

Weed Control in Field Crops

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Chemical

Herbicides are useful tools in most weed management programs. They should be used to supplement and not supplant other methods or tools available. These other tools include good cultural practices, such as proper fertilization and liming to give the crop a head start, and crop rotation and proper cultivation, which are essential for a total weed management program.

The following are definitions of terms you will find in this and similar publications on herbicides:

Preplanting. The herbicide is applied to a growing weed before the land is plowed.

Early Preplant (EPP). The herbicide is applied to the soil before planting. Generally used in no-till to control existing vegetation and provide early residual control.

Preplant incorporated (PPI). The herbicide is applied to the soil after plowing but before planting, and mixed with the top few inches of soil with different incorporation implements.

Preemergence (PRE). The herbicide is applied after the crop is planted but before it emerges from the ground. Soil moisture, light rainfall, or shallow cultivation may be necessary to obtain good weed control with many preemergence herbicides.

Postemergence (POST). The herbicide is applied to the foliage of weeds after the crop has emerged.

Surfactant. This is a surface-active agent that reduces the surface tension, thus permitting a more uniform application, and spreads the herbicide solution evenly on the plant foliage or ground.

Many terms designate particular surface activities such as adjuvant, detergent, emulsifier, spreader, sticker, and wetting agent.

Most of the herbicides recommended in this publication are selective. That is, at the recommended rate of application, they will selectively control or injure weeds but will not seriously damage the crop in which these weeds are growing. In using most selective herbicides, you should carefully follow the recommended rate of application because higher rates may severely injure or kill the crop. You, the user, must accept the responsibility if you use a herbicide other than as directed on the label. Read the label on the container and follow the directions carefully.

The precision required for the application of herbicides is greater than for many other farm tasks. Three factors governing the rate of application are pressure, nozzle size, and ground speed. Contact your local Extension office for related publications.

Use Rate

The recommended use rates of herbicides generally vary with soil texture and organic matter content. The herbicide rates given in this section refer only to three soil texture groups: coarse, medium, and fine. The following is a listing of soil textures included of these three soil texture groups:

Soil texture group	Soil texture
Coarse	Sand, loamy sand, sandy loam
Medium	Loam, silt loam, silt, sandy clay loam
Fine	Silty clay loam, clay loam, sandy clay, silty clay, clay

Please refer to the chart above to determine the soil texture group for the soil you want to treat. Low rates of herbicides generally are used on coarse soils low in organic matter while high rates generally are used on fine soils high in organic matter. Consult the label for the proper herbicide rate for your soils.

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Table 5.1 - Guide to Prepackaged Mixes

Product Name	Prepackaged Mix Ingredients	Formulation Ratio	Manufacturer
Authority Assist 4L	Authority + Pursuit	3.33 + 0.67 lb/gal	FMC
Authority MTZ 45 DF	Authority + metribuzin	1:1.5 ratio	FMC
Axiom 68 DF	Define + metribuzin	4:1 ratio	Bayer
Basis 75 DF	Harmony SG + Matrix	1:2 ratio	DuPont
Bicep Lite II Magnum 6L	Dual II Magnum + atrazine	3.33 + 2.67 lb/gal	Syngenta
Bicep II Magnum 5.5L	Dual II Magnum + atrazine	2.4 + 3.1 lb/gal	Syngenta
Boundary 6.5L	Dual II Magnum + metribuzin	5.25 + 1.25 lb/gal	Syngenta
Buctril + Atrazine 3L	Buctril + atrazine	1.0 + 2.0 lb/gal	Bayer
Bullet 4L	Lasso MT + atrazine	2.5 + 1.5 lb/gal	Monsanto
Camix 3.67L	Dual II Magnum + Callisto	3.34 + 0.33 lb/gal	Syngenta
Canopy 75 DF	Lexone + Classic	6:1 ratio	DuPont
Canopy EX 75 DF	Classic + Express	3.33:1 ratio	DuPont
Celebrity Plus 70DF	Distinct + Accent	5.6:1 ratio	BASF
Cimarron Plus	mtesulfuron methyl + Glean	3.2:1 ratio	DuPont
Crossbow 3.0L	Remedy + 2,4-D	1.0 + 2.0 lb/gal	Dow AgroSciences
Curtail 2.4L	Stinger + 2.4-D amine	0.4 + 2.0 lb/gal	Dow AgroSciences
Degree Xtra 4EC	Harness + atrazine	2.7 + 1.34 lb/gal	Monsanto
Distinct 70 DF	Banvel/Clarity + diflufenzopyr	2.5:1 ratio	BASF
Equip 32 WG	Option + iodosulfuron	15:1 ratio	Bayer
Exceed 57 WG	Peak + Beacon	1:1 ratio	Syngenta
Expert 4.88 EC	Dual II Magnum + Roundup + atrazine	1.74 + 1.0 + 2.14 lb/gal	Syngenta
Extreme 2.17 EC	Pursuit + glyphosate	0.17 + 2.0 lb/gal	BASF
Fieldmaster 4.25 SE	Roundup + Harness + atrazine	0.75 + 2.0 + 1.5 lb/gal	Monsanto
Finesse 75 DF	Glean + Ally	5:1 ratio	DuPont
Forefront 3 EC	Milestone + 2,4-D	0.33 + 2.66 lb/gal	Dow AgroSciences
Fultime 4 EC	Topnotch + atrazine	2.4 + 1.6 lb/gal	Dow AgroSciences
Fusion 2.56 EC	Fusilade 2000 + Whip	2.0 + 0.56 lb/gal	Syngenta
Gangster (copack)	Valor + FirstRate	1:1.65 ratio	Valent
Grazon P + D 2.54L	2,4-D + Tordon	2.0 + 0.54 lb/gal	Dow AgroSciences
Guardzman Max 5L	atrazine + Outlook	3.3 + 1.7 lb/gal	BASF
Guardzman Max Lite 5L	Outlook + atrazine	2.25 + 2.75 lb/gal	BASF
Halex GT 4.38EC	Dual II Magnum + glyphosate + Callisto	2.1 + 2.1 + .21 lb/gal	Syngenta
Harness Extra 5.6L	Harness + atrazine	3.1 + 2.5 lb/gal	BASF
Harmony Extra SG 50 SG	Harmony SG + Express	2:1 ratio	DuPont
Hornet 78.5 WP	Broadstrike + Stinger	1:3.25 ratio	Syngenta + Dow AgroSciences
Keystone 5.25L	atrazine + acetochlor	2.25 + 3.0 lb/gal	Dow AgroSciences
Keystone LA 5.5L	atrazine + acetochlor	1.5 + 4.0 lb/gal	Dow AgroSciences
Laddock S12 5L	Basagran + atrazine	2.5 + 1.5 lb/gal	MicroFlo
Landmaster 3.1 SL	glyphosate + 2,4-D amine	1.2 + 1.9 lb /gal	Monsanto
Lariat 4L	Lasso EC + atrazine	2.5 + 1.5 lb/gal	Monsanto

¹Products not targeted for major distribution in Delaware, Maryland, and Virginia.

Table 5.1 - Guide to Prepackaged Mixes (cont.)

Product Name	Prepackaged Mix Ingredients	Formulation Ratio	Manufacturer
Lexar 3.7 SC	atrazine + Dual II Magnum + Callisto	1.74 + 1.74 + 0.22 lb/gal	Syngenta
Liberty ATZ 4.3L	Liberty + atrazine	3.3 + 1.0 lb/gal	Bayer
Lighting 70 DG	Pursuit + Arsenal	2:1 ratio	BASF
Lumax 3.95 SC	atrazine + Dual II Magnum + Callisto	1.0 + 2.68 + 0.268 lb/gal	Syngenta
Marksman3.2 L	Banvel/Clarity	1.1 + 2.1 lb/gal + atrazine	BASF
Northstar 47.4 DG	Beacon + Banvel/Clarity	1:5.9 ratio	Syngenta
PastureGard 2.5L	Remedy + Vista	1.5 + 0.5 lb/gal	Dow AgroSciences
Prefix 5.29 EC	Dual II Magnum + Reflex	4.34 + 0.95lb/gal	Syngenta
Radius 4L	Define + Balance	3.57 + 0.43 lb/gal	Bayer
Ready Master ATZ 4L	glyphosate + atrazine	2.0 + 2.0 lb/gal	Monsanto
Redeem 3EC	Stinger + Clopyralid	2.25 + 0.75 lb/gal	Dow AgroSciences
Require Q	Banvel/Clarity + Matrix	8.5:1 ratio	DuPont
Resolve Q 22.4 DF	Matrix + Harmony SG	4.6:1 ratio	DuPont
Sequence 5.25 SC	glyphosate + Dual II Magnum	2.25 + 3.0 lb/gal	Syngenta
Sonic/Authority First 70 DF	Authority + FirstRate	7.75:1 ratio	Dow AgroSciences
Spirit 57 WDG	Beacon + Peak	3:1 ratio	Syngenta
Status 56 WG	Banvel/Clarity + diflufenzopyr	2.5:1 ratio	BASF
Steadfast 75 DF	Accent + Matrix	2:1 ratio	DuPont
Steadfast ATZ 89 WDG	Accent + Matrix + atrazine	2.1:1:65.6 ratio	DuPont
Stellar 3.1 EC	Resource + Cobra	0.7 + 2.4 lb/gal	Valent
Storm 4S	Basagran + Blazer	2.67 + 1.33 lb/gal	UPA
Stout 72.5 DF	Accent + Harmony SG	1.35:1 ratio	DuPont
Surestart 4.25 EC	acetochlor + Stinger + Python	3.75 + 0.38 + 0.12 lb/gal	Dow AgroSciences
Surmount 1.34 SL	Vista + Tordon	0.67 + 0.67 lb/gal	Dow AgroSciences
Synchrony XP 28.4 DF	Classic + Harmony SG	3.1:1 ratio	DuPont
TNT Broadleaf 75 DF	Harmony SG + Express	2:1 ratio	DuPont
Valor XLT 40 WDG	Valor + Classic	2.9:1 ratio	Valent
Yukon 67.5 WDG	Permit + Banvel	1:4.4 ratio	Monsanto

¹Products not targeted for major distribution in Delaware, Maryland, and Virginia.

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Table 5.2 - Guide to Single Active Ingredient Herbicides¹

Trade Name	Ingredients	Mode of Action	Manufacturer
Accent	nicosulfuron	ALS inhibitor	DuPont
Aim	carfentrazone-ethyl	PPO inhibitor	FMC
Ally	metsulfuron	ALS inhibitor	DuPont
Arsenal	imazapyr	ALS inhibitor	BASF
Assure II	quizalofop	lipid synthesis inhibitor	DuPont
Atrazine	atrazine	mobile photosynthesis inhibitor	Various
Authority	sulfentrazone	PPO inhibitor	FMC
Axial XL	penoxaden	lipid synthesis inhibitor	Syngenta
Balan	benefin	seedling root inhibitor	UAP
Balance Flex	isoxaflutole	pigment inhibitor	Bayer
Banvel	dicamba	growth regulator	MicroFlo
Basagran	bentazon	non-mobile photosynthesis inhibitor	MicroFlo
Beacon	primisulfuron	ALS inhibitor	Syngenta
Buctril	bromoxynil	non-mobile photosynthesis inhibitor	Bayer
Callisto	mesotrione	pigment inhibitor	Syngenta
Classic	chlorimuron	ALS inhibitor	DuPont
Clarity	dicamba	growth regulator	BASF
Cobra	lactofen	cell membrane disrupter	Valent
Command	clomazone	pigment inhibitor	FMC
2,4-D	2,4-D	growth regulator	Various
2,4-DB	2,4-DB	growth regulator	Various
Define	FOE-5043	seedling shoot inhibitor	Bayer
Degree	acetochlor	seedling shoot inhibitor	Monsanto
Devrinol	napropamide	seedling shoot inhibitor	UPI
Distinct/Overdrive	dicamba	growth regulator	BASF
Dual II Magnum/Cinch	s-metolachlor	seedling shoot inhibitor	Syngenta/DuPont
Eptam	EPTC	seedling shoot inhibitor	Syngenta
Eradicane	EPTC	seedling shoot inhibitor	Syngenta
Evik	ametryn	mobile photosynthesis inhibitor	Syngenta
Express ²	tribenuron	ALS inhibitor	DuPont
FirstRate	cloransulam	ALS inhibitor	Dow AgroSciences
Flexstar	fomesafen	cell membrane disrupter	Syngenta
Fusilade DX	fluzifop-P	lipid synthesis inhibitor	Syngenta
Glean ²	chlorsulfuron	ALS inhibitor	DuPont
Gramoxone Inteon	paraquat	cell membrane disrupter	Syngenta
Harmony SG	thifensulfuron	ALS inhibitor	DuPont
Harness	acetochlor	seedling shoot inhibitor	Monsanto
Hoelon	diclofop	lipid synthesis inhibitor	Bayer
Ignite 280	glufosinate	EPSP inhibitor	Bayer
Impact	topramezone	HPPD inhibitor	AMVAC
Kerb	pronamide	seedling shoot inhibitor	Dow AgroSciences

¹This update compiled September 2006.

²Products not targeted for major distribution in Delaware, Maryland, or Virginia.

Table 5.2 - Guide to Single Active Ingredient Herbicides¹ (cont.)

Trade Name	Ingredients	Mode of Action	Manufacturer
Lasso/Micro-Tech	Alachlor	seedling shoot inhibitor	Monsanto
Linex/Lorox	linuron	mobile photosynthesis inhibitor	Griffin
Laudis	tembotrione	MPPD inhibitor	Bayer
Matrix	rimsulfuron	ALS inhibitor	DuPont
MCPA	MCPA	growth regulator	Various
Milestone	aminopyralid	growth regulator	Dow AgroSciences
Option	foramsulfuron	ALS inhibitor	Bayer
Outlook	dimethenamid-P	seedling shoot inhibitor	BASF
Paramount	quinclorac	growth regulator	BASF
Peak	prosulfuron	ALS inhibitor	Syngenta
Pendimax	pendimethalin	seedling shoot inhibitor	Dow AgroSciences
Permit	halosulfuron	ALS inhibitor	Gowan
Poast (1.5 lb/gal)	sethoxydim	lipid synthesis inhibitor	MicroFlo
Poast Plus (1.00 lb/gal)	sethoxydim (with surfactant)	lipid synthesis inhibitor	MicroFlo
Princep	simazine	mobile photosynthesis inhibitor	Syngenta
Prowl, Pendimax	pendimethalin	seedling root inhibitor	BASF
Pursuit	imazethapyr	ALS inhibitor	BASF
Python	flumetsulam	ALS inhibitor	Dow AgroSciences
Raptor	imazamox	ALS inhibitor	BASF
Reflex	fomesafen	cell membrane disrupter	Syngenta
Remedy	triclopyr	growth regulator	Dow AgroSciences
Resolve	rimsulfuron	ALS inhibitor	DuPont
Resource	flumiclorac	PPO inhibitor	Valent
Roundup or other formulations	glyphosate	EPSP inhibitor	Various
Scepter	imazaquin	ALS inhibitor	BASF
Select	clethodim	lipid synthesis inhibitor	Valent
Sencor	metribuzin	mobile photosynthesis inhibitor	Bayer
Sinbar	terbacil	mobile photosynthesis inhibitor	DuPont
Sonalan	ethafluralin	seedling root inhibitor	Dow AgroSciences
Spartan	sulfentrazone	PPO inhibitor	FMC
Spike	tebuthiron	mobile photosynthesis inhibitor	Dow AgroSciences
Stinger	clopyralid	growth regulator	Dow AgroSciences
Strongarm	diclosulam	ALS inhibitor	Dow AgroSciences
Tillam	pebulate	seedling shoot inhibitor	Monterey Chemical
Topnotch	acetochlor	seedling shoot inhibitor	Dow AgroSciences
Touchdown	glyphosate	EPSP inhibitor	Syngenta
Treflan	trifluralin	seedling root inhibitor	Dow AgroSciences
Ultra Blazer	acifluorfen	cell membrane disrupter	UPI
Valor	flumioxazin	PPO inhibitor	Valent
Velpar	hexazinone	mobile photosynthetic inhibitor	DuPont

¹This update compiled September 2006.

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Table 5.3 - Selected Glyphosate Products and Premixes for Agronomic Use

(courtesy Penn State University)

Currently, numerous products contain glyphosate. Most of them are labeled for “burndown”/preemergence and/or spot applications. The majority, but not necessarily all, of the products below are labeled for over-the-top application in Roundup Ready crops (namely, RR corn and RR soybean). Refer to the product label for additional information on crop use, formulation, application rates, and other use restrictions.

Product and Amount of glyphosate/gallon ¹	Company	Product rate (fl oz) equivalent to:				Formulation	
		0.375 lb ae	0.56 lb ae	0.75 lb ae	1.13 lb ae	Salt ²	Adjuvant load ³
5 lb ae							
Touchdown HiTech	Syngenta	10	14	19	29	Potassium	minimal
4.5 lb ae/5.5 lb ai							
Roundup WeatherMax	Monsanto	11	16	22	32	Potassium	fully loaded (TranSorb II)
Roundup Original Max	Monsanto	11	16	22	32	Potassium	partial
4 lb ae/5 lb ai							
Debit TMF	Nufarm	12	18	24	36	IPA	minimal
Glyphomax XRT/ Durango (5.4 ai)	Dow AgroSciences	12	18	24	36	IPA	fully loaded
Gly Star 5	Albaugh/AgriStar	12	18	24	36	IPA	minimal
Roundup Custom	Monsanto	12	18	24	36	IPA	minimal
Touchdown Total	Syngenta	12	18	24	36	Potassium	fully loaded (IQ System)
3.7 ae/5 lb ai							
Roundup Ultra Max	Monsanto	13	20	26	40	IPA	fully loaded (TranSorb)
3 lb ae/4 lb ai							
Buccaneer	Tenkoz	16	24	32	48	IPA	partial
Buccaneer Plus	Tenkoz	16	24	32	48	IPA	fully loaded
ClearOut 41	CPT	16	24	32	48	IPA	partial
ClearOut 41 Plus	CPT	16	24	32	48	IPA	fully loaded
Cornerstone	Agrilience	16	24	32	48	IPA	partial
Credit	Nufarm	16	24	32	48	IPA	partial
Credit Extra	Nufarm	16	24	32	48	IPA	fully loaded

¹Glyphosate products can be formulated to have different concentrations of glyphosate acid per gallon of product. To improve handling, performance, and concentration, the glyphosate acid is formulated as a salt compound. *Acid equivalent (ae)* is only the weight of the glyphosate acid, which is herbicidally active. *Active ingredient (ai)* is the weight of the glyphosate acid plus the salt. It is best to refer to ae when comparing glyphosate products and rates.

²Glyphosate can be formulated as different salts: isopropylamine (IPA), monoammonium, diammonium, or potassium.

³Some glyphosate products contain all the necessary adjuvants (i.e., fully loaded). Others contain only a limited amount and additional surfactants must be added to the tank before application. All brands of glyphosate recommend adding ammonium sulfate (AMS) if using hard water as a carrier or under other challenging conditions. If using AMS, always add to the spray solution before glyphosate. Refer to product label for more information.

Table 5.3 - Selected Glyphosate Products and Premixes for Agronomic Use (cont.)

(courtesy Penn State University)

Product and Amount of glyphosate/gallon ¹	Company	Product rate (fl oz) equivalent to:				Formulation	
		0.375 lb ae	0.56 lb ae	0.75 lb ae	1.13 lb ae	Salt ²	Adjuvant load ³
Credit Duo Extra	Nufarm	16	24	32	48	IPA + mono-ammonium	fully loaded
Gly-4	UPCA	16	24	32	48	IPA	partial
Gly-4 Plus	UPCA	16	24	32	48	IPA	fully loaded
Glyphos	Cheminova	16	24	32	48	IPA	partial
Glyfox Xtra	Cheminova	16	24	32	43	IPA	fully loaded
Gly Star Original	Albaugh/AgriStar	16	24	32	48	IPA	partial
Gly Star Plus	Albaugh/AgriStar	16	24	32	48	IPA	fully loaded
Glyphomax	Dow AgroSciences	16	24	32	48	IPA	partial
Glyphomax Plus	Dow AgroSciences	16	24	32	48	IPA	fully loaded
Glyphosate 4	FarmSaver.com	16	24	32	48	IPA	partial
Glyphosate 41%	Helm Agro	16	24	32	48	IPA	partial
Glyphosate Herbicide	DuPont	16	24	32	48	IPA	partial
Glyphosate Original	Griffin	16	24	32	48	IPA	partial
Honcho	Monsanto	16	24	32	48	IPA	minimal
Honcho Plus	Monsanto	16	24	32	48	IPA	fully loaded
Mirage	UAP	16	24	32	48	IPA	partial
Mirage Plus	UAP	16	24	32	48	IPA	fully loaded
Rascal	Agrilience	16	24	32	48	IPA	minimal
Rattler	Helena	16	24	32	48	IPA	partial
Rattler Plus	Helena	16	24	32	48	IPA	fully loaded
Roundup Original	Monsanto	16	24	32	48	IPA	partial
3 lb ae/3.7 lb ai							
Touchdown IQ	Syngenta	16	24	32	48	diammonium	fully loaded (IQ system)

¹Glyphosate products can be formulated to have different concentrations of glyphosate acid per gallon of product. To improve handling, performance, and concentration, the glyphosate acid is formulated as a salt compound. *Acid equivalent (ae)* is only the weight of the glyphosate acid, which is herbicidally active. *Active ingredient (ai)* is the weight of the glyphosate acid plus the salt. It is best to refer to ae when comparing glyphosate products and rates.

²Glyphosate can be formulated as different salts: isopropylamine (IPA), monoammonium, diammonium, or potassium.

³Some glyphosate products contain all the necessary adjuvants (i.e., fully loaded). Others contain only a limited amount and additional surfactants must be added to the tank before application. All brands of glyphosate recommend adding ammonium sulfate (AMS) if using hard water as a carrier or under other challenging conditions. If using AMS, always add to the spray solution before glyphosate. Refer to product label for more information.

Table 5.4. - Crop Rotation Planting Restrictions – Months after Herbicide Application until Planting New Crop¹

Summary of crop rotation restrictions after certain herbicide applications have been made. Example: If Devrinol was applied to tomatoes this year, you must delay planting sweet corn in the field for 12 months after the application of Devrinol. Consult the label for a different time interval if two or more of these materials are applied in the same season. This table is not a substitute for the label!

Herbicide	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Pea	Pepper	Potato, white	Pumpkin	Rye, winter	Soybean	Sorghum, grain	Squash	Tomato	Watermelon	Wheat, winter
Accent	12	4	1 ²	10 ²	10 ²	NR	10	10 ⁵	10	10 ⁵	10 ²	10 ²	10 ²	10 ²	4	0.5	10	10	10 ²	10	4
Aim	1	12	1	1	1	NR	1	1	1	1	1	1	1	1	12	1	1	1	1	1	1
Alanap	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Assure II/Targa	4	4	4	NR	4	4	4	4	4	4	NR	4	4	4	4	NR	4	4	4	4	4
Atrazine	SY	SY	SY	SY	SY	NR	NR	SY	SY	SY	SY	SY	SY	SY	12	SY	NR	SY	SY	SY	SY
Authority MTZ	12	4	18	18	18	10	18	18	18	18	18	18	12	18	18	4	18	18	18	18	4
Axial	4	0	4	4	1	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	0
Axiom	NY	NY	NY	NY	NY	NR	NY	NY	NY	NY	NY	NY	1	NY	NY	NR	NY	NY	NY	NY	NY
Balance	10	6	18	18	18	NR	6	18	18	18	18	18	6	18	18	6	6	18	18	18	4
Banvel	AH	1 ³	AH	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	13	14	NR	AH	AH	AH	1 ³
Basagran	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Basis	10	8	18	8	18	NR	10	18	18	18	8	18	4	18	18	0.5	18	10	18	18	4
Beacon	8	3	18	8	18	0.5d	8	18	18	18	8	18	18	18	3	8	8	18	18	18	3
Boundary	4.5	4.5	12	12	12	8	12	12	12	18	12	12	8	12	12	NR	12	12	12	12	4.5
Breakfree	NY	NY	NI	NI	NI	0	0	NI	NI	NI	NI	NI	NI	NI	NY	NY	NY	NI	NI	NI	4

¹AH = After Harvest, B = Bioassay of Soil Recommended before Planting, d = Days, NI = No Information, NR = No Restrictions, NY = Next Year, SY = Second Year following Application

²18 months with a soil pH ≥ 6.5

³20 days per pint

⁴30 days per pint

⁵Read the label for additional restrictions due to special state restrictions, varieties, rate, rainfall, soil, pH, application rate, etc.

⁶Transplanted

⁷Corn hybrids, which are classified as tolerant (IT) or resistant (IR) to Scepter and/or other imidazoline herbicides (example Pursuit), may be planted in the spring of the following year following Scepter or Pursuit application.

⁸See current 2,4-D label.

Table 5.4. - Crop Rotation Planting Restrictions – Months after Herbicide Application until Planting New Crop¹ (cont.)

Summary of crop rotation restrictions after certain herbicide applications have been made. Example: If Devrinol was applied to tomatoes this year, you must delay planting sweet corn in the field for 12 months after the application of Devrinol. Consult the label for a different time interval if two or more of these materials are applied in the same season. This table is not a substitute for the label!

Herbicide	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Pea	Pepper	Potato, white	Pumpkin	Rye, winter	Soybean	Sorghum, grain	Squash	Tomato	Watermelon	Wheat, winter
Buctril	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Callisto	NY	4	NY	NY	NY	NR	NY	NY	NY	NY	NY	NY	NY	NY	4	NY	NY	NY	NY	NY	4
Canopy	10	4	30	12	18	10	18	18	30	30	12	30	30	18	4	NR	12	30	10	18	4
Canopy EX	12	4	12	12	18	10	18	18	30	18	12	30	18	18	4	NR	12	30	10	18	4
Celebrity Plus	12	4	10 ⁵	10	10 ⁵	NR	10 ⁵	10 ⁵	10 ⁵	10 ⁵	10	10 ⁵	10 ⁵	10 ⁵	4	1	10 ⁵	10 ⁵	10 ⁵	10 ⁵	4
Chateau	12	4	12	4	12	1	4	12	12	12	4	12	12	12	4	NR	1	12	12	12	2
Cimarron Plus	B	10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	1
Clarity	3	AH	AH	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	13	14	NR	AH	AH	AH	AH
Classic ⁵	12	3	30	9	18	9	18	18	30	30	9	30	30	18	3	NR	9	30	9	18	3
Cobra	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Command ⁶	16	12	16	9	12	9	9	9	9	16	NR	NR	9	NR	12	NR	9	NR	96	9	12
Curbit	NR	NR	AH	NR	NR	NR	NR	NR	NR	AH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dacthal	8	8	8	AH	NR	8	8	8	8	NR	8	8	8	8	8	8	8	8	8	8	8
Define	12	12	12	12	4	NR	12	12	12	18	12	4	18	12	12	NR	12	12	12	12	12
Degree	SY	SY	SY	SY	SY	NR	NY	SY	SY	SY	SY	SY	SY	SY	SY	NY	NY	SY	SY	SY	AH

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²18 months with a soil pH ≥ 6.5

³20 days per pint

⁴30 days per pint

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⁶Transplanted

⁷Corn hybrids, which are classified as tolerant (IT) or resistant (IR) to Scepter and/or other imidazoline herbicides (example Pursuit), may be planted in the spring of the following year following Scepter or Pursuit application.

⁸See current 2,4-D label.

Table 5.4. - Crop Rotation Planting Restrictions – Months after Herbicide Application until Planting New Crop¹ (cont.)

Summary of crop rotation restrictions after certain herbicide applications have been made. Example: If Devrinol was applied to tomatoes this year, you must delay planting sweet corn in the field for 12 months after the application of Devrinol. Consult the label for a different time interval if two or more of these materials are applied in the same season. This table is not a substitute for the label!

Herbicide	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Pea	Pepper	Potato, white	Pumpkin	Rye, winter	Soybean	Sorghum, grain	Squash	Tomato	Watermelon	Wheat, winter	
Devrinol	12	12	12	12	NR	12	12	12	12	12	12	NR	12	12	12	12	12	12	12	NR	12	12
Distinct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Dual Magnum	4	4.5	NR	NR	NY	NR	NR	12	12	12	NR	12	NR	12	4.5	NR	NR	12	6	12	12	4.5
Eptam	0	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	NR	AH	AH	AH	AH	AH	AH	AH	AH	AH
Equip	8	2	18	18	18	0.5	18	18	18	18	18	18	18	18	2	9	9	18	18	18	18	2
Eradicane	AH	AH	AH	AH	AH	NR	NR	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Evik	NY	AH	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	NY	AH	NY	NY	NY	NY	NY	NY	AH
Extreme	4	9.5	NR	40	40	8.5	18	40	40	40	40	40	26	40	4	NR	18	40	40	40	40	4
Finesse Grass & Broadleaf	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
First Rate	9	30B	30B	30B	30B	9	9	30B	30B	30B	30B	30B	30B	30B	30B	NR	9	30B	30B	30B	30B	3
Flexstar	18	4	10	10	18	10	10	18	18	18	10	18	18	18	4	10	18	18	18	18	18	4
Fusilade DX/Fusion	2	2	NR	NR	NR	2	2	NR	NR	NR	NR	NR	NR	NR	2	NR	2	NR	NR	NR	NR	2
Galigan	2	10	2	2	2	10	10	2	2	2	2	2	2	2	10	NR	10	2	2	2	2	10

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³20 days per pint

⁴30 days per pint

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⁶Transplanted

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⁸See current 2,4-D label.

Table 5.4. - Crop Rotation Planting Restrictions – Months after Herbicide Application until Planting New Crop¹ (cont.)

Summary of crop rotation restrictions after certain herbicide applications have been made. Example: If Devrinol was applied to tomatoes this year, you must delay planting sweet corn in the field for 12 months after the application of Devrinol. Consult the label for a different time interval if two or more of these materials are applied in the same season. This table is not a substitute for the label!

Herbicide	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Pea	Pepper	Potato, white	Pumpkin	Rye, winter	Soybean	Sorghum, grain	Squash	Tomato	Watermelon	Wheat, winter	
glyphosate products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Goal	2	10	2	2	2	10	10	2	2	2	2	2	2	2	10	NR	10	2	2	2	2	10
Gramoxone products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Harmony Extra SG	2	NR	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	NR
Harmony GT	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	NR	1.5	1.5	1.5	1.5	1.5	1.5
Harness	SY	SY	SY	SY	SY	NR	NY	SY	SY	SY	SY	SY	SY	SY	SY	NY	SY	SY	SY	SY	SY	AH
Ignite 280	4	2.5	4	4	4	NR	4	4	4	4	4	4	4	4	2.5	NR	2.5	4	4	4	4	2.5
Impact	9	3	18	18	18	0	18	18	18	18	9	18	9	18	3	9	9	18	18	18	18	3
Intro	NY	NY	NI	NI	NI	NY	NY	NI	NI	NI	NI	NI	NI	NI	NI	NY	NY	NI	NI	NI	NI	NY
Karmex	24	24	24	24	24	NY	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	12
Kerb ⁵	0	12	5	5	7	5	5	7	7	7	12	12	12	7	12	5	5	7	7	7	7	12
Laudis	10	4	18	10	18	0	18	18	18	18	10	18	10	18	4	8	10	18	10	18	10	4
Lightning	9.5	9.5	40B	9.5	40B	8.5 ⁵	18	40B	40B	40B	9.5	40B	26	40B	4	9	18	40B	40B	40B	40B	4

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²18 months with a soil pH ≥ 6.5

³20 days per pint

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Table 5.4. - Crop Rotation Planting Restrictions – Months after Herbicide Application until Planting New Crop¹ (cont.)

Summary of crop rotation restrictions after certain herbicide applications have been made. Example: If Devrinol was applied to tomatoes this year, you must delay planting sweet corn in the field for 12 months after the application of Devrinol. Consult the label for a different time interval if two or more of these materials are applied in the same season. This table is not a substitute for the label!

Herbicide	Alfalfa	Barley, winter	Bean, lima	Bean, snap	Cabbage	Corn, field	Corn, sweet	Cucumber	Muskmelon	Onion	Pea	Pepper	Potato, white	Pumpkin	Rye, winter	Soybean	Sorghum, grain	Squash	Tomato	Watermelon	Wheat, winter	
Lorox	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Matrix	12	12	10	10	12	NR	10	12	12	12	12	12	NR	12	12	10	12	12	1	12	4	4
Micro-Tech/Partner	AH	AH	NR	NY	NY	NR	NR	NY	NY	NY	NY	NY	NY	NY	AH	NR	NR	NY	NY	NY	AH	AH
Milestone	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B
Option	2	2	2	2	2	0.25	0.25	2	2	2	2	2	2	2	2	0.5	2	2	2	2	2	2
Outlook/Frontier	NY	4	NY	NY	NY	NR	NY	NY	NY	NY	NY	NY	NY	NY	4	NR	NY	NY	NY	NY	NY	4
Paramount	24B	10	24B	24B	24B	10	10	24B	24B	24B	24B	24B	24B	24B	10	24B	0	24B	24B	24B	24B	0
Paraquat products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Peak	22	0	22	10	22	1	10	22	22	22	10	22	22	22	0	10	1	22	22	22	22	0
Permit	9	2	9	9	15	1	3	9	9	18	9	10	9	9	2	9	2	9	8	9	2	2
Poast	NR	NR	NR	NR	NR	AH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	AH	NR	NR	NR	NR	NR
Poast Plus	NR	NR	NR	NR	NR	AH	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	AH	NR	NR	NR	NR	NR
Prefar	4	4	4	4	4	4	4	NR	NR	NR	4	NR	4	NR	4	4	4	NR	NR	NR	4	4
Princep	SY	SY	SY	SY	SY	NR	NR	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY
Prowl	NY	4	NR	NR	NY	NY	NY	NY	NY	NY	NY	NY	NR	NY	NY	NR	NY	NY	NY	NY	NY	4

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Pursuit ⁵	4	9.5	NR	4	40B	8.5 ⁷	18	40B	40B	40B	4	40B	26	40B	4	NR	18	40B	40B	40B	4	
Python	4	4	26B	26B	26B	NR	18	26B	26B	26B	4	26B	12	26B	4	NR	12	26B	26B	26B	4	
Raptor	9	4	9	9	9	9	9	9	9	9	9	9	9	9	4	9	9	9	9	9	9	3
Reflex	18	4	10	10	18	10	18	18	18	18	10	18	18	18	4	10	18	18	18	18	18	4
Resolve	18	9	18	10	18	NR	10	10	18	18	18	18	NR	18	18	10	18	18	18	18	18	3
Resource	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ro-Neet	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Sandea	9	2	NR	NR	15	1	3	NR	NR	18	9	10	9	NR	2	9	2	NR	NR	NR	NR	2
Scepter ⁶	18	11	11	11	18	9.5 ^{5,7}	18	18	18	18	18	18	18	18	18	18	11	18	18	18	18	3
Select/Select Max	NR	1	1	1	1	1	1	1	1	NR	1	1	1	1	1	1	1	1	1	1	1	1
Sencor	4	4	12	12	12	4	12	12	12	18	8	12	4	12	12	12	12	12	12	12	4	4
Sinbar	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Sollicam	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Sonalan	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Sonic/Authority First	12	12	30B	30B	30B	10	18	30B	30B	30B	12	30B	18	30B	12	NR	12	30B	30B	30B	30B	4

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Spin-aid	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Spirit	18	3	18	10	10	17	8	18	18	18	10	18	10	18	3	10	10	18	10	18	3	3
Starane	4	NR	4	4	4	NR	NR	4	4	4	4	4	4	4	NR	4	NR	4	4	4	4	NR
Status	1	1	4	4	4	0.25	0.25	4	4	4	4	4	4	4	1	1	1	4	4	4	4	1
Steadfast	12	4	10	10	18	NR	10	18	18	18	18	18	18	18	4	0.5	18	18	18	18	4	4
Stinger	10.5	NR	18	18	NR	NR	NR	18	18	10.5	18	18	18	18	NR	10.5	10.5	18	18	18	18	NR
Synchrony XP ⁵	12	3	9	9	18	9	18	18	30	30	9	30	30	18	3	NR	9	30	9	18	3	3
Tillam	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Touchdown products	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Treflan	NR	NR	NR	NR	NR	5	5	NR	5	5	NR	NR ⁶	NR	5	NR	NR	5	5	NR6	5	NR	NR
Ultra Blazer	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	18	AH	AH	AH	AH	AH	AH	AH	AH	AH
Valor	12	4	12	12	12	2	4	12	12	12	12	12	12	12	4	NR	2	12	12	12	12	2
2,4-D	3	3	3	3	3	NR	NR	3	3	3	3	3	3	3	3	.25-1 ⁸	3	3	3	3	3	3

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²18 months with a soil pH ≥ 6.5

³20 days per pint

⁴30 days per pint

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⁸See current 2,4-D label.

Table 5.5 - Rain-free Periods for Postemergence Herbicides

Herbicide	Hours	Herbicide	Hours
Accent	4	Impact	1
Aim	1	Liberty	4
Assure II	1	Liberty ATZ	4
Atrazine	1-2	Lightning	1
Axial XL	30 minutes	Marksman	6
Banvel/Clarity	4	Milestone	Not specified
Basagran	8	Northstar	4
Basis	4	Option	2
Basis Gold	4	Paramount	6
Beacon	4	PastureGard	Not specified
Buctril	1	Peak	4
Callisto	1	Permit	4
Celebrity Plus	4	Poast Plus/Poast	1
Cimarron Plus	4	Pursuit	1
Clarity	4	Raptor	1
Classic	1	Ready Master ATZ ¹	4-6
Cobra	30 minutes	Redeem	Not specified
Contour	1	Reflex	1
Crossbow	Not specified	Remedy	Not specified
2,4-D Amine	6-8	Require Q	4
2,4-D Ester	1-2	Resolve	Not specified
2,4-DB	6	Resolve Q	Not specified
Distinct	4	Resource	1
Equip	2	Roundup Weather Max	30 minutes
Exceed	4	Scepter	1
Expert	2	Scorpion III	6
Extreme	1	Select	1
Fieldmaster	2	Sequence	Not specified
Finesse	6	Steadfast	4
Firstrate	2	Stellar	1
Flexstar	1	Stinger	6-8
ForeFront	Not specified	Storm	8
Fusilade	1	Stout	4
Fusion	1	Surmount	Not specified
Gramoxone Inteon	30 minutes	Synchrony	1
Grazon P+D	Not specified	Touchdown	1-2
Harmony Extra SG	3	Typhoon	1
Harmony SG	Not specified	Ultra Blazer	6
Hoelon	4-6	Yukon	4
Hornet	4		

¹Heavy rainfall soon after application may reduce control.

Forages: Alfalfa and Other Legumes

Legume seedlings are relatively slow growing, whereas weeds often have a rapid initial growth period. Thus, in new seedlings, weeds compete strongly with the legume seedlings for light, moisture, and nutrients. Severe reduction or loss of stands may result. Several preplant-incorporated treatments are available that offer good annual grass control and some broadleaf weed control at establishment. In addition, postemergence treatments, available for use on new stands, give good broadleaf weed control. Once a stand is established, weeds may continue to reduce yields and impair quality of the forage. Residual herbicides and postemergence herbicides are both available for use in established forage stands. Most are recommended for fall or spring dormant application. Pick the treatment that best suits the specific weed infestation, and carefully follow label directions in terms of timing and rates of application.

Spray volumes for forage areas should be 20-30 gal/A. Lower volumes will also work, but increase risk of spray drift.

The following table illustrates the susceptibility of common alfalfa weeds to recommended herbicides. Herbicide application timings include establishment, seedling stands, fall/spring dormant, and postcutting. Note that four treatments may be used either in seedling stands or as fall or spring treatments in established stands.

Table 5.6 - Alfalfa - Treatment and Application Timing¹

Species	Establishment					Seedling stand and fall/spring dormant					Post			
	Eptam	Balan	2x Gramox-one Inteon ²	Glyphosate	Buctril	2,4-DB	Kerb	Prowl H ₂ O	Pursuit	Raptor	Poast Plus/Poast	Pursuit	Raptor	Select or Select Max
Grasses														
Barnyardgrass	G	G	G	G	N	N	F	G	F-G	F-G	G	F-G	F-G	G
Bermudagrass	F	P	P-F	G	N	N	P	P	N	N	G	N	N	G
Cheat	G	G	G	G	N	N	G	F-G	N	G	P-F	N	G	G
Crabgrass spp.	G	G	G	G	N	N	F	G	F-G	F-G	G	F-G	F-G	G
Fescue, tall (EST)	N	N	G	G	N	N	G	N	N	P	P	N	P	F
Foxtail spp.	G	G	G	G	N	N	F	G	G	G	G	G	G	G
Goosegrass	G	G	G	G	N	N	F	G	F	P	G	F	P	G
Johnsongrass	G	F	G	G	N	N	P	P	G	F-G	G	G	F-G	G
Nutsedge, yellow	G	P	P	F-G	N	N	N	N	P-F	P-F	N	P-F	P-F	N
Orchardgrass (EST)	N	N	G	G	N	N	G	N	N	P	F-G	N	P	G
Panicum, fall	G	G	G	G	N	N	F	G	F	F-G	G	F	F-G	G
Quackgrass	F	P	F	G	N	N	G	N	P-F	P	F-G	P-F	P	F-G
Broadleaf Weeds														
Amaranth, spiny	G	G	G	G	F	G	N	-	F-G	G	N	F-G	G	N
Chickweed, common	F	F	G	G	P	N	G	F	F	G	N	F	G	N
Dandelion (EST)	N	N	P	G	N	P-F	P	N	P-F	F-G	N	P-F	F-G	N
Dock spp. (EST)	N	N	P	F-G	N	P	F	N	P	P	N	P	P	N
Dock spp. seedling	N	N	G	G	N-P	G	F	N	P-F	P-F	N	P-F	P-F	N
Dogbane, hemp	N	N	P	G	N	N	N	N	N	N	N	N	N	N

¹The susceptibility ratings listed in this table assume correct rates and timings of herbicide application for the normal growth habit of each species. In some instances, ratings are lower than might be obtained if the recommended time of herbicide application and the time of weed presence or optimum susceptibility coincided. The rating scale is as follows: G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = < 20 percent control.

²2x paraquat refers to susceptibility of weeds when sequential (two) applications of Gramoxone Inteon are used.

5-18 Weeds: Forages: Alfalfa and Other Legumes

Table 5.6 - Alfalfa - Treatment and Application Timing¹ (cont.)

Species	Establishment					Seedling stand and fall/spring dormant					Post				
	Eptam	Balan	2x Gramox-one Inteon ²	Glyphosate	Buctril	2,4-DB	Kerb	Prowl H ₂ O	Pursuit	Raptor	Poast Plus/Poast	Pursuit	Raptor	Select or Select Max	
Henbit	G	P-F	G	G	F-G	N	F	F-G	F	F	N	F	F	N	
Horsenettle	N	N	P	F-G	N	N	N	N	N	N	N	N	N	N	
Horseweed	P	P	P	G	P-F	F-G	P	P	N	N	N	N	N	N	
Knawel (German moss)	P	P-F	F-G	F-G	G	N	P	P-F	N	N	N	N	N	N	
Lambsquarters, common	G	G	G	G	G	G	P	G	P	P	N	P	P	N	
Lettuce, prickly	N	N	F	G	P-F	F	P	N	N	N	N	P	N	N	
Milkweed spp.	N	N	P	F-G	N	N	N	N	N	N	N	N	N	N	
Mustard spp.	P	P	G	G	G	G	P	P-F	G	G	N	G	G	N	
Nightshade, black	G	P-F	G	G	G	G	P	P-F	F-G	F-G	N	F-G	F-G	N	
Pennycress spp.	P	P	G	G	G	G	F	P-F	G	G	N	G	G	N	
Pepperweed spp.	P	P	G	G	G	G	P	P-F	G	G	N	G	G	N	
Pigweed spp.	G	G	G	G	F	G	N	G	F-G	G	N	F-G	G	N	
Plantain spp.	N	N	P	F-G	N	F-G	F	N	N	P	N	N	P	N	
Ragweed, common	P	N	G	G	F	F	N	P	F-G	F	N	F-G	F	N	
Shepherdspurse	P	P	G	G	G	G	F	F	G	G	N	G	G	N	
Smartweed spp.	P	P	F-G	G	G	P	P	P	F-G	F-G	N	F-G	F-G	N	
Speedwell	P	P	G	G	P	P	P	P	P-F	F	N	P-F	F	N	
Thistle, bull	N	N	F	G	P-F	F-G	P	N	N	P-F	N	N	P-F	N	
Thistle, Canada	N	N	P	F-G	P	N	N	N	P	P-F	N	P	P-F	N	
Thistle, plumeless	N	N	F	G	P-F	F-G	P	N	N	P-F	N	N	P-F	N	
Thistle, musk	N	N	F	G	P-F	F-G	P	N	N	P-F	N	N	P-F	N	
Yellow rocket	P	P	F	G	F	G	P-F	P-F	G	G	N	G	G	N	

¹The susceptibility ratings listed in this table assume correct rates and timings of herbicide application for the normal growth habit of each species. In some instances, ratings are lower than might be obtained if the recommended time of herbicide application and the time of weed presence or optimum susceptibility coincided. The rating scale is as follows: G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = < 20 percent control.

²2x paraquat refers to susceptibility of weeds when sequential (two) applications of Gramoxone Inteon are used.

Table 5.7 - Alfalfa - Treatment and Application Timing¹

Species	Fall/spring dormant									Postcutting				
	Kamex	MCPA	Velpar	Sencor	Pursuit	Gramoxone Inteon	Sinbar	Raptor	Prowl H ₂ O	Velpar	Pursuit	Gramoxone Inteon	Sinbar	Raptor
Grasses														
Barnyardgrass	F	N	P-F	P-F	F-G	N	P-F	F-G	G	P-F	F-G	G	G	F-G
Bermudagrass	P	N	N	P	N	P	P-F	N	P	P-F	N	P-F	P-F	N
Cheat	P-F	N	G	G	N	G	G	G	F-G	F-G	N	G	G	G
Crabgrass spp.	F	N	P-F	P-F	F-G	N	P-F	F-G	G	P-F	F-G	G	G	F-G
Fescue, tall (EST)	F	N	F	P-F	N	F	F	P	N	F	N	F	F	P
Foxtail spp.	F	N	P-F	P-F	G	N	P-F	G	G	P-F	G	G	G	G
Goosegrass	F	N	P-F	P-F	F	N	P-F	P	G	P-F	F	G	G	P
Johnsongrass (seedling)	P-F	N	P	P	G	N	P	F-G	P	P	G	G	G	F-G
Nutsedge, yellow	N	N	P	N	P-F	P	P	P-F	N	P	P-F	P-F	P-F	P-F
Orchardgrass (EST)	F	N	F	P	N	F	F	P	N	F-G	N	F	F	P
Panicum, fall	P-F	N	P-F	P-F	F	N	P-F	F-G	G	P-F	F	G	G	F-G
Quackgrass (EST)	P-F	N	P-F	P	P-F	F	F	P	N	F	P-F	F	F	P
Broadleaf weeds														
Amaranth, spiny	F-G	P	F-G	P	F-G	N	F-G	G	-	F-G	F-G	G	G	G
Chickweed, common	G	N	G	G	F	G	G	G	F	G	F	G	G	G
Dandelion (EST)	P	F-G	F-G	F-G	P-F	P	F	F-G	N	F-G	P-F	P-F	F	F-G
Dock spp. (EST)	P-F	P-F	P-F	F	P	P-F	P-F	P	N	P-F	P	P-F	F	P
Dock spp. (seedling)	F	G	F	F	P-F	G	F	P-F	N	F	P-F	G	G	P-F
Dogbane, hemp	N	N	P	N	N	N	P	N	N	P	N	P	P	N
Henbit	F	N	G	G	F	G	G	F	F-G	F-G	F	G	G	F
Horsenettle	P-F	N	P-F	P-F	N	P	P-F	N	N	P-F	N	P	P-F	N
Horseweed	F	F-G	F	P	N	P	F	N	P	F	N	P	F-G	N
Knawel (German moss)	F-G	N	F	F	N	F-G	F	N	P-F	F	N	F	F	N
Lambsquarters, common	F-G	P	F-G	P	P	N	F-G	P	G	F-G	P	G	G	P
Lettuce, prickly	F	F	F	F	N	F	F	N	N	F-G	N	F	F	N
Milkweed spp.	N	N	P	N	N	N	P	N	N	P	N	P	P	N
Mustard spp.	G	G	G	G	G	F	G	G	P-F	G	G	G	G	G
Nightshade spp.	P-F	P	F	P	F-G	P	F	F-G	P-F	F	F-G	G	G	F-G
Pennycress spp.	G	G	G	G	G	F	G	G	P-F	G	G	G	G	G
Pepperweed spp.	G	G	G	G	G	F	G	G	P-F	G	G	G	G	G
Pigweed spp.	F-G	P	F-G	P	F-G	N	F-G	G	G	F-G	F-G	G	G	G
Plantain spp.	P-F	G	F-G	G	N	P-F	F-G	P	N	F-G	N	G	G	P
Ragweed, common	F-G	P	F-G	P	F-G	N	F-G	F	P	F-G	F-G	G	G	F
Shepherdspurse	G	G	G	G	G	F	G	G	F	G	G	G	G	G

¹The susceptibility ratings listed in this table assume correct rates and timings of herbicide application for the normal growth habit of each species. In some instances, ratings are lower than might be obtained if the recommended time of herbicide application and the time of weed presence or optimum susceptibility coincided. The rating scale is as follows: G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = < 20 percent control.

5-20 Weeds: Forages: Alfalfa and Other Legumes

Table 5.7 - Alfalfa - Treatment and Application Timing¹ (cont.)

Species	Fall/spring dormant									Postcutting				
	Kamex	MCPA	Velpar	Sencor	Pursuit	Gramoxone Inteon	Sinbar	Raptor	Prowl H ₂ O	Velpar	Pursuit	Gramoxone Inteon	Sinbar	Raptor
Smartweed spp.	F	P	F-G	P	F-G	N	F-G	F-G	P	F-G	F-G	G	G	F-G
Speedwell	F-G	P	G	F-G	P-F	G	G	F	P	G	P-F	G	G	F
Thistle, bull	P-F	G	P-F	F	N	F	P-F	P-F	N	P-F	N	F	F	P-F
Thistle, Canada	P	P	P	P	P	P	P	P-F	N	P	P-F	P-F	P	P-F
Thistle, plumeless	P-F	G	P-F	F	N	F	P-F	P-F	N	P-F	N	F	F	P-F
Thistle, musk	P-F	G	P-F	F	N	F	P-F	P-F	N	P-F	N	F	F	P-F
Yellow rocket	G	G	G	G	G	P-F	G	G	P-F	G	G	F	F-G	G

¹The susceptibility ratings listed in this table assume correct rates and timings of herbicide application for the normal growth habit of each species. In some instances, ratings are lower than might be obtained if the recommended time of herbicide application and the time of weed presence or optimum susceptibility coincided. The rating scale is as follows: G(good) = 80-100 percent control, F(fair) = 60-80 percent control, P(poor) = 20-60 percent control, and N(none) = < 20 percent control.

Table 5.8 - Harvesting, Feeding, and/or Grazing Restrictions for Forage Herbicides

Herbicide	Type	Length	Comments
Buctril (Bromoxynil)	Graze or Harvest	30 Days 60 Days	After spring application. After fall or winter application.
2,4-DB	Graze or Feed	60 Days 30 Days	Seedling alfalfa. Established alfalfa.
Gramoxone Inteon (Paraquat)	Graze Graze or Harvest	none 60 days 42 days 30 days	Preplant application. Fall/spring dormant seedling. Fall/spring dormant established. Between cutting application.
Karmex (Diuron)	Graze or Harvest	none	Do not replant treated areas in any crop within 2 years of application.
Kerb (Pronamide)	Graze or Harvest	120 Days	Fall or dormant applications.
Poast (Sethoxydim)	Forage (Graze)	7 Days	On the label, forage refers to green, undried alfalfa.
Poast Plus	Hay (harvest)	14 Days	Hay is dried alfalfa.
Prowl H ₂ O	Graze or Harvest	50 Days	
Pursuit (Imazethapyr)	Graze or Harvest	30 Days	Do not feed, graze, or harvest for 30 days after application.
Raptor	Cutting or Feeding	20 Days	
Roundup Weather Max (in RR alfalfa)	Graze or Harvest	5 Days	Post application.
glyphosate containing product as labeled	Preplant Preharvest Spot treatment	none 3 days 14 Days	The preharvest interval is 3 days for Roundup Weather Max, but differs for other glyphosate formulations. No more than 1/10 of any acre should be treated at one time. Remove domestic livestock before application and wait 14 days after application before grazing livestock or harvesting.
Select or Select Max	Graze, Feed or Harvest	15 Days	If tank mixed with 2,4-DB, the restriction is 60 days.
Sencor (Metribuzin)	Graze or Harvest	28 Days	Dormant applications.
Sinbar (Terbacil)	Graze or Harvest	none	Do not replant treated areas to any crop within 2 years of application.
Velpar (Hexazinone)	Graze or Feed	30 Days	Plant only corn 12 months following application of Velpar.

Table 5.9 - Alfalfa, Red Clover, and Ladino Clover

Weed problem	Chemical rate per acre	Product per acre	Remarks
<i>Preplant</i>			
Annual grasses and broadleaf weeds, including barnyardgrass, annual bluegrass, carpetweed, chickweed, crabgrass, Florida pusle, fall panicum, foxtails (giant, green, yellow), goosegrass, johnsongrass from seed, lambsquarters, pigweed, common purslane, sandbur, and annual ryegrass.	Benefin 1.2-1.5 lb	Balan 60DF 2-2.5 lb	Apply to clean, dry soil surface no more than 3 weeks before planting. Incorporate within 4 to 8 hours with a disk set to cut 4 to 6 inches and operate in two different directions at 4 to 6 mph or with power takeoff-driven equipment set to cut 2 to 3 inches deep once over. See label, and adjust rate to soil texture.
Above weeds; also, bermudagrass <i>Brachiaria</i> sp., corn spurry, fall panicum, henbit, nightshade, nutsedge, quackgrass, ryegrass, volunteer small grains, sandbur, and shattercane.	EPTC 3.0-4.0 lb	Eptam 7E 3.5-4.5 pt	Spray on surface of freshly prepared soil. Incorporate into the soil to a depth of 2-3 inches immediately after application. Follow label suggestion for proper incorporation procedures. Plant alfalfa seed immediately after incorporation. Perennial grass rhizomes must be chopped up thoroughly (2- inch sections or less) before treatment. Temporary stunting and sealing of first leaves may occur. Do not use if more than 1.2 lb active ingredient of atrazine was applied within the previous 12 months.
Bluegrass (annual), downy-brome crabgrass, fleabane, foxtails, kochia, common lambsquarters, prickly lettuce, fall panicum, redroot pigweed, smooth pigweed, common and giant ragweed, sandbur, shattercane, Pennsylvania smartweed, Spanish needles, Russian thistle, velvetleaf, volunteer wheat, behiagrass, bermudagrass, field bindweed, Kentucky and annual bluegrass, cattail, dallisgrass, curly dock, hemp dogbane, fescues, guineagrass, johnsongrass, milkweed, wirestem muhly, common mullein, napiergrass, silverleaf nightshade, orchardgrass, paragrass, quackgrass, reed canarygrass, swamp smartweed, Texas blueweed, Canada thistle, torpedograss, vaseygrass.	Glyphosate 0.75-3.3 lb	4.0 lb ai/gal glyphosate or equivalent 0.75-3.3 qt	For control of emerged vegetation before the establishment of alfalfa in conventional systems, or when overseeded into a cover crop. When overseeding alfalfa, glyphosate must be applied before planting a labeled cover crop. Avoid contact of spray with foliage, green stems, or fruit of desirable crops, plants, trees, or other vegetation because severe damage or destruction may result. Repeated treatments may be necessary to control weeds regenerating from underground parts or seed. Repeat treatments must be made before the crop emerges. Do not feed or forage, treated crops within 8 weeks after application. Low volume broadcast applications (3-10 gal/A) are recommended with some formulations for best results.
Orchardgrass and fescue sods, control of annual weeds, alfalfa establishment, and suppression of perennial broadleaf weeds.	Paraquat 0.625-1.0 lb + surfactant	Gramoxone Inteon 2.5-4.0 lb + surfactant as specified by label	For no-till establishment of alfalfa into perennial grass sods. Two applications using 2.25 pt followed in 10-14 days by an additional 1.5 pt will generally be required for complete sod kill. Additional herbicide treatments or alternate methods of establishment may be required if perennial broadleaf weeds are present.

