

Eurasian Hemp Borer

The **Eurasian hemp borer** (*Grapholita delineana*) is the caterpillar (larval) stage of a small moth that tunnels into stems and buds of *Cannabis*. (It is also known as the Eurasian hemp moth and hemp borer.) This species is presently known only to occur east of the Rocky Mountains, and is widespread in eastern Colorado.

Most of the observed damage by this insect occurs when the caterpillars (larvae) tunnel into the base of developing buds, girdling the stem at the base of the bud, which then wilts and dies. Larval tunneling may also cause some stunting and distortion of stems and stalks, perhaps with some effect on yield. Damage to developing seed has also been reported.

The Eurasian hemp borer has potential to be a significant insect pest of this crop in eastern Colorado, particularly of crops grown for pharmaceutical purposes (e.g., CBD) and seed. It also will likely become more commonly encountered in the crop as hemp cultivation continues and expands.

Life History and Habits. The caterpillars are quite small, reaching a maximum size of about 6-8 mm. Early stage caterpillars are cream colored with a dark head. Last stage caterpillars have a reddish-orange coloration. The last stage larvae are much more commonly noticed than younger larvae that blend in color with the pith of the plant. Often they are noticed during harvest or when they get dislodged from plants during drying.

The stage that survives through winter is the full-grown caterpillar, often in small diameter stems near the top of the plant. They may also survive winter within a folds of leaves around seed heads. The caterpillar remains dormant through winter, transforming to the transition pupal form in spring. Pupation also usually occurs within the plant.



Eurasian hemp borer larva in stem at the base of a bud



Last stage Eurasian hemp borer larva with reddish-orange coloration.



Leaf wilting and dieback of terminal growth can occur from stem tunneling of Eurasian hemp borer larvae.

Adults later emerge in mid spring and begin the first of two, probably three, generations that are completed during the course of the growing season. After mating, the female moths can lay a few hundred eggs over the course of a couple weeks. When eggs hatch, the minute, first stage caterpillars feed for a few days on the leaf surface. As the caterpillars get a bit older and larger they then bore into the stems of the plant. From that point the remainder of their life will occur within the plant, as a stem/stalk borer, until they reach the adult form that begins a new generation.

Adults that develop from the eggs laid during spring produce a second generation that results in caterpillars (larvae) present in plants during midsummer. It is likely that a third generation occurs, with adults present through late summer. These late season moths lay eggs that result in the caterpillars that do the most injury to plants. These last generation caterpillars then go dormant, resuming development the following spring.

In addition to *Cannabis*, Eurasian hemp borer is also reported to develop in hops and knotweed (*Polygonum*). Wild host plants appear to be important in sustaining populations of this insect in eastern Colorado that later infest hemp. These alternate wild plant hosts used by Eurasian hemp borer presently are unknown but perhaps include various weeds in the family Polygonaceae (smartweeds, knotweeds) with stems large enough to support this insect.

Other Hemp-infesting Caterpillars with Similar Injury Patterns

The **European corn borer** (*Ostrinia nubilalis*) is another stalk boring caterpillar. The caterpillars are light brown or cream colored, never reddish-orange. They also get much larger than the Eurasian hemp borer (ca. 20 mm). European corn borer develops in the stalk and larger diameter stems and would rarely be associated with the area around developing buds and seeds. European corn borer is found in many areas of North America east of the Rocky Mountains, but in Colorado is rarely found outside the northeastern counties.

Corn earworm (*Helicoverpa zea*) is an insect that will tunnel into the buds and developing seeds of hemp and during outbreaks has caused serious damage to CBD cultivars of hemp grown in eastern Colorado. It can be a fairly large caterpillar, reaching about an inch (25 mm) when full-grown, and is highly variable in color with green and mottled black forms usually predominating.

Corn earworm does not develop within the stems but feeds at the base of the developing buds, gouging the base of the bud which then dies. An individual caterpillar may move through a plant and damage several buds during the last week of its life when it nears full-growth and causes most injury. Corn earworm is an insect found throughout North America and is a serious pest of many crops, including corn, tomatoes, peppers, and cotton. More information on this insect and its management can be found elsewhere in the Hemp Insect Website.



Adult of the Eurasian hemp borer.

The specific plants capable of being hosts of this insect in eastern Colorado are presently unknown but it is suggested that fields with knotweed or smartweed nearby be examined for the presence of larvae and tunneling. If any are found hosting this insect, these weeds should be destroyed in a way to kill the insect in the stem, before adult moths emerge in spring.

Since some larvae may become dislodged and survive in drying shed, crops should not be located near (within a 1/2 mile) of these buildings.

The use of insecticides is problematic for this situation for at least two reasons. One is that the larvae are present for only a brief period on the outside of the plant where they would be exposed. This occurs during the first few days, probably a week at most, after eggs hatch when the very young caterpillars feed on the leaves. After this point they tunnel into the plant and are inaccessible to treatment.

Insecticide options are very limited for hemp and only consist of insecticides that are considered to be allowable by the state Department of Agriculture. (Presently, issues involving

Thoughts on Management

Since Eurasian hemp borer survives winter as a larva within stems, removal of all crop debris (stems, stalks) should largely eliminate overwintering populations. This normally occurs when plants are cut at the base and removed from the fields for processing. Mechanical harvesting that leaves some residue may allow some survival, although stem crushing during harvest would likely kill most larvae.

Wild weed hosts also appear capable of supporting Eurasian hemp borer. The

pesticide use on hemp are handled individually by states, or not at all.) In Colorado, the [list of allowable pesticides](#) includes several formulations of *Bacillus thuringiensis* var. *kurstaki* (Deliver, Dipel, Javelin, Thuricide, etc.) that could kill young larvae feeding on the *exterior* of the plant.

Eurasian hemp borer is a weak flier and initially infests field edges so these areas should be targeted. Presently the best way to tell when adults are present and laying eggs is to observe the presence of the moths, either visually while walking the field or in a sweep net. At this time, there are no pheromone traps that will capture this insect.

Lepidoptera: Tortricidae



Buds killed by tunneling injuries of Eurasian hemp borer larvae



Adult Eurasian hemp borers on a sweep net



Pupa of Eurasian hemp borer