Who's Who and What to Do
Forage Insect Pests

2009 Minnesota Forage Days
Detroit Lakes, MN
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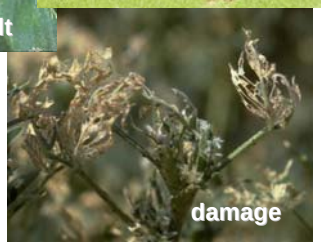
Crops

Major Insect Pests of Alfalfa

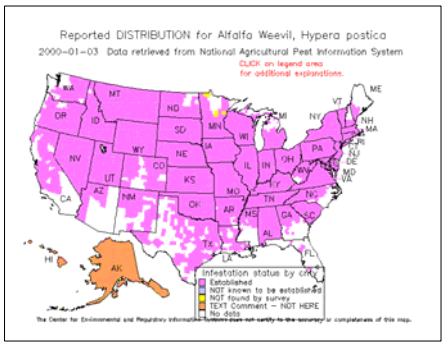
- **Alfalfa weevil**
- **Potato leafhopper**
- **Lygus**
- **Alfalfa caterpillar**
- **Alfalfa webworm**
- **Aphids – Pea, Spotted, Blue**
- **Clover leaf weevil**
- **Alfalfa blotch leafminer**
- **Blister beetles**
- **Green cloverworm**
- **Variegated cutworm**

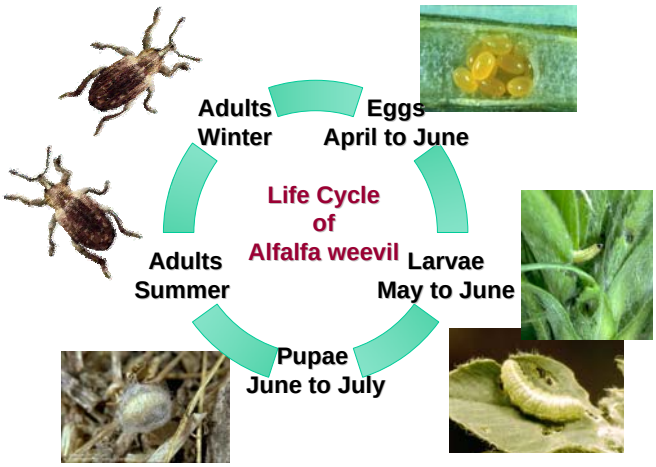
Alfalfa Weevil



Alfalfa Weevil Distribution

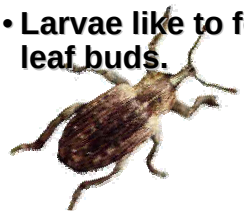
alfalfa weevil, *Hypera postica*, is an old problem in the U.S., first discovered in Utah in 1904.





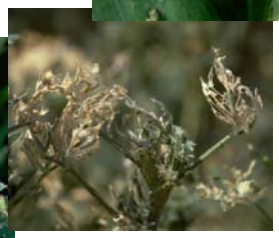
Alfalfa Weevil

- **Larvae hatch over a month or more;**
- **A range of sizes are found because of extended hatch time;**
- **Larvae like to feed in leaf buds.**



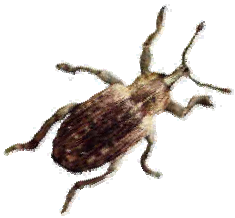
Alfalfa Weevil

- The larvae are green with a white stripe down the back;
- They skeletonize the leaves.



Alfalfa Weevil

- Feeding damage results in a "frosted" appearance to the field



Alfalfa Weevil

Damage – Before First Cutting

- Larvae feed on terminals, damaging young leaves;
- At high weevil numbers, foliage is very ragged with yield losses of 30 to 40% possible;
- Early damage may not be easily seen.

Alfalfa Weevil

Sampling – Sweep Net

- Weevil populations can be detected with a sweep net.
  - 8" to 10" high alfalfa
  - 180º arc
  - 10 sweeps at 4 locations

Management Threshold

20 larvae per sweep

Alfalfa Weevil

Alfalfa Weevil degree day guidelines used by Iowa State University are based on a 48˚F base temperature.

