

# Entomology

## Arthropod Pests of Hemp

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Hemp is becoming one of the most popular crops in Tennessee. Almost all hemp grown in the state is for cannabidiol (CBD) production. It is also cultivated for grain and fiber. Similar to other crops, hemp is affected by arthropod pests. Although many arthropod pests have been documented to feed on hemp in Tennessee, only a few species can cause economic loss. The most damaging arthropod pests are corn earworm, hemp russet mite, twospotted spider mite, and cannabis aphid. Insecticides are not the best option to manage arthropod pests in hemp. Only the Organic Materials Review Institute (OMRI) listed pesticides for organic crop production such as potassium salts of fatty acids (insecticidal soaps) are registered for use on hemp in Tennessee. Hence, growers need to take an integrated pest management (IPM) approach that utilizes multiple cultural, physical, biological, and chemical practices to manage these pests and reduce losses.

**Corn earworm** Corn earworm (Fig. 1A) is one of the most important pests of field-grown hemp. It can cause economic losses for hemp growers by feeding on floral buds. It is a late-season pest of hemp grown for seed and CBD production. Adults (moths) (Fig. 1B) move to hemp when most other crops they attack are harvested. They are observed during bud development. Larvae cause considerable damage by feeding on the buds and accumulating frass/feces on them (Fig. 2). Wounds on plants allow pathogens to invade and infect plants and cause bud rot.



Figure 1: A. Corn earworm larvae. B. Corn earworm adult. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org. (5556157 and 5556158).



Figure 2: A. Damaged terminal bud of a hemp plant caused by corn earworm larvae. B. A hemp plant heavily damaged by corn earworm. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org. (5576278 and 5576279).

### Arthropods reported on hemp:

#### Pests

**Mites:** twospotted spider mite, hemp russet mite

**Aphids:** cannabis aphid, bean aphid, cotton/melon aphid, rice root aphid

**Caterpillars:** Corn earworm, tobacco budworm, woollybear species, armyworms, saltmarsh caterpillar

**True bugs:** tarnished plant bug, stink bugs

**Beetles:** Japanese beetle, spotted cucumber beetle

**Thrips**

**Grasshoppers**

#### Natural enemies (predators and parasitoids)

Lady beetles, ground beetles, soldier beetles, lacewings, syrphid flies, minute pirate bugs, big-eyed bugs, damsel bugs, spiders, and parasitic wasps (parasitoids)

## Mites

Mites are tiny arthropods that are difficult to see with the naked eye. Hemp russet mites (Fig. 3A) and twospotted spider mites (Fig. 3B and 3C) on hemp grown in greenhouses and open fields are typically considered indirect pests because they only damage leaves instead of buds. They are the most severe pests of hemp grown in greenhouses. Mites reduce plant vigor, and severe infestations cause premature leaf drop, plant stunting, and death. They are commonly observed on the underside of leaves but can feed on all plant parts. Discoloration of infested leaves is indicated by a yellowing or bronzing effect. Silk webbing is observed on severe infestations of twospotted spider mites.



Figure 3: A. Hemp russet mite infestation on hemp, B. Twospotted spider mite, C. Twospotted spider mite infestation on hemp. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5602030, 5356811 and 5559960).

## Aphids

Aphids are indirect pests of hemp that can reduce plant vigor. Information is limited on the damage aphids can cause to hemp plants. The most common species found in hemp is the cannabis aphid (Fig. 4A and 4B). Bean aphids, the cotton or melon aphids and rice root aphid have also been reported on hemp. Aphids are typically observed on the underside of leaves and stems. They feed on plant sap from phloem tissues and produce a sugary waste (honeydew). Severe aphid infestations make a large amount of honeydew, resulting in subsequent black sooty mold development. Aphids are generally controlled by predators and parasitic wasps.



Figure 4: A. Adult cannabis aphid. B. Mixed life stages of cannabis aphid on hemp. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5602027 and 5556184).

## Thrips

Thrips (Fig. 5) are observed on hemp throughout the growing period. Although thrips can cause severe damage to other crops, the damage they cause to hemp is not well studied. Feeding injuries cause plant stunting and reduction in vigor in greenhouse-grown hemp plants.

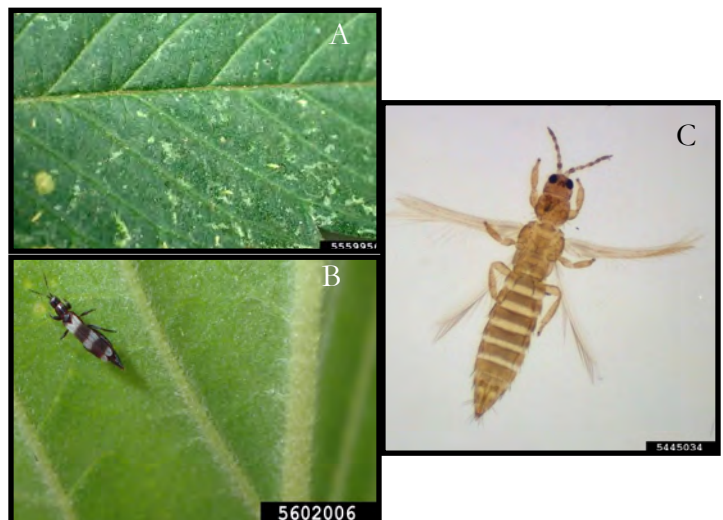


Figure 5: A. Onion thrips damage on hemp B. Branded thrips on hemp leaf. C. Onion thrips Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5559956 & 5602006). Diane Alston, Utah State University, Bugwood.org (5445034).

