

A Look at Common Hemp Insect Pests and Disease in CT

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The purpose of this document is to provide hemp growers with information on identifying male and female cannabis plant, and insect pests and diseases of hemp found in hemp fields in CT to help growers with roguing and proper pest management to improve the yield and quality of the produce. For CBD hemp growers, identifying and removing male plants at early stage of flowering (before pollination) is critical. Female plants are ideal for CBD production as the inflorescences of female plant has significantly greater CBD content than male plants. Pollination and seed set drastically reduces CBD content. Proper pest management is important to maximize yield and quality of the produce.

Many of the chemicals traditionally used for weed, insect, and disease control with other crops remain to be evaluated and approved for use with hemp. However, Connecticut Department of Energy and Environmental Protection (DEEP) offers a guidance for the selection of pesticides in the cultivation/production of hemp in the state of Connecticut. DEEP has also compiled a list of pesticides that may be used on sites where hemp is grown. Go to [CT DEEP Website](#) to see the guidance and the list of pesticides. Go to [UConn Cannabis Webpage](#) for resources available for at UConn.

UConn Extension partnered with USDA NRCS, the Connecticut Resource Conservation and Development, Department of Agriculture, and Connecticut Hemp Industry Association to organize the 2021 Connecticut Hemp webinar series from January to May of 2021 (total of six webinars). The goal of the conference was to bring together hemp producers, agricultural suppliers, and regulatory agencies interested in the hemp industry. The conference covered hemp growing from seed to harvest outdoor and indoor, basics of hemp processing, hemp regulations, and insect pest and disease management. The recordings are available on [CT RC&D website](#).

Identification of male and female plants

Most cultivars currently grown in field are photoperiod sensitive. As daylength gets shorter than 14 hours (starting second week of August), you will start to see hemp flower, even in full sunlight field conditions. Where the plants are not exposed to full sunlight conditions, you may expect to see flowers earlier than that. You will need to be vigilant in identifying male flowers and remove any male plants before pollination occurs. [This video](#) shows how to identify male and female flowers.



A male hemp plant (Photo: S. Ghimire)



A female hemp plant (Sean Flynn/UConn Photo)

Insect pests

European corn borer (ECB): ECB is a resident pest that has 2 generations per year in Connecticut. ECB has an incredible appetite and is one of the most wide-ranging and destructive pests that can impact a hemp and many other crops including corn, pepper, potato, chrysanthemum, dahlia, and several other ornamentals. ECBs can bore into and infest any plant with a large enough stalk. For this reason, you should be extra careful with this pest when planting a field of hemp next to a corn crop.

ECB can be monitored using pheromone-baited Scentry Heliiothis net traps. A first flight of adult moths starts in late May or early June. A second flight begins in mid-July to mid-August, depending on location and the seasonal growing degree day accumulation. Place two traps at least 50 feet apart along the edge of your field, with the bottom of the trap above the top of grassy weeds, no higher than 4 inches above the vegetation. Avoid placing them over bare ground. Because there are two strains of ECB found in Connecticut (New York strain and Iowa strain), bait one trap with a lure for each. Be sure to check the traps once per week, and replace lures every other week. There is no established threshold, but once you start trapping any moths, you should carefully scout the plants to see any egg masses or larvae.

Scouting your crop once a week is a good idea to monitor pest populations. The ECB can easily be managed in their egg and larval stages, but once the caterpillars enter the stem, they are more difficult to deal with. To scout your hemp, examine the top and bottom of the leaves, on

low and high portions of the plant stems. I suggest you should scout 15 plants at 5 stops (3 plants at each stop) in a field. You can walk the field in W direction.

Bacillus thuringiensis aizawai (XenTari) or Bt kurstaki (Dipel) are effective if applied when the larvae are small. See more options for pesticides on [DEEP website](#).



ECB: Adult female moth (*left*), egg mass (*middle*) and first instar larvae (photos: Jim Kalisch, University of Nebraska Lincoln)

European corn borer larva and a hole bored by it. Also note the frass at the bottom right photo (S. Ghimire)



Corn earworm (CEW): CEW can be the most damaging pest of hemp grown in outdoor environments as it targets the marketable portions of hemp plants, i.e. floral regions of CBD hemp. Corn earworm is a chewing pest that feeds on a variety of economically important crops. Hemp is attractive to this insect and is a late season source of sustenance after most other crops have been harvested. Even though we have yet to establish economic thresholds and injury levels for corn earworm in hemp, this insect has caused economic loss for hemp growers.

