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EC84-1513 Field Crop Insect Control Guide for Nebraska Alfalfa, Soybeans, and Small Grains

D. L. Keith

L. L. Peters

J. F. Witkowski

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FIELD CROP INSECT CONTROL GUIDE FOR NEBRASKA ALFALFA, SOYBEANS, AND SMALL GRAINS

D. L. Keith, L. L. Peters, J. F. Witkowski
J. B. Campbell, A. F. Hagen
Agricultural Extension Entomologists
L. W. Andersen, IPM Specialist
K. J. Jarvi, IPM Extension Assistant
S. D. Danielson, Extension Technologist (Entomology)

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. NebGuides containing additional information on identification, damage and life cycles are listed under insect headings. They are available from county extension offices.

Often the choice of a pesticide is based mainly on its cots. However, several other factors should be considered in the decision, including efficacy for the particular pest or pest combination, formulation of the pesticide, label restrictions, safety to non-target species (including man) and environmental conditions present at the time of application.

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

IMPORTANT

All insecticides listed in this publication are subject to many label restrictions on use or on use of the crop after application. Restrictions are so lengthy it is not practical to list all of them. Therefore, it is essential that labels be read and understood before purchasing or using any product to be certain that its use does not result in illegal application, danger to the user or environment, or residues that exceed tolerances.

Insecticides that are classified RESTRICTED USE that require EPA certification for use in this circular are: carbofuran (Furadan 4F), disulfoton (Di-Syston), fonophos (Dyfonate) emulsifiable concentrates greater than 44%, methomyl (Lannate), ethyl parathion, methyl parathion, Penncap M, methomyl (Nudrin), azinphos methyl (Guthion), toxaphene, permethrin (Pounce), methidathion (Supracide), and fenvalerate (Pydrin). Applications must be made by or under the direct supervision of a certified applicator. Other products may be classified restricted use in 1984.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Leo E. Lucas, Director of Cooperative Extension Service, University of Nebraska, Institute of Agriculture and Natural Resources.

The Cooperative Extension Service provides information and educational programs to all people without regard to race, color, national origin, sex or handicap.

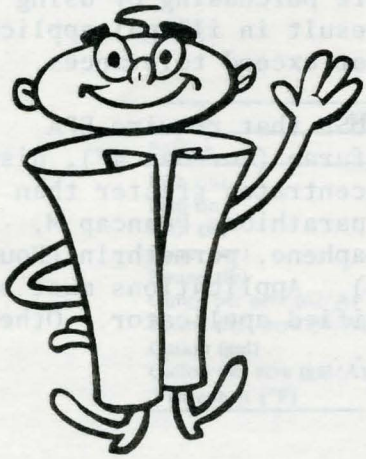
Revised November, 1983

All insecticides are poisonous and must be used with caution. Always store them in their original containers out of the reach of children, uninformed adults and livestock. It is essential that the label of every insecticide be studied and understood before use. Follow directions completely to avoid accidental poisoning and to prevent illegal residues in crops.

Compounds so marked are restricted use. Applicators must be EPA certified. The highly toxic insecticides in this publication are ethyl parathion, azinphos methyl (Guthion), carbofuran (Furadan 4F), methyl parathion, disulfoton (Di-Syston), phorate (Thimet), terbufos (Counter) and fonophos (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 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 only if special precautions are taken.

Moderately toxic insecticides are diazinon, carbofuran (Furadan 15G), chlorpyrifos (Lorsban), carbaryl (Sevin), malathion, permethrin (Pounce) dimethoate (Cygon), oxydemetonmethyl (Metasystox-R), toxaphene, carbophenothion (Trithion), fenvalerate (Pydrin), and lindane. They must be used with special care. Familiarize yourself with all warnings given on the labels.

Registrations of some chemicals listed in this publication are subject to review and withdrawal in 1984. Visit with your county agricultural agent if you are uncertain of which insecticides to use.



LARRY THE LABEL SAYS:

. . Identify Your Problem

. . Select the Right Insecticide

. . Study the Label

. . Apply as Directed

. . Clean Up Afterwards

ALFALFA INSECTS

Insects which attack alfalfa grown for seed are discussed in another section of this guide. This portion will deal only with pests of alfalfa grown for forage.

Protect Pollinators

Insecticides kill honeybees in substantial numbers if insecticides are used carelessly on legumes.