5-22 Weeds: Forages: Alfalfa and Other Legumes

Table 5.9 - Alfalfa, Red Clover, and Ladino Clover (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks
<i>Seedling Stands</i>			
Mustard spp., knawel (German moss), common lambsquarters, nightshade spp., and suppression of some other winter annuals.	Bromoxynil 0.25-0.375 lb	Buctril 4EC 0.5-0.75 pt	Apply when weed seedlings are actively growing but do not exceed 4 leaf stage or 2 inches in height. Do not apply to seedling alfalfa with less than 2 trifoliolate leaves. Do not apply if temperatures are expected to exceed 70°F for 3 days after application.
Thistle (bull, curled, and musk), cocklebur, common ragweed, curly dock seedlings, fanweed, filaree, lambsquarters, morningglory, mustards, nightshade, pennycress, prickly lettuce, pigweed, sheperdspurse, and smartweed.	2,4-DB 0.5-1.5 lb	2,4-DB 2.0 lb ai/gal 2.0-6.0 pt or equivalent	Apply when weeds are actively growing, and no more than 3 inches high, or rosettes less than 3 inches across. May be applied either to seedling legumes (when seedling plants have 2-4 trifoliolate leaves) or to established stands (in late fall or early winter for best control). Fields should not be grazed or harvested for forage within 30 days on established stands or 60 days on seedling stands after application. Do not apply if temperature expected above 90°F or to fall below 40°F during or shortly after treatment.
Bluegrass (annual and perennial), cheat, chickweed, orchardgrass, quackgrass, ryegrass, red sorrel, volunteer grains, and wild oats.	Pronamide 0.5-1.5 lb	Kerb 50DF 1.0-3.0 lb	Use on established plantings or on new plantings after legume has reached trifoliolate stage. Apply during fall or early winter and before winter freeze-up. Apply when soil temperature is 50°F or less. Remove or disperse trash or crop residue before treatment. Rainfall necessary to move it into the root zone where it is absorbed. Avoid drift to nontarget areas. Do not graze or harvest for forage within 120 days of treatment.

Table 5.10 - Established Alfalfa

Weed Problem	Chemical rate per acre	Product per acre	Remarks
<i>Postemergence</i>			
Bedstraw, chickweed spp., cocklebur, henbit, jimsonweed, knotweed, mallow spp., morningglory spp., mustard spp., nightshade spp., pennycress, pepperweed, pigweed spp., wild radish, ragweed spp., yellow rocket, sheperdspurse, smartweed spp., spurge spp., velvetleaf, barnyardgrass, crabgrass spp., foxtail spp., seedling johnsongrass, shattercane, broadleaf signalgrass, and suppression of rhizome johnsongrass	Imathezapyr 0.047-0.095	Pursuit 2L 3.0-6.0 oz	Apply postemergence to seedling alfalfa, in the fall to dormant alfalfa, in the spring to dormant alfalfa or before spring regrowth reaches 3 inches, or between cuttings. Make applications when weeds are no larger than 1-3 inches or when rosettes are less than 3 inches in diameter. Apply in 10 or more gal of water/A in combination with an approved nonionic surfactant or crop oil concentrate. Do not apply to seedling alfalfa before the crop has two fully expanded trifoliolate leaves. Consult the label and adjust rate for the specific weed infestation. Rates of 4.0 to 6.0 oz/A are generally required for broad spectrum weed control. May be applied to alfalfa/grass mixtures except in the establishment year or in the last year due to rotational restrictions.

Table 5.10 - Established Alfalfa (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Bromegrass, cereals (barley, oat, wheat), chickweed (common), cocklebur, crabgrass (large), fox-tail (giant, green, yellow), lambs-quarters, jimsonweed, morning-glory, mustard, nightshade, pennycress, pigweed, ryegrass, shattercane, shepardspurse, smartweed, and velvetleaf	Imazamox 0.031-0.047 lb	Raptor 1AS 4.0-6.0 oz	For seedling alfalfa, apply Raptor when the seedling alfalfa is in the second trifoliolate stage or larger and when the majority of the weeds are 1-3 inches high. A temporary reduction in growth may occur. Raptor can be applied to established alfalfa in fall, winter, or spring to dormant or semi-dormant alfalfa, or between cuttings. Apply when the weeds are actively growing and before they exceed a height of 3 inches. Wait at least 20 days between application and cutting or using alfalfa forage or hay as feed. Apply a maximum of 6 ounces per season.
Chickweed, corn gromwell, corn spurry, knawel (German moss), pennycress, shepherdspurse, prickly lettuce, dog fennel, wild mustards (including <i>Calepina</i> spp.)	Diuron 1.2-1.6 lb	Karmex 80DF 1.5-2.0 lb	Apply in March or early April when alfalfa is dormant and before it begins growth in the spring. Treat only stands established for one year or more. Do not apply to alfalfa/grass mixtures or to alfalfa with unusually shallow root penetration (such as shallow hard pans) or on sandy soils with less than 1 percent organic matter content. Do not replant treated areas to any crop within 2 years, unless otherwise directed.
Cheat, smoothbrome, wild oats, chickweed, henbit, pepperweed, shepherdspurse, white cockle, bluegrass, dandelion and suppression of dock	Metribuzin 0.375-1.0 lb	Sencor 4F 0.375-1.0 qt, DF 0.5-1.3 lb	Make a single application in the fall after alfalfa becomes dormant or in the spring before new growth starts. Stands planted in the spring that are less than one year old at the time of application may be treated with a maximum of 2/3 lb of Sencor DF/A after alfalfa growth ceases in the fall. Do not graze or harvest within 28 days after application. May be used in alfalfa/grass mixtures.
	Metribuzin 0.25-0.375 lb	Sencor 4F 0.25-0.375 qt, DF 0.33-0.50 lb	Lower rate for chickweed control only.
Bluegrass, chickweed, henbit, downy brome and suppression of perennial grasses including orchardgrass, timothy.	Paraquat 0.50-0.75 lb + surfactant	Gramoxone Inteon 2.0-3.0 pt + surfactant as specified by label	Apply as a broadcast application in 20-60 gal of water/A using ground equipment. Use higher rate for kill or suppression of harder to control weeds and grasses, such as the perennial and smooth brome species. Do not apply if fall regrowth following the last fall cutting is more than 6 inches high. Apply to well-established stands (at least 1 year old) after the last fall cutting when the crop is dormant or before spring growth reaches 2 inches. Alfalfa foliage present at the time of application will be burned, which may reduce the yield of the first cutting. Weeds and grasses should be succulent and growing at the time of application. Do not graze, cut, or harvest within 60 days of application.

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Table 5.10 - Established Alfalfa (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Annual grasses and broadleaf weeds and suppression of perennial plants	Paraquat 0.25 lb + surfactant	Gramoxone Inteon 1.0 pt + surfactant as specified by label	Alternate method: postharvest application. Apply 20-60 gal of water by ground equipment immediately after alfalfa has been harvested. Do not treat more than 5 days after cutting. Foliage present at application will be burned. Do not cut, or harvest within 30 days of application. Make 1-3 applications per year as required. May be used as a salvage treatment on alfalfa less than 1 year old where weeds threaten the stand. First year alfalfa lands and yields may be reduced if alfalfa is allowed to regrow more than 2 inches. For first year alfalfa, do not apply more than twice during the growing season.
Chickweed, henbit, lambsquarters, horseweed, mustard, pepperweed, prickly lettuce, shepherds-purse, yellow rocket, crabgrass, downy brome, foxtail, ryegrass, and wild barley	Terbacil 0.4-1.2 lb	Sinbar 80W 0.5-1.5 lb	Treat only stands established 1 year or more. Make a single application in the fall after plants become dormant or in the spring before new growth exceeds 2 inches or after cutting following hay removal. For semidormant and nondormant varieties, apply in the fall after last cutting or in the spring before new growth exceeds 2 inches in height. Do not use on seedling alfalfa or on alfalfa grass mixtures or other mixed stands. Do not apply on snow-covered or frozen ground because injury to the crop may result. Do not replant to any crop within 2 years after last application.
Chickweed	Terbacil 0.26-0.4 lb	Sinbar 80W 0.33-0.5 lb	Apply to new seedlings or to established stands. These reduced rates are useful primarily for chickweed control during the dormant season, in less than one-year-old stands.
Barnyardgrass, crabgrass, foxtail spp., goosegrass, seedling johnsongrass, fall panicum, Texas panicum, witchgrass, pigweed spp., henbit, common lambsquarters, carpetweed, purselane, annual spurge, and others	Pendimethalin 0.95-3.8 lb	Prowl H ₂ O 3.8 L 1.0-4.0 qt	Apply 1.0-4.0 qts to established alfalfa prior to weed emergence as dormant treatment or before alfalfa reaches 10 inches in height after cutting. Apply 1.0-2.0 qts to seedling alfalfa prior to weed emergence after the alfalfa has reached the second trifoliolate stage but before it reaches 6 inches in height. Do not apply less than 50 days prior to alfalfa harvest for forage or hay.
Annual bluegrass, common chickweed, dandelion, groundsel, lambsquarters, crabgrass, fiddle-neck, mustard spp., pennycress, fleabane, foxtails, pigweed spp., shepherdspurse, speedwell, plantain, prickly lettuce, sweet clover	Hexazinone 0.45-1.35 lb	Velpar 90W 0.5-1.5 lb	Apply as a postemergence treatment to established stands of alfalfa in the fall or winter after alfalfa becomes dormant or in the spring before new growth begins or after cutting following hay removal. Use the lower rate on coarse textured soils and the higher rate on fine textured soils. Apply in a minimum of 20 gal/A when weeds are 2 inches high or less for best results. Corn may be planted 12 months after application. Do not graze or feed treated forage to livestock within 30 days following application.

Table 5.10 - Established Alfalfa (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Many broadleaf weeds, including burdock, Calepina sp., dandelion, goatsbeard, mustards, penncress, pepperweed, plantain, shepherdspurse, thistles (curled, musk), and yellowrocket	MCPA 0.5 lb	MCPA 1.0 pt	Apply after frost when alfalfa is defoliated and dormant. Stand losses may result if sprayed when not completely dormant. Temperatures at the time of spraying should be above 40°F. May be used on mixtures with orchardgrass if established 1 year.
Barnyardgrass, bermudagrass, crabgrass, foxtail (giant, green, and yellow), johnsongrass, panicum (fall), quackgrass, ryegrass (annual), shattercane, witchgrass, volunteer small grains, volunteer corn	Sethoxydim 0.19-0.47 lb + crop oil concentrate	Poast 1.0-2.5 pt or Poast Plus 1.5-3.75 pt + crop oil concentrate 2.0 pt or Dash 2.0 pt	Apply to actively growing grasses at the size and rate indicated on the label for the individual grass species. Always add crop oil concentrate to the spray solution. A second application is required for complete control of perennial grass species. Do not apply sethoxydim within 7 days of feeding, grazing, or harvesting forage or within 14 days of feeding or harvesting hay. Can be tank mixed with 2,4-D, but also observe feeding, grazing, and harvesting restrictions.
Barnyardgrass, bermudagrass, crabgrass, foxtail (giant, green, and yellow), goosegrass, johnsongrass (seedling), panicum (fall and Texas), quackgrass, shattercane, and volunteer corn and cereals.	Clethodim 0.094-0.125 lb + crop oil concentrate	Select 2EC 6.0-8.0 oz + crop oil concentrate 1 qt	May be applied to seedling or established alfalfa. Do not apply within 15 days of grazing, feeding, or harvesting (cutting) alfalfa for forage or hay. Can be tank mixed with 2,4-DB, but a 60-day feeding, grazing, and harvesting restriction must be observed. Clethodim may also be available as Select Max 0.97 EC. Consult label for specific rate and adjuvant recommendations.
<i>Spot treatment</i>			
Alfalfa and clover	Glyphosate 0.5-4.0 lb	Roundup Weather Max 0.4-2.9 qt or Touchdown Total 0.35-2.8 qt or other labeled glyphosate formulation	Glyphosate can be used in alfalfa and clover as a spot treatment application. Apply in areas where the movement of domestic livestock can be controlled. No more than one-tenth of any acre should be treated at one time. Remove domestic livestock before application and wait 3 days for Roundup WeatherMax or 14 days for Touchdown after application before grazing livestock or harvesting. May also be applied at a rate of 1.0-2.0 percent, glyphosate: water. Touchdown Total is available as a non-surfactant containing formulation under the trade name Touchdown HiTech.

5-26 Weeds: Forages: Alfalfa and Other Legumes

Table 5.10 - Established Alfalfa (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
<i>Preharvest</i>			
Alfalfa	Glyphosate up to 1.9 lb depending upon formulation	Roundup Weather Max 1.4 qt or Touchdown Total 1.5 qt or other labeled glyphosate formulation	Glyphosate can be used in declining alfalfa stands or any stand of alfalfa where crop destruction is acceptable. This application will severely injure or destroy the stand of alfalfa. This product will control annual and perennial weeds including quackgrass, when applied prior to harvest of alfalfa. The treated crop and weeds can be harvested and fed to livestock after 36 hours. Allow a minimum of 36 hours between application and harvest. Application can be made at any time of the year. Make only one application to an existing stand of alfalfa per year. Applications greater than 1.4 qt/acre or Roundup Weather Max or 1.5 pt/acre of Touchdown Total will require an 8 week waiting period between application and grazing or harvesting.

Pasture

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

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

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

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

Table 5.11 - Pounds per Acre to Liquid Volumes

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

Table 5.12 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments¹

Treatment and rate (lb active ingredient per acre)

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

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

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

Table 5.12 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments¹ (cont.)

Treatment and rate (lb active ingredient per acre)

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

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

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

Table 5.12 - Susceptibility of Pasture Weeds to Recommended Herbicide Treatments¹ (cont.)

Treatment and rate (lb active ingredient per acre)

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

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

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

Table 5.13 - Grazing and Haying Restrictions for Grass Forage and Pasture Herbicides

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

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

Table 5.14 - Rotational Crop Restrictions for Pasture Herbicides¹

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

¹A “–” indicates that a rotational restriction for that crop is not specified on the label.

²Consult herbicide label for specific crops.

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

⁴NS = next growing season after application.

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

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

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

Table 5.15 - Permanent Pasture

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.15 - Permanent Pasture (cont.)

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

Table 5.16 - Pasture Renovation

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

Corn

Uncontrolled weeds continue to be a major limiting factor in Delmarva corn production. To be successful in controlling weeds in corn, the weed control program must be both well planned and well executed. Consideration should be given to cultural, mechanical, and chemical methods of weed control with reference to specific weed infestations. The major elements of a successful weed control program in corn are summarized below.

Weed Control Program

Weed identification. The first step in an effective weed control program is proper weed identification. Only by knowing the exact identities and relative infestations of weeds on a field-by-field basis can the proper weed control strategy be developed. Continued use of the same program, or use of reduced tillage practices, can result in changes in weed infestations. Keep an accurate field record of the weeds in each field on a yearly basis and use this record to plan your weed control program.

Cultural control. Several aspects of cultural weed control should be considered in planning a corn weed control program. These include weed-free seed, cover crops, and crop rotation. Crop rotation is a valuable tool in our corn/soybean rotations because perennial broadleaf weeds that cannot be controlled in soybeans can be effectively controlled in corn. Take advantage of this opportunity to control these tough weeds with mechanical methods and herbicides.

Mechanical control. Mechanical weed control is still one of our most useful weed control tools. Both primary tillage and cultivation should be considered for specific weed problems. Perennial broadleaf weeds are an increasing problem in no-till corn production. In some cases, these weeds cannot be controlled without tillage to disrupt underground perennial parts. The use of the moldboard plow when these weeds become a problem is an effective method of control, and for some weeds represents the only practical method of control.

Herbicidal control. Many options are available in terms of herbicidal control of weeds in corn. Both preplant-incorporated and preemergence combinations are available that offer broad-spectrum weed control. Preplant incorporated treatments ensure activation of the herbicide and minimize the risk of crop injury. Preemergence treatments require rainfall for activation, but offer good weed control when rainfall occurs within the first 2 weeks after application. Consider postemergence and directed postemergence applications. These are some of our strongest options in corn weed control. Identify the weed and select the herbicide program that best fits your specific weed infestation.

The repeated use of herbicides with similar modes of action may result in herbicide-resistant weed populations. (See Table on Guide to single active ingredient herbicides.) Crop rotation, herbicide rotation, or tank-mixing herbicides with different modes of action will help reduce the buildup of herbicide-resistant weeds.

The following tables give general ratings of relative herbicidal activity. Activity varies with weather conditions, soil type, and application method. Under nonoptimal conditions, activity may be less than indicated.

Table 5.17 - Corn Herbicides and their Restrictions

Trade name	Common name	Manufacturer	Restricted-use pesticide ¹	Water quality advisory ²	Worker re-entry (hours) ³
2,4-D amine 4S	2,4-D amine	several	—	—	48
2,4-D LVE 4E	2,4-D LVE	several	—	—	12
AAtrex, Atrazine 4L/90DF	atrazine	Syngenta, others	yes	yes	12
Accent 75DF/SP	nicosulfuron	DuPont	—	—	4
Aim 2EC	carfentrazone-ethyl	FMC	—	—	12
Axiom 68DF	flufenacet + metribuzin	Bayer	—	yes	12
Balance Flex	Isoxaflutole	Bayer	yes	yes	12
Banvel 4S	dicamba	MicroFlo	—	yes	24
Basagran 4S	bentazon	MicroFlo	—	yes	48
Basis 75DF	rimsulfuron + thifensulfuron	DuPont	—	—	4
Beacon 75DF	primisulfuron	Syngenta	—	—	12
Bicep II Magnum 5.5L	s-metolachlor + atrazine + safener	Syngenta	yes	yes	24
Bicep Lite II Magnum 6L	s-metolachlor + atrazine + safener	Syngenta	yes	yes	24
Buctril 4E	bromoxynil	Bayer	—	—	12
Buctril + atrazine 3L	bromoxynil + atrazine	Bayer	yes	yes	24
Bullet 4ME	alachlor + atrazine	Monsanto	yes	yes	12
Callisto 4L	mesotrione	Syngenta	no	yes	12
Camix 3.67L	mesotrione + metolachlor	Syngenta	no	yes	24
Celebrity Plus 70DF	nicosulfuron + dicamba + diflufenzopyr	BASF	—	yes	12
Cinch 7.64E	metolachlor	DuPont	no	yes	24
Cinch ATZ 5.5L	metolachlor + atrazine	DuPont	yes	yes	12
Clarity 4S	dicamba	BASF	—	yes	24
Define 60DF	flufenacet	Bayer	no	yes	12
Degree 3.8ME	acetochlor	Monsanto	yes	yes	12
Degree Xtra 4.04ME	acetochlor + atrazine	Monsanto	yes	yes	12
Distinct 70DF	dicamba + diflufenzopyr	BASF	no	yes	12
Dual II Magnum 7.64E	s-metolachlor + safener	Syngenta	no	yes	24
Equip	foramsulfuron+iodosulfuron	Bayer	no	yes	12

¹ Only licensed applicators may purchase and apply restricted-use pesticides. To become licensed, contact the Virginia Department of Agriculture.

² These herbicides have properties that may result in ground- or surface-water contamination. Do not apply them in areas where soils are permeable or coarse and groundwater is near the surface. Practice should be followed to minimize the potential for dissolved runoff and/or runoff erosion. See the herbicide label for specific restrictions.

³ If soil-applied products are injected or incorporated at application time, under certain circumstances the Worker Protection Standard allows workers to enter the treated area if they will have no contact with anything that has been treated. Personal protective equipment is required for early entry to treated areas if contact with treated soil, plants, or water is involved.

⁴ For use only on IMI (IR/IT) or Clearfield (CL) corn hybrids.

⁵ For use only on glufosinate-resistant corn hybrids.

Table 5.17 - Corn Herbicides and their Restrictions (cont.)

Trade name	Common name	Manufacturer	Restricted-use pesticide ¹	Water quality advisory ²	Worker re-entry (hours) ³
Evik 80W	ametryn	Syngenta	—	—	12
Expert	metolachlor + glyphosate + atrazine	Syngenta	yes	yes	24
Field Master 4.25SE	glyphosate + acetochlor + atrazine	Monsanto	yes	yes	12
FulTime 4CS/EC	acetochlor + atrazine + safener	Dow AgroSciences	yes	yes	12
Gramoxone Inteon (Harvest Aid)	paraquat	Syngenta	yes	—	24
Gramoxone Inteon (Preemergence)	paraquat	Syngenta	yes	—	12
Guardman Max 5L	atrazine + dimethanimid	BASF	yes	yes	12
Halex GT	metolachlor + glyphosate + mesotrione	Syngenta	no	yes	24
Harmony Extra SG	thifensulfuron + tribenuron	DuPont	—	—	12
Harmony SG	thifensulfuron	DuPont	no	no	4
Harness 7E	acetochlor + safener	Monsanto	yes	yes	12
Harness Xtra 5.6/6L	acetochlor + atrazine	Monsanto	yes	yes	12
Hornet 78.5 WG	flumetsulam + clopyralid	Dow AgroSciences	—	yes	48
Impact 2.8L	topramezone	AMVAC	no	no	12
Keystone 5L	atrazine + acetochlor	Dow AgroSciences	yes	yes	12
Keystone LA 5.5L	atrazine + acetochlor	Dow AgroSciences	yes	yes	12
Lariat 4E	alachlor + atrazine	Monsanto	yes	yes	12
Lasso 4E	alachlor	Monsanto	yes	yes	12
Laudis	tembotrione	Bayer	no	yes	12
Lexar 3.7SC	atrazine + metolachlor + mesotrione	Syngenta	yes	yes	24
Lightning 70DG ⁴	imazethapyr + imazapyr	BASF	—	yes	12
Linex 50DF, 4L	linuron	Griffin	—	—	24
Lumax 4L	atrazine + mesotrione + s-metolachlor	Syngenta	yes	yes	24
Marksman 3.2L	dicamba + atrazine	BASF	yes	yes	24
Micro-Tech 4ME	alachlor	Monsanto	yes	yes	12

¹ Only licensed applicators may purchase and apply restricted-use pesticides. To become licensed, contact the Virginia Department of Agriculture.

² These herbicides have properties that may result in ground- or surface-water contamination. Do not apply them in areas where soils are permeable or coarse and groundwater is near the surface. Practice should be followed to minimize the potential for dissolved runoff and/or runoff erosion. See the herbicide label for specific restrictions.

³ If soil-applied products are injected or incorporated at application time, under certain circumstances the Worker Protection Standard allows workers to enter the treated area if they will have no contact with anything that has been treated. Personal protective equipment is required for early entry to treated areas if contact with treated soil, plants, or water is involved.

⁴ For use only on IMI (IR/IT) or Clearfield (CL) corn hybrids.

⁵ For use only on glufosinate-resistant corn hybrids.

Table 5.17 - Corn Herbicides and their Restrictions (cont.)

Trade name	Common name	Manufacturer	Restricted-use pesticide ¹	Water quality advisory ²	Worker re-entry (hours) ³
NorthStar 51.4WG	primisulfuron + dicamba	Syngenta	—	—	12
Option 35WDG	foramsulfuron	Bayer	no	yes	12
Outlook	dimethenamid-P	BASF	—	yes	12
Permit/Sandea 75WG	halosulfuron	Gowan	—	—	12
Princep, Simazine, 4L/90DF	simazine	Syngenta, others	—	yes	12
Prowl 3.3E	pendimethalin	BASF	—	—	24
Prowl H ₂ O	pendimethalin	BASF	—	—	24
Pursuit 2S	imazethapyr	BASF	—	—	4
Python 80WDG	flumetsulam	Dow AgroSciences	—	yes	12
Radius 4L	isoxaflutole + flufenacet	Bayer	yes	yes	12
Ready Master ATZ 4L	glyphosate + atrazine	Monsanto	yes	yes	12
Require Q	rimsulfuron + dicamba	DuPont	no	yes	24
Resolve	rimsulfuron	DuPont	no	no	4
Resolve Q	rimsulfuron + thifensulfuron	DuPont	no	no	4
Resource 0.86E	flumiclorac	Valent	—	—	12
Roundup Weather Max	glyphosate	Monsanto	—	—	4-12
Sencor 75DF/4L	metribuzin	Bayer	—	yes	12
Spirit 57WG	primisulfuron + prosulfuron	Syngenta	—	—	12
Status 56WG	dicamba + diflufenzopyr	BASF	no	yes	24
Steadfast 75DF	nicosulfuron + rimsulfuron	DuPont	no	no	4
Stinger 3S	clopyralid	Dow AgroSciences	—	yes	12
Stout 72.5DF	nicosulfuron + thifensulfuron	DuPont	no	no	4
SureStart	acetochlor + flumetsulam + clopyralid	Dow AgroSciences	yes	yes	12
TopNotch 3.2CS	acetochlor + safener	Dow AgroSciences	yes	yes	12
Touchdown Total + Hi-Tech	glyphosate	Syngenta	—	—	12
Valor	fluxioxazin	Valent	no	yes	12
Yukon 67.5WDG	halosulfuron + dicamba	Monsanto	no	yes	12

¹ Only licensed applicators may purchase and apply restricted-use pesticides. To become licensed, contact the Virginia Department of Agriculture.

² These herbicides have properties that may result in ground- or surface-water contamination. Do not apply them in areas where soils are permeable or coarse and groundwater is near the surface. Practice should be followed to minimize the potential for dissolved runoff and/or runoff erosion. See the herbicide label for specific restrictions.

³ If soil-applied products are injected or incorporated at application time, under certain circumstances the Worker Protection Standard allows workers to enter the treated area if they will have no contact with anything that has been treated. Personal protective equipment is required for early entry to treated areas if contact with treated soil, plants, or water is involved.

⁴ For use only on IMI (IR/IT) or Clearfield (CL) corn hybrids.

⁵ For use only on glufosinate-resistant corn hybrids.

Table 5.18 - Relative Effectiveness of “Burndown” for No-till Corn Establishment^{1,2,3}

	Grasses and broad-leaf weeds in crop stubble (0-3 in)	Grasses and broad-leaf weeds in crop stubble (>3 in)	Annual ryegrass and weeds	Rye cover and annual weeds	Volunteer orchard-grass sod and annual weeds	Small grains and annual weeds
Gramoxone Inteon	G	F-G	P	G	P-F	F
Gramoxone Inteon (and then Gramoxone Inteon 10-14 days later)	G	G	P-F	G	G	G
Gramoxone Inteon + 2,4-D	G	G	P	G	P-F	F
Gramoxone Inteon + Banvel/Clarity	G	G	P	G	P-F	F
2,4-D (and then Gramoxone Inteon 10-14 days later)	G	G	P	G	P-F	F
Banvel/Clarity (and Gramoxone Inteon 10-14 days later)	F	G	G	P	G	P-F
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others	G	F-G	F-G	F-G	P	F
4.0 lb ai/gallon glyphosate or equivalent ⁴ (2.0-3.0 qt) or others	G	G	G	G	F-G	G
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others + 2,4-D	G	G	F-G	F-G	P	F
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others + Banvel/Clarity	G	G	F-G	F-G	P	F
Atrazine (1.0-2.0 lb) + Gramoxone Inteon	G	F-G	F	G	F	G

¹G = 80 to 100 percent control, F = 60 to 80, P = 20 to 60, N = less than 20, NR = not recommended.

²These treatments are rated only for control of vegetation existing at the time of no-till corn establishment. Add residual herbicides as required for the specific infestation.

³Use Banvel only on soil types for which the preemergence use of this product is permitted by label.

⁴See Table 5.3 - Selected Glyphosate Products and Premixes for Agronomic Use: *Weed Control in Field Crops* section.

Table 5.19 - Relative Effectiveness of “Burndown” for No-till Corn Establishment^{1,2,3}

	Fescue sod and annual weeds	Clover and annual weeds	Alfalfa and annual weeds	Horseweed and other annual weeds	Perennial broadleaf weeds and annuals
Gramoxone Inteon	F	F	P-F	F	P-F
Gramoxone Inteon (and then Gramoxone Inteon 10-14 days later)	G	F-G	F	F-G	F
Gramoxone Inteon + 2,4-D	P-F	F-G	F	F-G	F
Gramoxone Inteon + Banvel/Clarity	P-F	F-G	F-G	F-G	F
2,4-D (and then Gramoxone Inteon 10-14 days later)	P-F	G	F	G	F-G
Banvel/Clarity (and then Gramoxone Inteon 10-14 days later)	P-F	G	G	G	F-G
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others	P	F	P-F	F-G	F
4.0 lb ai/gallon glyphosate or equivalent ⁴ (2.0-3.0 qt) or others	G	G	G	G	F-G
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others + 2,4-D	P	G	F	G	F-G
4.0 lb ai/gallon glyphosate or equivalent ⁴ (1.0 qt) or others + Banvel/Clarity	P	G	G	G	F-G
Atrazine (1.0-2.0 lb) + Gramoxone Inteon	F	F	P	F	P-F

¹G = 80 to 100 percent control, F = 60 to 80, P = 20 to 60, N = less than 20, NR = not recommended.

²These treatments are rated only for control of vegetation existing at the time of no-till corn establishment. Add residual herbicides as required for the specific infestation.

³Use Banvel only on soil types for which the preemergence use of this product is permitted by label.

⁴See Table 5.3 - Selected Glyphosate Products and Premixes for Agronomic Use: *Weed Control in Field Crops* section.

Table 5.20 - Corn Group 1 - Preplant IncorporatedRelative effectiveness of residual herbicides for corn¹

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Atrazine	F	N	P	F-G	N	F	F	N	N	P-F	P	N	N	N
Dual II Magnum/Cinch	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F-G
Dual II Magnum/Cinch + Atrazine	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F-G
Dual II Magnum/Cinch + Atrazine + Princep	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F-G
Outlook	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F-G
Outlook + Atrazine	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F-G
Outlook + Atrazine + Princep	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F-G
Princep	G	N	P	F-G	F	F-G	F-G	P	N	P	-	P	P	P
SureStart	G-E	N	F-G	G-E	E	E	E	P	N	N	F	P	P	F

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.21 - Corn Group 1 - PreemergenceRelative effectiveness of residual herbicides for corn¹

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Atrazine	F	N	P	P-F	P	F	F	N	N	P-F	P	P	P	P
Atrazine + Princep	F-G	N	P	F-G	F	F-G	F-G	P	N	P-F	P	P	-	P
Axiom	G	N	F-G	G	G	G	G	P	N	N	P	P	P	P
Basis	G	N	N	P	G	G	P	N	N	N	P	N	-	N
Callisto	N	N	P	F	N	P	N	N	N	N	-	N	N	P
Degree/Harness/Topnotch	G-E	N	F-G	G-E	E	E	E	P	N	P-F	F	P	P	F
Degree/Harness/Topnotch + Atrazine	G-E	N	F-G	G-E	E	E	E	P	N	P-F	F	P	P	F
Degree/Harness/Topnotch +Atrazine+Princep	G-E	N	F-G	G-E	E	E	E	P	N	P-F	F	P	P	F
Dual II Magnum/Cinch	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F
Dual II Magnum/Cinch + Atrazine	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F
Dual II Magnum/Cinch + Atrazine + Princep	G-E	N	F-G	G-E	G-E	E	E	P	N	P-F	F	P	P	F
Hornet	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Lumax (atrazine + Dual II Magnum + Callisto)	G-E	N	G	G-E	G-E	E	E	F	N	N	F	F	P-F	F
Micro-Tech	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	P
Micro-Tech + Atrazine	G-E	N	F-G	F-G	E	E	E	P	N	P-F	F	P	P	P
Micro-Tech + Atrazine + Princep	G-E	N	F-G	F-G	E	E	E	P	N	P-F	F	P	P	P
Outlook	G-E	N	F-G	G	G	G	G	P	N	N	P-F	P	P	F
Outlook + Atrazine	G-E	N	F-G	G	G	G	G	P	N	P-F	P-F	P	P	F
Outlook + Atrazine + Princep	G-E	N	F-G	G	G	G	G	P	N	P-F	P-F	P	P	F
Princep	F-G	N	P	F-G	G	G	F-G	P	N	F	-	P	P	P
Prowl	G-E	N	F-G	F	F-G	G	F	F	N	N	F	F	P-F	N
Python	N	N	N	N	N	N	N	N	N	N	N	N	N	N
SureStart	G-E	N	F-G	G-E	E	E	E	P	N	N	F	P	P	F

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.22 - Corn Group 1 - PostemergenceRelative effectiveness of residual herbicides for corn¹

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Accent	G-E	N	G-E	P-F	G	G	P	E	G-E	G-E	G	E	G	P
Aim	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Atrazine + Oil	F	N	F	P-F	P	F	G	P	N	F-G	-	P	P	P-F
Banvel/Clarity	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Basagran	N	N	N	N	N	N	N	N	N	N	N	N	N	F
Basis	F-G	N	F-G	P-F	G	G	P	F-G	F	-	F	F-G	F	P-F
Beacon	P	N	P	P	F	F-G	P	E	G	G	-	E	P	P
Brominal or Buctril	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Callisto	-	N	F	F	P	P	P	P	N	-	-	P	P	F
Celebrity Plus	G-E	N	G-E	P-F	G	G	P	E	G-E	G-E	G	E	G	P
2,4-D	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2,4-D + Banvel	N	N	N	N	N	N	N	N	P	N	N	N	N	N
Distinct	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Equip	F	N	F-G	F	F	F	F	F-G	F-G	G	F	G	F	-
Evik	G	N	G	F-G	F-G	F-G	G	P-F	N	-	-	F	G	P
Exceed	P	N	N	P	P	P-F	N	P-F	N	P-F	-	P-F	N	P
FieldMaster	E	G	E	E	G-E	E	E	E	G	G-E	E	G	G	P-F
Glyphosate	E	G	E	E	G-E	E	E	E	G	G-E	E	G	G	P-F
Gramoxone Inteon	G	N	F	G	G	G	G	G	N	P	G	G	F	F
Hornet	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Impact	-	N	F	F-G	F	G	F	P	N	-	-	P	-	-
Laudis	G	N	P-F	F-G	P	G	F	G	N	N	-	G	G	-
Liberty	F-G	N	F	F	F-G	F-G	P	F-G	N	F	F-G	F-G	F-G	P
Liberty ATZ	G	N	F-G	F-G	F-G	G	P-F	F-G	N	F	F-G	F-G	F-G	P-F
Lightning	G	N	F-G	P-F	P-F	G	P	G	F	F-G	-	G	P-F	F-G
Linex/Lorox	F	N	F-G	F	F	F	F	P-F	N	N	-	P-F	F	P
Marksman	N	N	P	P	N	P	F	N	N	F	-	N	-	P
NorthStar	P	N	P	P	F	F-G	P	E	G	G	-	E	P	P
Option	F-G	N	G	P-F	G	G	G	G	G	G	G	G	G	F
Permit	N	N	N	N	N	N	N	N	N	N	N	N	N	E
Poast Plus/Poast	E	F-G	G	G-E	E	E	G-E	E	G	G	G-E	G	G	N
Prowl + Atrazine	F-G	N	F	F-G	P	F	G	P-F	N	F	-	P	P	F
Require Q	G	N	F-G	P-F	G	G	P	P-F	N	-	F	F-G	F	P-F

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.22 - Corn Group 1 - Postemergence (cont.)

Relative effectiveness of residual herbicides for corn¹

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Resolve	G	N	F-G	P-F	G	G	P	P-F	N	-	F	F-G	F	P-F
Resolve Q	G	N	F-G	P-F	G	G	P	P-F	N	-	F	F-G	F	P-F
Resource	N	N	N	N	N	N	N	N	N	N	N	N	N	N
"Sencor + 2,4-D or Banvel"	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Spirit	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Status	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Steadfast	G-E	N	G-E	P-F	G	G-E	P	E	G-E	G-E	G	E	G	P

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.23 - Corn Group 2 - Preplant Incorporated

Relative effectiveness of residual herbicides for corn¹

	Eastern black nightshade	Burcucumber	Cocklebur	Jimson weed	Lambsquarters	TR-Lambsquarters	Morningglory (annual spp.)	Pigweed	TR-Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Atrazine	E	F	G	G	G	N	G	G	N	G	G	G	G	G	G	G	G
Dual II Magnum/ Cinch	F	N	N	N	P-F	P-F	N	G	G	N	P	N	P	N	P	N	N
Dual II Magnum/ Cinch + Atrazine	E	F	G	G	G	P-F	G	G	G	G	G	G	G	G	G	G	G
Dual II Magnum/ Cinch + Atrazine + Princep	E	F	G	G	G	P-F	G	G	G	G	G	G	G	G	G	G	G
Outlook	F	N	N	N	P-F	P-F	N	G	G	N	P	N	P	N	P	N	N
Outlook + Atrazine	E	F	G	G	G	P-F	G	G	G	G	G	G	G	G	G	G	G
Outlook + Atrazine + Princep	E	F	G	G	G	P-F	G	G	G	G	G	G	G	G	G	G	G
Princep	G-E	F	G	G	G	N	G	G	N	F	G	G	G	F-G	F-G	F-G	F-G
SureStart	P-F	N	G	F	G	G	F	G	G	G	G	-	-	-	P	-	G

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.24 - Corn Group 2 - PreemergenceRelative effectiveness of residual herbicides for corn¹

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarters	TR-Lambsquarters	Morningglory (annual spp.)	Pigweed	TR-Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Atrazine	E	P-F	G	E	E	N	F-G	E	N	F-G	G-E	G	G	F-G	G	G	F-G
Atrazine + Princep	E	F	G	E	E	N	G	E	N	G	E	G	G	F-G	G	G	G
Axiom	P	N	N	N	P-F	P-F	N	P-F	P-F	N	P	N	N	N	N	N	N
Basis	N	N	P	P	F-G	F-G	N	G	G	N	N	-	P	P	-	-	P
Callisto	P	-	P-F	F	G	G	F	F-G	F-G	-	P	-	-	N	N	N	-
Degree/Harness/ Topnotch	F	N	N	N	F	F	N	F-G	F-G	N	P	N	P	-	P	N	N
Degree/Harness/ Topnotch + Atrazine	E	F	G	E	E	F	G	E	F-G	G	E	G	G	G	G	G	G
Degree/Harness/ Topnotch + Atrazine + Princep	E	F	G	E	E	F	G	E	F-G	G	E	G	G	G	G	G	G
Dual II Magnum/ Cinch	F	N	N	N	P	P	N	G	G	N	P	N	P	N	P	N	N
Dual II Magnum/ Cinch + Atrazine	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Dual II Magnum/ Cinch + Atrazine + Princep	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Gramoxone Inteon	G	G	G	G	G	G	F-G	G	G	F-G	G	G	F-G	G	G	G	G
Hornet	P-F	P	F-G	F-G	F-G	G	P	E	E	P	P	F-G	E	F	F-G	-	G
Lumax (atrazine + Dual II Magnum + Callisto)	G-E	P-F	F	G-E	G-E	G-E	F-G	G	G	F	F-G	P-F	F-G	P-F	F-G	-	F
Micro-Tech	F-G	N	N	N	P	P	N	G	G	N	P	N	P	N	P	N	N
Micro-Tech + Atrazine	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Micro-Tech + Atrazine + Princep	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Outlook	F	N	N	N	P	P	N	G	G	N	P	N	P	N	P	N	N
Outlook + Atrazine	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Outlook + Bladex	F-G	P	F	G	G	P	F-G	G	G	F	G	-	G	-	G	-	P-F
Outlook + Atrazine + Princep	E	F	G	E	E	P	G	E	G	G	E	G	G	G	G	G	G
Princep	G-E	F	G	G-E	E	N	G	E	N	F	E	G-E	E	F-G	F-G	F-G	F-G
Prowl	N	N	N	N	F-G	F-G	P	F-G	F-G	N	P	N	P	N	P	P	F
Python	P-F	P	F-G	F-G	G	G	P	G	G	P	P	F-G	E	F	F-G	-	G
SureStart	P-F	N	G	F	G	G	F	G	G	G	G	-	-	-	P	-	G

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.25 - Corn Group 2 - PostemergenceRelative effectiveness of residual herbicides for corn¹

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarters	TR-Lambsquarters	Morningglory (annual spp.)	Pigweed	TR-Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Accent	N	F-G	P	F	P	P	F	G-E	G-E	P	P	F	F-G	-	P	-	P
Aim	G	N	N	N	F-G	F-G	F	G	G	N	P	-	-	-	-	-	E
Atrazine + Oil	G-E	F-G	G-E	E	E	N	G-E	E	N	G	G-E	G	E	-	G	F-G	F-G
Banvel/Clarity	E	F	E	E	E	E	E	E	E	G-E	G-E	G-E	E	-	G	G	G
Basagran	P	P	G-E	E	P-F	P-F	P	P	P	P-F	F-G	P	G-E	F	F-G	F	F-G
Basis	N	N	F	P-F	G	G	P	G-E	G-E	N	P	P	G	-	N	-	G
Beacon	P-F	G	F-G	F-G	F-G	F-G	F	G-E	G-E	G	G-E	F	F-G	-	F	-	F-G
Buctril	G-E	F-G	F-G	F-G	G	G	F	P	P	F-G	F-G	N	F-G	-	P	G	F-G
Callisto	G	-	F-G	G	E	E	F-G	G-E	G-E	-	F	-	-	F-G	P	-	G-E
Celebrity Plus	E	F-G	E	E	E	E	E	E	E	G-E	G-E	G-E	E	-	G	G	F-G
2,4-D	F	P	G-E	E	E	E	E	E	E	E	E	F-G	F-G	-	G	G	F-G
Distinct	E	F-G	E	E	E	E	E	E	E	G-E	G-E	G-E	E	-	G	G	G
Equip	F	F-G	F	F	F	F	P	E	E	F-G	F-G	P-F	F	-	-	-	P
Evik	G	F	E	E	E	E	F-G	G	G	F-G	G-E	F-G	F-G	-	G	F-G	F-G
Exceed	G	G	G	G	P-F	P-F	P-F	G-E	G-E	G-E	G-E	G	G-E	-	P	-	F-G
FieldMaster	F-G	E	E	E	F-G	F-G	G	E	E	G	F-G	F-G	F-G	F	F-G	G	F-G
Glyphosate	F-G	E	E	E	F-G	F-G	G	E	E	G	F-G	F-G	F-G	F-G	F	F-G	G
Gramoxone Inteon	G	G	G	G	G	G	F-G	G	G	F-G	G	G	F-G	G	G	G	G
Harmony SG	P	P-F	F	P	E	E	P	E	E	P	N-P	P	G	P	P	P	F-G
Hornet	P	N	G	G	P-F	P-F	F	F	F	F-G	G	-	F-G	-	N	-	G
Impact	G	-	F-G	G	E	E	F	G-E	G-E	G	G	-	-	F-G	P	-	G-E
Laudis	G	-	F-G	G	E	E	F	G-E	G-E	G	G	-	G	-	N	-	G-E
Liberty	G	G	G-E	G-E	F-G	F-G	G-E	G	G	G	G-E	G-E	F	-	F-G	-	G
Liberty ATZ	G-E	G	G-E	G-E	G-E	F-G	G-E	G-E	G	G	G-E	G-E	E	-	G	F-G	G
Lightning	G-E	P	G-E	G-E	P-F	P-F	P-F	E	E	P	P-F	F	G	-	G	-	F
Linex/Lorox	P-F	F	G	G	G	G	F-G	G	G	G	G	G	F-G	G	G	-	F-G
Marksman	E	G	E	E	E	E	G-E	E	E	G-E	G-E	G-E	E	-	G	G	G
NorthStar	E	F-G	E	E	E	E	E	E	E	G-E	G-E	G	E	-	G	G	G
Option	F	F-G	F	F	P-F	P-F	P	E	E	P-F	G	-	-	-	-	-	P
Permit	P	P	G-E	G	P	P	F	G-E	G-E	F-G	G-E	P-F	F-G	-	N	-	G

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.25 - Corn Group 2 - Postemergence (cont.)Relative effectiveness of residual herbicides for corn¹

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarters	TR-Lambsquarters	Morningglory (annual spp.)	Pigweed	TR-Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Poast Plus/Poast	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Prowl + Atrazine	G-E	F-G	G-E	E	E	N	G-E	E	N	G	G-E	G	E	-	G	F-G	G
Require Q	P-F	-	P-F	F	P-F	P-F	P-F	G	G	F	P	-	P	-	-	-	P
Resolve	P	-	P	-	P	P	P-F	F-G	F-G	-	P	-	P	-	-	-	P
Resolve Q	P	-	P-F	-	P-F	P-F	P-F	G	G	-	P	-	P	-	-	-	P
Resource	F-G	F-G	P	P	P	P	P	F	F	P	P	N	P	-	N	-	E
Scorpion III	P-F	P	G-E	G	F	F	G	G	G	G	G-E	-	F-G	-	F	G	E
Sencor + 2,4-D or Banvel	F	P	G	G-E	G	G	G-E	G-E	G	G	G	G	F-G	-	G	G	G
Status	E	F-G	E	E	E	E	E	E	E	G-E	G-E	G-E	E	-	G	G	G
Steadfast	N	F-G	P	P-F	P	P	P	G-E	G-E	P	P	P	F-G	-	P	-	P
Stinger	F	N	G-E	G	P	P	N	P	P	G-E	E	-	F	-	-	-	P
Spirit	F	F-G	F-G	F-G	P-F	P-F	P-F	G-E	G-E	G	G-E	F	F-G	-	P	-	F-G

¹Legend - based on adequate moisture, good growing conditions, and proper herbicide application.

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Atrazine Use Recommendations and Precautions

Preemergence* - Soil applications prior to crop emergence:

1. On highly erodible soil (as defined by SCS):
 - Fields where more than 30% of the soil is covered with plant residue at planting - apply a maximum of 2.0 pounds of active ingredient of atrazine per acre as a broadcast spray.
 - Fields where less than 30% of the soil is covered with plant residue at planting - apply a maximum of 1.6 pounds of active ingredient of atrazine per acre as a broadcast spray.
2. On soils not highly erodible
 - Apply a maximum of 2.0 pounds of active ingredient of atrazine per acre as a broadcast spray.

Postemergence* - for all applications after crop has emerged:

1. If no atrazine was applied prior to crop emergence, use a maximum postemergence rate of 2.0 pounds of active ingredient of atrazine per acre.
2. If a preemergence application was made in the same calendar year, the combined pre- and postemergence applications may not exceed 2.5 pounds of active ingredient of atrazine per acre.

***Remember** - the total amount of atrazine applied (pre- and postemergence combined) may not exceed 2.5 pounds of active ingredient of atrazine per acre per calendar year.

Do not mix, load or apply atrazine within 50 feet of:

- Drinking water wells
- Livestock water wells
- Agricultural drainage wells
- Irrigation wells
- Abandoned wells
- Sinkholes

Do not mix or load atrazine within 50 feet of:

- Intermittent streams
- Perennial streams
- Rivers
- Lakes
- Reservoirs

Do not apply atrazine within 200 feet of:

- Lakes
- Reservoirs

Do not apply atrazine within a 66 foot arc measured from points where surface water runoff enters:

- Intermittent streams
- Perennial streams
- Rivers

Corn Herbicide Use

Table 5.26 - Grazing and Foraging Restrictions for Corn Herbicides

The following corn herbicide labels restrict grazing and/or foraging (silage) intervals for treated corn.

Corn Herbicide	Days after treatment	
	Graze	Silage/Grain
24-D	7	7
Accent	30	30
Aim	No restrictions	No restrictions
Atrazine	21	21
Axiom	Do not graze	—
Banvel/Clarity or Marksman	> milk stage	> milk stage
Basagran	12	12
Basis	30	30
Basis Gold	30	30
Beacon	30	45/80
Buctril	30	30
Callisto	not specified	not specified
CelebrityPlus	Do not graze	32/72
Define	5 months	5 months
Degree	Do not graze	0
Distinct	Do not graze	32/72
Dual II Magnum/Cinch	30	30
Equip	45	45/70
Evik	30	30
Exceed	30	40/80
Expert	30	30
Gramoxone Inteon	Do not graze	Do not feed
Halex GT	45	45
Harmony SG	30	30
Harness	21	21
Hornet	Do not graze	85
Ignite 280	Do not graze	60/70
Impact	45	45
Laudis	45	45
Liberty	Do not graze	60/70
Liberty ATZ	Do not graze	60/70
Lightning	45	45
Lumax	Do not graze	Do not feed
Micro Tech/Partner	21	21
Northstar	<30	45/60
Option	<45	<45/70

¹Do not graze or use for silage if sequential in-crop applications are made.

²Do not graze, harvest, or feed corn forage or silage following a sequential in-crop application of this product followed by Roundup Ultra herbicide on Roundup Ready corn.

Table 5.26 - Grazing and Foraging Restrictions for Corn Herbicides (cont.)

The following corn herbicide labels restrict grazing and/or foraging (silage) intervals for treated corn.

Corn Herbicide	Days after treatment	
	Graze	Silage/Grain
Outlook	40	40
Permit	30	30
Poast Plus/Poast	60	45/60
Princep	Do not graze	—
Prowl	75	75
Pursuit	45	45
Python	Do not graze	85
Ready Master ATZ ²	—	50/—
Require Q	30	30
Resolve	30	30
Resolve Q	30	30
Resource	28	28
Roundup Weather Max	0 ¹	50/7 ¹
Roundup Weather Max (spot treatment)	14	14
Sequence	30	30/50
Spirit	<30	<40/60
Status	—	32/72
Steadfast	30	30
Stinger	40	40
Stout	30	30
SureStart	not specified	not specified
Touchdown	56	56
Yukon	30	30

¹Do not graze or use for silage if sequential in-crop applications are made.

²Do not graze, harvest, or feed corn forage or silage following a sequential in-crop application of this product followed by Roundup Ultra herbicide on Roundup Ready corn.

IR/IT Corn Statement

Lightning, Pursuit, and Scepter are imidazolinone herbicides or imidazolinone-containing package mixes. These herbicides can be used only on IR (imidazolinone resistant) or IT (imidazolinone tolerant) corn varieties such as Clearfield or severe injury may result. IR and IT corn varieties are recommended when a risk of Pursuit or Scepter carryover makes the planting of standard varieties impractical. Continuous or exclusive use of a herbicide or herbicides with a single site of action encourages the development of resistant weeds. The use of these products in corn is not recommended due to the increased risk of weed resistance development.

Table 5.27 - Maximum Corn and Weed Size for Delayed Preemergence Herbicides

Herbicides	Maximum Corn Size	Maximum Weed Size
Atrazine	12 inches	1.5 inches
Banvel or Marksman + Dual or Lasso EC	3 inches	2-leaf grass
Banvel or Marksman + Outlook	8 inches	1-inch grass
Bicep II Magnum/Cinch ATZ	5 inches	2-leaf
Bullet or Micro-Tech + atrazine	5 inches	2-leaf
Callisto	30 inches or 8-leaf	5 inch
Define	before emergence	before emergence
Degree ⁵	11 inches or by tank-mix partner	before emergence or by tank-mix partner
Dual II Magnum/Cinch	<40 inches	2-leaf
Dual II Magnum + Banvel	5 inches	3-inch pigweed
Dual II Magnum/Cinch + Marksman	3 inches	2-leaf
Guardsman Max/Leadoff	12 inches	1.5 inches
Harness or Harness Xtra ³	11 inches or by tank-mix partner	2-inch grass or by tank-mix partner
Marksman + Prowl	2-leaf	1-inch grass
Outlook	8 inches	before emergence or by tank-mix partner
Outlook + Accent ¹	12 inches	3 inches
Outlook + Beacon	12 inches	depends on weed (see Beacon label)
Princep	before emergence	before emergence
Prowl + Accent ²	6-leaf	depends on weed (see Accent label)
Prowl + Atrazine or Prowl + Bladex 90DF	4-leaf	1 inch
Prowl + Beacon ²	6-leaf	depends on weed (see Beacon label)
Python WDG	2 inches (spike)	before emergence
SureStart	11 inches	1-2 inch
TopNotch ⁴ , Fulltime	11 inches or by tank-mix partner	before emergence or by tank-mix partner

¹ May use a reduced rate of Outlook and Accent under certain conditions.

² Accent rate of 1/3-2/3 oz/A and Beacon rate or 3/8-3/4 oz/A.

³ May be tank mixed with Accent, Atrazine (Harness), Banvel, or Clarity, Marksman, Permit, or Pursuit (IMI-corn)

⁴ May be tank mixed with a number of different products including Accent, Banvel, or Clarity, Prowl, Pursuit (IMI-corn), etc. See an herbicide label for specific information.

⁵ May be tank mixed with Accent, Atrazine, Banvel or Clarity, Marksman, Permit, Princep, Prowl, or Pursuit (IMI corn).

Table 5.28 - Perennial Sod: Bluegrass, Fescue, Orchardgrass, Timothy, and Ryegrass

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
<i>CORN (no-till)</i>			
For control of fescue and orchardgrass sods and control of annual weeds listed above	paraquat 0.50 lb + surfactant + paraquat 0.50 lb + surfactant 10-14 days later + residual herbicide treatment as required for specific infestations	Gramoxone Inteon 1.0 pt + surfactant as labeled + Gramoxone Inteon 1.0 pt + surfactant as labeled 10- to 14-days later + residual herbicide	Use double paraquat application for vigorous orchardgrass stands where single applications have not been effective. Observe paraquat use instructions and precautions as above. Tankmix with residual herbicides as listed below for the specific weed infestation. High triazine rates are not required for orchardgrass control where the double paraquat application is used.
Alternative method: For control of tall fescue and orchardgrass sods	glyphosate 1.0-3.0 lb + residual herbicide treatment as required for specific infestation	4.0 lb ai/gal glyphosate or equivalent 1.0-3.0 qt + residual herbicides	For fescue control apply 3.0 lb rates of Roundup Ultra or Touchdown when most plants have reached the boot stage. For orchardgrass control, apply the 2.0 lb rate of Roundup Ultra or Touchdown when most plants have reached the boot stage. 1.0-1.5 lb of Roundup Ultra can be used in 3.0-10.0 gal of water for orchardgrass control when orchardgrass is a minimum of 12 inches tall. Use of atrazine with these treatments is recommended for optimum sod control.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble**Acetochlor use restrictions:**

- Read label concerning personal protective equipment.
- This product is toxic to fish. Avoid application/runoff to areas containing aquatic life.
- This chemical demonstrates the properties and characteristics associated with chemicals detected in ground water. Avoid permeable soils and minimize runoff.
- Do not apply to coarse soils classified as sands with less than 3% OM, loamy sands less than 2% OM, or sandy loams less than 1% OM, where depth to groundwater is 30' or less.
- Observe restrictions on label concerning mixing, loading, rinsing, and washing.
- Do not apply through irrigation equipment.
- Do not apply using aerial application equipment.
- Do not use acetochlor on any crop other than corn.

