Pasture

Spray volumes for pasture areas should be 20-30 gal/A with ground sprayers. Lower volumes also will work, but risk of spray drift increases. Aerial application of lower volumes also may be used.

Musk and curled thistles are major problems in Western Virginia and Maryland and continue to spread eastward. These plants are considered biennials but some plants actually may germinate in spring and flower in the late summer. Such plants would be annuals. In the spring, susceptible crop and ornamental plants are actively growing and will be damaged if spray drift reaches them.

The 2,4-D used for thistle control has little residual activity in the soil. Thus, we are experiencing reinfestation of areas where the thistles were killed in the fall. This results in plants that bloom and produce seed the next summer. Based on this experience, we can conclude that spring is a more effective time to control thistles but also is considerably more hazardous in terms of damage to desirable plants.

Rates of application are stated in pounds acid equivalent (AE) per acre. Amine, low volatile ester (LVE), and oil-soluble amine (OSA) formulations for various weed situations are suggested. Various formulations containing from 2-6 lb acid equivalent per gallon are available. Usually, higher acid equivalents per gallon are more economical. The following table will aid in converting pounds per acre to liquid volumes necessary to supply the amount of the weed killer suggested. It is important to have the correct amount of herbicide.

Table 5.14 - Pounds per Acre to Liquid Volumes

AE (lb/gal on label)	Pints of given formulation necessary to supply following rates per acre:					
	1/4 lb	1/2 lb	1 lb	2 lb	3 lb	4 lb
2	1	2	4	8	12	16
3	2/3	1 1/3	2 2/3	5 1/3	8	10 2/3
4	1/2	1	2	4	6	8
6	1/3	2/3	1 1/3	2 2/3	4	5 1/3

Table 5.15 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments[1]

Treatment and rate (lb active ingredient per acre)

Species	Cimarron Plus	Crossbow	2,4-D		Dicamba (Banvel/Clarity)				2,4-D + Dicamba (Banvel/ Clarity)	triclopyr + clopyralid (Redeem)		2,4-D + Picloram (Grazon P+D)		Surmount	Milestone	ForeFront
			1.0-1.5	2.0	0.25	0.50	1.0	2.0	0.75-1.5 + 0.25-0.50	0.42+ 0.14	0.70+ 0.23	0.50+ 0.14	0.75+ 0.20			
Amaranth, spiny	G	G	F-G	G	F-G	G	G	G	G	P	P	F	F	F-G	F-G	F-G
Aster spp.	F	G	G	G	F	F-G	G	G	G	G	G	F	G	G	—	—
Bedstraw spp.	—	F-G	P	P	N	N	P	P-F	P[2]	—	—	—	—	G	G	G
Bindweed, field	—	F	F	F	P	P-F	F-G	G	F	G	G	P	P	G	—	—
Bindweed, hedge	—	G	G	G	F	F-G	G	G	G	—	—	—	—	—	—	—
Blackberry spp.	F-G	F-G	P	P	N	N	P	P-F	P-F[2]	F	F	G	G	G	P	P
Brackenfern	—	P	P	P	N	N	P	P-F	P[2]	—	—	—	—	—	—	—
Burdock spp.	—	G	G	G	P-F	F	F	G	G	G	G	G	G	—	F-G	F-G
Buttercup spp.	F-G	G	G	G	P	F	F-G	G	G	G	G	G	G	G	G	G
Campion, bladder	F	P	P	P	N	P	P	P-F	P-F	P	P	P	F	F	P	P

[1]G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = <20 percent control.

[2]Better control of these species may be obtained by using higher rates of 2,4-D plus dicamba. Consult the label for use rates and precautions.

Table 5.15 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments[1] (cont.)

Treatment and rate (lb active ingredient per acre)

