

NC STATE UNIVERSITY



SOYBEAN

INSECT GUIDE



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INTRODUCTION

Numerous kinds of insects can be found in soybeans. Most are beneficial or harmless, but some can cause yield loss and even crop failure if not controlled.

Yield-reducing insect populations do not occur with enough regularity to allow a soybean farmer to accurately predict when and where treatment will be needed. Pest insect populations can vary drastically by year, general area, field and variety. As a result, farmers must scout soybeans for insects regularly throughout the growing season.

Treating soybeans with chemical insecticides should be done only on an as-needed basis. Overtreatment is expensive and can have negative or unforeseen consequences. Also, poorly timed treatments might be ineffective and can lead to future insect or spider mite problems later in the same season.

This guide provides farmers with brief descriptions and photographs of pest species common in North Carolina and Virginia. Farmers will encounter many non-pest species that are benign or only occasional “visitors” that are not covered in this booklet.

When identification of less common insects is needed, specimens may be sent to the Plant Disease and Insect Clinic at North Carolina State University (www.cals.ncsu.edu/plantpath/extension/clinic) or the Insect Identification Clinic at Virginia Tech (www.insectid.ento.vt.edu/insect-id/insect-collection.html). Contact your county extension office or reference the North Carolina Agricultural Chemicals Manual for procedures for correctly collecting specimens to be identified. Persons outside North Carolina or Virginia can usually have specimens identified by extension entomology specialists at their respective agricultural colleges and universities.



FOLIAGE FEEDERS



Foliage-eating insects are present in practically all soybean fields throughout the growing season. Most fields suffer no yield loss because the number of foliage feeders and the amount of leaf loss usually remain at low to moderate levels. Many studies have indicated that soybean plants can compensate for foliage loss or injury. Younger plants in vegetative growth stages, prior to flowering, can tolerate more defoliation, or leaf loss, than plants in reproductive stages, when flowering and pod development occur.

Soybean farmers and scouts should be aware of damage limits recommended by the cooperative extensions of North Carolina (www.nccrops.com) and Virginia (http://pubs.ext.vt.edu/456/456-016/Section_4_Insects-8.pdf) to correctly determine whether soybeans should be treated for foliage feeders.

GREEN CLOVERWORM

(Plathypena scabra)

(Size 1¼")

DESCRIPTION

Greenish caterpillars with faint white stripes along the body that have the same thickness from the head to the rear. Sometimes the stripes are not obvious. They have three pairs of legs near the head (plus a pair of legs near the back, 3 + 1) and move with a looping motion similar to a soybean looper. When disturbed, these larvae become very active and fall to the ground. When held in the palm, they often wriggle violently, a unique habit compared with other green-colored caterpillar species found in soybeans.

DAMAGE

Green cloverworms only eat foliage and tend to concentrate in the upper canopy. They eat holes in the leaves and prove damaging only under very high populations or in combination with other defoliators. Present throughout most of the growing season, they typically do not cause economic damage. Because they attract predators, in low to moderate numbers they can actually be beneficial.

SOYBEAN LOOPER

(Pseudoplusia includens)



(Size 1½")

DESCRIPTION

Light green in color with several thin light lines running the length of the body. The body of this caterpillar is largest at the rear and tapering to the head. Loopers form the characteristic hump, or “loop,” when crawling. There are two pairs of legs near the head (plus a pair of legs near the back, 2 + 1).

DAMAGE

Loopers eat large holes in the leaves. Heavy populations can rapidly strip areas or even entire fields of leaves. Due to its migratory nature in North Carolina and Virginia, economic infestations of this pest seldom occur before late August or early September. This pest usually occurs in fields previously sprayed with insecticides, which often kill off the looper's natural enemies that would otherwise help control looper populations.

VELVETBEAN CATERPILLAR

(Anticarsia gemmatalis)



(Size 1¾")

DESCRIPTION

Greenish, brown or almost black caterpillars with a broad lighter band down each side. Head is prominent and usually yellow or orange. Caterpillars have four pairs of legs near the head, along with a pair of legs near the back (4 + 1) that give the appearance of a forked tail. When disturbed, they wriggle violently.

