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EC78-1509 Insect Control Guide for Corn and Sorghum in Nebraska

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INSECT CONTROL GUIDE FOR CORN AND SORGHUM

NEBRASKA

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Insect control suggestions in this guide are based on University of Nebraska research results, U.S.D.A. recommendations, and label registrations. Insect control is never perfect. The suggestions are designed to benefit Nebraska farmers when they need control programs.

In some instances trade names have been used. No endorsement is implied by the Nebraska Cooperative Extension Service and no discrimination is intended.

TOXICITY OF INSECTICIDES

All insecticides are poisonous and must be used with caution. They should always be stored in the original container out of the reach of children, uninformed adults, and livestock. It is very important that the labels of every insecticide be studied until they are understood. Follow these completely to avoid accidental poisoning or death, and to prevent illegal residues in crops.

The highly toxic insecticides in this publication are ethyl parathion, methyl parathion, EPN, Di-Syston, Thimet, Counter, and Dyfonate. Skull and crossbones and the word Poison appear in red on the label of highly toxic materials. These chemicals are not recommended for farmer application as sprays. They must be applied only by certified commercial operators. However, with proper precautions, farmers should be able to use granular formulations for soil application to control corn rootworms. Furadan 4F is highly toxic orally--farmers can use this product if special precautions are taken.

Moderately toxic insecticides are Furadan 10G, Mocap, Lorsban, Metasystox-R, toxaphene, Ethion, Trithion, and lindane. They must be used with special care. Familiarize yourself with all warnings given on the labels.

Extension work in "Agriculture, Home Economics and subjects relating thereto," The Cooperative Extension Service, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, Cooperating with the Counties and the U.S. Department of Agriculture
Leo E. Lucas, Director

Revised December 1977

Registrations of some chemicals listed in this publication are subject to review and withdrawal in 1978. Visit with your county agricultural agent before making the final decision of which insecticide to use.

INSECTS BELOW GROUND

CORN ROOTWORM LARVAE

Corn rootworm larval damage is most likely to occur in continuous corn production fields. If one or more beetles per plant were observed the previous August, soil insecticides at planting or cultivation are indicated. Corn following other crops may be damaged by rootworm larvae if beetles in adjacent corn fields were numerous the previous August. Rotation is usually an effective prevention for corn rootworms and soil insecticides are not necessary in most first year corn fields. Always leave a small untreated strip for comparison.

Effectiveness of soil insecticides is reduced if soil remains dry after application, excessive rainfall occurs, soils are highly alkaline, or if corn is planted very early. Control on alkaline soils is more reliable if applied at cultivation time in early June. If corn is to be planted in late April or the first week of May, it may be best to delay soil insecticide application until first cultivation, before June 10.

Many failures to control rootworms in previous years could be traced to poor calibration of granular applicators. In most cases, amounts used were below recommended amounts. REMEMBER THAT LABEL RECOMMENDATIONS ARE BASED ON 40 INCH ROW SPACINGS. If corn is planted in rows narrower than 40 inches, there are more rows per acre. This means that more insecticide must be applied per acre to obtain the proper rate needed to protect the corn. By calibrating applicators to deliver the suggested amount per 1000 feet (305 meters) of row, the amount per acre will be correct regardless of row spacing. Refer to NebGuide G76-283.

It is essential that insecticides be covered with soil. Granules or liquids remaining on the surface are lost and poor control is likely.

Fertilizer in combination with a soil insecticide must be applied in bands on each side of the seed furrow at seed level, not in the furrow or below the seed. Placement below seed level is not effective. Seed furrow applications of liquid or granular insecticides for rootworm control are not recommended because some compounds may reduce the stand when in direct contact with germinating seeds. Seed furrow placement reduces the effectiveness of any compound because the treated zone is too narrow to protect lateral roots.

Some feeding on roots will occur, regardless of material or placement used. When rootworm numbers are high or egg hatch is extended, do not expect complete control.

