

## **Brush and Weed Control in Pasture and Rangeland**

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Rangeland, pasture, and hay meadows are often a diverse mix of both desirable and undesirable plant species. The definition of desirable is up to the owner or operator of the land. Whether a plant is considered a weed or not is often subjective and thus defined as a “plant out of place”. Although an integrated weed management approach (utilizing multiple methods of weed and brush control) should be taken to control or suppress any weed population, chemical weed control is often the most common method. **All persons using pesticides must read and follow all label directions before use.** The user of the pesticide is responsible for all instructions contained within the label. For additional information visit your local county Extension office.

**Livestock Utilization.** The common notion of the perfect forage for livestock being strictly grass is often short-sided and misunderstood. The fact is many broadleaf species are nutritious and highly sought after by livestock commonly produced in Kansas. Cattle in a native range may consume greater than 20% of their diet as palatable forbs (a herbaceous flowering plant other than grass) if available for grazing. In fact, many of the forb species are higher in quality than common forage grasses, especially later in the season when grass quality begins to decline. Other livestock such as sheep and goats consume a diet of plants considerably different than cattle. Sheep may consume greater than 50% of their diet as forbs while goats may consume most of their diet as plants other than grass. Therefore, proper plant identification is critical to avoid killing desirable forbs.

Native rangeland evolved to include fire in the system. It was because of fire that many of the woody species were often limited to low-lying or creek areas. The presence of trees along rivers and streams served several valuable roles including reduction of stream bank soil erosion, shade and weather protection for livestock, and cover for many wildlife species. When fire became less widespread, many invasive tree and brush species began to encroach on the grassland. Therefore management rather than elimination of the woody species will likely be the goal of many producers. If adequate establishment of grass is maintained, often times prescribed fires are the most important control methods producers can utilize to maintain healthy rangeland.

For tame forages such as tall fescue, smooth brome grass, or bermudagrass, interseeding of legumes to the existing grass is a recommended practice. Benefits from legume establishment include increased forage quality, increased forage quantity, extended grazing season when grass is low quality, and in the case of high entophyte tall fescue a dilution of the ergovaline toxin in livestock diets. Because legumes are broadleaf plants like many of the weeds producers intend to control with herbicides, herbicides available to kill weeds yet leave legumes unharmed are limited. One exception is annual lespedeza that is 6-inches or taller can tolerate moderate rates (0.5lb/acre active ingredient or less) of 2,4-D amine however weed control is generally limited to smaller annual or biannual weeds.

**Plant Lifecycle.** Plants will either be annual (complete its lifecycle in one growing season), biannual (complete its life cycle in two growing seasons), or perennial (the same plant regrows each year). Knowing the lifecycle of each weed is important when considering timing of chemical control. Annual weeds are most susceptible to herbicides at a small seedling stage. Biannual plants spend the first growing season in a vegetative stage and produce reproductive structures in the second seasons. Consequently, biannual plants are easiest to control in the first growing season or in the early vegetative stages of the second growing season. Perennial plant chemical control needs to be timed to coincide with translocation of carbohydrates to the roots. Timing with root translocation aids herbicide movement to the roots for a more effective kill of the perennial root system. Optimal translocation most often occurs when plants have “fully leafed out” or produced a significant vegetative growth. For summer species this stage is generally reached in late-May or mid-June depending on the plant species, spring weather, and region of Kansas. When perennial weeds reach 10 to 20” of growth, herbicide applications are often effective at killing the perennial root systems. Many brush species are best controlled in the month of June, however **buckbrush** is best controlled in early-May, while **blackberry** and **multiflora rose** are best controlled after late-May.

**Methods of Herbicide Applications.** Herbicides can be applied by various means, often specific to the size of the brush/weed, time of year, severity of brush/weed invasion, or the equipment available to make the application.

*Foliar Application.* Often chemicals are applied to the foliage when plants are fully leafed out. Herbicides are delivered as either a broadcast application (high concentrated herbicide spray solution applied over large areas) or as a spot spray application (diluted herbicide solution applied at high volume to individual plants). Either method is effective if applied correctly. Broadcast applications are often implemented for widespread brush/weed invasions while spot spray applications are used for small localized brush/weed invasions. Adequate spray coverage is critical to good brush/weed control regardless of spray method.

