CONTROLLING WEEDS IN GRASS HAY AND ALFALFA-GRASS MIXTURES

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ABSTRACT

High quality grass and alfalfa/grass mixtures are increasingly popular in the Western U.S. due to an expanding horse-hay market that often prefers these hays over pure alfalfa. To produce the premium hay desired by horse owners requires excellent weed control. A dense, vigorous stand competes well with weeds, so in most cases, weed problems in grass and alfalfa/grass are a result of a poor stand and/or improper irrigation, fertility, or harvest management. If these factors are not remedied, weed control methods are rarely successful. Many times, a combination of tillage and herbicides at planting reduces weed populations during crop establishment improving the stand density and vigor of the crop. Controlling perennial weeds before planting is extremely important since herbicide choice and rates are limited during the 1st year of the stand. In established stands, herbicides provide effective weed control. Several herbicides are labeled for use in grass hay for broadleaf weed control. These herbicides are best applied in spring, fall, or between cuttings when annual weeds are in the seedling stage. For control of most perennial weeds, target herbicide applications in late spring when they are flowering or in fall to new re-growth. Weed control in mixed alfalfa/grass stands is problematic, as the herbicides must be safe to both species. We conducted trials to evaluate weed control options in alfalfa/grass stands in cold-climate areas where the alfalfa goes dormant over the winter. Sencor DF at 0.5- 1.0 lb/A plus non-ionic surfactant applied in late fall provided effective weed control and excellent selectivity to alfalfa and orchardgrass. Pursuit plus methlyated seed oil applied shortly after green-up provided good control of emerged mustards and acceptable selectivity to both alfalfa and orchardgrass. Gramoxone applied shortly after green-up provided mediocre weed control and caused significant injury to orchardgrass. Currently, Sencor is the only one of these herbicides with specific label instructions for use in mixed alfalfa/grass stands.

Key Words: *Medicago sativa*, winter annual weeds, orchardgrass, tall fescue, crop establishment, established stands

INTRODUCTION

An integrated approach combining herbicides with sound farming practices is necessary for weed control in grass and alfalfa/grass hay. Good cultural practices (proper stand establishment, irrigation, fertility, and harvest management) promote a dense, vigorous crop that is able to suppress weeds preventing weed encroachment during the growing season. Although a healthy stand protects against most weed problems, weeds can become established during stand establishment, crop dormancy, or between cuttings. Because crop competition is minimal during these periods, herbicides are often needed to prevent weed establishment and assure a weed-free crop. Pre- and post-emergent herbicides are available for weed control in grass and alfalfa-grass.

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Herbicide selection, rate, and application timing frequently make the difference between success and failure. This paper discusses the effects of herbicides, rates, and herbicide application timing for weed control and crop safety in seedling and established grass and alfalfa/orchardgrass hay.

WEED CONTROL DURING GRASS ESTABLISHMENT

Weed management when establishing a new, grass-hay field starts with anticipating weed pressures and implementing aggressive weed control with tillage and/or herbicides before planting. Many times, effective weed control before planting dramatically improves stand establishment and limits weed populations throughout the life of the stand. A key to effective weed control before planting is triggering weeds to germinate before crop emergence. For fall plantings, pre-irrigating after seedbed preparation can trigger weeds near the soil surface to germinate. Then glyphosate (Roundup) can be applied immediately before planting to kill weed seedlings without further soil disturbance. For spring planting, preparing a seedbed in late fall or winter allows winter rains to firm up the seedbed and trigger weed germination before planting. Again, Roundup can be applied before planting to kill the new weeds while preserving soil moisture. Fall/winter tillage in combination with a spring application of glyphosate works especially well for controlling troublesome winter annual grasses such as cheatgrass, downy brome, winter cereals, and hare barley. After the grass crop emerges, several herbicides can be applied to control broadleaf weeds, but few herbicides are labeled for controlling grassy weeds. Most broadleaf herbicides are safe to use on seedlings after the grasses reach the 3-leaf stage. Always treat weeds as soon as possible after the 3-leaf stage to prevent excessive competition. In UC trials, 2,4-D, dicamba (Banvel), Buctril, Transline, and Milestone were safe on most perennial grasses when applied at the 3-leaf stage. See Tables 1 and 2 for more information of herbicides and rates used during establishment.

