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EC90-1537 1990 Insect Management Guide for Sugarbeets, Dry Beans, Sunflowers, Vetch, Potatoes, and Onions

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Nebraska Cooperative Extension EC 90-1537

1990 Insect Management Guide for Sugarbeets, Dry Beans, Sunflowers, Vetch, Potatoes, and Onions

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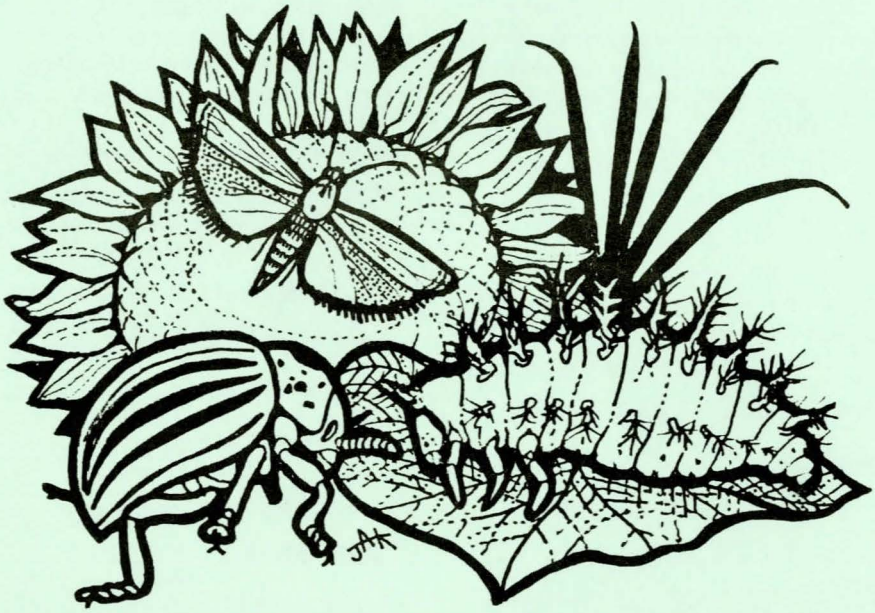

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Leo E. Lucas, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural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

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1990 Insect Management Guide for Sugarbeets, Dry Beans, Sunflowers, Vetch, Potatoes, and Onions

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 insect management program. NebGuides and other publications containing additional information on insect identification, damage and life cycles are referred to under insect headings and are available by mail order (Write: Bulletins, 105 ACB, University of Nebraska, Lincoln, NE 68583-0918), or from Cooperative Extension offices.

There are several approaches to the management of insect pests in Nebraska. These include the use of cultural practices, resistant varieties, biological control, and/or insecticides. Before making a treatment decision, all appropriate management strategies should be considered. If insecticide use is indicated, give consideration to efficacy against the target pest or pest combination, label restrictions, formulation of the pesticide, cost, safety to nontarget 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 Cooperative Extension office.

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

Toxicity of Insecticides

(NebGuides G85-758, G84-715, G79-460, G79-472, G79-473, G79-479)

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. Skull and crossbones and the words **Danger/Poison** appear in red on the label of highly toxic materials and 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.

(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 purchasing these chemicals. Your Cooperative Extension office will have a listing of the dates and locations where certification training can be obtained.

Remember: the status of a formulation can change at any time. When purchasing a pesticide, be certain to ask the dealer if the attached label is up to date.

Who to Call

The following telephone numbers are provided for your use 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, NE (402) 471-5080
Kansas City, KS (913) 236-2800

Nebraska Department of Environmental Control (DEC)
(402) 471-2186

Nebraska State Patrol (800) 525-5555

Nebraska Department of Agriculture - Bureau of Plant Industry (402) 471-2341

Nebraska Natural Resources Commission
(402) 471-2081

Important

Subscribe to the *Insect, Plant Disease, and Weed Science Newsletter* for the latest pest management recommendations, changes in pesticide registrations, and updates on the current status of insect pests.

Management Decision Guidelines/Economic Thresholds

Economic thresholds are flexible guidelines. They indicate the level of insect abundance or damage that can be tolerated before management actions should be taken. **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 of the crop, 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.

Chemigation

The term "chemigation" refers to the injection and application of chemicals through irrigation systems. Proper equipment needs, procedures for calibration and other instructions for application through center pivot systems are provided in NebGuides G84-703, *Applying Insecticides Through Center Pivots*, and G73-43, *Anti-Pollution Devices for Applying Chemicals Through Irrigation Systems.*

The Nebraska Chemigation Act took effect Jan. 1, 1987. This legislation requires that the applicator attend a training session and pass a written examination for **certification** as defined in the state law.

Among additional requirements is the provision that a **permit** must be issued for the injection site verifying that all necessary anti-pollution equipment is installed and working properly. Injection site inspections are performed by staff of the appropriate Natural Resources District.

Copies of the law, rules, and regulations concerning chemigation are available from the Nebraska Department of Environmental Control, 301 Centennial Mall South, P.O. Box 94877, Lincoln, NE 68509-4877. In some cases, supplemental rules and regulations have been issued by individual Natural Resources Districts. These rules and regulations are available at the respective NRD offices.

Endangered Species Act

Rules and regulations are pending concerning the impact of pesticides on endangered plant and animal species (e.g., Blowout Penstemon, Piping Plover, and Interior Least Tern) in certain areas of Nebraska. **BEFORE** applying any pesticide, refer to the *Pesticide Use Bulletin For Protection of Endangered Species* for the county you are working in, which is available from your local pesticide dealer, Cooperative Extension office, or the Environmental Protection Agency.

