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Broadleaf Weed Management in Texas Rangelands

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General practices

Weed management on native rangeland is a common practice to increase grass production, control poisonous plants, control seedling brush species, and provide some level of brush suppression on mature brush species. Weed control with herbicides has been a common practice on rangelands since the introduction of 2,4-D in the 1940s. Modern selective herbicides allow land managers to target broadleaf plant species while allowing grasses to flourish due to reduced competition for water, nutrients, and sunlight. This publication describes the benefits, application practices, timing, weed control recommendations, and negatives of weed management in Texas rangeland.

Why control weeds on native rangelands?

Weed management on Texas rangelands can benefit the land manager, depending on the operation land manager's goals. Below are some of the benefits that weed control on native rangeland can provide.

Increased grass production

Resources needed for plant growth (water, nutrients, sunlight) are finite. Thus, more grass can be produced if broadleaf weeds are effectively controlled. The standard goal for weed control on native pastures is to grow an additional pound of grass for every pound of weeds controlled. While livestock do consume certain broadleaf plant species, you must also remember that 80 to 90 percent of a cow's diet consists of grass. Keep in mind that increased forage production received from weed control will depend on many factors such as soil type, precipitation, and grass species present at that site. On sites with shallow soils or during drought years, weed management efforts may be less advantageous and increased grass production may not occur.

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Maximize plant species diversity

One of the main advantages of native rangelands is plant diversity. High plant diversity is able to support more wildlife species while still providing forage for livestock. This is necessary, as differing plants mature and produce at various times throughout the year. Therefore, management often becomes beneficial when one or more species start to dominate an area, reducing the amount of other plants that can thrive. Many broadleaf weeds are extremely competitive and over time can decrease the number of grass species growing in your pasture. For example, common broomweed produces numerous seeds, which will remain viable for up to 10 years. Broomweed will dominate a pasture if left unchecked, decreasing production and diversity of grass species within the invaded area.

Rangeland Restoration

When rangeland has been poorly managed or overgrazed by livestock for some time, the remaining dominant plants will often be noxious and undesirable broadleaf weeds. "Nature abhors a vacuum." Thus, weeds invade and become established after desirable grasses have been overutilized. Annual species typically invade first, taking advantage of any bare or disturbed soil, followed by slower-growing perennial weeds and woody species. To encourage the plant community to return to grass production, it is often beneficial to control broadleaf weeds to reduce competition with the desirable grasses.

Brush Control/Suppression

A battle that many Texas land managers face is constant brush encroachment into open areas on rangeland. Some of our brush species, when mature, are susceptible to common weed herbicides, while other brush species will be suppressed or defoliated but not truly killed. If treated early enough, many brush species are quite susceptible to common broadleaf herbicides in the seedling stage. Often, general broadleaf weed treatments will not take a stand of mature brush and turn it into open pasture. They can, however, maintain open pasture and delay the encroachment of brush. This could be an added benefit if land managers are planning to treat pastures for weeds regularly.

Is it always practical to control weeds?

The location, topography, and surrounding vegetation may impact what can be done on a piece of land. For example, when a creek runs through a pasture, it may bring in new broadleaf weed seeds when it floods. In this case, regular, recurring management may be necessary to help eliminate weed problems. What about pastures with marsh-like spots that retain water for long periods? These poorly drained areas can be challenging to access with

Figure 1. A native pasture in Shackleford County, Texas. The right side (treated) of the picture is a healthy stand of little bluestem, and the left side (untreated) is dominated by common broomweed.

ground broadcast equipment. The use of different application methods, such as aerial application, may be required if weed control is desired. Another common problem is rough terrain that is difficult or impossible to drive over. In this case, the concern would be if these areas will provide enough forage to warrant weed management efforts.

When not to control weeds?

Native pasture weed control is not for every land manager. Some of the species commonly considered weeds are very beneficial to wildlife, especially when they exist within a diverse vegetative community. Some cases where land managers may not want to control broadleaf weeds are:

- Those who wish to manage for wildlife species such as dove, quail, and deer will find weeds and forbs beneficial as a source of food and cover.
- Those who are not trying to maximize forage production for livestock grazing.
- Large scale weed control may not be desirable for promoting a pollinator habitat. Treating in smaller patches and alternating years will ensure local pollinator plant species remain present.
- In areas where good grazing management has been practiced, and invasive broadleaf weeds are not a major concern.
- In areas with poor soil productivity, where increased grass production may not be probable.

General weed management practices

A common weed management practice on rangelands is the treatment of weeds during spring and early summer when they are small. By treating weeds before they get too large or too mature, you can often use lower herbicide rates and less expensive products, as these small weeds are easier to control. Additionally, the harmful impacts of weed competition with grass species are greatly reduced if weeds are controlled as early as possible.

Herbicide Resistance

While herbicide-resistant weeds have become a major issue in row crops, currently this is not a common problem in native pastures. While not impossible, it is unlikely that herbicide resistance will become an issue for pasture managers, as repeated herbicide use is much less prevalent than in row crops.

