South Dakota State University Extension

An identification guide for

Sunflower Insect Pests

in South Dakota

Department of **Agronomy, Horticulture and Plant Science**
College of **Agriculture, Food and Environmental Sciences**

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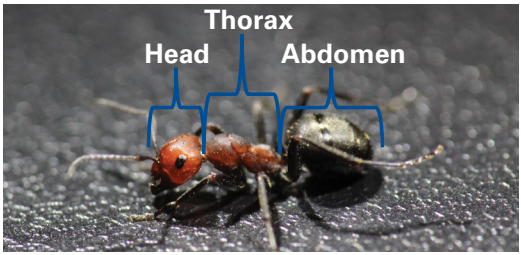
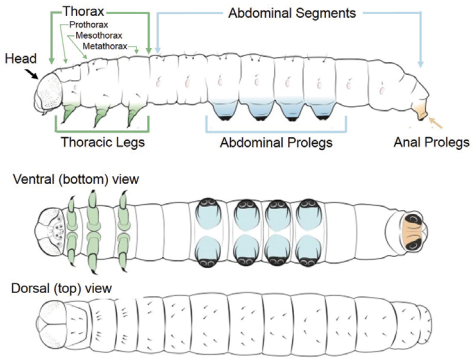
How to identify insects and caterpillars

Adult insects have three distinguishing features to look for: six legs, one-two pairs of wings, and three body segments (head, thorax and abdomen). These features are found on all insects even though they can sometimes be modified and appear differently or be missing completely. Beetles also have two pair of wings, except the forewings are modified into hard shells/ covers called elytra.



Caterpillars are the larval (immature) form of butterflies and moths. There are several characteristics used to identify caterpillar species, including color, patterns, number of abdominal prolegs, and the presence of elongated hairs and/or tubercles (spots). Of these characteristics, the number of abdominal prolegs is often the most important.



Dingy Cutworms

(Lepidoptera: Noctuidae)
(Culex tarsalis)

Caterpillar Identification

- Dull brown to cream colored
- Broad, diagonal “V” shaped gray markings on each body segment
- Light brown head capsule with dark brown markings
- Last instar is 1-1 ¼ inches long

Adult Identification

- Drab brown-gray color
- Front wings are dark brown with light brown bean shaped marking below light triangle

Darksided Cutworms

(Lepidoptera: Noctuidae)
(Culex tarsalis)

Caterpillar Identification

- Body color ranges from gray to brown
- Slim dark gray stripe along each side
- Last instar length around 1 ½ inches

Adult Identification

- Light colored forewings with darker markings

Redbacked Cutworms

(Lepidoptera: Noctuidae)
(Euxoa ochrogaster)

Caterpillar Identification

- Body color ranges from dull gray to brown
- Two dull red stripes run lengthwise
- Last instar size is around 1 ¼ inches

Adult Identification

- Reddish brown forewings with both circular and bean shaped mottled gray markings

Redbacked Cutworms

(Lepidoptera: Noctuidae)
(Euxoa ochrogaster)

Caterpillar Identification

- Gray to pale yellow body
- Distinct white line down middle of the back
- Light brown head capsule with black inverted V marking

Adult Identification

- Tan to gray with light colored circle on forewings

Cutworms

(Lepidoptera: Noctuidae)

Crop Injury and Damage

- Small holes, notches, or transparent windows on leaves (dingy, redbacked and darksided)
- Plants cut right at or below soil line (dingy) and 1 inch below to 2 inch above soil line (later stage redbacked and darksided)
- Plants fed on exclusively below soil surface (pale western)

Scouting Tips

- Caterpillars are nocturnal feeders, but may be observed feeding during the day
- Cut plants and defoliated plants are good indicators of cutworm presence
- Dig 1 to 6 inches deep around cut plant and search for caterpillars

Economic Thresholds

- Threshold of 1 caterpillar per square foot is observed OR
- 25-30% of scouted plants are cut

Management

- Insecticide seed treatments
- Apply foliar insecticides late day to early evening
- Only minimal management for pale western cutworm due to below ground feeding habits

Palestripped Flea Beetle

(Coleoptera: Chrysomelidae)

Larvae Identification

- Small, white, and slender

Adult Identification

- Approximately ⅛ inch long
- Shiny brown to black with a single white stripe running along each elytron (hardened forewing)
- Enlarged hind legs allow for jumping

