GRASS PASTURE AND HAY FIELD HERBICIDES

Fred Yelverton, Ph.D. - Professor, North Carolina State University
Tim R. Murphy, Ph.D. - Professor, University of Georgia
July 2017

For many years, 2,4-D (several trade names), dicamba (Vanquish, Banvel) and 2,4-D + dicamba (WeedMaster, other trade names) were the primary herbicides used for broadleaf weed control in pastures and hay fields. While these products are still valuable components of broadleaf weed management, several new herbicides have been registered in recent years for weed control in pastures and hayfields. The following is a discussion of the characteristics and uses of these herbicides.

1. Aim – FMC

a. Two formulations: Aim EW, 1.9 lbs. carfentrazone per gallon of formulated product
Aim EC, 2.0 lbs. carfentrazone per gallon of formulated product

b. Controls seedling, annual broadleaf weeds up to 4 inches tall. Aim will not control grass weeds or sedges.

c. Add a nonionic surfactant at 0.25% v/v to the spray mix.

d. Typically, Aim is tank-mixed with other broadleaf herbicides such as 2,4-D, WeedMaster, Grazon P+D, ForeFront/GrazonNext, Milestone, Cimarron products, etc.

e. Needs a rain-free period of 6 to 8 hours.

f. There is no grazing or haying restriction for any type of livestock for Aim formulations.

2. Cimarron Max - DuPont

a. A co-pack product consisting of metsulfuron and 2,4-D + dicamba.

b. Adding metsulfuron to 2,4-D + dicamba increases number of broadleaf weed species controlled.

c. Rates - 0.25 oz. metsulfuron product plus 1.0 to 2.0 pts. 2,4-D + dicamba product per acre.

d. Apply with 0.125 to 0.25% v/v nonionic surfactant.

e. **Grazing and haying restrictions**
- No grazing restrictions for non-lactating animals
- 7 day grazing restriction for lactating dairy animals
- Remove meat animals from treated pastures 30 days before slaughter.
- Do not harvest hay for all types of livestock for 37 days after treatment.

f. Rotation intervals - same as shown for Cimarron Plus below.

g. Sprayer cleanup procedures are same as shown for Cimarron Plus below.

3. Cimarron Plus 63DF – DuPont

a. A two-way product pre-mixed product that contains 48% metsulfuron + 15% chlorsulfuron per pound of formulated product. The addition of chlorsulfuron to metsulfuron increases the number of weed species controlled.

b. Effective for 'Pensacola" bahiagrass control. Cimarron Plus has also shown excellent control of bitter sneezeweed, wild garlic/onions, curly dock, horseweed, blackberry, dewberry, buttercup, mayweed chamomile, Carolina geranium, henbit, common chickweed, wooly croton, pigweeds and thistles.

c. Rates - 0.125 to 1.25 ozs. product per acre.

d. Cimarron Plus will not control crabgrass, goosegrass, sandbur, smutgrass, 'Common' bahiagrass and 'Argentine' bahiagrass.

e. Apply with 0.125 to 0.25% v/v nonionic surfactant.

f. **There is no grazing or haying restriction for Cimarron Plus.**

g. The minimum rotation intervals after the use of Cimarron Plus at 0.25 oz. product/acre are as follows:

   a) 4 months - for overseeding with clover or alfalfa, bermudagrass, ryegrass, tall fescue.

   b) 1 month - for seeding winter or spring wheat (up to 0.375 oz/acre).

   c) 10 months - for seeding durum wheat, barley and oats (up to 0.375 oz./acre).

h. There are specific sprayer clean-up procedures which must be followed if the sprayer is to be subsequently used on other crops. This clean-up procedure is shown on the Cimarron Max label and involves the use of ammonia or spray tank cleaning solutions such as Nutra-Sol, Loveland Spray Tank Cleaner and Tank-Aid.

i. Cimarron Plus tank-mixes with liquid fertilizer are not recommended for 'Pensacola' bahiagrass control.

4. Chaparral – DowAgroSciences

a. Contains 0.62 lbs. of aminopyralid and 0.0945 lbs. metsulfuron per pound of formulated product.

b. **Recommended for use only on permanent grass pastures and hayfields.**

c. Use only on bermudagrass (established for more than 60 days) and well-established tall fescue (two years).

d. Rates – 1.5 to 3.0 ozs. product per acre.

e. Apply with 0.125 to 0.25% v/v nonionic surfactant

f. Controls numerous broadleaf weeds and ‘Pensacola’ bahiagrass.

g. Highly effective for horsenettle and tropical soda apple control.

h. No grazing or haying restriction for any type of livestock

i. Crop rotational intervals:

1. Ryegrass may be seeded at 4 months after use.

2. Do not rotate to any other crop within one year of treatment

3. Do not seed forage legumes or other broadleaf crops until a field bioassay show that the level of aminopyralid or metsulfuron in the soil will not adversely affect that forage legume or broadleaf crop. (see label).

j. Other considerations:

1. Do not transfer livestock from treated pastures, or from Chaparral treated hay feeding areas on to broadleaf crop areas without first allowing livestock to graze for 3 days on an untreated grass pasture.