Timing of weed control on native rangelands

Many of the common broadleaf weeds on rangeland are annuals that are easier to treat in early spring when they are small. At this time, a lower rate of herbicide can be used to achieve a high rate of control. The longer you wait, the higher the application rate you will need to achieve the same level of control.

Special exceptions to spraying in spring for broadleaf weeds

- ***Broadcast spraying mesquite later in summer***

  If you plan to spray mesquite later in the year, you should not spray anything during the spring that would defoliate mesquite. When you spray for mesquite in the summer, you will also get weed control from the mesquite herbicide. Therefore, your weed control will be later in the year than it typically would as a byproduct of mesquite spraying.

- ***A heavy thistle population***

  Thistles are easier to control when treated in the rosette stage, when they are growing flat to the ground. Once they bolt or flower, they become harder to control, and higher rates of herbicide are needed. If you have a pasture that is filled with thistle, consider spraying in February or March when the thistles are still in the rosette stage.

You have many hard to kill perennial weeds

If you have a pasture with hard-to-kill weeds, such as silverleaf nightshade, horsenettle, or bull nettle, consider applying herbicide later in the growing season when plants are flowering. By applying herbicide at this time, plants will be most likely to transport herbicide down to the root. This will help maximize your chance of controlling these difficult species.

Choosing the Right Product

Determining the right herbicide to use when managing weeds on rangeland has many factors to be considered, such as primary target weed species, location of the area to be treated, local regulations, and timing of treatments.

Primary Target Weed Species

If your primary target weed is a hard-to-kill perennial, you should consider using an herbicide that contains active ingredients such as aminopyralid, picloram, or triclopyr. These ingredients tend to be stronger on these tough species.

Location of Area to be Treated

If the pasture you wish to treat is near a sensitive crop such as a cotton field, vineyard, or ornamentals, it is strongly recommended that you use herbicides that are low in volatility (such as amines or other salt formulations) instead of volatile ester formulations. These products will have less chance of moving off target as a vapor and causing damage to desirable plants. Regardless of the formulation used, spray drift is always a concern and should be managed appropriately if sensitive crops are nearby.

Local Regulations

In certain counties throughout Texas, there are regulations enforced by the Texas Department of Agriculture regarding when and what herbicides can be sprayed at certain times of the year. For a complete list of regulated herbicides and counties and to ensure you are in compliance, refer to the Texas Department of Agriculture website: http://www.texasagriculture.gov/RegulatoryPrograms/Pesticides/RegulatedHerbicides

Time of Treatment

When you treat may determine if you use a product with residual (soil) activity—one that would provide pre- and postemergence control. If you are spraying early in the season and know that more weeds will emerge later in the year, you should consider using an herbicide with residual soil activity which will continue to provide weed control after application. Time of treatment could also impact what rates of herbicides you would need to spray. Many of the common weeds on rangeland have a rate range listed on the label, but they can be controlled at the lower rates when treated while they are still small.

Residual Activity of Herbicides

In addition to controlling emerged weeds through foliar uptake (through the leaves), some herbicides can affect plant growth by remaining active in the soil. Some of these soil residual herbicides can control susceptible weeds before they emerge for many weeks after application. Picloram, aminopyralid, and metsulfuron-methyl are common active ingredients in many range and pasture herbicides that exhibit extended residual activity. If there are plans to convert rangeland or pasture to other uses (row crops, vegetables, ornamentals, etc.), the residual activity of any herbicides used in the past or planned to be used in the future must be considered as these may affect future plantings of certain plant species. Depending on the herbicide used, sensitive crops may not be able to be planted for months or even years until herbicide residues dissipate. Refer to the product label for information about residual activity, rotational restrictions, and how to conduct an adequately sensitive bioassay to ensure herbicide residues have dissipated.

Application methods on native rangeland

Aerial

Fixed-wing

Airplanes can carry large amounts of herbicide mix in their tanks and cover a large number of acres very quickly (Fig. 2). They will spray at a speed of 110-140 miles per hour. The highest maximum total spray volume is around 10 gallons per acre, which is fine when the typical weed spray gallons per acre is 2-4 GPA. Airplanes also will emit a small droplet size which will deliver better coverage. However, planes will need to ferry to and from an airstrip for reloading.

Figure 2. Airplane applying herbicide for mesquite control.

Rotary-wing

A helicopter can spray at speeds as low as 30 miles per hour, which also provides more flexibility in total spray volume and droplet size (Fig. 3). Due to their ability to fly more slowly, helicopters also have a greater ability to selectively treat areas of land while leaving other areas untreated.

Figure 3. Helicopter equipped for aerial application.

Ground Broadcast

Boom

Boom sprayers deliver a fine, uniform pattern of herbicide throughout the applied area. The standard height for boom sprayers is 12 to 24 inches above the top of their target weed and the nozzles on an 18- to 20-inch spacing. Boom sprayers are often challenging when trying to work in native pastures on uneven ground and in and around fences, trees, and brush. The primary benefit of a boom sprayer is that it provides the best spray coverage and uniformity of spray (Fig. 4). This is particularly important when spraying very small weeds or using non-translocated herbicides.

