



INSECT PEST MANAGEMENT

Alfalfa is a superb forage, but it can be attacked by a complex of insect pests. In fact, the introduction of the alfalfa weevil in the early 1960s contributed to the decline of alfalfa acreage in Alabama. However, improved cultivars and management techniques have led to a renewed interest in alfalfa.

Alfalfa insect populations can vary greatly from field to field. Therefore, it is essential to check each alfalfa field frequently for the presence of insects or insect injury. Table 1 indicates when each insect pest is likely to be present.

Action Thresholds for Alfalfa Pests

An action threshold is a decision-making tool that indicates when an insect population is high enough to cause significant yield loss. Listed below are the recommended action thresholds for the pests in the scouting guide.

Alfalfa Weevil. Treat when 50 percent of stems have injury and insects are present at the rate of (1) 25 larvae per net sweep; or (2) two larvae per stem when alfalfa is 16 inches tall; or (3) one larva per stem when alfalfa is 10 inches tall. When the threshold is reached, harvest if alfalfa is within 10

days of normal harvest. Otherwise, treat with an insecticide. After harvest, check to see how many alfalfa weevil larvae are present on the stubble and new regrowth. If there are more than eight larvae per square foot (five per sampling hoop), consider a stubble spray.

Pea Aphid. The action threshold depends on height of crop. When alfalfa is 15 inches tall, treat if there are 50 aphids per stem; when it is 25 inches tall, treat if there are 120 aphids per stem. Aphid populations frequently decline due to natural enemies. Do not treat for aphids unless aphid populations are high.

True Armyworm, other Caterpillars. Treat when there are two to three caterpillars (0.5 inch long or longer) per square foot (one to two per sampling hoop).

Three-Cornered Alfalfa Hopper. Treat when the insect is girdling and killing 10 percent of the lateral stems in the field—probably about three hoppers per plant.

Blister Beetles. These beetles poison livestock, particularly horses, when they are eaten along with the hay. Treat when there are two per square foot, about one per sampling hoop. Blister beetles are often clumped in the weedy margins of a field; spot treatment may be possible.

Table 1. Alfalfa Insect Scouting Guide

Insects	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Alfalfa Weevil		//////////										
Pea Aphids		////////////////////////////////////										
True Armyworms			//////////									
Other Caterpillars*									-----			
Japanese Beetle					//////////							
Three-Cornered Alfalfa Hopper						////////////////////////////////////						
Blister Beetles						////////////////////////////////////						
Leafhoppers				////////////////////////////////////								
Grasshoppers									-----			

* Corn earworm, webworms, alfalfa caterpillar, green cloverworm, yellow-striped armyworm, soybean looper, beet armyworm, fall armyworm.

KEY TO RATINGS: ////////// normal; ----- may vary with season.

Grasshoppers. Treat when heavy populations are defoliating the alfalfa. This will probably be about 12 per square yard (one per sampling hoop).

Potato Leafhopper. Potato leafhopper feeding causes abnormal plant response. Only a few are needed to cause injury. Recommended thresholds are based on sweep-net sampling. Threshold is one half per sweep when alfalfa is 3 to 7 inches tall, one per sweep when 8 to 10 inches tall, and two per sweep when it is 11 to 14 inches tall. When alfalfa is taller, the yield loss will probably not be observed if it is harvested at the usual time.

Webworms. Treat when the crop is more than 2 weeks from cutting and when 25 to 30 percent of plant terminals are infested.

Sampling Equipment

Equipment needed depends on the method of measuring thresholds. When insect thresholds are based on the number of pests per stem, gently cut the stem off at the base and shake it into a bucket. When thresholds are based on number per area, use a sampling hoop that can be tossed onto the alfalfa. To make a hoop, bend the body of a wire coat hanger until it is approximately round. This should make a circle about 11 inches in diameter, which is approximately two-thirds of a square foot in area.