*Soil Application.* Some herbicides have efficacy both applied to the leaves of plant and the soil. Herbicides with soil activity are taken up by the roots, stolons, or rhizomes of plants and translocated to the active site for an effective kill. Soil applied herbicides can be in liquid, granular, or pellet form and should be applied to the soil on the upper slope above the brush/weed. Herbicides should be applied early in the growing season when root uptake is actively occurring. Herbicides should not be applied to saturated, snow-covered, or frozen soils.

*Basal Bark Application.* Many woody species can be effectively controlled with herbicide in the fall and winter months when applied to the bark at the base of the tree. Herbicide needs to be mixed in an oil-type carrier like diesel for better penetration across the bark to the cambium layer (living tissue that transports nutrients and water). The circumference of the tree should be liberally treated from the ground up to 12 to 18 inches. Applications work well from mid-summer to mid-winter. Do not treat when ground is saturated, snow-covered, or frozen.

Girdle Application. Trees can be cut an inch or two deep around the circumference of their trunk and treated with a herbicide mixture. The living cambium tissue is just inside the bark, so girdling itself will kill the tree, however herbicide treatment is needed to stop resprouts from occurring. Depending on the solubility of the herbicide, a mixture in either water or oil can be used for treatment of the girdled area. Applications should be made relatively soon after trees are girdled before the sap hardens and herbicide absorption is reduced. A safety advantage of girdling is less risk of injury from trees falling on the person cutting.

Cut Stump. Trees or brush can be cut at ground level and their stump treated with a herbicide mixture. Trees should be treated soon after cutting so the sap does not harden and herbicides are more readily absorbed. The most important area of the stump surface to treat is near the outside edge where the cambium layer is located. One exception to the cut stump/herbicide treatment is **red cedar** which not need to be treated with a herbicide if cut below the lowest green branch.

<b>Measurements and Conversions</b>	
1 Tablespoon = 3 teaspoons	1 quart = 2 pints
1 teaspoon = 5 millimeters or 5 cc	1 gallon = 128 ounces
1 Tablespoon = 15 millimeters or 15 cc	1 gallon = 8 pints
1 fluid ounce = 2 Tablespoons	1 gallon = 4 quarts
1 cup = 8 fluid ounces	1 pound = 16 ounces
1 pint = 16 fluid ounces	1 ounce = 28.4 grams
1 quart = 32 fluid ounces	1 acre = 43,560 ft <sup>2</sup>

**Basal Bark, Cut Stump, or Girdle Herbicide Treatments**

Herbicide	Related information	Species controlled
<p>Remedy Ultra</p> <p><i>Active ingredient: triclopyr</i></p>	<p>Dow AgroSciences</p> <p>For use in pasture, rangeland, and CRP</p> <p>No grazing restriction except lactating dairy animals</p> <p>Mix 1 part Remedy vol/vol to 3 parts oil carrier (i.e. diesel) and treat cambium layer of the surface of a cut stump or the basal bark of the lower 12 to 15 inches of base of the tree.</p>	<p>Hedge</p> <p>Cottonwood</p> <p>Elm</p> <p>Locust</p> <p>Oak</p> <p>Persimmon</p>
<p>Pathfinder II</p> <p><i>Active ingredient: triclopyr in a ready-to-use form</i></p>	<p>Dow AgroSciences</p> <p>For use in pasture, rangeland, forest, and non-cropland</p> <p>No grazing restriction except lactating dairy animals</p> <p>Controls susceptible woody plants less than 6 inches in diameter. Apply to cambium layer of cut stump surface or the basal bark of the lower 12 to 15 inches of the tree.</p>	<p>Hedge</p> <p>Locust</p> <p>American elm</p> <p>Oak</p> <p>Green ash</p> <p>Cottonwood</p> <p>Hackberry</p> <p>Persimmon</p>
<p>Tordon RTU</p> <p><i>Active ingredients: picloram, 2,4-D in a ready-to-use form</i></p>	<p>Dow AgroSciences</p> <p>For use in forest, and non-cropland</p> <p>Grazing is NOT allowed</p> <p>Apply to cambium layer of the cut stump surface or of the girdled area.</p>	<p>American elm</p> <p>Green ash</p> <p>Oak</p> <p>Persimmon</p>
<p>Milestone</p> <p><i>Active ingredient: aminopyralid</i></p>	<p>Dow AgroSciences</p> <p>For use in pasture, rangeland, CRP, and non-cropland</p> <p>No grazing restriction</p> <p>Apply Milestone as a 10% dilution vol/vol in water to fresh cut cambium layer after girdle or cut stump method.</p> <p>For basal bark applications, mix Milestone at 1 to 5% vol/vol in a commercially available basal diluent (Milestone is water soluble).</p> <p>Apply to susceptible trees from ground level to the lower 12 to 15 inches of the tree.</p>	<p>Locust</p>