2. Do not store or feed Chaparral treated hay on fields that will be planted to broadleaf crops.

3. Do not use manure from livestock grazing on Chaparral treated areas on gardens, broadleaf crops or orchards.

4. Chaparral will injure or kill legumes such as clovers and alfalfa. Do not plant legumes or broadleaf crops until a field bioassay has shown that the aminopyralid concentration in the soil is not at a level that will injure broadleaf crops (see label for instructions on conducting field bioassay).

k. There are specific sprayer clean-out procedures shown on the Chaparral label which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

5. <u>Crossbow - DowAgroSciences</u>

a. Contains 2.0 lbs. of 2,4-D and 1.0 lbs. of triclopyr per gallon of formulated product. This is an ester formulation and care must be used during the warm months of the year when conditions are favorable for volatilization.

b. Labeled on established forage grasses. Do not use on newly seeded or sprigged grasses until the grass has either tillered or has achieved complete soil coverage.

c. Highly injurious to interseeded legumes.

d. Effective on a wide range of woody and herbaceous broadleaf weeds. The following is a partial listing:

<u>Woody Plants</u>	<u>Herbaceous</u>
blackberry	bull thistle
black locust	buttercup
cherry	curly dock
honeysuckle	dogfennel (suppression)
multiflora rose	horseweed
sassafras	horsenettle (suppression)
sumac	musk thistle
sweetgum	willow

<u>NOTE</u>: There are additional weed species listed on the label.

e. Generally applied as a postemergence foliage application.

   Dormant stem applications are effective for multiflora rose and blackberry.

f. Use rates range from 1.0 to 4.0 qts./acre.

g. Spot treatments of a 1.5% solution (2.0 ounces of Crossbow per gallon of water) are very effective.

h. **Grazing and haying restrictions:**

   Beef cattle - Withdraw animals from treated pasture 3 days prior to slaughter.
   Horses - No grazing restriction.
   Lactating Dairy Animals - 14 days.
   Hay - Do not harvest grass for hay until the next growing season for lactating dairy animals. For other types of livestock, the haying restriction is 7 days.

h. **Reseeding Restrictions:** grasses - 21 days

6. Direx 4L (DuPont) and Diuron 4L (MANA, AgriSolutions, Loveland)

a. Both formulations contain 4.0 lbs. diuron per gallon of formulated product.

b. May be applied at 1.5 to 4.5 pts./acre immediately after sprigging of bermudagrass for preemergence control of certain annual grasses and small-seeded broadleaf weeds.

c. May also be applied postemergence at low rates (0.75 to 1.5 pts./acre + 0.125% v/v nonionic surfactant) to control small weeds that emerge during the first few weeks after bermudagrass sprigging. Bermudagrass that is emerged at time of application will be temporarily injured.

d. Sprigs should be planted 2 inches deep.

e. Not labeled for use in established forage bermudagrass.

f. Grazing restriction – 70 days

7. ForeFront and Grazon Next - DowAgroSciences

a. Both contain 0.33 lbs. aminopyralid + 2.67 lbs, 2,4-D per gallon of formulated product.

b. **Recommended for use only on permanent grass pastures and hayfields.**

c. The addition of 2,4-D to aminopyralid improves the control of plantains, wild radish and common pokeweed and certain other broadleaf weeds. This herbicide will provide excellent control of horsenettle and tropical soda apple.

d. Use rates are 1.5 to 2.6 pts./acre.

e. No grazing restriction for any type of livestock. Do not harvest forage for hay within 7 days of a ForeFront application.

f. Crop rotational intervals:

1. Do not rotate to any other crop within one year of treatment

2. Do not seed forage legumes or other broadleaf crops until a field bioassay show that the level of aminopyralid or metsulfuron in the soil will not adversely affect that forage legume or broadleaf crop (see label).

g. Other considerations:

1. Do not transfer livestock from treated pastures, or from ForeFront treated hay feeding areas on to broadleaf crop areas without first allowing livestock to graze for 3 days on an untreated grass pasture.
2. Do not store or feed ForeFront treated hay on fields that will be planted to broadleaf crops.
3. Do not use manure from livestock grazing on ForeFront treated areas on gardens, broadleaf crops or orchards.
4. ForeFront will injure or kill legumes such as clovers and alfalfa. Do not plant legumes or broadleaf crops until a field bioassay has shown that the aminopyralid concentration in the soil is not at a level that will injure broadleaf crops (see label for instructions on conducting field bioassay).

h. There are specific sprayer clean-out procedures shown on the ForeFront label which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

8. <u>Grazon P+D, HiredHand P+D – DowAgroSciences; GunSlinger - Albaugh</u>

a. All contain 2.0 lbs. 2,4-D amine and 0.54 lbs. picloram per gallon of formulated product. **THESE HERBICIDES ARE LABELED FOR USE ONLY ON PERMANENT GRASS PASTURES AND HAY FIELDS. THEY MAY ALSO BE APPLIED TO PERMAMENT PASTURES THAT WILL BE SEEDED WITH SMALL GRAINS OR RYEGRASS. THESE HERBICIDES ARE NOT RECOMMENDED FOR USE IN TEMPORARY SUMMER OR WINTER GRAZING SYSTEMS OR IN ROTATIONAL PROGRAMS THAT UTILIZE BROADLEAF CROPS.**

b. Controls a wide range of annual and perennial broadleaf weeds. Also provides 3 to 4 weeks residual, or preemergence, control of annual broadleaf weeds. May be used at high rate (1.0 gallon per acre) for pricklypear cactus control. It may take 2,4-D + picloram 1.5 to 2.0 years to kill pricklypear cactus.

c. Add a nonionic surfactant at 0.25% v/v.

d. Rates:

- Normal use rates are 2.0 to 4.0 pts./acre. Higher rates may be used for certain weeds such as pricklypear cactus.

e. **Grazing and haying restrictions:**

1. Lactating dairy animals - 7 days.
2. No grazing restrictions for other types of livestock.
3. Do not cut for hay (all types of livestock) for 30 days. Do not feed 2,4-D + picloram treated hay on areas that will be rotated to sensitive broadleaf (tobacco, peanuts, etc.), or use treated hay for mulching purposes. Do not use manure from animals grazing on, or hay from, 2,4-D + picloram treated areas on lands used for growing broadleaf crops.
4. Withdraw meat animals from treated forage at least 3 days before slaughter.

