

Corn Earworm

*The insect that has shown the most potential to damage hemp in Colorado is the **corn earworm** (*Helicoverpa zea*). This is one of the most widespread and commonly damaging insects in much of the United States, affecting both field crops and vegetable crops. Evidence of its importance is indicated by it having three accepted common names: **corn earworm** (when in corn), **tomato fruitworm** (when feeding on fruits of peppers, tomatoes, etc.), and **bollworm** (when feeding on cotton bolls).*

In hemp the primary damage occurs when they tunnel into buds and developing seeds. Damage to hemp by corn earworm has potential to cause significant damage, particularly to crops grown for production of large buds to extract CBD or other pharmaceutical compounds. Potential damage to fiber or seed producing cultivars is likely to be minimal. Populations of this insect vary greatly from season to season in Colorado. This insect will usually move into hemp in late summer with peak injury occurring after plants begin to flower during late August and September.

Life History and Habits. Parts of southern Colorado include areas of the northern range of where corn earworm has historically been able to survive through winter (as a pupa in the soil). However, mild winters will allow this insect to survive further north. Furthermore, adults of the corn earworm are strong flying moths and disperse long distances; many of the corn earworms that occur in fields in Colorado may well have migrated many hundreds of miles. The adult moths fly at dusk and evening, although a few are sometimes active on overcast days. On other plants the moths lay most eggs on leaves or, in corn, on green silk. On hemp, eggs are likely laid on the outer areas of the plant, particularly on younger leaves, such as those surrounding the flower buds and developing seed.



Corn earworm feeding in the top of a hemp plant



Bud damaged by corn earworm



Adult of the corn earworm



Close-up of a corn earworm egg.

Photograph courtesy of John Ruberson, Kansas State University and Bugwood.org



Larvae of corn earworm collected from hemp

Corn earworm moths lay their eggs singly (not in masses) which results in infestations being scattered through the crop. A female corn earworm may lay about 30 eggs each evening over the course of her lifetime, which typically lasts for about two weeks.

Eggs hatch 2-3 days after being laid and the larvae begin to feed, usually concentrating on flowers and reproductive parts of the plant. The newly hatched caterpillars are minute, only about 2mm or so in length, but they develop quickly and are full-grown (about 25mm) in two to three weeks after eggs hatch, depending on temperature. Color of the caterpillars can be highly variable and can range from pale brown to nearly black, occur in various shades of green, or even may have reddish coloration. Most damage is done by the late stage caterpillars which are present 10-14 days after egg hatch and feed for a week or two before being full-grown. Often there will be granular-form fecal pellets (frass) left around the feeding site that can be used for diagnosing injury.

The full-grown caterpillars will drop to the ground, enter the soil and create a small earthen cell a few inches below ground where they transform to the pupal stage. During the growing season, the adult will emerge about two weeks later and produce a new generation. Corn earworms that develop late in the season will produce a pupal stage that remains dormant until the following season. In areas and seasons where there is deep freezing of the soil these pupae are often killed. Warmer areas, or seasons that follow very mild winters, are likely to have high survival of pupae through winter.

Damage and Management. Damage to hemp by corn earworm has potential to cause significant damage, particularly to crops grown for production of large buds to extract CBD or other pharmaceutical compounds. The caterpillars burrow into the buds and cut stems, causing

wilting and death of tissues beyond the cut area. Late stage caterpillars can feed extensively and may damage multiple buds. Outbreaks are episodic, but some areas in the Arkansas Valley saw significant injury in 2016 and again in 2018. Potential damage to fiber or seed producing cultivars is likely to be much less than to CBD cultivars that produce large buds of unfertilized flowers.

A Proposed Management Plan for Corn Earworm in Hemp is located elsewhere in this website (see "Recommendations" button). The proposed management plan suggests regularly monitoring flights of the adult corn earworm after flowering and to consider treating fields with allowable formulations of insecticides when trap captures indicate high moth numbers, which are associated with egg laying.

Hemp Insects of Similar Habits. A caterpillar of similar size that resembles corn earworm is the beet armyworm (*Spodoptera exigua*). Beet armyworm appears to limit most feeding to leaves and does not have the destructive habit of tunneling buds that the corn earworm does. Beet armyworm caterpillars are always green, and can be confused with green forms of corn earworm. Beet armyworm is an insect that is more abundant in southern, warmer areas of the country, but it can stray into Colorado in significant numbers in some seasons.

Another insect that destroys buds is Eurasian hemp borer (*Grapholita delineana*). This is a much smaller insect than corn earworm and develops by tunneling into stems. Stem tunneling beneath buds cause death of the bud in a manner that superficially resembles injury done by corn earworm. The injury can be distinguished by looking at the base of the wilted/damaged area. Eurasian hemp borer will produce tunnels within the stem below the bud; corn earworm comes in from the side of the stem and cuts it.

Lepidoptera: Noctuidae



Late stage corn earworm caterpillars showing a range of coloration.



A large number of corn earworm moths caught in a light trap during 3 nights in mid-September, 2018, Rocky Ford, CO.



Pellets of corn earworm excrement (frass) near area of earlier feeding injury.



A Heliothis-style pheromone trap used to monitor flights of corn earworm moths as a means to predict egg laying peaks.



Pupa of a corn earworm. This stage would occur in the soil at the base of previously infested plants. Several other "cutworm family" moths produce pupae of similar appearance.