

WEED AND BRUSH MANAGEMENT IN PASTURES: AN ESSENTIAL STEP IN GOOD FORAGE PRODUCTION

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Weed control is one of the most talked about concerns of livestock producers. Vegetation manipulation is the only practical way to increase forage for livestock and to improve wildlife habitat on some grasslands (Holechek et al., 2004) especially when land prices prohibit the acquisition of more acreage. Production of forage crops can be severely limited by a variety of pests. Producers will sometimes pay more attention to some pests than others and more so in some crops than others. For example, a producer may have a very low threshold for weed infestation in their corn or soybean field but will have a very high tolerance for weeds in their pastures. This is usually because the “direct” dollar value of the forage is not seen while we can “see” how a reduction in soybean or corn yield will affect the bottom line of our operation.

A weed is a plant that can be toxic or unpalatable to grazing animals, can compete with desirable plants for light, space, water and nutrients, is aesthetically unpleasing, or is declared as noxious by government authorities and must be controlled (Barnhart et al. 2005). Weeds reduce yield, forage quality, production efficiency (especially at grazing/harvest time) and can be toxic (eg black nightshade and Jimsonweed).

When forage production is limited and animals are hungry, they will eat plants that they would not otherwise eat. Some plants may also become more palatable at certain growth stages(young), after herbicide application, or if animals have access to wilted leaves (Ball et al. 2002). This does not imply that the plants have no inherent value. Species that are considered as weeds in production agriculture can be valuable as food for wildlife, ground cover, host biological organisms that may be beneficial, fix nitrogen in the soil, and may contain genetic information that can help to improve domesticated crops. Nevertheless, weeds tend to reduce the palatability, quality, quantity, and stand life of desirable forage crops (Green and Martin, 1998). Weeds usually grow very quickly and compete with cultivated crops for light, water, nutrients and space and may even be hosts for other harmful pests such as insects and diseases. Weedy plants, generally, are not high yielding and are not usually desirable by livestock or have high quality. Forage quality of weeds rapidly declines with maturity and weeds become completely unacceptable to livestock, thus leaving a visible weedy look to your pasture.

Weeds are “passive opportunists” that will fill the gap left by dead or overgrazed forage plants (Barnes et al. 2003) but some species can be very aggressive and choke out your desired forage. Therefore, it is important to consider implementing **appropriate** weed control strategies when needed.

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Weed control is an integral tool in an arsenal of management options that a producer should use to achieve the best possible, most productive, and efficient forage-livestock system. Weed control in forage stands should be a component of an overall management strategy that is directed toward increasing the vitality and productivity of the forage stand. Weed removal or suppression often results in increased productivity of forages as long as the weeds are replaced by the forage and not another weed.

Life cycle of weeds: Generally, weeds can be classified as; winter annuals, summer annuals, biennials, perennials. Management will vary depending on the life cycle of the weeds. Winter annuals such as buttercup, chickweed and henbit are often not noticed until we see their showy yellow or purple flowers in the field in later winter. At that time, they are very difficult to control with herbicides because they have passed the stage when they are most susceptible. ***Proper timing of herbicide application is crucial for success*** and should be based on weed stage of development, risk to nearby crops, and environmental conditions. Perennial weeds are usually actively storing carbohydrates in the roots or rhizomes (from which they can and will regrow or reproduce) during the fall to provide energy for over-wintering and regrowing the following spring. This is usually a great time to apply translocated herbicides that will enter the plant and move along with the food down to the roots to provide better control. More information on best time of control for annuals, biennials and perennials is presented later.