Table 2. Alfalfa Insect Control ¹

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Caution: Most insecticides cannot be used when alfalfa is in bloom. Read labels for instructions.					
Alfalfa Webworms, Garden Webworms					
	<i>Bacillus thuringiensis</i> (Bt)				
	DIPEL DF	0.5-1 lb.	7-14 billion	0	Most formulations of Bt are approved for organic production.
	Other trade names ²		CLU		
	beta-cyfluthrin				
	BAYTHROID XL	1.6-2.8 fl.oz.	0.0125-0.022	7	Baythroid XL is a RESTRICTED USE pesticide.
	carbaryl				
	SEVIN XLR PLUS	1-1.5 qt.	1-1.5	7	
	Other trade names ²				
	chlorpyrifos + gamma-cyhalothrin				
	COBALT	13-26 fl.oz.	0.25-0.51 + 0.004-0.009	7-14 ¹	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin				
	TOMBSTONE	1.6-2.8 fl.oz.	0.025-0.04	7	Tombstone is a RESTRICTED USE pesticide.
	Other trade names ²				
	gamma-cyhalothrin				
	DECLARE	0.77-1.28 fl.oz.	0.0075-0.0125	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
	lambda cyhalothrin ¹				
	KARATE with ZEON TECHNOLOGY	0.96-1.6 fl.oz.	0.015-0.025	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
	Other trade names ²				
	methoxyfenozide				
	INTREPID 2F	4-8 fl.oz.	0.06-0.12	7 (hay) 0 (grazing)	Use higher rate for heavier infestations.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.

² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Alfalfa Webworms, Garden Webworms (cont.)					
permethrin	POUNCE 25 WP Other trade names ²	3.2-12.8 oz.	0.05-0.2	0-14 ¹	All permethrin formulations are RESTRICTED USE pesticides.
zeta-cypermethrin	MUSTANG MAX 0.8E Other trade names ²	2.2-4 fl.oz.	0.014-0.025	3	Mustang Max is a RESTRICTED USE pesticide.
Alfalfa Weevils					
beta-cyfluthrin	BAYTHROID XL	1.6-2.8 fl.oz	0.0125-0.022	7	Baythroid XL is a RESTRICTED USE pesticide.
carbaryl	SEVIN XLR PLUS Other trade names ²	1.5 qt.	1.5	7	
chlorpyrifos	LORSBAN ADVANCED Other trade names ²	1-2 pt.	0.47-0.93	14-21 ¹	Use a minimum of 20 gallons per acre by ground. Lorsban Advanced is a RESTRICTED USE pesticide.
chlorpyrifos + gamma-cyhalothrin	COBALT	19-38 fl.oz.	0.37-0.74 + 0.007-0.013	7-21 ¹	Cobalt is a RESTRICTED USE pesticide.
cyfluthrin	TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	7	Tombstone is a RESTRICTED USE pesticide.
gamma-cyhalothrin	DECLARE	1.02-1.54 fl. oz.	0.01-0.015	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
indoxacarb	STEWARD EC	6.7-11.3 fl.oz.	0.065-0.11	7	Use 4 to 6.7 fluid ounces when 10 to 14 days of residual control are needed. Use 6.7 to 11.3 fluid ounces when longer residual control is needed.
lambda-cyhalothrin	KARATE with ZEON TECHNOLOGY Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
methomyl	LANNATE 2.4LV Other trade names ²	3 pt.	0.9	7	Lannate is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Alfalfa Weevils (cont.)					
permethrin	POUNCE 25WP Other trade names ²	6.4-12.8 oz.	0.1-0.2	0-14 ¹	FOR ROTATIONAL GRAZING: Use low rate for short-term weevil control when alfalfa is too short to graze. Graze as soon as possible for further weevil suppression. Pounce is a RESTRICTED USE pesticide.
phosmet	IMIDAN 70-W	1.0-1.33 lb.	0.7-1.0	7	
zeta-cypermethrin	MUSTANG MAX 0.8E Other trade names ²	2.2-4 fl.oz.	0.014-0.025	3	Mustang Max is a RESTRICTED USE pesticide.
Aphids					
chlorpyrifos	LORSBAN ADVANCED Other trade names ²	1-2 pt.	0.47-0.93	14-21 ¹	Lorsban 4E is a RESTRICTED USE pesticide.
chlorpyrifos + gamma-cyhalothrin	COBALT	13-26 fl.oz.	0.25-0.51 + 0.004-0.009	7-14 ¹	Cobalt is a RESTRICTED USE pesticide.
dimethoate	DIMETHOATE 4EC Other trade names ²	0.5-1 pt.	0.25-0.5	10	DO NOT apply more than once per cutting.
gamma-cyhalothrin	DECLARE	1.02-1.54 fl.oz.	0.01-0.015	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
lambda-cyhalothrin	KARATE with ZEON TECHNOLOGY Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
methomyl	LANNATE LV	1.5-3 pt.	0.45-0.9	7	Lannate is a RESTRICTED USE pesticide.
permethrin	POUNCE 25 WP Other trade names ²	3.2-12.8 oz.	0.05-0.2	0-14 ¹	Use higher rate for higher pest pressure or for longer residual. Pounce is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Armyworms, Corn Earworms, Fall Armyworms, Yellow-Striped Armyworms, Green Cloverworms					
<i>Bacillus thuringiensis</i>					
	DIPEL DF Other trade names ²	1-2 lb.	14-29 billion CLU	0	Treat to control small armyworms when populations are light and full coverage sprays are applied. For mature worms or heavy populations, a contact insecticide should be used to enhance control. Most formulations are approved for organic production.
beta-cyfluthrin	BAYTHROID XL	1.6-2.8 fl.oz.	0.0125-0.022	7	Baythroid XL is a RESTRICTED USE pesticide. Use on small larvae (1st-2nd instar).
cyfluthrin	TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	7	Tombstone is a RESTRICTED USE pesticide. Use on small larvae (1st-2nd instar).
chlorpyrifos + gamma-cyhalothrin	COBALT	19-38 fl.oz.	0.37-0.74 + 0.007-0.013	7-21 ¹	Cobalt is a RESTRICTED USE pesticide.
gamma-cyhalothrin	DECLARE	1.02-1.54 fl.oz.	0.01-0.015	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide. Use on small larvae (1st-2nd instar).
indoxacarb	STEWARD	6.7-11.3 fl.oz.	0.065-0.11	7	Use intermediate to higher rate on later instar larvae. One application per cutting.
lambda-cyhalothrin	KARATE with ZEON TECHNOLOGY Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide. Use the higher rate for large larvae.
methomyl	LANNATE 2.4LV Other trade names ²	1.5-3 pt.	0.45-0.9	7	Use higher rate for larger caterpillars or for beet armyworms. DO NOT apply to dormant or semi-dormant alfalfa when minimum daily temperature is 50°F or lower. Lannate is a RESTRICTED USE pesticide.
methoxyfenozide	INTREPID 2F	4-8 fl.oz.	0.06-0.12	7 (hay) 0 (grazing)	Use higher rater for heavier infestations.
zeta-cypermethrin	MUSTANG MAX 0.8E Other trade names ²	2.8-4 fl.oz.	0.07-0.025	3	Mustang Max is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Blister Beetles					
	carbaryl				
	SEVIN XLR PLUS	0.5-1 qt.	0.5-1	7	
	Other trade names ²				
	chlorpyrifos + gamma-cyhalothrin				Cobalt is a RESTRICTED USE pesticide.
	COBALT	19-38 fl.oz.	0.37-0.74 + 0.007-0.013	7-21 ¹	
	gamma-cyhalothrin				Declare is a RESTRICTED USE pesticide.
	DECLARE	1.02-1.54 fl.oz.	0.01-0.015	7 (hay) 1 (forage)	
	lambda-cyhalothrin				Karate is a RESTRICTED USE pesticide.
	KARATE with ZEON TECHNOLOGY	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	
	Other trade names ²				
Cutworms, Grubs, Wireworms					
	chlorpyrifos				FOR SUPPRESSION AT PLANTING: Apply as an in-furrow or a broadcast treatment and incorporate prior to planting.
	LORSBAN 15G	6.7 lb.	1	21	
	Other trade names ²				
Grasshoppers					
	beta-cyfluthrin				Baythroid XL is a RESTRICTED USE pesticide.
	BAYTHROID XL	2.0-2.8 fl.oz	0.0155-0.022	7	
	carbaryl				Use 1.25 to 1.875 pounds for mature grasshoppers or applications to dense foliage.
	SEVIN XLR PLUS	0.5-1.5 qt.	0.5-1.5	7	
	Other trade names ²				
	chlorpyrifos				Lorsban Advanced is a RESTRICTED USE pesticide.
	LORSBAN ADVANCED	0.5-1 pt.	0.235-0.47	7-14 ¹	
	Other trade names ²				
	chlorpyrifos + gamma-cyhalothrin				Cobalt is a RESTRICTED USE pesticide.
	COBALT	7-13 fl.oz.	0.14-0.25 + 0.002-0.004	7	

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.

² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Grasshoppers (cont.)					
cyfluthrin	TOMBSTONE Other trade names ²	2.8 fl.oz.	0.044	7	Tombstone is a RESTRICTED USE pesticide.
dimethoate	DIMETHOATE 4EC Other trade names ²	0.5-1 pt.	0.25-0.5	10	
gamma-cyhalothrin	DECLARE	1.02-1.54 fl.oz.	0.01-0.015	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
lambda cyhalothrin ¹	KARATE with ZEON TECHNOLOGY	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
phosmet	IMIDAN 70-W	1.0-1.33 lb.	0.7-1.0	7	
zeta-cypermethrin	MUSTANG MAX Other trade names ²	2.8-4 fl.oz.	0.018-0.025	3	Mustang Max is a RESTRICTED USE pesticide.
Imported Fire Ants					
s-methoprene	EXTINGUISH PROFESSIONAL ANT BAIT	1-1.5 lb.	0.005-0.0075	0	Broadcast the bait according to label directions.
Japanese Beetle Adults					
beta-cyfluthrin	BAYTHROID XL	1.6-2.8 fl.oz	0.0125-0.022	7	Baythroid XL is a RESTRICTED USE pesticide.
carbaryl	SEVIN XLR PLUS Other trade names ²	1 qt.	1	7	
chlorpyrifos + gamma-cyhalothrin	COBALT	13-26 fl.oz.	0.25-0.51 + 0.004-0.009	7-14 ¹	Cobalt is a RESTRICTED USE pesticide.
cyfluthrin	TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	7	Tombstone is a RESTRICTED USE pesticide.
gamma-cyhalothrin	DECLARE	1.02-1.54 fl. oz.	0.01-0.015	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Japanese Beetle Adults (cont.)					
	lambda-cyhalothrin KARATE with ZEON TECHNOLOGY Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
Potato Leafhoppers					
	beta-cyfluthrin BAYTHROID XL	0.8-1.6 fl.oz.	0.0065-0.0125	7	Baythroid XL is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1 qt.	1.0	7	Carbaryl may bleach tender foliage. DO NOT apply when crop is wet.
	chlorpyrifos LORSBAN ADVANCED Other trade names ²	0.5-1 pt.	0.235-0.47	7-14 ¹	Some phytotoxic symptoms may be observed on young, tender growth. Lorsban Advanced is a RESTRICTED USE pesticide.
	chlorpyrifos + gamma-cyhalothrin COBALT	7-13 fl.oz.	0.14-0.25 + 0.002-0.004	7	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	0.8-1.6 fl.oz.	0.013-0.025	7	Tombstone is a RESTRICTED USE pesticide.
	dimethoate DIMETHOATE 4EC Other trade names ²	0.5-1 pt.	0.25-0.5	10	
	gamma-cyhalothrin DECLARE	0.77-1.28 fl.oz.	0.0075-0.0125	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with ZEON TECHNOLOGY Other trade names ²	0.96-1.60 fl.oz.	0.015-0.025	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
	malathion MALATHION 5 Other trade names ²	1.5-2 pt.	0.94-1.25	7	
	permethrin POUNCE 25WP Other trade names ²	6.4-12.8 oz.	0.1-0.2	0-14 ¹	Pounce is a RESTRICTED USE pesticide.
	zeta-cypermethrin MUSTANG MAX 0.8E Other trade names ²	2.2-4 fl.oz.	0.014-0.025	3	Mustang Max is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.² See Table 3 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest	Comments
Three-Cornered Alfalfa Hoppers					
beta-cyfluthrin	BAYTHROID XL	1.6-2.8 fl.oz.	0.0125-0.022	7	Baythroid XL is a RESTRICTED USE pesticide.
carbaryl	SEVIN XLR PLUS Other trade names ²	1 qt.	1	7	
chlorpyrifos + gamma-cyhalothrin	COBALT	19-38 fl.oz.	0.37-0.74 + 0.007-0.013	7-21 ¹	Cobalt is a RESTRICTED USE pesticide.
cyfluthrin	TOMBSTONE	1.6-2.8 fl.oz.	0.025-0.044	7	Tombstone is a RESTRICTED USE pesticide.
gamma-cyhalothrin	DECLARE	0.77-1.28 fl.oz.	0.0075-0.0125	7 (hay) 1 (forage)	Declare is a RESTRICTED USE pesticide.
lambda-cyhalothrin	KARATE with ZEON TECHNOLOGY Other trade names ²	0.96-1.60 fl.oz.	0.015-0.025	7 (hay) 1 (forage)	Karate is a RESTRICTED USE pesticide.
zeta-cypermethrin	MUSTANG MAX 0.8E Other trade names ²	2.2-4 fl.oz.	0.014-0.025	3	Mustang Max is a RESTRICTED USE pesticide.

¹ See Table 3 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.

² See Table 3 for other trade names.