f. May be applied at 4.0 pts./acre or less to permanent pastures that will be seeded with cool-season grasses (ryegrass, tall fescue). Delay planting for 21 days after application.

g. Small grains should not be planted in Grazon P+D treated areas for 60 days after application.

h. Clover seeding restrictions for Grazon P+D are as follows:

   Fall-seeding is permitted if Grazon P+D at 2 pts./acre or less are applied at no later than June (4 month plant back)

   Spring (Feb. – Mar.) seeding is permitted the following spring for Grazon P+D at 2 to 3 pts./acre if applied no later than Sept. 15 the previous year.

i. May be applied to permanent pastures that have been over seeded with small grains or ryegrass. Do not apply at rates in excess of 1.5 pts./acre and until over seeded ryegrass or small grains are well-established and at the tillering stage of growth.

j. May be applied at up to 1.5 pts./acre may be applied to newly sprigged bermudagrass once the stolons (runners) have reached 6 inches in length and growing conditions are favorable.

k. There are specific sprayer clean-out procedures shown on the 2,4-D + picloram labels which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

l. **Other restrictions:**

   Do not rotate to grain sorghum until 8 months after application.

   Do not rotate to any food or feed crop on 2,4-D + picloram treated land if they are not registered for use with picloram until a field bioassay shows that no picloram is present in the soil.

9. <u>Gramoxone Inteon – Syngenta; Firestorm - ChemTura</u>

a. Gramoxone Inteon contains 2.0 lbs. of paraquat per gallon of formulated product. Firestorm contains 3.0 lbs. of paraquat per gallon of formulated product.

b. Labeled in dormant forage bermudagrass and for the conversion of endophyte-infected tall fescue.

c. Effective on a wide range of winter and summer annual weeds.

d. **Dormant bermudagrass** - Controls a wide range of winter annual weeds, including little barley (before mid-boot stage). Apply on warm days in Jan. - March, while bermudagrass is dormant. Do not apply during green-up.

e. Use rates: Firestorm - 0.7 to 1.3 pts./acre; Gramoxone Inteon – 1.0 to 2.0 pts./acre. A 0.25% v/v nonionic surfactant must be added to the spray mixture. A minimum spray volume of 20 to 30 gpa should be used to ensure adequate spray coverage.

f. Always use a nonionic surfactant with paraquat.

g. **Grazing and haying restrictions:**

Dormant bermudagrass -Do not pasture or mow for hay until 40 days after treatment.

Endophyte-Fescue Conversion - Do not graze the new planting for 60 days after the last application and until the new growth is at least 6 inches tall.

10. Impose – MANA (Makhtesian Agan); Panoramic - Alligare

a. Both contain 2.0 lbs. imazapic per gallon of formulated product.

b. Use only on established forage bermudagrass. Do not use on tall fescue or bahiagrass. Do not apply to newly-sprigged bermudagrass or during the grow-in period from seed or sprigs. Imazapic is not recommended for use on 'World Feeder 'or 'Jiggs' bermudagrass.

c. Do not apply during spring transition.

d. Controls crabgrass, sandbur, broadleaf signalgrass, johnsongrass, yellow and purple nutsedge, and many broadleaf weeds such as pigweed and cocklebur.

e. Can also be used to control bahiagrass..

e. Imazapic does not control knotroot foxtail, dallisgrass, goosegrass, horsenettle, pricklypear cactus, purpletop, broomsedge, hophornbeam copperleaf and bitter sneezeweed.

f. The normal application rate of imazapic for most annual grass weeds, such as crabgrass and sandbur less than 4 inches tall, is 4.0 fl. oz. product per acre. A nonionic surfactant at 0.25% v/v should be added to the spray mix, unless liquid fertilizer is used as the spray carrier (see label).

g. There are no grazing restrictions (including lactating dairy animals, horses, etc.) for Impose and Panoramic. However, there is a 7-day haying restriction for all types of livestock.

h. Impose and Panoramic is non-volatile.

i. **Studies conducted under weed-free conditions have shown that imazapic will reduce bermudagrass hay yields 20 to 50% at the first hay cut (usually 30 days)**

following an application. At a first glance the yield reduction associated with imazapic appears to be less than desirable. However, keep in mind that annual grass weeds, such as crabgrass, also reduce yield and the marketability of bermudagrass hay. Bermudagrass recovers or grows out of the injury within 20 to 30 days. No hay yield reductions have been reported for hay cuttings at 60 and 90 days after application.

11. <u>Metsulfuron – Several manufacturers</u>

a. Contains 0.6 pounds of metsulfuron per pound of formulated product. A 60 DF formulation. Formerly marketed as Ally.

b. Effective for 'Pensacola" bahiagrass control. Metsulfuron has also shown good to excellent control of bitter sneezeweed, wild garlic/onions, curly dock, horseweed, buttercup, mayweed chamomile, Carolina geranium, henbit, wooly croton, pigweeds and thistles.

c. Use only on bermudagrass (established for more than 60 days) and well-established tall fescue (two years).

d. Rates - 0.1 to 0.4 oz. product per acre.

e. Metsulfuron will not control crabgrass, goosegrass, sandbur, smutgrass, 'Common' bahiagrass and 'Argentine' bahiagrass.

f. Apply with 0.125 to 0.25% v/v nonionic surfactant.

g. **There is no grazing or haying restriction for metsulfuron.**

h. The minimum rotation intervals after the use of Metsulfuron at 0.3 oz. product/acre are as follows:

   a) 4 months - for overseeding with clover or alfalfa (0.1 to 0.3 oz./acre).
   b) 4 months - for overseeding or renovating with bermudagrass, ryegrass, tall fescue (0.1 to 0.3 oz./acre).
   c) 1 month - for seeding winter or spring wheat (0.1 to 0.3 oz./acre).
   d) 10 months - for seeding durum wheat, barley and oats (0.1 to 0.3 oz./acre).

i. There are specific sprayer clean-up procedures which must be followed if the sprayer is to be subsequently used on other crops. This clean-up procedure is shown on the Metsulfuron label and involves the use of ammonia or spray tank cleaning solutions such as Nutra-Sol, Loveland Spray Tank Cleaner and Tank-Aid.

j. Metsulfuron tank-mixes with liquid fertilizer are not recommended for 'Pensacola' bahiagrass control.

