# Kansas State University Extension Entomology Newsletter

For Agribusinesses, Applicators, Consultants, Extension Personnel & Homeowners



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**March 29, 2024, No. 2**


**News Corner**

- Army Cutworm Activity in Western Kansas

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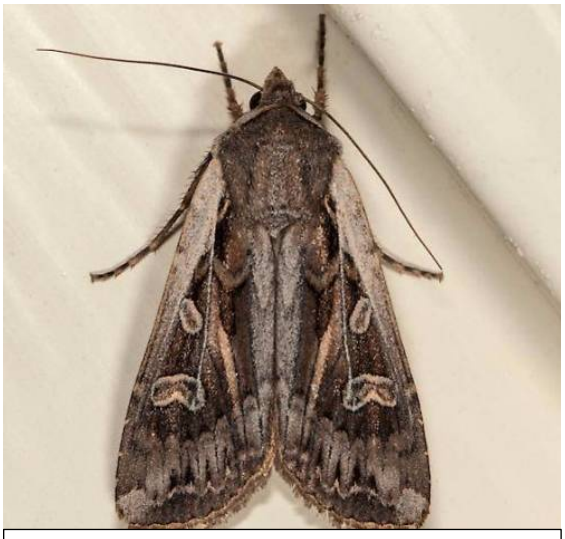
- *Bacillus thuringiensis*

# NEWS CORNER

## Army Cutworm Activity in Western Kansas

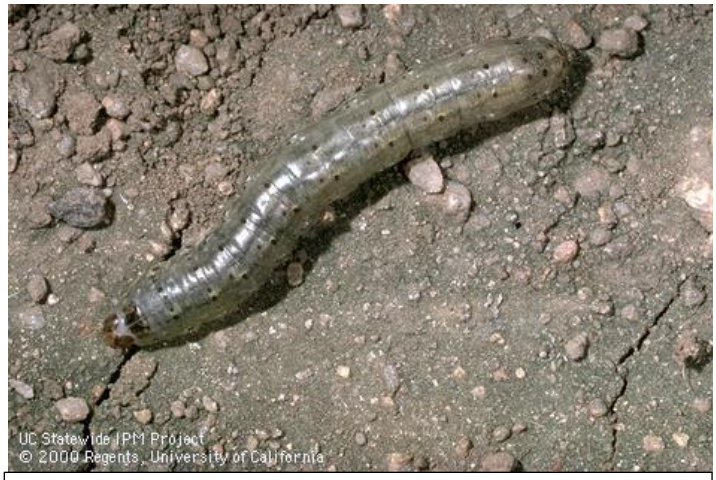
The army cutworm, also known as the miller moth, is a late fall and early spring pest of several Kansas crops, including wheat. These moths begin migrating into Kansas and neighboring states in the fall from their over-summering locations in the Rocky Mountains. Females lay eggs on the soil surface of freshly cultivated, weedy or newly seeded fields with each laying up to 1000 eggs or more. After hatching, caterpillars will begin feeding, causing classic windowpane damage to leaves, and do so until cold weather forces them below ground. Be aware that it is possible for caterpillars to resume feeding on warmer winter days and mild winters can result in feeding resuming earlier in the spring.



Adult army cutworm, aka miller moth (KSU Entomology Photo)

High numbers of army cutworm moths were trapped in western Kansas in the fall of 2023 as part of the monitoring efforts of the

Kansas Insect Trapping Network. Moths began arriving the first week of October and were active until the first week of November. Trap counts of the moths were particularly high in southwestern Kansas, with almost 2000 moths caught in the month of October at one location. Generally, trap counts of 800 or more moths in an area through October may indicate significant caterpillar activity the following spring and, in fact, caterpillar activity has been noticeable in wheat fields in several areas of western Kansas so far in 2024 with reports of fields reaching treatable levels in the last two weeks.




Army cutworm caterpillar

Windowpane damage caused by young army cutworm caterpillar (KSU Entomology Photo)

It is recommended that scouting for this pest should be underway in wheat fields of the region. Thin stands or fields under stressful conditions may suffer economic damage with only 1-2 caterpillars per square foot. Typically, treatment will not be necessary until populations average 4-5 per square foot and well-tillered fields under good growing conditions can tolerate up to 10 per square foot without measurable yield loss. If treatment is warranted, there are various products available, but understand that all these products will negatively impact the beneficial insects that are common in Kansas wheat fields in the springtime. Thorough scouting is critical to ensure that treatments are justified.

