University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Historical Materials from University of Nebraska-Lincoln Extension

Extension

1995

EC95-1511-D Insect Management Guide for Nebraska Alfalfa, Soybeans, Wheat, Range and Pasture

S. D. Danielson
University of Nebraska-Lincoln, sdanielson1@unl.edu

R. J. Wright
University of Nebraska-Lincoln, rwright2@unl.edu

J. F. Witkowski

Follow this and additional works at: http://digitalcommons.unl.edu/extensionhist

Danielson, S. D.; Wright, R. J.; and Witkowski, J. F., "EC95-1511-D Insect Management Guide for Nebraska Alfalfa, Soybeans, Wheat, Range and Pasture" (1995). *Historical Materials from University of Nebraska-Lincoln Extension*. 4702.
http://digitalcommons.unl.edu/extensionhist/4702

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

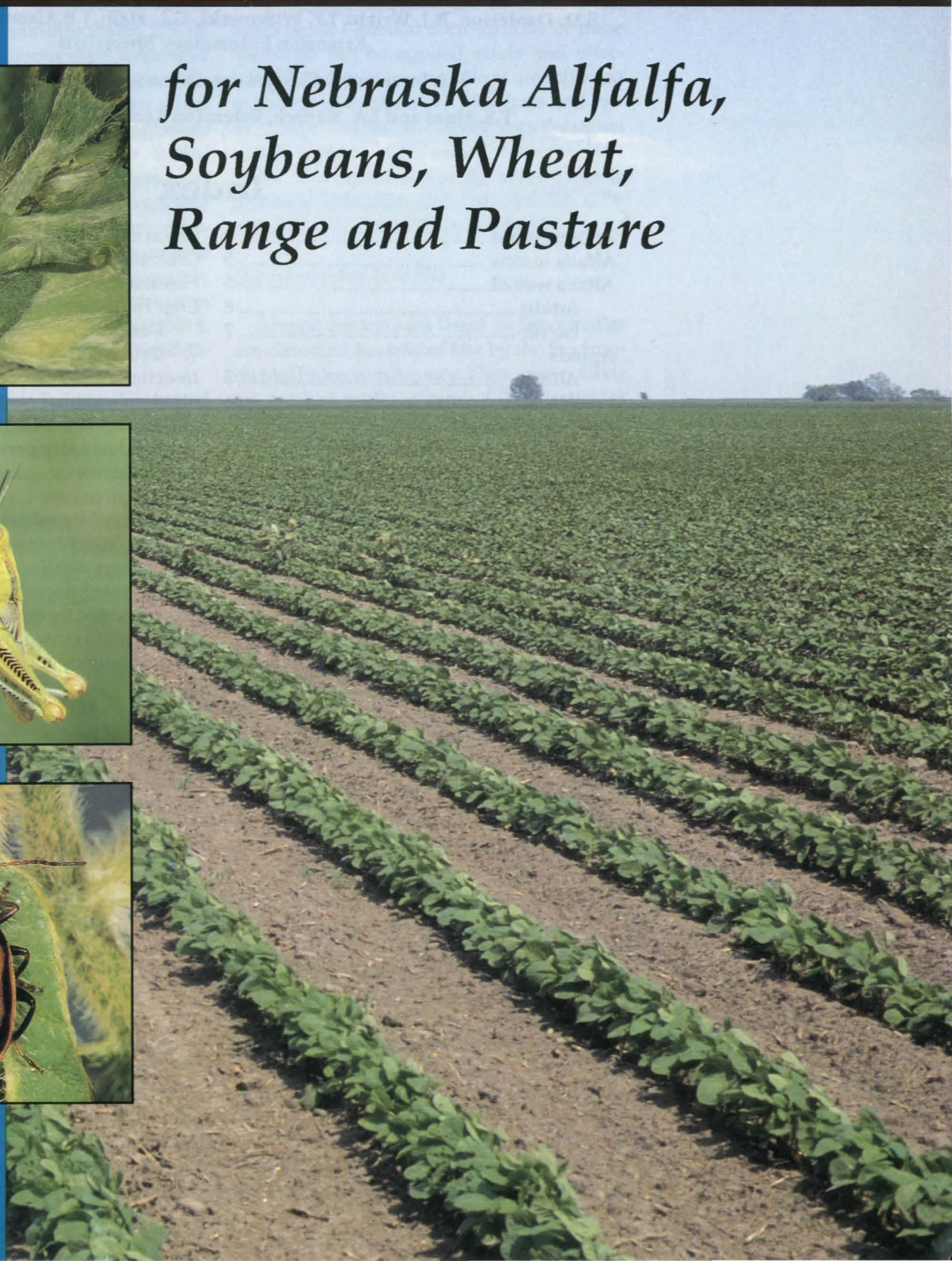
Nebraska Cooperative Extension EC 95-1511—D

CYT
S
85
E7
no. 1511
Copy 1

Nebraska Cooperative
Extension Service
Extension circular
Received on: 03-07-95
University of Nebraska,
Lincoln -- Libraries

IAN GUIDE

for Nebraska Alfalfa, Soybeans, Wheat, Range and Pasture



Insect Management Guide for Nebraska Alfalfa, Soybeans, Wheat, Range and Pasture

S.D. Danielson, R.J. Wright, J.F. Witkowski, G.L. Hein, J.B. Campbell and J.E. Foster
Extension Entomology Specialists

K.J. Jarvi and R.C. Seymour, Extension Assistants - IPM

T.E. Hunt and J.A. Kalisch, Extension Technologists - Entomology

Index

Abbreviations 3
Alfalfa insects 5
Alfalfa weevil 5
  Adults 8
  Larvae 7
Aphids
  Alfalfa 8
  Wheat 26
Army cutworms
  Alfalfa 11
  Wheat 28
Armyworms
  Range and pasture 30
  Wheat 28
Bean leaf beetle, soybeans 18
Bees 2, 5
Black grass bugs
  Range and pasture 28
  Wheat 30
Blister beetle, alfalfa 10
Brown wheat mites 29
Chinch bugs, wheat 29
Clover leaf weevil 10
Container disposal 3
Cutworms
  Alfalfa 11
  Soybeans 22
  Wheat 29
Fall armyworms, wheat 24
Foliage feeders, soybeans 23
Grasshoppers
  Alfalfa 12
  Range, pasture 28
  Soybeans 19
  Wheat 30
Green cloverworm, soybeans 21
Greenbugs, wheat 26
Hessian fly, wheat 31
Crop Watch newsletter
  Description 1
  Order Form 33
Insecticides
  Application/harvest intervals 4
  Emergency contacts 3
  Field re-entry periods 4
  Performance 2
  Restricted use 1
  Sprayed by mistake? 3
  Toxicity of insecticides 1
Lygus bugs, alfalfa 14
Management decision guidelines/
  economic thresholds 1
Pale western cutworm, wheat 27
Potato leafhopper
  Alfalfa 15
  Soybeans 22
Range and pasture insects 32
Russian wheat aphid 25
Scouting and decision making 16
Seed treatments 2
Soybean insects 17
Spider mites, soybeans 25
Variegated cutworm, alfalfa 11
Webworms, alfalfa 16
Wheat insects 26
White grubs, wheat 31
Wireworms, soybeans 25

On the cover

Pictured, from the top, are some of Nebraska's major insect pests affecting alfalfa, soybeans, wheat, range and pasture: the alfalfa weevil larva, grasshopper, and bean leaf beetle.

General guidelines

Insect management suggestions in this circular are based on University of Nebraska test results, data from surrounding states, USDA recommendations, previous experience, and label registrations. These suggestions are designed to guide Nebraska farmers when they select an integrated pest management (IPM) program for crop insect pests. Extension NebGuides and other publications containing additional information on insect identification, damage, and life cycles are referenced under insect headings and are available by mail order or from local Cooperative Extension Offices. (For more information write: Bulletins, 104 ACB, P.O. Box 830918, University of Nebraska, Lincoln, NE 68583-0918.)

There are several approaches to integrated management of insect pests in Nebraska. These include the use of cultural practices, resistant varieties, biological control, and/or insecticides. Before choosing a treatment, consider all appropriate management strategies. If insecticide use is indicated, consider the efficacy against the target pest or pest combination, label restrictions, pesticide formulation, cost, safety to non-target species (including humans), environmental conditions at the time of application, and other factors.

The user is responsible for the effects of pesticide residues on crops and livestock, as well as pesticide drift and contamination.

This publication does not supersede label information. Always read and carefully follow the instructions on the container label. For current information, contact your local Cooperative Extension Office.

The use of trade names in this circular is not an endorsement by Nebraska Cooperative Extension.

Toxicity of insecticides

All insecticides are poisonous and must be used with caution. Always store them in their original containers out of the reach of children, unauthorized personnel, and livestock. Highly toxic materials, which have a skull and crossbones and the words ***Danger/Poison*** on the label, require special handling. Liquid formulations of these products are recommended only for use by commercial applicators. Granular formulations of these chemicals can be applied safely and effectively when proper precautions are followed as indicated on the label. Moderate and low toxicity pesticides are marked with the signal words ***Warning*** and ***Caution,*** respectively.

For more information on this subject, refer to Extension NebGuides G85-758, G84-715, G79-460, G79-472, G79-473, and G79-479.

(R) Restricted Use (R)

Several insecticides listed in this circular are classified ***Restricted Use*** by the Environmental Protection Agency. These compounds are marked with the symbol **(R)**. Pesticides may be classified as ***Restricted Use*** based on their persistence, toxicity, or potential environmental hazards. To use these products, EPA certification is required. A valid certification card must be presented to your dealer when buying these chemicals.

Your local Cooperative Extension office will have a list of the dates and locations of certification training. Remember that the status of a formulation can change at any time. When buying a pesticide, ask the dealer if the attached label is current.

Important

Subscribe to the University of Nebraska-Lincoln ***Crop Watch*** newsletter for the latest pest management recommendations, changes in pesticide registrations, and updates on the current status of insect pests. An order blank is on page 33.

Management decision guidelines/ economic thresholds

Economic thresholds are flexible guidelines. They indicate the level of insect abundance or damage that can be tolerated before taking action. **They are not hard rules that apply to every situation.** Used conscientiously, they should be helpful in making management decisions. Many variables can affect

your decision including insect abundance, anticipated value, relative effectiveness of controls, and pesticide plus application costs. Timing and accuracy of application, as well as the effects of weather, also determine the ultimate degree of control.

Seed treatments

Damage to crop seed by soil-dwelling, seed-feeding insects is often intensified by prolonged periods of cool, moist weather after planting or other conditions which delay germination. In Nebraska, the major seed-feeding insects are wireworms, seedcorn maggots and seedcorn beetles. Once planted, little can be done to protect seed from these insects. Probably the most effective way of reducing injury by seed-feeding insects is with an approved planter-box seed treatment containing lindane prior to planting. In fields with a history of serious seed-feeding insect problems or in situations where stands have been seriously reduced and replanting is the only feasible recourse, consider a seed treatment plus an in-furrow application with an approved soil insecticide. Refer to insecticide product labels prior to purchase and be sure the pesticide is labeled for the commodity on which it is to be used.