Species	Cimarron Plus	Crossbow	2,4-D		Dicamba (Banvel/Clarity)				2,4-D + Dicamba (Banvel/ Clarity)	triclopyr + clopyralid (Redeem)		2,4-D + Picloram (Grazon P+D)		Surmount	Milestone	ForeFront
			1.0-1.5	2.0	0.25	0.50	1.0	2.0	0.75-1.5 + 0.25-0.50	0.42+ 0.14	0.70+ 0.23	0.50+ 0.14	0.75+ 0.20			
Carrot, wild	—	G	G	G	P-F	F	G	G	G	G	G	G	G	P	F	F-G
Chamomile, mayweed	G	F	P	P	F	F-G	G	G	G	—	—	—	—	—	F	F-G
Chicory	—	G	G	G	P	P	F	F-G	G	G	G	G	G	—	G	G
Chickweed, common	G	F	P	P	F	F-G	G	G	G	—	—	—	—	G	G	G
Chickweed, mouseear	—	F-G	P	P	P	P-F	F-G	G	P-F[2]	—	—	—	—	G	—	—
Clover spp.	F-G	F-G	P	P	P-F	F-G	G	G	F-G	G	G	G	G	G	G	G
Clover, hop	F-G	F-G	P	P	N	N	P	P-F	P[2]	—	—	—	—	—	G	G
Cockle, corn	—	F-G	F	F	G	G	G	G	G	—	—	—	—	—	—	—
Cocklebur, common	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Cowcockle	G	F-G	F	F	G	G	G	G	G	F	G	—	—	—	—	—
Daisy spp.	—	G	G	G	F	F-G	G	G	G	G	G	G	G	G	F-G	G
Dandelion	G	G	G	G	P	F	F-G	G	G	G	G	G	G	G	F	F-G
Dewberry sp.	F-G	F-G	P	P	N	N	P	P-F	P-F[2]	—	—	—	—	G	P	P
Dock spp.	G	F-G	F	F	P-F	P-F	F	F-G	G	G	G	G	G	G	F-G	G
Dogbane, hemp	P	F-G	P	P	P-F	P-F	F	F-G	F	P	P	F	F	G	P	F
Dogfennel	F-G	G	G	G	P	F	F-G	G	G	G	G	P	F	G	P	F-G
Evening primrose	F	G	G	G	P-F	F	G	G	G	—	—	—	—	—	G	G
Fleabane spp.	—	G	G	G	F	F-G	G	G	G	G	G	F	G	G	F-G	F-G
Garlic, wild	G	F-G	F-G	G	P	F	G	G	G	—	—	—	—	N	N	F
Goldenrod spp.	F	G	G	G	P	P	F	F-G	G	F	G	F	G	F-G	P	F-G
Hawkweed spp.	—	G	G	G	P	P	F	F-G	G	P	F	P	F	—	F-G	F-G
Henbit	G	G	P	F	P-F	F-G	G	G	G	F	G	F	G	F-G	G	G
Honeysuckle spp.	P-F	F-G	P	P	N	N	P	P-F	P[2]	F	F	F	G	—	—	—
Horsenettle	P	F	P	P	P-F	P-F	F	F-G	G	F	F	F-G	G	G	G	G
Horseweed, marestail	G	G	G	G	F	F-G	G	G	G	G	G	G	G	G	G	G
Jimsonweed	—	G	G	G	G	G	G	G	G	F	F	F	F-G	F-G	F-G	G
Knapweed, spotted	P	F-G	F	F-G	P-F	F	G	G	G	G	G	G	G	—	G	G
Knawel (German moss)	—	P-F	P	P	G	G	G	G	G	—	—	—	—	—	—	—
Knotweed prostrate	—	F	F	F	G	G	G	G	G	—	—	—	—	—	—	—
Kudzu	—	P-F	P	P	N	N	P	P-F	P[2]	G	G	G	G	—	F-G	F-G
Lambsquarters, common	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G
Lettuce, wild	—	G	G	G	F	F-G	G	G	G	G	G	G	G	—	G	G

[1]G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = <20 percent control.

[2]Better control of these species may be obtained by using higher rates of 2,4-D plus dicamba. Consult the label for use rates and precautions.

Table 5.15 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments[1] (cont.)

Treatment and rate (lb active ingredient per acre)

