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Weed Control in Small Grain and Millet: 2011

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WEED CONTROL

in Small Grain and Millet: 2011



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Herbicide Suggestions

Information in this publication is based on research by the South Dakota Agricultural Experiment Station and other research or observations. Herbicides are included only after the chemical is registered by the Environmental Protection Agency (EPA) as to residue tolerances in crops used for food or feed.

This information provides a summary of herbicide uses and does not imply a guarantee. The label is the final guide.

Rates. Rates for most treatments are stated as the amount of product per acre; however rates for MCPA, 2,4-D, bromoxynil, and glyphosate are stated as acid equivalent (ae) per acre. Refer to the chart provided to determine the amount required for the specific product being used.

Time to Apply. The time to apply most treatments is based on crop and/or weed growth stage.

Cost. The cost for low and high rates is listed. Cost of additives is not included. Prices vary. Consult your dealer for actual price.

Resistance Management. Refer to the table on page 27 for a brief description of each herbicide site of action.

Repeated use of similar herbicide modes of action over multiple years may result in herbicide resistant weed populations or shifts in weed populations toward weed species that are difficult or costly to control. Maintaining the efficacy of herbicide chemistries through herbicide rotations may be an effective long-term strategy to reduce weed control costs as herbicide patents expire and weed control technology becomes less expensive. To facilitate proper herbicide rotation, the herbicide site of action number is listed next to the herbicide products in this publication.

Abbreviations Used

pt = pint
qt = quart
gal = gallon
oz = ounce
lb = pound
ai = active ingredient
ae = acid equivalent
DF = dry flowable (spray)
G = granule
L = liquid or EC
WSP = water soluble packet
NIS = nonionic surfactant
COC = crop oil concentrate
MSO = processed seed oil
WDG = water dispersible granule

Safety First

Follow the Label. It is a violation of federal pesticide laws to use an herbicide in a manner inconsistent with its labeling. Read the entire label for using.

Applicator Safety. The most serious risk of exposure is during handling and mixing the concentrated product. Use protective equipment specified on the label. Use chemical resistant gloves, eye shield, long-sleeved clothing, rubber boots, and appropriate respirator as required. In case of emergency, contact the Poison Control Center via 24 hour phone line:

Poison Control Center – 1-800-222-1222

Water Protection. Water quality is a public concern. Preventing spills and accidents reduces risk of groundwater and surface water contamination. Mix herbicides away from wells and water sources. Prevent back siphoning. Install anti-backflow devices in irrigation equipment used for pesticides. Triple rinse containers. Store herbicides properly. Identify high-risk areas such as coarse soils or areas where the water table is near the surface. Be aware of herbicide properties that increase the risk of contamination in the critical area. Some treatments have specific restrictions requiring buffer strips and border areas around wells, lakes, and streams.



Trade names for herbicides are used in this publication to aid reader recognition. The common name is also listed and is used for herbicides that are available in many labeled products. Examples of other product names are listed where possible based on information available. As patents expire and marketing agreements are formed, additional products may be marketed. Be sure crop use and application directions are followed for the product being used.

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2,4-D RATE – Product per Acre

Rates for 2,4-D are stated as acid equivalent (ae) per acre. The amount of product varies according to the formulation. The amount of product for several rates is listed for each formulation.

<u>Lb/A</u> <u>Required</u>	<u>FORMULATION</u>			
	<u>3.8L</u> *	<u>5.7L</u> *	<u>80% WSP</u>	<u>90% WSP</u>
.5	1 pt	.66 pt	.66 lb	.6 lb
1	2 pt	1.33 pt	1.25 lb	1.1 lb
1.5	3 pt	2 pt	1.9 lb	1.7 lb
2	4 pt	2.66 pt	2.5 lb	2.2 lb

*2,4-D showing 3.8 lb/gal is the same as 4 lb/gal; and 5.7 lb/gal is the same as 6 lb/gal acid equivalent. The lower values reflect new laboratory methods; products have not changed.

WHEAT, RYE, BARLEY, TRITICALE, MILLET, and OATS (not planted with legumes)

TREFLAN (trifluralin) *Site of Action:* 3 **(\$3.40-7.25)**

1-1.5 pt Treflan 4L or 5-7.5 lb Treflan 10G (0.5-0.75 lb ai)

FOXTAIL

Spring Application after Planting, Shallow Incorporated. Liquid formulation. Incorporate 1 to 1.5 inches deep with two flexline or spike-tooth harrowing. Plant seed 2 to 3 inches deep. Does not control wild oats. Better crop tolerance than fall-incorporated application. Minimum carrier is 5 gpa. Do not plant oats or sorghum the following year. Preferred application method for most situations. Trifluralin may be available in additional brand products. Do not apply where Treflan or Sonalan was applied at a rate greater than 0.5 lb ai the previous season.

Spring Preplant Incorporated. Barley only. Spray or granules. Use 1 pt Treflan 4L or 5 lb per acre Treflan 10G. Incorporate within 24 hours. Incorporated with a second pass before planting; for granules allow at least 7 days before the second pass.

Fall-Applied, Preplant Incorporated. Granules preferred. Apply after September 1. Granules may be applied into standing stubble. Incorporate within 24 hours. Make second incorporation in the spring before planting. Consistent foxtail control. Crop tolerance may be adequate; however, some stand reduction may be noted in certain conditions. Note precautions as for spring application.

HARD RED SPRING WHEAT, DURUM, and BARLEY. Apply liquid in spring after planting and incorporate shallowly or apply in the fall and incorporate. Apply granules in fall and incorporate. May be applied in the spring preplant and incorporated before planting for barley only. Not for winter wheat or rye.

5-10 lb Treflan 10G (0.5-1 lb ai) **(\$4.85-9.65)**

FALLOW. Use for foxtail control during the fallow period. Plant hard red spring, durum wheat, and barley the following spring. Incorporate within 24 hours. Complete the second incorporation whenever escaping weeds make it necessary. Plant seed 2 inches deep.

FAR-GO (trilalate) *Site of Action:* 8 **(\$11.80-17.65)**

1-1.25 qt Far-go 4L or 12.5-15 lb Far-go 10G (1-1.25 or 1.25-1.5 lb ai)

WILD OAT

Spring Application. Far-go 4L or Far-go 10G. Control is fair to very good. Spray formulation preferred. Incorporate Far-Go 4L immediately into the top 2 inches of soil either before seeding or after planting with two harrowing. Use 1 qt for spring and durum wheat or 1.25 qt for barley. Far-Go 10G may be incorporated before seeding barley as for 4L or after planting and incorporated immediately into the top 2 inches of soil with two harrowing for spring wheat, durum, or barley using 10 to 12.5 lb per acre. Use the low rate when seeding wheat with a press drill. Best wheat tolerance when applied after planting.

BUCKLE (trilalate + trifluralin) *Site of Action:* 8+3 **(\$15.25-22.85)**

10-15 lb Buckle 13G (1.3-2 lb ai)

WILD OAT,
FOXTAIL

Intended for residual control of wild oats, green and yellow foxtail, and downy brome suppression in winter wheat, durum wheat, and barley. Best results if granules are incorporated within 24 hours after application to a depth not exceeding 3-4 inches.

Spring Application. Apply 10-12.5 lb/A for barley or barley/pea mix. To incorporate, use equipment such as a culti-harrow but not disc implements. A second incorporation at a right angle may improve efficacy.

Fall Application. Apply 10-12.5 lb/A for barley or durum wheat or 12.5-15 lb/A for winter wheat. If incorporating with a single pass in the fall, a second incorporation must be performed in the spring during seedbed preparation. Avoid working the soil in the spring any deeper than fall tillage. If no spring work is anticipated, then two incorporations must be completed in the fall. Buckle may be applied at 10 lb/A in the fall prior to planting spring wheat in Corson, Dewey, Harding, Perkins, and Ziebach counties. Average soil temperature from 0-2 inches deep must be less than 40° F. at the time of application. Do not plant wheat deeper than 1.5-2 inches and delay planting until soil is 45° F. or warmer. There is a risk of crop injury on hilltop soils. Crop rotation restriction is 12 mo for peas and lentils and 16 mo for sorghum, proso millet, corn, or oats.

CALLISTO (mesotrione) Site of Action: 27**3 - 6 fl oz Callisto (0.094 + 0.19 lb ai)**

LAMBSQUARTERS,
PIGWEEEDS,
SEVERAL OTHERS

For oats and millet only. Controls several common broadleaf weed species, such as kochia, lambsquarters, pigweed, mustard, and velvetleaf, and common ragweed.

If weeds are emerged at the time of application, add a NIS (0.25% v/v) or COC (1% v/v). Using COC rather than NIS may increase the risk of crop injury. In addition to NIS or COC, UAN (28%N, 2.5% v/v) or AMS (8.5 lb/100 gal. spray solution) may be added for improved weed control but it is not required and it may increase the risk of oat injury. Do not graze or feed forage within 30 days after application. Do not make more than one application per year.

OAT. Apply 6 fl. oz/A for preemergence applications or 3 fl. oz/A for postemergence (after weed and oat emergence) applications. Apply to weeds less than 5 in tall. Postemergence applications may result in temporary oat injury, which may include leaf bleaching, leaf burn, or stunting. Tank mixing with other herbicides or pesticides (particularly those with EC formulations) may increase the risk of foliar oat injury.

MILLET. Apply up to 6 oz/A after planting but prior to millet emergence. Tolerance has been good in SDSU trials.

MCPA AMINE or MCPA ESTER Site of Action: 4**(\$1.05-2.75)****0.25-0.5 lb ae MCPA amine or MCPA ester (0.25-0.5 lb ae)**

SOME
BROADLEAVES

Selective, translocated herbicides for annual broadleaves. Equal to 2,4-D on wild mustard, lambsquarters, and Canada thistle. Weeds must be small; early spraying is important. Less effective than 2,4-D on larger weeds. Kochia and wild buckwheat control usually unsatisfactory. Excellent crop tolerance at a wide range of stages. Avoid spraying at boot to heading. Most situations require 0.33 to 0.5 lb ae per acre. Ester forms have appeared slightly more effective on some species. Apply by air or ground. Do not graze dairy or slaughter animals on treated areas for 2 weeks after treatment.

WINTER WHEAT, RYE. Apply in the spring after tillering but before early boot. MCPA is not widely used because other treatments frequently give better control of weed problems.

HARD RED SPRING WHEAT, DURUM, BARLEY. Apply from the 5-leaf to early boot stage. Frequently used in combination treatments.

OAT. Apply at the 3 – 4 leaf stage. Excellent crop tolerance.

2,4-D AMINE or 2,4-D ESTER Site of Action: 4**(\$.85-2.20)****0.25-0.5 lb ae 2,4-D amine or 2,4-D ester (0.25-0.5 lb ae)**

BROADLEAVES

Selective, translocated herbicide for several annual and perennial broadleaved weeds. Best choice for field bindweed. Very good control of several annual broadleaves but less effective for kochia or wild buckwheat. Good crop tolerance at proper growth stage. Avoid treating at boot to heading. Better crop tolerance with amine.

Ester usually used at slightly lower rate than amine. Rates of 0.33 lb ester or 0.5 lb ae amine per acre have been satisfactory for most general broadleaved problems. Rate of 0.25 lb ae per acre will control small susceptible weeds such as wild mustard. Use maximum rate for perennials. Some labels allow rates to 0.75 lb ae per acre for improved perennial control if some crop injury can be tolerated. Apply by air or ground. Label does not support preplant applications. Do not graze dairy or slaughter animals on treated areas for 2 weeks after application.

Harvest aid application of 1 lb ae per acre may be made after the dough stage. Do not use straw for feed.

WINTER WHEAT, RYE. Apply in spring when crop is fully tillered until early boot. Do not apply in fall.

HARD RED SPRING WHEAT, DURUM, BARLEY. Apply from the 5-leaf to early boot stage after crop has tillered. Earlier treatment may reduce number of tillers.

2,4-D Amine or Ester (Continued . . .)

OAT. Apply only 2,4-D amine at 0.25 – 0.33 lb ae/A at the 3 – 4 leaf stage. Do not apply at boot or heading. Crop tolerance is marginal and varies among varieties. Considerable yield reduction is possible. Weak on wild buckwheat and kochia. Higher rates for larger weeds or perennials.

MILLET. Apply 2,4-D amine 3.8L at 0.5 – 1 pt/A from 5-leaf to early boot stage after crop tillering. Earlier treatment may reduce number of tillers.

BANVEL, CLARITY, RIFLE, STERLING + MCPA or 2,4-D (dicamba + MCPA + 2,4-D)

Site of Action: 4

(\$2.35-4.60)

**2-4 fl oz dicamba 4L + 0.25-0.38 lb ae MCPA or 0.25-0.38 lb ae 2,4-D
(0.06-0.12 + 0.25-0.38 lb ae)**

SEVERAL
ANNUAL
BROADLEAVES

Tank-mix. Excellent broadleaved weed control, including wild buckwheat and kochia. Application time is usually too early for maximum perennial control. Crop stage is critical. Late applications may cause injury. Lower rates improve crop tolerance and may be adequate if conditions are favorable; however, even lower rates should not be applied past recommended crop stages. Rate of 3 fl oz dicamba 4L + .25 lb ae MCPA or 2,4-D amine suggested for most situations. Use lower rates for small susceptible weeds under favorable growing conditions. Use higher rates for best kochia control. MCPA in the combination gives best crop safety. Amine form of MCPA or 2,4-D preferred; ester forms not recommended. Minimum carrier is 3 gpa for ground and 1 gpa for air. Do not harvest hay for 37 days after application. Grazing is allowed. Wait 22 days per 8 oz of dicamba to plant wheat.

Labeling allows preharvest application in winter and spring wheat using 8 fl oz 4L plus 0.25 to 0.375 lb ae 2,4-D and in barley using 0.5 pt 4L plus 0.25 lb ae 2,4-D per acre. Apply after crop is in hard dough stage; allow at least 7 days before harvest. Do not graze or feed straw from treated fields. Test germination if crop is used for seed purposes.

WINTER WHEAT. Apply in the spring before jointing stage of crop. Not for rye.

HARD RED SPRING WHEAT, DURUM. Apply at the 3 – 4 crop leaf stage for best tolerance. Do not apply if the crop exceeds the 5-leaf stage. Durum is slightly less tolerant than hard red spring.

BARLEY. Tank-mix only. Label suggests 0.12 to 0.19 pt dicamba 4L + 0.25 lb ae MCPA per acre at the 2- to 3-leaf crop stage. Poor crop tolerance.

TRITICALE. Apply Clarity only at 2 to 4 oz per acre. Apply prior to jointing for winter types and up to 6-leaf stage for spring types.

OAT. Apply at the 3 – 4 oat leaf stage. Do not apply after the 4 leaf stage. Crop tolerance is adequate within the narrow application window. Adding MCPA improves mustard control.

PROSO MILLET. Apply dicamba alone at the 2 - 5 leaf crop stage. One tank mix option may be 0.18 pt dicamba 4L + 0.75 pt 2,4-D amine 4L. Apply the tank-mix at the 3 – 5 leaf stage. Crop tolerance is marginal. Do not graze treated areas for 7 days or harvest hay for 37 days after application.

OTHER TANK-MIXES – WHEAT. Rates of dicamba 4L are 0.12 to 0.18 pt in most situations. Dicamba 4L at 0.12 to 0.25 pt may be used in two-way tank-mixes with other herbicides including Ally, Ally Extra, Amber, Express, Finesse, Harmony Xtra, Harmony GT, Peak, bromoxynil, bromoxynil + MCPA, Curtail, and Stinger. These combinations control additional weeds and improve control of weeds less susceptible to dicamba. Dicamba 4L at 0.18 to 0.25 pt may be tank-mixed with reduced rates of other herbicides including Ally (0.05 oz); Amber (0.14 oz); Express (0.08 oz); and Finesse (0.16 oz) per acre. Reduced rate combinations suggested for small weeds under good conditions.

SPECIAL THREE-WAY TANK-MIXES – WHEAT. Dicamba 4L at 0.18 to 0.25 pt per acre may be used in 3-way combinations. These mixtures have potential where there is concern for resistant weeds and a need for broad spectrum control. Several combinations are listed:

0.18-0.25 pt dicamba 4L + 0.05 oz Ally 60XP + 0.25 lb ae 2,4-D

0.18-0.25 pt dicamba 4L + 0.14 oz Amber 75DF + 0.25 lb ae 2,4-D

0.18-0.25 pt dicamba 4L + 0.08 oz Express 75XP + 0.25 lb ae 2,4-D

0.18-0.25 pt dicamba 4L + 0.16 oz Finesse 75DF + 0.25 lb ae 2,4-D

0.18-0.25 pt dicamba 4L + 0.16 oz Harmony GT 75XP + 0.25 lb 2,4-D amine

2,4-D + DICAMBA**BANVEL+2,4-D, BRASH, RANGE STAR, RIFLE-D, WEEDMASTER**

0.5 – 2 pt (0.06-0.25 lb ae dicamba + 0.18-0.72 lb ae 2,4-D)

BROADLEAVES Apply 0.5 – 1 pt/A for general broadleaf weed control. Several broadleaf herbicide tank mix options, such as Aim (0.3 oz), Ally (0.05 – 0.1 oz), Bronate (0.75 – 1.5 pt), Buctril (1 – 1.5 pt), Curtail (2 – 2.67 pt), Express (0.083 – 0.167 oz), Harmony Extra (0.167 – 0.33 oz), and others.