Seed Treatments

Damage to seed by soil-dwelling, seed-feeding insects often is intensified by prolonged periods of cool, moist weather after planting, or other conditions that 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 through the use of an approved planter-box seed treatment containing lindane and/or diazinon prior to planting. Diazinon is no longer labeled for use on sorghum, alfalfa, wheat, dry beans, or range grass. **THESE TREATMENTS ARE RECOMMENDED FOR ALL FIELD CROPS IN NEBRASKA.**

In fields that have a history of serious seed-feeding insect problems or in situations where stands have been seriously reduced and replanting is the only feasible recourse, a seed treatment plus an in-furrow application with an approved soil insecticide should be considered.

NOTE: Agricultural seed often is 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 scouting on a regular basis to determine pest abundance and to 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 an Extension agent or other pest management 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 lost yield.

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 (pollen-shed stage for corn and sorghum), they may be killed in substantial numbers.

To avoid injury to important pollinators, try to 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. In many cases, beekeepers 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 recommend using vegetables or fruits treated with a pesticide 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, you can make an informed decision concerning use of the crop.

Minimum Number of Days Between Application and Harvest For Some Selected Crops

Insecticide	Tomatoes	Peppers	Sweet Corn	Cucumbers	Cabbage	Leaf Lettuce	Green Beans	Apple
Ambush 2E	NR	3	1	NR	1	1	NR	***
Asana 1.9 EC	1	7	1	3	3	NR	NR	21
Counter 15G	NR	NR	30	NR	NR	NR	NR	NR
Cygon 400	7	0	NR	NR	3	14	0	28
Diazinon AG500	1	5	0	7	7	10	7	NR
Diazinon 14G	**	**	**	**	**	**	**	NR
Dipel 2X	0	0	0	0	0	0	0	0
Di-Syston 8EC	30	NR	NR	NR	42	60	60	NR
Di-Syston 15G	30	NR	40	NR	14	NR	NR	NR
Dyfonate 4EC	*	*	*	NR	*	NR	*	NR
Dyfonate II 20G	NR	NR	30	NR	*	NR	NR	NR
Furadan 4F	NR	NR	7	NR	NR	NR	NR	NR
Furadan 15G	NR	NR	**	**	NR	NR	NR	NR
Imidan 50WP	NR	NR	14	NR	NR	NR	NR	7
Lannate 1.8L	1	3	0	1-3	1	NR	1-3	8
Lorsban 4E	NR	NR	35	NR	*	NR	NR	NR
Malathion EC	1-5	3	5	1	7	14	1	3
Metasystox-R 2SC	NR	**	7-21	**	7	NR	21	NR
Parathion 8E (ethyl)	10	15	12	15	10	21	15	14
Penncap-M	15	NR	3	NR	21	NR	15	14
Pounce 3.2EC	0	3	1	NR	1	1	NR	***
Pydrin 2.4EC	1	7	1	3	3	NR	3	21
Sevin 80S, XLR Plus	0	0	0	0	3	14	0	1
Thimet 20G	NR	NR	*	NR	NR	NR	*60	NR

NR = Not Registered
* = At or prior to planting time application only
** = Registered, preharvest interval not indicated on label
*** = Do not apply after petal fall

Some Suggested Field Re-entry Periods

Re-entry periods may be listed on the label. Follow label directions and do not enter fields after treatment until the re-entry period has passed.

Ambush 2E —When spray is dry
Asana 1.9EC —When spray is dry
Comite 6.5EC —When spray is dry
Counter 15G —7 days (foliar)
— After dust settled (soil)
Cygon 400 — 4 days
Diazinon AG500 —When spray is dry
Diazinon 14G —After dust settled
Dipel 10G, ES —When dust settles or spray is dry
Di-Syston 8EC, 15G —24 hrs
Dyfonate II 20G— 24 hrs (foliar)
— After dust settled (soil)
4EC —24 hrs
Dylox 80S —When spray is dry
EPN 5EC —24 hrs
Furadan 15G—None stated on label
Furadan 4F —24 hrs (limited activity in fields)
— 14 days (prolonged activity in fields)
Guthion 50WP —24 hrs
Imidan 50WP —When spray is dry
Lannate 1.8L, 90S —When spray is dry
Larvin 3.2F —When spray is dry
Lorsban 4E —24 hrs
15G —None stated on label
Malathion EC —When spray is dry
Metasystox-R 2E — 48 hrs
Parathion (ethyl and methyl) — 48 hrs
Penncap-M — 48 hrs
Pounce 3.2EC —When spray is dry
Pydrin 2.4EC—When spray is dry
Supracide 2E (up to 2 lb rate)— 48 hrs
(2 to 10 lb rate)—14 days
Sevin, all formulations— When spray is dry
Thimet 20G —7 days (foliar)
—After dust settled (soil)

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 all contents have been emptied into applicators or tanks. Burn paper containers in open fields where: 1) regard is given to wind direction in relation to people, domestic animals, and water supplies; 2) 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 three 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 rinsing. 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/A - Active Ingredient Per Acre; **Form** - Formulation; **LS** - Liquid Solution; **E** - Emulsifiable; **G** - Granular; **oz** - Ounce; **EC** - Emulsifiable Concentrate; **L** - Liquid; **S** - Soluble; **ES** - Emulsifiable Suspension; **lb** - Pound; **SP** - Soluble Powder; **F** - Flowable; **LC** - Liquid Concentrate ; **WP** - Wettable Powder.

Sugarbeet Insects

Sugarbeets require a long growing season to develop maximum sugar content. During this period they are subject to attack by insects, both above and below ground. Good production practices such as proper seed bed preparation, crop rotation, fertilization and proper irrigation tend to minimize pest damage.