Life Stage	Activity	Degree Days
Egg hatch		300
1st - 2nd instar	Light leaf feeding	301 - 438
3rd - 4th instar	Major leaf feeding	439 - 595
pupa - adult	Feeding stops	596 - 810

Alfalfa Weevil

Sampling – Stem Counts

- Monitoring tip feeding is simple
  - Select 10 to 20 stems from 5 locations
  - Examine tips for feeding
  - Determine % damaged tips
  - Determine average # of larvae/stem

Management Threshold

IF, 30 to 50% damaged tips

IF, 1.5 to 2 larvae per stem

Alfalfa Weevil

Management Decision

- Do not apply insecticide unless weevils are at economic levels;
- If alfalfa is starting to bloom, harvest rather than spray;
- Monitor re-growth for weevils.

Alfalfa Weevil Economic Injury Level – Early Bud Stage

(Average Number of Larvae per Stem)

Control Cost ($ / acre)	Alfalfa Market Value ($ per ton)							
	45	55	65	75	85	95	105	115
7.00	4.0	3.3	2.8	2.4	2.2	1.9	1.8	1.6
8.00	4.6	3.6	3.2	2.7	2.4	2.2	2.0	1.8
9.00	5.2	4.2	3.6	3.1	2.7	2.5	2.2	2.0
10.00	5.8	4.7	4.0	3.4	3.0	2.7	2.5	2.2
11.00	6.3	5.2	4.4	3.8	3.4	3.0	2.7	2.5
12.00	6.9	5.6	4.8	4.2	3.7	3.3	3.0	2.7
13.00	7.4	6.1	5.2	4.5	3.9	3.5	3.2	2.9

Alfalfa Weevil

Damage – AFTER First Cutting

- Monitor stubble and regrowth for surviving larvae
  - Inspect 20, 1 sq ft samples
  - You may take samples in windrow
  - Larvae concentrated here

Management Threshold

8 or more larvae per square foot, or feeding is suppressing growth

Number of Days of Delayed Re-Growth of Alfalfa that Can be Tolerated after 1st Cutting

Control Cost ($ / acre)	Alfalfa Market Value ($ per ton)				
	20	40	60	80	100
2.00	5	3	2	1	1
4.00	10	5	3	3	2
6.00	15	8	5	4	3
8.00	20	10	7	5	4
10.00	25	13	8	6	5
12.00	30	15	10	8	6
14.00	35	18	12	9	7

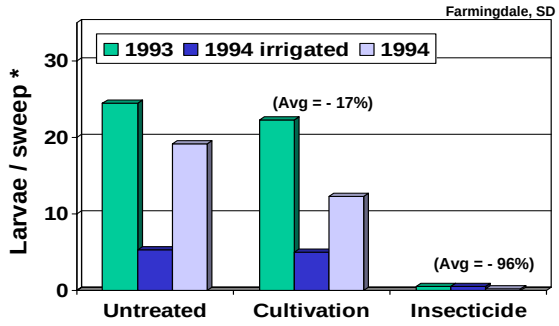
Formula: # of delayed re-growth days = $\frac{\text{Cost of Control}}{\text{(Value of Hay x 0.0198)}}$

Alfalfa Weevil

Management Decision

- What about cultural activities such as:
  - cultivation
  - early cutting

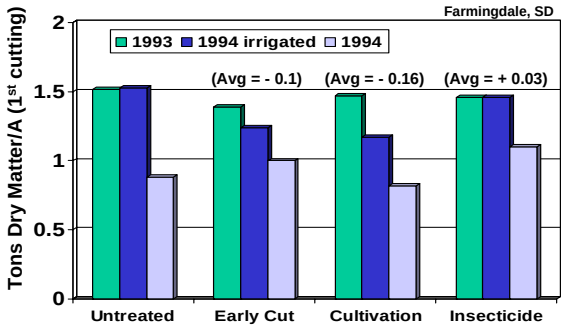
Alfalfa Weevil larvae found in Untreated Alfalfa Hay Compared to Alfalfa Hay Cultivated or Treated with Insecticide to Manage Alfalfa Weevil



* Pretreatment counts, larvae/sweep: 1993 – 27.5; 1994 irrigated – 6.1; 1994 – 107.8

Source: M. Catangui. 2001. Evaluation of Control Practices in South Dakota: Alfalfa Weevil. SDSU Extension Publication EEFS 011.

Tons Dry Matter Produced/Acre from Untreated Alfalfa Hay Compared to Early Cutting, Cultivation, and Insecticide Treatment to Manage Alfalfa Weevil



Source: M. Catangui. 2001. Evaluation of Control Practices in South Dakota: Alfalfa Weevil. SDSU Extension Publication EEFS 011.