For more information on this subject, refer to Extension NebGuide G91-1023.

NOTE: Agricultural seed is often treated with an insecticide such as malathion to protect against damage from stored grain pests. These treatments will **not** provide protection against seed-feeding soil insects.

Insecticide performance

When pest problems exist or are anticipated, select an appropriate management strategy. If pesticides are indicated:

1) Select the proper insecticide/miticide.
2) Read, understand, and follow label directions.
3) Calibrate application equipment for each use.
4) Document application rates and keep accurate records.
5) Leave untreated check strips.
6) Continue regular scouting to determine pest abundance and evaluate product performance.

Insecticides can provide less than satisfactory control for a variety of reasons, including: 1) unusually high insect infestations, 2) inaccurate calibration, 3) improper placement and incorporation, 4) poor timing, 5) inappropriate product selection (low toxicity to target pest), 6) high soil or water pH, 7) pest resistance to insecticide, 8) enhanced microbial breakdown, 9) weather factors (excess rain, wind, drought, temperature), and 10) other environmental conditions.

If you suspect a problem with insecticide performance:

1) Compare treated areas of field to untreated check strips.
2) Reread product label for warranties, guarantees, and claims.
3) Consult a pest management consultant or specialist and, if appropriate, contact your pesticide dealer and/or pesticide company representative as soon as possible.
4) Be prepared to document suspected loss.

When one product fails in a field while another product provides control, the manufacturer may have a responsibility to the grower. This could include replacement of the product, and/or compensation for loss.

Protect bees

Honeybees collect nectar and/or pollen wherever they can, including field crops such as corn, sorghum, soybeans and alfalfa. If bee colonies are nearby or bees are foraging in fields sprayed during flowering or pollenshed, they may be killed in substantial numbers.

To avoid injury to important pollinators observe the following precautions: 1) treat only if insect pests reach economic levels; 2) if possible, do not treat crops that are in bloom; 3) never directly spray honeybee colonies; 4) check the crop for heavy concentrations of flowering weeds and avoid spraying these areas; 5) treat only those parts of fields that have significant pest infestations; 6) when possible, select an insecticide that has a lower toxicity to bees; 7) make applications very early in the morning or later in the evening when bees are not actively foraging; and 8) properly dispose of unused pesticides.

Beekeepers often will relocate bees from areas to be treated if given sufficient prior notice.

Sprayed by mistake?

Gardens, particularly plantings of sweet corn, often are placed in or adjacent to crop fields that may be sprayed with an insecticide. The produce is safe to eat if the insecticide is registered for use on the vegetable or fruit and the specified waiting period has elapsed.

We do not suggest using vegetables or fruit that have been treated with a pesticide which is not labeled for that commodity. The following table shows some selected preharvest intervals (waiting periods). Check appropriate labels for any others.

If you have questions regarding accidental applications, determine the specific pesticide formulation used, the application rate, and time of spraying. Then, by checking the pesticide label, an informed decision can be made concerning use of the crop.

Container disposal

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

Paper bags: Be certain all contents have been emptied into hoppers or tanks. Dispose of empty bags in an approved sanitary landfill, or as recommended on the product label.

Metal, glass, or plastic containers: Thoroughly rinse containers or triple rinse containers with water, transfer rinse water into spray tank and apply according to the label. Where possible, recycle containers after completely rinsing. Containers that cannot be recycled should be disposed of in an approved sanitary landfill, or as recommended on the product label.

Abbreviations

AI/A — Active ingredient per acre
E — Emulsifiable
EC — Emulsifiable concentrate
ES — Emulsifiable suspension
F — Flowable
Form — Formulation
G — Granular
GPA — Gallons per acre
lb — Pound
L — Liquid
LC — Liquid concentrate
LS — Liquid solution
oz — Ounce
(R) — Restricted Use
S — Soluble
SC — Spray concentrate
SP— Soluble powder
WP — Wettable powder

Who to call

Use the following telephone numbers in case of emergency:

Poison Center — Children's Memorial Hospital (Omaha) ..... **(800) 955-9119**

CHEMTREC — Pesticide Emergency Network ..... **(800) 424-9300**

EPA — Environmental Protection Agency
Lincoln ..... **(402) 437-5080**
Kansas City, KS ..... **(913) 551-7020**

Nebraska Department of Environmental Quality (DEQ) ..... **(402) 471-2186**

Nebraska State Patrol ..... **(800) 525-5555**

Nebraska Department of Agriculture ..... **(402) 471-2394**

Nebraska Natural Resources Commission ..... **(402) 471-2081**

Minimum number of days between application and harvest for some selected crops

	Apple	Cabbage	Cucumbers	Green Beans	Leaf Lettuce	Peppers	Sweet Corn	Tomatoes
(R) *Ambush 2E, 25W*	**	1	0	NR	1	3	1	NR
(R) *Asana XL*	21	3	3	3	NR	7	1	1
Comite 6.5 EC	NR	NR	NR	NR	NR	NR	NR	NR
Cygon 400	28	3	NR	0	14	0	NR	7
Dipel 2X, ES, 10G	0	0	0	0	0	0	0	0
(R) *Di-Syston 8EC*	NR	42	NR	60	*	NR	NR	30
(R) *Di-Syston 15G*	NR	42	NR	60	*	*	NR	NR
(R) *Dyfonate 4EC*	NR	*	NR	*	NR	*	*	NR
(R) *Dyfonate II 20G*	NR	*	NR	NR	NR	NR	30	NR
(R) *Furadan 4F*	NR	NR	NR	NR	NR	NR	7	NR
(R) *Guthion 3F, 50WP, 2S*	7	NR	NR	NR	NR	NR	NR	NR
Imidan 70WP	7	NR	NR	NR	NR	NR	NR	NR
(R) *Lannate*	14	1	½ lb—1 >½ lb—3	¼-½ lb—1 >½ lb—3	NR	3	0	1
(R) *Lannate LV*	14	1	1½ pt—1 >1½ pt—3	¾-1½ pt—1 >1½ pt—3	NR	3	0	1
Lorsban 4E	NR	*	NR	NR	NR	NR	35	NR
Malathion EC, Cythion 57EC	3	7	1	1	14	3	5	1
(R) *Parathion 8E (ethyl)*	NR	NR	NR	NR	NR	NR	12	NR
Penncap-M	14	21	NR	3	NR	NR	3	15
(R) *Pounce 3.2EC*	**	1	0	NR	1	3	1	NR
Sevin 80S, XLR Plus	1	3	0	0	14	0	0	0

NR = Not Registered
* = At or prior to planting time application only
** = Do not apply after petal fall

Field re-entry periods

Most labels indicate the re-entry period as a minimum time period that must elapse before entering the treated area, unless the worker wears protective clothing. Follow label directions and do not enter fields after treatment until the re-entry period has passed.

(R) *Ambush 2E, 25W* — When spray is dry
(R) *Asana XL* — 12 hrs
Comite 6.5EC — When spray is dry
(R) *Counter 15G* — After treatment completed
Cygon 400 — 4 days
Dipel 2X ES, 10G — When dust settles or spray is dry
(R) *Di-Syston 8EC, 15G* — 24 hrs
(R) *Dyfonate 4EC* — 24 hrs, 48 hrs (sorghum)
(R) *Dyfonate II 20G* — 96 hrs (foliar)
— 24 hrs (soil)
4 EC — 24 hrs
(R) *Force 1.5G* — None stated on label
(R) *Furadan 15G, 4F* — 24 hrs (limited activity in fields)
— 14 days (prolonged activity in fields)
(R) *Guthion 3F, 50WP, 2S* — 48 hrs
Imidan 70WP — 24 hrs
(R) *Lannate* — 72 hrs (apple)
48 hrs (Others listed)
Lannate LV — 72 hrs (apple)
48 hrs (Others listed)
Larvin 3.2F — When spray is dry
Lorsban 4E — 24 hrs
15G — None stated on label
Malathion EC — When spray is dry
(R) *Parathion (ethyl and methyl)* — 48 hrs
(R) *Penncap-M* — 48 hrs
(R) *Pounce 3.2EC* — When spray is dry
Sevin, all formulations — When spray is dry
(R) *Thimet 20G* — 48 hrs

Alfalfa insects

Protect pollinators from insecticides

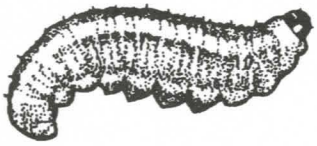
Protecting honeybees and other pollinators requires communication and cooperation among producers, beekeepers and pesticide applicators. Insecticides, when carelessly applied to legumes or other flowering crops, can destroy substantial numbers of honeybees and result in disastrous losses for beekeepers. The following are suggestions to help reduce bee losses:

1. Carefully inspect plants to ensure that pest densities have reached treatment thresholds before using an insecticide.
2. Harvest rather than spray if insects are threatening and alfalfa is beginning to bloom.
3. When insecticides are needed, apply when bees are not actively foraging. Late evening applications after bees have returned to the hive and early morning treatments before bees become active outside the hive are less hazardous than mid-day applications.
4. Avoid spraying alfalfa during bloom or if a field has numerous blossoming weeds, such as dandelions or mustards.
5. If insecticides must be applied to blooming alfalfa, notify local beekeepers at least 48 hours in advance so bees can be moved or confined during application.

Alfalfa weevil

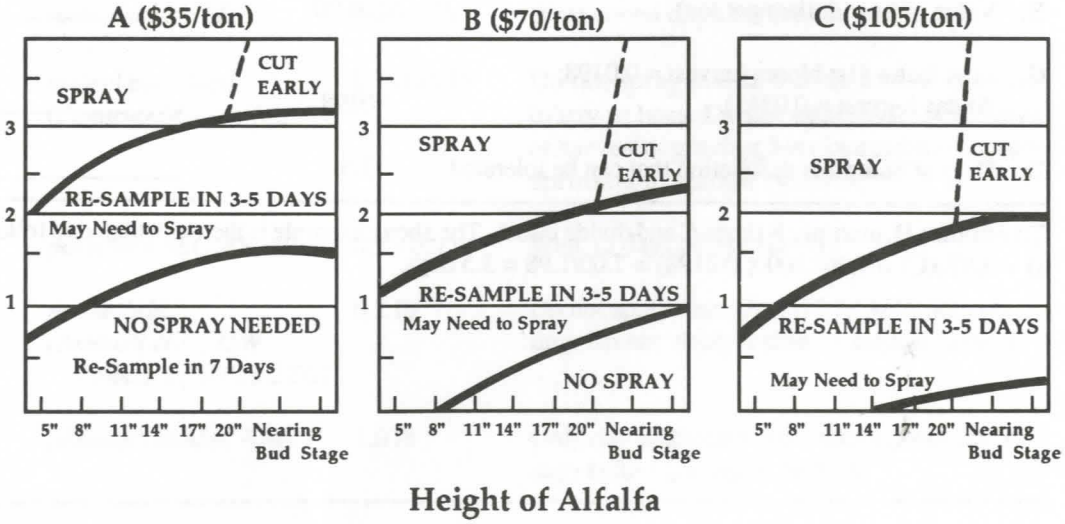
Check alfalfa in April and May for the first signs of larval feeding in the tips of alfalfa stems. Earliest damage appears as tiny shot holes on terminal foliage and buds. Look for small, green or yellow larvae, about 1/8-inch long, with black heads and a light-colored stripe down the middle of the back. When fully grown, the larvae are about 3/8-inch long. The following scouting and decision-making method has been developed by entomologists from several midwestern universities. Use it to help determine the need for alfalfa weevil management procedures.