Species	Cimarron Plus	Crossbow	2,4-D		Dicamba (Banvel/Clarity)				2,4-D + Dicamba (Banvel/ Clarity)	triclopyr + clopyralid (Redeem)		2,4-D + Picloram (Grazon P+D)		Surmount	Milestone	ForeFront
			1.0-1.5	2.0	0.25	0.50	1.0	2.0	0.75-1.5 + 0.25-0.50	0.42+ 0.14	0.70+ 0.23	0.50+ 0.14	0.75+ 0.20			
Mallow, common	—	F	F	F	F	F-G	G	G	F-G	—	—	—	—	G	—	—
Milkweed spp.	P	F	P	P	P-F	P-F	F	F-G	F	P	P	P	F	F-G	P	F-G
Mullein, common	F-G	P	P	P	N	P	P	P	P	G	G	F	G	—	F-G	F-G
Mustard spp.	G	G	G	G	F	F-G	G	G	G	F	F	P	F	P	P	F-G
Nightshade, black	—	P-F	P-F	P-F	F	F-G	G	G	F-G	G	G	P	F	G	—	—
Onion, wild	—	F-G	F-G	G	P	F	G	G	G	—	—	—	—	N	N	F
Pennycress spp.	G	G	G	G	F	F-G	G	G	G	—	—	—	—	G	P	F-G
Pepperweed spp.	G	G	G	G	F	F-G	G	G	G	—	—	—	—	—	P	F-G
Persimmon, common	—	P	P	P	P	P	P-F	F-G	G	F	G	F	F	G	—	—
Pigweed spp.	G	G	F-G	G	F-G	G	G	G	G	G	G	P	F	G	F-G	F-G
Plantain spp.	G	G	G	G	P	F	F-G	G	G	G	G	G	G	F-G	P	F-G
Poison hemlock	P	F-G	F	G	N	N	P	P-F	G	G	G	G	G	—	—	—
Poison ivy, oak	—	F	P	P	P	P	P-F	F-G	G	F	F	G	G	—	—	—
Pokeweed, common	N	F-G	P	P	N	N	P	P-F	P[2]	P	P	P	F	P	F-G	F-G
Ragweed, common	P-F	G	F-G	G	F-G	G	G	G	G	G	G	G	G	G	G	G
Ragweed, giant	P-F	F-G	F	F	F-G	G	G	G	G	G	G	G	G	G	G	G
Rose, multiflora	F-G	F-G	P	P	N	N	P	F	P-F[2]	P	F	F-G	G	G	F-G	F-G
Shepherdspurse	G	F-G	F-G	F-G	F	F-G	G	G	G	—	—	—	—	P	P	F-G
Sneezeweed, bitter	G	F-G	F-G	G	F	F-G	G	G	G	G	G	G	G	G	G	G
Sorrel spp.	—	F-G	P	P	F	F-G	G	G	G	G	G	—	—	—	—	—
Spurge, prostrate	—	P	P	P	F	F-G	G	G	G	—	—	—	—	—	—	—
Stickweed (perennial composite)	—	G	G	G	P-F	F-G	G	G	G	G	G	F	G	G	G	G
Sumac spp.	—	F-G	P	P	N	N	P	P-F	P[2]	G	G	P	F	G	—	—
Sunflower spp.	F	F-G	F-G	F-G	G	G	G	G	G	G	G	G	G	G	G	G
Teasel spp.	P	P-F	P-F	P-F	P-F	F	G	G	G	G	G	F	G	—	G	G
Thistle, bull	F-G	G	F-G	G	P-F	F	G	G	G	G	G	G	G	G	G	G
Thistle, Canada	F	F-G	F	F	P	P-F	F	F-G	F	G	G	F	G	F	G	G
Thistle, plumeless	F-G	G	F-G	G	P-F	F	G	G	G	G	G	G	G	G	G	G
Thistle, musk	F-G	G	G	G	P-F	F	G	G	G	G	G	G	G	G	G	G
Trumpetcreeper	—	P-F	P	P	P	P	F	F-G	P-F[2]	P	P	P	F	—	—	—
Velvetleaf	—	F-G	F-G	F-G	G	G	G	G	G	G	G	F	G	G	—	—
Water hemlock, spotted	—	F-G	F	G	N	N	P	P-F	G	—	—	—	—	—	—	—
Woodsorrel spp.	—	F-G	P	P	P	P	P-F	G	P-F[2]	—	—	—	—	—	F-G	G
Yellow rocket	G	G	G	G	F	F-G	G	G	G	—	—	—	—	P	P	F-G

[1]G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = <20 percent control.

[2]Better control of these species may be obtained by using higher rates of 2,4-D plus dicamba. Consult the label for use rates and precautions.

Table 5.16 - Grazing and Haying Restrictions for Grass Forage and Pasture Herbicides

Herbicide	Type of Animal	Interval between application and grazing	Interval between application and haying	Comments
2,4-D Amine	Dairy	7 Days	30 Days	2,4-D labels vary. See specific label of product used.
2,4-D Ester	Dairy	7 Days	30 Days	2,4-D labels vary. See specific label of product used.
Aim	All	None	None	
Cimarron Plus	All	None	None	Do not seed to other crops for 1 or more years. See label for restrictions.
Banvel/Clarity (dicamba)	Lactating Dairy Other	Next Season None	14 Days 14 Days	No waiting period between treatment and grazing for non-lactating animals.
Crossbow (2,4-D + triclopyr)	Lactating Dairy Other Livestock	< 2 gal/A-14 days > 2 gal/A - do not graze < 2 gal/A none > 2 gal/A- 14 days[1]	Harvest next season Harvest next season 7 Days 14 Days	Remove meat animals from treated areas at least 3 days prior to slaughter.
ForeFront	All	None	None	
Glyphosate containing product as labled	All	Spot - 14 days Renovate - 8 weeks	Spot - 14 days Renovate - 8 weeks	Use as spot treatment. Do not treat more than one tenth of any acre. Leaves no soil residue. Glyphosate has no slaughter restrictions.
Grazon P+D	Dairy Other	7 days 0 days	30 days 30 days	Remove meat animals from treated areas at least 3 days prior to slaughter.
PastureGard	Lactating Dairy Other	Next Season None	14 days 14 days	Withdraw livestock from treated areas or treated hay at least 3 days before slaughter.
Milestone	All	None	None	
Redeem (triclopyr + clopyralid)	Lactating Dairy Other Livestock	Next Season None	Harvest next season 14 days	Remove animals from treated areas at least 3 days prior to slaughter.
Spike 80 P (tebuthiuron)	All	< 20 lb/A - none > 20 lb/A - one year	One year	Leaves soil residue up to 12 years.
Stinger (clopyralid)	All	None	None	Do not use hay or straw from treated areas for compost or mulch on susceptible broadleaf crops.
Surmount	Lactating Dairy Other	14 days None	7 days 7 days	Withdraw livestock from treated areas or treated hay at least 3 days before slaughter.