Palestripped Flea Beetle

(Coleoptera: Chrysomelidae)

Crop Injury

- Larvae can inflict minor injury to roots
- Adults feed on young leaves and cotyledons resulting in stunting or death of plant
- Injury from adults can also be observed as either irregular or small pits in the leaf

Scouting Tips

- Monitor newly emerged plants every week until the V4 growth stage

Cultural Controls

- Residue management in field
- Remove alternative host plants in field margins
- Rotate crops

Economic Thresholds

- Visible injury observed in 20% of field

Management

- Insecticide seed treatments
- Foliar insecticide recommended when economic threshold reached

Notes

- Larvae overwinter in soil
- Adults emerge in June and remain active through summer

Thistle Caterpillars

(Lepidoptera: Nymphalidae)
(Vanessa cardui)

Caterpillar Identification

- Variation of black, yellow, or gray body
- Long black, yellow, or gray spines
- 4 pairs of abdominal prolegs
- Length varies from 1 ¼ to 1 ½ inches

Adult Identification

- Orange and brown wing colorations with dark spots on wing edges
- Forewing edges are darker than hindwing edges
- Black, white, and orange markings are on the inside of the forewings
- Wingspan ranges from 2 to 2 ¾ inches

Thistle Caterpillars

(Lepidoptera: Nymphalidae)
(Vanessa cardui)

Crop Injury

- Occasional pest especially during vegetative stages
- Feeding results in irregular holes and/or entire removal of leaves

Scouting Tips

- Early season: look for irregular holes in leaves or leaves bound by silken webs
- Examine 20 plants in an “X” pattern per site for defoliation

Economic Thresholds

- If average of 20 sampled plants is 25% defoliation, then management is recommended if caterpillars are 1 ¼ inches or less

Management

- Foliar insecticides

Notes

- Caterpillars will feed late June to early July
- One to two generations per growing season

Silvery Checkerspot Caterpillar

(Lepidoptera: Nymphalidae)
(Chlosyne nycteis)

Caterpillar Identification

- Black body that may or may not have small white spots
- One broad stripe ranging from yellow to orange on the back and two thin stripes along the sides
- Multiple branched spines along body
- Can reach 1 ½ inches in length

Adult Identification

- Pale orange wings with black edges and markings
- Silver patches/spots under the wings
- Hindwings with large white crescent shape at the margin
- Wingspan ranges from 1 ½ to 2 inches

Silvery Checkerspot Caterpillar

(Lepidoptera: Nymphalidae)
(Chlosyne nycteis)

Crop Injury

- Group feeding after hatching can cause rapid defoliation
  - Leaves appear skeletonized
  - Concentrated areas of waste

Scouting Tips

- Sample 10 random plants in one area and repeat 5 additional times within the field
- Determine defoliation on every plant sample collected

Economic Thresholds

- 25% plant defoliation
- Majority of the caterpillars are less than 1 ¼ inches long

Management

- If economic threshold is reached, insecticide application may be necessary
- Spot spraying where defoliation is heaviest

Grasshoppers

(Orthoptera: Acrididae)

Nymph Identification

- Size varies by life stage and species
- Nymphs will go through 4-6 instars
- Color will vary by life stage and species
- Wing pads present that will increase in size through development
- Nymph identification to species is often difficult to impossible depending on the species

Grasshoppers

(Orthoptera: Acrididae)

Redlegged Grasshopper

(Melanoplus femurrubrum)

Adult Identification

- Medium body size ranging from ⅔ to 1 inch long
- Black and yellow-orange body coloration
- Black stripe down entire hind femur
- Red hind tibia, rarely blue
- Partial black band on thorax
- Rare individuals of the species will have a yellow and blue body coloration

Grasshoppers

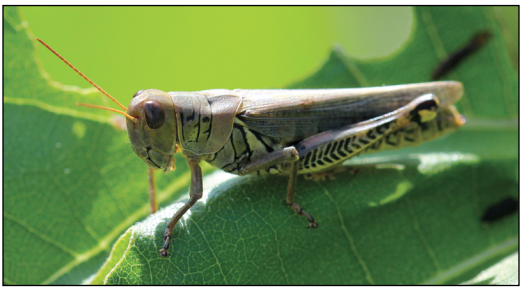
(Orthoptera: Acrididae)

