

Bacillus thuringiensis var. *kurstaki* FAQ

Vermont Department of Forests, Parks and Recreation



VTFPR is providing technical support to help sugarbush owners and other landowners weigh management alternatives that can prevent anticipated defoliation in 2018 or minimize its impact. One option is aerial application of a biological insecticide containing the active ingredient *Bacillus thuringiensis* var. *kurstaki* (*Btk*). Goals include maximizing efficacy and minimizing adverse environmental and human impacts based on site-specific tree health, insect population assessments, and management objectives. The *Btk* product, Foray 48b, is listed for use in certified organic food products.

What is *Btk*?

Bacillus thuringiensis var. *kurstaki* (*Btk*) is a spore-forming bacterium that produces crystal proteins that are toxic to species of moth and butterfly caterpillars when ingested.

What does “listed for certified organic products” mean?

Foray 48B is listed in the Organic Materials Review Institute (OMRI) directory of products for organic production or processing under the U.S. National Organic Program Standards. OMRI is recognized by the USDA National Organic Program as a 3rd party reviewer, and OMRI lists are recognized by the Vermont Organic Farmers and other grower organizations.

How does *Btk* kill insects?

Btk needs to be swallowed by caterpillars to be effective. Once consumed, the *Btk* toxin dissolves in the high pH insect gut and becomes active. The toxin binds to specific receptors in the gut, causing the gut wall to break down, and enabling spores and normal gut bacteria to enter the body. The insect stops eating and dies within a couple of days.

Do humans need to take care not to be exposed to *Btk*?

As one of the first biological insecticides in the United States, *Btk*'s active and inert ingredients have been subjected to substantial testing. No serious human health risks have been associated with *Btk*. Eating or breathing the material does not adversely affect humans; our bodies don't have the right chemistry to activate the toxin. However, like dust, pollen or other particles, it may cause irritation in some persons with allergies if there is direct eye or skin contact. Though research indicates that *Btk* does not pose human health risks, treatment plans include minimizing exposure to people by keeping them off-site during an application and for 4 hours afterwards.

How long does *Btk* remain active?

The level of *Btk* in air decreases to very low levels within 30 to 90 minutes after an aerial application. Sunlight and other microbes destroy *Btk* applied to foliage within 7-14 days. *Btk* does not multiply or accumulate on foliage after it is applied. *Btk* products do contain inert ingredients, including stickers and binders, that allow the spray to remain on vegetation.

How does *Btk* affect organisms other than FTC?

Btk has insecticidal activity only against caterpillars of moths and butterflies, and will directly affect caterpillars feeding on treated foliage at the time of application or shortly thereafter. It does not release its toxic crystals when eaten by other animals, nor are the crystals released in soil or in water. As a precaution, however, FPR has sites checked by the Vermont Fish and Wildlife Department Natural Heritage Program.

Are numbers of FTC predators and parasitoids reduced by *Btk* treatments?

Natural enemies walking on treated foliage are not directly affected, and *Btk* spores do not spread to other insects or cause disease outbreaks. The effects of *Btk* on FTC predators and parasitoids are indirect, through the reduction of the caterpillars they feed on. Since surrounding forests would maintain sugar maples and forest tent caterpillars, it is likely that predator and parasitoid reductions will be temporary.

Will birds and mammals that eat FTC be affected by *Btk*?

Caterpillars that become ill or die after ingesting *Btk* are not considered dangerous to birds or other animals that feed on them. There may be indirect adverse effects on the food supply of birds and other animals. Some animals may expand their foraging territories or adjust their foraging habits temporarily.

Where can I get more information?

For more information about Foray48B or *Btk*, contact the National Pesticide Information Center at 1-800-858-7378 or <http://npic.orst.edu/>. For more information about forest tent caterpillar, visit the VT Dept of Forests, Parks and Recreation website http://fpr.vermont.gov/forest/forest_health, or contact one of the VT FPR district offices listed below.

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