Competitiveness of weeds: Weeds are often very difficult to control because of their competitiveness. Think about the white clover or dandelion growing in your lawn that seems to spread and get stronger every time you mow (recall that white clover is extremely grazing tolerant) . Weeds tend to be very competitive with crop plants for the following reasons:

- Rapid canopy development
- Large leaves and/or rapid leaf development
- Early and rapid development of the root system and high nutrient uptake capacity
- Large number of seeds produced, often with a built in dormancy system and an effective seed dispersal mechanism eg cocklebur or sandbur
- Adaptive growth pattern; after frequent mowing, plant may begin growing close the ground
- Root secretion of allelopathic compounds that limit the growth and development of other plants

WEED MANAGEMENT STRATEGIES

As with disease and insect management strategies, it is prudent to use a variety of measures to be most successful. The common weed management strategies include:

Biological Methods: Biological control is more effective on some weeds than others. If you choose this option you should expect a delay in control as the control agent gets

established and multiplies. Contact your local extension offices for more information on bio control agents that are available in your area.

Cultural Methods: This includes the crop management decisions and practices that are employed in the production system. Examples include:

- **Variety selection:** Select certified, vigorous, adapted varieties that will grow quickly in the early season to provide competition against weeds.
- **Crop rotation:** Rotation crops with different lifecycles can help reduce weed pressure in a field. If you grow soybeans in the same field year after year, you will likely have some of the same weed problems every year. In forage production systems, yearly rotations do not normally occur but we may notice different weed problems if you go from a grass hayfield or pasture to an alfalfa hayfield or pasture and vice versa.
- **Use weed free seed:** Cheap seed may not be so cheap after all. Use certified seed that is free of noxious and other weeds. The seed label will provide information about the content of weed seed. You can visit http://invader.dbs.umt.edu/Noxious_Weeds/default.htm to find out what weeds are considered noxious weeds in your state.
- **Soil fertility:** Proper soil fertility that favors the crop will lead to faster growth and allow crops to compete better with weeds. Some weeds are also known to thrive under poor fertility, high or low pH situations.
- **Changing planting and harvesting date:** In some instances, crops will be able to germinate and grow earlier in the season than many weeds will. This early planting date will give crops an early start on the weeds. Keep in mind however, that some weeds are winter annuals and will be actively growing early in the spring if that is when you plan to plant your crop.
- **Field scouting:** It is a good practice to occasionally scout your fields for weed problems to aid in making management decisions. This can be done in conjunction with other activities such as moving cattle or fences, while putting out feed or minerals or while mowing. Once a weed problem is identified, whatever treatment option you choose, **DO NOT DELAY TREATMENT.** Delaying will only worsen the weed problem as the weed will likely get to a reproductive stage and reproduce.

Mechanical methods: Mechanical methods of weed control have been around for a long time and can be effective. They are even more effective when used in conjunction with other methods of control.

- **Tillage:** Tillage is not a viable option in forage production systems after establishment of the crop. Seeds can remain alive in the soil for decades and if the conditions are right they will germinate.

- **Mowing and clipping:** When weeds are mowed frequently it can deplete their food reserves in the root because they will not have enough time to replenish them before they are cut again. Low root reserves lead to slow growth and crops can then out-compete weeds. Some weeds can alter their growth habit if mowed frequently. For example, upright growing spiny amaranth or pigweed can change to a creeping growth habit if mowed frequently. Weeds subjected to mowing will speed up their growth and can accomplish seed production in a much shorter timeframe. The growth habit of some weeds makes them nearly impossible to control with moving, for example white clover. The creeping stolons grow so low to the ground that no mowing equipment can get to them. This is why within days after mowing your lawn you see those familiar white ball-like flower heads pop out of nowhere. It is this very characteristic that make white clover so tolerant to grazing.

Chemical methods: Depending on the complexity of the forage system that is in place, weed management can be simple or very complex. For example, if all your pastures are pure stands of grass, it is very easy to use a selective herbicide to control broadleaf weeds. However, when the situation in question involves legume-grass mixtures, it is not likely that you will successfully control broadleaf weeds without significantly injuring or killing your legumes. Any decision to use a herbicide should be prefaced by first determining which weeds are present in the area to be treated and the best time/stage to treat them. Table 1 shows a number of herbicides from different chemistry groups and modes of action that are registered for use in grasslands (Ross and Lembi 1999). Mode of action refers to the system, process, or tissue affected by the herbicides. A herbicide is usually selective only within certain rates, environmental conditions, and methods of application. Foliar-active herbicides are applied directly to the leaves or stems of plants where they are absorbed and translocated in the plant. For control of established weeds, including perennial plants, herbicides that are translocated within the plant prevent regrowth. These herbicides may or may not remain active once moved into the soil. Soil-active herbicides can provide control of germinating seed and may also be absorbed by the roots or inhibit root growth of established plants.