Insects with Piercing - Sucking Mouthparts

Potato Leafhopper

- Nymphs more injurious than adults;
- nymphs walk sideways, found on undersides of leaf;
- do NOT allow damage to progress to the point where yellowing of foliage has occurred.

Potato Leafhopper

Stem Length *(inches)*	Average # Leafhoppers/sweep
3 or less	0.2
6	0.5
8 – 10	1.0
12 - 14	2.0

Insects with Piercing - Sucking Mouthparts

Lygus bugs

- Prefer to feed on flower and leaf buds
- toxin in saliva can abort flowers and cause poor development of seeds

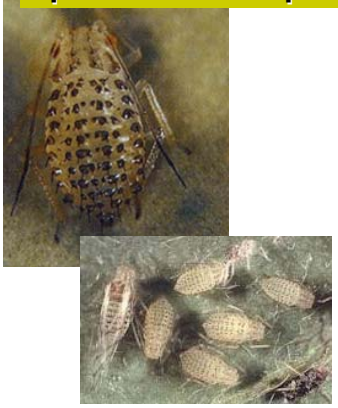
Insects with Piercing - Sucking Mouthparts

Pea Aphid

. . . and others

- green in color
- feed on stems and underside of leaves
- NOT a major problem in ND

Spotted Alfalfa Aphid



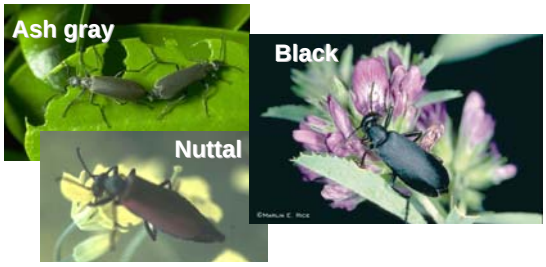
Blue Alfalfa Aphid

Economic thresholds (aphids/per plant) for Pea, Blue, and Spotted aphids for four growth stages of Alfalfa

Growth Stage	Pea aphid	Blue alfalfa aphid	Spotted alfalfa aphid
Seedling	5	1	1
< 10 inch	40	10	10
> 10 inches	75	30	30
20 inches	100	50	100

Blister Beetles

- Defoliate plants
- Congregate in large groups
- Bodies contain cantharidin
- Chemical is toxic to horses and livestock



Relative Toxicity to Horses of Three Common Blister Beetle Species

Number of blister beetles expected to kill a horse weighing:

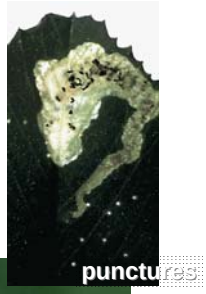
	Horse Weight		
Blister beetle species	275 lbs	550 lbs	825 lbs
Black blister beetle	550	1100	1700
Spotted blister beetle	175	345	520
Threestriped blister beetle	40	80	120

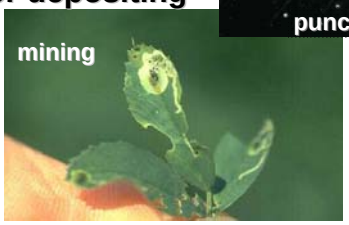
Adapted from Capinera et al. 1985. J. Econ. Entomol. 78:1052-55.

Adjust harvesting equipment to give blister beetles the best chance of survival . . . So they can leave or at the very least, not be crushed.

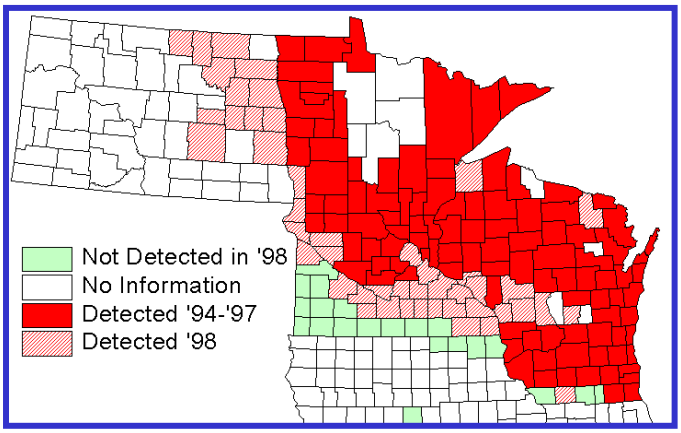
Alfalfa Blotch Leafminer

- Maggots mine leaves resulting in lost tonnage and quality
- Adult flies puncture leaves to feed and for depositing eggs