Corn earworm feeding and injury to hemp plants has most frequently been associated with elevated occurrences of bud rot on floral portions of CBD hemp.

CEW moths migrate annually into the Northeast, traveling north on storm fronts, and may arrive anytime from late June through September. Heaviest numbers are found in coastal areas



and up the major river valleys. The severity of infestations varies from year to year and may change suddenly during the season. While CEW feeds in a wide range of crops and among vegetables, its favorite crops are corn and tomato (hence it is also known as tomato fruitworm).

Like ECB, CEW can be monitored using pheromone traps. Sprays used for ECB (*Bacillus thuringiensis*) are also effective to this pest if applied when the larvae are small. Another option for spray rotation is [Gemstar LC](#), which is a baculovirus insecticide that contains a naturally occurring virus that infects and kills larvae of the CEW. With this very host-specific virus, beneficial insects, fish, wildlife, livestock, and humans are left untouched while pest species are devastated. See more options for pesticides on DEEP website.

CEW larva feeding on hemp flowers. (photo: S. Ghimire)

Aphids: aphid is a piercing-sucking insect that can reproduce asexually, so populations can rapidly increase in favorable environments. Aphid excretes excessive amounts of honeydew (sticky, sugary waste) which creates sticky surfaces on plants. As aphids grow and molt (shed skin to grow), their shed skins can get caught in the sticky honeydew that remains on plant surfaces; this is undesirable for consumers of raw plant material. Honeydew is also an excellent substrate for sooty mold growth. The honeydew and sooty mold both present contamination issues in the raw plant material and mechanical issues d



Aphid on hemp leaf (photo: S. Ghimire)

Aphid is less of a concern in outdoors due to the presence of natural enemies and environmental conditions such as rain events. Predators, such as lady beetles, help manage aphid populations naturally. Additionally, sufficient rainfall or dew aids in the removal of sticky honeydew from plant surfaces and helps prevent sooty mold problems. However, aphid outbreaks can occur and may require short-term mitigation in order to prevent excess sticky honeydew deposition on plants. Fortunately, a wide range of insecticides are available that can help reduce aphid numbers. These include pyrethrins, insecticidal soaps, neem oil, azadirachtin, and the bacteria-derived products Grandevo and Venerate.



Aphids in multiple life stages. Photo by W. Cranshaw, CSU, Bugwood.org.

Mites: Two-spotted spider mite is a piercing-sucking pest usually found on the undersides of plant leaves. Feeding injury to plants causes white stippling marks on leaves. This mite is small and oval in shape, has 8 legs, and can be orange/red or brown with two distinct dark spots on the body. Mites can be seen with the naked eye but microscopy can assist with proper identification. When mite populations are extremely high, webbing can be observed on leaves or in hemp flower buds or seed heads.

Another type of mite that infest hemp, hemp russet mite, is extremely small and is not visible to the naked eye. For perspective, hemp russet mite is less than half the size of two-spotted spider mite. Hemp russet mite is not easily managed and, due to its extremely small size, populations can quickly get out of control. Mites feed primarily on leaves, petioles, and shoot tips of hemp plants. Because hemp russet mite does not produce webbing on plants, its presence usually goes unnoticed until plants exhibit physical symptoms of stress. Advanced symptoms from extremely high populations can include upward curling of leaf edges, bronzing/russetting of leaf tissue, or a brown/tan powder appearance on leaf edges and stems which is actually an extremely heavy mite infestation. By the time plants express physical symptoms, irreparable damage to plants has already occurred. Venerate is found effective controlling mites.



A slight curling along the leaf edge is a symptom produced by hemp russet mite in some cultivars. However, this symptom is not consistently produced and it does not develop in all plants. Also, leaf curl symptoms can be present from other causes that have nothing to do with hemp russet mite, notably genetics. Photo by W. Cranshaw, CSU,

Japanese beetles and oriental beetles: Adult Japanese and oriental beetles chew holes that can eventually skeletonize the leaves by feeding on the tissue between the veins. Oriental beetles feed to a limited extent when compared with Japanese beetles. In large numbers, adults can completely defoliate plants. The grubs may cause damage to the roots in the ground prior to May.

