

Insect and Mite Pests of Outdoor Hemp in Alabama

► **Effective pest management requires knowing which insects are damage-producing and which are beneficial to crop health. This guide provides current information on and strategies to control known insect and mite pests of outdoor hemp production in Alabama.**

Insects in Hemp

Many insects and insect relatives make hemp their home. These arthropods include various species of insects, spiders, and mites.

Not all arthropods found in hemp are pests. Only some of the insects found on hemp will cause damage resulting in yield and/or quality loss. In fact, many are beneficial and provide free biological control for your crop. Some are predators that feed on pests. Others are parasitoids that use pest insects as a host, which results in pest death. It is important to recognize these natural enemies so that you don't mistake them for pests and remove them from the plant.

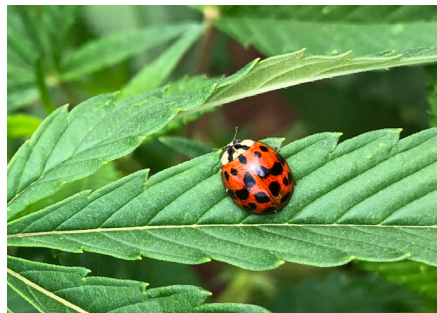
When scouting for pests, you also should scout for beneficials in your crop. Natural enemies are a significant part of an integrated pest management plan and should not be ignored. Some insecticides are broad spectrum and will kill beneficials along with pests. Many times this results in a pest outbreak, as there is no natural enemy to keep the population in check.

Common beneficials in hemp include ladybugs, spiders, parasitoids, lacewings, damsel bugs, big-eyed bugs, and assassin bugs.

Because of the variety of insects you will encounter, proper identification is key. It is important that you know what is on your plant before taking any pest control measures. Alabama has a large diversity of insects on hemp. These insects may vary from those in other states also growing hemp. For assistance with insect identification, contact your county Extension office.

Pest Management

Following correct pest identification, control measures may be needed. Pest management in hemp should be in the form of a multifaceted, integrative approach. Do not rely on one single control method for your crop.



Ladybug



Lynx spider



Assassin bug



Big-eyed bug



Parasitoid eggs



To manage insect pests effectively, regularly scout fields, understand the biology of each pest, and know methods of pest control. These methods may include insecticides as part of an overall integrated pest management plan. Refer to the “Hemp Pest Management in Alabama” (Extension publication ANR-2635) for a list of chemicals that legally can be applied to hemp in Alabama.

Every state has different rules and regulations regarding pesticide use in hemp. If you are growing in another state, check with your county Extension office or Department of Agriculture for the specific rules regarding chemical use in hemp.

Types of Insect and Mite Pests

There is a large diversity in the types of damage caused by insect and mite pests. Damage will vary depending on the insect’s mouthparts, seasonal activity and abundance, and feeding preference. In many cases, you may not see the pest on the plant, but you will see signs and symptoms of feeding damage.

Insects are often divided into groups based on the anatomy of their mouthparts. Insect mouthparts can help us identify pests and also help with diagnosing plant damage. There are many forms of mouthparts in insects; the two most common are chewing and piercing-sucking. Insects with chewing mouthparts include beetles, caterpillars, termites, and grasshoppers. Insects with piercing-sucking mouthparts include true bugs, mosquitoes, and the insect relatives, spider mites.

These different mouthparts will create different-looking damage on a plant. Recognizing the differences can aid in proper identification and application of control measures.

Piercing-Sucking Pests

These pests, which include true bugs and mites, have straw-like mouthparts capable of sucking plant sap from the plant. This can occur on the leaves, flowers, or stems. In these instances, you won’t see large amounts of plant matter missing like you would for chewing pests. Damage from piercing-sucking mouthparts usually results in discoloration, wilting, stunting, and even death. In other crops, some piercing-sucking pests inject a toxin into the plant or transmit a virus while they are feeding. As far as we know, there are no pests that transmit viruses to hemp in Alabama.

Piercing-sucking pests can easily go unnoticed for long periods of time. This may be because of their small size, location on the plant (under the leaves), or a lack of understanding of what the damage looks like. Some, such as mites and aphids, have an extraordinary reproductive capacity as well. Scouting the entire hemp plant is important because of the ability of these cryptic pests to continue feeding without being noticed.

