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Bacillus thuringiensis (Bt): Nature's Way to Control Caterpillars and Mosquitoes

What is Bacillus thuringiensis?

Bacillus thuringiensis (Bt) is a naturally occurring bacterium, commonly found in soils, that has the ability to infect and kill certain insects. Because of this property, Bt has been developed for insect control, using the bacteria as the active ingredient in some insecticides. Bt is a biological pathogen (or biological control agent) marketed as a microbial insecticide.

When consumed by susceptible insects, Bt acts like a stomach poison where proteins react with the cells of the gut lining causing paralysis to the digestive system. Infected insects stop causing damage, eating little to nothing before they die. Death often takes several days and ultimately the insect dies from starvation.

The most commonly used strain of Bt (kurstaki strain) will kill only leaf– and needle-feeding caterpillars, but there is another (israelensis strain, or Bti) used to control certain types of fly larvae, including black flies, fungus gnats and larvae of mosquitoes.

Advantages

- Compared to other commonly used insecticides, Bt products are nontoxic to people, pets, wildlife, and other organisms not closely related to the target pest.
- There are different strains of the bacterium and each strain is capable of affecting only a specific group or species of insects, such as caterpillars. Therefore most products do not directly affect beneficial insects (i.e. pollinators) in treated areas.
- Because of the high level of safety, most common Bt formulations can be used on food crops and do not require a lapse between application and harvest. Bt is also recommended for sensitive sites where pesticide use can cause adverse effects.

Disadvantages

- Sunlight causes Bt to degrade, and most formulations persist on treated foliage less than one week. This means that repeat applications may be necessary.

- To be effective, Bt must be eaten by the target insect and therefore application coverage must be thorough. Also, young insects are more susceptible, whereas older instars may not be as easily controlled.

- Bt does not kill rapidly (takes several days) which may cause users to assume that the treatment was ineffective.

- Bt products tend to have a shorter shelf life than other insecticides, having reduced effectiveness after two to three years of storage. Liquid formulations are more perishable than dry formulations but shelf life is greatest when storage conditions are cool, dry and out of direct sunlight.

Available Products*

For control of common leaf-feeding caterpillars (caterpillar pests of vegetables, European corn borer larvae in field corn, bagworms and tent caterpillars on trees and shrubs and other forest caterpillars) look for the following product names or any Bt product containing the *kurstaki* strain.

Dipel® **Javelin®** **Thuricide®**

Worm Attack® **Caterpillar Killer®** **Bactospeine®** **SOK-Bt®**

For control of mosquito larvae, black flies and fungus gnats look for the following products or any Bt product containing the *israelensis* strain.

Vectobac® **Mosquito Dunks®**

Gnatrol® **Bactimos®**

* The use of trade names is solely for the purpose of providing specific information. It is not a guarantee of warranty of the products names and does not signify they are approved to the exclusion of others of suitable comparison.