Table 3. Insecticides Labeled for Use on Alfalfa

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)
<i>Bacillus thuringiensis kurstaki</i>				
DIPEL DF (strain ABTS-351)	54%	dry flowable	4	0
DIPEL ES (strain ABTS-351)	23.7%	emulsifiable suspension	4	0
BIOBIT HP (strain ABTS-351)	58.2%	wettable powder	4	0
LEPINOX WDG (strain EG7826)	50.0%	water dispersible granule	12	0
JAVELIN WG (strain SA-11)	85%	water dispersible granule	4	0
CRYMAX WDG (strain EG7841)	40%	water dispersible granule	4	0
<i>Bacillus thuringiensis aizawai</i>				
AGREE WG (strain GC-91)	50%	water dispersible granule	4	0
XENTARI (strain ABTS-1857)	54%	dry flowable	4	0
beta-cyfluthrin				
BAYTHROID XL (Restricted Use)	1 lb./gal.	emulsifiable concentrate	12	7
carbaryl				
SEVIN 4F	4 lb./gal.	liquid suspension	12	7
SEVIN XLR PLUS	4 lb./gal.	liquid suspension	12	7
CARBARYL 4L	4 lb./gal.	liquid suspension	12	7
SEVIN 80 SOLUPAK	12.8 oz./lb.	wettable powder	12	7
SEVIN 80WSP	12.8 oz./lb.	water soluble packet	12	7
chlorpyrifos				
LORSBAN 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	7 (0.5 pt./A) 14 (1 pt./A) 21 (>1 pt./A)
LORSBAN ADVANCED (Restricted Use)	3.755 lb./gal.	emulsifiable concentrate	24	Same as above
GOVERN (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
HATCHET (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
CHLORPYRIFOS 4E AG (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
NUFOS 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
WARHAWK (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
WHIRLWIND (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
YUMA 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	Same as above
LORSBAN 75WG	12 oz./lb.	water dispersible granule	24	7 (0.33 lb./A) 14 (0.67 lb./A) 21 (>0.67 lb./A)
LORSBAN 15G	2.4 oz./lb.	granular	24	21
NUFOS 15G	2.4 oz./lb.	granular	24	21
SAURUS	2.4 oz./lb.	granular	24	21

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)
chlorpyrifos + gamma-cyhalathrin				
COBALT (Restricted Use)	2.5 lb./gal. + 0.045 lb./gal.	liquid	24	7 (≤ 13 fl.oz./A) 14 (13.1-26 fl.oz./A) 21 (>26 fl.oz./A)
cyfluthrin				
RENOUNCE 20WP (Restricted Use)	3.2 oz./lb.	wettable powder	12	7
TOMBSTONE (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	7
dimethoate				
DIMETHOATE 4E	4 lb./gal.	emulsifiable concentrate	48	10
DIMATE 4E	4 lb./gal.	emulsifiable concentrate	48	10
DIMATE 4EC	4 lb./gal.	emulsifiable concentrate	48	10
DIMETHOATE 400	4 lb./gal.	emulsifiable concentrate	48	10
DIMETHOATE 4EC	4 lb./gal.	emulsifiable concentrate	48	10
gamma-cyhalothrin				
PROAXIS (Restricted Use)	0.5 lb./gal.	microencapsulated suspension	24	7 (h), 1 (g)
DECLARE (Restricted Use)	1.25 lb./gal.	microencapsulated suspension	24	7 (h), 1 (g)
indoxacarb				
STEWARD EC	1.25 lb./gal.	emulsifiable concentrate	12	7
lambda-cyhalothrin				
KARATE with ZEON TECHNOLOGY (Restricted Use)	2.08 lb./gal.	capsule suspension	24	7 (h), 1 (g)
LAMBDASTAR 1CS (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	7 (h), 1 (g)
LAMBDA-T (Restricted Use)	1 lb./gal.	capsule suspension	24	7 (h), 1 (g)
SILENCER (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	7 (h), 1 (g)
TAIGA Z (Restricted Use)	1 lb./gal.	capsule suspension	24	7 (h), 1 (g)
GRIZZLY Z (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	7 (h), 1 (g)
LAMBDA-CY (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	7 (h), 1 (g)
KAISO 24WG (Restricted Use)	0.24 lb./1 lb.	wettable granule	24	7 (h), 1 (g)
malathion				
MALATHION 5	5 lb./gal.	emulsifiable concentrate	12	0
MALATHION 8	8 lb./gal.	emulsifiable concentrate	12	0
FYFANON	5 lb./gal.	emulsifiable concentrate	12	0