Honeybees do not observe man's artificial boundaries and will enter any field that contains attractive bloom to obtain pollen and nectar. Bees are important to all farmers because their presence means successful pollination of garden vegetables (cucumbers, melons, cantaloupes, squash) and fruits (applie, cherries, peaches, pears, apricots). Spraying a crop like alfalfa, when it is in bloom, can cause disastrous losses for beekeepers. Also, since forage quality declines during the blooming period - plan to harvest alfalfa at the one-tenth bloom stage, for the highest protein content and quality. The following are suggestions to follow to reduce bee losses:

1. Take a cutting rather than spray if insects are threatening and alfalfa is beginning to bloom.

2. Apply chemicals when bees are not actively foraging. Apply before bloom. Select a material of low toxicity and apply in late evening after bees have returned to hives (Penncap M and Sevin are especially hazardous to honeybees).

3. If pesticides must be applied to blooming alfalfa, notify local beekeepers so bees can be moved or confined during application. NOTE - it is extremely difficult for the beekeeper to move more than just a few hives, and many bees frequently die in the process when they are covered. These are last resorts - it is best to avoid spraying during bloom whenever possible.

4. Never dump unused sprays - they might become bee poisoning hazards. (Bees collect water to cool the hive.)

ALFALFA WEEVIL
(NebGuide G73-30)

The alfalfa weevil increased in 1983 and is expected to cause more damage in 1984. Watch in April and May for the first signs of larval feeding in the tips of alfalfa stems. Earliest damage appears as tiny shotholes - look for small, greenish or yellowish larvae, about 1/8 inch long, with dark brown heads and a white stripe down the middle of the back, on alfalfa terminals. When full grown, the worms are about 3/8 inch long. Plan to treat for alfalfa weevil if 35 percent of the tips are chewed early in May. As the season progresses, the alfalfa grows, and weevil activity increases, the treatment threshold may need to be raised accordingly.

REGISTERED FOR ALFALFA WEEVIL CONTROL

Insecticide	Rate AI/Acre	Restrictions
azinphos methyl (Guthion 2LC)	0.25-0.75 lb	Apply only once per cutting. See label for harvest restrictions.
carbaryl (Sevin 80 WP)	1.0 lb	No waiting period. Highly toxic to bees. Avoid application during bloom stage.
carbofuran (Furadan 4F)	0.25, 0.5 or 1.0	Apply only to pure stands of alfalfa. Only 1 application per season. Do not move bees into treated areas within 7 days of treatment. See label for harvest restrictions.
chlorpyrifos (Lorsban 4E)	0.5-1.0 lb	Do not apply more than once per cutting. See label for harvest restrictions.
diazinon (AG500)	1.0 lb	Wait 10 days.
diazinon 10% plus methoxychlor 20% (Alfacide)	--	Do not apply during bloom. Wait 7 days.
malathion 20% plus methoxychlor 20% (Alfacide)	--	Do not apply during bloom. Repeat if necessary. Wait 7 days before harvest.
malathion 57EC	1.25 lb	No time limitations.
methomyl (Lannate, Nudrin)	0.9 lb	Wait 7 days. Do not apply to dormant or semi-dormant alfalfa when temperature is 50°F or lower. Do not apply when alfalfa is in bloom.
methoxychlor 25EC	1.5 lb	Wait 7 days.
phosmet (Imidan 50WP)	1.0 lb	Only 1 application per cutting. Do not graze or cut for 7 days.
parathion (ethyl) (8 lb/gal EC)	0.5 lb	Wait 15 days.
parathion (methyl) (8 lb/gal EC)	0.5 lb	Wait 15 days.
Penncap 2FM	0.5 lb	Wait 15 days. Do not apply during bloom.
methidathion (Supracide)	0.5-1.0 lb	Do not apply during bloom. Wait 10 days. One application per cutting.

Restricted use

APHIDS

Aphids are small (about 1/8 inch long) whitish, yellow, or green-colored insects which suck sap from alfalfa stems and leaves. Their feeding lowers plant vigor, causes stunting, and may kill cells around the point of entry, either through mechanical destruction or by injection of a toxic saliva. Typically, early signs of aphid feeding are yellowish spots on leaves which later merge into larger yellow areas. Eventually damaged leaves may drop and plants may be killed. Several kinds of aphids can attack alfalfa in Nebraska, but fortunately, weather and natural enemies normally hold them in check. Resistant varieties form an important tool in aphid (and leafhopper) management on alfalfa. Check the latest list of varieties recommended for your area.