The stem-count decision method. Carefully break off 30 to 50 stems selected at random from across the field and shake them individually into a deep-sided bucket. Take stems from each of several different areas of



Alfalfa weevil larva

ALFALFA WEEVIL STEM COUNT METHOD



Alfalfa weevil adult

the field to obtain a representative sample. Count the stems and determine the average stem height. Count the larvae and determine the average number of larvae per stem. By plotting the average stem height versus the average number of larvae on the charts provided, the appropriate course of action is suggested.

Please note that Chart "A" on page 5 was developed assuming an alfalfa value of approximately $35 per ton. You can adjust this method to account for varying alfalfa prices by adjusting the lines on the chart. The decision curves should be lowered when the value of alfalfa increases and raised when it decreases.

For example, if the price of alfalfa hay is expected to be $70 per ton when you sell it, the decision curves on the chart should be lowered to one half their height in Chart A. Chart B shows the curves for $70 alfalfa. If hay is selling for $105 per ton, the curves should be lowered to one third their height in Chart A. Chart C shows the curves for $105 per ton alfalfa.

After bud stage, it is probably more profitable to harvest the alfalfa than to treat with an insecticide. Resistant alfalfa varieties are available that will reduce, but not eliminate, damage by the alfalfa weevil.

For more information on this subject, refer to Extension NebGuide G94-1208.

Stubble treatments

After cutting and removing the hay, examine the stubble in several areas for evidence of continued feeding. Sift through windrows and under litter. Check in and around crowns for larvae, cocoons and adult weevils.

Adults have long snouts, are light brown to gray with a dark stripe down the back and are about 3/8 inch long. If normal regrowth is not forthcoming after five to seven days and adult weevils or larvae are numerous, a stubble treatment may be necessary. The following table provides additional assistance in determining whether a treatment might be justified when regrowth is delayed by alfalfa weevils, clover leaf weevils or variegated cutworms.

Please note: The following table will help you calculate the number of days that complete defoliation can be tolerated before an insecticide application is likely to be economically beneficial. The number of days will vary, depending on the cost of the insecticide treatment, value of the hay, and whether the hay is cut at first bloom or on a 28-day harvest schedule.

Alfalfa stubble threshold calculation chart

Factors	Example	Your field
A. Insecticide plus application cost (dollars per acre)	$7.00	_____
B. Value of hay (dollars per ton)	$100.00	_____
C. Loss factor (1st bloom harvest = 0.0198; 28-day harvest = 0.0345)	0.0198	_____
D. Days of **complete** defoliation that can be tolerated	3.5	_____

To estimate **D**, multiply **B** times **C** and divide into **A**. The above example is then calculated as follows: **D = A/(BxC)** = 7.00/(100 x 0.0198) = 7.00/1.98 = 3.5 days.

Registered treatments for controlling alfalfa weevil larvae in alfalfa

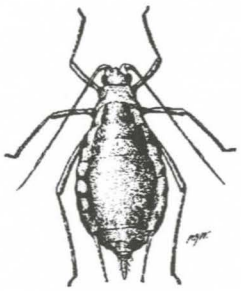
	Insecticide	Rate AI/acre	Restrictions and comments
	azinphos-methyl (Guthion 3F, 50WP, 2S)	0.375-0.5 lb	Only one application per cutting. Wait 14 days before harvest with 0.375 lb rate and 16 days with 0.5 lb rate.
	carbaryl (Sevin 80S, XLR Plus)	1.0-1.5 lb	Highly toxic to bees. Avoid application during bloom stage. Wait seven days before harvest.
(R)	*carbofuran (Furadan 4F)*	0.25-1.0 lb	Apply only to pure stands of alfalfa. Do not apply more than once per cutting or twice per year. Do not move bees into treated areas within seven days of application. See label for harvest restrictions.
	chlorpyrifos (Lorsban 4E)	0.5-1.0 lb	Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation system.
	malathion ULV 9.33	1.2 lb	Wait five days before harvest. Apply when day temperatures are expected to exceed 65° F. Do not apply during bloom. Do not apply to seed alfalfa.
	malathion 57EC	1.0-1.25 lb	No waiting period. During bloom, apply only in the evening or early morning.
(R)	*methidathion (Supracide 2E)*	0.5-1.0 lb	Do not apply during bloom. Wait 10 days before harvest. One application per cutting.
(R)	*methomyl (Lannate LV, 90SP)*	0.9 lb	Wait seven days before harvest. 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 2EC	1.0-1.5 lb	Wait seven days before harvest.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Do not spray alfalfa during bloom to avoid injury to bees. Do not apply within 15 days of harvest or grazing. May be applied through sprinkler irrigation system.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.5 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush 2EC, 25W Pounce 25 WP, 3.2EC)*	0.2 lb	Do not apply more than 0.2 lb AI/A per cutting. Do not apply within 14 days of harvest.
	phosmet (Imidan 70WP)	1.0 lb	Only one application per cutting. Wait seven days before grazing or harvest.

Spraying blooming alfalfa can be extremely hazardous to bees. Coordinate with local beekeepers before applying insecticides.

Registered treatments for controlling alfalfa weevil adults in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
(R)	*carbofuran (Furadan 4F)*	0.5-1.0 lb	Apply only to pure stands of alfalfa. Do not apply more than once per cutting or twice per year. See label for harvest restrictions.
	chlorpyrifos (Lorsban 4E)	0.5-1.0 lb	Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation system.
(R)	*methidathion (Supracide 2E)*	0.5 lb	Wait 10 days before harvest. One application per cutting.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 15 days before harvest. One application per cutting. May be applied through overhead sprinkler irrigation system.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.5 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush 2EC, 25W, Pounce 25WP, 3.2EC)*	0.2 lb	Do not apply more than 0.2 lb AI/A per cutting. Do not apply within 14 days of harvest.
	phosmet (Imidan 70WP)	1.0 lb	Do not apply more than once per cutting. Do not apply within seven days of harvest or grazing.

Aphids



Aphid

A number of aphid-resistant alfalfa varieties are available. Growers should consider planting these to help reduce the need for pesticides in the future.

Spotted alfalfa aphids are small (1/16 inch long), pale yellow or gray aphids with four to six rows of dark spots on the back. They inject a toxin that kills leaves, causing them to drop. These aphids also produce large amounts of honeydew which support the growth of a black sooty mold. This mold may cover leaves and lower portions of the stem. An average of one aphid per plant in seedling stands can kill the entire field. In older stands, treat when 20-30 aphids are found per stem.

Since spotted alfalfa aphids are found on the lower portions of the plant, cut stems with a sharp knife and gently lift plants to count the aphids on the stem and undersides of leaves.

Pea aphids and **blue alfalfa aphids** are about 1/8 inch long and are very similar in appearance. They range in color from yellow to blue-green. The blue alfalfa aphid has uniformly brown antennae, and the pea aphid has a narrow dark band at the top of the third antennal segment.

The blue alfalfa aphid is a more serious pest than the pea aphid. It injects a toxin that causes stunting, shortened internodes, yellowing, and crinkling of leaves.

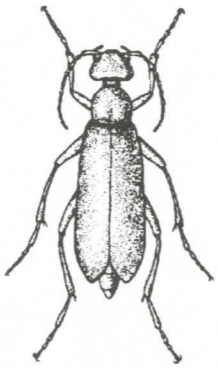
Heavy infestations of pea aphids cause plants to wilt. Normally, pea aphid populations must be 30 or more per stem to justify controls. Blue alfalfa aphids can cause damage at lower levels. Apply pre-bloom insecticide materials at least seven days before bloom to protect pollinators.

Registered treatments for controlling aphids in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
(R)	*carbofuran (Furadan 4F)*	0.25-1.0 lb	Apply only to pure stands of alfalfa. Do not apply more than once per cutting or twice per year. Do not move bees into treated areas within seven days of application. See label for harvest restrictions.
	chlorpyrifos (Lorsban 4E)	0.25 lb	For suppression only. Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation system.
	dimethoate (Cygon 400)	0.25-0.50 lb	Wait 10 days before harvest or grazing. One application per cutting. Do not apply during bloom.
	malathion 57EC	1.0-1.25 lb	No waiting period. During bloom, apply only in the evening or early morning.
(R)	*methidathion (Supracide 2E)*	0.5-1.0 lb	Do not apply during bloom. Wait 10 days before harvest.
(R)	*methomyl (Lannate LV, 90SP)*	0.45-0.9 lb	Wait seven days before harvest. Do not apply to dormant or semi-dormant alfalfa when temperature is 50°F or lower. Do not apply when alfalfa is in bloom.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Do not apply during bloom. Wait 15 days before harvest or grazing. Not registered for spotted alfalfa aphid. May be applied through overhead sprinkler irrigation system.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.50 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush 2E, 25W, Pounce 25WP 3.2 EC)*	0.05-0.2 lb	Use higher dosage for increased pest pressure or increased residual control. Do not apply more than 0.2 lb AI/A per cutting. When rates of 0.1 lb AI/A or less are used, application may be made on day of harvest. When rates greater than 0.1 lb AI/A are used, do not apply within 14 days of harvest.
	phosmet + dimethoate (Imidan 70WP) + (Cygon 400)	1.0 lb + 0.125-0.25 lb	Do not apply more than one time per cutting. Do not graze or cut for hay within 10 days. Do not apply to alfalfa during the bloom period.

Spraying blooming alfalfa can be extremely hazardous to bees. Coordinate with local beekeepers before applying insecticides.

Blister beetles



Blister beetle

Blister beetles feed in clusters on the foliage and flowers of numerous weeds and agricultural crops. Several species commonly are found in alfalfa and can be abundant in July and August.

Adults are elongate, cylindrical, soft-bodied beetles that range in length from 1/2 to 1 inch. Beetles are typically black, gray, spotted or striped with conspicuous heads and soft wing covers that do not cover the tip of the abdomen.