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Control of annual weeds and annual cover crops	paraquat 0.25-0.50 lb + surfactant	Gramoxone Inteon 0.5-1.0 pt	Apply in 20.0 to 60.0 gal/A of water 10- to 14-days before planting. A nonionic surfactant is needed. Paraquat may not control weeds taller than 6 inches. Increase gallonage as density of stubble, crop residue, or weeds increases. Paraquat will not provide residual weed control. Residual herbicides can be tankmixed with paraquat.
Control of annual weeds and annual cover crops and suppression or control of perennial weeds or covers	glyphosate 0.5-3.0 lb	4.0 lb ai/gal glyphosate or equivalent 0.5-3.0 qts	Glyphosate is effective in heavy annual weed infestations and with large weeds where through coverage with paraquat is not possible. Higher rates will control perennial species, but those species often are not present or susceptible at the time of planting. Use 0.5 qt for annual weeds up to 6 inches tall and 1.5 qt for weeds taller than 6 inches. Applications with fan-type nozzles generally have been more effective than with flood nozzles. A surfactant is required for some glyphosate formulations. Residual herbicides can be tankmixed with glyphosate. Glyphosate is also available in a prepack with Dual II Magnum called Sequence.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of rye, wheat, and barley cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals including barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, lambsquarters, morning-glory (annual), mustard, nightshade, redroot pigweed, purslane, ragweed, smartweed, spanish needles, velvetleaf and witchgrass	nonselective herbicide + atrazine 1.0-2.0 lb + simazine 1.0-2.0 lb	(discussed above) + atrazine 4L 1-2 qt, or 90DF 1.1-2.2 lb + Princep 4L 1.0-2.0 qt or 90DF 1.1-2.2 lb	Apply 10-14 days before planting in 35-45 gal/A. Use paraquat 0.5 lb active ingredient on barley. Use 1:2 atrazine to simazine ratio on heavily infested fall panicum fields. Do not plant to any crop, except those specified on the label, the following year. Do not allow animals to graze treated forage. See precaution above on use of paraquat. Follow label for proper mixing procedures and adjust rate to soil texture, organic matter content of soil, and weed problem. Low-volume broadcast applications (3-10 gal/A) are recommended with some formulations for best results.
Contact kill of rye, wheat and barley cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals including barnyardgrass, carpetweed, cocklebur, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, jimsonweed, lambsquarters, nightshade (black), pigweed spp., purslane, ragweed (common), signalgrass, smartweed, velvetleaf and witchgrass	nonselective herbicide + alachlor 2.5-3.0 lb + atrazine 1.0-2.0 lb	(discussed above) + Micro-Tech 2.5-3.0 qt + atrazine 4L 1.0-2.0 qt or 90DF 1.1-2.2 lb	Apply 10-14 days before and up to day of planting. Use paraquat at 0.47 lb active ingredient on barley. See precaution above on use of paraquat. Follow label for proper mixing procedures and adjust rate to soil texture, organic matter content of soil, and weed problem. This combination may be weak on crabgrass species and may not provide season-long control of other annual grasses. Alachlor plus atrazine may also be applied as prepackage mix called Bullet. Low-volume broadcast applications (3-10 gal/A) are recommended with some formulations.
Contact kill of rye, wheat, and barley cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals including barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, signalgrass yellow nutsedge, carpetweed, cocklebur, common purslane, pusley, lambsquarters, morning-glory, pigweed spp., ragweed, smartweed, and velvetleaf	nonselective herbicide + s-metolachlor 0.95-1.6 lb + atrazine 1.2-2.0 lb	(discussed above) + Dual II Magnum 7.64 L 1.0-1.67 pt + atrazine 4L 1.2-2.0 qt or 90DF 1.3-2.2 lb or Bicep II Magnum 5.5 1.6-2.6 qt	Apply before, during, or after planting, but before the corn emerges. Adjust rates to soil texture and organic matter. Use lower rate of glyphosate for annual weeds and higher rate for perennial weeds. Do not graze or feed forage to livestock or use for silage. Small grains may be seeded 4.5 months after metolachlor use. Do not graze or feed forage or fodder from small grains to livestock. Metolachlor and the Metolachlor plus Atrazine prepackage mix are also available as Cinch and Cinch ATZ. Atrazine plus s-metolachlor is also available with glyphosate as the prepackage mix Expert.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of rye, wheat, and barley cover crops from use of Gramoxone Inteon or glyphosate and residual be control of annual grasses including barnyardgrass, crabgrass spp., fall panicum, foxtail spp., goosegrass and witchgrass and annual broadleaf weeds including jimsonweed, lambsquarters (including triazine-resistant species), nightshade, common pigweed (including triazine-resistant species), smartweed, and velvetleaf	nonselective herbicide + atrazine 0.625-0.75 lb + mesotrione 0.168-0.20 lb + s-metolachlor 1.68-2.0 lb	(discussed above) + Lumax 4.0L 2.5-3.0 qt	Use the 2.5 qt rate on soils of less than 3.0% organic matter content, and the 3.0 qt rate on soils of greater than 3.0% organic matter. Unsatisfactory weed control may be observed if activation rainfall is not received within 7 days of application. Lumax contains a relatively low rate of atrazine. Broadleaf weed control can be significantly improved through use of additional atrazine. The addition of Princep will also provide improved broadleaf and annual grass control. Lumax provides control of triazine-resistant pigweed and ragweed, lambsquarters species. Do not rotate to crops other than corn (all types), cotton, soybeans, sorghum, or peanuts in the spring following application. Lumax can also be applied as an early postemergence treatment on corn up to 5 inches in height. Early postemergence applications will not provide consistent control of emerged annual grasses.
Contact kill of rye, wheat, and barley cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals including barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, signalgrass, yellow nutsedge, carpetweed, cocklebur, common purslane, Florida pusley, lambsquarters, morning-glory, pigweed spp., ragweed, smartweed, and velvetleaf	pendimethalin .75-1.5 lb	Prowl 3.33EC 0.91-1.8 qt	Addition of prowl will aid in the control of triazine-resistant lambsquarters and velvetleaf. Use of this treatment on coarse textured soils of less than 1.5% organic matter content is not recommended due to the potential for crop injury. Pendimethalin is also available as Prowl H ₂ O.
Contact kill of rye, wheat, and barley cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals including barnyardgrass, crabgrass, fall panicum, foxtail millet, giant foxtail, goosegrass, green foxtail, signalgrass, southwestern cupgrass, witchgrass, yellow foxtail, yellow nutsedge, carpetweed, cocklebur, common purslane, Florida pusley, lambsquarters, morning-glory, pigweed spp., ragweed, smartweed, velvetleaf, and sandbur	nonselective herbicide + s-metolachlor 0.95-1.6 lb + atrazine 0.6-1.0 lb + simazine 0.6-1.0 lb	(discussed above) + Dual II Magnum 7.64L 1.0-1.67 pt + atrazine 4L 0.6-1.0 qt or 90DF 0.66-1.1 lb + Princep 4L 0.6-1.0 qt or 90DF 0.66-1.1 lb	Apply in 10-40 gal of water or fluid fertilizer with ground equipment in minimum tillage or no-tillage systems where corn is planted directly into a cover crop, stale seedbed, established sod, or previous crop residues. Use lower rate of glyphosate for annual weeds and higher rate for perennial weeds. Adjust rates of metolachlor, atrazine, and simazine to soil texture, organic matter content of soil, and weed problem. Check labels for restrictions regarding planting of rotational cover crops. Note: metolachlor plus atrazine plus simazine may also be applied as Bicep II Magnum plus Princep. Consult label for specific rates. Metolachlor and the metolachlor plus atrazine prepackage mix are also available as Cinch and Cinch ATZ.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of barley, rye and wheat cover crops from use of Gramoxone Inteon, or glyphosate and residual control of annuals, including barnyardgrass, carpetweed, cocklebur, crabgrass, foxtail; (giant, green and yellow), goosegrass, lambsquarters, morning-glory spp., nutsedge (yellow), panicum (fall), pigweed supp., purslane, pusley (Florida), ragweed, signalgrass, smartweed and velvetleaf	nonselective herbicide + the approved tankmix dimethenamid-P 0.66-0.98 lb + atrazine 1.2-2.0 lb	(discussed above) + Outlook 6EC 14.0-21.0 oz + atrazine 4L 1.2-2.0 qt or 90W 1.3-2.2 lb	Apply before, during or after planting, but apply before the corn emerges. Adjust rates to soil texture and organic matter content of soil. Do not graze or feed forage to livestock or use for silage. Small grains may be seeded 4 months after dimethenamid use. Do not graze or feed forage or fodder from small grains to livestock. Dimethenamid plus atrazine may also be applied as the prepackage mix Guardsman Max.
Contact kill of barley, wheat, or rye cover crops from use of Gramoxone Inteon or glyphosate and residual control of annuals, including barnyardgrass, carpetweed, cocklebur, crabgrass, south-western cupgrass, foxtail; (giant, green and yellow), goosegrass, lambsquarters, foxtail millet, morning-glory spp., yellow nutsedge, fall panicum, pigweed supp., purslane, Florida pusley, ragweed, signalgrass, smartweed, velvetleaf and witchgrass.	nonselective herbicide + dimethenamid-P 0.66-0.98 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	(discussed above) + Outlook 14.0-21.0 oz + atrazine 4L 0.5-1.0 qt or 90W 0.55-1.1 lb + Princep 4L 0.5-1.0 qt or 90W 0.55-1.1 lb	Apply in 10 to 40 gal of water or fluid fertilizer with ground equipment in minimum tillage or no-tillage systems where corn is planted directly into a cover crop, stale seedbed, established sod or previous crop residues. Adjust rates of atrazine, dimethenamid and simazine to soil texture, organic matter content of soil and weed problem. Check labels for restrictions regarding planting of rotational cover crops. Consult label for specific rates. Dimethenamid plus atrazine may also be applied as the prepackage mix Guardsman Max. Late season grass control may diminish in no-till conditions.
Contact kill of barley, wheat, or rye cover crops from use of Gramoxone Extra or glyphosate and residual control of carpetweed, chickweed, cocklebur, henbit, horseweed, jimsonweed, lambsquarters, morning-glory, nightshade, pigweeds, ragweed purslane, red clover (common), sicklepod, sida (prickly), smartweed, spurred anoda, velvetleaf	nonselective herbicide + flumetsulam/clopyralid 0.171-0.257 lb or flumetsulan 0.04-0.07 lb	(discussed above) + Hornet 78.5D 4.0-6.0 oz or Python 80D 0.8-1.33 oz	Adequate soil moisture is required for optimum herbicidal activity. If using in liquid fertilizer solution, water-soluble packets containing Hornet or Python should be premixed with water and added to the spray tank through a 20-35 mesh screen. Soil insecticides should be applied in a band to avoid potential injury. Plant corn at least 1.5 inches deep with soil organic matter > 1.5% and soil temperature above 50° F. If these three criteria are not met, injury may occur. To avoid crop injury, plant "IR" or "IMR" corn hybrids. Observe rotational restrictions on label. Hornet and Python are approved for use with most residual grass herbicides.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of barley, wheat, or rye cover crops from use of Gramoxone Inteon or glyphosate and residual control of annual grasses such as barnyard grass, broadleaf signalgrass, browntop and fall panicum, crabgrass, crowfootgrass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red sprangletop, robust foxtail (purple, white), seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane, ragweed (common and giant), smartweed sp., and velvetleaf.	nonselective herbicide + acetochlor 1.53-2.4 lb + atrazine 1.25-2.0 lb	(discussed above) + Harness 7EC 1.75-2.75 pt + atrazine 4L 1.25-2.0 qt or 90 DF 1.4-2.2 lb	See acetochlor comments below. Use of the highest labeled rates should result in more consistent late-season annual grass control. Harness is also available as a package mix with atrazine called Harness Extra.
Contact kill of barley, wheat, or rye cover crops from use of Gramoxone Inteon or glyphosate and residual control of annual grasses such as barnyard grass, broadleaf signalgrass, browntop and fall panicum, crabgrass, crowfootgrass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red sprangletop, robust foxtail (purple, white), seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane, ragweed (common and giant), smartweed sp., and velvetleaf.)	nonselective herbicide + acetochlor 1.6-2.4 lb + atrazine 1.0-2.0 lb or acetochlor 1.6-2.4 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	Topnotch 3.2L 4.0-6.0 pt + atrazine 1.0-2.0 qt or Topnotch 3.2L 4.0-6.0 pt + atrazine 1.0-2.0 pt + simazine 1.0-2.0 pt	See acetochlor comments below. Use of the highest labeled rates should result in more consistent late-season annual grass control. Topnotch plus atrazine is also available as a prepackage mix with atrazine called FulTime. Acetochlor plus atrazine is also available in other prepackage mixes including Keystone and Keystone LA.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of barley, rye, and wheat cover crops from use of Gramoxone Inteon or glyphosate and residual control of annual grasses such as barnyardgrass, broadleaf signalgrass, browntop + fall panicum, crabgrass, crowfootgrass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red rice, red sprangletop, robust foxtail (purple, white), seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge, and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane ragweed (common and giant), smartweed sp., and velvetleaf	nonselective herbicide + the approved tank-mix: acetochlor 1.54-2.4 lb + atrazine 1.25-2.0 lb or acetochlor 1.54-2.4 lb + atrazine 1.25-2.0 lb or 90W 1.39-2.2 lb + simazine 1.0-1.5 lb	nonselective herbicide + the approved tank-mix: Degree 3.8EC 3.25-5.0 pt + Atrazine 4L 1.25-2.0 qt or 90W 1.39-2.2 lb or Degree 3.8EC 3.25-5.0 pt + Atrazine 4L 1.25-2.0 qt + Princep 4L 1.0-1.5 qt or 90W 1.1-1.6 lb	See acetochlor restrictions above. Use of the highest labeled rates should result in more consistent late-season annual grass control. Degree is available in a package mix called Degree Xtra. Rates of Degree Xtra range from 2.9 to 3.7 qt/A.
Pigweed, carpetweed, chickweed, crabgrass, jimsonweed, lambsquarters, nightshade, ragweed (common), smartweed, and velvetleaf	nonselective herbicide + mesotrione 0.188-0.24 lb or mesotrione 0.188-0.24 lb + residual grass herbicide or mesotrione 0.156-0.188 lb + residual grass herbicide + atrazine 1.2-2.0 lb	nonselective herbicide + Callisto 4FL 6.0-7.7 oz or Callisto 4FL 6.0-7.7 oz + residual grass herbicide or Callisto 4FL 5.0-6.0 oz + residual grass herbicide + Atrazine 4L 1.2-2.0 qt or 90W 1.3-2.2 lb	Callisto is a systemic preemergence and postemergence herbicide for the selective contact and residual control of broadleaf weeds in field corn. Callisto is not effective for the control of most grass weeds. Many preemergence grass herbicides or a postemergence grass herbicide can be tank-mixed with Callisto to provide a broader spectrum of weed control. To broaden its broadleaf weed control ability, tank-mix atrazine with Callisto. Do not apply more than a total of 10.7 oz/A of Callisto/A/season.
Barnyardgrass, carpetweed, crabgrass (large, smooth), foxtail (giant, green, yellow), goosegrass, johnsongrass (seedling), fall panicum, common purslane, and signalgrass	nonselective herbicide + flufenacet 0.6-0.79 lb or flufenacet 0.6-0.79 lb + atrazine 1.0-2.0 lb	nonselective herbicide + Define 60DF 16.0-21.0 oz or Define 60 DF 16.0-21.0 oz + Atrazine 4L 1.0-2.0 qt or 90W 1.1-2.2 lb	Apply after planting and before corn emerges. In the event of a crop failure, corn or soybeans may be planted immediately after a Define application. Small grains may be seeded 12 months after a Define application. Adjust rate to soil texture and organic matter.

Table 5.29 - Annual Cover Crops: Rye, Wheat, Barley, or Crop Stubble (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Contact kill of barley, rye, and wheat cover crops and residual control of annual grasses, including barnyardgrass, crabgrass spp., fall panicum, foxtail spp., goosegrass, and witchgrass and annual broadleaf weeds, including jimsonweed, lambsquarters (including triazine-resistant species), morningglory spp. (suppression), nightshade, common ragweed, pigweed (including triazine-resistant), smartweed, velvetleaf, and yellow nutsedge	nonselective Herbicide + approved tank-mix: Atrazine 1.3-1.5 lb + mesotrione 0.168-0.196 lb + s-metolachlor 1.3-1.5 lb	nonselective herbicide + approved tank-mix: Lexar 3.7FL 3.0-3.5 qt	Use 3 qt/acre on soil with organic matter content less than 3% and 3.5 qt/acre on soil organic matter content 3% or greater. Do not apply more than 14 days prior to planting or to field corn taller than 12 inches. Do not graze or feed forage from treated areas for 45 days following last application. Do not harvest forage, grain, or stover within 60 days after last application. Do not apply other mesotrione containing products (Callisto, Camix, or Lumax) to ground that has been treated the same season. The addition of Princep will improve preemergence broadleaf and annual grass control. Do not apply Lexar postemergence to corn that has received an at-plant application of Counter. Do not make a postemergence application of Lexar in a tank-mix with any organophosphate or carbamate insecticide. Do not make a postemergence application of any organophosphate or carbamate insecticide within 7 days before or 7 days after a Lexar application. If significant rainfall does not occur within 7 days after application, weed control may be decreased. Do not rotate to crops other than corn, cotton, small grains, sorghum or peanuts the spring following application of Lexar herbicide. If applied after June 1, do not rotate with crops other than corn or sorghum the next season.
Early preplant control of annual grasses.	Simazine 1.0-1.5 lb	Princep 4L 1.0-1.5 qt or 90DF 1.1-1.7 lb	Apply 2-4 weeks prior to corn planting. Rainfall is necessary for satisfactory control. Apply additional burndown and residual herbicides at planting as required.
Supplement to paraquat or glyphosate early preplant, burndown treatments. For added control of hard to control annual broadleaf weeds present at no-till corn establishment, suppression of some perennial broadleaf species, and control of alfalfa and clovers.	2,4-D 0.25-0.5 or Dicamba 0.25-0.375 lb	2,4-D 0.5-1.0 pt or Banvel 0.5-0.75 pt	Add 2,4-D or dicamba to paraquat or glyphosate for added burndown of hard to control broadleaf weeds. Use the lower rate of 2,4-D on light sandy soils and the higher rate only on heavy soils. Do not apply dicamba on light, sandy, coastal plain soils as a preemergence treatment. Adjust dicamba rate to soil texture and organic matter content as labeled. Use 2,4-D for added control or suppression of mustard spp., plantains, horseweed, dandelion, and 2,4-D susceptible annual broadleaf weeds. Use dicamba for control or suppression of dock, clovers, alfalfa, and dicamba-susceptible annual broadleaf weeds.

Triazine-resistant Weeds in No-till Corn

For pigweed control, use a nonselective herbicide plus atrazine in combination with chloroacetamide herbicide (alachlor, s-metolachlor, acetochlor, or dimethenamid-p). Simazine may also be included where required for late-season annual-grass control. The chloroacetamide herbicide will suppress or control initial triazine-resistant pigweed flushes, but in most years an early postemergence application of dicamba will be required for season-long control. For control of triazine-resistant pigweed, common lambsquarters, and velvetleaf, use a nonselective herbicide in combination with flumetsulam (Python) or rimsulfuron plus thifensulfuron-methyl (Basis). With timely activation rainfall, these treatments can provide season-long control of these species without supplemental postemergence herbicide applications. Atrazine should generally be applied in combinations with flumetsulam for broad-spectrum weed control. A residual grass herbicide should be tank mixed with Python or Basis for season-long grass control. Lumax, a blend of s-metolachlor + atrazine + mesotrione (Callisto) also provides excellent season-long control of triazine-resistant lambsquarters and pigweed species.

Corn (Conventional Tillage) Herbicide Use

Table 5.30 - Preplant Incorporated

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Barnyardgrass, carpetweed, crabgrass (large, smooth), foxtail (giant, green, yellow), goosegrass, johnsongrass (seedling), fall panicum, common purslane, and signalgrass	flufenacet 0.525-0.75 lb or flufenacet 0.525-0.75 lb + atrazine 1.0-2.0 lb	Define 60DF 14.0-20.0 oz or Define 60DF 14.0-20.0 oz + Atrazine 4L 1.0-2.0 qt or 90W 1.1-2.2 lb	Apply to the soil and incorporate into top 2 inches of soil before planting using a field cultivator, disk harrow, or similar implement. Read the label and adjust rate to soil texture and organic matter content of soil. In the event of a crop failure, corn or soybeans may be planted immediately after a Define application. Small grains may be seeded 12 months after a Define application.
Barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, signalgrass, witchgrass, yellow nutsedge, carpetweed, Florida pusley, and pigweed.	s-metolachlor 0.95-1.6 lb	Dual II Magnum 7.64L 1.0-1.67 pt	Apply to the soil and incorporate into the top 2 inches within 14 days before planting using a disk, harrow, rolling cultivator, or similar implement. Small grains may be planted 4.5 months following treatment. Do not graze or feed forage or fodder from small grains to livestock. S-metolachlor is also available as Cinch.
Above weeds and cocklebur, common purslane, lambsquarters, pigweed spp., morning glory, ragweed, smartweed, and velvetleaf	s-metolachlor 0.76-1.6 lb + atrazine 1.0-2.0 lb	Dual II Magnum 7.64L 0.8-1.67 pt + atrazine 4L 1.0-2.0 qt or 90DF 1.1-2.2 lb or Bicep II Magnum 5.5L 1.3-2.6 qt	Apply tankmixture to the soil and incorporate into the top 2 inches before planting using a disk, harrow, rolling cultivator, or similar implement. Read the label and adjust rate to soil texture and organic matter content. See metolachlor restrictions above. S-metolachlor plus atrazine is also available in the prepackage mix Cinch ATZ.

Table 5.30 - Preplant Incorporated (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Barnyardgrass, crabgrass, fall panicum, foxtail millet, giant foxtail, goosegrass, green foxtail, signalgrass, southwestern cupgrass, witchgrass, yellow foxtail, yellow nutsedge, carpetweed, cocklebur, common purslane, Florida pusley, lambsquarters, morning-glory, pigweed spp., ragweed, smartweed, velvetleaf, sandbur, seedling johnsongrass, and volunteer sorghum	s-metolachlor 0.76-1.6 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	Dual II Magnum 7.64L 0.8-1.67 pt + Atrazine 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb + Princep 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb	Apply the tankmixture to the soil and incorporate into the top 2 inches of soil within 14 days before planting using a finishing disk, harrow, rolling cultivator, or similar implement capable of providing uniform 2 inches incorporation. If corn is to be planted on beds, apply and incorporate the tankmixture after bed formation. Read the label and adjust rate to soil texture and organic matter content. Note: Metolachlor plus atrazine plus simazine may also be applied as Bicep II Magnum or Cinch ATZ plus Princep (simazine). Consult label for specific ratios.
Barnyardgrass, crabgrass spp., foxtail spp., goosegrass, seedling johnsongrass, yellow Nutsedge, panicum spp., shattercane, broadleaf signa lgrass, witchgrass, pigweed spp., ca rpetweed, common chickweed, cocklebur, galinsoga, henbit, horseweed, jimsonweed, lambsquarters spp., Venice mallow, morningglory spp., purselane, ragweed spp., sicklepod, prickly sida, smartweed, spurge spp., velvetleaf, and others	acetochlor 0.70 - 0.94 lb + clopyralid 0.071 - 0.095 lb + flumetsulam 0.023 - 0.030 lb	SureStart 4.25 E 1.5 - 2.0 pt	SureStart contains acetochlor. Follow acetochlor use restrictions. If incorporated, uniformly incorporate into the top 2 to 3 inches of soil. Adequate soil moisture is required for preemergence surface activity. If adequate soil moisture is not received within 7 to 10 days following a surface-applied treatment, a shallow cultivation is recommended. Injury to corn has been observed when cool, wet soil conditions follow application. Refer to label restrictions regarding insecticide interactions. Do not use as a soil-applied treatment in fields with less than 1.5% organic matter content unless risk of crop injury is acceptable. SureStart may also be applied as a postemergence treatment to corn up to 11 inches in height and weeds up to 1 to 2 inches in height.
Barnyardgrass, carpetweed, crabgrass, foxtail (giant, green and yellow), goosegrass, nutsedge (yellow), panicum (fall), pigweed spp., pusley (Florida), signalgrass and witchgrass	Dimethenamid-P 0.66-0.98 lb	Outlook 6EC 14.0-21.0 oz	Apply to the soil and uniformly incorporate into the top 2 inches within 14 days before planting using a field cultivator, disk harrow, or similar implement. Small grains may be planted 4 months following treatment.
Above weeds and johnsonweed, cocklebur, lambsquarters, morning-glory spp., pigweed spp., purslane, ragweed, smartweed, velvetleaf and nightshade (black)	Dimethenamid-P 0.66-0.98 lb + atrazine 1.0-2.0 lb	Outlook 6EC 14.0-21.0 oz + atrazine 4L 1.0-2.0 qt or 90W 1.1-2.2 lb	Apply tankmixture to the soil and incorporate into the top 2 inches of soil before planting using a field cultivator, disk harrow, or similar implement. Read the label and adjust rate to soil texture and organic matter content of soil. See dimethenamid restrictions above. Dimethenamid plus atrazine may also be applied as the prepackage mix Guardsman Max.

Table 5.30 - Preplant Incorporated (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Barnyardgrass, carpetweed, crabgrass, cupgrass (southwestern), foxtail (giant, green and yellow), goosegrass, johnsongrass seedling, lambsquarters, millet (foxtail), morning glory spp., nutsedge (yellow), panicum (fall), pigweed spp., purslane, pusley (Florida), ragweed, sandbur, signalgrass, smartweed, velvetleaf, volunteer sorghum and witchgrass	Dimethenamid-P 0.66-0.98 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	Outlook 6EC 14.0-21.0 oz + atrazine 4L 0.5-1.0 qt or 90W 0.5-1.1 lb + Princep 4L 0.5-1.0 qt or 90W 0.5-1.1 lb adjust rate to soil texture and	Apply the tankmixture to the soil and incorporate into the top 2 inches of soil within 14 days before planting using a finishing disk, harrow, field cultivator or similar implement capable of providing uniform 2 inch incorporation. If corn is to be planted on beds, apply and incorporate the tankmixture and organic matter content of soil. Dimethenamid plus atrazine may also be applied as the prepackage mix Guardsman Max.

Table 5.31 - Preemergence

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Acetochlor use restrictions:			
-Read label concerning personal protective equipment.			
-This product is toxic to fish. Avoid application/runoff to areas containing aquatic life.			
-This chemical demonstrates the properties and characteristics associated with chemicals detected in ground water. Avoid permeable soils and minimize runoff.			
-Do not apply to coarse soils classified as sands with less than 3% OM, loamy sands less than 2% OM, or sandy loams less than 1% OM, where depth to groundwater is 30' or less.			
-Observe restrictions on label concerning mixing, loading, rinsing, and washing.			
-Do not apply through irrigation equipment.			
-Do not apply using aerial application equipment.			
-Do not use acetochlor on any crop other than corn.			
Barnyardgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails (giant, green, and yellow), goosegrass, purslane (common), signalgrass, witchgrass, and pigweed spp.	Alachlor 2.0-3.25 lb	Micro-Tech 2.0-3.25 qt or other alachlor formulations	Apply after planting and before crop or weeds emerge. Read label and adjust rate to soil texture and organic matter content. Most effective on grasses; higher rate improves control of many broadleaf weeds.
Above weeds and black nightshade, jimsonweed, lambsquarters, morning-glory, mustards, pigweed spp., ragweed, smartweed, and velvetleaf	Alachlor 1.5-3.0 lb + atrazine 1.0-1.6 lb	Micro-Tech 1.5-3.0 qt or other alachlor formulations + atrazine 4L 1.0-1.6 qt, or 90DF 1.1-1.8 lb or Bullet (prepackage mix) 2.5-4.5 qt	Read label and adjust rate to soil texture and organic matter content. See other remarks and precautions to the use of alachlor and atrazine separately. Alachlor and atrazine may be applied as a tankmix and incorporated into the top 2 inches of soil within 7 days before planting. Certain alachlor formulations may also be applied as an early postemergence treatment up to the time when weeds reach the 2 leaf stage and corn is not more than 5 inches high. Do not apply as an early postemergence treatment in fluid fertilizer.

Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Many annuals: Florida pusley, lambsquarters, morning-glory, nightshade, mustards, redroot pigweed, velvetleaf, and witchgrass. Broadleaf weeds listed above for atrazine plus barnyardgrass, <i>Brachiaria</i> sp., crabgrass, foxtails, fall panicum, Florida pusley, goosegrass, lambsquarters, morning-glory, mustards, nightshade, redroot pigweed, ragweed, smartweed, spanish needles, and witchgrass	Atrazine 1.5-2.0 lb or atrazine 1.0-1.5 lb + simazine 1.0-1.5 lb	Atrazine 4L 1.5-2.0 qt or 90 DF 1.66-2.21lb or atrazine 4L 1.0-1.5 qt or 90DF 1.1-1.6 lb + Princep 4L 1.0-1.5 qt or 90DF 1.1-1.6 lb	Spray immediately after planting. Use lower rate on light soils. Shallow cultivation usually will improve weed control. Do not plant any crop the following year except those specified on the label the following year. Do not apply more than 4 lb of atrazine or simazine in any one year. Use 1:2 ratio of atrazine to simazine on more severe annual grass problem areas.
Barnyardgrass, crabgrass, fall panicum, foxtails, pigweed spp., signalgrass, witchgrass, yellow nutsedge, goosegrass, carpetweed, and Florida pusley	s-metolachlor 0.95-1.6 lb	Dual II Magnum 7.64L 1.0-1.67 pt	Apply after planting and before corn emerges. Small grains may be seeded 4.5 months after treatment. Do not graze or feed forage or fodder from small grains to livestock. Adjust rate to soil texture. S-metolachlor is also available as Cinch.
Above weeds and cocklebur, lambsquarters, ragweed, smartweed, and velvetleaf	s-metolachlor 0.67-1.6 lb + atrazine 1.0-2.0 lb	Dual II Magnum 7.64L 0.8-1.67 pt + atrazine 4L 1.0-2.0 qt or 90DF 1.1-2.2 lb or use Bicep II Magnum 5.5L 1.3-2.6 qt	See above for respective herbicides. Metolachlor plus atrazine (Bicep) also may be applied as an early postemergence treatment up to the time when weeds reach the 2 leaf stage and corn is no more than 5 inches high. Do not apply as an early postemergence treatment in fluid fertilizer. Atrazine plus s-metolachlor is also available as the prepackage mix Cinch ATZ.
Barnyardgrass, crabgrass, fall panicum, foxtail millet, giant foxtail, signalgrass, southwestern cupgrass, witchgrass, yellow nutsedge, carpetweed, cocklebur, common purslane, Florida pusley, lambsquarters, morning-glory, pigweed spp., ragweed, smartweed, velvetleaf, sandbur, seedling johnsongrass, and volunteer sorghum	s-metolachlor 0.67-1.4 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	Dual II Magnum 7.64 L 0.8-1.67 pt + atrazine 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb + Princep 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb	Apply the tankmixture during planting (behind the planter) or after planting but before weeds or corn emerge. Read the label and adjust rates to soil texture and organic matter content. Check labels for instructions regarding planting of rotational crops. Note: Metolachlor plus atrazine plus simazine may also be applied as Bicep or Cinch ATZ plus Princep (simazine). Consult labels for specific ratios.

Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Annual grasses including barnyardgrass, crabgrass spp., fall panicum, foxtail spp., goosegrass and witchgrass and annual broadleaf weeds including jimsonweed, lambsquarters (including triazine-resistant species), nightshade, common ragweed, pigweed (including triazine-resistant species), smartweed, and velvetleaf	atrazine 0.625-0.75 lb + mesotrione 0.168-0.2 lb + s-metolachlor 1.68-2.0 lb	Lumax 4.0L 2.5-3.0 qt	Use the 2.5 qt rate on soils of less 3.0% organic matter content, and the 3.0 qt rate on soils of greater than 3.0% organic matter. Unsatisfactory weed control may be observed if activation rainfall is not received within 7 days of application. Lumax contains a relatively low rate of atrazine. Broadleaf weed control can be significantly improved through use of additional atrazine. The addition of Princep will also improve broadleaf and annual grass control. Lumax provides control of triazine-resistant pigweed and lambsquarters species. Do not rotate to crops other than corn (all types), cotton, soybeans, sorghum, or peanuts in the spring following application. Lumax can also be applied as an early postemergence treatment on corn up to 5 inches in height. Early postemergence applications will not provide consistent control of emergent annual grasses.
Barnyardgrass, carpetweed, crabgrass, foxtail (giant, green and yellow), goosegrass, nutsedge (yellow), panicum (fall), pigweed spp., pusley (Florida), signalgrass and witchgrass	Dimethenamid-P 0.66-0.98 lb	Outlook 6EC 14.0-21.0 oz	Apply after planting and before corn emerges. Small grains may be seeded 4 months after treatment. Adjust rate to soil texture.
Above weeds and cocklebur, lambsquarters, ragweed, smartweed and velvetleaf	Dimethenamid-P 0.66-0.98 lb + atrazine 1.0-2.0 lb or atrazine 0.15-1.0 lb + simazine 0.5-1.0 lb	Outlook 6EC 14.0-21.0 oz + atrazine 4L 1.0-2.0 qt or 90DF 1.1-2.2 lb atrazine 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb Princep 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb	See above for respective herbicides. Frontier plus atrazine also may be applied as an early postemergence treatment up to the time when weeds reach the two-leaf stage and corn is no more than 8 inches high. Do not apply as an early postemergence treatment in fluid fertilizer. Dimethenamid plus atrazine may also be applied as the prepackage mix Guardsman Max or Leadoff.

Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Carpetweed, chickweed, cocklebur, henbit, horseweed, jimsonweed, lambsquarters, morning-glory, nightshade, pigweeds, purslane, red clover, ragweed (common) sicklepod, sida (prickly), smartweed, spurred anoda, velvetleaf.	Flumetuslam + clopyralid 0.171-0.257 lb or Flumetsulan 0.04-0.07 lb	Hornet 78.5D 4.0-6.0 oz or Python 80D 0.80-1.33 oz	If incorporating, uniformly incorporate the herbicide treatment into the top 2-3 inches of the final seedbed. Adequate soil moisture is required for optimum herbicidal activity. If adequate soil moisture is not received within 7-10 days after a surface applied treatment, a shallow cultivation is recommended. If using in liquid fertilizer solution, water soluble packets containing Hornet or Python should be pre-mixed with water and added to the spray tank through a 20-35 mesh screen. Soil insecticides should be applied in a band to avoid potential injury. Plant corn at least 1.5 inches deep with soil organic matter > 1.5% and soil temperature above 50° F. If these three criteria are not met, injury may occur. To avoid crop injury, plant Clearfield corn hybrids. Observe rotational restrictions on label. Hornet and Python are approved for use with most residual grass herbicides.
Annual grasses such as barnyard grass, bristly foxtail, broadleaf signal grass, browntop + fall panicum, crabgrass, crowfootgrass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red rice, red sparangletop, robust foxtail (purple, white), seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane, ragweed (common and giant), smartweed sp. and velvetleaf.	Acetochlor 1.53-2.4 lb + atrazine 1.25-2.0 lb	Harness 7EC 1.75-2.75 pt + atrazine 4L 1.25-2.0 qt or 90 DF 1.4-2.2 lb	See acetochlor restrictions below. Acetochlor plus atrazine is also available in a prepackage mix called Harness Extra.

Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Residual control of annual grasses such as barnyard- grass, broadleaf signal- grass, browntop + fall panicum, crabgrass, crowfoot- grass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red rice, red sprangletop, robust foxtail (purple, white), seedling john- songgrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge, and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane ragweed (common and giant), smart- weed sp., and velvetleaf.	acetochlor 1.54-2.4 lb + atrazine 1.25-2.0 lb or acetochlor 1.54-2.4 lb + atrazine 1.25-2.0 lb + simazine 1.0-1.5 lb	Degree 3.8EC 3.25-5.0 pt + Atrazine 4L 1.25-2.0 qt or 90W 1.39-2.2 lb or Degree 3.8EC 3.25-5.0 pt + Atrazine 4L 1.25-2.0 qt or 90W 1.39-2.2 lb + Princep 4L 1.0-1.5 qt or 90W 1.1-1.6 lb	See acetochlor restrictions below. Use of the highest labeled rates should result in more consistent late-season annual grass control. Degree plus atrazine is available in a package-mix called Degree Xtra. Rates of Degree Xtra range from 2.9 to 3.7 quarts per acre.
Annual grasses such as barnyard grass, bristly foxtail, broadleaf signal grass, browntop + fall panicum, crabgrass, crowfootgrass, field sandbur, foxtail millet, foxtails (giant, green, yellow), goosegrass, prairie cupgrass, red rice, red sparangletop, robust foxtail (purple, white), seedling johnsongrass, shattercane, Texas panicum, wild proso millet, witchgrass, yellow nutsedge and broadleaf weeds such as carpetweed, cocklebur, Florida beggarweed, galinsoga, ground cherry, jimsonweed, lambsquarters, nightshade (black and hairy), pigweed, prickly sida, purslane, ragweed (common and giant), smartweed sp. and velvetleaf.	Acetochlor 0.8-2.4 lb + atrazine 1.0-2.0 lb or Acetochlor 0.8-2.4 lb + atrazine 0.5-1.0 lb + simazine 0.5-1.0 lb	Topnotch 3.2L 2.0-6.0 pt + atrazine 4L 1.0-2.0 qt or 90 DF 1.1-2.2 lb or Topnotch 3.2L 2.0-6.0 pt + atrazine 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb + Princep 4L 0.5-1.0 qt or 90DF 0.6-1.1 lb	See acetochlor restrictions below. Topnotch plus atrazine is also available in the prepackage mix FulTime. Acetochlor plus atrazine is also available in the prepackage mixes including Keystone and Keystone LA.

Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Pigweed, carpetweed, chickweed, crabgrass, jimsonweed, lambsquarters, nightshade, ragweed (common), smartweed, and velvetleaf.	mesotrione 0.188-0.24 lb	Callisto 4FL 6.0-7.7 oz	Callisto is a systemic preemergence and postemergence herbicide for the selective contact and residual control of broadleaf weeds in field corn. Callisto is not effective for the control of most grass weeds. Most preemergence grass herbicides or a postemergence grass herbicide can be tank mixed with Callisto to provide a broader spectrum of weed control. To broaden its broadleaf weed control ability, tank-mix atrazine with Callisto. Do not apply more than a total of 10.7 oz/A of Callisto/A/season.
	or mesotrione 0.188-0.24 lb	or Callisto 4FL 6.0-7.7 oz	
	+	+	
	residual grass herbicide or mesotrione 0.156-0.188 lb	residual grass herbicide or Callisto 4FL 5.0-6.0 oz	
	+	+	
	residual grass herbicide + atrazine 1.2-2.0 lb	residual grass herbicide + Atrazine 4L 1.2-2.0 qt or 90W 1.3-2.2 lb	
Residual control of annual grasses, including barnyardgrass, crabgrass, spp. fall panicum, foxtail spp., goosegrass, and witchgrass and annual broadleaf weeds, including jimsonweed, lambsquarters (including triazine-resistant species), morning-glory spp. (suppression), nightshade, common ragweed, pigweed (including triazine-resistant), smartweed, velvetleaf, and yellow nutsedge	atrazine 1.3-1.5 lb	Lexar 3.7FL	Use 3 qt/A on soil with organic matter content less than 3% and 3.5 qt/A on soil organic-matter content 3% or greater. Do not apply more than 14 days prior to planting or to field corn taller than 12 inches. Do not graze or feed forage from treated areas for 45 days following last application. Do not harvest forage, grain, or stover within 60 days after last application. Do not apply other mesotrione-containing products (Callisto, Camix, or Lumax) to ground that has been treated the same season. The addition of Princep will improve broadleaf and annual grass control. Do not apply Lexar postemergence to corn that has received an at-plant application of Counter. Do not make a postemergence application of Lexar in a tank-mix with any organophosphate or carbamate insecticide. Do not make a postemergence application of any organophosphate or carbamate insecticide within 7 days before or 7 days after a Lexar application. If significant rainfall does not occur within 7 days after application, weed control may be decreased. Do not rotate to crops other than corn, cotton, small grains, sorghum, or peanuts the spring following application of Lexar herbicide. If applied after June 1, do not rotate with crops other than corn or sorghum the next season.
	+	3.0-3.5 qt	
	mesotrione 0.168-0.196 lb		
	+		
	s-metolachlor 1.3-1.5 lb		

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Table 5.31 - Preemergence (cont.)

Weed Problem	Chemical Rate per acre	Product per acre	Remarks
Barnyardgrass, large crabgrass, smooth crabgrass, foxtail (green, giant, yellow) goosegrass, seedling johnsongrass, fall panicum, broadleaf signalgrass, witchgrass, Florida beggarweed, carpetweed, galinsoga, common lambsquarter, pigweed, common purslane, Florida pusley, spotted spurge	flufenacet 0.44-0.78 lb + metribuzin 0.11-0.2 lb + atrazine 1.0-2.0 lb	Axiom 13-23 oz atrazine 4L 1.0-2.0 qt or 90D 1.1-2.2 lb	Plant corn 1.0 to 1.5 inches deep. Axiom is not labeled for application to emerged corn plants.
Barnyardgrass, carpetweed, crabgrass (large, smooth), foxtail (giant, green, yellow), goosegrass, johnsongrass (seedling), fall panicum, common purslane, and signalgrass	flufenacet 0.525-0.75 lb + atrazine 1.0-2.0 lb	Define 60 DF 14.0-20.0 oz + Atrazine 4L 1.0-2.0 qt or 90W 1.1-2.2 lb	Apply after planting and before corn emerges. Define may also be applied early postemergence through the 5th leaf of corn, but will not control emerged weeds and grasses. In the event of a crop failure, corn or soybeans may be planted immediately after a Define application. Small grains may be seeded 12 months after a Define application. Adjust rate to soil texture and organic matter.
Barnyardgrass, crabgrass spp., foxtail spp., goosegrass, seedling johnsongrass, yellow Nutsedge, panicum spp., shattercane, broadleaf signalgrass, witchgrass, pigweed spp., carpetweed, common chickweed, cocklebur, galinsoga, henbit, horseweed, jimsonweed, lambsquarters spp., Venice mallow, morningglory spp., purselane, ragweed spp., sicklepod, prickly sida, smartweed, spurge spp., velvetleaf, and others	acetochlor 0.7-0.94 lb + clopyralid 0.071-0.095 lb + flumetsulam 0.023-0.03 lb	SureStart 4.25E 1.5-2.0 pt	SureStart contains acetochlor. Follow acetochlor use restrictions. If incorporated, uniformly incorporate into the top 2 to 3 inches of soil. Adequate soil moisture is required for preemergence surface activity. If adequate soil moisture is not received within 7 to 10 days following a surface-applied treatment, a shallow cultivation is recommended. Injury to corn has been observed when cool, wet soil conditions follow application. Refer to label restrictions regarding insecticide interactions. Do not use as a soil-applied treatment in fields with less than 1.5% organic matter content unless risk of crop injury is acceptable. SureStart may also be applied as a postemergence treatment to corn up to 11 inches in height and weeds up to 1 to 2 inches in height.

Table 5.32 - Post-herbicide Application Restrictions for Corn

Herbicide	Over-the-top application	Use of drop nozzles	Comment
2,4-D	<8" tall	0.5 pt—8" to 36" tall	
Accent	20" or 6-collar	20" to 36" or 10-collar	
Aim	Up to 8-leaf collar stage	up to 14-leaf collar stage	
Atrazine	12" tall		
Banvel or Clarity	1.0 pt—8" tall or 5 leaves; 0.5 pt—8" to 36" tall or 15 days before tassel emergence		Do not apply Banvel or Clarity near soybeans if corn is >24" tall or if soybeans are >10" tall or have begun to bloom
Basis	Spike to 4 leave (or 2 collars) or 0.5" to 6" tall		Do not apply to corn >6" tall or having 3 collars
Beacon	4" to 20" tall (freestanding)	For splits, 20" tall to before tassel emergence	
Buctril	1.0 pt—emergence to tassel; 1.5 pt—4 leaves to tassel		Postemergence application before 3-leaf stage may result in corn leaf burn
Callisto	Up to 30" tall (or 8-leaf stage of corn)		
Celebrity Plus	4" to 24" tall (freestanding) or <6 collars (V6 stage)	When necessary	
Distinct	4" to 24" tall		
Equip	0" to 12" or V4	V4-V8, 12" to 36"	Use the more restrictive of growth stage or height recommendations
Expert	Up to 12" tall	N/A	Apply to Roundup Ready hybrids only
Halex GT	30" or 8-leaf		
Harmony SG	2 to 6 leaves up to 12" tall (1 to 4 collars)		Do not apply to corn >12" tall or having 4 collars
Hornet	Emergence up to 20" tall		
Ignite 280	Up to 5-collar		Apply to Liberty Link or GR corn hybrids only
Impact	Up to 45 days before harvest	When necessary	
Laudis	Up to V8		
Lightning	Up to 20" tall	When necessary	Apply to Clearfield or IMI corn hybrids only
Marksman	Emergence to 5-leaf stage (or up to 8" tall)		
NorthStar	4" to 20" (or 6 collars)	>20" to 30" tall	
Option	0" to 16" or V6	V6-V8, 16" to 36"	Use the more restrictive of growth stage or height recommendations.
Permit/Sandea	Spike to 48" tall	When necessary	If tank mixed with 2,4-D, apply to corn up to 8" tall; with Banvel or Clarity up to 36" tall corn
Require Q	4" to 20" or V2-V6		
Resolve	Up to 12" tall or 6 leaf collars		
Resolve Q	20" or 7-collar		
Resource	2-leaf to 10-leaf stage (collars must be visible)	When necessary to direct below corn leaves	

Table 5.32 - Post-herbicide Application Restrictions for Corn (cont.)

Herbicide	Over-the-top application	Use of drop nozzles	Comment
Roundup	Up to 30" tall (V8 stage)		Apply to Roundup-Ready hybrids Weather Max only
Sequence	Up to 30"		Only postemergence in glyphosate-resistant corn
Spirit	4" to 20" or 6-collar	20" to 24"	
Status	4" to 35" or V2-V10		
Stout	Up to 16" or 5 leaf collars		Target applications to corn that is less than 12" tall for best overall performance
SureStart	Up to 11"		
Touchdown IQ	Emergence through V8 stage		Apply to Roundup-Ready hybrids only
Yukon	Spike through 36" tall	When necessary	

