

Management of Native Hay Meadows After Herbicide Treatment for Noxious Weeds

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In a recent article in this magazine, Earl Creech and his co-authors highlighted the importance of controlling noxious weeds as soon as they appear. Early control saves a substantial amount of time, funds and forage resources, which provides producers operational flexibility. Operational flexibility is essential to maintaining the long-term viability and success of ranches in the Great Basin. Having a flexible operation is the only way producers can successfully cope with the variable climate and forage resources of the Great Basin.

Native grass-hay meadows and pastures are an essential component of most Great Basin ranches. These areas, however, frequently become infested with noxious weeds. The first few weeds have little effect on hay production or quality. Left uncontrolled, the rapid spread of these weeds can cause significant declines in forage quantity and/or quality in the future. A decrease in the forage resource eventually reduces operational flexibility and the long-term stability and viability of the ranch.

The most commonly used tool for weed control is herbicides. Modern herbicides are powerful and quick acting so treated weeds will often show symptoms within a week and die shortly thereafter. The following spring, weed populations are often 85 to 95 percent smaller and it appears that the weed has become a thing of the past. But, have we successfully controlled the weed? Unfortunately, the answer is no.

After herbicides are successfully applied several conditions exist. First, there are large areas of bare ground and/or a thin stand of desired forage species. Russian knapweed, perennial pepperweed and other deep-rooted perennial species often form large patches that crowd out other species. As a result, when the weed is removed substantial amounts of bare ground are left. It may take several growing seasons or more for the residual forage species to fully occupy the treated areas. The actual rate will depend upon the size of the bare areas, the availability of irrigation water and the vigor of the remaining forage species. Drill-seeding barren areas with desired forage species can often help to speed the recovery process.

Second, large mature stands of deep-rooted perennial weeds are seldom fully controlled with one herbicide application. Most deep rooted perennial weeds have roots with many buds and some of the buds will survive and produce new shoots. Surviving roots probably are those furthest from the leaves where herbicide uptake occurs, which suggests the deeper roots have the best chance of surviving. If you have noticed substantially more new shoots from weeds the second year after treatment, these shoots are probably from deep roots. It just took a full growing season for their regrowth to reach the surface of the soil.

Third, once a weed has gone to seed the weed will be present for many years. Seeds from weeds are viable anywhere from several years to decades, depending upon the species. This fact alone tells us why producers must kill weeds as soon as they occur. Once seed is produced and dispersed, the weed will likely be a problem on the ranch for decades.

Abundant bare ground and weak stands of forage species creates the ideal environment for weeds to grow. Neither the surviving roots nor germinating seedlings face competition from desired plants. The lack of competition is a weed's best friend. That alone is why meadow and pasture management after weed control is important for the long-term success of both weed management and forage production.

All too often, producers think that once the drought breaks the forage plants will return and the weeds will die off. This seldom happens. After the initial weed control effort, the management of a meadow or pasture cannot be the same as before treatment occurred. Managers must ask the question, "Why did the weed problem begin?" Yes, a drought can affect our vegetation, but management of the vegetation, typically when and how often it is harvested, must be changed to accommodate the drought. Remember the flexibility concept: this is where it becomes critical. Producers cannot control the timing, duration, or intensity of a drought, but they can control how the vegetation is managed during and after a drought and/or other stress. If managers do not apply flexible management toward the desired forage species, so they can accommodate their natural stresses, the only outcome will be weak forage plants. Weak forage plants facilitate the establishment of weeds and continued improper management only facilitates more weeds.

Harvest of the forage species must be managed so these desirable species can increase their root biomass, tillers (stems) and leaf area. Grass plants are similar to cows. Both require stored energy reserves to be productive the following spring. For the cow, stored energy is essential for lactation and rebreeding. For a perennial forage plant, stored energy ensures the plant's very survival. The grass plant's leaves photosynthesize and produce carbohydrates. Most of the carbohydrates are used to produce leaves, stems and roots; but a small amount becomes stored energy. This energy is stored in plant buds, crowns and roots.

Stored energy has two important roles that are critical to a plant's survival (i.e., sustained forage production). First, pasture grasses typically are dormant for 6 to 9 months. Buds on dormant plants develop into the new leaves and roots the following spring. In order to survive dormancy, these buds use energy (a process called respiration). The energy for respiration comes from carbohydrates stored during the previous year.

Second, if the bud survives the winter it must use additional stored energy to produce the first two or three green leaves on a tiller. Inadequate stored energy for either process results in death of the bud and tiller and less forage. Only after the tiller produces two to three leaves is leaf area sufficient for photosynthesis to produce enough carbohydrates to meet the plant's needs for both growth (leaves for forage) and stored energy for the coming dormant period. Plants that are repeatedly harvested have insufficient leaf area to produce enough carbohydrates to keep all buds on the root crown alive. The result is fewer roots, smaller plants, more bare ground and ultimately many weeds. If harvest management before weed control weakened the desired forage plants, continuing the same management strategy after weed control will only guarantee that weeds will return.

Successful weed control management only begins with herbicide treatments. Perennial weeds with large, deep root systems will require annual follow-up treatment for several to many years. Furthermore, harvest management of the desired forage species must be changed to ensure that their physiological needs for growth and energy storage are met. Only then will the establishment and spread of noxious weeds be slowed to a manageable level.

Photo 1. This area is infested with Russian knapweed and was treated in October 2004. The bare areas are where the knapweed formed dense patches and eliminated all desired forage species. Grazing this pasture throughout the growing season the first spring after it was treated will prevent the residual forage species from colonizing the bare spots and thickening the weakly vegetated areas. Often, large barren areas like this one should be seeded to increase the rate of recovery of the desired vegetation. Without rapid re-establishment of desired forage species, the return of the Russian knapweed and/or other noxious weeds is inevitable.

