

Managing Insect Pests of Texas Sunflower



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MANAGING INSECT PESTS OF TEXAS SUNFLOWER

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Because the sunflower has a short growing season, it is a suitable primary spring planted crop or a second crop following wheat. Sunflower production can be an alternative where wind, sand, rain or hail has destroyed other primary plantings. Drought tolerance makes sunflower an attractive dryland crop and an alternative in areas with only limited irrigation. It also responds well under full irrigation.

In 1975, 375,000 acres of sunflower were planted in Texas, approximately 370,000 acres more than had been planted in 1974. In 1976, sunflower acreage dropped drastically, but since that time acreage has slowly increased to the present level of 75,000 to 100,000 acres. The dramatic reduction of sunflower acreage in 1976 can be attributed to lack of knowledge about proper crop management procedures such as fertilization, disease control, weed control, plant populations, marketing and insect control. The recent discovery of cytoplasmic male sterility has produced hybrid sunflower with greater uniformity, yield, disease resistance and ease of insect pest management.

Insect pests are often a major limiting factor in Texas sunflower production. Approximately 50 species of insects have been recorded on sunflower in Texas; however, only about 15 are considered potentially major pests. The sunflower moth is currently the major pest of sunflower; stem weevils, the girdler complex and thistle caterpillar are of secondary importance.

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Until insect resistant or tolerant hybrids are developed, producers will need to rely on insecticides to control these pests. Crop rotation, weed control, volunteer sunflower control and fall tillage are sound cultural practices that help reduce insect pest problems. This publication has been developed to assist the producer with identification, biology and control of insect pests that presently have the greatest potential for causing sunflower yield reduction.

INSECT PESTS INFESTING THE HEAD

Sunflower Moth

The sunflower moth is the single most important insect pest affecting sunflower production in Texas. The adult is a small, slender, silver to buff gray moth approximately 1/2-inch long. It will be most likely observed resting on sunflower heads during the blooming period, especially in the early morning and early evening. Eggs are laid in the blooming florets and hatch into larvae in 24 to 72 hours. Larvae have a brown background and four longitudinal, green stripes running the length of the body. During the first 2 larval instars which last about 6 days, larvae eat only pollen and floral parts and cause no economic damage. The third instar larvae, however, begin to burrow into the seeds and head. If florets are destroyed by larval feeding before fertilization, seed development will be prevented and pops (empty seed hulls) may develop. Heads infested with sunflower moth larvae present a very trashy appearance. In addition to feeding damage, sunflower moth larvae predispose the sunflower head to *Rhizopus* head rot. This disease can reduce yields significantly and seed oil content by 50 percent.

Delaying sunflower planting until after May 1 in the High Plains and Rolling Plains reduces the sunflower moth problem. Insecticidal control is based on percent bloom and presence of moths in the field. Sunflower blooms rapidly once it begins. Count as blooming any head with any part of the flower exposed. Moths can lay eggs as soon as any part of the head is exposed. Initiate insecticide applications at 20 to 25

percent bloom when any adult moths are found in the field. Two more applications should be made at 5-day intervals if moths continue to be observed.



SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide (listed alphabetically)	Concentrate/ Acre	Harvest Interval
Sun- flower Moth	Bacillus thuringiensis (Dipel®, Thuricide®, et.al.)		See remarks. 0
	WP	0.5 lb.	
	Liquid	1 pt.	
	Chlorpyrifos (Lorsban®)		See remarks. 42
	4E	1 pt.	
	Endosulfan (Thiodan®)		See remarks.
	3 EC	1 1/3 pt.	0
	2 miscible	2 qt.	0
	50 WP	2 lb.	0
	Methidathion (Supracide®)		See remarks.
	2 E	2 pt.	50
	Methyl parathion		See remarks.
	4E	1 pt.	30
	Parathion		See remarks.
	8 E	1/2-1 pt.	30

REMARKS

Bacillus thuringiensis. Has obvious advantages where pollination protection is important in hybrid seed production. Also, protects other beneficial species in the field at the time of application. There is no coincidental control of other pest species as is the case with other chemicals recommended for sunflower moth control.

Chlorpyrifos. Apply no more than 9 pints/acre per season. Do not graze treated areas.

Endosulfan. Make no more than 3 applications per season. Do not graze or feed treated crop.

Methidathion. Make no more than 3 applications per season. Do not graze or feed treated crop.

Methyl parathion. Make no more than 3 applications per season. Do not graze or feed treated crop.

Parathion. Make no more than 3 applications per season.

Sunflower Bud Moth (*Suleima*)

The appearance of deformed heads and black frass on head or stalk indicates the presence of sunflower bud moth. The adult is 3/8- to 1/2-inch long, gray with a black band on the wings. The larvae are white and grow to approximately 1

inch. In Texas, infestations have been light and feeding activity has been restricted to the fleshy part of the head and stalk. Yield loss occurs only when larvae burrow into small, unopened buds, which prevents head formation. No insecticide is currently labeled for this pest in sunflower.

