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Weed Control in Corn: 2011

Mike Moechnig
South Dakota State University

Darrell L. Deneke

Leon J. Wrage

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WEED CONTROL

in Corn: 2011

FS525C



Mike Moechnig, Extension Weed Specialist
Darrell L. Deneke, Extension IPM Coordinator
Leon J. Wrage, Distinguished Professor – Emeritus

HERBICIDE SUGGESTIONS

Information in this publication is based on South Dakota Agricultural Experiment Station research and other research or observations. An herbicide is included only after it 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 uses and does not imply a guarantee or responsibility for results. There is no intent to specify product performance guarantees; such agreements involve the labeler and user. Users are responsible for following all label directions and precautions.

Rates. Rates for most products are listed as product per acre. Product rates for glyphosate, bromoxynil, 2,4-D, and dicamba are based on acid equivalent (ae). Refer to accompanying tables to determine the amount for the specific product used.

Tank Mixes and Combinations. Selected tank-mixes are listed for several herbicides where specific products and rates are given on the label. Most interpretations allow mixing products unless prohibited; however the user assumes responsibility if the specific combination is not shown. Tank-mixes having the most promise for local situations are included with at least one of the products. Check the section for each product alone and each product label for the complete listing of combinations for that specific product.

Herbicide Cost. The cost per acre for low and high rates is listed. Cost of additives is not included. Prices do not reflect special marketing programs. Consult your dealer for actual price.

Resistance Management. Refer to the table on page 42 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.

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 before 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.

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Tradenames 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.

LIST of CORN HERBICIDES

Accent (nicosulfuron) products		Lightning (imazethapyr + imazapyr)	40
Accent Q, Adapt, Nic-It, Primero	25	Lumax (s-metolachlor + mesotrione + atrazine)	16
Aim (carfentrazone)	31	Marksman (dicamba + atrazine)	29
Atrazine (atrazine)	4	Micro-Tech (alachlor)	6
Autumn (iodosulfuron-methyl-sodium)	29	Metribuzin products	
Balance Flexx (isoxaflutole)	13	Metri, TriCor	37
Basagran (bentazon)	33	NorthStar (primisulfuron + dicamba)	35
Basis (rimsulfuron + thifensulfuron)	23	Option (foramsulfuron)	28
Beacon (primisulfuron)	35	Outlook (dimethenamid-p) products	
Bicep (s-metolachlor + atrazine)	9	Establish, Propel, Slider	12
Buctril (bromoxynil) products		Parallel (metolachlor)	7
Broclean, Brox, Brozine, Charger Basic, Cinch,		Permit (halosulfuron) products	
Maestro, Moxy	34	Sandea	36
Bullet (alachlor + atrazine)	7	Prequel (rimsulfuron + isoxaflutole)	14
Cadet (fluthiacet + methyl)	32	Priority (carfentrazone + halosulfuron)	37
Callisto (mesotrione)	15	Prowl (pendimethalin) products	
Callisto Xtra (mesotrione + atrazine)	16	Pendant	21
Camix (s-metolachlor + mesotrione)	17	Python (flumetsulam)	19
Capreno (thiencarbazone + tembotrione)	18	Radius (flufenacet + isoxaflutole)	15
Celebrity Plus (nicosulfuron + dicamba +		Rage D-Tech (carfentrazone + 2,4-D ester)	32
diflufenzopyr)	31	Require Q (rimsulfuron + dicamba)	25
Corvus (thiencarbazone + isoxaflutole)	14	Resolve (rimsulfuron) products	
Curtail (clopyralid + 2,4-D) products		Pravin	23
Cutback	37	Resolve Q (rimsulfuron + thifensulfuron)	24
Define (flufenacet)	18	Resource (flumiclorac)	33
Dicamba products (dicamba)		Sequence (s-metolachlor + glyphosate)	8
Banvel, Clarity, Sterling	29	Sharpen (saflufenacil)	5
Distinct (dicamba + diflufenzopyr)	30	Shotgun (2,4-D + atrazine)	23
Dual II Magnum (s-metolachlor) products		Spirit (prosulfuron + primisulfuron)	36
Brawl, Charger Basic, Cinch, Medal II	7	Stalwart (metolachlor)	7
Epic (flufenacet + isoxaflutole)	14	Starane (fluroxypyr)	38
Eradicane (EPTC + safener)	4	Status (dicamba + diflufenzopyr)	30
Expert (s-metolachlor + glyphosate + atrazine)	8	Steadfast products (nicosulfuron + rimsulfuron)	
Glyphosate products (glyphosate)	39, 41	Ironclad	27
G-Max Lite (dimethenamid-p + atrazine)	12	Stinger (clopyralid) products	
Gramoxone (paraquat) products		Clopyr AG, Garrison, Solix	37
Firestorm	39	Stout (nicosulfuron + thifensulfuron)	26
Halex GT (s-metolachlor + glyphosate +		SureStart or TripleFLEX (acetochlor + flumetsulam +	
mesotrione)	8	clopyralid)	12
Harmony SG (thifensulfuron) products		Surpass (acetochlor) products	
Thief, Unity, Volta	38	Breakfree, TopNotch, Volley	10
Harness (acetochlor) products		Treflan (trifluralin)	22
Breakfree, Cadence, Degree,		Valor SX (flumioxazin)	6
OverTime, Warrant	10	Verdict (saflufenacil + dimethenamid)	6
Harness Xtra (acetochlor + atrazine) products		Vida (pyraflufen)	38
Keystone, Fultime, Confidence	11	WideMatch (clopyralid + fluroxypyr) products	
Hornet WDG (flumetsulam + clopyralid)	20	Colt AS	38
Ignite (glufosinate)	41	Yukon (halosulfuron + dicamba)	37
Impact (topramezone)	17	2,4-D (amine or ester)	22
Integrity (saflufenacil + dimethenamid)	6	Mode of Action Table	43
Lariat (alachlor + atrazine)	7	Weed Response Table	44
Laudis (tembotrione)	17		

GLYPHOSATE RESISTANT WEEDS

Glyphosate resistant weeds are becoming more common in South Dakota. The following list includes weed species that are known or suspected to be glyphosate resistant. Early detection of resistance will greatly improve your ability to manage the resistant population. The best solution is to minimize selection for resistant weed species, which may be done by using preemergence herbicides or rotating different crop species or crop varieties such as Liberty Link or conventional.

Kochia: Several locations in northcentral SD west of Hwy 281 and east of the Missouri River. Apply a preemergence herbicide such as atrazine or isoxaflutole (Balance or Corvus). Tank mix partners with glyphosate may include a bleacher herbicide (Callisto, Laudis, Impact), dicamba (Banvel, Clarity, Status, etc.), or a bromoxynil product. Ignite will control glyphosate resistant kochia in Liberty Link corn.

Common ragweed: Some reports in southeastern SD. Apply a preemergence herbicide such as atrazine, saflufenacil (Sharpen, Verdict, Integrity), or isoxaflutole (Balance or Corvus). Tank mix partners with glyphosate may include a bleacher herbicide (Callisto, Laudis, Impact), dicamba (Banvel, Clarity, Status, etc.), or a bromoxynil product. Ignite will control glyphosate resistant common ragweed in Liberty Link corn.

Horseweed (marestail): Several reports in southeastern and northcentral SD. In the burdown application, tank mix glyphosate with 2,4-D ester or saflufenacil (Sharpen, Verdict, Integrity). Atrazine may provide good residual control, but would likely have less foliar activity than saflufenacil. Atrazine (1 qt) + 2,4-D (1 pt) has worked well for foliar and residual control in some SDSU trials. For postemergence applications, make applications while the horseweed is still small (less than 6 in) and tank mix glyphosate with a dicamba product (Banvel, Clarity, Status, etc.). Ignite will control glyphosate resistant horseweed in Liberty Link corn.

Common lambsquarters: May be resistant during adverse conditions, but this has not yet been adequately proven in SDSU trials. Apply a preemergence herbicide such as atrazine, saflufenacil (Sharpen, Verdict, Integrity), or isoxaflutole (Balance or Corvus). Tank mix partners with glyphosate may include a bleacher herbicide (Callisto, Laudis/Capreno, Impact), dicamba (Banvel, Clarity, Status, etc.), thifensulfuron (Harmony), or a bromoxynil product. Ignite will control glyphosate resistant lambsquarters in Liberty Link corn.

Common waterhemp: Some reports near the Huron area, but not verified yet. Apply a preemergence herbicide such as atrazine, saflufenacil (Sharpen, Verdict, Integrity), acetochlor (Harness, Surpass, etc.), or isoxaflutole (Balance or Corvus). Tank mix partners with glyphosate may include a bleacher herbicide (Callisto, Laudis, Impact) or dicamba (Banvel, Clarity, Status, etc.). Ignite will control glyphosate resistant waterhemp in Liberty Link corn.

ABBREVIATIONS and DEFINITIONS

EPSS	EARLY PREPLANT SURFACE: Usually applied 2 to 6 weeks before planting in no-till.
PPS	PREPLANT SURFACE: Prior to planting.
PPI	PREPLANT INCORPORATED: Before the crop is planted, incorporate as directed.
SPPI	SHALLOW PREPLANT INCORPORATED: Preplant incorporated, but herbicide usually restricted to the top 2 inches of soil with single-pass incorporation.
PRE	PREEMERGENCE: After planting, but before crop or weeds emerge.
EPOST	EARLY POSTEMERGENCE: After initial emergence or crop and weeds.
POST	POSTEMERGENCE: After the crop or weeds have emerged.

pt = pint
qt = quart
oz = ounce
lb = pound
gal = gallon
ai = active ingredient
ae = acid equivalent
lb/gal = pound per gallon
in = inch
mo = month
gpa = gallon per acre
psi = pounds per square inch pressure

L = liquid, flowable or EC
SG, DF, WDG = dry flowable, water dispersible granule (spray)
G = granule
WSP = water soluble packet
N = liquid nitrogen fertilizer
OM = organic matter
NIS = non-ionic surfactant
COC = crop oil concentrate
AMS = ammonium sulfate
MSO = methylated seed oil
RR = Roundup Ready Corn
LL = Liberty Link Corn
CF = Clearfield Corn

ANNUAL WEED CONTROL in SWEET CORN

Weeds are more competitive with sweet corn than with field corn since sweet corn doesn't grow as rapidly or as tall. Treatments registered for use on sweet corn are listed below. Combinations and premixes of labeled products can also be used on sweet corn. Check the product label for special precautions as some restrict use to certain varieties.

Accent	Dual II Magnum/Cinch	Pendimethalin
Aim EW/Avalanche	Eradicane	Permit
Atrazine	G-Max Lite	Priority
Basagran	Gramoxone (pre)	Glyphosate (pre)
Bicep Lite II Magnum	Lariat	Starane
Bullet	Micro-Tech	Stinger
Callisto/Callisto Xtra	Outlook	2,4-D
DegreeXtra		

CORN HERBICIDES

ERADICANE (EPTC + safener) *Site of Action: 8*

4.75-7.33 pt Eradicane 6.7E (4-6 lb ai)

(\$23.70-36.55)

Eradicane has provided excellent control of most annual grasses. Very good for sandbur and wild oat. Safening agent provides adequate crop tolerance. The 7.33 pt per acre Eradicane rate is suggested for yellow nutsedge, wild proso millet, or suppression of quackgrass. Weather factors such as cold soil temperature and heavy rainfall reduce length of soil persistence and reduce control, especially if weed flushes are extended. EPTC may be degraded more rapidly by soil microbes in fields where Eradicane was used the previous year; therefore, do not use Eradicane in succeeding years. Minimum carrier is 10 gpa. No carryover.

PPI. Apply within 2 weeks of planting. Incorporate to a depth of 2 to 3 inches. Immediate incorporation preferred. Incorporation of impregnated dry bulk fertilizer must be completed the same day; application in liquid fertilizer should be incorporated within 4 hours.

TANK-MIXES

Eradicane can be tank-mixed with several herbicides to improve broadleaf control and to make grass control more consistent. Refer to label restrictions or the section for each herbicide.

ERADICANE + ATRAZINE

PPI. Mix 3.75 to 7.33 pt Eradicane with 1 to 1.5 lb ai atrazine per acre. Incorporate as for Eradicane alone. Rates of 4.75 pt Eradicane + atrazine at 1 qt of 4L or 1.1 lb 90DF per acre have been satisfactory in most SDSU tests. Higher atrazine rates improve control of some broadleaves but also increase risk of carryover.

ERADICANE + SURPASS or DUAL or MICRO-TECH or OUTLOOK

SPPI. Mix 4 to 6 pt Eradicane with 1 to 1.5 pt Surpass or 0.5 to 0.7 pt Dual II Magnum or 2 to 3 pt Micro-Tech or 10 to 21 oz Outlook per acre. Incorporate uniformly into the top 2 to 3 inches. Apply within 2 weeks of planting. The low rate is used for most situations. Apply as for tank-mix.

ATRAZINE (atrazine) *Site of Action: 5*

1.6-2 qt atrazine 4L or 1.8-2.2 lb atrazine 90DF (1.6-2 lb ai)

(\$6.45-8.55)

Excellent control of several small-seeded annual broadleaves. High rate provides fair control of several large-seeded broadleaves. Annual grass control erratic. Good late-season control. Excellent crop tolerance. Atrazine at 2 qt of 4L or 2.2 lb of 90DF per acre has been satisfactory.

The maximum atrazine rate is 2 lb ai per acre for soil applications. The maximum rate is reduced to 1.6 lb ai per acre on fields designated as "highly erodible soil" (HEL) if there is less than 30% residue. A 66-foot buffer setback is required on HEL land. Atrazine cannot be applied within 66 feet of points where surface water enters streams or rivers or within 200 feet of lakes or reservoirs or loaded or applied within 50 feet of a well or sinkhole.

Atrazine (continued . . .)

Carryover may damage soybeans, sunflowers, small grain, and legume/grass seedings the following year. Corn and sorghum are tolerant. Risk of carryover is greatest on high pH, low-organic matter soils or eroded knolls. Soybeans and flax usually tolerate carryover rates up to 1 lb ai per acre. Minimum carrier for ground application is 10 gpa. For aerial preplant or preemergence application, minimum carrier is 1 qt for each quart of 4L or 1 gallon for each pound of dry formulation. Minimum carrier is 2 gpa for postemergence aerial application.

EPPS. Apply two-thirds of the total amount as the first part of a split application if treating 30 to 45 days before planting and apply the remainder at planting. Do not apply more than 2 weeks before planting on sandy soil.

SPPI. Incorporate into the top 2 inches within 2 weeks of planting. Most consistent application. Provides best large-seeded broadleaf control.

PRE. Requires 0.75 to 1 inch rain within one week after application. Less consistent.

1.25-2 qt atrazine 4L or 1.3-2.2 lb atrazine 90DF (1.25-2 lb ai) (\$4.65-8.55)

EPOST. With or without crop oil. Crop oil strongly preferred. Intended for annual broadleaves only. Weeds should be less than 1.5 inches high. Corn should not exceed 12 inches. Rainfall, high humidity, and dew improve results. Grass control is fair to poor. Some crop yellowing or leaf tip burn may occur under extremely cold, wet conditions. Use COC at the rate of 1 qt for ground or 1 to 2 pt per acre for air. Do not add 2,4-D or dicamba. Do not use liquid fertilizer carrier.

1-2 qt atrazine 4L or 1.1-2.2 lb atrazine 90DF (1-2 lb ai)

FALL. Labeling allows fall application in wheat stubble in a wheat-corn-fallow rotation. Rates of 1 to 1.25 lb ai per acre have been used in SDSU tests as late fall application in no-till systems. Do not exceed 1.5 lb ai per acre on soils with a pH over 7.5. Results have been favorable if a follow-up herbicide is used to improve grass control.

TANK-MIXES

Atrazine may be used in several preemergence tank-mixes. Gramoxone and glyphosate may be used for burndown. Atrazine is included in numerous tank-mixes on other herbicide labels.

SHARPEN (saflufenacil) *Site of Action: 14*

2-3 fl oz Sharpen (0.04-0.06 lb ai) (\$9.60-14.40)

Apply 2 fl oz/A on coarse soils or up to 3 fl oz/A on fine textured soils. Foliar and residual control of broadleaf weed species such as wild buckwheat, common lambsquarters, waterhemp, pigweed, mustard species, Russian thistle, horseweed (marestail), cocklebur, and several others. After application, at least 0.5 inches of rain is needed to activate the herbicide. May tank mix with glyphosate, atrazine, Outlook, Guardsman, Clarity, Status, Harness, or other herbicides for control of grass and additional broadleaf weed species. Do not apply in fields where organophosphate or carbamate insecticides were applied at planting. Do not apply more than 6 fl oz/A per growing season.

For foliar activity, add MSO (1% v/v or 1 gallon per 100 gallons or minimum of 1 pt/A with low volume applications) and either AMS (8.5-17 lbs per 100 gallons) or UAN (1.25-2.5% v/v or 1.25-2.5 gallons per 100 gallons). Minimum carrier volume is 5 gpa for ground applications or 3 gpa for aerial applications. If foliar activity is desired, the minimum carrier volume is 10 gpa (15 – 20 gpa is suggested) for ground applications or 5 gpa for aerial applications. May be impregnated onto dry granular fertilizer.

More flexible rotation options than atrazine. Crop rotation restriction is 6 months or less for most crops.

PPS or PPI. For applications up to 14 days prior to corn planting. May also apply up to 30 days prior to planting, but this is not recommended for coarse soils.

PRE. Do not apply after corn begins to emerge.

Sharpen (continued . . .)

PREMIX

VERDICT or INTEGRITY (saflufenacil + dimethenamid) Site of Action: 14+15 (\$15.40-24.60)

10-16 fl oz per acre. Apply 10 fl oz/A on coarse soils or up to 16 fl oz/A on fine textured soils. The 13 oz rate for medium textured soils is equivalent to 2.6 fl oz/A Sharpen + 10.8 fl oz/A Outlook. Intended for use in two-pass programs that will include a postemergence application. Provides foliar and residual control of several annual broadleaf weed species and grass species such as foxtail, crabgrass, and barnyardgrass. After application, at least 0.5 inches of rain is needed to activate the herbicide. Crop injury may occur during stressful conditions such as extreme hot or cold conditions, excessive moisture or drought, high soil pH, or disease injury. Special 24c label for SD prohibits application on specific soil types that have sand 0-12 inches below the soil surface, O.M. is 3% or less, and the water table is less than 30 ft below the soil surface.

For foliar activity, add either MSO (1% v/v or 1 gallon per 100 gallons) or COC (1% v/v) and either AMS (8.5-17 lbs per 100 gallons) or UAN (1.25-2.5% v/v or 1.25-2.5 gallons per 100 gallons). Minimum carrier volume is 3 gpa for ground or aerial applications. More flexible rotation options than atrazine. Wheat may be planted 4 months after application and any crop may be planted one year after application. Rotation restrictions for soybeans are not defined.

PPS. For applications up to 14 days prior to corn planting. May also apply up to 30 days prior to planting, but this is not recommended for coarse soils.

PRE. Do not apply after corn begins to emerge.

VALOR SX (flumioxazin) Site of Action: 14

1-2 oz Valor SX 51WDG (0.03-0.06 lb ai) (\$5.40-10.80)

Supplemental label for burndown applications 14 to 30 days prior to corn planting. When tank mixed with glyphosate, Valor provides residual and foliar control of wild buckwheat, pigweeds, waterhemp, lambsquarters, kochia, mustards, and others. May be tank mixed with 2,4-D to provide control of winter annual weed species such as marestail/horseweed. Add NIS (0.5% v/v or 2 qt per 100 gallons spray solution) plus AMS (17 lbs per 100 gallons spray solution) with glyphosate mixes or COC (1 pt/A) with 2,4-D mixes.

PPS FALL. Apply after November 15 or after the ground is less than 50° F.

PPS SPRING. Apply at least 14 days prior to corn planting. At least 1 inch rain or irrigation should occur after application but prior to corn planting.

MICRO-TECH (alachlor) Site of Action: 15

2-4 qt Micro-Tech 4L or 16-26 lb Lasso II 15G (2-4 lb ai) (\$14.30-28.55)

Very good to excellent control of several annual grasses. Fair control of pigweed and lambsquarters with high rates. Consistent on annual grasses. Very good crop tolerance. Rates of 2.5 to 3 qt Micro-Tech or 16 to 20 lb 15G (broadcast) per acre have been satisfactory in most SDSU tests. Rates of 3 to 4 qt per acre are suggested for severe weed infestations or for yellow nutsedge, or when planting into heavy residue.

Minimum carrier is 10 gpa for ground or 3 gpa for air. Granule and spray formulations appear equally effective. Micro-Tech is a microencapsulated formulation containing 4 lb per gallon. No carryover.

EPSS. Apply 60% of the total amount as the first part of a split application if treating 30 to 45 days before planting and the remainder at planting.

SPPI. Incorporate into the top 2 inches within 7 days of planting. Flextine harrow is not satisfactory. Better results than preemergence when rain is very limited, but slightly less control than a preemergence application with adequate rain. Heavy rain reduces results. Proper incorporation may be difficult with trashy, lumpy seedbed.

PRE. Requires 0.5 to 0.75 inch rain within one week after application.

EPOST. Apply from crop emergence to 5 inches. Emerged weeds are not controlled. Not a planned weed program. Liquid fertilizer carrier may cause severe injury.

Micro-Tech (continued . . .)

TANK-MIXES

Premixes with atrazine are listed below. Labeling also includes preemergence mixes with Banvel or Marksman or with glyphosate or Gramoxone for burndown.

MICRO-TECH + ATRAZINE

EPP, SPPI, PRE, EPOST. Mix 1.5 to 4 qt Micro-Tech + 1 to 2 lb ai atrazine. Rates of 2 to 2.5 qt Micro-Tech + atrazine at 1 qt of 4L or 1.1 lb of 90DF per acre have been used in most SDSU tests. Postemergence must be applied before corn is 5 inches and grass is less than 2-leaf stage.

PREMIX

LARIAT or BULLET (alachlor + atrazine)

(\$16.25-29.25)

EPP, SPPI, PRE, EPOST. Use 2.5 to 4.5 qt Lariat or Bullet premix per acre. Lariat and Bullet contain 2.5 lb alachlor + 1.5 lb ai atrazine per gallon. Refer to tank-mix section.