Harvest aid application in wheat up to 2 pt/A when wheat is in the hard dough stage and the nodes (joints) are no longer green. Wait 7 days after application until harvesting. Do not use on wheat being used for seed.

WHEAT. Apply after tillering but before the 6 leaf wheat stage.

STARANE (fluroxypyr) Site of Action: 4

(\$9.90-13.25)

STARANE + 2,4-D or STARANE+SALVO or COLT+SALVO (fluroxypyr + 2,4-D)**STARANE + MCPA or STARANE+SWORD or COLT+SWORD (fluroxypyr + MCPA)**

0.3-0.4 pt Starane Ultra 2.8L (0.11-0.14 lb ae)

0.66-1.33 pt Starane 1.5L (0.12-0.25 lb ae)

0.66-1.33 pt Starane 1.5L + 0.5-0.75 pt 2,4-D or MCPA (0.12-0.25 + 0.25-0.38 lb ae

1.33-2.33 pt Starane/Salvo 3.75L or 1.5-2.75 pt Starane/Sword 3.55L

(0.12-0.25 + 0.5-1 lb ae)

**KOCHIA,
ANNUAL
BROADLEAVES**

Starane is a translocated postemergence herbicide used to control certain broadleaf weeds. Fluroxypyr provides an alternative mode of action to control ALS resistant kochia biotypes. Labeling also includes cocklebur, sunflower, common ragweed, and Venice mallow. Mustard, Russian thistle, pennycress, wild buckwheat, and other broadleaves may require combination treatments. Starane has been tested extensively in SDSU tests; kochia control has been excellent and crop tolerance very good. Lower rates have been satisfactory for kochia in SDSU tests. Weeds should be actively growing.

Starane may be tank-mixed with other labeled postemergence herbicides. Tank-mixes with other broadleaf herbicides such as 2,4-D or MCPA add broadleaf control. Starane/Salvo premix contains 0.75 lb fluroxypyr (Starane) + 3 lb 2,4-D ester/gal. Rate is 1.33 to 2.33 per acre. The low rate is equivalent to 6 oz Starane Ultra and 1 pt 2,4-D ester. Starane/Sword premix contains 0.71 lb fluroxypyr (Starane) + 2.84 lb MCPA ester/gal. Rate is 1.5 to 2.75 pt per acre. The low rate is equivalent to 6 oz Starane Ultra and 1.2 pt MCPA ester and is suggested for most weeds including kochia and mustard. For oats, tank mixes with MCPA may provide good crop tolerance. Supplemental labels for reduce rates (Starane + Salvo at 1 pt or Starane + Sword at 1.125 pt) and tank mix partners for early season weed control when weeds are less than 4 in tall.

Minimum carrier is 8 gpa for ground or 3 gpa for air. Do not graze or harvest forage within 8 days of application. Allow at least 40 days after application before harvesting grain or straw. Only wheat, barley, or oats may be planted in treated fields within 120 days of application.

WINTER WHEAT, SPRING WHEAT, DURUM, OATS, and BARLEY. Apply from the 2-leaf crop stage up to and including flag leaf. Follow crop stage guidelines for the most restrictive product when tank-mixing.

MILLET. Apply after the 2 leaf stage but prior to early boot. Do not harvest for hay within 14 days after application or for grain within 40 days after application.

STARANE NXT (fluroxypyr + bromoxynil) Site of Action: 4+6

(\$7.10-13.90)

14-27.4 fl oz Starane NXT (0.6-0.12 lb ae fluroxypyr and 0.25-0.5 lb a.e. bromoxynil)

Starane NXT may control similar weeds as Starane (fluroxypyr) alone, plus additional weed species such as wild buckwheat, lanceleaf sage, and several mustard species. Rates depend on the targeted weed species to be controlled.

Starane NXT (Continued . . .)

Minimum spray volume of 10 to 20 gpa if recommended for ground application or 5 gpa for aerial application. A NIS or COC may improve control when using low carrier volumes, applying during adverse growing conditions (cool temperatures, low humidity, or drought), or when applying to small, heavily pubescent kochia. Grazing or harvesting treated forage for livestock feed is not allowed. Any crop may be replanted in treated fields 120 days after application.

FALL or SPRING SEEDED WHEAT, BARLEY, OATS. Apply after the 3-leaf growth stage but prior to flag leaf emergence.

PULSAR (dicamba + fluroxypyr) Site of Action: 4+4

(\$5.80-8.70)

8.3-12.5 fl oz Pulsar (0.047-0.7 + 0.06-0.09 lb ae)

ANNUAL
BROADLEAVES

Pulsar at 8.3-12.5 fl oz/A contains the equivalent amount of dicamba as 1.5-2.3 oz/A Clarity and 5.2-7.9 oz Starane 1.5L. Controls annual broadleaf weed species such as wild buckwheat, lambsquarters, pigweed, kochia, Russian thistle, and others. May be tank mixed with MCPA ester at 8.6 oz/A to increase weed spectrum, such as mustard species or prickly lettuce. Several other tank mix partners are possible (see label).

NIS may be added if growing conditions are dry, low relative humidity, or cool temperatures. Add 0.125-0.25% v/v (1-2 pt/100 gal water). Minimum carrier is 8 gpa for ground applications or 3 gpa for aerial applications. May be sprayed in a solution containing up to 50% liquid nitrogen, but this may increase the risk of crop burn.

Risk of off-site movement increases when temperature exceeds 85°F. or if thermal inversions exist. May be rainfast 4 hours after application. Do not graze or harvest treatment areas within 7 days after application. Do not apply within 14 days of cutting for hay or 40 days before harvesting for grain.

WHEAT (WINTER or SPRING) and BARLEY. For fall seeded wheat or barley, apply prior to the jointing stage. For spring seeded wheat, apply before the wheat is at the 6 leaf stage. For spring barley, apply before barley is at the 4 leaf stage. Best results if applied while weeds are actively growing.

STINGER or CLOPYR AG (clopyralid) Site of Action: 4

(\$14.30-18.85)

0.25-0.33 pt Stinger 3L (0.09-0.12 lb ae)

CANADA THISTLE,
SOME ANNUAL
BROADLEAVES

Especially effective for Canada thistle; also controls annual broadleaves such as sunflower and cocklebur. Very good crop tolerance. Use the high rate for Canada thistle. Stinger may be tank-mixed with bromoxynil, dicamba, MCPA, 2,4-D, Ally, or Express for improved control of other species. Commercial premix of Curtail generally preferred for use in small grain. Refer to sections for Curtail.

WINTER WHEAT, HARD RED SPRING WHEAT, DURUM, OAT, and BARLEY. Apply at 3-leaf to early boot crop stage.

WIDEMATCH or COLT AS (clopyralid + fluroxypyr) Site of Action: 4+4

(\$8.15-10.80)

1-1.33 pt WideMatch 1.5L (0.09+0.12 to 0.09-0.12 lb ae)

ANNUAL
BROADLEAVES

WideMatch is a premix containing 0.75 lb clopyralid (Stinger) plus 0.75 lb fluroxypyr (Starane) per gallon. It controls several annual and perennial broadleaved weeds, including clover, dandelion, kochia, dock, ragweed, several thistles, and biennial wormwood. Weak on mustards and common lambsquarters. Wild buckwheat must be treated early. Crop tolerance is excellent to both components.

Rates are 1 to 1.33 pt per acre. The low rate is suggested for small, susceptible weeds. The 1 pt rate provides the equivalent of 3.8 oz Stinger and 7.7 oz Starane. Minimum carrier is 8 gpa for ground or 3 gpa for air. Additives are not required but may improve control under difficult conditions. For wheat, liquid fertilizer up to 50% of the total volume may be used. Do not graze treated areas or harvest forage for 7 days or cut hay for 14 days or harvest grain or straw for 40 days. Avoid spreading manure or using hay or straw from treated areas for mulching or use on land to be planted to susceptible broadleaf crops.

WideMatch or Colt AS (Continued . . .)

Barley, grasses, oats, corn, and wheat can be planted anytime. Avoid planting flax and canola for 120 days; alfalfa, sorghum, safflower, sunflower, field peas, dry beans, and soybeans for 10.5 mo; chickpeas and lentil for 18 mo.

WINTER WHEAT, SPRING WEHAT, DURUM, OATS, and BARLEY. Apply from the 3-leaf through flag leaf emergence crop stage.

CURTAIL or COMMANDO or CUTBACK (clopyralid + 2,4-D amine) Site of Action: 4+4 (\$9.00-15.95)

1.5-2.66 pt Curtail 2.38L (0.075-0.13 + 0.37-0.66 lb ae)

CANADA THISTLE,
ANNUAL
BROADLEAVES

Commercial premix. Curtail contains 0.38 lb clopyralid + 2 lb ae 2,4-D amine per gal. Rates of 1.5 to 2 pt are special labeled for annual weeds; rates of 2 to 2.66 pt per acre are suggested for less susceptible annuals or perennial weeds. Crop tolerance is good. Clopyralid gives excellent seasonal control of Canada thistle; it also controls mustard, lambsquarters, sunflower, and cocklebur. Wild buckwheat control has been fair to good; kochia control is variable. Thistle should not exceed 6 inches or be past bud stage. Minimum carrier is 5 gpa for ground or 2 gpa for air. Do not harvest hay from treated fields. Do not rotate to any crop except small grain, corn, or forage grass for one year after treatment. Carryover is possible in dry or cool conditions.

WINTER WHEAT, HARD RED SPRING WHEAT, DURUM, and BARLEY. In spring after tillering up to jointing stage.

TANK-MIXES. Curtail may be tank-mixed with bromoxynil, dicamba, MCPA, or 2,4-D, Ally, Harmony Xtra, Harmony GT, and Express. Refer to each product for precautions and application directions.

CURTAIL M or CUTBACK M (clopyralid + MCPA) Site of Action: 4+4 (\$11.95-15.70)

1.75-2.3 pt Curtail M (0.09-0.12 + 0.5-0.68 lb ae)

CANADA THISTLE,
ANNUAL
BROADLEAVES

Curtail contains 0.42 lb clopyralid + 2.35 lb ae MCPA per gal. Apply 1.75 to 2.3 pt/A. Higher rates may be used during adverse conditions, but risk of crop injury will increase. Curtail M provides control of several annual broadleaf species and Canada thistle. Minimum carrier is 2 gpa, but at least 10 gpa is recommended for adequate coverage. Do not harvest hay from treated fields. Crop rotation restriction is 30 days for barley, field corn, grasses, oats, or wheat; 5 mo for canola and flax; 10.5-18 mo for alfalfa, dry beans, sorghum, safflower, soybeans, and sunflowers; and 18 mo for lentils and peas. May be rainfast 6 hours after application.

WHEAT, OATS, and BARLEY. Apply after 3 leaves have unfolded but prior to the jointing stage. For Canada thistle control between jointing and the boot stage, apply only if the risk of crop injury is acceptable. Apply to weeds after emergence but smaller than 3 inches tall or wide.

TANK-MIXES. Do not tank mix with 2,4-D or dicamba unless crop injury is acceptable.

HAT TRICK (clopyralid + MCPA + fluroxypyr) Site of Action: 4+4+4

1.5 – 2 pt Hat Trick (0.09-0.12 lb ai clopyralid + 0.3-0.5 lb ai MCPA + 0.09-0.12 lb ai fluroxypyr)

CANADA THISTLE,
ANNUAL,
BROADLEAVES

For slightly greater control of mustard species and lambsquarters relative to other clopyralid + fluroxypyr products or mixes. Apply 1.5 pt/A to actively growing susceptible weeds that are less than 4 in tall or 1.5 – 2 pt/A to weeds 4 – 8 in tall or during adverse growing conditions. Risk of crop injury increases and weed control may decrease if extreme adverse conditions such as drought or near freezing temperatures occur within 3 days of application. Weed control may decrease if foliage is wet at the time of application or if temperatures are less than 45°F or greater than 85°F during application. Rainfast within 6 hours after application.

Minimum carrier volume is 3 gpa for ground or aerial applications. Using at least 10 gpa may result in the best control. A NIS is not necessary, but may be used during adverse growing conditions or to small pubescent kochia.

Hat Trick (Continued . . .)

Do not allow livestock to graze or harvest treated fields for forage within 7 days of application. Do not cut for hay prior to 14 days after application or harvest for grain prior to 40 days after application.

WHEAT (including Durum), BARLEY, OATS. Apply to actively growing weeds up to wheat jointing but prior to the boot stage.

BROMOXYNIL PRODUCTS (bromoxynil) Site of Action: 6 (\$7.80-17.75)
BROMOXYNIL + MCPA or 2,4-D (\$5.10-13.00)

<i>Trade names</i>	<i>Concentration per gallon</i>	<i>Use rates</i>
Buctril, Moxy, Broclean, Brox, Maestro 2EC	2 lb ae bromoxynil	1 - 2 pt/A
Buctril 4EC, Maestro 4EC	4 lb ae bromoxynil	0.5 – 1 pt/A
Bison, Brox M, Bromac, Maestro MA, Vendetta, WildCard Xtra	2 lb ae bromoxynil + 2 lb ae MCPA	1 – 1.5 pt/A
Bronate Advanced, Bromac Advanced, Bison Advanced, Maestro Advanced	2.5 lb ae bromoxynil + 2.5 lb ae MCPA	0.8 – 1.2 pt/A
Maestro D, Double Up B+D	2 lb ae bromoxynil + 1.9 lb ae 2,4-D est	0.75 – 2 pt/A

WILD
BUCKWHEAT,
SUNFLOWER,
SEVERAL ANNUAL
BROADLEAVES

Bromoxynil is a contact herbicide with excellent crop tolerance. Applications with 2,4-D or MCPA in a tank-mix or commercial premix may improve weed control in many situations. Bromoxynil/MCPA premix contains bromoxynil and MCPA ester. Broad spectrum annual broadleaf control. Excellent wild buckwheat and good kochia control. Not for perennials. Weeds should be in the 1 – 4 leaf stage. Very good crop tolerance at a wide range of growth stages.

Rate of 0.25 lb bromoxynil + 0.25 MPCA lb ae per acre has been satisfactory for small weeds under favorable growing conditions. Use 0.38 lb ae per acre of each for larger weeds or less favorable conditions.

Good coverage required. Carrier rate is 10 gpa for ground or 5 gpa for air. Reduced carrier to 5 gpa for ground or 3 gpa for air may result in reduced control.

Rates of bromoxynil 2L to 2 pt or 4L to 1 pt per acre may be used on winter wheat. Use high rates of MCPA for best perennial weed control. An additional 0.25 lb ae per acre MCPA may be added to the rates listed in the combination. MCPA provides better crop tolerance than combinations with 2,4-D. Some labels recommend a maximum of 1 pt per acre bromoxynil when tank-mixing with 2,4-D whereas 2 pt per acre bromoxynil may be applied when tank-mixing with MCPA. MCPA ester formulation suggested. Avoid treating during adverse growing conditions, such as cold temperatures. Tank mixing with some EC formulated fungicides may increase the risk of leaf burn. Do not graze treated fields for 30 days.

WINTER WHEAT, RYE. Apply bromoxynil after crop emergence but before the crop has reached boot stage.

HARD RED SPRING WHEAT, DURUM, BARLEY. Apply bromoxynil at 2-leaf to early boot stage. When tank-mixed with 2,4-D, apply from fully tillered up to jointing stage.

TRITICALE. Apply bromoxynil alone as for wheat.

OAT. Apply from the 3 leaf to the early boot stage. Some reports of floret abortion if applied after the 5 leaf stage. Lower rates preferred for best crop safety.

OTHER TANK-MIXES. Tank-mixes for special situations include bromoxynil or premix products with dicamba, Amber, Curtail, Express, Finesse, Harmony Xtra, and Harmony GT. Bromoxynil is also labeled for use with several herbicides for grass control, but may antagonize some grass herbicides such as Puma if used at higher rates.

Bromoxynil Products (Continued . . .)