[1]If less than 25% of coverage treated, no grazing restrictions applied.

Table 5.17 - Rotational Crop Restrictions for Pasture Herbicides[1]

	Rotational crops (month after application)								
Pesticide	**Alfalfa or (Clover)**	**Corn**	**Cotton**	**Forage grasses**	**Grain sorghum**	**Peanuts**	**Small grains**	**Soybeans**	**Other crops[2]**
2,4-D	NS[4]	NS[4,5]	NS[4]	NS[4]	NS[4,5]	NS[4]	NS[4]	NS[4,5]	NS[4]
Aim	0	0	0	0	0	12	0	0	12
Banvel	AH[3]	NS[4,5]	AH[3,5]	20 days per pint	NS[4,5]	AH[3]	20 days per pint	NS[4,5]	AH[3,5]
Chaparral	12[6]	12[6]	12[6]	12[6]	12[6]	12[6]	12[6]	12[6]	12[6]
Cimarron Plus	4	12	FB[6]	4	FB[6]	FB[6]	1-10	12	FB[6]
Clarity	4	4[5]	4[5]	30 days per pint	4[5]	4	30 days per pint	4[5]	4[5]
Crossbow	NS[4]	NS[4]	NS[4]	21 days	NS[4]	NS[4]	NS[4]	NS[4]	NS[4]
Distinct/ Overdrive	1	1	1	1	1	1	1	1	1
ForeFront	FB[6]	12	12 + FB[6]	–	12	12 + FB[6]	12	12 + FB[6]	12 + FB[6]
Grazon P + D	-[7]	-[7]	-[7]	-[7]	-[7]	-[7]	-[7]	-[7]	-[7]
Milestone	FB[6]	12	12 + FB[6]	–	12	12 + FB[6]	12	12 + FB[6]	12 + FB[6]
PastureGard	4	4	4	21 days	4	4	21 days	4	4
Redeem	FB[6]	NS[4]	FB[6]	–	NS[4]	FB[6]	NS[4]	FB[6]	NS[4] or FB[6]
Stinger	10.5 (10.5 + FB[6])	0	18	0	10.5	18	0	10.5	0-18 or FB[6]
Surmount	12[7]	12[7]	12[7]	21 days	21 days	12[7]	21 days	12[7]	12[7]

[1]A "–" indicates that a rotational restriction for that crop is not specified on the label.

[2]Consult herbicide label for specific crops.

[3]AH = after normal harvest of crop in which herbicide was applied.

[4]NS = next growing season after application.

[5]Some crops are labeled for preplant applications of this product, but usually at lower rates than normally used in pasture. If the rate used does not exceed what is allowed in the preplant section of the label, shorter rotational restrictions may be allowed. Consult the label concerning preplant applications for each specific crop.

[6]FB = a field bioassay is required prior to planting the crop; refer to the herbicide label for instructions.

[7]For use in permanent grass pasture. Do not plant to other crops until picloram residues are no longer detectable as indicated by an adequately sensitive bioassay or chemical test.