<b>Foliar Herbicide Treatments</b>		
<b>Herbicide</b>	<b>Related information</b>	<b>Species controlled</b>
Remedy Ultra  <i>Active ingredient: triclopyr</i>	Dow AgroSciences Use in pasture, rangeland, and CRP No grazing restriction except lactating dairy animals <u>Broadcast spray:</u> 1 to 2 pt/acre <u>Spot spray:</u> 2 qt Remedy in 100 gal water	Hedge Elm Oak (check label) Persimmon Blackberry Multiflora rose Sumac Buckbrush
PastureGard HL  <i>Active ingredient: triclopyr and fluroxypyr</i>	Dow AgroSciences Use in pasture, rangeland, non-cropland, and CRP No grazing restriction except lactating dairy animals <u>Broadcast spray:</u> 1 to 4 pt/acre <u>Spot spray:</u> 2 to 4 qt PastureGard HL + 1 qt nonionic surfactant (NIS) in 100 gal water	Hedge Elm Hackberry Oak (check label) Persimmon Blackberry Multiflora rose Sumac Buckbrush
Tordon 22K  <i>Active ingredients: picloram</i>	Dow AgroSciences Use in pasture, rangeland, non-cropland, and CRP No grazing restriction except lactating dairy animals (Tordon 22K is a restricted use pesticide) <u>Broadcast spray:</u> 1 to 2 pt/acre <u>Spot spray:</u> 2 qt Tordon in 100 gal water	Locust Multiflora rose Sumac Buckbrush
Milestone  <i>Active ingredient: aminopyralid</i>	Dow AgroSciences Use in pasture, rangeland, CRP, and non-cropland No grazing restriction <u>Broadcast spray:</u> 7 floz/acre <u>Spot spray:</u> Milestone concentrations can vary, however do not exceed 7 floz/acre/year	Locust Buckbrush
Surmount  <i>Active ingredients: picloram and fluroxypyr</i>	Dow AgroSciences Use in pasture, rangeland, and CRP No grazing restriction except lactating dairy animals (Surmount is a restricted use pesticide) <u>Broadcast spray:</u> 3 to 6 pt/acre <u>Spot spray:</u> 1 to 2 gal Surmount + 1 to 2 qt NIS in 100 gal water	Roughleaf dogwood Hedge Locust Persimmon Blackberry Multiflora rose Sumac
Remedy + Tordon + 2,4-D  <i>Active ingredients: triclopyr, picloram, and 2,4-D</i>	Dow AgroSciences Use in pasture, rangeland, and CRP No grazing restriction except lactating dairy animals (Tordon is a restricted use pesticide) <u>Broadcast spray:</u> 1 pt Remedy + 1 pt Tordon + 1 qt 2,4-D per acre <u>Spot spray:</u> 2 qt Remedy + 2 qt Tordon + 2 qt 2,4-D + 2 qt NIS in 100 gal water	Hedge Locust Roughleaf dogwood Numerous other brush species

**Noxious Weeds.** There are several noxious weeds of Kansas that control is required by land owners. Kansas noxious weeds include: field bindweed, musk thistle, sericea lespedeza, Johnsongrass, Russian knapweed, hoary cress, Canada thistle, quackgrass, leafy spurge, kudzu, bur ragweed, and pignut.

Two additional plants, multiflora rose (*Rosa multiflora*) and bull thistle (*Cirsium vulgare*), can be placed on the county option for noxious weed control.

For more information please visit your local county Extension office. Additional control options are available in the KSU report of progress publication “*Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland*” SRP 1081 for additional control information. [www.ksre.ksu.edu/bookstore/pubs/srp1081.pdf](http://www.ksre.ksu.edu/bookstore/pubs/srp1081.pdf).