Differential Grasshopper

(Melanoplus differentialis)

Adult Identification

- Large body size ranging from 1 ⅛ to 1 ½ inches long
- Green to olive to yellow body coloration
- Black chevrons on hind femur
- Hind tibia light green to gray color
- Rare individuals of the species will have a black (melanistic) body coloration



Grasshoppers

(Orthoptera: Acrididae)

Two-Striped Grasshopper

(Melanoplus bivittatus)

Adult Identification

- Large body size ranging from 1 to 1 ½ inches long
- Brown to tan body coloration
- Two yellow stripes that run from the head to the tips of the wings, forming a triangle
- Black stripe down entire hind femur
- Blue to gray hind tibia

Grasshoppers

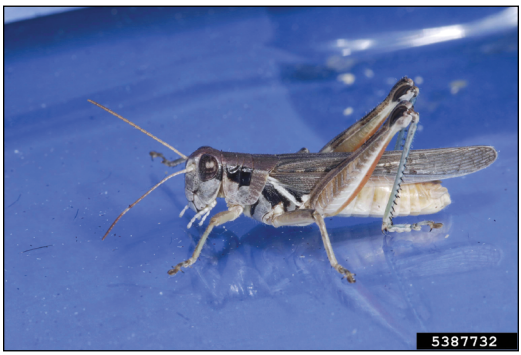
(Orthoptera: Acrididae)

Migratory Grasshopper

(Melanoplus sanguinipes)

Adult Identification

- Medium body size ranging from ¾ to 1 ⅛ inches long
- Black and yellow-orange body coloration
- Black stripe down entire hind femur
- Blue green or red hind tibia
- Partial black band on thorax



Grasshoppers

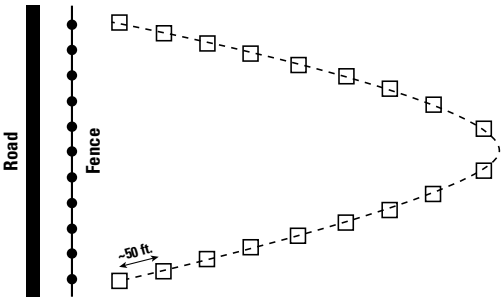
(Orthoptera: Acrididae)

Crop Injury

- Nymphs and adults feed on leaves
- Large populations of grasshoppers can result in complete defoliation

Scouting Tips

- Walk in a U-pattern to include the edge and center of the field for evaluation. Stop at multiple locations along the pattern and scout for grasshoppers



- At each stop point, stand and count the moving grasshoppers in approximately a one square yard area

Grasshoppers

(Orthoptera: Acrididae)

Economic Thresholds

- 8-10 adult grasshoppers per square yard within the field
- 15-20 nymph grasshoppers per square yard within the field

Notes

- Seedlings should be monitored closely for early season defoliation
- Cause more issues during dry seasons
- Warm fall conditions and late frost may result in increased grasshopper populations during the following year
- Increased spring rainfall may have negative impact on populations

Sunflower Beetle

(Coleoptera: Chrysomelidae)
(Zygogramma exclamationis)

Larvae Identification

- Light brown head capsule
- Green, yellow, or white body
- Size similar to adult stage

Adult Identification

- Approximately ⅓ of an inch in length
- Brown head
- Pronotum brown with white margins towards head
- White elytra with 3 lateral brownish black lines and a fourth shorter line ending at a dot
- Individual lateral brown line runs along center of elytra

Sunflower Beetle

(Coleoptera: Chrysomelidae)
(Zygogramma exclamationis)

Crop Injury

- Defoliation caused by both life stages
- Newly hatched larvae feed during the night on the underside of leaves
- Second generation adults feed on upper leaves and sunflower heads
- Early season feeding can remove entire leaves
- Late season feeding will result in leaves with lace-like holes

Scouting Tips

- Sample 5 sites using “X” pattern
- Examine 20 plants per site
- Monitor defoliation percentage

Cultural Controls

- Natural enemies and parasites

Economic Thresholds

- 25% defoliation OR
- Average of 1-2 adults or 10-15 larvae per plant during V2-V6 growth stages