Table 5.18 - Permanent Pasture

Weed problem	Chemical rate per acre	Product per acre	Remarks
Annual and perennial weeds including aster, buttercup, burdock, chicory, crane's bill, daisy fleabane, dandelion, dogfennel, elderberry, evening primrose, goatsbeard, goldenrod, hawkweed, horseweed, wild lettuce, dock seedlings, musk thistle, mustards, pepperweed, pennycress, plantains, spotted knapweed, wild carrot, and wild parsnip	2,4-D 1.0-1.5 lb	LVE, OSA or amine	Apply when weeds are actively growing. Use lower rates on annuals and biennials and higher rates for perennials.
Bitterweed	2,4-D 1.5 lb	LVE, OSA or amine	Apply when bitterweed reaches about 3 inches high.
Thistle (bull and curled)	2,4-D 1.5 lb	LVE, OSA or amine	Spray thistles when in rosette stage and actively growing, either in late fall or early spring.
Pigweed (spiny) and ragweed	2,4-D 1.0-1.5 lb	LVE, OSA, or amine	Apply in early summer when weeds first reach 2 to 4 inches in height. Usually one application is sufficient. Occasionally more seed will germinate. Repeat treatment if necessary.
Horsenettle (sandbriar), curly dock, dewberry, persimmon, poison ivy, and many other weeds listed above for 2,4-D	Dicamba 0.25-0.5 lb plus 2,4-D amine 0.75-1.5 lb	Banvel/Clarity 4L 0.5-1.0 + 2,4-D amine 1.5-3.0 pt	Spray about time horsenettle blooming begins. All legumes will be killed. Repeat treatment on regrowth 2nd year. Do not graze dairy animals on treated areas within 7 days after application. Do not graze meat animals on treated areas within 30 days of slaughter. Do not harvest for dry hay within 37 days of treatment. Make ground application only, 10-20 gal of water/A.
Multiflora rose, hawthorne, juniper, kudzu, sumac, and other woody species	Dicamba 1.0-2.0 lb or Dicamba 1.0 lb + 2,4-D 2.0 lb	Banvel/Clarity 1.0-2.0 qt Banvel/Clarity 1.0 qt + 2,4-D 2.0 qt	Consult the table at the beginning of the pasture section and the product labels for grazing and haying restrictions. Do not apply more than 1 lb/A dicamba as a broadcast treatment.
Coralberry (devil's shoestring)	2,4-D 2.0 lb	LVE or OSA	Clip in winter. Spray when weed is about 1 inch high (early May) and actively growing. Be prepared to spot-treat the second year.
Dwarf larkspur, water hemlock, and wild garlic or onion	2,4-D 2.0lb or 2,4-D 1.5-2.0 lb + Dicamba 1.0 lb	LVE, OSA, or amine LVE Banvel/Clarity 1.0 qt	Apply in the bud to early-bloom stage. See 2,4-D wild garlic or above. Spray late in fall and during February or early March with midday temperature of 60°F or above. Repeat twice annually for 3 to 4 years. Do not graze lactating dairy animals on dicamba-treated areas for 21 days after treatment.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Cowcockle, corn cockle, corn chamomile, German moss (knawel), knotweed, mayweed, ragweed, sheepsorrel (red sorrel), prostrate spurge, and sunflower	Dicamba 0.25 lb	Banvel/Clarity 0.5 pt	Postemergence application. Apply when weeds are actively growing. Clovers will be killed. Do not apply near desirable trees or plants, or in locations where chemicals may be washed or moved into contact with their roots. Do not graze meat animals in treated fields within 30 days before slaughter.
Bladder campion, chickweed, curly dock, common ragweed, giant ragweed, shepherdspurse, wormwood, croton, sesbania, and velvetleaf	Dicamba 0.5 lb	Banvel/Clarity 1.0 pt	Do not graze dairy animals on treated areas within 7 days if 0.5 lb/A is applied; 21 days if 1.0 lb/A is applied; 40 days if 2.0 lb/A is applied; or 60 days if 8.0 lb/A is applied.
Aster, clover, spotted knapweed, goldenrod, wild garlic, wild onion, sow thistle, mallow, spotted knapweed, and teasel	Dicamba 1.0 lb	Banvel/Clarity 1.0 qt	Observe dosage rates and days of delay between treatment and harvesting for hay: 37 days if 0.5 lb/A is applied; 51 days if 1.0 lb/A is applied; 70 days if 2.0 lb/A is applied; 90 days if 8.0 lb/A is applied.
Blueweed (viper's bugloss), buckbrush (coralberry), chicory, cottonwood (seedlings), evening primrose, groundsel, musk thistle, nightshade, poison ivy, spotted knapweed, stinging nettle, trumpet creeper, wild carrot, wood sorrel, yarrow, and tansy ragwort	Dicamba 2.0 lb	Banvel/Clarity 2.0 qt	Use as a postemergence spot-treatment application only.
Spot treatment of undesirable woody vegetation including pine, cherry, sumac, locust, elm, maple, alder, spruce, oak species, multiflora rose.	Tebuthiuron 1.0-4.0 lb	Spike 80W 1.25-5.0 lb or Spike 20P 5.0-20.0 lb	For nonselective soil spot sterilant activity as a treatment on individual woody plants. Consult label for rates for individual species and for application procedures for individual formulations. Do not use Spike in any area where desirable species are in the vicinity of plants to be eliminated. Both grasses and broadleaf plants in treated spots will be killed. Grazing is allowed in areas treated with 4.0 lb active ingredient tebuthiron or less. In areas treated with 4.0 lb or less, grass may be cut for hay 1 year after application.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Burdock, Canada thistle, cocklebur, dandelion, goldenrod, lambsquarters, spiny amaranth, marsh elder, oxalis, plantains, wild carrot, ragweed, ironweed, sunflower, vetch, and others	2,4-D plus triclopyr (prepackage mix) 0.75-1.5 lb	Crossbow 1.0-2.0 qt	Apply when weeds and brush are actively growing. Apply in a manner to avoid drift or other contact with nearby susceptible vegetation. Use lower rates for general weed control and control of more susceptible woody species. Do not graze or harvest green forage for lactating dairy animals until the next season. There are not harvest or grazing restrictions for other animals. Do not harvest hay from treated areas until 14 days after treatment. Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.