Table 5.33 - Postemergence

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Cocklebur, nightshade (black), morning glory, jimsonweed, mustards, ragweed, velvetleaf, barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, johnsongrass from seed, lambsquarters pigweed spp., and signalgrass	Pendimethalin 0.75-1.5 lb + atrazine 1.0-1.6 lb	Prowl 3.33 EC 0.9-1.8 qt + atrazine 4L 1.0-1.6 qt or 90DF 1.1-1.8 lb	Refer to label for rate of application for different soil types and organic matter content and for mixing procedures. Some injury can occur if seed is not well covered with soil. Apply as early postemergence treatments in water only up until corn reaches the 2 leaf stage and weeds are no more than 1 inch high. These combinations are particularly effective as early postemergence treatments for velvetleaf control.
Barnyardgrass, crabgrass, foxtails, lambsquarters, morning glory, nightshade, pigweed, purslane, ragweed, cocklebur, mustards and smartweed	Atrazine 2.0-2.5 lb + crop oil concentrate	Atrazine 4L 2.0-2.5 qt or 90DF 2.2-2.7 lb + crop oil concentrate 1.0 qt	Use in single broadcast spray before weeds exceed 1.5 inch in height. Use oil/atrazine in 20 gal/A. Do not include oil in atrazine sprays when corn is under stress from prolonged cold, wet weather, poor fertility, or other factors, or when corn is wet and succulent from recent rainfall because crop injury may occur. Do not use oil in sprays when treating inbred lines or other breeding stock. Adding other pesticides, fertilizers, or other material to the oil/water emulsions may cause compatibility problems or crop injury. Follow instructions on the container for proper mixing and maintaining the emulsion in the spray tank.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails (giant, green, yellow), galinsoga, goosegrass, lambsquarters, pigweed spp., morning-glory, purslane (common), ragweed (common), smartweed, prickly sida, cocklebur, sicklepod, sesbania, and velvetleaf	Linuron 0.63-1.5 lb + surfactant	Lorox DF 1.25-3.0 lb or Linex 4L 1.25-3.0 pt + surfactant as labeled	Apply as a single directed spray in 25 gal of water after corn is at least 15 inches high and weeds are up to 5 inches high. Thoroughly cover weed foliage without contacting upper leaves or whorl of corn because such contact causes crop injury. Use wetting agent suggested by manufacturer. Do not plant to other crops not on the label within 4 months after treatment. Gauge wheels and/or leaf-lifter equipment should be used to prevent corn leaf contact with spray. Provide continuous agitation in tank.
Above weeds and nutsedge, shattercane and signalgrass	Ametryn 1.6-2.0 lb + surfactant	Evik 80W 2.0-2.5 lb + surfactant as labeled	Same as above. Apply in a minimum of 20 gal of water or nonpressure nitrogen solution. Do not harvest, graze, or feed forage to livestock until 30 days after application. Do not apply if temperatures are low. Do not plant any rotational crop other than small grains until the following year. Do not apply within 3 weeks of tasseling.
Canada thistle, beggarticks, cocklebur, dayflower, jimsonweed, prickly sida, ragweed, smartweed, spurred anoda, velvetleaf, wild mustard, wild sunflower, and yellow nutsedge	Bentazon 0.75-1.0 lb + crop oil concentrate	Basagran 0.75-1.0 qt + crop oil concentrate 1.0 qt	Refer to label because the rate of application is dependent on leaf stage and height of weeds to be controlled. For Canada thistle and yellow nutsedge, follow with a second application if needed in 7 -10 days. Cultivation within 10-14 days after application will improve control. For some species (jimsonweed and cocklebur), the addition of a crop oil concentrate is not required for adequate control.
Beggarticks, bindweed, burdock, cocklebur, coffeeweed, carpetweed, Florida pusley, galinsoga, horseweed, jimsonweed, lambsquarters, morning-glory (annual), mustards, nightshade (black), purslane (common), ragweed (common), smartweed, spanish needles, sunflower, velvetleaf, pigweed spp., and sicklepod	2,4-D 0.25-0.5 lb	2,4-D amine or LVE 0.5-1.0 pt of a 4.0 lb/gal formulation or equivalent.	Use from time corn emerges until layby. Do not cultivate for 10 days, or corn may break off. Small weeds are easier to kill; use higher rate for larger weeds. Grasses are not controlled. After corn is more than 10 inches high direct the spray below top of corn plant (use drop nozzles). Many current formulations contain greater than 4.0 lb ai/gal.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Clovers, cocklebur, jimsonweed, lambsquarters, morning-glory, mustards, black nightshade, pepperweed, pigweed spp., prickly sida (teaweed), purslane, ragweed, smartweed, prostrate spurge, velvetleaf, and Canada thistle suppression	Dicamba 0.25-0.5 lb dicamba 0.26-0.47 lb + atrazine 0.52-0.94 lb	Banvel/Clarity 0.50-1.0 pt Marksman 2.0-3.5 pt	Use the early postemergence rate as labeled for the specific soil type for corn up to the fifth leaf. For corn past the 5 leaf stage, use only Banvel at the 0.25 lb (0.50 pt) rate. Apply Banvel in this manner after weeds have emerged but before corn is burcucumber, giant ragweed, tassel emergence. Best performance occurs when weeds are small. Drop-nozzles may be used to increase coverage where corn leaves cover weeds. Do not graze or harvest for dairy or beef feed before ensilage (milk) stage. Observe precautions to avoid drift to adjacent crops. Also may be applied as a dicamba plus atrazine prepackage mix as Marksman.
Burcucumber, carpetweed, cocklebur, jimsonweed, lambs-quarters, marestalk, morning-glory spp., nightshade (black) pigweed spp., ragweed (common & giant), sicklepod sida (prickly), smartweed velvetleaf, suppression of perennial broadleaf weeds such as alfalfa, bindweed, clover, dandelion, dock dogbane, horsenettle, milk-weed spp., pokeweed, and thistles.	Sodium salt of dicamba 0.175-0.263 lb + diflufenzopyr	Distinct 70DF 4.0-6.0 oz	Apply Distinct up to 6 oz/A from 4 to 10-inch corn. Apply 4 oz/A from 10 to 24-inch tall corn. Do not exceed a total of 10 oz/A per season. Adjuvants must be used. Use a non-ionic surfactant at 0.25% v/v plus 5 qt/A of UAN (28-34% nitrogen) per 100 gallons of water. Distinct contains dicamba, the same active ingredient as Banvel or Clarity.
Nightshade spp., cocklebur, lambsquarters, common ragweed, giant ragweed, morning-glory spp., jimsonweed, smartweed spp., velvetleaf, wild buckwheat.	Bromoxynil 0.25-0.375 lb	Buctril 2E 1.0-1.5 pt	Apply as an early postemergence treatment to small weeds in corn from the 4-8 leaf stage. Adjust rate to weed size as specified by label. This treatment is nonvolatile and is appropriate to situations where the proximity of susceptible crops prohibits the use of 2,4-D or dicamba.
Contact kill of emerged annual weeds in corn	Paraquat 0.25 lb + surfactant	Gramoxone Inteon 0.5 pt + surfactant as labeled	Apply as a directed spray when corn plants are at least 10 inches high. Do not allow spray to contact more than the lower 3 inches of the corn plant. Paraquat is toxic. Follow label for proper mixing procedures.
Weeds listed above for respective chemicals plus suppression of alfalfa, Jerusalem artichoke, bindweeds, curly dock, hemp dogbane, horsenettle, or milkweed (common and honeyvine), broadleaf plantain, red sorrel, and Canada thistle	2,4-D amine 0.125 lb + dicamba 0.25 lb	2,4-D 0.25 pt of a 4.0 lb/gal formulation + Banvel 0.5 pt	Observe all precautions listed for respective chemicals. When corn is greater than 8 inches, direct spray beneath corn leaves and onto weeds.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, foxtail (giant, green, and yellow), johnsongrass (seedling and rhizome), panicum (fall), pigweed, quackgrass, shattercane, and smartweed	Nicosulfuron 0.031 lb	Accent 75SP 0.66 oz or approved tankmixes: atrazine 0.75-1.5 qt or other formulations Buctril 1.0-1.5 qt or Buctril-Atrazine as labeled Banvel/Clarity 0.5-1.0 pt Marksman 2.0-3.5 pt	Prior to using Accent, consideration should be given to crop rotational plans. Consult label. Apply to corn prior to 11- leaf stage. Consult label prior to application to corn that is under stress, treated with Counter insecticide, treated preemergence or postemergence with another organophosphate insecticide or Basagran herbicide 7 days before Accent application, or a hybrid that is susceptible to MDMV or MCDV if johnsongrass is present. Always add a nonionic surfactant or crop oil concentrate when used alone. Tank-mixing with broadleaf herbicides other than atrazine may result in a reduction in annual grass control and may result in an increase in crop injury. Consult Accent label for adjuvant recommendations for tankmix combinations. A higher degree of johnsongrass control may be achieved with split applications, but do not exceed 1.33 oz/A in 1 year. Do not graze or feed forage or grain from treated areas to livestock within 30 days after application.
Barnyardgrass, foxtails (giant, green, and yellow), seedling johnsongrass, panicum (fall and Texas), ryegrass (annual), sandbur (field), signalgrass (broadleaf), shattercane, jimsonweed, chickweed, cocklebur, quackgrass, burcucumber, carpetweed, lambsquarters, marestail, morningglory spp., black nightshade, pigweed spp., ragweed (common and giant), sicklepod, sida (prickly), smartweed, velvetleaf.	Nicosulfuron 0.031 lb + sodium salt of dicamba 0.0178 lb	Celebrity Plus 70DF 4.8 oz	Do not use where Counter was applied in furrow. Temporary injury may also result when applied over top of corn that had Dyfonate, Lorsban, or Thimet applied. Apply to corn from 4-24 inches tall. Use in a minimum of 10 gal/A Applications must include a nonionic surfactant (0.25 - 0.5% v/v) and an ammonium nitrogen fertilizer (ex. 1 - 2 qts of 28 - 0 - 0). Do not apply more than 9.4 oz /A per season.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, foxtail spp., fall panicum, smartweed spp., common lambsquarters, pigweed spp., velvetleaf, and wild mustard	Rimsulfuron 0.01 lb + thifensulfuron methyl 0.005 lb	Basis 75 WDG 0.33 oz Approved tankmixes: Banvel/Clarity .25-.50 pt or Atrazine .75-1.5 pt or Marksman 2.0-3.5 pt	Apply to 1-2 inch grasses and 1-3 inch broadleaf weeds when corn is in the spike to 4 leaf stage. Applications of Basis must include a nonionic surfactant and an ammonium nitrogen fertilizer. Do not apply Basis to conventional corn hybrids previously treated with Counter 15G. Applications of Basis to conventional or corn hybrids previously treated with other insecticides may also result in crop damage. No restrictions with regard to insecticide apply when a Clearfield corn hybrid is planted. Do not tankmix Basis with Basagran, Laddok, 2,4-D, Marksman, atrazine, Beacon, or other ALS inhibiting herbicides, or with foliarly applied organophosphate or pyrethroid insecticides to avoid antagonism or crop injury. Rimsulfuron is available as a single active ingredient under the trade name Resolve.
Anoda (spurred), bindweed, burcucumber, cocklebur, jimsonweed, johnsongrass (seedling), lambsquarters, morning-glory, nightshade, pigweed, quackgrass, ragweed (common, giant), shattercane, sicklepod, sida (prickly) smartweed, thistle (Canada), velvetleaf	Prosulfuron/primisulfuron 0.036 lb + COC or NIS	Spirit 57WG 1.0 oz + approved tankmixes: Accent 0.33-0.5 oz or atrazine 0.5-1.5 qt or Banvel or Clarity 0.125-0.5 pt or Buctril 0.5-1.0 pt or Marksman 1.0-2.0 pt or 2,4-D 0.25-0.5 pt or Beacon 0.19-.38 oz or Tough 1.0-2.0 pt	Do not apply to corn under severe environmental stress. Do not apply to corn treated with Counter 15G (any application) or Counter 20CR applied in-furrow. If an IR corn hybrid is planted, the above restrictions do not apply. Apply Spirit postemergence to corn between 4 and 30 inches in height. Applications made after the corn is 24 inches tall should be post-directed. Do not apply aerially. The use of a crop oil concentrate or nonionic surfactant is recommended - consult label. Consult label for rotational restrictions.
Cocklebur, nutsedge (yellow, purple), pigweed, pokeweed, ragweed (common, giant), sunflower, velvetleaf	Halosulfuron 0.032-0.063 lb + COC or NIS	Permit/Sandea 75WG 0.6-1.3 oz + approved tankmixes: Accent 0.66 oz or atrazine 0.75-1.5 qt or Banvel or Clarity 0.25-0.5 pt or Beacon 0.76 oz or Buctril 0.5-1.0 pt or 2,4-D 0.25-0.5 pt	Do not apply to corn under severe environmental stress. Do not apply aerially. Permit, alone, can be applied over-the-top or with drop nozzles from the spike through layby stage of field corn. The use of a crop oil concentrate or nonionic surfactant is recommended - consult label. Consult label for rotational restrictions. When used exclusively with Pioneer IR field corn hybrids, Permit may be soil applied at the rate of 1.3-2.0 oz/A.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
velvetleaf	Flumiclorac 0.027-0.04 lb + Crop oil concentrate	Resource 4.0-6.0 oz + crop oil concentrate 1.0 pt	Apply as a broadcast over-the-top postemergence spray to 5-6 leaf velvetleaf and to corn that is in the 2- to 10-leaf stage. As a directed spray using drop nozzles, Resource may be applied at 8.0 oz/A. Resource has activity against several other weeds when they are in the 2- to 3-leaf stage including lambsquarters, common ragweed, and smooth pigweed. Labeled combinations include Accent, atrazine, Banvel, Basis, Basis Gold, Beacon, Buctril, Clarity, Exceed, Hornet, Laddok, Liberty (for use on corn varieties designated as Liberty Link or Gr [Glufosinate Resis- Tant]), Lightning, Marksman, Northstar, Permit, Poast and Poast Plus (for use on corn varieties designated as IMI-Corn), Roundup Ultra (for use on corn varieties designated as Roundup Ready), and Stinger.
Cocklebur, foxtail (giant, green and yellow), johnsongrass (rhizome and seedling), jimsonweed, lambsquarters, panicum (fall), pigweed, quackgrass, ragweed, shattercane, smartweed and velvetleaf	Primisulfuron 0.018-0.036 lb	Beacon 75 SP 0.38-0.76 oz approved tankmixes: atrazine 2.0-3.0 pts or other formulations Banvel/Clarity 0.25-1.0 pt Buctril 0.5-1.0 pt 2,4-D 0.5-1.0 pt Clarity 0.5-1.0 pt Accent 0.33 oz Marksman 1.0-2.0 pts	Consult county Extension office or seed corn dealer for listing of corn hybrids susceptible to Beacon applications. Apply when free-standing corn height is between 4-20 inches tall or using post directed equipment until corn tassels. Do not apply to corn that is under stress, treated with Counter insecticide, treated with an organophosphate insecticide 10 days before Beacon application, or in tankmixes with other pesticides unless recommended on the label. Wait at least 20 days after planting to apply Beacon if insecticides other than counter are applied at time of corn seeding. Do not apply an organophosphate insecticide within 10 days of Beacon application. Do not apply to hybrids susceptible to MDMV or MCDV if johnsongrass is present in field. Always add a nonionic surfactant or crop oil concentrate when sprayed alone. Tankmixing with other broadleaf herbicides may result in a reduction of grass control and may result in an increase in crop injury. Use only nonionic surfactant at 1.0 qt/100 gal when tankmixing. A higher degree of johnsongrass control may be achieved with split (0.38 oz + 0.38 oz) applications, but do not exceed 0.76 oz/A in 1 year. Do not graze or feed forage from Beacon-treated corn to livestock within 30 days after application. Consult label for rotational restrictions.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Chickweed, cocklebur, jimsonweed, lambsquarters, morning-glory, nighshade, pigweeds, purslane, ragweeds, sicklepod, sida (prickly), spurred anoda, sunflower and velvetleaf	Flumetsulam/clopyralid/ 2,4-D 0.21 lb	Scorpion III 84.3WG 0.25 lb	Apply ovetop of corn up to 8 inches tall. May be applied in Tankmix combination with other herbicides registered for postemergence application in field corn. All applications must include a nonionic surfactant at 0.25% v/v. Consult label for rotational restrictions.
Alfalfa, bindweed, burcucumber cocklebur, dandelion, dog-bane, horsenettle, horseweed, jimsonweed, lambsquarters, morningglory spp., night-shade (black) pigweed spp., ragweed (common, giant) sicklepod, sida (prickly), thistles (suppression), velvetleaf, johnsongrass (seedling), quackgrass, ryegrass (annual), and shattercane.	Primisulfuron 0.075 lb + sodium salt of dicamba 0.4 lb	NorthStar 47.4 WDG 5 oz	NorthStar can be broadcast from 4- to 20-inch corn. From a 20- to 36-inch tall corn, apply as a directed spray. Do not apply if Counter was used. Do not make a foliar post or soil application of any OP insecticide within 10 days before or 7 days after a NorthStar application.
Canada Thistle	Clopyralid 0.09-0.25 lb	Stinger 0.25-0.66 pt	Apply after corn emergence until corn reaches 24 inches to Canada thistle at least 6-8 inches in height. The addition of an adjuvant is not required.
Cocklebur, jimsonweed, lambsquarters, nightshades, pigweed, ragweed, velvetleaf	Pyridate 0.5-1.0 lb	Tough 5L 0.8-1.6 pt Approved tank mixes: Accent 0.66 oz Atrazine 0.75-1.5 pt Banvel/Clarity 0.5-1.0 pt	Tough is mostly effective on small, actively growing broadleaf weeds in the 1- to 4-leaf stage. The addition of atrazine or an approved adjuvant will provide broader spectrum control.
Anoda (spurred), cocklebur, jimsonweed, morning-glory (suppression), nightshade (suppression), purslane ragweed (common), sicklepod, sida (prickly), smartweed, thistle (Canada) (suppression), and velvetleaf	Flumetsulam 0.023 lb + clopyralid 0.063 lb	Hornet 78.5D 2.0 oz	Applications may be applied broadcast over the top of field corn up to 24 inches tall. Apply when broadleaf weeds are at the 2 to 8 inches in height. Do not apply if rainfall is expected within 6 hours. Do not apply within 85 days of harvest. Include a non-ionic surfactant at 0.25% v/v. Reduced weed control may result if applied to weeds under severe stress. If cultivating, delay for 10 days after application. Follow rotational restrictions with subsequent crops.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, large crabgrass, foxtail (giant, green, yellow), seedling johnsongrass, panicum (fall, Texas), quackgrass, ryegrass (Italian), field sandbur, shattercane, broadleaf signalgrass, jimsonweed, mustard sp., pigweed, smartweed.	Nicosulfuron 0.023 lb and rimsulfuron 0.012 lb	Steadfast 75DF 0.75 oz + approved tank-mixes: Atrazine 90DF 0.25-1.0 lb or Clarity 4L 4.0-8.0 oz or Marksman 3.2FL 1.0 pt or Hornet 78.5D 2.0 oz or Callisto 4FL 3.0 oz or Tough 5EC 1.0 pt or Stinger 3SL 2-4 oz or Distinct 70DF 1.0-2.0 oz	Apply Steadfast to corn that is up to 12 inches tall. Do not apply to corn taller than 12 inches or exhibiting 6 collars, whichever is the more restrictive. Applications of Steadfast must include either a crop oil concentrate at 1% v/v or a nonionic surfactant at 0.25 to 0.5% v/v. In addition, an ammonium nitrogen fertilizer is required. Use a high quality liquid nitrogen fertilizer such as 28-0-0 at a rate of 2.0 qt/A, or a spray grade ammonium sulfate may be used at a rate of 2.0 lb/A. Do not apply Steadfast with Basagran, Laddok, 2,4-D, or foliar applied organophosphates such as Lorsban. To avoid crop injury or antagonism, apply these products at least 7 days before or 3 days after the application of Steadfast. Do not tank-mix Steadfast with other ALS inhibiting herbicides such as Exceed, Permit, or Northstar unless the mixture is specifically recommended on Steadfast labels.
Anoda (spurred), Jerusalem artichoke, wild buckwheat, carpetweed, common cocklebur, field bindweed (suppression), jimsonweed, knotweed, lambsquarters, honeyvine milkweed, morningglory (eni-leaf, ivyleaf, pitted, tall, smallflower), mustard spp., nightshade (eastern black, black), nutsedge (suppression), pigweed (palmer, prostrate, redroot, smooth, spiny), common ragweed suppression, giant ragweed, sicklepod, prickley sida, smartweed, spurge, (prostrate, spotted) sunflower, velvetleaf, Canada thistle suppression), barnyardgrass, crabgrass (large, smooth), foxtail (giant, green, yellow) goosegrass, johnsongrass (seedling, rhizome), fall panicum, quackgrass, field sandbur, shattercane, witchgrass.	Imazethapyr 0.042 lb + imazapyr 0.014 lb	Lightning 70DG 1.28 oz + approved tank mixes: 2,4-D 0.5-1.0 pt or Banvel/Clarity 0.5-1.0 pt or Buctril 0.5-1.0 pt or Outlook 20.0-32.0 oz or Prowl 0.9-1.8 qt	Apply to Clearfield corn only. Lightning should be applied to small weeds, usually no larger than 3 inches tall. Lightning requires the addition of a nonionic surfactant. Addition of liquid fertilizer may enhance weed control. There are no soil insecticide restrictions. Lightning can carry over and cause injury to some rotational crops. Be sure to check rotational restrictions.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Control of many annual broadleaf weeds and control or suppression of some annual grasses in conventional and no-till corn production systems and suppression of many perennial weeds	Glufosinate 0.4 lb	Ignite 280SL 22.0 fl oz/A	For use only on corn varieties designated as Liberty Link or GR (glufosinate resistant). Ignite 280 may be applied from emergence until corn has 5 developed collars. A repeat application of Ignite 280 or applications with appropriate residual herbicides will be needed to control weeds that have not emerged at the time of application. Do not apply more than 44.0 fl oz/A on corn per growing season. Good coverage is required for acceptable control. Ignite 280 is a postemergence herbicide with no residual soil activity and may be applied as the only herbicide in the program, alone following preemergence herbicides, or mixed with other postemergence herbicides listed on label. Ammonium sulfate has improved broadleaf weed control by Ignite 280.
Velvetleaf, pigweed spp., lambsquarters, annual smartweeds, wild mustard.	Thifensulfuron 0.004 lb	Harmony SG 50SG 0.128 oz	Apply to corn 2 to 6 leaf (1-3 collars) or up to approximately 12 inches tall. Do not apply Harmony SG to standard IT corn hybrids if previously treated with Counter 15 G or 20 CR. Applications of Harmony SG to or IT corn hybrids treated with other insecticides may also result in crop damage. There are no restrictions with regard to insecticides applied if an IR corn hybrid is planted. Use a nonionic surfactant (0.25% v/v) or crop oil concentrate 1%. Nitrogen fertilizer is also required (UAN or spray grade ammonium sulfate).
Lambsquarters (common), morningglory (ivyleaf and pitted), nightshade (black), pigweed, velvetleaf	carfentrazone 0.008 - 0.016 lb	Aim 2EW 0.5-1.0 oz + approved tank mixes: Atrazine 4L 16.0 oz or DF 9.0 oz or Banvel/Clarity 4.0-8.0 oz	Apply to corn up to 14-leaf collar stage and when weeds are generally 1-4 inches tall. Include a nonionic surfactant at 0.25% v/v. Tank mixing with other herbicides increases weed control spectrum. Do not tank mix with EC formulated products or COC as excessive injury may occur. Injury may vary with corn hybrid and environmental conditions. When tank-mixing, make sure that the Aim is mixed in the spray tank water first. Apply to corn up to the 14-leaf collar stage at a rate of 2 oz/A with drop nozzles or sprayers capable of directing spray to target weeds and away from the corn whorl.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Control of many annual broadleaves and grasses; species and suppression or control of certain perennial species.	Glyphosate 0.75 to 1.0 lb	4.0 lb ai/gal glyphosate containing product 0.75-1.0 qt or equivalent	Apply approved glyphosate products to corn hybrids designated as Roundup Ready. Apply from emergence to V-8 (8 leaf collar visibles) or 30 inches tall, whichever occurs first. A full rate preemergence herbicide program followed by one application of glyphosate may provide better weed control under heavy weed pressure than one timely application of glyphosate. Tank-mix combinations with other residual or post herbicides are allowed by respective labels. Single in-crop applications are not to exceed 1 qt/A. Sequential in-crop applications must not exceed 2 qt/A. This product can be applied preharvest, up to 1 qt/A, after maximum kernal fill is complete (black layer formation) until 7 days before harvest. Combined total per year for all applications may not exceed 8 qt/ A. Allow a minimum of 50 days for application to corn harvest for forage and 7 days to corn harvest for grain. Do not graze, harvest, or feed corn forage or silage following sequential in-crop applications. Some Roundup Ready corn hybrids may not have acceptable disease tolerance.
Pigweed, carpetweed, chickweed, crabgrass, jimsonweed, lambsquarters, nightshade, giant ragweed, smartweed, velvetleaf, cocklebur, and yellow nutsedge.	mesotrione 0.094 lb or mesotrione 0.094 lb + atrazine 0.25 lb	Callisto 4FL 3.0 oz or Callisto 4FL 3.0 oz + Atrazine 4L 0.25 qt or 90W 0.28 lb	Callisto is a systemic preemergence and postemergence herbicide for the selective contact and residual control of broadleaf weeds in field corn. Callisto is not effective for the control of most grass weeds. Postemergence grass herbicide can be tank mixed with Callisto to provide a broader spectrum of weed control. To broaden its broadleaf weed control ability, tank-mix atrazine with Callisto. Always add crop oil concentrate at a rate of 1% v/v. Always add spray guide UAN (28-0-0) at 2.5% v/v or ammonium sulfate at 8.5 lb/ 100 gallons spray solution. Do not apply postemergence if the corn was treated with Counter or Lorsban. Do not tank-mix and apply with any organophosphat or carbamate insecticide. Do not apply an organophosphat or carbamate insecticide within 7 days before or 7 days after a Callisto application. Do not apply Callisto in a tank-mix with emulsifiable concentrate grass herbicides. Do not use methylated seed oil. Do not apply more than a total of 10.7 oz/A of Callisto/A/season.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, foxtail spp., goosegrass, johnsongrass, fescue, orchardgrass, fall panicum, quackgrass, Italian ryegrass, shattercane, witchgrass, volunteer cereals, burcucumber, Canada thistle, jimsonweed, lambsquarters, marehail, morningglory spp., pigweed spp., ragweed (common, giant), smartweed, and velvetleaf	Foramsulfuron .028 lb + Iodosulfuron-methyl .002 lb	Equip 1.5 oz	Apply to young, actively growing weeds when corn is 0"-12" tall or from emergence to the V4 growth stage. Drop nozzles can be used for corn from 12"-36" or V4-V8 growth stages. Apply in combination with methylated or ethylated seed oil with a minimum of 10% emulsifier and with nitrogen fertilizer. Use 1.5 pt/A seed oil and 1.5-2.0 qt/A UAN or 1.5-3.0 lb/acre AMS. May be tank mixed with many residual or postemergence herbicides for increased spectrum of weed control. Consult label.
Barnyardgrass, burcucumber, cocklebur, foxtail (giant, green, yellow), goosegrass, jimsonweed, johnsongrass (rhizome, seedling), nightshade, panicum (fall, Texas), pigweed, quackgrass, ragweed (common), shattercane, velvetleaf, and volunteer cereals	Foramsulfuron 0.03-0.04 lb	Option 35WDG 1.5-1.75 oz	Apply when corn is 0"-16" tall. Use drop nozzles when corn is 16"-36" tall. Methylated or ethylated seed oil with 10% emulsifier or greater in combination with nitrogen fertilizer is the recommended adjuvant system at 1.5 pt/A + 1.5-2.0 qt/A. Do not apply by air. Do not apply more than twice per season. Do not use if Counter, Dyfonate, or Thimet was applied. Do not apply foliar applications of the OP insecticide within 7 days of an Option application.
Cocklebur, jimsonweed, lambsquarters, morningglory, nightshade, nutsedge, pigweed, pokeweed, ragweed, smartweed, velvetleaf, and suppression of horse nettle, milkweed, and Canada thistle	Halosulfuron-methyl 0.02-0.04 lb + Sodium salt of dicamba 0.09-0.18 lb	Yukon 67.5WDG 4.0-8.0 oz	A nonionic surfactant or crop oil concentrate should be used. Use 0.25-0.5% nonionic surfactant or 1% v/v crop oil concentrate. When used alone, Yukon can be applied over the top or with crop nozzles from the spike through 36"-tall corn. Yukon can be applied 2 times a season with total application not to exceed 8.0 oz/A. Allow at least 2 weeks between applications.
Amaranth (palmer), carpetweed, cocklebur (common), galinsoga, jimsonweed, lambsquarters (common), morningglory (suppression), mustard, nightshade (eastern black), pigweed species, ragweed (common, giant), smartweed, sunflower, velvetleaf; barnyardgrass, crabgrass (large), yellow and giant foxtail, goosegrass, signalgrass, broadleaf, Texas panicum; suppression of smooth crabgrass and green foxtail	Tembotrione 0.082 lb ai	Laudis 3.5SC 3.0 oz	Methylated seed oil (MSO) or crop-oil concentrate (COC) adjuvants are recommended by manufacturer. In addition, nitrogen fertilizer is required (liquid or AMS). Tank mix with 0.25 to 1.0 lb ai/A of atrazine for improved control and to broaden the spectrum of control. Local university data supports at least 0.5 lb ai/A of atrazine. Do not apply the tank mixture of Laudis and atrazine to corn greater than 12 inches tall. Laudis will control/suppress crabgrass and some other grass species, but will not control fall panicum.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Amaranth (palmer), carpetweed, cocklebur (common), jimsonweed, lambsquarters (common), morning-glory (suppression), mustard, nightshade (eastern black), pigweed species, ragweed (common, giant), sunflower, velvetleaf; suppression of smartweed and prickly sida, barnyardgrass, crabgrass (large and smooth), giant foxtail, goosegrass, suppression of yellow foxtail, green foxtail, seedling johnsongrass, fall panicum, and broadleaf signalgrass	Topramezone 0.164 lbs ai/A	Impact 2.8L 0.75 oz/A	Methylated seed oil (MSO) or crop oil concentrate (COC) adjuvants are recommended by manufacturer. In addition, nitrogen fertilizer is required (liquid or AMS). Tank mix with 0.25 to 1 lb ai/A of atrazine for improved control and to broaden the spectrum of control. Local university data supports at least 0.5 lb ai/A of atrazine. Do not apply the tank mixture of Impact and atrazine to corn greater than 12 inches tall. Do not use postemergence if Lumax or Lexar was used preemergence. Do not tank mix with Callisto. Impact will control/suppress crabgrass and other grass species, but is not effective for fall panicum control. Tank mixes include 2,4-D, Accent, atrazine, Basagran, Buctril, Clarity, Distinct, glyphosate, Hornet, Laddok, Liberty, Lightning, Marksman, Option, Permit, Steadfast, and Stinger.
Shattercan (up to 4 inches); less than 2 inches: volunteer barley and wheat, barnyardgrass, annual bluegrass, foxtail species, and fall panicum, large crabgrass less than 1/2 inch tall. Broadleaf weeds less than 3 inches tall: common chickweed, dandelion, henbit, pigweed species, shepherd's-purse, and wild radish	Rimsulfuron 0.016 lb ai/A	Resolve 25D 1 oz/A	Resolve alone will control small seedling weeds, grass less than 2 inches and broadleaves less than 3 inches. Resolve will control crabgrass less than 1/2 inch tall. Resolve can be tank mixed with glyphosate to provide residual control of broadleaf and grass weed species emerging after the application. Do not apply Resolve to corn under stress due to crop injury. Refer to the Resolve label for all restrictions concerning increased injury when tank mixed with organo-phosphate insecticides (Counter, Lorsban, or Thimet). Do not tank mix with Basagran or Laddok due to crop injury concern. Apply Resolve to corn up to 12 inches tall or before the appearance of 6 or more collars, whichever is more restrictive. Resolve must be applied with a nonionic surfactant (NIS) and nitrogen fertilizer. Crop-oil concentrate (COC) may be used in place of nonionic surfactant. When applying Resolve in tank mixture with a glyphosate product that contains a "built-in" adjuvant system, the Resolve label does not recommend the use of extra adjuvants. Resolve can be tank mixed with other registered herbicides for use in corn (except Basagran and Laddok).

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, broadleaf signalgrass, foxtails, johnsongrass (seedling and rhizome), panicum (fall and Texas), quackgrass, ryegrass (Italian and perennial), sandbur, shattercan, timothy, volunteer grains, and wirestem muhly, burcucumber, jimsonweed, common lambsquarters, morningglory, pigweed, smartweed, and velvetleaf. Local experience has shown good control of dock. Suppression of hemp dogbane, pokeweed, and Canada thistle.	Nicosulfuron + thifensulfuron 0.023-0.034 lb	Stout 0.5 to 0.75 oz/A	Stout can be applied to corn up to 16 inches tall or with less than 6 collars, whichever is more restrictive. Stout will not control crabgrass species. Applications of Stout must include either a crop-oil concentrate (COC) or a nonionic surfactant (NIS). In addition, a nitrogen fertilizer must be used. Do not tank mix Stout with Basagran or Laddok due to crop safety concerns. Do not tank mix with 2,4-D due to reduction in grass control. Refer to Stout label for restrictions regarding organophosphate insecticides such as Counter, Lorsban, malathion, parathion, and Thimet. Do not tank mix with other ALS-inhibiting herbicides (Group 2) unless specifically mentioned on herbicide label.
Barnyardgrass, annual bluegrass, foxtail spp., fall panicum, volunteer barley, volunteer wheat, chickweed, henbit, mustard spp., pigweed spp., Russian thistle, shepherd's-purse, wild radish, wild sunflower, velvetleaf, and others	Rimsulfuron 0.016 lb + dicamba 0.132 lb	Require Q 59DF 4.0 oz	Apply after corn has reached 4 inches in height. Do not apply to corn taller than 20 inches in height. Applications made after weed emergence will provide contact control of labeled weeds and limited residual control of later emergence. For control of emerged weeds, include a nonionic surfactant and an ammonium-nitrogen fertilizer. If applied in combination with a glyphosate or glufosinate herbicide that contains a built-in adjuvant system, no additional surfactant needs to be added. Require Q may be tank mixed with glyphosate or glufosinate herbicides if applications are made to corn hybrids containing appropriate herbicide tolerance genes, and can be tank mixed with full or reduced rates of other products registered for use in corn. Crop-oil concentrate can be used in place of nonionic surfactant for burndown applications of Require Q. Require Q may be tank mixed with full or reduced rates of preemergence grass and broadleaf herbicides to provide added residual activity.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, annual bluegrass, foxtail spp., fall panicum, volunteer barley, volunteer wheat, chickweed, henbit, mustard spp., pigweed spp., shepherd's-purse, wild radish, velvetleaf, and others	Rimsulfuron 0.14 lb + thifensulfurom-methyl 0.003 lb	Resolve Q 22.4DF 1.25 oz	Apply postemergence to corn up to 20 inches tall. Applications made after weed emergence will provide contact control of labeled weeds and limited residual control of later emergence. For control of emerged weeds, include a nonionic surfactant and an ammonium-nitrogen fertilizer. If applied in combination with a glyphosate or glufosinate herbicide that contains a built-in adjuvant system, no additional surfactant needs to be added. Resolve Q may be tank mixed with glyphosate or glufosinate herbicides if applications are made to corn hybrids containing appropriate herbicide tolerance genes and can be tank mixed with full or reduced rates of other products registered for use in corn. Do not tank mix Resolve Q with Basagran or Laddock. Resolve Q may be tank mixed with full or reduced rates of preemergence grass and broadleaf herbicides to provide added residual activity.
Johnsongrass and other annual and perennial weeds.	Glyphosate	4.0 lb ai/gal glyphosate containing product or equivalent as labeled	In annual cropping systems, apply 1.0 to 1.75 qt/A. Apply 1.0 qt of this product in 3.0 to 10.0 gal/ water/A Use 1.75 qt of this product when applying 10.0 to 30.0 gal/water/A. In noncrop, or areas where annual tillage (no-till) is not practiced, apply 1.75 to 2.5 qt of this product in 10.0 to 30.0 gal/water/ A. For best results, apply when plants have reached the boot-to-head stage of growth or in the fall prior to frost. Allow 7 or more days after application before tillage. Do not tank-mix with residual herbicides when using the 1.0 qt/A rate. In corn, for spot treatments, apply prior to silking. Do not treat more than 10% of the total field area to be harvested.

Table 5.33 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Control of many annual grasses and broadleaf weeds and suppression of many perennial weeds as well	Glyphosate 0.75-1.0 lb + atrazine 0.75-1.0 lb	Ready Master ATZ 1.5-2.0 qt	Apply this product postemergence to Roundup Ready corn from seedling emergence until the corn reaches 12 inches in height. A single in-crop application must not exceed 2.0 qt/A. The addition of adjuvants, micronutrients, or liquid fertilizers is not recommended. Ready Master ATZ can be tank-mixed with Harness, MicroTech, Partner, or atrazine. Tank mixtures of Ready Master ATZ with Harness must be applied before the corn is 11 inches tall, while tank mixtures with MicroTech or Partner must be applied before the corn exceeds 5 inches in height. If adding atrazine, a maximum of 2.0 lb of active ingredient may be applied postemergence if no atrazine was applied before corn emergence.
Control of Roundup Ready Corn: volunteer corn or replanting	<p>There are times when corn has to be removed from a field with the intention of replanting a corn crop. Tillage is one effective method, but it is not appropriate in no-tillage situations. The use of glyphosate is highly effective for non-Roundup Ready corn. The challenge is in removing Roundup Ready hybrids. There are limited herbicides that consistently kill small corn plants. Gramoxone Inteon, Ignite, and Select are three products that have shown the most activity. Research conducted in this region with Gramoxone and Select demonstrated that Select was the most effective for corn 2 to 3 inches tall. For taller corn (4 to 6 inches tall), Gramoxone in combination with a photosystem II inhibiting herbicide (Sencor, Lorox, or atrazine) was the most effective. Ignite is a third option, but will not control Liberty Link hybrids. Individual recommendations are as follows:</p> <p>Select Max: Apply up to 6.0 oz of Select Max with a nonionic surfactant at 0.25% v/v plus AMS at 2.5 to 4.0 lbs/A. Do not use a COC or MSO. Wait a minimum of 6 days from time of application until corn planting due to risk of crop injury.</p> <p>Gramoxone Inteon: Apply 2.0 to 3.0 pt/A in combination with Sencor (4.0 to 6.0 oz/A), Lorox (1.0 pt/A) or atrazine (1.0 lb/A). These photosystem II inhibitors are not added to control the corn, but are used to reduce the speed of Gramoxone Inteon activity, which helps provide more consistent control.</p> <p>Ignite 280: 22.0 to 29.0 oz of Ignite. Ignite has not been as consistent for control of corn as Gramoxone.</p>		

Table 5.34 - Harvest Aid

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Morningglory and other broadleaf weeds	2,4-D 0.5-1.0 lb	2,4-D amine 0.5-1.0 lb ai of a formulation labeled for harvest aid use.	Apply after hard dough or denting stage. Do not forage or feed corn fodder for 7 days following application.
	Glyphosate up to 3.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent as labeled Up to 3.0 qt by ground, 1.0 qt by air.	Apply at 35% grain moisture or less. Ensure that maximum kernel fill is complete and the corn is mature (black layer formed). Allow at least 7 days between application and harvest. Apply with extreme caution because spray drift can be very damaging to trees, shrubs, and lawns at this time of year. For Roundup-Ready corn, the maximum amount of this product that can be applied after maximum kernel fill is complete and the crop is physiologically mature (black layer formation) until 7 days before harvest is 32.0 oz/A.
	Paraquat 0.3-0.5 lb	Gramoxone Inteon 3L 1.2-2.0 pt	Make one application at least 7 days prior to harvest after corn is mature and the black layer has formed. Apply in a minimum of 5.0 gal/A by air and 20 gal/A by ground. Use a nonionic surfactant containing at least 75% surface active agent at 0.25% v/v. 2.0 pt/A should be used on mature broadleaf weeds and grasses and those that are taller than 18".

Table 5.35 - Fall Weed Control (Postharvest)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Improved spectrum of control for perennial broadleaf weeds	Glyphosate 1.0-5.0 lb + dicamba 0.5-2.0 lb or glyphosate 1.0-5.0 lb + 2,4-D ester 0.5-3.0 lb	4.0 lb ai/gal glyphosate or equivalent. 1.0-5.0 qt + Banvel 1.0-4.0 pt or 4.0 lb ai/gal glyphosate or equivalent. 1.0-5.0 qt + 2,4-D ester 1.0-6.0 pt	See the remarks for glyphosate. Fall seeded small grains can follow dicamba applications (20 days/pint of dicamba applied). Small grains are restricted to the following year for 2,4-D applications.
Alfalfa, artichoke (Jerusalem), bindweeds dock (curly), dogbane (hemp), horsenettle, milkweed (common and honeyvine), plantains, pokeweed, sorrel (red), and thistle (Canada)	Dicamba 1.0-2.0 lb + surfactant or crop oil concentrate	Banvel/Clarity 2.0-4.0 pt + surfactant 1.0 qt/100.0 gal or crop oil concentrate 1.0 gal/100.0 gal	Apply after corn harvest and prior to frost to actively growing weeds. Results are best when weeds are at or beyond the full bloom stage. Allow 10 or more days after applications before tillage or mowing. Fall seeded small grains are restricted to 20 days after application/pint of dicamba applied.

Table 5.35 - Fall Weed Control (Postharvest) (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
	Glyphosate up to 3.0 lb	4.0 lb ai/gal glyphosate or equivalent as labeled. Up to 3.0 qt by ground, 1.0 qt by air	Apply at 35% grain moisture or less. Ensure that maximum kernel fill is complete and the corn is mature (black layer formed). Allow at least 7 days between application and harvest. Apply with extreme caution because spray drift can be very damaging to trees, shrubs, and lawns at this time of year.
Alfalfa, artichoke (Jerusalem), bindweeds dock (curly), dogbane (hemp), horsenettle, milkweed (common and honeyvine), plantains, pokeweed, sorrel (red), and thistle (Canada), garlic (wild)	Dicamba 0.5-2.0 lb + 2,4-D ester 0.5-3.0 lb + surfactant or crop oil concentrate	Banvel/Clarity 1.0-4.0 pt + 2,4-D ester 1.0-6.0 pt + surfactant 1.0 qt/100.0 gal or crop oil concentrate 1.0 gal/100.0 gal	See the remarks for dicamba above. Fall seeded small grains are restricted to the following year for 2,4-D applications.
Alfalfa, artichoke (Jerusalem), Bermudagrass, bindweeds dock (curly), dogbane (hemp), horsenettle, johnsongrass, milkweed (common), muhly (wirestem), thistle (Canada), and ryegrass (perennial)	Glyphosate 1.0-5.0 lb	4.0 lb ai/gal glyphosate or equivalent. 1.0-5.0 qt	Apply after corn harvest and prior to frost to actively growing weeds. Results are best when weeds are at or beyond the full bloom stage. Allow 7 or more days after application before tillage or mowing.
Docks spp., garlic (wild)	Thifensulfuron & tribenuron 0.014-0.028 lb + crop oil concentrate or surfactant	Harmony Extra SG 0.45-0.9 oz + crop oil concentrate 1.0 gal/100.0 gal or surfactant 0.5-4.0 pt/100.0 gal.	Best results are obtained when applications are made to young actively growing weeds. Always premix Harmony Extra SG with water before adding to the spray tank. Sequential treatments may be applied provided the total amount of Harmony Extra SG applied during one fallow cropland season does not exceed 1.5 ounce/A. Harmony Extra SG must be applied at least 45 days prior to planting corn, rice, grain sorghum, or soybeans and 14 days prior to planting cotton. For small grains, all other crops require a 60-day planting restriction.
	approved combinations: tankmix with 2,4-D or dicamba		Use to improve spectrum of perennial weed control.

Soybeans

Table 5.36 - Soybean Herbicides and their Restrictions⁷

Trade name	Common name	Manufacturer	Restricted-use pesticide ¹	Water-quality advisory ²	Worker re-entry (hrs) ³
2,4-D amine 4S	2,4-D amine	several	—	—	48
2,4-D LVE 4E	2,4-D LVE	several	—	—	12
2,4-DB	2,4-DB	several	—	—	12
Assure II/Targa 0.88L	quizalofop	Dupont/Gowan	—	—	12
Authority 75DF	sulfentrazone	FMC	—	yes	12
Authority Assist	sulfentrazone + imazethapyr	FMC	no	yes	12
Authority MTZ 45DF	sulfentrazone + metribuzin	FMC	—	yes	12
Axiom 68DF	flufenacet + metribuzin	Bayer	—	yes	12
Basagran 4S	bentazon	MicroFlo	—	yes	48
Boundary 7.8L	s-metolachlor + metribuzin	Syngenta	—	yes	12
Canopy 75DF	chlorimuron + metribuzon	DuPont	—	yes	12
Canopy EX 29.5DF	chlorimuron + tribenuron	DuPont	—	—	12
Classic 25DF	chlorimuron	DuPont	—	—	12
Cobra 2E	lactofen	Valent	—	—	12
Command 3ME	clomazone	FMC	—	—	12
Dual II Magnum/Cinch 7.64L	s-metolachlor	Syngenta	—	—	24
Extreme 4.17L	imazethapyr + glyphosate	BASF	—	yes	48
FirstRate 84WDG	cloransulam-methyl	Dow AgroSciences	—	yes	12
Fusilade DX 2E	fluazifop	Syngenta	—	—	12
Fusion 2.56E	fluazifop + fenoxaprop	Syngenta	—	—	24
Gangster (co-pack)	flumioxazin + chloransulam-methyl	Valent	no	yes	12
Gauntlet (co-pack)	sulfentrazone + chloransulam-methyl	FMC/Dow AgroSciences	—	yes	12
Glyphosate ⁴	glyphosate	various	—	—	4
Gramoxone Inteon 2.5S	paraquat	Syngenta	yes	—	12
Harmony SG 50SG	thifensulfuron	DuPont	—	—	12
Ignite 280	glufosinate	Bayer	—	—	12

¹ Only licensed applicators may purchase and apply restricted-use pesticides. To become licensed, contact the Virginia Department of Agriculture and Consumer Services.

² These herbicides have properties that may result in ground- or surface-water contamination. Do not apply them in areas where soils are permeable or coarse and groundwater is near the surface. Practice should be followed to minimize the potential for dissolved runoff and/or runoff erosion. See the herbicide label for specific restrictions.

³ If soil-applied products are injected or incorporated at application time, under certain circumstances the Worker Protection Standard allows workers to enter the treated area if they will have no contact with anything that has been treated. Personal protective equipment is required for early entry to treated areas if contact with treated soil, plants, or water is involved.

⁴ May be applied over-the-top on Roundup Ready soybean varieties only.

⁵ For use on Liberty Link soybean varieties only.

⁶ For use on STS soybean varieties only.

⁷ Legend based on adequate moisture, good growing conditions, and proper herbicide application.

5-94 Weeds: Soybeans

Table 5.36 - Soybean Herbicides and their Restrictions⁷ (cont.)

Trade name	Common name	Manufacturer	Restricted-use pesticide ¹	Water-quality advisory ²	Worker re-entry (hrs) ³
Lasso 4E	alachlor	Monsanto	yes	yes	12
Linex/Lorox	linuron	Griffin	—	—	24
Micro-Tech 4ME	alachlor	Monsanto	yes	yes	12
Outlook 6E	dimethenamid-P	BASF	—	yes	12
Poast 1.5E	sethoxydim	MicroFlo	—	—	12
Poast Plus 1E	sethoxydim	MicroFlo	—	—	12
Prefix 5.3EC	metolachlor + fomesafen	Syngenta	—	yes	24
Prowl 3.3E/H ₂ O	pendimethalin	BASF	—	—	24
Pursuit 2S	imazethapyr	BASF	—	yes	12
Python 80WDG	flumetsulam	Dow AgroSciences	—	yes	12
Raptor 1S	imazamox	BASF	—	—	4
Reflex 2E/Flexstar 1.88E	fomesafen	Syngenta	—	yes	24
Resource 0.86EC	flumiclorac	Valent	—	—	12
Scepter 1.5S/70DG	imazaquin	BASF	—	yes	12
Select Max 0.97E	clethodim	Valent	—	—	12
Sencor 75DF/4L	metribuzin	Bayer	—	yes	12
Sequence 5.25EC	s-metalachlor + glyphosate	Syngenta	—	yes	24
Sonic/Authority First 70DF	sulfentrazone + cloransulam	Dow AgroSciences/FMC	—	yes	12
Stellar 3.1EC	flumiclorac + lactofen	Valent	—	—	12
Storm 4S	acifluorfen + bentazon	UPI	—	yes	48
Synchrony XP 28.4DF	chlorimuron + thifensulfuron	DuPont	—	—	12
Treflan	trifluralin	Dow AgroSciences	—	—	12
Ultra Blazer 2S	acifluorfen	UPI	—	yes	48
Valor	flumioxazin	Valent	—	—	1
Valor XLT 40WDG	flumioxazin + chlorimuron-ethyl	Valent	—	—	12

¹ Only licensed applicators may purchase and apply restricted-use pesticides. To become licensed, contact the Virginia Department of Agriculture and Consumer Services.

² These herbicides have properties that may result in ground- or surface-water contamination. Do not apply them in areas where soils are permeable or coarse and groundwater is near the surface. Practice should be followed to minimize the potential for dissolved runoff and/or runoff erosion. See the herbicide label for specific restrictions.

³ If soil-applied products are injected or incorporated at application time, under certain circumstances the Worker Protection Standard allows workers to enter the treated area if they will have no contact with anything that has been treated. Personal protective equipment is required for early entry to treated areas if contact with treated soil, plants, or water is involved.

⁴ May be applied over-the-top on Roundup Ready soybean varieties only.

⁵ For use on Liberty Link soybean varieties only.

⁶ For use on STS soybean varieties only.

⁷ Legend based on adequate moisture, good growing conditions, and proper herbicide application.

Relative Effectiveness of Herbicides for Soybeans

Table 5.37 - Weed Group 1 - Preplant Incorporated

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Authority Assist	P-F	N	N	N	P-F	P-F	N	N	N	N	N	N	N	F
Canopy	F	N	P-F	F	F	F	P	P	N	N	P	P	N	N
Canopy + Dual II Magnum/Cinch	G-E	N	F-G	E	G-E	E	E	P	N	N	F	P	P	F-G
Canopy + Micro-Tech	G-E	N	G	F-G	E	E	E	P	N	N	F	P	P	F
Canopy + Treflan	E	N	G	G	G	E	E	G	P	P	G	P	F-G	P
Command	F-G	P	G-E	F-G	E	E	E	P	N	P	G-E	P	G	N
Command + Sencor	F-G	P	G-E	F-G	E	E	E	P	N	P	G-E	P	G	N
Dual II Magnum/Cinch	G-E	N	F-G	E	G-E	E	E	P	N	N	F	P	P	F-G
Dual II Magnum/Cinch + Sencor	G-E	N	F-G	E	G-E	G	E	P	N	N	F	P	P	F-G
Micro-Tech	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	F
Micro-Tech + Sencor	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	F
Prowl	E	P	G	F	G	E	G-E	G	P	P	G	G	G	N
Prowl + Sencor	E	P	G	F	G	E	G-E	G	P	N	G	G	G	N
Python	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Scepter	P	N	N	P	P	F	P	F	N	N	N	P	N	P
Scepter + Dual II Magnum/Cinch	G-E	N	F-G	G	G-E	E	E	N	N	N	F	P	P	G
Scepter + Micro-Tech	G-E	N	F-G	G	E	E	E	F	N	N	F	P	P	F-G
Scepter + Prowl	E	P	G	G	G	E	G-E	G	P	P	G	G	G	P
Scepter + Treflan	E	P	G	G	G	E	E	G	P	P	G	G	G	P
Sencor	P-F	N	P-F	P-F	P-F	P-F	F	P	N	N	P	P	N	N
Treflan	E	P	G	G	G	E	E	G	P	P	G	G	G	N
Treflan + Sencor	E	P	G	G	G	E	E	G	P	P	G	G	G	N

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.38 - Weed Group 1 - Preemergence

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Authority Assist	P-F	N	N	N	P-F	P-F	N	N	N	N	N	N	N	F
Canopy	F	N	P-F	F	F	F	P	P	N	N	P	P	N	P
Canopy + Dual II Magnum/Cinch	G-E	N	F-G	G-E	G	E	E	P	N	N	F	P	P	F-G
Canopy + Micro-Tech	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	P
Canopy + Prowl	G-E	N	F-G	F	F-G	G	P-F	F	N	N	F	F	P-F	P
Dual II Magnum/Cinch	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F
Dual II Magnum/Cinch + Linex	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F
Dual II Magnum/Cinch + Sencor	G-E	N	F-G	G-E	G-E	E	E	P	N	N	F	P	P	F
FirstRate	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Linex/Lorox	F	N	P	F	F	F	F	P	N	N	F	P	N	N
Micro-Tech	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	P
Micro-Tech + Linex	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	P
Micro-Tech + Sencor	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	P
Outlook	G-E	N	G	G	G	G-E	G	P	N	N	P-F	P	P	F
Outlook + Linex	G-E	N	F-G	G	G	G-E	G	P	N	N	P-F	P	P	F
Outlook + Scepter	G-E	N	F-G	G	G	G-E	G	P	N	N	P-F	P	P	F
Outlook + Sencor	G-E	N	F-G	G	G	G-E	G	P	N	N	P-F	P	P	F
Prowl	G-E	N	F-G	F	F-G	G	F	F	N	N	F	F	P-F	N
Prowl + Linex	G-E	N	F-G	F	F-G	G	F	F	N	N	F	F	P-F	N
Prowl + Sencor	G-E	N	F-G	F	F-G	G	F	F	N	N	F	F	P-F	N
Python	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Scepter	P	N	N	P	P	P-F	P	P-F	N	N	N	P	N	P
Scepter + Dual II Magnum/Cinch	G-E	N	F-G	G-E	G	E	E	P	N	N	F	P	P	F-G
Scepter + Micro-Tech	G-E	N	F-G	F-G	E	E	E	P	N	N	F	P	P	F
Scepter + Prowl	G-E	N	F-G	F	F-G	G	F	F	N	N	F	F	P-F	P
Sencor	P-F	N	P-F	P-F	P-F	P-F	P-F	P	N	N	P	P	N	N
Valor	P	N	P	P	P	P	P	N	N	N	N	N	P	N

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.39 - Weed Group 1 - Postemergence

	Barnyardgrass	Bermudagrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Goosegrass	Johnsongrass (seedlings)	Johnsongrass (rhizome)	Quackgrass	Sandbur	Shattercane	Texas panicum	Yellow nutsedge
Assure II	G-E	G	G	F-G	E	G	G	E	G-E	G	G	E	G	N
Authority Assist	P-F	N	N	N	P-F	P-F	N	N	N	N	N	N	N	F
Basagran	N	N	N	N	N	N	N	N	N	N	N	N	N	F
Classic	N	N	N	P	P	P	N	P	N	N	N	P	N	P-F
Cobra	N	N	N	N	N	N	N	N	N	N	N	N	N	N
FirstRate	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Flexstar	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Fusilade DX	E	G	G	F-G	E	E	G	E	G-E	G	G	E	G	N
Fusion	E	F-G	G	G	E	E	G	E	G	G	G	E	G	N
Glyphosate	E	G	E	E	G-E	E	E	E	G	G-E	E	G	G	P-F
Harmony SG	N	N	N	N	N	N	N	N	N	N	N	N	N	P
Poast, Poast Plus	E	F-G	G	G-E	E	E	G-E	E	G	G	G	G	G	N
Pursuit	F	N	F-G	F-G	F	F-G	P	G	P-F	N	P-F	G	P-F	P
Raptor	F-G	N	F-G	F-G	F-G	G	P	G	P-F	N	F	G	P-F	P
Reflex	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Resource	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Scepter	N	N	N	P	P	P	P	P	N	N	N	P	N	P-F
Select	E	G-E	G-E	E	E	E	G	E	G-E	G-E	G	E	G	N
Stellar	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Storm	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Synchrony XP	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Assure II	G-E	G	G	F-G	E	G	G	E	G-E	G	G	E	G	N
Typhoon	E	G	G	F-G	E	E	G	E	G-E	G	G	E	G	N
Ultra Blazer	N	N	N	N	P	P	N	P	N	N	N	P	N	N

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.40 - Weed Group 2 - Preplant Incorporated

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarter	Morningglory (annual spp.)	Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Authority Assist	G-E	N	F-G	F-G	F-G	F-G	G	P	P	P	F-G	F	-	-	F-G
Broadstrike SF + Dual II Magnum/Cinch	F-G	N	P-F	P-F	G-E	P	G	P	P-F	F-G	E	F	G	-	E
Broadstrike + Treflan	F-G	N	P-F	P-F	G-E	P	E	P	P-F	F-G	E	F	G	-	E
Canopy	P-F	F	G	G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Canopy + Dual II Magnum/Cinch	F	F	G	G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Canopy + Mirco-Tech	F-G	F	G	G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Canopy + Treflan	P-F	F	G	G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Command	P	P	P	F-G	G	N	P-F	P-F	F	P	F-G	E	F-G	G	E
Command + Sencor	P-F	P	F	F-G	G	P-F	E	P-F	G	F-G	G	E	G-E	F-G	E
Dual II Magnum/Cinch	F	N	N	N	P-F	N	G	N	P	N	P	N	P	N	N
Dual II Magnum/ Cinch + Sencor	F	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Micro-Tech	F-G	N	N	N	P-F	N	G	N	P	N	P	F	P	N	N
Micro-Tech + Sencor	F-G	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Prowl	N	N	N	N	G-E	P	G	N	N	N	P	N	N	P	F
Prowl + Sencor	P	N	F	F	G-E	P-F	E	P	G	F-G	G	F	G	F-G	F
Python	P-F	P	F-G	F-G	G-E	P	E	P	P	F-G	E	F	F-G	-	G
Scepter	F-G	F-G	E	F-G	G	F	E	F	F-G	F-G	F-G	P-F	G	P	F-G
Scepter + Dual II Magnum/Cinch	F-G	F-G	E	F-G	G	F	E	F	F-G	F-G	F-G	P-F	G	P	F-G
Scepter + Micro-Tech	F-G	F-G	E	F-G	G	F	E	F	F-G	F-G	F-G	P-F	G	P	F-G
Scepter + Prowl	F-G	F-G	E	F-G	G-E	F	E	F	F-G	F-G	F-G	P-F	G	P	F-G
Scepter + Treflan	F-G	F-G	E	F-G	G	F	E	F	F-G	F-G	F-G	P-F	G	P	F-G
Sencor	P	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Treflan	N	N	N	N	G	P	G	N	N	N	P	N	N	P	N
Treflan + Sencor	P	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.41 - Weed Group 2 - Preemergence

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarter	Morningglory (annual spp.)	Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Authority Assist	G-E	N	F-G	F-G	F-G	F-G	G	P	P	P	F-G	F	-	-	F-G
Broadstrike SF + Dual II Magnum/ Cinch	F-G	N	P-F	P-F	G-E	P	G	P	P-F	F-G	E	F	G	-	G
Canopy	P-F	F	F-G	F-G	G-E	F	E	F	G	F-G	G-E	G-F	G-E	F-G	F
Canopy + Dual II Magnum/Cinch	F	F	F-G	F-G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Canopy + Micro-Tech	F-G	F	F-G	F-G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Canopy + Prowl	P-F	F	F-G	F-G	G-E	F	E	F	G	F-G	G-E	F	G-E	F-G	F
Dual II Magnum/Cinch	F	N	N	N	P-F	N	G	N	P	N	P	N	P	N	N
Dual II Magnum/ Cinch + Linex	F	P	P-F	P-F	G	P-F	E	P	G	P-F	G	P	F-G	F-G	F
Dual II Magnum/ Cinch + Sencor	F	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F-G
FirstRate	N	P	G	G	E	G	P	F-G	G	N	G	G	N	N	G
Linex/Lorox	P	P	P-F	P-F	G-E	P-F	E	P	G	P-F	G	P	F-G	P	F
Micro-Tech	F-G	N	N	N	P-F	N	G	N	P	N	P	N	P	N	N
Micro-Tech + Linex	F-G	P	P-F	P-F	G-E	P-F	E	P	G	P-F	G	P	F-G	P	F
Micro-Tech + Sencor	F-G	P	F	F	G-E	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Outlook	F	N	N	N	P	N	G	N	P	N	P	N	P	N	N
Outlook + Linex	F	P	P-F	P-F	G	P-F	E	P	G	P-F	G	P	F-G	P	F
Outlook + Scepter	F	P-F	F-G	F-G	F-G	P	E	P	F-G	F-G	F-G	P	F-G	P	P-F
Outlook + Sencor	F	P	F	F	G	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Prowl	N	N	N	N	F-G	P	G	N	P	N	P	N	P	P	F
Prowl + Linex	P	P	P-F	P-F	G-E	P-F	E	P	G	P-F	G	P	F-G	P	F
Prowl + Sencor	P	P	F	F	G-E	P-F	E	P	G	F-G	G	F	G	P	F-G
Python	P-F	P	F-G	F-G	G-E	P	E	P	P	F-G	E	F	F-G	-	G
Scepter	P-F	P-F	F-G	F-G	F-G	P-F	E	P	P-F	F-G	F-G	P	F-G	P	P-F
Scepter + Dual II Magnum/Cinch	F	P-F	F-G	F-G	F-G	P	E	P	P-F	F-G	F-G	P	F-G	P	P-F
Scepter + Micro-Tech	F-G	P-F	F-G	F-G	F-G	P	E	P	P-F	F-G	F-G	P	F-G	P	P-F
Scepter + Prowl	P-F	P-F	F-G	F-G	F-G	P	E	P	P-F	F-G	F-G	P	F-G	P	P-F
Sencor	P	P	F	F	G-E	P-F	E	P	G	F-G	G	F	G	F-G	F-G
Valor	G	N	N	F-G	G	F-G	G	N	N	N	P	F-G	G	F-G	P

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

Table 5.42 - Weed Group 2 - Postemergence

	Eastern black nightshade	Burcucumber	Cocklebur	Jimsonweed	Lambsquarter	Morningglory (annual spp.)	Pigweed	Giant ragweed	Common ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Tropic Croton	Velvetleaf
Assure II	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Basagran	P	P	G-E	E	P-F	P ¹	P	P-F	F-G	P	G-E	F	F	F	G
Classic	P	G	E	E	P	P-F ¹	E	G-E	F	F-G	F-G	N	P	P	P-F
Cobra	F-G	F-G	F ¹	E	P	P-F ¹	E	G	E	P	P	P-F	F	F-G	F-G
Firstate	N	F	E	E	N	G	P	G	G-E	P	G	P	P	-	F-G
Flexstar	F-G	F	F ¹	E	F	F-G ¹	E	G-E	E	P-F	F	P-F	N	F	P-F
Fusilade DX	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Fusion	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	F-G	E	E	E	F-G	G	E	G	F-G	F-G	F-G	F	F-G	G	F-G
Harmony SG	N	P-F	F	P	E	P	E	N	N-P	P	G	N	P	P	G
Poast, Poast Plus	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Pursuit	F-G	P-F	E	G	P	F-G	E	F	P-F	P	F-G	F	P	P	F-G
Raptor	F-G	P-F	E	G	F	F-G	E	F	F	P	F-G	F	F	-	F-G
Reflex	F-G	F	F ¹	G	P	F-G ¹	E	G	E	P-F	F	P	P	F-G	P
Resource	P	F	P	P	F	F	F	P	P	N	P	P	N	P	E
Scepter	P	P	E	F	N	P	E	P	P	F	P	N	P	P	P
Select	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Stellar	F	P-F	P-F	F-G	P-F	F	F-G	P-F	F-G	N	P	P	N	P	E
Storm	F-G	P-F	G	E	P	F-G ¹	F	P-F	F-G	P	G	F	F	P	F-G
Synchrony	N	G	E	E	E	F	E	F-G	F	F-G	G	N	P	P	G
Typhoon	F-G	F	F ¹	G	P	F-G ¹	E	G	E	P-F	F	P	P	F-G	P
Ultra Blazer	F-G	F	F ¹	E	P-F	G-E	E	F-G	E	P	G	P	N	F-G	P

Legend - based on adequate moisture, good growing conditions, and proper herbicide application

E = Excellent (>90% control), G-E = Good to Excellent, G = Good (80-90% control), F-G = Fair to Good, F = Fair (60-80% control), P-F = Poor to Fair, P = Poor (20-60% control), N = None (<20% control)

¹Indicates species for which control can be improved by the addition of 2 fl oz of 2,4-DB.

Soybean Herbicide Rotation Restrictions

The following table summarizes the crop rotation restrictions after certain soybean herbicide applications have been made. Consult the label for a different time interval if two or more of these materials are applied in the same season. *This list is not a substitute for the label!*

Table 5.43 - Postemergence Overtop Broadleaf Herbicide Rate Chart¹

Weed	Maximum Leaf No. ²	Storm (pt)	Basagran (pt)	Classic (oz)	Cobra (oz)	FirstRate (oz)	Flexstar (pt)	Glyphosate ¹² (pt)	Harmony SG (oz)	Pursuit (oz)	Raptor (oz)	Reflex (pt)	Resource 0.86E (oz)	Stellar(oz)	Synchrony (oz)	Ultra Blazer (pt)
Balloonvine	2	³	1.5	-	12.5	-	1.25	-	-	-	-	-	-	-	-	1.5
	4	-	1.5-2	-	12.5	-	1.5	-	-	-	-	-	-	-	-	-
	6	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
Black nightshade	2	1.5	-	-	12.5	-	1.0	-	-	1.4	5.0	1-1.25	-	5.0	-	2.0
	4	1.5	-	-	12.5	-	1.0	1.5	-	1.4	5.0	1-1.25 ⁴	-	-	-	1.5
	6	1.5	-	-	12.5	-	1.25	1.5	-	-	5.0	-	-	-	-	1.5
Burcucumber	3	-	-	0.67 ^{4,5}	12.5	-	-	1.5	-	-	-	-	-	-	0.85	-
	4	-	-	0.75 ^{4,5}	12.5	-	-	1.5	-	-	-	-	-	-	0.85	-
	8	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-
Cocklebur	2	1.5	1-1.5	0.5	12.5	0.3	1.0	1.5	0.25 ⁴ /0.08	1.4	5.0	1.25	-	5.0	0.85	2.0
	4	1.5	1-1.5	0.5	12.5	0.3	1.0	1.5	0.25 ⁴ /0.08	1.4	5.0	1.25	-	7.0	0.85	1.5
	5	1.5	1.5	0.5	12.5	0.3	1.25	1.5	0.25 ⁴ /0.08	1.4	5.0	-	-	-	0.85	-
	6	1.5	1.5-2.0	0.5	12.5	0.3	1.25	1.5	0.25 ⁴ /0.08	1.4	-	-	-	-	0.85	-
	8	-	2.0	0.67	-	0.3	1.5	1.5	-	1.4	-	-	-	-	0.85	-
	10	-	2.0	0.75	-	-	-	1.5	-	-	-	-	-	-	-	-

¹Taken from product labels. See label for equivalent recommendations.

²Do not count cotyledons as leaves.

³Means control not claimed on label.

⁴Label claims only partial control or suppression.

⁵See label for special use directions concerning split applications.

⁶See label for special use directions.

⁷Add crop oil concentrate according to label.

⁸Apply 1.0-1.5 pt Blazer per acre plus 2.0 pt nonionic surfactant per 100.0 gallons anytime before weed begins blooming.

⁹Control may be inconsistent.

¹⁰Label claims control only with two applications, second application of same rate 5-14 days after first.

¹¹Label recommends addition of liquid nitrogen. See label.

¹²Based on 4.0 lb ac/gallon glyphosate containing product. Adjust rates for other formulation strengths as directed by label.

Table 5.43 - Postemergence Overtop Broadleaf Herbicide Rate Chart¹ (cont.)