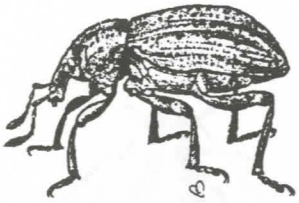
When large aggregations of beetles are feeding, fields take on a ragged, stunted appearance. The larvae of some blister beetles are predaceous on the eggs of grasshoppers and in this capacity are considered beneficial. The body fluids of most blister beetles contain cantharidin, a chemical substance capable of producing large, watery blisters if allowed to contact the skin.

When consumed with hay or feed, blister beetles can seriously affect livestock health. Horses are particularly sensitive, with as few as two to five ingested beetles capable of causing colic, abortion, lethargy, urinary tract infections, and even death. Alfalfa producers should check fields for the presence of blister beetles before harvest, particularly for cuttings made from mid to late season. If beetles are numerous, an insecticide application should be considered. The use of a hay "crimper" may accentuate the problem if beetles are crushed along with the hay rather than being allowed to move out of the field following cutting.

Registered treatments for controlling blister beetle in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus)	1.0 lb	Wait three days before harvest.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.5 lb	Wait 15 days before harvest.

Clover leaf weevil



Clover leaf weevil adult

During the past several years, clover leaf weevils have been a serious pest of alfalfa in some eastern Nebraska counties. Although the clover leaf weevil and alfalfa weevil are quite similar, the table below will help in differentiating the two species.

Differences in appearance of two weevils

Alfalfa weevil	Clover leaf weevil
Overwinter primarily as adults.	Overwinter primarily as larvae.
Adults are brown with a dark brown stripe halfway down back, snout on head, and 3/16 inch long.	Adults are dark brown, pitted light brown underneath, snout on head, and over 1/4 inch long.
Larvae prefer to feed on newly emerging leaves on stem tip.	Larvae prefer to feed on lower and middle leaves.
Larvae remain on plant most of time.	Larvae feed on plant at night; during the day, they rest in debris at base of plant.
Larvae have black heads.	Larvae have brown heads.
Adults leave fields in June.	Adults may remain in fields into July.

Most damage has occurred after first cutting when large numbers of adults feed on regrowth and delay subsequent harvest. Refer to the *Alfalfa stubble threshold calculation* table on page 6 for help in determining when treatment is necessary to reduce this damage.

Clover leaf weevil larvae also have been noticed in high numbers during the first crop growth phase. These larvae feed on the lower and middle leaves of the plant at night and hide in debris near the base of the plant during the day. They normally pupate prior to first cutting. Clover leaf weevil larvae have not been associated with economic or preventable damage to the first cutting of alfalfa.

Insecticides and rates suggested for control of the alfalfa weevil probably will provide satisfactory control of clover leaf weevil larvae and adults.

Cutworms — army and variegated

Several species of night-flying millers, including the **army cutworm** moth, deposit eggs in alfalfa. When larvae hatch from the eggs and begin to feed, they are about 1/8 inch long. Eventually, they grow to 1 inch or longer. Army cutworms are a problem early in the season when they feed at night, usually climbing onto the plants to feed on leaves and hiding in the soil by day.

In newly seeded alfalfa, food reserves in the roots are limited and a small amount of feeding is enough to kill individual plants. Consider treatment on newly established stands when two or more cutworms per square foot are observed. Established alfalfa is not as likely to suffer stand loss, but growth may be delayed and yields reduced if cutworms are numerous. Consider treatment in established alfalfa fields when four or more cutworms per square foot are found. Apply insecticides in the evening or early morning for best control.

Variegated cutworm larvae are occasionally severe pests in alfalfa, particularly on regrowth after harvest. They also tend to be night feeders that hide under the windrow or debris during the day.

Cutworm

For assistance in determining whether insecticide treatment is justified for this pest, consult the *Alfalfa stubble threshold calculation* table on page 6 of this guide.

For more information on this subject, refer to Extension NebGuide G93-1145.

Registered treatments for controlling cutworms in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus)	1.5 lb	Wait three days before harvest.
	chlorpyrifos (Lorsban 4E)	0.5-1.0 lb	Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation systems.
(R)	*methyl parathion (Penncap-M)*	0.5-1.0 lb	Do not apply during bloom. Wait 15 days before harvest or grazing. May be applied through overhead sprinkler irrigation system.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.50 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush, 2E, 25W, Pounce 25WP, 3.2EC)*	0.05-0.2 lb	Use higher dosage for increased pest pressure or increased residual control. Do not apply more than 0.2 lb AI/A per cutting. When rates of 0.1 lb AI/A or less are used, application may be made on day of harvest. When rates greater than 0.1 lb AI/A are used, do not apply within 14 days of harvest.

Grasshoppers

Grasshopper

Grasshoppers are best controlled while they are small and still feeding in field margins. If hoppers average 21-40 in field margins or 8-14 per square yard in the alfalfa, consider an insecticide application. Look for increased grasshopper activity in weedy alfalfa and fields surrounded by weedy waste areas or pasture. Hoppers become especially abundant during dry seasons.

When establishing new stands of alfalfa, field margins should be treated **before** plants begin to emerge, if grasshoppers are present at threshold levels. Refer to the following table for grasshopper treatment thresholds in fields and margins.

Treatment thresholds for grasshoppers in fields and field margins (non-crop areas)

Number of nymphs or adult grasshoppers per square yard

Classification	Field	Field margin	Is treatment necessary?
Non-economic	0 to 2	5 to 10	Usually not
Light	3 to 7	11 to 20	Questionable
Moderate	8 to 14	21 to 40	Probably
Abundant	15 or more	41 or more	Yes

Registered treatments for controlling grasshoppers in alfalfa

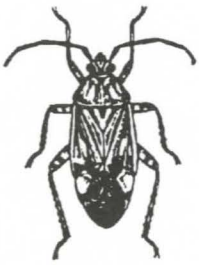
	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, 4F, XLR Plus)	0.5-1.5 lb	Wait three days before harvest.
(R)	*carbofuran (Furadan 4F)*	0.125-0.25 lb	Apply only to pure stands of alfalfa. Do not apply more than once per cutting or twice per year. Do not move bees into treated areas within seven days of application. See label for harvest restriction.
	chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation system.
	dimethoate (Cygon 400)	0.25-0.50 lb	Wait 10 days before harvest. Only one application per cutting. Do not apply during bloom.
	malathion 57EC	1.0-1.25 lb	No waiting period. During bloom, apply only in the evening or early morning.
	malathion ULV 9.33	0.6 lb	No waiting period. Do not apply to alfalfa in bloom. Do not apply to seed alfalfa.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Do not spray alfalfa during bloom to avoid injury to bees. Do not apply within 15 days of harvest or grazing. May be applied through sprinkler irrigation system. Use higher rates as stated on the label if majority of grasshoppers are large or the weather is cool.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.50 lb	Wait 15 days before harvest.

Registered treatments for controlling grasshoppers in non-crop and waste areas

Rates are active ingredient per acre

	Insecticide	Rate AI/acre
	acephate (Orthene 75S)	0.125-0.5 lb
	carbaryl (Sevin 4-F, XLR Plus, 80S)	0.5-1.5 lb
(R)	*esfenvalerate (Asana XL)*	0.025-0.05 lb
	malathion ULV 9.33	0.6-0.9 lb
	phosmet (Imidan 70WP)	1.5-2.0 lb

Lygus bugs



Lygus bug

Lygus bugs are major pests of alfalfa seed in most areas of the country. Both adults and nymphs feed on buds, flowers, and seeds with their sucking mouthparts. Adults are green or brown bugs, about 3/16 inch long and about half as wide. There is a distinct triangle about one-third of the distance down the back. The young nymphs are tiny, aphid-like in appearance, and blue-green in color. Nymphs can be distinguished from adults by the presence of wing pads instead of wings.

Lygus bugs do their greatest damage by feeding on alfalfa buds. Feeding by nymphs is more destructive than that by adults. Alfalfa buds bleach, die, and drop two to five days after feeding. The bugs also feed on the immature seeds within the pods, causing them to shrivel and turn brown. Lygus bug feeding during blossoming causes flowers to drop, although not all flower drop can be attributed to lygus bugs.

Economic levels of lygus bugs for various growth stages are as follows (although smaller in size, nymphs count the same as adults because of greater damage potential): pre-bloom — two per sweep, full bloom — five per sweep; and post-bloom — eight per sweep. Pre-bloom sprays should be applied seven to 14 days before pollinators appear.

Registered treatments for controlling lygus bugs in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
(R)	*carbofuran (Furadan 4F)*	1.0 lb	Pre-bloom only. One application per season. Do not harvest or graze within 28 days of application. Use at least 14 days before bloom.
	dimethoate (Cygon 400)	0.25-0.5 lb	Pre-bloom only. Do not feed, graze, or harvest within 10 days of application. Use at least seven days before bloom.
	malathion 57EC	1.0-1.25 lb	No time limitations. During bloom, apply only in the evening or early morning.
(R)	*methidathion (Supracide 2EC)*	0.5-1.0 lb	Pre-bloom only. Do not harvest or feed treated foliage within 10 days of application. Use at least seven days before bloom.
(R)	*permethrin (Pounce 25WP, 3.2EC)*	0.1-0.2 lb	Use higher labeled dosages for increased pest pressure or increased residual control. Do not apply more than 0.2 lb AI/A per cutting. When rates of 0.1 or less lb AI/A are used, application may be made on the day of harvest. When rates greater than 0.1 lb/A are used, do not apply within 14 days of harvest.

Potato leafhopper

These small (1/8 inch long), green, wedge-shaped insects frequently become abundant in alfalfa, but only occasionally cause economic damage. Normally, harvesting practices interrupt the leafhopper life cycle in the egg stage. Damage, caused by injection of a toxin as the leafhopper feeds, is expressed as yellow or purple triangular-shaped areas on individual leaflets.

If leafhoppers are abundant, plant growth may be stunted and death is possible, particularly in seedling stands. In Nebraska, potato leafhoppers are usually more important on the second and third cuttings. Certain alfalfa varieties are somewhat resistant to potato leafhopper damage.

For more information on this subject, refer to Extension NebGuide G93-1136.

The following treatment thresholds are recommended for potato leafhoppers:

Table I. Dynamic treatment thresholds for Potato Leafhoppers (average number per sweep) on alfalfa that is 1 to 4 inches tall.

Value of hay (per ton)	Cost of insecticide application (per acre)					
	$8	$10	$12	$14	$16	$20
$ 60	0.4	0.5	0.6	0.7	0.8	1.0
$ 80	0.3	0.4	0.5	0.5	0.6	0.75
$100	0.25	0.3	0.4	0.4	0.5	0.6
$120	0.2	0.25	0.3	0.35	0.4	0.5
$140	0.2	0.2	0.25	0.3	0.3	0.4
$160	0.15	0.2	0.3	0.3	0.3	0.4

Table II. Dynamic treatment thresholds for Potato Leafhoppers (average number per sweep) on alfalfa that is 4 to 8 inches tall.