12. <u>Milestone - DowAgroSciences</u>

a. Contains 2.0 lbs. per gallon of aminopyralid.

b. **Recommended for use only on permanent grass pastures and hayfields.**

c. Controls numerous annual and broadleaf weeds. Highly effective for the control of tropical soda apple and horsenettle.

d. Normal use rates are 4.0 to 7.0 fl. ozs./acre.

e. No grazing or haying restriction for any type of livestock.

f. Crop rotational intervals:

1. Do not rotate to any other crop within one year of treatment

2. Do not seed forage legumes or other broadleaf crops until a field bioassay show that the level of aminopyralid or metsulfuron in the soil will not adversely affect that forage legume or broadleaf crop (see label).

g. Other considerations:

1. Do not transfer livestock from treated pastures, or from Milestone treated hay feeding areas on to broadleaf crop areas without first allowing livestock to graze for 3 days on an untreated grass pasture.
2. Do not store or feed Milestone treated hay on fields that will be planted to broadleaf crops.
3. Do not use manure from livestock grazing on Milestone treated areas on gardens, broadleaf crops or orchards.
4. Milestone will injure or kill legumes such as clovers and alfalfa. Do not plant legumes or broadleaf crops until a field bioassay has shown that the aminopyralid concentration in the soil is not at a level that will injure broadleaf crops (see label for instructions on conducting field bioassay).

h. There are specific sprayer clean-out procedures shown on the Milestone label which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

13. Outrider (formerly Maverick) - Monsanto

a. Contains 0.75 pound of sulfosulfuron per pound of formulated product.

b. Highly effective for the postemergence control of johnsongrass and nutsedge(s) and other sedges in bermudagrass and bahiagrass. Apply to emerged johnsongrass 18 to 24 inches tall up to the seedhead stage of growth. This usually occurs from May 1 to September 15 in Georgia. Applications before the boot seedhead growth stage are recommended to prevent competition.

c. Outrider will not control crabgrass, goosegrass or other grass weeds.

d. Outrider is injurious to tall fescue and other cool-season grasses.

e. Use rate is 1.33 ozs. product/acre. A nonionic surfactant (90% active ingredient) should be added at 0.25% v/v to the spray mix (2.0 pts. per 100 gallons of spray mixture). Two applications, each at 1.33 ozs./acre, at a minimum application interval of 40 days, may be used per year if johnsongrass regrowth occurs.

f. There is no grazing restriction (all types of livestock) for Outride. For best weed control do not mow or harvest two weeks before or after application.

g. Outrider will suppress bahiagrass seedhead emergence, and should not be applied to seed production fields.

h. No crop, except wheat, may be planted in Outrider treated fields within 12 months of application. There are no crop rotation restrictions for wheat

14. Pastora – DuPont

a. Contains 0.562 lbs. nicosulfuron + 0.15 lbs. metsulfuron per pound for formulated product.

b. Use rate is 1.0 to 1.5 oz. product/acre. Add a nonionic surfactant at 0.25% v/v.

c. Recommended for use only on bermudagrass that has been established for one or more years.

d. Provides postemergence control of annual grasses such as fall panicum, Texas panicum, sandbur sp., Italian ryegrass, goosegrass and crabgrass. Also, controls 'Pensacola' bahiagrass, Johnsongrass and numerous broadleaf weeds. In bermudagrass hay fields repeat applications can be used to control vaseygrass (see supplemental label at:

http://www2.dupont.com/Production_Agriculture/en_US/label_msds_info/labels/R1094.pdf

e. For best results apply to annual grasses ≤ 2 inches tall.

f. Pastora may temporarily injure or stunt bermudagrass. To minimize potential for injury, apply Pastora during bermudagrass dormancy, during spring green-up with < 2 inches of new bermudagrass growth, or within 7 days of cutting for hay. Applications at other times than those listed may decrease bermudagrass production.

g. Pastora will severely injure or kill legumes.

h. Pastora has no grazing or haying restriction for any type or livestock.

i. The minimum rotation intervals after the use of Pastora are as follows:

1) 4 months - for seeding bermudagrass, ryegrass, tall fescue and wheat

2) 10 months – for seeding barley and oats

3. 12 months – for seeding alfalfa and clovers

15. PastureGard – DowAgroSciences

a. Contains 1.5 lbs. triclopyr ester + 0.5 lbs. fluroxypyr ester per gallon of formulated product.

b. Controls a wide range of annual and perennial broadleaf weeds and numerous woody species. Provides excellent control of upright-growing blackberry at 3.0 to 8.0 pts. per acre. Also, has fair to good activity on maypop passionflower.

c. A mixture of 50% v/v PastureGard plus 50% v/v diesel fuel or kerosene may be applied for the control of most woody species with stem diameters less than 4 to 6 inches in basal diameter. Apply this mixture to the lower 12 to 18 inches of the stem

(all sides of the trunk). This same mixture can be used as a cut stump treatment. Apply basal and cut stump treatments at any time of the year except when snow or water prevents spraying to the ground line.

d. For yucca and palmetto control apply a 2.0% v/v solution. Wet the center of plant including the growing point and leaf bases to soil surface. Complete coverage of leaves is not needed.