Growers who have experienced unsatisfactory results at planting time with any insecticide, especially after using it 2 or more years, should consider switching to one in a different category. If an organic phosphate (Counter, Dyfonate, Lorsban, or Thimet) has not provided acceptable control,

rotate to a carbamate (Furadan). If Furadan has not performed well, rotate to an organic phosphate.

MATERIAL	AMOUNT FORMULATION PER 1000 LINEAR FEET (305 METERS)	RESTRICTIONS

(Some of these insecticides may be restricted for use only by certified applicators starting with the 1978 crop season)

PLANTING TIME BEFORE MAY 7:

Insecticides applied at early planting are subject to decomposition in the soil, which will reduce efficiency. Applications at first cultivation, and before June 10 may be more reliable.

PLANTING TIME

Counter 15G (terbufos)	8.0 ounces (227 grams)	Field, sweet & popcorn.
Dyfonate 10G (fonofos)	12.0 ounces (340 grams)	Field, sweet & popcorn.
Dyfonate 20G (fonofos)	6.0 ounces (170 grams)	Field, sweet & popcorn.
Furadan 10G (carbofuran)	12.0 ounces (340 grams)	Field corn.
Furadan 4F (carbofuran)	2.4 Fluid ounces (71 milliliters)	Apply in split boot in combination with starter fertilizer at seed depth or above, or in 7" band over the row.
Lorsban 15G (chlorpyrifos)	8.0 ounces (227 grams)	Field corn. See label for subsequest crops.
Mocap 10G* (ethoprop)	12.0 ounces (340 grams)	Field corn.
Thimet 15G* (phorate)	8.0 ounces (227 grams)	Field and sweet corn.

* Do not allow to fall into seed furrow, or stand reduction may occur.

FIRST CULTIVATION BEFORE JUNE 10 (at lay-by for emergency control)

Diazinon 14G	8.5 ounces (241 grams)	Basal or over plants.
Dyfonate 10G (fonofos)	12.0 ounces (340 grams)	Basal or over plants.
Dyfonate 20G (fonofos)	6.0 ounces (170 grams)	Basal or over plants.

FIRST CULTIVATION - continued.

Furadan 10G (carbofuran)	12.0 ounces (340 grams)	Basal or over plants.
Mocap 10G (ethoprop)	12.0 ounces (340 grams)	Basal application only.
Thimet 15G (phorate)	8.0 ounces (227 grams)	Basal or over plants.
Diazinon AG 500	2.4 Fluid ounces (71 milliliters)	Basal spray on each side of row and cover with soil immediately.

CUTWORMS

Corn following sod or small grain stubble or fields with heavy crop residues are most likely to be damaged by cutworms. Treatment is justified when one plant out of 20 shows cutworm feeding injury.

POSTEMERGENCE

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Toxaphene	3 pounds (1361 grams)	Band spray 10" (25 cm) wide ofer rows when first evidence of cutworm infestation is detected and before worms are more than 1" (2.5 cm) long.
Diazinon	2 pounds (907 grams)	
Dylox (trichlorfon)	1 pound (454 grams)	Apply in a 10" (25 cm) band using at least 20 gal. of water per acre.
Sevin (carbaryl)	2 pounds (907 grams)	
Sevin 5% bait (carbaryl)	1 pound (454 grams)	Broadcast.

WIREWORMS AND SEED DESTROYING INSECTS

First year corn, eco-fallow and early planted fields are more likely to be damaged.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Counter 15G (terbufos)	1 pound (454 grams)	Apply 8 oz. (227 g) per 1000 ft. (305 m) 15% granules in seed furrow at planting.
Mocap 10G (ethoprop)	1 pound (454 grams)	Apply 7 inch band at time of planting. May reduce stand if in seed furrow.

Furadan 10G (carbofuran)	1 pound (454 grams)	Apply 12 oz. (340 g) per 1000 ft. (305 m) 10% granules in seed furrow at planting.
Seed treatment lindane diazinon heptachlor		Mix with seed in planter box. Follow package directions for amount. Never mix treated seed with feed grains.