Insect problems on sugarbeets in the Nebraska Panhandle are sporadic. The most common insect pest is the sugarbeet root maggot. Several other insect pests have the potential of developing serious infestations. These are the seedcorn beetle, seedcorn maggot, wireworms, sugarbeet webworm, armyworms, cutworms, flea beetles and sugarbeet root aphid.

Germinating and young seedling sugarbeets are sensitive to the presence of insecticides alone and possibly in combination with herbicides. All soil insecticides registered for use on sugarbeets have been shown to exhibit some phytotoxicity on this crop under certain conditions. The organophosphates are the most phytotoxic while carbamates are less phytotoxic. Extreme care must be taken to follow product label recommendations on placement and to prevent any chemical from making direct contact with the seed. Even with these precautions phytotoxicity may occur. Because of the potential for significant stand loss, planting-time insecticides should be used on sugarbeets only when absolutely necessary to control damaging insect populations.

Registered for Control of Sugarbeet Insects

! Read the entire pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insect	Rate	Restrictions and Comments
aldicarb			
(R) *Temik 15G*	aphids root maggot	4.5-9.5 oz form***	Applied at planting or post emergence. Check label for placement instructions.
	leafhoppers leafminers	9.5-13.5 oz form***	

Use of this product is not recommended due to the possibility of ground water contamination. Excess irrigation or rainfall, soil pH lower than 6, coarse textured (sandy) soils, soil temperature less than 50°F, and soil organic matter under 1 percent are likely to lead to reduced degradation of aldicarb and may cause residues to move deeper into the soil, possibly resulting in ground water contamination.

carbaryl *Sevin XLR Plus, 80S*	armyworms grasshoppers leafhoppers webworms	1.5 lb	Wait 14 days before harvest.
	flea beetles	1.0-1.5 lb	
Sevin 5% bait		2.0 lb form*	Wait 14 days before harvest.
carbofuran **(R)** *Furadan 15G*	root maggot	9 oz form*	Apply at planting. See label for placement instructions.
chlorpyrifos			
Lorsban 4E	beet armyworm	0.75-1.0 lb	Wait 30 days before harvest. Apply only 8 pints total per season.
Lorsban 15G	root maggot cutworms	5.5-9.0 oz form*	Apply at planting. See label for placement instructions.
	root maggots	6.5-9.0 oz form*	Applied post emergence. Only one application per season.
diazinon 14G	root maggot	6-8 oz form*	Apply at planting or post emergence. See label for placement instructions.
	wireworms	21-28 lb form/A	Preplant broadcast and incorporate 4-8 inches deep.

Registered for Control of Sugarbeet Insects (continued)

Insecticide	Insect	Rate	Restriction and Comments
AG500	wireworms	3-4 lb	Preplant broadcast and incorporate 4-8 inches deep.
	aphids grasshoppers leafhoppers leaf miners	0.5 lb	
fensulfothion (R) *dasanit 14G*	root maggot	4.5-9.0 oz form*	Apply at planting. See label for placement instructions.
fonofos (R) *Dyfonate 4EC*	Symphylans/ wireworms	4 lb	Broadcast prior to planting and incorporate.
(R) *Dyfonate 10G*	Symphylans/ wireworms	40 lb form/A	Broadcast prior to planting and incorporate.
(R) *Dyfonate II 20G*	root maggots	5-7.5 lb form/A	Apply at planting. See label for placement instructions.
malathion 57EC	aphids grasshoppers	1.0-1.25 lb 1.875 lb	Wait 7 days before grazing tops.
ULV 9.33	root maggot adults grasshoppers	0.6 lb	
methomyl (R) *Lannate L*	beet armyworm	0.5 lb	Wait 7 days before harvest, 30 days before grazing tops.
naled *Dibrom 8EC*	leafhoppers	1.0 lb	Wait 2 days before harvest.
oxydemeton-methyl *Metasystox-R*	aphids	0.37-0.75 lb	Do not apply more than 6 times per season. Wait 30 days before using either beets or beet tops for feed or forage.
	leafhoppers	0.75 lb	
(R) *parathion 4EC, 8E*	aphids armyworms blister beetles flea beetles grasshoppers leafhoppers leaf miners webworms	0.5 lb	Wait 15 days before harvest.
phorate (R) *Thimet 20G*	aphids root maggots leafhoppers leaf miners	4.5 oz form**	Apply at planting. Do not place granules in direct contact with seed. See label for placement instructions. Wait 30 days before harvest. Do not feed tops or silage to dairy cattle.
terbufos (R) *Counter 15G*	root maggots wireworms white grubs	4-8 oz form**	Apply at planting. See label for placement instructions.
	root maggots	4-8 oz form**	Postemergence application. One application per year.

* Rate per 1,000 row feet (any row spacing).
** Rate per 1,000 row feet (minimum 20" row spacing).
*** Rate per 1,000 row feet (22' row spacing).

Dry Bean Insects

(NebGuide G86-786)

The dry bean growing area of Nebraska lies primarily in the Panhandle and in the southwest. Major insect pests are the western bean cutworm and the Mexican bean beetle.

Mexican Bean Beetle

Mexican bean beetles overwinter as adult beetles in western Nebraska. These overwintering adults begin feeding on the beans shortly after the plants emerge in mid-June. The adults lay their eggs on the foliage. The next generation begins feeding on the foliage when the eggs hatch. The adults of the first generation begin to emerge in July.

Control of the first generation needs to be considered if defoliation is severe enough to threaten plant stand. Control during the second generation should be attempted if one or more egg mass is found per six plants.