Management

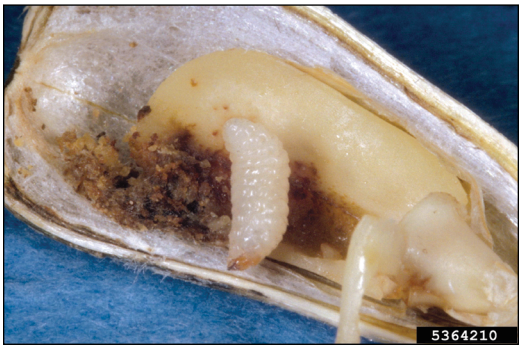
- Apply insecticides when economic threshold is reached
- Apply insecticidal seed treatments to suppress early season pressure if past growing season had high pest populations

Red Sunflower Seed Weevil

(Coleoptera: Curculionidae)
(Smicronyx fulvus)

Larvae Identification

- Light brown head capsule
- Cream-colored body
- Legless
- Curl into a C-shape when disturbed



Adult Identification

- Reddish-orange in color
- Elongated black snout
- Small, bent antennae originating from snout
- Approximately 1/10 of an inch long

Red Sunflower Seed Weevil

(Coleoptera: Curculionidae)
(Smicronyx fulvus)

Crop Damage

- Larvae feed on developing seed, reducing seed oil content and weight

Scouting Tips

- Start when >50% of plants are between showing yellow ray petals (R5.0) and 30% of the head shedding pollen (R5.3). Continue through 70% pollen shed (R5.7)
- Select 5 sites at least 75 feet from field edge to sample with at least one site on each side of the field
- Count adults on 5 plants per site and calculate average weevil(s) per plant
- Spraying a repellent containing DEET onto the head will force many adults to surface

Cultural Controls

- Plant early to reduce levels of infestation

Economic Thresholds

- 4-6 adults per plant

Management

- Apply foliar insecticide at R5.4 with a pollen shed average of 40%
- Scout fields 48 hours after insecticide application to determine effectiveness

Notes

- 1 generation per year
- Larvae instars 1-5 develop inside achenes
- 5th instar emerges late fall, drops to soil, and overwinters
- Adults emerge early summer
- Populations with reduced susceptibility to lambda cyhalothrin, esfenvalerate, and zeta-cypermethrin active ingredients detected in South Dakota

Gray Sunflower Seed Weevil

(Coleoptera: Curculionidae)
(Smicronyx sordidus)

Larvae Identification

- Light brown head
- Legless with cream-colored body
- Curl into C-shape when disturbed

Adult Identification

- Light gray in color
- Elongated black snout
- Small bent antennae originating from snout
- Approximately ⅛ of an inch long

Gray Sunflower Seed Weevil

(Coleoptera: Curculionidae)
(Smicronyx sordidus)

Crop Damage

- Larvae consume entire developing seed
- Adults feed on leaves and beneath bracts where developing flower buds are located
- Adult feeding is minor

Scouting Tips

- Begin scouting when plants reach R1
- Stop scouting once majority of plants have reached R4 growth stage

Economic Thresholds

- No set thresholds

Management

- Insecticide application must occur when 10-15% of field hits R4 growth stage OR prior to bloom

Notes

- One generation per year
- Overwinter as last instar larvae

Banded Sunflower Moth

(Lepidoptera: Cochylidae)
(Cochylis hospes)

Larvae Identification

- Head capsule initially dark brownish-black in color but turns light brown in mature larvae
- Young larvae initially off-white in color
- Body color turns pinkish-red followed by blueish-green in later instars

Adult Identification

- Approximately ½ of an inch wingspan
- Yellowish-tan forewings with dark band

Banded Sunflower Moth

(Lepidoptera: Cochylidae)
(Cochylis hospes)

Crop Damage

- Young larvae feed on bracts and open florets
- Early feeding reduces overall seed numbers
- Mature larvae consume seed contents by tunneling through base of floret and into seed
- 6-7 kernels can be consumed per larvae

Scouting Tips

- Begin scouting mid-July through mid-September
- Small patches of webbing on sunflower head indicates presence of larvae
- Use a magnifying lens to scout for eggs
- Pick 8 random areas consisting of 5 plants and count eggs on 6 outer bracts of a bud per plant
- Calculate and compare average eggs observed per plant to the economic threshold

Economic Thresholds

- 2 to 3 eggs per 6 bracts
- 1 adult per 100 plants

Management

- Apply insecticide treatment either early morning or late afternoon to sunflower heads when either egg or adult threshold is reached