Alder, ash, aspen, birch, blackberry, blackgum, cherry, elderberry, hawthorne hazel, maples, multiflora rose, oak, pine, salmonberry, sumac, sweetgum, tamarack, willow, and others	2,4-D plus triclopyr (prepackage mix)	Crossbow 2.0-6.0 qt	Apply when weeds and brush are actively growing. Apply in a manner to avoid drift or other contact with nearby susceptible vegetation. Use lower rates for general weed control and control of more susceptible woody species. Remove animals from treated areas 3 days prior to slaughter. Do not graze lactating dairy animals for 14 days or harvest hay for lactating dairy animals until the next season. Do not harvest hay for other animals until 7 days after application. No restrictions apply if less than 25% of forage is treated.
Bitter sneezeweed, buttercup, Carolina geranium, common chickweed, common purselane, cowcockle, curly dock, dandelion, field pennycress, filaree, groundsel, henbit, lambsquarters, marestail, mayweed, multiflora rose, pigweed spp., plantain, shepherd's-purse, smartweed spp., biennial thistle spp., wild mustard, common yarrow, dogfennel, wild carrot, and others	metsulfuron methyl + chlorsulfuron 0.0038-0.0113 lb + 0.0012-0.0035 lb	Cimarron Plus 63 DG 0.125-375 oz	Apply as a broadcast spray from early spring through fall as indicated by the label for the specific weed species to be controlled. For multiflora rose control, apply in the spring, soon after plants are fully leafed. Optimum biennial thistle control will occur with applications made in the late fall or early spring to plants in the rosette stage of growth. Application of Cimarron Plus must include either a crop-oil concentrate or a nonionic surfactant. Cimarron Plus may be used on established native grasses such as bluestems, gamma, buffalograss and other pasture grasses such as bermudagrass, bluegrass, orchardgrass, bromegrass (except Matua), and fescue. Do not use on bentgrass or susceptible grass pastures such as timothy, Matua bromegrass, or St. Augustine grass. Cimarron Plus may cause severe injury to Italian or perennial ryegrass.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Artichoke (Jerusalem), burdock (common), chamomile, clover, cocklebur, cornflower, dandelion, curly dock, dogfennel, groundsel (common), horseweed, lettuce (prickly), nightshade, ragweed (common, giant), thistle (Canada, musk), and vetch	Clopyralid 0.124-0.5 lb	Stinger 0.33-1.33 pt	Apply to actively growing weeds. Do not apply by aircraft. Grasses are tolerant. New grass seedlings may be injured until established. No grazing restrictions. Avoid drift to sensitive crops. See section on rotational restrictions.
Chickweed, clover species, cocklebur, dandelion, henbit, vetch, burdock, cornflower, horseweed, jimsonweed, lambsquarters, prickly lettuce, nightshade species, Virginia pepperweed, plantain species, common ragweed, shepherd's-purse, red sorrel, sheep sorrel, ironweed, bitter sneezeweed, thistle (bull, musk, plumeless, Canada), knapweed, and mugwort	triclopyr + clopyralid 0.563-1.5 lb/A	Redeem 3L 1.5-4.0 pt/A	Apply to actively growing weeds (a minimum of 10 gal/A). Extreme conditions including cold or drought prior to or following application may reduce effectiveness. Lower use rates are generally effective for annual weed species, but higher rates are required for perennial species. Use a nonionic surfactant at manufacturer's recommended rate for all applications. Do not apply this product to, or allow spray drift to contact vegetables, ornamentals, susceptible broadleaf crops, or other desireable non-target plants. Do not graze or feed harvested forage or hay to lactating dairy animals until the next season. Do not harvest hay for other animals until 14 days after application. There are no grazing restrictions for other animals. Withdraw meat animals from treated areas at least 3 days prior to slaughter.
Many difficult to control annual, biennial, and perennial broadleaf species, including mugwort, prickly pear cactus, and horsenettle Bladder campion suppression	picloram + 2,4-D 0.32-2.54 lb 0.95-1.27 lb	Grazon P+D 1.0-8.0 pt 3.0-4.0 pt	**For use only In Virginia and West Virginia.** For use only in permanent pastures. The distribution of Grazon P+D will be further restricted within Virginia and West Virginia due to the picloram content of the product and sensitivity of certain broadleaf crops. Do not allow spray to contact crops or other desireable broadleaf plants. Do not apply in residential areas or near ornamental trees and shrubs. Desirable plants can be damaged through foliar and root uptake. Do not rotate to crops intended for food or feed use other than pasture grasses or small grains until soil residues of picloram are no longer detectable by an adequately sensitive bioassay. Do not contaminate water intended for irrigation or domestic purposes.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Herbaceous broadleaf weeds, including black medic, burdock, chickweed, chickory, cinquefoil spp., clover spp., cocklebur, common purselane, curly dock, cutleaf evening primrose, dogfennel, hemp dogbane, ironweed, lambsquarters, lespedeza, maypop, morningglory spp., pigweed spp., plantain spp., prickly lettuce, ragweed spp., vetch, yarrow, wild violet, and others. Woody broadleaf weeds, including blackberry, hawthorn, locust spp., multiflora rose, poison ivy, poison oak, privet, sumac, yucca, and others	triclopyr + fluroxypyr 0.5-2.0 lb	PastureGard 2.0-8.0 pts	**For use only In Virginia and West Virginia.** For use only in permanent pastures. Do not apply where drift may be a problem due to proximity of sensitive crops or other broadleaf species. Do not apply to alfalfa, clover, or other desirable broadleaf species unless injury to or loss of these species is acceptable. Do not apply directly to water. Do not allow runoff of surface water to reach desirable species on adjacent areas. Do not reseed pasture grasses for three weeks following application, or apply to new seedlings until pasture grass species are well established. Do not rotate within 120 days of application to any crop except pasture grass species, wheat, barley, or oats.