## Tarnished plant bugs and stink bugs

Tarnished plant bugs (Fig. 6A) and several species of stink bugs (Fig. 6B) are frequently found on hemp. Although the damage of these insects to hemp is not well studied, they cause the most damage in hemp grown for seed production.



Figure 6: A. Tarnished plant bug adult on hemp. B. Brown stink bug adult on hemp. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5556171 and 5559994).

## Defoliating insects

In addition to corn earworm, other defoliating insects of hemp (Fig. 7 and 8) include saltmarsh caterpillar, Japanese beetle, spotted cucumber beetle, and several species of grasshoppers. They can feed on leaves and sometimes within developing buds. These insects rarely cause significant damage.



Figure 7: A. Saltmarsh caterpillar on hemp. B. Japanese beetle on hemp. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5569064 and 5596920).



Figure 8: A. Spotted cucumber beetle. B. Differential grasshopper on hemp. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5559962 and 5559965).

## Beneficial arthropods

Beneficial arthropods are very important in managing pest populations in hemp (Fig. 9, 10 and 11). Adult and immature lady beetles are present in plants where aphids are abundant. Other predatory arthropods, such as spiders, lacewings, syrphid fly larvae, ground and soldier beetles, and predatory true bugs (Hemipterans) such as *Orius*, *Geocoris*, and *Nabis* spp., are also frequently observed. Parasitic wasps (Hymenopteran parasitoids) are present in many of the hemp fields.



Figure 9: A. Crab spider B. Crab spider on hemp. C. Green lacewing egg. D. Green lacewing adult on hemp. Photo credit: David Cappaert, Bugwood.org, (UGA2106069), Whitney Cranshaw, Colorado State University, Bugwood.org (5596874, 5556176, and 5556177).

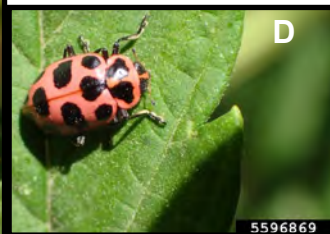


Figure 10: Beneficial arthropods on hemp. A. Convergent ladybeetle adult and larva. B. Convergent ladybeetle pupa. C. Asian ladybeetle. D. Spotted ladybeetle. Photo credit: Whitney Cranshaw, Colorado State University, Bugwood.org (5556179, 5597740, 5561458 and 5596869).

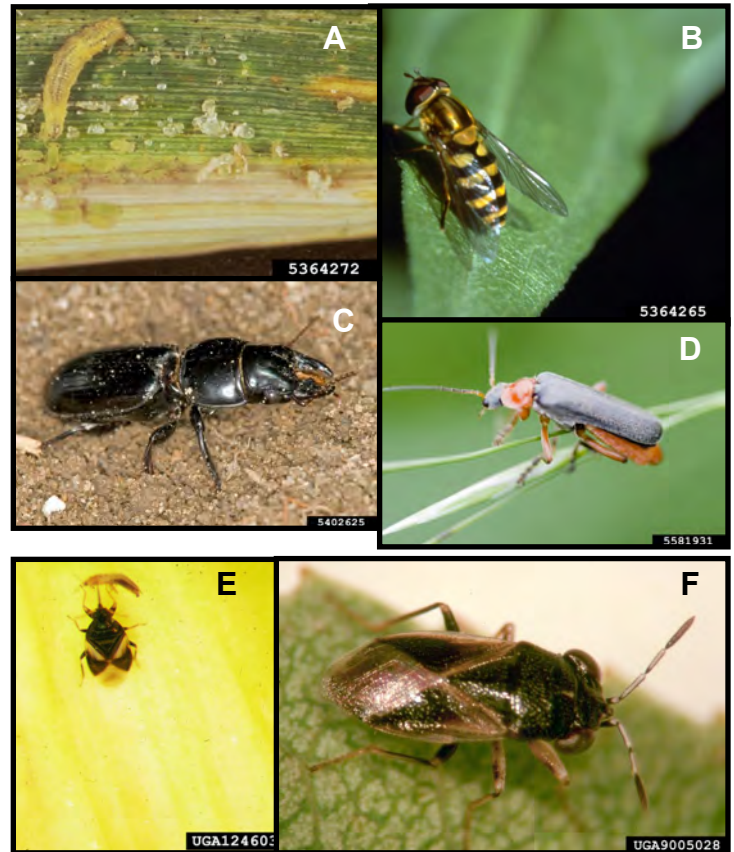


Figure 11: Beneficial arthropods. A. Syrphid fly (hover fly) larva. B. Syrphid fly adult. C. Ground beetle. D. Soldier beetle. E. *Orius* sp. (minute pirate bug). F. Big-eyed bug (*Geocoris* sp.). Photo credit: Frank Peairs, Colorado State University, Bugwood.org, David Capraert, Bugwood.org, Mary C Legg, Bugwood.org, Whitney Cranshaw, Colorado State University, Bugwood.org, Bradley Higbee, Paramount Farming, Bugwood.org (5364272, 5364265, 5402625, 5581931, UGA1246035, UGA9005028).

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[https://hemp.tennessee.edu/wp-content/uploads/sites/183/2020/12/Hemp\\_Disease\\_and\\_Pest\\_Management\\_W916.pdf](https://hemp.tennessee.edu/wp-content/uploads/sites/183/2020/12/Hemp_Disease_and_Pest_Management_W916.pdf)

**Hemp Insect Fact Sheets.** Colorado State University. <https://>

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