end of this document.)
- Keep bottles and tubes laying horizontally for maximum air exchange and to keep contents evenly distributed within the carrier.
- Product should always be released before the expiry date on the sticker.

Continue reading to find specific instructions on each available product from Biobest North America.

Amblyseius Breeding System (ABS) - *Amblyseius cucumeris*

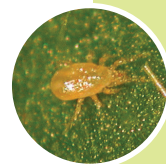
- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- Product comes in tubes and buckets, apply accordingly:
 - To open the cardboard tube, turn the dial and push through the plastic cutout.
 - To open the bucket, pull on the plastic strap to remove it and open the lid.
- Release bulk material in piles on top of the substrate.

5 ml = 1 tsp. | 1 L tube = 200 piles



ABS Mini Sachet with Hook - *Amblyseius cucumeris*

- Hang sachets on the plant out of direct sunlight and away from overhead irrigation or direct sprays. Sachets are water resistant, however water can still enter through the exit hole.
- Do not puncture. Contents of the sachet will continue to breed for 4 - 6 weeks.



ABS Mini Sachets on a Stake - *Amblyseius cucumeris*

- Using the stake, insert the sachet into the substrate of hanging baskets, propagation trays, pots or growing blocks.
- Make sure the sachet stands 1" (2.5 cm) above the substrate and is in contact with the plant.
- Do not puncture the sachet or make the exit hole bigger.
- Contents of sachet will continue to breed for 4-6 weeks.
- To protect multiple plants, canopy needs to be touching. If plants are not touching, hang one sachet per plant.



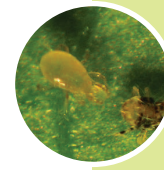
Adalia System - *Adalia bipunctata*

- Release by opening the tray and placing it under a hotspot to allow the larvae to self disperse, or by carefully transferring each larva onto plants or into bioboxes.
- Do not expose to direct sunlight.



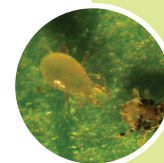
Andersoni Breeding System - *Amblyseius andersoni*

- Hang sachets by the hook at the desired height in the plant, out of direct sunlight and away from overhead irrigation or direct sprays.
- Sachets are water resistant, however water can still enter through the exit hole.
- Do not puncture the sachet or make the exit hole bigger.
- Contents of sachet will continue to breed for 4-6 weeks.
- To protect multiple plants, canopy needs to be touching. If plants are not touching, hang one sachet per plant.



Andersoni System - *Amblyseius andersoni*

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, make sure to roll the tube gently a few times so that the mites are evenly dispersed within the carrier.
- To open the cardboard tube, turn the dial and push through the plastic cutout.
- Release bulk material preventatively or curatively over crop canopy of susceptible varieties and surrounding plants.
- Apply manually (sprinkling/broadcasting) or by using a Makita blower with Nutri-App (speed level 1-2 only)
- If plant canopies are not touching or connected, make sure to apply onto every plant.
- If carrier over foliage is undesirable, use bioboxes, hang them from the crop or pots and add the desired amount of product inside.



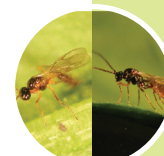
Aphelinus System - *Aphelinus abdominalis*

- Open the bottle to release the product.
- In hotspots apply the equivalent of 0.5 -1 tsp directly onto foliage or in bioboxes.
- For preventative treatment distribute throughout the crop.
- Apply immediately upon receipt.



Aphidius System (Aphidius Mix System) - *Aphidius colemani* & *Aphidius ervi*

- Open the bottle to release the product.
- In hotspots apply the equivalent of 0.5 -1 tsp directly onto foliage or in bioboxes.
- For preventative treatment distribute throughout the crop.
- Apply immediately upon receipt.



Aphidoletes System - *Aphidoletes aphidimyza*

- Release immediately! Adults live only for a few days.
- To open the cardboard tube, turn the dial and push through the plastic cutout.
- Apply in piles onto moist growing media at about 250 larvae per release point or release in a dark moist place such as a cardboard tube or bucket (Love Shack). Ensure that there are paper fibres, moistened media and a sugar water soaked wick, as this provides energy and a suitable mating place for the adults.