Alfalfa Blotch Leafminer



Alfalfa Caterpillar

Caterpillars are defoliators, consuming the entire leaf

Yellow butterflies are often quite abundant in August

UNIVERSITY OF MINNESOTA
EXTENSION

ALFALFA WEEVIL

Insecticide Recommendations for Managing Insect Pests in Alfalfa — 2008

Larvae

Historically, alfalfa weevil larvae are not a widespread concern in North Dakota, occurring mainly in the southern counties when they are a problem. The light green larvae have a white stripe down the center of the back. They feed in the terminal buds of the growing alfalfa. They may be found in rolled up leaves at the growing tip of the plant. Feeding injury appears as small, circular holes in leaves. As larvae increase in size, feeding injury is more evident. Severely damaged fields take on a silvery appearance due to browning of injured leaf tissue.

Alfalfa Weevil Management:

If alfalfa weevil infestations are observed, one of the best strategies is to cut fields for hay early. After cutting, monitor carefully for signs of damage or delayed regrowth, particularly in the swath area where larvae may be concentrated.

When early cutting of the crop is not possible, treatment should be considered when 30% of the plants show feeding damage and larvae are still present. To sample, inspect 20 stems from each of 5 sites in the field, recording the percent of damaged plants and whether larvae were found.

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
beta-cyfluthrin Baythroid XL *RUP*	0.0125 - 0.022	1.6 - 2.8 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
carbaryl Sevin	1.5	rate varies by formulation	PHI = 7 days (alfalfa).
carbofuran Furadan 4F (alfalfa only) *RUP*	0.25 - 0.5	0.5 - 1 pt	Do not cut or graze for 7 days at 0.25 lb rate and 14 days at 0.5 lb rate.
chlorpyrifos Lorsban 4E (alfalfa only) *RUP*	0.5 - 1	1 - 2 pts	Do not cut or graze treated alfalfa within 7 days after application of ½ pint per acre, within 14 days after application of 1 pint per acre, or within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per season or one application per cutting of any product containing chlorpyrifos. Apply in at least 2 to 5 gal water/acre by air and 10 gal water/acre by ground. REI = 24 hours.
chlorpyrifos Warhawk (alfalfa only) *RUP*	0.5 - 1	1 - 2 pts	
chlorpyrifos Yuma 4E (alfalfa only) *RUP*	0.5 - 1	1 - 2 pts	
chlorpyrifos + gamma-cyhalothrin Cobalt (alfalfa only) *RUP*	0.37 - 0.74 + 0.007 - 0.013	19 - 38 fl oz	PHI = 7 days for 13 fl oz per acre, 14 days for 26 fl oz per acre, 21 days for greater than 26 fl oz per acre. Do not make more than 4 applications or make a second application within 10 days of the first application.
cyfluthrin Tombstone Tombstone Helios *RUP*	0.025 - 0.044	1.6 - 2.8 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
gamma-cyhalothrin Proaxis *RUP*	0.01 - 0.015	2.56 - 3.84 fl oz	PHI = 1 day for forage or within 7 days for hay. Apply in minimum of 2 gal/A by air or 10 gal/A by ground.
indoxacarb Steward EC	0.065 - 0.11 0.034 - 0.065	6.7 - 11.3 fl oz **Reduced Rate** 4.0 - 6.7 fl oz	PHI = 7 days. Do not apply more than 45 fl oz per acre per season. Apply no more than 11.3 fl oz per cutting. When Steward EC is used alfalfa grown for seed, the seed may not be used for sprouts or livestock feed. All seed from treated crop must be tagged "Not for Human or Animal Use" at the processing plant. A **reduced rate** has been issued as a state 2 (ee) label for control of alfalfa weevil larvae when only 10 to 14 days of residual are needed. Or, when a tank-mixture with OP or pyrethroid insecticides is needed for control of alfalfa weevil larvae and aphids.
lambda-cyhalothrin Lambda-Cy (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	Apply only to pure stands of alfalfa. PHI = 1 day for forage or within 7 days for hay. Do not apply more than 0.03 lb ai (3.84 fl oz) per acre per cutting. Do not apply more than 0.12 lb ai (15.36 fl oz) per acre per season. Avoid application when bees are actively foraging. Apply in minimum of 2 gal/A by air or 10 gal/A by ground.
lambda-cyhalothrin Taiga Z (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	
lambda-cyhalothrin Warrior (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	
malathion Malathion 57EC	0.9 - 1.25	1.5 - 2 pts	No time limitation. Not effective on adults.
methomyl Lannate LV *RUP*	0.9	3 pts	PHI = 0 days. Do not graze or feed to livestock for 7 days.
methoxychlor Methoxychlor 2EC	1 - 1.5	2 - 3 qts	PHI = 7 days.
methyl parathion *RUP*	0.25 - 0.5	0.5 - 1 pt	PHI = 15 days of cutting or grazing. Do not enter treated fields within 48 hours after application.
permethrin Ambush 2E Pounce 3.2EC Arctic 3.2E Permethrin 2EC Perm-Up 25 WP Perm-Up 32. EC *RUP*	0.1 - 0.2	 6.4 - 12.8 fl oz 4 - 8 fl oz 4 - 8 fl oz 4 - 8 fl oz 6.4 - 12.8 fl oz 4 - 8 fl oz	PHI = 14 days at rates above 0.1 lb/A. Do not apply more than 0.2 lb active/cutting.
phosmet Imidan 50 WP	0.75	2 lbs	Do not apply more than once per cutting. Do not graze or cut for hay within 7 days of application. Do not apply to alfalfa during the bloom period.
zeta-cypermethrin Mustang Max (alfalfa only) *RUP*	0.014 - 0.025	2.24 - 4 fl oz	PHI = 3 days of cutting or grazing or up to 7 days of harvesting seed.