DAMAGE

This caterpillar eats the entire leaf and will strip whole fields when in high numbers. The pest will attack pods if defoliation is severe. Due to its migratory nature in North Carolina, damaging populations usually do not occur before September and generally limit themselves to late-planted fields, especially double-crop soybeans. Usually less abundant than soybean loopers, this foliage feeder is not known to occur in Virginia, although southernmost counties could be at risk if warmer weather patterns continue.

BEET ARMYWORM

(Spodoptera exigua)

(Size 1¼")

DESCRIPTION

Olive green to near black, smooth caterpillar with a stripe down each side. A black spot appears on each side, just above the second pair of legs behind the head; there are four pairs of legs near the head plus a pair of legs near the back (4 + 1). Larvae fall and curl up when disturbed. Small larvae web the underside of the leaf.

DAMAGE

The beet armyworm chiefly affects late-planted seedling soybeans. Small larvae skeletonize the lower leaves. Large larvae feed over the whole plant. Severely damaged plants are very ragged in appearance. Beet armyworms often feed on and defoliate pigweed plants in and around soybean fields. Noticing such damage can alert the scout that worms may be present and moving toward a soybean field.

YELLOWSTRIPED ARMYWORM

(*Spodoptera ornithogalli*)



(Size 1¾")

DESCRIPTION

Pale-gray to velvety black, smooth caterpillar with a yellow or yellowish-orange stripe running down each side. Above the stripe, a black triangular spot is found on nearly every segment of the body. Like the fall armyworm, a distinct cream-colored upside-down "Y" separates the eyes on either side of the head. Small black spots appear on each side of the first abdominal segment, farther toward the rear compared with the side spots on the beet armyworm. There are four pairs of legs near the head plus a pair of legs near the back (4 + 1).

DAMAGE

This foliage-feeding caterpillar overwinters in North Carolina and Virginia and can be found throughout the season. It's only sporadically injurious to soybeans, and generally only in young stands.

FALL ARMYWORM

(*Spodoptera frugiperda*)



(Size 1½")

DESCRIPTION

Olive-green to dark-brown, smooth caterpillar with a dark band above a stripe running down each side. The head is dark brown with a distinct cream-colored upside-down "Y" separating the eyes on either side of the head. Four black spots arranged in a square pattern appear on the top of the body near the rear, and have four pairs of legs near the head plus a pair of legs near the back (4 + 1).

DAMAGE

This armyworm produces damage similar to the beet armyworm (see p. 9).

MEXICAN BEAN BEETLE

(*Epilachna varivestis*)

(Larval size $\frac{9}{32}$ ")

DESCRIPTION

Adults are copper to yellow, rounded beetles with 16 black spots on their backs. Larvae are yellow, oval, soft-bodied, grub-like insects with darker, branched spines.

DAMAGE

Adults and larvae feed on the underside of leaves and eat the softer leaf tissues. Beetles feed between the leaf veins causing a lacy appearance in heavily injured leaves. Mexican bean beetles attack soybeans throughout the season, but most damage occurs in August and September. Mexican bean beetles typically do not cause economic damage in North Carolina or Virginia, but occasional severe infestations occur, especially in unusually cool, cloudy summers.

BEAN LEAF BEETLE

(Cerotoma trifurcate)

(Size ¼")



DESCRIPTION

The color of adult beetles varies greatly from yellow to red. They usually have four distinct black spots on their back, although some are missing these spots. All have a distinct black triangular shaped mark just behind the head at the front of the wing covers.

DAMAGE

Beetles eat small rounded holes in the leaves usually inside the leaf margins, favoring unexpanded leaves. Damage is often more visually alarming than serious since holes expand with leaf growth. Beetles can feed on outer pod walls late in the season, causing them to look skinned or scarred. This damage can cause the seed to rot and shrivel. Bean leaf beetles attack the plant throughout the season but are most severe in late July and early September in late-maturing beans.