PREMIXES

Cleansweep M 1 – 1.5 pt/A (0.2-0.3 lb ae MCPA + 0.2-0.3 lb ae bromoxynil + 0.08-0.12 lb ae fluroxypyr)

WILD BUCKWHEAT
KOCHIA, RUSSIAN
THISTLE, PRICKLY
LETTUCE,
RAGWEED,
LAMBSQUARTERS

For control of several common broadleaf weed species, such as wild buckwheat, kochia, Russian thistle, lambsquarters, prickly lettuce, common ragweed, and several others.

Do not harvest for hay within 14 days after application or allow livestock to graze within 45 days after application. Do not apply more than 2.4 pt/A per growing season. The risk for crop injury increases and weed control efficacy declines if applied during adverse growing conditions, such as drought or near freezing temperatures.

WHEAT, BARLEY, OATS, TRITICALE. Apply after the 2 leaf stage up to flag leaf emergence. Best if applied when weeds are less than 8 in tall. May apply 1 pt/A to weeds less than 4 in tall or 1.5 pt/A to weeds 4 – 8 in tall or during adverse growing conditions. Do not apply more than 2.4 pt/A per growing season.

Cleansweep D 1 – 1.5 pt/A (0.25-0.38 lb ae 2,4-D + 0.2-0.3 lb ae bromoxynil + 0.08-0.12 lb ae fluroxypyr)

For control of several common broadleaf weed species, such as wild buckwheat, kochia, mustards, lambsquarters, prickly lettuce, common ragweed, and several others.

Do not graze or harvest forage within 45 days after application or harvest for hay within 14 days after application. Do not feed straw to livestock. Do not apply more than 1.5 pt/A per growing season. The risk for crop injury increases and weed control efficacy declines if applied during adverse growing conditions, such as drought or near freezing temperatures.

WHEAT, BARLEY, OATS. Apply after full tiller but prior to jointing. Use the higher rate when weed densities are high or growing conditions are poor.

HUSKIE (pyrasulfotole + bromoxynil) Site of Action: 27 + 6

(\$7.60-10.40)

11-15 oz Huskie (0.028-0.038 + 0.15-0.21 lb a.i.)

KOCHIA, MUSTARDS
PRICKLY LETTUCE,
LAMBSQUARTERS,
WILD BUCKWHEAT,
OTHERS

Standard rate is 11 oz/A, but may use 13-15 oz/A for improved control of difficult weeds or Canada thistle suppression. May provide very good control of kochia, Russian thistle, prickly lettuce, lambsquarters, pigweed, mustards, and several other broadleaf weed species. Apply to young (1-6 inches tall), actively growing weeds.

Add nitrogen fertilizer and/or NIS to improve control. AMS at 0.5-1 lb/A is the preferred N source, but may use UAN (28, 30, or 32% N) at 1-2 qt/A. NIS may be added at 0.25-0.5% v/v (1-2 qt/100 gallon spray solution). Combinations of NIS and either AMS or UAN may be added at these rates. Minimum carrier is 10 gpa for ground applications (5 gpa with AMS under ideal conditions) or 5 gpa for aerial applications. Huskie may be tank mixed with several grass and broadleaf herbicides.

Crop rotations are 7 days for wheat, barley, oats, rye, and triticale; 4 months for millet, sorghum, and soybeans; 9 months for alfalfa, canola, chickpeas, corn, dry beans, flax, field peas, lentils, safflower, and sunflowers.

WHEAT, DURUM, BARLEY, TRITICALE. Apply from 1-leaf up to flag leaf emergence.

AIM (carfentrazone) Site of Action: 14 (\$3.45-13.10)
AIM + 2,4-D or MCPA (carfentrazone + 2,4-D or MCPA) (\$3.85-13.90)

0.5-1.9 oz Aim EC 2L + 0.12-0.24 lb ae 2,4-D amine (0.008-0.031 ai + 0.12-0.24 lb ae)

SEVERAL
ANNUAL
BROADLEAVES

Aim is a postemergence herbicide with contact activity on broadleaf weeds. It has provided good control of normal and ALS resistant kochia. Aim also has fair to good activity on wild buckwheat, pigweed, and black nightshade. Tank-mix with 2,4-D, MCPA, or other labeled broadleaf herbicides. Pennycress and wild mustard have also been controlled in SDSU tests. Crop tolerance at the lower rate appears adequate; temporary leaf chlorosis may be noted. High moisture and humidity increase the risk of leaf speckling.

Rates of 0.5 to 0.75 oz per acre plus 2,4-D are suggested for most situations in wheat. Rate of 0.75 oz per acre will improve consistency. The 0.5 to 1 oz rates are for pigweed, tansy mustard, nightshade, and pennycress under 4 inches. These rates suppress field bindweed and have activity on Russian thistle, kochia, prickly lettuce, and wild buckwheat. Rates of 1.4 to 1.9 oz improve control of weeds suppressed at lower rates. Weed response is rapid. Good coverage is important. Minimum carrier is 10 gpa for ground or 3 gpa for air. Add NIS at 2 pt/100 gal. Under stress conditions AMS at 2 to 4 lb or 28% N may be added at 2 to 4 gal/100 gal. Corn, wheat, barley, sorghum, and soybeans may be planted after 30 days, other crops may be planted after 12 months. Do not harvest for forage for 7 days after application.

WINTER WHEAT, SPRING WHEAT, DURUM, BARLEY. Apply from 30 days before planting up to jointing stage. Crop should be 4-leaf to tiller stage for best safety with 2,4-D tank-mix.

OATS. Consider tank mixing with MCPA or other appropriate herbicide to maintain good crop tolerance.

PROSO and PEARL MILLET. May be applied from 30 days prior to planting through the 6-leaf stage. For best results apply before jointing.

TANK-MIXES. Aim may be tank-mixed with Assert, Everest, and Puma + Harmony GT for annual grass control. Antagonism has not been a significant factor. Aim may be tank-mixed with several other broadleaf herbicides. Refer to section for each product alone. Add NIS at 1 qt/100 gal for tank-mix with Harmony, Harmony Extra, and Starane. Do not add NIS with Bronate or Bison mixes. Aim may also be mixed with Salvo, Sword, or Saber.

0.5 oz Aim 1.9L + 2-4 oz dicamba 4L
0.5 oz Aim 1.9L + 0.12-0.18 lb ae 2,4-D or MCPA + 2-3 oz dicamba 4L
0.5 oz Aim 1.9L + 0.5-0.75 pt bromoxynil/MCPA 4L or 0.4-0.6 pt 5L
0.5 oz Aim 1.9L + 0.5-0.67 pt Starane
0.5 oz Aim 1.9L + 0.3 oz Harmony GT or Harmony Extra

PREPLANT BURNDOWN. Rate is .5 to 1.9 oz Aim 1.9L per acre. Add NIS at 2 pt/100 gal or COC at 1.5 to 2 pt per acre; 28% N at 2 to 4 gal/100 gal may also be added. Burndown of small weeds has been effective in SDSU tests.

RAGE D-TECH (carfentrazone + 2,4-D ester) Site of Action: 14+4 (\$1.85-3.70)

8-16 fl oz Rage D-Tech (0.008-0.016 lb ai + 0.25-0.50 lb ae)

KOCHIA,
LAMBSQUARTERS,
PIGWEEDS,
OTHER
BROADLEAVES

Controls kochia, Russian thistle, lambsquarters, pigweed, mustards, and several other broadleaf weed species.

Use a NIS at 0.25% v/v (1 qt per 100 gallons spray solution). Do not use other adjuvants for broadcast foliar applications in small grains. In addition to NIS, liquid nitrogen at 2-4% v/v (2-4 gallons per 100 gallons spray solution) or AMS at 2-4 lb/A may be used. Minimum carrier is 10 gpa for ground applications or 3 gpa for aerial applications. It is recommended to increase carrier volume by 50% if the canopy is dense. Rainfast in 6-8 hours after application. Do not apply when foliage is wet from dew, precipitation, or irrigation. There are several tank mix options, but mixing bromoxynil products is not recommended. Do not graze until 14 days after application and do not feed treated straw to livestock.

WHEAT, BARLEY, OATS, RYE. Apply from 3-tiller up to the jointing growth stage.

HARVEST AID. Apply 16-32 fl oz/A from hard dough up to 3 days before harvest.

ORION (florasulam + MCPA ester) *Site of Action: 2+4***(\$690)****17 fl oz Orion (0.004 + 0.311 lb ai)**LAMBSQUARTERS,
PIGWEEDES,
SEVERAL OTHERS

Controls several common broadleaf weed species, such as lambsquarters, pigweed, mustard, common ragweed, wild buckwheat, and several others.

Does not require an adjuvant. Minimum carrier volume is 3 gpa, but 10 gpa is recommended for adequate coverage. May be applied with ground or aerial equipment. Rainfast 4 hours after application. Rotation restrictions are less than 12 months for most crops. Crop may be grazed 7 days after application.

WINTER WHEAT, SPRING WHEAT, DURUM, BARLEY, OATS, RYE, TRITICALE. Apply from the 3 leaf crop growth stage to jointing. Results may be best when applied to small, actively growing weeds.

HARMONY 50SG (thifensulfuron)**(\$13.75-27.45)****UNITY 75WDG, VOLTA, THIEF****(\$3.45-6.95)****0.45-0.9 oz Harmony 50SG (0.14-0.28 lb ai)****0.3-0.6 oz Unity 75WDG, Volta, or Thief**MUSTARDS, ANNUAL
BROADLEAVES

SEVERAL Harmony controls several annual broadleaved weeds. Gives very good to excellent control of Russian thistle, wild sunflower, and buckwheat. Does not control ALS resistant kochia. Weeds should be actively growing and free of moisture stress. Grass is not controlled. Apply after weeds are emerged but less than 3 inches tall or across for best results. Crop tolerance is very good. Wheat, barley, and oats may be planted anytime after application, any other crop may be planted 45 days after application. Do not graze or feed forage or hay from treated areas. Harvested straw may be used for bedding and/or feed.

Apply 0.3 to 0.6 oz 75DF or 0.45 to 0.9 oz 50SG per acre. Use 0.5 to 0.6 oz 75DF or 0.75-0.9 50SG per acre for most situations if wild buckwheat is a significant problem. Sequential treatments may be applied provided total amount applied does not exceed 1 oz/A for Harmony GT or 1.5 oz/A for Harmony SG. Add NIS at 0.25%-0.5% v/v (1 to 2 qt/100 gal) or COC (1% v/v or 2% under arid conditions). Minimum carrier is 5 gpa for flat fan nozzles on ground equipment; 10 gpa for flood nozzles on 30 in spacing, and higher volume for wider spacing. Minimum carrier is 2 gpa for air. May be applied in liquid nitrogen fertilizer carrier. Do not use Harmony plus malathion as crop injury will occur.

WINTER WHEAT, HARD RED SPRING WHEAT, DURUM, BARLEY, and TRITICALE. Postemergence after the crop is in the 2-leaf stage but before the flag leaf is visible.

OAT. Apply after the 3 leaf stage but before jointing. Do not apply to Ogle, Porter, or Premier varieties as injury can occur. Tolerance has been adequate on oat varieties tested in SDSU trials including Bay, Burnett, Dane, Don, Hazel, Horicon, Hytest, Newdak, Settler, Troy and Valley. Crops affected by drought or prolonged cold, wet conditions are less tolerant. Using a COC rather than NIS may increase the risk of crop injury.

TANK-MIXES. Harmony may be tank-mixed with dicamba, 2,4-D, or bromoxynil to reduce the risk of resistant biotypes. Tank-mixes of 2,4-D ester or MCPA ester used for most situations (0.25-0.38 lb a.e./A). MCPA is safer for oats. Combinations with bromoxynil or dicamba have provided very good control of weeds including wild buckwheat. Refer to the section for each product used alone.

THREE-WAY MIXES. Harmony GT may be used in 3-way combinations. These mixtures have been useful to manage weed resistance.

0.17-0.33 oz Harmony GT 75XP + 0.25 lb ae 2,4-D + 0.12 pt dicamba 4L**0.17-0.33 oz Harmony GT 75XP + 0.75-1.5 pt bromoxynil/MCPA 4L or 0.6-1.2 pt 5L****0.17-0.33 oz Harmony GT 75XP + 0.25 lb ae MCPA + 0.12 pt dicamba 4L**

FALLOW. Apply in the spring or fall when the majority of weeds have emerged and are actively growing. May be tank-mixed with Fallowmaster, glyphosate+2,4-D, glyphosate + dicamba, 2,4-D, or dicamba.

Harmony GT XP, Unity, Volta, Thief (Continued . . .)

PREMIX

***Affinity BroadSpec, T-Pac* 0.4 - 1.0 oz (0.006-0.016 lb a.i. thifensulfuron and 0.006-0.016 lb a.i. tribenuron) (\$4.35-10.90)**

1:1 ratio thifensulfuron : tribenuron

Controls several broadleaf weeds species when applied alone, such as mustard species, pigweed species, lambsquarters, and wild buckwheat. A tank-mix partner is recommended for difficult weed species. For Canada thistle, apply 0.8 oz/A when thistle is 4-8 inches tall or add 2,4-D (0.5-0.75 pt/A of 4 lb a.i./gallon product) or dicamba (2-4 fl oz/A Banvel or Clarity) for improved control. For common ragweed or lanceleaf sage, apply 0.4 to 0.8 oz/A Affinity BroadSpec plus 2,4-D ester (0.5-0.75 pt/A of 4 lb a.i./gallon product). For kochia, Russian thistle, and prickly lettuce, apply in a tank-mix with fluroxypyr (e.g. Starane), dicamba, and 2,4-D or in a tank-mix with bromoxynil (e.g. Buctril) and 2,4-D. See label for more specific details regarding tank-mixes.

Add a NIS at 0.5-4 pt per 100 gallons of spray solution (0.06-0.5% v/v). In addition to the surfactant, an ammonium nitrate fertilizer, such as 28% N, 32% N, may be added at 2 qt/A or spray grade ammonium sulfate at 2 lb/A or double these fertilizer rates under dry conditions. May use a COC at 1 gallon per 100 gallon of spray solution (1% v/v), or 2% v/v when conditions are dry. Select adjuvants that are authorized with the tank-mix partner.

Minimum carrier for ground application is 5 gpa for flat-fan nozzles or 10 gpa for flood nozzles. Minimum carrier for aerial application is 2-5 gpa. Do not graze or feed treated plants to livestock.

WHEAT, BARLEY, TRITICALE. Apply after the 2-leaf stage but before the flag leaf is visible.

OAT. Apply after the 3 leaf stage but prior to jointing. Do not apply on Ogle, Porter, or Premier varieties. Do not make more than one application per year. Risk of crop injury increases during stressful growing conditions (drought, flood, disease/insect damage, low fertility, etc.). Crop is most susceptible to injury during the 2 – 5 leaf stage.

***Harmony Extra 75XP, TNT Broadleaf 75DF* 0.3 - 0.6 oz (0.009-0.019 thifensulfuron + 0.005-0.009 lb a.i. tribenuron)**
***Harmony Extra 50SG* 0.45 - 0.9 oz**

2:1 ratio thifensulfuron : tribenuron

Controls several common broadleaf weed species, such as mustards, pigweed and wild buckwheat, but add a tank mix partner for most weed species. For Canada thistle 4-8 inches tall, apply 0.6 oz/A of 75XP or 0.9 oz/A 50SG with surfactant plus 2,4-D (0.25-0.38 lb a.e./A). For common cocklebur, common ragweed, and lanceleaf sage, apply 0.4-0.5 oz/A of 75XP or 0.6-0.75 oz/A 50SG with 2,4-D (0.25-0.38 lb a.e./A). For kochia, Russian thistle, and prickly lettuce less than 2 inches tall, apply with dicamba + 2,4-D or bromoxynil+2,4-D (0.75-1 pt/A Buctril + 0.25-0.38 lb a/e/A 2,4-D). See label for additional tank-mix options.

Add a NIS at 0.25-0.5% v/v (1-2 qt/100 gallon spray solution). For ground applications, minimum carrier volume is 5 to 13 gpa depending on nozzles. Minimum carrier is 2 to 5 gpa for aerial applications. Do not graze or feed treated plants to livestock.

WHEAT, BARLEY, TRITICALE. Apply after the crop is in the 2-leaf stage but before the flag leaf is visible.

OAT. Apply after the 3 leaf stage but before jointing. Do not apply more than 0.4 oz/A.

Harmony GT XP, Unity, Volta, Thief (Continued . . .)