Weed	Maximum Leaf No. ²															
		Storm (pt)	Basagran (pt)	Classic (oz)	Cobra (oz)	FirstRate (oz)	Flexstar (pt)	Glyphosate ¹² (pt)	Harmony SG (oz)	Pursuit (oz)	Raptor (oz)	Reflex (pt)	Resource 0.86E (oz)	Stellar(oz)	Synchrony (oz)	Ultra Blazer (pt)
Common ragweed	2	1.5	2.0 ⁷	0.67	12.5	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	4.0	5.0	0.85	1.0
	4	1.5	2.0 ⁷	0.67	12.5	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	6.0	5.0	0.85	1.5
	5	1.5	2.0 ⁷	0.67	12.5	0.3	1.25	1.5	-	-	5.0	-	8.0	5.0	-	-
	6	1.5	2.0 ⁷	0.67	12.5	0.3	1.25	1.5	-	-	-	-	8.0	5.0	-	-
	8	-	-	-	12.5	0.3	1.5	1.5	-	-	-	-	-	-	-	-
Giant ragweed	2	1.5	2.0	0.75 ⁵	12.5	0.3	1.0	1.5	-	1.4	5.0	-	-	5.0	0.85	2.0
	4	1.5	2.0	0.75 ⁵	12.5	0.3	1.0	1.5	-	1.4	5.0	-	-	7.0	0.85	1.0-1.5
	6	-	-	0.75 ⁵	12.5	0.3	1.25	1.5	-	-	-	-	-	-	-	-
Jimsonweed	4	1.5	1.5	0.5	12.5	0.3	1.0	1.5	0.25 ⁴ /0.08	1.4	5.0	1.0	8.0	7.0	0.85	1.0
	5	1.5	1.5	0.67	-	-	1.0	1.5	0.25 ⁴ /0.08	-	5.0	1.25	-	-	0.85	1.5
	6	1.5	1.5-2.0	0.75	-	-	1.0	1.5	-	-	-	1.25	-	-	-	1.5
	8	-	2.0	-	-	-	1.25	1.5	-	-	-	-	-	-	-	2.0
	10	-	2.0	-	-	-	-	1.5	-	-	-	-	1.5	-	-	-
	12	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-
Lambsquarters	2	1.5 ⁹	2.0 ^{7,9}	-	-	-	-	1.5	0.25/0.08	1.4	5.0	1.25	-	-	0.85	1.5
	3	1.5 ⁹	2.0 ^{7,9}	-	-	-	-	1.5	0.25/0.08	-	5.0	-	-	-	0.85	-
	4	1.5 ⁹	2.0 ^{7,9}	-	-	-	-	1.5	0.25/0.08	-	5.0	-	-	-	0.85	-
	6	1.5 ⁹	2.0 ^{7,9}	-	-	-	-	1.5	0.25/0.08	-	5.0	-	-	-	0.85	-
	8	-	2.0 ^{7,9}	-	-	-	-	1.5	0.25/0.08	-	5.0	-	-	-	0.85	-
Morningglory pitted	2	1.5	1.5 ¹⁰	0.50 ⁵	12.5 ⁷	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	-	-	0.85	1.0
	3	1.5	1.5 ¹⁰	0.67 ⁵	12.5 ⁷	0.3	1.0	1.5	-	-	5.0	-	-	-	0.85	1.5
	4	1.5	1.5 ¹⁰	0.75 ⁵	12.5 ⁷	0.3	1.0	1.5	-	-	-	-	-	-	-	1.5

¹Taken from product labels. See label for equivalent recommendations.

²Do not count cotyledons as leaves.

³Means control not claimed on label.

⁴Label claims only partial control or suppression.

⁵See label for special use directions concerning split applications.

⁶See label for special use directions.

⁷Add crop oil concentrate according to label.

⁸Apply 1.0-1.5 pt Blazer per acre plus 2.0 pt nonionic surfactant per 100.0 gallons anytime before weed begins blooming.

⁹Control may be inconsistent.

¹⁰Label claims control only with two applications, second application of same rate 5-14 days after first.

¹¹Label recommends addition of liquid nitrogen. See label.

¹²Based on 4.0 lb ac/gallon glyphosate containing product. Adjust rates for other formulation strengths as directed by label.

Table 5.43 - Postemergence Overtop Broadleaf Herbicide Rate Chart¹ (cont.)

Weed	Maximum Leaf No. ²	Storm (pt)	Basagran (pt)	Classic (oz)	Cobra (oz)	FirstRate (oz)	Flexstar (pt)	Glyphosate ¹² (pt)	Harmony SG (oz)	Pursuit (oz)	Raptor (oz)	Reflex (pt)	Resource 0.86E (oz)	Stellar(oz)	Synchrony (oz)	Ultra Blazer (pt)
	8	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-
Tall	2	1.5	1.5 ¹⁰	0.50 ⁵	12.5 ⁷	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	-	-	0.85	1.0
	3	1.5	1.5 ¹⁰	0.75 ⁵	12.5 ⁷	0.3	1.25	1.5	-	-	5.0	-	-	-	0.85	1.5
	4	1.5	1.5 ¹⁰	-	12.5 ⁷	0.3	1.5	1.5	-	-	-	-	-	-	-	-
Ivyleaf	2	1.5	1.5 ¹⁰	0.50 ⁵	12.5 ⁷	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	-	-	0.85	1.0
	3	1.5	1.5 ¹⁰	0.75 ⁵	-	0.3	1.25	1.5	-	-	5.0	-	-	-	0.85	1.5
	4	1.5	1.5 ¹⁰	-	-	0.3	1.5	1.5	-	-	-	-	-	-	-	-
Entireleaf	2	1.5	1.5 ¹⁰	0.50 ⁵	12.5 ⁷	0.3	1.0	1.5	-	1.4	5.0	1.25 ⁴	-	-	0.85	1.0
	3	1.5	1.5 ¹⁰	0.75 ⁵	12.5 ⁷	0.3	1.0	1.5	-	-	5.0	-	-	-	0.85	1.5
	4	1.5	1.5 ¹⁰	-	12.5 ⁷	0.3	1.25	1.5	-	-	-	-	-	-	-	-
Pigweed (redroot)	2	1.5	-	0.5	12.5	-	1.0	1.5	0.25/.08	1.4	5.0	1.25 ⁴	8.0	5.0	0.85	0.5
	4	1.5	-	0.5	12.5	-	1.0	1.5	0.25/.08	1.4	5.0	1.25 ⁴	-	5.0	0.85	0.5
	5	1.5	-	0.67	12.5	-	1.25	1.5	0.25/.08	1.4	5.0	1.25 ⁴	-	5.0	0.85	1.0
	6	1.5	-	0.75	12.5	-	1.25	1.5	0.25/.08	1.4	5.0	1.25 ⁴	-	5.0	0.85	1.0-1.5
Prickly sida	4	1.5 ⁹	1.5	-	12.5	-	1.5	1.5	-	-	-	-	8.0	-	-	-
	6	-	1.5-2.0	-	-	-	-	1.5	-	-	-	-	-	-	-	-
	8	-	2.0	-	-	-	-	1.5	-	-	-	-	-	-	-	-
Sicklepod	1	-	-	0.5 ⁵	12.5 ⁴	0.3	-	1.5	-	-	-	-	-	-	0.85	-
	2	-	-	0.67 ⁵	12.5 ⁴	-	-	1.5	-	-	-	-	-	-	0.85	-
	3	-	-	0.75 ⁵	-	-	-	2.0	-	-	-	-	-	-	-	-
Smartweed	4	1.5	1.5	0.5	12.5 ⁴	0.3	1.0	1.5	0.25/.08	1.4	5.0	1.25 ⁴	-	-	0.85	1.0
	5	1.5	1.5	0.67	-	-	1.25	1.5	0.25/.08	-	5.0	-	-	-	0.85	1.5

¹Taken from product labels. See label for equivalent recommendations.

²Do not count cotyledons as leaves.

³Means control not claimed on label.

⁴Label claims only partial control or suppression.

⁵See label for special use directions concerning split applications.

⁶See label for special use directions.

⁷Add crop oil concentrate according to label.

⁸Apply 1.0-1.5 pt Blazer per acre plus 2.0 pt nonionic surfactant per 100.0 gallons anytime before weed begins blooming.

⁹Control may be inconsistent.

¹⁰Label claims control only with two applications, second application of same rate 5-14 days after first.

¹¹Label recommends addition of liquid nitrogen. See label.

¹²Based on 4.0 lb ac/gallon glyphosate containing product. Adjust rates for other formulation strengths as directed by label.

Table 5.43 - Postemergence Overtop Broadleaf Herbicide Rate Chart¹

Weed	Maximum Leaf No. ²	Storm (pt)	Basagran (pt)	Classic (oz)	Cobra (oz)	FirstRate (oz)	Flexstar (pt)	Glyphosate ¹² (pt)	Harmony SG (oz)	Pursuit (oz)	Raptor (oz)	Reflex (pt)	Resource 0.86E (oz)	Stellar(oz)	Synchrony (oz)	Ultra Blazer (pt)
	6	1.5	1.5-2.0	0.75	-	-	1.25	1.5	0.25/.08	-	-	-	-	-	0.85	1.5
	8	-	2.0	-	-	-	-	1.5	0.25/.08	-	-	-	-	-	-	-
	10	-	2.0	-	-	-	-	1.5	0.25/.08	-	-	-	-	-	-	-
Spurred anoda	2	1.5 ⁹	1.5	-	12.5 ⁴	-	1.25	1.5	-	-	-	-	-	-	-	-
	4	1.5 ⁹	1.5	-	-	-	1.5	1.5	-	-	-	-	-	-	-	-
	6	-	1.5-2.0	-	-	-	-	2.0	-	-	-	-	-	-	-	-
	8	-	2.0	-	-	-	-	2.0	-	-	-	-	-	-	-	-
Tropic croton	1	1.5	1.5	-	12.5	-	1.0	-	-	-	-	1.25	-	-	-	1.0
	2	1.5	1.5-2.0	-	12.5	-	1.0	-	-	-	-	1.25	-	-	-	1.5-2.0
	4	-	2.0	-	12.5	-	1.0	-	-	-	-	1.25	-	-	-	-
	6	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-
Velvetleaf	2	1.5 ⁹	1.5 ¹¹	0.67 ^{5,11}	12.5 ⁶	0.3	-	1.5	0.25 ¹¹ /.08	1.4	5.0	1.25 ⁴	4.0	5.0	0.85	-
	4	1.5 ⁹	1.5- 2.0 ¹¹	0.67 ^{5,11}	-	0.3	1.25	1.5	0.25 ¹¹ /.08	1.4	5.0	-	4.0	5.0	0.85	-
	6	-	2.0 ⁸	0.67 ^{5,11}	-	-	-	1.5	0.25 ¹¹ /.08	-	5.0	-	4.0	5.0	0.85	-
	8	-	-	0.75 ^{5,11}	-	-	-	1.5	0.25 ¹¹ /.08	-	-	-	6.0	-	0.85	-

¹Taken from product labels. See label for equivalent recommendations.

²Do not count cotyledons as leaves.

³Means control not claimed on label.

⁴Label claims only partial control or suppression.

⁵See label for special use directions concerning split applications.

⁶See label for special use directions.

⁷Add crop oil concentrate according to label.

⁸Apply 1.0-1.5 pt Blazer per acre plus 2.0 pt nonionic surfactant per 100.0 gallons anytime before weed begins blooming.

⁹Control may be inconsistent.

¹⁰Label claims control only with two applications, second application of same rate 5-14 days after first.

¹¹Label recommends addition of liquid nitrogen. See label.

¹²Based on 4.0 lb ac/gallon glyphosate containing product. Adjust rates for other formulation strengths as directed by label.

Table 5.44 - Application Rates and Perennial Grass Sizes for Treatment with Fusilade DX, Poast, Poast Plus, Select, and Assure II¹

Herbicide	Weed	Weed Size and Herbicide Rate ² (oz/A)	
		First Application	Second Application
Assure II/Targa	Rhizome johnsongrass	10-24 inches 10 oz	6-10 inches 7 oz
	Bermudagrass	up to 6 inches 10 oz	up to 6 inches 7 oz
Fusilade DX	Rhizome johnsongrass	8-18 inches 12 oz	6-12 inches 8 oz
	Bermudagrass	4-8 inches 12 oz	4-8 inches 8 oz
Poast	Rhizome johnsongrass	20-25 inches 24 oz	12 inches 16 oz
	Bermudagrass	6-inch stolon 24 oz	4-inch stolon 16 oz
Poast Plus	Rhizome johnsongrass	15-25 inches 12 oz	6-12 inches 12 oz
	Bermudagrass	6 inches or less in diameter 36 oz	1-4 inches 24 oz
Select	Rhizome johnsongrass	12-24 inches 8-16 oz	6-18 inches 6-8 oz
	Bermudagrass	3-6 inches 8-16 oz	3-6 inches 8-16 oz

¹Taken from product labels.

²Weed size refers to height of johnsongrass and length of bermudagrass runners.

Table 5.45 - Application Rates and Annual Grass Sizes for Treatment with Assure II, Fusilade DX, Poast, Poast Plus, Pursuit, Fusion, Select, and Raptor¹

Species	Assure II		Poast		Poast Plus		Fusilade Dx		Fusion		Pursuit		Select		Raptor	
	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)	Ht. (in)	Rate (oz/A)
Barnyardgrass	2-6	8	8	16	3-8	24	2-3	12	2-3	8	1-3	1.4	2-8	6-8	2-5	5
Broadleaf signal grass	2-6	8	6	16	1-4 4-8	18 24	2-4	12	2-4	8	1-8	1.4	2-6	6-8	-	-
Crabgrass	2-6	8	6	16	3-6	24	1-2	12	1-2	8	1-3	1.4	2-6	6-8	-	-
Crowfoot grass	2-6	7	-	-	-	-	-	-	-	-	-	-	2-6	6-8	-	-
Fall panicum	2-6	7	8	16 3-8	1-4 24	18	2-6	12	2-6	8	-	-	2-8	6-8	2-6	5
Foxtails Giant	2-8	7	8	16	1-4 4-8	18 24	2-6	12	2-6	8	1-6 1.4 1-3 1.4	2-8 6-8	2-12	6-8	2-6	5
Green	2-4	7	8	16	1-4 4-8	18 24	2-4	12	2-4	8			2-8	6-8	2-6	5
Yellow	2-4	7	8	16	1-8	24	2-4	12	2-4	8			2-8	6-8	2-6	5
Goosegrass	2-6	7	6 3-6	16 24	1-3	18	2-4	8	2-4	8	-	-	2-6	6-8	-	-
Seedling johnsongrass	2-8	5	8	16	1-8	24	2-8	6	2-8	6	1-8	1.4	4-10	6-8	4-8	5
Sandbur	2-6	7	3	20	-	-	2-4	12	-	-	-	-	2-6	6-8	-	-
Shattercane	6-12	5	18	16	6-18	24	6-12	6	6-12	6	1-8	1.4	6-18	6-8	2-8	5
Texas panicum	2-4	8	8	16	1-4 4-8	18 24	2-8	12	2-8	8	-	-	2-6	6-8	-	-
Volunteer corn	6-18	5	20	16	1-12 12-20	18 24	12-24	6	12-24	6	-	-	4-12	4-8	2-8	5

¹Taken from product labels; control not claimed on label.

Table 5.46 - Feeding Restrictions on Soybean Hay and Preharvest Interval Following Treatment with Various Herbicides¹

Herbicide	Hay		Seed Pre-Harvest
	Do not feed	No Restrictions	
2,4-D	x		45 days EPP to soybeans
2,4-DB	60 days ²		60 days
Assure II/Targa	x		80 days ⁴
Authority Assist	x		—
Axiom	x		
Basagran	30 days	x	
Boundary	40 days		—
Canopy	x		—
Canopy EX	x		—
Classic	x		60 days
Cobra	x		45 days
Command	x		—
Dual II Magnum/Cinch	x		—
Extreme	x		85 days
FirstRate	14 days		65 days
Fusilade DX	x		Before bloom
Fusion	x		Before bloom
Glyphosate	25 days		7 days
Glyphosate on Roundup Ready Soybeans	14 days		14 days
Gramoxone Inteon	x		— ⁵
Harmony SG	x		60 days
Ignite 280	45 days		45 days
Micro-Tech	40 days	x ³	
Lexone	40 days		
Outlook	x		—
Poast or Poast Plus		x	90 days
Prefix	x		—
Prowl		x	
Pursuit	x		85 days
Python	x		
Raptor	x		85 days
Reflex/Flexstar	x		Before bloom
Resource	x		60 days
Scepter	x		90 days
Select Max	x		60 days

¹These restrictions apply to soybean hay. For feeding of green forage, see labels, as restrictions may be different.

²Minimum time between application and hay making.

³Do not feed if Micro-Tech is applied after crop emergence.

⁴Do not apply after pod set.

⁵When at least 65% of the seed pods have reached a mature brown or when seed moisture is 30% or less.

Table 5.46 - Feeding Restrictions on Soybean Hay and Preharvest Interval Following Treatment with Various Herbicides¹ (cont.)

Herbicide	Hay		Seed Pre-Harvest
	Do not feed	No Restrictions	
Sencor	40 days		
Sequence (POST on RR soybeans)	x		90 days
Sequence (PRE)	30 days		—
Sonic/Authority First	x		65 days
Stellar	x		60 days
Storm	x		50 days
Synchrony XP	x		60 days
Touchdown Total/HiTech (RR soybeans)	x	x	14 days
Treflan		x	—
Ultra Blazer	x		50 days
Valor	x		—
Valor XLT	x		—

¹These restrictions apply to soybean hay. For feeding of green forage, see labels, as restrictions may be different.

²Minimum time between application and hay making.

³Do not feed if Micro-Tech is applied after crop emergence.

⁴Do not apply after pod set.

⁵When at least 65% of the seed pods have reached a mature brown or when seed moisture is 30% or less.

Table 5.47 - Preplant

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Johnsongrass (rhizomes)	Glyphosate 1.0-3.0 lb	4.0 lb ai/gallon glyphosate containing product or equivalent 1.0-3.0 qt	Use in 10.0-40.0 gal of water/A. Spray when johnsongrass is 24-30 inches high and in boot to head stage. Rainfall within 6 hours may reduce effectiveness, within 2 hours retreatment is necessary. Allow at least 7 days before plowing. Use one of the pre-plant incorporated herbicides for johnsongrass seedling control before planting. Do not feed or forage treated crops within 8 weeks after application.
Johnsongrass (rhizomes) Alternate method	Glyphosate 1.0-1.5 lb	4.0 lb ai/gallon glyphosate containing product or equivalent 1.0-5.0 qt	Use 1.0-1.5 lb ai/A with low water volume (5.0-10.0 gal/A) and with flat fan type nozzles on annually cropped areas. Use the 2.0-3.0 lb ai/A rate described above on noncrop areas or where annual tillage is not performed.

Table 5.48 - Preplant Incorporated

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Carpetweed, cocklebur, crabgrass spp., jimsonweed, lambsquarters, morningglory spp., nightshade, fall panicum, pigweed spp., purselane, prickly sida, smartweed, spurred anoda, and velvetleaf.	Sulfentrazone 0.16-0.32 lb + Imazethapyr 0.031 - 0.062 lb	Authority Assist 4 SC 6.0-12.0 oz	Apply preplant incorporated or as a preemergence treatment. If incorporated, do not incorporate more than 2 inches deep. Do not apply to soils classified as sand with less than 1% organic matter content or to soils with pH of 7.9 or higher. Authority Assist rates of 4 to 6 ounces can be used when followed by glyphosate applications in a Roundup Ready soybean system. Rates of 6 to 12 ounces are recommended in conventional soybean systems.
Cocklebur, jimsonweed, lambsquarters, pigweed, common ragweed, smartweed, prickly sida or tea-weed, velvetleaf, and suppression of annual morning-glory species, burcucumber and giant ragweed	Chlorimuron + metribuzin 0.19-0.38 lb	Canopy 75DG 4.0-8.0 oz	Incorporate uniformly into the top 1-2 inches of soil before planting soybeans. If tank mixed with grass herbicide, follow incorporation instructions for the grass herbicide. Use lower rates on sand or loamy sand or any soil of less than 0.5% organic matter content. Do not use on soils of pH 7.0 or higher. Observe labeled rotational crop restrictions. May require use of a supplementary postemergence herbicide. Use of STS soybeans with Canopy may allow use of higher rates with reduced risk of crop injury.
		Approved combinations: Micro-Tech, Dual II Magnum/Cinch, Treflan, Outlook	Observe all precautions, rates of application, and weeds controlled stated on respective labels.
Barnyardgrass, crabgrass, fall panicum, foxtails, goosegrass, broadleaf signalgrass, yellow nutsedge, carpetweed, pigweed, and galinsoga	s-metolachlor 0.96-1.9 lb	Dual II Magnum/Cinch 1.0-2.0 pt Approved combinations: Sencor, tank mix or preemergence; Scepter, tank mix or preemergence.	If used preplant incorporated, incorporate not over 2 inches deep within 14 days before planting. Apply before weeds or crop emerge. Refer to labels for rates application, and complete weed lists. The metolachlor plus metribuzin combination may be applied as the prepackage mix Turbo.
Barnyardgrass, carpetweed, crabgrass, fall panicum, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, broadleaf signalgrass, smartweed, spurges, and shattercane	Pendimethalin 0.5-1.5 lb	Prowl 3.3EC 1.21-3.63 pt	Adjust rate to soil texture. Apply and incorporate 1-2 inches deep within 7 days after application. Soybeans may be planted immediately.
		Approved combinations: Sencor/Lexone, tank mix or preemergence; Linex, preemergence; Scepter, tank mix or preemergence.	Observe all precautions, rates of application, and weeds controlled stated on the respective labels. Prowl + sceptor are available as the package-mix Squadron (3.0 pt/A). Prowl is also available in a prepack with Scepter and Pursuit called Steel.

5-110 Weeds: Soybeans

Table 5.48 - Preplant Incorporated (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Cocklebur, pigweed only	Imazaquin 0.95 lb	Scepter 1.5E 0.5 pt, 70DG 2.15 oz	Approved combinations: MicroTech, Dual II Magnum/Cinch, Prowl, Treflan Observe all precautions, rates of application, and weeds controlled stated on respective labels.
Cocklebur, jimsonweed, lambsquarters, pigweed spp., common ragweed, smartweed, prickly sida or tea-weed, velvetleaf, foxtail spp., seedling johnsongrass, and suppression of giant ragweed	Imazaquin 0.125 lb	Scepter 70DG 2.8 oz	Apply before planting and incorporate uniformly into the top 1-2 inches of soil. Observe labeled rotational crop restrictions. Do not graze or feed treated soybean forage, hay, or straw to livestock.
Johnsongrass control and above annual weeds for respective chemicals	Trifluralin 1.0-2.0 lb or pendimethalin 1.0-2.0 lb	Treflan 4EC 2.0-4.0 pt or Prowl 3.3 EC 2.42-4.84 pt	In the fall (preferable) or early spring, bring johnsongrass rhizomes to soil surface by moldboard plow, spring harrow, or chisel plow. Thoroughly disc soil before treatment to cut johnsongrass rhizomes into 2-3 in pieces. Apply herbicide to well worked, dry-surfaced soil. Apply in spring at the rate suggested for your soil and thoroughly incorporate with a tandem disc set to cut 4-6 inch deep and operated at 4-6 mph and cross disc. Soybeans can be planted immediately. Cultivate at least once during growing season. Usually requires two annual applications for effective control. Follow label as to rotational crops that may be safely grown. Use a johnsongrass seedling control
Wild cane or shattercane control and above annual weeds for respective chemicals	Trifluralin 0.5-1.25 lb	Treflan 4EC 1.0-2.5 pt	Follow soil preparation, mixing, application, and incorporation instructions listed above.
Barnyardgrass, brachiaria sp., brome grass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, stinkgrass, Texas panicum, wild cane, shattercane	Trifluralin 0.5-1.0 lb	Treflan HFP 4EC 1.0-2.0 pt	Incorporate with tandem disk set to cut 4-6 inches immediately or within 24 hours after application. Use lower rates on sandy and sandy loam soils and heavier rates on loam and silt loam soils. Plant soybeans after early season adverse weather has passed. Do not plant deeper than 2 inches. Follow label for proper soil incorporation procedures. Approved combinations: Sencor/Lexone tank mix or preemergence; Linex, preemergence; Scepter, tank mix or preemergence. Observe all precautions, rates of application, and weeds controlled stated on the respective labels.

Table 5.49 - Preemergence (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Anoda (spurred) barnyardgrass, crabgrass, foxtail (giant, green, and yellow), goosegrass, johnsongrass (seedling), lambsquarters, panicum (fall), purslane, sandbur (field), sida (prickly), signalgrass (broadleaf), smartweed, and velvetleaf	Clomazone 0.5-1.0 lb	Command 3ME 1.33-2.66 pt Approved combinations: Tank mix with Scepter or Sencor	Apply in a minimum spray volume of 10 gal/A. Do not apply within 1,200 feet of areas listed on the label. Do not exceed 30 psi spray pressure. Off-site movement of spray drift or vapors of Command 3ME can cause foliar whitening or yellowing of some plants.
Barnyardgrass, beggarweed, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, galinsoga, goosegrass, pigweed, broad-leaf signalgrass, witchgrass, and yellow nutsedge	s-metolachlor 0.96-1.9 lb	Dual II Magnum 7.64 EC 1.0-2.0 pt Approved combinations: Linex, tank mix; Sencor, tank mix or preplant incorporated; Treflan, preplant incorporated; Scepter, tank mix or preplant incorporated;	Apply before, during or after planting but before weeds or crop emerges. May be incorporated into the top 2 inches of soil within 14 days before planting. Small grains may be planted 4.5 months after treatment. Do not graze or feed forage or fodder from small grains or soybeans. Observe all precautions, rates of application, and weeds controlled stated on the respective labels. Do not use metribuzin on coarse textured, coastal plain soils. The metolachlor plus metribuzin combination may be applied as the prepackage mix Boundary.
Cocklebur, horseweed, ragweed (common, giant), jimsonweed, smartweed, lambsquarters, Venice mallow, velvetleaf, morningglory species, pigweed species	cloransulam-methyl 0.032-0.040 lb/A	FirstRate 84D 0.6-0.75 oz/A	Apply Firstrate/Amplify alone or in tank-mix combination with other herbicides registered for preplant surface application in soybeans. For best results apply within 2 weeks of planting, but prior to crop or weed emergence. When applied in combination, follow use instructions and restrictions for each product used in tank-mixture.
Barnyardgrass, carpetweed, crabgrass, foxtails, Florida pusley, goosegrass, fall panicum, galinsoga, lambsquarters, mustard, pigweed, purslane, ragweed, and smartweed. Will not control cocklebur, jimsonweed, morning-glory, or velvetleaf	Linuron 0.3-1.0 lb	Linex 4L 0.3-1.0 qt Approved combinations: MicroTech, tank mix; Dual II Magnum/Cinch, tank mix; Treflan, preplant incorporated; Prowl, preplant incorporated or tank mix	Apply after planting and before beans germinate. Provide good agitation in tank before and during application. Follow labeled directions regarding soybean planting depth. Do not use on light sandy soils with low organic matter because injury may occur. Do not plant any crop not on label within 4 months of application. Often provides short-term grass control. Observe all precautions, rates of application, and weeds controlled stated on the respective labels. When used in combinations, linuron rates generally should be reduced.

Table 5.49 - Preemergence (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Barnyardgrass, crabgrass, carpetweed, Florida pusley, foxtails, galinsoga, goosegrass, fall panicum, nightshade (black), pigweed, broadleaf signalgrass, and witchgrass	Alachlor 1.5-4.0 lb	MicroTech or others 1.5-4.0 qt	Apply immediately after planting and before crop and weeds emerge. Use lower rates on sandy and sandy loam soils, higher rates on silt loam soils. Also may be used as a pre-plant incorporated treatment. Shallow incorporation or surface blend generally is most effective, particularly on light, sandy, soils. MicroTech is not recommended for incorporation on coarse soils in the Southeast.
		Approved combinations: Linex, tank mix; Sencor, tank mix; Scepter, tank mix	Observe all precautions, rates of application, and weeds controlled stated on respective labels.
Barnyardgrass, carpetweed, crabgrass, foxtail (giant, green, yellow), goosegrass, nutsedge (yellow), panicum (fall), pigweed spp., pusley (Florida), broadleaf signalgrass, and witchgrass	Dimethenamid-P 0.47-0.98 lb	Outlook 6.0 EC 10.0-21.0 oz	Do not exceed a rate of 20.0 oz/A on coarse soils with less than 2.5 % OM, PPI treatments are not recommended on these soils. Add 3-5 oz/A to the rates given when Frontier is used on heavy surface plant residue. Frontier plus Scepter is available as a package mix called Detail. Do not apply Detail on coarse soil classified as sand with less than 3% organic matter content and where depth to ground water is 30 feet or less.
		Approved combinations: tank mix with Scepter, Linex, or Sencor	Observe all precautions, rates of application and weeds controlled on the respective labels.
Barnyardgrass, carpetweed, crabgrass, foxtail spp., goosegrass, panicum (fall), lambsquarters (common), nightshade (eastern black), pigweed spp., purslane (common), ragweed (common), signalgrass (broadleaf), smartweed	S-metolachlor 1.1-1.6 lb + fomesafen 0.24-0.36 lb	Prefix 5.32EC 2.0-3.0 pt	Prefix can be used as part of a two-pass program for weed control in soybeans. A sequential application of Reflex or Flexstar is prohibited.
Barnyardgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, lambsquarters, pigweed, broadleaf signalgrass, smartweed, spurges, and velvetleaf suppression	Pendimethalin 0.5-1.25 lb	Prowl 3.3EC 1.21-3.0 pt	Apply to a seedbed that is firm and free of trash. Rainfall is necessary for activation, and treatment is most effective when adequate rainfall or overhead irrigation is received within 7 days after application. If rainfall is not adequate for activation, a shallow cultivation should be made to control existing weeds; place herbicide in zone of weed seed germination. Under certain environmental conditions, soybeans may become brittle at soil surface.

Table 5.49 - Preemergence (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
		Approved combinations: tank mix with Canopy plus Scepter, or Sencor; preplant incorporated with Scepter or Sencor	
Cocklebur, jimsonweed, lambsquarters, morning glory species, nightshade spe- cies, pigweed, sida (prickly), smartweed, velvetleaf	Flumetsulam 0.04-0.067 lb	Python 0.8-1.33 oz	Do not apply aerially. Do not apply to soils with a pH >7.8. A tank mix grass herbicide is recommended.
Cocklebur, pigweed only	Imazaquin 0.95 lb	Scepter 70DG 2.15 oz	Approved combinations: tank mix with Prowl, dimethenamid, Micro- Tech or Dual II Magnum/Cinch; preplant-incorporated with Outlook, Prowl, Treflan, or Dual II Magnum/Cinch
Cocklebur, jimsonweed, lambsquarters, pigweed spp., common ragweed, smart- weed, prickly sida or tea- weed, and foxtail spp.	Imazaquin 0.125 lb	Scepter 70DG 2.8 oz	Apply during or after planting but before crop emergence. If sufficient rainfall for activation is not received within 7 days of application, a shallow tillage or cultivation is recommended. May be tankmixed with a residual herbicide for improved annual grass control. Observe labeled rotation crop restrictions.
Barnyardgrass, beggar- weed, carpetweed, coffee- weed, pusley, fall panicum, jimsonweed, lambsquarters, mustard spp., pigweed spp., purslane, ragweed, broad- leaf signalgrass, sicklepod, smartweed, spurred anoda, prickly sida, and velvetleaf	Metribuzin 0.25-0.375 lb	Sencor 4L 0.5-0.75 pt or DF 0.33-0.5 lb	Apply immediately after planting. Plant at least 1.5 inches deep. Do not use on sands or sandy loam soils or soils with less than 0.5% organic mat- ter. If used on coarser textured soils with less than 2% organic matter, or if heavy rainfall follows soon after appli- cation, severe stand losses can occur. Certain organic phosphate soil insecti- cides placed in contact with seed also may result in increased soybean injury from metribuzin. Do not use on Altona, Coker 102 and 156, Gervin, Semmes, Tracy, or Varsoy varieties. The lowest rates have not effectively controlled cocklebur, jimsonweed, or morning- glory. Rainfall (0.25-0.5 inches) within 2 weeks after application is neces- sary to activate herbicide. Do not use treated vines for feed or forage. Do not replant treated areas to any crop other than soybeans within 4 months after treatment. Read and follow the label for such use.

Table 5.49 - Preemergence (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
		Approved combinations: MicroTech, tank mix; Dual II Magnum/Cinch, tank mix or preplant incorporated; Prowl, tank mix or preplant incorporated; Treflan, preplant incorporated	Observe all precautions, rates of application, and weeds controlled stated on the respective labels.
Anoda (spurred), carpetweed, cocklebur (common), crabgrass, croton (tropic), dayflower (common), goosegrass, jimsonweed, lambsquarters (common), momingglory spp., nightshade (eastern black), panicum (fall), pigweed spp., purslane (common), ragweed (common), signalgrass (broadleaf), smartweed, velvetleaf	Sulfentrazone 0.25-0.31 lb + cloransulam 0.032-0.04 lb	Sonic/Authority First 70DF 6.45-8.0 oz	Sonic/Authority First contains a group 2 herbicide (chloransulam) and there is known weed resistance to group 2 herbicides. Sonic/Authority First will not control group 2-resistant weed biotypes. Do not apply to soils classified as sand with less than 1% organic matter. It is recommended that you use 3.0 oz/A when followed by glyphosate in a Roundup-Ready soybean system, or 6.45 to 8.0 oz/A in conventional soybeans. For soils with less than 3.0% organic matter, use 6.45 oz/A, for soils with greater than 3.0% organic matter use 8.0 oz/A. Do not apply to sands with less than 1.0% organic matter.
Cocklebur, lambsquarters, maretail, pigweed spp., common ragweed, smartweed, and velvetleaf; and suppression of annual grasses (foxtails, barnyardgrass, crabgrass spp., fall panicum), common chickweed, jimsonweed, morningglory spp., yellow nutsedge, prickly sida, and giant ragweed.	chlorimuron 0.21-0.64 oz + thifensulfuron 0.0 -0.21 oz	Synchrony XP 28.4 DG 1.0-3.0 oz	Apply to either conventional, reduced-tillage, or no-till plantings. In reduced-tillage and no-tillage plantings, Synchrony XP will also provide burndown control of many existing winter annual and summer annual weeds. Burndown applications should include a crop-oil concentrate at 1% v/v and be made in a minimum of 20 GPA. The addition of 2,4-D LVE at 1 pt/A will enhance burndown control. The addition of 2,4-D LVE is required with the 1.0 oz rate of Synchrony XP and is recommended for all other rates. Do not apply more than 1.5 oz/A of Synchrony XP to soils with composite pH greater than 7.0.

Table 5.49 - Preemergence (cont.)

Weed Problem	Chemical rate per acre	Product per acre	Remarks
Carpetweed, lambsquarters, horseweed, nightshade spp., pigweed spp., prickly sida (teaweed), morningglory species, common ragweed, jimsonweed, spurred anoda, tropic croton	Flumioxazin 0.64-0.80 lb/A	Valor 51D 2.0-2.5 oz/A	Apply preemergence using ground equipment only. Crop injury may occur from applications made to poorly drained soils or under cool, wet conditions. Apply in 10.0-30.0 gal/A. Valor can be tank mixed with pendimethalin or Command for additional grass control. Tank mixes with metolachlor (Dual products or Boundary), dimethenamid (Frontier or Outlook), or alachlor (Micro-Tech) may result in severe injury to soybeans when application is followed by prolonged periods of cool wet weather and should not be used with Valor. Valor can be tank mixed with Sencor, FirstRate, Linex, Python, or Scepter for additional broadleaf weed control.
Barnyardgrass, carpetweed, crabgrass (large), goosegrass, lambsquarters (common), nightshade (eastern black), panicum (fall and Texas), pigweed spp., primrose (evening), purslane (common), sida (prickly), signalgrass (broadleaf). At rates >4 oz include the following: cocklebur (common), croton (tropic), jimsonweed, morningglory spp., ragweed (common and giant), smartweed spp., velvetleaf	Chlorimuron 0.019-0.0317 lb + flumioxazin 0.056-0.093 lb	Valor XLT 40.3WDG 3.0-5.0 oz	Do not incorporate Valor XLT. Valor XLT contains a group 2 herbicide (chlorimuron) and there is known resistance to group 2 herbicides. Chlorimuron will not control group 2-resistant weed biotypes. Risk of crop injury can be minimized by not using on poorly drained soils, planting at least 1.5 inches deep, and completely covering seeds with soil prior to preemergence applications. For improved grass control, Valor XLT can be tank mixed with products such as Command or pendimethalin (Prowl and others).

Table 5.50 - 2,4-D Application Rate Chart - Preplant Soybeans¹

2,4-D is now labeled for use prior to planting soybeans. Use the following table to determine the amount of 2,4-D to use and the time interval needed between application and planting soybeans.

Product	Use Rate	lb ai/A	When to Apply (Pre-Plant Interval)
4.0 lb ai/gallon	0.75-1.0 pt	0.375-0.5	15 days
2,4-D amine	1.0-2.0 pt	0.5-1.0	30 days
4.0 lb ai/A gallon	0.75-1.0 pt	0.375-0.5	7 days
2,4-D ester	1.0-2.0 pt	0.5-1.0	30 days

¹Restrictions and limitations for use of 2,4-D on soybeans (pre-plant).

- Do not apply when weather conditions such as temperature air inversions or wind favor drift from treated areas to susceptible plants.
- Do not exceed the 2,4-D rates given on the product labels.
- Do not apply 2,4-D prior to planting soybeans if you are not prepared to accept the results of soybean injury including possible loss of stand and yield.
- Do not replant fields treated with 2,4-D in the same growing season with crops other than those labeled for 2,4-D pre-plant use.
- Do not mow or cultivate weeds prior to treating with 2,4-D or poor control may result.
- Do not cut for feed or graze soybeans grown in fields which have received a 2,4-D pre-plant application.
- Other 2,4-D formulations (such as Selvo) can have shorter preplant intervals.
- Some 2,4-D formulations contain greater than 4.0 lb ai/gallon. Consult label and adjust rates accordingly.

Table 5.51 - Soybeans (Full-season No-till)

For control of vegetation existing at planting, use one of the three following options.

Weed problem	Chemical rate per acre	Product per acre	Remarks
Contact kill of most annual weeds and annual cover crops	Paraquat 0.5 lb + surfactant	Gramoxone Inteon 2.0 pt ¹ + surfactant as specified by label	Apply in 20.0-60.0 gal/A. May not control weeds higher than 6 inches. Increase gallonage as density of stubble, crop residue, and/or weeds increases. 2,4-D-B may increase activity of this treatment on some species.
Alternate method for increased activity on harder to control annual weeds such as horseweed (mares-tail), annual vetch, and lambsquarters	Paraquat 0.25-0.5 lb + surfactant + paraquat 0.25-0.5 lb + surfactant 10 days later + residual herbicide	Gramoxone Inteon 1.0 - 2.0 pt ¹ + surfactant as labeled + Gramoxone Inteon 1.0 - 2.0 pt + surfactant as labeled 15 days later + residual herbicide as needed	Apply as directed above. 2,4-D may be needed with first application. Refer to label and to 2,4-D comment below.

¹For enhanced control of marestail or horseweed, lambsquarters, ragweed, and other susceptible broadleaf species, and as a supplement to traditional burndown herbicides, 2,4-D may be added to paraquat or glyphosate.

Table 5.51 - Soybeans (Full-season No-till) (cont.)

For control of vegetation existing at planting, use one of the three following options.

Weed problem	Chemical rate per acre	Product per acre	Remarks
Control of annual weeds including horseweed (mares-tail) and annual cover crops and suppression or control of perennial weeds or covers	Glyphosate 0.75-3.0 lb	4.0 lb ai/gallon glyphosate containing product or equivalent 0.75-3.0 qt	Effective in heavy annual weed infestations and with large weeds where thorough coverage with paraquat is not possible. Higher rates will control perennial species, but those species often are not present or susceptible at the time of planting. Use 0.75 lb ai for annual weeds up to 6 inches and 1.5 lb ai for weeds greater than 6 inches. Use a minimum of 1.5 lb ai for horseweed (marestalk) control. Horseweed taller than 6 inches may not be controlled. Make applications with fan-type nozzles. Use 15.0-30.0 gal/A (lower volumes usually are most effective).

¹For enhanced control of marestalk or horseweed, lambsquarters, ragweed, and other susceptible broadleaf species, and as a supplement to traditional burndown herbicides, 2,4-D may be added to paraquat or glyphosate.

Successful production of full-season and double crop no-till soybeans depends on control of existing vegetation (cover crop/weeds) and broadleaf and grass weeds that emerge after planting. A diversity of herbicides and cover crop/residue situations make it impossible to utilize a single program to efficiently control weeds and grasses on all situations. Herbicide selection based on weed histories of each farm or field is necessary to achieve weed-free, high-yielding soybeans.

Existing vegetation is traditionally controlled by the non-selective herbicides glyphosate or paraquat (Gramoxone Inteon) in no-till soybeans. If in-crop applications of glyphosate are planned, consider use of an alternative burndown program to reduce the potential for development of tolerant or resistant species. Two paraquat applications may be required for satisfactory control of some species. More recently, 2,4-D and thifensulfuron (Harmony SG) were labeled for control of broadleaf weeds prior to planting full season no-till soybeans. In double crop no-till soybeans planted into barley or wheat stubble, chlorimuron plus metribuzin (Canopy), linuron (Linex), metribuzin (Sencor), or chlorimuron plus sulfentrazone (CanopyXL) plus adjuvants have controlled small broadleaf weeds without addition of non-selective herbicides. Annual grass control in no-till soybeans can be obtained with preemergence applications of alachlor (Micro-Tech), metolachlor (Dual II Magnum/Cinch), dimethenamid (Outlook), pendimethalin (Prowl) or with any of several postemergence grass herbicides. Stem brittleness and lodging can be associated with pendimethalin when soil conditions are cool and wet, these conditions can occur most frequently in early-planted full-season no-till soybeans.

Annual broadleaf weed control **in no-till** can be achieved with a combination of preemergence and postemergence broadleaf herbicides. Because of the diversity of species in many fields it is frequently necessary to apply postemergence herbicides to control weeds that escape preemergence herbicides.

Escalating herbicide costs and our interest in keeping herbicide use to a minimum is encouraging many people to **rethink their herbicide strategy by reducing or eliminating preemergence herbicides and following with timely applications of post-emergence herbicides**. Our experiences lead us to suggest that one should always control existing vegetation at or prior to planting. Preemergence and/or postemergence herbicides can then be selected at rates that will control weeds that emerge after planting. Reducing or eliminating all or some of the preemergence herbicides can reduce costs in fields that historically have needed postemergence herbicides. This approach **should** be considered first in double-crop no-till soybeans where weed populations have traditionally been low and expanded to the full-season no-till system as appropriate.

Table 5.52 - General Consideration for Weed Control in Full-season No-till Soybeans

Control of annual weeds and grasses as listed for specific	For annual grass control in full-season, no-till soybeans, use either alachlor (Micro-Tech), metolachlor (Dual II Magnum/Cinch), dimethenamid (Outlook), or pendimethalin (Prowl). Where herbicides in previous tables split paraquat applications are used, a portion of the residual grass herbicide may be applied with the initial paraquat application for improved early season grass control. Stem brittleness and lodging can be associated with applications of pendimethalin when soil conditions are cool and wet. Because these conditions frequently occur early in the growing season, especially under no-till conditions, the use of alachlor or metolachlor for early, full-season, no-till plantings is recommended. Late-season grass control will tend to be better with the longer residual herbicides than with the somewhat shorter residual herbicides, such as Prowl. Supplement the grass control herbicide with linuron (Linex), metribuzin (Sencor), chlorimuron + metribuzin (Canopy), imazaquin (Scepter), or chlorimuron + sulfentrazone (Canopy XL) for broadleaf weed control. Carefully monitor weed development and supplement the preemergence herbicide program with appropriate postemergence or postdirected herbicides.
Perennial broadleaf weeds	No selective herbicides are available to control perennial broadleaf weeds in soybeans, and these weeds may become prevalent under continuous no-till culture. Spot treatment with glyphosate may be used. The use of glyphosate in Roundup Ready soybean has been very effective for control or suppression of many perennial broadleaf species.
Perennial grass weeds (johnsongrass, bermudagrass)	In general, soil-applied herbicides to control perennial grasses must be incorporated and cannot be used in no-till culture. Perennial grasses, therefore, must be controlled in no-till with glyphosate, or with Assure II, Fusilade DX, Fusion, Poast, Poast Plus or Select. See directions under postemergence treatments listed below. Carefully consider these options before establishing no-till soybeans in areas containing a perennial grass infestation.

Table 5.53 - Soybeans (No-till, Small-grain Stubble)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Contact kill of most annual weeds and weeds listed in previous tables for specific residual herbicides	Paraquat 0.5-1.0 lb + surfactant + alachlor, metolachlor, dimethenamid, pendimethalin (residual grass control) + clomazone linuron metribuzin	Gramoxone Inteon 2.0-4.0 pt + surfactant as specified by label + Micro-Tech or Dual II Magnum/Cinch, Outlook, Prowl + Command ME or Linex or Sencor	Apply to small-grain stubble after planting and before emergence of soybeans. Use 20.0-60.0 gal of diluted spray/A. As the density of the stubble or crop residue increases, the spray gallonage should increase to ensure complete coverage and kill. Do not graze or feed treated forage to livestock. Observe all precautions, rates or application and weeds controlled stated on the respective labels. Use 4.0-8.0 oz for added control of velvetleaf, spurred anoda, and volunteer small grains.

Table 5.53 - Soybeans (No-till, Small-grain Stubble) (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Kill of most annuals and some perennials and weeds listed in previous tables for specific residual herbicides	Glyphosate 0.5-3.0 lb + alachlor, metolachlor, dimethenamid, pendimethalin (residual grass control) + clomazone linuron metribuzin	4.0 ai/gal glyphosate containing product or equivalent 0.5-3.0 qt + Micro-Tech or Dual II Magnum/Cinch, Outlook, Prowl + Command ME or Linex or Sencor	At the normal time of planting of soybeans, johnsongrass and bermudagrass will not be at the proper stage of growth for effective control. Do not feed or forage glyphosate-treated crops within 8 weeks after application. See label for specific weeds controlled. Use 0.75 lb ai for control of annual broadleaf weeds and grasses up to 6 inches high and 1.5 lb ai for annual broadleaf weeds and grasses more than 6 inches high. Applications with fan type nozzles generally have been more effective than with flood-jet type nozzles. Use 3.0-10.0 gal of water/A and low-rate instructions for most economical glyphosate use rates, or 10.0-40.0 gal of water using high-volume instructions and corresponding glyphosate rates. Glyphosate is also available in a prepack with Dual II Magnum called Sequence, and in a prepack with Pursuit called Extreme.
Preplant: Canada thistle, carolina geranium, cutleaf evening primrose, curly dock, Pennsylvania smartweed, prickly lettuce, prostrate knotweed and many other broadleaf weeds	Thifensulfuron and Tribenuron 0.023-0.028 + surfactant or crop oil concentrate or liquid fertilizer	Harmony Extra SG 0.75-0.9 oz + surfactant 1.0 qt/100.0 gal or crop oil concentrate 1.0 qt/100.0 gal or fertilizer	Apply Harmony Extra SG at least 45 days prior to planting soybeans, either conventional or no-till. Allow to stand for 5 weeks before tillage or mowing. Best results obtained when applications are made to young, actively growing weeds. This is an excellent treatment, especially when combined with 2, 4-D ester for the control of Canada thistle and many hard to kill weeds in full season no-till soybeans such as horseweed, carolina geranium, cutleaf evening primrose, curly dock, etc.
		Approved combination: tank mix with 2,4-D ester 1.0-2.0 pt/A (4.0 lb/gal)	Use for improved control of Canada thistle, carolina geranium cutleaf primrose and most other broadleaf weeds.

Table 5.53 - Soybeans (No-till, Small-grain Stubble) (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Burndown control of emerged winter annual, perennial, and summer annual weeds, including buttercup, chickweed, dandelion, deadnettle, henbit, lambsquarters, prickly lettuce, mustard spp., pigweed, ragweed spp., smartweed, speedwell, and velvetleaf.	chlorimuron 0.25 oz + tribenuron 0.075 oz	Canopy EX 29.5 DG 1.1 oz	Apply to no-till or conventional-tillage fields anytime after fall harvest, up to 45 days before soybean planting. For best results, apply to annual weeds that are up to 3 inches in height or diameter, and to perennial weeds that are up to 6 inches in height or diameter. For the best burndown results, the addition of 1 pt/A of 2,4-D LVE is recommended, and is required for control of some species. Applications of Canopy EX must include either a crop-oil concentrate or a nonionic surfactant. Crop-oil concentrate is the required adjuvant unless tank mixing with a product that precludes use of crop-oil concentrate. On soils with soil pH of 7.0 or less, Canopy EX may be applied at rates of 1.5 - 3.3 oz/A and will also provide residual control of cocklebur, henbit, marestail, pigweed spp., common ragweed, smartweed, and winter annual mustard spp., and will provide suppression of annual grasses, chickweed, jimsonweed, morningglory spp., yellow nutsedge, prickly sida, giant ragweed, and velvetleaf.
The addition of Synchrony XP to glyphosate containing herbicides will increase the burndown control of dandelion, curly dock, henbit, marestail, morningglory spp., yellow nutsedge, evening primrose, ragweed spp., sicklepod, smartweed spp., and velvetleaf versus application of glyphosate alone.	chlorimuron 0.16 oz + thifensulfuron 0.052 oz	Synchrony XP 28.4 DG 0.75 oz	Synchrony XP may be tank mixed with glyphosate-containing herbicides registered for soybeans for burndown of existing summer and winter annual weeds. Apply up to 30 days before planting and prior to soybean emergence. Always include 0.25% v/v nonionic surfactant. The addition of 1-2% w/w ammonium sulfate may increase performance of this tank mix. 1 pt/A of 2,4-D LVE will enhance performance and may be applied up to 7 days before planting. Synchrony XP will also provide limited preemergence control of jimsonweed, lambsquarter, marestail, yellow nutsedge, pigweed spp., ragweed spp., and smartweed spp. For season-long control, however, a planned PRE or POST sequential program is required.