SPOTTED CUCUMBER BEETLE

(Diabrotica undecimpunctata howardi)



(Size ¼")

DESCRIPTION

Yellowish-green beetle with 12 black spots on its back.

DAMAGE

The spotted cucumber beetle eats foliage but is seldom abundant enough to cause yield loss. Damage by this insect may be significant if many other defoliating pests are present.

BLISTER BEETLE

(Epicauta pestifera) (Epicauta lemniscata)



(Size ¾")

DESCRIPTION

Black with gray margins on the wings. The three-striped blister beetle is yellow or orange with dark stripes running the length of the body (pictured). The margined blister beetle is black with gray margins on the wings.

DAMAGE

Blister beetles eat foliage. Severe defoliation sometimes occurs on field margins. These insects tend to congregate, with damage confined to small areas of the field. Blister beetles alone rarely cause economic damage.

JAPANESE BEETLE

(Popillia japonica)

(Size ½")

DESCRIPTION

Shiny green or greenish-bronze beetles with reddish-brown wing covers. White tufts of hair are present on the sides and tip of the abdomen.

DAMAGE

Japanese beetles eat the leaf areas between the veins and cause skeletonizing of the leaves. Although frequently found in soybeans during June and July, the insect seldom causes yield loss since defoliation is usually light and plants recover from damage before blooming.

OTHER FOLIAGE FEEDERS

GRASSHOPPERS

(Melanoplus spp.)

(Size 1½")

DESCRIPTION

Full-grown grasshoppers range in length from 19 to 38 mm. The differential grasshopper (pictured) is basically brownish-yellow or olive-green with contrasting black markings. On the hind femur, these markings resemble chevrons. The redlegged grasshopper has a reddish-brown back, a yellow belly and bright red hind legs. The two-striped grasshopper is greenish-yellow with contrasting black or brown markings. It has two light-color stripes that run from the head to the tips of the wings. Newly hatched nymphs are white. However, after several hours of exposure to sunlight, they assume the distinctive colors and markings of adults.

DAMAGE

Grasshoppers are foliage feeders. Immature grasshoppers are usually more of a problem in no-till fields. Often there will be concentrations of grasshoppers at the field edges. Situations where insect numbers are high are very rare, but in some cases the feeding can cause significant stand loss and defoliation.

SALTMARSH CATERPILLAR

(*Estigmene acrea*)



(Size 1½")


DESCRIPTION

Larvae are distinctly fuzzy with three pairs of legs near the head, plus four pairs of legs in the middle of the body and a pair of legs near the back (4 + 3 + 1).

DAMAGE

Saltmarsh caterpillar larvae will eat soybean foliage, but situations requiring treatment are very rare.

SLUGS



(Size ½" to 1½")

DESCRIPTION

Coloration and size vary by species and life stage, but all slugs in soybeans are soft-bodied and covered with a mucus-like slime. Slugs are difficult to sample, not only because of their small size, but also because they are active in low-light conditions, like cloudy days and at night. One thing that you can do is move the residue around to find the slugs and look for the slime of their trails where they have moved. The dried slime will shine in the sun.

DAMAGE

Slugs are more of a problem in no-till fields and can occasionally reduce stands by feeding on seedlings.

SILVER-SPOTTED SKIPPER

(Epargyreus clarus)



(Size ½")

DESCRIPTION

Green- and yellow-striped caterpillar with a large brown head and conspicuous yellow eyespots near the bottom of the head. These caterpillars can often be found inside a rolled leaf, held together with silk.

DAMAGE

Silver-spotted skipper larvae will eat soybean foliage, but treatable situations are very rare.