Western Bean Cutworm

Western bean cutworm moths begin to emerge early-to-mid July. The peak moth flight in western Nebraska is in the latter half of July. This moth flight can be monitored using pheromone traps to attract male moths. Pheromone traps indicate the time of the peak flight and, to some extent, the size of the population.

Shortly after the peak, maximum egg laying occurs. Young larvae feed on the buds and young leaves. As they mature the larvae feed on the pods and seeds. Under heavy infestations this results in reduced yield and reduced bean quality.

Development of the western bean cutworm in dry beans parallels their development in corn. Because the larvae can be found in the corn ear much more easily than in the beans, scouting methods first should establish their presence in adjacent corn and then concentrate on their presence in the dry beans. Scouting for the larvae should take place in the evening, because the larvae are only active at night and they hide in the soil during the day.

Treatment for western bean cutworm should be considered if significant populations of larvae are present in adjacent cornfields or if significant pod damage (1 percent or more) has been observed and larvae are still actively feeding.

Registered for Control of Dry Bean Insects

! Read the entire pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insect	Rate	Restrictions and Comments
acephate *Orthene 75S*	grasshoppers	0.25-0.5 lb	Wait 14 days to harvest. Do not feed treated vines to livestock.
	aphids cutworms leafhoppers Mexican bean beetle thrips	0.5-1.0 lb	Do not apply to dry beans within 30 days of harvest. Do not exceed 4 applications/season. Do not feed or ensile treated forage.
azinphos-methyl **(R)** *Guthion 2S*	aphids	0.37-0.5 lb	Do not apply to dry beans within 30 days of harvest. Do not exceed 4 applications/season. Do not feed or ensile treated forage.
carbaryl *Sevin 80S, XLR Plus*	flea beetle	1.0 lb	Do not apply to wet foliage or in rain or high humidity. No harvest restrictions.
	Mexican Bean beetle	0.5 lb	
dimethoate *Cygon 400*	aphids grasshoppers leafhoppers Mexican bean beetle	0.25-0.5 lb	No waiting period for harvest of beans. Do not feed treated vines.

Registered for Control of Dry Bean Insects (continued)

Insecticide	Insect	Rate	Restriction and Comments
disuolfoton			
(R) *Di-Syston 8EC*	aphids leafhoppers Mexican bean beetle thrips	0.9-1.9 oz form*	At planting or post emergence. Wait 60 days before harvest. Apply in a 6 to 8 inch band and lightly incorporate. Avoid seed contact.
(R) *Di-Syston 15G*	aphids leafhoppers Mexican bean beetle thrips	6-12 oz form*	
endosulfan			
Thiodan 3EC, 50WP	aphids Mexican bean beetle	0.5-1.0 lb	Do not exceed 3 applications per year. Do not feed threshings or allow livestock to graze in treated fields.
	western bean cutworm	1.0 lb	
esfenvalerate			
(R) *Asana XL 0.66EC*	Mexican bean beetle	0.015-0.03 lb	Do not exceed 0.2 lb AI/acre per season. Do not feed or graze livestock on treated vines. Wait 21 days before harvest.
	aphids grasshoppers leafhoppers cutworms western bean cutworms	0.03-0.05 lb	
fenvalerate			
(R) *Pydrin 2.4EC*	Mexican bean beetle	0.05-0.1 lb	Do not exceed 0.8 lb AI/acre per season. Do not graze livestock on treated vines.
	aphid grasshoppers cutworms western bean cutworms	0.1-0.2 lb	
malathion 57EC	aphids leafhoppers	1.25 lb	Wait 1 day before harvest.
	Mexican bean beetle	0.94-1.25 lb	
malathion ULV 9.33	leafhoppers Mexican bean beetle	0.6 lb	Wait 1 day before harvest.
methomyl			
(R) *Lannate L*	Mexican bean beetle	0.5 lb	Do not apply within 25 days of harvest.
methyl parathion			
(R) *Penncap-M*	aphids leafhoppers Mexican bean beetle	0.5 lb	To avoid injury to bees, do not apply during the period from 7 days prior to first bloom through peak bloom. After this time, apply to beans as long as bees are not actively visiting the area. Do not apply within 15 days of harvest.

Registered for Control of Dry Bean Insects (continued)

Insecticide	Insect	Rate	Restrictions and Comments
naled			
Dibrom 8EC	aphids	1.0 lb	Wait 4 days before harvest.
(R) *parathion*			
4EC, 8E, 8F	aphids leafhoppers Mexican bean beetle	0.5 lb	Wait 15 days before harvest.
	thrips	0.5-0.75 lb	
phorate			
(R) *Thimet 20G*	aphids leafhoppers thrips	4.5-7.0 oz form**	Distribute the granules evenly in the row to the side of the seed at planting. Do not place granules in direct contact with seed. Do not feed the foliage of treated beans within 60 days of treatment.
	Mexican bean beetle	4.5-9.4 oz form**	
trichlorfon			
Dylox 80SP	Mexican bean beetle	1.0-1.5 lb	Do not apply within 14 days of harvest.
	western bean cutworm	0.5-1.0 lb	

* Rate per 1,000 row feet (any row spacing).
** Rate per 1,000 row feet (minimum 30" row spacing).

Sunflower Insects

(NebGuide G80-498)

Sunflowers serve as a host for numerous insects, including several important pest species. Essential to the successful management of sunflower insect pests are an effective scouting program, adherence to established economic thresholds [which will vary depending on whether sunflowers are grown for oil or seed (confectionary)], and proper timing of insecticide applications. Because of sunflowers' attractiveness to bees, SPRAYING BLOOMING SUNFLOWERS CAN BE EXTREMELY HAZARDOUS TO BEES. COORDINATE ALL INSECTICIDE APPLICATIONS WITH LOCAL BEEKEEPERS BEFORE APPLYING INSECTICIDES.