Plant response to herbicide treatment is typically dependent on the growth characteristics of the target plant (Sosebee, 1983). Annual plants are best treated with herbicide when actively growing and before changing from the vegetative to reproductive stage. Biennials should be treated when in the rosette stage of development. Simple perennial herbs and non-sprouting woody plants, perennial plants that reproduce solely by seed, are best treated during the late vegetative through flowering stages of development, but before fruit set. Creeping perennial herbs, plants that reproduce both by seed and vegetative means, should be treated after flowering and fruiting are complete or when carbohydrates within storage organs below-ground are being replenished. Herbicide effectiveness declines when vegetative growth ceases and reproduction begins. Sprouting woody plants, arguably the most difficult class of plants to control should be treated when energy reserves in the roots are being replenished and the herbicide can be translocated below-ground. Refer to **Table 2** for

recommendations for rate and timing for effective control of selected weeds with Milestone™, ForeFront™ R&P, Grazon® P+D, and Tordon® 22K.

Six tips for cost –effective weed control

- Identify the weed problem
- Use a calibrated sprayer
- Spray at the right time, at the right rate, with the right herbicide
- Recognize that drought stressed or mature weeds will be more difficult to control
- Follow label directions for mixing and application and proper use.

Table 1. Selected herbicides currently registered for use on rangeland and pastures.¹

Common name	Trade names	Plants controlled ²	Activity ³	Application timing ⁴
Dicamba	Banvel, Clarity	B	F, S	PRE, POST
Bromoxynil	Buctril	B	F	POST
Paraquat	Gramoxone	B, G	F	POST
Aminopyralid	Milestone®	B	F, S	PRE, POST
Imazapic	Plateau	B, G	F, S	PRE, POST
2,4-D	Weedone, 2,4-D LV4, etc.	B	F	POST
2,4-DB	Butyrac	B	F	POST
MCPA	Class, MCPA Amine/Ester	B	F	POST
Tebuthiuron	Spike® 20P	B, G	F, S	PRE, POST
Clopyralid	Stinger®	B	F, S	PRE, POST
Picloram	Tordon® 22K	B	F, S	PRE, POST
Triclopyr	Remedy® Ultra, Garlon	B	F	POST
Diflufenzopyr		B, G	F	POST
Metsulfuron	Ally, Escort	B, G	F, S	PRE, POST
Aminopyralid + 2,4-D	Forefront®	B	F, S	PRE, POST
Clopyralid + triclopyr	Redeem® R&P	B	F, S	POST
Picloram + 2,4-D	Grazon® P+D	B	F, S	POST
Triclopyr + fluroxypyr	PastureGard®	B	F	POST
Picloram + fluroxypyr	Surmount®	B	F, S	POST
Dicamba + Diflufenzopyr	Overdrive	B, G	F	POST
Metsulfuron + 2,4-D + Dicamba	Cimarron Max	B	F, S	POST
Glyphosate	Glyphomax®, Roundup®, etc.	B, G	F	POST

¹Adapted from Ross and Lembi 1999, common and chemical names from (Weed Science Society of America 2002). Refer to herbicide labels for specific information on how to use these and other herbicides. ²B = broadleaf & G = grass; ³F = foliar active & S = soil active; ⁴PRE = applied before plant emerges and POST = applied after plant emerges

Table 2. Recommendations for rate and timing for effective control of selected weeds. Dow AgroSciences Weed Control Fact sheet, 2006.

