

BOTANIGARD® ES

MYCOINSECTICIDE

EPA Establishment No: 65626 MT-02
EPA Registration No: 82074-1

CONTROL OF THE COFFEE BERRY BORER

ADDED VALUE

KEY FACTORS

Factors to be considered for the proper management and control of the Coffee Berry Borer.

1. Take data on flowering dates and timing to determine the application of BOTANIGARD® ES at 60 and 150 days after onset of flowering.
2. Having more than one borer per branch at the onset of the main harvest means higher populations in the crop.
3. Hot weather encourages the reproduction of the borer because its life cycle is shortened, producing more generations.
4. Perform measurements and monitoring of the pest at least every 10 to 15 days.
5. Harvest fallen beans immediately after the main harvest ends.
6. Harvest remains can disseminate the borer and these can contain up to 5 generations of the insect. You must manage these residues to prevent the explosion of the insect which will significantly impact and drastically reduce the crop harvest.

BOTANIGARD® ES is formulated with the GHA strain of the fungus *Beauveria bassiana*, which achieves high levels of efficiency against the coffee berry borer (*Hypothenemus hampei*). Minimum concentration of 2.2×10^{10} spores per mL, viability greater than 90% and mortality rates of above 90%, make BOTANIGARD® ES biological insecticide ideal for the control of the coffee berry borer in coffee cultivars.

BOTANIGARD® ES is produced in facilities that meet GMP standards and procedures. BOTANIGARD® ES complies with EPA standards.

ADVANTAGES OF BOTANIGARD® ES

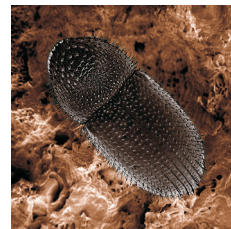
FORMULATION: Protects the active ingredient against adverse conditions such as, UV radiation, pH 2 to 13, water hardness below 150 ppm and other damaging substances. No additional coadjuvants are needed and ionic charge allows the active ingredient to reach the place of action by adhering to the plant surface and the insect's cuticle.

RESISTANCE: Ideal tool for managing insecticide resistance due to its complex mechanism of action, restricting the potential to generate resistance from the target insect.

SAFETY: Exempt from all residue tolerances. Worker safe with reduced restricted-entry intervals (REI). No pre-harvest interval and 4 hour REI, allows harvesting after spraying.

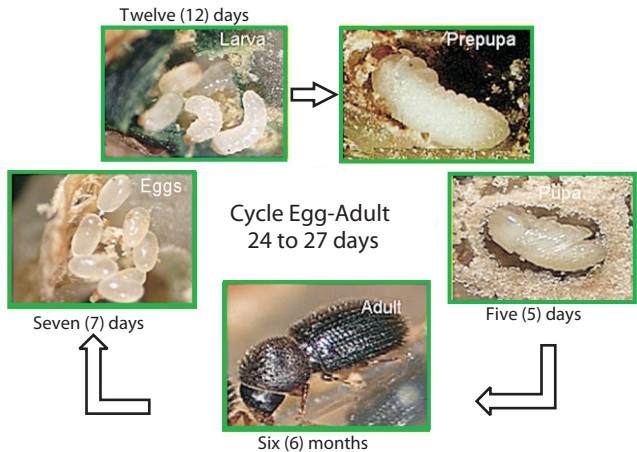
COMPATIBILITY: Can be tank mixed with most insecticides, herbicides and foliar fertilizers with acid reaction.

ENVIRONMENTALLY FRIENDLY: Affects only the target pests and is safe on non-target organisms (birds, fish, beneficial insects and mammals). Biodegradable, resulting in lower exposures and avoiding potential pollution problems.



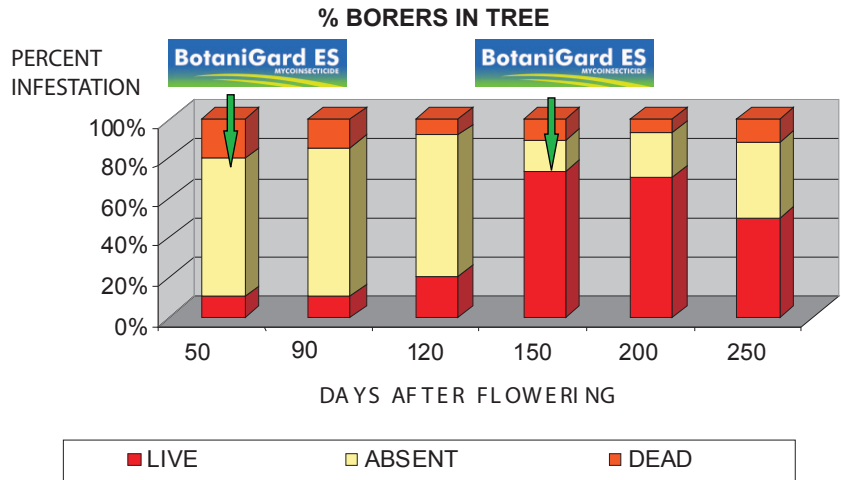
EFFECTIVE CONTROL

BOTANIGARD® ES is a fundamental tool for managing populations of the coffee berry borer. A basic knowledge of this insect pest's life cycle and a successful implementation approach is key to obtaining optimal results.