SOYBEAN THRIPS

(*Neohydatothrips variabilis*)



(Size $\frac{1}{50}$ " to $\frac{1}{25}$ ")

DESCRIPTION

There are multiple species of thrips that infest soybeans in North Carolina and Virginia, with soybean thrips being common. These tiny insects have a narrow body that is wingless and sausage-like in the immature stages. Adults are winged during the time of the year when soybeans are grown and have tiny hairs that look like fringes on the wings. Adult soybean thrips have alternating black and white bands on the wings and body.

DAMAGE

These insects are rarely pests, although they can often be found in high numbers; thrips have never been shown to reduce soybean yields in North Carolina or Virginia.

A close-up photograph of a green soybean pod, showing its fine hairs and the developing seeds inside. The pod is the central focus, with a soft, out-of-focus background.

POD FEEDERS

Insecticide treatments primarily target insects that attack the soybean pods and seeds. The most common pod feeders include corn earworm and stink bugs, although the bean leaf beetles sometimes feed on outer pod walls (see page 13). Not all soybean fields are subject to attack by pod feeders, however. Corn earworm and stink bugs both show varietal, row width and planting date preferences. Scout for corn earworm beginning in July and August, as late-blooming soybeans attract the pest. Stink bugs are most attracted to fields with developing pods.

CORN EARWORM

(Helicoverpa zea)



(Size 1½")

DESCRIPTION

Small corn earworms are usually brown with small dark spots. Larger caterpillars may be green, brown, yellow or black. The bodies are stocky with prominent pale brown or orange heads, never dark brown. Light and dark stripes run the length of the body, which also bears four pairs of legs near the head and one pair of legs near the back (4 + 1). When disturbed, this insect will drop to the ground and curl up. It does NOT crawl with a looping motion.

DAMAGE

This insect lays its eggs on blooming or succulent soybeans. The insect prefers blooming, open-canopy fields. Small earworms might be found in flower clusters. Feeding usually occurs first on foliage and later on pods. This pest can cause severe pod damage and defoliation.

GREEN STINK BUG

(*Chinavia (Acrosternum) hilaris*) (*Nezara viridula*)



(Size ¾")

DESCRIPTION

Adults are green, shield-shaped bugs. They fly readily and produce a distinct buzz when flying. Stink bugs give off a foul odor. Smaller nymph bugs do not have wing covers and are green with black, orange and white markings. Larger nymph bugs are green and, like all stink bugs, will begin to develop wing pads as they approach adulthood. Green stink bugs (*C. hilaris*) can be distinguished from southern green stink bugs (*N. viridula*) by turning the insect over and inspecting the spine that extends from where the hind legs meet the body. The green stink bug has a pointed spine between the last two legs, whereas the southern green stink bug has a rounded spine between the last two legs. Green stink bugs have black bands in the antennae, whereas the southern green stink bugs have red bands.

DAMAGE

Stink bugs suck the juices from immature soybean seeds and cause pod drop, yield loss and seed quality decreases. Yield loss can be substantial and could cause severe pod damage and defoliation.

BROWN STINK BUG

(Euschistus servus)



(Size ½")

DESCRIPTION

Shield-shaped bugs are similar in appearance to the green stink bugs but are dull brown and somewhat smaller. Younger bugs closely resemble adults but have no wings and are smaller. Newly hatched brown stink bugs are small, round and gray. When they become older, they take on a greenish-brown hue that becomes browner as they reach adulthood.

DAMAGE

This stink bug produces damage similar to the green stink bugs (see preceding page).

BROWN MARMORATED STINK BUG

(*Halyomorpha halys*)



(Size $\frac{3}{8}$ ")

DESCRIPTION

A brown-colored stink bug but distinguished from the brown stink bug by the white angular spots on the outside edges of the rear abdominal segments, coppery patches on or near the head and a white stripe on the next-to-last antennal segment.

DAMAGE

Damage is similar to other stink bug species but can occur in very large numbers on field edges, especially those next to wooded areas or late-planted corn fields.