Value of hay (per ton)	Cost of insecticide application (per acre)					
	$8	$10	$12	$14	$16	$20
$ 60	0.7	0.8	1.0	1.0	1.3	1.7
$ 80	0.6	0.6	0.75	0.9	1.0	1.3
$100	0.4	0.5	0.6	0.7	0.8	1.0
$120	0.3	0.4	0.5	0.6	0.7	0.8
$140	0.3	0.35	0.4	0.5	0.6	0.7
$160	0.25	0.3	0.4	0.4	0.5	0.6

Potato leafhopper

Table III. Dynamic treatment thresholds for Potato Leafhoppers (average number per sweep) on alfalfa that is 8 to 12 inches tall.

Value of hay (per ton)	Cost of insecticide application (per acre)					
	$8	$10	$12	$14	$16	$20
$ 60	2.0	2.4	2.8	3.0	3.9	5.0
$ 80	1.8	1.9	2.2	2.7	3.0	4.0
$100	1.2	1.5	1.8	2.1	2.4	3.0
$120	0.9	1.2	1.5	1.8	2.1	2.4
$140	0.9	1.0	1.2	1.5	1.8	2.0
$160	0.8	0.9	1.0	1.2	1.5	1.8

Registered treatments for controlling potato leafhopper in alfalfa

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus)	1.25 lb	Wait three days before harvest.
(R)	*carbofuran (Furadan 4F)*	0.5-1.0 lb	Apply only to pure stands of alfalfa. Do not apply more than once per cutting or twice per year. Do not move bees into treated areas within seven days of application. See label for harvest restrictions.
	chlorpyrifos (Lorsban 4E)	0.5-1.0 lb	Do not apply more than once per cutting or four times per year. See label for harvest restrictions. Some phytotoxic symptoms may occur on young foliage. May be applied through overhead sprinkler irrigation systems.
	dimethoate (Cygon 400)	0.25-0.5 lb	Wait 10 days before harvest. Only one application per cutting. Do not apply during bloom.

(continued)

Registered treatments for controlling potato leafhopper in alfalfa *(continued)*

	Insecticide	Rate AI/acre	Restrictions and comments
	malathion 57EC	1.0-1.25 lb	No waiting period. During bloom, apply only in the evening or early morning.
(R)	*methidathion (Supracide 2E)*	0.5-1.0 lb	Do not apply during bloom. Wait 10 days before harvest.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Do not spray alfalfa during bloom to avoid injury to bees. Do not apply within 15 days of harvest or grazing. May be applied through sprinkler irrigation system.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.50 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush 2E, 25W, Pounce 25WP, 3.2 EC)*	0.1-0.2 lb	Use higher dosage for increased pest pressure or increased residual control. Do not apply more than 0.2 lb AI/A per cutting. When rates of 0.1 lb AI/A or less are used, application may be made on day of harvest. When rates greater than 0.1 lb AI/A are used, do not apply within 14 days of harvest.
	phosmet (Imidan 70WP)	1.0 lb	Only one application per cutting. Wait seven days before grazing or harvest.

Webworms

Webworm

Fully developed webworm larvae are yellow or green to nearly black in color. They are 1 to 1 1/4 inches long with dark and light stripes extending down the center of the back and three small dark spots on either side of each segment. Infestations are often the result of migrations from weedy areas, so webworms are more commonly a problem in older fields or where stands are thin and weedy. However, webworms also occasionally defoliate established fields and reduce stands of newly-seeded alfalfa. When larvae feed, they spin silken webs in the tops of plants and tie leaves together.

No Nebraska threshold data are available for webworms, but Texas A&M University entomologists recommend treatment when 25 to 30 percent of plant terminals are infested and the crop is more than two weeks from harvest. Otherwise, early cutting is suggested.

Registered treatments for controlling webworms in alfalfa

	Insecticide	Rate AI/Acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus)	1.0-1.5 lb	Wait three days before harvest.
(R)	*parathion 4EC, 8E, 8F*	0.25-0.50 lb	Wait 15 days before harvest.
(R)	*permethrin (Ambush 2E, 25W, Pounce 25WP, 3.2EC)*	0.05-0.2 lb	Use higher labeled dosage for increased pest pressure or increased residual control. Do not apply more than 0.2 lb AI/A per cutting. When rates of 0.1 lb AI/A or less are used, application may be made on day of harvest. When rates greater than 0.1 lb AI/A are used, do not apply within 14 days of harvest.

Soybean insects

Most insects that damage soybeans can be placed in one of two large groups: chewing insects or sucking insects.

Chewing insects are the most common soybean pests and may damage any part of the plant, depending on the time of the season and the growth stage of the plant. Bean leaf beetles, green cloverworms, and grasshoppers are the most common chewing insect pests of soybeans in Nebraska. Other chewing insects include woollybear caterpillars, soil cutworms, loopers, and variegated cutworms, and to a lesser extent, leafminers, webworms, blister beetles, corn earworms, western bean cutworms, imported longhorned weevils and Mexican bean beetles.

Sucking insects and mites injure soybean plants by probing plant parts with their piercing needle-like mouthparts. Damage is produced when plant juices are removed and/or toxins are injected, causing plants to appear stippled, mottled, and to take on a yellow or discolored appearance.

Sucking insects are relatively minor pests of soybeans in Nebraska. Stink bugs occasionally attack pods and may discolor the developing bean within the pod. Spider mites may be of concern during hot, dry years. Thrips and plant bugs are other sucking insects that may feed on soybeans.

Scouting and decision making

Treatment guidelines are usually based on number of insects per foot of row, percent damage, and growth stage of the plant. Other than soil insects, the best way to scout soybean pests is with a drop cloth. Attach a 3 foot by 3 foot square piece of light-colored canvas to two dowels. Carefully insert the cloth between two soybean rows and spread underneath. Knocking the plants from each row over the cloth will give you the number of insects per 6 feet of row (3 feet on each side). Do this in at least five places in the field to obtain a representative count for the entire field. In solid-seeded soybeans, a sweep net must be used to sample insects.

Caution: Certain organophosphate soil insecticides may produce a cross reaction (burning) with the herbicide metribuzin (Sencor/Lexone). **The use of a preventative soil insecticide is not suggested on soybeans.**

Spraying flowering soybeans can be extremely hazardous to bees. Coordinate with local beekeepers before applying insecticides.

Registered treatments for controlling chewing insects in soybeans

Rate is active ingredient per acre unless otherwise noted.

Insect		Insecticide	Rate
Blister beetles		*carbaryl (Sevin 80S, XLR Plus, 50W, 4F)*	1.0 lb
Loopers		*acephate (Orthene 75S)*	0.5-1.0 lb
		Bacillus thuringiensis (Dipel ES, Biobit F)	See label
	(R)	*esfenvalerate (Asana XL)*	0.025-0.05 lb
	(R)	*permethrin (Ambush 2E, 25WP, Pounce 3.2EC)*	0.05-0.10 lb
		thiodicarb (Larvin 3.2F)	0.5-0.75 lb
	(R)	*tralomethrin (Scout 0.3EC)*	0.015-0.019 lb
Thistle caterpillar		*carbaryl (Sevin 80S, XLR Plus, 50W, 4F)*	2.0 lb
		permethrin (Pounce 3.2E)	*0.116 lb*

(Continued)

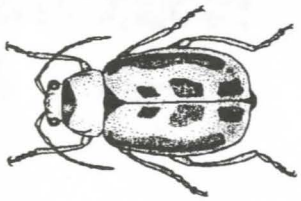
Registered treatments for controlling chewing insects in soybeans *(continued)*

Rate is active ingredient per acre unless otherwise noted.

Insect	Insecticide	Rate
Defoliating cutworms	*carbaryl (Sevin 80S, XLR Plus, 50W, 4F)*	1.0 lb
	chlorpyrifos (Lorsban 4E)	0.5-1.0 lb
	(R) *esfenvalerate (Asana XL)*	0.03-0.05 lb
	(R) *permethrin (Pounce 25WP, 3.2EC)*	0.05-0.1 lb
	thiodicarb (Larvin 3.2F)	0.5-0.75 lb
	(R) *tralomethrin (Scout 0.3EC)*	0.015-0.019 lb
Webworms	*carbaryl (Sevin 80S, XLR Plus, 50W, 4F)*	1.0 lb
	(R) *methyl parathion (Penncap-M)*	0.25 lb
	(R) *permethrin (Pounce 25WP, 3.2EC)*	0.1-0.2 lb
	(R) *parathion 4EC, 8EC*	0.25 lb
Woollybear caterpillar	*chlorpyrifos (Lorsban 4E)*	0.50-1.0 lb
	(R) *esfenvalerate (Asana XL)*	0.015-0.03 lb
	(R) *permethrin (Ambush 2E, Pounce 3.2EC)*	0.05-0.10 lb
	thiodicarb (Larvin 3.2F)	0.25-0.4 lb

Bean leaf beetle

Bean leaf beetles are about 1/4 inch long and vary in color from yellow to tan or red. They have a black triangle behind the head, with black outside borders and usually two or three black spots on each wing cover. Bean leaf beetles are present early in the season and from July to frost. They feed on cotyledons, leaves, and pods.



Bean leaf beetle

Economic thresholds are given in the following tables for bean leaf beetles on seedling (VC), early vegetative (V1), and reproductive (R6) stage soybean, assuming an approximate 36.6 bu/acre yield potential and 30-inch row spacing with approximately seven plants/foot. Numbers in parenthesis ( ) are beetles per sweep for drilled soybean with 7-inch row spacing.