e. PastureGard rates:

- Normal use rates for broadleaf weeds are 1.5 to 3.0 pts./acre.

f. **Grazing and haying restrictions:**

1. Lactating dairy animals – grazing is not permitted the growing season of application.
2. No grazing restrictions for other types of livestock.
3. Do not cut for hay (all types of livestock) for 14 days.
4. Withdraw meat animals from treated forage at least 3 days before slaughter.

g. **Reseeding Restrictions are as follows:**

Cool-season grasses - 21 days

Clovers and other legumes – 30 days

Only wheat, barley, oats or perennial forage grasses may be planted within 120 days of application

All other crops – 120 days

h. PastureGard may be applied to permanent pastures that have been over seeded with small grains or ryegrass. Do not apply until over seeded ryegrass or small grains are well-established and at the tillering stage of growth.

i. There are specific sprayer clean-out procedures shown on the PastureGard label which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

16. Prowl H_2O – BASF

a. Contains 3.8 lbs. of pendimethalin per gallon of formulated product.

b. Use rates: 3.0 to 4.2 qts./acre.

c. Controls annual grasses such as crabgrass, sandbur, goosegrass, fall panicum, Texas panicum, etc. Control of broadleaf weeds such as pigweed and lambsquarters may also occur.

d. Apply only to dormant, established bermudagrass in late winter to mid-March for preemergence control of annual grasses and certain annual broadleaf weeds.

e. Crabgrass begins to germinate when soil temperatures average 55 F. Prowl H_2O must be applied before crabgrass or other annual grasses germinate.

f. Do not apply to tall fescue, or to newly-sprigged bermudagrass.

g. Prowl H_2O may be tank-mixed with postemergence broadleaf control herbicides such Weed Master, Grazon P+D, etc. for the control of emerged broadleaf weeds.

Grazing Restriction - 60 days, all livestock types

Haying Restriction – 45 days, all livestock types

17. <u>Remedy - DowAgroSciences</u>

a. Contains 4.0 lb./gal. of triclopyr ester.

b. Triclopyr is labeled on established forage grasses. Do not use on newly seeded or sprigged grasses until the grass has established a good root system, shows good vigor and is tillering.

c. Use rates: Remedy - 1 to 2 pints /acre

d. Highly injurious to legumes.

e. Triclopyr is effective on a wide range of herbaceous plants.

Some examples are:

<u>Woody Plants</u> - blackberry, cherry, elderberry, locust, poison ivy, sassafras, sumac, willow.

<u>Herbaceous Plants</u> - clover, curly dock, common lambsquarters, plantains, vetch, thistles, and many others.

f. **Reseeding Restrictions:** grasses - 21 days

g. Applied as a postemergence foliage application. Dormant stem applications are effective on a wide range of tree and brush species. Also, a mixture of 25% v/v Remedy plus 75% v/v diesel fuel or kerosene may be applied for the control of most woody species with stem diameters less than 4 to 6 inches in basal diameter and pricklypear cactus. Apply this mixture to the lower 12 to 18 inches of the stem (all sides of the trunk). Apply basal treatments at any time of the year except when snow or water prevents spraying to the ground line.

h. Remedy may be tank mixed with 2,4-D to make a "Crossbow-type" herbicide mixture.

i. A nonionic surfactant at 0.25% v/v should be used with triclopyr.

j. Applications at air temperatures > 85 F. may cause moderate to severe bermudagrass injury for two to three weeks.

k. **<u>Grazing and haying restrictions</u>:** Same as Crossbow.

18. <u>Roundup (Monsanto)</u>

a. Roundup WeatherMax, PowerMax and Original Max contains 5.5 lb./gal glyphosate.

b. Labeled for spot and wick-bar treatments and dormant bermudagrass. Roundup PowerMax is labeled for use after the first hay cut of bermudagrass. Check the label to determine if these uses are labeled on other specific branded glyphosate products. May also be used in late summer and fall months for conversion of endophyte-infected tall fescue to non-toxic endophytic tall fescue.

c. **Application Timings**:

Dormant bermudagrass - Apply from late December to mid-March while bermudagrass is dormant for the control of Italian ryegrass, little barley and certain broadleaf weeds.

After first bermudagrass hay harvest – Apply after the first bermudagrass cutting when bermudagrass has not yet initiated regrowth for the control of annual grasses. Application made after the initiation of regrowth will damage bermudagrass.

Spot treatment - Apply anytime to control emerged annual weeds. See label for information on application timings for perennial weed control. Use a 1.0 to 2.0% v/v glyphosate/water solution

Wickbar - Apply when suitable height differential between forage grass and weeds exist. Wipe as low as possible without contacting desirable forage grass. Weeds should be "wiped" in two opposite directions. Use a 33 to 50% v/v glyphosate/water solution.

d. **Grazing and Haying Restrictions**

Dormant bermudagrass – 0 days

After first bermudagrass hay harvest – 28 days

Spot and Wickbar - 7 days

Renovations/Conversions – 0 days for rates $\leq$ 2.0 qts./acre. 56 days at rates $\geq$ 2.0 qts./acre.

19. <u>Spike 20P - DowAgroSciences</u>

a. Contains 0.2 lbs. of tebuthiuron per pound of formulated product. This herbicide has considerable activity on woody plants and extreme care must be used.

b. Effective on a wide range of woody plant species. The following is a partial listing:

oaks	cherry	black locust	maples
pines	multiflora rose	sumac	blackberry
hickory	kudzu	sweetgum	willow

<u>NOTE</u>: Numerous other woody plant species are listed on the Spike label. Spike is not effective in controlling persimmon and sassafras

c. Spike is a pelleted herbicide formulation.

d. Primarily used for spot treatment brush and tree control at the rate of 3/4ounce of product per 100 square foot of soil surface.

e. Spike will kill desirable grasses and legumes in the area where the pellet contacts the soil.

f. **Grazing and haying restrictions:**

Do not cut for hay for one year after treatment. No restriction on grazing.