Sunflower Moth

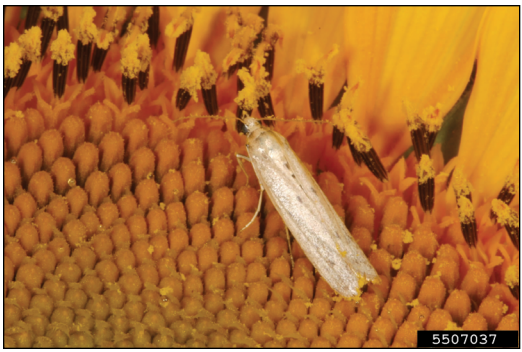
(Lepidoptera: Pyralidae)
(Homoeosoma electellum)

Larvae Identification

- Distinct orange head
- Black with light colored stripes
- Body color can change to light brown with white stripes in mature caterpillars
- Approximately ¾ of an inch at final instar

Adult Identification

- Mottled gray body
- Wingspan from ½ to 1 inch
- Wings tucked into body when at rest



Sunflower Moth

(Lepidoptera: Pyralidae)
(Homoeosoma electellum)

Crop Damage

- Caterpillars feed on pollen, corollas, and developing achenes
- Rhizopus head rot can occur when caterpillars tunnel into tissue of sunflower head and is the main source of yield loss
- Each caterpillar may feed on 3-12 seeds
- Webbing may cause buildup of debris and lead to additional head decay

Scouting Tips

- Begin scouting at the R4 growth stage
- Use flashlight 1 hour after sunset to examine fields during peak moth activity
- Select 20 plants from 5 random locations in the field and count the number of moths on each head
- Silken webs covering most of the sunflower head give it “trashy” appearance

Cultural Controls

- Planting later in the season can prevent moths from reaching economic threshold

Economic Thresholds

- 1-2 moths per 5 sunflower heads

Management

- Apply insecticide to sunflower heads in the evening once threshold has been reached

Sunflower Bud Moth

(Lepidoptera: Tortricidae)
(Suleima helianthana)

Larvae Identification

- Dark head capsule
- Smooth cream-colored body
- Approximately ¼ to ½ of an inch long at final instar

Adult Identification

- Overall gray in color
- Two dark, traverse markings on back of forewings
- Approximately ⅔ of an inch wingspan

Sunflower Bud Moth

(Lepidoptera: Tortricidae)
(Suleima helianthana)

Crop Damage

- Feeding injury occurs in the stalk
- Head development disrupted when caterpillars tunnel through unopened buds

Scouting Tips

- Not established due to lack of economic significance

Economic Thresholds

- N/A

Notes

- Up to 2 generations per year
- Caterpillars pupate within plant and emerge as adults

Headclipping Weevil

(Coleoptera: Curculionidae)
(Haplorhynchites aeneus)

Adult Identification

- Black in color
- Characteristic bronze sheen
- Elongated snout with antennae near base of snout
- Approximately ⅓ of an inch long

Headclipping Weevil

(Coleoptera: Curculionidae)
(Haplorhynchites aeneus)

Crop Damage

- Adult feed on peduncle
- Girdling or head clipping can result

Scouting Tips

- Scout field in “X” pattern
- Count all adult weevils

Economic Thresholds

- 1 adult per 2 plants scouted
- Entire field has >5% clipped heads

Management

- Apply insecticide to sunflower heads when threshold levels are reached

Notes

- Larvae overwinter in detached sunflower heads
- Adults emerge in July and feed for approximately 2-3 weeks
- Economic injury rarely occurs

Sunflower Midge

(Diptera: Chironomidae)
(Contarinia schulzi)

Larvae Identification

- Cream to yellowish-orange in color
- Approximately ⅛ of an inch in length
- Cause head deformations

Adult Identification

- Tan body with transparent wings
- Approximately 7/100 of an inch in length
- Wingspan is roughly 2/10 of an inch
- Clusters on bracts

Sunflower Midge

(Diptera: Chironomidae)
(Contarinia schulzi)

Crop Damage

- Larvae feed on edge and center of heads
- Most damage occurs from center feeding
- Large populations can cause underdeveloped and twisted heads
- Sporadic damage near field margins
- Varies from bract damage, cupping, to closed heads with no seeds