VC Economic thresholds (beetles per plant)

	Pest-management costs, $/a			
Crop value, $/bu	6.00	8.00	10.00	12.00
5.00	3	4	5	6
6.00	3	4	5	5
7.00	2	3	3	4
8.00	2	3	3	4

V1 Economic thresholds (beetles per plant)

	Pest-management costs, $/a			
Crop value, $/bu	6.00	8.00	10.00	12.00
5.00	4	6	7	9
6.00	4	5	6	7
7.00	3	4	5	6
8.00	3	4	5	5

R6 Economic thresholds (beetles per sweep)

	Pest-management costs, $/a			
Crop value, $/bu	6.00	8.00	10.00	12.00
5.00	4(3)	5(4)	6(5)	8(5)
6.00	3(2)	4(3)	5(4)	6(5)
7.00	3(2)	4(3)	4(3)	5(4)
8.00	2(2)	3(2)	4(3)	5(3)

Registered insecticides for bean leaf beetle control in soybeans

	Insecticide	Rate AI/acre	Restrictions and Comments
	acephate (Orthene 75S)	0.5-1.0 lb	Wait 14 days to harvest. Do not graze or cut vines for hay or forage.
	carbaryl (Sevin 80S, XLR Plus 50W, 4F)	0.5-1.0 lb	No waiting period. May be applied through overhead irrigation system.
	chlorpyrifos (Lorsban)	0.5-1.0 lb	Do not apply more than six pints (3 lbs AI) per acre per season. Do not apply last treatment within 28 days before harvest or within 14 days of any previous treatment. Do not allow livestock to graze in treated areas or otherwise feed treated soybean forage, hay, or straw to meat or dairy animals. On determinate soybeans, do not apply more than one application after pod set. May be applied through overhead irrigation system.
	dimethoate (Cygon 400)	0.5 lb	Wait 21 days to harvest. Do not feed or graze within five days of last application.
(R)	*esfenvalerate* (Asana XL)	0.03-0.05 lb	Wait 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb AI/A per season.
(R)	*methomyl (Lannate 90SP, 2.4LV)*	0.25-0.5 lb	Wait 14 days to harvest, three days for forage, seven days for hay, 90SP formulations are not restricted.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 20 days to harvest or grazing. Do not make more than two applications per season. May be applied through overhead irrigation system.
(R)	*permethrin (Ambush, 2E, 25W Pounce 3.2EC, 25WP)*	0.05-0.1 lb	Wait 60 days to harvest. Do not graze or feed forage or hay. Do not make more than two applications of Ambush per season. Do not apply more than 0.4 lb AI/A of Pounce per season. Pounce may be applied through an overhead irrigation system.
	thiodicarb (Larvin 3.2F)	0.45-0.75 lb	Wait 28 days to harvest. Do not feed treated forage, hay, or straw to livestock.

Grasshoppers

Grasshopper infestations usually begin in waste vegetation (e.g. roadsides, borrow pits, fence rows, benches, terraces) and pastures, moving into border rows of soybeans in mid summer. Hoppers are best controlled in these staging areas before they invade soybeans. Plan to treat if hoppers average 20 or more per square yard in field margins or 15 or more per square yard in the soybean field itself. Refer to grasshopper suggestions in the alfalfa section for a list of insecticides registered for non-crop and waste areas. The following are suggested for control of grasshoppers once they have moved into the soybean field.

Grasshopper

Registered treatments for controlling grasshoppers in soybeans

	Insecticide	Rate AI/acre	Restrictions and comments
	acephate (Orthene 75S)	0.25-0.5 lb	Wait 14 days to harvest. Do not graze or cut vines for hay or forage.
	carbaryl (Sevin 80S, XLR Plus, 50W, 4F)	1.0 lb	No waiting period. May be applied through overhead irrigation system.
(R)	*carbofuran (Furadan 4F)*	0.125-0.25 lb	Wait 21 days to harvest. Do not graze, forage, or cut for silage or hay. Do not make more than two applications per season. Do not apply if Furadan 10G,15G, or 4F was applied at planting time.
	chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Do not apply more than six pints (3 lbs AI) 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 or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. On determinate soybeans, do not apply more than one application after pod set. May be applied through overhead irrigation system.
	dimethoate (Cygon 400)	0.5 lb	Wait 21 days to harvest. Do not feed or graze within five days of last application.
(R)	*esfenvalerate (Asana XL)*	0.03-0.05 lb	Wait 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb AI/A per season.
	malathion ULV 9.33	0.6 lb	Wait seven days to harvest or graze.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 20 days to harvest or graze. Do not make more than two applications per season. May be applied through overhead irrigation system.
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 20 days to harvest. Do not apply more than two times per season.
(R)	*tralomethrin (Scout 0.3EC)*	0.015-0.019 lb	Wait 21 days to harvest. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.12 lb AI/A per season.

Green cloverworm

Cloverworms are green caterpillars with a narrow, white stripe down each side. When fully grown, they are about 1 1/4 inch long. High numbers 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 25 percent defoliation occurs during bloom through maturity.

Green cloverworm

Registered treatments for controlling green cloverworm in soybeans

Rate is active ingredient per acre unless otherwise noted.

	Insecticide	Rate	Restrictions and comments
	acephate (Orthene 75S)	0.5-1.0 lb	Wait 14 days to harvest. Do not graze or cut vines for hay or forage.
	Bacillus thuringiensis (Dipel ES, Biobit F)	See label	None
	carbaryl (Sevin 80S, XLR Plus, 50W, 4F)	0.5-1.0 lb	No waiting period. May be applied through overhead irrigation system.
	chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Do not apply more than six pints (3 lbs AI) 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 or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. On determinate soybeans, do not apply more than one application after pod set. May be applied through overhead irrigation system.
(R)	*esfenvalerate (Asana XL)*	0.015-0.03 lb	Wait 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb AI/A per season.
	malathion ULV 9.33	0.6 lb	Wait seven days to harvest or graze.
	malathion 57EC	1.87 lb	May be applied on the day of harvest or forage use.
(R)	*methomyl (Lannate 90SP, 2.4 LV)*	0.25-0.5 lb	Wait 14 days to harvest, three days for forage, seven days for hay. 90SP formulations are not restricted.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 20 days to harvest or grazing. Do not make more than two applications per season. May be applied through overhead irrigation system.
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 20 days to harvest. Do not apply more than two times per season.

(continued)

Registered treatments for controlling green cloverworm in soybeans *(continued)*

Rate is active ingredient per acre unless otherwise noted.

	Insecticide	Rate AI/acre	Restrictions and comments
(R)	*permethrin (Ambush 2E, 25W, Pounce 3.2EC, 25WP)*	0.05-0.1 lb	Wait 60 days to harvest. Do not graze or feed forage for hay. Do not make more than two applications per season of Ambush. Do not apply more than 0.4 lb AI/A of Pounce per season. May be applied through an overhead irrigation system.
	thiodicarb (Larvin 3.2F)	0.25-0.4 lb	Wait 28 days to harvest. Do not feed forage, hay, or straw to livestock.
(R)	*tralomethrin (Scout 0.3EC)*	0.014-0.016 lb	Wait 21 days to harvest. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.12 lb AI/A per season

Potato Leafhopper

Potato leafhoppers are occasional pests of seedling soybean. Adults are light green, wedge-shaped and about 1/8 inch long. Damage is most likely to occur in late-planted fields or fields near recently cut alfalfa that was infested with leafhopper adults. Economic thresholds for potato leafhopper on seedling and early vegetative (V1-V4) stage soybean have been developed and are presented below to aid in decision making.

Economic thresholds for potato leafhopper on seedling and early vegetative soybean.

V1 Economic Thresholds (insects per plant)

	Pest-management costs, $/a			
Crop value, $/bu	**6.00**	**8.00**	**10.00**	**12.00**
5.00	0.6	0.8	1.0	1.2
6.00	0.5	0.7	0.9	1.0
7.00	0.4	0.6	0.7	0.9
8.00	0.4	0.5	0.6	0.8

V2 Economic Thresholds (insects per plant)

	Pest-management costs, $/a			
Crop value, $/bu	**6.00**	**8.00**	**10.00**	**12.00**
5.00	1.0	1.3	1.6	2.0
6.00	0.8	1.1	1.3	1.6
7.00	0.7	1.0	1.1	1.4
8.00	0.6	0.8	1.0	1.2

V3 Economic Thresholds (insects per plant)

	Pest-management costs, $/a			
Crop value, $/bu	**6.00**	**8.00**	**10.00**	**12.00**
5.00	1.4	1.9	2.4	2.9
6.00	1.2	1.6	2.0	2.4
7.00	1.0	1.4	1.7	2.1
8.00	0.9	1.2	1.5	1.8

V4 Economic Thresholds (insects per plant)

	Pest-management costs, $/a			
Crop value, $/bu	**6.00**	**8.00**	**10.00**	**12.00**
5.00	2.1	2.8	3.5	4.2
6.00	1.7	2.3	2.9	3.5
7.00	1.5	2.0	2.5	3.0
8.00	1.3	1.7	2.2	2.6

Registered treatments for controlling potato leafhopper in soybeans

	Insecticide	Rate AI/acre	Restrictions and comments
	acephate (Orthene 75S)	0.25-0.5 lb	Wait 14 days to harvest. Do not graze or cut vines for hay or forage.
	carbaryl (Sevin 80S, XLR Plus, 50W, 4F)	1.0 lb	No waiting period. May be applied through overhead irrigation system.
(R)	*carbofuran (Furadan 4F)*	0.125-0.25 lb	Wait 21 days to harvest. Do not graze, forage, or cut for silage or hay. Do not make more than two applications per season. Do not apply if Furadan 10G,15G, or 4F was applied at planting time.
	chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Do not apply more than six pints (3 lbs AI) 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 or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. On determinate soybeans, do not apply more than one application after pod set. May be applied through overhead irrigation system.
	dimethoate (Cygon 400)	0.5 lb	Wait 21 days to harvest. Do not feed or graze within five days of last application.
(R)	*esfenvalerate (Asana XL)*	0.03-0.05 lb	Wait 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb AI/A per season.
	malathion ULV 9.33	0.6 lb	Wait seven days to harvest or graze.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 20 days to harvest or graze. Do not make more than two applications per season. May be applied through overhead irrigation system.
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 20 days to harvest. Do not apply more than two times per season.
(R)	*tralomethrin (Scout 0.3EC)*	0.015-0.019 lb	Wait 21 days to harvest. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.12 lb AI/A per season.

Soil cutworms

Soil cutworm

Soil cutworms are occasional pests of seedling soybeans. The most common species involved is the black cutworm. This pest is a greasy black or gray worm with a brown head that may be over one inch long when feeding is completed. Black cutworms feed primarily at night and will hide under debris or in the soil during the day. Young black cutworms feed on above-ground portions of plants, while older cutworms cut plants at or below the soil surface. Controls are suggested when 20 percent of the plants are cut, stands have gaps of one foot or more, and cutworms are present.

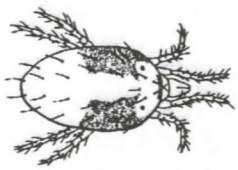
Registered treatments for controlling soil cutworms in soybeans

Rate is active ingredient per acre unless otherwise noted.

