

**INSECTICIDE RECOMMENDATIONS FOR ALFALFA, CLOVER AND PASTURES – 2007**

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The information in these recommendations is not as comprehensive as the product labels and is intended only as a guideline. **READ THE LABEL** before buying and using any pesticide. Some insecticides are sold under brand names not listed in this publication. Check labels for names of recommended active ingredients. Products in ***bold italics*** are ***Restricted Use***.

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**Alfalfa Weevils**

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**Alfalfa Weevil Field Sampling Procedure**

**When to Sample:** This insect is a pest on the first cutting. Symptoms are small holes in the leaves and growing tips of alfalfa plants. From a distance, damaged plants look as though they have had frost injury. Field samples for alfalfa weevil should be made at least every 7 days, or more frequently if recommended by the Alfalfa Weevil Pest Management Recommendation Tables included in this publication.

Select the appropriate management table based on the degree day accumulation for your area. This information is available through county agricultural extension agents. Fields should be first examined when 190 day degrees (base temperature 48° F) have accumulated. If alfalfa weevil larval feeding damage is observed, take stem samples using the equipment and procedures listed below to determine the magnitude of the alfalfa weevil population and to decide what management strategy is needed.

**Equipment needed:** ● Yardstick or other measuring device ● a white or yellow plastic bucket ● Alfalfa Weevil Pest Management Recommendation Tables ● pencil and paper.

**Sampling Procedure:**

1. Walk into the field at least 20 paces before beginning to sample.
2. Collect 30 complete stems while moving through the field in a "U" or "Z" shaped pattern and place each stem, top first, into the bucket. After collecting 30 stems return to the edge of the field and lay them on a clean, flat surface, such as the hood of a truck.
3. Select 4 or 5 stems at a time and beat them vigorously against the inside of the bucket to dislodge alfalfa weevil larvae. Count all larvae, including any that may have fallen onto the surface where the stems were resting and record this number.
4. Randomly select and measure 10 of the 30 stems. Measure each stem to the nearest inch. Calculate the average stem height.
5. Use the Alfalfa Weevil Pest Management Recommendation Table that corresponds to the current degree day range. Use the number of larvae per 30 stems and average alfalfa height in inches to determine the management recommendations for the situation in the field you are sampling. Note the growth stage of each stem that you measured - pre-bud if there are no buds; bud if buds have formed and flower if any flowers present. Calculate and record the percentage of the plants in the bud or flower stage. This information is useful in determining when to harvest the crop.

**How to Use the Pest Management Tables:**

Suppose that first sample is taken when 200 degree days have accumulated, the average alfalfa height is 4" and a total of 24 larvae have been found in the 30 stem sample. By checking the 190-225 Degree Day table we find that the management recommendation for this situation is: "Re-sample in 2 days if the larval number is not exceeded but is above 15". You will need to sample this field again in two days. At that time you will use the table with the degree day accumulation as of that day. Be sure to read the footnotes that are found on the bottom of the tables.



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**Alfalfa Weevil Pest Management Recommendation Tables**

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**190 to 225 Degree Days**

# larvae per 30 stems	27	67	100	130
Plant height	2"	4"	6"	8"

- Apply a long residual insecticide if the larval number you find is greater than the number in the table above for the average height of alfalfa sampled. Spraying now protects alfalfa weevil parasites emerging later.
- Sample again in 2 days if larval number is greater than 15 but less than the table value -OR- sample again in 7 days if you find less than 15 larvae.

**226 to 275 Degree Days**

# larvae per 30 stems	15	19	20
Plant height	2"	4"	6" or taller

- Apply a long residual insecticide if the larval number you find is greater than the number in the table above for the height of alfalfa sampled.
- Sample again in 7 days if you find less than the number of larvae for the appropriate alfalfa height.