Sunflower (Head) Moth

The sunflower (head) moth generally is considered the most serious insect pest of sunflowers. The buff to gray colored moths are approximately 3/8 inch long with a 3/4 inch wing span. When at rest, the wings are rolled tightly against the body. Eggs are deposited among the florets on the face of the flower head. Eggs hatch within 40-72 hours, and larvae begin to feed on florets and developing seeds.

The majority of eggs are laid by the third day after the onset of bloom, and up to 90 percent are laid within seven days after onset of bloom. If moth flights are not synchronized with the early bloom of the sunflowers, damage is minimized. Planting after June 1 reduces the potential for head moth damage.

Controls are directed at the adult moths to prevent egg laying. Insecticides must be applied at early bloom (first ray flowers visible) for acceptable results. Scout and treat for the sunflower moth in the evening when moths are most active. Consider treatment if one to two adults are found per five plants at the beginning of bloom. Fields that are yet to bloom or are in full bloom at the first appearance of the head moth have a much reduced potential for severe damage.

Banded Sunflower Moth

The banded sunflower moth has tan wings with a dark brown band across the wings. Its wingspan is about 1/2 inch. It emerges in July, and females are attracted to sunflowers that are in the late bud stages where they lay their eggs. The eggs develop and hatch during the early blooming stages; the larvae begin to feed on the florets, and eventually feed within the seed. Larvae feed within the

developing seed and form an exit hole in the seed. Unlike the seed weevils, they eat the entire contents of the seed. These seeds likely will be blown through the combine.

Banded moth larvae also feed on multiple seeds. Late planting (after June 1) probably will reduce the severity of this pest in most instances. North Dakota has set its threshold at one moth per two plants.

Cutworms

Predominant species include dingy, dark-sided and sandhill cutworms. These early season pests are nocturnal feeders that partially defoliate plants or cut them off at or below the soil surface. Treatment of cutworms on sunflowers should be considered if 20 percent or more of the plants are cut or show feeding damage, and cutworms are less than 3/4 inch in length.

Seed Weevils

Two species of seed weevils occur in Nebraska. The red seed weevil is slightly over 1/8 inch in length. The gray seed weevil is about 1/4 inch in length. Both have prominent snouts. Adults of both species lay eggs in the newly developing seeds, and the C-shaped, legless larvae feed within the seed. Control is directed at the adults to prevent egg laying. Treatment should be considered if 10-12 (oil) or one to three (confectionary) adults are found per plant during the early stages of bloom.

Stem Weevil

The stem weevil is about 3/16 inch long and grayish-brown with white dots on its wing covers. Adults often are found in the leaf axils in the early summer. Eggs are laid in and larvae feed in the lower stalk, and the larvae move to the lower portion of the stalk and form an overwintering chamber. The presence of several overwintering chambers from these larvae reduces stalk strength and may cause lodging. Control is primarily directed at the adult weevils. Treat if two adults are found per plant at the 14-leaf to early bud stage.

Sunflower Beetle

The sunflower beetle is cream colored with three dark stripes on each wing cover. The head is reddish-brown. These 1/4-3/8 inch long beetles resemble Colorado potato beetles. The larvae are yellowish-green and hump-backed in appearance.

These are early season pests and larvae appear shortly after the adults. Treatment should be considered if one to two adults or 10-15 larvae are found per seedling.

Head-clipper Weevil

This 1/4 inch long, metallic black weevil is active for a short time in mid to late summer. Females girdle the stem just below the developing head. Eggs are laid in the head, which later drops. Severe damage usually is limited to field borders and seldom requires treatment. Control guidelines have not been established for this insect, and no insecticides are specifically registered for its control.

Grasshoppers
(G86-791)

Treatment for grasshoppers in sunflowers should be considered if eight or more are found per square yard and/or 25 percent defoliation has occurred.

Registered for Control of Grasshoppers in Non-Crop and Waste Areas

Rates are active ingredient per acre unless otherwise noted.

	acephate (Orthene 75S)	0.25 lb	Do not graze/feed.
	carbaryl(Sevin 80S, XLR Plus, Sevin 4-Oil)	0.5-1.5 lb	
	diazinon AG500	0.5-1.5 lb	
(R)	*esfenvalerate (Asana XL 0.66 EC)*	0.015-0.03 lb	Do not feed treated crop to livestock.
(R)	*fenvalerate (Pydrin 2.4EC)*	0.05-0.1 lb	
	malathion ULV 9.33	8-12 fl oz form/Acre	

