6 Insect Identification, Injury Symptoms, & Management Recommendations

Only the most common or the most economically –damaging corn insects in the North American region are discussed in this chapter. Most, but not all, insect identifications can be made in the field by trained individuals.

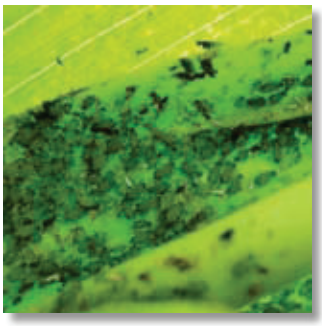
As insects progress through their life cycles, they change form and features. The following comments describe the appearance of damaging stages, which may not correspond with their appearance when damage is being investigated. It is not uncommon to investigate crop insect damage, but find none of the suspected insects. At other times, damage from insect feeding may be detected, but the insect is no longer present.

Use economic thresholds whenever possible and seek further pest management guidance if symptoms are unclear. Generalized thresholds for most pests are provided in this guide. These thresholds may change depending on the cost of a control tactic or the commodity value. Always confirm that pest numbers have been suppressed below thresholds following the application of a rescue tactic. Pesticides may perform below expectation due to environmental, chemical, or biological situations, or due to application timing.

While this publication is focused on in-season diagnostics and treatment options of insect pests of corn, a number of Bt traits are available for several of the insect pests discussed in this handbook. The Corn Insect Control with Monsanto Corn Insect Traits and Seed Treatments table (see pp. 39) provides a list of some of these products as well as the insects they control. These products provide season-long control of the specific insects and reduce the need for additional pest management action.

APHIDS

(1) Corn Leaf Aphid



This small, soft-bodied, bluish-green to gray insect colonizes on or in the whorl, upper leaves, and tassel, especially under dry conditions. It sucks plant juices and can cause wilting, pollen shed failure, and barrenness. The aphid secretes a sticky honeydew that may gather dirt and act as a medium for mold. Predatory insects, like the lady beetle, may be present and are important predators of aphids. Scouting should occur during late whorl to early tassel. Aphid infestations after 50% pollen shed have little effect on grain yield. A rescue application of insecticide may be warranted if 50% or more plants have light to moderate infestations and the crop is under moisture stress.

(2) Corn Root Aphid

This pinhead-sized, soft-bodied, blue-green to gray-green insect, may be winged or wingless. Corn root aphid groups are found in clusters on the crown and along the roots of young plants. They suck plant juices and cause wilting, discoloration, and stunting. Cornfield ants are generally found in conjunction with corn root aphid colonies. There are no rescue treatments for corn root aphid. Cultural practices like crop rotation and tillage can be effective preventative tactics.

ARMYWORMS

Fall Armyworm

The fall armyworm grows up to 1.5 inches long and appears greenish-brown in color with an inverted white "Y" on its head. It chews ragged holes in the leaves and usually concentrates in the whorl of young plants. The fall armyworm also feeds on the tassel and bores into developing ears. Early detection is critical since this pest feeds in protected areas of the plant. It lays round, gray eggs in clusters of 50 or more, which are usually covered with scales. Eggs hatch in 3 to 5 days and larvae migrate to the whorl and adjacent plants. Consider using a rescue application if eggs are present on at least 5% of plants or whorl injury is detected on 25% or more plants. Because larvae feed deep in the whorl of young plants, control with insecticides can be difficult.

(2) True Armyworm

The true armyworm is greenish-gray with orange or pinkish lines along the body. "Armies" migrate from maturing small grains or grass at night. They devour foliage, sometimes leaving only leaf midveins, and chew silks. Infestations are more frequent in no-till or reduced tillage systems and the true armyworm is usually only an occasional pest in rotated corn. Consider an insecticide application if 35% or more plants in the field are infested.

BILLBUG

This black or gray hard-shelled snout beetle is active only at night. Leaves are punctured while still rolled in the whorl. When they unfurl, irregular rows of holes appear across the leaves. The billbug also chews into plant stems at or below ground level. This feeding can damage the growing point and cause plants to be bent, twisted or stunted and sometimes die. Billbug incidence is often associated with nutsedge. Consider spraying for billbug if stand loss during seedling stages exceeds 5%.