RUP - Restricted use pesticide

Insecticide Recommendations for Managing Insect Pests in Alfalfa — 2008

LEAFHOPPERS

The potato leafhopper is wedge-shaped and pale green in color. It is only 1/8 inch long. Adults are very active, jumping or flying when disturbed. Both adults and nymphs will run backwards or sideways rapidly. Damage by leafhoppers is referred to as hopper-burn. Foliage becomes dwarfed, crinkled and curled. Small triangular brown areas appear at the tips of leaves, gradually spreading around the entire leaf margin.

Potato Leafhopper Thresholds:

Suggested treatment guidelines are presented below. Thresholds are based on the number of leafhoppers per sweep when swinging a sweep net in a pendulumlike motion through the tops of the plants.

Stem Length (inches)	Average No. Leafhoppers/Sweep
3 or less	0.2
6	0.5
8 - 10	1.0
12 -14	2.0

Insecticides Registered for Leafhopper Management in Alfalfa

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
beta-cyfluthrin Baythroid XL *RUP*	0.0065 - 0.0125	0.8 - 1.6 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
carbaryl Sevin	1	rate varies by formulation	PHI = 7 days (alfalfa).
carbofuran Furadan 4F *RUP*	0.25 - 0.5	0.5 - 1 pt	Do not cut or graze within 7 days at 0.25 lb rate or 28 days at 0.5 lb rate.
chlorpyrifos + gamma-cyhalothrin Cobalt (alfalfa only) *RUP*	0.14 - 0.25 + 0.003 - 0.004	7 - 13 fl oz	PHI = 7 days for 13 fl oz per acre, 14 days for 26 fl oz per acre, 21 days for greater than 26 fl oz per acre. Do not make more than 4 applications or make a second application within 10 days of the first application.
chlorpyrifos Lorsban 4E (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	Do not cut or graze treated alfalfa within 7 days after application of ½ pint per acre, within 14 days after application of 1 pint per acre, or within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per season or one application per cutting of any product containing chlorpyrifos. Apply in at least 2 to 5 gal water/acre by air and 10 gal water/acre by ground. REI = 24 hours.
chlorpyrifos Warhawk (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	
chlorpyrifos Yuma 4E (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	
cyfluthrin Tombstone Tombstone Helios *RUP*	0.013 - 0.025	0.8 - 1.6 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.