Registered for Control of Sunflower Insects

! Read pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
carbaryl			
Sevin 80S, XLR Plus	cutworms	1.5 lb	Do not apply within 60 days of harvest. Do not allow livestock to graze in treated areas.
	grasshoppers	1.0-1.5 lb	
	stem weevils sunflower beetle	1.0-2.0 lb	
carbofuran (R) *Furadan 4F*	sunflower moth banded sunflower moth seed weevils stem weevils	0.5 lb	Do not apply within 28 days of harvest. Do not apply more than 4 times per season.
	grasshoppers	0.125-0.5 lb	
	sunflower beetle	0.125-0.25 lb	
(R) *Furadan 15G*	stem weevils grasshoppers	8-16 oz form*	In-furrow or 7-inch band at planting time.
chlorpyrifos *Lorsban 4E*	sunflower moth banded sunflower moth seed weevils stem weevils sunflower beetle	0.5-0.75 lb	Do not apply within 42 days of harvest. Do not allow livestock to graze in treated areas. Do not apply more than 4.5 lbs AI (9 pints formulation) per acre per season.
	grasshoppers	0.5 lb	
	cutworms	1.0-1.5 lb 1.0-2.0 lb	Preplant incorporated into top 2-4 inches of soil.
Lorsban 15G	cutworms	8 oz form*	7-inch band at planting time.
endosulfan *Thiodan 50WP, 3EC*	sunflower moth	1.0 lb	No harvest restriction. Do not exceed 3 applications per season. Do not feed treated forage to livestock.
(R) *ethyl parathion 8F*	sunflower moth	0.5-1.0 lb	Do not apply within 30 days of harvest. No more than 3 applications per season (at least 5 days apart).
esfenvalerate (R) *Asana XL 0.66EC*	sunflower beetle	0.015-0. 031 lb	Do not apply within 28 days of harvest. Do not exceed 0.2 lb AI per acre per season.
	sunflower moth banded sunflower moth grasshoppers cutworms seed weevil stem weevil	0.03-0./05 lb	
fenvalerate (R) *Pydrin 2.4EC*	sunflower beetle	0.05-0.1 lb	Do not apply within 28 days of harvest. Do not exceed 0.8 lb AI per acre per season.

Registered for Control of Sunflower Insects (continued)

Insecticide	Insect	Rate AI/Acre	Restriction and Comments
	sunflower moth banded sunflower moth grasshoppers cutworms seed weevil stem weevil	0.1-0.2 lb	
methidathion (R) *Supracide 2E*	sunflower moth banded sunflower moth seed weevil stem weevil	0.5 lb	Do not apply within 50 days of harvest. No more than 3 applications at least 7 days apart. Do not graze treated areas or feed treated forage to livestock.
(R) *methyl parthion*	sunflower moth seed weevils	1.0 lb	Do not apply within 30 days of harvest. No more than 3 applications per season.

* Rate per 1,000 row feet.

Vetch Insects

Insect management is important in producing vetch seed. Particular care must be taken so beneficial pollinators are not poisoned. Refer to guidelines provided in the alfalfa section of EC90-1511 with regard to bee protection.

While several insects may attack the vetch crop, the pea aphid and vetch bruchid are probably the most important. Pea aphids are sucking insects that remove sap from stems and leaves. The vetch bruchid is a small beetle that deposits its eggs in seed pods with the larvae feeding on the developing seeds. Apply insecticides to kill adult bruchids before they lay their eggs. This should be done as the first pods appear in the fields. Apply insecticides when temperature are 60°F or higher.

Registered for Control of Vetch Insects

! Read pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
(R) *ethyl parathion 4EC, 8E, 8F*	armyworms pea aphid	0.25-0.50 lb	Wait 15 days before harvest.
malathion 57EC	pea aphid vetch bruchid	1.0-1.25 lb	No harvest restrictions.
(R) *methyl parathion*	vetch bruchid	0.5 lb	Pre-bloom only. No harvest restrictions.

Potato Insects

(G79-452, G79-454)

Even minor feeding injury on potato tubers can leave them unmarketable. This increases the importance of routine insect scouting to assist in determining when threatening pest infestations are present.

Soil Insects

Flea Beetles

Two species of flea beetle larvae attack the potato tuber by either etching the surface or making small tunnels (referred to as "slivers") in the tuber. Adults overwinter in field margin areas and begin to feed on the potato leaves when they first emerge. The adults cause shotholing of the leaves. The most damage is caused by the larvae as they feed on the roots and tubers.

Wireworms

Wireworms are difficult insects to control. Damage is most likely when potatoes are planted following sod or wheat. These hard-bodied, slender brown larvae bore into underground stems causing the young plants to wither and die. Later season damage results in damaged tubers. This damage results in long, slender tunnels lined with periderm that normally do not become infected with secondary organisms (rot).

Avoid planting potatoes on ground that recently has been broken out of sod. Wheat should not be regularly included in a rotation with potatoes. Wireworms may take up to five years to complete their life cycles. Therefore, problem areas may remain a problem for several years.

Control options are to use a preplant broadcast or planting time insecticide. Postemergence applications will not be effective for wireworm control because the insecticides will not be able to be moved adequately into the soil where the wireworms are feeding.

Registered for Control of Soil Insects on Potatoes

! Read pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
aldicarb **(R)** *Temik 15G*	flea beetles	21 oz form*	Apply at planting according to label directions. Wait 90 days before harvest. Use lower rate for lighter soils and higher rate for heavier soils.

Use of this product is not recommended due to the possibility of ground water contamination. Excess irrigation or rainfall, soil pH lower than 6, coarse textured (sandy) soils, soil temperature less than 50°F and soil organic matter under 1 percent are likely to lead to reduced degradation of aldicarb and may cause residues to move deeper into the soil, possibly resulting in ground water contamination.

carbofuran **(R)** *Furadan 15G*	flea beetles	24 oz form*	Apply in furrow at planting.
diazinon AG500	wireworms	3-6 lb	Preplant broadcast application; incorporate immediately 4-8 inches deep by disk or harrow.
disulfoton **(R)** *Di-Syston*	flea beetles	15.0 to 23.0 oz form*	Band application at planting. Do not apply within 75 days of harvest. Apply lower rate for lighter soils and higher rate for heavier soils.
ethoprop **(R)** *Mocap 10G, 15G, 20G*	wireworms and symphylans	33.6 oz form* 27 oz form* 16 oz form*	12 inch band application at planting. Mix into top 2-4 inches of soil.
(R) *Mocap 10G,15G, 20G, 6EC*	wireworms and symphylans	4-6 lb	Preplant broadcast and incorporate into top 2-4 inches inches of soil.
(R) *Mocap 6EC*	wireworms and symphylans	3 lb	12 inch band application at planting. Mix into top 2-4 inches of soil.
fensulfothion **(R)** *Dasanit*	wireworms flea beetles	33.3 lb	Preplant broadcast and incorporate into top 3-4 inches of soil.