SOD WEBWORMS

Sod webworms frequently occur in first year corn following pasture, or when slot planting in grass.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Toxaphene	3 pounds (1361 grams)	Apply in 10" (25 cm) band over rows, using at least 20 gal. (75 L) water per acre.

INSECTS DAMAGING CORN ABOVE GROUND

CORN ROOTWORM ADULTS

Corn rootworm beetles occasionally interfere with pollination if there are sufficient beetles to chew silks to husks during the pollen-shedding period. Controls are indicated only when severe silk chewing is occurring at 25 to 50 percent pollen shed. In an average year, few fields will need to be sprayed to prevent silk clipping by beetles. Beetles are most likely to cause a problem in late-planted or late-silking fields. Be certain to warn beekeepers within 2 miles (3219 m) of a field if a field must be sprayed when it is shedding pollen. Beetle control as a substitute for a soil insecticide to control rootworms is not reliable. The results of this method of rootworm control have been inconsistent in University of Nebraska research.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Diazinon	8 ounces (227 grams)	None
Di-Syston (disulfoton)	4 ounces (113 grams)	28 days. Certified applicators only. One treatment per season.
EPN	4 ounces (113 grams)	14 days. Certified applicators only.

Continued...

Ethyl or methyl parathion	4 ounces (113 grams)	12 days. Certified applicators only.
Malathion	1 pound (454 grams)	5 days.
Malathion ULV	4 ounces (113 grams)	5 days. Certified applicators only.
Sevin (carbaryl)	1 pound (454 grams)	None
Sevin 4 Oil	1 pound (454 grams)	None

CHINCH BUGS

Control when migrations are occurring from harvested small grains adjacent to corn or sorghum. Spraying barrier strips around margins of fields is suggested when bugs first begin to damage border rows. Use high gallonage (20-30 gallons) directed at base of plants and on the soil.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Toxaphene	2 pounds (907 grams)	Do not feed treated foliage.
Sevin (carbaryl)	2 pounds (907 grams)	Nebraska only.

EUROPEAN CORN BORER

The need for insecticide treatment for first brood is determined by examining early planted corn 36 inches or taller for evidence of whorl feeding. Treat if 50 percent of the corn plants on dryland, 35 percent on irrigated, 25 percent on popcorn or 15 percent on seed fields show shotholes in whorl leaves. Heaviest first brood borer activity is expected in earliest planted fields. If borers have already entered stalks, control is impossible. It is difficult to tell when control of second brood borers will be profitable. Fields that have green silks during the second brood moth flight in late July and August are attractive to moths for egg laying. When late developing fields have an average of one egg mass per plant, or most plants have small borers feeding on leaf axils, controls may be feasible. In most cases, control would probably not be highly beneficial. Harvest heavily infested fields early to prevent field losses. Second brood is most serious in late-planted or long season hybrid corn. Granular formulations of insecticides are more effective than sprays.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Dasanit 15G (fensulfothion)	1 pound (454 grams)	Second brood only.
Diazinon 14G	1 pound (454 grams)	10 days.
Dyfonate 10G & 20G (fonofos)	1 pound (454 grams)	45 days harvest or grazing.
EPN 4G	0.3 pound (136 grams)	14 days.
Furadan 10G (carbofuran)	1 pound (454 grams)	Do not make a foliar application if more than 10 pounds per acre were used at planting. Do not make more than 2 foliar applications per season.
Thimet 15G or 10G (phorate)	1 pound (454 grams)	First brood only. 30 days. Do not make more than 1 application over plants.
Sevin 80WP (carbaryl)	2 pounds (907 grams)	Use nozzles over whorls for first brood and 4 nozzles per row for second brood so leaf axils and ear zones are thoroughly covered with spray. Harvest limitations same as for granules.
EPN EC (commercial application)	8 ounces (227 grams)	
Diazinon EC	1 pound (454 grams)	

GRASSHOPPERS

Prevent damage to corn by controlling grasshopper nymphs when there are 10 or more immature grasshoppers per square yard in field margins.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Diazinon	8 ounces (227 grams)	None
Malathion EC	1 pound (454 grams)	5 days.
Parathion EC	8 ounces (227 grams)	Certified applicators only. 12 days.