Insecticides Registered for Leafhopper Management in Alfalfa

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
dimethoate Digon 400, Dimethoate 400	0.25 - 0.5	0.5 - 1 pt	PHI = 10 days of harvest or pasturing. Make only 1 application per cutting. Do not enter treated fields within 4 days after application.
gamma-cyhalothrin Proaxis *RUP*	0.01 - 0.015	2.56 - 3.84 fl oz	PHI = 1 day for forage or within 7 days for hay. Apply in minimum of 2 gal/A by air or 10 gal/A by ground. Rates for leafhoppers are lower; refer to label.
indoxacarb Steward EC	0.09 - 0.11	9.2 - 11.3 fl oz	PHI = 7 days. Do not apply more than 45 fl oz per acre per season. Apply no more than 11.3 fl oz per cutting. When Steward EC is used alfalfa grown for seed, the seed may not be used for sprouts or livestock feed. All seed from treated crop must be tagged "Not for Human or Animal Use" at the processing plant.
lambda-cyhalothrin Lambda-Cy (alfalfa only) *RUP*	0.015 - 0.025	1.92 - 3.20 fl oz	Apply only to pure stands of alfalfa. PHI = 1 day for forage or within 7 days for hay. Do not apply more than 0.03 lb ai (3.84 fl oz) per acre per cutting. Do not apply more than 0.12 lb ai (15.36 fl oz) per acre per season. Avoid application when bees are actively foraging. Apply in minimum of 2 gal/A by air or 10 gal/A by ground.
lambda-cyhalothrin Taiga Z (alfalfa only) *RUP*	0.015 - 0.025	1.92 - 3.20 fl oz	
lambda-cyhalothrin Warrior (alfalfa only) *RUP*	0.015 - 0.025	1.92 - 3.20 fl oz	

RUP - Restricted Use Pesticide

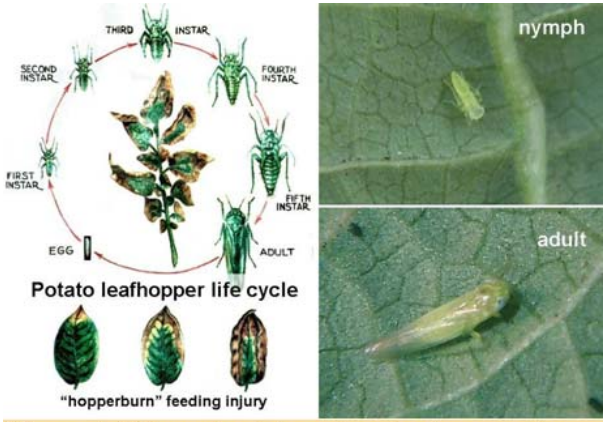


Figure 1. Life cycle of the potato leafhopper, the injury resulting from feeding, and the appearance of the wingless nymph and winged adult.

GRASSHOPPERS

In the Northern Plains, grasshopper egg hatch normally begins in late April to early May. Most grasshoppers emerge from eggs deposited in uncultivated ground or where plant cover attracted adults the previous season. Infestations could occur any time after emergence begins. Later infestations may develop when grasshopper adults migrate from harvested fields.

Threshold:

Grasshopper control is advised whenever 20 or more adults per square yard are found in field margins or 8 to 14 adults per square yard are occurring in the crop. (For more information on infestation ratings, see the discussion under Grasshoppers in Small Grain Insects).