Scouting Tips

- Observe field margins for underdeveloped or damaged heads

Cultural Controls

- Crop rotations
- Staggered planting dates
- Tolerant sunflower hybrids

Economic Thresholds

- N/A

Notes

- Overwinter as adults
- 1-2 generations per year
- Typically move from previously infested field to nearby sunflower field

Sunflower Receptacle Maggot

(Diptera: Tephritidae)
(Gymnocarena diffusa)

Larvae Identification

- Yellowish-white in color
- Approximately 5/16 of an inch when mature

Adult Identification

- Bright yellow body
- Mottled brown pattern on wings
- Metallic green eyes
- Approximately 5/16 of an inch in length

Sunflower Receptacle Maggot

(Diptera: Tephritidae)
(Gymnocarena diffusa)

Crop Damage

- Larvae feed and cut emergence holes on receptacles

Scouting Tips

- Check for adult presence during June and early July
- Check for exit holes in receptacle during August and early September

Cultural Controls

- Rotating crops can keep populations low

Economic Thresholds

- N/A

Notes

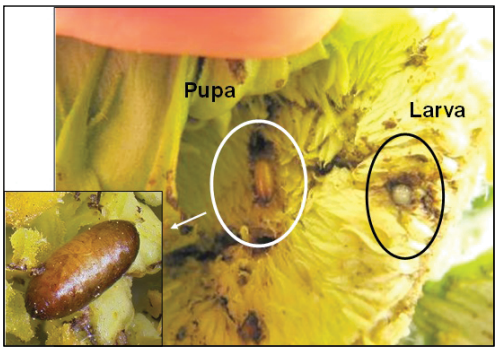
- Overwinter as pupal stage

Sunflower Seed Maggot

(Diptera: Tephritidae)
(Neotephritis finalis)

Larvae Identification

- White in color
- Approximately ⅕ of an inch in length
- Pupae yellowish-tan and become reddish-brown when mature
- Oblong shape



Adult Identification

- Light brown in color
- Clear wings with mottled, dark “X” pattern
- Light yellowish-brown head
- Green to red metallic eyes
- Abdomen end is dark, reddish-brown
- Approximately ¼ of an inch in length

Sunflower Seed Maggot

(Diptera: Tephritidae)
(Neotephritis finalis)

Crop Damage

- First-generation larvae feed on 10-12 ovaries and florets
- Feeding can result in deformed sunflower heads, lost or undeveloped seeds
- Second-generation larvae feed on developing seeds

Scouting Tips

- Monitor adults from late June to mid-August
- When scouting for larvae and pupae, look for deformed sunflower heads and dig into the receptable

Cultural Controls

- Later planting date may aid in avoiding first-generation adults
- Presence of natural enemies *(Pteromalus spp.)*

Economic Thresholds

- N/A

Notes

- 2 generations per year
- Overwinter as second-generation larvae

Aphids

(Hemiptera: Aphididae)

Sunflower aphid *(Aphis asclepiadis)*: Top left

Green peach aphid *(Myzus periscae)*: Top right

Cotton aphid *(Aphis gossypii)*: Bottom left

Potato aphid *(Macrosiphum euphorbiae)*: Bottom right

Adult Identification

- Small size with varying coloration
- Winged and wingless adults
- Soft bodied
- Two cornicles or “tailpipes” on end of body

Aphids

(Hemiptera: Aphididae)

Crop Damage

- Aphids feed on plant phloem using piercing-sucking mouthparts
- Large populations can result in wilting or yellowing of sunflowers

Scouting Tips

- Monitor the underside of leaves

Economic Thresholds

- Individual judgement of overall sunflower health combined with population sizes

Management

- Large populations may require foliar insecticide labeled for aphids

Notes

- Alternative hosts and life cycle vary by species
- Numerous generations per season due to asexual reproduction

Lygus Bugs

(Hemiptera: Miridae)

Nymph Identification

- Light green body
- Later instars with 5 black spots on the back
- Wings not fully developed
- Size ranges from 1/16 to 5/32 of an inch long depending on developmental stage

Adult Identification

- Green to brown in color
- White triangular mark on the back
- End of bodies bent downward
- Approximately ¼ of an inch long

Lygus Bugs

(Hemiptera: Miridae)