**276 to 325 Degree Days**

# larvae per 30 stems	37	60	83	105	135
Plant height	4"	6"	8"	10"	12" or taller

- Apply a medium residual insecticide if the larval number you find is greater than the number in the table above for the height of alfalfa sampled.
- Sample again in 7 days if you find less than the number of larvae for the appropriate alfalfa height.

**326 to 375 Degree Days**

#/30 stems	82	105
Plant height	8"	10" or taller

- Apply a short residual insecticide if the larval number you find is greater than the number in the table above for the height of alfalfa sampled.
- Sample again in 2 days if alfalfa is less than 16" and the number of larvae found is more than 20 but less than 82 per 30 stems -OR- sample again in 7 days if alfalfa is taller than 16" and the number of larvae is less than 20.

**376 to 525 Degree Days**

# larvae/30 stems	52	64	72	80
Plant height	12"	14"	16"	18" or taller

- Apply a short residual insecticide if the number of larvae are exceeded for the size alfalfa sampled or **harvest now if the alfalfa is in the 30% bud stage or greater.**
- Sample again in 2 days if the number of larvae is less than the level justifying treatment but within 20 of it.

Two cultural practices can be used to reduce alfalfa weevil damage. Fall removal of alfalfa for hay or by grazing following freeze-down will reduce egg-laying sites. Early harvest in the spring can be used instead of an insecticide application.

### Alfalfa Weevil Control

The best alfalfa weevil management decisions are based on stem sampling. If this information is not available then control is recommended when 25% to 50% of the tips are being fed upon and 2 or more larvae can be found per stem.

Alfalfa Weevil Insecticides	Rate per Acre	Harvest or Graze (days)
<i>Baythroid 2</i>	1.6 to 2.8 fl oz	7
<i>Furadan 4F</i>	½ pt 1 pt 2 pt	7 14 28
Imidan 70 WP	1 to 1-1/3 lb	7
<i>Lannate WSP</i>	1 lb	7
<i>Lorsban 4 E</i> <i>Chlorpyrifos 4E – AG</i>	1 to 2 pts	1 pt - 14 d; more than 1 pt - 21d Some temporary yellowing may occur after application, it will disappear.
<i>Mustang Max</i>	2.2 to 4 fl. oz.	3
<i>Pounce 3.2 EC</i>	4 to 8 fl oz	more than 4 oz - 14 d
<i>Proaxis 0.5 EC</i>	2.56 to 3.84 fl oz	1 day forage, 7 day harvest Apply only to fields planted to pure stands.
Sevin 80 S	1-7/8 lbs	7 May cause temporary bleaching of tender foliage.
Steward 1.25 SC	6.7 to 11.3 fl oz.	7
<i>Warrior 1 CS</i>	2.5 to 3.8 fl oz	1 d - forage, 7d - hay

#### Evaluating Post-Harvest Alfalfa Weevil Larval and Adult Damage

Routine stubble sprays are not justified. If early harvest was used as a weevil management tool, there occasionally may be sufficient larvae or newly-emerged adults present to justify an insecticide application. Watch such fields carefully for the normal green-up that indicates active re-growth. Surviving larvae may feed on developing leaves and new adults can cause "notch-like" feeding holes on leaves giving them a feathery appearance. The table below may be used to evaluate larval numbers and plant height to determine whether or not control is necessary. Treatment may be justified if adult weevils are found feeding on 50% or more of the crowns and re-growth is prevented for 3 to 6 days. Use low rates if an insecticide application is necessary.

#### Assessing Alfalfa Weevil Larvae on First Cutting Re-growth (5 to 7 days after harvest)

# larvae/30 stems ●	20	33	47	60
# larvae/30 stems ● ●	17-20	17-32	23-46	23-59
Plant height	2"	4"	6"	8" or taller

● Spray with a short residual insecticide if the number of larvae/30 stems exceeds the number in the table above for the appropriate alfalfa height. ● ● Sample again in 2 days if the number of larvae/30 stems is in this range for the appropriate alfalfa height. If numbers are below this level, no treatment should be necessary.

