Weed Management in Intermountain Alfalfa and Grass Hay

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Forages, primarily alfalfa, grasses and mixed planting of alfalfa and grasses, are important crops in the intermountain area of Northern California occupying the majority of the irrigated acreage in the region. The intermountain alfalfa and grass hay production area is unique compared with other production areas in California. The growing season is shorter and cooler and the winter is much colder than in the Central Valley and desert areas of California. Therefore, alfalfa is typically only harvested three to four times per season and grass hay crops are cut three times. Hay destined for the dairy and horse markets must be nearly weed-free—a difficult accomplishment given the broad spectrum of weeds encountered in many fields.

The intermountain environment creates some unique weed control issues and challenges. The primary issues are the following: timing of herbicide application timing for winter annual weed control in established alfalfa, summer annual weed control, weed control in mixed stands of alfalfa and orchardgrass, and weed control in grass hay fields. Trials were conducted over the past several years in Siskiyou and Lassen Counties to address these issues.

Application Timing for Winter Annual Weed Control in Established Alfalfa

Unlike other areas of California, alfalfa in the intermountain area goes completely dormant over the winter and visible growth ceases for several months. During mid winter, frozen soil and/or snow can preclude herbicide applications. In late winter, inclement weather and windy conditions make herbicide applications difficult often delaying applications into early spring, mid- to late-March. The question arises as to whether it is better then to make applications in late fall, late winter or early spring. To evaluate which of the three timings is superior, a series of trials were established where herbicides were applied in November, January-February, or mid March. The herbicides evaluated in the fall timing included hexazinone (Velpar), diuron (Karmex), and metribuzin (Sencor). Those same herbicides plus a Karmex and Gramoxone tank mix were applied in late winter. The same herbicide applied in late winter were applied in early spring except an imazamox (Raptor) treatment replaced the Karmex alone treatment.

The late winter (late January-February) treatment timing generally provided the best weed control. Figure 1 shows the results for shepherdspurse, but other weeds responded similarly. The fall application may be less effective because at the rates tested the herbicides may not have enough soil residual to control late-emerging weeds, especially with the amount of

rainfall received in the years we conducted the study. Weed control with a March application was generally less than the late-winter application timing because by this time the weeds were larger and more difficult to control. Another problem with mid to late March applications is that oftentimes there is insufficient rainfall after application to incorporate the herbicides.

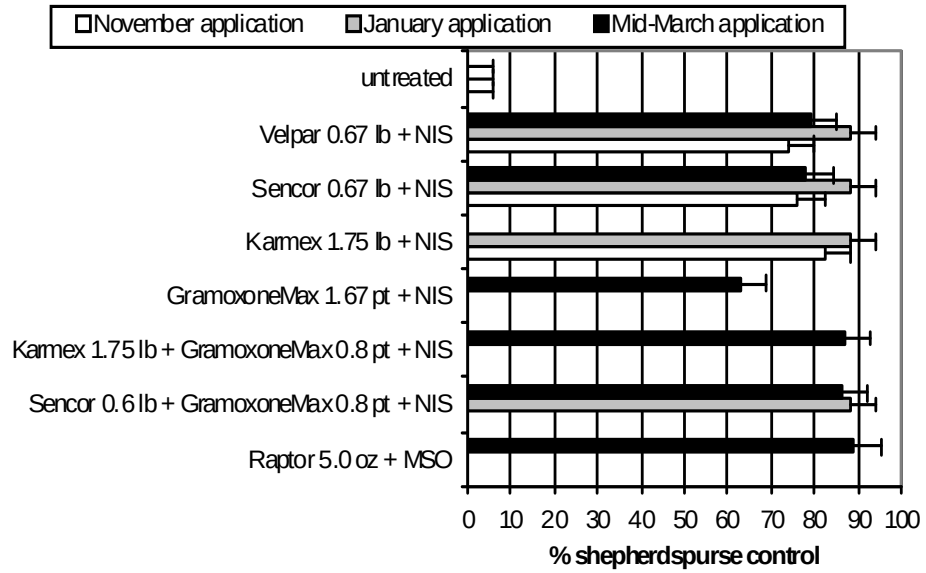

Figure 1. The effect of application timing on shepherdspurse control in established alfalfa.

Another major drawback of spring applications is that they are more injurious to the alfalfa. These studies demonstrated that late winter is the preferred herbicide application timing to maximize weed control while minimizing alfalfa injury.

Summer Annual Weed Control

Summer annual weeds (such as summer foxtails, lovegrass, and pigweed) can be problematic in established alfalfa fields in some areas of the Intermountain Region. This is especially the case in older fields where the alfalfa stand is less competitive with weeds. Alfalfa stand life in the intermountain area is longer than other areas in California—typically 5 to 7 years—due to the environment and lack of profitable rotation crops.

Trifluralin (Treflan) is often used to control summer annual grasses in established alfalfa. However, in the Intermountain area summer annual weeds only infest the second and third cuttings making it more difficult to justify the cost especially since Treflan granules require a separate application. Research was conducted during the 2007 growing season to evaluate the effectiveness of pendimethalin (Prowl H2o) for summer annual weed control. As a liquid, Prowl can be tank mixed with the standard herbicides used for winter annual weed control. A trial was

established where Prowl was tank mixed with Velpar, Sencor or Gramoxone at 1.9 or 3.8 pounds active ingredient per acre. Combining Prowl with the dormant herbicides resulted in a slight increase in the control of the winter annual weeds. This was surprising because the weeds were already emerged at the time of application and Prowl is generally not effective on the winter weed spectrum. Prowl provided effective control of the summer annual weeds (both green foxtail and pigweed). The higher rate was needed for near perfect control but this may have been due to the low alfalfa stand density in the trial affording little competition to the weeds. The overall most effective treatment for the control of both winter and summer annual weeds was a tank mix of Velpar and Prowl. These results are promising because they demonstrate that season-long control of both winter and summer annual weeds may be feasible with a single application of herbicides.