Piercing-sucking pests in hemp include multiple species of mites, aphids, stink bugs, and tarnished plant bugs.

Chewing Pests

Insects with chewing mouthparts can damage plants by feeding on foliage or flowers. Defoliation by chewing insects is probably the easiest insect damage to recognize while scouting plants. In some cases, an entire part of the plant may be gone. Other times, you will notice that plant parts have chewed edges or middles. Some chewing insects will skeletonize a leaf, feeding on the softer tissue and leaving the veins intact.

There also are chewing pests that bore through plant stems or leaves. This damage, often called boring or mining, occurs on the inside of the plant structures. As a result, you may not notice the pest until feeding damage is visible. Insects boring through the plant stem can cause extensive damage as they cut off nutrients moving through the plant. Insects mining in plant leaves can be damaging, but it is often limited to aesthetic damage.

In many cases, the destructive life stage is the larval (immature) form of the pest. Boring larvae spend most of their time protected inside the leaf stem, feeding and causing damage, emerging only to pupate and turn into an adult. These boring larvae are protected inside the stem and cannot be managed by insecticides.

Chewing pests in hemp include multiple species of caterpillars, beetles, termites, and ants.

Piercing-Sucking Insects

Two-Spotted Spider Mite (*Tetranychus urticae*)

Identification

Two-spotted spider mites are small, approximately 0.5 millimeter. A hand lens or magnifying lens is helpful in detecting early infestations. Their bodies are oval-shaped and typically yellow-green, but sometimes they can be brown or reddish. There are two dark spots on each side of their bodies. These spots are actually their gut contents. Spider mites have eight legs.

Biology

Two-spotted spider mites have four life stages: egg, larva, nymph, and adult. Adult mites produce webbing to help the eggs adhere to the leaf surface. Depending on temperature and humidity, eggs can hatch in a few days to a few weeks. The larval form has six legs and does not feed. Nymphal spider mites have eight legs and are reproductively immature. Each female can lay 50 to 100 eggs in a lifetime.

Two-spotted spider mites overwinter in protected areas such as leaf litter, weedy areas, or beneath tree bark. They prefer hot, dry weather, and populations can really take off during the summer, especially in a drought.

Damage

Spider mites use their piercing-sucking mouthparts to feed on plant sap. Feeding damage appears as stippling on the leaf surface. Each of these discolored spots is a feeding site. Heavy infestations can cause the entire leaf to become discolored or even fall off. As their name implies, spider mites produce webbing on the plants.

Management

Early detection is important for control of two-spotted spider mites. A hand lens or magnifying glass is needed to conduct thorough scouting of your hemp plants. The undersides of leaves should be routinely checked for mites or their webbing.



Two-spotted spider mites



Spider mite damage

Hemp Russet Mite (*Aculops cannibicola*)

Identification

Hemp russet mites are part of the Eriophyoid family of mites. These mites are very small and cannot be seen without magnification. A good-quality 20x hand lens will allow you to see individual mites. A hemp russet mite is less than half the size of a two-spotted spider mite. In the case of a large infestation, mites may be visible to the naked eye. Eriophyoid mites look different than most other mites. They have a long, cylindrical body with beige coloration and only four legs; other mites have eight legs.

Biology

Little information is available on the hemp russet mite. We do not know details regarding its life cycle, overwintering capability, or host range. So far, these mites have only been found on plants in the genus *Cannabis*. There are other related Eriophyoid mite pests, such as the tomato russet mite, *Aculops lycopersici*. The hemp russet mite may have a similar life cycle to the tomato russet mite, but this information has not yet been determined.

Hemp russet mites are not very mobile. They are able to crawl only short distances. Infestations spread when mites crawl to the edge of a leaf or top of the plant and are carried by wind. In indoor production systems, fans can spread mite infestations. While it is assumed that hemp russet mites can survive year-round on plants grown indoors, little is known about its survival capabilities outdoors.



Hemp russet mites



Hemp russet mite damage

Damage

Mites have piercing-sucking mouthparts that are used to feed on the outer layer of leaves. Damaged leaves may curl upward along the outside edge. Affected leaves take on a dull appearance and can turn yellow or brown. Leaves with extensive damage appear brittle and will fall off the plant. Hemp russet mites also can be found feeding on stems or flowers. On heavily infested plants, buds can appear yellow. Unlike spider mites, hemp russet mites do not produce any webbing.