Audit 75WDG 0.133-0.66 oz/A (0.004-0.02 lb a.i. thifensulfuron + 0.002-0.008 lb a.i. tribenuron)

3:1 ratio thifensulfuron : tribenuron

The 0.133 oz/A is intended to be tank mixed with another broadleaf herbicide, but will provide control of lambsquarters, pigweed, velvetleaf, and mustard. Use 0.4-0.66 oz/A to control additional weed species, such as marshelder or curly dock. May get best results if applied while weeds are small and actively growing. For Canada thistle 4-8 inches tall, common ragweed, common cocklebur, or lanceleaf sage, apply 0.66 oz/A with 2,4-D (0.5-0.75 pt/A of 4L formulation or 0.3-0.5 pt/A of 6L formulation) plus NIS at 0.125-0.5% v/v (adding NIS may increase the risk for crop injury). Add a bromoxynil herbicide such as Bronate or Bison at 1.5 pt/A to control Russian thistle or ALS-resistant kochia. Add a fluroxypyr herbicide such as Starane at 0.5 pt/A for prickly lettuce or ALS-resistant kochia. See label for additional tank mix options.

Add a surfactant such as NIS (0.25-0.5% v/v or 1-2 qt per 100 gallons spray solution) or COC (1% v/v or 1 gallon per 100 gallons spray solution, use 2% v/v in arid conditions). MSO (0.5% v/v) may be added if specified by Arysta programs. In addition to a surfactant, a nitrogen fertilizer may be added such as UAN (28% or 32% N) at 2 qt/A or AMS at 2 lb/A. The N rate may be doubled during arid conditions. Minimum carrier rate is 5-10 gpa for ground applications or 3-5 gpa for aerial applications.

WHEAT, BARLEY, TRITICALE. Apply after the 2 leaf stage but before the flag leaf is visible. May also be applied as a preplant burndown or as a post-harvest application at 0.4-0.66 oz/A. More than one application in a growing season is permissible as long as the applications total less than 1.2 oz/A. Do not graze or feed treated plants to livestock.

Affinity TankMix 0.6-1.0 oz (0.015-0.025 lb a.i. thifensulfuron and 0.004-0.006 lb a.i. tribenuron) (\$4.90-8.20)

4:1 ratio thifensulfuron : tribenuron

Intended to be tank-mixed with other broadleaf or grass herbicides, such as bromoxynil, 2,4-D, dicamba, fluroxypyr, carfentrazone, and several other broadleaf and grass herbicides. The label describes several tank-mix options for specific weed species or weed communities.

Add a NIS at 1-2 qt per 100 gallons of spray solution (0.25-0.5% v/v). An ammonium nitrate fertilizer, such as 28% N, 32% N, or 2 lb/A spray grade ammonium sulfate, may be used with the surfactant. May use a COC at 1 gallon per 100 gallons or spray solution (1% v/v) or 2% v/v when conditions are dry. Select adjuvants that are authorized with the tank-mix partner. Do not graze or feed treated plants to livestock.

Minimum carrier for ground application is 5 gpa for flat-fan nozzles or 10 gpa for flood nozzles. Minimum carrier for aerial application is 2-5 gpa.

WHEAT, BARLEY, TRITICALE. Apply to wheat or barley after the 2 leaf stage but before the flag leaf is visible.

OAT. Apply after the 3 leaf stage but before jointing. Do not apply on Ogle, Porter, or Premier varieties. Using COC rather than NIS will increase the risk of crop injury. Do not apply more than 0.75 oz/A and do not make more than one application per year.

EXPRESS (tribenuron) Site of Action: 2 (\$4.35-8.70)

0.25-0.5 oz Express 50SG (0.008-0.16 lb ai)

SOME
ANNUAL
BROADLEAVES

Use as tank-mix with other broadleaf herbicides. It is a sulfonyl urea with very little soil activity. Gives good to excellent control of wild mustard, pennycress, Russian thistle, and non-ALS kochia. Control of wild buckwheat, smartweed, and sunflower is more variable. Weeds should be less than 4 inches tall or across and be actively growing. Crop tolerance is satisfactory. Warm temperature and good soil moisture enhance results. There are no rotational restrictions.

Rates are 0.25 to 0.5 oz Express 50SG per acre. Use 0.25-0.38 oz/A for light infestations when conditions are favorable. Use 0.5 oz for less tolerant species and for Canada thistle suppression. Add NIS (0.5-4 pt per 100 gal) or COC (1 gal per 100 gal or 2 gal per 100 gal during arid conditions). MSO may be added at 2 qt per 100 gal if specified by a DuPont program. In addition, a N fertilizer such as UAN (28% or 32% N) at 2 qt/A or AMS at 2 lb/A may be added. The N rate may be doubled during arid conditions.

Express (Continued . . .)

Minimum carrier is 5 gpa for flat fan nozzles in ground equipment; 10 gpa for flood nozzles on 30 in. spacing, and higher volume for wider spacing. Minimum carrier is 2 gpa for air. May be applied in liquid nitrogen carrier. Risk of crop yellowing is increased with surfactant and fertilizer carrier. Do not tank-mix with Malathion or Lorsban insecticide. Mixes with organophosphate insecticides may produce crop discoloration or injury. Do not graze or feed forage from treated fields. Straw may be used for feed or bedding. Corn, soybeans, and sorghum may be planted 14 days after application. Several other crops may be planted 45 days after application.

Tank-mix with other herbicides improves consistency and reduced the risk of resistant weeds. Tank-mixes with 2,4-D or MCPA (0.12-0.38 lb ae) used for most situations. Add 1-2 pt NIS when tank mixing 0.12 lb ae 2,4-D or MCPA and 1 pt NIS when tank mixing 0.25-0.38 lb ae 2,4-D or MCPA. Combinations with bromoxynil or dicamba have provided very good control of weeds such as wild buckwheat.

WINTER WHEAT, SPRING WHEAT, BARLEY, and TRITICALE. Postemergence after crop is in the 2-leaf stage but before flag leaf is visible. Do not harvest within 45 days of application.

THREE-WAY TANK-MIXES. Express may be used in 3-way combinations. These mixtures have been useful to manage weed resistance.

0.25-0.5 oz Express 50SG + 0.25-0.38 lb ae 2,4-D 4L 0.12-0.18 pt dicamba 4L
0.25-0.5 oz Express 50SG + .75-1.5 pt bromoxynil/MCPA 4L or 0.6-1.2 pt 5L
0.25-0.5 oz Express 50SG + 0.25 lb ae MCPA + 0.12 pt dicamba 4L

OTHER TANK-MIXES. Express may also be tank mixed with broadleaf herbicides such as Aim or Curtail or grass herbicides such as Puma, Everest, Discover, Assert, or Maverick.

FALLOW. Provides short-term annual broadleaf weed control; including kochia, lambsquarters, pigweed, and winter annual mustards. Apply in spring 60 days before planting or after cereal crop harvest in reduced tillage systems. Express may be tank-mixed with most herbicides labeled for fallow. Tank-mix with 2,4-D or dicamba is suggested for wild buckwheat, kochia, prickly lettuce, and Russian thistle. Rates as for Express alone.

ALLY 60XP, METSULFURON 60EG, PLOTTER 60DF,

PURESTAND, VALURON (metsulfuron) Site of Action: 2

(\$1.40)

ALLY + 2,4-D or MCPA or BROMOXYNIL or BANVEL or CLARITY or STERLING

0.1 oz Ally 60XP + 0.25-0.5 lb ae 2,4-D or MPCA (0.004 ai+0.25-0.5 lb ae)

0.1 oz Ally 60 XP + 0.75-1.5 pt bromoxynil 2L or 0.38-0.75 pt 4L

0.1 oz Ally 60 XP + 0.12-0.25 pt dicamba 4L

SEVERAL
ANNUAL
BROADLEAVES

Ally is a sulfonyl-urea herbicide with some soil residual. Use a s a tank-mix with other broadleaf herbicides. Residual properties extend control for 1 to 6 weeks. Pennycress, pigweed, prickly lettuce, wild mustard, and volunteer sunflower are among species most susceptible. Non-ALS kochia, wild buckwheat, Russian thistle, and tansy mustard are controlled or suppressed, depending on weed size and rainfall. Ally will not control wild oats or grasses. Results in field tests have been very good. Lower rates of 2,4-D or MCPA are adequate for susceptible weeds.

Ester forms perform best; surfactant can be reduced to 1 to 2 pt/100 gal. Surfactant improves control; crop tolerance may be reduced when used with the high rates of some combinations. Results on large mustard have been very good. Symptoms develop slowly. Crop tolerance appears adequate at recommended rates. Apply when weeds are small but before they are 4 inches tall or across. Rainfall after application improves results. Use a surfactant that is at least 80% active. Do not use on soil with pH over 7.9. Minimum carrier is 3 gpa for flat fan nozzles in ground equipment; 10 gpa for flood nozzles on 30 in. spacing and higher volume for wider spacing. Minimum carrier is 1 gpa for air. There are no grazing restrictions for Ally alone.

Follow rotational guidelines. Winter or spring wheat may be planted after 1 mo; CRP grasses after 4 mo; durum, barley, or oats after 10 mo; flax, safflower, and sunflower after 22 mo. Grain sorghum or proso millet in the south part of the state (south of Hwy 212 east of the Missouri River and south of Hwy 34 west of the Missouri River) may be planted after 12 mo if there has been 13 inches of precipitation between application and planting. Field corn may be planted after 12 mo east of the Missouri River and west of the Missouri River south of Hwy 14 if there has been 15 inches of precipitation since application. All other crops require 34 mo and at least 28 inches precipitation.

Ally (Continued . . .)

Labeling also allows preharvest application in winter and spring wheat using 0.1 oz Ally 60DF plus 0.25 to 0.5 lb ae 2,4-D ester with surfactant at 1 qt/100 gal. Crop should be at dough stage; allow at least 10 days before harvest. Do not feed straw or graze stubble after preharvest treatment.

ALS resistant kochia biotypes are significant in most areas. Rotate crops and herbicides or use tank-mixes or sequential treatments that include other modes of action that are effective for kochia.

WINTER WHEAT. Postemergence in spring when weeds are small and before boot stage. Use 1 to 2 qt surfactant per 100 gal. Use lower surfactant rate for combinations.

SPRING WHEAT, BARLEY. Postemergence from 2-leaf to early boot stage. Use MCPA or 2,4-D tank-mix.

TRITICALE. Supplemental label. Apply as for wheat. Tank-mix with herbicides labeled for triticale.

THREE-WAY TANK-MIXES. Ally may be used in 3-way combinations. These mixtures have been useful to manage weed resistance.

0.1 oz Ally 60XP + 0.25 lb ae 2,4-D + 0.12 pt dicamba 4L

0.1 oz Ally 60XP + 0.75-1.5 pt bromoxynil/MCPA 4L or 0.6-1.2 pt 5L

0.1 oz Ally 60XP + 0.25 lb ae MCPA + 0.12 pt dicamba 4L

ALLY EXTRA (thifensulfuron + tribenuron + metsulfuron) Site of Action: 2+2+2

(\$1.90-3.70)

0.2-0.4 oz Ally Extra 71.25DF (0.0089-0.018 lb ai)

0.3-0.5 oz Ally Extra 51.86SG (0.0097-0.016 lb ai)

SEVERAL
ANNUAL
BROADLEAVES

Ally Extra 71.25DF 0.2-0.4 oz and Ally Extra 51.86SG 0.3-0.5 oz contains 0.005-0.009 lb a.i. thifensulfuron, 0.002-0.005 lbs a.i. tribenuron, and 0.002-0.004 lb a.i. metsulfuron. Very good to excellent control of mustard, pennycress, Russian thistle, wild sunflower, wild buckwheat, and several other annual broadleaves. At high rates (0.4 oz), wild buckwheat control is improved over either product used alone; residual effects will extend 4 to 6 weeks. Does not control ALS resistant kochia. At low rates (0.2 oz) the potential residual is reduced compared to metsulfuron (Ally) alone. Labeling requires a tank-mix with another herbicide when using rates less than 0.4 oz. Grass is not controlled. Crop tolerance is good. Weeds should be actively growing and free of stress for best results.

The high rate is suggested for best results. It is equivalent to 0.1 oz Ally + 0.3 oz Harmony Extra per acre. Do not make more than one application of Ally Extra per crop season. Ally Extra may be tank-mixed with 2,4-D, MCPA, or other registered small grain herbicides. Ester formulation of 2,4-D or MCPA is preferred. Use the low surfactant rate with 2,4-D or MCPA tank-mixes. See the Agility label for additional recommended tank-mix partners.

Minimum carrier is 5 gpa for flat fan nozzles in ground equipment; 10 gpa for flood nozzles on 30 inch spacing and higher volumes for wider spacing. Minimum carrier is 1 gpa for air. Add NIS at 1 to 2 pt/100 gal. May be applied in liquid nitrogen carrier. Do not tank-mix with Malathion.

Maximum soil pH is 7.9. Winter or spring wheat may be planted after 1 mo; durum, barley, or oats after 10 mo; flax or safflower after 22 mo. Grain sorghum or proso millet in the southern part of the state (south of Hwy 212 east of the Missouri River and south of Hwy 34 west of the Missouri River) may be planted after 12 mo if there has been 13 inches of precipitation between application and planting. Field corn may be planted after 12 mo east of the Missouri River and west of the Missouri River south of Hwy 14 if there has been 15 inches of precipitation since application. All other crops require 34 mo and at least 28 inches precipitation. At 0.2 oz 71.25DF or 0.3 oz 51.86SG, grain sorghum may be planted after 4 mo and safflower after 10 mo and at pH 6.8 or less for peas, lentil, alfalfa, and dry beans the interval is 10 mo; increase the interval to 22 mo if pH is 6.9 to 7.9. At 0.3 oz 71.25DF or 0.4 oz 51.86SG, may rotate to sunflower after 10 mo. At higher rates, the rotation interval for sunflowers is 22 months.

RESISTANT
KOCHIA

Special management is required for resistant weed biotypes. Include herbicides with other modes of action if ALS resistant kochia is present. Tillage and crop rotation are useful to reduce the development of resistant populations.

Do not harvest for 45 days after application. Do not graze treated areas or feed forage or hay from treated areas; however, straw may be used for bedding or feed.

Ally Extra (Continued . .)

WINTER WHEAT, SPRING WHEAT, BARLEY. Postemergence after the 2-leaf stage but before the flag leaf is visible.

DURUM. Postemergence after crop is tillered but before boot stage. When using Agility on durum spring wheat, only use 2,4-D as a tank-mix partner and apply between tillering and the boot stage.

TRITICALE. Supplemental label. Apply as for wheat. Tank-mix with herbicides labeled for triticale.

FALLOW. Ally in the spring or fall when most weeds have emerged and are actively growing. Winter or spring wheat may be planted in 1 mo; durum wheat, barley and oats may be planted after 10 mo.

AGILITY (dicamba + thifensulfuron + tribenuron + metsulfuron) *Site of Action: 4+2+2+2* (\$4.15-8.25)

1.6-3.2 oz Agility 72.6SG (0.07-0.14 lb a.i.)

Agility 72.6SG at 1.6-3.2 oz is equivalent to 2-4 fl oz 4L dicamba product plus 0.2-0.4 oz Ally Xtra 71.25DF or 0.3-0.5 oz Ally Extra 51.8SG. Relative to Ally Extra, Agility provides additional control of black nightshade, wild buckwheat, and velvetleaf. Apply 3.2 oz/A for heavy weed infestations or difficult species or apply 1.6-2.4 oz/A for light infestations and optimal conditions. Weed control may be reduced in dry, dusty conditions. Do not apply when the crop is stressed by severe weather conditions, drought, low fertility, water saturated soil, disease, or insect damage.

Recommended spray adjuvants, minimum carrier volume, and rotation restrictions are similar to Ally Extra.

FALL WHEAT, BARLEY, TRITICALE. Apply after the crop is in the 2-leaf stage but before the joint stage.

SPRING WHEAT, SPRING TRITICALE. Apply after the crop is in the 2-leaf stage but before it exceeds the 6-leaf stage.

SPRING BARLEY. Apply after the crop is in the 2-leaf stage but before it exceeds the 4-leaf stage. Do not tank mix with 2,4-D for early season applications.

AMBER (triasulfuron) *Site of Action: 2* (\$2.75-5.55)

AMBER + 2,4-D ESTER or BANVEL or CLARITY or STERLING or BROMOXYNIL or BROMOXYNIL/MCPA

RAVE (triasulfuron + dicamba)

0.28-0.56 oz Amber 75DF (0.013-0.026 lb ai)

0.28-0.56 oz Amber 75DF + 0.25 lb ae 2,4-D ester

0.28-0.56 oz Amber 75DF + 0.12-0.25 pt dicamba 4L

0.28-0.56 oz Amber 75DF + 0.75-1.5 pt bromoxynil 2L or 0.38-0.75 pt 4L

0.28-0.56 oz Amber 75DF + 0.75-1.5 pt bromoxynil/MCPA or 0.6-1.2 pt 4L

SEVERAL
ANNUAL
BROADLEAVES

Amber controls several annual broadleaved weeds. It is a sulfonyl-urea with extended soil residual activity. It is usually used in a tank-mix application. Pennycress, pigweed, tansy mustard, sunflower, and kochia are among the most sensitive species. Does not control ALS resistant kochia. Wild buckwheat and Russian thistle control may be more variable, depending on weed size and conditions. Downy brome is included as suppression at special rates. Amber does not control wild oat or foxtail. Warm temperature and good moisture improve results. The addition of low rates of 2,4-D or dicamba is suggested.