LOVE SHACK



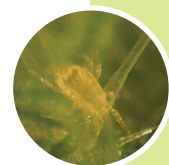
Atheta System - *Dalotia coriaria*

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- Product comes in tubes and buckets, apply accordingly:
 - To open the cardboard tube, turn the dial and push through the plastic cutout.
 - To open the bucket, pull on the plastic strap to remove it and open the lid.
- Apply in piles to growing medium. (It does not need to be applied to each plant or pot because adults fly!)
- Divide 1 package of 1000 into 25 to 50 piles



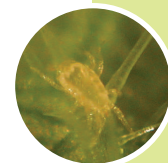
Californicus System - *Amblyseius californicus*

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- Product comes in tubes and buckets, apply accordingly:
 - To open the cardboard tube, turn the dial and push through the plastic cutout.
 - To open the bucket, pull on the plastic strap to remove it and open the lid.
- Apply manually (sprinkling/broadcasting) or by using a Makita blower with Nutri-App (speed level 1-2 only)
- Release bulk material evenly over the canopy of the plants to be protected or treated.
- If plant canopies are not touching or connected, make sure to apply onto every plant.
- If carrier over foliage is undesirable, use bioboxes, hang them from the crop or pots and add the desired amount of product inside.



Californicus Breeding System - *Amblyseius californicus*

- Hang sachets by the hook at the desired height in the plant, out of direct sunlight and away from head irrigation or direct sprays.
- Sachets are water resistant, however water can still enter through the exit hole.
- Do not puncture the sachet or make the exit hole bigger.
- Contents of sachet will continue to breed for 4-6 weeks.
- To protect multiple plants, canopy needs to be touching. If plants are not touching, hang one sachet per plant.



Chrysopa Eggs 100K - *Chrysopa carnea*

- Add to bioboxes and hang boxes from affected plants (best method). If canopy is overlapping, the eggs can be directly sprinkled onto canopy using a shaker lid or mixed with predatory mites in sawdust or bran and applied with a Makita blower and Nutri-App. Hatch rates are best if eggs are applied to foliage or bioboxes rather than the floor or potting media.
- Store at 10° - 12°C (50° - 54°F) (or in front of fridge) for no more than 48 hrs after receipt. Hatch rate will decrease with storage.



Chrysopa System - *Chrysopa carnea*

- Release immediately! Larvae are cannibalistic.
- Release bulk material over the canopy or in hot spots at the base of the plants or in bioboxes.
- Provide Nutrimac or Nutricards as a food supplement.



Cryptolaemus - *Cryptolaemus montrouzieri*

- Release larvae onto infested plants by carefully transferring them alone or with the shredded paper carrier onto plants or into bioboxes.
- Release the adults on hot spots preferably in the evening and if possible cover the plants with a breathable fabric to keep the beetles in.
- Ants in the crop adversely affect the work of this predator. Make sure to control ants before attempting to control the mealybugs.



Dacnusa System - *Dacnusa sibirica*

- Open the vial and gently tap onto foliage in affected areas or sensitive varieties.
- Adults fly and will disperse on their own.



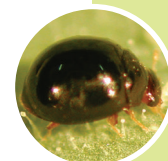
Degenerans System - *Amblyseius degenerans*

- Sprinkle onto foliage at a minimum of one release point per row. For best results have 250 release points per hectare (100 per acre) in vegetable crops. In ornamentals, apply by gently tapping the contents out onto the affected areas or sensitive crops.
- Feed *A. degenerans* with Nutrimite™ for increased reproduction. (See Nutrimite™ instructions.)



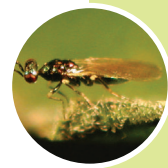
Delphastus System - *Delphastus catalinae*

- Open the vial to release adults.
- With low whitefly infestations apply on leaves over the entire crop.
- In hotspots apply over affected canopy or in bioboxes.
- For best results use in combination with whitefly parasitoids (see Encarsia and Eretmocerus).