Weed Control in Mixed Stands of Alfalfa and Orchardgrass

Alfalfa/grass mixtures have become very popular in the Western U.S. due to a strong horse-hay market that often prefers mixed hay over pure alfalfa. Excellent weed control is needed to produce the quality of hay desired by horse owners. A dense vigorous stand competes well with weeds so in many cases weed problems in alfalfa/grass mixtures are the result of poor stand and/or improper irrigation, fertility, or harvest management. Alfalfa density thins in an aging stand and the grass component, typically orchardgrass, becomes more dominant. While a 50:50 mixture of alfalfa was considered optimum in the past, a higher proportion of grass has become acceptable, or even preferred, by some horse owners allowing growers to keep the stand in production longer. Weeds have become more of a problem in these older stands.

Weed control in mixed alfalfa/grass stands is challenging, as the herbicides must be safe to both species. Several herbicides including Velpar, Sencor, Gramoxone, Pursuit, Raptor and MCPA were evaluated in the Intermountain Region with two treatment timings (late-November to early December and early March). The most effective treatment was Sencor DF at 0.5- 1.0 lb/A plus non-ionic surfactant applied in late fall. This treatment provided excellent weed control and very little injury to either the alfalfa or the orchardgrass. Prior to conducting this research, it was thought that Gramoxone would be an effective treatment thinking that Gramoxone would only cause temporary “burn-back” of the orchardgrass and alfalfa foliage. However, it was found that Gramoxone alone or in combination with other herbicides was much more injurious to the orchardgrass than expected and caused yield reduction and even stand loss. In contrast to the results with pure alfalfa, a fall application to alfalfa/orchardgrass was preferred. The herbicides were more effective for grass control when applied pre-emergence and long soil residual was not as important as with pure alfalfa because the orchardgrass resumes growth earlier in the spring and shades the soil. Pursuit plus methlyated seed oil applied shortly after green-up provided good control of emerged mustards and excellent selectivity to both alfalfa and orchardgrass. Currently, Sencor is the only one of these herbicides with specific label instructions for use in mixed alfalfa/grass stands.

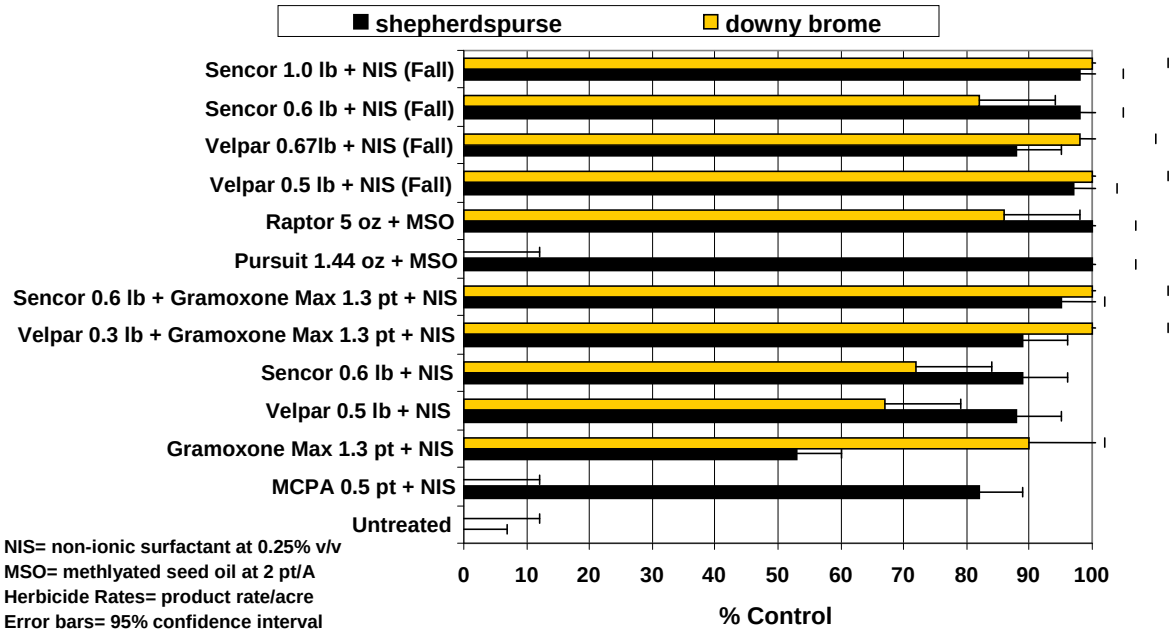

Figure 2. Shepherdspurse and downy brome control in alfalfa/orchardgrass with fall or early March herbicide applications (data combined over years and sites).

Weed Control in Grass Hay Fields

Pure grass hay has become very popular for the horse market. A dense vigorous stand of grass is an outstanding competitor with weeds. Adequate nitrogen fertilizer throughout the growing season improves grass vigor helping to reduce weed problems. Besides dramatically increasing yield and forage quality, nitrogen speeds growth in the spring and after cutting minimizing the chance for weed encroachment. If grass stands become patchy and depleted, reseed to thicken the stand because weeds quickly invade bare areas in the field.

Even with a good stand, herbicides are sometimes needed and they offer an effective and undisruptive weed control option. 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. Controlling grassy weeds in grass hay is far more problematic and current research is underway to evaluate potential herbicides and to determine their safety to different grass hay species.