Rates are .28 to .56 oz Amber 75DF per acre. The lower rates of 0.28 oz (5 Acres/Pak) or 0.35 oz (4 Acres/Pak) is suggested for most situations. The low rate is adequate for small, susceptible weeds and is used in most tank-mixes. The 0.47 oz (3 Acres/Pak) rate is for larger, more difficult weeds. The maximum rate of 0.56 oz (2.5 Acres/Pak) is suggested for suppression of downy brome. The maximum rate is 0.35 oz per acre for soils with a pH over 7.9. Minimum carrier is 3 gpa for ground or 2 gpa for air. Add NIS at 1 to 2 qt/100 gal. Follow grazing or haying restrictions for the tank-mix partner; no restrictions for Amber alone.

Special labeling allows for reduced rates of Amber at 0.175 oz with dicamba 4L at 0.12 to 0.18 pt in a 2-way mix or in a 3-way mix with addition of 0.25 lb 2,4-D per acre. Reduced rates are for small, susceptible weeds and will be most effective where good crop competition is anticipated.

Amber or Rave (Continued . . .)

Follow rotation guidelines. Barley, rye, or oats may be planted in 6 mo if pH is 6.9 or less or 18 mo if higher pH. Corn may be planted in 4 mo if IR hybrid is used; in 22 mo if pH is 7.9 or less, or 36 mo if higher pH. Proso millet may be planted in 4 mo; grain sorghum 24 mo; soybeans 36 mo; sunflower 24 mo and bioassay; other crops require bioassay. ALS resistant kochia biotypes are significant in most areas. Rotate crops and herbicides or use tank-mixes or sequential treatments that include other modes of action and are effective for kochia.

RESISTANT KOCHIA

Special management of Amber is required to reduce the risk of increasing populations of weeds resistant to sulfonyl-urea herbicides. Tank-mixing postemergence applications with another herbicide having a different mode of action reduces the risk. Crop rotations and tillage are other important management practices. Do not apply Amber or other herbicides with a similar mode of action within 12 months of an Amber application, except for split Amber treatments. Increase the interval to 15 months if soil pH exceeds 7.5.

WINTER WHEAT – SPLIT APPLICATION. For soils less than 7.5 pH. Use 0.28 oz per acre for each application. The initial treatment may be soil applied or postemergence; the second application must be tank-mixed with another herbicide with a different mode of action.

WINTER WHEAT, HARD RED SPRING WHEAT. Preplant, shallow incorporated or preemergence. Use only disk drill if preplant or shallow incorporated. Soil applied treatment provide downy brome suppression and control of susceptible winter annuals. Rainfall timing with application and weed emergence is important for performance.

WINTER WHEAT, SPRING WHEAT, and BARLEY. Postemergence. Wheat may be any stage up to preboot; barley should be at the 2-leaf to preboot stage.

OTHER TANK-MIXES. Amber may be tank-mixed with labeled rates of other herbicides including Assert and Curtail, or with Gramoxone or glyphosate for burndown.

FALLOW. Wheat may be planted after application; barley, rye, or oats may be planted 6 months after application according to soil pH and rate guidelines. Rate as for Amber alone.

2-4 oz Rave 58.8WDG (0.06-0.12 ae + 0.01-0.02 lb ai) (\$3.80-7.55)

Rave is a commercial premix containing 50% dicamba + 8.8% triasulfuron (Amber). Weed control similar to Amber + dicamba tank-mix. The 4 oz rate provides dicamba equivalent to 4 oz of dicamba per acre. Minimum carrier is 5 gpa for ground or 2 gpa for air. Add NIS at 1 to 2 pt/100 gal. Follow rotational guidelines for Amber. Rave may be tank-mixed with bromoxynil or bromoxynil/MCPA.

WINTER WHEAT. After emergence to jointing.

SPRING WHEAT. After emergence before 6-leaf stage.

BARLEY. After emergence to 4-leaf stage. Tolerance in barley is marginal; maximum rate for barley is 2 oz per acre.

FINESSE (chlorsulfuron + metsulfuron) *Site of Action: 2+2* (\$2.95-4.40) **FINESSE + 2,4-D ESTER or BROMOXYNIL or BANVEL or** **CLARITY of STERLING**

0.2-0.3 oz Finesse 75DF (0.009-0.014 lb ai)

0.2-0.3 oz Finesse 75DF + 0.25-0.5 lb ae 2,4-D

0.2-0.3 oz Finesse 75DF + 0.25-1 pt bromoxynil 2L or 0.12-0.5 pt 4L

0.2-0.3 oz Finesse 75DF + 0.12-0.25 pt dicamba 4L

SEVERAL ANNUAL BROADLEAVES

Finesse is a commercial premix of two sulfonyl-urea herbicides containing 62.5% chlorsulfuron (Glean) plus 12.5% metsulfuron (Ally). The combination controls several annual broadleaves such as pennycress, tansymustard, non-ALS kochia, and wild buckwheat. Soil residual extends into the following season or longer. Do not use on soil with a pH exceeding 7.9.

Finesse (Continued . . .)

The rate is 0.2 to 0.3 oz Finesse 75DF per acre. Labeling does not include higher rates used in other regions for suppression of "cheatgrass". Control with lower rates will be more erratic. Use NIS at 1 to 2 qt/100 gal for postemergence applications. Minimum carrier is 3 gpa for flat fan nozzles in ground equipment; 10 gpa for flood nozzles on 30 in spacing, and higher volume for wider spacing. Minimum carrier is 1 gpa for air. Wheat or rye may be planted anytime; oats after 10 mo and barley after 10 mo if pH is 6.5 or lower or 16 mo if pH exceeds 6.5. Other crops require a bioassay.

WINTER WHEAT. Apply after planting but before crop emergence or postemergence at the 2-leaf but before boot stage.

TRITICALE. Supplemental label. Apply as for wheat. Tank-mix with herbicides labeled for triticale.

OTHER TANK-MIXES. Finesse may also be tank-mixed with MCPA ester (0.25-0.5 lb) or Curtail (1-2 pt); or in 3-way combinations using bromoxynil + MCPA (0.75-1.5 pt 4L) or 2,4-D (0.25 lb) plus dicamba (0.12 pt) per acre.

PEAK (pro sulfuron) *Site of Action: 2*

(\$3.30-6.60)

PEAK + 2,4-D ESTER or MCPA or BANVEL or CLARITY or STERLING or BROMOXYNIL or BROMOXYNIL/MCPA

0.25-0.5 oz Peak 57DF (0.009-0.018 lb ai)

0.25-0.5 oz Peak 57DF + 0.25-0.38 lb ae 2,4-D or MCPA ester

0.25-0.5 oz Peak 57DF + 2-4 oz dicamba 4L

0.25-0.5 oz Peak 57DF + 0.75-1.5 pt bromoxynil 2L or

0.38-0.75 pt 4L or 0.75-1.5 pt bromoxynil/MCPA or 0.6-1.2 pt 5L

ANNUAL
BROADLEAVES
Wild

Sulfonyl-urea herbicide with moderate residual. Usually used in a tank-mix with other broadleaf herbicides. Gives good to excellent control of pennycress, lambsquarters, Russian thistle, kochia, and other annuals. buckwheat control has been adequate with combinations. Crop tolerance has been very good in SDSU tests. Does not control grasses or ALS resistant kochia.

Rates are 0.38 to 0.5 oz Peak 57DF per acre. Use the lower rate (8 Acres/Pak) for sensitive weeds under favorable conditions. The high rate is 6 Acres/Pak. Most weeds should be small (1-2 in) for best results. Wild buckwheat should have 1 to 2 true leaves.

Follow rotation guidelines. Fields may be rotated the following season to small grain, proso millet, corn, grain sorghum, or soybean (10 mo); canola and flax (11 mo) when used within soil pH guidelines and applied before the early July dates specified. Sunflower is 22 mo; alfalfa 15 mo.

Carryover is greater under high pH.

Minimum carrier is 5 gpa for ground or 2 gpa for air. Use NIS at 1 to 2 qt/100 gal; COC may be used for Peak alone under poor growing conditions.

Use tank-mixes to reduce risk of ALS weed biotypes and to improve weed control consistency. Use NIS additive with tank-mixes. Follow crop stage guidelines and limitations for each product; use combinations only on labeled crops.

WINTER WHEAT, SPRING WHEAT, RYE, and BARLEY. Postemergence from the 3-leaf to before second node is detectable in stem elongation.

TRITICALE. Apply as for wheat. Tank-mix with herbicides labeled for triticale.

OAT. Tank mixes with MCPA may be preferred for best crop tolerance. Peak rates as low as 0.25 oz are used in some tank mixes.

PROSO MILLET. Apply from the 3-leaf but before the second node is detectable in stem elongation. Crop tolerance is generally good, but often less at earlier stages.

GLEAN XP (chlorsulfuron) Site of Action: 2**(\$3.20-6.20)****0.17-0.33 oz Glean XP (0.008-0.015 lb a.i.)**

Use 0.17 oz for short-term control or suppression or 0.33 oz for soil residual weed control where soil pH is <6.5 or for controlling difficult weed species. Controls some mustard species, pigweed, waterpod, primrose, and others.

Add NIS at 0.25 to 0.5% v/v (1-2 qt/100 gallons spray solution). For ground applications, minimum carrier is 3 to 13 gpa depending on nozzles. For aerial applications, minimum carrier is 1 to 5 gpa depending on nozzles. Do not apply on soils with pH>7.9. Carryover risk increases with high soil pH and dry or cool soil conditions. Rotation options are limited.

WHEAT, BARLEY, OAT, TRITICALE. Apply from the 2-leaf stage but before boot.

TANK-MIXES. 2,4-D (amine or ester) or MCPA (amine or ester) may be tank-mixed at 0.25 to 0.5 lb a.i./A. Adding surfactant (0.5-1 qt/100 gallons) increases the chance of crop injury and do not add any surfactant when applying with liquid fertilizer. With 2,4-D or MCPA, apply at the 3 to 4 leaf stage. Other Glean tank mix options include Buctril 4EC (0.25-1 pt/A), Bronate (0.5-2 pt/A), Banvel (0.125-0.25 pt/A), Banvel SGF (0.25-0.5 pt/A), or Curtail (1-2 pt/A).

MAVERICK (sulfosulfuron) Site of Action: 2**(\$10.25)****0.66 oz Maverick 75DF (0.03 lb ai)**

"CHEATGRASS",
SOME
BROADLEAVES

Maverick is a selective sulfonyl-urea herbicide used to control certain annual grasses and broadleaved weeds. The primary use is for downy brome and Japanese brome in winter wheat. Control has been very good to excellent in SDSU tests. Maverick also gives excellent control of winter annual mustards including pennycress and tansy mustard. Emerged wild oat will be controlled; however wild oat emerges in spring and would not be consistently controlled with fall application.

Maverick has activity by root and foliar uptake. Rainfall is required for preemergence response from soil residual. Crop tolerance is very good. The label rate is 0.67 oz 75DF per acre. Performance is more consistent under variable conditions than with lower rates. Minimum carrier is 5 gpa for air or ground equipment. Add NIS at 2 qt/100 gal.

Carryover restricts crop rotation options. Treated fields can be rotated to wheat or fallow the following year. Other crops may be planted at shorter rotation if certain soil and precipitation criteria are met. Millet, IR corn, or STS soybean may be planted after 3 mo on soil with less than 7.5 pH and with 18 inches precipitation. Corn or soybean can be planted after 22 mo if there has been 24 inches precipitation on soils with less than 7.5 pH. A field bioassay is recommended before planting rotational crops.

Wheat may be grazed after application. Do not harvest for hay for 30 days. Allow 55 days after application before harvesting grain or straw.

Maverick has considerable potential for "cheatgrass" control in wheat. Postemergence timing allows treating field borders or parts of fields. Crop rotation, herbicides with other mode of action and cultural control should be used in the program to reduce risk associated with resistant weed biotypes.

WINTER WHEAT. Fall postemergence timing gives the most consistent results on downy brome. Weeds should be in seedling stage and not exceed 2 or 3 leaves. Preemergence applications require rain. Spring postemergence applications are usually less effective; suppression can be expected if applied very early and downy brome has not become well established.

SPRING WHEAT. Postemergence only. Apply at emergence to jointing crop stage.

OLYMPUS (propoxycarbazone-sodium) Site of Action: 2**(\$7.25-10.90)****0.6-0.9 oz Olympus 70WDG (0.026-0.039 lb ai)**"CHEATGRASS",
SOME
BROADLEAVES

Olympus is a postemergence sulfonyl-urea herbicide used to control certain annual grasses and broadleaved weeds. The primary use is for "cheatgrass" in winter wheat. Japanese brome is more sensitive than downy brome. It also controls foxtail barley and has some activity on wild oat. Olympus controls broadleaves including pennycress, tansy mustard, blue mustard, and pigweed. Control in SDSU tests has been very good to excellent.

Olympus may be applied in fall or spring; however, grassy weeds should be treated at the 2-leaf up to 2-tiller stage. Downy brome control has been most consistent with early postemergence fall application. Spring applications may result in only downy brome suppression (about 60% control) and control will diminish as grasses tiller and grow. Broadleaf weeds should be less than 2 inches in diameter.

Rates are 0.6 to 0.9 oz product per acre. The low rate has been satisfactory for early fall applications on Japanese brome and broadleaves. The high rate is suggested for most consistent downy brome control and wild oat suppression. Fall applications may be followed by 0.3 to 0.6 oz in the spring; total application not to exceed 1.2 oz per acre. For jointed goatgrass suppression, apply 0.6-0.9 oz/A in the fall and 0.3-0.6 oz/A in the spring. Minimum carrier is 5 gpa for ground or air. Add NIS at 0.25 to 0.5% volume. Olympus may be applied with nitrogen fertilizer; however, it should not exceed 50% of the carrier. Leaf burn may increase. A buffer for native plants of 50 feet for ground and 350 feet for air is required.

Wheat may be planted with restrictions; proso millet after 4 mo and 10 in. precip; conventional corn after 22 mo and 24 in. Wheat may be harvested for grain or straw after 71 days.

WINTER WHEAT, SPRING WHEAT, and DURUM. Apply after when emergence but before crop jointing.

OLYMPUS FLEX (propoxycarbazone + mesosulfuron) Site of Action: 2+2**(\$10.85-12.65)****3-3.5 oz Olympus Flex (0.021-0.025 lb ai)**"CHEATGRASS",
WILD OAT,
SOME
BROADLEAVES

Premixes containing propoxycarbazone (Olympus) and mesosulfuron (Silverado). Olympus Flex is labeled for winter wheat and may be most effective when applied postemergence in the fall for control of annual grass weed species, such as cheat, downy brome, Japanese brome, wild oat, foxtail barley, and some broadleaf weed species. SDSU trials demonstrated very good to excellent control. Apply from crop emergence (fully expanded first true leaf) but before grassy weeds begin to tiller. Add an adjuvant such as a nonionic surfactant at 0.5% v/v plus AMS or UAN; a methylated seed oil (MSO); or a "basic blend" type adjuvant. Risk of crop injury increases with the use of an MSO. Do not use a crop oil concentrate or an organosilicone-based surfactant. Tank-mixtures with 2,4-D or dicamba may reduce grass control.

Crop rotation interval is 4 months for millet (with at least 10 inches precipitation); 12 months to soybeans and sorghum (with at least 18 inches precipitation); and 18 months to corn (with at least 24 inches precipitation).

RIMFIRE or RIMFIRE MAX (propoxycarbazone + mesosulfuron) Site of Action: 2+2**1.75-2.25 oz Rimfire (0.011-0.014 lb ai)****(\$9.70-12.50)****3 oz Rimfire Max (0.013 lb ai)****(\$11.50)**WILD OAT,
FOXTAIL,
"CHEATGRASS",
FOXTAIL BARLEY,
PERSIAN DARNEL,
SOME
BROADLEAVES

Rimfire contains 8.1% propoxycarbazone + 2% mesosulfuron and Rimfire Max contains 4.8% propoxycarbazone + 1.9% mesosulfuron. Labeled for winter or spring wheat, with spring applications recommended. Rimfire is primarily intended for wild oat control, but may suppress some other grasses, such as downy brome or "cheatgrass" and broadleaf weed species. May also provide partial control of foxtail barley if applied prior to the weed tillering stage. The Rimfire application rate is 1.75 oz per acre from wheat emergence to flag leaf emergence. Under dry conditions, may apply Rimfire up to 2.25 oz per acre but do not apply more than 2.25 oz per year. Best control achieved when grasses are in the 1 leaf to 2 tiller stage and broadleaf weeds are less than 2 inches in diameter. Adjuvant recommendations are similar to Olympus Flex.