CEREAL LEAF BEETLE

The adult is a 0.2 inch long, hard-shelled beetle with metallic blue-black head and wing covers, and reddish- orange legs and thorax. Feeding on corn is rare and usually limited to field borders. Though the beetle eats completely through the leaf between the veins, plants normally outgrow the injury and rescue applications are not necessary. Generally infestations are limited to Michigan, Indiana, and eastward.

CHINCH BUG

The adult is 0.25 inch long, and is red and black with white wing covers. When crushed, this bug emits a distinct odor. It migrates from grasses and maturing small grains, attacks field borders first and is most destructive during dry years. The young nymph (juvenile stage) is bright red, but turns black as it develops. Chinch bugs cluster in groups behind the sheath of lower leaves, sucking plant juices and causing wilting and eventual plant death. Management may be necessary if 10 or more chinch bugs are found on more than 50% of plants. Insecticide applications may be limited to only the infested area.

COMMON STALK BORER

This purplish-brown larva may reach 2 inches in length. It has white longitudinal stripes with a distinct purple saddle near the middle of the body. It tends to move out of weedy or grassy field borders and attack

corn on field edges (or throughout no-till fields). The larva tunnels into stalks or whorls. Infestation of plants at the 4-7 leaf stage can lead to dead heart. Whorl feeding results in leaves that have a ragged appearance with injury appearing as a series of holes across the leaf. Timing insecticide applications prior to borer tunneling is critical. Consider treating if 10% of V2 plants, 15% of V4 plants, or 30% of V6 plants show symptoms.

CORN BORER

(1) European Corn Borer

This larvae varies in shades of tannish-gray and ranges in size from less than 0.5 to 1.0 inch long. There are

two or more generations per season. Larvae of the first generation feed on leaves before they burrow into the stalk. This feeding causes broken midribs and creates a “shot hole” appearance as leaves grow out of the whorl. Consider treating first generation populations if the moth flight has already peaked and 5% or more of plants have shot hole feeding. Second generation larvae feed on and bore into stalks, tassels, ear shanks, and ear tips causing top breakage, ear drop (with husk attached), stalk lodging, and kernel damage. Treatment for second generation larvae may be necessary if more than 10% of plants have fresh or hatched egg masses, or young larvae in the leaf axils. Timing insecticide applications prior to insect tunneling is critical.

(2) Southwestern Corn Borer

This larvae is white or cream-colored and 0.5 to 1.0 inch long. It has distinct black spots except on the overwintering form. Two generations feed on corn. The first feeds on leaves and creates a “shot hole” effect or “dead heart” in very young plants. Later

instars tunnel in the stalk. The second generation larvae feed on developing ear tissue, bore into the shank and ear, and tunnel in the stalk below the ear zone. In the fall, overwintering larvae migrate to the base of the stalk and prepare overwintering tunnels in the stalk below soil level. These larvae girdle the plants near the soil level, resulting in severe stalk lodging. Treatment may be necessary for first generation populations when greater than 35% of plants hold larvae or show symptoms. Insecticide applications for both first and second generations must be applied before they begin tunneling. Consider a rescue treatment for second generation if eggs or young larvae are found on 20 to 25% of plants.

CORN EARWORM

This larva varies in color from green, yellow, brown

to pink, but all have a yellow-brown head and reach full size at about 1.5 inches. Since the insect is cannibalistic, two or more full-size larvae are seldom found together.

They may feed on leaves in the whorl, on the tassel or on silks, but the preferred feeding site is ear tips and on developing kernels. Moreover, ear injury often leads to ear molds and rots. The window for effective treatment is the few days after eggs are laid and before larvae tunnel into the silk channel.

CORN ROOTWORM

This small, white larva feeds on and tunnels into roots or crowns of young plants. It destroys root systems, can delay development, and causes root lodging. Lodging is accentuated by wind storms. Plants may "gooseneck" across rows and resume upright growth. Rescue treatments for control of corn rootworm larvae are available, but efficacy is greatly dependent on the product's ability to move into the root zone. Continuous corn or observations of adult beetles made the previous year can trigger the use of control tactics. The adult beetle may feed on corn leaves, stripping spots of the upper surface away. After pollen shed, it feeds on pollen and fresh silks. Heavy silk feeding can reduce or prevent pollination and result in partial or complete failure of kernel set. The beetle can be found in ear tips as maturity approaches. The general guideline for silk clipping insects is as follows: control may be necessary if silks are clipped to less than 0.5 inch and fewer than 50% of plants have been pollinated. Also, one beetle per plant in late summer is a useful guideline for justifying whether a control tactic may be necessary to prevent larval injury in continuous corn.