Some formulations of azadiractin have been shown to have some activity against adult Japanese beetles. Two types of beneficial insects attack Japanese beetles. The parasitoid wasps *Tiphia vernalis* and *Tiphia popilliavora* attack Japanese beetle larvae, and parasitoid flies (*Istocheta aldrichi*) attack adult beetles.



Japanese beetles on hemp. (photo: S. Ghimire)



Oriental beetles on hemp (photo by S. Ghimire)

Other insects spotted in hemp fields but did not appear to cause problems are Southern corn rootworm, plant hoppers, potato leaf hoppers, leafminers, and tachinid fly.



Southern corn rootworm or spotted cucumber beetle (photo: S. Ghimire)



Plant hoppers (photos: S. Ghimire)



Anthomyiidae fly (same family as cabbage root maggot) (photo: S. Ghimire)



Leafminer damage and tachinid fly (photos by S. Ghimire)

Recommendations for hemp insect pest prevention and control:

1. Destruction, burial, or removal of crop residues after harvest will deter many pests and keep them from becoming a problem. Roots can be plowed in.
2. Cultivate well or use cover crops to keep weeds in check.
3. Use crop rotation and promote or introduce beneficial predators like ladybeetles, green lacewings, and wasps.
4. Scout and remove pests in the early stages by hand picking when practical ([scouting video](#)).
5. Go to <https://portal.ct.gov/DEEP/Pesticides/Information-for-Hemp-and-Medical-Marijuana-Growers> to see the guidance and the list of pesticides that can be used on hemp.

Diseases

Leaf spots: Septoria leaf spot causes leaf spotting that can result in leaf loss and reduction of photosynthesis. Under favorable conditions (lots of rain events back-to-back before leaves can dry from previous rain), this disease spread quickly and plants can lose 50% to 90% of leaves. If disease becomes severe early in the season, plant stunting and loss of vigor is possible. Plant death can occur under extreme conditions.

Various other leaf spots have been diagnosed in our region including: Bipolaris and Cercospora leaf spots. Sometimes, they cannot be distinguished from each other visually.



Septoria leaf spot on hemp (photo by S. Ghimire)

Powdery mildew:

High humidity greenhouses and other closed environments are often ideal for powdery mildew. Outdoor-grown hemp is much less susceptible to the disease. Powdery mildew develops on leaf surfaces as white powdery growth.

Masses of white mycelia (fungal strands) and chains of conidia (asexual spores that are produced in large numbers) make up this powdery growth. Under ideal conditions (moderate temperatures and high humidity), disease can spread quickly. Within 5 to 10 days after infection, diseased plant tissue becomes a source for new spores, and the cycle continues.



Powdery mildew on hemp (photo by Nicole Gauthier)

Mold: *Sclerotinia sclerotiorum* (white mold) and *Botrytis cinerea* (grey mold) are common molds and the most serious diseases affecting hemp.



Early stage of sclerotinia infection and late stage of sclerotinia infection (Left photo by Canadian Hemp Trade Alliance); Botrytis gray mold on hemp (Right photo by Cornell Hemp),

Disease management Strategies:

1. Maintain weed-free fields to limit fungal survival on grasses or other weedy hosts.
2. Destroy crop debris at the end of the growing season to limit overwintering inoculum.
3. Improve air flow through the plant canopy to limit humid conditions that favor fungal growth.
4. Minimize other stresses (soil moisture and nutrient) as much as you can so that plant can tolerate some of the disease pressure.
5. See <https://portal.ct.gov/DEEP/Pesticides/Information-for-Hemp-and-Medical-Marijuana-Growers> to see the guidance and the list of pesticides that can be used on hemp.

Additional resources:

[UConn Cannabis Webpage](#)

[CT Hemp Webinar Series 2021 Recordings](#)

2020 Cornell Hemp Virtual Field Day (Video recording):

<https://www.youtube.com/watch?v=ZQk7BUVDQ6c&feature=youtu.be>

For an excellent pictorial guide to hemp insect pests, also check out Colorado State University's [Hemp Insect Factsheets](#).

A guide to identify and counteract hemp pest and disease pressures is *[Hemp Diseases and Pests Management and Biological Control](#)*, written in 1996 by one of Vermont's own, J.M. McPartland Ph.D. and his colleagues R.C. Clarke, and D.P. Watson.

Insect Pests of Industrial Hemp in NYS <https://hemp.cals.cornell.edu/docs/insect-pests-industrial-hemp/>.

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