Management

The key to managing hemp russet mites is early detection. The early signs of a mite problem are difficult to spot and easy to overlook. Regular scouting is necessary. Because hemp russet mites are so small, magnification is required. Options include a hand lens (at least 20x), a digital microscope, or a stereo microscope. Many infestations begin at the bottom of the plant and work their way up. It is important to check several parts of the plant in multiple areas of the field.

Cannabis Aphid (*Phorodon cannabis*)

Identification

Cannabis aphids are pale yellow-green, pear-shaped pests. They have both winged (alate) and nonwinged (apterous) forms. The alates may appear darker. Their dark antennae are shorter than the length of their bodies. Like all aphids, cannabis aphids have two protrusions, called cornicles, coming off the back of their abdomen. Cannabis aphids are sometimes called hemp aphids or bhang aphids.

Biology

Cannabis aphids were only recently confirmed in North America. They have been found on outdoor hemp grown from Colorado to Virginia and in greenhouses across several states. The cannabis aphid was first confirmed in Alabama on hemp grown in a greenhouse in 2020. This species is known to feed and reproduce only on Cannabis plants. Cannabis aphids have a holocyclic life cycle, which means they alternate between sexual and asexual reproduction throughout the year. In the fall, the aphids reproduce sexually, and offspring overwinter as eggs. In the spring and summer, the aphids reproduce asexually. There are multiple generations each year of asexual reproduction.

Damage

Even with large numbers of aphids, the cannabis aphid does not appear to cause substantial plant injury to outdoor hemp. Aphid excrement, called honeydew, is capable of damaging plants by leaving a sticky residue on leaf surfaces. In outdoor grows, rain can wash away the honeydew to lessen the damage. Closed growing environments, such as greenhouses, that are not exposed to weather events may have more widespread problems from aphids.



Cannabis aphid (Photo credit: Marion Zuefle, Cornell AgriTech)

Management

Plants should be monitored on a regular basis for aphid infestations. Aphids tend to have patchy distribution in the field, so be sure to check several plants across different areas of the field.

Many natural enemies feed on cannabis aphids; these include generalist predators such as lacewings, hover fly larvae, various species of lady beetles, and minute pirate bugs. Natural enemies are abundant in the environment and can provide free biological control for your hemp. Therefore, be cautious of using a broad spectrum insecticide for aphid control. Removing natural enemies from the environment may cause aphid populations to increase.

Chewing Pests

Fire Ants (*Solenopsis invicta*)

Identification

Red imported fire ants are usually dark red to brown in color. The workers are typically $\frac{1}{8}$ to $\frac{1}{4}$ inch long. Red imported fire ants have a very narrow waist with two nodes in front of the abdomen. They are similar in appearance to other common ants. The easiest way to distinguish fire ants from others is by their aggressive defense of their mound. When disturbed, fire ants will move quickly to protect the rest of the colony and sting anything that is near their mound.

Biology

Fire ants are social creatures that work together to protect their brood and queen. They have four life stages: egg, larva, pupa, and adult. The life cycle from egg to adult takes approximately 30 days.

A fire ant colony is made up of multiple types of adults and their brood. Worker ants are females that are wingless and sterile. Their jobs are to protect the queen, forage for food, and care for the brood. Following a rain, the winged ants leave the mound to engage in a mating flight. While males die after mating, fertilized females will drop to the ground, lose their wings, and begin forming a new mound.

A queen can lay up to 800 eggs per day and live for several years. A typical fire ant colony can have more than 200,000 workers. They live in characteristic mounds that are a maze of underground tunnels that ants constantly move about in to maintain ideal conditions. The tops of mounds collect warmth, while the lower galleries have increased moisture and lower temperatures. Fire ants are omnivorous, eating both plants and other small animals.



Fire ants

Damage

Fire ants form mounds at the base of or adjacent to plants and begin feeding. They can strip the bark and, in some cases, tunnel through the stem. This cuts off nutrients and water to the rest of the plant, eventually leading to plant death. Young hemp plants are the most vulnerable.