**Potato Leafhoppers**

**When to sample:** Sample each field once a week. Established alfalfa fields should be first sampled the week following the end of alfalfa weevil season. New seedings of alfalfa should be sampled beginning in mid-May. Spring seedings of alfalfa are not cut until late June or early July and they often build up damaging leafhopper populations. Alfalfa fields can be sampled anytime during the day as long as the foliage is not wet. Sweeping alfalfa when it is wet from dew or rain is difficult and the samples are almost impossible to count. **Equipment needed:** • Yardstick or other measuring device. • 15" sweep net. • Pencil and paper. • Potato Leafhopper Treatment Guideline Table.**How to sample:** 1. Take 20 sweeps at 5 locations in the field (100 sweeps per field). 2. Count all potato leafhoppers (adults and nymphs) collected at each location and record these numbers. 3. Randomly collect 10 complete stems as you leave the field. Compute the average stem height, and count the number of stems with buds or flowers. 4. Compute the number of leafhoppers per sweep and use the "Potato Leafhopper Economic Threshold Table" to determine if control measures are needed.

**Determining the need for leafhopper control:** Resample the field within 7 days after cutting to determine whether control measures are needed. After the first cutting, and for every additional cutting, use the Treatment Guideline Table below to determine when potato leafhoppers should be controlled. If your leafhopper counts exceed the critical values on the table, control measures should be implemented. Early harvests often can be used to control potato leafhoppers. However, insecticides may be needed especially if the alfalfa is small, usually early in the regrowth period.

**Potato Leafhopper Treatment Guideline Table**

Average stem length	# Leafhoppers/Sweep	# Leafhoppers/100 Sweeps
Less than 3"	0.2	20
3" to 6"	0.5	50
8" to 10"	1.0	100
12" to 14"	2.0	200

• If the alfalfa is at 30% bud or more you should plan on cutting within 7-10 days. If this is the case, you should not spray. However, soon after cutting you should resample the field to determine the need for control. Harvesting will kill a high percentage of potato leafhopper nymphs and some adults. Most surviving adults will leave the field. Because of this, stubble sprays are unnecessary. The adults will return when the regrowth is about 4" to 6" tall. Sweep samples, beginning 5 to 7 days after harvest, will determine whether or not a treatment is necessary.

Potato Leafhopper Insecticides	Rate per Acre	Harvest or Graze (days)
<i>Baythroid 2</i>	0.8 to 1.6 fl. oz.	7
Dimethoate E267	3/4 to 1-1/2 pt	10
<i>Furadan 4F</i>	1 to 2 pts	14 or 28
Imidan 70WP	1-1/3 lb	7
<i>Lorsban 4E</i> <i>Chlorpyrifos 4E - AG</i>	1/2 to 1 pt	1/2 pt - 7 d; 1 pt - 14 d Some temporary yellowing may occur after application, it will disappear.
<i>Mustang Max</i>	2.2 to 4 fl. oz.	3
<i>Pounce 3.2 EC</i>	4 to 8 oz	4 oz - 0 d more that 4 oz - 14 d

Sevin 4F Sevin 80S	1 qt 1-1/4 lb	7
Steward 1.25 SC	6.7 to 11.3 fl oz	7
<b>Warrior 1 CS</b>	1.9 to 3.2 fl oz	1 d forage - 7 d hay Apply only to fields planted to pure stands of alfalfa

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### Other Alfalfa and Clover Pests

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**Aphids-** An average of 50 aphids or more per stem would be needed to justify control. Treat only if plants lose their dark green color and are wilting. Products such as *Ambush*, *Baythroid*, Cythion, Dimethoate, *Furadan*, Imidan, *Lannate*, *Lorsban*, *Mustang Max*, *Pounce*, *Proaxis*, or *Warrior 1 CS* may be used.