SPECIES	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV
Aster species: Yarrow, Heath Aster, others				2 pts ForeFront™ R&P or 4 pts Grazon® P+D							
Broom Snakeweed								1 pt Tordon® 22K or 4 pts Grazon			
Broomweed (Annual)				1.5 pts ForeFront or 2 pts Grazon							
Buffalobur					1.5 pts ForeFront or 2 - 4 pts Grazon						
Bull Nettle/Horse Nettle				1.5 pts ForeFront or 2 pts Grazon				Apply before flowering only			
Camphor Weed				1.5 pts ForeFront or 2 pts Grazon							
Chickory				2 pts ForeFront or 3 pts Grazon				Apply before flowering only			
Clover, Wild or Sweet				1.5 pts ForeFront or 2 pts Grazon							
Cocklebur				1.5 pts ForeFront or 2 pts Grazon				Must be emerged			
Curly Dock				2 pts ForeFront or 3 pts Grazon				Apply before flower stalk bolts			
Curly Cup Gumweed				1.5 pts ForeFront 2 pts Grazon							
Field Bindweed				1-2 pts Tordon + 2,4-D: minimum of 8-12 inch runners.							
Goldenrod				2 pts ForeFront or 3 pts Grazon							
Hemlock, Poison			2 - 3 pts Grazon								
Horseweed (Marestail)				1.5 pts ForeFront or 2 pts Grazon							
Ironweed				2 - 2.6 pts ForeFront or 3 pts Grazon after plant is 8" or taller				Do not apply after bud stage			
Leafy Spurge				2 pts Tordon and 1 lb, 2,4-D				2 pts Tordon and 1 lb, 2,4-			
Locoweed				3 pts Grazon							
Louisiana Wormwood				<6" use 1.5 pts ForeFront or 2 pts Grazon ≥6" use 2 pts ForeFront or 3pts Grazon							
Marijuana			1.5 pts ForeFront or 3 pts Grazon								

SPECIES	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Milkweeds					Generally not controlled							
Mullein, Common					2 pts ForeFront or 7 oz. Milestone™				In Rosette Only			
Nightshade, Silverleaf						2 - 4 pts Grazon						
Ox-eye Daisy				2 - 2.6 pts ForeFront								
Pigweed					1.5 pts ForeFront or 2 pts Grazon			Must be emerged				
Plains Larkspur				4 pts Grazon or 16 - 32 oz. Tordon 22K								
Prickly Lettuce			3 - 4 pts Surmount™									
Prickly Pear Cactus				4 pts Grazon or 4 pts Surmount								
Ragweed, Annual				1.5 pts ForeFront or 2 pts Grazon or 3 oz. Milestone								
Ragweed, Western				1.5 pts ForeFront or 2 pts Grazon before drought stress								
Ragweed, Lanceleaf				2 pts ForeFront or 3 pts Grazon								
Common Mugwort					4 pts Grazon							
Scurf Pea					2 pts Grazon							
Sericea Lespedeza					1.5 - 2 pts PastureGard®			Apply after 8-10 inches tall				
Smartweed				2 - 2.6 pts ForeFront 2 pts Grazon								
Snow-On-the-Mountain					3 pts Grazon need to be emerged							
Thistle, Bull			1.5 pts ForeFront or 3 pts Grazon or 3 - 5 oz. Milestone						12-16 oz. Tordon 22K or 3 - 5 ozs Milestone			
Thistle, Musk		1.5 - 2 pts ForeFront or 2 - 3 pts Grazon or 3 - 4 oz. Milestone							10 oz. Tordon 22K or 3 - 5 ozs Milestone			
Thistle, Wavy Leaf				1.5 pts ForeFront or 2 - 3 pts Grazon								
Thistle, Canada				2 - 2.6 pts ForeFront or 5 - 7 oz. Milestone Bolting - early bud				7 oz. Milestone before freeze				
Vervain				1.5 pts ForeFront or 2 pts Grazon								
Vetch					1.5 - 2 pts ForeFront 3 pts Grazon at bloom							
Teasel			2 - 2.5 ForeFront or 4 oz. Milestone			Apply in rosette						

BRUSH MANAGEMENT

Slowing the pace of brush encroachment into pastures is a challenge to land managers. A critical need is to determine what set of conditions or series of events are responsible for the invasion of pastures by woody species. Often the woody plant movement into pastures and subsequent expansion has been favored by overgrazing or neglect of a pasture. Overgrazing reduces vigor of forage species and decreases their ability to suppress encroaching woody species. Some characteristics are shared by woody species that can become weeds in pastures. These characteristics include: high seed production; seeds that persist in the soil for many years; ability to disperse over long distances; ability to resprout following top removal; tolerance to low levels of water or nutrients; and low palatability (Archer and Smeins, 1991).