Registered for Control of Soil Insects on Potatoes (continued)

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
fonofos (R) *Dyfonate 4EC, 10G*	wireworms and symphylans	4.0 lb	Preplant broadcast application and incorporate into soil.
phorate			
(R) *Thimet 20G*	flea beetles	11.3-17.3 oz form*	Band application at planting or in-furrow. Lower rate
(R) *Thimet 15G*	and wireworms	15-23 oz form*	is for sandy soils. Wait 90 days before harvest.

* Rate per 1,000 row feet.

Defoliating Insects

Potatoes can withstand some defoliation without yield loss. Potatoes are most susceptible to yield loss during the period when tubers begin to form (pea-sized or larger) and for 3 weeks thereafter. Treatments are suggested if defoliation exceeds 15 percent during this period, and if defoliation exceeds 30 percent before or after this period.

Cutworms

Several cutworm species are known to damage potatoes. Cutworms may feed at the soil surface, below the ground or climb on the plants and feed. Because they feed primarily at night, they often are difficult to locate.

Colorado Potato Beetle

Immature beetles (larvae) cause the most defoliation damage. If defoliation levels exceed the suggested guidelines, best control with foliar sprays is achieved after peak egg hatch but before larvae are more than half grown.

European Corn Borer

Because corn borer larvae tunnel into the potato stalk soon after hatch, controls need to be applied soon after egg hatch. If treatments are needed, best control occurs by timing foliar applications to immediately follow peak moth flights based on light or pheromone trap data. Thorough coverage of potato foliage improves control.

Aphids

Green peach aphids can be monitored by examining one leaf from the lower half of a plant. This should be done from 10 different plants at each of 10 sites in a field. For fresh market potatoes, treatment is suggested if 30 wingless aphids are found per 100 leaves. This treatment guideline should not be used for Russett Burbank or other varieties susceptible to tuber net necrosis.

Registered for Control of Foliar Insects of Potatoes

! Read pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
azinphos-methyl (R) *Guthion 50WP*	European corn borer	0.5 lb	Wait 7 days before harvest.
	flea beetles	0.75 lb	
carbaryl *Sevin 80S, XLR Plus, 50W*	Colorado potato beetle flea beetles leafhoppers	0.5-1.0 lb	No harvest restrictions
	European corn borer	1.0-2.0 lb	

Registered for Control of Foliar Insects of Potatoes (continued)

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
	cutworms	2.0 lb	
carbofuran **(R)** *Furadan 4F*	Colorado potato beetle European corn borer flea beetles leafhoppers	0.5-1.0 lb	Apply 14 days before harvest. Apply by ground equipment only.
(R) *Furadan 15G*	European corn borer	1.5 lb	Apply in furrow at planting.
diazinon AG500, 50W	aphids flea beetles Colorado potato beetle	0.25-0.375 lb	Wait 35 days before harvest.
	leafhoppers	0.375-0.5 lb	
diazinon AG500, 50W, 14G	cutworms	2.0-4.0 lb	Apply preplant and incorporate.
dimethoate *Cygon 400*	aphids leafhoppers	0.5 lb	No harvest restrictions.
	grasshoppers	0.25-0.5 lb	
disulfoton **(R)** *Di-Syston 8EC, 15G*	psyllid	2.0-4.0 lb	Wait 75 days before harvest.
endosulfan *Thiodan 50WP, 3EC*	aphids armyworms Colorado potato beetle flea beetles leafhoppers	0.5-1.0 lb	Do not exceed 6 applications per year or a maximum of 3 lb per acre per year. Do not follow potatoes with root crops other than carrots, potatoes, sugarbeets, or sweet potatoes.
	psyllid European corn borer	0.75-1.0 lb	
esfenvalerate **(R)** *Asana XL 0.66EC*	psyllid	0.015-0.03 lb	Do not graze livestock on treated vines. Do not exceed 0.35 lb AI/A per season. Wait 7 days before harvest.
	aphids armyworms Colorado potato beetle cutworms European corn borer flea beetles grasshoppers leafhoppers	0.03-0.05 lb	
fenvalerate **(R)** *Pydrin 2.4EC*	psyllids Colorado potato beetle	0.05-0.1 lb	Do not graze livestock on treated vines. Do not exceed 1.4 lb AI per acre per season.