REGISTERED FOR APHID CONTROL

Insecticide	Rate AI/Acre	Restrictions
parathion 4F, 8F	0.25-0.50 lb	Wait 15 days before harvest.
dimethoate (Cygon 400)	0.25-0.50 lb	Wait 10 days before harvest or pasture. One application per cutting.
malathion 57EC	1.0-1.5 lb	No wait.
carbofuran (Furadan 4F)	0.5 lb	Wait 14 days. See label for details.

Restricted use

WEBWORMS

Webworms are greenish with a light stripe down the center of their backs and 6 black spots on each segment. Infestations are often associated with weeds, therefore webworms are frequently found in older alfalfa fields or where stands are thin and weed control is poor. These insects are most likely to form protective cells in which to hide.

REGISTERED FOR WEBWORM CONTROL

Insecticide	Rate AI/Acre	Restrictions
parathion 4F, 8F	0.25-0.50 lb	Wait 15 days before harvest.
carbaryl (Sevimol 4, XLR, 80S)	1.0-1.5 lb	No wait.

Restricted use

CUTWORMS

Several species of night-flying millers, including the variegated and army cutworm moths, deposit eggs in alfalfa. The worms which emerge to feed are about 1/8 inch long, but eventually reach an inch or longer. Cutworms feed at night, usually climbing onto the plants to feed on leaves and hide in the soil by day. In newly seeded alfalfa, which has limited food reserves in the roots, a small amount of feeding is enough to kill individual plants. Established alfalfa fields are not likely to suffer stand loss, but growth may be delayed and yields reduced if cutworms are numerous. Spray in evening or very early in the morning for best control.

REGISTERED FOR CUTWORM CONTROL

Insecticide	Rate AI/Acre	Restrictions
parathion 4F, 8F	0.25-0.50 lb	Wait 15 days before cutting.
chlorpyrifos (Lorsban 4E)	1.0 lb	Wait 21 days. Some phytotoxicity may occur on young plants.
carbaryl (Sevimol 4, XLR, 80S)	1.5 lb	No wait.
trichlorfon (Dylox 80SP)	1.0 lb	Do not apply more than 3 times per cutting.

POTATO LEAFHOPPER

These small (1/8 inch long), green, wedge-shaped insects frequently become abundant in alfalfa, but only occasionally cause damage. Normally our cutting interrupts the leafhopper life cycle in the egg stage. Damage, which is caused by a toxin injected as the leafhopper feeds, is expressed as yellow or purplish triangular areas in individual leaves. If leafhoppers are abundant, leaves may turn yellow and drop. Usually most important on the second and third cuttings of alfalfa in Nebraska

REGISTERED FOR POTATO LEAFHOPPER CONTROL

Insecticide	Rate AI/Acre	Restrictions
parathion 4F, 8F	0.25-0.50 lb	Wait 15 days before cutting.
malathion 57EC	1.0-1.5 lb	No wait.
chlorpyrifos (Lorsban 4E)	1.0 lb	Wait 21 days. Some phytotoxicity may occur on young alfalfa.
carbaryl (Sevimol 4, XLR, 80S)	1.0 lb	No wait.
carbofuran (Furadan 4F)	0.5-1.0 lb	At 0.5 lb wait 14 days. At 1.0 lb wait 21 days. See label.

Restricted use

GRASSHOPPERS
(NebGuide G74-106)

Control grasshoppers when they are small for best results. If young hopper nymphs average 10-15 per square yard in alfalfa, they should be sprayed. Look for increased grasshopper activity in weedy alfalfa and fields surrounded by weedy waste areas or pasture. Hoppers become especially abundant and damaging in dry seasons.

REGISTERED FOR GRASSHOPPER CONTROL

Insecticide	Rate AI/Acre	Restrictions
carbaryl (Sevimol 4, XLR, 80S)	0.5-1.5 lb	No wait.
carbofuran (Furadan 4F)	0.125-0.25 lb	Wait 7 days. See label.
chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Wait 14 days. One application per cutting, no more than 4 per year.
diazinon (AG500)	0.375-0.5 lb	Wait 7 days.
dimethoate (Cygon 400)	0.25-0.50 lb	Wait 10 days, only 1 application per cutting.
malathion 57EC	1.0-1.5 lb	No wait.
malathion ULV	8-12 fl. oz formulation	No wait.
methyl parathion EC	0.25-0.75 lb	Wait 15 days.
ethyl parathion 4EC, 8EC	0.25-0.50 lb	Wait 15 days.