Headclipper Weevil


Sunflower plants that are girdled about 1 to 2 inches below the head are likely infested with the headclipper weevil. The adult weevil is metallic black and about 3/8- to 1/2-inch long and is usually present in the field as adults from mid-July to early August. As females prepare to deposit eggs, they girdle just below the head and lay in the girdled head. The girdled head subsequently falls to the ground where larval development and overwintering occurs. Economic infestations of this insect have not been noted in Texas. No insecticide is currently labeled for this pest in sunflower.

Seed Weevils

Two species of seed weevils have been detected in Texas. One species is reddish-brown and approximately 1/8-inch long, and the other species is gray and about 1/4-inch long.

Adults emerge from late June through early July and begin feeding between the bracts of sunflower buds. As the sunflower matures, the weevils begin feeding on pollen and, as the seed begins to mature, eggs are deposited within the seed. With egg hatch, larvae begin feeding on the seed. Mature larvae drop to the ground and overwinter in the soil. Completion of a single generation per year occurs with the larvae pupating in June. Seed weevils have the greatest economic impact on confectionery and seed sunflower. Economic infestations, although not yet detected in Texas, have the greatest potential of occurring on sunflower blooming after the first of July. Although no definite economic thresholds exist, researchers suggest that an average of 20 adults per plant during onset of bloom can cause economic losses.

SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide (listed alphabetically)	Concentrate/ Acre	Harvest Interval/ Days
 Seedling	Methidathion		See remarks.
	(Supracide®)		
	2 E	2 pt.	50
	Methyl parathion		See remarks.
	4 E	2 pt.	30

REMARKS

Methidathion. Make no more than 3 applications per season. Do not graze or feed treated crop.

Methyl parathion. Make no more than 3 applications per season. Do not graze or feed treated crop.

INSECT PESTS INFESTING THE STALK

Stem Weevil

The stem weevil occasionally causes losses in sunflower. The adults are about 1/8-inch long, brown and white mottled color. The single generation per year emerges in early May. The adults feed on leaves but cause no economic damage. Eggs are deposited in sunflower stalks 2 to 5 weeks after adults emerge. Young larvae burrow into the stalk, destroying pith which results in a plant highly susceptible to lodging. As many as 100, 1/4-inch long larvae have been found in a single stalk. Stem weevil infested plants have resulted in 50 percent yield reduction. Infestations are highest where sunflower follows sunflower. Evidence indicates that stalk infestation by this insect predisposes plants to charcoal rot. *Crop rotation and delayed planting until mid-May has been very effective in eliminating yield reduction from this pest.*

Insecticide applications to control stem weevil should be made from the development of the third alternate leaf to the appearance of the head tightly surrounded by young leaves.

SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide (listed alphabetically)	Concentrate/ Acre	Harvest Interval/ Days
Stem Weevil	Carbaryl (Sevin®)		See rem
	XLR	1-2 qt.	
	80S	1¼ - 2½ lb.	60
	Chlorpyrifos (Lorsban®)		See remarks.
	4 E	1 pt.	42
	Methidathion (Supracide®)		See remarks.
	2 E	2 pt.	50

REMARKS

Carbaryl. Check label for grazing restrictions.

Chlorpyrifos. Apply no more than 9 pts. per acre per season. Do not graze treated areas.

Methidathion. Make no more than 3 applications per season. Do not graze or feed treated crop.

Cocklebur Weevil

The adult weevil is 1/4- to 3/8-inch long and is red with black spots. The larvae are large and leave a 1/4-inch tunnel in the pith as they burrow down to the roots. Oval feeding scars on the stalk and rather large larvae in the pith indicate the presence of this pest. Stalk destruction is beneficial in reducing this pest. No insecticide is currently labeled for the control of cocklebur weevil in sunflower.

Girdlers

Several species of girdlers attack sunflower. Of the several girdler species, the genus *Mecas* appears to pose the greatest potential for causing yield reduction. The adult is 1/2-inch long and gray. The adult female makes two girdles about one-third of the way down the stalk, causing the upper stalk to die and fall to the ground. Eggs are deposited just beneath the stem surface and above the lower girdle. After hatching, larvae, which are white and 1-inch long when mature, burrow down the pith to the roots where they overwinter as larvae. Stalk destruction is beneficial in reducing this pest. No insecticide is currently labeled for this pest in sunflower.

INSECT PESTS INFESTING THE FOLIAGE

Sunflower Beetle

The adult sunflower beetle resembles the Colorado potato beetle; it is about 1/4-inch long and is yellow with brown stripes. The larvae are yellowish and humped. During the day, larvae hide in the bracts of the head; at night they move to feed on younger leaves, causing defoliation. Thirty to 40 percent defoliation prior to seed-fill can cause yield reduction.

SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide	Concentrate/ Acre	Harvest Interval/ Days
Sun- flower Beetle	Carbaryl		See remarks.
	(Sevin®)		
	XLR 80S	1-2 qt. 1 1/4 - 2 1/2 lb.	60 60

REMARKS

Carbaryl. Check label for grazing restrictions.

Thistle Caterpillar (Painted Lady Butterfly)

The thistle caterpillar, larval stage of the painted lady butterfly, can cause significant defoliation. This colorful larva attains a length of 1- to 1 1/4-inches and has prominent spines on the body. Larvae feed under the webbing of a curled leaf in the terminal area of the plant. Larval infestations of 15 to 20 per plant can cause economic damage. Outbreaks exceeding economic levels have been rare. No insecticide is currently labeled for this pest in sunflower.

Saltmarsh Caterpillar

The saltmarsh caterpillar is a late season pest that occasionally causes damage to late planted sunflower. The very hairy caterpillar can vary from yellow to brown to black and is often referred to as the "woolly bear". The caterpillar, which can be as large as 2 inches, is capable of causing economic damage from severe defoliation. The adult moth is white with black spots and has a wing span of 1 1/2 to 2 inches. Weed-free fields prior to and after planting will reduce problems with this pest. No insecticide is currently labeled for this pest in sunflower.

Beet Armyworm

Severe plant defoliation can occur from a heavy infestation of beet armyworm. When mature, the armyworm can be 1 ¼-inches long and variable in color. The immature beet armyworm is light green with thin, white stripes while the mature worms have green and black stripes. These armyworms can best be identified by the presence of a black spot on the side of the larvae above the second pair of true legs. Pupation occurs in the soil. The adult moth has a wingspread of 1 inch. The forewings are grayish brown with a pale spot in the mid-front margin. The hind wings are white with a dark anterior margin. Control of pigweed in and around sunflower will reduce this pest.

SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide	Concentrate/ Acre	Harvest Interval/ Days
Beet Army- worm	Carbaryl		See remarks.
	(Sevin®)		
	XLR	1½ - 2 qt.	60
	80S	1⅞ - 2½ lb.	60

REMARKS

Carbaryl. Check label for grazing restrictions.

Grasshopper

Heavy infestations of grasshoppers periodically develop and cause economic damage to sunflower. These insects can attack sunflower from May until first frost. Early in the season, check for immature grasshoppers in crop margins. Grasshopper control in crop margins can often prevent movement into the crop. Eleven or more grasshoppers per square yard in crop margins are likely to cause economic damage. Thirty to 40 percent defoliation prior to seed-fill generally causes yield reduction.

SUGGESTED INSECTICIDE CONTROL

Pest	Insecticide (listed alphabetically)	Concentrate/ Acre	Harvest Interval/ Days
Cotton- seed	Carbaryl (Sevin®)		See remarks.
	XLR	½ - 1½ qt.	60
	80S	1¼ - 1⅞ lb.	60
	Chlorpyrifos (Lorsban®)		See remarks.
	4 E	1 pt.	42

REMARKS

Carbaryl. Check label for grazing restrictions.

Chlorpyrifos. Apply no more than 9 pints per acre per season. Do not graze treated areas.

INSECT PESTS INFESTING THE ROOTS

Carrot Beetle

The carrot beetle is occasionally very damaging to sunflower in the sandy soils of the Texas Rolling Plains. The ½-inch long, brown "June bug" feeds on the roots of the sunflower, causing the tops to wilt and eventually die. Carrot beetle infestations can often be detected by excavations near the base of the sunflower stalk. These excavations are made by skunks and other mammals foraging for the carrot beetles. No insecticide is currently labeled for this pest. Control of pigweed in and around the sunflower field is beneficial.

Root-Boring Moth (*Eucosma*)

Larvae of this pest have been found infesting as much as 88 percent of the roots of sunflower research plots in Texas. *Eucosma* larvae bore into the root primarily between the woody part and the epidermis and into larger secondary roots, eventually killing the plant. Economic infestations have not been detected in Texas. No insecticide is currently labeled for this pest in sunflower.

INSECTICIDE APPLICATION

Ground equipment or aircraft may be used to apply most insecticides. For best results with aerial applications, flag the swaths so that they overlap. Spray applications are most effective and hazards from spray drift are minimized when wind velocity does not exceed 10 miles per hour. Avoid spraying when plants are wet. Best results are obtained with most insecticides when daytime temperatures are between 70 to 85 degrees F.