Before a brush management strategy can be developed it is important to **assess the means of regeneration or reproduction**. Woody species can be classified as those that reproduce only by seed and those that reproduce by seed and vegetative propagation from buds located on the root or crown of the parent plant. Eastern redcedar is an example of a woody species that reproduces solely by seed. Once the main stem of eastern redcedar is removed the plant is dead. In contrast, when the main stem of honey locust is removed, buds located on the crown produce stems that enable the plant to persist.

Most woody species can be categorized as one of four growth types: (1) upright, single-stemmed trees; (2) bushes or trees with a creeping growth habit; (3) multi-stemmed bushes; and (4) those plants that grow as vines or canes (Scifres, 1980). Original-growth oaks, ashes, elms, honey locust, and osage orange are examples of single-stemmed upright growth forms. Wild plum, buckbrush, and dogwoods that possess multiple shoots arising from a spreading root system are examples of creeping growth habit. Multi-stemmed brush often results from a single-stemmed tree that was incompletely controlled in some manner. Finally, blackberry and multiflora rose are examples of plants that exhibit the vine type growth. Upon removal of the top of these plants new shoots may arise from the base of the plant located below-ground or new shoots can arise from cut stems, other wise known as canes, which are pressed into the ground and take root.

Brush Control Measures

As with herbaceous weeds, biological, mechanical, cultural, and chemical control measures are available to manage brush in pastures. The most promising measures to manage brush are herbicides. Specific recommendations for woody species are given in Table 5 on pages 11-12.

Herbicides can be broadcast applied aerially or by ground equipment. Where the targeted brush stands are tall and/or dense aerial application may be most suitable. Use of application technology that reduces drift potential is important. Spray volumes should

be no less than 5 gallons per acre. With ground spray equipment, keeping the spray boom as a low as possible without disrupting the desired spray pattern could reduce spray drift. Total spray delivery volume of 20 gallons per acre will also reduce drift potential and increase coverage of the targeted brush species.

Individual Plant Treatment Techniques: Individual plant treatment can be an efficient, cost-effective alternative to broadcast applications to control brush, shrubs, or vines. Individual plant treatments include spot applied concentrate, high volume foliar, low volume basal, and cut-stump applications.

Spot-applied concentrate. Soil-applied spot applications of Tordon® 22K can be used to control brush species including eastern redcedar and other junipers. Apply undiluted herbicide with a spot gun (or syringe), which automatically pre-measures the amount of herbicide. Apply to the soil inside the dripline in a ring around the plant. Rate of application is 3 to 4 ml of Tordon 22K per 3 feet of plant height and trees greater than 15 feet tall should not be treated. Application should precede periods of expected rainfall.

High volume foliar. The high-volume foliar technique is ideal for small trees, vines, bushes with canes or stems, such as multiflora rose, or low-growing shrubs like buckbrush. You can use Surmount®, Remedy Ultra and Grazon® P+D herbicides for excellent broad-spectrum brush and weed control. This is an ideal combination to clean up and maintain high-value fencerows and stop encroaching weeds and brush around pasture perimeters. Apply diluted herbicide directly to a target plant's foliage. Cover the entire plant. For large jobs, use a tractor-powered sprayer or other power equipment. For small jobs, use a pump-up or backpack sprayer. Coverage is critical to this method's effectiveness. The target plant should have healthy foliage as this is the means of entry into the plant for the herbicide. Insects, hail, freezing temperatures, drought, and other conditions that damage foliage may reduce control. For best results, spray after full leaf expansion when the plants are actively growing. Plants should be sprayed from both sides until dripping wet. To improve coverage, use 1 quart of an approved agricultural surfactant per 100 gallons of spray mix. If brush is too tall, use a basal treatment. The table below provides mixing ratios for smaller batches.