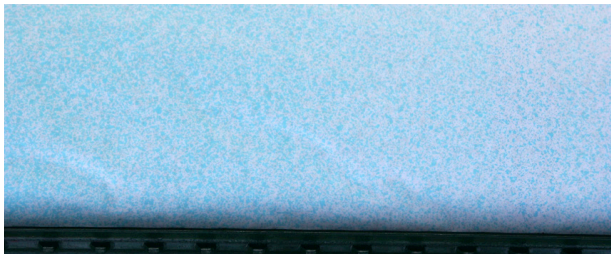

Figure 4. Boom sprayer pattern using a Teejet extended range (XR) flat fan nozzle at 10 gallons per acre. Small droplet size and very uniform distribution pattern.

Boomless

Boomless nozzles work well when spraying native pastures due to their ease of traveling on rough ground and around obstacles such as trees and fences. Common downfalls of boomless nozzles are uneven droplet size and variability in spray pattern (Fig. 5). Fine droplets are normally present near the nozzle, but larger droplets are necessary to extend the spray swath.

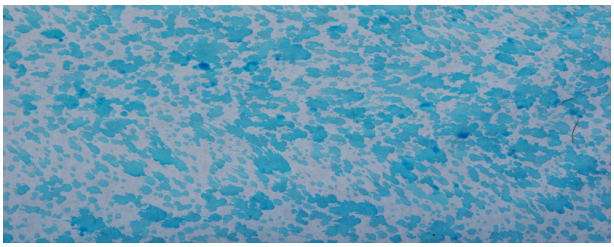

Figure 5. Boomless sprayer distribution pattern of a Boom Buster model 125 at 20 gallons per acre. Note the larger droplet size and uneven distribution.

Individual plant treatment

Individual plant treatments work well when you have a very low plant density or an isolated small population where you can spray each plant individually. This treatment method is ideal for removing unwanted plants and avoiding desirable plants you would like to keep. Treating individual plants can also be the best method when you have a small population of toxic plants or a few hard-to-control weeds. Individual plant treatments can be done using backpack sprayers, garden pump-up sprayers, hand wands connected to larger tanks on spray rigs, and various other sprayer types.

Table 1. Common range and pasture herbicides for broadleaf weed control*.

Trade Name	Active Ingredient(s)	Applicator License Required?	Common Uses and Notes‡
(several)	2,4-D†	yes	Annual broadleaf weeds. No residual activity.
Chaparral	aminopyralid + metsulfuron-methyl	no	Many annual and perennial broadleaf weeds, as well as thistles. Lengthy residual activity. Can be impregnated on and applied with dry fertilizer in TX.
Cimarron Max	metsulfuron-methyl + 2,4-D + dicamba	yes	Many annual and perennial broadleaf weeds, as well as thistles. Moderate residual activity.
Cimarron Plus	Metsulfuron-methyl + chlorsulfuron	no	Many annual and perennial broadleaf weeds. Very low use rates. Moderate residual activity.
Banvel, Clarity	dicamba	yes	Many annual and perennial broadleaf weeds. Short residual activity.
GrazonNext HL	aminopyralid + 2,4-D	yes	Many annual and perennial broadleaf weeds, as well as thistles. Lengthy residual activity. Can be impregnated on and applied with dry fertilizer in TX.
Grazon P+D	picloram + 2,4-D	yes	Many annual and perennial broadleaf weeds. Suppression of many brush species. Lengthy residual activity.
PastureGard HL	triclopyr + fluroxypyr	no	Many annual and perennial broadleaf weeds. Suppression of certain brush species. No residual activity.
Remedy Ultra, Garlon	triclopyr	no	Many annual and perennial broadleaf weeds. Control or suppression of certain brush species. No residual activity.
Surmount	picloram + fluroxypyr	yes	Many annual and perennial broadleaf weeds. Lengthy residual activity.
Tordon 22K	picloram	yes	Many annual and perennial broadleaf weeds. Control or suppression of many brush species. Lengthy residual activity.
Weedmaster	dicamba + 2,4-D	yes	Many annual and perennial broadleaf weeds. Short residual activity.

*Not an exhaustive list of available herbicides. For a more comprehensive list, refer to: ESC-046 "Quick Reference for Common Rangeland and Pasture Herbicides."
† Applications of 2,4-D-containing products may be subject to county regulations, check http://www.texasagriculture.gov/RegulatoryPrograms/Pesticides/RegulatedHerbicides/RegulatedHerbicidesCounties.aspx for more information.
‡ Refer to the herbicide product label for a detailed list of species controlled or suppressed.

Common Weeds that Occur on Texas Native Pastures

Common Broomweed

Thistle in rosette stage

Western Ragweed

Buffalo bur

Marshelder

Stand of mature woolly distaff thistle

Silver leaf nightshade

Carolina horsenettle

Bitter sneezeweed

Texas Croton

Annual Sunflower

Snow-on-the-Mountain

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