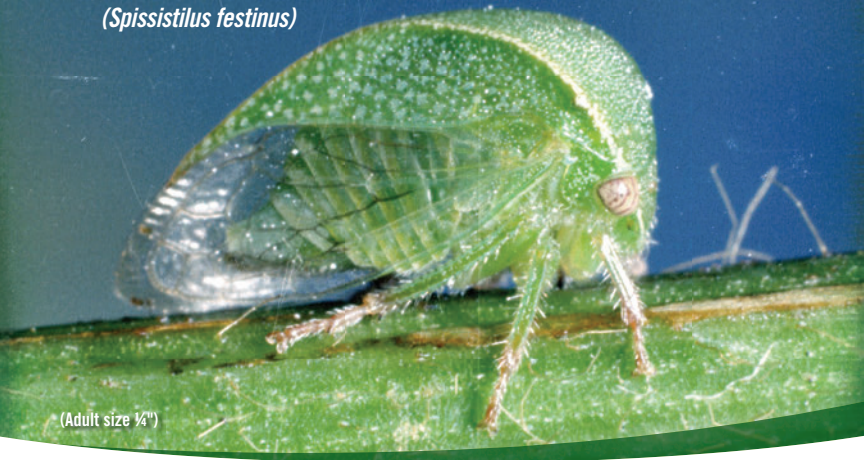


STEM FEEDERS

Stem-feeding insects cause relatively minor losses. In dry years, following burned wheat and/or in sandy soil conditions, lesser cornstalk borer (page 31) can be a serious pest. The *Dectes* stem borer (page 29) is an occasional sporadic pest that farmers usually detect at harvest when plants are found to be cut off and lodged. Other stem feeders regularly occur but infrequently cause economic damage.

THREE-CORNERED ALFALFA HOPPER

(*Spissistilus festinus*)



(Adult size ¼")

DESCRIPTION

Adults are shiny green wedge-shaped insects with a blunted front end and pointed rear. Young insects appear similar to adults but brownish in color, have no wings and have numerous spines resembling coral over the back.

DAMAGE

The pests feed on young soybean plant stems near the soil, with much of this damage occurring before plants reach 12 inches in height. When feeding, the pest punctures the stem, generally several inches above the soil line. As a result, plants frequently lodge during cultivation or windy periods. Lodging may result long after the damage occurs and usually does not reduce yield. The insect feeds on the leaf petioles and upper stems of older plants, leaving noticeable dark girdling scars, but this damage is not known to affect yields.

DECTES STEM BORER

(Dectes texanus texanus)



(Size $\frac{3}{5}$ ")

DESCRIPTION

Adults are charcoal-gray beetles with very long antennae that are commonly found in the crown of ragweed and sunflower during July and early August.

Larvae are cream-colored, legless grubs that tunnel the stems of soybeans, sunflowers, ragweed and other plants.

DAMAGE

The larvae cause damage to plants, tunneling through soybean stems and cutting off the plant at the base. Lodging often occurs after the plants have matured. More serious damage usually occurs in early maturing and non-rotated soybeans.

GRAPE COLASPIS

(*Colaspis brunnea*)

(Adult size ¼")

DESCRIPTION

Adults are tan beetles with darker lines running along the wing covers. They readily drop to the ground when disturbed. Larvae are small, brown-headed, white grubs that live in the soil. They are curved and somewhat flat from top to bottom.

DAMAGE

Most damage occurs when larvae eat small roots and the soft outer layers from below-ground stems, causing the plants to be severely stunted. Damage is usually limited to fields with soybeans following soybeans. Adults eat foliage but seldom occur in damaging numbers.



LESSER CORNSTALK BORER

(Elasmopalpus lignosellus)

(Size up to ¾")

DESCRIPTION

Dark yellowish-green or bluish-colored caterpillars with reddish-brown cross bands. They are found at the soil surface in silk and soil tubes next to the plant or in galleries under the stem near the soil surface. Larvae of this insect wiggle violently when disturbed and can crawl backward.

DAMAGE

Caterpillars tunnel or girdle small soybean plants at the ground level. Some plants may die, whereas others are severely stunted and may lodge. Damage commonly occurs in fields with wheat stubble that has been burned, as well as in late-planted soybeans on dry, sandy soils. This insect can be a serious pest in soybeans.