WEED CONTROL IN ESTABLISHED GRASS

If grass stands become patchy and depleted, re-seed to thicken the stand because weeds quickly invade bare areas in the field. Adequate nitrogen fertilizer throughout the growing season improves grass vigor helping to reduce weed problems. Besides increasing yield and forage quality, nitrogen speeds growth in the spring and between cuttings minimizing the chance for weed establishment. In most cases, herbicides offer an effective and undisruptive weed control option. Burning or harrowing can be used for early-season weed control, but results are typically mediocre. Burning destroys top growth, but several weeds including most grasses re-grow after the burn. Harrowing in late winter is effective at breaking up manure and can control some small broadleaf seedlings, but several weed species typically survive and thrive after harrowing. Additionally, soil disturbance from harrowing can foster subsequent weed germination if rain occurs shortly after treatment.

In general, herbicides work best when applied in spring to small actively growing annual and biennial weeds. At this time, weeds are susceptible to herbicides and the potential for crop injury is low. The best times to treat perennial weeds are in late spring when they are flowering or during the fall. Herbicide translocation to perennial roots is high at both application times. For more information on herbicides and weed susceptibility see Tables 1 and 2.

WEED CONTROL DURING ALFALFA/GRASS ESTABLISHMENT

Few herbicide options exist for weed control in alfalfa/grass. For this reason, cultural practices play an important role in minimizing weed competition during establishment. The most common method for establishing mixed alfalfa/grass stands is to overseed grass (typically orchardgrass) into a depleted alfalfa stand. This practice works best in older alfalfa stands—those with less than 5 plants per square foot. Overseeding methods vary between locations depending on environment and grower preference. There are three popular planting windows: in spring just as alfalfa breaks dormancy, in late summer after the second to last cutting of the year, and in early fall after the last cutting of the season. If weeds are present at planting, tillage or paraquat (Gramaxone) can be used to control weeds before seeding. Applying Gramoxone shortly before a spring seeding helps control winter annual weeds and suppresses spring alfalfa growth to allow time for grass establishment.

WEED CONTROL IN ESTABLISHED ALFALFA/GRASS

Alfalfa/grass is a very competitive crop, so a thick stand, proper irrigation, and adequate fertilization minimizes most weed problems. Crop safety is critical and difficult to achieve in alfalfa/grass mixtures because the herbicides must be safe to both species. Typically, a fall application of Sencor DF after crop dormancy at rates between 0.5 and 1.0 lb/A is the most effective control option for winter annual weeds. UC trials have shown Sencor is very effective at controlling winter annual mustards, downy brome, cheatgrass, and hare barley in alfalfa/orchardgrass. Sencor also caused minimal injury to alfalfa and orchardgrass at rates below 1.0 lb/A when applied in the fall. Do not apply Sencor after orchardgrass breaks dormancy! In UC trials, spring-applied Pursuit DG at 1.44 oz/A + non-ionic surfactant and ammonium sulfate at grass green-up provided effective control of winter annual mustards, but Pursuit does not have label instructions for use in alfalfa-grass mixtures.

Graxomone is another herbicide option for controlling winter annual weeds in alfalfa-grass. Gramoxone must be applied during crop dormancy to avoid crop injury. Gramoxone produced mediocre results in UC trials. If the orchardgrass or tall fescue has re-growth, Gramoxone causes unacceptable grass injury and decreases first-cutting yield. Weed control with Gramoxone has been variable. In some trials, Gramoxone provided good control, but in other trials, weeds re-grew the Gramoxone treatment or weeds emerged after the application resulting in unacceptable control.

See figures 1 and 2, for UC trial weed control and crop injury results using herbicides in established alfalfa/orchardgrass.