Diglyphus System - *Diglyphus isaea*

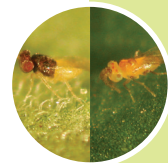
- Open the vial and gently tap onto foliage in affected areas or sensitive varieties.
- Adults fly and will disperse on their own.



Encarsia, Eretmocerus, Eretmix and Pointsettia Mix System

Encarsia formosa & *Eretmocerus eremicus*

- Fold the cards back and forth (2 - 3 times) on the vertical perforation.
- Tear the cards apart carefully to avoid crushing the exposed pupae. The pupae are attached to the circle on the surface of the card.
- Hang cards on plants or from the rim of pots with the pupae facing towards the plant, out of direct sunlight and sprays.
- Distribute the cards evenly throughout the area you wish to treat.



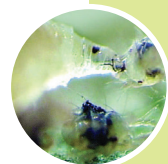
Ervi System - *Aphidius ervi*

- Open the bottle to release the product.
- In hotspots apply the equivalent of 0.5 - 1 tsp directly onto flat and dry foliage or in bioboxes.
- For preventative treatment distribute throughout the crop.
- Apply immediately upon receipt.



Feltiella System - *Feltiella acarisuga*

- With a sharp knife cut a 'door' into the top of the container about 1/4 of the size of the lid.
- Adults will mate and fly out dispersing themselves.
- Place the tray at the base of a heavily affected plant out of direct sunlight.



Hypoaspis System - *Stratiolaelaps scimitus* (formerly *Hypoaspis miles*)

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- Product comes in tubes and buckets, apply accordingly:
 - To open the cardboard tube, turn the dial and push through the plastic cutout.
 - To open the bucket, pull on the plastic strap to remove it and open the lid.
- Broadcast material or apply in 1 tsp piles onto the ground, growing medium or pots you wish to treat.
- Hypoaspis does not fly, so spreading them out evenly is key.
- Hypoaspis can survive without pests for up to 7 weeks.



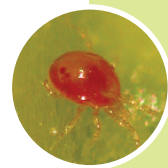
Insidiosus System - *Orius insidiosus*

- Warm the tube to room temperature before applying, make sure to roll the bottle gently a few times so that the beneficials are evenly dispersed within the carrier.
- Distribute evenly into large piles throughout the greenhouse on flat leaves, fruits, slabs or bioboxes. Do not disturb for a few days.
- When establishing a population, release when daylight levels are longer than 11.5 hours.
- Feed with Nutrimac or Nutricards for increased reproduction, longevity and preying activity.



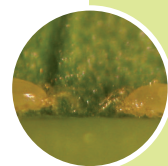
Phytoseiulus System - *Phytoseiulus persimilis*

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- To open the bottle, flip the lid up. The lid is designed to deliver 3-5 mites in every stroke.
- Apply manually by pointing the open bottle down to release; bring it upright to reload, and repeat at every release point or use a Makita blower with Nutri-App (speed 1-2 only).
- Release bulk material preventatively or curatively over the canopy of the plants or area you wish to treat (susceptible varieties, affected and surrounding plants).
- If plant canopies are not touching or connected, make sure to apply onto every plant.
- If carrier over foliage is undesirable, use bioboxes, hang them from the crop or pots and add the desired amount of product inside.



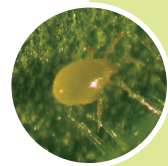
Swirskii Breeding System - *Amblyseius swirskii*

- Hang sachets by the hook at the desired height in the plant, out of direct sunlight and away from overhead irrigation or direct sprays.
- Sachets are water resistant, however water can still enter through the exit hole.
- Do not puncture the sachet or make the exit hole bigger.
- Contents of sachet will continue to breed for 4-6 weeks.
- To protect multiple plants, canopy needs to be touching. If plants are not touching, hang one sachet per plant.
- Feed A. *Swirskii* with Nutrimite™ for increased reproduction. (See Nutrimite™ instructions.)