Plants will appear wilted and discolored after fire ant damage. Plants in bare ground, plastic, and pots are all susceptible to fire ants. In many cases, by the time plant damage is noticed, the fire ants have moved their mound to nearby plants.



Fire ant damage

Management

The key to successful fire ant management is to kill the queen and stop her from producing hundreds of eggs each day. There are two options for controlling fire ants: baits and individual mound treatments. Baits work by combining an attractant with an insecticide that worker ants will pick up and bring back to the colony. This food is then fed to the rest of the colony, including the queen. Mound treatments are applied directly to the mound and use a contact insecticide to kill the ants.

For baits to be effective, worker ants need to be actively foraging for food. You can perform a quick test to see if the ants are actively foraging. Put a food product that contains oil, such as potato chips or hot dog slices, near mounds and see if they are covered in ants within 20 minutes. If not, then it is not a good time to apply bait. Ants do not forage in high temperatures; applications should be done early in the morning or in the evening. Put out baits only in dry conditions when rain is not expected for 12 to 24 hours. Do not use old bait; ants will not feed on rancid bait.

Mound treatments come in a variety of forms, such as dusts, granules, or liquid drenches. Best results for mound drenches are achieved when temperatures are between 65 and 80 degrees F. A repeat application may be necessary after 7 days if mound activity resumes. Mound drenches are faster acting than baits, but many fail to kill the queen. The queen can escape, resulting in the colony relocating.

Although slower acting, baits are more economical than individual mound treatments, especially for larger areas. Some baits may take several weeks before you see results. If you are growing hemp on a historically heavily infested area, a two-step approach to fire ant management will work best. This consists of first applying bait in the fall (August to October), allowing it to take effect over the winter. Follow up in the spring with individual mound treatments as they arise following mating flights.



Hemp field on Auburn University research plot.



Fire ant damage

Termites (*Reticulitermes flavipes*)

Identification

Eastern subterranean termites range in color from beige (workers) to dark brown (reproductives) and may be winged or wingless. Workers, the most common members in a colony, are eyeless and a pale beige color. Termite soldiers are also beige but have an enlarged, hardened head with large jaws. The reproductives are dark brown and have wings.

Biology

Termites have three life stages: egg, nymph, and adult. Subterranean termites are social insects that live in colonies with division of labor. Each individual has tasks to perform. A termite colony

consists of workers, soldiers, and reproductives. The winged reproductives are the ones that leave the colony, mate, and shed their wings when they fall back to the ground. These are the termites that start new colonies. A termite queen can produce thousands of eggs each day.

Termites are unique in that they can consume and utilize cellulose as food. They have special enzymes in their guts that allow them to feed on wood and other cellulose products. Termites feed on roots, tree stumps, fallen limbs, and occasionally living plants. They can be beneficial as they help recycle wood products.

Damage

Termites typically are found on dead and decaying wood but will occasionally feed on live plants. They have been found feeding on outdoor hemp in Alabama, but damage has been minimal. Plants fed on by termites are at risk of lodging.

Management

Determining the source of termite infestations is crucial for control. The source is often a fallen tree or old building that is infested. If fields are planted next to wooded areas or abandoned wooden structures, you should do an inspection prior to planting. Once located, all infested wood should be removed.



Termites

Eurasian Hemp Borer (*Grapholita delineana*)

The Eurasian hemp borer has not yet been detected in Alabama. However, it has been found on both the west and east coasts and in the southeastern United States.

Identification

The damaging life stage of the Eurasian hemp borer is the caterpillar (larva). Eurasian hemp borers are smaller than the European corn borer, another boring pest. Hemp borer caterpillars are small (9 to 10 millimeters) and vary in color from whitish-pink to pale brown. Caterpillars have a dark-brown head capsule. The adult moth is also very small; their body color ranges from grey to reddish-brown with fringed wings.

Biology

Hemp borers overwinter as larvae in crop stubble or weeds. The larvae that survive the winter move down into the soil in the spring (April) to pupate, then later emerge as moths. The next generation of hemp borers pupate in the plant stem. The adults emerge in May and move to hemp fields to lay eggs. There are possibly three generations each year.

Damage

Hemp borer eggs are typically laid on plants within 10 feet of the edge. Females can lay 350 to 500 eggs following mating. Adults only live for 2 weeks. Newly hatched larvae feed on leaves first before boring into the stems. Once larvae are big enough, they bore into plant stems. Hemp borers then tunnel into the base of flowers, causing wilting and eventually death. They also can damage hemp plants by tunneling into the stalk.