Continued....

Sevin 80WP (carbaryl)	2 pounds (907 grams)	No restrictions.
Toxaphene EC	2 pounds (907 grams)	Field margins only. Do not feed treated forage.

WESTERN BEAN CUTWORMS

Use chemical controls when 14% of plants are infested with larvae in tassels and/or eggs on leaves and corn is 95-100 percent tasseled, and before worms have entered silks.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Sevimol (carbaryl)	2 pounds (907 grams)	No restrictions.
Sevin 4 Oil	2 pounds (907 grams)	Apply in 2 qts. (1.9 L) crop oil per acre.

SPIDER MITES

Apply chemical control if 2 lower leaves are killed by mites and mites are present to the ear zone before corn has reached the hard dent stage. Insecticides do not kill eggs, so reinfestation frequently will occur.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Before August 1		
Di-Syston 15G (disulfoton)	1 pound (454 grams)	40 days. Certified applicators only.
Thimet 15G (phorate)	1 pound (454 grams)	30 days. Certified applicators only.
After August 1		
Diazinon EC	8 ounces (227 grams)	None
Cygon (dimethoate)	8 ounces (227 grams)	14 days forage, 42 grain. Not more than 3 applications.
Di-Syston 15G (disulfoton)	1 pound (454 grams)	40 days. Certified applicators only.

Continued....

Ethion EC	1 pound (454 grams)	50 days. One application. Do not feed treated forage.
Metasystox-R EC (oxydemetonmethyl)	8 ounces (227 grams)	7 days.
Parathion EC	12 ounces (340 grams)	12 days. Certified applicators only.
Thimet 15G (phorate)	1 pound (454 grams)	30 days. Certified applicators only.
Trithion EC (carbophenothion)	1 pound (454 grams)	21 days. One application.

ARMYWORMS

Control when migration from adjacent grassy fields is sufficient to damage margin rows, or when field infestations are consuming lower leaves before hard dent stage.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Sevin (carbaryl)	1.6 pounds (726 grams)	No restrictions.
Dylox SP	1 pound (454 grams)	21 days. One application.
Malathion 57% EC	1.5 pounds (680 grams)	5 days.
Toxaphene EC	2.5 pounds (1134 grams)	Do not feed treated forage to dairy cattle or animals being finished for slaughter. No restrictions on grain.
Lannate SP (methomyl)	6 ounces (168 grams)	3 days. Certified applicators only.
Parathion	8 ounces (227 grams)	12 days. Certified applicators only.

SORGHUM INSECTS

CORN EARWORMS AND FALL ARMYWORMS

Infestations may occur in whorls and later in heads. Usually not feasible to control whorl infestations. If two or more larvae per head are present, controls may be profitable.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Sevin 80 WP (carbaryl)	1.6 pounds (726 grams)	21 days for grain.
Toxaphene	1 pound (454 grams)	28 days. Do not feed treated forage to animal being finished for slaughter. DO NOT USE ON DAIRY FARMS.
Lannate SP (methomyl)	6 ounces (168 grams)	14 days. Certified applicators only.

GREENBUGS AND CORN LEAF APHIDS

Corn leaf aphids are not known to cause economic damage to grain sorghum grown under Nebraska conditions. Treatments applied for this insect would seldom result in a yield increase that would pay for the cost of treatment.

Greenbugs have caused serious yield losses in Nebraska grain sorghum since 1968. For a discussion of treatment guidelines on susceptible and resistant grain sorghum hybrids, refer to NebGuide G76-266, available at your county extension office.