Herbaceous broadleaf weeds, including biennial thistle spp., chickweed, clover spp., cocklebur, croton spp., curly dock, dogfennel, field bindweed, goldenrod, groundsel, hemp dogbane, horsenettle, horseweed (marestail), knotweed, lambsquarters, morningglory spp., nightshade spp., pigweed, ragweed spp., yarrow, white cockle, and many others. Woody broadleaf weeds, including blackberry, eastern red cedar, hawthorn, locust spp., multiflora rose, pricklypear, sumac spp., and others.	picloram + fluroxypyr 0.26-1.0 lb	Surmount 1.5-6.0 pts	**For use only In Virginia and West Virginia.** For use only in permanent pastures. The distribution of Surmount will be further restricted within Virginia and West Virginia due to the picloram content of the product and sensitivity of certain broadleaf plants. Do not apply where drift or runoff may be a problem due to proximity of sensitive crops or other broadleaf species. Do not apply in residential areas or near ornamental trees or shrubs. Do not apply directly to water or allow drift, application, sprayer cleanup, or runoff to contaminate water used for irrigation or domestic purposes. Do not rotate within 12 months of application to any crop except permanent grass pasture, grasses for hay or silage, barley, oats, wheat, or grain sorghum. After 12 months, rotate to other crops only after an adequately sensitive bioassay indicates no risk of crop injury.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Black medic, burdock, buttercup spp., chicory, cocklebur, curly dock, cutleaf evening rimrose, fireweed, fleabane, henbit, horsenettle, horseweed, ironweed spp., knapweed spp., kudzu, lambsquarters, mayweed spp., mugwort, wild chrysanthemum, ragweed, smartweed spp., spiny amaranth, sneezeweed, sunflower, teasel, thistle spp. (bull, musk, plumeless, Canada), yarrow, and others.	aminopyralid 0.047-0.109 lb	Milestone 2 EC 3.0-7.0 oz	For control of susceptilbe broadleaf weeds in permanent grass pasture. Do not use Milestone if loss of desirable legume species cannot be tolerated. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high-water mark. Do not allow spray drift to come in contact with any broadleaf crop or other desirable broadleaf plant. Do not rotate to any crop within one year following treatment or to any broadleaf crop until an adequately sensitive field bioassay shows that the aminopyralid level in soil will not adversely affect that broadleaf crop. Do not use aminopyralid-treated plant residues, or manure from animals that have consumed forage or hay from treated areas, as compost or mulch in areas where susceptible broadleaf crops may be grown. There are no restrictions on grazing or haying following Milestone applications. The addition of a nonionic surfactant at 0.25-0.50% by volume is recommended to enhance herbicide activity under adverse enviromental conditions. Do not apply this product with mist blower or airblast systems.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Aster spp., bedstraw, biennial thistle spp., bittercress, bitter sneezeweed, black locust, black medic, black-eyed Susan, blackberry, brackenfern, burdock, buttercup spp., Canada thistle, Carolina geranium, chamomile, common chickweed, common purslane, common ragweed, common sunflower, common vetch, common yarrow, chicory, cinquefoil, clover spp., corn cockle, cocklebur, cowcockle, crownvetch, cutleaf eveningprimrose, dandelion, dewberry, dock, fiddleneck, filaree, fleabane, goldenrod spp., hawkweed spp., henbit, honeylocust, honeysuckle, horsenettle, ironweed, knapweed spp., kudzu, lambsquarters, lespedeza spp., mayweed spp., mexicantea, mullien, mustard spp., multiflora rose, oxeye daisy, partridgepea, pigweed spp., plantain spp., ragwort, red sorrel, sowthistle spp., shepardspurse, sicklepod, sida spp., smartweed spp., Spanish needles, spiny amaranth, starthistle spp., teasel, yellow woodsorrel, wild carrot, wild parsnip, wooly croton, and others.	aminopyralid + metsulfuron-methyl 0.039-0.128 + 0.006-0.019 lbs	Chaparral 71.6 D 1.0-3.3 oz	Chaparral is intended for broadleaf weed control in permanent grass pasture. Consult label for use rates for specific weed species. Unless otherwise directed, Chaparral should be applied in combination with crop oil concentrate or nonionic surfactant. Chaparral may be tank mixed with labeled rates of other herbicides registered for all labeled use sites. Do not use on Timothy hay or other cool-season grasses grown for hay. Do not use more than 2 oz/A on tall fescue. Chaparral will control desirable legume species. Do not reseed legumes until a sufficiently sensitive bioassay indicates that aminopyralid and metsulfuron levels remaining in soil will not adversely affect these plantings. Do not use treated plant residues or manure from animals that have grazed treated forage or eaten hay from treated areas within the previous three days as compost that will be applied to sensitive broadleaf plants. Manure from animals that have grazed treated areas or eaten hay harvested from treated areas may only be used on pasture grasses, grass grown for seed, or wheat. Do not rotate to any crop until one year following application. Do not rotate to a broadleaf crop until a sufficiently sensitive bioassay indicates that aminopyralid and metsulfuron levels remaining in soil will not adversely affect these plantings.