Management

Full-grown caterpillars overwinter in crop stubble; therefore the first step in preventing an infestation is removal of all crop residue at the end of the season. Deep tillage in the fall can help reduce overwintering populations. Infested plant material (i.e., stems) should not be moved into uninfested areas. There may be additional host plants for Eurasian hemp borers. Control weeds and feral hemp to help reduce the risk.



Eurasian hemp borer (Photo credit: Marguerite Bolt, Purdue University)



Eurasian hemp borer 2 (Photo credit: Marguerite Bolt, Purdue University)

Corn Earworm (*Helicoverpa zea*)

Identification

Corn earworms are also referred to as cotton bollworm, tomato fruitworm, sorghum headworm, or soybean podworm. These common names come from the part of a crop plant on which they are a pest. Regardless of the name, it is the same species of caterpillar that attacks corn, cotton, other vegetables, and now hemp. Corn earworms come in a variety of colors, including green, brown, and pink, with light and dark stripes running down their bodies. Corn earworm caterpillars, or larvae, will grow to be 1½ inch long. The adult corn earworm moth is cream or tan colored, with irregular markings on the wings. Moths have a wingspan of about 1½ inch.

Biology

Corn earworms are highly mobile pests that engage in long-distance migrations each year. They overwinter as pupae in soil in the southern United States and migrate north over the summer, aided by weather events.

Alabama has five generations of moths each year. The earlier generations prefer to feed on corn, which can be a large source of later generations. Later in the summer, corn earworms are often found in cotton, soybeans, or peanuts. With hemp now added to the landscape, it appears that the later generations of corn earworms are attracted to hemp.



Corn earworm

Damage is caused by the larval (caterpillar) form of the corn earworm. Female moths lay small, spherical, individual eggs on plants. Corn earworm moths will live for about 2 weeks, and females can lay thousands of eggs in their lifetime. Eggs begin as a light green to light yellow color and darken as they get older. Corn earworm eggs may hatch into larvae in 3 to 4 days.

Larval growth and development may be slowed down or accelerated by the weather; warm temperatures can speed up development. Young larvae begin very small and are difficult to find in dense plant canopies. Corn earworms go through five to eight larval stages (instars) over the course of approximately 2 weeks before moving into the soil to pupate. The entire life cycle is completed in about 30 days.

Damage

Corn earworms have emerged as one of the most damaging pests in hemp grown outdoors in Alabama. They are attracted to hemp later in the season when other crops, such as corn and cotton, are no longer viable hosts.

Corn earworms use their chewing mouthparts to feed on floral material and are often nestled in dense buds, making them difficult to find. It is especially difficult to find the early instar larvae. Early detection is important because larger caterpillars consume more plant material and are more difficult to control than small larvae. Caterpillars also produce a lot of waste, called frass, which can be abundant in the flowers and also contribute to loss.

More concerning than floral consumption is the association between caterpillar feeding and plant pathogens. Feeding damage can create wounds in the buds, which make the plant more susceptible to pathogens that are already present in the environment.

Fusarium bud rot has emerged as a major issue in outdoor hemp production. The Fusarium fungus is spread by air currents and wind-blown rain and infects a variety of plants. In hemp, the pathogen generally colonizes flower buds in the later stages of flower development. Affected flower tissue may turn brown. Fusarium is a major problem because it can lead to mycotoxin contamination, which is dangerous to humans and animals. Plants infected with this pathogen should not be harvested.

Management

Being proactive is crucial for managing corn earworms in hemp. Regularly scout your plants as soon as flowering begins. Carefully examine several plants in multiple parts of the field. Young larvae are very small and often go unnoticed, especially in hemp buds. Look for caterpillars or evidence that they were there. It is often easier to detect a caterpillar infestation in hemp by first finding their frass as an indication of a problem.

You can monitor for corn earworms at your farm using a pheromone trap. These traps capture the adult male moths using scented lures. The lure is an imitation of the sex pheromone in female moths. The trap will only capture male moths, while the females will be in the field laying eggs. Traps can only be used for monitoring and not control. They alert us to moths in the area and allow us to make more informed decisions about when to intensify scouting efforts and management. Contact your county Extension office for help with using pheromone traps.