Corn rootworm feeding

(1) Mexican Corn Rootworm

The adult beetle is light green and looks similar to the northern corn rootworm beetle, but can be distinguished by a black stripe on the leg.

(2) Northern Corn Rootworm

The adult beetle is less than 0.5 inch long, tan or green to greenish-yellow without distinctive spots or stripes.

(3) Southern Corn Rootworm

The adult beetle is 0.25 to 0.5 inch long, yellow or greenish with six black spots on each wing cover.

(4) Western Corn Rootworm

The adult beetle is about 0.25 inch long, black and yellow striped or black with a yellow tip on the wing cover. It cannot be visually identified as to species.

CUTWORM

There are many species of cutworms that attack corn and other crops such as cotton, tobacco, and many vegetable crops. Cutworms are widely distributed; some species migrate to Corn Belt states from the South and many overwinter there. Young larvae typically feed on leaf margins and larger larvae feed below or at the soil surface. They chew into or

completely cut young stalks, causing wilting or death. Plants may recover if injury is limited to above the growing point. Cutworms are primarily active at night. An insecticide application should be considered if 2 to 3% of seedling plants are wilted or cut and larvae are early in their development (<0.75 inch). If larvae are larger, increase the economic threshold to 5% of plants wilted or cut. Plants at V5 or later stages of development usually are unaffected by cutworms.

(1) Black Cutworm

The black cutworm larva varies from almost black to lighter gray and is a pest of many crops at the seedling stage. Most of the Corn Belt is re-colonized each year with migrant adults. Cutting is usually observed 300 degree days (base 50°F) after heavy adult activity. Several generations per year are possible, but the first generation in spring is most injurious. Areas of high soil moisture or low-lying areas within a field are most favorable for this insect and should be scouted first.

(2) Western Bean Cutworm

The western bean cutworm affects corn during reproductive stages. The young larva has a pale body with longitudinal brown stripes along the back. Fully grown, it is light brown to pale gray with a brown head. The cutworm feeds on silks and chews into husks and developing ear tips of the ear shank. Severe ear and kernel damage can lead to mold and ear rots. This insect has historically been limited to the western Great Plains, but has moved eastward and can now be found in many areas of the Corn Belt.

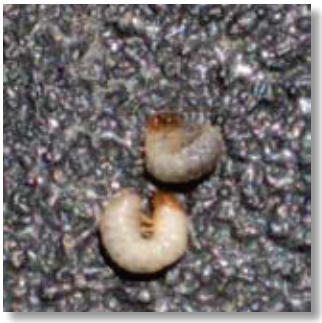
(3) Other Cutworms

The bronzed, claybacked, dingy, glassy, sandhill, and variegated cutworms are less frequent pests and less injurious to corn.

FLEA BEETLE

The flea beetle is a tiny, shiny, black beetle that jumps like a grasshopper when disturbed. It feeds on leaves of young plants and produces “scratch marks” or small holes. The flea beetle is the primary vector of the bacterium that causes bacterial (Stewart’s) wilt of corn. Consider treating field corn if five or more beetles per plant are found on V4 or younger corn and adverse growing conditions have slowed corn growth. Current seed treatments generally provide good control.

GRAPE COLASPIS



This white, curved, grub-like larva develops six distinct foreleg projections. It feeds on young corn roots and can cause nutrient deficiency symptoms.

GRASSHOPPER

Several species of grasshoppers attack corn. The grasshopper generally moves from field-side hatching sites. It eats leaves from the margin inward and may prevent pollination by clipping silks. The grasshopper may also chew on tassels, husks, stalks, or kernels. Defoliation and ear damage should be used to determine if an insecticide treatment is necessary in field corn. It may be more economical to limit applications to infested areas like field margins.

JAPANESE BEETLE

This shiny, green-bodied adult beetle has copper- to bronze- colored wing covers. As an adult, it grows to about 0.5 inch in length and feeds on corn leaves and silks. Leaf feeding by this pest appears skeletonized or "lacy." Larvae are white with a brown head and feed unobtrusively on the roots of plants. They can be differentiated from other white grubs by the V-shaped pattern of bristles on the raster. The general guideline for silk clipping insects, such as an adult Japanese beetle, is as follows: control may be necessary if silks are clipped to less than 0.5 inch and fewer than 50% of plants have been pollinated.