More information regarding this pest and treatment options can be found in the KSRE Wheat Insect Management Guide.

http://www.bookstore.ksre.ksu.edu/pubs/mf745.pdf

**Will 2024 bring another record miller moth flight?**

In late spring, as caterpillars finish developing, moths will emerge and begin their migration to the Rocky Mountains. Moths present at this time pose no risk to crops as they are not sexually mature and cannot lay eggs. At this point in the season, they are simply a nuisance. In the spring of 2023, record numbers of miller moths plagued many areas of western Kansas, getting trapped in homes and outbuildings, clogging up ventilation and even home furnaces. This record flight of miller moths was likely due to the high number of moths that showed up in fall of 2022 which deposited large numbers of eggs in the region. Given the number of moths trapped last fall, it is possible that we may see another large miller moth flight this spring in western Kansas.

Kansas Insect Newsletter

**March 29, 2024, No. 2**

Anthony Zukoff—Southwest Research and Extension Center – Garden City, KS

HOME

# LEARNING CORNER

## *Bacillus thuringiensis*

*Bacillus thuringiensis* (*Bt*) is a soil borne bacterium that can be used as an insecticide to manage certain insect pest populations in gardens and landscapes. The common *Bt* strain used to manage caterpillar insect pest populations is *Bacillus thuringiensis* subsp. *kurstaki* (*Btk*). *Bacillus thuringiensis* subsp. *kurstaki* is a stomach poison, which means the active ingredient must be consumed or ingested in order to kill caterpillars feeding on plant leaves. Products containing *Btk* as the active ingredient (Figures 1 through 3) may be used against various caterpillar pests including: bagworm, eastern tent caterpillar, fall webworm, imported cabbageworm, cabbage looper, and cross striped cabbageworm.

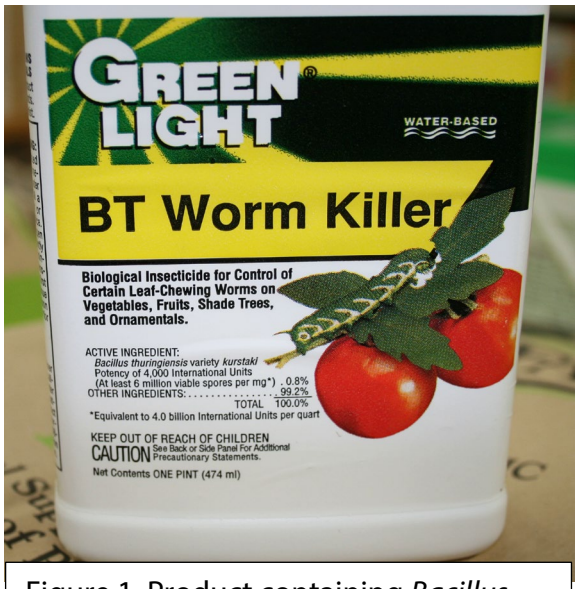



Figure 1. Product containing *Bacillus thuringiensis* subsp. *kurstaki* (Raymond Cloyd)

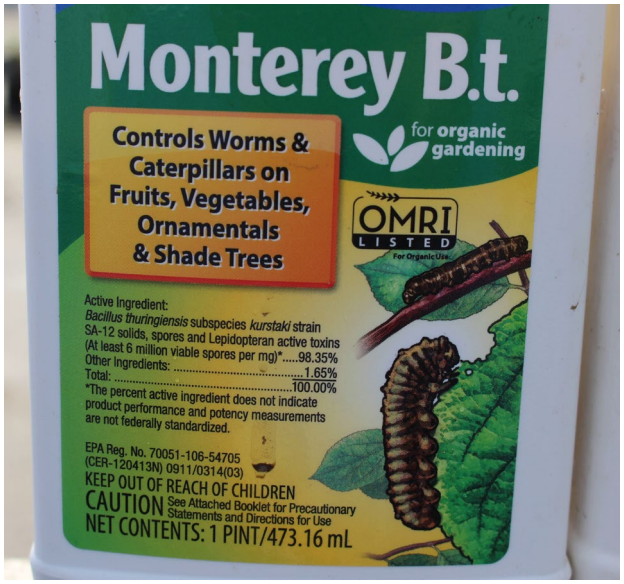



Figure 2. Product containing *Bacillus thuringiensis* subsp. *kurstaki* (Raymond Cloyd)