20. Surmount - DowAgroSciences

a. Contains 1.19 lbs. picloram amine + 0.96 lbs. fluroxypyr ester per gallon of formulated product. **SURMOUNT IS LABELED FOR USE ONLY ON PERMANENT GRASS PASTURES AND HAY FIELDS. SURMOUNT MAY BE APPLIED TO PERMAMENT PASTURES THAT WILL BE SEEDED WITH SMALL GRAINS OR RYEGRASS. THIS PRODUCT IS NOT RECOMMENDED FOR USE IN TEMPORARY SUMMER OR WINTER GRAZING SYSTEMS OR IN ROTATIONAL PROGRAMS THAT UTILIZE BROADLEAF CROPS.**

b. Controls a wide range of annual and perennial broadleaf weeds. Also provides 3 to 4 weeks residual, or preemergence, control of annual broadleaf weeds.

Provides good control of upright-growing blackberry at 3.0 to 4.0 pts. per acre. May be used at 3.0 to 4.0 pts. per acre for pricklypear cactus control.

Complete die back of pricklypear cactus may take 2 to 3 years.

c. Add a nonionic surfactant at 0.25% v/v.

d. Surmount rates:

- Normal use rates are 1.5 to 2.0 pts./acre.

e. **Grazing and haying restrictions:**

1. Lactating dairy animals – 14 days.
2. No grazing restrictions for other types of livestock.
3. Do not cut for hay (all types of livestock) for 7 days. Do not feed Surmount treated hay on areas that will be rotated to sensitive broadleaf (tobacco, peanuts, etc.), or use treated hay for mulching purposes.
4. Withdraw meat animals from treated forage at least 3 days before slaughter.

f. **Reseeding Restrictions are as follows:**

Cool-season grasses - 21 days
Clovers and other legumes – 12 months
Grass crops are permitted within 12 months of application
All other crops - after 12 months and bioassay field

i. Surmount may be applied to permanent pastures that have been over seeded with small grains or ryegrass. Do not apply until over seeded ryegrass or small grains are well-established and at the tillering stage of growth.

j. May be applied to newly sprigged bermudagrass once the stolons (runners) have reached 6 inches in length and growing conditions are favorable.

k. There are specific sprayer clean-out procedures shown on the Surmount label which must be followed to avoid injury to broadleaf crops. The preferred approach is to have a separate pasture sprayer.

21. <u>Telar 75DF</u>

a. Contains 0.75 pounds of chlorsulfuron per pound of formulated product. A 75 DF formulation.

b. Use rates range from 0.25 to 1.0 oz. product per acre. Maximum use rate in tall fescue is 0.5 oz. product per acre.

c. Use with a nonionic surfactant at 0.25% v/v.

d. **USE ONLY IN PERMANENT GRASS PASTURES AND HAY FIELDS**. **THIS HERBICIDE IS NOT RECOMMENDED FOR USE IN ROTATIONAL PROGRAMS THAT UTILIZE GRASS OR BROADLEAF CROPS.**

e. Effectively controls many broadleaf weeds such as blackberry, pigweeds and wild radish. Not effective on common ragweed and horsenettle.

f. There is no grazing or haying restriction (all types of livestock) for Telar.

g. The minimum rotation intervals after the use of Telar is as follows:

a) 3 months - for reseeding tall fescue

h. There are specific sprayer clean-up procedures which must be followed if the sprayer is to be subsequently used on other crops. This clean-up procedure is shown on the Telar label and involves the use of ammonia or spray tank cleaning solutions such as Nutra-Sol, Loveland Spray Tank Cleaner and Tank-Aid.

22. <u>Velpar 90SP and Velpar 2L - DuPont</u>

a. Contains hexazinone.

b. Primarily is used for the control of established smutgrass. Hexazinone is root absorbed and requires about one-half inch of rainfall within two weeks of application. Applications for smutgrass control should be made in the April to July time frame. Fall applications are not highly effective.

c. Hexazinone will moderately to severely injure bermudagrass and may eliminate the first cutting of hay. Bermudagrass and bahiagrass will recover within two to four weeks of application. Not recommended for tall fescue. Bermudagrass and bahiagrass should be established for one year before treatment. Do not apply to newly seeded or newly sprigged pasture grasses.

d. Use rates: Velpar 90SP - 0.75 to 1.15 lbs. product/acre
Velpar 2L - 2.75 to 4.5 pts. product/acre.
Use low rates on sandy soils.

e. There is no grazing restriction (all types of livestock) for Velpar

f. Do not cut for hay (all types of livestock) for 38 days.

g. Hexazinone can injure trees (especially oaks). Caution should be used near desirable deciduous trees.

WEEDY GRASS CONTROL IN FORAGE GRASSES.