**Blister Beetles** are long cylindrical beetles that may be black, gray, yellow and brown striped or black with gray margins on the wing covers. These insects usually appear in mid-July and are usually found feeding in clusters on plant flowers. Livestock that eat hay containing dead beetles can become sick and may die. If small numbers are found, they can be kept out of the harvested hay by avoiding the use of a hay "crimper" when cutting the crop. If the beetles are not crushed during the harvesting process, they will leave the field before the hay is baled. Blister beetles can be controlled using applications of carbaryl sprays sold in products such as *Proaxis*, Sevin 4F, 80S, Sevin XLR, or *Warrior 1 CS*. See the label for the rate to use. Do not apply Sevin or *Warrior 1 CS* within 7 days of harvest.

**Cloverleaf weevil larvae** are usually controlled by a fungus each spring and insecticide treatments are seldom justified. Fungus infected larvae are yellow-brown and often are found stuck to leaves at the top of the plant. Healthy cloverleaf weevil larvae are always found on the ground at the base of the plant during the daylight hours.

### Grasshoppers

Treat after cutting when plants are less than six inches tall if more than 15 grasshoppers per square yard are found in the field. Treat if there are 40 or more grasshopper nymphs or adults per square yard in the field margins or field.

Grasshopper Insecticides	Rate per Acre	Harvest or Graze (days)
<i>Baythroid 2</i>	2 to 2.8 fl oz	7
Dimethoate E267	3/4 to 1-1/2 pt	10
<i>Furadan 4F</i>	1/4 to 1/2 pt	7
<i>Lorsban 4E</i> <i>Chlorpyrifos 4E - AG</i>	1/2 to 1 pt	7 or 14
<i>Mustang Max</i>	2.8 to 4 fl. oz.	3
<b>Proaxis 0.5 EC</b>	2.56 to 3.84 fl oz	1 day forage, 7 day harvest Apply only to fields planted to pure stands.
Sevin 4F	1/2 to 1-1/2 qts	7
<b>Warrior 1 CS</b>	2.56 to 3.84 fl oz	forage 1 day, hay 7 days

**Meadow spittlebugs-** A treatment is seldom, if ever, needed. If spittle masses and nymphs average more than 1 per stem and alfalfa is less than 6" tall, then an insecticide application of products such as *Ambush*, *Baythroid*, *Lorsban*, methoxychlor, *Mustang Max*, *Pounce*, or *Warrior 1 CS* may be considered. Control is likely to be poor due to the protection of the insect by the spittle mass.

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**Insect Pests of Fall Seeded Alfalfa**

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A preplant incorporated application of *Lorsban 4E*, at the rate of 1 qt per acre, can be used to reduce numbers of cutworms, wireworms, and white grubs.

Several insects can feed on new seedlings in fall-seeded stands. Generally, they are not pests in established fields but can eat or kill small seedlings. Watch newly-seeded stands closely and examine scattered areas of the field to check for bare spots that may be due to insect feeding. The insecticides listed below can be used to control these pests.

<b>Pest</b>	<b>Insecticide</b>	<b>Rate/Acre</b>
Bean leaf beetle	Sevin 4F <b>Proaxis 0.5 EC</b> <b>Warrior 1 CS</b>	1-1/4 lbs 2.56 to 3.84 2.5 to 3.8 fl oz
Cutworms	<b>Baythroid 2</b> <b>Lorsban 4E</b> <b>Mustang Max</b> <b>Pounce 3.2 EC</b> <b>Proaxis 0.5 EC</b> Sevin 4F <b>Warrior 1 CS</b>	0.8 to 1.6 fl oz 1 to 2 pts 2.2 to 4 fl. oz. 2 to 8 fl oz 2.56 to 3.84 1-1/4 to 1-5/8 lbs 1.9 to 3.2 fl oz
Fall armyworm	<b>Baythroid 2</b> <b>Mustang Max</b> <b>Proaxis 0.5 EC</b> Sevin 4F <b>Warrior 1 CS</b>	1.6 to 2.8 fl oz (small larvae only) 2.8 to 4 fl. oz. 2.56 to 3.84½ to 1 qt 2.5 to 3.8 fl oz (small larvae only)
Mexican bean beetle	Sevin 4F <b>Warrior 1 CS</b>	½ to 1 qt 2.5 to 3.8 fl oz
Grasshoppers	See Grasshopper section above	
Spotted cucumber beetle Southern corn rootworm beetle	<b>Lorsban 4E</b> <b>Pounce 3.2 EC</b> <b>Proaxis 0.5 EC</b> Sevin 4F <b>Warrior 1 CS</b>	½ to 1 pts 4 to 8 fl oz 2.56 to 3.84 ½ to 1 qt 2.5 to 3.8 fl oz