Table 3. High-Volume Foliar Tank-Mix Guide

Sprayer Size	Remedy	Grazon P+D	Surfactant
1 gallon	2 tsp	8 tsp	4 tsp
3 gallons	1 fl oz	4 fl oz	2 fl oz
5 gallons	1.6 fl oz	6.4 fl oz	3.2 fl oz
10 gallons	3.2 fl oz	12.8 fl oz	6.4 fl oz
14 gallons	4.5 fl oz	18 fl oz	9 fl oz
25 gallons	8 fl oz	2 pts	1 pt
100 gallons	1 qt	4 qts	2 qts

Low volume basal. This method uses a high percentage of herbicide, so less spray volume is needed than other forms of basal application. Generally, the mix ratios are 20-30% herbicide plus 70-80% basal oil (or diesel fuel). For a more convenient, no-mixing option, go with ready-to-use Remedy* RTU or Pathfinder II herbicides. Use low-volume basal applications to control woody species with trunks less than 6 inches in diameter at the base of the tree. Apply enough of the spray to wet the lower 15 to 20 inches of the trunk including the root collar area, but not to the point of runoff. Use this method any time of the year, except when snow or water prevents spraying to the groundline. The table below provides mixing ratios for the combination of Remedy Ultra plus basal/diesel oil for various sprayer sizes.

Table 4. Low-Volume Basal/Cut-Stump Tank-Mix Guide

Sprayer Size	25% Solution (25% Remedy Ultra + 75% Diesel Fuel/Fuel Oil)
1 gallon	1 qt Remedy Ultra + 3 qts diesel fuel/fuel oil
3 gallons	3 qts Remedy Ultra + 9 qts (2 gallons, 1 qt) diesel fuel/fuel oil
20 gallons	5 gallons Remedy Ultra + 15 gallons diesel fuel/fuel oil
50 gallons	12.5 gallons Remedy Ultra + 37.5 gallons diesel fuel/fuel oil

Cut-stump: Cooler weather and a lighter workload make the fall or winter a good time to control brush. Mechanically controlled brush quickly resprouts thicker and heartier than before. But you can kill the stump for good with Remedy® Ultra herbicide. Apply a solution of 25 % Remedy Ultra plus 75 % basal/diesel oil, or Pathfinder II straight out of the jug, to the freshly cut stump. Spray the sides of the stump and the outer portion of the cut surface, including the cambium ring along the inner bark. Thoroughly wet the stem and root collar area, but not to the point of runoff. Treat stumps any time of the year, as long as snow or water doesn't prevent proper application.

Table 5.

Application Rate (per acre or % v/v for spot spray) and Timing Recommendations for Brush Control

Generally speaking, brush control will always be better when foliar applications are made after mid June and are made prior to September 1. Application before Mid June can result in uneven control a year after treatment.