*Sericea lespedeza.* Sericea lespedeza is a perennial legume that is often a problem in pastures, rangelands, roadsides, and non-cropland in the eastern 1/3<sup>rd</sup> of Kansas. Although it is a legume but considered unpalatable, it will be consumed by cattle at a young stage of growth. As it matures, tannins accumulate in the leaves and it becomes less desirable. Sericea will compete with forage grass and forbs for space, light, water, and nutrients.

There are generally two times to effectively control sericea. The first is during summer when plants have reached 12 to 15” in height and initiates branching. The best control at this growth stage has been with products containing the active ingredient triclopyr (Remedy, Pastureguard, others). When conditions turn hot and dry, chemical application is discouraged. Generally August and September will bring cooler weather and rainfall and sericea will begin to bloom. It is at this stage which the use of products containing metsulfuron (Escort, Cimarron, Chaparral, others) are most effective.

<b>Sericea lespedeza herbicide control</b>		
Herbicide	Rate	Timing
Remedy <i>Or any product containing the active ingredient triclopyr</i>	<u>Broadcast spray:</u> - Remedy at 1.5 pt/acre <u>Spot spray:</u> (Remedy at 1% solution vol/vol) - 1 gal Remedy in 100 gal water or - 6.5 floz Remedy in 5 gal water	Summer (early-June to early-July) when plants are in the vegetative stage
Escort <i>Or any product containing the active ingredient metsulfuron</i>	<u>Broadcast spray:</u> - Escort at 0.5 oz/acre + nonionic surfactant (NIS) at 0.25% vol/vol <u>Spot spray:</u> - 1 oz Escort + 1 qt NIS in 100 gal water or - 1.5 grams Escort + 1.5 floz NIS in 5 gal water	Fall (mid-August to mid-September) when plants are in full bloom

Musk thistle. Musk thistle is primarily a biannual plant but can occur as a summer annual occasionally. Biannual musk thistle will spend the first season as a rosette and during the spring of the second growing season, it will begin to “bolt” or shoot a seed head with a pink flower. Musk thistle seed has a tuft of hair which aids in its wind-blown dispersal. Musk thistle is generally a problem in pastures, roadsides, and non-cropland areas.

Control of musk thistle is easiest when plants are in the rosette stage of growth. Many products can be used including 2,4-D at 1.5 lb a.i./acre, Grazon P+D at 32 floz/acre, Escort at 0.25 oz/acre, dicamba at 16 floz/acre, Chaparral at 2.5 oz/acre, or Milestone at 4 floz/acre. When plants begin to bolt in the spring, it is much harder to control. Bolted musk thistle control is best with Escort (metsulfuron), Milestone (aminopyralid), or Chaparral (metsulfuron + aminopyralid).

Johnsongrass. Johnsongrass is a perennial grass very prevalent in southeast Kansas. Plants are extremely competitive, tillering profusely, and produce large amounts of seed. Johnsongrass emerges in the spring as temperatures warm and initial tillers will often produce heads in late June or early July with additional tillers heading throughout the summer.

While Johnsongrass is a problem in crop production, it is consumed some in pastures and hay meadows. However, Johnsongrass can be a concern to livestock because it accumulates high levels of nitrates. In addition, Johnsongrass can be toxic to livestock if prussic acid is present in leaf tissue. Prussic acid is in high concentrations in fresh, young leaves and is more diluted as the leaf ages (generally >15 inch long leaves). If Johnsongrass is cut for hay the prussic acid is volatile and will usually disappear from the dried leaves before baled. Forages should be tested for both nitrates and prussic acid before animals have access to Johnsongrass.

Several herbicides control Johnsongrass including glyphosate at 0.75 lb a.i./acre, Plateau at 8 floz/acre, Pastora at 1 oz/acre, Outrider at 0.75 oz/acre, Oust XP at 6 oz/acre, and grass herbicides like Select at 8 floz/acre, Assure II at 12 floz/acre, and Fusilade at 12 floz/acre. Because Johnsongrass is a perennial plant, applications should be when plants reach 8 to 18” or near boot stage so herbicide can more readily translocated to the roots for improved control. Even with proper timing, the perennial plant may need several years of chemical applications before acceptable control is achieved.