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**Grasshopper and Armyworm Control for Pastures and Hay Fields**

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<b>Insecticide</b>	<b>Rate/acre</b>	<b>Days to harvest</b>	
Bt products* Agree WG Biobit HP Dipel DF Javelin	0.5 to 2.0 lbs 0.5 to 2.0 lbs 1 to 2 lbs 1/4 to 1-1/2 lbs	0	Armyworms only. All products work best against small larvae
Sevin 4F Sevin 80S	1 to 1-1/2 qts 1-1/4 to 1-7/8 lbs	14	

\*Agree, Biobit, Dipel 2X, and Javelin

### Information Summary Table for Alfalfa Insecticides

This table is provided for a quick comparison of insecticides labeled on alfalfa. Insecticides are listed alphabetically by pesticide common name (usually present in the active ingredients section of the product label). One or more brand names are included along with the Restricted Entry Interval (REI) and Mode of Action Group number. Brand names of Restricted Use pesticides appear in ***bold italics***.

Use pesticide products only in accordance with their labels and with the Worker Protection Standard. Do not enter or allow worker entry into treated areas during the restricted entry interval. Check the label for Personal Protective Equipment required for early entry to treated areas that is permitted under the Worker Protection Standard and involves contact with anything that has been treated, such as plants, soil, or water.

**Mode of Action Group** A numerical classification system has been developed to make it easy to recognize the modes of action of insecticide products. These Mode of Action Group codes are on many pesticide labels and have been developed by the Insecticide Resistance Action Committee (IRAC). Insecticides with the same mode of action are assigned to groups with unique numbers. Selection of a labeled product from different number categories will help to slow down the development of resistance to either group. For example, alternate the use of pyrethroid insecticides and pyrethrins sprays (Category 3) with labeled organophosphate insecticides (Category 1B). Always avoid tank mixing products with the same mode of action.

Common Name	Brand Name	Restricted Entry Interval (hours)	Mode of Action Group
Bt aizawai	Agree WG, XenTari DF	4	11B1
Bt kurstaki	Biobit, Dipel DF, Javelin WG, Lepinox WDG, etc.	4	11B2
carbaryl	Sevin XLR Plus	12	1A
carbofuran	<b><i>Furadan 4F</i></b>	48**	1A
chlorpyrifos	<b><i>Lorsban 4E Chlorpyrifos 4E, Warhawk, Whirlwind, Yuma</i></b>	24	1B
cyfluthrin	<b><i>Baythroid 2, Govern</i></b>	12	3
<i>gamma</i> -cyhalothrin	<b><i>Proaxis 0.5 EC</i></b>	24	3
<i>lambda</i> -cyhalothrin	<b><i>Warrior, Mystic Z, Taiga Z</i></b>	24	3
<i>zeta</i> -cypermethrin	<b><i>Mustang Max, Mustang</i></b>	12	3
dimethoate	Cygon 400	48	1B
indoxacarb	Steward 1.25 SC	12	22
methomyl	<b><i>Lannate</i></b>	48	1A
permethrin	<b><i>Pounce EC, Ambush, Arctic</i></b>	12	3
phosmet	Imidan 70 WP	24	1B

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