Table 5.54 - Postemergence

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Common cocklebur (2 leaf only), morning-glory, pigweed, jimsonweed, common ragweed, smell melon, buffalo bur, wild mustard, carpetweed, common purslane, Pennsylvania smartweed, giant ragweed, Florida pusley, black nightshade, ironweed, tropic croton, lance-leaf groundcherry, prostrate spurge, and burcucumber	Acifluorfen 0.25-0.375 lb	Ultra Blazer 2L 1.0-1.5 pt	Apply when weeds are 2-4 inches high and actively growing and when soybeans are in the 1-2 trifoliolate leaf stage. Use standard herbicide sprayers equipped with hollow-cone or flat-fan nozzles. (Best results have been obtained with fan type nozzles). Use 40-60 psi at the nozzle tips and a minimum of 20.0 gal spray volume/A. Add a nonionic surfactant at the rate of 1.0 pt/100.0 gal to Ultra Blazer 2L. Do not apply when crop and weeds are under stress, such as from drought, flooding, excessive fertilizer or soil salts, wind injury, frost damage, unseasonable cold night and day temperatures, or injury from previous herbicides. Application with 30.0 gal of spray volume/A; a minimum of 50 psi, and the addition of surfactant to the 2L formulation may improve on drought-stressed or slightly oversized weeds, but applications made under these conditions generally will be less satisfactory than those made under optimum conditions. Do not apply if rain is threatening (6 hour rainfree period is required for best results). Do not apply within 50 days of harvest and do not use treated plants for feed or forage. The addition of 2,4-DB (2 fl oz) is recommended for additional control of morning-glory spp. and cocklebur. Add to Basagran, Ultra Blazer, Classic, Reflex, or Cobra.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Beggarticks, cocklebur, Pennsylvania smartweed, wild mustard, velvetleaf, common ragweed, galinsoga, jimsonweed, giant ragweed, prickly sida (teaweed), purslane, spurred anoda, yellow nutsedge, and suppression of Canada thistle	Bentazon 0.75-1.0 lb + Crop oil concentrate	Basagran 0.75-1.0 qt + Crop oil concentrate 1.0 qt	Apply to thoroughly cover weeds when they are small and actively growing. Add oil concentrate to the spray solution according to label instructions. Weed growth stages generally correspond to soybean growth stages or 1-2 trifoliolate leaves. For best results, treat before weeds reach the size limits listed on the label. Control has generally been most effective using fan tips and pressures of 40-50 psi. Yellow nutsedge may be controlled best when application is followed in 7- 10 days with a repeated application or by cultivation in 10- 14 days. Soybeans may exhibit a slight yellowing, bronzing, or speckled appearance, which generally is soon outgrown. Do not apply to soybeans growing under unfavorable conditions and exhibiting stress symptoms. Rainfall within 8 hours of application may reduce effectiveness. Do not apply within 65 days of harvest. Do not feed forage to livestock. The addition of 2,4-DB (2 fl oz) is recommended for additional control of morning-glory spp. and cocklebur. Add to Basagran, Ultra Blazer, Classic, Reflex, or Cobra.
Cocklebur, jimsonweed, pigweed, common ragweed, smartweed, velvetleaf, and suppression of morning-glory species and sicklepod, giant ragweed, and burcucumber restrictions. The addition of 2,4-DB (2 fl oz) is recommended for additional control of morning-glory spp. and cocklebur. Add to Basagran, Ultra Blazer, Classic, Reflex, or Cobra.	Chlorimuron 0.008-0.012 lb + surfactant 0.25% or chlorimuron 0.008-0.012 lb + surfactant 0.25% + 2,4-DB 0.03 lb	Classic 0.5-0.75 oz + surfactant 0.25% or Classic 0.5-0.75 oz + surfactant 0.25% + Butyrac 2.0 fl oz	Apply to young, actively growing weeds within labeled growth-stage ranges. Apply at 25-40 psi with a minimum of 10.0 gal/A. Always add 0.25% surfactant. Do not use crop oil, crop oil concentrate, or vegetable oil spray additives. Flood type, low-pressure nozzles are not recommended. Observe labeled rotational crop
Cocklebur, pigweed, and suppression of sicklepod	Imazaquin 0.063-0.125 lb + surfactant 0.25%	Scepter 70DG 1.42-2.85 oz + surfactant 0.25%	Apply after crop emerges but before weeds are 12 inches high. Do not apply when weeds and soybeans have been subjected to temperature or moisture stress. Allow 90 days between application and harvest. Observe labeled rotation crop restrictions. Use the lower rates for control of cocklebur, pigweed, and volunteer corn only.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Burcucumber, carpetweed, cocklebur, groundcherry, galinsoga, jimsonweed, morning-glory suppression, nightshades, pigweed, prickly sida (teaweed), purslane, ragweeds, spurge, velvetleaf	Lactofen 0.2 lb	Cobra 12.5 oz	Consult label for specific adjuvants recommendations. Apply in 15.0-30.0 gal of water using flat fan or hollow-cone nozzles. Do not apply within 45 days of harvest. Special local-need label for VA, MD, DE: Apply cobra for control of 15-36 inch tall common ragweed, velvetleaf, jimsonweed, and burcucumber that have escaped earlier treatment. The addition of 2,4DB (2.0 fl oz) is recommended for additional control of morning-glory spp. and cocklebur. Labeled combinations include Basagran, 2,4DB, Classic, FirstRate, Pinnacle, Pursuit, Raptor, Resource, Roundup Ultra Max (for use on soybean varieties designated as Roundup Ready), Scepter, Select, and Synchrony (for use on soybean varieties designated as STS).
Morningglory, nightshade, cocklebur, common ragweed, jimsonweed, smartweed, pigweed, and others	Fomesafen 0.25-0.375 + surfactant crop oil concentrate	Reflex 1.0-1.5 pt + surfactant 0.25% v/v crop oil concentrate 1.0% v/v	Apply in a minimum of 10 gal of water at 40-60 psi when weeds are small and before weeds reach maximum growth stages described on the label. Apply in combination with 0.25-0.5% nonionic surfactant or 1% crop oil concentrate. Do not apply Reflex more than once every 2 years. Carefully observe labeled rotational crop restrictions. The addition of 2,4DB (2 fl oz) is recommended for additional control of morning-glory spp. and cocklebur. Add to Basagran, Ultra Blazer, Classic, Reflex, or Cobra.
Common lambsquarters, pigweed spp., smartweed, velvetleaf, and burcucumber	Thifensulfuron 0.004 lb + surfactant 0.125%	Harmony SG 75 DF 0.12 oz + surfactant 0.125% v/v	Use a nonionic surfactant at a rate of 1.0 pt/100 gal of spray mixture. For adequate velvetleaf control, add 1.0 gal/A of liquid nitrogen.
Barnyardgrass, crabgrass, foxtail spp., seedling johnsongrass, shattercane, cocklebur, jimsonweed, pigweed, smartweed, velvetleaf, and nightshade spp.	Imazethapyr 0.063 lb + surfactant 0.25%	Pursuit 2L 4.0 oz + surfactant 0.25% v/v	Apply early postemergence when weeds are actively growing and before most exceed a height of 3 inches. Use a nonionic surfactant at a rate of 2.0 pt/100.0 gal of spray mixture. Use of a fertilizer solution additive is recommended for optimum weed control. Pursuit plus Roundup Ultra Max can also be applied as the prepack Extreme.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Beggarticks, bristly starbur, burcucumber, cocklebur, cowpea, Florida beggarweed, hemp sesbania, lambsquarters, jimsonweed, morning-glory spp., pigweed spp., ragweed spp., sicklepod, smartweed spp., yellow nutsedge, velvetleaf, and suppression of Canada Thistle, marestalk, and purple nutsedge	(chlorimuron 0.16 + thifensulfuron 0.052 oz) + crop oil concentrate	Synchrony XP 28.4 D 0.75 oz + crop oil concentrate 1.0% v/v	For use only on soybean varieties designated as "STS" in the variety name. These soybeans contain a trait which enhances tolerance to sulfonylurea herbicides. Make application to small, actively growing weeds. Split applications may be required for certain weeds, including burcucumber, morning-glory species, and sicklepod. Carefully observe crop rotation intervals, and note that extended crop rotation intervals apply when synchrony STS is applied following preemergence application of other sulfonylurea or imidazolinone herbicides. Synchrony XP can be used at the reduced rate of 0.375 oz/A on non-STS soybeans for the control of 1-4 inch cocklebur and pigweed, and suppression of 1-4 inch lambsquarters, jimsonweed, common ragweed, smartweed, and velvetleaf.
Velvetleaf	Flumiclorac + crop oil 0.027-0.054 lb	Resource 4.0-8.0 oz + crop oil concentrate 1 qt	Apply 4.0-8.0 oz as a broadcast over-the-top postemergence spray to 6-10 leaf velvetleaf using the higher rates for larger velvetleaf. Resource has activity against several other weeds when they are in the 2-3 leaf stage including cocklebur, lambsquarters, common ragweed, jimsonweed, pigweed species, and prickly sida but control declines on larger weeds. Labeled combinations include Basagran, Ultra Blazer, Classic, Cobra, FirstRate, Flexstar, Pinna cle, Pursuit, Raptor, Reflex, Roundup Ultra Max (for use on soybean varieties designated as ROUNDUP READY), Scepter, Select, Storm, and Synchrony (for use on soybean varieties designated as STS).
Common waterhemp, tall waterhemp, velvetleaf, common ragweed, redroot pigweed, smooth pigweed, palmer amaranth, eastern black nightshade	flumiclorac .027 lb + lactofen .093 lb	Stellar 3.1EC 5.0 fl oz + crop oil concentrate or methylated seed oil at 1.0-2.0 pt	Good coverage of young, actively growing weeds is essential for good control. Apply Stellar in 10 to 30 gal of water/A on a broadcast basis at a pressure of 40 to 60 psi measured at the nozzle. Use flat fan or hollow cone nozzles. Do not use flood nozzles. Always add crop oil concentrate or methylated seed oil to be 0.5% of the spray solution, but not less than 1.0 pt/A. Soybean leaves that are sprayed may exhibit bronzing and speckling, and may be cupped or crinkled at the tip. The crop will outgrow these effects.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Control of most annual grasses and broadleaf weeds in conventional and no-till soybean production systems, and control or suppression of many perennial weeds including bermudagrass, Canada thistle, field bindweed, hemp dogbane, horse-nettle, nutsedge, quackgrass, rhizome johnsongrass, and trumpetcreeper. Most effective in narrow row spacings	Glyphosate 0.75-3.0 lb	4.0 lb ai/gallon glyphosate containing product or equivalent 1.0-3.0 qt	For use only on soybean varieties designated Roundup Ready. Glyphosate may be applied postemergence from cracking through the full flowering stage. Single or sequential applications in crop may not exceed 2.0 qts per acre annually. Make initial post-emergence applications of 0.75-1.5 lb ai. and if necessary, sequential treatments of 0.75-1.5 lb ai. Adjust application rates for individual weed species and weed size as directed by the label. Apply 1.0-2.0 lb ai for perennial weed suppression or control. Extreme care must be used to avoid drift to adjacent crops or other desirable vegetation. Many current glyphosate formulations are very effective in removing pesticide residues from spray tanks. Carefully clean equipment prior to spray application. Do not graze or feed treated soybean forage. Do not tank-mix with other herbicides except as specified by label. Most effective in narrow row spacings. The maximum use rate is 3.0 lb ai in-crop, with a maximum of 2.0 lb ai for any single application.
Anoda (spurred), carpetweed, cocklebur, copperleaf (Virginia), croton (tropic), eclipta, groundcherry (ground), jimsonweed, lambsquarters, morning-glory sp., mustard (wild), nightshade (black), pigweed sp., purslane, ragweed (common, giant), sida (prickly), smartweed, sunflower, velvetleaf	Fomesafen 0.235-0.35 lb/ai	Flexstar HL 1.88 L 1.0-1.5 pt	Best control of susceptible weeds is obtained when Flexstar HL is applied early to actively growing weeds. Flexstar HL should be used with a minimum of 1.0% liquid nitrogen or a minimum of 4.0 lb of ammonium sulfate/100 gal of spray volume. Always add a nonionic surfactant or crop-oil concentrate as discussed on the label. Do not use flood-type spray nozzles. A maximum of 1.6 pt of Flexstar HL may be applied/A in alternate years in MD, DE, and VA; a maximum of 1.3 pt/A may be applied in alternate years in NJ, PA, and WV. Consult label for tank-mix partners. Can provide more crop response than Reflex.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Artichoke (Jerusalem), chickweed (common), cocklebur, jimsonweed, lambsquarters, morning-glory (entireleaf, ivyleaf, smallflower, tall), mustard sp., nightshade (black, eastern black, hairy), pigweed sp., purslane, ragweed (common, giant), sunflower, velvetleaf	Imazamox 0.039 lb	Raptor 5.0 oz	Applications of Raptor require the addition of an adjuvant and a nitrogen fertilizer solution — consult label. Occasionally, internode shortening and/or temporary yellowing of soybeans may occur, especially if under environmental stress. When adequate soil moisture is present, Raptor will provide residual activity of susceptible germinating weeds. Consult label for tank-mix partners.
Cocklebur, jimsonweed, horseweed, (marstail), morning-glory, ragweed (common, giant, smart-weed, velvetleaf	Chloransulam-methyl 0.016 lb	Firstrate 0.3 oz	Thorough mixing is required. Firstrate water dispersible packets are not soluble in liquid fertilizer solutions. Premixing in water is required. Do not apply aerially. Apply before 50% flowering stage of soybeans. Always use an approved adjuvant system. UAN will be required for improved velvetleaf control.
Cocklebur, morning-glory, and suppression of jimsonweed, lambsquarters, pigweed, ragweed, and velvetleaf weed seedling must be sprayed. Use precision, directed-spray application equipment. Apply with sprayer nozzles mounted on skids or gauge wheels. Do not spray over one-third the base of soybean because severe injury may occur. Do not harvest within 60 days after application.	2,4-DB 0.175-0.22 lb	2,4-DB 0.7-0.9 pt	Apply as directed spray into the row when soybeans are 8-12 inches and cocklebur, morning-glory, jimsonweed, and redroot pigweed not exceeded 3 inches high. Top of
Barnyardgrass, crabgrass, goosegrass, pigweed, johnsongrass, and seedlings	Paraquat 0.07-0.125 lb + surfactant	Gramoxone Inteon 4.5-8.0 oz + surfactant as recommended	Apply in 20.0-40.0 gal of water/A when soybeans are at least 8 inches tall and weeds 2-4 inches. Use as a precision directed spray , hitting no more than the lower 3 inches of the soybeans. Follow label for necessary application equipment and procedures. Do not treat more than twice. Do not graze or feed treated forage to livestock.
Barnyardgrass, fall panicum, foxtails, johnsongrass seedlings, goosegrass, crabgrass, shattercane, volunteer corn, volunteer cereal grains, and broadleaf signalgrass	Sethoxydim 0.19-0.28 lb + crop oil concentrate	Poast Plus 1.5-2.25 pt or Poast 1.0-1.5 pt + crop oil concentrate or Dash 2.0 pt	Apply to actively growing grasses at the rate and size range indicated on the label for the individual grass species with 10.0-20.0 gal of water/A and 40 psi. Do not use flood type nozzles. Always add 2.0 pt/A of crop oil concentrate. Rainfall within 1 hour of application will decrease effectiveness.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Rhizome johnsongrass, bermudagrass (wiregrass)	Sethoxydim 0.19 lb + crop oil concentrate + (sequential treatment on regrowth) sethoxydim 0.19 lb + crop oil concentrate	Poast Plus 1.5-2.25 pt or Poast 1.5 pt + crop oil concentrate or Dash 2.0 pt + Poast Plus 1.5 pt or Poast 1.0 pt + crop oil concentrate or Dash 2.0 pt	Apply to actively growing grasses in the manner described above. Apply first application to johnsongrass 15-20 inches high or bermudagrass plants less than 6 inches in diameter. Apply regrowth treatments to 6-10 inches johnsongrass or 1-4 inches diameter bermudagrass plants. Rainfall within 1 hour of application will decrease effectiveness.
Quackgrass	Sethoxydim 0.28 lb + crop oil concentrate + (sequential treatment on regrowth) sethoxydim 0.19 lb + crop oil concentrate	Poast Plus 2.25 pt or Poast 1.5 pt + crop oil concentrate or Dash 2.0 pt + Poast Plus 1.5 pt or Poast 1.5 pt + crop oil concentrate or Dash 2.0 pt	Apply to actively growing quackgrass 6-8 inches high and to regrowth 6-8 inches high with 2.0 pt/A crop oil concentrate in the manner described above. Rainfall within 1 hour of application will decrease effectiveness.
Barnyardgrass, fall panicum, crabgrass, foxtails, johnsongrass seedlings, goosegrass, shattercane, volunteer corn, and broadleaf signalgrass	Fluazifop-P 0.19 lb + crop oil concentrate	Fusilade DX 0.75 pt + crop oil concentrate 0.5-1.0% v/v	Apply to actively growing grasses at the rate and growth stage indicated on the label for the individual grass species with a minimum of 10.0 gal of water/A and 30-60 psi. Do not use flood nozzles. Add 0.5% to 1.0% crop oil concentrate or 0.25% non-ionic surfactant to the spray mixture. Rainfall within 1 hour of application will decrease effectiveness.
Rhizome johnsongrass	Fluazifop-P 0.19 lb + crop oil concentrate + (sequential treatment on regrowth) fluazifop-P 0.125 lb + crop oil concentrate	Fusilade DX 0.75 pt + crop oil concentrate 0.5-1.0% v/v + Fusilade DX 0.5 pt + crop oil concentrate 0.5-1.0% v/v	Apply in the manner described above to johnsongrass 12-18 inches high and before boot stage; and, if necessary, to regrowth 6-12 inches high.
Bermudagrass (wiregrass), quackgrass	Fluazifop-P 0.19 lb + crop oil concentrate + (sequential treatment on regrowth) Fluazifop-P 0.125 lb + crop oil concentrate	Fusilade DX 1.5 pt + crop oil concentrate 0.5-1.0% v/v + Fusilade DX 1.0 pt + crop oil concentrate 0.5-1.0% v/v	Apply in the manner of 10 gal of water and 30-60 psi using flat-fan or hollow-cone nozzles when johnsongrass is 10-15 inches tall. The sequential application may be needed on regrowth of rhizome johnsongrass. Do not add crop oil concentrate to Fluazifop-P when treating johnsongrass. Do not graze or use treated forage, hay, or straw.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Barnyardgrass, crabgrass, fall panicum, foxtails, seedling johnsongrass, goosegrass, shattercane, volunteer corn, cereals, and broadleaf signalgrass	Quizalofop 0.06-0.1 lb + crop oil concentrate	Assure II/Targa 5.0-8.0 oz + crop oil concentrate 1.0% v/v	Apply to actively growing grasses in 10.0-40.0 gal/A using flat-fan or hollow-cone nozzles. Always add crop oil concentrate. Do not graze treated field or harvest for forage or hay. Do not apply within 80 days of harvest or afterpod set. Rainfall within 1 hour of application will decrease effectiveness.
Rhizome johnsongrass, bermudagrass, and quackgrass	Quizalofop 0.12 lb A + crop oil concentrate Quizalofop 0.09 lb + crop oil concentrate	Assure II/Targa 10.0 oz + crop oil concentrate 1.0% v/v Assure II 7.0 oz + crop oil concentrate 1.0% v/v	Apply to actively growing grasses in manner described above. The first application when johnsongrass is 10-24 inches, bermudagrass is 3 inches, and quackgrass is 6-10 inches. Apply regrowth treatments to 6-10 inch johnsongrass, 3 inch bermudagrass, and 4-8 inch quackgrass.
Quackgrass, wirestem muhly, seedling johnsongrass, volunteer corn, volunteer small grains, and most annual grass species	Fluzifop-P + fenoxypop-ethyl 0.125-0.21 lb + crop oil concentrate or nonionic surfactant	Fusion 6-10 oz + crop oil concentrate 1.0% v/v or nonionic surfactant 0.25-0.5 1.0% v/v	Apply in 5.0-40.0 gal of spray mixture. Consult label for rates and weed heights for individual species. Use of crop oil concentrate or nonionic surfactant is required. Flat fan nozzles are recommended for optimum results.
Barnyardgrass, crabgrass, foxtail (giant, green, and yellow), goosegrass, johnsongrass (seedling), panicum (fall, Texas), shattercane, and volunteer cereals and corn	Clethodim 0.068-0.121 lb + crop oil concentrate	Select Max 0.97 EC 9.0-16.0 oz + crop oil concentrate 2.0 pt	Apply to actively growing grasses in 10 to 40 gallons of water by ground or 3 to 10 gallons of water by air. See label for tank-mix instructions. Clethodim may be available as a 0.97 lb ai/gallon formulation under the trade name Select Max. Check label for specific rate and adjuvant recommendations.
Bermudagrass and quackgrass	Clethodim 0.091-0.243 lb + crop oil concentrate (sequential treatment on regrowth) Clethodim 0.091-0.243 lb + crop oil concentrate	Select Max 0.97 EC 12.0-32.0 oz + crop oil concentrate 2.0 pt Select Max 0.97 EC 12.0-32.0 oz + crop oil concentrate 2.0 pt	Time first application when bermudagrass is 3 inches tall and quackgrass is 4 to 12 inches tall. Apply second application when regrowth of bermudagrass is 3 inches tall and quackgrass is 4 to 12 inches tall.
Johnsongrass (rhizome)	Clethodim 0.091-0.243 lb + crop oil concentrate (sequential treatment on regrowth) Clethodim 0.068-0.182 lb + crop oil concentrate	Select Max 0.97 EC 12.0-32.0 oz + crop oil concentrate 2.0 pt Select Max 0.97 EC 9.0-24.0 oz + crop oil concentrate 2.0 pt	Time first application when johnsongrass is 12 to 24 inches tall. Apply second application when regrowth reaches 6 to 18 inches tall.

Table 5.54 - Postemergence (cont.)

Weed Problem	Chemical Rate per Acre	Product per Acre	Remarks
Johnsongrass and other perennial weeds, cocklebur, pigweed, volunteer corn, and shattercane	Glyphosate 1.0-3.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent	Use a spot treatment when johnsongrass is 24-36 inches high and in the boot-seeding stage. See label for proper stage of treatment for other 1.0-3.0 qt perennials. All soybeans hit with chemical will be killed. Applications of glyphosate may be made with a wick applicator or recirculating sprayer. Apply when there is 6 inches or more differential in height. The 1.0 lb ai rate may be used on johnsongrass if 5.0- 10.0 gal of water are applied and fan tips are used. Use the 2.0-3.0 lb ai rate on noncrop land or where annual tillage is not performed. Do not harvest soybeans within 7 days after application.
Harvest aid	Paraquat 0.125-0.25 lb + surfactant	Gramoxone Inteon 0.5-1.0 pt + surfactant as recommended	Apply in 20.0-40.0 gal/A when soybeans are fully developed, at least one-half of the leaves have dropped, and remaining leaves are yellow. With aerial applications, observe caution and consider the addition of drift control agents. Do not pasture livestock within 15 days of treatment. Remove livestock from treated fields at least 30 days before slaughter.
Harvest Aid: useful for johnsongrass control and control of other perennial weed species, or for late season weed control	Glyphosate 1.0 - 3.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent 1.0-3.0 qt	Apply after pods have set and lost all green color. Allow a minimum of 7 days between application and harvest. Do not apply more than 26.0 fl oz of Roundup Ultra Max by air.

Small Grains

Table 5.55 - Wheat, Barley, Oats, and Rye

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Contact kill of most annual broadleaf weeds for no-till plantings	Paraquat 0.5-1.0 lb + surfactant	Gramoxone Inteon 2.0-4.0 pt + surfactant as labeled	No-till establishment	Apply after planting and before emergence of the small grain. Use a minimum of 10.0 gal/A of diluted spray. As the density of the crop residue increases, the spray gallonage should increase to ensure complete coverage and kill. Use the higher rate if existing vegetation is dense, cool temperatures exist, and/or drought conditions are prevalent.
Kill of most annual weeds for no-till plantings	Glyphosate 1.0-4.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent 1.0-4.0 qt	No-till establishment	See label for specific instructions for use. The lower rate can be used when small winter annuals are present and less than 2 inches high. Increase rate on larger weeds. Application with fan-type nozzles is preferred using 3.0-40.0 gal/A. The lower rate is more effective with reduced gallonage (3.0-10.0 gal/A). Higher glyphosate rates can be used in controlling certain perennials if their stage of growth and condition are correct according to product labeling.
Johnsongrass control	Glyphosate 1.0-3.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent 1.0-3.0 qt	Preplant	Apply 3.0-40.0 gal water/A when johnsongrass is 18 inches or more and approaching the early head stage of growth. Allow 7 or more days before plowing. Barley, oats, and wheat can be planted immediately after tillage. Do not feed or forage treated crops within 8 weeks after treatment. Use lower rates (1.0-1.5 qts) in 3.0-10.0 gal/A water carrier.
For use in wheat only. Spot treatment in wheat for control of most annual and perennial weeds	Glyphosate	glyphosate		For annual weeds less than 6 inches, use a 0.5% to 1.0% v/v solution. For annual weeds over 6 inches, use a 1.0% v/v solution. Use a 1.0% to 2.0% v/v solution for most perennials. Apply to wet the foliage of actively growing weeds but not to the point of runoff. Re-treat in 14 to 21 days if regrowth occurs. See spot spray dilution table on label for amounts of glyphosate to add to water. Will kill emerged crop.

Table 5.55 - Wheat, Barley, Oats, and Rye (cont.)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Corn chamomile, corn gromwell, cowcockle, knawel (German moss), mayweed, field pennycress, pepperweed, sheperdspurse, wild mustard, wild radish, yellow rocket, weak in control of chickweed and henbit	Bromoxynil 0.375-0.5 lb	Buctril 4E 0.75-1.0 pt	Postemergence fall or spring	Destroy all weed seedlings before seeding small grains. Look for weeds as soon as small grains start to germinate. Apply after small grain is beyond 2-leaf stage and weed seedlings have not more than 2-4 leaves or rosettes 1.5 inches across. Best results can be expected with flat fan nozzles using a minimum of 30 lb/square inch (psi) and 10.0 gal/A. With flood nozzles, use a minimum of 20.0 gal/A and 30 psi. Use higher rate for cowcockle, henbit, chickweed, and wild mustard control. Poor control has resulted when applied to larger weeds. Thorough weed coverage is necessary for effective control. Do not apply if small grains form a canopy, during or after boot stage, or when crop is under stress from lack of moisture. Do not graze treated fields for 30 days after application. May be applied with fluid fertilizer.

Table 5.56 - Wheat, Barley, Oats, and Rye (Not Seeded to Legumes)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Black mustard, blessed thistle, bulbous buttercup, burdock, cornflower (bachelor buttons), meadow campion (ragged-robin), corn poppy, curly dock seedlings, fanweed, goatsbeard, hairy vetch, penny-cress, plantain, primrose, prickly lettuce, rock cress, shepherdspurse, wild mustard, wild radish, wild turnip, fleabane, chicory, dandelion, henbit, vetch, smartweed, suppression of thistles, wild onions, and garlic	2,4-D amine 0.25-0.75 lb	2,4-D amine 0.5-1.0 pt (various brands 4.0 lb/gal)	Postemergence spring	Spray, 2,4-D when grain is 4 to 8 inches high or after tillering but before jointing. Spraying small grain too early or after jointing can result in reduced yields and uneven ripening. The higher rates of 2,4-D increase the risk of grain injury. Use production practices favorable to maximum crop competition. Do not graze dairy animals or feed forage within 14 days of treatment. Always premix 2,4-D amine with water before mixing with liquid fertilizer. Oats may be injured, use low rate. Some 2,4-D formulations are available that contain greater than 4.0 lb ai/gal. Consult label.
Most winter annual broadleaf weeds as listed for 2,4-D amine. Better suppression of perennials, especially garlic and onion (wild)	2,4-D low volatile ester 0.25-0.5 lb	2,4-D low volatile ester 0.5-1.0 pt (various brands 4.0 lb/gal)	Postemergence spring	Spray when grain is 4-8 inches high and tillering but before jointing. <i>Caution: Vapors and drifts are injurious to tomato, tobacco and many ornamentals.</i> Underseeded legumes usually are killed. Use higher rates to prevent garlic aerial bulblet formation. Cannot control garlic in oats without injuring oats. Best results if daytime temperature is 50°F for 5-7 days following treatment. Some 2,4-D formulations are available that contain greater than 4.0 lb ai/gal. Consult label.
Most winter annual weeds listed for 2,4-D amine and bromoxynil, especially good on knawel or German moss	2,4-D amine or low volatile ester 0.25-0.5 lb + bromoxynil 0.25-0.375 lb	2,4-D amine or lowvolatile ester 0.5-1.0 pt (various brands 4.0 lb/gal) + Buctril 0.5-0.75 pt	Postemergence spring	See remarks for 2,4-D and bromoxynil.
Chickweed (suppression), cutleaf eveningprimrose, henbit (suppression), mustards, thistle(Canada) (suppression), wild garlic	Prosulfuron 0.018 lb	Peak 57DF 0.5 oz Approved tank mixes: Banvel 2.0-4.0 oz or Buctril 0.375- 0.75 pt or 2,4-D 8-12 oz	Postmergence fall or spring	Apply Peak postmergence from the 3-leaf stage to before the second node is detectable in stem elongation (Feekes Growth Stage 7). Add a non-ionic surfactant to all applications. Do not apply more than 1.0 oz of Peak/A during the cropping season. Do not apply to a crop under stress. Consult label for interactions with organophosphate insecticides and recrop intervals. Do not plant soybeans within 10 months of Peak application. Can be applied to small grains to be harvested for forage. Do not harvest, graze, or plant corn within 30 days of application.

Table 5.56 - Wheat, Barley, Oats, and Rye (Not Seeded to Legumes) (cont.)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Bedstraw, bittercress, black nightshade, common mallow, fixweed, kochia, lambsquarters, pennycress, pigweed spp., shepherd's-purse, sowthistle, wild buckwheat, and others. Local research indicates Star of Bethlehem and speedwell suppression.	carfentrazone 0.0078-0.0313 lb	Aim 2EW 0.5-2.0 oz		<p>May be applied to barley, grain and forage millet, oats, rye, teosinte, triticale, and wheat. Make applications to actively growing weeds up to 4 inches tall and to rosettes less than 3 inches in diameter. Apply with nonionic surfactant at 0.25% by volume. A sprayable liquid nitrogen fertilizer at 2-4% by volume or ammonium sulfate at 2-4 lb/A may be added to the nonionic surfactant. Aim may be tank mixed with other registered herbicides to expand the spectrum of control. Do not harvest treated small grains for forage within 7 days of application.</p> <p>Alternative Use - Harvest Aid: Aim may be applied at 1-2 fl oz/A to any of the small-grain crops listed above to defoliate or desiccate troublesome broadleaf weeds such as morningglories, pigweed, and velvetleaf that may be present at harvest. Aim may be used alone or as a tank mixture with other harvest aids. Applications should be made when the crop is mature and grain has begun to dry down. Applications should be made in a minimum of 10 gal/A with the addition of either nonionic surfactant, crop-oil concentrate, or methylated seed oil. A sprayable liquid nitrogen fertilizer at 2-4% by volume or ammonium sulfate at 2-4 lb/A may be added to the nonionic surfactant, crop oil, or methylated seed oil.</p>
Harvest aid for wheat. Control of annual grasses and broadleaf weeds and suppression of perennial weeds including Canada thistle, quackgrass, and field bindweed to facilitate harvest	Glyphosate 0.5-1.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent 1.0-2.0 pt	Postemergence spring	<p>Controls annual and perennial weeds at rates and timings as listed on the Roundup Ultra Max label. Make applications after the hard dough stage (30% moisture) of grain and at least 7 days prior to harvest. May be applied with ground or aerial equipment. For control of quackgrass or suppression of Canada thistle, apply 1.0 lb ai in 3.0-10.0 gal of water. For suppression of field bindweed, apply 0.5-1.0 lb ai plus 1.0-2.0 pts of 2,4-D using the same gallonage. Do not apply more than 1.0 lb ai of this product for preharvest use. Do not apply to wheat grown for seed.</p>
Harvest aid for previous weeds listed for 2,4-D amine	2,4-D amine 0.5-1.0 lb	2,4-D amine 1.0-2.0 pt (various brands 4.0 lb/gal)	Postemergence spring	<p>2,4-D amine can be applied from dough stage to harvest as a harvest aid when weeds threaten to interfere with harvest operations. Do not use treated straw for livestock feed.</p>

Table 5.57 - Fall-seeded Wheat and Barley

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Knawel, mustard spp., carolina geranium, chickweed, hen-bit, mousear cress, shepherdspurse, swinecress, mayweed, wild garlic and suppression of evening primrose, prickly lettuce, wild radish, and Canada thistle	Thifensulfuron 0.15-0.30 oz + tribenuron 0.08-0.15 oz	Harmony Extra SG 50SG 0.45-0.9 oz or TNT Broadleaf 75DF 0.3-0.6 oz	Postemergence fall or spring	Best results are obtained when applications are made to young, actively growing weeds. Make applications after the crop is in the 2 leaf stage but before the flag leaf is visible. Delay application until weeds have emerged. Do not graze or feed forage or hay from treated areas to livestock. Harvested straw may be used for bedding or feed. Do not plant any crop other than wheat or barley for 60 days after application. Always premix Harmony Extra SG with water before adding to spray tank. Refer to the table before for mixing instructions with respect to use of nitrogen fertilizer carriers or surfactants.
	Approved combinations: Tank mix with 2,4-D, dicamba			For improved control of vetch, wild radish, and other difficult to control species. Use lower labeled rates or 2,4-D and dicamba
Wild garlic	Thifensulfuron 0.15-0.30 oz + tribenuron 0.08-0.15 oz	Harmony Extra SG 50SG 0.75 oz + 0.75 oz	Preemergence + Postemergence	See label for Virginia. Apply Harmony Extra SG at 0.75 oz/A to actively growing wild garlic once prior to crop emergence and again after the crop is in the 2-leaf stage, but before the flag leaf is visible.

Table 5.58 - Surfactant Use with Harmony Extra SG

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Carrier	Situation	Nonionic Surfactant Rate/100 Gallons		
Water	Normal	1.0 qt		
Nitrogen diluted with water	Normal	0.5-1.0 pt		
Nitrogen	garlic > 8"	0.5 pt		
Nitrogen	garlic < 8"	none		
Nitrogen	with 0.5 pt 2,4-D	none		
Water	with 0.5 pt 2,4-D	1.0 pt		
Many annual broadleaf weeds including several mustard species, curly dock, knawel, chamomile/ mayweed, wild garlic, and several other species.	Thifensulfuron 0.023-0.028 lb	Harmony SG 0.75-0.9 oz or Unity 75DF 0.5-0.6 oz	After crop is at the 2-leaf stage but before the flag leaf is visible.	For best results, apply in water with 0.25 to 0.5% v/v nonionic surfactant. Consult the label for more information about certain hard-to-control species including wild garlic, wild radish, and others. May be tank mixed with 2,4-D, Banvel/Clarity, Buctril, and several others including several grain herbicides registered for wheat. Harmony SG may be mixed with several insecticides or fungicides but should not be mixed with Malathion. Refer to the label for mixing instructions with respect to use of nitrogen fertilizer carriers or surfactants. Wheat, barley, oats, soybeans, and corn may be planted any time after Harmony SG application. Any other crop may be planted 45 days after Harmony SG application.
Italian ryegrass, wild oats, volunteer oats, foxtail spp., barnyardgrass	Penoxaden 0.053 lb	Axial XL 0.42EC 16.4 oz		Apply by ground in 5-10 gal/A using flat fan nozzles or by air using a minimum of 5 gal/A. No added adjuvant is required with Axial XL. Apply to wheat and barley from the 2-leaf to pre-boot stage. Apply to Italian ryegrass with 1-5 leaves on the main stem and prior to emergence of the third tiller. Some naturally occurring infestations of Italian ryegrass have been identified as resistant to the ACC-ase inhibiting family of herbicides of which Axial is a member. Selection of resistant biotypes, through repeated use of these herbicides in the same field, may result in control failures. Axial may be tank mixed with Amber, Bronate Advanced, Buctril, Finesse, Harmony Extra SG, Harmony SG, MCPA, or Peak for broadleaf weed control. Do not apply in combination with 2,4-D or dicamba. Do not graze or harvest hay from treated areas for 50 days following application or harvest grain for 60 days following application. Do not use on barley that will be grazed or ensiled.

Table 5.59 - Fall-seeded Wheat

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Black mustard, blessed thistle, bulbous buttercup, burdock, cornflower (bachelor buttons), meadow campion (ragged-robin), corn poppy, curly dock seedlings, fanweed, goatsbeard, hairy vetch, penny-cress, plantain, primrose, prickly lettuce, rock cress, shepherdspurse, wild mustard, wild radish, wild turnip, fleabane, chicory, dandelion, henbit, vetch, smartweed, thistle suppression, wild onions, and garlic	2,4-D amine 0.25-0.75 lb	2,4-D amine 0.5-1.5 pt (various brands 4.0 lb/gal)	Postemergence spring	Spray, 2,4-D when grain is 4 to 8 inches high or after tillering but before jointing. Spraying small grain too early or after jointing can result in reduced yields and uneven ripening. The higher rates of 2,4-D increase the risk of grain injury. Use production practices favorable to maximum crop competition. Do not graze dairy animals or feed forage within 14 days of treatment. Always premix 2,4-D amine with water before mixing with liquid fertilizer. Oats may be injured, use low rate.
Corn chamomile, cow cockle, corn cockle, dandelion, dogfennel, (mayweed), goatsbeard, knawel (German moss), smartweed; weak on chickweed	Dicamba 0.125 lb	Banvel 0.25 pt or Clarity 0.125-0.25 pt	Postemergence spring	See label for grazing restrictions. Apply after tillering, but before jointing.
Above weeds listed for dicamba and 2,4-D	Dicamba 0.06-0.125 lb + 2,4-D amine or ester 0.25-0.375 lb	Banvel/Clarity 0.13-0.25 pt + 2,4-D amine or ester 0.5-0.75 pt (various brands 4.0 lb/gal)	Postemergence spring	Good general treatment for broadleaf control. Controls wider spectrum of weeds than either herbicide alone. Apply before jointing, but after grain is fully tillered.
Many winter annual broadleaf weeds	Dicamba 0.06-0.125 lb + bromoxynil 0.25-0.375	Banvel /Clarity 0.13-0.25 pt + Buctril 0.5-.075 pt	Postemergence spring	Apply after tillering, but before jointing. Observe label precautions.
Above weeds listed for 2,4-D and dicamba, and for improved performance against the following difficult-to-control weeds: fiddle-neck, wild garlic, wild onion, gromwell, henbit	Dicamba 0.125 lb + 2,4-D amine 0.5-1.0 lb or Dicamba 0.125 lb + 2,4-D ester 0.5-0.75 lb	Banvel 0.25 pt + 2,4-D amine 1.0-2.0 pt (4.0 lb/gal) or Banvel /Clarity 0.25 pt + 2,4-D ester 1.0-1.5 pt ester (4.0 lb/gal)	Postemergence spring	Apply after tillering, but before jointing. This combination gives better control of more weeds than either chemical alone. This is only labeled on fall-seeded wheat, not barley, oats, or rye. Do not use unless possible crop injury will be tolerated.

Table 5.59 - Fall-seeded Wheat (cont.)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Italian ryegrass	Diclofop 0.5-1.0 lb	Hoelon 1.3-2.7 pt	Postemergence	Hoelon will not control broadleaf weeds. It is slow acting on controlling Italian ryegrass. Hoelon can be applied preemergence at 2.0- 2.66 pt/A in the states of DE, MD, VA, and WV. For postemergence control, apply before the first node (jointing) develops. Post applications are permitted in DE, MD, VA and WV. The use of 1.0 pt-1.0 quart of crop oil concentrate/A may be helpful, but do not use when conditions are cool and wet. Do not tank-mix Hoelon with any broadleaf herbicides in the states of DE, MD, and VA as reduced Italian ryegrass control may occur. Broadleaf herbicides can be applied 5 days after Hoelon is applied. Hoelon is labeled to be used with numerous fungicides. When tank mixed with liquid nitrogen (28-32%), do not use less than 2.0 pints of Hoelon/A. Hoelon resistant Italian ryegrass is distributed throughout Eastern Virginia. Alternative herbicides with different modes of action are available.
Italian ryegrass, annual mustard spp., cutleaf evening primrose, hen- bit, mayweed, pigweed spp., and suppression or control of common chickweed	chlorsulfuron 0.012 - 0.014 lb + flucarbazone- sodium 0.022 - 0.026 lb	Finesse Grass and Broadleaf 71.7 DF 0.75 - 0.90 oz	Postemergence	Apply to ryegrass from the 1-leaf to the 2-tiller stage and to wheat from the 2-leaf stage until jointing. Apply in combination with 0.5% v/v of nonionic surfactant and either 2.0 qt/A of UAN or 2.0 lb/A of spray grade ammonium sulfate. Finesse Grass and Broadleaf can be tank mixed with other suitable herbicides for weeds listed as partially controlled or those not listed as controlled on the label. Finesse Grass and Broadleaf may also be applied in liquid nitrogen fertilizer solutions in place of water. Carefully observe crop rotational restrictions following Finesse Grass and Broadleaf application including 6 months to STS soybeans and 14 months to field corn.
Many winter annual broadleaf weeds, same as under fall seeded wheat	Dicamba 0.125 lb	Banvel 0.25 pt or Clarity 0.125-0.25 pt	Postemergence	Apply after tillering, but before jointing. Observe precautions on label.
	Dicamba 0.06-0.125 lb + 2,4-D amine or ester 0.25 lb	Banvel/Clarity 0.13-0.25 pt + 2,4-D amine 0.5 pt or ester (4.0 lb/gal)	Postemergence	Apply after tillering, but before jointing. Observe precautions on label.

Table 5.59 - Fall-seeded Wheat (cont.)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Bluegrass (annual and roughstalk), ryegrass (annual/Italian), common chickweed (suppression), henbit (suppression), bromegrass (suppression)	Mesosulfuron-methyl 0.013 lb	Osprey 4.75 oz	Postemergence	Osprey is targeted in our region for control of Hoelon-resistant Italian ryegrass. Applications should be made to small weeds 1-leaf to the 2-tiller stage. Applications may be made only to wheat from emergence up to the jointing stage. The label requires the addition of either a methylated seed oil (MSO) at 1.5 pt/A or a basic blend type of adjuvant. A basic blend adjuvant includes a nonionic surfactant (NIS) or MSO and a nitrogen source. Use 0.8 to 1.6 pt/A of the basic blend surfactant. An ammonium nitrogen fertilizer may be added to the MSO at 1 to 2 qt/A or utilize an ammonium sulfate fertilizer at 1.5 to 3 lb/A. When using a tank-mix partner that restricts the addition of a MSO or basic blend, use a NIS at 0.5% v/v with ammonium nitrogen fertilizer as listed above. The preferred carrier for Osprey is water. If utilizing liquid N as the carrier, limit it to no more nitrogen than 15% of the spray solution. Do not use liquid fertilizers without either a MSO, NIS or basic blend adjuvant. Do not make topdress applications of liquid ammonium nitrogen fertilizer within 14 days of an Osprey application. Harmony Extra SG, TNT Broadleaf, Harmony SG, and Unity can be tank mixed with Osprey. Do not apply Osprey within 30 days of harvesting wheat forage, and 60 days for hay, grain, and straw. Soybeans can be planted within 90 days of application.
Bulbous oatgrass, roughstalk bluegrass, Brome species, wild mustard, shepherd's-purse, chickweed, annual bluegrass	Sulfosulfuron 0.031 lb	Maverick 0.67 oz weed species	Postemergence fall or spring depending on fall applications. Many mustard species	For best control of brome species apply to actively growing weeds in the fall. Bulbous oatgrass is controlled best by may be controlled by spring or fall applications of Maverick. Applications should contain 0.5% nonionic surfactant by volume (2.0 qts/100 gallons). Maverick is most effective when applied in water versus liquid fertilizers or nitrogen. The pH of spray solutions should be between 6.0 and 8.0 (see label). For best control of brome species, apply Maverick to 2- to 3-leaf brome. Rotation crops may be injured by Maverick. If soybeans are planted, use STS varieties. Corn may be planted the year following wheat. One year after applications, corn and other crops may be grown if, in a bioassay, that crop is not injured (see label).

Table 5.59 - Fall-seeded Wheat (cont.)

Weed problem	Chemical rate per acre	Product per acre	Treatment time	Remarks
Italian ryegrass	Diclofop 0.5-1.0 lb	Hoelon 1.3-2.7 pt	Postemergence	If applied too early (1-2 Leaf Stage), Hoelon can damage to barley. Work in Virginia has demonstrated that barley varieties vary in tolerance to Hoelon. Apply after tiller initiation. Do not apply preemergence. Do not apply with crop oil concentrate. Do not mix with broadleaf herbicides other than Buctril. Do not apply with liquid fertilizers. See wheat section for additional comments. Frequent use of Hoelon has selected for resistant Italian ryegrass biotypes which cannot be controlled with Hoelon, Achieve, or Axial XL.
Many winter annual broadleaf weeds, same as under small grains, fall seeded wheat.	Dicamba 0.125	Banvel 0.25 pt or Clarity 0.125-0.25 pt	Postemergence	Apply before jointing, but after grain is full tillered for fall-seeded oats. Applications to spring-seeded oats must be made before the oats exceed the 5-leaf stage. Observe precautions on label.
Many winter annual broadleaf weeds and wild garlic as listed under small grains, fall seeded wheat and barley	Thifensulfuron 0.15-0.20 oz + tribenuron (0.08-0.11 oz)	Harmony Extra SG 0.45-0.6 oz or TNT Broadleaf 0.3-0.4 oz	Postemergence	See comments under small grains, fall seeded wheat and barley. Consider tank mixes with 2,4-D, Buctril, Banvel, or Clarity for improved control of some weed species.
Many annual broadleaf weeds including several mustard species, curly dock, knawel, chamomile/ mayweed, wild garlic, and several other species.	Thifensulfuron 0.023-0.028	Harmony SG 50SG 0.75-0.9 oz or Unity 75DF 0.5-0.6 oz	After crop is at the 2-leaf stage but before the flag leaf is visible	For best results, apply in water with 0.25 to 0.5% v/v nonionic surfactant. Consult the label for more information about certain hard-to-control species, including wild garlic, wild radish, and others. May be tank mixed with 2,4-D, Banvel/Clarity, Buctril, and several others, including several grain herbicides registered for wheat. Harmony SG may be mixed with several insecticides or fungicides but should not be mixed with Malathion. Refer to the label for mixing instructions with respect to use of nitrogen fertilizer carriers or surfactants. Wheat, barley, oats, soybeans, and corn may be planted any time after Harmony SG application. Any other crop may be planted 45 days after Harmony SG application.

Sorghum

There are excellent herbicide combinations for weed control in both conventional and no-till sorghum. The best combinations include Dual or Lasso combined with atrazine, but to use these grass control materials, the sorghum seed must be properly protected with seed treatments of Concep or Screen. If untreated seed is to be used, then Ramrod and atrazine or atrazine alone are the only choices.

Consult the “relative effectiveness tables” listed in the *Weed Control in Corn* section for efficacy information on many of the sorghum herbicides.

Table 5.60 - Sorghum No-till

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Cover crops, including perennial sods, annual weeds and top kill and suppression of perennial weeds	G + F	Paraquat 0.5-1.0 lb + surfactant	Gramoxone Inteon 2.0-4.0 pt + surfactant as labeled	Always use a nonionic surfactant. Uniform coverage is important for good kill. Use lower rate for rye cover crop. Must be accompanied by pre-emergence residual herbicides.
Cover crops, perennial sods, annual weeds and suppression of perennial weeds such as quackgrass and thistle (Canada)	G + F	Glyphosate 0.75-4.0 lb	4.0 lb ai/gal glyphosate con- taining product or equivalent 0.75-4.0 qt	Use 1.0-1.5 lb ai for control of annual cover crops and emerged annual grass and broadleaf weeds. Use 2.0-3.0 lb ai for emerged perennial weeds. At normal application dates in no-till systems, perennial weeds may not be at the proper stage of growth for control. Glyphosate is slower acting than paraquat in killing vegetation, therefore may result in greater soil moisture loss. Uniform coverage is important. Rainfall within 1-2 hours will reduce effectiveness. Must be accompanied by residual herbicides for season-long grass and broadleaf weed control.

¹G = grain; F = forage

Table 5.61 - Preemergence

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Barnyardgrass, crabgrass, cupgrass (southwestern), foxtail (giant, green and yellow), lambsquarters, morning-glory spp., nutsedge (yellow), panicum (browntop and fall), pigweed, purslane, rice (red), signalgrass and witchgrass. Also carpetweed, cocklebur, goosegrass, pusley (Florida), smartweed and velvetleaf	G + F	s-metolachlor 0.67-1.0 lb + atrazine 1.2-1.6 lb	Dual II Magnum 0.8-1.1 pt + atrazine 4L 1.2-1.6 qt or 90W 1.3-1.8 lb or Bicep II Magnum 5.5L 1.3-1.75 pt	<i>Use only if the sorghum seed has been treated by the seed company with Concep or Screen.</i> Apply to the soil and incorporate in the top 2 inches of soil within 14 days before planting using a finishing disk, harrow, rolling cultivator or similar implement capable of providing uniform 2 inch incorporation. Preemergence applications may be at planting (behind the planter or after planting, but before weeds or crops emerge. Do not use with atrazine on coarse soils or on soils with less than 1% organic matter. Observe precautions on the label.
Barnyardgrass, crabgrass, foxtail (giant, green and yellow), cupgrass (south western), lambsquarters, morning-glory spp., nutsedge (yellow), panicum (browntop and fall), pigweed, purslane, rice (red), signalgrass and witchgrass. Also carpetweed, cocklebur, goosegrass, pusley (Florida), smartweed and velvetleaf	G	Alachlor 2.0-3.0 lb + atrazine 1.0-1.75 lb	MicroTech 2.0-3.0 qt + atrazine 4L 1.0-1.75 qt or 90W 1.1-1.9 lb or Bullet 3.0-4.0 qts	<i>Use only if sorghum seed has been treated by the seed company with Concep or Screen.</i> Apply to the soil and incorporate into the top 1-2 inches of soil within 7 days before planting using a finishing disk, harrow, rolling cultivator or similar implement capable of providing uniform 2 inch incorporation. Preemergence applications may be at planting (behind the planter) or after planting, but before weeds or crops emerge. Do not use with atrazine on coarse soils or on soils with less than 1% organic matter. Observe precautions on the label.
Barnyardgrass, carpetweed, cocklebur, crabgrass, foxtail (giant, green and yellow), goosegrass, jimsonweed, lambsquarters, morning-glory spp., mustards, nightshade, panicum (fall), pigweed, pusley (Florida), purslane, ragweed, ryegrass (annual), smartweed and velvetleaf	G	Propachlor 2.5-3.0 lb + atrazine 1.0-1.6 lb	Ramrod 4L 2.5-3.0 qt + atrazine 4L 1.0-1.6 qt or 90W 1.1-1.8 lb	See label and adjust rate to soil texture and organic matter. Apply in 20.0 gal of water/A after planting and prior to crop and weed emergence. Thorough agitation in the tank is necessary. Corn, sorghum or soybeans may be planted the following year. Do not graze or feed sorghum forage or silage from treated fields to dairy animals. Do not use with atrazine on coarse soils with less than 3% organic matter content. Do not graze treated area or feed treated forage to livestock for 21 days following application.

¹G = grain; F = forage

Table 5.61 - Preemergence (cont.)

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Barnyardgrass, carpetweed, crabgrass, foxtails, goosegrass, nutsedge, panicum, pigweed spp., cocklebur, jimsonweed, lambsquarters, morning-glory, ragweed, smartweed, and velvetleaf	G + F	Dimethenamid-P 0.66-0.98 lb + atrazine 0.75-2.0 lb	Outlook 6.0EC 14.0-21.0 oz + Atrazine 4L 0.75-2.0 qt or 90W 0.8-2.21 lb or Guardsman Max 3.0-4.6 pt	<i>Use only if the sorghum seed has been treated by the seed company with Concep or Screen.</i> Can be applied preplant incorporated or pre-emergence. Under high soil moisture and/or cool conditions, Outlook may cause temporary stunting or leaf wrapping. Sorghum will normally out-grow these symptoms in 10-14 days. Sorghum forage may be grazed or fed to livestock at 60 or more days after application. Grain and fodder may be harvested and fed at 80 or more days after application.
Barnyardgrass, crabgrass (large), foxtail species, signalgrass (broadleaf), bedstraw, clovers, lettuce (prickly), morningglory, bindweed, suppression of common lambsquarters ragweed (common, giant), sunflower, velvetleaf, dandelion	G	quinclorac 0.25 lb	Paramount 75DF 5.3 oz	Labeled tank mix partners include Guardsman Max.
Barnyardgrass, crabgrass (common), foxtail species, goosegrass, panicum (fall), carpetweed, chickweed (common), dayflower (common), galinsoga, lambsquarter (common), mustard, pigweed, purslane, radish (wild), ragweed (common), shepherd's-purse, smartweed (Pennsylvania) and Suppression of annual morningglory, cocklebur, eastern black nightshade, prickly sida, sickleud, velvetleaf	G,F	linuron 0.25-1.0 lb	Lorox 5ODF 0.5-2.0 lb	Lorox can be tank mixed with other labeled herbicides for expanded weed control. Do not apply over the top of emerged sorghum. Do not use on sand or loamy sand soils. Do not use on soils with less than 1% organic matter. Sorghum seed must be planted at least 1 inch deep if Lorox is used preemergence.

¹G = grain; F = forage

Table 5.62 - Postemergence

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Barnyardgrass, crabgrass, foxtail (giant, green and yellow), common cocklebur, lambsquarters, morning-glory spp., nightshade (black), pigweed (redroot), purslane, pusley (Florida), ragweed, velvetleaf and witchgrass	G + F	Atrazine 1.0-2.0 lb	Atrazine 4L 1.0-2.0 qt or 90W 1.1-2.2 lb	Adjust rate to soil texture and organic matter. Do not graze or feed forage from treated crop. Apply to sorghum up to 12 inches in height. Add crop oil concentrate at the rate of 1.0 gal/100 gal spray mixture. Heavy rains immediately after treatment may result in crop injury. Do not plant in treated areas any crop except corn or sorghum the following year if applied after June 10. This treatment is weak on fall panicum. Refer to label for additional instructions.
Cocklebur, coffeeweed, galinsoga, horseweed, jimsonweed, lambsquarters, morning-glory spp., mustards, nightshade (black), pigweed, poorjoe, pusley (Florida), ragweed, sicklepod, spanish-needles, sunflower and velvetleaf	G	2,4-D 0.25-0.5 lb	2,4-D amine 0.5-1.0 pt of a 4.0 lb/gal formulation	Apply after crop reaches 6 inches tall and before it reaches 15 inches tall, but prior to the boot stage. A directed spray is desirable if crop is over 8 inches tall. Do not apply during boot to early dough stage. Hybrids vary in susceptibility to 2, 4- D. Treat only those known to be tolerant.
Clovers, cocklebur, jimsonweed, lambsquarter, morning-glory (ivyleaf and tall), mustards, nightshade (black), pepperweed, pigweeds, purslane, sida (prickly), or tea-weed, ragweeds, smartweed, spurge (prostrate), sunflower (common) and velvetleaf. Suppression of alfalfa, artichoke (jerusalem), bindweeds, dock (curly), dogbane (hemp), horsenettle, milkweed (common and honeyvine), plantain (broadleaf), sorrel (red) and thistle (Canada)	G	Dicamba 0.25 lb	Banvel 0.5 pt or Marksman 1.5-2.0 pt	Apply after weeds have emerged and are actively growing. Apply after sorghum is in the three leaf stage but before sorghum is 15 inches tall (12 inches for Marksman). Drop nozzles should be used if the crop is taller than 8 inches. Do not graze or feed treated sorghum, forage or silage prior to mature grain stage. Do not apply to sorghum grown for seed production. Observe precautions to avoid drift to adjacent crops.
Beggarticks, cocklebur, dayflower, jimsonweed, mustard (wild), nutsedge (yellow), ragweed, sida (prickly), smartweed, spurred anoda, sunflower (wild), thistle (Canada) and velvetleaf 1.0 qt	G + F	Bentazon 0.75-1.0 lb + crop oil concentrate	Basagran 0.75-1.0 qt + crop oil concentrate	Refer to label as the rate of application is dependent on leaf stage and height of weeds to be controlled. For Canada thistle and yellow nutsedge, only 1 application can be made in sorghum. Therefore, control may be partial or inconsistent.

¹G = grain; F = forage

Table 5.62 - Postemergence (cont.)

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Buckwheat (wild), cocklebur, jimsonweed, lambsquarters, morning-glory spp., mustard (wild), nightshade spp., ragweed (common and giant), smartweed spp. and velvetleaf	G + F	Bromoxynil 0.25-0.375 lb	Buctril 4E 0.5-0.75 pt or Buctril/Atrazine 1.5-3.0 pt	Apply as an early postemergence treatment to small weeds. Adjust rate to weed and crop size as specified by label. This treatment is nonvolatile and is appropriate for situations where the proximity of susceptible crops prohibits the use of 2,4-D or dicamba.
Harvest aid to reduce the moisture content of grain prior to harvest	G	Sodium Chlorate	Defol 6 0.75-1.0 gal	Desiccation of morning-glory and other vines may be erratic.
Harvest aid	G	Glyphosate up to 2.0 lb	4.0 lb ai/gal glyphosate containing product or equivalent up to 2.0 qt	Apply at 30% grain moisture or less. Allow at least 7 days between application and harvest. Apply with extreme caution because spray drift can be very damaging to trees, shrubs, and lawns at this time of year.
Cocklebur, nutsedge, pigweed, ragweed (common, giant), sunflower, and velvetleaf	G	Halosulfuron 0.032 lb	Permit 75WG 0.66 oz + approved tank mixes: or Banvel/Clarity 0.25-0.5 pt or Buctril 0.5-1.0 pt or 2,4-D 0.25-0.5 pt	Do not apply to sorghum under severe environmental stress. Do not apply aerially. Permit, alone, can be applied from the 2-leaf through layby stage (before grain head emergence). The use of a nonionic surfactant is recommended – consult label. Consult label for rotational restrictions.
Bindweed, cocklebur, jimsonweed, lambsquarters, morning-glory (suppression), mustards, pigweed, ragweeds, smartweed, velvetleaf	G	Prosulfuron 0.027-0.036 lb	Peak 57DF 0.75-1.0 oz + approved tank mixes: Banvel/Clarity 0.125-0.5 pt or 2,4-D 0.25-0.5 pt or Atrazine 0.5-1.0 qt or Buctril 0.5-1.0 pt or Marksman 1.0-2.0	Peak may be applied postemergence to sorghum between 5 and 30 inches in height. Do not apply to sorghum under stress. Use crop oil concentrate or nonionic surfactant. When tank-mixing, consult label for proper additive. Peak can interact with certain organophosphate insecticides. Consult label.

¹G = grain; F = forage

Table 5.62 - Postemergence (cont.)

Weed problem	Sorghum type ¹	Chemical rate per acre	Product per acre	Remarks
Barnyardgrass, crabgrass (large), foxtail species, signalgrass (broadleaf, bed-straw), clovers, lettuce (prickly), morningglory, bindweed and suppression of common lambsquarters, ragweed (common, giant), sunflower, velvetleaf, dandelion	G	0.25-0.38 lb 0.25-0.38 lb	Paramount 75DF 5.3-8.0 oz	Paramount requires the addition of methylated seed oil (MSO) or crop-oil concentrate (COC). Nitrogen fertilizers may also be included (AMS or UAN). Apply up to 12-inch tall sorghum. Can be tank mixed with 2,4-D, atrazine, Clarity, and Buctril. Best results occur with applications to weeds less than 2 inches tall.
Lambsquarters (common), morningglory (ivyleaf and pitted), nightshade (eastern black), pigweed, velvetleaf	G,F	carfentrazone 0.008-0.016 lb	Aim 2EW 0.5-1.0 fl oz	Apply to weeds 1 to 4 inches tall. Include a nonionic surfactant (NIS). Tank mixing other herbicides increases the spectrum of weeds controlled.
Barnyardgrass, crabgrass, foxtails, goosegrass, panicum (fall and Texas), ryegrass (annual), signalgrass (broadleaf), morningglory (annual), carpetweed, chickweed (common), cocklebur (common), dayflower (common), groundsel, knawel, lambsquarters (common), mustard, pigweed, prickly sida, purslane (common), ragweed (common), sicklepod, smartweed (Pennsylvania), velvetleaf, wild buckwheat	G,F	linuron 0.5-1.0 lb	Lorox 50 DF 1,0-2.0 lb	Post-directed application only. Do not apply over the top of emerged sorghum. Use only when there is sufficient differential between height of sorghum and weeds so that weeds are thoroughly covered and upper leaves of sorghum and whorl are not exposed to spray or drift. Include a nonionic surfactant (NIS). Weeds should be treated prior to 2-inch tall grass weeds and 6-inch broadleaf weeds.

¹G = grain; F = forage

Tobacco

Charles S. Johnson, Extension Specialist, Southern Piedmont AREC

Soil Texture

Herbicide performance and safety are highly influenced by soil texture and organic matter content. Herbicide rates are usually higher for fine versus coarse soil textures and with increasing percentages of organic matter content. In general, high herbicide rates may be necessary for fine-textured soils with at least 1% to 2% organic matter. Use the low recommended herbicide rate when soil organic matter is less than 1%, regardless of soil texture. Soil textures are described in herbicide recommendations as:

Coarse - Sands; loamy sands; sandy loams

Medium - Sandy clay loams; loams; silt loams; silts

Fine - Clay loam; silty clay loams; clays

Soil Preparation

All weed growth and crop stubble must be thoroughly worked into the soil prior to application of most herbicides used in tobacco fields. The soil should be moist and loose with all clods broken down.

Spray Equipment

ALWAYS clean, check, and calibrate sprayers before use to ensure correct herbicide spray volume and uniform spray pattern. Apply liquid and wettable powder herbicide formulations in 20 to 40 gallons of water per acre using a standard low-pressure (25 to 50 psi) boom sprayer. Poast must be applied in 5 to 20 gallons of water per acre at 40 to 60 psi using hollow-cone or flat-fan nozzles. Maintain continuous agitation, and never leave a spray mixture in the tank overnight.

Preplant Incorporated (PPI)

Apply herbicides in an even broadcast application before planting. **Avoid spray overlap.** Use boom sprayer equipped with fan-type nozzles (8004, etc.), flood-jet nozzles (TK4, etc.), or raindrop nozzles. Incorporate herbicide immediately after application (see label) with the following:

1. **Disc** (Combination, tandem, double-disc, disk harrow, or similar equipment) - Set to cut 4 to 6 inches deep and operate in two different directions (at right angles to each other) at 4 to 6 mph. A disc set to cut 4 to 6 inches will incorporate herbicide in the top 1 to 2 inches of soil.