Certain sorghum varieties may be sensitive to organic phosphate insecticides. Red or brown spots where spray droplets contact leaves frequently occur. Usually these are not serious. Sensitivity can be determined by spraying a small area of a field and observing for several days for crop injury.

MATERIAL	AMOUNT ACTIVE INGREDIENT PER ACRE	RESTRICTIONS
Cygon, Defend, Dimex, Rebelate (dimethoate)	6 ounces (170 grams)	28 days. Use drop nozzles and 20 gallons water per acre, so plant is covered.
Diazinon	8 ounces (227 grams)	7 days. Use drop nozzles and 20 gallons water per acre.
Di-Syston 15% granules (disulfoton)	1 pound (454 grams)	30 days. Band over rows. 14 days, forage.

Continued...

Malathion EC	1 pound (454 grams)	7 days.
Metasystox-R (oxydemetonmethyl)	8 ounces (227 grams)	28 days. Band over rows.

COMMERCIAL APPLICATION - AIRCRAFT

Di-Syston EC (disulfoton)	8 ounces (227 grams)	See label for post-treatment intervals with different treatment combinations.
Di-Syston 15% granules	1 pound (454 grams)	30 days - grain. 14 days - forage.
Ethyl parathion	8 ounces (227 grams)	12 days. Apply in 2-4 gallons water.
Thimet 15% granules (phorate)	1 pound (454 grams)	28 days.

SEED INSECTS IN SOIL

Seed treatment in planter box with heptachlor, lindane, or diazinon. Follow package directions. NEVER MIX TREATED SEED WITH FEED GRAINS.

CHINCH BUGS

Sorghum following wheat stubble in southeastern Nebraska frequently is severely injured by chinch bugs that move from volunteer wheat into seedling sorghum. This may occur in spots or throughout fields. Chinch bug nymphs are red and white and feed on the stems above and below the soil surface. Avoid planting sorghum following small grain or adjacent to small grain fields.

Chinch bug migrations into sorghum from adjacent ripe or harvested small grains can be reduced by spraying 30-40 rows of sorghum along margins of the small grains with toxaphene, 3 pounds (1358 g) or Sevin, 2 pounds (907 g) active ingredient per acre. Spray must be directed to the stalks and on the ground using at least 20 gallons of water per acre to assure complete coverage, and may need to be repeated.

CONTAINER DISPOSAL

Proper disposal of insecticide containers is very important. Serious accidents have occurred when "empty" containers have not been disposed of safely. Suggested methods of disposal are:

PAPER BAGS: Be certain that all contents have been emptied into applicators or tanks. Burn paper containers, not to exceed 50 pounds, in open fields where; (1) regard is given to wind direction in relation to people, domestic

Continued....

animals and water supplies, (2) where such burning is not in violation of Federal, State, or local ordinances, and (3) provisions are made to avoid contamination of surface water.

METAL, GLASS, OR PLASTIC CONTAINERS: Thoroughly rinse containers at least 3 times with water and dump rinse material into tanks to be used with regular applications. Recycle 5 gallon or larger metal drums where possible after complete decontamination. Containers that cannot be recycled should be punctured, crushed, and buried in a landfill, or 24 inches (60 cm) below the soil surface in a location that will not result in contamination of water, crops, man, or animals.

For more detailed information on corn and sorghum insects refer to the following NebGuides:

G 76-206 - "Corn Rootworm Control - 1978"
G 76-283 - "Rootworm Insecticide Rate Conversions"
G 76-217 - "European Corn Borer - 1978"
G 76-290 - "Western Bean Cutworm in Corn"
G 75-50 - "Spider Mites in Corn"
G 76-266 - "Sorghum Greenbug Control - 1978"
G 74-106 - "Grasshoppers"
G 73-5 - "Pest Control in Stored Grain"
G 73-44 - "Insect Control in Stored Grain"

These and many other NebGuides on important insects are available from County Cooperative Extension offices or the Cooperative Extension Service of the Institute of Agriculture and Natural Resources in Lincoln, Nebraska.

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