METOLACHLOR PRODUCTS Site of Action: 15

(\$12.10-30.15)

DUAL II MAGNUM or CINCH (s-metolachlor)

1-2 pt Dual II Magnum or Cinch or Medal II 7.6L or 6-12 lb Dual II G-Magnum 16G (0.95-1.9 lb ai)

Very good to excellent control of several annual grasses. Fair control of pigweed with high rates. Weak on lambsquarters. Consistent on annual grasses when rainfall or soil moisture requirements are met. Rates of 1.67 to 2 pt Dual II Magnum or Cinch or 10 to 12 lb 16G per acre (broadcast) have been satisfactory in most SDSU tests. Labeling includes higher rates for special grass problems. Very good crop tolerance. Minimum carrier is 10 gpa for ground and 2 gpa for air. No carryover. Labeled for field, silage, and sweet corn.

Dual products designated as "II" contain a crop protectant. Products designed "Magnum" contain the resolved form of metolachlor (s-metolachlor) and product rates were adjusted.

FALL. Apply after September 30 when soil temperature is 55° F and falling but before soil freezes. For soil having greater than 2.5% O.M. Use 1.67 to 2 pt Dual II Magnum or Cinch on medium soils. Use the high rate on fine textured soil. Performs best in early, dry spring seasons and where grass pressure is light to moderate.

EPPS. Apply 2/3 of the total as the first part of a split application if treating 30 to 45 days before planting and apply the remainder at planting. Applications less than 30 days before planting may be as a split or single application. Split application usually preferred if more than 14 days before planting. Do not apply more than 2 weeks before planting on sandy soil.

SPPI. Incorporate into top 2 inches within 14 days. Better results than preemergence when rain is very limited, but gives slightly less control than preemergence with adequate rain. May be more consistent in low rainfall areas. Heavy rain reduces effectiveness. Proper incorporation may be difficult with trashy, lumpy seedbed. Deeper incorporation reduces control. Use maximum rate for soil type.

PRE. Requires 0.5 to 0.75 inch rain within one week after application.

POST. Apply postemerge until corn reaches 40 inches. Less consistent. Use with a tank-mix partner that controls emerged weeds.

STALWART C or PARALLEL (metolachlor)

1-2 pt Stalwart C or Parallel 7.8L (0.98-2 lb ai)

Products contain metolachlor. EPA has limited the rate to the same amount of product as for Dual II Magnum containing s-metolachlor. Higher rates are included for certain grassy weed problems. Apply as for s-metolachlor above.

Metolachlor Products (continued . . .)

PREMIXES

SEQUENCE (s-metolachlor + glyphosate)

(\$16.40-26.25)

Intended to control emerged weeds and provide residual control of several annual grass weed species. Rates vary from 2.5-4 pt/A depending on weed height at the time of application. Each pint of Sequence contains the equivalent of 0.4 pt Dual Magnum.

PPS and PRE. Apply to Roundup Ready or non-RR corn. Do not apply more than 3.5 pt/A on coarse soils or 4 pt/A on medium or fine textured soils.

EPOST. Apply only to glyphosate (e.g. Roundup Ready) corn from emergence until 30 inches tall. Do not exceed 2.5 pt/A in a single application or a total of 5 pt/A per season. Do not exceed 1.5 lb ae/A glyphosate per season (each pint of Sequence contains approximately 0.3 lb ae). Do not apply to corn stressed from weather, insects, disease, or cultivation injury. Do not graze or feed treated forage until 30 days after application. May be tank mixed with atrazine, dicamba, 2,4-D, Callisto, or other (see label).

EXPERT (s-metolachlor + glyphosate + atrazine)

(\$18.90-28.35)

Intended to provide control of emerged weeds and residual control of several broadleaf and grass weed species. Rate is 2.5-3.75 qt/A. Rates vary based on soil texture and organic matter. Adding AMS (2% by weight or 17 lbs per 100 gallons spray solution) may improve weed control during adverse conditions. Expert at 3 qt/A contains the equivalent active ingredient as 1.6 qt/A atrazine 4L, 1.4 pt/A Dual II Magnum, and 18 oz/A Durango 5.4L (glyphosate). Minimum carrier is 10 gpa (use 20 gpa in dense canopies) for ground applications. Do not apply with aerial equipment.

Expert may be tank mixed with Dual II Magnum (s-metolachlor), atrazine, Princep (simazine), glyphosate, Python (flumetsulam), Hornet (flumetsulam + clopyralid), Prowl (pendimethalin), dicamba, or 2,4-D.

Do not mix or load within 50 feet of wells, sink holes, streams, rivers, lakes, or reservoirs. Do not apply within 66 feet of areas where field surface runoff drains into streams or rivers. Do not apply within 200 ft of natural or impounded lakes or reservoirs.

PPS or PRE. Conventional or Roundup Ready corn. Apply up to 30 days prior to corn planting or prior to corn emergence.

EPOST. Apply in corn from emergence up to 12 inches tall. For glyphosate resistant corn only.

HALEX GT (s-metolachlor + glyphosate + mesotrione)

(\$19.90-22.15)

EPOST. For glyphosate-tolerant corn only. Rate to 3.6 to 4 pt/A. Add NIS at 1 to 2 qt/100 gal water and AMS at 8.5 to 17 lbs/100 gal water. Using UAN rather than AMS could result in crop injury. Minimum carrier is 10 gpa for ground applications. An application of 3.6 pt/A will be equivalent to 3 oz/A Callisto, 0.99 pt/A Dual Magnum, and 24 oz/A Touchdown HiTech.

Controls many common grass and broadleaf weed species. Apply to weeds less than 4 inches tall. Provides 3-4 weeks residual control if at least 0.25 inches rainfall is received within 7 days after application. Tank mixing with atrazine will increase the weed control spectrum.

Do not apply Halex GT to corn where Counter, Lorsban, or other organophosphate soil insecticides have been applied. Do not apply foliar organophosphate insecticides 7 days before or 7 days after applying Halex GT. Do not tank mix Halex GT with emulsifiable concentrate grass herbicides.

Corn or sorghum can be planted any time after application; barley, rye, oats, or wheat 120 days after application; alfalfa, canola, flax, sunflowers, soybeans 10 months after application; dry beans, peas, red clover, and other crops 18 months after application.

Metolachlor Products (continued . . .)

BICEP II MAGNUM or BICEP LITE II MAGNUM (s-metolachlor+atrazine) (\$10.30-32.60)
CINCH ATZ LITE (s-metolachlor+atrazine)
MEDAL II AT (s-metolachlor+atrazine)
STALWART EXTRA (metolachlor+atrazine)

EPPS, SPPI, PRE, EPOST. Bicep products designated as "II" contain a protectant for added metolachlor tolerance. Bicep products designated "Magnum" contain a resolved chemical form of metolachlor. Bicep products designated as "Lite" have less atrazine and are preferred where carryover is to be minimized. Cinch ATZ Lite contains similar active ingredients and is used at the same rates as Bicep Lite II Magnum. Very good to excellent control of several annual grasses and small-seeded annual broadleaves. Consistent performance. Apply as for tank-mix.

	metolachlor + atrazine <u>lb/gal</u>	s-metolachlor + atrazine <u>lb/gal</u>	product/A <u>qt</u>	equivalent atrazine/A <u>lb ai</u>
Bicep II Magnum 5.5L	----	2.4+3.1	1.3-2.6	1-2
Bicep Lite II Magnum 6L	----	3.3+2.7	0.9-2.2	0.6-1.5
Cinch ATZ Lite 6L	----	3.3+2.7	0.9-2.2	0.6-1.5
Medal II AT	----	2.4+3.1	1.6-2.6	1.2-2.0
Stalwart Extra 5.5L	2.4+3.1	----	1.3-2.6	1-2

Early preplant rates are 2.1 to 2.6 qt for Bicep II Magnum and 1.5 to 2.2 qt for Bicep Lite II Magnum per acre. Maximum atrazine rate is 1.6 lb ai per acre on highly erodible land with less than 30% residue.

TANK-MIXES/PREMIKES

Tank-mixes and premixes for most situations are listed below. Labeling also includes preemergence mixes with Balance or postemergence mixes with Banvel, Liberty, or Liberty ATZ (LL corn), or burndown with Gramoxone, Roundup, 2-4-D, Banvel, or Marksman. Refer to label restrictions or the section for each herbicide. Mix 1 to 2 pt Dual II Magnum + 1 to 2 lb ai atrazine per acre. Very good to excellent control of several annual grasses and small-seeded annual broadleaves. Consistent performance.

DUAL II MAGNUM 7.6E or CINCH + ATRAZINE

EPPS. As for Dual or Cinch alone.

SPPI. Incorporate as for Dual or Cinch alone.

PRE. Refer to Dual or Cinch section.

EPOST. May be applied before the 2-leaf stage or weeds, but before corn is 5 inches. Less consistent. Primarily an alternative if unforeseen conditions prevent earlier application. Harrowing or rotary hoeing to remove emerged weeds improves results.

Tank-mix for special label for reduced rates of Dual and postemergence herbicides is listed below.

DUAL or CINCH + ACCENT + NORTHSTAR

POST. Mix 0.67 to 1.33 pt Dual II Magnum or Cinch with 0.33 to 0.45 oz Accent plus 5 oz NorthStar per acre. Add NIS at 1 qt/100 gal plus 2 to 4 qt 28% N per acre. Do not use COC.

ACETOCHLOR PRODUCTS *Site of Action: 15*

(\$15.35-46.70)

HARNESS or CONFIDENCE or SURPASS or VOLLEY or BREAKFREE or TOPNOTCH or DEGREE (acetochlor)**1.5-3.75 pt Surpass or Volley 6.4L or Breakfree (1.2-3 lb ai), 2-3.75 qt TopNotch 3.2L
1.25-3 pt Harness or Confidence 7L or 6-12 lb Harness 20G (1.2-2.4 lb ai), 2.75-5.5 pt Degree 3.8L**

Products contain acetochlor plus safener. TopNotch is a microencapsulated formulation (Surpass) targeted to no-till. Degree is an encapsulated formulation (Harness) that is released by temperature. The acetochlor and safener in Degree release as temperature rises above 50° F extending control further into the weed emergence period. Annual grass control has been very good to excellent. It has been more consistent than some preemergence treatments when rainfall was limited. Control of small-seeded annual broadleaves such as pigweed is more variable but is fair to good in many tests. Gives fair to good control of waterhemp.

General labeling and precautions are similar. Crop tolerance is very good. Approved rotational crops include wheat (4 mo); soybeans and milo the following year.

Several environmental restrictions are intended to reduce the risk of groundwater contamination. Mixing and loading pads are required if within 50 feet of a well. Application is prohibited on sandy soil with less than 3% O.M. if groundwater is within 30 feet of the surface. In addition, loamy sands with less than 2% O.M. or sandy loams with less than 1% O.M. should not be treated if groundwater is within 30 feet. Minimum carrier is 10 gpa. Acetochlor is not approved for air application.

FALL. Several acetochlor products are registered for fall application after soybean harvest. Apply after October 15, but before the soil freezes. For medium and fine textured soils with greater than 2.5% O.M. Best suited for fields where light or moderate grass pressure is anticipated. Do not incorporate more than 2 inches deep if tilled after application.

EPPS. For no-till or reduced tillage systems. Apply Harness, Confidence, Surpass, Breakfree, or Volley within 30 days of planting or TopNotch within 40 days. High rates are suggested if applied more than 10 days before planting. Incorporated applications should be made within 10 days of planting. Harness may be used as a split application if applied within 45 days of planting. Slightly higher rates are used for early preplant applications. Performance is best in early, dry spring seasons.

SPPI. Apply within 14 days of planting. Incorporate shallowly into the top 1 to 2 inches.

PRE. Apply within 5 days of the last tillage. Rainfall required.

POST. Apply postemerge until corn reaches 11 inches. Do not use fluid fertilizer carrier. Use with tank-mix partner that controls emerged weeds.

WARRANT 3L (1.2 – 2.5 lb ai/A)

Primarily intended for EPOST applications in soybeans, but a supplemental label is available for applications in corn. Rates are 1.5 – 3 qt/A depending on soil texture and organic matter (O.M.). For soils with less than 3% O.M., apply 1.5 – 2 qt/A on coarse soil or 1.5 – 2.75 qt/A on medium or fine texture soil. May be applied from corn emergence until the corn is 30 in tall. Do not use on sweet corn. Do not use liquid fertilizer as the carrier.

HARNESS or CONFIDENCE or DEGREE (1.2-2.6 lb ai/A)

(\$15.35-39.70)

Rates are 1.25 to 2.75 pt acetochlor 7L for conventional till or 1.5 to 3 pt per acre for reduced till. Rates for most situations are 2.2 to 2.7 pt per acre; use the higher rate for reduced till. The higher rates are most consistent. Degree 3.8L rates are 2.25 to 5 pt for conventional till or 2.75 to 5.5 pt per acre for reduced till. Rates for most situations are 3.25 to 4.25 pt per acre. Harness at 2 pt provides the equivalent acetochlor as 3.67 pt Degree.

TANK-MIXES

Tank-mixes for most situations are listed below. Labeling may include preemergence mixes with Prowl and Python and postemerge mixes with Hornet, Accent, and Permit or burndown mixes with Gramoxone, 2,4-D, and Roundup. Refer to label for specific tank-mix instructions.

HARNESS or CONFIDENCE or DEGREE + ATRAZINE

EPP, PPI, PRE, EPOST. Mix 1.25 to 2 qt/A atrazine. Add 1 to 2.25 pt/A Harness or Confidence in conventional till or 1.75 to 2.5 qt/A Harness in reduced till. Tank-mix 2.25 to 4.25 pt Degree in conventional till or 3.25 to 4.5 pt Degree in reduced till. Weeds must be small for post timing. Preemergence preferred.

Acetochlor Products (continued . . .)

HARNESS or CONFIDENCE or DEGREE + DICAMBA PRODUCT or MARKSMAN or STERLING PLUS

PRE or **EPOST**. Tank-mix 1.25 to 2.75 pt Harness or Confidence or 2.25 to 5 pt Degree + 1 pt dicamba 4L or 3.5 pt Marksman or Sterling Plus per acre. Not for coarse soils. Grass must be small for postemergence. Rain required for preemergence activity. Refer to dicamba or Marksman section for post rates.

HARNESS or DEGREE + BALANCE

PRE. Tank-mix 1.25 to 2.25 pt Harness or Confidence or 2.25 to 4.25 pt Degree with 1 to 3.5 oz Balance Pro per acre. Refer to soil precautions in section for Balance alone.

HARNESS or DEGREE + CALLISTO

EPOST. Tank-mix with 3 oz/A Callisto for postemergence broadleaf weed control. Weeds must be less than 5 inches tall. Add nitrogen (2.5% v/v 28% N or 8.5 lbs/100 gal AMS). Adding 0.25% v/v NIS may improve control of emerged weeds. Do not add MSO.

PRE with Degree. Add 3 oz/A Callisto.

PREMIXES

HARNESS XTRA, CONFIDENCE XTRA, DEGREE XTRA, BREAKFREE ATZ, or KEYSTONE (acetochlor + atrazine) (\$15.95-43.50)

EPP, PPI, PRE, or **EPOST**. Use 1.8 to 2.3 qt/A Harness Xtra or Confidence Xtra premix containing 4.3 lb acetochlor (Harness) + 1.7 lb atrazine per gallon. Use 2.9 to 3.7 qt/A Degree Xtra containing 2.7 lb acetochlor + 1.3 lb atrazine per gallon. Use 2.2 to 3.4 qt/A Breakfree ATZ or Keystone containing 3.0 lb acetochlor (Surpass) + 2.25 lb atrazine per gallon. Rates vary by soil texture, O.M. and time of application. Weeds must be small for post timing, preemergence preferred.

FIELD MASTER (acetochlor + atrazine + glyphosate)

PRE or **EPOST**. For PRE, apply 3.5 – 5 qt/A on coarse texture soil or 4 – 5 qt/A on medium to fine texture soil. For POST in RR corn less than 12 in tall, apply 4 qt/A to emerged susceptible weeds less than 6 in tall or 5 qt/A to weeds 6 – 12 in tall. Adding AMS (17 lbs per 100 gallons spray solution) may improve control. Field Master at 4 - 5 qt/A is equivalent to 2.3 – 2.9 pt Harness, 1.5 – 1.9 qt atrazine 4L, and 16 - 20 oz/A Roundup WeatherMax. Therefore, the atrazine rate may be a little high for rotations (to wheat, alfalfa, or sunflowers) in some locations.

SURPASS, TOPNOTCH, BREAKFREE, OVERTIME, or VOLLEY (1.2-3 lb ai/A) (\$10.70-46.70)

Surpass, Breakfree, or Volley rates are 1.5 to 3.75 pt for conventional till or 2 to 3.75 pt per acre for reduced till. Rates for most situations are 2.5 to 3 pt per acre; use the higher rate for reduced till. The higher rates are most consistent. TopNotch rates are 2 to 3 qt per acre.

TANK-MIXES

Tank-mixes for most situations are listed below. Labeling may include postemergence mixes with Accent, dicamba, 2,4-D, glyphosate products, Liberty (LL corn), Lightning (CF corn), Resource, Steadfast, and other products labeled for postemergence application.

SURPASS, VOLLEY, TOPNOTCH, or BREAKFREE + ATRAZINE

EPP, PPI, PRE, EPOST. Tank-mix 0.5 to 2 qt/A atrazine. Weeds must be small for early post timing.

SURPASS, TOPNOTCH, BREAKFREE + HORNET WDG

PRE. Add 4 to 5 oz Hornet WDG per acre. Use 5 oz rate for fine-textured soils with >3% O.M. Do not use on coarse-textured soils with <1.5% O.M.

EPOST. Add 2 to 3 oz Hornet WDG for postemergence control of velvetleaf, sunflower, cocklebur, marestalk, annual smartweed, and others. Add 0.25% v/v NIS or 1% v/v COC.

SURPASS, VOLLEY, TOPNOTCH, or BREAKFREE + DICAMBA PRODUCT or MARKSMAN or STERLING PLUS

PRE or **EPOST**. Add 0.5 to 1 pt/A dicamba 4L or 2 to 3.5 pt/A Marksman or Sterling Plus. Not for coarse-textured soils with <2% OM. Adjust dicamba or Marksman rates according to weed situation for postemergence applications.

SURPASS, VOLLEY, TOPNOTCH, or BREAKFREE + BALANCE PRO

PRE. Refer to the Balance Pro label for proper use rates for your location and soils.

Acetochlor Products (continued . . .)

PREMIXES

KEYSTONE LA, VOLLEY ATZ LITE, or BREAKFREE ATZ LITE (acetochlor + atrazine)

(\$14.25-46.90)

PRE, EPOST. Premixes containing 4 lb acetochlor (Surpass) + 1.5 lb atrazine per gallon. Rate is 1.6 to 3 qt per acre. The 2 qt rate provides 2 lb acetochlor + 0.75 lb ai atrazine per acre. Rates vary with soil texture, O.M., and time of application.

SURESTART or TRIPLEFLEX (acetochlor+flumetsulam+clopyralid)

(\$16.25-21.65)

EPPS, PPI, PRE EPOST. Rate is 1.5 to 2 pt/A depending on soil texture and O.M. Supplemental label allows rates up to 3 pt/A if longer residual control is desired. Standard rates are intended for limited residual control that will be followed by a postemergence herbicide application. May be applied 30 days prior to planting up to corn 11 inches tall, but it is recommended to apply just prior to weed germination. May be applied in the fall to soybean stubble after October 15 as defined for acetochlor.

Provides control or suppression of several annual grass and broadleaf weed species. SureStart contains 3.75 lb acetochlor + 0.12 lb flumetsulam + 0.29 lb clopyralid per gallon. SureStart at 1.5 to 2 pt/A is equivalent to 0.9 to 1.2 pt/A Surpass + 0.45 to 0.6 oz wt/A Python + 0.15 to 0.2 pt/A Stinger.

Do not apply preemergence to soils with a pH >7.8. Do not apply postemergence if the field was previously treated with Counter or Thimet insecticide. Where the water table is less than 30 ft below the soil surface, do not apply within 150 ft of a well if the soil is a sand with less than 3% organic matter (OM), loamy sand with less than 2% OM, or sandy loam with less than 1% OM. Do not mix or load within 50 ft of a well unless it is done on a properly constructed impervious pad.

OUTLOOK or PROPEL or ESTABLISH or SLIDER (dimethenamid-p) Site of Action: 15

8-21 fl oz Outlook 6L or Propel 6L or Establish 6L or Slider 6L (0.4-1 lb ai)

(\$11.15-29.80)

Chloroacetamide herbicide. Very good to excellent control of several annual grasses. Sandbur and wild proso millet are partially controlled. Fair to good control of certain annual broadleaves such as pigweed, waterhemp, or black nightshade. Crop tolerance is adequate.

Do not apply to coarse soil (sand) with less than 3% O.M. and where groundwater is 30 feet or less below surface. A supplemental label for SD lists specific soil series where application is prohibited. Rates of 14 to 16 oz Outlook 6L per acre suggested for most situations. The maximum rate has been used in SDSU tests. Minimum carrier is 2 gpa for ground or air equipment. There are no rotational crop restrictions for the next season. Winter wheat can be planted after 4 months.

FALL. Apply after October 1 when soil temperature at 4 inches is less than 55° F. Use 21 oz per acre for medium and fine textured soil with 2.5% O.M.

EPPS. For reduced or no-till systems. Apply up to 45 days before planting. A split application (2/3 early and 1/3 at planting) is preferred if applying more than 30 days before planting. Burndown herbicide may be added for emerged weeds.

SPPI. Apply within 2 weeks of planting and incorporate into the top 1 to 2 inches. Avoid deep incorporation. Better results than with preemergence if rain is very limited.

PRE. Requires rain prior to weed emergence. Use a rotary hoe or harrow if weeds emerge before it rains.

POST. May be applied early postemergence on corn up to 12 inches. Emerged weeds are not controlled. Preemergence preferred.