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
beta-cyfluthrin Baythroid XL *RUP*	0.0155 - 0.022	2.0 - 2.8 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
carbaryl Sevin	1 - 1.5	rate varies by formulation	PHI = 7 days (alfalfa).
carbofuran Furadan 4F (alfalfa only) *RUP*	0.125 - 0.25	0.25 - 0.5 pt	Do not cut grass for 7 days after treatment. Do not apply more than once/season. Do not move bees into alfalfa field within 7 days of application.
chlorpyrifos Lorsban 4E (alfalfa only) *RUP*	0.25 - 0.5	0.5 - 1 pt	Do not cut or graze treated alfalfa within 7 days after application of ½ pint per acre, within 14 days after application of 1 pint per acre, or within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per season or one application per cutting of any product containing chlorpyrifos. Apply in at least 2 to 5 gal water/acre by air and 10 gal water/acre by ground. REI = 24 hours.
chlorpyrifos Warhawk (alfalfa only) *RUP*	0.25 - 0.5	0.5 - 1 pt	
chlorpyrifos Yuma 4E (alfalfa only) *RUP*	0.25 - 0.5	0.5 - 1 pt	
chlorpyrifos + gamma-cyhalothrin Cobalt (alfalfa only) *RUP*	0.14 - 0.25 + 0.003 - 0.004	7 - 13 fl oz	PHI = 7 days for 13 fl oz per acre, 14 days for 26 fl oz per acre, 21 days for greater than 26 fl oz per acre. Do not make more than 4 applications or make a second application within 10 days of the first application.
cyfluthrin Tombstone Tombstone Helios *RUP*	0.031 - 0.044	2.0 - 2.8 fl oz	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
dimethoate Digon 400, Dimethoate 400	0.25 - 0.5	0.5 - 1 pt	Do not apply to alfalfa in bloom. PHI = 10 days or pasturing. Make only 1 application per cutting. Do not enter treated fields without protective clothing until spray dries.
gamma-cyhalothrin Proaxis *RUP*	0.01 - 0.015	2.56 - 3.84 fl oz	PHI = 1 day for forage or within 7 days for hay. Apply in minimum of 2 gal/A by air or 10 gal/A by ground. Proaxis may be used in bordering, non-crop areas that are not hayed or grazed
lambda-cyhalothrin Lambda-Cy (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	Apply only to pure stands of alfalfa. PHI = 1 day for forage or within 7 days for hay. Do not apply more than 0.03 lb ai (3.84 fl oz) per acre per cutting. Do not apply more than 0.12 lb ai (15.36 fl oz) per acre per season. Avoid application when bees are actively foraging. Apply in minimum of 2 gal/A by air or 10 gal/A by ground.
lambda-cyhalothrin Taiga Z (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	
lambda-cyhalothrin Warrior (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz	
malathion Malathion 57EC	1	1.5 pts	No limitation on cutting or grazing.
malathion Malathion ULV	0.6	8 oz	Aerial application. Applied alone or dissolved in 1 pint of diesel oil per acre. No time limitation on cutting or grazing.
methyl parathion *RUP*	0.25 - 0.5	0.5 - 1 pt	PHI = 15 days, cutting or grazing. Do not enter treated fields within 48 hours after application.
zeta-cypermethrin Mustang Max (alfalfa only) *RUP*	0.0175 - 0.025	2.8 - 4 fl oz	PHI = 3 days of cutting or grazing or up to 7 days of harvesting seed.

RUP - Restricted use pesticide

Insecticides for Rangeland and Non-Crop Areas - grazed or cut for hay

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
carbaryl Sevin	0.5 - 1.5	rate varies by formulation	Pastures: PHI = 0 days for aerial application. Rangeland: PHI = 0 days for aerial application. The lower rate (0.5 lb) is suggested for nymphs on small plants or sparse vegetation. The higher rate (1.5 lb) is suggested for mature grasshoppers or when material is applied to crops requiring greater coverage.
diflubenzuron Dimilin 2L *RUP*	0.008 - 0.032	0.5 - 2.0 fl oz	Dimilin (diflubenzuron) is an insect growth regulator. Applications should be timed when the majority of nymphs are 2nd to 3rd instar. This treatment is NOT effective in controlling adult grasshoppers. Allow at least 1 day after treatment before cutting grass.
malathion Malathion 57EC	1.0 - 1.33	1.5 - 2.0 pts	No time limitation on grazing or cutting.
malathion Malathion ULV	0.6	8 oz/acre	Aerial application. Applied alone or dissolved in diesel oil at 1 pt/A. No time limitation on grazing or cutting.
zeta-cypermethrin Mustang Max *RUP*	0.0175 - 0.025	2.8 - 4.0	PHI = 0 days for forage and hay, PHI = 7 days for straw. Do not make applications less than 7 day apart for forage and hay and not less than 17 days for straw. A maximum of 0.025 lb ai per acre may be applied per cutting. For hay, a maximum of 0.10 lb ai per acre per season may be applied. For forage and straw, a maximum of 0.125 lb ai per acre per season may be applied.

RUP - Restricted use pesticide

Insecticide Recommendations for Managing Insect Pests in Alfalfa — 2008

PEA APHID

The pea aphid is light green and about 1/4 inch long. Alfalfa infested by pea aphids may appear wilted and have a bronze color. When present, pea aphids will crowd together on the terminal shoot, leaves or stems. Monitor fields closely during periods of slow plant growth.

Pea Aphid Thresholds:

Many aphids per plant are required before the vigor of that plant is reduced. Light populations may be beneficial by providing a food source for predatory and parasitic insects. On 10-inch tall alfalfa, treatment would not be needed until aphids exceed 50 per stem. Taller alfalfa will tolerate greater numbers.