Restricted use

SOYBEAN INSECTS
(NebGuide G78-397)

Soybean damaging insects can be divided into two broad classifications, chewing insects and sucking insects. Chewing insects are the most common soybean pests and will damage cotyledons, leaf tissue, flowers and pods. Bean leaf beetles, green cloverworms, and grasshoppers are the most commonly occurring chewing insect pests of soybeans in Nebraska. Other chewing insects include woollybear caterpillars, thistle caterpillars, soil cutworms, webworms, blister beetles, corn earworms, western bean cutworms, imported longhorn weevils, and Mexican bean beetles.

Sucking insects and mites injure soybean plants by probing leaves, stems, and pods with their piercing mouthparts. Damage is produced by sucking plant juices which causes the plant to appear stippled, mottled, and to take on a yellowed or discolored appearance. Stink bugs can attack pods and may discolor the developing bean within the pod. Thrips will feed on leaves and flowers, but are not considered a serious threat at this time. Spider mites are related to insects and may be of concern in hot, dry years.

CHEWING INSECTS

Treatment decision-making

Treatment decisions are based on levels of defoliation, number of insects per unit area (usually number per foot of row), and stage of plant development. In general, soybeans can tolerate 30% defoliation before bloom, and 20% defoliation between bloom and pod fill, without yield loss. Much of the current economic threshold information has been developed in Illinois. More detailed information can be found in NebGuide G78-397.

BEAN LEAF BEETLE

Beetles are brown to reddish brown, usually with 3-4 black spots and a black outside border on each wing cover. These insects feed upon soybean cotyledons, leaves and pods. As a rule, soybeans are very tolerant of leaf feeding. For seedling stage soybeans, control beetles when defoliation reaches 30 percent, at least 1 cotyledon per foot of row is destroyed, and there are 5 or more beetles per foot of row. For beans in the bloom to pod fill stage, control BLB when defoliation reaches 20% and there are 5 or more beetles per foot of row. In maturing beans, control when 10% of the pods are damaged, the leaves are green, and there are more than 10 beetles per foot of row.

REGISTERED TO CONTROL BEAN LEAF BEETLE
Amounts are active ingredient per acre.

acephate (Orthene 75S)	0.5-1.0 lb
✋ azinphos methyl (Guthion 50WP)	0.375-0.5 lb
carbaryl (Sevin 80S, XLR, Sevimol 4)	1.0 lb
chlorpyrifos (Lorsban 4E)	0.5-1.0 lb
✋ fenvalerate (Pydrin 2.4EC)	0.1-0.2 lb
✋ methomyl (Lannate 90SP, Lannate L, Nudrin 1.8)	0.25-0.5 lb
✋ methyl parathion (Penncap M)	1.0 lb

✋ Restricted use

GREEN CLOVERWORM

Cloverworms are green caterpillars with 2 narrow white stripes down the side. When fully grown, they are about 1 1/4 inch long. Heavy populations can strip soybeans of foliage. Control cloverworms when 12 or more half-grown (about 1/2 inch long) worms are found per foot of row and 20% defoliation occurs during bloom through pod fill.

REGISTERED FOR CONTROL OF GREEN CLOVERWORM
Amounts are active ingredient per acre.

acephate (Orthene 75S)	0.5-1.0 lb
✋ azinphos methyl (Guthion 50WP)	0.375-0.5 lb
carbaryl (Sevin 80S, XLR, Sevimol 4)	1.0 lb
✋ fenvalerate (Pydrin 2.4EC)	0.5-0.1 lb
malathion ULV	0.61 lb
✋ methomyl (Lannate L, 90SP, Nudrin 1.8)	0.25-0.5 lb
✋ methyl parathion (Penncap 2FM)	0.5 lb
✋ parathion	0.5 lb
✋ permethrin (Pounce 3.2EC)	0.05-0.1 lb
Bacillus thuringiensis (Dipel, Thuricide, SOK-BT, Bactur)	See label

GRASSHOPPERS

Grasshoppers breed in waste vegetation (roadsides, borrow pits, fencerows, benches, terraces) and pastures, moving into border rows of soybeans in July. Hoppers are best controlled in these staging areas before they invade soybeans. In waste areas, carbaryl (Sevin), diazinon AG500, or fenvalerate (Pydrin 2.4EC) can be used to control small grasshoppers. Plan to treat if hopper nymphs average 15-20 per square yard. The following are suggested for use on soybeans once hoppers have moved into field margins.