Few tools currently exist for corn earworm management in hemp. Most are insecticides with *Bacillus thuringiensis*, or Bt, but efficacy data in Alabama is minimal for these products. Bt is a naturally occurring soil bacterium with specific strains that are toxic to particular species of insects. The various strains of Bt may treat specific pests, such as mosquitoes, caterpillars, or beetles, so always check the label to make sure you are using the correct strain for your target pest.

For Bt to be effective, it must be consumed by the caterpillar. After consumption, the Bt particles rupture the insect's gut lining, causing the contents to spill out and the caterpillar to slowly starve to death. It typically takes 2 to 5 days for the caterpillar to die. The smaller the caterpillar is at the time of the application the better the control will be. By the time the caterpillars are large, they have already damaged the plant and are difficult to kill.

Bt applications should always be prepared immediately prior to use. Apply early in the day or in the evening for maximum effectiveness. Repeat applications are necessary; refer to the label for specific information. Hand removal of small caterpillars, while tedious, is likely a more effective control method than insecticides.



Corn earworms



Corn earworm damage



Corn earworm monitoring trap

Yellowstriped Armyworm (*Spodoptera ornithogalli*)

Identification

Yellowstriped armyworms get their name from the yellow line running down the top of their bodies. When they are small, larvae often are found together in groups. As they get older, the worms spread out to different plants. Yellowstriped armyworm larvae are typically gray or black with two yellow stripes along each side of the body. Black triangular markings are sometimes visible on each segment along the top of the body. Larvae can grow to be 1¾ inch long.

Biology

Yellowstriped armyworms feed on a variety of crops including corn, cotton, tomatoes, and other vegetables. They overwinter in the soil as pupae, and moths emerge in the spring. Damage is caused by the larval form of the moth. Female moths lay egg clusters on the underside of leaves. These clusters can contain hundreds of eggs that typically hatch 3 to 5 days after being laid. Larvae feed for about 3 weeks before moving into the soil to pupate. There are between three and five generations of yellowstriped armyworms in Alabama each year.

Damage

Yellowstriped armyworms can be found on hemp throughout the growing season. Young larvae will feed on the foliage of vegetative hemp. In years with large yellowstriped armyworm populations, they are found in reproductive hemp later in the season. Damage is similar to that of corn earworms but is usually less substantial.

Management

Similar to other caterpillar species, small yellowstriped armyworms are easier to control. Plants should be scouted regularly throughout the growing season, beginning with young plants. Seedling hemp plants are vulnerable if large numbers of armyworms are feeding.



Yellowstriped armyworms

Grasshoppers (various species)

Identification

Grasshoppers have a variety of colors and patterns but are typically brown to green insects with jumping capabilities. They have a distinct head shape with prominent eyes. Immature grasshoppers (nymphs) look similar to adults but are smaller and lack fully developed wings.

Biology

Grasshoppers are generalist insects that feed on a wide variety of wild and cultivated plants. Grasshoppers in the genus *Melanoplus* are commonly found in Alabama hemp. They overwinter as eggs in the soil and can be destroyed with tillage. Eggs hatch in the spring, beginning in late March and lasting through June. The life cycle takes from 35 to 50 days, with development accelerated in warm weather. Most species of grasshoppers have only one generation per year in Alabama.

Due to a lack of functional wings, grasshopper nymphs are restricted in their movement and generally stay near their hatching site. Upon reaching adulthood, they are more mobile, primarily due to the development of wings. When populations are high, especially during drought situations, grasshoppers can move through a field quickly.

Damage

Grasshoppers feed on the leaves of vegetative hemp. They are highly mobile, moving in and out of fields on a regular basis. Damage is unpredictable and typically linked to outbreaks of extreme populations. Grasshoppers may feed on foliage, but severe damage occurs when they feed on the stems of young plants.

Management

To scout for grasshoppers, start at the field borders then move to several spaces throughout the field. If severe defoliation is occurring and there are numerous grasshoppers per square yard, treatment may be warranted. If the grasshoppers have not moved throughout the entire field, spot treatments or border sprays can be used. Keep an eye out for reinfestation, however, since these are mobile pests that do not all hatch at the same time.



Grasshoppers



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