Registered for Control of Foliar Insects of Potatoes (continued)

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
	aphids armyworms cutworms European corn borer flea beetles grasshoppers leafhoppers	0.1-0.2 lb	
malathion 57EC	aphids grasshoppers leafhoppers	1.25 lb	No harvest restrictions.
methamidophos **(R)** *Monitor 4*	aphids armyworms Colorado potato beetle cutworms European corn borer flea beetles leafhoppers	0.75-1.0 lb	Wait 14 days before harvest. Do not graze livestock.
methyl parathion **(R)** *Penncap-M*	Colorado potato beetle	0.5-1.5 lb	Wait 5 days before harvest.
	cutworms European corn borer flea beetles leafhoppers	0.5-1.0 lb	
	grasshoppers	0.5-0.75 lb	
permethrin **(R)** *Pounce 3.2EC, 25W*	armyworms Colorado potato beetle cutworms European corn borer flea beetles leafhoppers psyllids	0.1-0.2 lb	Wait 7 days before harvest. Do not feed or graze forage.
(R) *Ambush 2E, 25W*	aphids Colorado potato beetle flea beetles psyllid	0.05-0.2 lb	Wait 7 days before harvest. Do not apply more than 2.4 lbs AI per acre per season.
phorate **(R)** *Thimet 20G*	aphids leafhoppers psyllids	11.3-17.3 oz form*	Band or in-furrow at planting. Use lower rate for sandy soils. Apply 90 days before harvest.
	Colorado potato beetle	17.3 oz form*	Band or in-furrow at planting. Wait 90 days before harvest.
phosmet *Imidan 50WP*	Colorado potato beetle flea beetles leafhoppers	1.0 lb	Wait 7 days before harvest.

* Rate per 1,000 row feet.

Onion Insects

(NebGuide G76-304)

The primary insect pests of onions in Nebraska are the onion maggot and onion thrips. In addition to the chemical controls listed below, crop rotation aids in onion maggot management.

Onion Maggot

The onion maggot adult is a gray-colored fly about 1/3 inch in length. Larvae are legless white maggots that mine into and consume bulbs, causing plants to turn yellow and die. Partially damaged bulbs may increase storage problems.

Onions grown under dryland conditions and in dry climates rarely are damaged by the onion maggot. However, after a series of two or three wet springs, this insect can destroy up to 80 percent of the crop. There are three to four generations each year in Nebraska.

Avoid mechanical injury to onion plants and bulbs since damaged plants are more attractive to egg-laying adults. Removal or burial of culled onions immediately after harvest may reduce the potential for onion maggot problems. Also, crop rotation aids in onion maggot management.

Insecticides can be applied as seed or soil treatments to control the adults. Properly applied soil treatments should provide protection through midsummer. After this time, foliar sprays are needed to reduce adult (fly) numbers. Foliar treatments should coincide with periods of peak adult activity. Proper timing is critical. Repeat treatments at 10-14 day intervals as needed.

Onion Thrips

Adult onion thrips are tiny (1/25 inch long), pale yellow to tan insects that have elongate bodies with four feathery wings folded over the backs. Nymphs resemble adults but are wingless and cream-colored. Onion thrips feed on the foliage, producing light-colored streaks on the leaves. Small, black fecal spots also are associated with thrips damage. When numerous, thrips cause onion foliage to discolor and curl, and bulb size can be significantly reduced.

Treatment for thrips in onions should be considered when 10-20 thrips per plant are observed. Adequate soil moisture reduces the impact of the thrips. Treatment must utilize maximum water volume and give complete coverage to penetrate new growth. The potential exists for the presence of thrips resistant to organophosphate insecticides. If poor control is observed with these compounds, a follow-up treatment with a carbamate should be considered.

Cutworms

Cutworms are brown to black and commonly reach 1.5 inches in length at maturity. They feed at night and chew holes in bulbs and leaves. Cutworms are more often a problem in the spring and early summer. For best results, apply insecticides in late evening when damage is first observed. Repeat treatment as needed.

Registered for Control of Onion Insects

! Read pesticide label before making insecticide decisions !
Rate is active ingredient per acre unless otherwise noted.

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
azinphos-methyl (R) *Guthion 2S*	thrips	0.5-0.75 lb	Do not apply more than 3 times per season. Wait 7 (green onions) or 28 (dry onions) days before harvest.
carbaryl			
Sevin 20%	cutworms	5-10 lb form/A	No waiting period.
Sevin 5%		40 lb form/A	
chlorpyrifos			
Lorsban 4E	onion maggot	1.1 fl. oz form*	Drench in-furrow. One application per year. Incorporate to depth of 1-2 inches.
Lorsban 15G	onion maggot	3.7 oz form*	Apply in-furrow at planting. One application per year.
diazinon			
14G	onion maggot	14-28 lb form/A	Broadcast prior to planting and incorporate 3-4 inches.

Registered for Control of Onion Insects (continued)

Insecticide	Insects	Rate AI/Acre	Restrictions and Comments
50W	onion maggot	2.0 lb	Apply at planting with sufficient water to drench seed furrow.
AG500	onion maggot	1.0 lb	Apply at planting with sufficient water to drench seed furrow.
AG500, 50W	thrips	0.5 lb	Wait 10 days before harvest.
ethion 25WP	onion maggot	0.5-1.0 lb	Seed treatment. Refer to label.
fonofos *Dyfonate 10G*	onion maggot	1.0 lb	Apply in-furrow at planting. To be used on soils with greater than 10% organic matter.
(R) *Dyfonate 4EC*	onion maggot	1.0 lb	Apply in-furrow at planting. To be used on soils with greater than 10% organic matter.
malathion 57EC	onion maggot adults	1.0-1.6 lb	Wait 3 days before harvest.
	thrips	1.0-1.25 lb	Wait 3 days before harvest.
methomyl **(R)** *Lannate L*	thrips cutworms	0.45 lb	Add wetting agent. Wait 7 (dry onions) or 28 (green onions) days before harvest.
methyl parathion **(R)** *Penncap-M*	thrips	0.5 lb	Wait 15 days before harvest.
permethrin **(R)** *Pounce 3.2EC, 25WP*	onion maggot	0.1-0.3 lb	Do not apply more than 2.4 lb AI per acre per season. Do not graze livestock in treated areas or cut treated crops for feed.
	thrips	0.15-0.3 lb	

* Rate per 1,000 row feet.