Nozzle size and number, speed and pressure influence the rate of output per acre; therefore, calibrate the sprayer carefully to insure proper application of suggested insecticide rates. Thorough plant coverage is essential for insect control. Overtreatment may result in excess residues or plant injury. Undertreatment may result in poor insect pest control. Proper sprayer calibration results in proper spray volume and droplet size to maximize coverage. Refer to L-486 *Insecticide Spraying of Field Crops with Ground Machinery* and L-764 *Pesticide Application Ground Equipment Calibration Guide* for additional information.

POLICY FOR MAKING INSECT CONTROL SUGGESTIONS

Suggestions on pesticide use made by the Texas Agricultural Extension Service and the Texas Agricultural Experiment Station are based upon:

- Effectiveness under Texas conditions
- Avoiding residues in excess of allowable tolerance
- Avoiding adverse side effects on beneficial predators, parasites, honey bees, fish and other wildlife, plants, animals and humans
- Avoiding toxicity to humans, animals and desirable vegetation

Suggested pesticides must be registered and labeled for use by the U.S. Environmental Protection Agency and the Texas Department of Agriculture. The status of pesticide label clearance is subject to change and may have changed since this publication was printed.

County Extension agents and specialists are advised of changes as they occur.

The USER is always responsible for the effects of pesticide residues on his livestock and crops, as well as problems that arise from drift or movement of the pesticide from his property to that of others. ALWAYS READ AND FOLLOW CAREFULLY THE INSTRUCTIONS ON THE CONTAINER LABEL.

Proper disposal of waste pesticides and "empty" or used containers is an essential step in the safe use of pesticides. For additional information see L-1008 *Disposal - Pesticide and Pesticide Containers*.

For further information, contact your county Extension agent, county Extension entomologist or Extension agricultural chemist, Texas Agricultural Extension Service, Texas A&M University (409) 845-3849.

PROTECTING BEES AND OTHER POLLINATORS FROM INSECTICIDES

Pollination is extremely important in producing many seed crops. Most grass plants are wind or self-pollinated and do not require the assistance of insect pollinators. Where pollen-collecting insects are required for flower fertilization, the producer, insecticide applicator and beekeeper should cooperate closely to minimize bee losses. The following guidelines will reduce bee losses:

1. Apply insecticide, if practical, *before* bees are moved into fields for pollination.
2. Where insecticides are needed, use material least toxic to bees.

3. Make all applications when bees are not visiting the field. Evening or early morning treatments, between 7 p.m. and 6 a.m., generally are most satisfactory. Evening applications, after bees have left the field, are less hazardous than early morning.
4. Use spray or granular formulations rather than dusts.
5. Where it is necessary to use one of the insecticides in Groups 1 or 2 in the following list, notify the beekeeper so that he can make necessary arrangements to protect his bees.
6. Avoid drifting or spraying an insecticide directly on colonies. Heavy losses generally occur in these situations. On hot evenings, bees often cluster on the front of the hives. Pesticide drift or direct spray at this time generally results in heavy mortality.

**INSECTICIDES USED ON SUNFLOWER
GROUPED ACCORDING TO THEIR
RELATIVE HAZARDS TO HONEY BEES**

Insecticides	Remarks
GROUP 1 — Highly toxic	
Carbaryl (Sevin®)	This group includes material that kill bees on contact during application or for several days. With some exceptions, bees should be removed from the area if these are used on plants visited by the bees.
Chlorpyrifos (Lorsban®)	
Methidathion (Supracide®)	
Methyl parathion	
Parathion	
GROUP 2 - Moderately toxic	
Endosulfan (Thiodan®)	Do not apply when bees are working in field. Apply in late evening.
	Endosulfan is significantly less hazardous on pollinators and is preferred to the other compounds for head moth. There is good information showing yield (and oil) increase of 12-30 percent with good pollination.
GROUP 3 - Relatively non-toxic	
<i>Bacillus thuringiensis</i>	Make applications in late evening or early morning when bees are not foraging.

PRECAUTIONS

1. Read the label on each pesticide container before use. Follow instructions carefully, heed caution and warning statements and observe precautions concerning avoidance of residues. Follow proper clothing recommendations. Adhere strictly to all restrictions concerning use of plant material as animal feed.
2. Keep pesticides in original containers. Keep them away from children or animals under lock, and away from food, feed, seed or other material that may become harmful if contaminated. Proper storage of partially used insecticide containers is very important. Many small children are accidentally poisoned each year because of easy access to insecticides which are improperly stored.
3. Dispose of the empty containers according to specifications on the label. If disposal instructions are not on the label, burn containers where smoke will not be a hazard or bury them at least 18 inches deep in a place where water supplies will not be contaminated.
4. Improper use of insecticides will result in poor insect control. Using materials without proper label clearance or exceeding approved tolerance limits can result in crop condemnation. When using approved insecticides, do not exceed recommended maximum dosage levels, and be sure to allow the proper time between the last application and harvest.

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