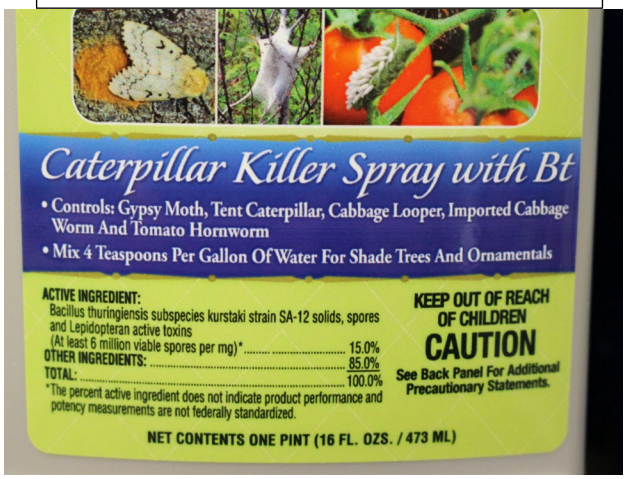



Figure 3. Product containing *Bacillus thuringiensis* subsp. *kurstaki* (Raymond Cloyd)

Thorough coverage of all plant parts (e.g. leaves, stems, flowers, and fruit) is important when applying *Btk* products to ensure that caterpillars consume the bacteria. After the bacteria is consumed, the bacteria produces an endotoxin crystal that binds to the gut membrane and creates pores resulting in leakage and swelling. Swelling continues until cells rupture, which causes the gut contents to leak into the hemolymph (blood) of the caterpillar. Hence, the blood pH is disrupted resulting in paralysis and death in 24 to 72 hours.

The following characteristics of *Btk* products need to be understood to maximize effectiveness in managing caterpillar populations below plant damaging levels.

1. **Selectivity**. Compared to conventional insecticides, *Btk* products do not have broad spectrum activity. Therefore, *Btk* products have minimal effect on non-target organisms, including pollinators and beneficial insects. As a result, there are no issues associated with secondary pest outbreak and/or target pest resurgence, which can occur with the use of broad spectrum insecticides. *Btk* products have no activity on mites or sucking insects, such as, aphids, lace bugs, leafhoppers, mealybugs, soft scales, or whiteflies. Alternative insecticides must be applied if sucking insects are the primary pest.
2. **Timing of application**. *Btk* products must be applied when young caterpillars are present. Young caterpillars, due to their small size, do not have to consume much plant material (e.g. leaves) for the bacteria to kill them. Caterpillars are also killed before they can cause plant damage. If *Btk* products are applied too late, caterpillars must consume more plant material containing the bacteria, which will result in taking longer to kill them. Consequently, caterpillars can cause plant damage before succumbing to the bacteria. Furthermore, caterpillars that do not consume enough bacteria and survive may pupate and then become adults, resulting in a new generation of caterpillars produced during the growing season. Hence, products containing *Btk* can be used to manage caterpillar populations below plant damaging levels, but the products must be applied early in the growing season when caterpillars are small.
3. **Residual activity**. *Btk* products have short residual activity because they are easily degraded when exposed to ultraviolet light and rainfall. Therefore, repeat applications will be required during the growing season to keep caterpillar populations below plant damaging levels.
4. **Speed of activity**. Because *Btk* products are stomach poisons they take longer to manage caterpillar populations than conventional insecticides. Hence, *Btk* products must be applied before caterpillar populations reach plant damaging levels.
5. **Safety.** The mode of action of *Btk* products is specific for caterpillars. Consequently, there are no harmful effects to mammals or humans.

6. **Storage life**. *Btk* products must be stored at temperatures between 50 and 60 degrees Fahrenheit to prolong their shelf life. *Btk* products must not be exposed to extreme hot (>90 degrees Fahrenheit) or cold (<32 degrees Fahrenheit) temperatures, which can negatively affect the survival of the bacteria.
7. **Water quality**. A water pH above 8 (basic or alkaline) can result in alkaline hydrolysis, which is a degradation process that will decrease the effectiveness of the *Btk* endotoxin in killing caterpillars. Hence, the water solution pH must be adjusted below 7.

Raymond Cloyd – Horticultural Entomology

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**Kansas State University Agricultural Experiment Station and Cooperative Extension Service**

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