Coffee Berry Borer Activity

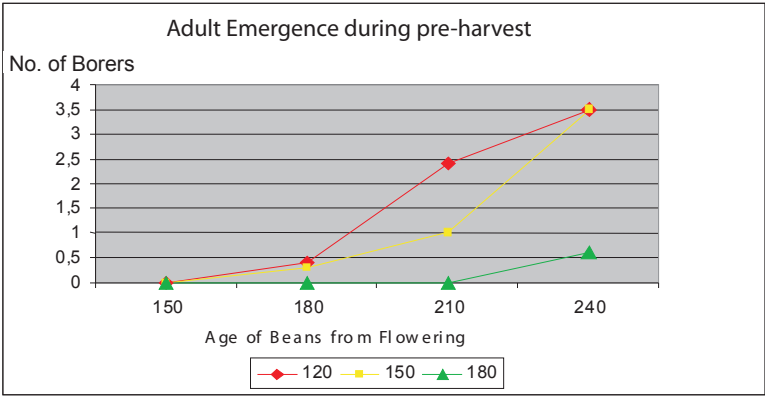
Dr. Peter Beaker showed that the Borer is most active in the tree from 150 days after flowering, which favors high reproduction at this stage of the bean. From the beans lying on the ground borer quickly emerge, which means high levels of borer ready to infest beans on the trees. For this reason it is important to make a thorough harvest and avoid as many fallen beans as possible.



INTEGRATED PEST MANAGEMENT

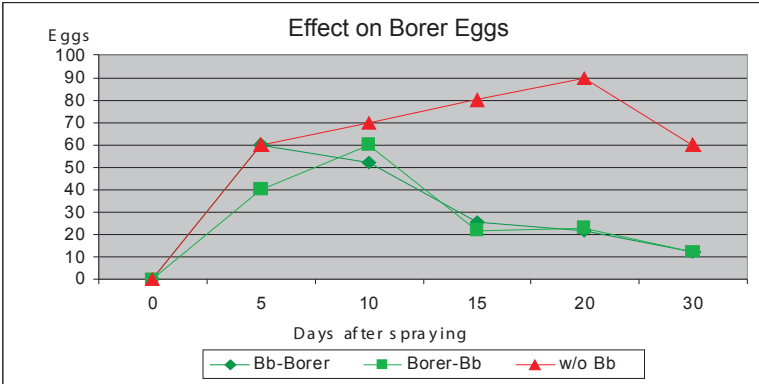
Emergence before harvest

To assess the dynamics of adult emergent borers before harvest, Peter Becker infested beans at 120, 150 and 180 days after flowering and found that 3.5 borers emerged daily from fruits at 120 days and 150 days of age. In the beans with 180 days, only a small fraction of the progeny escaped before the harvest. This tells us that for each infested bean at least 3 months before harvest, another bean will be infested at harvest time if no control measures are taken. This phenomenon is called re-infestation.



Effects of Beauveria bassiana GHA strain on the Coffe Berry Borer

BOTANIGARD® ES is used within the framework of an integrated pest management and exerts a regulatory effect on the population causing several physiological and physical disorders. Females that come in contact with the *Beauveria bassiana* spores have a 90% decrease in oviposition rate and a decrease in the production of larvae up to 60%.



STEPS TO FOLLOW

Rate: 3.5 - 7 fl. oz of BOTANIGARD ES per acre in 50 gallons of water. Apply the recommended rate with the appropriate water volume and calibrated equipment.

Preparation: In a bucket pour 1 quart of water, shake the bottle of BOTANIGARD® ES well and pour the amount of BOTANIGARD® ES required for spraying into the water. Stir the mix and add to the total volume of water required for spraying.

Application Timing and Location: Apply BOTANIGARD® ES at 60 days and 150 days after flowering. Make application to berries and the soil surface where berries fall.

Evaluation of control: To measure the effectiveness of the spray, assess the population before and 30 days after application. Evaluate 12 trees randomly per acre choosing a third of each tree also randomly. Evaluate a branch and take all the green damaged beans. Evaluate if there are borers present in the field by dissecting the bean. After examining 12 trees, determine the number of trees with presence of borers. Determine the number of trees with borers before application and after application.

For further questions, contact our technical support.



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