REGISTERED FOR CONTROL OF GRASSHOPPERS
Amounts are active ingredient per acre.

acephate (Orthene 75S)	0.25-0.5 lb
carbaryl (Sevin 80S, XLR, Sevimol 4)	1.0 lb
chlorpyrifos (Lorsban 4E)	0.25-0.5 lb
dimethoate (Cygon 400, Defend 267)	0.5 lb
malathion ULV	0.61 lb
✋ methyl parathion (Penncap 2FM)	0.25-0.5 lb
✋ parathion	0.5 lb

OTHER FOLIAGE FEEDERS

Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.

REGISTERED FOR CHEWING INSECTS ON SOYBEANS

Insect	Insecticide	Amount AI/Acre
Thistle Caterpillar	carbaryl (Sevin 80S, XLR, Sevimol 4)	2 lbs
Loopers	acephate (Orthene 75S)	0.5-1.0 lb
	✋ fenvalerate (Pydrin 2.4EC)	0.1-0.2 lb
	✋ methomyl (Lannate L, 90SP, Nudrin 1.8)	0.5-1.0 lb
	✋ permethrin (Pounce 2.4EC)	0.05-0.10 lb
	Bacillus thuringiensis (Dipel, Thuricide, SOK-BT, Bactur)	See label

✋ Restricted use

Webworms	carbaryl (Sevin 80S, XLR, Sevimol 4)	1.0 lb
	✋ methyl parathion (Penncap 2FM)	0.25 lb
	✋ parathion	0.25 lb
Blister Beetles	carbaryl (Sevin 80S, XLR, Sevimol 4)	1.0 lb
	✋ methyl parathion (Penncap 2FM)	0.5 lb
Saltmarsh Caterpillar	carbaryl (Sevin 80S, XLR, Sevimol 4)	2.0 lb
	✋ methomyl (Lannate L, 90SP, Nudrin 1.8)	0.5 lb
Woollybear Caterpillar	None registered, contact county extension agent for latest control recommendations.	

CUTWORMS

Control when stand has gaps of 1 foot or more and cutworms are present.

REGISTERED FOR CONTROL OF CUTWORMS
Amount is active ingredient per acre.

chlorpyrifos (Lorsban 4E).... 1 lb
carbaryl (Sevin 80S, XLR, Sevimol 4).. 1 lb

WIREWORMS AND SEED DAMAGING INSECTS

If replanting due to damage from these insects is necessary, use planter box treatments of diazinon or lindane.

SPIDER MITES

Control if mites are abundant on undersides of leaves and lower leaves are beginning to drop.

REGISTERED FOR CONTROL OF SPIDER MITES
Amounts are active ingredient per acre.

carbophenothion (Trithion 8E).... 0.5-0.75 lb

dimethoate (Cygon 400, Defend 267)..... 0. 5 lb

SOYBEAN INSECTICIDE RESTRICTIONS

In some cases harvest intervals and other label restrictions prevent the use of certain pesticides even if registered for the problem. When choosing an insecticide, be certain that the use of the product does not result in illegal application, danger to the user, environment, or beneficial organisms, or residues that exceed tolerances. Use the following table as a guide when choosing a chemical control.