LEAF MINER

This small, white larva or maggot tunnels between leaf surfaces, leaving long blotchy tunnels within the leaf. This pest seldom reaches economic proportion in corn.

LESSER CORNSTALK BORER

This black larva with white bands burrows into the stalk base of young plants. This borer causes wilting and plant deformities like twisted, bent or often barren plants.

PICNIC BEETLE

(Sap Beetle, Scavenger Beetle)

This small, dark beetle usually has four orange or

cream colored spots on wing covers. It frequently inhabits ear tips as corn approaches maturity and often appears where primary insect pests or birds have damaged ear tips.

SEED CORN BEETLE

This small, 0.25 to 0.33 inch long brown ground beetle damages the germ and hollows seed before it germinates. The beetle also attacks emerging seedlings, causing spotty stands. Damage is greatest if germination has been delayed by the environment. Current seed treatments generally provide good control.

SEED CORN MAGGOT

This yellowish-white spindle-shaped larva, is about 0.25 inch long and may eat the entire kernel before it germinates. Often times it leaves only the seed coat behind. Wet, cold, and heavy soils are associated with this pest that can create spotty, uneven stands. Modern seed treatment provides good control. Otherwise, there is no rescue treatment for seed corn maggot and replanting may be the only option.

SLUG

This soft-bodied, slimy and legless grayish creature hides under residue. It is active at night and leaves a telltale silver-colored slime trail on the soil surface. It feeds using a rasping action on the lower stalk and leaves of young plants. This feeding often removes only one surface of a leaf and the symptom is more common in no-till systems. Insecticidal baits are available for slug control, however, injury seldom warrants this expense.

SOUTHERN CORN LEAF BEETLE

Adult beetles are dark brown and can be difficult to find in the field because they are often covered with soil. Beetles feed on stems and on the edges of leaves of seedlings. Injured plants appear ragged. When beetles feed in large numbers, plants may die. This beetle is most problematic in fields that have not been cultivated.

SPIDER MITE

Two species can cause severe damage to corn: banks grass mite and two-spotted spider mite. Spider mite problems are more prevalent when temperatures are high and humidity and rainfall are low. The tiny (about the size of a pencil dot), eight-legged creature feeds by piercing individual leaf cells and sucking out the contents. Damage is usually first noted as plants approach tasseling and continues through grain dent stage. Lower leaves appear blotched and chlorotic and continued feeding can cause leaves to die. Damage symptoms progress up the plant with time. The mite spins a white web on the leaf surface where it feeds.

STINK BUG

Several species of green or brown stink bugs occasionally attack corn. The adult (shield bug) has a hard, angular back and wing covers, and gives off a foul odor if crushed. It inserts its piercing-sucking mouthparts into the base of young plants and can kill the growing point or distort further growth.

SUGARCANE BORER

This tan larvae has indistinct brown spots on each segment. It feeds in whorl-and reproductive-stage plants similar to the southwestern corn borer, except that it does not girdle the stalk. Yield losses occur

due to reduced ear weight. The sugarcane borer is found in Florida, Louisiana, Mississippi, and Texas.

THRIPS

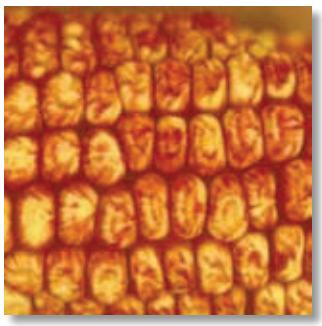
Several species of this tiny, slender insect occasionally feed on leaves of young corn plants. As an adult, it develops wings. With mouthparts fitted for rasping and sucking, thrips remove the green surface layer in tiny streaks. Individual leaves have a speckled appearance and fields, or affected areas, may look silvery.

WEBWORM

The garden webworm and sod webworm attack young corn. It appears as a gray to yellow-green, spotted, bristly larva about 1 inch long. This pest gets its name from the fine web it spins from its silk-lined underground nest. The larva uses this web to travel to plants at night and return to its nest during the day. Similar to the cutworm and wireworm, the webworm's primary feeding site is at or just below the surface. Injury becomes more obvious as damaged leaves emerge from the whorl. Larvae also feed on the underside of lower leaves.