These are the facts for weedy grass control in forage grasses.
1. There is no labeled, selective preemergence or postemergence herbicide labeled for the control of annual grass weeds, johnsongrass and nutsedge species in fescue forage systems.
2. MSMA, Zorial, atrazine (AAtrex, other trade names) and simazine (Princep, other trade names) are not labeled on any forage grass.
3. Adequate soil fertility, especially potassium levels, must be maintained if one expects to limit the gradual build-up of annual and perennial weedy grasses. *Mydocs/pastweed11*

WEED RESPONSE TO HERBICIDES USED IN FORAGES GRASSES

Time of Application	PRE ------	---------- POSTEMERGENCE ----------						
	Prowl	Chaparral	Cimarron Max	Cimarron Plus	Crossbow	2,4-D	dicamba (Banvel, Clarity)	ForeFront Grazon Next
amaranth, spiny	F-G	E	E	E		F-G	G-E	E
bahiagrass	P	G	F-G	G	P	P	P	P
bermudagrass	P	P	P	P	P	P	P	P
bitter sneezeweed		E	E	E	E	E	E	E
blackberry	P	G-E	F	E	G	P	F	P
bracken fern	P		G		G	P	G	

briars (Smilax)	P				P	P	F	
broomsedge	P		P	P	P	P	P	P
buttercup	P	G-E	E	E	E	E	P	E
camphorweed	P	G		G		P		G
chickweed	F	E	E	E	F	P	G	G
crabgrass	G		P	P	P	P-F	P	P
crotalaria, showy	P	G				G	G	G
cudweed		G	G	G	E	F	E	G-E
curly dock	P	G-E	G-E	G-E	G	F	E	G-E
dallisgrass	P		P	P	P	P	P	P
dandelion	P				E	E	E	G-E
dodder					P	P	P	
dogbane, hemp	P	P	P	P	F-G	P-F	F	P
dogfennel	P	P-F	G-E	F-G	E	F	E	F
evening primrose		G	G	G	E	E	E	E
foxtails, green & yellow	F		P	P	P	P	P	P
gallberry	P				E	G	E	
goldenrod	P	P	G-E	P	G	F	G	G
henbit	F-G	G-E	E	E	F	P	G	F
honeysuckle	P				E	E	E	
horsenettle	P	G-E	F	P-F	P-F	P	G	E
horseweed	P	G-E	E	F	G	G	E	E
Italian ryegrass			P-F	P-F	P	P	P	P
johnsongrass	G[1]		P	P	P	P	P	P
kudzu	P	G	P-F	P-F	F-G	P-F	G	G
lespedeza, Sericea	P	P	F-G	G-E	P-F	P	P	
little barley					P	P	P	

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

[1]Seedling johnsongrass only.

WEED RESPONSE TO HERBICIDES USED IN FORAGE GRASSES (continued)

Time of Application	PRE ---------- POSTEMERGENCE ----------							
	Prowl	Chaparral	Cimarron Max	Cimarron Plus	Crossbow	2,4-D	dicamba (Banvel, Clarity)	ForeFront Grazon Next
maypop passion flower	P	P	P	P		P		P
mayweed			G	G	G	F	E	G-E
nettle, stinging	P	G-E	F-G	F-G	F-G	P	P	G-E
nutsedge	P		P	P	P	P	P	P
palmetto	P	P	P	P		P	F	
perilla mint	P				F-G	P-F	F-G	
persimmon	P				G	P	E	
pigweed species	F-G	G-E	E	E	E	G-E	E	E
plantain(s)	P	G-E	E	E	G	G-E	F	G
pokeweed, common	P	P		P	G	G	G	G
prickly pear	P	P	P	P		P	F	P
ragweed, common	P	G-E	G	G	E	E	E	E
red sorrel	P	E	G	G-E	E	P	G	E
rush species	P	P	P	P	F-G	G	P	
sandbur	G		P	P	P	P	P	P
shepherdspurse	F				E	E	E	E
sicklepod	P	G	G	G	E	G	E	E
sida, arrowleaf & prickly	P		G	G	P-F	G	G	E
smartweed(s)	P	G-E	E	E	G-E	F	G	E
smutgrass	P		P	P	P	P	P	P
swinecress						E	E	E
Texas panicum	F-G			P	P	P	P	P
thistles	P	E	G-E	F-G	E	E	G	E
tropical soda apple	P	G-E	P	P	F	P	F-G	G-E
vaseygrass	P		P	P	P	P	P	P
vervain, blue								G
Virginia pepperweed	P-F					G	E	G
wax myrtle	P	P				G	E	
wild cherry	P					E	P	E
wild garlic	P	G	G-E	G-E		G-E	F	F
wild plum	P					E	E	E
wild radish	P	G-E	G-E	G-E	E	G	E	E
wild rose	P	G	F	F	E	G	E	F
wooly croton	P	G-E	G-E	G	E	G	E	E

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

WEED RESPONSE TO HERBICIDES USED IN FORAGE GRASSES (continued)

Time of Application	----------POSTEMERGENCE----------					
	Grazon P+D	hexazinone (Velpar)	imazapic (Impose)	Metsulfuron	Milestone	paraquat
amaranth, spiny	G-E	F-G	G	E	G	F-G
bahiagrass	P	P	G-E	G	P	P
bermudagrass	P	P	P	P	P	P
bitter sneezeweed	E			E	G-E	
blackberry	F	F		G	G	P
bracken fern	F	F		G	G	P
briars (Smilax)		F				P
broomsedge	P	P	P	P	P	P
buttercup	E	G		E	G-E	G
camphorweed	G-E			G		P
chickweed	P	E		P	F	E
crabgrass	P	P	F-G	P	P	F
crotalaria, showy	E					
cudweed	G			G	E	G
curly dock	G-E	P-F		E	E	P
dallisgrass	P		P	P	P	P
dandelion	E	E		G-E	P	G
dodder						G-E
dogbane, hemp	F				P	
dogfennel	G-E			P-F	P	P
evening primrose	E	E		G	E	P-F
foxtails, green & yellow	P	P-F	F-G	P	P	F
gallberry		P				P
goldenrod	G			G-E	G	P
henbit	P-F	G-E		E	F-G	G
honeysuckle	F					P
horsenettle	G-E		P	P	E	P
horseweed	E	F	P	F	E	P
Italian ryegrass	P	G	F	P		G
johnsongrass	P	P	F-G	P	P	P
kudzu	F		P	P-F	F-G	P
lespedeza, Sericea	P			G-E		P
little barley	P	E		P	P	G-E