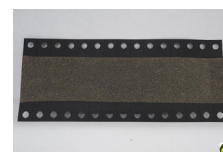
Swirskii System (loose) - *Amblyseius swirskii*

- Warm the tube to room temperature, keeping it in a horizontal position.
- Before applying, roll/rotate the container gently a few times, so that the mites are evenly dispersed within the carrier.
- Product comes in tubes and buckets, apply accordingly:
 - To open the cardboard tube, turn the dial and push through the plastic cutout.
 - To open the bucket, pull on the plastic strap to remove it and open the lid.
- Release bulk material preventatively or curatively over crop canopy of susceptible varieties and surrounding plants.
- Apply manually (sprinkling/broadcasting) or by using a Makita blower with Nutri-App (speed level 1-2 only)
- If plant canopies are not touching or connected, make sure to apply onto every plant.
- If carrier over foliage is undesirable, use bioboxes, hang them from the crop or pots and add the desired amount of product inside.
- Feed A. *Swirskii* with Nutrimite™ for increased reproduction. (See Nutrimite™ instructions.)



T. Brassicae System - *Trichogramma brassicae*

- Using scissors, cut cards on the perforated lines and use the built in hooks to hang from plants or from the rim of pots. Make sure pupae are facing towards the plant, out of direct sunlight and sprays.
- Timing is critical to ensure host eggs are available for parasitism.



Nematodes

Steinernema System - *Steinernema feltiae*

Carpocapsae System - *Steinernema carpocapsae*

- Mix nematodes in luke warm water (Do not shock the nematodes with a dramatic change in temperature. Let the nematodes warm up to room temperature before mixing with water.)
- Apply as a spray, drench or dip at the rates recommended by your Biobest advisor.
- UV sunlight kills nematodes: always apply at cloudy or low light level times of day.
- Maintain agitation to prevent nematodes from settling to the bottom of the tank.
- Use bubbler for maximum aeration and thorough suspension of nematodes in stock solution.
- Do not put through centrifugal pumps.
- Use filters wider than 50 mesh and nozzles larger 0.5 mm.
- Use a spray pressure lower than 60 psi.
- Soil temperature should be between 10° and 30°C (50° - 86°F) for nematodes to be active.
- Always use full packages.



Biopesticides and Biorationals

AsperelloT34 - *Trichoderma asperellum*

- Apply to prevent soilborne diseases in ornamentals and edible crops.
- Used as a dip for rooted and unrooted cuttings, drenched in the soil or incorporated in potting mix.
- Follow rates and directions on label and additional technical sheets.
- Availability and approved uses may vary per country/state. Consult with your Biobest advisor.



Bluestim®

Protects plants from stress caused by temperature (heat/frost), water (drought/flood) and salinity. It prevents calcium deficiency, reduces blossom end rot, cracking and tip burn in food, medical and ornamental crops. Bluestim® extends shelf life of berries and reduces sunburn.

- Apply Bluestim® as a spray mixed with water as indicated on the product label.
Repeat every 3-4 weeks.
- Availability and approved uses may vary per country/state. Consult with your Biobest advisor.



PMV-01

- PMV®-01 is part of a complete vaccination strategy. It includes a careful clean-out, leaf sample analysis before and after vaccination, and strict hygiene measures throughout the crop cycle.
- Make sure to maintain the spray solution between 4° - 15° C at all times during the application. Summer applications may require the addition of ice or icepacks to the spray tank.
- Read the product label and contact your Biobest advisor.



Scania Vital

- Apply the product on wounds caused by leaf pruning and other stem damage using the bottle applicator or a brush. This will form a physical barrier and encapsulate the wound.
- Spread the paste evenly in a thick layer over the wound extending above and below the affected area.
- Scania Vital® Silica has a red dye, to distinguish treated areas from plant wounds.
- Use the buckets with Scania Vital Dispenser to refill empty applicator bottles.



Food supplements: Nutrimite, Nutricards, Nutrimac

Nutrimite

- Apply over the crop canopy using a Makita blower and a Nutri-App attachment or BioBobby. (See information below.)
- Set the Makita blower to level 2 or 3 and calibrate your pace to apply the product evenly over the required area. (Cornstarch can be added to dilute product and ensure proper rate is applied.) Makita will cover up to 4 m wide at maximum speed.
- Nutrimite quality is optimal on the crop for up to 2 weeks.
- Store in a freezer until the expiry date.
- Apply biweekly at full rate or weekly at 1/2 rate in crops with rapid growth such as cucumbers, ornamentals or frequently overhead irrigated/sprayed crops.