SPECIES	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Ash						4 pts Surmount™						
Beech						2 pts Remedy® Ultra + 1 lb 2,4-D or 4 pts Surmount						
Blackberry Brambles					4 pts Surmount or 2% spot spray Surmount		Apply at bottom or at fruit drop approximately 4 weeks after bloom					
Buckbrush				1 qt Grazon® + 1 lb 2,4-D before May 15 or 2 lb 2,4-D low-vol		Apply when Buckbrush has 6-8 inches of new growth						
Cottonwood						2-3 qts Grazon or 4 pts Surmount						
Dew Berries				2% spot spray Surmount		Apply at late bud through bloom						
Dogwood						4 pts Surmount						
Elderberry					1-2 pts Remedy Ultra + 1 lb 2,4-D							
American or Slippery Elms						4 pts Surmount; expect no more than 80% control						
Hackberry						4 pts Surmount						
Hawthorne						4 pts Surmount						
Hedge (Osage Orange)						1-2 pts Remedy Ultra, 2-3 pts PastureGard® or 4 pts Surmount						If multiple species such as hedge, locust, hackberry and multiflora rose, use Surmount at 4 pts
Honeysuckle						Basal bark: 1 part Remedy Ultra + 3 parts basal/crop oil						Foliar sprays are generally ineffective
Locust Honey and Black						3 qts Grazon or 4 pts Surmount						
Maple						1-2 pts Remedy Ultra + 1 lb 2,4-D						Maple Control is difficult with foliar sprays. Basal bark with Remedy Ultra for best control
Mulberry						3 qts Grazon or 4 pts Surmount						Mulberry can be controlled with a 2% Surmount spot spray
Multiflora Rose					4 pts Surmount or 1-1.5% spot spray							Only apply when plants have healthy leaf surfaces any time from budding - flowering. Delay treatment 9-12 months after mowing.
Oaks (Post)						1-2 qts Remedy Ultra						
Oaks (Blackjack)						2 qts Remedy Ultra						
Persimmon						4 pts Surmount						Difficult to control, expect 75-80%. Two consecutive years of treatment may be needed.
Poison Ivy					1% PastureGard foliar spot spray							

SPECIES	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
Red Cedar			Undiluted Tordon 22K soil applied at 2 ml/foot of tree height										
Russian Olive	Basal bark treatment with Remedy Ultra plus basal/crop oil (1 part Remedy Ultra plus 3 parts basal/crop oil)												
Sycamore						1-2 pts Remedy Ultra + 1 lb 2,4-D							
Sumac, Smooth					1-2 qts Grazon or 2-4 pts Surmount								
Sumac, Aromatic (Skunk Brush)					1.5 pts Remedy Ultra + 2 pts Grazon								
Trumpet Creeper					Basal Treatment 1 part Remedy Ultra plus 3 parts basal/crop oil								
Willow	Low-volume basal treatment using Remedy Ultra plus basal/crop oil					2 qts Grazon Suppression Only		Low-volume basal treatment using Remedy Ultra plus basal/crop oil					
Yucca	2 % Remedy Ultra in basal/crop oil (hand spot-treat)												

For pastures with a general mix of brush species under 10 ft tall use a tank mix of 1 pt of Remedy Ultra + 1 -2 qts of Grazon P+D or a single treatment of Surmount at 4 pints/acre.

For stands that are taller than 10 ft., use 1 qt of Remedy Ultra + 2 qts of Grazon P+D or a single treatment of 4 pints Surmount/acre.

Always use a drift control agent.

When treating brush keep in mind that certain species such as dogwood, oaks, elms, skunkbrush, persimmon and ash trees will all need some follow-up treatment in 1-2 years.

You also may use a spot spray rate of 1% Grazon, 1/2 % Remedy Ultra and 1/4% surfactant to treat fence rows and touch up treated areas. Or a 2% Surmount Spot treatment is an excellent choice.

For extremely overrun pastures consult you local Dow AgroSciences Range and Pasture representative for recommendations.

Use the higher end of the rate range when treating brush 10' or taller. Always use a drift agent, a surfactant and a minimum of 5 gallons/acre when applying by air. Some applications may require retreatment the following year.

Integrating biological, cultural, mechanical, and chemical control methods in the proper sequence and combination will improve the efficiency and effectiveness of weed management. Your best weapon against weeds is a vigorous stand of productive forage. It is important to note that chemical weed control is a tool that should be used when the situation warrants and it is not as an answer for all situations. Weaknesses in pasture management strategies must be identified before long-term improvements can be made following weed control. Adjustments in management practices to overcome deficiencies can alleviate the adverse effect of weeds on the yield and quality of forages. The cost of any potential treatment should be weighed against its potential success and effect on the forage system. While options like mowing may provide some control/suppression of weeds, the per acre cost compared to using chemicals is usually higher and total control is not as long-lasting.

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