Crop Damage

- Nymphs and adults feed on seeds
- Injected digestive enzymes can cause kernel brown spot in confection seeds
- Causes obvious spot on seed and bitter taste when consumed
- Each adult may damage over 30 seeds

Scouting Tips

- Begin scouting at onset of flowering

Economic Thresholds

- 1 adult per 10 plants for confection sunflower

Management

- Foliar insecticides labeled for Lygus bugs
- Continue scouting as second application may be necessary

Notes

- Overwinter as adults
- 2 to 3 generations per year

Dectes Stem Borer

(Coleoptera: Cerambycidae)
(Dectes texanus)

Larvae Identification

- White to cream colored body
- Legless
- Orange-brown head capsule
- Accordion-shaped body segmentation
- Approximately ½ to ⅝ of an inch in length

Adult Identification

- Light gray in color
- Alternating black and light gray antennae
- Antennae length longer than body
- Approximately ⅜ of an inch in length

Dectes Stem Borer

(Coleoptera: Cerambycidae)
(Dectes texanus)

Crop Damage

- Larvae feed to ½ of an inch out from stalk center
- Larvae descend to plant base and ultimately cause girdling in the stem
- Girdling is worsened by dry years

Scouting Tips

- Dissect sunflower stems to determine presence of larvae
- Monitor seed moisture in infested fields

Cultural Controls

- Reduce seeding rates to encourage larger and stronger stems
- Early harvest to prevent any or further yield loss to lodging

Economic Thresholds

- N/A

Notes

- Overwinters as larvae
- Alternative hosts include ragweed, cocklebur and soybean
- Size of adults emerging from soybean will be much smaller

Sunflower Stem Weevil

(Coleoptera: Curculionidae)
(Cylindrocopturus adspersus)

Larvae Identification

- Yellow in color
- Dark brown head capsule

Adult Identification

- Grayish-brown in color
- Irregular white spots on body
- Black eyes
- Beak-like mouthpart tucked underneath head
- Approximately ⅛ to 3/16 of an inch long

Sunflower Stem Weevil

(Coleoptera: Curculionidae)
(Cylindrocopturus adspersus)

Crop Damage

- Adults are vectors of both charcoal rot and Phoma black stem
- Larvae feed on vascular tissue from sunflower stem
- Feeding can result in lodging and can become severe during drought

Scouting Tips

- Begin scouting mid-June until mid-July
- Use “X” pattern
- Select 5 sites within a field and count adults on 20 plants per site

Cultural Controls

- Planting early to late June
- Planting less per stand to encourage larger stems and less lodging
- Planting hybrids with tolerance

Economic Thresholds

- Average of 1 adult per 3 plants

Management

- Foliar insecticides management when threshold is reached

Notes

- Overwinter as larvae
- 1 generation per year

Sunflower Maggot

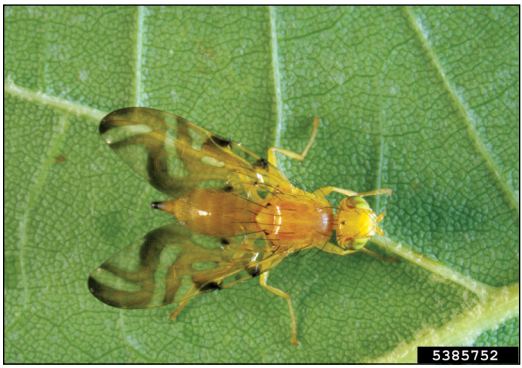
(Diptera: Tephritidae)
(Strauzia longipennis)

Larvae Identification

- White to cream in color
- Lack head and legs
- Approximately ¼ to ⅓ of an inch long at last larval instar

Adult Identification

- Light orange body
- Yellow head and legs
- Clear wings with dark yellow-black bands
- Wing tip with reversed “F” shape
- Iridescent eyes ranging from orange to green
- Approximately ¼ to 5/16 of an inch long



Sunflower Maggot

(Diptera: Tephritidae)
(Strauzia longipennis)

Crop Damage

- Breakage may be observed with 8-10 larvae per plant
- Tunnels created by larvae may provide a point of entry for diseases

Scouting Tips

- Examine pith for maggot larvae if broken stalks or lodging is observed

Economic Thresholds

- N/A

Notes

- Overwinter as larvae
- 1 generation per year
- Adults emerge in the spring and remain until the end of July