PREMIX

G-MAX LITE (dimethenamid-p + atrazine) Site of Action: 15+5

(\$17.70-30.95)

EPPS, PPI, PRE, and POST. Use 2 to 3.5 pt G-Max Lite premix containing 2.25 lb dimethenamid-p (Outlook) + 2.75 lb atrazine per gallon. Preemergence preferred. COC may be added to early post timing. The 3 qt rate provides the equivalent of 18 oz Outlook plus 1 lb atrazine per acre.

TANK-MIXES

Labeling also lists tank-mixes or sequential applications with Accent, Balance, Basagran, Beacon, Callisto, Dual, Lasso, Liberty (LL corn), Lightning or Pursuit (CF corn), NorthStar, Option, Steadfast, and 2,4-D. Glyphosate product, or Gramoxone may be added for burndown. Refer to label restrictions or the section for each herbicide and follow the most restrictive label.

BALANCE FLEXX (isoxaflutole) *Site of Action: 27*

3-6 fl oz Balance Flexx 2L (0.05-0.09 lb ai)

(\$13.00-26.00)

Balance Flexx is a soil-applied herbicide with root and shoot uptake. Isoxaflutole is an HPPD-inhibiting herbicide that can inhibit pigment functions causing leaves to turn white. Contains the safener cyprosulfamide that allows early postemergence applications. Controls annual broadleaf weed species such as pigweed, waterhemp, velvetleaf, lambsquarters, kochia, common ragweed, black nightshade, and others. May also control some annual grass weed species, such as green foxtail, barnyardgrass, and field sandbur. May only suppress yellow foxtail and wild buckwheat. Rainfall is required for incorporation and uptake.

Rates vary from 3-6 fl oz/A depending on application timing, soil organic matter, and soil texture. For coarse textured soils, apply 3 oz/A if organic matter is less than 1.5% or 4 oz/A if O.M. is greater than 1.5%. For medium textured soils, apply 5 oz/A if O.M. is less than 1.5% or 6 oz/A if O.M. is greater than 1.5%. For fine textured soils, apply 6 oz/A. Minimum carrier rate is 10 gpa. The potential for corn injury increases in soils with low O.M., coarse texture, or high soil pH.

If the water table is less than 25 feet below the soil surface, do not apply to sandy, sandy loam, or loamy sand soils or subsoils where the average organic matter in the upper 12 inches is less than 2% by weight. Plant corn at least 1.5 inches deep and make sure the seed is adequately covered. Do not exceed 6 oz/A per year. Off-site movement may occur if applied in areas that receive less than 15 inches annual precipitation. Do not apply using aerial equipment. Do not mix or load within 50 feet of wells, sink holes, streams, rivers, lakes, or reservoirs.

Rotation interval is 4 mo for wheat, 6 mo for soybeans, sweet corn, barley, grain sorghum, and sunflower, 10 mo for alfalfa (with 15 inches annual precipitation), and 18 mo for dry beans (with 15 inches annual precipitation).

BURNDOWN. If weeds have emerged at time of application prior to corn emergence, mixing a COC or MSO may aid in foliar activity of weeds less than 3 inches tall (use NIS rather than MSO or COC when tank mixing with certain glyphosate formulations (non-loaded) or mixing with liquid nitrogen). Tank mix an additional herbicide, such as Gramoxone, glyphosate, or 2,4-D if weeds are greater than 3 inches tall or weed species are present that may not be controlled by Balance Flexx. Tank mixing atrazine may improve control of emerged giant ragweed, common cocklebur, or Pennsylvania smartweed.

PPS. Apply up to 21 days prior to planting or up to 30 days prior to planting if a postemergence herbicide application is also planned. If splitting the application, apply 60% of the rate 15-30 days prior to planting and the remaining 40% at planting.

PPI. Apply up to 21 days prior to planting or up to 30 days prior to planting if a postemergence herbicide application is also planned. Incorporate less than 2 inches below the soil surface.

PRE. Apply after planting but prior to crop emergence. Failure to properly close the seed furrow could result in crop injury.

EPOST. Apply from corn spiking to the V2 growth stage (2 leaf collars). May tank mix with atrazine but not other herbicides for EPOST applications. May not provide control of weeds larger than the 1 true leaf growth stage. Do not use liquid fertilizers or COC or MSO when applying to emerged corn. Do not harvest corn forage until 45 days after application.

TANK-MIXES

Balance may be tank-mixed with herbicides to improve burndown or mixed with other preemergence herbicides, including atrazine, Dual, Harness, Micro-Tech, Prowl, Surpass, TopNotch, Degree, Define, Outlook, Bicep, Harness Xtra, Lariat, Bullet, Degree Extra, and Guardsman. Rate of the tank-mix partner is frequently reduced 50% from full rate.

PREMIX

CORVUS 2.63SC (thiencarbazone + isoxaflutole) Site of Action: 2+27 (\$17.85-30.05)

Corvus is a premix containing Balance Flexx (isoxaflutole + the safener cyprosulfamide) and thiencarbazone, an ALS-inhibiting herbicide that primarily improves grass control, but also has activity on some broadleaf weed species. Controls several common grass species such as foxtail (green, yellow, giant, bristly), barnyardgrass, crabgrass, and others. Controls broadleaf weed species such as pigweed, lambsquarters, kochia, common ragweed, velvetleaf, and others.

Rate is 3.33 fl oz/A on coarse soils (sandy, loamy sand, sandy loam) with less than 2% organic matter (O.M.) or 5.6 fl oz/A medium to fine textured soils or coarse soils with more than 2% O.M. Reduce the recommended rate by 0.5 fl oz/A on soils with a high pH (greater than 7.5) and less than 2% O.M.

Follow application restrictions as described for Balance Flexx. Minimum carrier rate is 10 gpa for ground applications (do not apply by air). May be applied using water or liquid fertilizer as the carrier when applying preplant or preemergence. Cold and wet conditions during seedling emergence and early growth may cause temporary crop injury (leaf bleaching or stunting). Do not harvest fields for forage within 45 days after application.

Rotation interval is 4 mo for wheat, 9 mo for barley, soybeans, sweet corn; 17 mo for alfalfa, oats, sorghum, sunflower, and canola. If soil pH is greater than 7.5, increase rotation restrictions to the next high interval or 24 mo for crops in the 17 mo interval.

EPPS, PPI. May be applied up to 21 days prior to corn planting or 30 days prior if planning a sequential program with postemergence herbicides. If incorporating, do not incorporate more than 2 inches deep.

PRE, POST. Ensure complete furrow closure to avoid crop injury. Corvus may have foliar activity on weeds less than 6 inches tall. If weeds have emerged at the time of EPPS or PRE applications, foliar activity may be increased by adding COC or MSO. Use NIS if tank mixing with a glyphosate product. Although Corvus is intended as a preplant or preemergence herbicide, it may be applied after corn emergence up to the V2 corn growth stage. Atrazine is the only registered tank mix partner for applications after corn emergence. Do not add COC or MSO to applications after corn emergence. Do not tank mix with organophosphate or carbamate insecticides when applying to emerged corn.

PREQUEL (rimsulfuron + isoxaflutole) Site of Action: 2 + 27

Apply 1.66 – 2.5 oz wt/A, which is equivalent to 1 – 1.5 oz wt Resolve SG + 2 - 3 fl. oz Balance Flexx. Do not apply on corn with a maturity less than 77 days. Corn must be planted at least 1.5 in deep. Most effective if rain falls within 14 days after the application. The label recommended carrier rate is 15 gpa for dense weeds or 10 gpa for low weed densities with ground applications (do not apply with aerial equipment). Do not apply on coarse texture soil (sand, sandy loam, or loamy sand) with less than 1% organic matter. Do not apply on coarse texture soils where the water table is less than 25 ft below the soil surface (see supplemental label for restricted soil types). Do not load, rinse, or empty equipment within 150 ft of a well or surface water unless doing so on a properly constructed impermeable containment area. Discharges in excess of 25 lb ai must be reported to the SD Dept. of Ag.

PPS, PPI, or PRE. Apply from 30 days prior to planting but prior to corn emergence. If incorporating, do not incorporate more than 2 in deep. For PRE applications, make sure the seed furrow is closed to avoid corn injury. May control or suppress many emerged broadleaf weed species less than 3 in tall. If weeds are emerged, add COC or MSO. If weeds are taller than 3 in, add tank mix partner such as glyphosate, 2,4-D, dicamba, or Gramoxone. If mixing with a loaded glyphosate product or Ignite, no additional surfactant is needed.

EPIC 58DF (flufenacet + isoxaflutol) Site of Action: 15+27 (\$21.00-52.50)

Premix containing 48% flufenacet (Define) + 10% isoxaflutol (Balance). Foxtail control in SDSU tests has been very good. Woolly cupgrass and sandbur require additional herbicide program or cultivation for late emerging weeds. Several broadleaves including pigweed, waterhemp, lambsquarters, velvetleaf, Venice mallow, and mustard are controlled. Cocklebur and sunflower are partially controlled.

Crop tolerance has been satisfactory in SDSU tests. Plant seed at least 1.5 inches deep. Avoid coarse soils with pH over 7.5; coarse or medium soil with less than 1.5% O.M.; and medium soils with less than 2.5% O.M. and pH over 7.5.

Rates are 8 to 20 oz Epic per acre. Use 8 to 14 oz for light soil and 11 to 20 oz per acre for medium and fine soils. Rates of 11 to 15 oz are suggested for most medium and fine soils. The 13 oz rate provides the equivalent of 2.6 oz Balance Pro plus flufenacet.

Epic (continued . . .)

Minimum carrier is 10 gpa for ground equipment. Soybeans can be planted in 6 months; alfalfa, barley, millet, oats, sorghum, and wheat can be planted in 12 months. Avoid groundwater contamination. Do not apply if the water table is less than 25 feet deep and the soil O.M. is less than 2% in the upper 12 inches and the soil texture is sandy loam, loamy sand, sand, or modified versions of these textures. Do not over-irrigate soils with less than 15% field moisture holding capacity. A supplement (24c) label for SD prohibits Epic applications in Bennett, Butte, Fall River, Gregory (south of US Hwy 18), Harding, Jackson (south of White River), Lawrence, Mellette, Perkins, Shannon, Todd, and Tripp (south of US Hwy 18) county.

PPS. May be surface applied or incorporated into top 1 to 2 inches. Apply up to 21 days before planting when used alone or up to 30 days if part of a planned post program. Adjust rates according to timing.

PRE. Apply within 7 days of planting. Do not apply after corn emerges.

TANK-MIXES

Epic may be tank-mixed with several herbicides including burndown products to control emerged weeds in reduced till systems.

RADIUS (flufenacet + isoxaflutole) Site of Action: 15+27 (\$11.50-45.95)

Preemergence herbicide containing 36% flufenacet (Define) + 4% isoxaflutole (Balance) for control of grass and broadleaf weed species. Grass weed species controlled include foxtail, crabgrass, barnyardgrass, and others. Woolly cupgrass and field sandbur are suppressed. Broadleaf weed species controlled include pigweed, waterhemp, lambsquarters, velvetleaf, Venice mallow, mustard, and others. Cocklebur and sunflower are suppressed.

Rates range from 7 to 28 oz/A (0.22-0.88 lb ai) based on soil texture and O.M. Use 8 to 18 oz for coarse soil, 13 to 28 oz for medium soil, and 20 to 28 oz for fine soil. Check label for appropriate rates based on the field soil O.M. Use lower rates if the soil pH is greater than 7.5.

Plant corn at least 1.5 inches deep. Apply Radius only with ground equipment. Minimum carrier is 10 gpa. Soybeans can be planted in 6 months whereas alfalfa, wheat, barley, rye, and sorghum can be planted 12 months after application.

Supplemental label for application restrictions in South Dakota. Do not apply in Bennett, Butte, Fall River, Gregory (south of US Highway 18), Harding, Jackson (south of White River), Lawrence, Mellette, Perkins, Shannon, Todd, and Tripp (south of US Highway 18). Do not apply Radius if the water table is less than 25 feet below the ground surface where the soil O.M. is less than 2% in any portion of the field. Do not apply more than 0.79 lb/A flufenacet or 0.14 lb/A isoxaflutole (or 28 oz/A Radius) per season.

PPS, PPI. May be surface applied 30 days prior to planting or incorporated into the top 1 to 2 inches up to 21 days before planting.

PRE. Apply at or after planting, but prior to crop or weed emergence.

TANK-MIXES

Radius may be tank-mixed with several broadleaf herbicides including burndown products to control emerged weeds in reduced till systems.

CALLISTO (mesotrione) Site of Action: 27

3-7.7 oz Callisto 4L (0.09-0.24 lb ai) (\$14.05-36.10)

Callisto is a systemic preemergence or postemergence HPPD inhibiting herbicide than can cause "bleaching" injury symptoms on weeds. Callisto gives very good to excellent control of annual broadleaves including pigweed, waterhemp, lambsquarters, ragweed, buffalobur, velvetleaf, nightshade, and smartweed. Sunflower and cocklebur are controlled with postemerge applications. Atrazine improves control of kochia, wild buckwheat, and waterhemp; results in SDSU tests have been very good. Callisto is used in programs with preemergence or postemergence grass herbicides.

Note rates for preemergence or postemergence. Crop tolerance has been satisfactory in SDSU tests. Consider avoiding application on fields treated with Counter or Lorsban. Do not tank mix postemergence applications with an organophosphate or carbamate insecticide or apply these insecticides 7 days before or after a Callisto application. Do not cultivate 7 days before or after application. Do not tank mix with emulsifiable concentrate grass herbicides.

Callisto (continued . . .)

Minimum carrier is 10 gpa for ground equipment. Section 24c label for aerial applications in SD. For aerial applications, minimum carrier volume is 3 gpa and avoid applications within 50 feet of sensitive crops (broadleaf species). Use additives with postemergence application.

Small grains may be planted 4 months after application. Soybeans, sorghum, flax, potatoes, sunflowers, canola, alfalfa, and sweetcorn can be planted the following season (10 mo); peas, dry beans, and all other rotational crops may be replanted 18 mo after application.

PRE. Rate is 6.0 to 7.7 oz per acre. Rain required. May be applied with liquid fertilizer.

POST. Rate is 3 oz per acre. Apply from emergence to 30 inches. Use COC at 1 gal/100 gal and 28% N at 2.5 gal/100 gal or AMS at 2.5 lb per acre. Do not use MSO. If mixing with glyphosate, AMS and perhaps a NIS may be added if necessary but do not add UAN, COC, or MSO.

TANK-MIXES

Tank-mixes with preemergence applications of Callisto at 6 to 7.7 oz per acre include Degree, Dual, Harness, Outlook, Surpass, and TopNotch. Tank-mixes of 5 to 6 oz include atrazine, Bicep, Degree Extra, Guardsman, and Harness Xtra. Callisto may be mixed with Gramoxone, glyphosate, and 2,4-D for burndown.

Tank-mix postemergence applications on the Callisto label are listed below. Additional tank-mixes with Steadfast, Hornet, Accent, Basis Gold, and Liberty (LL corn) are listed in other sections. Do not add MSO with tank-mixes.

CALLISTO+ATRAZINE

POST. Mix 3 oz Callisto plus atrazine at 0.5 to 1 pt 4L or 0.3 to 0.6 lb 90DF per acre. Very good combination. Do not add MSO.

PREMIX

CALLISTO XTRA (mesotrione + atrazine) Site of Action: 27+5

20 – 24 fl. oz Callisto Xtra

For added foliar and residual control of wild buckwheat and other common broadleaf species. Apply 20 fl. oz/A on susceptible weeds less than 5 in tall or 24 fl. oz/A for weeds 5 – 10 in tall or for added residual control. Do not apply more than 24 fl. oz per year. Callisto Xtra at 20 – 24 fl. oz/A is equivalent to 2.5 - 3 oz Callisto and 0.5 – 0.6 qt atrazine 4L.

Add NIS (0.25% v/v) or COC (1% v/v). Choosing COC may result in more consistent weed control, but the risk of crop injury will be greater relative to NIS. In addition, UAN (28%N, 2.5% or 2.5 gal/100 gal spray solution) or AMS (8.5 – 17 lb/100 gal spray solution) may be added. Adding MSO may result in severe crop injury. If tank mixing with a fully loaded glyphosate product for Roundup Ready corn or Ignite for Liberty Link corn, only add AMS. NIS may be added if needed for the glyphosate product. Do not add UAN when mixing with glyphosate.

EPOST. Apply to corn less than 12 in tall.

LUMAX (s-metolachlor + mesotrione + atrazine) Site of Action: 15+27+5

(\$31.60-47.40)

2-3 qt Lumax 3.95L

Premix containing 2.68 lb s-metolachlor (Dual II Magnum) plus 0.268 lb mesotrione (Callisto) + 1 lb ai atrazine per gal. Rate is 2 to 3 qt per acre. The low rate is for soils with less than 3% OM; use the high rate for soils with more than 3% O.M.

	<u>Equivalent Product Rates in Lumax</u>		
<u>Lumax</u>	<u>Dual II Magnum</u>	<u>Callisto</u>	<u>Atrazine (ai)</u>
2.5 qt	1.75 pt	5.36 oz	0.625 lb
3 qt	2.1 pt	6.43 oz	0.75 lb

Lumax provides good to excellent control of foxtails and very good to excellent control of annual broadleaf weeds including velvetleaf, lambsquarters, pigweed, waterhemp, common ragweed, smartweed, nightshade, buffalobur, and kochia. Crop tolerance has been good in SDSU tests. Note restrictions as for Callisto. Do not rotate to crops other than corn, soybeans, or sorghum the following year. Do not graze or harvest forage or grain for 45 days after application. Minimum carrier is 10 gpa for ground and minimum of at least 2 gpa total volume for air.

EPP, PRE. Apply up to 10 days before planting to the soil surface.

EPOST. Lumax may be applied to corn less than 12 in tall. Does not control emerged grasses.

Callisto (continued . . .)

CAMIX (s-metolachlor+mesotrione) Site of Action: 15+27

(\$28.90-34.65)

2-2.4 qt Camix (1.8-2.2 lbs ai)

Premix containing 3.34 lbs s-metolachlor (Dual II Magnum) and 0.33 lb mesotrione (Callisto) per gallon. The low rate is for soils with less than 3% O.M. Camix has a similar chemistry as found in Lumax (s-metolachlor + atrazine + mesotrione), but Camix does not contain atrazine in the premix. Do not apply organophosphate or carbamate insecticides 7 days before or 7 days after Camix application.

Carrier volume should be 10-80 gpa for preemergence applications or 10-30 gpa for postemergence applications (20 gpa in dense canopy). For postemergence applications, a non-ionic surfactant at 0.25% v/v (1 qt per 100 gallons) may be used. If a crop oil concentrate is used, add less than 1% v/v or less than 1 qt/A. Do not use AMS, UAN, or MSO when applied alone, but these adjuvants may be used with certain tank mixes according to label specifications.

Do not rotate to crops other than corn, soybean, sorghum, wheat, barley, oats, rye or potatoes. If Camix is applied after June 1, do not rotate to crops other than corn or sorghum. Do not graze or harvest forage or grain for 45 days after application.

EPP, PRE. Apply to soil surface up to 14 days before planting.

EPOST. May be applied after corn emergence to corn plants less than 30 inches tall or the V8 growth stage. Does not control emerged grasses but may control small broadleaf weeds less than 3 inches tall.

IMPACT (topramezone) Site of Action: 27

0.5-0.75 fl oz Impact (0.011-0.016 lbs ai)

(\$11.05-16.55)

Impact inhibits a similar site of action as Callisto. Controls several broadleaf weed species and suppresses some common annual grass weed species. Add atrazine at rates of 0.25 to 1.5 lbs ai/A to improve control. Lower atrazine rates may improve burndown and higher rates may provide residual control. Apply to small weeds 3 to 8 inches tall, depending on the species.

Many tank mix options with broadleaf or grass herbicides. Do not apply with other herbicides that have a similar site of action, such as Callisto or Lumax. May be used after application of isoxaflutole (Balance, Epic, Radius) if the isoxaflutole rate is less than 0.063 lbs ai/A (equivalent of 2 fl oz/A Balance Pro). Corn may be injured if the adjuvants used with Impact are tank-mixed with growth regulator herbicides such as 2,4-D, Clarity, Distinct, or Marksman.

Add adjuvant and nitrogen. Adjuvants include COC or MSO at a rate of 1 to 1.5% v/v. Preferred adjuvant is MSO, particularly in conditions of moisture and temperature stress and to improve grass control. Nitrogen fertilizers include 28 or 34% UAN or ammonium phosphate (10-34-0) at 1.25 to 2.5% v/v, or AMS at 8.5 to 17 lbs per 100 gallons. Minimum water carrier volume is 10 gpa for ground equipment or 3 gpa for aerial applications.

Rotation interval is 3 months for cereal crops or 9 months for alfalfa, sorghum, soybeans, sunflower, peas, dry beans, or snap beans.

POST. May be applied up to 45 days prior to corn harvest. Use drop nozzles if crop canopy inhibits herbicide contact to weeds.

LAUDIS (tembotrione) Site of Action: 27

3 fl oz Laudis (0.08 lb ai)

(\$14.65)

Laudis is a "bleacher" herbicide that inhibits a similar site of action as Impact or Callisto. Controls several annual broadleaf weed species and some annual grass weed species, such as barnyardgrass, crabgrass, and yellow foxtail. Suppresses green foxtail and field sandbur. Apply to broadleaf weeds less than 6 inches tall or grasses less than 4 inches tall. Add atrazine to improve weed control.

Add a surfactant and nitrogen fertilizer. Add MSO at 1% v/v (or minimum of 1.25 pt/A) or COC at 1% v/v. MSO is preferred where permitted. Also add UAN at 1.5 qt/A or AMS at 1.5 lb/A (8.5 lb/100 gal). UAN may be preferred during dry conditions. Minimum carrier is 10 gpa for ground applications.

Laudis may be rainfast after 1 hr. Control may be reduced if applied during heavy dew or drought conditions. Apply when weeds are actively growing. Do not harvest corn forage prior to 45 days after application.

Laudis (Continued . . .)