	Insecticide	Rate	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus, 50W, 4F)	1.0 lb	No waiting period. May be applied through overhead irrigation system.
	chlorpyrifos (Lorsban 15G)	8 oz form*	Planting time or postemergence. Do not make more than one application per season.
	(Lorsban 4E)	0.5-1.0 lb	Planting time or postemergence. Do not apply more than six pints (3 lbs AI) per acre per season. Wait 28 days to harvest. Do not graze or feed treated foliage or straw to livestock.
(R)	*esfenvalerate (Asana XL)*	0.03-0.05 lb	Wait 21 days to harvest. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb AI/A per season.
(R)	*permethrin (Pounce 3.2EC, 25WP)*	0.05-0.1 lb	Wait 60 days to harvest. Do not graze or feed soybean forage or hay. Do not apply more than 0.4 lb AI/A per season.
	thiodicarb (Larvin 3.2F)	0.5-0.75 lb	Wait 28 days to harvest. Do not feed forage, hay, or straw to livestock.
(R)	*tralomethrin (Scout 0.3EC)*	0.015-0.019 lb	Wait 21 days to harvest. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.12 lb AI/A per season.

* Rate is formulation per 1,000 row feet.

Spider mites



Spider mite

Control is suggested if mites are abundant on underside of leaves and lower leaves are beginning to drop as a result of mite damage.

For more information on this subject, refer to Extension NebGuide G93-1167.

Registered treatments for controlling spider mites in soybeans

Insecticide	Rate AI/acre	Restrictions and comments
chlorpyrifos (Lorsban 4E)	0.25-0.5 lb	Do not apply more than six pints (3 lbs AI) 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 or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. On determinate soybeans, do not apply more than one application after pod set. May be applied through overhead irrigation system.
dimethoate (Cygon 400)	0.5 lb	Wait 21 days to harvest. Do not feed or graze within five days of last application.

Wireworms and seed damaging insects

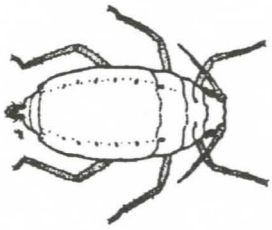
Use planter box seed treatments of diazinon and/or lindane. Follow label directions for amounts and restrictions.

Wheat insects

The principal insects that damage wheat in Nebraska are the pale western and army cutworms, armyworms, grasshoppers, greenbugs, Russian wheat aphids, other aphids, the Hessian fly, and various seed and seedling feeding insects, including wireworms. Much of the loss to the wheat crop from insect pests can be prevented by proper cropping practices. Control of volunteer wheat and delayed seeding, for example, are important control measures for Russian wheat aphid, the Hessian fly, and wheat curl mite. Timeliness of application is important when chemicals are used for insect control. Check appropriate NebGuides for additional information.

Aphids and Greenbugs

Although a number of aphid species can infest wheat and other small grains, the Russian wheat aphid and greenbug are the aphids that most often cause economic damage in Nebraska.



Russian wheat aphid

The **Russian wheat aphid** has become a serious threat to western Nebraska wheat production. Continue to examine wheat for this pest from plant emergence through the fall and in spring from the time wheat resumes growth through the bloom stage. Feeding prevents infested leaves from unrolling and causes the leaves to turn purple with yellow or white lengthwise stripes. Heavily infested plants become prostrate, with young tillers lying parallel to the ground.

The Russian wheat aphid is difficult to control due to its habit of feeding in rolled up leaves of new growth. Feeding on flag leaves can cause premature death and distorted white heads. Damage often appears in circular, purple or reddish-brown areas in a field.

The Russian wheat aphid is a small aphid, with an olive-green, spindle-shaped body, and short antennae. Its "double-tailed" appearance and reduced cornicles ("tailpipes") help distinguish it from greenbugs and other aphids commonly found in wheat. Contact your local University of Nebraska Cooperative Extension office or crop consultant for help in distinguishing these aphid species.

Caution: Several other species of aphids occur in wheat, including the greenbug, oatbird cherry aphid, English grain aphid, and corn leaf aphid. The last three species rarely cause serious damage. Therefore, identification is critical. Do not make a control decision until you are sure which aphids are in your fields.

In the fall, control of field border infestations of Russian wheat aphids may be justified when 50 percent or more of the plants are infested. Consider control of full-field infestations when 20 percent or more of the plants are infested. Control of this pest in the spring appears justified when 10 percent or more of the tillers are infested. Early control with spot treatments in only those areas that are infested will reduce costs and may eliminate the need for large scale treatments later.

Two insecticides have proven to be most effective against the Russian wheat aphid. These are Lorsban 4E-SG (chlorpyrifos) and Di-Syston 8 (disulfoton). If applied properly according to label recommendations, these products provide good control of the Russian wheat aphid for two to four weeks. After this, reinfestation is possible. Contact insecticides, such as ethyl and methyl parathion, may provide reasonable control, particularly early when leaves are not as tightly curled around the colonies and later when the aphids are exposed and feeding on the heads. Whatever foliar insecticide is used, thorough plant coverage is important.

Use at least 2 gallons of finished spray per acre to obtain reasonable control by aerial application. Because of the uncertainty of fall infestations, fall planting-time treatment with granular systemic insecticides is economically questionable. When deciding, consider all potential risks of insect infestations (i.e. proximity to infested alternate hosts or volunteer wheat and other pests such as grasshop-

pers, greenbugs, wheat curl mites, etc.). However, keep in mind that fall treatment will not prevent spring infestations.

Wheat fields infested by **greenbugs** develop yellow or dead areas during late fall or early spring that gradually increase in size. Examination of these areas should reveal the small green aphids feeding on the underside of leaves. The greenbugs inject phytotoxic saliva as they feed. Plants under stress from other causes may need to be treated even though greenbug numbers are relatively low. Fall planting time treatments for greenbugs are economically questionable because damaging fall infestations are relatively unusual. The following table indicates approximate growth stages and treatment thresholds for greenbug control:

Treatment thresholds for greenbugs at various growth stages of wheat

Stage and development of plants	Number of greenbugs per linear foot of drill row
Seedlings, thin stands, less than three tillers	50 (fewer if plants are very small)
3- to 6- inch wheat, three tillers or more	100 - 300
6- to 10-inch wheat	300 - 500

For more information on this subject, refer to Extension NebGuides G73-49 and G87-853.

Registered treatments for controlling aphids and greenbugs in wheat*

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus, 4F)	1.0-1.5 lb	No waiting period on forage. Wait 21 days before harvesting grain.
(R)	*chlorpyrifos (Lorsban 4E-SG)*	0.25-0.5 lb	Wait 28 days before harvest and 14 days before grazing.
(R)	*carbofuran (Furadan 4F)*	*0.25-0.5 oz form/1,000 feet of row	Do not feed treated forage to livestock.
(R)	*disulfoton (Di-Syston 15G)*	*6.7 lb form/acre	Wait 75 days before harvesting or grazing.
	(Di-Syston 8)	*4-12 fl. oz. form/acre	Wait 30 days before grain harvest. Do not graze or cut for forage.
(R)	*methomyl (Lannate LV, 90SP)*	0.225-0.45 lb	Wait seven days before harvest, 10 days before grazing.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 15 days before harvest or grazing.
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 15 days before harvest.
(R)	*phorate (Thimet 15G)*	*1.6 oz form/ 1,000 feet of row	Wait 70 days before feeding or grazing.

*Rates are active ingredient per acre unless noted.

Armyworms

(True, Fall, Wheathead, Yellowstriped)

Four species of armyworms occur in Nebraska. They are generally associated with field crops and small grains but also feed on pasture grasses. These pests hide in the soil or beneath debris by day and emerge at night to feed on foliage. Hail-damaged fields that become weedy with foxtail and other grasses are particularly susceptible to armyworm infestations. Spray in early morning or evening for best results.

For more information on this subject, refer to Extension NebGuide G82-615.

Registered treatments for controlling armyworms in wheat

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 80S, XLR Plus, 4F)	1.0-1.5 lb	No waiting period on forage. Wait 21 days before harvesting grain.
(R)	*methomyl (Lannate 1.8L, 90SP)*	0.225-0.45 lb	Wait seven days before harvest, 10 days before grazing.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 15 days before harvest or grazing.
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 15 days before harvest.

Black grass bug

The black grass bug can cause significant damage to wheatgrasses and wheat. The primary host of the black grass bug is crested wheatgrass. Eggs are laid and early nymphal development will begin on crested wheatgrass. As nymphs develop they will move out of the crested wheatgrass and into adjoining areas of other wheatgrasses or wheat. Wheat fields are seldom severely infested except for borders (10-20 feet) that adjoin crested wheatgrass ditches or set aside areas. The best control of the black grass bug is to graze or hay the wheatgrass during the summer. This will remove many of the eggs that are laid on the wheatgrass stems early in the summer. Because set-aside areas cannot be grazed or hayed, they are particularly vulnerable to large buildups of the black grass bug. Wheat fields adjoining unharvested wheatgrass areas should be scouted in April and May for infestations of black grass bugs along the borders. If black grass bugs are causing significant discoloration of the wheat and the majority of the bugs are still in the nymph stage, a border treatment of the infested area may be justified. In most instances a border treatment of 50 feet or less will be sufficient to reduce damage. More extensive treatments will generally not improve control.

Registered treatments for controlling black grass bug in wheat

Insecticide	Rate/acre	Restrictions and comments
malathion ULV 9.33	8.5 oz form	Non-agricultural areas
carbaryl (Sevin XLR Plus)	0.5-1.0 lb AI	Non-agricultural and rangeland
acephate (Orthene 75S)	0.094-0.87 lb AI	Non-agricultural, pasture and rangeland. Wait 21 days to harvest hay.

Brown wheat mites

Brown wheat mites can be a problem in wheat in the early spring when conditions are dry. The brown wheat mite is a small, dark brown mite about 0.5 mm long. Like all mites, it has four pairs of legs, and the front pair of legs is markedly longer than the remaining pairs. This mite is quite cold hardy and begins its development in the fall. It can continue to reproduce in the winter during periods of warmer weather. Once temperatures warm and spring wheat growth begins, mite populations will increase more rapidly. As temperatures increase later in the spring, the mites will lay eggs that will be dormant until fall. Damage symptoms range from a stippling of the leaves to dying back of the leaf tips. Significant damage will result only in plants that are already under severe drought stress, thus it is difficult to distinguish what is the result of mite damage or drought. Rains of only 0.25-0.5 inch may be enough to reduce mite infestations and allow the wheat to outgrow severe reinfestation. However, if wheat is under severe drought stress, the added stress of large brown wheat mite infestations (30-50 mites/plant) may be enough to cause significant damage. The value of chemical control needs to be assessed in each situation based on the yield potential of the wheat and prospects for rain. The application of an insecticide for mite control will not solve the major problem of drought stress. The only pesticide labeled for brown wheat mite control in wheat is dimethoate (Cygon 400) which is applied at rates of 0.17 to 0.25 lb AI/A.

Chinch bugs

Adults leave overwintering sites and migrate to small grains in the spring. Heavy spring infestations in wheat may result in reduced yields, particularly if wheat is under stress from other causes. Usually either a partial or full generation occurs in wheat fields before chinch bugs migrate to corn or sorghum. Controls are seldom necessary, but 0.5 lb AI/Acre of (R) parathion applied aerially can be used at least 15 days prior to harvest. Damage to wheat seldom occurs in the fall because chinch bugs are usually in the process of moving to overwintering sites.