WHEAT CURL MITE

(Kernel Red Streak)



Kernel red streak is caused by a toxin secreted during feeding of the wheat curl mite. It is most common on yellow corn, but may occur on sweet corn, popcorn, and white corn. Streaks are more pronounced toward ear tips, especially if kernels are exposed. Streaks vary from dark red on yellow kernels to pink on white kernels. No detrimental effects from the discoloration are known.

WHITE GRUB

The larva has a thick, soft body with three pairs of legs just behind a brown head. It ranges from 0.125 to 1.5 inches long depending on age, and it characteristically curls into a "C"-shape when disturbed. There are several species with 1 to 4 year life cycles. The white grub feeds on developing roots of young plants, and causes stunting, nutrient deficiency symptoms and death. Heaviest infestations occur where corn is planted into killed sod. There are no rescue treatments for grubs and the percent stand loss is the best gauge for determining if replanting is worthwhile.

WIREWORM

The larva is shiny and slender with a yellow- to brown-colored hard body. It ranges in size from 0.5 to 1.5 inches long, depending on age and species.

Damage to seed or young plants reduces stand and vigor. It damages the germ, stunts plants by root pruning or kills the growing point by boring into the base of the stem near ground level. Modern seed treatments prevent damage to seeds. Like grubs, there is no way to combat this pest after stands have been thinned. Use percent stand loss as a gauge for determining if replanting is worthwhile.

Photo Citations:

Frank Peairs, Colorado State University, Bugwood.org (viewed 9/23/10) Armyworm 5364223

Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org (viewed 9/23/10) Billbug 1234011

University of Georgia Archive, University of Georgia, Bugwood.org (viewed 3/11/2011) Grasshopper 4709020

David Riley, University of Georgia, Bugwood.org (viewed 9/23/10) Lesser Cornstalk Borer 2511032

Alton N. Sparks, Jr., University of Georgia, Bugwood.org (viewed 3/11/2011) White grub (scarab) 1327103

Corn earworm damage

Corn Insect Control with Monsanto Corn Insect Traits and Seed Treatments

		Protection for Above and Below Ground Pests			Protection for Above Ground Pests
	Trait Name	**Genuity® SmartStax®**	**Genuity® VT Triple PRO™**	**YieldGard VT Triple®**	**Genuity® VT Double PRO™**
	Trait Logo	genuity SMARTSTAX CORN SmartStax	genuity VT TRIPLE PRO CORN	YieldGard VT Triple	genuity VT DOUBLE PRO CORN
	Seed Treatment	ACCELERON Insect Disease Corn Seed Treatment Products	ACCELERON Insect Disease Corn Seed Treatment Products	Poncho® 250	ACCELERON Insect Disease Corn Seed Treatment Products
	Insects				
Above Ground	European corn borer	Trait	Trait	Trait	Trait
Above Ground	Southwestern corn borer	Trait	Trait	Trait	Trait
Above Ground	Corn earworm (ear feeding)	Trait	Trait	Trait	Trait
Above Ground	Western bean cutworm	Trait	NC	NC	NC
Above Ground	Black cutworm	Trait/250 Rate	250 Rate	250 Rate	250 Rate
Above Ground	Fall armyworm	Trait	Trait	Trait	Trait
Above Ground	Sugarcane borer	Trait	Trait	Trait	Trait
Above Ground	Common stalk borer	Trait	Trait	Trait	Trait
Above Ground	Lesser cornstalk borer	Trait	Trait	Trait	Trait
Above Ground	Corn flea beetle (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Above Ground	Corn leaf aphid (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Above Ground	Chinch bugs (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Above Ground	Southern corn leaf beetle (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Below Ground	Western corn rootworm larvae	Trait	Trait	Trait	NC
Below Ground	Northern corn rootworm larvae	Trait	Trait	Trait	NC
Below Ground	Mexican corn rootworm larvae	Trait	Trait	Trait	NC
Below Ground	Wireworm (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Below Ground	White grubs (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Below Ground	Grape colaspis (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate
Below Ground	Seedcorn maggot (seedling stage)	250 Rate	250 Rate	250 Rate	250 Rate

Color Key to Activity

= Control

= Suppression

= No Control

Insect activity conferred by:

Trait, Insecticide 250 rate, or multiple

Trait, Insecticide 250 rate, or multiple

NC = No Control