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

WEED RESPONSE TO HERBICIDES USED IN FORAGE GRASSES (continued)

Time of Application	----------POSTEMERGENCE----------					
	Grazon P+D	hexazinone (Velpar)	imazapic (Impose)	Metsulfuron	Milestone	paraquat
maypop passionflower	P-F			P	P	P
mayweed	G-E	F-G		G		E
nettle, stinging	E		P	F-G	E	
nutsedge	P	P	G	P	P	P
palmetto		P	P	P	P	P
perilla mint	F-G				P	
persimmon	P	F			P	P
pigweed species	E	G	G-E	E	E	G
plantain(s)	F-G	F-G		E	P	P
pokeweed, common	F			P	F	
prickly pear	F-G	P		P	P	P
ragweed, common	E	F	F	G	E	G
red sorrel				E		P-F
rush species			P	P		P
sandbur	P		G-E	P	P	G
shepherdspurse	E	E	E	G	P	G
sicklepod	E		G	G	P	F-G
sida, arrowleaf & prickly	E			F	P	P
smartweed(s)	E	F-G		E	E	E
smutgrass	P	G-E	P	P	P	P
swinecress	E	E	E		P	E
Texas panicum	P	P	P-F	P	P	G
thistles	E	E		F	E	G
tropical soda apple	G-E	F	P	P	E	P
vaseygrass	P		F	P	P	P
vervain, blue	G				F	
Virginia pepperweed	E	E			P	G
wax myrtle		P				P
wild cherry		E				P
wild garlic	F			G	P	E
wild plum		E	P			P
wild radish		E	E	G-E	P	P
wild rose	F		P	G	F	P
wooly croton	E	P		G	E	P

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

WEED RESPONSE TO HERBICIDES USED IN FORAGE GRASSES (continued)

Time of Application	----------POSTEMERGENCE----------						
	Pastora	PastureGard	Redeem	Spike	Surmount	Triclopyr (Remedy)	Weedmaster
amaranth, spiny	G-E	P-F	P		G-E		E
bahiagrass		P	P		P	P	P
bermudagrass		P	P		P	P	P
bitter sneezeweed	G-E	E	E	E	E	E	E
blackberry		G	G-E	G	G	G-E	P-F
bracken fern		F	P	G	F	G	
briars (Smilax)		G	P	G	F	P	F
broomsedge		P	P		P	P	P
buttercup	E	F	E	G	G	E	E
camphorweed		E			E	E	P
chickweed	E	E	G	E	G-E	F	F
crabgrass	F	P	P		P	P	P
crotalaria, showy		E			E	E	G
cudweed		G	E		G	E	G
curly dock	G-E	F	E		G	E	E
dallisgrass		P	P		P	P	P
dandelion	G	G-E	G	G	E	E	E
dodder		P	P			P	P
dogbane, hemp		F-G	P		G	F	F
dogfennel	P	E	E	G	E	E	G
evening primrose	F	G		G	E	E	E
foxtails, green & yellow	F-G	P	P		P	P	P
gallberry		E	G			E	G
goldenrod	G	G	E		G	G	E
henbit	E	G-E	G	G	G	F	P
honeysuckle		P	P	G	G	P	E
horsenettle	P	P-F	F	F	E	P-F	F
horseweed		G	G		E	G	E
Italian ryegrass	G-E	P	P		P	P	P
johnsongrass	G-E	P	P		P	P	P
kudzu		G	G-E	P	F	G-E	F
lespedeza, Sericea		E				G-E	P
little barley		P	P		P	P	P

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

WEED RESPONSE TO HERBICIDES USED IN FORAGE GRASSES (continued)

Time of Application	----------POSTEMERGENCE----------						
	Pastora	PastureGard	Redeem	Spike	Surmount	Triclopyr (Remedy)	Weedmaster
maypop passion flower		F					P
mayweed	G-E	G	E	E	G-E	G	G
nettle, stinging		E	F		G	G-E	F
nutsedge	P	P	P		P	P	P
palmetto		G	P	F	P	F	P
perilla mint		F			F	F-G	F-G
persimmon		F-G	P		G	F	F
pigweed species	G-E	G	G		G	E	E
plantain(s)	F	F	P		F	F	G-E
pokeweed, common		P	P		G	P	G
prickly pear		F	P		E	G[2]	P
ragweed, common		E	E		E	E	E
red sorrel		F	F-G		E	E	P-F
rush species		P	P		P	F	
sandbur	G-E	P	P		P	P	P
shepherdspurse		G	G	G	G	E	E
sicklepod	E	G	G		E	E	E
sida, arrowleaf & prickly		F	P		E	P	E
smartweed(s)	G						G
smutgrass		P	P		P	P	P
swinecress		G	G		G	G	E
Texas panicum	G-E	P	P		P	P	P
thistles	G	G	E		G-E	F-G	G
tropical soda apple	P	G	P	P	E	G	F
vaseygrass	F[3]	P	P		P	P	P
vervain, blue					E		
Virginia pepperweed		G				P	E
wax myrtle		G		F			G
wild cherry		G	F		G	E	E
wild garlic		F			P		G
wild plum		G	P	G	G		P
wild radish	G-E	G	F		E	E	E
wild rose		E	P	G	E	E	E
wooly croton	E	F	F		E	G	E

E = Excellent, G = Good, F = Fair, P = Poor Control. A blank space indicates weed response is known.

[2]For prickly pear cactus use 20% v/v Remedy plus 80% diesel fuel. Apply only as a spot treatment, as this treatment will severely insure desirable grasses.

[3]Apply in spring after full spring greenup of vaseygrass, or after hay harvest.