Minimum carrier rate is 10 gpa for ground applications or 5 gpa for aerial applications.

Crop rotation restrictions is 4 months for millet; 10 months for alfalfa, barley, canola, dry beans, flax, sorghum, safflower, soybeans, and sunflower; 12 months for corn after Rimfire or 10 months for corn after Rimfire Max.

POWERFLEX (pyroxsulam) Site of Action: 2**(\$10.95)****3.5 oz wt PowerFlex 7.5WDG (0.016 lb ai)**"CHEATGRASS",
SOME
BROADLEAVES

Controls "cheatgrass" species (downy brome and Japanese brome), wild oats, and broadleaf weed species such as mustard species, chickweed, and others. Activity may be somewhat slow and may not show on weeds for 1-2 weeks after application. Rotation interval is 9-12 months for most crops. Adverse weather conditions (cold or dry) may decrease breakdown in the soil and increase the risk for carryover.

Minimum carrier is 5 gpa for ground or aerial applications, but 10 gpa is suggested for ground applications. When applied alone, use NIS at 0.25-0.5% v/v (1-2 qt per 100 gallons spray solution) or COC at 0.8% v/v (0.8 gal per 100 gal spray solution). Potential for crop injury increases if COC is used rather than NIS.

Do not mix with dicamba, 2,4-D amine, or MCPA amine as they may antagonize grass control, but it is permissible to tank mix with 2,4-D ester or MCPA ester. Do not tank mix with organophosphate insecticides. Applications are rainfast after 4 hours.

WINTER WHEAT. Apply in the fall (for downy brome control) or spring from the 3 leaf stage to jointing. Best results may occur when weeds are small and actively growing.

GOLDSKY (florasulam + fluroxypyr + pyroxsulam) Site of Action: 2+4+2**(\$15.30)****1 pt GoldSky (0.002 + 0.089 + 0.014 lb ai)**ANNUAL
GRASSES and
BROADLEAVES

Controls wild oat and suppresses several other grass species and controls several broadleaf weed species, such as wild buckwheat, lambsquarters, kochia, mustards, Russian thistle, and several others. GoldSky at 1 pt/A is equivalent to 7.6 oz/A Starane, 8.7 oz/A Orion, and 3 oz/A PowerFlex.

Minimum carrier is 5 gpa, but 10 gpa is recommended. May be applied by ground or air. When applied alone, add NIS at 0.25-0.5% v/v (1-2 qt per 100 gallons spray solution). Add AMS at 1.5 lb/A during conditions of moisture stress. Do not apply adjuvant if mixing with another herbicide that is an emulsifiable concentrate (EC) formulation, such as 2,4-D ester or MCPA ester. Rainfast 4 hours after application. Slight yellowing or stunting may occur on wheat plants after application, particularly during stressful weather conditions such as drought, frost, or nutrient deficiency. Wheat often grows out of the injury symptoms within 2 weeks. Do not graze until 7 days after application or cut for hay until 28 days after application.

SPRING WHEAT and DURUM. Apply between the 3 leaf stage and jointing. Best results may occur when grass weeds are 2-leaf to 2-tillering and broadleaf weeds are less than 2 inches tall and the weed are actively growing.

EVEREST (flucarbazone) Site of Action: 2**(\$13.45-20.15)****0.4-0.6 oz Everest 70WDG (0.018-0.027 lb ai)**"CHEATGRASS",
GREEN and
YELLOW FOXTAIL,
BARNYARDGRASS

Controls green foxtail and wild oat and suppresses yellow foxtail, foxtail barley, and downy brome. The low rates may be used for green foxtail and the high rate for wild oat and downy brome suppression. Grass should be at the 1 to 4 leaf stage with up to 2 tillers. Crop tolerance is adequate, but may cause temporary chlorosis under some conditions.

For spring wheat, add NIS at 0.25% v/v (1 qt/100 gallons spray solution) or MSO (1.5 pt/A) + AMS (1.5 lb/A). The NIS rate for winter wheat may be 0.125-0.25% v/v (0.5-1 qt/100 gallons spray solution) and either AMS (1.5 lb/A) or liquid fertilizer (2 qt/A) may be added with the NIS. The MSO rate for winter wheat is similar to that for spring wheat. Do not add a surfactant when tank mixing with ester or EC formulated herbicides. Minimum carrier is 5-10 gpa for ground applications or 3-5 gpa for aerial application.

Rotation restrictions are 9 months for barley, canola, dry beans, flax, safflower, soybeans, and sunflower; 11 months for corn and field peas; and 24 months for lentils. Rotation restrictions to corn are not currently listed on the label, but future label revisions may include a statement allowing rotation to corn 11 months after application. Carryover risk increases in soils with <2% O.M., pH >7.5, or drought.

Everest (Continued . . .)

SPRING and DURUM WHEAT Apply prior to jointing, from 1 leaf to a maximum of 4 leaves of the main stem plus 2 tillers.

WINTER WHEAT. For fall applications, wheat must have at least 1 leaf. For spring applications, apply soon after wheat growth resumes from 1 leaf to full tillering but before jointing.

TANK-MIXES. Several bromoxynil or growth regulator herbicides may be tank-mixed with Everest. For sulfonylurea (e.g. Ally, Affinity, Harmony, and other) tank mix partners, add a growth regulator herbicide such as 2,4-D amine or ester (4 lb a.i./gallon) at 0.125-0.375 lb a.i./A or dicamba 4L at 2-4 fl oz/A in spring and durum wheat, but this is not required for winter wheat.

DISCOVER (clodinafop) *Site of Action: 1*

(\$16.80-21.00)

3.2-4 oz Discover 2L or 12.8-16 oz Discover NG .5L (0.05-0.625 lb ai)

WILD OAT,
GREEN and
YELLOW FOXTAIL,
BARNYARDGRASS

Discover is used postemergence to control grassy weeds. The low rate is for wild oat, barnyardgrass, and volunteer oats. The high rate is for green or yellow foxtail. Wild oat control has been very good in SDSU tests. Crop tolerance has been very good. Crop tolerance is reduced if applied when temperature nears freezing 48 hours before or after application. Wild oat should be at the 1- to 6-leaf stage and before the 4th tiller emerges. Foxtail should be at the 1- to 5-leaf stage and prior to the third tiller emergence.

Use 3.2 oz Discover 2L plus 10.2 oz DSV Adjuvant or use 12.8 oz Discover NG .5L per acre for wild oat, barnyardgrass, volunteer oats, and corn. Use 4 oz Discover 2L plus 12.8 oz DSV Adjuvant or use 16 oz Discover NG .5L per acre for green and yellow foxtail control. Discover NG .5L product contains the required surfactant. Lower rates are more variable. Minimum carrier is 5 gpa for ground or 3 gpa for air application. Spring wheat may be planted anytime after application; any other crop may be planted 30 days after application. Spring wheat may be planted anytime after application; any other crop may be planted 30 days after application. Do not graze or feed forage from treated areas for 30 days after application. Apply at least 60 days before harvest.

WINTER WHEAT, RED SPRING WHEAT, and DURUM. Apply at the 2-leaf to pre boot stage.

TANK-MIXES. Discover for green foxtail may be tank-mixed with herbicides for broadleaf control including Ally, Ally Extra, Amber, dicamba (2-3 oz), bromoxynil, Curtail, 2,4-D amine, MCPA amine and ester, Harmony GT, Peak, Starane, and Stinger. For yellow foxtail tank-mixes include bromoxynil, bromoxynil + MCPA, Harmony Extra, Harmony GT, and Peak. Follow growth stage requirements for the tank-mix partner. Surfactant required for Discover is adequate for broadleaf partners requiring an additive.

PUMA or PARITY (fenoxaprop) *Site of Action: 1*

(\$8.25-16.45)

0.33-0.66 pt Puma 1EC or Parity (0.041-0.082 lb ai)

WILD OAT,
FOXTAIL

WHEAT, DURUM, and BARLEY. Apply to wheat from emergence up to 60 days before harvest. Apply to barley at emergence to the 5-leaf stage up to 57 days before harvest. Do not apply in barley after jointing begins. Grassy weeds should be in the 1-leaf to 2-tiller stage for best results. Minimum carrier is 10 gpa for ground or 5 gpa for air. Apply 0.33 pt/A to control green foxtail, foxtail millet, and volunteer corn; 0.4 pt/A to control yellow foxtail, wild proso millet, or volunteer millet; or 0.66 pt/A to control many other grass weed species, such as wild oat, barnyardgrass, or field sandbur.

TANK-MIXES. When tank-mixing Puma herbicide with recommended herbicide options, do not exceed the labeled use rate shown for each tank-mix partner, as reduced annual grass control will occur. Puma at 0.33 pt per acre can be tank-mixed with bromoxynil 2L (1 pt); bromoxynil/MCPA 4L (1 pt) or 5L (.8 pt); MCPA ester (0.75 pt/A); Stinger (0.25-0.33 pt); Express (1/6 oz); Harmony GT (.5 oz); Amber (0.28 oz); Peak (0.5 oz); Ally (.1 oz); dicamba (2 fl oz); Curtail M (1.75 pt); or Starane (0.66 pt). Puma at 0.4 pt can be tank-mixed with MCPA ester (0.75 pt); Stinger (0.25-0.33 pt); dicamba (2 fl oz); Peak (0.5 oz); Curtail M (1.75 pt) or Starane (0.66 pt). Puma at 0.66 pt can be tank-mixed with bromoxynil 2L (1.0 pt); bromoxynil/MCPA 4L (1.0 pt) or 5L (.9 pt); Curtail M (1.75 pt); Stinger (0.25-0.33 pt); Harmony Extra (.3-4 oz); Harmony GT (.5 oz); MCPA ester (0.75 pt); Peak (.5 oz); or Starane (0.66 pt). Do not mix with dicamba or bromoxynil for barley. Puma can also be mixed with several insecticides. Refer to tank-mix partner label for further crop restrictions.

WOLVERINE (fenoxaprop + pyrasulfotole + bromoxynil) Site of Action: 1+2+6**(\$19.20)****1.7 pt Wolverine (0.081 lb ai fenoxaprop + 0.036 lb ai pyrasulfotole + 0.18 lb ai bromoxynil)**WILD OAT,
FOXTAIL,
ANNUAL
BROADLEAF
WEEDS

Controls several grass and broadleaf weed species. Grass species include foxtail (green and yellow), barnyardgrass, wild oat, field sandbur, volunteer corn, and others. Apply to grass weeds in the 1 leaf to full tiller growth stage. Broadleaf weed species include wild buckwheat, kochia, lambsquarters, pigweed, ragweed, marshelder, and others. Rainfall within 1 hour of application may reduce control.

Minimum carrier rate is 10 gpa for ground applications or 5 gpa for aerial applications. Do not make more than one application per season. Tank mixing with fungicides may cause leaf yellowing and necrosis. Do not mix with tebuconazole. Do not graze or harvest wheat or barley for forage until at least 25 days after application.

Rotation restriction is 1 mo for wheat, barley, oats, rye, or triticale; 3 mo for alfalfa, 4 mo for millet, sorghum, or soybeans, or 9 mo for corn, chickpeas, dry beans, flax, field peas, lentils, safflower, or sunflower.

WHEAT (including DURUM) and BARLEY. Apply to wheat any time after emergence but at least 60 days prior to harvest. Apply to barley from after emergence up to the 5 leaf stage.

AXIAL (pinoxaden) Site of Action: 1**(\$14.80)****8.2 oz Axial (0.05 lb ai)
16.4 oz Axial XL (0.05 lb a.i.)**

WILD OAT

Axial XL is premixed with an adjuvant. Axial is a grass herbicide that may be used to control wild oats, foxtail, barnyardgrass, and wild proso millet. Apply postemergence prior to the fourth tiller of wild oat or the third tiller of other grasses. May be tank-mixed with several broadleaf herbicides, including some sulfonyl urea herbicides (site of action: 2), bromoxynil herbicides, and growth regulator herbicides such as Starane, WideMatch, and MCPA.

Minimum carrier is 5-10 gpa for ground or 5 gpa for aerial application. For ground application, use at least 10 gpa during dry conditions or dense weed stands.

WINTER WHEAT, SPRING WHEAT, BARLEY. Apply from the 2-leaf stage up to the pre-boot stage.

AXIAL TBC (pinoxaden + florasulam) Site of Action: 1+2**8.85 oz Axial TBC (0.05 lb ai pinoxaden + 0.0045 lb ae florasulam)**

Controls several grass and broadleaf weed species. Grass weed species include foxtail (green, yellow, giant), barnyardgrass, wild oat, wild proso millet, Persian darnel, Italian ryegrass, and others. May control several mustard species and suppress wild buckwheat, lambsquarters, pigweed, and prickly lettuce. The "TBC" stands for "tailored broadleaf control" as tank mix partners will be needed to tailor the broadleaf control for the species present in the targeted fields. MCPA ester 4L at 10.8 oz/A may be a tank mix partner for general broadleaf weed control. For Russian thistle, add either Bronate Adv. (12.8 oz/A), Buctril 2EC (16-24 oz/A), Starane NXT (14 oz/A), or Starane + Sword (12-18 oz/A). For kochia, add ether Bronate Adv. (12.8 oz/A), Buctril 2EC (16 oz/A), WideMatch or Colt AS (10-16 oz/A), Starane (5.3-8 oz/A), Starane NXT (14 oz/A), or Starane+Sword (12-18 oz/A). For Canada thistle, tank mix with clopyralid products such as WideMatch (fluroxypyr + clopyralid), Curtail M (MPCA + clopyralid), and others.

Add Adigor adjuvant at 9.6 oz/A. Recommended carrier rate is 5-10 gpa (5 gpa for aerial applications).

Crop rotation restriction is 0.5 mo for barley, oats, wheat; 4 mo for corn, sorghum; 9 mo for alfalfa, soybean, sunflower, safflower, canola, chickpea, dry bean, pea, flax, lentil; or 12 mo for crops not listed on the label. Apply at least 4 hrs prior to rainfall.

Do not apply to crops stressed by frost, low fertility, drought, flooding, disease, or insects. Control may decrease if foliage is wet at the time of application. Do not graze or harvest for forage until at least 30 days after application.

SPRING WHEAT (excluding DURUM), WINTER WHEAT, BARLEY. Apply from the 3 leaf to pre-boot growth stage.

ASSERT (imazamethabenz) Site of Action: 2**(\$9.85-11.80)****1-1.2 pt Assert 2.5L (0.31-0.38 lb ai)**WILD OAT,
MUSTARD

For postemergence wild mustard and wild oat control. Wild mustard should be in the seedling stage and treated before bloom. Wild oat should be at the 1- to 4-leaf stage. Control has been excellent in most SDSU tests, except under severe moisture stress. Does not control foxtail. Suppresses growth of wild buckwheat.

Control is best if weeds are growing actively. Weed response takes several days and is extended if conditions are dry. Crop tolerance is very good. Labeling includes tank-mixes for improved broadleaf control. Fields treated with Assert may be rotated to barley, corn, sunflowers, soybeans, edible beans, safflower, wheat, or potatoes. Do not plant other crops for 15 mo. Do not graze treated fields or cut for forage. Minimum carrier is 8 gpa for ground or 5 gpa for air. Add NIS at 1 qt per 100 gal. Crop oil MSO at 1.5 to 2 pt per acre may be used. May be applied in liquid nitrogen fertilizer.

WINTER WHEAT, SPRING WHEAT, DURUM, and BARLEY. Apply postemergence. Use 1 to 1.2 pt per acre. Use the high rate and increase minimum carrier to 15 gpa for infestations over 25 plants per square foot or when conditions are unfavorable.

TANK-MIXES. Assert may be tank-mixed with other herbicides. Do not mix Assert with amine forms of MCPA or 2,4-D or with dicamba. Assert may be tank-mixed with 2,4-D ester, MCPA ester, Ally, Ally Extra, bromoxynil, bromoxynil/MCPA, Express, Harmony Extra, or Harmony GT. Refer to section for each herbicide used alone for specific crop and application directions.

SILVERADO (mesosulfuron) Site of Action: 2**(\$10.40-13.35)****1.75-2.25 oz Silverado 2WDG (0.002-0.003 lb ai)**

WILD OAT

Silverado is a sulfonyl-urea herbicide used for postemergence wild oat control and suppression of certain other grasses and broadleaves. It has limited activity on green foxtail. Wild oat control has been satisfactory in SDSU tests. The formulation includes a safener; crop tolerance is adequate. Leaf response noted under stress conditions has been temporary.