INSECTICIDE	RESTRICTIONS AND COMMENTS
acephate (Orthene 75S)	Apply in 10 to 50 gallons of water with ground equipment or in 2 to 10 gallons with aerial equipment. Apply as needed but do not apply within 14 days of harvest. Do not graze or cut vines for hay or forage.
azinphos methyl (Guthion 50WP)	Apply as necessary. Do not apply within 45 days of harvest. Do not graze or feed treated vines to livestock.
carbaryl (Sevin 80S, XLR, Sevimol 4)	No wait.
chlorpyrifos (Lorsban 4E)	For ground application, use at least 10 gallons of spray per acre. Do not apply more than 3 lbs AI (6 pints formulation) per acre per season. Do not apply last treatment within 28 days before harvest nor apply last two treatments closer than 14 days apart. Do not allow livestock to graze in treated areas nor otherwise feed treated soybean forage to meat or dairy animals within 14 days after application. Do not feed straw from treated soybeans to meat or dairy animals within 28 days after application.
dimethoate (Cygon 400, Defend 267)	Do not apply within 21 days of harvest. Do not feed or graze within 5 days of last application.
fenvalerate (Pydrin 2.4EC)	Do not apply within 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.8 lb AI (42.64 fl oz formulation) per acre per season.
malathion ULV	Do not apply within 21 days of harvest. Do not feed or graze within 5 days of last application.
methomyl (Lannate L, 90SP, Nudrin 1.8EC)	Do not apply within 14 days of harvest. If applied at under 0.5 lb AI, 3 days forage and 7 days hay; if applied at 0.5 lb AI or over, 10 days forage and 12 days hay.

Restricted use

methyl parathion (Penncap 2FM)	Do not apply within 20 days of harvest or grazing. Do not apply more than 2 times per season.
parathion	Do not apply within 20 days of harvest. Do not apply more than twice per growing season.
permethrin (Pounce 3.2EC)	Apply a minimum of 1 gallon of finished spray per acre by aircraft and 5 gallons with ground equipment. Do not make more than 2 applications per season. Do not apply within 60 days of harvest. Do not graze or feed soybean forage. Do not plant rotational crops within 60 days of last application.
Bacillus thuringiensis (Dipel, Thuricide, SOK, Bactur)	0 days to harvest or grazing.

SMALL GRAIN

Wheat can be damaged by various insect pests. The principal insects that attack the wheat plant are the pale western and army cutworms, armyworms, grasshoppers, greenbug, Hessian fly, and various seed insects such as wireworms and false wireworms. Much of the loss to the wheat crop from insect pests can be prevented by proper cropping practices. Delayed seeding, for example, is an important control measure for insects like Hessian fly and the wheat curl mite. Timeliness of application is important when chemicals are used for insect control.

PALE WESTERN AND ARMY CUTWORMS
(NebGuide G74-130)

Sporadic outbreaks of pale western and army cutworms have occurred in Nebraska following periods of drought. Thin stands on lighter soils are more subject to attack. The pale western cutworm is grey, about 1 inch long and feeds beneath the soil surface, destroying all plants and causing serious damage. One PWC per foot of drill row is considered economic. The army cutworm is mottled brown, up to 1¼ inches long and "grazes" the wheat above ground. Army cutworms are not considered serious pests unless conditions are dry and worms average 2-3 per foot of row.

REGISTERED FOR PALE WESTERN AND ARMY CUTWORM CONTROL

Insecticide	Rate AI/Acre	Directions
Endrin 1.6EC	0.25 lb	Single application at least 45 days before harvest. Do not graze treated fields.
trichlorfon (Dylox 80SP)	1.0 lb	Wait 21 days.

toxaphene 6EC	2.5 lb	Do not use stubble or straw for feed pasture or bedding. Apply only one time 7 days pre-harvest.
parathion 4EC, 8EC	0.5 lb	Restricted use compound. Wait 15 days.

ARMYWORMS
(True, Fall, Wheat head, Yellowstriped)
(NebGuide G82-615)

Four species of armyworms occur in Nebraska. They are generally associated with field crops and small grains, but can feed on pasture grasses, bluegrass, and garden vegetables. These pests hide in the soil or beneath debris by day, emerging at night to feed on foliage. Spray in very early morning or evening for best results.

REGISTERED FOR ARMYWORM CONTROL

Insecticide	Rate AI/Acre	Directions
malathion ULV	4-8 fl oz/acre (0.25-0.50 lb)	Wait 7 days
trichlorfon (Dylox 80SP)	1.0 lb	Wait 21 days
parathion 4EC, 8EC	0.5 lb	Wait 15 days

GRASSHOPPERS
(NebGuide G74-106)

Prevent damage to wheat by controlling grasshoppers when there are 20 or more adults per square yard in the margins, or 8 or more in the field itself. Time of day, temperature, wind density and height of vegetation affect grasshopper activity and should be considered in making counts.