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest (h) or Grazing (g)
methomyl				
LANNATE LV (Restricted Use)	2.4 lb./gal.	water soluble liquid	48	7
LANNATE SP (Restricted Use)	14.4 oz./lb.	water soluble bags	48	7
methoxyfenozide				
INTREPID 2F	2.0 lb./gal.	liquid	4	7 (h), 0 (g)
permethrin				
AMBUSH 25 WP (Restricted Use)	4 oz./lb.	wettable powder	12	0 (≤ 0.1 lb.a.i./A) 14 (> 0.1 lb.a.i./A)
PERMETHRIN 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERM-UP 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
POUNCE 25 WP (Restricted Use)	4 oz./lb.	wettable powder	12	Same as above
ARCTIC 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERMETHRIN (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERMASTAR AG	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
phosmet				
IMIDAN 70-W	11.2 oz./lb.	wettable powder or water soluble bag	24	7
s-methoprene				
	0.08 oz./lb. (0.5%)	fire ant bait	4	0
zeta-cypermethrin				
MUSTANG MAX (Restricted Use)	0.8 lb./gal.	liquid	12	3
RESPECT (Restricted Use)	0.8 lb./gal.	liquid	12	3

Table 4. Properties of Insecticides Used on Alfalfa That May Affect Water Quality

Common Name	Soluble Runoff Potential	Adsorbed Runoff Potential ¹	Leaching Potential ²
<i>Bacillus thuringiensis</i>			
subsp. <i>kurstaki</i>	High	High	Low
subsp. <i>aizawai</i>	High	High	Low
beta-cyfluthrin	Low	Intermediate	Very low
carbaryl	Intermediate	Low	Low
carbofuran	High	Intermediate	High
chlorpyrifos	Low	Intermediate	Low
cyfluthrin	Low	Intermediate	Very low
dimethoate	Intermediate	Low	Intermediate
gamma-cyhalothrin	Low	Intermediate	Very low
indoxacarb	Intermediate	High	Low
lambda-cyhalothrin	Low	Intermediate	Very low
malathion	Low	Low	Low
methomyl	Intermediate	Low	High
methoxyfenozide	High	Intermediate	High
permethrin	Low	Intermediate	Very low
phosmet	Intermediate	Low	Low
zeta-cypermethrin	Low	Intermediate	Very low

¹ Adsorbed runoff potential indicates the tendency of the pesticide to move with sediment in runoff.

² The leaching potential indicates the tendency of a pesticide to move in solution with water and to leach below the root zone.

NOTE: Differences in formulations, application mode (e.g., bare ground versus crop canopy), and soil type will affect how these ratings are used. Read manufacturer's label carefully for specific information for all product use restrictions and safety.

SOURCE: Ratings are based primarily on information obtained from The Pesticide Properties Database, USDA, NRCS (<http://www.wsi.nrcs.usda.gov/products/W2Q/pest/data/AIDATA.xls>).

WEED CONTROL

Table 5. Alfalfa Weed Control

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preplant Incorporated		
BALAN 60DF (2 lb.)	benefin (1.2 lb.)	Controls many annual grasses and small-seeded broadleaf weeds such as pigweed and lambsquarter. Apply just prior to planting and incorporate thoroughly into the soil 2 to 3 inches deep within 8 hours of application. Usually less injurious on coarse soils.
EPTAM 7E (3.5 pt.)	EPTC (3 lb.)	Controls many annual grasses and small-seeded broadleaf weeds and suppresses nutsedge. Apply just prior to planting and incorporate 3 inches deep immediately after application (within 30 minutes). Some temporary injury to alfalfa seedlings should be expected if conditions for germination and growth are not optimum. Alfalfa is sensitive to soil residues of atrazine. DO NOT use EPTAM on alfalfa if atrazine was applied within the previous 12 months.
Postemergence (Seedling Alfalfa)		
BUTYRAC 200 2,4-DB 200 (1-3 qt.) or BUTOXONE 7500 (1.33-2 lb.)	2,4-DB (0.5-1.5 lb.) (1-1.5 lb.)	Controls many annual and some perennial broadleaf weeds. Does not control chickweed. Apply after alfalfa has three or more true leaves. Apply when weeds are no more than 3 inches tall and when temperature is 60°F or above. DO NOT graze seedling alfalfa or cut for hay within 60 days of application.
KERB 50W (1-1.5 lb.)	pronamide (0.5-0.75 lb.)	Controls chickweed, annual grasses, and other winter annuals. Apply to fall-seeded alfalfa when temperatures are less than 55°F after seedlings are beyond the first true leaf stage. DO NOT graze or harvest for forage within 120 days after application. Kerb is a RESTRICTED USE pesticide.
POAST 1.5 (1-1.5 pt.) or POAST PLUS 1.0 (1.5-2.25 pt.) + Crop Oil Concentrate (2 pt.)	sethoxydim (0.19-0.28 lb.) + crop oil concentrate	Apply over-the-top of alfalfa for control of annual and perennial grasses. Annual grasses should be treated when they are 4 to 8 inches tall except for crabgrass and goosegrass which should be treated before reaching 4 inches. Johnsongrass should be 15 to 20 inches for Poast application. Use the low rate for annual grass control and the high rate for johnsongrass control. A second application may be necessary if regrowth of perennial grasses occurs. Use a minimum of 10 gallons of spray mix per acre and 40-psi nozzle pressure to ensure thorough spray coverage. DO NOT apply with any other pesticide. DO NOT graze treated areas within 7 days of treatment and DO NOT harvest for hay within 14 days of treatment. DO NOT use more than 6.5 pints of Poast or 9.75 pints of Poast Plus per acre per season. Poast does not control sedges (nutgrass).