TABLE 1. WEED SUSCEPTIBILITY TO HERBICIDES LABELED FOR USE IN COOL-SEASON GRASS HAY

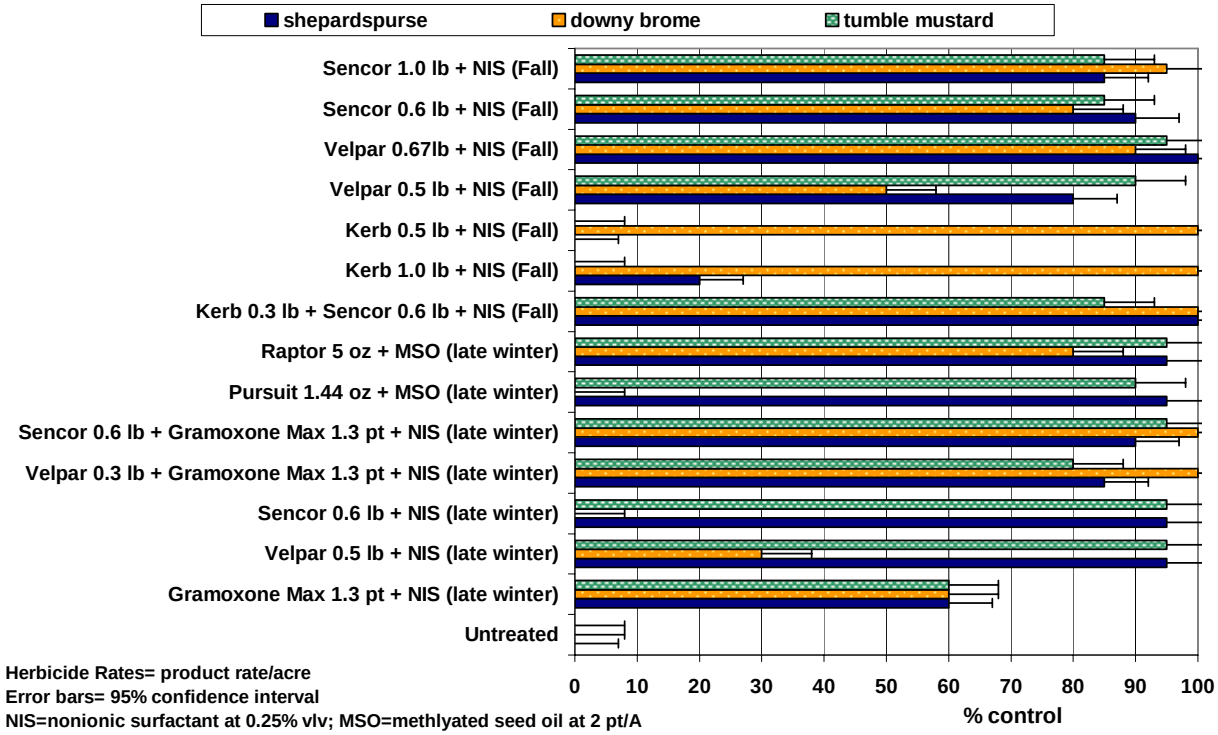
Control Ratings:[1] C = control P = partial control or suppression N = no control - = no information	aminopyralid	chlorsulfuron	clopyralid	2,4-D[2]	dicamba[3]	glyphosate[4]	imazapic[5]	MCPA	paraquat	triclopyr	triclopyr + clopyralid
bull thistle	C	C	C	C	C	C	C	P	P	C	C
bur buttercup	C	C	N	P	C	C	C	P	P	-	-
Canada thistle	C	C	C	P	C	C	P	P	N	P	C
cocklebur	C	C	C	C	C	C	C	C	C	-	C
curly dock	-	P	P	P	C	C	P	P	P	C	C
dalmation or yellow toadflax	N	P	N	N	N	P	C	N	N	N	N
diffuse knapweed	C	N	C	C	C	P	N	P	N	N	C
downy brome/cheatgrass	N	N	N	N	N	C	C	N	C	N	N
dyers woad	-	C	N	P	C	C	C	P	N	P	P
fiddleneck	C	C	N	P	C	C	C	P	P	-	-
field bindweed	N	N	N	P	P	P	P	N	N	P	P
filaree	-	-	P	C	C	C	C	P	P	P	P
hoary cress/whitetop	N	C	N	P	P	P	P	P	N	-	-
kochia	-	P	N	P	C	C	C	P	C	-	-
lambsquarter	C	C	N	C	C	C	C	C	C	C	C
medusahead	N	N	N	N	N	C	C	N	C	N	N
turkey mullein	-	C	N	P	P	P	N	N	P	-	-
musk thistle	C	C	C	C	C	C	C	P	P	-	C
perennial pepperweed	N	C	N	C	P	C	C	P	N	P	P
poison hemlock	-	C	N	C	C	C	C	C	N	-	-
poverty weed	-	-	N	P	C	N	-	-	N	-	-
prickly lettuce	-	C	P	C	C	C	N	C	P	C	C
puncturevine	-	C	N	C	C	C	C	C	P	-	-
ripgut brome	N	N	N	N	N	C	C	N	-	N	N
Russian knapweed	C	N	C	P	P	P	P	N	N	-	C
Russian thistle	-	C	N	C	C	C	C	P	C	P	-
sandbur	N	N	N	N	N	C	C	N	P	N	N
Scotch thistle	P	C	C	C	C	C	P	P	N	N	C
spotted knapweed	C	-	C	C	C	C	N	-	P	-	C
squarrose knapweed	C	-	C	C	C	C	N	-	P	-	C
mustards (annual)	N	C	N	C	C	C	C	C	P	-	-
tarweeds	-	C	-	C	C	C	-	C	P	-	-
yellow starthistle	C	P	C	C	C	C	N	P	C	P	C