Table 5.18 - Permanent Pasture (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
Black medic, burdock, buttercup spp., chicory, common chickweed, common vetch, clover spp., cocklebur, crownvetch, cutleaf evening primrose, dandelion, dock spp., fleabane, goldenrod spp., hawkweed spp., henbit, horsenettle, horseweed, ironweed spp., knapweed spp., kudzu, lambsquarters, mayweed, plantain spp., pokeweed, sicklepod, spiny amaranth, sneezeweed, sunflower, teasel, thistle spp. (bull, musk, plumeless, Canada), wild carrot, wingstem, and others.	aminopyralid 0.62-0.107 lb + 2,4-D 0.50 - 0.87 lb	ForeFront 3EC 1.5-2.6 pt	For control of susceptible broadleaf weeds in permanent grass pasture. Do not use ForeFront if loss of desirable legume species cannot be tolerated. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high-water mark. Do not allow spray drift to come in contact with any broadleaf crop or other desirable broadleaf plant. Do not rotate to any crop within one year following treatment or to any broadleaf crop until an adequately sensitive field bioassay shows that the aminopyralid level in soil will not adversely affect that broadleaf crop. Do not use aminopyralid-treated plant residues, or manure from animals that have consumed forage or hay from treated areas, as compost or mulch in areas where susceptible broadleaf crops may be grown. There are no restrictions on grazing following ForeFront applications. Do not harvest forage for hay within 7 days of a ForeFront application. The addition of a nonionic surfactant at 0.25-0.50% by volume is recommended to enhance herbicide activity under adverse environmental conditions. Do not apply this product with mist blower systems.
Bedstraw, bittercress, black nightshade, common mallow, fixweed, kochia, lambsquarters, annual mustard spp., pigweed spp., Russian thistle, velvetleaf, wild buckwheat, and others	carfentrazone 0.0078-0.0313 lb	Aim 2 EC 0.5-2.0 oz	Aim may be applied alone or in combination with other registered pesticides for the control of weeds in pasture, hay, and grasses grown for hay, silage, or grass seed production. Application should be made in a minimum of 10 gal/A with the addition of either nonionic surfactant, crop oil concentrate, or methylated seed oil. When applied alone, there are no grazing or haying restrictions following an Aim application. For tank-mix applications, observe the grazing and haying restrictions of the tank-mix partner. Aim is a contact herbicide and should be applied to small, actively growing annual weeds. Due to the rapid contact nature of its activity, Aim does not control perennial broadleaf species. Aim does not control clover species.

Table 5.19 - Pasture Renovation

Weed problem	Chemical rate per acre	Product per acre	Remarks
Suppression of competition by existing sod and undesirable emerged broadleaf weeds and grasses	Paraquat 0.25-0.50 lb + surfactant	Gramoxone Inteon 1.0-2.0 pt + surfactant as specified by label	Graze area closely, apply in spring or early summer after growth begins, before or at time of seedling grasses, alfalfa, clover or birdsfoot trefoil. Do not graze in treated areas until newly planted seedlings are 3 to 6 inches high for seedling grasses and forage legumes, and 18 to 24 inches high for sorghum-sudan. Do not pasture or mow bermudagrass for hay until 40 days after treatment.
Control of existing sods and undesirable annual and perennial broadleaf weeds grasses	Glyphosate 0.5-5.0 lb	4.0 lb ai/gal glyphosate or equivalent 0.5-5.0 qt	Apply before planting forage grasses legumes. Remove domestic livestock before and application. Wait 8 weeks after application before grazing or harvesting.