Rate of 1.75 to 2 oz per acre has been used in most tests. Weed stage is 1-leaf to the 2-tiller stage. Results are best at early stage. Carrier is 10 to 20 gpa for ground or minimum of 5 gpa for air. A 150 ft buffer for native plants is required for air application. Silverado is rainfast in 4 hours. Add MSO at 1.5 pt per acre or a basic blend type adjuvant at .8 to 1.6 pt depending on carrier volume. Ammonium nitrogen fertilizer may be used at 1 to 2 qt; however leaf burn may increase.

Wheat may be planted 7 days after planting; barley and sunflower 30 days; soybean, lentil, dry beans, and peas 90 days; and corn 12 months. Do not apply within 30 days of wheat harvest for forage; 50 days for hay; and 55 days for grain and straw harvest.

WINTER WHEAT, SPRING WHEAT, DURUM. Apply from emergence up to jointing stage.

TANK-MIXES. Silverado may be tank-mixed with several herbicides to improve broadleaf control including Ally Extra, Buctril, Bronate Advanced, Curtail M, Express, Harmony Extra, Harmony, Starane, and Stinger. Ester form of MCPA may be added at rates of 0.25 to 0.38 lb ae per acre. Labeling also includes several fungicide and insecticide tank-mixes; however, do not mix with malathion or parathion because of injury risk.

OSPREY (mesosulfuron) Site of Action: 2**(\$9.90-14.70)****3.2-4.75 oz Osprey 4.5WDG (0.009-0.013 lb ai)**

WILD OAT

Osprey is a sulfonyl-urea herbicide used for postemergence wild oat control in winter wheat. It contains the same ingredient as Silverado; however the concentration is higher and the safener is used at a low ratio. Winter wheat has very good tolerance. Osprey also controls wild mustard and pigweed and has suppression activity on downy brome at early stages. Wild oat should be at the 1-leaf to the 2-tiller stage.

The 3.2 oz rate may be used for wild oat; the high rate is suggested for other weeds. Minimum carrier is 10 gpa for ground or 5 gpa for air. Add MSO at 1.5 pt as a basic blend additive at 0.8 to 1.6 oz per acre. A NIS plus ammonium fertilizer additive may be used if the tank-mix partner restricts the use of MSO. A buffer strip of 50 feet between treatment and native plants for ground or 350 feet for aerial application is required.

Osprey (Continued . . .)

Wheat may be planted 7 days after planting; barley and sunflower 30 days; soybean, lentil, dry beans, and peas 90 days; corn 12 mo, and other crops after 10 months. Do not harvest wheat for forage for 30 days or hay, grain, or straw for 60 days.

WINTER WHEAT. Apply from emergence up to jointing stage of the crop. Osprey is not labeled for spring wheat.

TANK-MIXES. Tank-mix labeling includes Ally, Ally Extra, Buctril, Bronate Advanced, Curtail M, Harmony Extra, Peak, Starane, and MCPA ester (0.25 to 0.38 lb/A). Several fungicides and insecticides are also included in tank-mix labeling; however, do not mix with malathion, mancozeb, di-syston, or parathion because of injury risk.

ACHIEVE (tralkoxydim) *Site of Action: 1*

(\$13.90-18.55)

6.9-9.2 oz Achieve SC3.3 (0.18-0.24 lb ai)

WILD OAT,
GREEN and
YELLOW FOXTAIL

Selective, postemergence control of wild oats, green and yellow foxtail, and volunteer oat in winter wheat, and barley. Provides an alternative mode of action for resistance management. Apply to wild oat at the 1- to 6-leaf stage or to green and yellow foxtail at the 1- to 5-leaf stage. Best activity on foxtail is at the 2- to 3-leaf stage. Yellow foxtail is less sensitive than green foxtail. Use high rate when soil is dry, weeds are large, weed population is high or crop canopy is dense. Always add Supercharge adjuvant at 4 pt/100 gal. Add AMS at 7 to 15 lbs/100 gal when the spray water contains more than 400 ppm bicarbonate ions. Carrier is 10 to 15 gpa for ground or 3 to 5 gpa for air. Higher volume may reduce grass control. Can be used in all 2 or 6 row varieties of barley.

Wild oat and green foxtail control has been very good in SDSU tests. Barley or winter wheat tolerance data or experience in South Dakota is limited. Tolerance is reduced if crop is stressed from saturated soil or low temperature. Avoid application if there is heavy dew, or if temperature was below 40o F. up to 48 hours before application.

Minimum harvest interval is 60 days after treatment. Immature crop (forage) may be grazed or hayed 30 days after treatment and mature straw or grain may be fed 45 days after treatment. Rotational crops of cereal grains and leafy crop groups may be planted 30 days after application; all other rotational crops may be planted 106 days after application.

WINTER WHEAT and BARLEY. Application based on weed stage. Do not apply on spring wheat in South Dakota and in designated areas in adjacent states.

TANK-MIXES. Achieve may be tank-mixed with several herbicides that add broadleaf control.

HERBICIDE TOLERANT WHEAT

BEYOND (imazamox) ("CLEARFIELD" WHEAT) *Site of Action: 2*

(\$17.15-25.75)

4-6 oz Beyond 1L (0.031-0.047 lb ae)

JOINTED
GOATGRASS,
"CHEATGRASS",
ANNUAL
BROADLEAVES

Use only on Clearfield wheat (imidazolinone tolerant) varieties. Beyond is applied postemergence. It controls special problem weeds like jointed goatgrass and "cheatgrass" as well as several other annual broadleaves and grasses including mustards, black nightshade, pennycress, purslane, pigweed, smartweed, and foxtail. It has activity on wild oat and feral rye under certain conditions. Weeds should be less than 3 or 4 inches for most susceptible weeds. Jointed goatgrass and "cheatgrass" should have 1 to 5 leaves, preferably before tillers have developed. Wild rye control has been fair to good; only emerged plants in seedling stage are controlled. Fall is the best timing if weeds have emerged. Spring treatment for "cheatgrass" will usually be less effective if the weeds started in the fall. Weeds will have already affected yield potential. The low rate is for sensitive species like mustards; the high rate is for larger or less susceptible weeds. Crop tolerance has been satisfactory. Temporary yellowing may occur under prolonged cold or water-stressed crop conditions. Rotate crops and herbicides to manage ALS resistant weed biotypes. Beyond may be tank-mixed with herbicides such as Clarity, Starane, Buctril, or 2,4-D ester to improve control of weeds like wild buckwheat, ALS resistant kochia, or lambsquarters.

Beyond (Continued . . .)

Soybean, edible legumes, and Clearfield crops may be replanted/planted anytime. Allow 3 mo for alfalfa and wheat; 4 mo for rye (barley eastern area); 9 mo for grain sorghum, oat, millets, sunflower, barley (western area); 18 mo for canola (eastern area); and 26 mo canola (western area). Dry conditions may extend residual effects.

Minimum carrier is 10 gpa for ground or 5 gpa for air equipment. Add NIS at 1 qt plus AMS at 12 to 15 lb or 28% N at 2.5 gal/100 gal solution. If the Clearfield wheat variety posses the 2-gene tolerance, COC or MSO (1 – 2 gallons per 100 gal spray solution) or HSOC (0.5 gallons per 100 gal spray solution) may be used instead of NIS but AMS or 28%N should still be added. There are no restrictions for feeding or grazing forage or hay.

WINTER WHEAT (Clearfield only). Apply 4-6 fl oz/A early postemergence after tillers have initiated and before jointing. Weeds should be small.

SPRING WHEAT (Clearfield only). Apply 4 fl oz/A after the 4 leaf growth stage but prior to jointing.

PREMIX

Clearmax (imazamox + MCPA) Site of Action: 2+4

12-18 fl oz Clearmax (0.03-0.05 lb a.i. imazamox and 0.23-0.32 lb a.e. MCPA)

Controls several broadleaf weed specie such as many mustard species, Russian thistle, pigweed species, and lambsquarters and many grass weed species such as brome species (cheatgrass), foxtail species, and wild oats. Apply early postemergence when weeds are actively growing but before broadleaf weeds grow taller than 3 inches and grass weeds grow more than 4-5 leaves per plant.

Minimum carrier is 10 gpa for ground or 5 gpa for air equipment. For ground application, use 20 gpa water for fields with dense vegetation or heavy crop residue. Add NIS at 1 qt per 100 gallons of spray solution (0.25% v/v) and a nitrogen-based fertilizer (liquid ammonium, 28% N, 32% N, or 10-34-0) at 2.5 gallons per 100 gallons spray solution (2.5% v/v).

Do not forage or graze meat animals within 7 days of slaughter or dairy animals within 7 days after treatment.

WINTER WHEAT (Clearfield only). Apply 12 to 18 fl oz/A after tiller initiation but prior to jointing. Application rates vary based on the targeted weed species.

SPRING WHEAT (Clearfield only). Apply 16 fl oz/A after the 4 leaf stage but prior to jointing.

BURNDOWN and POST HARVEST

GRAMOXONE (paraquat) Site of Action: 22

(\$8.95-17.85)

2-4 pt Gramoxone Inteon 2L (0.5-1 lb ai)

ANNUAL
BROADLEAVES

NONSELECTIVE. Paraquat is a nonselective, contact herbicide that may be applied before planting until before crop emerges. No soil residual. Useful for controlling emerged weeds before planting in no-till or reduced-tillage systems. May be used before planting barley or wheat. Use low rate for most weeds under 3 inches or the high rate for weeds up to 6 inches. Minimum carrier for preplant and fallow applications is 5 gpa for ground or 5 gpa for air. Add NIS at 1 to 2 pt or COC at 1 gal/100 gal for ground. Use NIS at 2 pt or COC at 1 pt/100 gal for air. Follow precautions, as paraquat is toxic when ingested. Restricted Use Pesticide.

TANK-MIXES. After harvest treatment in wheat or wheat fallow rotations. Addition of 2,4-D or dicamba improves control of some annuals and perennials. Useful for wild buckwheat or nightshade. Apply as for Gramoxone alone.

**2 pt Gramoxone 2L + 0.25-1 lb ae 2,4-D ester or 0.25-1 pt dicamba 4L
(0.5 ai + 0.25-1 or 0.125-0.5 lb ae)**

GLYPHOSATE PRODUCTS (glyphosate) *Site of Action: 9*

Glyphosate is available in several products having different formulations and different amounts (lbs) of acid equivalent (ae) and active ingredient (ai). Examples include:

3 ae, 4 ai: Roundup Original (II) (RT), Touchdown (CF) (IQ), ClearOut 41 (Plus), Credit (Duo) (Duo Extra) (Extra), GlyStar Plus (Original), Glyphomax (Plus), Honcho (Plus), Mirage (Plus), Cornerstone (Plus), Glyphos (X-Tra), Gly-4 (Plus), Acquire, Buccaneer (Plus), Rattler, Glyphosate Original, Gly-Flo, Glyphosate 41, and Glyphosate 4. **4 ae, 5.4 ai:** Durango, GlyStar 5, Glyphomax XRT, Roundup Custom. **4.17 ae:** Touchdown Total. **4.5 ae, 5.5 ai:** Roundup Original Max, Roundup UltraMax II, Roundup WeatherMax, RT Master II. 5 ae: Touchdown Hi-Tech. Some products require the addition of NIS; AMS products at the equivalent rate of 8.5 to 17 lb/100 gal are required for most formulations. Check crop use and application directions on the product being used. Equivalent product rates for several formulations frequently used for burndown are listed below.

16-48 oz glyphosate 3 lb ae (0.38-1.1 lb ae)	(\$1.40-4.15)
12-36 oz glyphosate 4 lb ae (0.38-1.1 lb ae)	(\$1.75-5.35)
12-35 oz glyphosate 4.17 lb ae (0.38-1.1 lb ae)	(\$1.85-5.40)
11-32 oz glyphosate 4.5 lb ae (0.38-1.1 lb ae)	(\$2.35-6.85)
10-29 oz glyphosate 5 lb ae (0.38-1.1 lb ae)	(\$1.55-4.45)

GRASSES and
BROADLEAVES

BURNDOWN. Glyphosate is a non-selective, translocated herbicide with no soil residual weed control. It may be applied before planting, at planting, before crop emergence, after harvest or as a preharvest application in wheat. Weeds should be growing actively. Allow for regrowth after harvest. Straw should be spread and settled for post-harvest spraying. Water having more than 500 ppm combined calcium, magnesium, or iron may reduce activity; especially at high carrier volumes. Daytime temperatures below 55 degrees F. may also reduce activity. Avoid tillage for one day after application.

Carrier is 3 to 40 for ground and 3 to 15 gpa for air. Maximum rate for air is 1 qt of 3L ae product. Use precaution to avoid droplet drift to non-target crops. Follow cleanup procedures to avoid damage from equipment contamination.

Glyphosate rates in this section are listed for products having 3 lb acid equivalent (4 lb ai). Refer to the list above for product rates required for several formulations for most situations. Use the chart below to adjust for other concentrations.

<u>Formulation</u>		<u>Amount of Product for lb ae</u>			
		<u>0.38 ae</u>	<u>0.75 ae</u>	<u>1.5 ae</u>	<u>3 ae</u>
3 lb ae (4 lb ai)	L	16 oz	32 oz	64 oz	128 oz
3.75 lb ae (5 lb ai)	L	13 oz	26 oz	52 oz	104 oz
4 lb ae (5 or 5.4 lb ai)	L	12 oz	24 oz	48 oz	96 oz
4.17 lb ae (-----)	L	12 oz	23 oz	46 oz	93 oz
4.5 lb ae (5.5 lb ai)	L	11 oz	21 oz	43 oz	86 oz
5 lb ae (-----)	L	10 oz	19 oz	38 oz	77 oz

The amount required varies according to weed species and size. Green foxtail, mustard, sandbur seedlings, and volunteer wheat seedlings are more susceptible than many other species. Suggested rate is 16 oz per acre for most small annuals; 12 oz may be adequate for some situations. Use 20 to 24 oz for larger or more tolerant annuals or for post harvest stubble burndown. Rates of 32 to 48 oz are for perennials.

PREHARVEST. Some glyphosate products are labeled for preharvest use in wheat and barley. Several 2,4-D products are also labeled for preharvest use. Glyphosate 3L ae at 12 to 16 oz plus 2,4-D at 0.5 lb ae has been effective for foxtail and kochia. Maximum rate is 1 qt per acre. Apply after hard dough stage (30% or less moisture). Allow at least 7 days before harvest. Not suggested for seed fields.

16-24 oz glyphosate 3 lb + 0.5 lb ae 2,4-D (0.38-0.48 + 0.5 lb ae)

POST-HARVEST. Glyphosate combinations are frequently used for post harvest weed control. Rates can be selected based on the weed problem.

Glyphosate Products (Continued . . .)

16-20 oz glyphosate 3 lb ae + 0.5 lb ae 2,4-D (0.38-0.48 + 0.5 lb ae)
16-20 oz glyphosate 3 lb ae + 0.5 pt dicamba 4L (0.38-0.48 + 0.25 lb ae)
32-44 oz Fallowmaster (0.4-0.55 + 0.1-0.14 lb ae)

Fallowmaster premix contains 1.6 lb ae glyphosate plus 0.4 lb dicamba ae/gal.

16-20 oz glyphosate 3 lb ae + 1-1.5 oz Triumph (0.38-0.48 + 0.016-0.024 lb ae)

Triumph contains picloram, a similar active ingredient as Tordon. Apply only to fields to be planted the following year to barley, oats, wheat, or fallow. Do not plant broadleaf crops for 36 months.

FIRSTSTEP (florasulam + glyphosate) Site of Action: 2+9

1.34 fl. oz florasulam + 13.5 fl. oz Durango

MUSTARDS,
BROADLEAF
SPECIES

Co-pack containing florasulam and Durango (glyphosate). For improved control of mustards and other broadleaf species present at the time of application. Do not apply if weed leaves are wet. Do not apply more than 1.34 fl. oz of the florasulam product per growing season. The addition of AMS (8.5 – 17 lbs per 100 gallon spray solution) may improve control. Minimum carrier volume is 8 gpa for ground applications or 3 gpa for aerial applications. Rotation interval is 9 months for canola, chickpea, lentil, flax, sunflower, sugar beet, dry bean, alfalfa, safflower, and soybean.

SPRING WHEAT, BARLEY, OATS. Apply in the spring from 10 days prior to seeding to 2 days after seeding. Do not apply after planting if emerging seedlings have begun cracking the soil over the drill row.