[1] Herbicide control ratings assume herbicides are applied at the proper application time according to label instructions. Adding a non-ionic surfactant will often improve post-emergent control.
[2] 2,4-D ester or amine is an active ingredient in many products.
[3] Dicamba is the active ingredient in many products including Banvel, Clarity, and Vanquish.
[4] Glyphosate is the active ingredient in many products including Roundup.
[5] Imazapic is not labeled for use in CA.

TABLE 2. HERBICIDES LABELED FOR USE IN PASTURE AND GRASS HAY

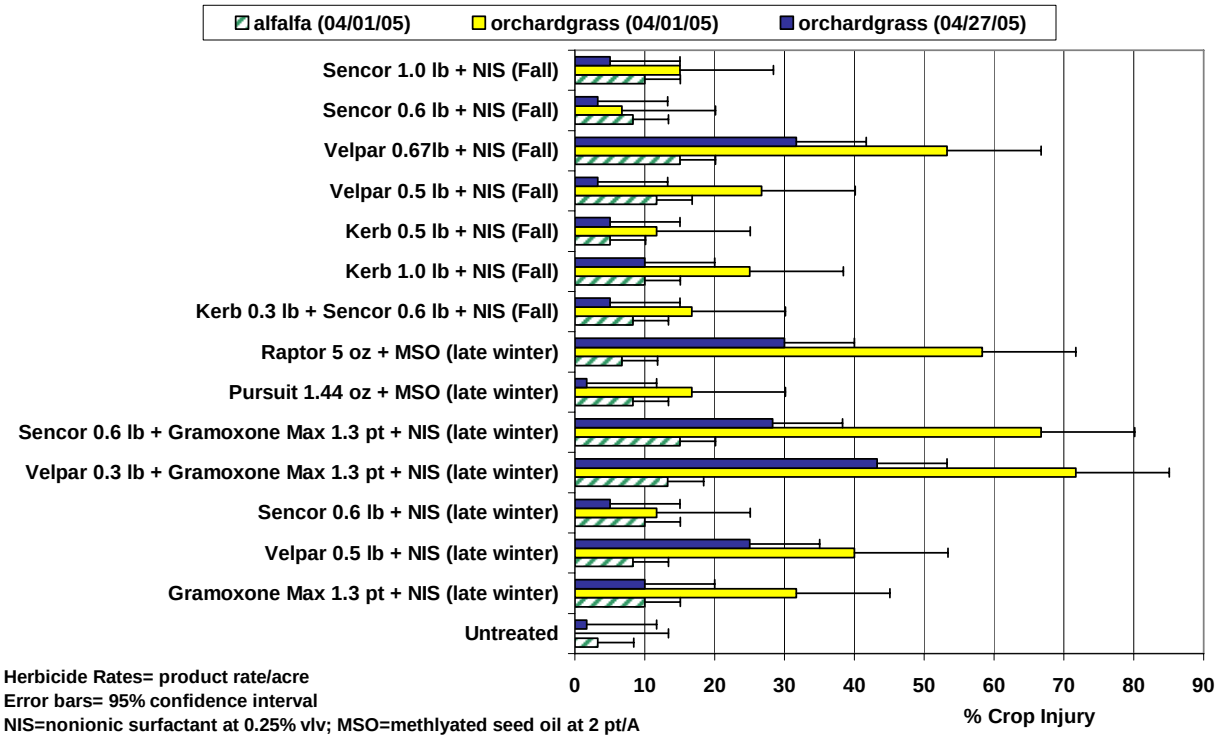
Herbicide Trade Name	**Product Rate/A**	**Labeled Sites**	**Use/Application Time**	**Remarks & Grazing Restrictions**
2,4-D ester or amine 2,4-D 4L	0.5-2.0 qt	pasture grass hay non-cropland	-seedling and established grass; use 1.0 pt/A rate on seedling grasses after 3-5 leaf stage	-read label for product rates since 2,4-D has many different formulations -do not graze for 7 days or hay for 30 days following treatment
aminopyralid Milestone	3.0-7.0 oz	pasture grass hay non-cropland	-established grass, but safe on several young grass species -provide excellent control of most thistles and knapweeds	-read label for rates -no grazing or hay restrictions
chlorsulfuron Telar	0.25-1.3 oz	non-cropland permanent pasture permanent grass hay	-pre and post- emergent weed control in established grass stands -read label for grass safety -persistent in high pH soils within low rainfall areas -not safe on tall fescue!	-no grazing or hay restrictions -provides good control of hoary cress, perennial pepperweed, and most mustards
clopyralid Transline	0.25-0.67 pt	pasture grass hay non-cropland	- weed control in seedling or established grass stands -provides good control of thistles	-no grazing restrictions -good treatment for thistles
Dicamba Banvel Clarity Vanquish	0.25-4.0 pt	pasture grass hay non-cropland	-seedling and established grass; use 0.5 pt/A rate on seedling grasses after 4-5 leaf stage	-add dicamba to 2,4-D for broad spectrum broadleaf control