Precautions - Avoid use of a large field disc. Discs should be set no more than 8 inches apart and be no wider than 24 inches in diameter. **A single cultivation does not adequately incorporate herbicides, and may increase crop injury and decrease weed control.** Incorporation with implements set to cut less than 2 inches deep may result in erratic weed control. Using incorporation equipment and tractor speeds not listed on the label may result in poor or erratic weed control and/or crop injury.

2. **PTO-driven equipment** (tillers, cultivators, hoes) - Set to cut 3 to 4 inches deep and operate one time at 4 mph. This type of equipment performs best on coarse soil types. PTO-driven equipment should not be operated at a speed greater than 4 mph.
3. Other equipment can be used, but proper procedures should be followed. Read labels or manufacturer's directions.

Overtop after Transplanting

Herbicides labeled for this use can be sprayed, either in a band or broadcast, onto freshly prepared soil within 7 days of transplanting. Cultivation is required, immediately before or at time of application, if the application is made more than 2 days after transplanting or if significant rain has fallen since transplanting.

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1. **Band application** - Apply herbicide in a 14 to 24-inch band over the row using fan-type, even-spray nozzles (8004E, etc.). Refer to label and product information for information on this type of application. The amount of herbicide required per crop acre is reduced with band application and can be determined by the following formula: **Banded product rate/acre = Band width (inches)/Row spacing (inches) x Broadcast product rate.**
2. **Broadcast** - Apply herbicide in an even broadcast application with a sprayer equipped with fan-type nozzles (8004, etc.).

Layby

Labeled herbicides can be applied as a directed spray to row middles immediately after the last normal cultivation, which should leave the row middles weed-free. Application should be made using commercially available drop nozzles equipped with flood-jet flat (TK2, TK4, etc.) or even flat-fan (8004E, etc.) nozzles in order to spray a 16- to 30-inch band between rows. In fields where the spray boom passes over the same row middle twice, use nozzles which apply one-half the normal number of gallons per acre to prevent over-application. Use the following formula to determine the amount of product to use with band application: **Product/acre for band treatment = Band width (inches)/Row spacing (inches) x Broadcast rate of product/A.** One-half inch of water is usually necessary within 7 to 10 days after application for herbicide activation.

No-till

Aim may be used as a pretransplant burndown treatment. Command 3ME and Devrinol DF may be applied at transplanting. Irrigation or rainfall may be needed to wash Devrinol off mulch and onto the soil surface.

Weeds

A herbicide should be selected based on the most important weeds in each field. The majority of the herbicides used in tobacco will control grasses and a limited number of broadleaf weeds.

Relative Effectiveness of Herbicides for Tobacco

Table 5.63 - Grasses and Nutsedge¹

	Barnyardgrass	Bermudagrass	Broadleaf Signalgrass	Crabgrass	Crowfoot grass	Fall Panicum
Command	E	P-F	E	E	E	E
Devrinol	G	P	F	E	E	G
Poast	F-G	G	E	G	F	E
Prowl or Pendimax	G	P	G	E	E	G
Spartan	F	P	P	F	F	F
Tillam	G	P	P	E	E	G

	Foxtails	Goosegrass	Johnsongrass (seedling)	Texas Panicum	Nutsedge
Command	E	E	G	G	P
Devrinol	E	E	F	-	N
Poast	E	G	E	E	N
Prowl or Pendimax	E	E	G	G	N
Spartan	F	F	F	F	E
Tillam	E	G	G	P	G

¹E = 90 to 100% control; G = 75 to 90%; F = 50 to 75%; P = Less than 50%; N = no control. This table gives general ratings of relative herbicidal activity. Activity varies with weather conditions, soil type, and application method. Under non-optimal conditions, activity may be less than indicated.

Table 5.64 - Broadleaf Weeds¹

	Carpetweed	Cocklebur	Galinsoga	Jimsonweed	Lambsquarters	Morningglory
Command	P	F	P-F	G	G	P
Devrinol	G	P	P-F	P	G	P
Poast	N	N	N	N	N	N
Prowl	G	P	P	P	G	P
Spartan	G	F-G	F	F-G	G	G
Tillam	G	P	P	P	G	P
	Pigweed	Purslane	Prickly sida	Ragweed	Sicklepod	Smartweed
Command	P	G	E	F-G	P	G
Devrinol	G	G	P	F	P	P
Poast	N	N	N	N	N	N
Prowl	G	G	P	P	P	P
Spartan	G	G	P	P	P	G
Tillam	G	G	P	P	P	P

¹E = 90 to 100% control; G = 75 to 90%; F = 50 to 75%; P = Less than 50%; N = no control. This table gives general ratings of relative herbicidal activity. Activity varies with weather conditions, soil type, and application method. Under non-optimal conditions, activity may be less than indicated.

Effect of PPI Applications on Early-season Growth of Tobacco

Herbicides applied preplant may temporarily delay plant growth during the first month after transplanting. Application factors which enhance root injury are: 1) improper herbicide incorporation; 2) wrong herbicide rates for soil texture; 3) poor application techniques and equipment. If all procedures for preplant application of a herbicide are followed, the delay in plant growth should be minimal, and under favorable growing conditions should have no effect on plant vigor or yields. However, the delay in plant growth may be increased by unfavorable growing conditions and other causes. Application of a herbicide at transplanting and/or after the last cultivation will eliminate delays in plant growth caused by PPI herbicide use.

Effect of Herbicide on Small Grain Crops

Residues of some tobacco herbicides, especially Command and Devrinol applied PPI, may affect the growth of small grain crops following tobacco (as indicated on product labels). If the small grain is grown only as a cover crop, the problem may not be considered serious. The potential for carry-over can be reduced by: 1) using minimum labeled rates of the chemicals; 2) band applications of labeled products at transplanting and/or at layby; 3) early stalk and root destruction; 4) deep plowing before seeding of small grain.

Table 5.65 - Field-grown Tobacco

Weed problem	Soil ¹ Texture	Chemical; lbs Active Ingredient/A	Product; Rate/A	Application ² Method	Remarks
Pigweed, lambsquarters, nightshade, purslane, smartweed, velvetleaf, spurred anoda, carpetweed, cocklebur, cotton, groundcherry, morningglory, common ragweed		carfentrazone	Aim 0.8-1.5 oz Aim EC or Aim EW 0.8-1.5 fl oz.	Burndown, shielded, directed	The pretransplant interval is 1 day; the preharvest interval is 6 days. No more than 2 oz Aim or 3 fl oz Aim EC or EW may be applied per season. Read precautionary statements.
Barnyardgrass, broadleaf signalgrass, crabgrass, field sandbur (suppression), foxtails, seedling johnsongrass, lambsquarters, fall panicum, velvetleaf, jimsonweed, prickly sida, purslane, spurred anoda, venice mallow, common ragweed, smartweed, cocklebur (suppression), shattercane	Coarse Fine	clomazone 0.75 1.0	Command 3ME 2.0 pt 2.7 pt	PPI, OT	Use the higher rate for heavy weed pressure or heavy soils. Best results are obtained when the product is incorporated no more than 1 inch deep. Transplants should be planted so that roots are below the treated area. OT applications must be made within 7 days of transplanting. Read precautionary statements.

¹ When the soil type has less than 1% organic matter, use the rate for the coarse soil texture recommendations. **Coarse** - Sands; loamy sands; sandy loams. **Medium** - Sandy clay loams; loams; silt loams. **Fine** - Clay loam, silty clay loam; clays.

² PPI - Preplant incorporated. Delay in growth may result under adverse weather conditions and/or when poor application practices have been used. OT - Overtop after transplanting as a band or broadcast applications. Layby - Application of herbicide in row middle after last cultivation. Burndown, shielded, directed - broadcast spray before transplanting (burndown), or shielded/hooded spray to row middles only (shielded), or spray directed toward row middles and surface of row beds after sequential harvesting of flue-cured tobacco has removed sufficient leaves that the spray will not contact remaining crop leaves (directed).

Table 5.65 - Field-grown Tobacco (cont.)

Weed problem	Soil ¹ Texture	Chemical; lbs Active Ingredient/A	Product; Rate/A	Application ² Method	Remarks	
Barnyardgrass, carpetweed, crabgrass, fall panicum, foxtails, goosegrass, johnsongrass from seed, lambsquarters, pigweed, common purslane, ragweed (suppression), ryegrass, check label for uncommon weeds		napropamide	Devrinol 2EC	PPI only	Incorporate the same day as applied. Small grain injury may result from PPI application. Use high rate for burley in southwest Virginia. Read precautionary statements.	
	Coarse	1.0	2.0 qt			
	Medium	1.0-1.5	3.0 qt			
	Fine	2.0	4.0 qt			
				Devrinol 50-DF		PPI, OT, Layby
		Coarse	1.0	2.0 lb		
	Medium	1.0-1.5	2.0-3.0 lb			
	Fine	2.0	4.0 lb			
Grass weeds and Volunteer small grain	All types	sethoxydim	Poast	post-emergence	Apply to actively growing grasses at 40-60 psi in 5-` 20 gal/A through hollow cone or flat-fan nozzles. May be banded or applied broadcast. Do not apply more than 4 pt/A/season. Read precautionary statements.	
	Single use:	0.28	1.5 pt + 2.0 pt oil concentrate			
	Sequential use:	0.19	1.0 pt + 2.0 pt oil concentrate			
Annual spurge, barnyardgrass, carpetweed, crabgrass, crowfootgrass, Florida pusley, foxtails, goosegrass, johnsongrass from seed, lambsquarters, panicums, pigweed, purslane, signalgrass, check label for uncommon weeds.		pendimethalin	Prowl 3.3EC or Pendimax 3.3		Use on transplanted tobacco. Apply up to 60 days prior to transplanting; incorporate within 7 days after application. Use high rate for silt and silt-loam soils. May also be applied in a band in row middles at layby. Read precautionary statements.	
	Coarse	0.74-0.99	1.8-2.4 pt	PPI only		
	Medium	0.74-1.24	1.8-3.0 pt			
	Fine	0.99-1.24	2.4-3.0 pt			
	Coarse	0.50-0.74	1.2-1.8 pt	Layby only		
	Medium	0.74-0.99	1.8-2.4 pt			
	Fine	0.74-0.99	1.8-2.4 pt			
				Prowl H ₂ O		
	Coarse	0.95	2.0 pt	PPI only		
	Medium	0.95-1.19	2.0-2.5 pt			
	Fine	1.19	2.5 pt			
	Coarse	0.71	1.5 pt	Layby only		
	Medium	0.95	2.0 pt			
	Fine	0.95	2.0 pt			

¹ When the soil type has less than 1% organic matter, use the rate for the coarse soil texture recommendations. **Coarse** - Sands; loamy sands; sandy loams. **Medium** - Sandy clay loams; loams; silt loams. **Fine** - Clay loam, silty clay loam; clays.

² PPI - Preplant incorporated. Delay in growth may result under adverse weather conditions and/or when poor application practices have been used. OT - Overtop after transplanting as a band or broadcast applications. Layby - Application of herbicide in row middle after last cultivation. Burndown, shielded, directed – broadcast spray before transplanting (burndown), or shielded/hooded spray to row middles only (shielded), or spray directed toward row middles and surface of row beds after sequential harvesting of flue-cured tobacco has removed sufficient leaves that the spray will not contact remaining crop leaves (directed).

Table 5.65 - Field-grown Tobacco (cont.)

Weed problem	Soil ¹ Texture	Chemical; lbs Active Ingredient/A	Product; Rate/A	Application ² Method	Remarks
Cocklebur, Florida pusley, hairy galin- soga, goosegrass, groundcherry, jim- sonweed, seed- ling Johnsongrass, lambsquarters, morning-glory, wild mustard, night- shade, nutsedge, orchardgrass, pigweed, prickly sida, Suppresses , barnyardgrass, crabgrass, crow- footgrass, foxtail, panicums, signal- grass, check label for uncommon weeds	Coarse	0.25	8 fl oz (0.50 pt)	After bed- ding, before transplanting	Apply to soil sur- face after field has been pre- pared for planting. Apply within 14 days of trans- planting. Where raised beds are used, apply after beds are knocked down for plant- ing. If soil must be worked after application, do not disturb soil below a 2 inch depth. Do not apply at or after transplanting. Read precaution- ary statements.
	Medium	0.31	10 fl oz (0.62 pt)		
	Fine	0.38	12 fl oz (0.75 pt)		

¹ When the soil type has less than 1% organic matter, use the rate for the coarse soil texture recommendations. **Coarse** - Sands; loamy sands; sandy loams. **Medium** - Sandy clay loams; loams; silt loams. **Fine** - Clay loam, silty clay loam; clays.

² PPI - Preplant incorporated. Delay in growth may result under adverse weather conditions and/or when poor application practices have been used. OT - Overtop after transplanting as a band or broadcast applications. Layby - Application of herbicide in row middle after last cultivation. Burndown, shielded, directed – broadcast spray before transplanting (burndown), or shielded/hooded spray to row middles only (shielded), or spray directed toward row middles and surface of row beds after sequential harvesting of flue-cured tobacco has removed sufficient leaves that the spray will not contact remaining crop leaves (directed).

Precautionary and Restriction Statements

Read all directions, cautions, precautions, and special precautions on each product label.

Aim; Aim EC, EW (carfentrazone)

As a contact burndown herbicide for broadleaf weeds, Aim may be applied (1) to kill cover crops prior to no-till transplanting, (2) as a shielded or hooded spray to row middles before layby, or (3) as a directed spray following first harvest of flue-cured tobacco. Spray solution will cause extensive burn to broadleaf plants (and tobacco leaves) on contact.

Command 3ME (clomazone)

Apply only as specified on the label. Command may be tank mixed with other EPA-registered tobacco herbicides and can be impregnated on dry bulk fertilizer. Bottom leaves of tobacco plants in treated soil may whiten or yellow temporarily, but the crop should grow out of this with no adverse effect on yield or quality. Avoid spraying Command within 300 feet of susceptible and desirable plant species, as spray drift can cause foliar whitening or yellowing of some plants. Do not apply Command within 1,200 feet of residences, towns, subdivisions, or commercial vegetable or fruit nurseries or greenhouses. Small grains should not be planted in the fall or following spring after product use.

Devrinol 50DF, 2E (napropamide)

Do not apply more than a total of 2 lb of active ingredient per acre in any one season. After harvest or prior to planting succeeding crops, deep moldboard or disk plowing operation must be carried out. Do not seed to alfalfa, small grain, sorghum, or corn for 12 months after Devrinol application. Injury to rotational crops is lessened by band versus broadcast application. When Devrinol is applied after transplanting or at layby, rainfall or overhead irrigation following application improves weed control.

Tillam 6E (pebulate)

Applied according to directions and under normal growing conditions, Tillam will not harm the treated crop. Read label directions when used in combination with fertilizers or other pesticides.

Poast (sethoxydim)

When mixing Poast, fill sprayer 1/2-2/3 full of water. Add oil concentrate (preferably highly refined vegetable oil) first with agitation. Add Poast last with remaining volume of water, also with agitation. Agitation must be maintained during application. Do not apply Poast (1) at rates above 1.5 pt/A in the field; (2) to exceed 4 pt/A/season; (3) when grasses are under stress; (4) if rainfall is expected within 1 hour; (5) with any other pesticide, additive, or fertilizer except as specified on the Poast label; (6) through any type of irrigation system; (7) within 42 days of harvest.

Prowl 3.3EC, Pendimax 3.3, and Prowl H2O (pendimethalin)

Applied according to directions and under normal growing conditions, pendimethalin should not harm transplanted tobacco, but can temporarily retard growth under stressful conditions (cold/wet or hot/dry weather). *Layby applications should be made as a directed spray in a 16- to 24-inch band centered between rows. Broadcast rates for layby applications must be adjusted based on the width of the intended spray band and soil texture.* Any spray contacting tobacco leaves may cause deformations. Crop injury may result if winter wheat and winter barley are planted in the fall (after a spring application) when no-till planting procedures are used. Do not feed forage or graze livestock for 75 days after planting wheat or barley in treated land.

Spartan 4F (sulfentrazone)

Do not use in tobacco greenhouses. Do not inpregnate on fertilizer. Do not apply after transplanting. Do not apply to soils classified as sands with less than 1 percent organic matter and shallow groundwater. *Most tobacco fields in Virginia contain coarse to medium textured soils. The 8 to 10 fl oz per acre rates are appropriate for these conditions. Crop injury can occur when incorporation is poor, transplants are set too shallow, or heavy rain falls near transplanting.* Splashing of treated soil onto young tobacco can also cause localized burning. Do not apply Spartan more than once, per site, per season. Do not seed small grains within 4 months of application. Do not plant cotton or canola with 18 months of use.

Peanuts

Henry P. Wilson, Professor, Weed Science, Eastern Shore AREC

With production costs escalating, efficient and effective weed control is very important. Failure to control weeds almost always results in a poor peanut crop. Detailed information on the use of herbicides cannot be included in a guide such as this. Refer to product labels for use suggestions and restrictions. Proper application is required to obtain satisfactory weed control and minimize carry-over residues.

Soil incorporation is necessary for some herbicides. Compliance with the label directions for incorporation is very important in obtaining effective weed control.

With postemergence herbicides, good spray coverage of the target plants, treatment at the proper stage of weed development, and use of relatively small droplets of spray under relatively high pressure are required to insure good control.

Effective Weed Management requires integration of all control strategies.

1. *Crop rotation.* Peanuts should be grown in rotation with corn, grain sorghum, and/or cotton to aid in management of various pests including weeds. Crop rotation allows for the use of different types of herbicides on the same field in different years. A good rotation and weed management system in each crop prevents the buildup of problem weeds in the field. Most annual and perennial broadleaf weeds can be controlled more economically and easier in corn than in peanuts. For example, there are no registered herbicides for use in peanuts that will effectively control perennial broadleaf weeds such as horsenettle, trumpet creeper, or maypop passionflower.
2. *Crop competition.* Peanuts are relatively poor competitors with weeds. Horsenettle, lambsquarter, cocklebur, and palmer amaranth have been shown to reduce yield by 17, 40, 70, and 28 percent, respectively. Fewer weeds are required to reduce yield and quality of peanuts than for most other crops. Generally, if peanuts are kept weed free for 6-8 weeks after planting, peanut yield will not be reduced by weed competition. However, late season weeds often interfere with digging and combining of peanuts and reduce harvesting efficiency and peanut quality.
3. *Cultivation.* Cultivation is often required to supplement chemical weed control. In addition, cultivation permits banding of herbicides which reduces herbicide costs. Cultivations must be flat and non-dirting. Soil must not be moved upon or around the peanut plant. Such soil movement results in physical damage to the peanut plant and often results in increased disease problems.
4. *Weed identification and scouting.* Proper weed identification is essential. Generally, one herbicide will not control every weed that is likely to be present in a typical field. Every field should be scouted and mapped for weeds present. Using graph paper, a grower should mark the approximate location of weeds in the fall of each year. Weeds present in the fall will generally have set seed and will be present the following year. Weed seed often will stay viable in the soil for several years. As a result, they will be a problem for many years. By knowing what weeds to expect, a grower will be able to make more intelligent decisions on herbicide applications and save money and time in the process.
5. *Herbicide selection.* To develop a herbicide program, a grower must know what weeds are present, the soil characteristics of the field, and herbicide limitations and capabilities. Seldom will one herbicide provide control of all weeds present. As a result, several herbicides must be used together for a successful program. By knowing what each herbicide provides to the program, the grower may eliminate expensive duplication or choose the herbicide that provides the best overall balance of weed control capabilities, crop safety, and the best buy.

Problem Weeds

Perennial Broadleaf Weeds

Perennial broadleaf weeds such as horsenettle, alligatorweed, Virginia buttonweed, trumpet creeper, maypop passionflower, and bigroot morningglory cannot be controlled in peanuts. These weeds can be controlled in corn grown in rotation with peanuts. In corn, make a layby application of 1.0 pt/A of 2,4-D amine plus surfactant. After corn harvest, spot spray any remaining infestations with glyphosate or a mixture of 1.0 pt/A of 2,4-D amine plus 0.5 pt/A of Banvel plus surfactant. See glyphosate product labels for suggested application rates.

Bermudagrass

In addition to controlling bermudagrass in the field, efforts should also be directed at controlling bermudagrass on edges of field. This prevents encroachment into the field.

- A. Ideally, control procedures should begin in the fall following corn harvest. This allows the grower several options and reduces the risk of yield reduction. After corn harvest, mow the stalks. If the bermudagrass foliage appears wilted or damaged, set the mower low to remove the old foliage. Do not till; allow the bermudagrass to regrow (8-10 inches tall) and be actively growing before applying glyphosate at 3.0 lb ai/A in a spray volume of 15 gpa using flat fan nozzles and 30-40 psi. Apply at least two weeks before frost and wait 14 days before tillage. Using moldboard or chisel plow followed by several diskings spaced at 4-6 week intervals (during the fall and winter if soil conditions allow) is most effective.
- B. Glyphosate may also be applied in the spring. Remove old thatch by burning or mowing. Allow bermudagrass to regrow before applying 3 quarts of glyphosate as described above. Wait 14 days before seedbed preparation.
- C. Two applications of Poast, Poast Plus, or Select Max in combination with good crop competition will usually provide good control or suppression of bermudagrass. See Table 4 for application rates and weed size for treatment. Always include a crop oil concentrate in the spray mixture.

Nutsedge

Both yellow and purple nutsedge occur in peanut fields. Know which nutsedge species is present; management practices vary for the two species.

Fields infested with yellow nutsedge should receive a preplant-incorporated or preemergence application of Pursuit, Frontier, Outlook, Strongarm, or Dual. Pursuit, Frontier, Outlook, or Dual may also be used as ground-cracking applications. Basagran may be applied postemergence when the yellow nutsedge is 6-8 inches tall. Apply 1.5-2.0 pt Basagran per acre. A second application of Basagran at same rate 7-10 days later may be required. The addition of 1 quart per acre of crop oil concentrate with Basagran will improve control. Either Cadre or Pursuit plus nonionic surfactant or crop oil concentrate may be applied for control of either yellow or purple nutsedge at the 1-4 inch stage.

Purple nutsedge is not controlled by Basagran, Frontier, Outlook, or Dual. Soil incorporated or preemergence treatments of Pursuit or Strongarm provide suppression of purple nutsedge.

Broadleaf Signalgrass and Texas Panicum

These two annual grasses are becoming more widespread in Virginia's peanut production area. Because management programs vary for the two species, it is important to have accurate information concerning the species present.

A management program for broadleaf signalgrass should begin with a preplant-incorporated treatment of Prowl, Sonalan, Dual, Frontier, Outlook, or Lasso. The preplant-incorporated treatment should be followed by a preemergence or ground-cracking application of Lasso, Frontier, Outlook, or Dual. Broadleaf signalgrass which escapes soil treatments may be controlled with postemergence application of Poast, Poast Plus, or Select Max. Cracking stage application of Gramoxone Inteon, or Boa effectively controls seedling broadleaf signalgrass.

Texas panicum **is not effectively controlled by Dual, Frontier, Outlook, Lasso, or Pursuit**. Management should begin with a preplant-incorporated application of Prowl or Sonalan. Texas panicum may emerge from deeper in the soil than other annual grasses. As a result, Prowl or Sonalan should be incorporated to a depth of 3 inches (this is deeper than specified on Prowl label). Dual, Frontier, Outlook, or Lasso applied preemergence or at ground-cracking provides some suppression. Texas panicum which escapes soil treatments may be controlled with postemergence application of Poast, Poast Plus, or Select Max. Cracking stage application of Gramoxone Inteon, or Boa also effectively controls seedling Texas panicum.

Recommended Herbicides for Weed Control in Peanuts

Table 5.66 - Preplant Incorporated

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Crabgrass, goosegrass, fall panicum, johnsongrass, broadleaf signalgrass, Texas panicum, carpetweed lambsquarters, pigweed	Pendimethalin 0.75-1.0 lb	Prowl 3.3 EC 1.8-2.4 pt or Prowl H ₂ O 1.6-2.1 pt	Incorporate into the top 1-2 inches within 7 days of application. Incorporate 3 inches deep for Texas panicum (note this is deeper incorporation than the label specifies). Use higher rate for broadleaf signalgrass, fall panicum, or Texas panicum. May be tank mixed with Dual, Pursuit, Frontier, Outlook, or Strongarm for control of mixed infestations of nutsedge and annual grasses.
Crabgrass, goosegrass, fall panicum, johnsongrass, broadleaf signalgrass, Texas panicum, carpetweed, lambsquarters, pigweed	Ethalfuralin 0.56-0.75 lb	Sonalan 3 HFP 1.5-2.0 pt	Incorporate 2-3 inches deep within 2 days of application (incorporation as soon as possible after application is preferred). For Texas panicum incorporate 3 inches deep. Use higher rate for fall panicum, Texas panicum, or broadleaf signalgrass. See label for application rates for particular soil. May be tank mixed with Dual, Pursuit, or Frontier, Outlook, or Strongarm for control of mixed infestations of nutsedge and annual grasses.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62 EC 1.0-1.33 pt or Dual II Magnum 7.64 EC 1.0-1.33 pt	Incorporate 2 inches deep within 14 days of planting. Will not control purple nutsedge or adequately control Texas panicum. A sequential application may be used with 1/2 rate applied PPI and 1/2 rate applied either preemergence or at cracking. May be tank mixed with Prowl or Sonalan to obtain control of broadleaf signalgrass and Texas panicum.
Broadleaf weeds and suppression of nutsedges	Diclosulam 0.024 lb	Strongarm 84 WDG 0.45 oz	Incorporate into the top 3 inches of the soil within 4 weeks of planting. When applied in tank mixture with other herbicides, follow incorporation directions for the tank-mix partner. May be tank mixed with Dual Magnum, Prowl, Sonalan, Pursuit, Outlook, or Frontier for improved control of annual grasses.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, carpetweed, yellow nutsedge	Dimethenamid 1.17-1.5 lb	Frontier 6 E 25.0-32.0 oz or Outlook 6 E 16.0 -21.0 oz	Incorporate 2 inches deep within 14 days of planting. May be applied in a split application with 1/2 to 2/3 the maximum rate applied PPI and 1/2 to 1/3 the maximum rate applied as a sequential application. Will not control purple nutsedge or adequately control Texas panicum. May be tank mixed with Prowl or Sonalan for improved broadleaf signalgrass and Texas panicum control.

Table 5.66 - Preplant Incorporated (cont.)

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Spurred anoda, pigweeds, prickly sida, velvetleaf, yellow nutsedge, purple nutsedge	Imazethapyr 0.063 lb	Pursuit 70 DG 1.44 oz Pursuit 2 EC 4.0 oz	May be applied and uniformly incorporated 1-2 inches deep prior to planting or applied to soil surface after planting. A sequential application may be used with 1/2 rate applied PPI and one-half rate applied either at ground crack or early postemergence. Soil incorporated treatments may be tank mixed with Prowl, Sonalan, Lasso, Dual, dimethenamid, or Strongarm. Do not apply more than 1.44 oz 70 DG/A/season.

Table 5.67 - Preemergence

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Yellow and purple nutsedge and many broadleaf weeds	Imazethapyr 0.063 lb	Pursuit 70 DG 1.44 oz Pursuit 2 EC 4.0 oz	Apply after planting, preferably before emergence of weeds. May be tank mixed with Lasso, Dual, dimethenamid, or Strongarm. Preemergence application of Pursuit has been less consistent in weed control than either soil incorporated or split (PPI + PRE) application.
Broadleaf weeds and the suppression of nutsedges	Diclosulam 0.124 lb	Strongarm 84 WDG 0.45 oz	Apply after planting but prior to crop or weed emergence. May be tank mixed with other herbicides registered for preemergence application.
Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, goosegrass, pigweed, carpetweed	Alachlor 3.0-4.0 lb	Lasso 4 EC 3.0-4.0 qt or Lasso II 15 G 20.0-26.0 lb or Micro-Tech 4 ME 3.0 qt or Partner 65 WDG 4.5 lb	Apply to the soil surface before weeds or crop emerge. Good annual grass control except for Texas panicum.
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62 EC 1.0-1.33 pt or Dual II Magnum 7.64 EC 1.0-1.33 pt or Dual II G Magnum 6.0-8.0 lb	Apply to soil surface before weeds or crop emerge. Good annual grass control except for Texas panicum. Do not use Dual II Magnum or Dual II G Magnum after peanuts have emerged.

Table 5.67 - Preemergence (cont.)

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Crabgrass, fall panicum, goosegrass, broadleaf signalgrass, pigweed, yellow nutsedge	Dimethenamid 1.17-1.5 lb	Frontier 6 E 25.0-32.0 oz or Outlook 6 E 16.0-21.0 oz	Apply to soil surface before weeds or crop emerge. Good annual grass control except for Texas panicum.
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control of temporary suppression of many weeds, including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails, and the suppression of yellow nutsedge.	glyphosate 0.703-0.984 lb ae/A + s-Metachlor 0.938-1.31 lb ai/A	Sequence 2.5-3.5 pt	Apply to soil surface at planting, but before crop emerges. Do not incorporate. Crop injury has been observed, especially when heavy rainfall is received shortly after cotton emergence. Do not exceed 2.5 pt/A of Sequence on medium or fine textured soils. Do not apply to sands or loamy-sand soils. May be useful in no-till cotton and for suppression of yellow nutsedge. Do not apply Sequence to cracking peanuts.
Broadleaf weeds	Flumioxazin 0.063 oz	Valor SX 2.0 oz	Apply within 2 days following planting. Significant injury has been observed if applied 3 or more days after planting. Do not incorporate. Will not control nutsedge (purple or yellow) or sicklepod. Effective on ragweed, eclipta, and pigweed. Follow labeled sprayer cleanout instructions. Spray equipment used to apply Valor SX should not be used to apply other material to crop foliage. If heavy rain occurs at emergence, foliar injury from splashing Valor can occur. Peanut typically recovers by mid season.

Table 5.68 - Ground Cracking

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Barnyardgrass, broadleaf signalgrass, crabgrass, fall panicum, goosegrass, pigweed, carpetweed	Alachlor 2.0-3.0 lb	Lasso 4 EC 2.0-3.0 qt or Micro-Tech 4 ME 3.0 qt or Partner 65 WDG 4.5 lb	Good annual grass control except Texas panicum, use as a supplement to preplant- incorporated or preemergence treatments to provide additional residual control of annual grasses and small-seeded broadleaf weeds. Will not control emerged weeds.
Small annual grasses and broadleaf weeds	Paraquat 0.125 lb	Gramoxone Inteon 8 fl oz	Effective only on small emerged weeds (less than 1-inch tall). Does not provide residual control. Add 1.0 pt of nonionic surfactant/ 100 gal spray solution. Will cause foliar burn on emerged peanuts, but crop recovers and yield is not affected. May be tank mixed with Basagran or 2,4-DB to broaden the spectrum of broadleaf weeds controlled. May be tank mixed with Dual, Frontier, Outlook, or Pursuit to obtain residual weed control. Do not apply with Dual II Magnum after peanuts have emerged. Do not apply later than 28 days after ground cracking.
Small annual grasses and broadleaf weeds	Paraquat 0.125 lb + 2,4-DB 0.125-0.25 lb	Gramoxone Inteon 8.0 fl oz + Butyrac 2 SC 0.5-1.0 pt or Butoxone 1.75 SC 0.5-1.0 pt	See comments for paraquat alone. Adding 2,4-DB improves morningglory and cocklebur control. Do not apply later than 28 days after ground cracking. Add 1.0 pt of nonionic surfactant/100 gal spray solution.
Small annual grasses and broadleaf weeds	Paraquat 0.125 lb + Bentazon 0.5 lb	Gramoxone Inteon 8.0 fl oz or Boa 2.5 SC 6.6 fl oz + Basagran 4 SC 1.0 pt	See comments for paraquat alone. Adding Basagran improves control of prickly sida, common ragweed, common lambsquarters, smartweed, spurred anoda, and cocklebur, and reduces peanut injury. Do not apply later than 28 days after cracking. Add 1.0 pt of nonionic surfactant/100 gal of spray solution.

Table 5.69 - Postemergence

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Mainly cocklebur, annual morningglory (except pitted morningglory), sicklepod	2,4-DB 0.2-0.25 lb	Butoxone 1.75 SC 0.9-1.1 pt or Butyrac 2 SC 0.8-1.0 pt	Use when weeds are in the seedling stage and actively growing. Apply with 10-30 gpa spray volume and 20-40 psi spray pressure. Cocklebur and morningglory are most susceptible. Ragweed, lambs quarters, jimsonweed, pig-weed, and teaweed (prickly sida) are rather tolerant and may only be suppressed. The higher rate should be used if the difficult-to-control species are present. Do not graze or feed treated forage to livestock. May be applied from 2 weeks after planting to within 45 days of harvest. Avoid drift to other crops.
Broad-spectrum broadleaf weed control	Bentazon 0.5 lb + Acifluofen 0.25 lb	Storm 4 EC 1.5 pt (premix)	Apply to small, actively growing weeds with a minimum of 20 gpa spray volume and 40 psi. Apply with 1-2 pt/A crop oil concentrate or 1.0 pt of non-ionic surfactant/100 gal spray solution. See label and Table 5 for weeds controlled. May be tank mixed with 0.5-1.0 pt/A 2,4-DB for improved control of certain broadleaf weeds.
Same as for bentazon alone; however, the addition of acifluofen improves control of pig-weeds, morningglories and common ragweed.	Bentazon 0.75-1.0 lb + Acifluofen 0.25-0.5 lb	Basagran 4 SC 1.5-2.0 pt + Ultra Blazer 2 L 1.0-2.0 pt (tank mix)	Apply to small actively growing weeds. Use spray pressures of 40-60 psi. Do not use large-orifice nozzles. Ultra Blazer may be included up to 2.0 pt/A. Apply with 1.0 pt nonionic surfactant/100 gal spray solution or a crop oil concentrate at 1.0-2.0 pt/A. Increased leaf burn and weed control is usually observed with use of crop oil and higher rates of Ultra Blazer. Do not apply within 75 days of harvest.
Cocklebur, jimsonweed, smartweed, prickly sida (teaweed), spurred anoda, wild mustard, yellow nutsedge	Bentazon 0.5-1.0 lb	Basagran 4 SC 1.0-2.0 pt	Apply when broadleaf weeds are small and actively growing. Apply with 1.0-2.0 pt/A crop oil concentrate. Peanuts are tolerant at any growth stage. Use minimum of 20 gpa spray volume at 40-50 psi. Split applications 7-10 days apart, applying 1.5-2.0 pt each usually improves nutsedge control. Addition of 2,4-DB improves control of morningglory and spurred anoda. Do not apply more than 4.0 pt/A/season.
Same as for bentazon alone; however, the addition of 2,4-DB improves control of morningglory and spurred anoda.	Bentazon 0.75-1.0 lb + 2,4-DB 0.12 lb	Basagran 4 SC 1.0-2.0 pt + Butyrac 2 SC 8 fl oz or Butoxone 1.75 SC 9 fl oz	Apply in a minimum of 20 gpa spray volume and 40 psi. Apply to actively growing or small weeds. Avoid drift to other crops. Label directions prohibit addition of oil concentrate or other additives. Do not apply within 45 days of harvest or make more than two applications/year.

Table 5.69 - Postemergence (cont.)

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Cocklebur, eastern black nightshade, ragweed, eclipta, jimsonweed, morningglory, and pigweed.	Lactofen 0.2 lb	Cobra 2 EC 12.5 fl oz	Apply to actively growing weeds after peanut reaches the 6 true-leaf stage. Do not apply sequential application with 14 days of the first. Good coverage by spray solution is important. Use a minimum of 25-40 gpa and spray pressure of 40-60 psi. Add nonionic surfactant at 1 qt/100 gal of petroleum or vegetable based crop oil concentrate at 1-1.5 pt/A. See label for adjuvant use. Do not apply within 90 days of harvest. May be tank mixed with Butyrac or Butoxone to enhance spectrum of weeds controlled. In tank mixes, use nonionic surfactants, not crop oil.
Common ragweed, jimsonweed, morningglory, pigweed, carpetweed, purslane, cocklebur, tropic croton, lambsquarters, black nightshade, smartweed, spotted and prostrate spurge, wild mustard	Acifluorfen 0.25-0.5 lb	Ultra Blazer 2 L 1.0-2.0 pt	Apply when broadleaf weeds are small and actively growing. Refer to label for proper growth stage of weed. Good coverage by spray solution is important. Follow label directions concerning best application procedures and rates for different weed sizes to be controlled. Use a minimum of 25-40 gpa, and spray pressure of 40-60 psi. Do not use flood tips. Add 2.0 pt/A crop oil concentrate or 1.0 pt nonionic surfactant/100 gal of spray solution. Do not apply more than 2.0 pt/A of Ultra Blazer postemergence/season. May be tank mixed with Butyrac or Butoxone to enhance spectrum of weeds controlled. May be applied at 1 pt/A for control of pitted morningglory, jimsonweed, tropic croton, and common ragweed 2 inches tall or less. Do not apply within 75 days of harvest.
Morningglories, pigweeds, velvetleaf, yellow nutsedge, purple nutsedge	Imazethapyr 0.063 lb	Pursuit 70 DG 1.44 oz or Pursuit 2EC 0.4 oz	Apply from ground crack to early postemergence when weeds are actively growing and are less than 3 inches tall. Certain weeds such as common lambsquarters, prickly sida, and velvetleaf should be treated when 2 inches or less. Apply with a nonionic surfactant (1.0 qt/100 gal spray volume) or Dash (1.0 qt/A). Do not apply more than 0.063 lb ai/A/season. Do not apply within 85 days of harvest.

Table 5.69 - Postemergence (cont.)

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Spurred anoda, morning-glories, pigweeds, velvetleaf, yellow and purple nutsedge, sicklepod	Imazapic 0.063	Cadre 70 DG 1.44 oz	Apply when broadleaf weeds are actively growing and are less than 3 inches tall. Certain weeds such as common lambsquarters, prickly sida, velvetleaf, and spurred anoda should be treated when 2 inches tall or less. Apply with 1.0 qt/A crop oil concentrate or 1.0 qt nonionic surfactant/100 gal spray solution. Apply as a sequential treatment following application of a soil-applied grass control herbicide.
Annual grasses	Sethoxydim 0.19 lb	Poast 1.5 EC 1.0 pt or Poast Plus 1 EC 1.5 pt	Apply to actively growing grasses. See label and Table 3 for maximum grass size to treat. In general, annual grasses should be 2-4 inches for best results. Do not apply within 40 days of harvest. See labels for tank-mix instructions. See Table 5.82 for adjuvant recommendations.
	Clethodim 0.094-0.125 lb	Select 2 EC 6.0-8.0 oz or Select Max 0.97 EC 12.0-16.0 oz	
Bermudagrass	Clethodim 0.125-0.25 lb	Select 2 EC 8.0-16.0 oz or Select Max 0.97 EC 16.0-32.0 oz	Apply to actively growing bermudagrass when stolons (runners) are 3 to 6 inches in length. If needed, a second application of 8.0 to 16.0 oz/A may be applied for control of regrowth when stolons are 3 to 6 inches in length.
	+		
	Crop-oil concentrate	COC 2.0 pt	
	Sethoxydim 0.28 lb	Poast 1.5 EC 1.5 pt or Poast Plus 1.0 EC 2.25 pt	Apply to actively growing bermudagrass before plant stolon (runner) length exceeds 6 inches. A second application of 1.0 pt/A Poast or 1.5 pt/A Poast Plus is usually necessary for good control. Make the second application when stolon regrowth is 1-4 inches in length. See Table 5.82 for adjuvant recommendations.
Rhizome Johnsongrass	Clethodim 0.125-0.25 lb	Select 2 EC 8.0-16.0 oz or Select 0.97 Max EC 16.0-32.0 oz	Apply to actively growing johnsongrass when 12 to 24 inches tall. If needed, a second application of 6.0 to 8.0 oz/A may be applied for control of regrowth when plants are 6 to 18 inches tall. See Table 5.82 for adjuvant recommendations.
	Sethoxydim 0.28 lb	Poast 1.5 EC 1.5 pt or Poast Plus 1 EC 2.25 pt or Select 0.97 EC 16.0-32.0 oz	

Table 5.69 - Postemergence (cont.)

Weed problem	Chemical Rate Per Acre	Product Per Acre	Remarks
Extended late-season residual grass control	s-Metolachlor 0.95-1.27 lb	Dual Magnum 7.62 EC 1.0-1.33 pt	Apply over the top of peanuts for control of late-season grasses in years when excessive rains may have reduced the residual control of early-season applications. Will not control emerged grasses. Do not apply within 90 days of harvest. Do not apply more than the equivalent of 2.67 lb ai/A s-metolachlor during any one year. Dual II G Magnum and Dual II Magnum are not registered for this method of application in peanuts.
Extended late-season residual grass control	Dimethenamid 1.17-1.5 lb	Frontier 6 E 25.0-32.0 oz or Outlook 6 E 16.0-21.0 oz	Apply over the top of peanuts for control of late-season grasses in years when excessive rains may have reduced residual control of early-season applications. Will not control emerged grasses. Do not apply within 80 days of harvest or more than 32 oz/A per season.

Table 5.70 - Weed Species Response to Soil-applied Herbicides for Peanuts¹

	Sonalan	Prowl PPI ²	Lasso PPI ²	Dual PPI/PRE ²	Frontier/Outlook PPI/PRE ²	Strongarm PPI/PRE ²	Pursuit PPI ²	Pursuit PRE ²	Sequence PRE ²	Valor PRE ²
Texas panicum	G-E	G-E	P	P	P-F	P	P-F	P-F	P	PF
Barnyardgrass	G-E	G-E	E	G	G	P	G	G	F-G	PF
Crabgrass	E	E	E	E	E	P	F	P-F	F-G	PF
Goosegrass	E	E	E	E	E	P	P	P	F-G	F
Fall panicum	G-E	G-E	G	G	G-E	P	P-F	P-F	F-G	PF
Signalgrass, broadleaf	G-E	G	G	G	G	P	G	G	P-F	P
Foxtails	E	E	E	G	G	P	F-G	F-G	F-G	PF
Nutsedge, yellow	N	N	F	G	F-G	F-G	F-G	F-G	P-F	P
Nutsedge, purple	N	N	P	P	P	F-G	F-G	P	P-F	P
Cocklebur	N	N	P	P	P	G	G	G	N	PF
Jimsonweed	P	P	P	P	P	G-E	G	G	N	G
Lambsquarters, common	G	G	F	F	P	F-G	G	F-G	P	GE
Morningglory	P	P	P	P	P	G	F-G	F-G	N	GE
Pigweed, common	G	G	E	G-E	G-E	G	E	E	F-G	E
Prickly sida (teaweed)	P	P	P	P	P-F	F-G	G	G	N	FG
Ragweed	P	P	P	P	P-F	G-E	P	P	P	GE
Smartweed	P	P	P	P	P-F	G	G	G	P	-
Eclipta	P	P	P	P	P	G	P	P	G	G
Carpetweed	G	G	F-G	F	F-G	G	F-G	F-G	E	F
Sicklepod	P	P	P	P	P	P	P	P	N	P
Spurred anoda (cottonweed)	P	P	P	P	P	F-G	G	G	G	F
Velvetleaf	P	P	P	P	P	G-E	F-G	F-G	P	F
Tropic croton	P	P	P	P	P	F	P	P	F	-

¹Control capabilities:E = Excellent control, 90% or better G = Good control, 80%-90% F = Fair control, 60%-80%
N = None, less than 20% P = Poor control, 20%-60%²Application method:

PPI = Preplant soil incorporated PRE = Preemergence

Table 5.71 - Weed Species Response to Postemergence Herbicides for Peanuts

	Pursuit AC/EPOE	Paraquat AC ²	2,4-DB POE	Paraquat + 2,4-DB AC	Paraquat + Basagran AC	Basagran ³ POE	Blazer POE	Cadre ⁶ POE	Storm ^{4,5} POE	Select Max or Poast POE	Cobra POE
Texas panicum	P-F	E	N	G-E	F	N	P	G-E	N	E	N
Barnyardgrass	G	G	P	G	P-F	N	P	G-E	N	E	N
Crabgrass	P-F	G	P	G	P-F	N	P	G-E	N	E	N
Goosegrass	P	E	P	G-E	P-F	N	P	G-E	N	E	N
Fall panicum	P-F	E	P	F-G	P-F	N	P	G-E	N	G	N
Signalgrass, broadleaf	G	E	P	G-E	P-F	N	P	G-E	N	E	N
Foxtails	G	E	P	G-E	P-F	N	P	G-E	N	E	N
Nutsedge, yellow	F-G	P-F	P	F	F-G	G	P	G-E	F	N	N
Nutsedge, purple	F-G	P	N	N	N	N	N	G-E	N	N	N
Cocklebur	G	E	E	E	E	E	G	G-E	E	N	G
Jimsonweed	G	E	F	G	E	E	E	F-G	E	N	E
Lambsquarters, common	P	F	G	F-G	F-G	G	G	P-F	G	N	P
Morningglory	F-G	F	E	G-F	F	F-G	G-E	G-E	G	N	G
Pigweed, common	E	E	G	G	G	P-F	E	E	G	N	E
Prickly sida (teaweed)	P	P-F	F	P	G	G	P	G	F-G	N	G
Ragweed, common	P	F	F-G	F	G	F-G	G	P-F	G	N	E
Smartweed	G	G	F	G	G	E	G	F-G	E	N	F
Eclipta	P	F-G	P	P	F	P	G	F	G-E	N	G
Carpetweed	F-G	F-G	F	F-G	P	P	G	G	G	N	G
Sicklepod	P	G ⁷	G ⁷	G ⁷	G ⁷	N	P	E	P	N	P
Spurred anoda (cottonweed)	F-G	P	P	P	G	G	P	G	F	N	F
Velvetleaf	F-G	F	P	F	G	G	P-F	G-E	F-G	N	G
Tropic croton	P	F	P-F	F	F	P	G-E	P	G-E	N	G

¹Response expressed as activity on emerged seedlings in early stages of development at relatively low rates.

Control is erratic or poor on weeds if they are larger.

E = Excellent control, 90% or better G = Good control, 80%-90% F = Fair control, 60%-80%

N = Essentially no control, less than 20% P = Poor control, 20%-60%

Stage: PPI = Preplant soil incorporated POE = Postemergence PRE = Preemergence AC = At cracking

²Control of emerged weeds only, 1 inch tall or smaller.

³Assumes optimum conditions and addition of crop oil concentrate.

⁴Rating assumes optimum rates and ratios of Basagran and Ultra Blazer; see labels.

⁵Rating assumes weeds 2 inches tall or smaller.

⁶Cadre provides G-E control of emerged annual grasses which escape soil applied grass control herbicides.

⁷Rating assumes sequential application of 2,4-DB 10-14 days after initial treatment

Table 5.72 - Recommended Weed Sizes for Treatment and Application Rates for Control of Annual Grasses with Poast, Poast Plus, and Select

Species	Application Rates and Annual Grass Size							
	Poast ¹		Poast Plus ¹		Select ¹		Select Max ¹	
	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)	Height (in)	Rate (oz/A)
Broadleaf signalgrass	8	16	8	24	2-6	6-8	2-6	12-16
Crabgrass	6	16	6	24	2-6	6-8	2-6	12-16
Fall panicum	8	16	8	24	2-8	6-8	2-8	12-16
Giant foxtail	8	16	8	24	2-12	6-8	2-12	12-16
Green foxtail	8	16	8	24	2-8	6-8	2-8	12-16
Yellow foxtail	8	16	8	24	2-8	6-8	2-8	12-16
Goosegrass	6	16	6	24	2-6	6-8	2-6	12-16
Seedling johnsongrass	8	16	8	24	4-10	6-8	4-10	12-16
Texas panicum	8	16	8	24	2-6	6-8	2-6	12-16
Volunteer corn	20	16	20	24	4-12 12-24	4-6 6-8	4-12 12-24	8-12 12-16

¹ See Table 5.82 for adjuvant recommendations.

Table 5.73 - Plant Size And Application Rates for Control of Perennial Grasses with Poast, Poast Plus, and Select

Application	Herbicide	Application Rate	Plant Size
<i>Bermudagrass</i>			
First application	Poast	1.5 pt/A ¹	stolons (runners) 6 inches or less
	Poast Plus	2.25 pt/A ¹	stolons (runners) 6 inches or less
	Select	8-16 oz/A ¹	stolons (runners) 3-6 inches
	Select Max	16-32 oz/A ¹	
Second application	Poast	1.0 pt/A ¹	stolons (runners) 1-4 inches
	Poast Plus	1.5 pt/A ¹	stolons (runners) 1-4 inches
	Select	8-16 oz/A ¹	stolons (runners) 3-6 inches
	Select Max	16-32 oz/A ¹	
<i>Johnsongrass</i>			
First application	Poast	1.5 pt/A ¹	plants 15-25 inches tall
	Poast Plus	2.25 pt/A ¹	plants 15-25 inches tall
	Select	8-16 oz/A	plants 12-24 inches tall
	Select Max	16-32 oz/A ¹	
Second application	Poast	1.0 pt/A ¹	plant/regrowth 6-12 inches tall
	Poast Plus	1.5 pt/A ¹	plant/regrowth 6-12 inches tall
	Select	6-8 oz/A ¹	plant/regrowth 6-18 inches tall
	Select Max	12-16 oz/A ¹	

¹ See Table 5.82 for adjuvant recommendations.

Table 5.74 - Recommended Weed Sizes for Treatment and Application Rates for Control of Annual Broadleaf Weeds with Basagran, Blazer, and Storm

Species	1.0 pt/A Basagran		1.5 pt/A Basagran		2.0 pt/A Basagran		1.5 pt/A Storm	
	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf number	Max. Ht. (inches)
Prickly sida	—	— ¹	6	3	6-8	4	4	2
Common ragweed	—	—	—	—	4-6 ²	3 ²	4-6	3
Cocklebur	2-4	4	2-6	6	6-10	10	2-6	6
Morningglory								
Pitted	—	—	4 ³	4 ³	SUD ³	SUD ³	4	4
Others	—	—	4 ³	4 ³	SUD ³	SUD ³	4	4
Smartweed	4 ⁸	4 ⁸	6	6	6-10	10	6	6
Jimsonweed	4	4	6	6	6-10	10	6	6
Pigweed	—	—	—	—	—	—	—	—
Lambsquarters	—	—	6 ⁴	1.5 ⁴	4-8 ⁴	2 ⁴	4-6	2
Tropic croton	—	—	2	2	2-4	4	6 ¹⁰	6 ¹⁰
Spurred anoda	—	—	6	3	6-8	4	4 ⁹	2 ⁹
Velvetleaf	—	—	4 ¹	2 ¹	4-6	5	4 ⁹	2 ⁹
Eclipta	—	—	—	—	—	—	— ¹¹	— ¹¹
Species	1.0 pt/A Ultra Blazer ⁵		1.5 pt/A Ultra Blazer ⁵		2.0 pt/A Ultra Blazer ⁵		12.5 fl oz Cobra ¹²	
	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	Max. Ht. (inches)	Max. Leaf Number	
Prickly sida	—	—	—	—	—	—	4	
Common ragweed	2	< 2	4	4	6	3	8	
Cocklebur	—	—	—	—	2-4	2-4	6	
Morningglory								
Pitted	2	< 2	4	2	4	2	4	
Others	—	—	—	—	3	2	4 ²	
Smartweed	—	—	—	—	4	4	—	
Jimsonweed	3	3	6	6	8	8	4	
Pigweed	—	—	4	2	6	3	6	
Lambsquarters	—	—	—	—	3 ⁶	1 ⁶	—	
Tropic croton	2	< 2	2	2	2	2	4	
Spurred anoda	—	—	—	—	—	—	—	
Velvetleaf	—	—	—	—	—	—	—	
Eclipta	— ⁷	— ⁷	— ⁷	— ⁷	— ⁷	— ⁷	6	

¹Control not claimed on label.

²Add crop oil concentrate according to label directions.

³See label for Special Use Directions. Label claims control only with two applications.

⁴Control of this species not claimed on peanut label but is claimed on soybean label. Add 2.0 pt of crop oil concentrate/A.

⁵Add 1.0 pt of nonionic surfactant/100 gal of spray solution.

⁶Add 1.0 pt of nonionic surfactant/100 gal of spray solution.

⁷Control not claimed on label. Experience indicates that 2.0 pt/A plus surfactant will suppress 1-2 inch Eclipta.

⁸Follow with second application of 1.0 pt/A, 7-14 days later if needed.

⁹Control may be inconsistent with this rate of Storm.

¹⁰Control not claimed on label, field experience indicates that Storm is very effective on tropic croton under 4 inches in height.

¹¹Control not claimed on label, field experience indicates that Storm is effective on eclipta under 2 inches in height.

¹²Add crop oil concentrate or nonionic surfactant according to label directions.

Table 5.75 - Restrictions on Feeding Herbicide-treated Peanut Vines to Livestock and Preharvest Intervals (PHI) for Peanut Herbicides

Herbicide	PHI	Do not feed treated vines to livestock	No feeding restrictions on label
Basagran	through pegging		X
Blazer	75 days	X	
Boa	28 days after GC ¹		X
Cadre	90 days	X	
Cobra	90 days	X	
Dual	90 days		X
Frontier/Outlook	80 days	within 80 days of treatment	X
Gramoxone Inteon/Boa	28 days after GC ¹		X
Lasso	GC		X
Poast/Poast Plus	40 days	X	X
Prowl	preplanting		X
Pursuit	85 days	X	
Select Max	40 days	X	
Sonalan	preplanting	X	
Strongarm	30 days	X	
Storm	75 days	X	
Valor			X
2,4-DB	45 days		
(Butyrac, Butoxone)	45 days	X	

¹GC = ground cracking

Table 5.76 - Suggested Rain-free Periods after Applications of Postemergence Herbicides and Tank Mixes

Herbicide or tank mix	Rain-free period (hours)
2,4-DB	NR1
Basagran	NR2
Blazer	NR2
Cadre	3
Cobra	0.5
Gramoxone Inteon/Boa	0.5
Poast/Poast Plus	1
Pursuit	1
Select Max	1
Storm	NR2

NR1 = No restrictions on label. Suggest at least 1 hour for best results.

NR2 = No restrictions on label. Suggest 4-6 hours for best results.

Table 5.77 - Adjuvant Recommendations for Postemergence Herbicides

Herbicide	Application Method	Adjuvant recommendations
Basagran	Ground	2.0 pt/A crop oil concentrate when treating lambsquarters, common ragweed, hemp sesbania, or yellow nutsedge. Vegetable oils may be used. Use 1.0 gal/A of 30 % nitrogen instead of crop oil concentrate if velvetleaf is the primary target weed.
	Air	1.0 pt/A crop oil concentrate when treating lambsquarters, common ragweed, hemp sesbania, or yellow nutsedge. Vegetable oils may be used. Do not use 30 % nitrogen with aerial applications.
Ultra Blazer	Ground or Air	Use 0.125 percent nonionic surfactant for most weeds. For lambsquarters, hemp sesbania, or cowpea, use 0.25 percent nonionic surfactant or 0.5 to 1.0 gal/A of 30 % nitrogen.
Cadre	Ground only	Use 0.25 percent nonionic surfactant or 2 pt/A crop oil concentrate.
Select	Ground	Always use a crop oil concentrate containing at least 15% emulsifier at 2.0 pt/A in the finished spray volume.
Select Max	Ground	0.25% non ionic surfactant, 1% crop oil concentrate, or 1% methylated seed oil.
Gramoxone Inteon/Boa	Ground	Use 0.125 percent nonionic surfactant in cracking stage sprays.
Poast	Ground or Air	2.0 pt/A crop oil concentrate. Vegetable oils may be used.
Poast Plus		2.0 pt/A Dash.
Pursuit	Ground	Use a petroleum or vegetable seed based oil concentrate at a rate of 1.5 to 2.0 pt/A <u>or</u> a nonionic surfactant containing at least 80% active ingredient at 1 qt/100 gallons of spray mixture.
Storm	Ground or Air	1.0 pt/A crop oil concentrate. Vegetable oils may be used.
Cobra	Ground only	Add nonionic surfactant at 1 qt/100 gal or petroleum or vegetable based crop oil concentrate at 1-1.5 pt/A. (See label for specifics.)

Note: Information in this table was taken from product labels. See the labels. See the labels for adjuvant recommendations with specific tank mixes.