REGISTERED FOR GRASSHOPPER CONTROL

Insecticide	Rate AI/Acre	Directions
dimethoate (Cygon 400)	0.5 lb	Wait 14 days for grazing, 60 days for harvest.
carbofuran (Furadan 4F)	0.25 lb	See label.
malathion 57 EC	1.0 lb	Wait 7 days

toxaphene 6E	1.5 lb	Wait 7 days
acephate (Orthene 75S)	0.125 lb	Wait 21 days
parathion 4EC, 8EC	0.5 lb	Wait 15 days
Sevin 5% bait	20-40 lbs	No wait

Thimet 20G can be used in the seed furrow at planting time at the rate of 1.2 oz per 1000 feet of row at 8 inch row spacing. Only the border 30-40 feet normally would benefit. Wait at least 45 days before grazing.

GREENBUG

Wheat infested by greenbugs develop yellowing or dead areas during late fall or early spring. Examination of such areas would reveal the small green aphids feeding on the leaves.

REGISTERED FOR CONTROL OF GREENBUGS

Insecticide	Rate AI/Acre	Directions
parathion 4EC, 8EC	0.5 lb	Wait 15 days
methyl parathion	0.5 lb	Wait 15 days
disulfoton (Di-Syston 8EC)	0.5 lb	Wait 21 days. Do not graze.
disulfoton (Di-Syston 15G)	1.0 lb	Planting time. Wait at least 30 days before grazing.
phorate (Thimet 20G)	1.0 lb	Apply in seed furrow at plantin Wait 45 days for grazing.
dimethoate (Cygon 400)	0.5 lb	Wait 60 days for harvest, 14 days for grazing.
malathion 57%EC	1.25 lb	Wait 7 days

Restricted use

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HESSIAN FLY
(NebGuide G73-46)

Injury caused by Hessian fly is not conspicuous. Wheat infested in the fall is stunted, leaves of the plants take on a dark bluish-green color, are distinctly thickened and stand more erect than those of uninfested plants.

Control consists of cultural methods. In eastern and central Nebraska delay planting until after the summer generations of flies have died to reduce later infestations. Fly safe-free dates for planting wheat in your area (except the panhandle) can be obtained from your county agent. In addition, destroying wheat stubble will help reduce the fly population. However, in western Nebraska because of wind erosion, this practice is not valid. In western Nebraska, controls consist mainly of planting wheat varieties that show resistance to Hessian fly.

Two systemic insecticides, phorate (Thimet 20G) and disulfoton (Di-Syston 15G) are registered for Hessian fly control, but the economics and effectiveness of preventive treatments in Nebraska have not been proved.

CHINCH BUGS
(NebGuide G78-427)

Adults leave overwintering sites and fly to small grains when temperatures reach 70° or above. Heavy spring infestations in wheat may reduce yields somewhat, particularly if wheat is under stress from other causes. Usually one generation or a partial generation occurs in wheat fields prior to migrating to corn or sorghum. Controls are seldom necessary but 1/2 pint of parathion applied aerially/acre can be used at least 15 days prior to harvest. Damage to fall-sown wheat seldom occurs because the bugs are moving to hibernating quarters.

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 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 below the soil surface in a location that will not result in contamination of water, crops, man, or animals.

Abbreviations

AI - Active Ingredient
EC - Emulsifiable Concentrate
WP - Wettable Powser
G - Granular
LC - Liquid Concentrate
L - Liquid
SP - Soluble Powder
S - Soluble
LS - Liquid Solution
lb - Pound
oz - Ounce
F - Flowable

- Restricted Use (applicators must have EPA certification)

Metric Conversion Table

English	*Multiply By*	*Metric*
Inch (in)	25.4	Millimeter (mm)
Inch (in)	2.54	Centimeter (cm)
Foot (ft)	0.3	Meter (m)
Ounce (oz)	28	Gram (g *or* gm)
Pound (lb)	0.45	Kilogram (kg)
Ounce per acre (oz/A)	69.2	Gram per hectare (g/ha)
Pound per acre (lb/A)	1.1	Kilogram/hectare (kg/ha)
Gallon (gal)	3.8	Liter (l)
Gallon per acre (gal/A)	9.39	Liter per hectare (l/ha)
Fahrenheit (°F)	°F-32 ÷ 1.8	Celsuis (°C)