glyphosate Roundup Glyfos Glyphomax	0.5-3.0 qt	pasture grass hay non-cropland	-weed control before or at planting -apply before desired plants emerge -use low rate for annual weeds and higher rates for perennials	-check label for grazing restriction -controls most **emerged** grass and broadleaf weeds
imazapic Plateau	2.0-12.0 oz	pasture grass hay non-cropland ***Not registered in CA***	-weed control in seedling or established pasture -controls both broadleaf and annual grass weeds	-do not hay for 7 days following treatment -selectively controls several annual grasses -poor control of thistles and most members of the sunflower family
MCPA	1.0-4.0 pt	pasture grass hay non-cropland	-weed control in established grass or grass/legume pastures	-do not hay or graze for 7 days following treatment -MCPA can injure legumes
paraquat Gramoxone-Max	0.8-1.5 pt	pasture grass hay alfalfa non-cropland	-weed control before or at planting -grass sod suppression for overseeding -winter annual grass control prior to grass/alfalfa green-up	-do not hay or graze for 30 days following treatment -controls **emerged** seedling weeds
triclopyr Remedy Garlon	0.5-1.5 qt	pasture grass hay non-cropland	-weed and brush control in established grasses	-read label for grazing restrictions
triclopyr + clopyralid Redeem R&P	1.5-4.0 pt	pasture grass hay non-cropland	-weed control in established grass -controls several perennial weeds	-do not hay for 7 days following treatment

Figure 1. Weed Control in Alfalfa and Orchardgrass at the Lassen site on April 27, 2005 (sandy loam soil)



Herbicide Rates= product rate/acre
Error bars= 95% confidence interval
NIS=nonionic surfactant at 0.25% v/v; MSO=methlyated seed oil at 2 pt/A
fall herbicide treatments were applied on 10/22/04; late winter herbicide treatments were applied on 03/03/05

Figure 2. Spring Herbicide Injury on Alfalfa and Orchardgrass at the Lassen site (sandy loam soil)



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