
IPMINFO

Integrated Pest Management for the Home Environment

BT FOR CATERPILLAR CONTROL

The bacterium Bacillus thuringiensis Berliner (Bt) is the active ingredient in a number of microbial Insecticides registered for home use on vegetables, trees, ornamentals and flowers for the control of certain caterpillars. Bt is highly selective--it kills caterpillars and is not toxic to their natural enemies. The bacterium is harmless to humans and animals and is considered environmentally safe.

Commercial formulations such as Dipel®, Thuricide® , Bug Time® and Caterpillar Control® contain Bt spores and crystalline endotoxin. When these are eaten by a susceptible caterpillar, the crystalline endotoxin is dissolved, releasing toxins inside its gut; gut paralysis follows, and the caterpillar stops feeding. Death usually results from toxemia, bacterial infection, starvation or predation and may follow in a few to 48 hours or longer.

Caterpillars most susceptible to Bt are those species with a high gut pH, such as tobacco hornworm, alfalfa caterpillars, cabbage looper, imported cabbage worm, and red-humped caterpillar. Spruce budworm and gypsy moth are susceptible, but higher concentrations of Bt may be needed for control. Armyworms and cutworms are usually not affected. In general, as with chemical pesticides, the younger and smaller caterpillars are most susceptible.

Different strains of Bt are effective against different insect species. The kurstaki variety is most effective against larvae of butterflies and moths. The israelensis variety (Bti) is highly toxic to the larvae of blackflies and mosquitoes, and Bt galleriae kills the larvae of wax moths that infest beehives.

Certain factors should be considered when using Bt to achieve maximum success. 1) Highly alkaline water or pesticides (pH 8-11) should not be mixed with Bt because the efficacy will be greatly reduced (Note: Most California water has a pH of 7 to 8). 2) Freezing or excessive heat (110°F) during storage should be avoided. 3) Bt should be applied against small caterpillars and before plants are extensively damaged. 4) Thorough coverage of foliage is important. 5) Reapplication of Bt in 3 to 14 days is often necessary in order to kill any newly hatched larvae and cover recently emerged foliage.

The qualities of Bacillus thuringiensis make it an attractive choice for home use. It can be applied by hand sprayer, hose-end sprayer, commercial spray rig, or other conventional means. There is no hazard to the applicator, so protective gear is not required. Wettable powder or aqueous concentrate formulations are compatible with most insecticides, fungicides, and nutritional sprays. The bacterium can be used up to the day of harvest since residues are not harmful to humans or animals. Beneficial organisms such as honeybees, insect predators and parasites are generally unaffected, preserving the complexity of the environment.

Bibliography

Dubois, N.R. and F.B. Lewis. 1981. What is Bacillus thuringiensis.
J. of Aboriculture, Vol. 7, No. 9, pp. 233-240.

Berg, G. L., editor. 1981. Farm Chemicals Handbook. Meister Publishing Co., Willoughby, OH.

NOTE

To simplify information, trade names of products have been used. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.