PRE-PARE (flucarbazone) Site of Action: 2

(\$10.40)

0.3 oz Pre-Pare 70WDG (0.013 lb ai)

CHEATGRASS
SUPPRESSION,
FOXTAILS,
WILD OATS

Intended to be tank mixes with a burndown herbicide such as glyphosate to improve control of grass species such as "cheatgrass" (downy or Japanese brome), mustards, and provide residual control for wild oat and foxtail suppression. SDSU trials have demonstrated good wild oat and green foxtail control when Pre-Pare was applied prior to spring wheat emergence, but a low rate of a postemergence grass herbicide may be needed to control escapes in dense weed infestations. In the SDSU trials, grass escapes did not reduce wheat yield. Pre-Pare contains a similar active ingredient (flucarbazone) and formulation (WDG) as Everest. Activity may be reduced if there is no rain within 7-10 days after application.

Do not apply over coarse textured soils with low organic matter (less than 2%) and high pH (above 7.8). Do not apply preplant or preemergence ahead of durum wheat. Do not apply more than a total of 0.6 oz/A Pre-Pare or Pre-Pare followed by Everest. Do not mix, load, or clean spray equipment within 33 feet or spray within 50 feet of a well head or standing water, such as marshes, ditches, ponds, lakes, etc.

For foliar activity, add NIS at 0.5-1 qt per 100 gallons or 0.125-0.25% v/v. For increased activity, add liquid nitrogen fertilizer at 2 qt/A (or up to 50% of spray solution in spring applications) or AMS at an equivalent of 1.5 lb N/A to the NIS. Otherwise, add a basic blend adjuvant at 2 qt per 100 gallons (0.5% v/v) or an MSO at 1/5 pt/A + AMS at 1.5 lb/A. If mixing with glyphosate, use only approved adjuvants for glyphosate (most MSO products can antagonize glyphosate). Recommended carrier is 5-10 gpa for ground applications or 3 gpa for aerial applications. Rotation restriction is 9 mo for canola, dry edible beans, flax, safflower, soybeans (6 mo for STS soybeans), sunflowers; 11 mo for corn or field peas; or 24 mo for lentils or mustard. Risk for carryover may increase after prolonged cool or dry soil conditions.

WINTER or SPRING WHEAT. Apply preplant or preemergence.

SHARPEN (saflufenacil) *Site of Action: 14***(\$4.80-9.60)****1-2 fl oz Sharpen (0.02-0.04 lb ai)**SEVERAL
ANNUAL
BROADLEAVES

Spring preplant surface, preplant incorporated, or preemergence. Intended for suppression or control of several annual broadleaf weed species. Good foliar activity and moderate to good residual weed control has been obtained in SDSU trials. For foliar activity, add adjuvants (MSO or COC plus AMS or UAN) if weeds are emerged at the time of application. Do not apply after small grain emergence. Minimum carrier volume is 5 gpa for ground applications or 3 gpa for aerial applications. Can rotate to wheat, sorghum, or corn at any time after application or to several other crops 5 months after application.

May be applied prior to wheat (durum, spring, and winter), barley, or oats.

AIM EC (carfentrazone) *Site of Action: 14***(\$3.45-6.90)****0.5-1 oz Aim EC 2L (0.008-0.016 lb ai)**

BURNDOWN. For annual weeds up to 4 inches tall or rosettes less than 3 inches. Add NIS at 2 pt/100 gal or use COC at 1.5 to 2 pt per acre. Refer to in-crop section for weeds controlled.

HARVEST AID. May be used as a defoliant or desiccant for broadleaf weed species such as morningglories, pigweeds, and velvetleaf after small grain maturity and the grain has begun to dry down. May be used in wheat, barley, oats, triticale, sorghum, or millet. Apply 1-2 fl oz/A at least 3 days before harvesting. A NIS (0.25% v/v), COC (1-2% v/v) or MSO (1-2% v/v) adjuvant is required. Use a minimum of 10 gpa of carrier for ground applications or 5 gpa for aerial applications. May tank mix with other preharvest herbicides.

VIDA (pyraflufen) *Site of Action: 14***(\$1.60-3.15)****0.5-1.0 oz Vida 0.2L (0.0008-0.0016 lb act)**

Vida is a contact herbicide with a similar site of action as carfentrazone (e.g. Aim). Activity on broadleaf weeds such as cocklebur, sunflower, lambsquarters, pigweed, Russian thistle, wild buckwheat, wild mustard, and others.

BURNDOWN. Apply 0.5-1 fl oz/A. Recommended adjuvants include NIS, COC, or MSO at 0.5-1% v/v. Minimum carrier rate is 10 gpa for ground applications or 5 gpa for aerial applications. May be tank mixed with other herbicides such as glyphosate (e.g. Roundup), glufosinate (e.g. Ignite), or paraquat (e.g. Gramoxone). Results alone have been variable, particularly with kochia.

POST. Apply to spring wheat (0.4-0.75 fl oz/A) or winter wheat (0.5-1 fl oz/A) after wheat emergence but before the flag leaf is visible. Do not apply more than 2 fl oz/A per season. Temporary leaf speckling may occur. Do not graze within 7 days of the last application or harvest for hay within 21 days of the last application.

PARAMOUNT 75DF, QUINSTAR 4L GT (quinclorac) *Site of Action: 4***(\$10.45-18.50)****3-5.3 oz wt Paramount 75DF (0.14-0.25 lb ai)
0.5 pt Quinstar 4L GT (0.24 lb ai)**

BURNDOWN. Paramount controls annual grass and broadleaved weeds in fallow and preplant to wheat. Grasses include foxtail and barnyardgrass. Paramount is especially useful for field bindweed and volunteer flax. There is partial control on dandelion, kochia, lambsquarters, sunflower, and ragweed. Annual weeds should be small, grasses should not exceed 1 to 2 inches for best results. Rate is 3 to 5.3 oz 75DF per acre. Use 5 to 30 gpa carrier for ground equipment. Add MSO at 1 to 2 pt or COC at 2 pt per acre. Adding AMS at 2.5 lb or 28% N at 0.5 to 1 gal per acre improves consistency. Bindweed should be actively growing with at least 4 inch vine growth. Allow 30 days after tillage before treating. Best bindweed program is 5.3 oz the first year followed by 3 to 5.3 oz the following year.

Paramount, Quinstar (Continued . . .)

Treated areas may be planted to spring or winter wheat or sorghum. Other crops may be planted after 10 mo, except allow 24 mo and complete a bioassay before planting alfalfa, flax, peas, and lentils. Avoid drift to non-target plants.

FALLOW or PREPLANT to WHEAT or SORGHUM. Apply in fallow or after harvest prior to frost.

TANK-MIXES. Paramount may be tank-mixed with 2,4-D, Clarity, Fallowmaster, or glyphosate products for additional weed control.

PERENNIAL WEEDS AFTER HARVEST

Perennial Weeds. After harvest. Refer to FS 525N, Noxious Weed Control, for complete information. Select from treatments below according to crop rotation, weed species, growing conditions and severity of the problem.

Glyphosate rates in this section are based on product containing 3 lb acid equivalent (4 lb active ingredient) per gallon. Use the Glyphosate Table on page 31 to adjust amount for other formulations.

1-2 lb ae 2,4-D (1-2 lb ae). Amine is preferred in spring or early summer when growing conditions are good. Use ester forms for less favorable conditions. A 10-day interval between application and planting winter grain is suggested. (\$2.70-6.70).

2-4 pt dicamba 4L (1-2 lb ae). Allow an application to planting interval of 45 days during which soil is not frozen for each pint of dicamba before planting wheat, oats, barley, or soybeans. (\$19.70-39.30)

1-4 pt dicamba 4L + 1 lb ae 2,4-D (0.5-2 + 1 lb ae). Especially promising for Canada thistle. Follow crop rotation guidelines as for dicamba alone. (\$12.60-42.60).

1-2 pt dicamba 4L + 1-2 qt glyphosate 3 lb ae (0.5-1 + 0.75-1.5 lb ae). A good choice for late fall application on Canada thistle or field bindweed. Note crop rotation guidelines for Banvel alone. (\$18.90-37.80).

0.5 pt dicamba 4L + 1 pt glyphosate 3 lb ae (0.25 + 0.38 lb ae). Intended for field bindweed and Canada thistle suppression in an annual control program. (\$9.50).

1-4 qt glyphosate 3 lb ae (0.75-3 lb ae). Lower rates give more variable results. No restriction on labeled rotational crops. (\$9.10-36.40).

1-2 qt glyphosate 3 lb ae + 0.5-1 lb ae 2,4-D (0.75-1.5 + 0.5-1 lb ae). Especially useful for spot treating for Canada thistle or field bindweed. (\$10.50-21.50).

1 pt glyphosate 3 lb ae + 0.5 lb ae 2,4-D (0.38 + 0.5 lb ae). Intended for suppression in annual control program in fallow and postharvest. (\$5.40).

0.5-1 pt Tordon 2L + 0.5-1 lb ae 2,4-D (0.12-0.25 + 0.5-1 lb ae). For fallow in small grain system. For 0.5 pt Tordon 22K allow 45 days of soil temperature above 40o F. before planting small grains, or 90 days for 0.5 to 1 pt Tordon 22K. (\$6.60-13.70).

4 pt Curtail 2.38L (0.19 + 1 lb ae). Curtail is intended for Canada thistle. Crop rotation the following season is limited to corn, wheat, barley, oats, or grasses. Labeled crops should not be planted for 30 days after application. (\$18.00).

SMALL GRAIN (planted with alfalfa)

MCPA AMINE *Site of Action: 4* (\$1.05)

0.25 lb ae MCPA amine (0.25 lb ae)

LAMBSQUARTERS, MUSTARD, RAGWEED, PIGWEED Emergency treatment for heavy weed growth. Apply when companion crop is in tillered to boot stage and legume seedlings are 2 to 3 inches tall. Not for vetch or clover. Crop and/or weed canopy reduces risk of crop injury. Check product label.

BROMOXYNIL PRODUCTS (bromoxynil) *Site of Action: 6* (\$8.80-13.30)

1-1.5 pt bromoxynil 2L or 0.5-0.75 pt bromoxynil 4L (0.25-0.38 lb ae)

BROADLEAVES Apply when alfalfa seedlings have 4 trifoliate leaves. Annual broadleaf weeds should not exceed 4 leaves or 2 inches. Control of sunflower, cocklebur, wild buckwheat, and kochia is very good. Overwintered mustards are not controlled. Temporary alfalfa leaf burn is noted in warm, humid weather. Temperature should not exceed 70 or 80o F. for 3 days after application. Do not graze or harvest forage for 30 days after application.

Group Numbers Associated with Herbicide Sites or Modes of Action

WSSA Group Number	<u>Site or Mode of Action</u>	<u>Examples</u>
1	ACCase inhibitor	fenoxaprop, clodinafop
2	ALS inhibitor	mesosulfuron, flucarbazone
3	Microtubule inhibitor	trifluralin
4	Growth regulator	2,4-D, dicamba
6	Photosynthesis inhibitor (contact)	bromoxynil
7	Photosynthesis inhibitor (urea)	propanil
8	Lipid synthesis inhibitor (thiocarbamates)	triallate, difenzoquat
9	EPSP inhibitor	glyphosate
14	Cell membrane disrupter (PPO inhibitor)	carfentrazone, pyraflufen
22	Cell membrane disrupter (PSI inhibitor)	paraquat
27	Bleacher (HPPD)	mesotrione

WEED RESPONSE TO HERBICIDE

WEED RESPONSE. Weed control percentages are intended as a guide for comparing alternatives. Percentages are estimated based on favorable conditions. E = Excellent; G – Good; F = Fair; M = Marginal; P = Poor.

CROP RESPONSE. Crop response is based on visual symptoms. Early-season symptoms do not necessarily cause yield losses. N = None; VS = Very slight; S = Slight; M = Moderate; H = High; + = usually high part of range.

	WEED RESPONSE											CROP RESPONSE			
	Green foxtail	Yellow foxtail	Wild oats	Gen. Broadleaves	Wild buckwheat	Prickly lettuce	Kochia (ALS)	Sunflower, Cocklebur	Mustard	Canada thistle*	Field bindweed*	Oats	Barley	Wheat	Proso millet
2,4-D ester	P	P	P	G	F+	E	F	G+	E	G	G	H	S+	S+	--
2,4-D amine	P	P	P	G	F	E	M	G	E	G	G	S	S	S	M
MCPA ester	P	P	P	F	M	G+	P	F+	E	G	M	VS	VS	VS	--
MCPA amine	P	P	P	F	M	G	P	F	E	G	M	VS	VS	VS	--
Dicamba+															
2,4-D or MCPA	P	P	P	G+	E	E	G+	G	G	G	F+	--	H	M+	M+
Bromoxynil	P	P	P	F+	E	G	G	G+	F	P	P	M	VS	VS	--
Bromoxynil/MCPA	P	P	P	G+	E	G+	G+	E	G+	F	P	S	VS	VS	--
Huskie	P	P	P	E	G	G	E	G+	E	F	F	--	VS	VS	--
Aim	P	P	P	G	F+	F	G+	M	M	P	G	M	--	M	--
Achieve	G	F	G+	P	P	P	P	P	P	P	P	--	S	--	--
Assert	P	P	G+	M	F	P	M	P	E	P	P	--	VS	VS	--
Far-go	P	P	G	P	P	P	P	P	P	P	P	--	VS	S	--
Treflan	G	F+	M	P	P	P	P	P	P	P	P	--	VS	VS	--
Sharpen	P	P	P	F	F	G	F	F	G	P	P	VS	VS	VS	S
Pre-Pare	G	G	G	P	P	P	P	P	G	P	P	--	--	VS	--
Amber	P	P	F+	G+	F+	F+	P	E	E	M	P	--	VS	VS	--
Harmony GT	P	P	P	G	E	F+	P	E	E	F	P	M	--	VS	--
Harmony Extra	P	P	P	G+	E	F+	P	G+	E	F	P	M	VS	VS	--
Affinity BroadSpec	P	P	P	G+	G	F+	P	E	E	F	P	--	VS	VS	--
Affinity TankMix	P	P	P	G	E	F+	P	G+	E	M	P	--	VS	VS	--
Orion	P	P	P	F	G	G	P	F+	E	M	P	S	S	VS	--
Express	P	P	P	G	F	F+	P	G+	E	F+	P	--	S	VS	--
Finesse	P	P	P	G+	G+	F+	P	E	E	F	P	--	--	VS	--
Peak	P	P	P	G+	G	F+	P	G+	E	F	P	S	VS	VS	S
Ally	P	P	P	G+	G+	F+	P	G	E	M	P	--	S	VS	--
Ally Extra	P	P	P	E	E	F+	P	E	E	F	P	--	VS	VS	--
Glean	P	P	P	G	F	F+	P	F	E	F	P	S	S	VS	--
Curtail	P	P	P	G	G	E	G	G	G+	E	M	S	S	--	--
Stinger	P	P	P	M	F	G	P	G	P	E	P	VS	VS	VS	--
WideMatch	P	P	P	E	G	G	E	G	F	E	M	S	VS	VS	--
Starane	P	P	P	M	F	F	E	G	F	M	M	VS	VS	VS	--
Starane NXT	P	P	P	G	E	G	E	G+	F+	M	P	S	VS	VS	--
Pulsar	P	P	P	G	E	G	E	G	G	F	F	--	VS	VS	--
Axial	E	G+	E	P	P	P	P	P	P	P	P	--	S	VS	--
Axial TBC	E	G+	E	M	M	P	P	P	G+	P	P	--	VS	VS	--
Puma	E	F	E	P	P	P	P	P	P	P	P	--	S	VS	--
Wolverine	E	F	E	E	G	G	E	G+	E	F	F	--	VS	VS	--
Everest	E	M	G+	P	P	P	P	P	P	P	P	--	--	VS	--
Discover	G+	F	E	P	P	P	P	P	P	P	P	--	--	VS	--
Maverick	P	P	F+	F+	M	P	P	F	E	P	P	--	--	VS	--
Olympus	P	P	F	F+	M	P	P	F	E	P	P	--	--	VS	--
Olympus Flex	P	P	G	F+	M	P	P	M	E	P	P	--	--	VS	--
Power Flex	P	P	G	F+	M	P	P	F	E	P	P	--	--	VS	--
Rimfire	M	P	E	F	P	P	P	P	E	P	P	--	--	VS	--
Osprey	M	P	E	P	P	P	P	P	E	P	P	--	--	S	--
Silverado	M	P	G+	P	P	P	P	P	E	P	P	--	S	M	--
GoldSky	F	G	E	G	G	E	E	G	E	P	P	--	--	VS	--
<u>Clearfield Wheat</u>															
Beyond	G	M	F+	G+	F	P	P	E	E	M	P	--	--	VS	--
Clearmax	G	F	F+	E	F	G	P	E	E	G	M	--	--	VS	--

*Topgrowth suppression

-- = not labeled

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