Nutricards - *Ephestia kuehniella* eggs on cards - 100 cards per box

- Introduce the cards in and around the release points of beneficials.
- Fold the cards back and forth (2 - 3 times) on the vertical perforation.
- Hang on crop via the built in hook.
- Introduce weekly.
- Apply directly on crop or banker plants.
- Store unused cards for future use in the freezer.
- This food supplement supports Insidiosus-System (Orius), Chrysopa-System and Adalia-System.



Nutrimac - Bulk *Ephestia kuehniella* eggs

- Add to bioboxes or apply by gently tapping on flat leaves in and around release points of beneficials.
- Introduce weekly.
- Keep leftover product in the freezer for future use.
- This food supplement supports Insidiosus-System (Orius), Chrysopa-System and Adalia-System.



Application Equipment for Food Supplements

Nutri-App in combination with a Makita Blower

- Nutri-App is an applicator tool that can be attached to a Makita blower. (We recommend the Makita DUB182Z)
- Distribute Nutrimite™ quickly, easily and evenly throughout your crop.
- 500 gram Nutrimite™ bottle can be directly attached to the device. The bottle can be turned in different positions to ensure it is completely emptied and nothing is wasted.
- Nutri-App can also be used to disperse beneficials in loose material such as bran, vermiculite and sawdust.
- If using to disperse beneficials DO NOT exceed speed #2. This will kill or break the legs of the mites!



Traps and Lures and Monitoring Accesories

BugScan® Traps and Rolls

- For detection and mass trapping of pests.
- Use the color of the cards depending on the pest to trap:
 - Yellow:* is versatile and can trap multiple pests. Mainly used for whiteflies, fungus gnats, leaf-miners, aphid adults and thrips.
 - Blue:* tends to attract more thrips and shoreflies which makes counting easier if focusing on those pests.
- Fewer beneficials are attracted to blue vs. yellow.
- Count the pest insects on the traps and observe the rolls at least once a week to determine pest pressure.



BugScan® Traps

- Hang Traps either by using the integrated hook to affix to GH wires, or the perforated holes and the wire ties provided, or by inserting a stake through the perforated holes.
- Hang the card vertically at crop height (ornamentals) or 10 inches above the crop (vegetables) unless the pest requires the trap to be placed horizontally or at soil level.
- A grid on one side of the trap makes counting easier.
- For monitoring use Mini BugScan® (10 x 12.5 cm; 4" x 5") or BugScan® (10 x 25 cm; 4" x 10")
- For mass trapping use BugScan® (25 x 40 cm; 10" x 16")
- See installation video guide: [How to use BugScan on YouTube.com](#)



BugScan® Rolls

- There is a non-sticky section of approximately 1m in length at the beginning of the roll to make it easier to unwind.
- Using the clips and hooks (see below) hang the tape along the posts, near windows and doors to prevent harmful flying insects from entering.



BugScan® Roll Clips and Hooks

- Use clips with BugScan® Rolls for easy set-up.
- BugScan® Roll Clips can be used to attach rolls of up to 30 cm wide. Affix the clip directly onto the GH wires (vegetable greenhouses) or by using the zip ties provided.
- Metallic hooks can easily be set up on wires in vegetable greenhouses. They can hold rolls of up to 15 cm wide.
- Plastic hooks are widely used in ornamentals on posts, but can also be attached to wires in vegetable greenhouses.
- See installation video guide: [How to use clips for roller traps from Biobest on YouTube.com](#)



Droso Trap / Dros'Attract®

- To assemble traps see installation video guide: How to use Droso Trap from Biobest on YouTube.com
- Fill with 200 ml DROS' ATTRACT® + 1 sugar cube (4 - 5 gram) + a few droplets of dishsoap or detergent.
- Replace the attractant every 2 weeks or once it has been contaminated by *Drosophila suzukii* or other insects.