Rotation interval is 4 mo for small grains, 8 mo for soybeans, 10 mo for sorghum, peas, canola, dry beans and alfalfa, or 18 months for sunflowers.

POST. Apply up to the V8 corn growth stage.

TANK-MIXES

Tank mix partners may include atrazine, Liberty, glyphosate products, Define SC, Accent, Option, Stout, Steadfast, and bromoxynil products. Add atrazine at 0.5 lb ai/A to increase broadleaf and grass weed control or increase control of weeds greater than 6 inches tall. With atrazine, it is recommended to use COC at 1% v/v + UAN at 1.5 qt/A or AMS at 8.5 lb/100 gal but may use MSO at 1% v/v + UAN at 1.5 qt/A in dry conditions. Do not use MSO or COC when tank mixing with glyphosate or Liberty. With Liberty, Laudis may be applied at 2 oz/A and add AMS at 8.5 lb/100 gal (1.5 lb/A). With bromoxynil products, it is recommended to use COC rather than MSO.

CAPRENO (thiencarbazono + tembotrione) *Site of Action: 2+27*

3 fl oz Capreno (0.013 lb ai thiencarbazono + 0.068 lb ai tembotrione)

(\$17.00)

Capreno is a premix containing Laudis (tembotrione + safener) and thiencarbazono, an ALS-inhibiting herbicide that primarily improves grass control, but also has activity on some broadleaf weed species. Capreno controls broadleaf weed species such as lambsquarters, pigweed, kochia, ragweeds, velvetleaf, Russian thistle, waterhemp, and others. Controls grass weed species such as foxtail (green, giant, yellow), barnyardgrass, crabgrass, wild oat, field sandbur, and others.

Add COC at 1% v/v (1 gal per 100 gal spray solution) or a minimum of 1.25 pt/A and a nitrogen fertilizer such as UAN at 1.5 qt/A or AMS at 1.5 lb/A or 8.5 lb per 100 gal spray solution. High surfactant oil blends (HSOB) may be used in place of COC to minimize adjuvant antagonism with glyphosate. Use of NIS may result in inconsistent and incomplete weed control.

Minimum carrier rate if 10 gpa for ground applications (do not apply by air). Rainfall within 1 hr after application may reduce weed control. Applications to wet foliage may reduce control. Do not apply Capreno in the same year as Lorsban, Counter, Dyfonate, or Thimet. Do not graze or harvest for forage within 45 days after application.

Rotation interval is 4 mo for wheat; 10 mo for barley, soybeans, sweet corn, sorghum; 18 mo for alfalfa, oats, sunflower, and canola. If soil pH is greater than 7.5, increase rotation restrictions to the next higher interval or 24 mo for crops in the 18 mo interval.

POST. Apply from the V1 (1 leaf collar) to the V6 corn growth stage. Best results if applied to young, actively growing weeds.

TANK-MIXES

Atrazine: Tank mixing atrazine at 0.5 lb ai/A may increase the spectrum and consistency of weed control. Do not use atrazine on corn greater than 12 inches tall.

Ignite: For corn designated as Liberty Link only. Capreno may be used at 2 fl oz/A when tank mixing with Ignite at 22 fl oz/A. Only use AMS and avoid the use of COC or MSO/ESO.

Glyphosate (e.g. Roundup): For use on glyphosate tolerant corn. Capreno may be used at 3 fl oz/A when tank mixing with a glyphosate product. It is recommended to use glyphosate-compatible HSOB rather than COC with loaded glyphosate products, but is required in non-loaded glyphosate products. Use AMS at recommended rates.

Buctril: Capreno may be used at 3 fl oz/A with Buctril up to 6 fl oz/A to aid in control of difficult broadleaf weeds such as common ragweed. Buctril may be used in place of atrazine in corn greater than 12 inches tall. Use of COC and N fertilizer is recommended.

DEFINE (flufenacet) *Site of Action: 15*

15-25 oz Define SC 4L (0.47-0.78 lb ai)

Define is a soil-applied herbicide with shoot uptake. It controls annual grasses and small-seeded broadleaf weeds. Higher rates are suggested for yellow foxtail and sandbur. Rates vary for Define applied alone or tank-mixed with another soil-applied herbicide or used in sequence with a postemergence herbicide. Define SC is a flowable formulation containing 4 lb/gal active.

Corn and soybeans may be planted any time after application. Potatoes can be planted after 1 mo, sugarbeets after 4 mo, all other field crops may be planted after 12 mo.

Define (continued . . .)

FALL. Apply after October 15 when soil temperature is less than 50° F. Use 23 to 35 oz on medium and fine textured soils with over 2.5% O.M.

EPSS. Apply up to 45 days before planting. If applied more than 14 days before planting, use 16 to 25 oz per acre. For soils with less than 3% O.M. use 16 oz for coarse texture, 19 to 22 oz on medium texture and 24 to 25 oz on fine texture. For soils with more than 3% O.M., use 18 oz on coarse texture, 22 to 24 oz on medium texture, and 24 to 25 oz per acre on fine texture.

PPI, PRE. Rates for Define used alone are 15 to 25 oz per acre up to 14 days before planting. Incorporate 1 to 2 inches deep. For soils with less than 3% O.M. use 15 oz for coarse texture, 17 to 19 oz for medium texture, and 22 to 24 oz per acre for fine texture. Soils with more than 3% O.M. use 17 oz on coarse texture, 19 to 22 oz on medium texture, and 22 to 25 oz per acre on fine texture. Apply prior to crop or weed emergence.

EPOST. Apply early postemergence through 5th leaf collar stage. Use AMS in postemergence tank-mixes if required. Liquid fertilizer may result in leaf burn.

TANK-MIXES or SEQUENTIAL

Define may be tank-mixed with several preemergence and postemergence herbicides including atrazine, Balance Pro, Banvel, Clarity, Epic, Glyphosate, Prowl, Python, Marksman, Gramoxone, Liberty, Buctril, and 2,4-D. Labeling lists sequential herbicides either before or following Define that may be used to control additional weeds.

PYTHON (flumetsulam) *Site of Action: 2*

0.8-1.33 oz Python 80WDG (0.04-0.067 lb ai)

(\$10.20-16.95)

Broadleaf herbicide with residual activity. Use 0.8 to 0.89 oz on coarse soils and 0.89 to 1 oz per acre on medium to fine soils for kochia, Russian thistle, common lambsquarters, Venice mallow, wild mustard, redroot pigweed, smooth pigweed, velvetleaf, and common waterhemp, including triazine resistance biotypes of these weeds. Use the higher rate on soils with greater than 3% OM. Do not apply these rates more than 14 days before planting. Use 0.89 to 1 oz on coarse soils and 1.14 to 1.33 oz per acre on medium to fine soils for marehail, ladythumb, black nightshade, and wild sunflower. Giant ragweed is partially controlled and cocklebur, common ragweed, and jimsonweed are partially to variably controlled. Use the higher rate on soils with greater than 3% O.M. and/or when applications are made 14 to 30 days before planting.

Do not exceed 1.4 oz per acre in a single crop year. Do not exceed 0.07 lb ai cumulative flumetsulam per acre if using sequential or tank-mix applications. Do not apply more than 30 days before planting or less than 85 days before harvest. Do not apply on soils that have a pH greater than 7.8 or contain greater than 5% O.M. and the pH is less than 5.9. Applications on soils with less than 1.5% O.M. may cause crop injury. Approved for ground application only.

Applications made under adverse (dry or cold) conditions result in less effective weed control. Do not apply under conditions which favor runoff or erosion of soil. Corn must be planted at least 1.5 inches deep. Do not use on corn treated with Counter or Thimet insecticides. Other insecticides should be applied in T-band or band. Organophosphate insecticides including Counter or Thimet can be applied to IR or IMR hybrids. IR or IMR hybrids may reduce injury to corn from Python on soils with less than 1.5% OM or pH greater than 7.8.

Follow crop rotation guidelines. Alfalfa, dry beans, peas, and small grains may be planted after 4 mo; grain sorghum, 12 mo; sunflower, 18 mo; and canola, 26 mo plus field bioassay.

FALL. Special label allows 1 to 1.25 oz 80WDG with 3 to 4 oz Sencor DF per acre for residual weed control in no-till programs. Apply in late fall when soil temperature has dropped below 50° F.

PPI. Incorporate 2 to 3 inches deep up to 30 days prior to planting.

PPS. Use in reduced and no-till systems. May be applied up to 30 days prior to planting.

PRE. Apply at planting or after planting, but prior to weed emergence. Rainfall required.

PRE-SPIKE. Use water carrier if corn is emerged and up to 2 inches.

Python (continued . . .)

TANK-MIXES/SEQUENTIAL

Tank-mixes of Python for burndown include Gramoxone, Glyphosate Products, and 2,4-D. Tank-mixes of a reduced Python rate (0.8 to 0.9 oz) in preemergence application include Bicep, Harness Xtra, and Guardsman. Sequential applications of postemergence treatments include Accent Gold and Hornet at reduced rate; Banvel, Clarity, 2,4-D, Marksman, Buctril, or Beacon.

Postemergence Hornet, dicamba, 2,4-D, Marksman, bromoxynil, or Beacon + 2,4-D herbicides may be used if follow-up treatment is required. Refer to label restrictions or the section for each herbicide.

PREMIX

HORNET 78.5 WDG (flumetsulam + clopyralid) Site of Action: 2+4 (\$8.55-25.60)

Hornet WDG contains 18.5% flumetsulam (Python) plus 60% clopyralid (Stinger). Hornet provides residual control of many broadleaf weeds and controls emerged Canada thistle. Use a tank-mix or sequential program for grass control.

Hornet may be applied preemergence. For preplant and preemergence applications use 4 to 5 oz Hornet WDG on coarse soil and 5 to 6 oz for medium and fine soil. The high rates are for soil over 3% O.M. or if applying 14 to 30 days before planting. It is most widely used as a postemergence herbicide for broadleaf weeds. Rates for postemergence application are 2 to 5 oz per acre.

Refer to the section for Python for soil restrictions for preemergence applications and for restrictions to prevent insecticide interaction with Hornet applied to the soil or postemergence.

Follow crop rotation guidelines to avoid carryover. Small grain can be planted after 4 mo; alfalfa, dry beans, peas, soybeans after 10.5 mo; grain sorghum after 12 mo; sunflower, sweet corn after 18 mo; canola after 26 mo and field bioassay.

PPS. Hornet may be applied up to 30 days before planting.

PPI. Incorporate into the top 2 to 3 inches within 30 days prior to planting.

PRE. Apply at or after planting, but prior to crop or weed emergence.

POST-SPIKE. Apply from corn emergence to before corn is 2 inches. Established broadleaf weeds at time of application may be controlled; rainfall is required for those weeds not emerged.

POST. Rates are 2 to 5 oz Hornet WDG per acre. The 3 oz rate is used for most annual broadleaf weeds. Good Canada thistle activity. Use higher rates to control heavy infestations, larger weeds, or when a longer period of residual control is desired. Apply from crop emergence (spike) stage to corn through V6 stage (six visible leaf colars) or 20 inches tall, whichever occurs first. For best control, apply when broadleaf weeds are less than 8 inches tall. All postemergence applications must include NIS at 1 qt/100 gal or COC or MSO at 1 gal/100 gal. Do not use liquid fertilizer as the total carrier as crop injury may occur. Do not cultivate for 10 days before or after application. Rainfast in 2 hours. Use a minimum spray volume of 5 gpa for air and 10 gpa for ground application.

TANK-MIXES

Hornet WDG may be tank-mixed with Gramoxone or glyphosate products for burndown in no-till. Tank-mixes with soil-applied grass herbicides or certain postemergence herbicides add weed spectrum. Do not tank-mix with Basagran.

HORNET WDG + DUAL II MAGNUM, OUTLOOK, HARNESS, DEGREE, SURPASS, or TOPNOTCH

EPP, PPI, or PRE. Tank-mix 4 to 5 oz Hornet WDG per acre with labeled rates of the herbicides as a non-atrazine alternative for broadspectrum grass and broadleaf control.

HORNET WDG + DUAL II MAGNUM, OUTLOOK, HARNESS, DEGREE, SURPASS, TOPNOTCH + atrazine premix product.

EPP, PPI, or PRE. Tank-mix 3 oz Hornet WDG per acre with labeled rates of the herbicides for improved control of ragweeds, velvetleaf, pigweed, lambsquarters, cocklebur, and sunflower.

Hornet (continued . . .)

HORNET WDG + CALLISTO

POST. Tank-mix 3 oz Hornet WDG with 0.75 oz Callisto plus 0.25 lb ai atrazine per acre. Use 1 gal COC and 2.5 gal 28% N or 8.5 lb AMS per 100 gal solution. Apply up to 12-in corn. Tank-mix improves pigweed, lambsquarters, waterhemp, kochia, and nightshade control.

HORNET WDG + ACCENT, BASIS GOLD, STEADFAST, or OPTION

POST. Tank-mix may also include low rates of dicamba or atrazine. Apply as tank-mix partner label directs. Hornet WDG is labeled for use with NIS, COC, or MSO adjuvants.

HORNET WDG + DICAMBA PRODUCTS

POST. Add 4 oz dicamba 4L per acre for improved pigweed, lambsquarters, waterhemp, kochia, and nightshade control. Distinct at 1.5 oz may also be used.

HORNET WDG + ATRAZINE

POST. Add 0.5 to 0.75 lb ai atrazine per acre for improved pigweed, lambsquarters, waterhemp, kochia, and nightshade control. Apply up to 12 in corn.

HERBICIDE	PRODUCT RATE/A	LB/A AI FLUMETSULAM	CLOPYRALID	
			LB/A AI	STINGER EQUIV (PT)
Python 80WDG	.08 oz	.004		
	.89 oz	.045		
	1.00 oz	.050		
	1.14 oz	.057		
	1.33 oz	.067		
Hornet 78.5WDG	2 oz	.023	.063	.17
	3 oz	.035	.094	.25
	4 oz	.047	.125	.33
	5 oz	.058	.156	.42
	6 oz	.070	.188	.5

PROWL or PENDANT (pendimethalin) Site of Action: 3 (\$8.30-22.20)

1.8-4.8 pt Prowl or Pendant 3.3L (0.75-2 lb ai)

2-4 pt Prowl H₂O 3.8L

Good control of several annual grasses and fair control of certain small-seeded broadleaves. Early-season weed control less consistent than for some other treatments. The 3.6 pt of 3.3L per acre rate has been used in most SDSU tests. Prowl H₂O is a new water based formulation that has improved performance in high residue and is preferred when tank-mixing post application in corn. Crop tolerance is adequate if the seed furrow is completely closed and seed planted at least 1.5 inches deep. Do not incorporate. Plant before applying herbicide. Minimum carrier is 10 gpa for ground or 5 gpa for air. Use 20 gpa for minimum-till systems or when using fertilizer carrier. No label restrictions for crops the following year.

PRE. Apply after planting. Rain critical for good results. Do not harrow before crop emergence. However, if crusting or early weed emergence requires cultivation, use shallow tillage such as a rotary hoe.

POST. Apply until corn is 30 in or has 8 leaf collars. Do not apply in liquid fertilizer.

1.8-3.6 pt Prowl or Pendimax 3.3L (0.75-1.5 lb ai)

(\$7.55-16.65)

1.5-3 pt Prowl H₂O 3.8L (0.75-1.5 lb ai)

POST INCORPORATED. Culti-spray application. Intended for late season annual weeds. Apply from 4 in crop until layby cultivation. Cultivate to move untreated soil over the corn root zone before application. Incorporate with cultivation unless there is sufficient rain or irrigation before weed emergence.

Prowl (continued . . .)

TANK-MIXES

Tank-mixes for most situations are listed below. Additional tank-mixes include Balance, Basis Gold, Bicep, Buctril, Bullet, Dual, Frontier, Guardsman, Harness Extra, Hornet, Lariat, Lasso, Python, or Surpass. Refer to label restrictions or the section for each herbicide.

PROWL or PENDIMAX + ATRAZINE

PRE, POST. Mix 1.8 to 3.6 pt 3.3L + 1 to 1.5 lb atrazine per acre. Apply as for Prowl alone. Apply early postemergence before crop has more than 4 leaves and weeds are less than one inch tall. Effective for wild proso millet. Corn must be over 4 inches but less than 12 inches tall. Incorporate with cultivator after application.

PROWL or PENDIMAX & ACCENT or BEACON or ACCENT + BEACON

PRE & POST. Sequential application. Apply Prowl or Pendimax preemergence surface at planting; then follow with the sequential postemergence treatment. Accent may be used at 0.33 oz to 0.66 oz on weeds under 3 inches; use 0.66 oz Accent per acre on larger weeds. Beacon is used at 0.38 to 0.76 oz per acre. Accent + Beacon tank-mix rates are 0.33 oz Accent + 0.38 oz Beacon per acre.

TREFLAN (trifluralin) *Site of Action: 3*

0.75-2 pt Treflan 4E (0.38-1 lb ai)

(\$2.55-6.85)

POST INCORPORATED. Intended to control late-season grasses. Apply after corn is 8 inches and incorporated with row cultivator. Cultivate before application to remove emerged weeds and to move untreated soil over corn root zone. Not labeled for preplant or preemergence use as injury can be severe. Not for seed fields. Has limited potential as a general weed program.

2,4-D *Site of Action: 4*

(\$0.55-1.70)

0.25-0.5 lb ae 2,4-D amine
0.12-0.25 lb ae 2,4-D ester

EPP. May apply up to 0.5 lb ae/A at least 7 days prior to planting or 0.5-1 lb ae/A at least 14 days prior to planting.

PRE. May apply up to 1 lb ae/A after corn planting but prior to corn emergence in tilled fields. Seed furrow must be completely closed prior to application to avoid corn injury. Check labels for guidelines as labels may vary.

POST. Very good control of most emerged annual and perennial broadleaved weeds. Apply before crop is more than 4 to 5 inches tall for best tolerance. Corn tolerance has been acceptable with early postemergence applications in SDSU tests. Use drop nozzles if corn exceeds 8 inches (soil to tip of whorl leaf). Avoid application during the period of rapid elongation. Do not apply later than 1 week before silking. Risk of brittleness increases in cool and wet or hot and humid conditions.

Wind storms may cause lodging or breakage. Hybrids vary in tolerance; however, hybrid susceptibility is also affected by growing conditions. Drop nozzles reduce risk of injury. Avoid cultivation for 7 days after spraying. Do not use wetting agents or other additives. Slightly higher rates will improve perennial weed control, but risk of injury increases.

Less risk of vapor drift with amine formulations. Reduce risk of droplet drift by using less than 20 psi pressure and using at least 20 gpa carrier. Soybeans will be affected more at bloom stage. Sunflowers are more seriously affected as plant size increases.

HARVEST AID. Apply after silks are brown or after black-layer stage. Substantially reduces viability of cocklebur and sunflower seed if first flush was controlled in early season. Good retreatment for perennials. Excellent crop tolerance. Use 1 lb ae of ester or amine per acre with high-clearance sprayer. Check labels for aerial application.

2,4-D (continued . . .)

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.

Lb/A ae Required	FORMULATION			
	3.8L*	5.7L*	80% WSP	90% WSP
.12	.25 pt	.17 pt	.17 lb	.15 lb
.25	.5 pt	.33 pt	.33 lb	.3 lb
.5	1 pt	.66 pt	.66 lb	.6 lb
1	2 pt	1.33 pt	1.25 lb	1.1 lb

*2,4-D showing 3.8lb/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.

PREMIX

SHOTGUN (2,4-D + atrazine)

EPPS, PRE, POST. Premix containing 1 lb ae 2,4-D + 2.25 lb ai atrazine per gallon. A 2 pt rate provides 0.25 lb ae 2,4-D + 0.56 lb ai atrazine per acre. The rate is 2 to 3 pt per acre for early preplant surface application 7 to 14 days before planting or for preemergence applications 3 to 5 days after planting but before corn emerges. The low rate is for coarse, low-organic-matter soil. The postemergence rate is 2 pt per acre at spike to 4-leaf (8 in) stage. Drop nozzles are required for 8- to 12-inch corn or if the 3 pt per acre rate is used at any stage. Spike to 2-leaf stage applications have best crop tolerance and are preferred. Minimum carrier is 10 gpa for ground and 3 gpa for air. Follow carryover restrictions as for atrazine alone and precautions for 2,4-D alone. Tank-mix is not labeled.

RESOLVE or PRUVIN (rimsulfuron) Site of Action: 2

0.5-2 oz Resolve 25DF or 25SG or Pruvin 25DF (0.008-0.03 lb ai)

(\$3.70-14.85)

Pre or early postemergence application in corn to control some grass weed species such as foxtail, wild oats, and barnyardgrass and several broadleaf weed species such as lambsquarters, pigweed, mustard, and others.

Label recommends 1 oz per acre for most situations and suggests tank-mixing with glyphosate for added residual control in Roundup Ready corn. Recommended carrier volume 15 gpa for most circumstances or 10 gpa for low weed densities. Minimum carrier volume is 5 gpa for aerial applications. Adequate soil moisture for plant growth will enhance herbicide activity. Resolve is absorbed by weed roots, so sprinkler irrigation (>0.5% in) or rain within 5-7 days of application is necessary for adequate control. If this activating precipitation is not received, follow with cultivation or a postemergence herbicide application as needed.

Postemergence applications should include a NIS (0.25% v/v or 1 qt per 100 gallons spray solution) and nitrogen fertilizer (either AMS at 2 lb/A or UAN (28% or 32% N) at 2 qt/A). Adjuvants are not needed if Resolve is tank mixed with glyphosate or glufosinate herbicides that contain premixed adjuvants. For burndown applications prior to corn emergence, COC (1% v/v or 1 gallon per 100 gallons spray solution) or MSO (0.5% v/v or 2 qt per 100 gallons spray solution) may be added in place of NIS.

POST. May be applied in corn up to 12 inches tall or less than 6 leaf collars.

TANK-MIXES

May be tank-mixed with glyphosate (Roundup Ready corn) or glufosinate (Liberty Link corn). Greater broadleaf control may be achieved by tank-mixing with 1/3 to 2/3 pt/A Starane or 2 to 4 fl oz of Banvel or Clarity. Tank mixtures with 2,4-D will result in severe grass control antagonism.