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (Seedling Alfalfa) (cont.)		
PURSUIT 70DG (1.08-2.16 oz.) or PURSUIT 2EC (3-6 oz.) + Crop Oil Concentrate (1.25 gal./100 gal. spray mix) or Non-ionic Surfactant (2 pt./100 gal. spray mix)	imazethapyr (0.047-0.094 lb.) + crop oil concentrate or non-ionic surfactant	Apply when seedling alfalfa is in the second trifoliate leaf stage or larger when weeds are 1 to 3 inches tall. There may be temporary discoloration of seedling alfalfa. Add liquid fertilizer (28% N, 32% N, or 10-34-0) at 1 to 2 quarts per acre or spray grade ammonium sulfate at 2.5 pounds per acre to the spray mix. DO NOT feed, graze, or harvest hay for 30 days after application.
RAPTOR (4-6 fl.oz.) + Non-ionic Surfactant (2 pt./100 gal. spray mix) or Crop Oil Concentrate (1 gal./100 gal. spray mix)	imazamox (0.031-0.047 lb.) + non-ionic surfactant or crop oil concentrate	Apply when seedling alfalfa is in the second trifoliate leaf stage or larger and when weeds are 1 to 3 inches tall. A temporary growth reduction may occur after application. A maximum total of 6 fluid ounces per acre may be applied per season. Always add a non-ionic surfactant or crop oil concentrate to the spray mix.
SELECT 2EC (6-8 fl.oz.) + Crop Oil Concentrate (1 qt.)	clethodim (0.09-0.125 lb.) + crop oil concentrate	Apply over-the-top of seedling alfalfa to control many actively growing annual grasses. DO NOT apply within 15 days of grazing, feeding, or harvesting for hay. DO NOT plant rotational crops within 30 days of application. DO NOT apply 2,4-DB as a tank mix with Select unless a 60-day harvest restriction can be observed. Always add a crop oil concentrate to spray mix.
Preemergence (Established Alfalfa)		
SOLICAM DF (1.25-2.5 lb.)	norflurazon (1-2 lb.)	Apply to established alfalfa in spring or early fall for the control of annual grasses and broadleaf weeds such as crabgrass, teaweed, and tropic croton. Apply to actively growing alfalfa following hay removal to ensure good spray coverage on soil surface. DO NOT apply to seedling alfalfa earlier than 5 months after emergence. DO NOT apply within 28 days of harvest. Use low rate on sandy-textured soils.
Postemergence (Established Alfalfa)		
BUTYRAC 200 2,4-DB 200 (2-3 qt.) or BUTOXONE 7500 (1.33-2 lb.)	2,4-DB (1-1.5 lb.) (1-1.5 lb.)	Controls many annual and some perennial broadleaf weeds. Does not control chickweed. Apply when weeds are no more than 3 inches tall and when temperature is 60°F or above. DO NOT graze established alfalfa or hay from treated established alfalfa to livestock within 30 days of application.
FIRESTORM 3 (0.7 pt.) or GRAMOXONE INTEON 2 (1 pt.) + Non-ionic Surfactant (1-2 pt./100 gal. spray mix)	paraquat (0.25 lb.) + non-ionic surfactant	Apply to established alfalfa stands at least 1 year old immediately after the alfalfa has been removed for hay or silage. DO NOT treat later than 5 days after cutting and DO NOT graze or cut within 30 days of application. Apply to small weeds using a minimum of 10 gallons of water per acre. Paraquat is a RESTRICTED USE pesticide.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (Established Alfalfa) (cont.)		
KERB 50W (1-1.5 lb.)	pronamide (0.5-0.75 lb.)	Controls chickweed, annual grasses, and other winter annuals. Make application in fall after last cutting when day temperatures are less than 55°F. DO NOT graze or harvest for forage within 120 days after application. DO NOT tank-mix with other herbicides. Kerb is a RESTRICTED USE pesticide.