KUDZU BUG

(*Megacopta cribraria*)



(Adult size ¼")

DESCRIPTION

Adults are olive-green brown to dark brown and shiny. They are strong fliers. Nymphs are light green to dark brown with a hairy appearance.

DAMAGE

Damage can occur to soybean plants indirectly from stem feeding. The damage often manifests itself as lesions on the stem, and, in severe cases, dark sooty mold will cover the plant from the sugary excrement. Occasionally, injury can be seen on the pods, but this is only external. Because the insect robs the plant of nutrients being transported in the stem, plant maturity, number of seeds per pod and seed size can be negatively impacted. They produce a secretion when handled that can stain and cause irritation.

A close-up photograph of a soybean plant, showing several trifoliate leaves with vibrant green, oval-shaped leaflets. The leaves are densely packed and fill the upper two-thirds of the page. A semi-transparent white banner with a green border is positioned horizontally across the middle of the image, serving as a background for the title.

BENEFICIAL INSECTS

Beneficial insects can be quite common in soybeans and are best preserved by avoiding the application of insecticides or the use of insecticidal seed treatments unless necessary to control economic levels of damaging pests. Although many beneficial insects can be found in soybeans, some of the more useful and common ones are listed here.

GREEN LACEWING

(Chrysopa spp)

(Immature size $\frac{1}{4}$ " to $\frac{1}{3}$ ")

DESCRIPTION

Adults have a green, thin, cigar-shaped body with very long antennae. The wings are clear and extend well beyond the body with numerous netlike veins. Green lacewings can be commonly found around home porch lights on summer evenings. Eggs are laid singly on silken stalks attached to leaves. The larvae resemble small alligators with large jaws that snap shut sideways. These insects can give a pinch that is detectable on human skin.

PREY

Larvae of these insects will eat many arthropods found in soybeans such as mites, thrips, whiteflies, aphids and small caterpillars. They will also eat insect eggs.

ASSASSIN BUG

(*Reduviidae*)

(Size ¼" to 1"+)

DESCRIPTION

Several assassin bug species can occur in soybean fields. Adults have a long, thin body with wings covering the abdomen, and a long, thin beak for feeding on insects. The legs are also long and thin, and many species have a pattern of orange and gray, green or black on the legs, body and wings. Immatures look similar, but do not have wings and are generally a single color. Although not aggressive, these insects can use their beak to bite humans, which can be painful from larger species.

PREY

Both immatures and adults use their front legs to capture prey and their piercing, sucking beak to feed. Common prey includes caterpillars and aphids.

INSIDIOUS FLOWER BUG AND MINUTE PIRATE BUG

(Orius insidiosus and Orius tristicolor)



(Size 1/16")

DESCRIPTION

Adults are oblong, with a distinct white and black checkerboard pattern. Immatures are tiny and green to orange, with red eyes. These fast movers are best viewed with a hand lens.

PREY

Both immatures and adults use their front legs to capture prey and their piercing, sucking beak to feed. Common prey includes insect eggs, spider mites and aphids. They are voracious predators of spider mite eggs. These insects will also bite humans, but it is no more than a prick.

SPINED SOLDIER BUG

(*Podisus maculiventris*)



(Size ½")

DESCRIPTION

This beneficial stink bug species closely resembles and is often confused with the brown stink bug (page 25) or rice stink bug. Adults resemble the brown stink bug (*Euschistus spp.*) pest species very closely. A very thick beak located on the bottom side of the body characterizes the species (this structure is much thinner in the brown stink bug), which is used for feeding on insects rather than plants. This beak is more than twice as thick as the antennae. Immature spined soldier bugs do not have wings and have orange, brown and black coloring. Like the adults, they have a beak that is more than twice as thick as the antennae.

PREY

Both immatures and adults pierce prey, such as caterpillars, and feed with their beak.

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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