PREMIX

BASIS (rimsulfuron + thifensulfuron) Site of Action: 2+2

(\$5.95-18.05)

Basis is intended for early postemergence grass control. It provides good to excellent control of green, bristly, yellow, and giant foxtail, barnyardgrass, and fall panicum. Basis also controls early flushes of smartweed, lambsquarters, mustard, and pigweed. Basis may be tank-mixed for additional broadleaf control. Wild oat, quackgrass, woolly cupgrass, wild proso millet, and smooth crabgrass are not controlled adequately. Basis at 0.33 oz contains the equivalent active ingredient as 0.66 oz Resolve 25SG and 0.17 oz Harmony 50SG.

Basis (continued . . .)

Early-season weed control has been satisfactory in SDSU tests; late flushes require cultivation 10 to 15 days after application. Applications should be made when grasses are 1 to 2 inches and actively growing. Crop tolerance has been good in SDSU tests. Avoid late application. Apply to hybrids with a relative maturity rating of 88 days or more. Consult your seed supplier before applying to specialty corn or hybrids or less than 88 days relative maturity.

Do not apply Basis to corn treated with Counter 15G or 20CR; Basis may be applied to corn treated with Fortress, Force, or Aztec insecticide. Applications made to corn treated with other soil insecticides may cause unacceptable crop injury. There are no restrictions for Basis in "IR" corn previously treated with any insecticide. Basis should not be tank-mixed with foliar applied organophosphate insecticides, Basagran, Beacon, or other ALS herbicides. To avoid antagonism or crop injury, apply these products 7 days prior to or 3 days after Basis applications. Add COC at 1 to 2 gal/100 gal plus 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre. Minimum carrier is 15 gpa for ground or 5 gpa for air.

Soybeans may be planted 15 days after treatment, winter cereals after 4 mo, spring cereals after 8 mo; alfalfa, grain sorghum and sunflower after 10 mo. Applying tank-mixes with dicamba to small corn (V-3 stage or smaller) during stress conditions may increase the chance of rattail after the V-11 stage of growth.

BURNDOWN. Basis may be applied at 0.33 to 0.5 oz as a fall treatment prior to ground freezing or 0.3 to 1 oz in the spring prior to corn emergence. Basis may be tank-mixed with Express or 2,4-D ester in the fall or with a full or reduced rate of LeadOff, atrazine, or 2,4-D in the spring. Refer to tank-mix partner label for rates and precaution information. Use COC and 28% N or AMS. Follow with sequential Accent, Basis Gold, or Steadfast postemergence.

POST. Apply 0.33 oz as a broadcast or banded treatment on field corn that is spike to 4-leaf stage, prior to emergence of the third collar and/or less than 6 inches tall.

TANK-MIXES

Tank-mix of Basis with full or reduced rates or preemergence grass herbicide applied early postemergence. Preemergence grass herbicides include Dual, Surpass, Frontier, and Prowl. Rate for preemergence herbicide is 2/3 of full labeled rate based on soil type listed on label. If preemergence herbicide contains atrazine, use less than 1 lb ai atrazine in tank-mix. If Prowl is used as tank-mixture EPOST on small grass use NIS in place of COC. Provides residual grass control. Refer to the label or section for each herbicide alone.

BASIS + ACCENT

POST. Tank-mix with 0.25 to 0.33 oz Accent 75DF. Adds a reduced rate of Accent for tolerant grass or if grass exceeds optimum size for Basis. Use required additives.

BASIS + ATRAZINE

POST. Tank-mix with 0.5 to 1 lb atrazine 90DF. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt per acre.

BASIS + DICAMBA PRODUCT

POST. Tank-mix with 0.25 to 0.5 pt dicamba 4L per acre. Add NIS at 1 to 2 qt/100 gal. Always add 28% N at 2 to 4 qt per acre.

BASIS + CALLISTO

POST. Tank-mix with 2 to 3 oz Callisto per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre.

RESOLVE Q (rimisulfuron + thifensulfuron) Site of Action: 2+2

1.25 oz Resolve Q (0.014 + 0.003 lb ai)

(\$9.00)

Controls or suppresses several grass weed species, such as foxtail, barnyardgrass, woolly cupgrass, and others, and broadleaf weed species such as pigweed, kochia, velvetleaf, mustards, small dandelion, and others. Provides control of emerged weeds (1-3 inches tall) and limited residual control. Rainfall within 5-7 days after application may improve residual weed control. May be tank mixed with glyphosate or glufosinate herbicides. Resolve Q at 1.25 oz/A contains the equivalent active ingredients as 0.9 oz/A Resolve 25SG and 0.1 oz/A Harmony 50SG.

Follow adjuvant recommendations and carrier volumes as described for Resolve.

POST. Apply to corn up to 20 inches tall or less than 7 leaf collars.

Resolve Q (continued . . .)

TANK MIXES

To improve kochia control, tank mix with Starane (fluroxypyr) at 1/3 to 2/3 pt/A or Starane + dicamba (Banvel of Clarity) at 2-4 oz/A. To improve residual weed control, tank mix with Cinch (s-metolachlor), Cinch ATZ (s-metolachlor + atrazine), Breakfree (acetochlor), Breakfree ATZ (acetochlor + atrazine), or Outlook (dimethanmid). For additional foliar and residual control, tank mix with Lumax (s-metolachlor + mesotrione + atrazine) at 2 pt/A and include a NIS. For improved burndown weed control, tank mix with Impact at 0.5-0.75 fl oz/A plus atrazine at 0.4-1.5 lb ai/A.

REQUIRE Q (rimsulfuron + dicamba) Site of Action: 2 + 4

4 oz Require Q mp (0.016 + 0.13 lb ai)

(\$11.80)

Multipack containing rimsulfuron and dicamba. Controls or suppresses several grass weed species, such as foxtail, barnyardgrass, woolly cupgrass, and others and broadleaf weed species such as pigweed, kochia, Russian thistle, velvetleaf, mustards, small dandelion and others. Provides control of emerged weeds (1-3 inches tall) and limited residual control. Rainfall within 5-7 days after application may improve residual weed control. May be tank mixed with glyphosate or glufosinate herbicides. Require Q qt 4 oz/A contains the equivalent active ingredients as 1 oz/A Resolve SG and 4 oz/A Clarity. Applications during periods of rapid growth may result in temporary corn leaning.

Follow adjuvant recommendations and carrier volumes as described for Resolve.

POST. Apply to corn from 4 inches tall (2 leaf collars) up to 20 inches tall (less than 7 leaf collars).

TANK MIXES

To improve kochia control, tank mix with Starane (fluroxypyr) at 1/3 to 2/3 pt/A. To improve residual weed control, tank mix with Cinch (s-metolachlor), Cinch ATZ (s-metolachlor + atrazine), Breakfree (acetochlor), Breakfree ATZ (acetochlor + atrazine), or Outlook (dimethanmid). For additional foliar and residual control, tank mix with Lumax (s-metolachlor + mesotrione + atrazine) at 2 pt/A and include a NIS. For improved burndown weed control, tank mix with Impact at 0.5-0.75 oz/A plus atrazine at 0.4-1.5 lb ai/A.

ACCENT, ACCENT Q, ADAPT, PRIMERO, NIC-IT 2L (nicosulfuron) Site of Action: 2 (\$26.65)

0.9 oz wt Accent Q 54.5 WDG (0.031 lb ai)

0.67 oz wt Accent 75WDG, Adapt, or Primero (0.31 lb ai)

2 fl oz Nic-It 2L (0.031 lb ai)

Excellent control of shattercane and good to excellent control of green and giant foxtail. Accent also controls barnyardgrass, yellow foxtail, sandbur, woolly cupgrass, and quackgrass. Pigweed and smartweed are controlled.

Foxtail, wild oat, sandbur, and woolly cupgrass should not exceed 2 to 3 inches, shattercane 4 to 12 inches, and quackgrass 4 to 10 inches. Results are more variable if grasses such as yellow foxtail or barnyardgrass are present. Corn tolerance has appeared good in SDSU tests. Cultivation 10 to 14 days after application will control late weed flushes.

Weeds stop growth soon after treatment but yellowing or stunting is not apparent for several days. Results are best when weeds are growing rapidly and plants are free of stress. Thorough coverage is important. Always add COC at 1 gal/100 gal or NIS at 1 to 2 qt/100 gal. Use 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre. Rainfall within 4 hours of application will reduce effectiveness. Minimum carrier is 10 gpa for ground or 3 gpa for air. Increase the carrier to 15 gpa for ground or 5 gpa for air under less favorable conditions. Avoid concentrating spray into plant whorl. Two-nozzle units are suggested for banding.

Do not apply Accent to corn that was treated with Counter 15G or 20 CR at planting unless an IR (not IT) corn hybrid has been used. To avoid crop injury or antagonism, apply Basagran, 2,4-D, or organophosphate insecticides such as Lorsban, Malathion, Parathion, etc., at least 7 days before or 3 days after application of Accent. Fortress, Aztec, and other non-organophosphate insecticide treated fields can be treated with Accent.

POST. Apply on corn up to 20 inches or up to and including 6 collars, whichever is most restrictive. Early application is important; especially in heavy infestations. Late applications to control escaped grasses or as a rescue treatment may be made using drop nozzles for 20 to 36 inch corn. Do not apply after corn is 36 inches or has 10 or more collars.

Accent (continued . . .)

TANK MIXES or SEQUENTIAL

Accent may be tank mixed with several herbicides to improve broadleaf control. Corn may develop rattailing after the V-11 stage of growth when Accent is tank mixes with products containing dicamba and applied to small corn (V3 stage or smaller) under stress conditions. Use Accent rate as for Accent alone. Refer to label restrictions or the section for each herbicide alone.

Tank mix of Accent with reduced rates of preemergence grass herbicides may be applied early postemergence. Preemergence grass herbicides include Dual II Magnum, Cinch (s-metolachlor), Cinch ATZ (s-metolachlor + atrazine), Prowl (pendimethalin), Surpass (acetochlor), Outlook (dimethenamid), or Lumax (s-metolachlor + mesotrione + atrazine). If tank mixing with Lumax, limit Lumax rate to less than 2 pt/A, use NIS rather than COC, omit the use of nitrogen fertilizer, and apply to broadleaf weeds less than 4 inches tall. Rate for preemergence herbicides is usually 50% of normal rate. Provides residual grass control. Performance best if rain occurs before new weed flush. Atrazine may be added for additional broadleaf control.

Sequential programs provide for reduced rates of preemergence herbicides prior to postemergence Accent. Herbicides include Dual II, Outlook, Harness, Prowl, and Surpass. Rates are usually 50% of normal rate for the preemergence herbicide and should be applied no more than 7 days before planting. Provides early-season protection and expands timing for postemergence application.

ACCENT + ATRAZINE

POST. Tank-mix with 0.75 to 1.5 qt Atrazine 4L per acre. Add COC at 1 gal/100 gal; 28% N may also be added at 2 to 4 qt per acre. Apply before corn exceeds 12 inches. Performance has been very good in SDSU tests. Note atrazine rate limitations.

ACCENT + BROMOXYNIL

POST. Tank mix with 1 to 1.5 pt bromoxynil 2L per acre. Add NIS at 1 qt/100 gal. Always use drop nozzles after corn exceeds 24 inches; do not apply after 36 inches. Some leaf burn possible. COC or nitrogen fertilizer or other similar additives may increase crop leaf burn. Good performance in SDSU tests.

ACCENT + BROMOXYNIL/ATRAZINE

POST. Tank mix with 1.5 to 3 pt bromoxynil/atrazine premix per acre. Add NIS at 1 qt/100 gal + 28% N at 2 to 4 qt per acre. Apply before corn exceeds 12 inches. Some leaf burn possible. COC or 28% N or other similar additive may increase crop leaf burn.

ACCENT + DICAMBA PRODUCT

POST. Tank mix with 0.5 to 1 pt dicamba 4L per acre. Add NIS at 1 qt/100 gal + 28% N at 2 to 4 pt per acre. Do not apply after corn exceeds 8 inches. Surfactant may increase corn response to dicamba. Slight grass antagonism under some conditions. Good performance in SDSU tests.

ACCENT + MARKSMAN or STERLING PLUS

POST. Mix with 2 to 3.5 pt Marksman or Sterling Plus per acre. Add NIS at 1 to 2 qt/100 gal + 28% N at 2 to 4 qt per acre. Apply before corn exceeds 8 inches.

ACCENT + HORNET WDG

POST. Tank mix with 2 to 3 oz Hornet WDG per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt per acre. Apply before corn exceeds 20 inches.

ACCENT + CALLISTO

POST. Tank mix with 3 oz Callisto per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre.

STOUT (nicosulfuron + thifensulfuron) *Site of Action: 2+2*

0.5-0.75 oz Stout (0.022-0.031 lb ai)

(\$10.40-15.60)

Postemergence control of grass species, such as foxtails (2-4 inches), barnyardgrass (2-4 inches), wild oat (2-4 inches), sandbur (1-3 inches), woolly cupgrass (4 inches) and some broadleaf weed species, such as common lambsquarters (4 inches), pigweed (4 inches), velvetleaf (4 inches), and dandelion (6 inches). Rate equivalent to 0.45-0.63 oz/A Accent 75DF and 0.033-0.047 oz/A Harmony GT XP. Use higher rates for taller grass weeds and for broadleaf weed control.

Stout (continued . . .)

Add NIS or COC (COC preferred) plus an ammonium nitrogen fertilizer. Add NIS at 0.25% v/v (1 quart per 100 gallons of water) or 0.5% under arid conditions, or COC at 1% v/v or 2% v/v under arid conditions, or add MSO at 0.5% v/v. Add 28 or 32% N at 2 qt/A or AMS at 2 lb/A or, under arid conditions, add UAN at 4 qt/A or AMS at 4 lb/A. Do not use MSO when tank mixing with Callisto at a rate greater than 1.5 oz/A. Use NIS rather than COC when tank mixing with preemergence grass herbicides such as Prowl, Cinch (s-metolachlor), or Lumax and follow ammonium nitrogen fertilizer restrictions listed for the tank mix partner.

Minimum carrier is 15 gpa for ground equipment (10 gpa if canopy is sparse) or 3 gpa for aerial application. Observe restrictions and precautions as described for Accent. Apply to corn varieties with a relative maturity rating greater than 88 days. Do not apply to field corn grown for seed, popcorn, or sweetcorn. Do not tank mix with Basagran, Laddok, 2,4-D, or other ALS-inhibiting (site of action 2) herbicides unless recommended on the label.

POST. Apply to corn that is less than 16 inches tall and has less than 5 leaf collars, but applications to corn less than 12 inches tall is recommended.

STEADFAST or IRONCLAD (nicosulfuron + rimsulfuron) *Site of Action: 2+2*

0.75 oz Steadfast 75WDG or Ironclad 75WDG (0.023 + 0.012 lb act)

(\$20.50)

Steadfast is a premix of 50% nicosulfuron + 25% rimsulfuron. Steadfast at 0.75 oz/A is equivalent to 0.5 oz Accent + 0.75 oz Resolve. Weed height should not exceed 4 in for barnyardgrass, foxtail, wild proso millet, common sunflower, and pigweeds; 3 in for woolly cupgrass and smartweed; 2 in for volunteer cereals, sandbur, and wild oat. Adequate soil moisture is required. Rainfall within 5 days will enhance residual activity. Rainfast in 4 hours.

Apply Steadfast to hybrids with a relative maturity rating of 88 days or more. Consult your seed supplier before applying to specialty corn or hybrids with 77-88 days relative maturity.

Applications must include either COC or 1 gal/100 gal or NIS at 1 to 2 qt/100 gal + AMS or 28% N. Minimum carrier is 15 gpa for ground or 5 gpa for air.

Do not tank mix Steadfast with Basagran. 2,4-D may cause grass antagonism. Do not tank mix with foliar applied organophosphate insecticides such as Lorsban, malathion, or parathion. Apply these products at least 7 days before or 3 days after application of Steadfast. May be tank mixed with Asana XL or Lannate insecticides.

Soybeans may be planted after 15 days; winter small grain 4 mo; spring wheat, barley, oats, or rye 8 mo; dry beans, peas 10 mo; alfalfa 12 mo. Rotational guidelines for sunflower and sorghum are based on soil pH. Sorghum may be planted after 10 mo and sunflower after 11 mo if pH is 7.5 or less. Higher pH requires a 18 mo planting restriction for these crops.

Do not graze or feed forage, hay, or straw from treated areas to livestock within 30 days of application.

POST. Apply to corn up to 20 inches or up to and including 6 collars, whichever is most restrictive.

SEQUENTIAL or TANK MIXES

Tank mix Steadfast with full or reduced rates of preemergence grass herbicide to be applied early postemergence. Preemergence grass herbicides include Prowl, Surpass, Dual, and Frontier. Rate for preemergence herbicide is 2/3 of full rate. If preemergence herbicide contains atrazine use less than 1.0 lb ai atrazine in tank mix. If Prowl is used as tank mix EPOST on small grass use NIS in place of COC. Provides residual grass control. Refer to the label or section for each herbicide alone.

Sequential programs provide for reduced rates of preemergence herbicides prior to postemergence Steadfast. Herbicides include Balance Pro, Dual II, Surpass, and Harness Xtra. Rates are usually 50% of normal rate for the preemergence herbicide. Provides early season protection and expands timing for postemerge application.

STEADFAST + ATRAZINE **STEADFAST ATZ**

POST. Tank mix with 0.25 to 1 lb atrazine 90DF or use 14 oz Steadfast ATZ 89.3 WDG containing 2.7% nicosulfuron (Accent) plus 1.3% rimsulfuron. Apply before corn exceeds 12 in or 7 leaf collars. Corn earlier than 88 day relative maturity may be injured. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt per acre. Soybeans may be replanted 10 months after application of Steadfast ATZ.

Steadfast (continued . . .)

STEADFAST + DICAMBA PRODUCT or MARKSMAN or STERLING PLUS

POST. Tank mix with 0.125 to 0.25 pt dicamba 4L or use 1 pt Marksman per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt per acre. Corn plants may develop some rattailing after the V-11 stage or growth when Steadfast is tank mixed with products containing dicamba and applied to small corn (V3 stage or smaller) under stress conditions.

STEADFAST + DISTINCT

POST. Tank mix with 1 to 2 oz Distinct 70WDG per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre.

STEADFAST + HORNET

POST. Tank-mix with 2 to 3 oz Hornet WDG per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt per acre.

STEADFAST + CALLISTO

POST. Tank mix with 3 oz Callisto per acre. Add COC at 1 gal/100 gal + 28% N at 2 to 4 qt or AMS at 2 to 4 lb per acre.

Products containing nicosulfuron, rimsulfuron, and other active ingredients are compared below. Percent active and pound/A active ingredient for labeled rates are listed.

	ACCENT 75DF (.67 oz)		ACCENT GOLD 78.1 WDG (3.5 oz)		BASIS 75DF (.33 oz)		BASIS GOLD 89.4DF (14 oz)		STEADFAST 75DF (.75 oz)		STEADFAST ATZ 89.3 SDG (14 oz)	
	%	lb/A	%	lb/A	%	lb/A	%	lb/A	%	lb/A	%	lb/A
nicosulfuron	75	.031	5.4	.012	---	---	1.34	.012	50	.023	2.7	.024
rimsulfuron	---	---	5.4	.012	50	.01	1.34	.012	25	.012	1.3	.011
thifensulfuron	---	---	---	---	25	.005	---	---	---	---	---	---
flumetsulam	---	---	15.9	.035	---	---	---	---	---	---	---	---
clopyralid	---	---	51.4	.094	---	---	---	---	---	---	---	---
atrazine	---	---	---	---	---	---	86.8	.76	---	---	85.3	.75

OPTION (formasulfuron) Site of Action: 2

1.5-1.75 oz Option 35WPG (0.033-0.4 lb ai)

(\$15.35-17.90)

Option is a sulfonyl-urea herbicide that gives good to excellent control of several annual grasses. Grasses should be treated early for best results. Green and yellow foxtail and wild proso should not exceed 3 in; woolly cupgrass 2 in, and barnyardgrass 4 in. It also controls shattercane and volunteer cereals. Broadleaves including lambsquarters, common ragweed (2 in), and pigweed and velvetleaf (3 in) may be controlled. Tank-mix with other herbicides will improve broadleaf control. Rates can be increased to 1.75 oz per acre for larger weeds. Corn tolerance has been good in SDSU tests. Option contains a safener. Treated weeds begin to show yellowing and die in 1 to 3 weeks. Results are best when weeds are actively growing. Good coverage is helpful. Minimum carrier is 10 gpa; 15 to 20 gpa is suggested for dense weed populations. Fields may be cultivated 7 days before or 7 days after application. Option degrades rapidly in the soil. Corn may be replanted 7 days after application; soybeans 14 days, and other crops in 60 days. Add MSO (1.5 pt/A) and 28% or 32% UAN (1.5-2 qt/A). May use AMS (1.5-3 lb/A) instead of UAN.

POST. Apply from emergence to 16 in or V6 stage.

TANK MIXES

Option may be tank mixed with other herbicides to improve broadleaf control or give residual. Tank mixes with low rates of atrazine, dicamba, or Distinct have performed well in SDSU tests. Other mixes include Harness, Prowl, Surpass, Outlook, TopNotch, NorthStar, Hornet, and Marksman. A 2(ee) recommendation allows postemergence application of Option (1.5 oz/A) + Lexar with MSO (1 pt/A) and AMS (1 lb/A) on V1 to 5 inch tall corn.

AUTUMN (iodosulfuron=methyl-sodium) Site of Action: 2**Up to 0.3 oz Autumn (0.0019 lbs ai)****(\$6.50)**

Controls several mustard species, marestail, chickweed, alfalfa, and other broadleaf weed species. Apply while weeds are actively growing. May provide short-term residual control of some small-seeded broadleaf weeds. The rotation interval is 90 days for soybeans, 4 mo for winter-seeded cereals, 8 mo for spring-seeded cereals, 9 mo for sorghum, and 18 mo for sunflower, peas, dry beans, or canola.