POAST 1.5 (1-1.5 pt.) or POAST PLUS 1.0 (1.5-2.25 pt.) + Crop Oil Concentrate (2 pt.)	sethoxydim (0.19-0.28 lb.) + crop oil concentrate	Apply over-the-top of alfalfa for control of annual and perennial grasses. Annual grasses should be treated when they are 4 to 8 inches tall except for crabgrass and goosegrass which should be treated before reaching 4 inches. Johnsongrass should be 15 to 20 inches for Poast application. Use the low rate for annual grass control and the high rate for johnsongrass control. A second application may be necessary if regrowth of perennial grasses occurs. Use a minimum of 10 gallons of spray mix per acre and 40-psi nozzle pressure to ensure thorough spray coverage. DO NOT apply with any other pesticide. DO NOT graze treated areas within 7 days of treatment and DO NOT harvest for hay within 14 days of treatment. DO NOT use more than 6.5 pints of Poast or 9.75 pints of Poast Plus per acre per season. Poast does not control sedges (nutgrass).
PURSUIT 70DG (1.08-2.16 oz.) or PURSUIT 2EC (3-6 fl.oz.) + Crop Oil Concentrate (1.25 gal./100 gal. spray mix) or Non-ionic Surfactant (2 pt./100 gal. spray mix)	imazethapyr (0.047-0.063 lb.) + crop oil concentrate or non-ionic surfactant	Apply in the fall or spring to dormant or semi-dormant (less than 3 inches new growth) established alfalfa or between cuttings. Spray must contact target weeds. DO NOT apply more than 6 fluid ounces per acre per year. DO NOT replant alfalfa for 4 months after last application. See label for other recropping time intervals. DO NOT feed, graze, or harvest alfalfa for 30 days after application.
RAPTOR (4-6 fl.oz.) + Non-ionic Surfactant (2 pt./100 gal. spray mix) or Crop Oil Concentrate (1 gal./100 gal. spray mix)	imazamox (0.031-0.047 lb.) + non-ionic surfactant or crop oil concentrate	Apply to established alfalfa in the fall or in the spring to dormant or semi-dormant alfalfa. Spring treatment should be made when alfalfa has less than 3 inches of new growth. Apply when weeds are 1 to 3 inches tall. A temporary growth reduction may occur following application. DO NOT feed, graze, or harvest alfalfa for 20 days after application. DO NOT apply more than 6 fluid ounces of Raptor per season. Always add a non-ionic surfactant or crop oil concentrate to the spray mix.
SELECT 2EC (10 fl.oz.) + Crop Oil Concentrate (1 qt.)	clethodim (0.16 lb.) + crop oil concentrate	Apply over-the-top of established alfalfa to control actively growing annual grasses. Can be tank mixed with 2,4-DB to broaden spectrum of weeds controlled. See additional remarks for Select under Seedling Alfalfa section. DO NOT graze or harvest for hay for 15 days after treatment.
METRI 4F (1 pt.) or METRIBUZIN 75DF (0.67 lb.)	metribuzin (0.5 lb.)	Controls small winter weeds and provides preemergence control of small-seeded grass and broadleaf weeds. Apply in fall after plants are FULLY DORMANT . DO NOT graze within 28 days after application. In alfalfa-grass mixtures, will provide partial reduction of forage grass stands. DO NOT use on sand or on soils with less than 0.5 percent organic matter. DO NOT apply within 12 months after seeding.

Table 6. Properties of Herbicides Used on Alfalfa That May Affect Water Quality ¹

	HERBICIDES							
	Balan	Butyrac	Eptam	Firestorm, Gramoxone	Kerb	Poast, Select	Pursuit	Sencor
Surface-Loss Potential²	M	S	M	S	L	S	---	M
Leaching Potential³	S	M	M	S	S	S	---	M

¹ Leaching and surface-loss potential ratings are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO RATINGS: S = Small; M = Medium; L = Large.

Weed Control section prepared by John W. Everest, Professor Emeritus, Agronomy and Soils, Auburn University.

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For more information, call your county Extension office. It is listed in your telephone directory under your county's name.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

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