Recommendations for use:

- Detection: 1 - 2 Droso Traps® per 1000m²
- Perimeter trapping: 80 - 100 Droso Traps® per ha



Thriper

- Put on gloves before using this product to avoid altering the pheromones.
- Remove lure from container.
- Attach the lure (rubber bait) to BugScan® trap or roll. Insert lure through a hole on the trap or stick it directly to the glue of the trap or roll.
- Do not attach pheromone lures for multiple pests on the same trap.
- Keep unused lures for future use in the freezer.
- When used to increase insecticide contact with thrips, place lures 2 hours prior to the application.



Supporting products

Bio-Box

Helps beneficials stay in the crop instead of falling down during application. Prevents the carrier from attaching and/or decaying on crop foliage (ornamentals/cannabis). BioBox prevents beneficials and the carrier from becoming moist in cases where they need to stay dry for best performance. (Aphidius, Orius, etc...)

- Unfold cardboard box by applying pressure in the center of the box until the box adopts a cubic shape.
- Hang biobox on plant/pots or attach to support systems.
- Add the recommended amount of beneficials inside the box.



Pollination

Biobest Bumblebees™

- Open the cardboard lid and carefully remove the sealed plastic box (hive). Do not open the plastic hive lid. Do not place your fingers directly on the hive vents or push your thumbs down on the hive lid, to prevent stings and damage to the hive.
- Unscrew and remove the black cap of the sugar water container.
- Place the plastic hive back into cardboard box so that the hive makes good contact with the wick in the sugar container.
- Close the lid of the cardboard box.
- Place the hive in the appropriate location inside greenhouse.
- Turn the rotating door to the opened hive position.



4-Pak™

- Upon arrival, inspect 4-Pak™ for damage that may have occurred during transit.
- Place in the designated location of the field preferably on a skid to keep 4-Pak™ from standing water.
- Turn the rotating door to the open position.
- 24 hours after opening, check the Bee-Safe sticker on the front of the hive to see if bumblebees have exited the 4-Pak™. If not contact your Biobest advisor.
- For all other inquiries please refer to the instructions provided with your order or contact your Biobest advisor.



To open the hive, turn the bee lock to this position. The bees will chew through the sticker.



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



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



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

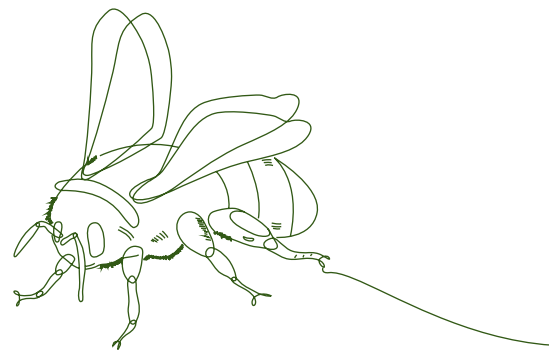
In case of a sting:

Most people have a local reaction if stung by a bumblebee, resulting in redness and itching in the vicinity of the sting. If stung where the skin is looser, such as eyelids, the swelling can be more pronounced. Local reactions normally disappear quickly but can sometimes last a couple of days.

In rare cases of an allergic reaction resulting in difficulty breathing, swelling of the throat and tongue, nausea, vomiting or diarrhea, dizziness or fainting, seek emergency help immediately.

For more information refer to our website:

<https://www.biobestgroup.com/en/news/been-stung-heres-what-to-do-next>



Notes

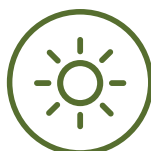
ICONGUIDE



CONDITIONS



Do not expose to sunlight



Place in the sun



Do not place in the rain



Protect from rain

STORAGE



Store at X °C/°F



Store between
X and Y °C/°F



Always store
horizontally

USE



Sprinkle on plant material



Sprinkle on substrate



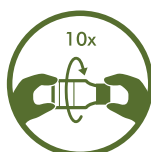
Spread in Bio-Box



Hang card in crop



Open pot and place
in crop



Gently turn bottle
10 times before use



Spread product on
soil/substrate

HIVES



Keep level. Do not place
hives on the ground



Wait for one hour
before opening



This side up



Evenly spread the
product in the tray



Caution! Stings



Check Biobest side
effect manual



Open ventilation system