Add COC at 1% v/v and nitrogen fertilizer, such as 28 or 32% N at 1.5 to 2 qts/A or AMS at 1.5 to 3.0 lbs/A. Do not apply with aerial equipment. Use a minimum carrier volume of 10 gpa.

EPPS. Apply before weeds are 3 inches tall, after fall harvest or up to 30 days prior to corn planting. Do not apply to frozen ground.

DICAMBA PRODUCTS (dicamba) Site of Action: 4**0.5-1 pt Banvel or Clarity or Sterling 4L (0.25-0.5 lb ae)****(\$3.80-11.15)**

Good to very good control of several small-seeded annual broadleaves and perennial broadleaves. Does not control mustard. Better crop tolerance than 2,4-D. Very good tolerance up to 8 inches. May cause brittleness, lodging, or breakage associated with greensnap problems. Risk of injury greatest during periods of rapid growth, especially if crop is beyond suggested crop stage. Minimum carrier for dicamba 4L is 5 gpa for ground or 3 gpa for air except when sensitive crops may be affected.

Banvel, Clarity, or Sterling contain 4 lb/gal dicamba. Banvel and Sterling are formulated as a dimethylamine salt; Clarity is a diglycolamine salt. Clarity has less temperature or humidity restrictions for application near sensitive crops. Weed control has been similar for these products. Minimum carrier for Clarity is 3 gpa for ground and 2 gpa for air. Use precautions to reduce risk of droplet drift. Do not apply if wind is gusty or in excess of 5 mph and moving toward sensitive crops or if expected high temperature is over 80 to 85° F. Slight wind moving away from sensitive crops is preferred to calm conditions. Use less than 20 psi pressure and at least 20 gpa. Use drop nozzles if corn is over 8 inches. Do not apply dicamba when soybeans are nearby if corn is over 24 inches tall or soybeans are over 8 inches or are starting to bloom. A June 20 cut-off date for dicamba is suggested if soybeans are planted at normal dates. Sunflowers become more sensitive after they are beyond the 6-leaf stage. Do not harvest for dairy cattle prior to milk stage or kernel fill. Rates vary according to time of application.

PPS, PRE. Apply up to 1 pt per acre on medium and fine soils with more than 2% organic matter (O.M.). For PPS applications, apply 0.5 pt/A if soils have coarse texture or less than 2% O.M. Do not make PRE applications on coarse texture soils or soils with less than 2% O.M.

EPOST. Apply 0.5 to 1 pt dicamba per acre when corn is spike to 5-leaf or up to 8 inches. Useful for Canada thistle in seasons where weeds emerge ahead of corn. Some crop effects noted if heavy rain is received soon after application. Consider patch treatments.

POST. Banvel only. Apply 0.5 pt Banvel per acre before corn is 36 inches tall or not later than 15 days before tassel. Use drop nozzles after corn is 8 inches to improve coverage and reduce risk of injury.

PREMIX**MARKSMAN or STERLING PLUS (dicamba + atrazine)**

POST. Use 2 to 3.5 pt Marksman 3.2L or Sterling Plus premix per acre. Marksman or Sterling Plus contains 1.2 lb dicamba + 2.1 lb atrazine per gallon. Use lower rate on light soil. Apply before corn exceeds 5-leaf stage. Do not use COC or NIS for best tolerance.

TANK-MIXES

Tank-mixes for most situations are listed below. Banvel may be tank-mixed with other herbicides, including Accent, Beacon, Gramoxone (burndown), Roundup (RR corn), Stinger, Tough, or 2,4-D.

Clarity may be used in sequential or tank-mixes, including Accent, Beacon, Celebrity, Eradicane, Gramoxone (burndown), Hornet, Liberty (LL corn), Permit, Python, Roundup (RR corn), Stinger, TopNotch, Touchdown (RR corn), or 2,4-D. Refer to label restrictions or the section for each herbicide.

Dicamba Products (continued . . .)

DICAMBA PRODUCT + ATRAZINE

PRE or **EPOST**. Use 0.5 to 1 pt dicamba 4L + 1.25 to 2 pt atrazine 4L. Use lower dicamba rate on light soil. Apply rates above 0.5 pt dicamba 4L before corn exceeds 5-leaf stage. Do not use crop oil or surfactants. Follow crop rotation guidelines for atrazine. Other atrazine formulations can be used.

DICAMBA PRODUCT + DUAL

PRE. 1.3 to 1.67 pt Dual II Magnum with 1 pt dicamba 4L per acre. Postemergence dicamba following preplant or preemergence treatments usually provides better control and is preferred for perennials. Plant corn at least 1.5 inches deep. Risk of corn stunting if heavy rain occurs at emergence. Use only on medium or fine textured soils with over 2.5% O.M. Not for furrow-planted corn. Minimum carrier is 10 gpa.

DICAMBA PRODUCT + MICRO-TECH

PRE or **POST**. Add 2.5 to 4 qt Micro-Tech 4L with 0.5-1 pt dicamba 4L per acre. Use only on fine textured soil with over 3% O.M. Crop should not exceed 3 inches. Adjust rates according to soil texture. Minimum carrier is 10 gpa.

DICAMBA PRODUCT + HARNESS or SURPASS

PPS or **PRE**. Add 1.85 to 3.75 pt Surpass or 1.7 to 3.4 pt Harness per acre. Do not apply preemergence on soil less than 2.5% O.M.

DICAMBA PRODUCT + OUTLOOK

PPS or **PRE**. Add 16 to 32 oz Frontier or 10 to 21 oz Outlook per acre. Do not apply on soil with less than 3% O.M.

DICAMBA PRODUCT + PROWL or PENDIMAX

PRE. Add 3.6 pt Prowl or Pendimax 3.3L with 0.75 to 1 pt dicamba 4L per acre. Use only on medium or fine textured soil having over 2.5% O.M. Minimum carrier is 10 gpa.

DICAMBA PRODUCT + 2,4-D AMINE

PRE or **LPOST**. Add 0.125 to 0.25 lb ae 2,4-D with 0.5 to 1 pt dicamba 4L per acre for preemergence. Add 0.12 lb ae 2,4-D per acre for late postemergence when crop is 8 to 36 inches or up to 15 days before tassel emergence. Always use drop nozzles for postemergence.

MARKSMAN or STERLING PLUS + DUAL

PRE or **EPOST**. Add 1 to 1.67 pt Dual II Magnum with 2 to 3.5 pt Marksman or Sterling Plus per acre. Use preemergence on fine-textured soil with over 2.5% OM. Apply in corn up to 3 inches.

MARKSMAN or STERLING PLUS + MICRO-TECH

PRE or **EPOST**. Add 2.5 qt Micro-Tech with 2 to 3.5 pt Marksman or Sterling Plus per acre. Use preemergence only on fine-textured soil with over 3% O.M. Apply in corn up to 3 inches.

MARKSMAN or STERLING PLUS + PROWL or PENDIMAX

PRE or **EPOST**. Add 2.4 to 3.6 pt Prowl 3.3L with 2 to 3.5 pt Marksman or Sterling Plus per acre. For medium, or fine-textured soils with over 2.5% O.M. Apply in corn up to 2-leaf stage.

DISTINCT or STATUS (dicamba + diflufenzopyr) Site of Action: 2+19

(\$7.35-29.40)

4-6 oz Distinct 70WDG (0.125-0.18 + 0.05-0.75 lb ae) 2.5-10 oz Status (0.06-0.25 + 0.025-0.1 lb ae)

Distinct is a postemergence, translocated herbicide containing 50% dicamba + 20% diflufenzopyr and Status contains 44% dicamba + 17% diflufenzopyr + safener. Diflufenzopyr is an auxin transport inhibitor that blocks movement of natural auxins and growth regulators from active meristematic regions in the stem and roots. The safener in Status reduces the potential for corn injury. These herbicides give very good to excellent control of many annual broadleaves including waterhemp and normal or ALS kochia. They also control perennials such as Canada thistle and field bindweed.

Rates are 4 to 7 oz/A for Distinct or 2.5 to 10 oz/A for Status. When tank mixing with glyphosate or glufosinate, Status may be used at 2.5 oz/A for increased broadleaf weed control or 5 oz/A for perennial weeds or weeds taller than 6 inches. With Distinct, crop tolerance is best at 4-8 inch corn under most conditions. Early application is suggested.

Distinct (continued . . .)

Minimum carrier is 3 gpa for ground equipment. For Distinct, add NIS (1 qt/A) and either 28% N (5 qt/100 gallons or 1.25% v/v) or AMS (minimum of 5 lb/100 gallons). For Status, add a surfactant such as NIS (1 qt/100 gallons or 0.25% v/v), COC (1-2 pt/A), or MSO (1-2 pt/A) with a nitrogen fertilizer such as UAN (5 qt/100 gallons or 1.25% v/v) or AMS (5-17 lbs/100 gallons). Do not tank mix with other growth regulator herbicides (site of action 4), such as dicamba, 2,4-D, or clopyralid, or apply one of these herbicides within 15 days of applying Distinct or Status. Do not tank mix with emulsifiable concentrate chloroacetamide herbicides such as Dual II Magnum, Harness, Outlook, or Surpass.

Do not plant any crop within 120 days after application unless 1 inch of rainfall is received after Distinct applied at less than 4 oz/A or Status at less than 5 oz/A. Forage may be harvested 32 days and grain harvested 72 days after application.

POST. For Distinct, apply 4 to 6 oz/A on corn 4 to 10 inches tall; 4 oz/A for corn 10 to 24 inches tall, or 4 oz/A with drop nozzles to corn 24 to 36 inches tall. For Status, apply 5 to 10 oz/A on corn 4 to 36 inches tall (V10 growth stage) in conventional corn or 2.5 to 10 oz/A when tank mixed with glyphosate or glufosinate.

PREMIX

CELEBRITY PLUS (nicosulfuron + dicamba + diflufenzopyr)

Use 4.7 oz Celebrity Plus premix which provides 0.66 oz nicosulfuron (Accent) plus 4 oz Distinct per acre. Apply as for tank-mix.

TANK-MIXES

Distinct is used as a sequential with a preemergence grass herbicide such as Frontier or Guardsman or tank-mixed with postemergence grass herbicide. Tank-mixes for most situations are listed below. Do not tank-mix with other products containing dicamba, 2,4-D, or clopyralid. Follow crop size and carrier requirements for tank-mix or combination partners.

DISTINCT + ATRAZINE

POST. Tank-mix with 0.75 to 1.5 lb ai atrazine. Good combination to add residual control.

DISTINCT + ACCENT

POST. Tank-mix with 0.66 oz Accent. Add NIS at 1 to 2 qt/100 gal and 28% N at 2 qt or AMS at 2 lb per acre.

DISTINCT + GLYPHOSATE

POST. Reduce rate of Distinct to 3 oz for 4 to 24 inch corn with weeds less than 6 inches tall.

AIM (carfentrazone) Site of Action: 14

(\$3.45)

0.5 oz Aim EC 2L or 0.33 oz Teamwork 40WDG (0.008 lb ai)

Aim is a contact herbicide for broadleaf weeds. It has little or no residual activity. It controls normal and ALS resistant kochia. Velvetleaf control is excellent; it also controls black nightshade, redroot pigweed, and lambsquarters.

Ragweed and sunflower are less sensitive and require tank-mix partner. Atrazine tank-mix adds control of weeds such as buffalobur, cocklebur, Venice mallow, and waterhemp. Performance on velvetleaf and waterhemp has been very good in SDSU tests. Crop tolerance is adequate.

Rate is 0.5 oz Aim 1.9L or Avalanche 1.9L or 0.33 oz Teamwork WDG per acre. Apply when weeds are 1 to 4 inches. Larger weeds may not be completely controlled. Warm, humid conditions favor activity. Action on weeds is rapid; membrane disruption results in rapid necrosis. Minimum carrier is 10 gpa for ground equipment. Add NIS at 2 pt/100 gal; COC may be used under very dry conditions but crop response (speckling) may be noted. Avoid concentration into leaf whorl. Avoid application within 8 hours of rain before or after application. There are no crop rotation restrictions for the following season.

BURNDOWN. For emerged weeds in no-till. Maximum rate is 1.9 oz of 1.9L or 0.33 oz of 40WDG total for preplant and in-crop use. Use COC additive. Additional burndown herbicide may be required for grass and large weeds.

POST. Postemergence up to eight collars. Rate is 0.5 oz of 1.9L or 0.33 oz 40WDG per acre. Aim can be applied with drop nozzles or as a directed spray at rates up to 1.9 oz per acre.

Aim (continued . . .)

TANK-MIXES

Tank-mixes with postemergence herbicides for many situations are listed below. Labeling also allows tank-mixes with 2,4-D amine, Accent, Accent Gold, Banvel, Basis, Basis Gold, Beacon, Callisto, Clarity, Distinct, Exceed, Hornet, Liberty (LL corn), Lightning (Clearfield corn), NorthStar, Permit, Roundup (RR corn), Sencor, Shotgun, Steadfast, Sterling, and Touchdown. Tank-mixes with Accent, Accent Gold, Atrazine, Basis Gold, Liberty (LL corn), Roundup (RR corn), and Shotgun require additives that may include NIS, COC, 28% N, or AMS. Do not mix Aim with emulsifiable concentrate formulations, fertilizer, or additives other than given on label. Add Aim to the tank first. Refer to the label or section for each herbicide alone.

AIM + ATRAZINE

(\$5.50)

POST. Tank-mix 0.5 oz Aim with 0.5 lb ai atrazine per acre. Use additives as for Aim.

AIM + DICAMBA PRODUCT

(\$4.40-6.25)

AIM + MARKSMAN or STERLING PLUS

POST. Tank-mix 0.5 oz Aim with 2 to 4 oz dicamba 4L or 1 pt Marksman or Sterling Plus per acre. Aim mixed with dicamba will improve control of susceptible weeds up to 6 inches. NIS additives may be used.

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

(\$1.85-7.40)

8-32 fl oz Rage D-Tech (0.008-0.03 lbs ai + 0.25-1 lb ae)

Controls several broadleaf weed species, including winter annuals (mustards, horseweed, and others) and summer annuals (common lambsquarters, pigweed, kochia, velvetleaf, and others). Apply to actively growing weeds less than 4 inches tall or rosettes less than 3 inches in diameter.

Minimum carrier is 10 gpa for ground application or 3 gpa for aerial application. Increase carrier rates (15 gpa for ground or 5 gpa for aerial) for large weeds, high densities, or dense residue. Coverage is important for good weed control. Add NIS (0.25% v/v or 1 qt per 100 gallons spray solution), COC (1.5 gallons spray solution). In addition to NIS, COC, or MSO, add liquid nitrogen fertilizer (2-4% v/v or 2-4 gallons per 100 gallons spray solution) or AMS (2-4 lbs/A).

For preplant burndown applications, may tank mix with glyphosate, glufosinate, paraquat, atrazine, Authority products, and others. Use appropriate adjuvants for the selected tank mix partner. Do not apply to light, sandy soils or soils containing less than 1% organic matter.

PPS. Apply to weeds less than 6 inches tall. May apply up to 8 fl oz/A 3 days prior to planting, 9-16 fl oz 7 days prior to planting, or 17-32 fl oz 14 days prior to planting. Use higher rates when weeds exceed 4-6 inches tall, high weed densities, or dense residue.

POST. Apply up to 8 fl oz/A from emergence up to the 5-leaf stage (8 inches) or use drop nozzles to apply up to 32 fl oz/A to corn with less than 14 leaf collars (36 inches).

HARVEST AID. Apply from the hard dough stage up to 3 days before harvest.

CADET (fluthiacet-methyl) Site of Action: 14

0.4-0.9 oz Cadet (0.003-0.009 lb ai)

(\$4.05-9.10)

Cadet is a PPO-inhibiting herbicide with a similar mechanism of action as Aim. The standard rate range is 0.6-0.9 fl oz/A depending on the size of the weeds. Use 0.4 oz/A when tank mixing with a glyphosate product. Controls some common broadleaf weed species, such as pigweed, waterhemp, lambsquarters, velvetleaf, and nightshade. Generally controls broadleaf weeds 2-6 inches tall, but may control velvetleaf up to 36 inches tall. Controls or injures weeds within 48 hours. Control may decline if weeds are large or not actively growing. May be tank mixed with several broadleaf or grass herbicides.

Thorough coverage is important to optimize control. Minimum carrier is 15 gpa. Use up to 40 gpa if canopy is dense. Do not apply by air. May use NIS (0.25% v/v or 1 qt per 100 gallons), COC up to 2.5% v/v (recommended during dry conditions), or a silicone based surfactant (0.25% v/v or 1 qt per 100 gallons). May also add UAN at 1-2 qt/A or AMS. Do not irrigate or apply within 4 hours of precipitation. Do not harvest or feed forage until 30 days after application or harvest grain until 90 days after application. Do not mix or load within 50 ft of a well, sink holes, streams, rivers, lakes, or reservoirs.

POST. Apply from the second collar growth stage (V2) to 48 inches tall corn or prior to tasseling, whichever comes first.

RESOURCE (flumiclorac) Site of Action: 14**4-8 fl oz Resource .86L (0.027-0.054 lb ai)****(\$6.50-13.05)**

Resource is a contact herbicide used to control certain annual broadleaf weeds. Apply from the 2-leaf through 10-leaf crop stage. Count leaves with visible leaf collars. Velvetleaf is the most sensitive weed. Control has been very good in SDSU tests. Lambsquarters and ragweed also labeled for Resource alone. It is frequently used in a tank-mix.

Resource activity is enhanced by COC adjuvants. COC is added for Resource alone and in some tank-mixes. Addition of 28% N at 2 gal/100 gal or AMS at 2.5 lb per acre improves activity.

Minimum carrier is 10 gpa for ground, not labeled for air. Do not apply if rain is expected in 1 hour. Do not graze or use forage for 28 days after treatments. There are no crop rotation restrictions for the next season.

POST. Rates are 4 to 6 fl oz per acre. Use COC at 1 pt per acre. Rates up to 8 fl oz may be used with COC at 1 qt per acre applied with drop nozzles. Labeling includes velvetleaf up to 10 inches.

TANK-MIXES

Resource is tank-mixed with herbicides listed below. Other herbicide tank-mixes include: Accent, Basis, Basis Gold, Beacon, Bromoxynil, Exceed, Glyphosate (RR corn), Hornet, Liberty (LL corn), Lightning (CF corn), Marksman, NorthStar, Permit, Poast, Pursuit, glyphosate, and Stinger. Refer to label restrictions or the section for each herbicide.

RESOURCE + ATRAZINE

POST. Add 4 oz Resource with 0.6 to 1.2 lb atrazine 90DF or 1 to 2 pt 4L per acre. Crop stage is 2-leaf to 12 inches. Use COC at 1 pt per acre.

RESOURCE + ACCENT

POST. Add 4 to 8 oz Resource with 0.66 oz Accent 75DF per acre. Crop stage is 2-leaf to 36 inches or 10-leaf. Do not use adjuvants.

RESOURCE + DICAMBA PRODUCT

POST. Add 4 oz Resource with 0.5 pt dicamba 4L per acre. Crop stage is 2-leaf to 36 inches or 10-leaf. Do not use adjuvants.

RESOURCE + 2,4-D

POST. Add 4 oz Resource with 0.25 lb ae 2,4-D ester or amine per acre. Crop stage is 2-leaf to 8 inches; use drop nozzles after 8 inches. Do not use adjuvants with 2,4-D ester, add NIS at 1 qt/100 gal with 2,4-D amine. Crop may develop temporary brittleness.

BASAGRAN (bentazon) Site of Action: 6**1.5-2 pt Basagran 4L (0.75-1 lb ai)****(\$18.75-25.00)**

POST. Excellent control of cocklebur. Very good control of sunflower and velvetleaf. Control is best on actively growing, small weeds. Lower rate is for cocklebur under 6 inches, velvetleaf under 2 inches, and sunflower under 4 inches. Use higher rate for cocklebur up to 10 inches, velvetleaf to 5 inches, and sunflower to 6 inches. For Canada thistle, use high rate and retreat if necessary.

Use COC at 1 qt in minimum of 20 gpa carrier with minimum of 40 psi pressure for ground and 1 pt COC per acre in minimum of 5 gpa at 40 psi for air. Velvetleaf control is improved with 28% N at 2 qt per acre as part of the carrier. Corn is usually at the 1- to 5-leaf stage when treated. Primarily for special situations where maximum crop safety is important. Drift to adjacent crops such as soybeans, small grain, or forage legumes does not cause visual harm.

TANK-MIXES

Tank-mix Basagran with one of the following herbicides to expand weed spectrum: Clarity, Distinct, Frontier, Marksman, or Roundup (RR corn). Refer to label restrictions and directions for each herbicide.

BASAGRAN + ATRAZINE**(\$21.75-31.10)**

POST. Tank mix with 0.75-1.5 lb ai atrazine per acre. Atrazine improves control of several broadleaf weeds and provides residual.

BROMOXYNIL PRODUCTS (bromoxynil) *Site of Action: 6*

Bromoxynil is available in several products, examples include **Buctril, Bromax, Broclean, Moxy, Maestro, Brox** and others. Refer to product label; adjust rate according to label for 2L or 4L ae products.

0.75-2 pt bromoxynil 2L or 0.38-1 pt bromoxynil 4L (0.18-0.5 lb ae)

(\$5.85-17.75)

Contact herbicide. Excellent for sunflower and cocklebur. Pigweed is somewhat tolerant. Velvetleaf control is variable; plants must be under 3 to 4 inches. Gives topgrowth burn on Canada thistle. Not intended as a rescue treatment for large weeds. No soil residual. Control is reduced if plants are under stress. Bromoxynil does not cause brittleness or lodging. No vapor drift. Some crop leaf burn is frequently noted. Symptoms disappear as new growth develops. Wet foliage and high temperature at time of spraying increase risk.

Bromoxynil alone is used at 1 to 2 pt of 2L or 0.5 to 1 pt of 4L per acre. Apply before weeds exceed the most susceptible stage; cocklebur (8 in), sunflower (6 in), wild buckwheat (6 in), and nightshade (6 in). Less susceptible weeds like pigweed, velvetleaf, and wild mustard require the higher rates and must be treated before they reach 2 to 4 inches, depending on species. Good coverage is important. Suggested carrier is 5 gpa for air or 10 gpa with ground equipment. Spray additives or liquid fertilizer may cause excessive crop leaf burn.

PRE. May be applied before planting to emerged weeds. Rate is 1 to 1.5 pt 2L or 0.38 to 1 pt 4L per acre.

POST. Optimum stage is 4- to 8-leaf. Bromoxynil at 1 pt 2L per acre may be used from emergence to tassel. Rates of 1.5 to 2 pt 2L per acre can be used after corn reaches the 4-leaf stage.

LATE POST. Rescue application. For cocklebur up to 14 inches and sunflower up to 18 inches, use 1 pt 2L or 0.5 pt 4L per acre followed by a second application of the same rate 7 to 10 days later. For velvetleaf up to 14 inches, use 1.5 to 2 pt 2L or 0.25 to 1 pt 4L or a tank-mix of 1 pt 2L or 0.5 pt 4L + 1.2 lb ai atrazine followed by 1 pt 2L per acre 7 to 10 days later.

TANK-MIXES and PREMIXES

Several combination treatments are listed below. Other tank-mix combinations include: Accent, Beacon, and Stinger. Refer to other sections or product label. Refer to label for specific bromoxynil product for tank-mix and rate directions for that product. Bromoxynil rates in tank-mixes below are given for 2L product; adjust rate for 4L product.

BROMOXYNIL + ATRAZINE

Tank-mix 0.75 to 1.5 pt 2L or 0.38 to 0.75 pt 4L + 0.5 to 1.2 qt atrazine 4L. Low atrazine rate reduces carryover and may allow rotating to crops with intermediate tolerance; however, small grain is not recommended.

PRE and **POST.** Apply before planting to 12 inches. Maximum bromoxynil rate is 1 pt 2L or 0.5 pt 4L when applying prior to 4-leaf crop stage. Addition of spray additive or liquid fertilizer may cause excessive crop leaf burn.

BROMOXYNIL + DICAMBA PRODUCT

POST. Tank-mix 1 to 1.5 pt 2L or 0.5 to 0.75 pt 4L with 0.12 to 0.5 pt dicamba 4L per acre. Apply from emergence to 36 inch corn or 15 days before tassel. Maximum bromoxynil rate is 1 pt 2L if applying before the 4-leaf stage; rate can be increased to 1.5 pt 2L per acre at later stages.

BROMOXYNIL + 2,4-D

POST. Tank-mix 1 to 1.5 pt 2L or 0.5 to 0.75 pt 4L with 0.06 to 0.25 lb ae 2,4-D per acre. Apply from emergence to prior to tassel emergence. Use drop nozzles if corn is over 8 inches. Maximum bromoxynil rate is 1 pt 2L or 0.5 pt 4L if applying before the 4-leaf stage; rate can be increased to 1.5 pt 2L or 0.75 pt 4L per acre at later stages.

PREMIX

BROMOXYNIL/ATRAZINE (bromoxynil + atrazine)

PRE or **POST.** Use premix at 1.5 to 3 pt per acre. Premix contains 1 lb bromoxynil + 2 lb ai atrazine per gallon. Apply as for tank-mix.

BEACON (primisulfuron) *Site of Action: 2***0.38-0.76 oz Beacon 75DF (0.017-0.036 lb ai)****(\$12.25-24.55)**

Excellent control of 4- to 12-inch shattercane; good control of 4- to 8-inch quackgrass. Beacon also gives good to excellent control of cocklebur, black nightshade, kochia, pigweed, sunflower, lambsquarters, velvetleaf, and Russian thistle. The low rate controls cocklebur, ragweed, sunflower, and redroot pigweed. Use tank-mixes to improve control of other broadleaves. Annual grasses are not effectively controlled; however, there is fair activity for yellow foxtail. Most annual broadleaves should not exceed 4 inches; lambsquarters should be less than 1.5 inches. Use COC and 28% N for velvetleaf. Labeled for field and silage corn.

Beacon is packaged in 1.52 oz water-soluble packets. Corn has acceptable tolerance; temporary yellowing or stunting may occur if crop is stressed. Some corn hybrids are sensitive. Beacon should not be used if Counter insecticide is applied any time during the season. Other organophosphate insecticides used at planting may cause temporary injury if Beacon is used. Do not apply foliar organophosphate insecticides within 10 days before or after Beacon application.

Field corn may be replanted after 14 days. Winter wheat may be planted after 3 mo; alfalfa, soybeans, sorghum, dry beans, sunflower, and spring grain after 8 mo; other crops require 18 mo.

Effects on susceptible weeds develop slowly. Yellow and/or red coloration and death occur 7 to 30 days after treatment. Apply in minimum of 10 gpa water; increase to 20 gpa for heavy stands. Do not apply Beacon as a band directly over the row. Add NIS at 1 qt/100 gal or COC at 1 to 4 pt per acre. Liquid nitrogen fertilizer may be added at 1 gal per acre. Rainfall within 4 hours may reduce effectiveness.

Do not graze or feed forage from treated fields within 30 days of application.

POST. Apply when corn is 4 to 20 inches. Use as a directed spray or with drop nozzles if corn is 20 inches or up to 15 days before tassel. Corn less than 4 inches may be more susceptible to injury.

PREMIX**NORTHSTAR (primisulfuron + dicamba)****(\$11.90)**

POST. Use 5 oz NorthStar premix containing 7.5% primisulfuron (Beacon) + 43.9% dicamba (Banvel). The 5 oz rate provides equivalent of 0.5 oz Beacon + 4 oz Banvel 4L per acre. Use NIS at 1 qt/100 gal. NorthStar tank-mixes include Accent, atrazine, Resource, Banvel, Clarity, and Marksman.

TANK-MIXES

Tank-mixes for most situations are listed below. Beacon may also be tank-mixed with Marksman and Resource. Do not use crop oil or liquid fertilizer additives with the mixtures unless labeled. Refer to label restrictions or the section for each herbicide.

BEACON + ACCENT

POST. Tank-mix 0.33 oz Accent 75DF with 0.38 oz Beacon per acre. Beacon + Accent controls escaped grasses and broadleaf weeds following a preemergence grass herbicide. Use additives as for Beacon alone.

BEACON + ATRAZINE

POST. Tank-mix 2 to 3 pt atrazine 4L or 1.1 to 1.7 lb atrazine 90DF with 0.38 oz Beacon per acre. The Beacon + atrazine tank-mix should be applied following an earlier grass herbicide. Use additives as for Beacon alone.

BEACON + DICAMBA PRODUCTS

POST. Tank-mix 0.25 to 0.5 pt dicamba 4L with 0.38 oz Beacon per acre or use 5 oz NorthStar premix containing 7.5% primisulfuron (Beacon) + 43.9% dicamba (Banvel). The 5 oz rate provides equivalent of 0.5 oz Beacon + 4 oz Banvel 4L per acre. Use NIS at 1 qt/100 gal. NorthStar tank-mixes include Accent, atrazine, Resource, Banvel, Clarity, or Marksman.

BEACON + BROMOXYNIL

POST. Tank-mix 0.5 to 1 pt bromoxynil 2L with 0.38 oz Beacon per acre. Use 0.25 lb ae bromoxynil for velvetleaf. NIS at 1 qt/100 gal suggested.

SPIRIT (prosulfuron + primisulfuron) Site of Action: 2+2**1 oz Spirit 57WG (0.009 lb prosulfuron + 0.027 lb primisulfuron)****(\$11.45)**

Controls several broadleaf weed species, such as waterhemp, wild buckwheat, buffalobur, common cocklebur, kochia, common lambsquarters, redroot pigweed, velvetleaf, and ragweed. May also suppress perennials such as Canada thistle, field bindweed, and quackgrass. Annual grasses are not controlled. Results are best when applied to small weeds. Apply to small-seeded broadleaf weed species when 1-4 inches tall or large-seeded species when less than 8-12 inches tall. Control may decline in drought conditions.

Crop tolerance is good under normal conditions. Do not apply to corn stressed from drought, cold weather, hail, flooding, compacted soil, insect damage, disease, nutrient deficiency, or other causes. Do not apply if Counter 15G or Counter CR was applied in-furrow at the time of planting or over the row at cultivation. Do not apply organophosphate insecticides within 10 days before or 7 days after applying Spirit, unless an IR or IMR hybrid was planted.

Apply in a minimum of 10 gpa for ground applications or 3 gpa for aerial applications. Add NIS at 1-2 qt or COC at 1-4 pt/100 gal. For improved velvetleaf control, add 28% N at 2-4 qt/A or AMS at 2-4 lb/A.

Use IR hybrids if crop is lost, conventional corn may be planted after 4 weeks. Crop rotations include wheat, barley, rye, triticale (3 mo); sorghum, peas, forage grasses, proso millet (10 mo); alfalfa, clover, lentils, sunflowers, canola, flax, soybeans, STS soybeans (18 mo). Rotate to corn, sorghum, wheat, barley, rye, oats, triticale, proso millet, or forage grasses the next year. Rotation periods may be longer in soils with pH >7.8.

POST. Apply to corn 4-24 inches tall. Use drop nozzles after corn exceeds 20 inches tall.

TANK-MIXES

Spirit may be tank-mixed with dicamba, Marksman, atrazine, 2,4-D, Beacon, Buctril, or Accent. Refer to the label for specific rates and recommendations.

PERMIT or SANDEA (halosulfuron) Site of Action: 2**0.67-1.33 oz Permit 75WSG or Sandea (0.032-0.063 lb ai)****(\$12.70-25.20)**

Permit is a sulfonyl-urea herbicide that controls annual broadleaf weeds. Permit provides very good to excellent control of cocklebur, sunflower, pigweed, velvetleaf, and common ragweed. Labeling also includes non-ALS kochia, Venice mallow, and smartweed. The higher rates control larger weeds and add yellow nutsedge and suppression of common milkweed. Control has been generally consistent in SDSU tests. There is no activity on annual grass.

Use the low rate for non-ALS kochia, pigweed, and Venice mallow up to 3 inches; cocklebur, common ragweed, and velvetleaf up to 9 inches, and sunflower to 12 inches. Control is more consistent if weeds are treated at early stages. Crop tolerance has been satisfactory.

Use NIS at 1 to 2 qt or COC at 1 gal per 100 gal per acre. Addition of 28% N at 4 gal/100 gal is allowed if required by a tank-mix partner. Minimum carrier is 10 gpa for ground or 3 gpa for air.

Treated fields may be rotated the next season to milo, field corn, winter or spring wheat, or soybeans. Allow 9 mo for soybeans or alfalfa or 2 mo for small grain or millet. Do not graze or harvest forage for 30 days after application.

PRE. Apply 1.33 to 2 oz Permit per acre as a soil application. Plant only IR hybrids.

POST. Apply 0.67 to 1.33 oz Permit per acre from spike through layby stage.

TANK-MIXES

Tank-mixes for most situations are listed below. Refer to label restrictions or the section for each herbicide.

PERMIT + DICAMBA PRODUCT

POST. Add 0.25 to 0.5 pt dicamba 4L with 0.67 oz Permit per acre. Apply from emergence to 36 inch. Use NIS.

PERMIT + BROMOXYNIL or BROMOXYNIL + ATRAZINE

POST. Add 0.5 to 1 pt bromoxynil 2L or 0.25 to 0.5 pt 4L with 0.67 oz Permit per acre. Add 0.75 to 1.5 lb ai atrazine or add 1 to 2.5 pt Buctril/Atrazine premix. Add NIS.

Permit (continued . . .)

PERMIT + ATRAZINE or MARKSMAN

POST. Improves broadleaf spectrum and adds residual. Use 0.75 to 1.5 lb ai atrazine with 0.67 to 1.33 oz Permit per acre. Marksman at 2 to 3.5 pt per acre provides dicamba with atrazine in the premix. Apply up to 12 inch crop.

PERMIT + ACCENT or BEACON

POST. Add 0.67 oz Accent or 0.76 oz Beacon with 0.67 oz Permit per acre. Apply when crop is 4 to 20 inches. Dicamba may be added. Use NIS.

PREMIX

YUKON (halosulfuron + dicamba)

(\$11.20-22.45)

POST. Use 4 to 8 oz Yukon premix per acre. Yukon contains 12.5% halosulfuron (Permit) plus 55% dicamba. Yukon can be tank-mixed with atrazine, Accent, or Beacon. Minimum carrier is 10 gpa for ground or 5 gpa for air.

PRIORITY (halosulfuron + carfentrazone)

POST. Apply 1 oz wt/A which is equivalent to 0.5 fl oz Aim + 0.67 oz wt Permit. Apply after emergence but prior to the 8 leaf collar corn growth stage and when weeds are less than 4 in tall. Add NIS at 0.25% v/v or 2 pt per 100 gallons spray solution. May also add AMS (2 – 4 lb/A) or UAN (28% N at 2-4 qt per 100 gallons spray solution). COC may be used if required by the tank mix partner. Minimum carrier volume is 10 gpa for ground applications or 3 gpa for aerial applications.

METRIBUZIN PRODUCTS (metribuzin) Site of Action: 5

2.4 – 8 fl. oz Metri 4F or TriCor 4F (0.09 – 0.25 lb ai)

Provides control of cocklebur, sunflower, kochia, pigweed, and smartweed. Fits where carryover from other herbicides must be avoided. Leaf yellowing may be noted in cool weather. Usually used in tank-mix with other herbicides. Do not use additives unless specified.

BURNDOWN or PPS. Apply up to 30 days prior to planting or preemergence. Use Metri 4F 3 – 8 fl oz per acre with 2,4-D LV ester (0.25 to 1 lb ai per acre) on Gramoxone Extra (24 to 48 fl oz per acre), or glyphosate product (0.5 to 1 lb ae per acre). Metri is usually tank-mixed with other grass and broadleaf herbicides. Do not apply on coarse texture soils with less than 1% organic matter (O.M.) or soils with a pH greater than 7.0. Do not apply more than 6 oz/A on soils with less than 2% O.M. Corn seed should be planted at least 1.5 in deep.

POST. Apply 2.4 - 3 fl. oz per acre may be tank-mixed with herbicides including 2,4-D (0.12-0.25 lb ae), dicamba 4L (0.5-1 pt), Marksman (1.5-2 pt), Basagran (1 pt) per acre. Bromoxynil (1-1.5 pt) may be tank-mixed as a rescue treatment using drop nozzles. May also be tank-mixed with the following broadleaf herbicides: Banvel, 2,4-D, Atrazine, Basagran, Buctril, Buctril + Atrazine, Pursuit (IMI corn only), and Resource. Apply after crop emergence to just prior to tasseling. Refer to label of tank-mix partner for specific directions and restrictions.

STINGER or SOLIX (clopyralid) Site of Action: 4

0.33-0.66 pt Stinger 3L or Solix 3L (0.125-0.25 lb ae)

(\$18.85-37.75)

Stinger is especially effective where Canada thistle is a major part of the weed problem. Lower rate provides seasonal suppression; 0.5 to 0.66 pt per acre has been more effective and provides stand reduction. It also controls ragweed, sunflower, and cocklebur. Crop tolerance is excellent. Apply in a minimum of 10 gpa carrier for ground equipment. Alfalfa, canola, safflower, and grain sorghum may be planted in 12 mo. Dry beans, soybeans, and sunflower may also be planted in 12 mo, except in light soil with less than 12 inches precipitation in the preceding 12 mo period. Avoid drift to sensitive crops. Do not allow livestock to graze treated fields or harvest grain or silage within 40 days after treatment. Do not apply by aircraft.

POST. Apply from crop emergence to 24 inches. Use drop nozzles to direct spray in larger corn. Thistles should be at least 4 inches but not at bud stage.

PREMIX

CURTAIL (clopyralid + 2,4-D)

(\$12.00)

POST. Premix containing 0.38 lb clopyralid (Stinger) plus 2 lb 2,4-D amine per gal. The 2 pt rate provides the equivalent of 4 oz Stinger and 1 pt 2,4-D 4L per acre. Apply until the 5th leaf collar is visible or up to 8 inches. Do not apply late. Effective for Canada thistle and general broadleaves.

STARANE (fluroxypyr) Site of Action: 4**0.66 pt Starane 1.5L (0.12 lb ae)**

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 require combination treatments. Starane has been tested extensively in SDSU tests; kochia control and corn tolerance have been excellent.

POST. Apply from emergence through 5-leaf collar stage.

BURNDOWN. For no-till, may be tank-mixed with other herbicides for use prior to planting. Minimum carrier is 8 gpa for ground equipment. May also be applied by air. Adjuvants are not usually used but may be added under dry conditions.

Weeds should be actively growing. Temperature below 45° and above 85° may result in reduced activity. Do not graze or harvest forage for 47 days or harvest grain or stover for 90 days after application.

TANK-MIXES

Starane may be applied alone or in tank-mix combination with other herbicides registered for postemergence application in field corn.

PREMIX**WIDEMATCH (clopyralid + fluroxypyr)****(\$10.80)**

POST. Apply 1.33 pt WideMatch containing 0.75 lb clopyralid (Stinger) plus 0.75 lb fluroxypyr (Starane) per gal. The 1.33 pt rate provides the equivalent of 0.33 pt Stinger plus 0.66 pt Starane. Apply from crop emergence through 5 collar stage. Refer to Stinger and Starane sections.

HARMONY 50SG or THIEF 75DF, Unity, or Volta (thifensulfuron) Site of Action: 2**0.125 – 0.9 oz wt Harmony 50SG (0.004 – 0.028 lb ai)****0.083 – 0.6 oz wt Thief 75DF or Unity 75DF, Volta 75DF (0.004 – 0.028 lb ai)**

BURNDOWN. Apply Harmony 50SG at 0.45 – 0.9 oz wt/A or 75DF product at 0.3 – 0.6 oz wt/A prior to planting or after planting but prior to corn emergence. May be tank mixed with glyphosate to improve control of difficult weeds such as wild buckwheat, mustards, or lambsquarters. Add NIS at 0.25% v/v and AMS at 2 – 4 lb/A.

POST. Apply Harmony 50SG at 0.125 (1/8) oz wt/A or 75DF product at 0.083 (1/12) oz wt/A in field corn with 2 – 6 leaves or 1 – 5 leaf collars or up to 16 in tall. Do not make more than one application per season. Add NIS (0.25% v/v) or COC (1% v/v) plus either AMS (2 – 4 lb/A) or UAN (28% N, 2 – 4 qt/A). Only apply to corn with a relative maturity of 88 days or more. May provide control or suppression of velvetleaf, lambsquarters, pigweed, smartweed, and mustards.

VIDA (pyraflufen) Site of Action: 14**0.5-2 oz Vida .2L (0.0008-0.0032 lb ai)****(\$1.60-6.30)**

BURNDOWN. Vida is a preplant burndown herbicide. It is a non-selective, non-residual treatment for emerged weeds prior to planting corn. It has activity on broadleaf weeds including cocklebur, sunflower, lambsquarters, pigweed, Russian thistle, wild buckwheat, and wild mustard. Vida is used primarily in a tank-mix with glyphosate. Results used alone have been variable; especially for kochia.

Rates of 0.5 to 1 oz per acre have been used in most tank-mixes. Use the high rate for large (4-6 in) weeds. Minimum carrier is 10 gpa for ground or 5 gpa for air. Labeled crops (corn, wheat, soybeans) may be planted immediately; allow 30 days for other food crops. Do not allow livestock to graze treated areas.

GRAMOXONE INTEON 2L or FIRESTORM 3L (paraquat) Site of Action: 22

1-2 pt Gramoxone Inteon 2L (0.25-0.5 lb ai) (\$4.45-8.95)

POST DIRECTED. Use Gramoxone Inteon as a directed spray. Provides a salvage option when weeds cannot be controlled with cultivation. Apply when corn is at least 10 inches. Arrange nozzles to spray no higher than the lower three inches of the corn stalk. Coverage is especially important for dense or tall weeds.

2-4 pt Gramoxone Inteon 2L (0.5-1 lb ai) (\$8.95-17.85)

BURNDOWN. Paraquat is a non-selective, non-residual, contact herbicide used at planting to control emerged grasses and broadleaves and topgrowth of perennials. Rates of 1.5 pt Gramoxone Inteon are adequate for most small weeds; high rate is for larger weeds (over 6 inches) or dense stands. Apply in a minimum of 10 gpa for ground or 5 gpa for air. NIS is important. Most mixtures with atrazine require surfactant at 1 pt/100 gal. Use 2 pt/100 gal with most combinations if nitrogen fertilizer carrier is used. Liquid fertilizer containing phosphorus will reduce paraquat activity. Paraquat is highly toxic when ingested; follow handling and safety precautions.

TANK-MIXES

Gramoxone may be tank-mixed in burndown treatments with postemergence and preemergence residual herbicides labeled for preemergence and burndown programs in corn.

GLYPHOSATE PRODUCTS (glyphosate) (BURNDOWN APPLICATIONS) Site of Action: 9

Glyphosate is available in several products having different formulations and different amounts (lbs) of acid equivalent (ae) and active ingredients (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 (Plus), Glyphosate Original, Gly-Flo, Glyphosate 41, and Glyphosate 4. **3.75 ae, 5 ai:** Extra Credit 5. **4 ae, 5.4 ai:** Durango DMA, Duramax, GlyStar 5, Roundup Custom. **4.17 ae:** Touchdown Total, Touchdown CT, Traxion. **4.5 ae, 5.5 ai:** Roundup Original Max, Roundup WeatherMax, Roundup PowerMax. **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.

16 oz-5 qt glyphosate 3 lb ae (0.38-3.75 lb ae)	(\$1.40-13.80)
12 oz-3.75 qt glyphosate 4 lb ae (0.38-3.75 lb ae)	(\$1.75-17.75)
12 oz-3.6 qt glyphosate 4.17 ae (0.38-3.75 lb ae)	(\$1.30-17.75)
11 oz-3.3 qt glyphosate 4.5 lb ae (0.38-3.75 lb ae)	(\$1.65-22.50)
10 oz-3 qt glyphosate 5 lb ae (0.38-3.75 lb ae)	(\$1.55-14.80)

BURNDOWN. Weeds should be growing actively. Water having more than 500 ppm combined calcium, magnesium, or iron may reduce activity; especially at high carrier volumes. Daytime temperatures below 55° F may also reduce activity. Avoid tillage for one day after treating annuals; 3 to 7 days for perennials. Carrier is 3 to 40 gpa for ground and 3 to 15 gpa for air. Maximum rate for air is 1 qt of 3 lb product. Use caution to avoid droplet drift to non-target crops. Follow cleanup procedures to avoid crop damage from equipment contamination.

SPOT TREATMENT. Use 2 to 4 qt of 3 lb ae per acre to control small patches of perennial weeds such as quackgrass or Canada thistle. It is usually applied with hand-held equipment. Crop contacted by spray or drift will be damaged or killed.

PREHARVEST. Several glyphosate products are labeled for preharvest use. Applications must be made 7 days prior to harvest and when grain moisture is 35% or less or corn has reached physiological maturity and maximum kernel fill is complete. Ground or aerial applications. Do not apply preharvest to corn grown for seed.

Glyphosate is a non-selective translocated herbicide with no soil residual weed activity. It controls both grasses and broadleaf species. Some products contain adequate surfactant, others require NIS. AMS at 8.5 to 17 lb/100 gal is required, especially if poor water quality, cool weather, or moisture stress may reduce control. **Refer to section for Herbicide Resistant Corn for in-crop use.** Rates below are listed for 3 lb ae products; refer to the previous table for other formulations.

Glyphosate rates in this section are listed for products having 3 lb acid equivalent (4 lb ai). Use the chart below to adjust for other concentrations.

Glyphosate Products (continued . . .)

GLYPHOSATE PRODUCTS – EQUIVALENT RATES

<u>Formulation</u>		<u>Amount of product for lb a.e.</u>			
		<u>.38 a.e.</u>	<u>.75 a.e.</u>	<u>1.5 a.e.</u>	<u>3 a.e.</u>
3 lb a.e. (4 lb act)	L	16 oz	32 oz	64 oz	128 oz
3.75 lb a.e. (5 lb act)	L	13 oz	26 oz	51 oz	102 oz
4 lb a.e. (5.4 lb act)	L	12 oz	24 oz	48 oz	96 oz
4.17 lb a.e. (----)	L	12 oz	23 oz	46 oz	92 oz
4.5 lb a.e. (5.5 lb act)	L	11 oz	21 oz	43 oz	85 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 for glyphosate 3 lb ae product is 16 oz for most small annuals; 12 oz per acre may be adequate for some situations. Use 20 to 24 oz per acre for larger or more tolerant annuals. Rates of 32 to 48 oz is for perennials.

TANK-MIXES

Glyphosate products are frequently used in tank-mix or premix combinations as preemergence soil-applied burndown treatments in no-till systems. Refer to specific glyphosate or tank-mix partner product label for approved herbicide combinations. For improved burndown, glyphosate may be tank-mixed with 2,4-D or dicamba and applied at least 7 days prior to planting.

HERBICIDE RESISTANT CORN

Herbicides for use only on herbicide resistant corn hybrids are listed in this section. Herbicides listed for standard corn may also be used in weed control programs for herbicide resistant corn.

LIGHTNING (imazethapyr + imazapyr (“CLEARFIELD” CORN) *Site of Action: 2+2*

1.28 oz Lightning 70DF (0.039-0.013 lb ai)

(\$17.75)

Premix containing 52.5% imazethapyr (Pursuit) + 17.5% imazapyr (Arsenal) active for postemergence control of many annual grass and broadleaved weeds. For use only on Clearfield corn hybrids. Lightning provides very good to excellent control of emerged weeds and has extended soil residual.

Results are best on small weeds, usually 2 to 3 inches. Lightning controls foxtail, lambsquarters, sunflower, velvetleaf, cocklebur, non ALS kochia, wild buckwheat, nightshade, and other annuals. Early postemergence applications give fair to very good control of wild proso millet, woolly cupgrass, and sandbur (1 in); an additional herbicide such as a reduced rate of Harness, Surpass, or other preemergence herbicides or Prowl or Pendimax at early postemergence will improve results in moderate or heavy infestations. Dicamba, atrazine, or other broadleaf herbicide is required for more consistent pigweed, common waterhemp, or common ragweed control.

POST. Apply from spike to before corn is 18 inches. Minimum carrier is 10 gpa for ground or 5 gpa for air. Apply at 1.28 oz per acre; one soluble bag treats 2 acres. Add NIS at 1 qt/100 gal and 28% N at 1 to 2 qt or AMS at 2.5 lb per acre. Refer to additive limitations that apply to tank-mix partners. Do not use liquid fertilizer as the carrier. Delay application for 48 hours if temperature remains below 40° F for 10 hours or more.

Rotation restrictions are 4 mo for rye and wheat; 8.5 mo for standard corn; 9.5 mo for barley, soybeans, alfalfa, peas, and edible beans; 18 mo for oats, sorghum, safflower, sweetcorn; 26 mo for potatoes; and 40 mo for crops not listed on the label.

TANK-MIX and SEQUENTIAL

For heavy grass pressure; Lightning may be used following soil applied herbicides such as Harness, Surpass, Prowl or Pendimax, Dual, Lasso, or Frontier. Lightning may be tank-mixed with other herbicides, including 2,4-D, atrazine, Banvel, Basagran, Bicep, Buctril, Buctril/Atrazine, Callisto, Clarity, Distinct, Dual, Frontier, Guardsman, Harness, Harness Extra, Lasso, Marksman, Prowl, Shotgun, Surpass, and TopNotch. It may also be applied sequentially after several preemergence herbicides. Consult the section for each product.

Do not tank-mix with Accent Gold, Basis, Basis Gold, Hornet, Python, or Steadfast.

IGNITE 280 (Liberty Link Corn) Site of Action: 10**22 fl oz Ignite 280 (0.4 lb ai)****(\$9.15)**

Ignite 280 (glufosinate) may only be applied postemergence to Liberty Link corn. Provides broad spectrum grass and broadleaf weed control. Relative to glyphosate in Roundup Ready corn, weed control from Ignite may be reduced slightly more by adverse weather conditions, such as drought or cool temperatures. Also, coverage is more important for Ignite as the recommended carrier rate is 15 gpa for ground applications or 10 gpa for aerial applications. Do not use nitrogen solutions as spray carriers. Do not use nozzles or pressures that result in coarse spray droplets. Add AMS at 3 lbs/A (or 17 lbs per 100 gallons). Reduce AMS rate to 1.5 oz/A (8.5 lbs per 100 gallons) when temperatures exceed 85° F. Additional surfactants or crop oils may increase the chance of corn injury.

Applying a preemergence herbicide is recommended to reduce weed competition. May make up to two Ignite applications per growing season totaling 44 oz/A. Sequential applications should be made 10-14 days apart. If Ignite was applied as a burndown treatment, do not apply Ignite postemergence. Do not apply to corn stressed from weather conditions, such as drought, excessive rainfall, etc. For best results, apply when weeds are actively growing. Heavy dew or fog may reduce efficacy. Rainfast within 4 hours after application. Apply between dawn and 2 hours before sunset.

Several tank mix options, such as atrazine, residual grass herbicides (pendimethalin, acetochlor, metolachlor, Guardsman Max), growth regulator herbicides (2,4-D, Status, Distinct), HPPD-inhibiting or "bleacher" herbicides (Laudis, Impact, Callisto), ALS-inhibiting herbicides (nicosulfuron, Python, Permit, Yukon, Spirit), and others (see label).

PPS. May be applied prior to planting conventional or transgenic corn. Apply a minimum of 29 fl oz/A. Postemergence applications are not allowed in fields treated with a preplant or preemergence application of Ignite.

POST. Apply from emergence up to V5 corn (5 leaf collars). Generally, apply to weeds 3 to 8 inches tall, but check the label for specific species height restrictions. Do not apply more than two 22 oz/A applications per year. Wait 10-14 days between applications. Do not apply within 60 days of harvesting corn for forage or within 70 days of harvesting for grain.

GLYPHOSATE PRODUCTS**ROUNDUP READY, ROUNDUP READY 2, or GLYPHOSATE TOLERANT CORN**

Glyphosate is a non-selective, translocated herbicide with no soil residual weed activity. Glyphosate controls most annual grasses and broadleaves; it is especially useful for perennial weeds. Control of Canada thistle, field bindweed, and milkweed has been very good. There is no soil residual activity. Weed control in SDSU tests has been very good. Crop canopy and crop residue help reduce late weed flushes. Programs should provide early grass control and adequate control of late emerging weeds. Consider using residual planting-time herbicide, split postemergence, or cultivation. Heavy foxtail densities should be controlled early (3 to 4 weeks after planting). Glyphosate will control larger weeds if early competition is not a factor.

ROUNDUP READY (RR) CORN

Only glyphosate products licensed and labeled for use with Roundup Ready (RR) hybrids may be used. Products having different formulations and different amounts (lbs) of acid equivalent (**ae**) and active ingredient (**ai**) are listed below. Examples of labeled products include:

3 ae, 4 ai: Roundup Original (II), Touchdown 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), Gly-Flo, Glyphosate 41%, Rattler (Plus), and Glyphosate 4. **3.75 ae, 5 ai:** Extra Credit 5, Roundup UltraMax. **4 ae, 5.4 ai:** Durango DMA, Duramax, Glyphomax XRT, Roundup Custom. **4.17 ae:** Touchdown Total, Traxion. **4.5 ae, 5.5 ai:** Roundup Original Max, Roundup WeatherMax, Roundup PowerMax; and **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.

<u>24-32 oz glyphosate 3 lb ae (0.5-0.75 lb ae)</u>	(\$2.05-2.75)
<u>18-24 oz glyphosate 4 lb ae (0.5-0.75 lb ae)</u>	(\$2.60-3.55)
<u>17-24 oz glyphosate 4.17 lb ae (0.5-0.75 lb ae)</u>	(\$1.95-3.70)
<u>16-21 oz glyphosate 4.5 lb ae (0.5-0.75 lb ae)</u>	(\$2.40-4.50)
<u>14-19 oz glyphosate 5 lb ae (0.5-0.75 lb ae)</u>	(\$2.15-2.95)

Glyphosate Products (continued . . .)

POST. Apply to Roundup Ready (RR) corn from emergence through the V8 stage (8 leaves with collars) or until corn height reaches 30 inches, whichever comes first. Avoid drift. Extreme care must be taken to prevent injury to desirable and non-target plants and crops that do not contain genetic tolerance to glyphosate. Follow cleanup procedures to avoid crop damage from equipment contamination.

Carrier is 5 to 20 gpa for ground and 3 to 15 gpa for air. Add 8.5 to 17 lb AMS/100 gal. Allow at least 50 days between application and harvest of corn forage and 7 days between application and harvest of corn grain. Allow a minimum of 10 days between in-crop applications.

Sequential in-crop application of glyphosate can be applied according to the maximum rates shown below.

Maximum Glyphosate Rates – Roundup Ready Corn Use the chart below to adjust for concentrations.

<u>FORMULATION</u>	<u>IN-CROP</u>		<u>PREPLANT</u>	<u>PREHARVEST</u>	<u>TOTAL/ SEASON</u>
	<u>MAXIMUM/ APPLICATION</u>	<u>TOTAL</u>			
3 lb ae products	32 oz	64 oz	5 qt	32 oz	8 qt
3.75 lb ae products	26 oz	52 oz	4 qt	26 oz	6.5 qt
4 lb ae products	24 oz	48 oz	3.75 qt	24 oz	6 qt
4.17 lb ae products	24 oz	48 oz	3.6 qt	24 oz	5.8 qt
4.5 lb ae products	21 oz	43 oz	3.3 qt	22 oz	5.3 qt
5 lb ae products	19 oz	38 oz	3 qt	19 oz	4.8 qt

TANK-MIXES – ROUNDUP READY

PRE. Glyphosate products list several preemergence tank-mixes. Labeling for many preemergence residual or postemergence burndown products used prior to crop emergence includes tank-mixes with glyphosate.

POST. Glyphosate products and potential tank-mix partners include labeling for several postemergence tank-mixes. Product labels vary considerably. Labeling may be on the glyphosate product or the tank-mix partner. Tank-mixes listed include herbicides that provide preemergence residual or postemergence activity in tank-mixes with glyphosate, Clarity, Degree products, dicamba, Distinct, Dual, Frontier, Fulltime, Guardsman Max, Harness products, Hornet, Keystone products, Leadoff, Lumax, Marksman, Micro-Tech, Outlook, Partner, Permit, Priority, Resource, Stinger, Surpass products, TopNotch, and 2,4-D. Consult your product label or supplemental labels that may apply.

ROUNDUP READY 2 (RR2) CORN

Glyphosate products with labeling: **3 ae:** Roundup Original, Roundup Original II, GlyStar Plus, Cornerstone Plus. **3.75 ae:** Roundup UltraMax. **4.5 ae:** Roundup UltraMax II, Roundup Original Max, and Roundup WeatherMax.

POST. Rates to be used on hybrids designated Roundup Ready 2 are listed below. The “event” used in developing these hybrids provides a resistance level that allows higher glyphosate rates if required. Apply from emergence through 8 leaf collar stage or 30 inches. Drop nozzles suggested when corn height is 24 to 30 inches. Drop nozzles required when corn is 30 to 48 inches. Do not make a preharvest application if a combined total of 1.5 lb ae has previously been applied over the top or with drop nozzles. Do not harvest for grain or forage for 50 days after in-crop application. Allow 7 days before harvest or feeding corn fodder or grain with preharvest application.

Maximum Glyphosate Rates – Roundup Ready 2 Corn Use the chart below to adjust for concentrations.

<u>FORMULATION</u>	<u>IN-CROP</u>		<u>PREPLANT</u>	<u>PREHARVEST</u>	<u>TOTAL/ SEASON</u>
	<u>MAXIMUM/ APPLICATION</u>	<u>TOTAL</u>			
3 lb ae products	48 oz	3 qt	5 qt	32 oz	8 qt
3.75 lb ae products	40 oz	2.4 qt	4 qt	26 oz	6.5 qt
4.5 lb ae products	32 oz	2 qt	3.3 qt	22 oz	5.3 qt

Glyphosate Products (continued . . .)

TANK-MIXES for ROUNDUP READY 2

PRE and **POST**. Specific tank-mixes listed on the glyphosate products labeled for Roundup Ready 2 hybrids include Degree, Degree Xtra, Distinct, Harness, Harness Xtra, Bullet, Micro-Tech, Permit, and atrazine. Follow label interpretations for other glyphosate or potential tank-mix partners.

SEQUENTIAL for ROUNDUP READY and ROUNDUP READY 2

PRE and **POST**. Several preemergence herbicides may be used at reduced rates to be followed by glyphosate postemergence. Rates of 60% of full normal rate have been used in SDSU tests. These programs include herbicides for early residual control. Suggested programs for fields with moderate or heavy weed pressure.

GLYPHOSATE TOLERANT (GT) CORN

Some hybrids are designated as Glyphosate Tolerant (GT), containing technology that provides in-plant tolerance to glyphosate-based herbicides. The following glyphosate products have additional labeling that includes Glyphosate Tolerant (GT) hybrids: **3 ae**: Touchdown IQ. **4.17 ae**: Touchdown Total. **5 ae**: Touchdown Hi-Tech.

Refer to interpretation of product labels for other glyphosate products or potential tank-mix partners.

Group Numbers Associated with Herbicide Sites or Modes of Action

WSSA Group Number	Site or Mode of Action	Examples
2	ALS inhibitor	nicosulfuron, rimsulfuron
3	Microtubule inhibitor	pendimethalin, trifluralin
4	Growth regulator	2,4-D, dicamba
5	Photosynthesis inhibitor (triazine, triazinone)	atrazine, metribuzin\
6	Photosynthesis inhibitor (contact)	bentazon, bromoxynil
8	Lipid synthesis inhibitor (thiocarbamates)	EPTC
9	EPSP inhibitor	glyphosate
10	Glutamine synthase inhibitor	glufosinate
14	Cell membrane disrupter (PPO inhibitor)	carfentrazone, flumiclorac
15	Seedling shoot inhibitor	acetochlor, metolachlor
19	Auxin transport inhibitor	diflufenzopyr
22	Cell membrane disrupter (PSI inhibitor)	paraquat
27	Bleacher (HPPD)	mesotrione

WEED RESPONSE to CORN HERBICIDES

Weed control percentages are intended as a guide for comparing alternatives. Percentages are estimated based on favorable conditions.

10.9	Excellent	90-99%	Usually over 90%	Best choice for weed
8.7	Good	80-90%	Sometimes over 80%	Usually satisfactory
6	Fair	70-80%	Sometimes under 70%	Sometimes unsatisfactory
5	Marginal	50-70%	Seldom over 70%	Seldom satisfactory
4	Poor	<50%	Usually under 50%	Not effective
0	None		No control	

Herbicide	Green foxtail	Yellow foxtail	Barnyardgrass	Field sandbur	Woolly cupgrass	Wild mustard	Wild buckwheat	Kochia (ALS)	C. ragweed	Lambsquarters	Pigweed	Waterhemp	Smartweed	Nightshade	Cocklebur	Sunflower	Velvetleaf	Canada thistle
<i>PPI/PRE:</i>																		
Acetochlor	10	9	8	6	6	0	0	4	4	6	8	8	4	7	0	0	0	0
Atrazine	6	5	5	5	4	10	10	10	9	10	10	9	10	9	6	7	8	4
Balance Flexx	8	6	8	6	7	9	2	8	8	9	9	8	7	8	5	6	9	0
Callisto	4	4	4	4	4	9	1	6	9	8	10	9	8	9	6	5	9	4
Corvus	9	8	8	7	7	9	2	8	8	9	9	8	8	8	6	6	9	0
Epic	9	8	8	6	6	9	3	7	7	9	9	8	6	8	4	5	8	0
Eradicane	10	9	9	8	8	0	0	5	5	6	6	5	4	6	0	0	5	0
Lumax	9	7	7	5	6	10	9	9	10	10	9	9	9	10	7	6	9	4
Metolachlor	9	8	7	5	6	0	0	4	4	4	7	7	4	7	0	0	0	0
Micro-Tech	9	8	7	5	6	0	0	4	4	5	7	7	4	7	0	0	0	0
Outlook	9	9	7	5	6	0	0	4	4	5	7	7	4	7	0	0	0	0
Python	0	0	0	0	0	9	2	4	7	8	9	8	8	6	6	7	8	0
Radius	9	7	8	6	6	9	3	7	7	9	9	8	6	8	4	5	8	0
Resolve	7	6	6	5	5	7	0	0	4	7	7	5	5	5	4	5	5	4
Sharpen	0	0	0	0	0	9	9	6	8	8	8	8	9	8	8	8	8	0
Verdict	8	8	7	6	6	9	9	6	8	8	8	8	9	8	8	8	8	0
<i>POST:</i>																		
Accent	9	7	7	8	8	9	2	0	4	4	7	5	7	4	5	4	4	5
Aim	0	0	0	0	0	8	4	8	6	9	9	8	6	9	6	6	10	4
Atrazine+oil	7	6	6	5	4	10	10	9	10	10	10	9	9	9	8	10	8	5
Banvel/Clarity	0	0	0	0	0	5	9	9	10	9	9	8	10	6	7	8	6	8
Basagran	0	0	0	0	0	9	8	6	7	6	4	4	9	6	9	7	8	7
Basis	9	6	6	5	5	9	7	0	4	9	9	8	9	4	5	5	6	4
Basis Gold	10	7	8	6	6	10	10	5	9	10	10	9	10	9	6	8	7	5
Beacon	4	5	4	4	0	7	3	4	9	5	7	8	8	7	7	9	6	5
Bromoxynil	0	0	0	0	0	6	9	9	9	8	5	4	9	9	9	9	7	5
Cadet	0	0	0	0	0	5	5	4	5	6	6	5	4	6	5	4	9	0
Callisto	4	4	4	4	4	9	5	8	9	10	9	8	9	10	8	7	9	5
Capreno	7	7	7	7	7	9	8	8	9	10	9	8	9	10	7	8	9	5
Distinct/Status	4	4	4	4	0	7	9	10	10	10	9	9	10	6	8	8	8	8
Glyphosate	10	10	10	10	10	9	7	8	8	8	9	8	9	9	10	9	7	9
Hornet	0	0	0	0	0	9	7	4	8	6	8	6	8	6	9	9	8	8
Ignite	9	7	7	7	9	9	8	8	8	7	7	7	9	8	9	9	7	5
Impact	7	5	7	4	6	9	5	8	9	10	9	9	9	10	8	8	9	5
Laudis	5	7	7	4	7	9	5	8	9	10	9	9	9	10	8	8	9	5
Lightning	10	8	8	8	9	10	9	0	6	8	6	5	9	10	9	8	9	5
NorthStar	4	4	4	0	0	9	9	8	9	9	8	8	10	8	9	9	8	6
Option	9	7	8	6	7	9	2	0	6	6	7	6	4	8	5	5	7	5
Permit	0	0	0	0	0	10	4	4	8	4	8	7	7	4	9	8	8	4
Rage D-Tech	0	0	0	0	0	9	7	8	7	9	9	8	7	9	8	7	9	6
Require Q	7	7	7	5	5	10	9	8	8	8	9	8	7	7	7	8	8	6
Resolve	7	7	7	5	5	8	7	0	4	7	7	5	5	4	4	5	5	5
Resolve Q	7	7	7	5	5	9	7	0	4	8	8	6	6	4	6	6	7	5
Resource	0	0	0	0	0	4	5	4	6	6	6	5	4	4	4	4	9	0
Shotgun	4	0	0	0	0	10	10	7	10	9	10	9	9	7	9	9	9	5
Spirit	4	4	4	0	0	9	4	4	9	7	9	6	8	9	8	8	9	5
Starane	0	0	0	0	0	4	6	9	8	2	2	2	2	5	6	6	7	4
Steadfast	9	7	7	7	7	9	7	0	4	4	7	6	7	4	5	4	4	5
Stout	9	7	7	7	7	10	4	0	4	7	7	5	7	4	5	4	6	5
WideMatch	0	0	0	0	0	4	8	8	8	7	7	7	2	6	9	6	7	6
2,4-D	0	0	0	0	0	9	6	5	9	8	8	8	6	6	9	7	7	6

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