Insecticides Registered for Pea Aphid Management in Alfalfa

INSECTICIDE	DOSAGE IN LB AI/ACRE	PRODUCT PER ACRE	RESTRICTIONS ON USE
beta-cyfluthrin Baythroid XL *RUP*	0.022	2.8 fl oz (aphid suppression)	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
carbaryl Sevin	1	rate varies by formulation	PHI = 7 days (alfalfa).
carbofuran Furadan 4F *RUP*	0.25 - 0.5	0.5 - 1 pt	Do not cut or graze within 7 days at 0.25 lb rate or 28 days at 0.5 lb rate.
chlorpyrifos + gamma-cyhalothrin Cobalt (alfalfa only) *RUP*	0.25 - 0.51 + 0.004 - 0.009	13 - 26 fl oz	PHI = 7 days for 13 fl oz per acre, 14 days for 26 fl oz per acre, 21 days for greater than 26 fl oz per acre. Do not make more than 4 applications or make a second application within 10 days of the first application.
chlorpyrifos Lorsban 4E (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	Do not cut or graze treated alfalfa within 7 days after application of ½ pint per acre, within 14 days after application of 1 pint per acre, or within 21 days after application of rates above 1 pint per acre. Do not make more than 4 applications per season or one application per cutting of any product containing chlorpyrifos. Apply in at least 2 to 5 gal water/acre by air and 10 gal water/acre by ground. REI = 24 hours.
chlorpyrifos Warhawk (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	
chlorpyrifos Yuma 4E (alfalfa only) *RUP*	0.25 - 1	0.5 - 2 pts	
cyfluthrin Tombstone Tombstone Helios *RUP*	0.44	2.8 fl oz (aphid suppression)	PHI or pre-grazing interval is 7 days. Maximum allowed per cutting: 3.2 fl oz/acre. A total of 12.8 fl oz may be applied per acre per season. Due to potential injury to bees, do not apply to alfalfa grown for seed.
dimethoate Digon 400, Dimethoate 400	0.25 - 0.5	0.5 - 1 pt	PHI = 10 days of harvest or pasturing. Make only 1 application per cutting. Do not enter treated fields within 4 days after application.
gamma-cyhalothrin Proaxis *RUP*	0.01 - 0.015	2.56 - 3.84 fl oz	PHI = 1 day for forage or within 7 days for hay. Apply in minimum of 2 gal/A by air or 10 gal/A by ground. Rates for leafhoppers are lower; refer to label.
indoxacarb Steward EC	0.09 - 0.11	9.2 - 11.3 fl oz	PHI = 7 days. Do not apply more than 45 fl oz per acre per season. Apply no more than 11.3 fl oz per cutting. When Steward EC is used alfalfa grown for seed, the seed may not be used for sprouts or livestock feed. All seed from treated crop must be tagged "Not for Human or Animal Use" at the processing plant.
lambda-cyhalothrin Lambda-Cy (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz (suppression)	Apply only to pure stands of alfalfa. PHI = 1 day for forage or within 7 days for hay. Do not apply more than 0.03 lb ai (3.84 fl oz) per acre per cutting. Do not apply more than 0.12 lb ai (15.36 fl oz) per acre per season. Avoid application when bees are actively foraging. Apply in minimum of 2 gal/A by air or 10 gal/A by ground.
lambda-cyhalothrin Taiga Z (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz (suppression)	
lambda-cyhalothrin Warrior (alfalfa only) *RUP*	0.02 - 0.03	2.56 - 3.84 fl oz (suppression)	
malathion Malathion 57EC	1	1.5 pts	No preharvest interval on foraging or grazing.
methomyl Lannate LV *RUP*	0.45 - 0.9	1.5 - 3 pts	PHI = 0 days. Do not graze or feed to livestock for 7 days.
methyl parathion *RUP*	0.25 - 0.5	0.5 - 1 pt	Wait 15 days before cutting or grazing. Do not enter treated fields within 48 hours after application.
permethrin			PHI = 14 days at rates above 0.1 lb/A. Do not apply more than 0.2 lb active/cutting.
Ambush 2E	0.1 - 0.2	6.4 - 12.8 fl oz	
Pounce 3.2EC	0.1 - 0.2	4 - 8 fl oz	
Arctic 3.2E	0.1 - 0.2	4 - 8 fl oz	
Permethrin 2EC	0.1 - 0.2	4 - 8 fl oz	
Perm-Up 25 WP	0.05 - 0.2	3.2 - 12.8 fl oz	
Perm-Up 32. EC *RUP*	0.05 - 0.2	2 - 8 fl oz	
zeta-cypermethrin Mustang Max (alfalfa only) *RUP*	0.014 - 0.025	2.24 - 4 fl oz	PHI = 3 days of cutting or grazing or up to 7 days of harvesting seed.

RUP - Restricted use pesticide