Adjuvant rates given in percentages are on a volume/volume basis:

- 0.125 percent - 1 pint per 100 gallons of spray solution
- 0.25 percent - 1 quart per 100 gallons of spray solution
- 0.50 percent - 2 quarts per 100 gallons of spray solution
- 1.00 percent - 4 quarts per 100 gallons of spray solution

Table 5.78 - Rotational Restrictions for Peanut Herbicides

	Rotational Crop							
	Corn	Cotton	Soybeans	Barley	Winter Rye	Wheat	Sorghum	Tobacco
Basagran	NS	NS	NS	NS	NS	NS	NS	NS
Ultra Blazer	AH	AH	NR	AH	AH	AH	AH	AH
Cadre	9M	18M	9M	18M	4M	4M	18M	9M
Cobra	NR	NR	NR	NR	NR	NR	NR	NR
Dual (PRE, PPI, Cracking)	NR	NR	NR	4.5M	4.5M	4 5M	NR	FY
Dual (layby)	FY	FY	FY	FY	FY	FY	FY	FY
Frontier/Outlook	NR	FY	NR	4M	4M	4M	FY	FY
Lasso	NR	NR	NR	NR	NR	NR	NR	NR
Poast	NR	NR	NR	NR	NR	NR	NR	NR
Poast Plus	NR	NR	NR	NR	NR	NR	NR	NR
Prowl	FY	NR	NR	4M	FY	4M	FY	NR
Pursuit	NR/8.5M ¹	9.5M/18M ²	NR	9.5M	4M	4M	18M	9.5M
Select	NR	NR	NR	NR	NR	NR	NR	NR
Sonalan	FY	FY	NR	AH	AH	AH	FY	FY
Strongarm	18M/10M ³	10M	NR	4M	6M	4M	18M	18M
Storm	AH	AH	NR	AH	AH	AH	AH	AH
Tough	NR	FY	FY	FY	FY	FY	FY	FY
Valor	4M ⁴	1M	NR	4M	4M	1M	1M	1M
2,4-DB	NS	NS	NS	NS	NS	NS	NS	NS

The above table provides a general summary of crop rotation restrictions specified in the labels of herbicide products commonly used for peanuts. Consult product labels for details and specific information.

KEY: M = Month; FY = Following Year; NR = No Restrictions; AH = After Harvest; NS = Crop rotation sequences not specified in label directions

¹ With IMI-Corn (resistant/tolerant varieties) = NR, with Non IMI-Corn = 8.5M.

² For sandy loam to loamy sand soils with 16 inches of rainfall or irrigation occurring from application through October, 9.5M; (refer to supplemental label of Virginia/North Carolina) otherwise, 18M.

³ With IMI corn (resistant/tolerant varieties) = 10M, with Non IMI corn = 18M.

⁴ 1M restriction for sweet corn, 4M for field corn

Cotton Weed Control

Henry P. Wilson, Professor, Weed Scientist, Eastern Shore AREC

Table 5.79 - Preplant Incorporated

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Pendimethalin 0.5-0.75 lb ai	Prowl 3.3EC 1.2-1.8 pt or Prowl H ₂ O 1.1-1.6 pt	Apply and incorporate 1-2 inches deep within 7 days after application. Follow label for proper soil incorporation procedures. Lower rate is safest to cotton.
Barnyardgrass, broadleaf signal- grass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Trifluralin 0.5-0.75 lb ai	Treflan 4EC 1.0-1.5 pt and others such as Trilin	Incorporate within 24 hours after application. Follow label for proper soil incorporation procedures. Lower rate is safest to cotton.

Table 5.80 - Preplant Incorporated or Split Application

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Barnyardgrass, broadleaf signal- grass, carpetweed, crabgrass, fall panicum, foxtails, goose grass, johnsongrass lambsquarters, seedlings, pigweed, purslane, prickly sida, spurred anoda, tropic croton, nutsedge suppression	Norflurazon 1.0-1.2 lb ai	Zorial 80DF 1.25-1.5 lb	See label for specific rates on various soils. Incorporate 2-3 inches deep. The full rate of Zorial may be incorporated or a half rate incorporated and a half rate applied preemergence. Rotate only to cotton, soybeans or peanuts within 16 months of application. Do not rotate to corn or vegetable crops within 16 months of application. Provides suppression of yellow and purple nutsedges. May be tank mixed with trifluralin or pendimethalin. On light, sandy soils, low in organic matter, use the lower rate.

Table 5.81 - Preemergence (Band Application)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Velvetleaf, spurred anoda, lambsquarters, and suppression of jimsonweed, spurge, prickly sida, common ragweed	Clomazone 0.5 lb ai	Command 3ME 21 oz	Command 3ME may be applied either banded at 7 oz/A (comparable to 21.0 oz/A broadcast) or broadcast at 21.0 oz/A. Use disulfoton or phorate organophosphate insecticides at 0.75 lb ai/A in furrow to protect against Command injury to cotton. Follow the Command label closely to prevent damage to desirable plants as a result of off-site movement. Observe buffer restrictions and do not apply within 1,500 feet of towns and housing developments, commercial fruit/nut or vegetable production, greenhouses or nurseries. Fluometuron is generally still needed for improved control of annual weeds including pigweed species, common ragweed, common lambsquarters and others but should be applied at low labeled rates.

Table 5.82 - Preemergence

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Fair control of cocklebur, morningglories, jimsonweed, sicklepod, and tropic croton; good control of lambsquarters, pigweed species, prickly sida, and ragweed	Fluometuron 1.0-2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 80DF 1.25-2.5 lb	Apply to soil surface after planting, before crop and weeds emerge. On light, sandy soils, low in organic matter, use no more than 1.0 lb ai/A. Not labeled for use on sand or loamy sand soils. May be tank mixed with Zorial. Plant only cotton within 6 months of last application. See remarks for Zorial on previous page
Annual grasses, yellow nutsedge suppression	s-Metolachlor 0.71-0.95 lb ai	Dual Magnum 7.62EC 0.75-1.0 pt Dual II Magnum 7.64EC 0.75-1.0 pt	Apply to soil surface at planting or after planting, but before weeds or crop emerge. Do not incorporate. Crop injury has been observed, especially when heavy rainfall is received shortly after planting or shortly after cotton emergence. Rates should be kept at the minimum for various soil types. Do not apply to sands or loamy sand soils. May be most useful in no-till cotton and for suppression of yellow nutsedge.
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many weeds including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails, and the suppression of yellow nutsedge.	Glyphosate 0.703-0.984 lb ae/A + s-Metolachlor 0.938-1.31 lb ai/A	Sequence 2.5-3.5 pt	Apply to soil surface at planting or after planting, but before crop emerges. Do not incorporate. Crop injury has been observed, especially when heavy rainfall is received shortly after planting or shortly after cotton emergence. Do not exceed 2.5 pt/A of Sequence on sandy-loam soils or 3.5 pt/A of Sequence on medium- or fine-textured soils. Do not apply to sands or loamy-sand soils. May be useful in no-till cotton and for suppression of yellow nutsedge.
Barnyardgrass, broadleaf signalgrass, carpetweed, crabgrass, fall panicum, Florida pusley, foxtails, goosegrass, johnsongrass seedlings, lambsquarters, pigweed, purslane, sandbur, Texas panicum, wild cane, shattercane	Pendimethalin 0.5-0.75 lb ai	Prowl 3.3EC 1.2-1.8 pt or Prowl H ₂ O 1.1-1.6 pt	Apply at planting or up to 2 days following planting to a firm seedbed.
Redroot pigweed, smooth pigweed, prickly sida, spotted spurge, spurred anoda, velvetleaf, and suppresses jimsonweed, ladythumb smartweed, Pennsylvania smart and several morning glory species	Pyriithiobac 0.031-0.042 lb ai	Staple LX 3.2 lb ai/gal 1.25-1.7 fl oz	Use the higher rate for harder to control weeds but do not exceed 0.8 oz/A and do not use on soils with less than 0.5% organic matter. Staple LX may be mixed with several other preemergence herbicides (Cotoran, Direx, Karmex, or Cotton Pro) taking care not to exceed recommended rates of these herbicides for soil types. Do not apply more than 2.4 oz Staple LX per acre per year.
Early control of Palmer amaranth and suppression of yellow nutsedge	Fomesafen 0.25-0.31 lb ai	Reflex 2E 1.0-1.25 pt	Can mix with Cotoran, Direx, Prowl, Staple. Apply only to coarse textured soils.

Table 5.83 - Postemergence Over-the-top: Annual Grasses

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Barnyardgrass, broadleaf signalgrass, fall panicum, foxtails, johnsongrass seedlings, crabgrass, shattercane, Texas panicum, volunteer corn	Clethodim 0.094-0.125 lb ai + (see remarks)	Select 2EC 6.0-8.0 oz or Select Max 0.97EC 12.0-16.0 oz + (see remarks)	Apply to actively growing grasses at the rate and size range indicated on the label for the individual grass species. Apply with 10.0-20.0 gal of water/A and 30-60 psi. Do not use flood-type nozzles. Always add 2.0 pt/A crop oil concentrate to Select. For Select Max, add 0.25% nonionic surfactant, 1% crop oil concentrate, or 1% methylated seed oil. May be weak on goosegrass.
Barnyardgrass, broadleaf signalgrass, fall panicum, foxtails, johnsongrass, crabgrass, shattercane, Texas panicum, and volunteer corn	Sethoxydim 0.19-0.28 lb ai + crop oil concentrate	Poast 1.5EC 1.0-1.5 pt or Poast Plus 1.5-2.25 pt + crop oil concentrate 2.0 pt	Apply to actively growing grasses at the rate and size range indicated on the label for the individual grass species with 10.0-20.0 gal of water/A and 40 psi. Do not use flood type nozzles. Always add 2.0 pt/A crop oil concentrate.
Barnyardgrass, broadleaf signalgrass, fall panicum, foxtails, johnsongrass seedlings, Texas panicum, goosegrass, shattercane and volunteer corn	Fluazifop-P 0.19 lb ai + crop oil concentrate or nonionic surfactant	Fusilade DX 2EC 12.0 oz + crop oil concentrate 0.5 - 1.0% v/v or nonionic surfactant 0.25% v/v	Apply to actively growing grasses at the rate and growth stage indicated on the label. Apply with a minimum of 10 gal of water/A and 30-60 psi. Do not use flood nozzles. Add 0.5-1.0% v/v crop oil concentrate or 0.25% v/v nonionic surfactant to the spray mixture.
Barnyardgrass, broadleaf, signalgrass, crabgrass, fall panicum, field sandbur, seedling johnsongrass, shattercane, Texas panicum, volunteer small grains	Fluazifop-P plus fenoxaprop-P 0.12 - 0.16 lb ai + crop oil concentrate or nonionic surfactant	Fusion 2EC 8.0-10.0 oz + crop oil concentrate 0.5 - 1.0% v/v or nonionic surfactant 0.25 - 0.5% v/v	Apply to actively growing grasses at the rate and growth stage listed on the label in 5.0-20 gal of water/A at 30-60 psi. Do not apply Fusion with recirculating sprayers, rope-wick applicators, controlled droplet applicators, or any similar devices. Add 0.5% -1.0% v/v crop oil concentrate or 0.25%-0.5% v/v nonionic surfactant to the spray mixture.
Barnyardgrass, broadleaf signalgrass, fall panicum, field sandbur, seedling johnsongrass, shattercane, Texas panicum	Quizalofop 0.034-0.055 lb ai + crop oil concentrate or nonionic surfactant	Assure II 0.88EC/Assure II 5.0-8.0 oz + crop oil concentrate 1% v/v or nonionic surfactant 0.25% v/v	Apply to actively growing grasses at the rate and growth stage listed on the label. Apply with a minimum of 10 gal water/A and 25-60 psi. May be weak on crabgrass.

Table 5.84 - Postemergence Over-the-top: Perennial Grasses

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Bermudagrass (wiregrass)	Clethodim 0.125-0.25 lb ai + crop oil concentrate +	Select 2EC 8.0-16.0 oz or Select Max 0.97EC 16.0-32.0 oz +	Apply to actively growing bermudagrass at the rate and stage indicated on the label. Apply the first application to bermudagrass with 3- to 6-inch runners. Apply regrowth treatments to bermudagrass with 3- to 6-inch runners. Always add 2.0 pt /A crop oil concentrate to Select. For Select Max, add 0.25% nonionic surfactant, 1% crop oil concentrate, or 1% methylated seed oil.
	(sequential treatment on regrowth) Clethodim 0.125-0.25 lb ai + crop oil concentrate	(see remarks) + (sequential treatment on regrowth) Select 2EC 8.0-16.0 oz or Select Max 0.97EC 16.0-32.0 oz + (see remarks)	
	Fluazifop-P + fenoxaprop-ethyl 0.19 lb ai + crop oil concentrate or nonionic surfactant +	Fusion 2EC 12.0 oz + crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v +	Make first application to 4- to 8-inch runners. Apply a second treatment to 4- to 8-inch runners if regrowth occurs. Use a minimum of 15.0 gal/A spray solution. Add 0.5%-1.0% v/v crop oil concentrate or 0.25%-0.5% v/v nonionic surfactant to the spray mixture.
	(sequential treatment on regrowth) Fluazifop P + fenoxaprop-ethyl 0.12 lb ai + crop oil concentrate or nonionic surfactant	(sequential treatment on regrowth) Fusion 2EC 8.0 oz + crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v	
	Sethoxydim 0.28 lb ai + crop oil concentrate +	Poast 1.5 pt or Poast Plus 2.25 pt +	Apply to actively growing grass. Apply first treatment to bermudagrass plants with stolons (runners) less than 6 inches in length. Apply regrowth treatments to bermudagrass plants with runners less than 4 inches in length. Add 2.0 pt/A crop oil concentrate.
	(sequential treatment on regrowth) Sethoxydim 0.19 lb ai + crop oil concentrate	crop oil concentrate 2.0 pt/A + (sequential treatment on regrowth) Poast 1.0 pt or Poast Plus 1.5 pt + crop oil concentrate 2.0 pt	

Table 5.84 - Postemergence Over-the-top: Perennial Grasses (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Bermudagrass (wiregrass), Rhizome johnsongrass	Fluazifop-P 0.19 lb ai + crop oil concentrate or nonionic surfactant + (sequential treatment on regrowth)	Fusilade DX 2EC 12.0 oz + crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v +	Apply to actively growing johnsongrass 8-18 inches high. Apply regrowth treatments when 6-12 inches high. Add 0.5%-1.0% v/v crop oil concentrate or 0.25%-0.5% v/v nonionic surfactant to the spray mixture. OR Apply to actively growing bermudagrass with 4- to 8-inch runners. Apply regrowth treatments to bermudagrass with a runner length of 4-8 inches. Add 0.5%-1.0% v/v crop oil concentrate or 0.25%-0.5% v/v to the spray mixture.
	Fluazifop-P 0.125 lb ai + crop oil concentrate or nonionic surfactant	(sequential treatment on regrowth) Fusilade DX 2EC 8.0 oz + crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v	
	Quizalofop 0.07 lb ai + crop oil concentrate or nonionic surfactant + (sequential treatment on regrowth)	Assure II 0.88EC/Assure II 10.0 oz + crop oil concentrate 1.0% v/v or nonionic surfactant 0.25% v/v +	Apply to actively growing johnsongrass when 10 to 24 inches tall or bermudagrass up to 6-inch runners. Apply regrowth treatments to 6 to 10 inch johnsongrass, or bermudagrass with 3- to 6-inch runners. Add 0.5-1.0% v/v crop oil concentrate or 0.25-0.5% v/v nonionic surfactant to the spray mixture.
	Quizalofop 0.05 lb ai + crop oil concentrate or nonionic surfactant	(sequential treatment on regrowth) Assure II 0.88EC 7.0 oz + crop oil concentrate 1.0 % v/v or nonionic surfactant 0.25% v/v	

Table 5.84 - Postemergence Over-the-top: Perennial Grasses (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Rhizome johnsongrass	Clethodim 0.125-0.25 lb ai + crop oil concentrate +	Select 2EC 8.0-16.0 oz or Select Max 0.97EC 16.0-32.0 oz +	Apply to actively growing johnson- grass at the rate and stage indicated on the label. Apply the first application to johnsongrass 12-24 inches high. Apply regrowth treatments to 6- to 18-inch johnsongrass. Always add 2.0 pt crop oil concentrate to Select. For Select Max, add 0.25% nonionic surfactant, 1% crop oil concentrate, or 1% methylated seed oil.
	(sequential treatment on regrowth) Clethodim 0.094-0.16 lb ai +	(see remarks) + (sequential treatment on regrowth) Select 2EC 6.0-8.0 oz or Select Max 0.97EC 16.0-32.0 oz +	
	crop oil concentrate	(see remarks)	
	Fluazifop-P +	Fusion 2EC 10.0-12.0 oz +	Make first application to actively grow- ing johnsongrass before the boot stage and a second application when regrowth is 4 to 6 inches tall. Add 0.5%-1.0% v/v crop oil concentrate or 0.25%-0.5% v/v nonionic surfactant to the spray mixture.
	fenoxaprop-ethyl 0.16-0.19 lb ai +	crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v +	
	crop oil concentrate or nonionic surfactant +	(sequential treatment on regrowth) Fusion 2EC 8.0 oz +	
	sequential treatment on regrowth Fluazifop P +	crop oil concentrate 0.5-1.0% v/v or nonionic surfactant 0.25-0.5% v/v	
	fenoxaprop-ethyl 0.12 lb ai +		
	crop oil concentrate or nonionic surfactant		
	Sethoxydim 0.28 lb ai +	Poast 1.5 pt or Poast Plus 2.25 pt +	Apply to actively growing johnson- grass. Apply first treatment to john- songrass 15 to 20 inches high. Apply regrowth treatments to 6- to 10-inch johnsongrass.
	crop oil concentrate +	crop oil concentrate 2.0 pt/A +	
	(sequential treatment on regrowth) Sethoxydim 0.19 lb ai +	(sequential treatment on regrowth) Poast 1.0 pt or Poast Plus 1.5 pt +	
	crop oil concentrate	crop oil concentrate 2.0 pt	

Table 5.85 - Early Postemergence: Over-the-top

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many perennial weeds including bermudagrass, hemp dogbane, horsenettle, nutsedges, rhizome johnsongrass, and trumpetcreeper.	Glyphosate 0.75-1.0 lb ai	Numerous brands and formulations	For use only on cotton varieties designated Roundup Ready or Roundup Ready Flex. Some brands of glyphosate are not registered for use on these varieties (see labels). For Roundup Ready cotton, glyphosate may be applied over-the-top from emergence to the four true-leaf stage. For Roundup Ready Flex cotton, glyphosate may be applied throughout the season over-the-top although there are maximum allowable rates set for various stages of cotton development (see label). Separate all over-the-top applications by at least 10 days. Glyphosate will be most effective as a component of a program that includes the use of standard preplant incorporated, preemergence, and postemergence herbicides. Adjuvant recommendations vary by glyphosate products. See labels for specification. Observe all labels regarding seasonal maximums and take extreme caution to avoid drift to adjacent vegetation.
Controls many annual broadleaf weeds and suppresses annual grasses in conventional and reduced tillage production systems. Suppression may be expected of pigweed spp. and most grasses after just a single glufosinate application.	Glufosinate 0.42-0.71 lb ai/A	Ignite 280 23 to 39 oz	For use only on cotton varieties designated Liberty Link. Apply postemergence over-the-top to cotton at emergence until the early-bloom stage of cotton development. Most weeds require an initial Ignite 280 application of no less than 23 oz, and some perennial and biennial weeds may require an initial rate of 39 oz. Ignite 280 can be applied up to a maximum of 3 applications at 29 oz each or one application of up to 43 oz/A followed by a single application of 23 oz/A with a seasonal maximum of 87 oz. The rotational restriction for small grains is 70 days. Over-the-top postemergence applications should not be made 70 days prior to harvest. Ignite may be tank mixed with Dual or Staple herbicides for postemergence over-the-top applications to enhance weed control and/or provide residual control. These tank-mix options can be beneficial in filling the pigweed and/or grass voids left by Ignite. If other pesticide products that are labeled for use in cotton and are desired to be tank mixed with Ignite, a compatibility test must be conducted to confirm tank-mix compatibility with Ignite. Extreme care must be used to avoid drift to adjacent crops or other desirable vegetation. Do not graze or feed treated cotton. See label.

Table 5.85 - Early Postemergence: Over-the-top (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Large crabgrass, goosegrass, fall panicum, foxtails and suppression of yellow nutsedge	s-Metolachlor 0.96-1.25 lb ai	Dual Magnum 1.0-1.3 pt	Apply over-the-top postemergence or directed to the soil surface to cotton at least 3 in tall. Applications should be prior to weed emergence or after clean cultivation since Dual Magnum does not control emerged weeds. At least 1/2 inch of rainfall is required within 10 days after application. If rainfall does not occur, a shallow, uniform incorporation will improve control. Over-the-top postemergence applications should be made not later than 100 days before harvest and directed postemergence applications may be made not later than 80 days before harvest. Tank mixtures with Touchdown or Roundup can be applied to Roundup Ready cotton only. Apply Dual Magnum as a tank mixture with Touchdown or Roundup in water postemergence directed according to Touchdown or Roundup labels for control of emerged weeds and for residual preemergence control of weeds listed on the Dual Magnum label. Do not add additional spray adjuvants, surfactants, fertilizers, or their additives to these tank mixtures if applied over-the-top, or unacceptable cotton injury may occur. Follow instructions on the Dual + glyphosate labels for rates, application methods, and application timing restrictions.

Table 5.85 - Early Postemergence: Over-the-top (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Controls most annual grasses and broadleaf weeds in conventional and reduced tillage production systems. Control or temporary suppression of many weeds including hemp dogbane, yellow nutsedge, and rhizome johnsongrass. Provides residual control of large crabgrass, goosegrass, fall panicum, foxtails, and the suppression of yellow nutsedge.	glyphosate 0.703-0.984 lb ae/A s-Metolachlor 0.938-1.31 lb ai/A	Sequence 2.5-3.5 pt	For use only on cotton varieties designated Roundup Ready. Apply postemergence over-the-top to cotton that is 3 inches tall to the four-leaf stage of cotton development. Do not apply later or severe crop injury will occur, including yield loss. Do not exceed 2.5 pt/A of Sequence per application or 3.5 pt/A of Sequence per growing season. If tank-mixing or applications follow other s- Metolachlor products, do not exceed 1.9 lb s-Metolachlor ai/A per season on coarse-textured soils. Over-the- top postemergence applications should not be made later than 100 days before harvest. At least 1/2 inch of rainfall is required within 10 days after application to activate the s- Metolachlor. Do not add additional spray adjuvants, surfactants, or fertilizers to Sequence when applied postemergence over-the-top, or unacceptable cotton injury may occur. Extreme care must be used to avoid drift to adjacent crops or other desirable vegetation. Do not graze or feed treated cotton. See label.
Cocklebur and suppression of yellow nutsedge	MSMA 0.75-1.0 lb ai	MSMA Plus 1.0-1.25 pt MSMA 6 Plus 1.0-1.25 pt MSMA 6.6 Plus 1.0-1.25 pt Weed-Hoe 108 1.0-1.25 pt	May be applied over-the-top of crop and weeds when cotton is 3 to 6 inches tall. Crop response may include stunting, stem reddening and delay of maturity. Check label for surfactant recommendations.
Cocklebur, jimsonweed, pigweed	Fluometuron 1.0 ai	Cotoran 4L 1.0 qt or Cotoran 80DF 1.25 lb	May be applied over-the-top of crop and weeds when cotton is 3 to 6 inches tall. For use only where crop loss due to weeds is likely. Moderate to severe crop injury may occur and may include maturity delay and yield reduction.
Pigweed species, Pennsylvania smartweed, spurred anoda, velvetleaf, jimsonweed. May be weak against tall morningglory common cocklebur and prickly sida	Pyrithiobac 0.062 lb ai + 0.25% nonionic surfactant	Staple LX 2.5 oz + nonionic surfactant at 1 qt/100.0 gal	Apply 2.5 oz/A Staple with 0.25% v/v (1 qt/100.0 gal) nonionic surfactant to control small annual broadleaf weeds listed. Staple may be applied to postemergence broadcast over-the-top of cotton, in a band over-the-top of cotton, or post-directed to cotton but over-the-top of weeds. Make applications to small, actively growing weeds after cotton has a true leaf. Cotton may be injured from Staple applied under cool, wet conditions. For best control, rainfall should not occur for 4 hours. See label.

Table 5.85 - Early Postemergence: Over-the-top (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Pigweed species, hemp sesbania, morning-glory spp. (except tall morningglory), prickly sida, spurred anoda, and velvetleaf	Pyrithiobac 0.031 lb ai + nonionic surfactant 0.25% v/v	Staple LX 1.25 oz (1 packet/10/A) + nonionic surfactant at 1 qt/100.0 gal	Apply with glyphosate on Roundup Ready and Roundup Ready Flex cotton. Apply Staple with 0.25% v/v (1 qt/100 gal) nonionic surfactant to control small annual broadleaf weeds. Staple may be applied postemergence broadcast over-the-top of cotton, in a band over- the-top of cotton, or post directed to cotton but over-the-top of weeds. Make applications to small, actively growing weeds after cotton has a true leaf. Cotton may be injured from Staple applied under cool, wet conditions. For best control, rainfall should not occur for 4 hours. See labels. Also note size restrictions for cotton when glyphosate is used and that not all brands of glyphosate are registered for overtop of cotton.
Bristly starbur, common cocklebur, coffee senna, volunteer corn (non-IT/IR), Florida beggarweed, hemp sesbania, common lambsquarters, morning-glory spp., common ragweed, redweed, sicklepod, velvetleaf, volunteer soybean (non-STs), wild poinsettia, yellow nutsedge.	Trifloxysulfuron-sodium 0.0047 - 0.0070 lb ai/A + 0.25% nonionic surfactant	Envoke 0.10 - 0.15 oz + nonionic surfactant at 1 qt/100.0 gal	Apply 0.10 – 0.15 oz/A Envoke with 0.25% v/v (1 qt/100.0 gal) nonionic surfactant to control small annual broadleaf weeds listed. Envoke may be applied postemergence broadcast over-the-top of cotton, or post-directed to cotton but over-the-top of weeds. Make applications to small, actively growing weeds after cotton has a minimum of 5 true leaves. Cotton may be injured from Envoke applied under cool, wet conditions and if cotton is less than in the 5-leaf stage of growth. For best control, rainfall should not occur for 3 hours. The higher rates of Envoke may be required to adequately control yellow nutsedge and velvetleaf. Envoke tank mixed with glyphosate on Roundup Ready cotton can cause injury by way of boll loss, delayed maturity, and/or loss of yield. Sequential Envoke applications must be 14 days apart.
Postemergence overtop of cotton with at least 5 true leaves. Compared to Envoke alone, mix is better on jimsonweed and spurred anoda. Compared to Staple alone, mixture is better on common ragweed, common lambsquarters, tall morningglory, and sicklepod.	Trifloxysulfuron 0.0047 lb/A + Pyrithiobac at 0.032 to 0.048 lb/A + nonionic surfactant at 0.25% v/v	Envoke 75 DG at 0.1 oz/A + Staple LX 3.2 lb/gal at 1.3 to 1.9 fl oz + NIS at 0.25	Use a minimum of 10 gal water/A and apply to cotton with at least 5 true leaves. Occasional yellowing of cotton leaves can occur but yields are not affected.

Table 5.86 - Early Postemergence Directed: Cotton 3-6 Inches Tall

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Cocklebur, yellow nutsedge, purple nutsedge	MSMA 2.0 lb ai	Various brands and formulations 2.66 pt MSMA (6.0 lb/gal formulations)	Apply as a directed spray to cotton at least 3 inches tall. Do not apply after first blooms appear. Refer to the product label to determine if surfactant should be added. Two applications/season may be made. May be tank mixed with fluometuron.
Cocklebur, jimsonweed, lambsquarters, morningglory, pigweed, ragweed, tropic croton	Fluometuron 1.0-2.0 lb ai + MSMA 2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 85DF 1.2-2.4 lb + MSMA 2.66 pt (6.0 lb/gal formulations)	Apply as a directed spray to cotton at least 3 inches tall. Best results are obtained if applied to weeds 2 inches tall or less. Apply with a nonionic surfactant. ¹

¹Do not apply tank mixture with MSMA after first bloom.

Table 5.87 - Late Postemergence Directed: Cotton 6-8 Inches or Larger

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Cocklebur, yellow nutsedge, purple nutsedge	MSMA 2.0 lb ai	Various brands and formulations 2.66 pt MSMA (6.0 lb/gal formulations)	Apply as a directed spray. Do not apply after first blooms appear. Refer to the product label to determine if a surfactant should be added. Two applications/season may be made. Primarily controls nutsedge and cocklebur. May be tank mixed with fluometuron, lactofen, or oxyfluorfen to broaden the control spectrum.
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, tropic croton, morningglory (suppression)	Fluometuron 1.0-2.0 lb ai + MSMA* 2.0 lb ai	Cotoran 4L 1.0-2.0 qt or Cotoran 80DF 1.2-2.4 lb + MSMA (6.0 lb/gal 2.66 pt formulations)	Apply as directed spray. Use 1.0 to 1.5 lb ai/A fluometuron for weeds up to 3 inches tall. Apply with 4.0 pt/100 gal nonionic surfactant. ¹
Ragweed, lambsquarters, pigweed, cocklebur, morning glory (suppression)	Linuron 0.5-1.5 lb ai	Linex 1.0 to 3.0 pt	Apply as a directed spray, at 1 pint per acre when cotton is at least 6 inches tall and up to 1 to 1 1/2 pints per acre when cotton is at least 8 inches tall and emerged weeds do not exceed 2 inches in height. Add 1 pint surfactant for each 25 gallons spray mixture. If needed, a second application of same rate may be made one week or later after initial treatment. Alternatively, after cotton is 20 inches tall, make a single application of 2 to 3 pints per acre following last cultivation; if emerged weeds are present, add surfactant as directed. Do not plant rotational crops other than corn, soybeans or potatoes within 4 months after application.

¹Do not apply tank mixture with MSMA after first bloom.

Table 5.87 - Late Postemergence Directed: Cotton 6-8 Inches or Larger (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Cocklebur, ragweed, jimsonweed, lambsquarters pigweed, prickly sida, smartweed, tropic croton, velvetleaf, morningglory (suppression)	Oxyfluofen 0.25-0.5 lb ai + MSMA* 2.0 lb ai	Goal 2.0E 1.0-2.0 pt + MSMA (6 lb/gal 2.66 pt formulations)	Apply to cotton at least 6 inches tall (preferably 8- to 10-inches tall). Apply with nonionic surfactant (2.0 pt/100 gal spray mix). May make two applications/season. Apply only with precision directed spray equipment. Do not exceed 0.5 lb ai/A oxyfluofen/year. ¹
Cocklebur, ragweed, jimsonweed, lambsquarters, pigweed, prickly sida, smartweed, tropic croton, velvetleaf	Lactofen 0.2 lb ai + MSMA* 2.0 lb ai	Cobra 2EC1 2.5 oz + MSMA (6 lb/gal 2.66 pt formulations)	Apply to cotton at least 6 inches tall. Apply with nonionic surfactant (2.0 pt/100 gal spray mix) or crop oil concentrate (0.5 to 1.0 pt/A). Apply only with precision -directed spray equipment. Make only one application of Cobra/ season. ¹
Cocklebur, ragweed, jimsonweed, lambquarters, pigweed, prickly sida, smartweed, tropic croton, morningglory (suppression)	Prometryn 0.5-0.65 lb ai + MSMA* 2.0 lb ai	Caparol 4L 1.0-1.3 pt or Cotton-Pro 4L 1.0-1.3 pt + MSMA (6.0 lb/gal 2.66 pt formulations)	Apply to cotton at least 6 inches tall. Apply only with precision -directed spray equipment. ¹
Bristly starbur, common cocklebur, coffee senna, volunteer corn (non-IT/IR), Florida beggarweed, hemp sesbania, johnsongrass (seedling), common lambsquarters, morningglory spp., smooth pigweed, redroot pigweed, common ragweed, redweed, sicklepod, velvetleaf, volunteer soybean (non-STs), wild poinsettia, yellow nutsedge	Prometryn 0.790-1.185 lb ai/A + Trifloxysulfuron-sodium 0.0070-0.0105 lb ai/A + 0.25% nonionic surfactant	Suprend 1.0 - 1.5 lb	Apply 1.0 to 1.5 lb/A Suprend to control small annual broadleaf weeds listed and provide some residual control of these weeds. Suprend must be applied post-directed to cotton but over-the-top of weeds. Apply to cotton at least 6 inches tall and only with precision-directed spray equipment. Sequential Suprend applications must be at least 14 days apart. Do not exceed 2.7 lbs/A of Suprend per growing season from all applications. Do not exceed a total of 0.0188 lb ai/A of trifloxysulfuron-sodium per growing season resulting from all applications of Suprend or Envoke. Do not exceed a total of 5.15 lb ai/A of prometryn per growing season resulting from all applications of Suprend, Caparol 4L, or Cotton-Pro 4L. If these totals for trifloxysulfuron-sodium and /or prometryn are exceeded, injury to cotton may result in addition to alterations in crop rotation restriction intervals. With Suprend's limited activity on grass weeds, MSMA may be tank mixed with Suprend to improve the control of the grasses.
Cocklebur, jimsonweed, lambsquarters, morningglory, pigweed, ragweed, sicklepod	Dimethipin 0.23-0.54 lb ai + MSMA* 2.0 lb ai + crop oil concentrate	Harvade 5F 6.0-14.0 oz + MSMA 2.66 pt (6.0 lb/gal formulations) + 1 pt crop oil concentrate	Apply as a directed spray to cotton at least 10 inches tall for control of weeds less than 4 inches tall. Do not apply more than 14 oz/A per year for combined post directed and defoliation applications. ¹ Apply with 1pt/A crop oil concentrate.

¹Do not apply tank mixture with MSMA after first bloom.

Table 5.88 - Late Postmergence Directed: Cotton at Least 12 Inches Tall

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Cocklebur, jimsonweed, lambsquarters, morning-glory, pigweed, ragweed, tropic croton	Fluometuron 1.0 lb ai	Cotoran 4L 1.0 qt or Cotoran 85DF 1.2 lb	Apply as a directed spray. Apply with a nonionic surfactant at 2.0 qt/100 gal spray solution. Do not apply within 60 days of harvest. Do not plant to rotation crops within 6 months of the last fluometuron application.

Table 5.89 - Late Postmergence Directed: Cotton at Least 16 Inches Tall

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Lambsquarters, morning-glory species, nightshade species, pigweed species, velvetleaf, spurred anoda, purslane, hemp sesbania, prostrate spurge, and Pennsylvania smartweed	Carfentrazone 0.016-0.025 lb ai	Aim EC 1.0-1.6 oz	Aim may be applied lay-by in tank mixtures to cotton that is 16 inches in height or taller with sufficient bark development and height differential between bottom crop leaves and the soil. Direct spray to avoid contact with green stem tissue or foliage while achieving maximum coverage of broadleaf weeds. Always use crop oil concentrate at 1% v/v (1 gallon per 100 gallons of spray). Do not apply more than 3.2 oz of Aim total per acre for post directed and lay-by applications. For best control, apply to weeds up to 4 inches tall. When applied with glyphosate or MSMA, the combinations will control larger morningglories, annual grasses, and yellow nutsedge. See directions and precautions on Aim label relative to potential cotton injury.
Lambsquarters, morning-glory species, nightshade species, pigweed species, velvetleaf, spurred anoda, purslane, hemp sesbania, prostrate spurge, and Pennsylvania smartweed	Flumioxazin 0.064 lb ai	Valor SX 2.0 oz	Valor should only be applied to cotton that is 16 inches in height or taller with sufficient bark development and height differential between bottom crop leaves and the soil. Avoid contact with green stem tissue or foliage. Use an approved nonionic surfactant at 1 qt./100 gal spray solution. Do not add crop oil, methylated seed oil, or organosilicone adjuvants to solution. When applied with MSMA, the combination will control larger morningglories, annual grasses, and yellow nutsedge. Follow label sprayer-clearout directions closely after applying Valor.

Table 5.89 - Late Postmergence Directed: Cotton at Least 16 Inches Tall (cont.)

Weed problem	Chemical rate per acre	Product per acre	Remarks and Precautions
Common cocklebur, common dayflower, dogfen- nel, Florida beggarweed, Florida pusley, hemp ses- bania, common lambs- quarters, annual morning- glory spp., pigweed spp., prickly sida, purslane, common ragweed, red- weed, sicklepod, smart- weed, velvetleaf, and most annual grasses	Linuron 0.40-0.50 lb ai/A Diuron 0.40-0.50 lb ai/A	Layby Pro 1.6-2.0 pt	Apply 1.6 to 2.0 pt/A Layby Pro to control small annual broadleaf and grass weeds listed that are up to 4 inches tall; Layby Pro will also provide residual control of these susceptible weeds following the application. Layby Pro must be applied post- directed to cotton but over-the-top of weeds. Apply to cotton at least 16 inches tall and only with precision- directed spray equipment. The use of a nonionic surfactant at 2.0 qt/100 gal or a crop oil concentrate at 1gal/ 100 gal is recommended for the control of emerged weeds. Layby Pro can be tank mixed with Aim or MSMA to enhance the control of emerged weeds. Do not exceed the following Layby Pro rates: 1.6 pt/A for coarse soils and 2.0 pts/A on medium soils. Do not use Layby Pro on sand or loamy-sand soils, on soils with less than 1% organic matter, or within 76 days of harvest. Only cotton, corn, and grain sorghum can be planted the spring following the Layby Pro post-directed application. All other crops cannot be planted in the treated area within 1 year after the last Layby Pro application, or severe injury to subsequent crops may occur. See label.

Table 5.90 - Relative Effectiveness of Herbicides for Grass Weed Control in Cotton¹

	Goosegrass	Broadleaf signalgrass	Crabgrass	Fall panicum	Foxtails	Johnsongrass (seedling)	Johnsongrass (rhizome)	Texas panicum	Purple & Yellow nutseidge	Shattercane	Bermudagrass
<i>Preplant Incorporated</i>											
Prowl	G	G	E	G	E	G	P	G	N	G	P
Treflan	G	G	E	G	E	G	P	G	N	G	P
Zorial	F-G	G	E	G	E	G	P	F	F	G	P
<i>Preemergence</i>											
Cotoran	F-G	P	F-G	F	G	P	P	P	P	P	P
Dual	F-G	P-F	F-G	F-G	F-G	P	N	P	P-F	P	N
Sequence	F-G	P-F	F-G	F-G	F-G	P	N	P	P-F	P	N
Zorial	G	G	E	G	E	G	P	F	P-F	G	P-F
<i>Postemergence</i>											
Assure II/Assure II	E	E	F	E	E	E	E	E	N	E	G
Caparol/Cotton-Pro	P	P	P	P	P	P	P	P	P	P	P
Cobra	P	P	P	P	P	P	P	P	P	P	P
Cotoran	P	P	P	P	P	P	P	P	P	P	P
Dual	N	N	N	N	N	N	N	N	P-F	N	N
Envoke	P	P	P	P	P	P	N	P	P-G	P	N
Fusilade	E	G-E	G	E	E	E	G-E	G	N	E	G-E
Fusion	E	E	G	E	E	E	G	G	N	E	G
Goal	G	G	G	G	G	P	P	P	F-G	P	P
Harvade	P	P	P	P	P	P	P	P	P-F	P	P
Ignite	G	G	G	G	G	G	P-G	G	P-G	F	P
Layby Pro	G-E	G-E	G-E	G-E	G-E	P	P	G-E	N	P	N
Linex	P	P	P	P	P	P	P	P	N	P	N
MSMA/DSMA	G	G	G	G	G	G	F	P-F	F-G	G	P
Poast	E	E	G	E	E	E	G	E	N	E	F-G
Glyphosate	E	E	E	E	E	E	G	E	F-G	E	F
Select	F	E	G	E	E	E	G	E	N	E	G
Sequence	E	E	E	E	E	E	G	E	F-G	E	P-F
Staple	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-P	N-F	N-P	N-P
Suprend	P	P	P	P	P	F	P	P	P-G	P	P

¹E (Excellent) = 90 to 100 percent control, G (Good) = 80 to 90 percent control, F (Fair) = 60 to 80 percent control, P (Poor) = 20 to 60 percent control, N (None) = less than 20 percent control.

Table 5.91 - Relative Effectiveness of Herbicides for Broadleaf Weed Control in Cotton¹

	Cocklebur	Jimsonweed	Lambsquarters	Morningglory (annual spp.)	Pigweed	Tropic	Croton	Common Ragweed	Sicklepod	Smartweed	Spurred anoda	Prickly sida or teaweed	Velvetleaf
<i>Preplant Incorporated</i>													
Prowl	N	N	G	P	G	P	N	N	P	N	N	N	P-F
Treflan	N	N	G	P	G	P	N	N	P	N	N	N	N
Zorial	F	P	G	F	F-G	G-E	G	P	F	G	G-E	F-G	F-G
<i>Preemergence</i>													
Command	P	G	G	P	P	F-G	F-G	N	F-G	G-E	F-G	E	E
Cotoran	F	F	E	F	G	F	G	F	F	F	F-G	F	F
Dual	N	N	P	N	F	N	P	N	P	G	N	P	P
Sequence	N	N	P	N	F	N	P	N	P	G	N	P	P
Zorial	F	F	G	F	F-G	G-E	G	P	G-E	G	G-E	F-G	F-G
<i>Postemergence</i>													
Aim	G	F	G	G	G	-	P	N-P	G	G	P	G	G
Assure II/Assure II	N	N	N	N	N	N	N	N	N	N	N	N	N
Buctril	G	G	G-E	F-G	F	P	F-G	P	G	G-E	F	G	G
Caparol/ Cotton-Pro	E	F-G	G	F	G	G	G-E	F	G	P	F-G	F	F
Cobra	E	G-E	P-F	P-F	E	F-G	G	P-F	F	F	E	G	G
Cotoran	E	F-G	G	F	G	P-F	G-E	F	G	P	F-G	P	P
Envoke	E	E	G-E	E	G-E	P-G	G-E	E	-	P-F	F-G	G	G
Fusilade	N	N	N	N	N	N	N	N	N	N	N	N	N
Fusion	N	N	N	N	N	N	N	N	N	N	N	N	N
Harvade	G	G	G	G-E	G	F-G	G	G	F-G	F-G	G	F-G	F-G
Ignite	E	E	G-E	E	F-G	E	E	E	E	G-E	E	G-E	G-E
Goal	E	E	G	G	E	E	G	G	E	F	E	E	E
Layby Pro	G-E	G	G-E	G-E	G-E	F-G	G-E	G-E	G-E	P-F	G-E	G-E	G-E
Linex	G	G	G	F-G	G-E	P-F	F-G	G	F	P	F-G	P-F	P-F
MSMA/DSMA	E	F	P-F	P	P-F	P-F	F	P	P	P	P	P	P
Poast	N	N	N	N	N	N	N	N	N	N	N	N	N
Glyphosate	E	E	F-G	F	G-E	G	F	G-E	F	G	F-G	G	G
Select	N	N	N	N	N	N	N	N	N	N	N	N	N
Sequence	E	E	F-G	F	G-E	G	F	G-E	G	G	F-G	G	G
Staple	G-E	E	P	G	E	N	P	N-P	G-E	F-G	F-G	E	E
Suprend	E	E	G-E	E	G-E	P-G	G-E	E	G	G	F-G	G	G
Valor	G	F	G	G	G	-	P	N-P	G	G	P	G	G

¹E (Excellent) = 90 to 100 percent control, G (Good) = 80 to 90 percent control, F (Fair) = 60 to 80 percent control, P (Poor) = 20 to 60 percent control, N (None) = less than 20 percent control.

Table 5.92 - Burndown Herbicides for Stale Seedbed and Conservation Tillage Cotton for Application 30 to 45 Days Prior to Planting

Weed Species/ Cover Crop	Herbicide & Rate per Acre				
	2,4D ¹ 1.0 pt	Gramoxone Inteon 1.66 pt	Glyphosate (see labels for rates)	Harmony Extra ² 0.5 oz	Valor SX ³ 1.0-1.5 oz
Annual grasses	N	G-E	E	P	P
Carolina geranium	P-F	G-E	P-F	G	G
Chickweed, common	P	E	G	E	P
Curly dock	F-G	N	P-F	G	P
Cutleaf eveningprimrose	G	P	P	F	G
Henbit	P	G	G	E	F-G
Horseweed (marestail)	P-F	P	G	G	P
Wheat/rye	N	E	E ⁴	P	P
Wild mustard	G-E	P-F	F	G	F
Wild radish	G-E	P-F	F	G	F

E (Excellent) = 90 to 100 percent control, G (Good) = 80% to 90%, F (Fair) = 60 to 80%, P (Poor) = 20 to 60%, N (None) = less than 20%.

¹Apply at least 30 days prior to planting.

²Apply at least 45 days prior to planting.

³ Apply at least 30 days prior to planting (tank mixed with glyphosate products).

Table 5.93 - Burndown Herbicides for Stale Seedbed and Conservation Tillage Cotton for Application 7 to 21 Days Prior to Planting

Weed Species/Cover Crop	Herbicide & Rate per Acre		
	Clarity ¹ 8.0 oz	Gramoxone Inteon 1.66 pt	Glyphosate (see labels for rates)
Annual grasses	N	G-E	E
Carolina geranium	G	G-E	P-F
Chickweed, common	P-F	E	G
Curly dock	F-G	N	P-F
Cutleaf eveningprimrose	F-G	P	P
Henbit	F	G	G
Horseweed (marestail)	F	P	G
Wheat/rye	N	E	E
Wild mustard	F	P-F	F
Wild radish	F	P-F	F

E (Excellent) = 90 to 100 percent control, G (Good) = 80% to 90%, F (Fair) = 60 to 80%, P (Poor) = 20 to 60%, N (None) = less than 20%.

¹Following application of Clarity, a minimum accumulation of 1 in rainfall or irrigation water and a waiting interval of 21 days is required prior to planting cotton.

Table 5.94 - Application Rates and Perennial Grass Sizes for Treatment with Assure, Fusilade DX, Fusion, Poast, Poast Plus, and Select¹

(Rain-free period is 1 hour for each herbicide listed below.)

Herbicide	Weed	Weed Size and Herbicide Rate (oz/A)	
		First Application	Second Application ²
Assure II/Assure II	Rhizome johnsongrass	10- to 24-inch tall 10.0 oz	6- to 10-inch tall 7.0 oz
	Bermudagrass	up to 6-inch runners 10.0 oz	up to 6-inch runners 7.0 oz
Fusilade DX	Rhizome johnsongrass	8- to 18-inch tall 12.0 oz	6- to 12-inch tall 8.0 oz
	Bermudagrass	4- to 8-inch runners 12.0 oz	4- to 8-inch runners 8.0 oz
Fusion	Rhizome johnsongrass	8- to 18-inch tall 10.0-12.0 oz	6- to 12-inch tall 8.0 oz
	Bermudagrass	4- to 8-inch runners 12.0 oz	4- to 8-inch runners 8.0 oz
Poast	Rhizome johnsongrass	15- to 25-inch tall 24.0 oz	6- to 12-inch tall 16.0 oz
	Bermudagrass	6-inch runners 24.0 oz	1- to 4-inch runners 16.0 oz
Poast Plus	Rhizome johnsongrass	15- to 25-inch tall 36.0 oz	6- to 12-inch tall 24.0 oz
	Bermudagrass	6-inch runners 36.0 oz	1- to 4-inch runners 24.0 oz
Select	Rhizome johnsongrass	12- to 24-inch tall 8.0-16.0 oz	6- to 18-inch tall 6.0-8.0 oz
	Bermudagrass	3- to 6-inch runners 8.0-16.0 oz	3- to 6-inch runners 8.0-16.0 oz
Select Max	Rhizome johnsongrass	12- to 24-inch tall 16.0-32.0 oz	12.0-16.0 oz
	Bermudagrass	3- to 6-inch runners 16.0-32.0 oz	16.0-32.0 oz

¹Taken from product labels.²Make second application only if needed to control regrowth or new plants. Size refers to regrowth or new plants.

Table 5.95 - Application Rates and Annual Grass Sizes for Treatment with Assure II, Fusilade DX, Fusion, Poast, Poast Plus, and Select¹

(Rain-free period is 1 hour for each herbicide listed below.)

Species	Poast		Poast Plus		Fusilade DX		Fusion		Assure II/ Assure II		Select		Select Max	
	Height (in.)	Rate (oz/A)	Height (in.)	Rate (oz/A)	Height (in.)	Rate (oz/A)	Height (in.)	Rate (oz.)	Height (in.)	Rate (oz/A)	Height (in.)	Rate (oz/A)	Height (in.)	Rate (oz/A)
Barnyardgrass	8	16	8	24	2-3	12	2-4	8	2-6	8	2-8	6-8	2-8	12-16
Broadleaf signalgrass	8	16	8	24	2-4	12	2-4	8-10	2-6	10	2-6	6-8	2-6	12-16
Crabgrass	6	16	6	24	1-2	12	1-4	8	2-6	10	2-6	6-8	2-6	12-16
Crowfootgrass	—	—	—	—	—	—	—	—	2-6	7-8	2-6	6-8	2-6	12-16
Fall panicum	8	16	8	24	2-6	12	2-6	8	2-6	7-8	2-6	6-8	2-6	12-16
Foxtails, Giant	8	16	8	24	2-6	12	2-8	6	2-8	7-8	2-12	6-8	2-12	12-16
Foxtails, Green	8	16	8	24	2-4	12	2-4	6	2-4	7-8	2-8	6-8	2-8	12-16
Foxtails, Yellow	8	16	8	24	2-4	12	2-4	6	2-4	7-8	2-8	6-8	2-8	12-16
Goosegrass	6	16	6	24	2-4	8	2-4	8	2-6	7-8	2-6	6-8	2-6	12-16
Seedling johnsongrass	8	16	8	24	2-8	6	2-8	6	2-8	5-8	4-10	6-8	4-10	12-16
Sandbur	3	20	3	30	2-6	12	2-6	8	2-6	7-8	2-6	6-8	2-6	12-16
Shattercane	18	16	18	24	6-12	6	6-12	6	6-12	5-8	4-10	6-8	4-10	12-16
Texas panicum	8	16	8	24	2-8	12	2-8	8	2-4	8-10	2-6	6-8	2-6	12-16
Volunteer corn	20	16	20	24	12-24	6	12-24	6	6-18	5-8	4-12	4-6	4-12	8-12

¹Taken from product labels; — control not claimed on label.

Table 5.96 - Rotational Restrictions

The herbicides listed below, when used in cotton, may influence one's ability to rotate crops in a normal fashion. Labeled rotational intervals which are discussed below may be influenced by many factors such as the addition of other residual herbicides, soil type, soil pH, etc. Do not use these herbicides unless all rotational restrictions are understood.

Herbicide	Rotation Restrictions
Aim	Corn, sweetcorn, popcorn, soybeans, grain sorghum, rice, wheat, barley, oats, buckwheat, pearl millet, proso millet, rye, teosinte, triticale, and wild rice may be planted any time following an application of Aim. Root and leafy vegetables may be planted after 30 days following an application of Aim. All other crops may be planted after 12 months following an application of Aim.
Assure II/Assure II	Do not rotate to crops other than soybeans or cotton within 120 days of application.
Buctril	Do not plant rotational crops until the following use season.
Caparol/Cotton-Pro	Do not plant rotational crops until the following year.
Cobra	No crop rotation restrictions.
Command	Rotate to crops as listed on label or crop injury may occur. Cover crops may be planted anytime but stand reductions may occur.
Cotoran	Do not plant crops other than cotton within 6 months of the last application of Cotoran/Meturon.
DSMA/MSMA	No restrictive statements listed on label.
Dual	Barley, oats, rye, or wheat may be planted 4 months following application. Crops on Dual label may be planted in the spring following application. All other rotation crops may be planted 12 months after application.
Envoke	Crop rotation interval restrictions based on a total of 0.4 oz/A of Envoke per season are as follows: winter wheat and transplanted tomato (3 months); cotton, field and sweet corn, grain sorghum, peanut, soybean, and trans-planted tobacco (7 months); transplanted bell pepper and Irish potato (12 months but based on field bioassay); and all other crops (18 months). If there is a cotton crop failure and no more than 0.15 oz/A of Envoke has been applied, cotton or STS-soybean (sulfonylurea tolerant soybean) may be replanted 30 or more days after the Envoke application, or 14 or more days after the first significant rainfall (≥ 0.5 inches) following the Envoke application.
Fusilade DX	Do not plant rotational grass crops such as corn, sorghum, and cereals within 60 days of last application.
Fusion	Do not plant rotational grass crops such as corn, sorghum, and cereals within 60 days of last application.
Glyphosate	No rotational restrictions.
Goal	Do not rotate to barley, corn, oats, sorghum, triticale, or wheat with 10 months following application. Do not direct seed any crops other than Goal-labeled crops, within 60 days of treatment. Do not transplant seedling crops, other than Goal-label crops within 30 days of treatment.
Harvade	Do not plant rotation crops within 6 months after application.
Ignite	Small grains may be planted 70 days after application.
Layby Pro	Only cotton, corn, and grain sorghum can be planted the spring following the Layby Pro post-directed application. All other crops cannot be planted in the treated area within 1 year after the last Layby Pro application, or severe injury to subsequent crops may occur.
Linex	Do not plant rotational crops other than corn, soybeans or potatoes within 4 months after application.
Poast/Poast Plus	No rotational restrictions.
Prowl	Winter wheat or winter barley may be planted 120 days after application. Any crop other than sugarbeets, red beets or spinach may be planted the year following application.
Select/Select Max	No rotational restrictions.
Sequence	Barley, oats, rye, or wheat may be planted 4 months following application. All crops with a label for metolachlor (Dual) may be planted in the spring following the application. All other rotation crops may be planted 12 months after application.

Table 5.96 - Rotational Restrictions (cont.)

The herbicides listed below, when used in cotton, may influence one's ability to rotate crops in a normal fashion. Labeled rotational intervals which are discussed below may be influenced by many factors such as the addition of other residual herbicides, soil type, soil pH, etc. Do not use these herbicides unless all rotational restrictions are understood.

Herbicide	Rotation Restrictions
Staple	Crop rotation interval restrictions for Staple are as follows: winter wheat (4 months); field corn, peanut, soybean, and transplanted tobacco (10 months); and all other crops are based on field bioassay or a minimum of 10 months. If there is a cotton crop failure following a Staple application, cotton may be replanted anytime (without disturbing original seedbed) or STS-soybean (sulfonylurea tolerant soybean) may be replanted 30 days after the Staple application.
Suprend	Crop rotation interval restrictions based on a total of 2.69 lb/A of Suprend (0.0188 lb ai/A of trifloxysulfuron-sodium) per season are as follows: winter wheat and transplanted tomato (3 months); cotton, field and sweet corn, grain sorghum, peanut, soybean, and transplanted tobacco (7 months); transplanted bell pepper and Irish potato (12 months but based on field bioassay); and all other crops (18 months). If there is a cotton crop failure and no more than 1.0 lb/A of Suprend has been applied, cotton or STS-soybean (sulfonylurea tolerant soybean) may be replanted 30 or more days after the Suprend application, or 14 or more days after the first significant rainfall (≥ 0.5 inches) following the Suprend application.
Treflan	Sugar beets, red beets or spinach should not be planted within 12 months of a spring application. Vegetable crops other than those listed on the Treflan label should not be planted within 5 months of application.
Valor	Crop rotation interval restrictions based on a total of 2 oz/A of Valor per season are as follows: cotton, field corn, sorghum, sunflower, tobacco, and wheat (30 days); barley, dry bean, field pea, rye, and sweet corn (4 months); alfalfa, canola, clover, oats, and all other crops not listed (12 months). At least one inch of rainfall/irrigation must occur between application and planting or crop injury may occur. Successful soil bioassay must be performed prior to planting alfalfa, canola, sugar beets, and other crops not listed. Preplant burndown applications of Valor 51 WDG may injure cotton if planted too soon. Valor at 1.0 oz/A will give 2 to 4 weeks control of lambsquarters, pigweed, prickly sida, spurge, and Florida pusley; and at 2.0 oz/A will give 6 to 8 weeks control of these species. Application to cover crop or dense weed stand may reduce residual control. Tillage after application will reduce or eliminate residual control. A minimum of 14 days and a 1-inch rainfall must occur between Valor application and cotton planting when Valor is applied at 1.0 oz/A; 21 days must pass and a 1-inch rainfall when applied at 1.5 to 2.0 oz/A. Valor at 2.0 oz/A may be applied up to 14 days prior to planting strip-till cotton. A tillage application must occur between application and cotton planting in order to prevent any potential injury to emerging cotton plants. Failure to conduct strip-tillage operation prior to planting may result in cotton injury. Strip-tillage operation must incorporate soil to a depth of 1 to 2 inches.
Zorial	Rotate only to cotton, soybeans or peanuts within 16 months of application.