For more information on this subject, refer to Extension NebGuide G86-806.

Cutworms — pale western and armyworm

Sporadic outbreaks of pale western and army cutworms have occurred in Nebraska wheat following droughts. Thin stands on lighter soils are more subject to attack. The pale western cutworm is gray, up to 1 inch long, and feeds near the crown beneath the soil surface, destroying plants and causing serious damage. Because they can damage plants severely, only one pale western cutworm per foot of drill row is considered an economic level in early spring. The army cutworm is mottled brown, up to 1 1/4 inches long, and "grazes" the wheat above ground. Army cutworms are usually not considered serious pests, however, where stands are thin and poorly tillered, one or two worms per square foot may justify treatment. In general, however, four to five cutworms per square foot are needed to justify treatment. Apply insecticide treatments on warm days (over 60°F) during the early morning or evening for best results.

For more information on this subject, refer to Extension NebGuide G93-1145.

Registered treatment for controlling pale western and army cutworms in wheat

	Insecticide	Rate AI/acre	Restrictions and comments
(R)	*parathion 4EC, 8EC*	0.5 lb	Wait 15 days before harvest.

Grasshoppers

Grasshopper

Minimize economic damage to wheat by controlling grasshoppers when there are 20 or more adults per square yard in field margins, or eight or more in the field itself. Time of day, temperature, wind, plant density and height of vegetation affect grasshopper activity and should be considered in making counts. For grasshopper control suggestions in non-crop and waste areas, refer to the grasshopper portion of the alfalfa section, page 12.

For more information on this subject, refer to Extension NebGuide G86-791.

Registered treatments for controlling grasshoppers in wheat

Rate is active ingredient per acre unless otherwise noted.

	Insecticide	Rate AI/acre	Restrictions and comments
	carbaryl (Sevin 5% bait)	20-40 lb form*	No waiting period on forage. Wait 21 days before harvesting grain.
	(Sevin 80S,XLR Plus)	0.5-1.5 lb	No waiting period on forage. Wait 21 days before harvesting grain.
(R)	*carbofuran (Furadan 4F)*	0.25-0.5 lb	Apply before heads emerge. Do not make more than two applications per season. Do not feed treated forage to livestock.
(R)	*chlorpyrifos (Lorsban 4E-SG)*	0.25-0.5 lb	Wait 28 days before harvest or 14 days before grazing.
(R)	*disulfoton (Di-Syston 8)*	0.5 lb	Wait 30 days before grain harvest. Do not graze or harvest for forage.
(R)	*(Di-Syston 15G)*	6.7 lb form/acre	Planting time application. Wait 75 days to graze or cut for forage.
	dimethoate (Cygon 400)	0.375 lb	Wait 14 days for grazing, 35 days for harvest. Maximum of two applications per season.
	malathion 57EC	1.0 lb	Wait seven days before harvest or forage use.
	malathion ULV 9.33	0.6 lb	Wait seven days before harvest or forage use.
(R)	*methyl parathion (Penncap-M)*	0.5-0.75 lb	Wait 15 days before harvest or grazing.
(R)	*parathion 4EC,8EC*	0.5 lb	Wait 15 days before harvest.
(R)	*phorate (Thimet 20G)*	1.0 lb	Apply in seed furrow at planting. Wait 45 days to graze.

* Rate is formulation per acre.

NOTE: Furadan 4F at a rate of 0.25 to 0.5 fl. oz/1000 feet of row (minimum 6-inch row spacing), Thimet 20G at a rate of 1.2 oz per 1,000 feet (minimum 8- inch row spacing) and Di-Syston 15 G (disulfoton) at a rate of 6.7 lb form/acre can be used in the seed furrow at planting time. Only the border 30-40 feet normally benefit from treatment. Wait at least 45 days before grazing after applying Thimet 20G and 75 days after applying Di-Syston 15G. Do **not** make any later applications after planting time treatment. Do **not** mix granules with wheat seed in drill box.

Hessian fly

Injury caused by the Hessian fly is not conspicuous at first, but can be devastating. Wheat infested in the fall becomes stunted. Leaves of infested plants take on a dark blue-green color, are distinctly thickened, and stand more erect than those of non-infested plants. Controls consist primarily of cultural methods. In eastern and central Nebraska, delay planting until after the summer generation of flies has died to reduce fall infestations. Fly-free dates for planting wheat in your area can be obtained from your local University of Nebraska Cooperative Extension office. In addition, destroying wheat stubble will help reduce the fly population. However, in western Nebraska, because of wind erosion, this practice may not always be practical. The planting of fly-resistant wheat varieties is also important in reducing the overall fly infestation. Three systemic insecticides, carbofuran [(R) Furadan 4F], disulfoton [(R) Di-Syston 15G] and phorate [(R) Thimet 20G] are registered for Hessian fly control, but the economics and effectiveness of preventive insecticide treatments in Nebraska have not been demonstrated.

For more information on this subject, refer to Extension NebGuide G73-46.

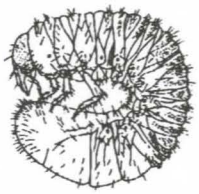
Hessian fly adult

Seed and seedling attacking insects

Use a drill box seed treatment with lindane. Follow label directions for rates and restrictions.

White grubs

White grubs occasionally damage fall-sown wheat in southwestern Nebraska. Treatment is suggested when grubs average three to four per square foot and insecticides must be applied at or before planting. Once plants have emerged from the soil, little can be done. Phorate [(R) Thimet 20G] is federally registered as a planting time treatment, applied in-furrow at a rate of 1.2 oz formulation per 1,000 feet of drill row (minimum 8-inch row spacings).



White grub

Range and pasture insects

Range and pastures in Nebraska are attacked by several insect pests, with grasshoppers being the most important. Grasshoppers usually affect large areas while areas damaged by other species are usually much smaller. It may not be economical to spray large areas of range and pasture without supplemental financial assistance. Small infested areas may be sprayed to control the insects and prevent their spread. Leafhoppers, western harvester ants, blister beetles, and army cutworms also may cause damage, however, there are no insecticides currently registered for control of these insects on range or pasture.

Although black grass bugs do feed on wheat grasses, treatment would only be justified if the stand is used for seed production. Black grass bug feeding does not substantially reduce wheat grass biomass unless under severe infestations. However, this feeding does deplete plant reserves necessary for seed production.

For more information on this subject, refer to Extension NebGuides G86-791, G82-615 and G87-831.

Registered treatments for controlling range and pasture insects

Insect	Insecticide	Rate AI/acre	Restrictions and comments
Grasshoppers	*acephate (Orthene 75S)*	0.094-0.125 lb	Minimum of 1/2 gallon of solution by air or 10 to 20 gallons per acre by ground. Do not apply when lactating dairy cattle are present. Do not pasture or feed treated hay to lactating dairy cattle within 21 days after application. Remove meat animals from treated areas at least one day before slaughter if they were present at application or graze treated areas within 21 days after application. Do not make more than one application per season.
	carbaryl (Sevin XLR Plus, 80S, 4F, 20% bait)	0.5-1.5 lb	No restrictions.
	diazinon (Diazinon 50W, AG500)	0.375-0.5 lb	Wait 30 days before harvesting as hay.
	malathion 57EC	1-1.5 lb	May be applied on the day of harvest or grazing.
	malathion ULV 9.33	8-12 oz form*	May be applied on the day of harvest or grazing.

(continued)

Registered treatments for controlling range and pasture insects *(continued)*

Insect	Insecticide	Rate	Restrictions and comments
	methyl parathion (R) *(Penncap-M)*	0.5-0.75 lb	Do not apply within 15 days of harvest or grazing.
	naled (Dibrom 8EC)	0.5-0.75 lb	See label for restrictions.
Armyworms	*carbaryl (Sevin 80S, XLR Plus)*	1-1.5 lb	No restrictions.
	malathion 57EC	1.5 lb	No waiting period.
	methyl parathion (R) *(Penncap-M)*	0.5-0.75 lb	Do not apply within 15 days of harvest.
Black Grass Bugs *(Labops sp.)*	*carbaryl (Sevin XLR Plus, 80S)*	1-1.5 lb	No restrictions.
	malathion ULV 9.33	8-12 oz form*	May be applied on the day of harvest or grazing.

*Rate is formulation per acre.

Order Form

Crop Watch

I wish to subscribe to ***Crop Watch*** for this crop production season (March-November). My check for $25 made out to the University of Nebraska is enclosed.

Name_____

Street Address _____

City_____ State_____ Zip_____

County_____

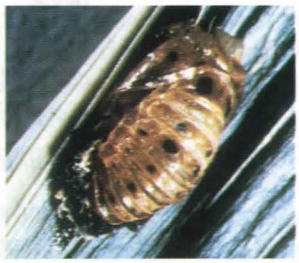
Please mail to: IANR Communications and Computing Services
108 Agricultural Communications Bldg.
P.O. Box 830918
Lincoln, NE 68583-0918

A variety of insects, mites, spiders and microbes often are important natural controls of pest insects and mites in Nebraska crops. It is important to be able to recognize them as beneficial. Use of nonchemical controls, such as crop rotations and plant resistance and use of economic thresholds to guide pesticide use will allow you to maximize the benefit of these organisms.

Lady beetle adult

Lady beetle eggs

Lady beetle larva



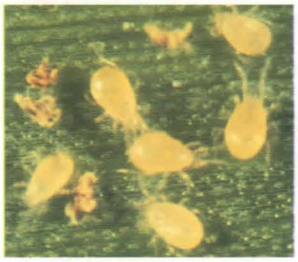
Lady beetle pupa

Green lacewing adult

Green lacewing larva

Minute pirate bug (*Orius*) adult

Minute pirate bug nymph

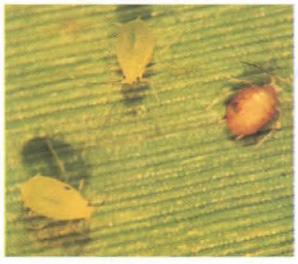


Predatory spider mites

Syrphid fly larva

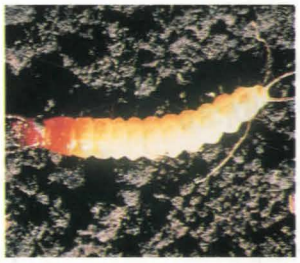
Damsel bug or nabid adult

Crab spider



The brown shell on right is a greenbug that has been killed by a tiny parasitic wasp developing within it.

Insect parasite (tachinid fly)



Ground beetle or carabid larva

Fungal disease of caterpillar

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department ofAgriculture. Kenneth R. Bolen, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.

It is the policy of the University of Nebraska-Lincoln not to discriminate on the basis of gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation.