2012

Louisiana Suggested Chemical **Weed Management** Guide

LSU AgCenter Research & Extension

LOUISIANA SUGGESTED WEED MANAGEMENT GUIDE
2012

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Should the registration of a herbicide or certain uses of a herbicide be canceled by federal or state agencies, suggestions thus affected herein are no longer applicable. Use of products in this guide does not constitute a guarantee or warranty of the products named and does not signify that these products are approved to the exclusion of comparable products.

INTRODUCTION

Herbicide rates are for broadcast application unless specified differently in the table heading for each crop. Conversion tables are provided to aid in converting large volumes, such as quarts and gallons, to ounces, tablespoons and teaspoons.

Rates of soil-applied herbicides vary according to soil type because soils can affect herbicide activity. The lower rate is for sandy loams (light), intermediate rate for silt loams (medium) and the higher rate for clay loam and clay (heavy) soils. In some instances, the same rate may be suggested for both medium and heavy soils.

Herbicides should be applied in enough water to ensure distribution over the area treated. That amount may vary from 5 to 40 gallons per acre on a broadcast basis. Wettable powder formulations require at least 50 mesh screens throughout the spray system and nozzle tips with a capacity of 0.2 gallons per minute or larger. Considerable agitation is necessary to keep wettable powders in suspension. Hardened stainless steel and nylon nozzles are more resistant to wear from the application of wettable powders than brass nozzles.

Tanks made of aluminum, fiberglass or other corrosion-resistant materials will reduce the amount of nozzle clogging. Some herbicides may not be used in unlined steel tanks. Be sure the water used as the spray solution is free from trash and other foreign material, particularly mud or soil particles.

Correct calibration is of utmost importance. Excess rates may cause injury to the crop, injury from excess residue to succeeding crops and increased herbicide costs. Less than recommended rates can result in unsatisfactory weed control. Read the label and be sure you are applying only the recommended amount.

RESTRICTED-USE PESTICIDES

Some of the pesticides or certain uses of pesticides in this publication may be classified for restricted use. Those pesticides with restricted-use labels will contain information regarding the restrictions. Be sure to read all labels thoroughly. It is illegal to use any pesticide in a manner that is inconsistent with the label directions. It is unlawful for a noncertified applicator to use a pesticide that has been classified with restricted uses. Information on pesticide applicator certification programs may be obtained from the LSU AgCenter's Louisiana Cooperative Extension Service.

If herbicides are handled or applied improperly or if unused portions are not disposed of safely, they may be injurious to humans, domestic animals, desirable plants and fish or other wildlife and may contaminate water supplies. Use herbicides only when needed and handle them with care. Follow the directions and heed all precautions on the containers' labels.

DIFFERENT TYPES OF HERBICIDE REGISTRATIONS

Additional herbicides for crop production have been introduced recently and more likely will be introduced in the near future. During this time of change, growers will be exposed to terminology that has very specific meanings about the development and use of these additional herbicides. The purpose of this section is to introduce, list and explain the definitions and implications of this terminology and to promote increased grower understanding that may aid in complying with state and federal pesticide laws.

HERBICIDE LABELS

State and federal agencies regulate herbicide use through the issuance of herbicide labels, which are the directions for herbicide use. These labels effectively are the federal law regarding a herbicide's use. Each herbicide is identified under various "sections" or parts of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). FIFRA is the federal law that addresses, among other things, how a herbicide may be used. Contained within FIFRA are the sections that deal with specific situations. There are three types of labels, each addressed by a specific section of FIFRA, that herbicide users should understand.

SECTION 3 – The most comprehensive registration granted. This registration shows the U.S. Environmental Protection Agency has reviewed and approved all required information to support all uses listed on the product label.

SECTION 24[c] – Granted by the state under federal regulation and often called a "special local need" label. A 24[c] label applies only to the state or states that issue the label and is issued for a specific use pattern for crops or sites already approved under a Section 3 label. This label has a time period of use (usually five years), which may be renewed.

SECTION 18 – An emergency exemption label . It is requested from the EPA through a state to control a specific weed problem that is not adequately addressed by any Section 3-labeled herbicides and that poses a threat to crop production. Before determining issuance of a Section 18 label, each Section 18 petition is scrutinized by EPA. If the label is issued, herbicide use is very clearly defined. If the EPA does not approve the Section 18 petition, the state may issue a crisis exemption and allow use of the herbicide. In all cases, Section 18 labels are temporary and expire within one year of issuance.

SUMMARY

Different types of labels allow herbicide use under varying conditions. It is important for herbicide users to understand this part of the herbicide registration process, the results of that process and how those results affect herbicide use. Much more information is available at the Internet sites listed below.
U.S. Environmental Protection Agency's Office of Pesticide Programs: http://www.epa.gov/pesticides/
U.S. Food and Drug Administration: www.fda.gov/
U.S. Department of Agriculture's National Institute of Food and Agriculture: http://www.nifa.usda.gov/

Other Useful Internet Sites

Chemical Companies	***Web Site***
Agriliance	http://www.agriliance.com
Amvac	http://www.amvac-chemical.com
BASF	http://www.agproducts.basf.com
Bayer	http://www.bayercropscienceus.com
Cheminova	http://www.cheminova.us.com
Crompton/Uniroyal	http://www.cromptoncorp.com
Dow	http://www.dowagro.com
Drexel	http://www.drexchem.com
DuPont	http://www.cropprotection.dupont.com
FMC	http://www.cropsolutions.fmc.com
Gowan	http://www.gowanco.com
Helena	http://www.helenachemical.com
Micro Flo	http://www.microflocompany.com
Monsanto	http://www.monsanto.com
NuFarm	http://www.ag.us.nufarm.com
PBI Gordon	http://www.pbigordon.com
Syngenta	http://www.syngenta-us.com
Syngenta-PP	http://www.syngentaprofessionalproducts.com
UAP	http://www.uap.com
Valent USA	http://www.valent.com
Labels	http://www.cdms.net
Wilbur-Ellis	http://www.wilbur-ellis.com
Weed Identification	
Illinois	http://web.aces.uiuc.edu/weedid
Texas A&M	http://www.csdl.tamu.edu/FLORA/gallery.htm
Iowa State	http://www.weeds.iastate.edu/weed-id/weedid.htm
WSSA	http://www.wssa.net/photos.html
Purdue Univ.	http://www.btny.purdue.edu/Extension/Weeds/NoTillID/NoTillWeedID1.html
Michigan	http://www.msue.msu.edu/msue/iac/e1363/e1363.htm
Virginia Tech	http://www.ppws.vt.edu/weedindex.htm
LSU AgCenter	http://www.lsuagcenter.com/
Colorado	http://www.cwma.org
Arizona Weeds	http://www.uapress.arizona.edu/onlinebks/weeds/titlweed.htm
New Jersey	http://www.rce.rutgers.edu/weeds/default.asp
FMC	http://cropsolutions.fmc.com/insectsandweeds/tabid/869/default.aspx
Harmful/Poisonous Plants	
U. S. Army	http://chppm-www.apgea.army.mil/ento/PLANT.HTM
Indiana	http://vet.purdue.edu/depts/addl/toxic/cover1.htm
Cornell	http://www.ansci.cornell.edu/plants
Pennsylvania	http://cal.vet.upenn.edu/poison/index.html
Herbicide Injury/Symptomology	
Illinois	http://www.extension.umn.edu/distribution/cropsystems/DC3832.html
Purdue	http://www.btny.purdue.edu/Extension/Weeds/Herbinj/InjuryHerb1.html
University Extension Sites	
Alabama	Auburn Univ. http://www.aces.edu
Arizona	U. Arizona http://ag.arizona.edu/extension
Arkansas	U. Arkansas http://www.uaex.edu
California	U. California http://www.ipm.ucdavis.edu
Colorado	CSU http://www.ext.colostate.edu
Connecticut	U. Conn. http://www.hort.uconn.edu/ipm/index.html
Florida	U. Florida http://edis.ifas.ufl.edu
Georgia	U. Georgia http://extension.caes.uga.edu
Idaho	U. Idaho http://info.ag.uidaho.edu
Indiana	Purdue U. http://www.agriculture.purdue.edu/agcomm
Iowa	Iowa State. http://www.extension.iastate.edu
Kansas	Kansas State http://www.oznet.ksu.edu
Kentucky	U. Kentucky http://www.ca.uky.edu/ces
Louisiana	**LSU AgCenter** **http://www.lsuagcenter.com**
Maine	U. Maine http://www.umext.maine.edu
Maryland	U. Maryland http://www.agnr.umd.edu/MCE/index.cfm
Michigan	Michigan State http://www.msue.msu.edu/home
Minnesota	U. Minnesota http://www.extension.umn.edu
Mississippi	Mississippi State U. http://msucares.com

Missouri	U. Missouri	http://outreach.missouri.edu
Nebraska	U. Nebraska	http://www.ianr.unl.edu
New Hampshire	U. New Hampshire	http://www.ceinfo.unh.edu
New Mexico	New Mexico	http://www.cahe.nmsu.edu/pubs
North Carolina	North Carolina State	http://www.ces.ncsu.edu
North Dakota	North Dakota State	http://www.ext.nodak.edu
Ohio	Ohio State U.	http://ohioline.osu.edu
Oklahoma	Oklahoma State U.	http://osuextra.okstate.edu
Pennsylvania	Pennsylvania State U.	http://cropsoil.psu.edu/Extension/Extension.html
Rhode Island	U. Rhode Island	http://www.edc.uri.edu
South Carolina	Clemson U.	http://www.clemson.edu/extension
Tennessee	U. Tennessee	http://www.utextension.utk.edu
Texas	Texas A&M	http://www.texasextension.tamu.edu
Utah	Utah State U	http://extension.usu.edu
Vermont	U. Vermont	http://www.uvm.edu/~uvmext
Virginia	Virginia Tech	http://www.ext.vt.edu/resources
Washington	Washington State	http://ext.wsu.edu
Wisconsin	U. Wisconsin	http://www.uwex.edu
Wyoming	U. Wyoming	http://uwadmnweb.uwyo.edu/UWCES

Societies

Aquatic Plant Management Society
http://www.apms.org

Canadian Weed Science Society
http://www.cwss-scm.ca

International Weed Science Society
http://www.olemiss.edu/orgs/iws/DEFAULT.HTM

Northeastern Weed Science Society
http://www.newss.org

North Central Weed Science Society
http://www.ncwss.org

Southern Weed Science Society
http://www.swss.ws

Weed Science Society of America
http://wssa.net

Western Aquatic Plant Management Society
http://wapms.org

Western Society of Weed Science
http://www.wsweedscience.org

Commodity Pages

American Corn Growers Association
http://www.acga.org

National Cotton Council
http://www.cotton.org

American Soybean Association
http://www.asasoya.org

American Soybean Association
http://www.amsoy.org

U. S. Rice Federation
http://www.usarice.com

Cotton Incorporated
http://www.cottoninc.com

Cotton Board
http://www.cottonboard.org

Cotton USA
http://www.cottonusa.org

United Soybean Board
http://www.talksoy.com

LSU AgCenter Soybean Information Page
http://www.lsuagcenter.com/en/crops_livestock/crops/soybeans/

LSU AgCenter Corn Information Page
http://www.lsuagcenter.com/en/crops_livestock/crops/corn/

LSU AgCenter Cotton Home Page
http://www.lsuagcenter.com/en/crops_livestock/crops/Cotton/

LSU AgCenter Wheat & Oats Home Page
http://www.lsuagcenter.com/en/crops_livestock/crops/WheatOats/

LSU AgCenter - Louisiana Forages
http://www.lsuagcenter.com/en/crops_livestock/livestock/pasture_forage/

LSU AgCenter Sorghum Information Page
http://www.lsuagcenter.com/en/crops_livestock/crops/Sorghum/

Louisiana Ag Summary
http://www.lsuagcenter.com/en/communications/publications/Publications+Catalog/Money+and+Business

LSU AgCenter Rice Home Page
http://www.lsuagcenter.com/en/crops_livestock/crops/rice/

International Rice Research Institute
http://www.irri.org

Rice Web	http://www.riceweb.org
Rice Online	http://www.riceonline.com
Audubon Sugar Institute http://www.lsuagcenter.com/Inst/Research/Departments/audubonsugar	
Sugar Knowledge International http://www.sucrose.com	

Louisiana Weed Science Recommendation Committee
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David Himelrick, Fruit Crops, Professor, School of Plant, Environmental and Soil Sciences

WEED RESISTANCE TO HERBICIDES

In Louisiana and surrounding states, examples of weeds with documented resistance to certain herbicides include: barnyard grass with resistance to propanil, Facet and Command; common cocklebur with resistance to MSMA, Scepter and Classic; giant ragweed, horseweed and Palmer amaranth with resistance to glyphosate; itchgrass with resistance to Fusliade; Johnson grass with resistance to glyphosate, Select and Fusliade; pigweed with resistance to Scepter and Classic; and ryegrass with resistance to Hoelon, Osprey and Oust.

Things That Promote Resistance

1 Overdependence on single herbicide
2 Relying on a single mode of action every year
3 Sequential applications of the same herbicides within a year

To manage herbicide-resistant weeds and prevent development of resistance, the LSU AgCenter recommends:

General Resistance Management Programs

1 Rotate crops.
2 Use tillage, cultivation or other cultural practices such as rotation, when possible.
3 Rotate herbicides using different modes of action.
4 Use tank mixtures at effective rates, with different modes of action.
5 Avoid using sequential applications of the same single herbicide over and over again.
6 Control weeds on fallow ground or set aside to prevent spreading of documented or suspected resistant weeds.
7 **If you suspect resistance after a herbicide application: Attempt to eradicate escapes with alternative herbicides or cultural methods. DO NOT ALLOW THE WEEDS TO GO TO SEED. If they go to seed, however, collect a seed sample from suspect plants and take them to your parish LSU AgCenter Extension Service agent, who will have them screened by LSU AgCenter scientists and/or inform you if resistant populations have been identified.**

Examples of Herbicides Having Same Mode of Action and Weeds That Are Resistant to Them in Louisiana and Locations in the United States.

	Mode of Action/Herbicides	Weeds Resistant to This Mode of Action in Louisiana
1	**EPSPS inhibitor:** Glyphosate (numerous formulations)	annual ryegrass, Palmer amaranth, Johnson grass
2	**ACCase inhibitor herbicide:** Hoelon, Axial XL, Select, Fusliade, Clincher, Assure II, Poast	annual ryegrass, Johnson grass, itchgrass
3	**ALS inhibitor herbicide:** Classic, Newpath, Pursuit, Staple LX, FirstRate, Scepter, Synchrony XP, FirstShot, Harmony, Oust, Regiment, Permit, Finesse	annual ryegrass, pigweed, common cocklebur
4	**Arsenicals:** MSMA	common cocklebur
5	**Ureas and Amides:** Propanil (numerous formulations)	barnyard grass
6	**Pigment inhibitors:** Command	none
7	**Pigment inhibitors:** Facet	barnyard grass
8	**DNA herbicides:** Prowl H2O, Treflan, Sonolan, Barricade, PendiMax, Trilin	none
9	**Acetamide herbicides:** Dual, Lasso, Degree, Outlook, Parrlay	none
10	**Photosynthesis inhibitors:** Atrazine, Sencor, Meturon, Lorox, Karmex, Cotoran	none
11	**PPO inhibitors:** Valor, Flexstar, Ultra Blazer, Reflex	none

MODE OF ACTION OF SELECTED HERBICIDES USED IN LOUISIANA

Herbicide Active Ingredient	Herbicide Trade Name	Mode of Action
glyphosate	numerous other formulations	EPSPS-inhibitor
chlorimuron	Classic	ALS-inhibitor
pyrithiobac	Staple LX	
trifloxysulfuron-sodium	Envoke	
imazethapyr	Pursuit, Newpath	
imazaquin	Scepter	
nicosulfuron	Accent	
cloransulam-methyl	FirstRate	
Fluazifop-P	Fusliade	ACCase-inhibitor
sethoxydim	Poast	
quizalofop	Assure II	
clethodim	Select, Arrow	
fenoxaprop	Fusion	
diclofop	Hoelon	
atrazine	Aatrex	Photosynthetic inhibitor
metribuzin	Sencor	
diuron	Diruon, Karmex	
fluometuron	Cotoran, Meturon	
prometryn	Caporal	
propanil	Stam, SuperWham	
MSMA	MSMA (numerous formulations)	no completely understood
pendimethalin	Prowl H2O, Pendimax	Cell division inhibitor
trifluralin	Treflan, Trilin	
prodiamine	Barricade	
mesotrione	Callisto	HPPD-inhibitor
tembotrione	Laudis	
fomesafen	Reflex, Flexstar	PPO-inhibitor
aciflurofen	Ultra Blazer	
flumixoazin	Valor	
oxyflurofen	Goal	
carfentrazone	Aim	

GUIDELINES FOR MANAGING WINTER VEGETATION

INTRODUCTION

Conservation tillage systems, whether no-till or stale seedbed, require herbicide programs that successfully control native winter vegetation or planted cover crops prior to planting. Elimination of competing vegetation helps to ensure crop stand establishment, rapid early season crop growth and efficient fertilizer use. Winter vegetation common to Louisiana ranges from easy-to-control weeds, such as annual bluegrass and common chickweed, to difficult to control species, such as curly dock and ryegrass. Cover crops may include wheat or legumes (vetch and winter peas). Consequently, proper weed identification and herbicide selection are keys to a successful pre-plant burn-down weed control program.

More than 20 "winter weeds" commonly are found in fields throughout Louisiana. Only a few key species dictate selection of the most effective herbicide program, however. Glyphosate[1] and paraquat continue to be the "backbone" of most burn-down herbicide programs. Each product exhibits specific strengths and weaknesses. Tank-mixtures with other materials broaden the spectrum of control and/or provide residual control until planting. Glyphosate provides slow systemic control of weeds, while paraquat results in fast contact control requiring thorough weed coverage for maximum effectiveness. Addition of ammonium sulfate to glyphosate spray solution has not been beneficial in most cases and should not be used except where "hard water" (water containing mineral salts, including iron, calcium and magnesium) is used as the carrier.

Glyphosate provides good to excellent control of annual bluegrass, Carolina foxtail, little barley, buttercup species, chickweed species, dandelion, mare's tail, shepherd's purse, bitter cress and Virginia pepperweed (Table 1). Control of geranium species, curly dock, henbit, cutleaf evening primrose, smartweed species and legume cover crops has been poor to fair. Tank-mixing Goal 2XL with glyphosate improves geranium, henbit, smartweed and legume cover crop control. Tank-mixing Harmony Extra with glyphosate improves geranium, curly dock, cutleaf evening primrose, henbit, smartweed and legume cover crop control. Including Clarity or 2,4-D as a tank-mix partner can aid in control of Carolina geranium, curly dock, cutleaf evening primrose, smartweed and legume cover crops. Clarity is more active on smartweed than 2,4-D, whereas 2,4-D is more active on cutleaf evening primrose and geranium. There is not a current tank-mix partner that substantially improves ryegrass control more than glyphosate alone. Multiple applications of glyphosate generally are required to control ryegrass, unless applications are made prior to five leaves.

Paraquat provides good to excellent control of annual bluegrass, little barley, buttercup species, geranium species, chickweed species, henbit and shepherd's purse. Control of ryegrass, curly dock, cutleaf evening primrose, mare's tail, smartweed species, swinecress, legume cover crops and Virginia pepperweed has been poor. Including Goal 2XL as a tank-mix partner aids in the control of cutleaf evening primrose, mare's tail, smartweed, legume cover crops and Virginia pepperweed. Control of curly dock, cutleaf evening primrose, mare's tail, smartweed, swinecress, legume cover crops and Virginia pepperweed is increased with the addition of Harmony Extra. Some materials tank-mixed with paraquat increase ryegrass control, but not to an acceptable level. Consequently, paraquat is not recommended when ryegrass is the main target weed.

Ignite 280 is a relatively new herbicide to Louisiana growers. With the introduction of Liberty Link technology (crops tolerant to glufosinate, the active ingredient in Ignite 280) growers will become more familiar with this herbicide. Ignite is effective on numerous winter weeds found in Louisiana (Table 1). Adding 2,4-D or Clarity to Ignite 280 in a burn-down program is sometimes needed but not always advantageous. Since a phenoxy herbicide is not always needed to control cutleaf evening primrose or geranium, it may have an advantage in "phenoxy-sensitive" areas. Ammonium sulfate, however, must be used according to label directions. although Ignite is only labeled for pre-plant weed control in corn, cotton and soybeans, it has an active replant interval for several crops (Table 2). This is an excellent burn-down herbicide, but producers are limited to an amount of Ignite that can be used in the season. As of 2009, at the rates needed for effective burn-down (29 ounces per acre), Ignite cannot be used in-season on Liberty Link soybeans or corn and will be limited to two applications on Liberty Link cotton when used pre-plant. **Note all the ratings listed in Table 1 are based on 32 ounces per acre.** Lower rates likely will reduce winter weed control and it is unknown by how much. In many cases, producers are well-advised to save their Ignite for in-crop use until a new label is issued, allowing more product per acre per season.

[1]Glyphosate and paraquat are sold under various trade names and formulations. Observations in this document are based primarily on field experiments with glyphosate formulations in Roundup Ultra, Roundup D-Pak, Touchdown and Gramoxone Inteon.

GUIDELINES FOR MANAGING WINTER VEGETATION

TIMING OF VEGETATION REMOVAL

Timing of vegetation removal is another critical factor for successfully implementing reduced tillage programs. Conservation tillage practices provide an environment favorable to insect pest populations, primarily cutworms. Cutworm larvae feed on existing winter vegetation until it is removed or decomposed to a point that it is no longer adequate as a food source. If present at planting, cutworm larvae may threaten stands of emerging crops.

Research has shown that destroying winter vegetation at least three to four weeks prior to cotton planting is critical (Figure 1). Cutworms are able to feed on decaying vegetation. Therefore, a herbicide application six to eight weeks prior to planting is preferable. Pyrethroid insecticides can be used in combination with a burn-down herbicide or at planting[2] when the potential for cutworm infestation is high. If any living vegetation remains on the seedbed at planting, insecticide should be used for cutworm management.

The LSU AgCenter has long recommended that weeds be removed six to eight weeks before planting to avoid increased problems with insects. Recent research has shown that even when insects are managed, weeds like cutleaf evening primrose and swinecress will reduce crop yields when not removed well in advance of planting. In a five-year study, corn yields were 15 to 25 percent higher when weeds were removed four weeks before planting compared to removing them two weeks before planting.

USE OF RESIDUAL HERBICIDES FOR MANAGING TROUBLESOME WEEDS

Weeds may regrow from initial burn-down application, or new weeds may germinate when herbicides are applied six to eight weeks prior to planting. In these situations, use of residual herbicides such as Goal 2XL, Valor or Resolve (in corn) can be beneficial.

In recent years, problems in managing several winter annuals like henbit, mouse-ear chickweed and cudweed have led to the increased use of residual products. These products often are added for increased knockdown of existing weeds. They perform best, however, as residual herbicides and should be used earlier in the season (January and early February). The use of residual herbicides earlier in the season will improve the control of troublesome winter weeds and help protect crops from yield losses associated with late burn-down timings. Sequential applications of glyphosate or paraquat also are very effective and often eliminate the need for tank-mixes. Glyphosate applied six weeks prior to planting followed by paraquat at planting makes an excellent weed control program.

GLYPHOSATE-RESISTANT MARE'S TAIL

Although glyphosate-resistant mare's tail (horseweed), *Conyza canadensis*, has been confirmed in states surrounding Louisiana, it has not been confirmed in Louisiana. As of the time of this printing, most identified populations exhibit an eight- to 13-fold level of resistance, meaning that these resistant biotypes can survive a glyphosate application 13 times the normal use rate.

In Louisiana, few acres receive a burn-down herbicide composed strictly of glyphosate, since we have weeds that are difficult to control with glyphosate alone. These, of course, include Carolina geranium, curly dock and cutleaf evening primrose, to name a few. Since most of our treated acreage will include a tank-mix herbicide such as 2,4-D or dicamba (Banvel/Clarity), most of the mare's tail present will be controlled by the phenoxy herbicide if there is glyphosate-resistant mare's tail present. Therefore, these plants will not go to seed. Through vigilance and tank-mixes with herbicides that will control mare's tail, Louisiana producers should not have great difficulty dealing with glyphosate-resistant mare's tail.

As a precaution, however, we recommend that 8 ounces per acre (0.25 pound active ingredient per acre) dicamba be mixed with 22 ounces per acre (1 pound active ingredient per acre) glyphosate plus 24 ounces per acre (0.75 pound active ingredient per acre) 2,4-D when mare's tail is present. The three-way tank-mix is recommended because 2,4-D is more active on cutleaf evening primrose than dicamba. 2,4-D can be left out of the mix when primrose is small or absent, but the dicamba rate should be increased to 16 ounces per acre (0.5 pound active ingredient per acre).

Ignite 280 is another choice for controlling mare's tail and numerous other weeds found in Louisiana fields, but control can be temperature dependent. Ignite 280 works best if daytime temperatures are 60 degrees or above. Consult Table 1 for specific levels of control.

[2] In-furrow application is the least effective method for controlling cutworms.

GUIDELINES FOR MANAGING WINTER VEGETATION

GLYPHOSATE-RESISTNAT RYEGRASS

Glyphosate-resistant ryegrass has been confirmed in Louisiana. Unlike mare's tail, herbicides than can be tank-mixed with glyphosate for improved ryegrass control are not readily available. The number of calls/complaints about glyphosate-resistant ryegrass increases each year. Producers are encouraged to closely monitor ryegrass populations. To date, recommendations for managing glyphosate-resistant ryegrass have not been formulated – but they are expected to include fall programs. Fall applications of Dual II may help to reduce ryegrass populations. (See the corn, soybean and cotton weed control sections for recommendations.) In the meantime, the best strategy for managing suspect ryegrass will be to make adjustments in both pre-plant and in-season weed control programs. Ignite and paraquat can be effective at reducing ryegrass populations but often require multiple applications. Ryegrass control from paraquat often is improved when mixed with linuron or atrazine, but labels should be closely consulted before using these mixes. In corn, products containing nicosulfuron (Accent) have been very effective at controlling ryegrass. In broadleaf crops, graminicides such as Assure, Select and Poast can be effective at controlling ryegrass.

FALL BURN-DOWN

Increased problems in managing weeds like henbit and ryegrass during the spring have led to increased interest in fall herbicide programs. Two of the more popular choices for fall applications have been Goal and Valor. Either of these two products will control winter vegetation if applied shortly after emergence of the vegetation.
Valor may be applied at 2-3 ounces per acre in combination with glyphosate and/or 2, 4-D. Applications in Louisiana should not be made prior to Nov. 15. Goal may be applied at 1-2 pints per acre and tank-mixed with glyphosate to control emerged weeds – including suppression of mare's tail and ryegrass. In most cases, the herbicide must be tilled, moved or in some way disturbed prior to planting. Be certain to check the product labels for specific recommendations.
Although these treatments will result in a relatively weed-free seedbed at planting, the soil will be exposed to weathering. Therefore, these treatments should not be used on highly erodible or sloping soil. Be certain to consult with your local FSA or NRCS office to determine if you can use these treatments without conflicting with your conservation plan.

SUMMARY

Burn-down herbicide decisions should be based on activity of glyphosate or paraquat on the most difficult to control weed species present. Appropriate tank-mixtures should be considered based on their ability to enhance control with glyphosate or paraquat and/or to provide residual activity. A list of guidelines for choosing appropriate burn-down programs follows:

Guidelines for Choosing a Burn-down Program

1. Vegetation should be destroyed at least three to four weeks prior to planting, preferably six to eight weeks.
2. Choice of herbicide program depends on the most difficult to control weed species present.
3. Use glyphosate if annual ryegrass, mare's tail, swinecress, speedwell, groundsel, Virginia pepperweed, or wheat is the target vegetation. Use paraquat if geranium species or henbit is the primary weed present.
4. Carolina geranium, curly dock, cutleaf evening primrose, clover species, henbit, smartweed, swinecress and legume cover crop control can be increased when glyphosate is tank-mixed with other herbicides.
5. Carolina foxtail, curly dock, cutleaf evening primrose, clover species, dandelion, groundsel, henbit, mare's tail, smartweed, speedwell, swinecress, Virginia pepperweed and legume cover crop control can be increased when paraquat is tank-mixed with other herbicides.
6. Consider using an insecticide program that controls cutworms if any live vegetation is present at planting.

GUIDELINES FOR MANAGING WINTER VEGETATION

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SELECTED REFERENCES

These are other LSU AgCenter publications related to conservation tillage systems:

1. Conservation Tillage Systems for Energy Reduction: Pre-plant Weed Control in Cotton. Pub. 8909.
2. Conservation Tillage Systems for Energy Reduction: Soil Fertility. Pub. 8910.
3. Conservation Tillage Systems for Energy Reduction: Tillage Equipment. Pub. 8908.
4. Conservation Tillage Systems for Energy Reduction: Cotton Stand Establishment. Pub. 8906.
5. Conservation Tillage Systems for Energy Reduction: Insect Pest Management. Pub. 8907.
6. www.lsuagcenter.com

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GUIDELINES FOR MANAGING WINTER VEGETATION

Table 1. Effectiveness of fall applications of selected herbicides for controlling winter vegetation.

	ryegrass, annual	bluegrass, annual	foxtail, Carolina	barley, little	henbit	evening primrose, cutleaf	chickweed	geranium spp.	dock, curly	buttercup, spp.	mare's tail	smartweed spp.	swinecress	shepherd's purse	bittercress
glyphosate	7[1]	9	9	9	6	5	9	5	6	9	9[2]	7	7	9	9
paraquat	4	9	8	9	8	4	9	9	4	9	5	4	2	9	9
Valor[3]	0	0	-	-	9	9	9	-	-	9	9	9	-	-	-
Leadoff[3]	8	9	-	-	9	9	9	-	-	9	9	9	-	-	-
Goal[3]	6	6	-	-	9	8	9	-	-	9	-	-	-	-	-
Sharpen[3]	0	0	0	0	9	-	9	-	-	9	-	-	-	-	-
Dual II Magnum[3]	9	9	-	-	9	-	9	-	-	-	-	-	-	-	-
Select	9	9	-	-	0	0	0	0	0	0	0	0	0	0	0
Select plus Valor	8	8	-	-	9[4]	9[4]	9[4]	-	-	-	-	-	-	-	-
Select plus Dual II Magnum[5]	9	9	-	-	8[5]	8[5]	9[5]	-	-	-	-	-	-	-	-

[1]Rating is for glyphosate susceptible populations; if resistance is suspected, use Select and/or Dual II Magnum.

[2] Rating is for glyphosate susceptible populations; if glyphosate resistance is suspected, use 1 pound active ingredient per acre glyphosate plus 0.75 pound active ingredient per acre 2,4-D plus 0.25 pound active ingredient per acre dicamba.

[3] Must be applied with glyphosate, paraquat or Select to control emerged weeds. Use paraquat or Select for glyphosate-resistant ryegrass; Select does not control broadleaf weeds.

[4]Provides excellent residual control in December and early January but will not control broadleaf weeds larger than 2 inches.

[5] Will not control emerged broadleaf weeds; provides residual control of broadleaf weeds.

GUIDELINES FOR MANAGING WINTER VEGETATION

Table 2. Effectiveness of spring applications of selected herbicides for controlling winter vegetation.

	ryegrass, annual	bluegrass, annual	foxtail, Carolina	barley, little	henbit	evening primrose, cutleaf	chickweed	geranium spp.	dock, curly	buttercup, spp.	mare's tail	smartweed spp.	swinecress	shepherd's purse	bittercress
glyphosate	7[1]	9	9	9	6	5	9	5	6	9	9[2]	7	7	9	9
glyphosate + 2,4-D	7[1]	9	9	9	7	9	9	8	9	9	9[2]	8	7	9	9
glyphosate + dicamba	7[1]	9	9	9	8	8	9	7	8	9	9	9	8	9	9
glyphosate + Firstshot	7[1]	9	9	9	9	7	9	8	9	9	9[2]	9	9	9	9
glyphosate + Valor	7[1]	9	9	9	9[3]	8[4]	9	6	8	9	9[2]	9	8	9	9
glyphosate + Leadoff	8[1]	9	9	9	9[3]	8[4]	9	7	8	9	9[2]	9	9	9	9
glyphosate + Goal	7[1]	9	9	9	9[3]	8[4]	9	6	7	9	9[2]	8	8	9	9
Glyphosate + Sharpen	7[1]	9	9	9	9[3]	8	9	7	9	9	9[2]	9	9	9	9
paraquat	4	9	8	9	8	4	9	9	4	9	5	4	2	9	9
paraquat + 2,4-D	4	9	8	9	8	9	9	9	7	9	6	6	6	9	9
paraquat + dicamba	4	9	8	9	8	8[6]	9	9	7	9	6	8	6	9	9
paraquat + Firstshot	5	9	8	9	9	8[6]	9	9	7	9	7	9	7	9	9
paraquat + Valor	-	-	-	-	-	-	-	-	-	-	--	-	-	-	-
paraquat + Leadoff	8	9	8	9	9	7	9	9	7	9	7	7	4	9	9
paraquat + Goal	7	9	5	9	9	7	9	9	5	9	7	7	3	9	9
paraquat + Sharpen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-D	0	0	0	0	5	9	3	6	7	9	6	6	6	9	7
dicamba	0	0	0	0	6	8	3	5	8	-	9	8	7	9	7
Firstshot	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-
Sharpen	0	0	0	0	8-	-	-	-	-	-	-	-	-	-	-

[1]Rating is for glyphosate susceptible populations; if resistance is suspected, use Select and/or Dual II Magnum.

[2]Rating is for glyphosate susceptible populations; if glyphosate resistance is suspected, use 1 pound active ingredient per acre glyphosate plus 0.75 pound active ingredient per acre 2,4-D plus 0.25 pound active ingredient per acre dicamba.

[3]Provides excellent residual control in December and early January but will not control flowering henbit in February.

[4]Will not control plant with rosettes larger than 4 inches.

GUIDELINES FOR MANAGING WINTER VEGETATION

Table 3. Plant back restrictions for commonly used burn-down herbicides.

	Cotton	Corn	Soybeans	Rice	Grain sorghum
FirstShot	14 days	14 days	7 days	0	14 days
Harmony GT	7 days	Before emergence	Before emergence	0	45 days
Goal	8 days	30 days[1]	8 days	See label	See label
Clarity	21 days[1]	Before emergence	14 days (8 oz or less)[1]	See label	15 days
Valor	30 days[2]	7 to 30 days[1,3]	0	30 days[2]	30 days[2]
Aim	0	0	0	0	0
2,4-D	30 days[1]	Before emergence[4]	15-30 days[1]	30 days	15 days
Ignite 280[5]	0	0	0	0	180 days
Direx	15-45 days	Following year	Following year	Following year	Following year
Leadoff	30 days	Before emergence	30 days	10 months	10 months
Sharpen	42 days[1]	0	0 to 45 days[1]	4 to 9 months[1]	0[1]
Reflex	14[1]	10 months	0	10 months	18 months
Dual Magnum	Apply before Nov. 20	Apply before Nov. 20	Apply before Nov. 20	See label	See label
Select 2EC	0	30	0	30	30

[1] Consult label.

[2] An accumulation of 1 inch of rainfall or irrigation is required.

[3] Interval was shortened in 2009; see label for rainfall and other requirements. LSU Agricultural Center data suggests 30 days.

[4] LSU AgCenter suggest that not more than 0.5 pound active ingredient per acre be applied within two weeks of planting.

[5] Only labeled for burn-down in cotton, corn and soybeans.

GUIDELINES FOR MANAGING WINTER VEGETATION

Active Ingredient and Rate	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
glyphosate[2] at 1.0-3.0 pounds per acre	glyphosate (4 pounds per gallon formulations) at 1.0-3.0 quarts per acre	Pre-plant knockdown of most emerged annual weeds; week on primrose and others (see Table 1 and 3). Controls Johnson grass from rhizomes.	Apply at least one week before planting. Apply after rhizomes have sprouted and Johnson grass is at least 18 inches. Wait seven days, disk under vegetation and plant. Follow label directions.
paraquat at 0.47-0.94 pounds per acre	Gramoxone Inteon at 1.9- 3.8 pints per acre Apply with NIS at 1 quart per 100 gal	All annual grassy and broadleaf weeds that are not more than 6 inches tall	Apply near planting time. This treatment is most useful on heavy soil that should not be disturbed in the spring before planting. Apply 5 gallons of water by air or 20 gallons by ground.
flumioxazin at 0.032 - 0.095 pounds per acre	Valor SX at 1-3 ounces per acre Apply with NIS at 1 quart per 100 gal or COC at 1 gallon per 100 gallons	Provides excellent residual control of most winter broadleaf weeds. Apply with glyphosate or paraquat to control emerged weeds.	Apply as part of pre-plant burn-down program. Corn can be planted seven days after a 2 ounces per acre application if 25 percent of the soil is covered by residue and 0.25 inches of rainfall has occurred. Allow 14 to 30 days before planting corn following a 3 ounces per acre application. The LSU AgCenter does not recommend planting corn within 30 days of Valor regardless of the rate used. Soybeans can be planted anytime after application. Cotton, rice and grain sorghum can be planted 30 days after a 2 ounces per acre application or 60 days after a 3 ounces per acre application; see label for other crops. Do not plant until at least 1 inch of rainfall or overhead irrigation has been received following application.
rimsulfuron at 0.016 to 0.028 pounds per acre + thifensulfuron at 0.016 to 0.028 pounds per acre	Leadoff 1.5 to 2.7 ounces per acre for corn; 1.5 ounces per acre for cotton or soybean Apply with NIS at 1 quart per 100 gal	Good residual control of many cool-season weeds including henbit and bluegrass. Apply with glyphosate or paraquat to control emerged weeds	Apply as part of pre-plant burn-down program. Corn can be planted anytime after the application; cotton and soybeans can be planted 30 days after application. Do not plant grain sorghum or rice for 10 months; see label for re-crop intervals of other crops. Do not use Counter or other organophosphate insecticides with 60 days of a Leadoff application.
oxyfluorfen at 0.25-0.5 pounds per acre	Goal 2XL at 1 to 2 pints per acre	Provides excellent residual control of most winter broadleaf weeds. Apply with glyphosate or paraquat to control emerged weeds	Apply as part of pre-plant burn-down program. One pint provides about 4 weeks of residual and 2 pints can provide up to 8 weeks of residual weed control. Corn, cotton and soybeans can be planted after 30 days if at least three rainfall events of 0.25 inches or more have occurred. Consult label for plant back restrictions for additional crops.
thifensulfuron at 0.2 ounces per acre + tribenuron at 0.2 ounces per acre	FirstShot, BroadSpec at 0.8 ounces per acre	Smartweed, knotweed, dock and cutleaf evening primrose	Apply with glyphosate or paraquat. Use Table 3 as guide for planting intervals. Note labels are updated regularly and should be consulted.

GUIDELINES FOR MANAGING WINTER VEGETATION

Active Ingredient and Rate	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
	Apply with NIS at 1 quart per 100 gal or COC at 1 gallon per 100 gallons		
saflufenacil at 0.022 to 0.066 pounds per acre	Sharpen at 1 to 3 ounces per acre for corn Sharpen at 1 ounce per acre for cotton Apply with MSO at 1 gallon per 100 gallons + 8.5 to 17 pounds per 1– gallons AMS or 1.25 to 2.5 gallons per 100 gallons UAN	Provides excellent residual control of most winter broadleaf weeds. Residual control is limited at rates lower than 2 ounces per acre. Apply with glyphosate or paraquat to control emerged weeds.	Apply as part of pre-plant burn-down program. Corn and grain sorghum can be planted any time following 1 to 3 ounces per acre. The maximum use rate for sorghum is 2 ounces per acre. Do not apply if an organophosphate or carbamate insecticides will be used. Cotton can be planted 42 days after a 1 ounce per acre application. Soybeans can be planted immediately after a 1 ounce per acre application on medium and fine textured soils; allow 30 days on coarse soils. Consult label before planting cotton or soybeans if more than 1 ounce per acre was used for burn-down. Do not apply with Valor or other PPOs within 30 days of planting.
S-metolachlor at 1.0-1.9 pounds per acre	Dual Magnum at 1.33-1.67 pints per acre	Italian ryegrass; fall treatment	This is a 24-C label to control glyphosate-resistant ryegrass and expires Jan. 26, 2014. Apply to prepared seedbeds between September and November. Best control generally is observed from late October to mid-November. Will not control emerged ryegrass. Mix with paraquat to control emerged ryegrass. Incorporation will be beneficial if an activating rainfall is not received soon after application. Don't incorporate deeper than 2-3 inches. The maximum combined fall and spring metolachlor rate is 2.54 pounds active ingredient per acre.
clethodim at 0.09 to 0.25 pounds per acre	Select 2 EC at 6 to 16 ounces per acre Apply with COC at 1% v/v.	Glyphosate-resistant ryegrass; use 6 to 8 ounces per acre on 2 to 6 inch ryegrass. Use 12 ounces per acre on ryegrass larger than 6 inches or that has more than two tillers.	Can be applied as a fallow treatment 30 days before planting.
clethodim at 0.09 to 0.25 pounds per acre + *S*-metolachlor at 1.0-1.9 pounds per acre	Select 2 EC at 6 to 16 ounces per acre + Dual Magnum at 1.33-1.67 pints per acre Apply with COC at 1% v/v.	Glyphosate-resistant ryegrass; use 6 to 8 ounces per acre on 2 to 6 inch ryegrass. Use 12 ounces per acre on ryegrass larger than 6 inches or that has more than two tillers.	Can be applied as a fallow treatment 30 days before planting. Provides excellent post-emergence and residual control of most winter grasses. See above comment for Dual and Select.
clethodim at 0.09 to 0.25 pounds per acre + flumioxazin at 0.63 pounds per acre	Select 2 EC at 6 to 16 ounces per acre + Valor SX at 2 ounces per acre Apply with COC at 2% v/v.	Glyphosate-resistant ryegrass; use 6 to 8 ounces per acre on 2 to 6 inch ryegrass. Use 12 ounces per acre on ryegrass larger than 6 inches or that has more than 2 tillers. Also	Can be applied as a fallow treatment 30 days before planting. Provides excellent post-emergence and residual control of many winter weeds when applied before mid-December. See above comments for Valor and Select.

GUIDELINES FOR MANAGING WINTER VEGETATION

Active Ingredient and Rate	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
		controls henbit and many other broadleaf weeds.	
glyphosate[2] at 1 pound per acre + 2,4 D at 0.5-1 pound per acre	Glyphosate (4 pounds per gallon formulations) + 2,4-D (4L) at 1 quart per acre + 1-2 pints per acre, Unison at 24 ounces per acre or Barrage at 13 to 16 ounces per acre	Same as glyphosate plus – primrose, geranium and others	Most common burn-down program used in Louisiana. May not control large, flowering henbit on Delta soils. Use Table 3 as guide for planting intervals. Note labels are updated regularly and should be consulted.
glyphosate[2] at 1 pound per acre + dicamba at 0.25 pound per acre	Glyphosate (4 pounds per gallon formulations) + Clarity 4 SL, Vision at 1 quart per acre + 8 ounces per acre	Glyphosate-resistant horseweed. Weak on primrose, geranium and other winter broadleaf weeds. Add 2,4-D if primrose is present	At least 21 days prior to planting following 1 inch of rainfall or overhead irrigation. Use Table 3 as guide for planting intervals. Note labels are updated regularly and should be consulted.
glyphosate[2] at 1 pound per acre + diuron at 0.53-0.80 pound per acre	Glyphosate (4 pounds per gallon formulations) + Direx 4L at 1.5 pints per acre on light soil 2.0 pints per acre on medium soil Karmex 80DF at 10 ounces per acre on light soil 14 ounces per acre on medium soil	Most small-seeded annual grasses and broadleaf weeds	Apply 15 to 45 days prior to planting. Cover seed at least ½ inch deep. Apply to soil surface behind press wheel. To avoid possible cotton injury, do not use diuron following a soil applied organophosphate insecticide or injury may occur.
fomesafen at 0.25 pound per acre	Reflex 2 EC at 1 pint per acre	Residual control of pigweed and control and/or partial control of other broadleaf weeds, sedges and grasses. Mix with other herbicides to burn-down[1] existing vegetation.	This is a 24 C label for weed control in cotton and expires Feb. 23, 2014. Apply 14-21 days before planting. Do not plant until at least 0.5 inch of rainfall or overhead irrigation has been received following the application. Plant at least 0.75 inches deep. Do not use on light/coarse textured soils. Cotton plants may exhibit some crinkling or spotting on foliage or stunting, but plants normally outgrow these effects.

[1] Burn-down programs limited to a specific crop are listed in that crops section.

[2] See Appendix A for glyphosate formulations and surfactant requirements.

CORN

Table 1. Effectiveness of burn-down herbicides used in corn 4 weeks after application.[1]

	annual bluegrass	annual ryegrass	Carolina foxtail	little barley	Carolina geranium	chickweed	curly dock	cutleaf evening primrose	henbit	horseweed	speedwells	shepherd's purse	bittercress	swinecress	smartweed
2,4-D	0	0	0	0	5	3	6	9	5	5	6	8	6	5	5
glyphosate	9	6	8	9	6	9	5	5	6	8	9	9	8	7	6
glyphosate + Clarity	9	6	8	9	8	9	8	8	8	8	9	9	9	8	7
glyphosate + Goal	9	6	8	9	7	9	6	6	8	8	9	9	9	7	7
glyphosate + Valor	9	6	8	9	5	9	5	8[2]	9	8	9	9	8	8	8
glyphosate + FirstShot	9	6	8	9	7	9	8	6	8	8	9	9	9	8	9
glyphosate + 2,4-D	9	6	8	9	8	9	7	9	7	8	9	9	9	7	7
glyphosate + Sharpen	9	6	8	9	8	9	7	8	8	9	9	9	9	9	-
glyphosate +2,4-D + Clarity	9	6	8	9	8	9	9	9	8	9	9	9	8	9	9
glyphosate + 2,4-D +Valor	9	6	8	9	8	9	8	9	9	8	9	9	9	8	9
glyphosate +2,4-D + Resolve	9	8	8	9	8	9	8	9	9	8	9	9	9	9	8
paraquat	8	4	7	8	8	9	4	5	5	5	6	8	8	2	4
paraquat + Goal	9	5	8	9	9	9	5	6	8	6	7	9	9	3	5
paraquat + FirstShot	8	5	7	9	9	9	5	7	8	6	8	9	9	6	9
paraquat + 2,4-D	8	4	7	8	8	9	6	9	7	5	7	8	9	5	5

[1] Consult the label(s) prior to use and determine: (1) proper burn-down application time and herbicide rates; (2) if surfactant or crop oil concentrate is required in the burn-down treatment and (3) the required time period between burn-down application and crop planting.

[2] Small primrose only (4 to 5 inch rosette or less).

[3] Numerous formulation of paraquat.

CORN

Table 2. Effectiveness of selected corn herbicides 4 weeks after application.

	seedling Johnson grass	annual grasses	barnyardgrass	broadleaf signalgrass	yellow nutsedge	purple nutsedge	prickly sida	hemp sesbania	morningglory	cocklebur	sicklepod	copperleaf	smellmelon	crabgrass	foxtail	itchgrass
PRE-EMERGENCE HERBICIDES:[1]																
Atrazine	5	7	9	7	5	0	8	8	8	9	8	9	5	6	7	I
Bicep, Cinch ATZ	8	9	9	8	9	I	8	8	8	8	8	9	9	9	9	I
Dual, Cinch	7	9	8	8	7	I	2	2	2	2	2	2	I	9	9	I
Outlook	7	9	8	8	7	I	2	2	2	2	2	2	I	9	9	I
Guardsman	8	9	9	8	8	I	8	8	8	8	8	9	9	9	9	I
Harness	7	9	9	7	5	I	2	2	2	2	2	2	I	9	9	I
Harness Xtra	7	9	9	9	6	I	8	8	8	8	8	9	9	9	9	I
Prowl H_2O	7	9	8	7	0	I	2	2	2	2	2	2	0	9	9	7
Prowl H_2O+ Atrazine	8	9	9	8	5	I	8	8	8	8	8	9	9	8	8	7
POST-EMERGENCE HERBICIDES:																
Accent	9	8	8	8	5	4	2	2	6	5	5	I	I	4	8	8
Atrazine	3	4	7	5	3	I	8	7	8	8	7	9	9	6	7	I
Banvel/Clarity	0	0	0	0	0	3	9	9	9	9	7	8	8	0	0	0
Beacon	9	7	6	5	4	3	I	I	5	6	6	5	6	9	9	6
Buctril	0	0	0	0	0	0	3	9	8	9	4	8	8	0	0	0
Callisto + Atrazine	3	4	7	5	3	I	8	8	9	-	8	9	9	6	7	I
Capreno	8	9	9	9	-	-	8	9	9	9	9	8	9	9	9	-
Status	3	3	3	3	3	5	9	9	9	9	8	8	8	0	0	0
Exceed	9	7	8	0	4	3	8	7	8	9	7	3	4	8	8	0
glyphosate*#	9	9	9	9	8	8	8	7	8	9	9	8	8	9	9	9
glyphosate + atrazine + rimsuulfuron	9	9	9	9	8	8	9	9	9	9	9	9	9	9	9	9
paraquat	8	9	9	9	4	3	6	7	6	8	6	9	9	9	9	5
Ignite	8	8	8	8	7	9	9	9	9	9	9	9	9	8	8	8
Linex	6	8	I	8	I	2	7	8	6	8	7	9	9	8	8	0
Permit	I	2	0	2	9	9	I	8	5	9	5	I	I	0	0	0
Python	0	-	0	0	4	I	8	9	9	8	7	4	5	0	0	I
Steadfast	9	8	9	9	5	5	3	3	7	6	6	7	7	8	9	-
LAY-BY HERBICIDES																
Atrazine	4	4	4	4	2	0	0	7	8	8	6	9	9	4	4	0
Karmex/Direx	6	6	6	6	2	I	7	6	7	8	7	9	9	6	6	5

CORN

Table 2. Effectiveness of selected corn herbicides 4 weeks after application.

	seedling Johnson grass	annual grasses	barnyardgrass	broadleaf signalgrass	yellow nutsedge	purple nutsedge	prickly sida	hemp sesbania	morningglory	cocklebur	sicklepod	copperleaf	smellmelon	crabgrass	foxtail	itchgrass

[1] Pre-emergence herbicides must be activated by rainfall or overhead irrigation;
[2]Use only appropriate herbicide tolerant corn;
[3] See appendix A for various glyphosate products.

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
s-metolachlor[4] @ 1.0-1.9 lb/A	Dual Magnum @ 1.33-1.67 pt/A	Italian ryegrass	This is a 24-C label to control glyphosate resistant ryegrass and expires January 26, 2014. Apply to prepared seedbeds between September and November. Best control is generally observed from late-October to mid-November. Will not control emerged ryegrass. Mix with paraquat to control emerged ryegrass. Incorporation will be beneficial if an activating rainfall is not received soon after application. Don't incorporate deeper 2-3 inches. The maximum combined fall and spring metolachlor rate is 2.54 lb ai/A.
rimsulfuron @ 0.016 to 0.028 lb/A +thifensulfuron @ 0.016 to 0.028 lb/A	Leadoff 1.5 to 2.7 oz/A for corn; 1.5 oz/A for cotton or soybean Apply with NIS @ 1 qt/100 gal	Good residual control of many cool season weeds including henbit and bluegrass. Apply with glyphosate or paraquat to control emerged weeds	Apply as part of pre-plant burn-down program. Corn can be planted anytime after the application; cotton and soybean can be planted 30 days after application. Do not plant grain sorghum or rice for 10 months; see label for re-crop intervals of other crops. Do not use Counter or other organophosphate insecticides with 60 days of a Leadoff application.
PRE-EMERGENCE:			
atrazine @ 2.0 lb/A (1.6 lb/A on highly erodible soils)	80 DF formulations @ 2.5 lb/A 90 DF formulations @ 2.2 lb/A 4L formulations @ 2 qt/A 5L formulations @ 1.6 qt/A Reduce rate by 25% on highly	Many small seeded annual broadleaf weeds and some annual grasses. Inconsistent on broadleaf signalgrass	Best if applied to the soil surface after planting, before weeds emerge. Rainfall required for activation. Do not plant treated areas with any crop except corn or grain sorghum until the following year. Do not apply more than 2.0 lb ai/A/ application or 2.5 lb ai/year. Check label for tank-mixes with other herbicides. Do not mix,

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
	erodible soils.		load or use within 50 ft of a well. Use a device to prevent back siphoning when mixing.
s-metolachlor[3] @ 0.95-1.27 lb/A	Dual II Magnum, Dual Magnum, Cinch @ 1.0 pt/A on light soil 1.17 pt/A on medium soil 1.33 pt/A on heavy soil	Most annual grasses including signalgrass, seeding Johnson grass and pigweeds	Apply after planting before weeds emerge. May also be used before planting; consult label. Rates listed should be adjusted for OM; consult label. Poor control of most large seeded broadleaf weeds. For improved broadleaf weed control mix with atrazine; consult label.
s-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Bicep II Magnum @ 1.3 qt/A on coarse soil 1.6 qt/A on medium soil 2.1 qt/A on heavy soil	Most small seeded annual grasses and broadleaf weeds	See comments for atrazine and s-metolachlor. Use Bicep Lite if another atrazine application will be needed at lay-by. Rates can be increased approximately 25% on soils with 3% or more OM; consult label.
s-metolachlor @ 0.75-1.25 lb/A + atrazine @ 0.6-1.0 lb/A	Bicep Lite II Magnum @ 0.9 qt/A on coarse soil 1.1-1.5 qt/A on medium soil 1.5 qt/A on heavy soil		
PRE-EMERGENCE: continued			
dimethenamid @ 0.56- 0.84 lb/A	Outlook 6L @ 12-14 oz/A on coarse soil 14-18 oz/A on med-heavy soil	Most annual grasses, pigweeds, and some sedges	Apply after planting before weeds emerge. May also be used before planting; consult label. Higher rates may be needed on soil with 3% or higher OM; consult label. Mix with atrazine for improved broadleaf weed control; consult label.
dimethenamid @ 0.53-0.85 lb/A +atrazine @ 1.0-1.65 lb/A	Guardsman Max @ 2.5-3 pt/A on coarse soil 3-4 pt/A on med-heavy soil	Most annual small seeded grasses and broadleaf weeds	Apply after planting before weeds emerge. See comments for dimethenamid and atrazine. Adjust rates per label if OM > 3%.
acetochlor @ 1.1 - 2.0 lb/A	Harness 7.0 EC @ 1.25-1.75 pt/A on coarse soil 1.75-2.25 pt/A on med-hvy soil Surpass EC @ 1.5-2.25 pt/A on coarse soil 1.5-2.5 pt/A on medium soil 1.5-2.75 pt/A on heavy soil	Some grasses and broadleaves	Apply after planting before weeds emerge. May also be used before planting; consult label. Rates differ for reduced and no-till systems; consult label. Adjust rate per label if OM > 3%. Mix with atrazine for improved broadleaf weed control; consult label. Rates differ for reduced and no-till systems; consult label.
acetochlor @ 1.9-2.8 lb/A + atrazine @ 0.76-1.1	Harness Xtra @ 1.8 qt/A on coarse soil 2.3 qt/A on medium soil 2.3-2.6 qt/A on heavy soil	Broadleaves and grasses	Apply after planting before weeds emerge. See comments for acetochlor and atrazine. Adjust rates per label if OM > 3%.
s-metolachlor @ 1.3 + atrazine @ 1.3 lb/A + mesotrione @ 0.168 lb/A	Lexar @ 3 qt/A	Most small seeded grasses and broadleaf weeds	Apply after planting before weeds emerge. Provides better annual grass and broadleaf weed control than s-metolachlor + atrazine alone. Additional, atrazine may improve morningglory control. Up to 1.3 lb ai/A atrazine can be used at lay-by following this treatment.

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
			Use 3.5 qt/A Lexar if soil OM is above 3%. Do not follow this treatment with an HPPD inhibitor such as Callisto, Impact or Laudis. Use caution if Counter or other OP insecticides were used at planting; consult label.
alachlor @ 2.0 - 3.0 lb/A	Micro-tech @ 2.5 qt/A on coarse soil 2.5-3 qt/A on med-heavy soil	Most annual grasses including signalgrass, seedling Johnson grass and pigweeds	Apply after planting before weeds emerge. May also be used before planting; consult label. Poor control of most large seeded broadleaf weeds. Suggested for use in fields where grasses are a problem. Mix with atrazine for improved broadleaf weed control; consult label. Adjust rate per label if OM > 3%.
alachlor @ 1.25-2.3 lb/A + atrazine @ 0.75-1.4 lb/A	Lariat, Bullet @ 2.0-2.5 qt/A on coarse soil 2.0-3.0 qt/A on medium soil 2-3.75 qt/A on heavy soil	Most small seeded annual grasses (including fall panicum) and broadleaf weeds	Apply after planting before weeds emerge. See comments for alachlor and atrazine. Adjust rates per label if OM > 3%.
PRE-EMERGENCE: continued			
pendimethalin @ 0.50 - 1.5 lb/A	Prowl/Pendimax 3.3EC @ 1.2-1.8 pt/A on coarse soil 1.8-2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil Prowl H2O @ 1-1.58 pt/A on coarse soil 1.58-2.1 pt/A on medium soil 2.1-3.16 pt/A on heavy soil	Most annual grasses, seedling Johnson grass and some broadleaf weeds	Apply to the soil surface after planting but before weeds or corn emerge. Plant corn at least 1.5" deep. Do not use if furrow is not completely closed. An activating rainfall is needed within 7 days of application. Economical treatment but weed control may not be as consistent as Lasso, Dual or Outlook. Apply with atrazine for improved grass and broadleaf weed control.
flumetsulam @ 0.04-0.05/A + clopyralid @ 0.14-0.16 lb/A	Hornet @ 3.2-4 oz/A on light soil 4-4.8 oz/A on med-heavy soil	Broadleaves, good on prickly sida	Apply after planting before weeds emerge. Limited use due to long rotation interval. Interacts with certain insecticides. Consult label before using.
POST-EMERGENCE:			
atrazine @ 2.0 lb/A	80 DF formulations @ 2.5 lb/A 90 DF formulations @ 2.2 lb/A 4L formulations @ 2 qt/A 5L formulations @ 1.6 qt/A Apply with COC @ 1gal/100 gal	Most broadleaf weeds and some grasses; grasses must be very small to obtain control	Apply before weeds exceed 1.5" or corn exceeds 12" in height. Do not exceed 2.5 lb ai/A atrazine per season. Do not graze or feed forage from treated areas to livestock for 21 days after treatment. Consult label for rotation restrictions and tank-mixes.
s-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Bicep II Magnum @ 1.3 qt/A on coarse soil 1.6 qt/A on medium soil 2.1 qt/A on heavy soil	Most small seeded annual grasses and broadleaf weeds	See comments for atrazine and s-metolachlor above. Apply before weeds emerge and corn reaches the 5 leaf stage. Do not apply with liquid fertilizer. May be mixed with selected herbicides for improved post-emergence and residual weed control, consult label.
s-metolachlor @ 0.75-1.25 lb/A +	Bicep Lite II Magnum @		

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
atrazine @ 0.6-1.0 lb/A	0.9 qt/A on coarse soil 1.1-1.5 qt/A on medium soil 1.5 qt/A on heavy soil		
s-metolachlor @ 1.3 + atrazine @ 1.3 lb/A + mesotrione @ 0.168 lb/A	Lexar @ 3 qt/A	Most small seeded grasses and broadleaf weeds	See comments in pre-emergence section. Apply before weeds emerge and corn is 12 inches tall. If weeds are present apply with 0.25% v/v non-ionic surfactant (NIS). Do not apply with liquid fertilizer. May be mixed with selected herbicides for improved post-emergence and residual weed control, consult label.
glyphosate[5] @ 1 lb/A	5.5 L formulations @ 22 oz/A 4 L formulations @ 32 oz/A	Most annual grasses and broadleaf weeds	**Roundup Ready Corn Only.** Apply from corn emergence until 8 leaves with collars (or 30"). Consult product labels for glyphosate products cleared on Roundup Ready corn. Do not exceed more than 44 oz/year Roundup WeatherMax or 64 oz/yr of other formulations.
POST-EMERGENCE: continued			
rimsulfuron @ 0.014 lb/A + thifensulfuron-methyl @ 0.003 + a safener	Resolve Q @ 1.25 oz/A Apply with COC @ 1 gal/100gal + 2 qt/A UAN	Improved grass and broadleaf weed control when mixed with other herbicides; consult label. Provides some residual control.	Apply to corn up to 20 inches tall or that has no more than 7 collars. An activating rainfall within 5-7 days of application is required for residual control**. Do not use on fields treated with Counter; consult label.**
Glyphosate[5] @ 1 lb/A + rimsulfuron @ 0.014 lb/A + thifensulfuron-methyl @ 0.003 lb/A + atrazine @ 1-2 lb/A	5.5 L glyphosate @ 22 oz/A or 4 L glyphosate @ 32 oz/A + Resolve Q @ 1.25 oz/A + 4 L atrazine @ 1-2 qt/A	Most annual grass and broadleaf weeds, with some residual grass control	**Roundup Ready Corn Only.** Apply from emergence to 12 inch corn or just prior to exhibiting 6 collars. See the above comments for glyphosate, Resolve Q and atrazine. **Do not use on fields treated with Counter; consult label.**
glyphosate @ 1.0 lb/A + s-metolachlor @ 1.0 lb/A + mesotrione @ 0.10 lb/A + atrazine @ 0.25-2.0 lb/A	Halex GT @ 3.8 pt/A + atrazine 4L @ 0.25-2 qt/A Apply with NIS @ 1-2 qt/100 gal plus AMS 8.5-17 lb/100 gal	Most annual grass and broadleaf weeds; good residual control	**Roundup Ready Corn Only.** Apply after emergence up to 12 inch corn. If corn is 12-30 (V8) inches tall apply Halex GT alone. Do not use more than 2.5 lb ai/A/season of atrazine. Do not use Halex GT if another HPPD inhibitor such as Callisto, Impact or Laudis has or will be used. Do not use on fields treated with Counter. Consult label for more information.
glufosinate @ 0.40 lb/A	Ignite 280 @ 22 oz/A	Many annual grasses and broadleaf weeds. Adhere to weed size restrictions on label or unsatisfactory control will result	**Liberty Link Corn Only.** Apply from emergence through V5. Apply before weeds are 2-3 inches tall with atrazine and/or residual grass herbicides. Refer to label for approved tank-mixes. Will not control large escaped grasses. Make no more than 2 applications per year. Do not apply more than 44 oz/year
mesotrione @ 0.094 lb/A + atrazine @ 0.5 lb/A	Callisto @ 3 oz/A + Atrazine 4L or equivalent @ 1 pt/A	Many broadleaf weeds, including copperleaf; broadleaf signalgras (<2") and large crabgrass (<2"),	Apply before weeds are 4 inches tall. Has excellent residual weed control, so early applications are encouraged. Do not use if Counter was used at

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
	Apply with COC @ 1 gal/100 gal; consult label for precautions	weak on most grasses; Callisto alone will not control teaweed and most morningglories.	planting; consult label for other use restrictions. See the Callisto label for other tank-mixtures.
pendimethalin @ 0.5-1.5 lb/A + atrazine @ 1.0 lb/A	Prowl/Pendimax 3.3EC @ 1.2-1.8 pt/A on coarse soil 1.8-2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil Prowl H2O @ 1-1.58 pt/A on coarse soil 1.58-2.1 pt/A on medium soil 2.1-3.16 pt/A on heavy 4L atrazine @ 1 qt/A 5L atrazine @ 0.8 qt/A	Most annual grasses and broadleaf weeds	Apply before weeds emerge and corn is 4" tall. "Culti-Spray" as per label is beneficial on certain weeds or when an activating rainfall is not received within 7 days of application. The addition of COC will be necessary to control emerged weeds. Some injury may result from this application.
POST-EMERGENCE: continued			
dicamba @ 0.25-0.5 lb/A	Clarity, Banvel @ 0.5 pt/A on coarse soil 1.0 pt/A on med-heavy soil Apply with NIS @ 1pt/100 gal; consult label for precautions	Most broadleaf weeds	Apply after corn emergence before the 5th leaf stage or corn is 8 inches tall. During periods of rapid growth temporary leaning may occur. Do not cultivate until corn recovers. Mixing with atrazine adds residual control. Do not use crop oil. May be used on corn 8-24 inches tall at a reduced rate; consult label.
thiencarbazone-methyl @ 0.13 lb/A + tembotrione @ 0.07 lb/A + a safener + atrazine @ 1 lb/A	Capreno @ 3 oz/A + 4L + atrazine @ 1 qt/A	Seedling and rhizome Johnson grass. Most annual grasses and broadleaf weeds	Apply before corn exceeds 12" in height. Add 1% v/v of crop oil concentrate. Corn injury may occur is rainfall does not occur within 3 weeks after application. **Do not use on fields treated with Counter; consult label.**
nicosulfuron @ 0.0.31 lb/A	Accent Q @ 0.9 oz/A Apply with COC @ 1 qt/100 gal or NIS @ 2 pt/100 gal plus 2 qt/A UAN; consult label for correct adjuvant system when mixing with other herbicides.	Annual grasses, Johnson grass, pigweeds and morningglories. Can be erratic on crabgrass, yellow foxtail and under heavy signalgrass pressure.	Apply to corn up to 20 inches tall. Do not broadcast after the 6 leaf stage. Can be used as a rescue treatment on corn 20-36 inches tall (V10) if drop nozzles are used; consult label. Can be mixed with other herbicides, including atrazine, for broad-spectrum and/or residual weed control. Not all tank-mixes can be applied to corn taller than 12 inches; consult label. Best results are observed when corn is less than 12 inches tall and weeds are less than 4 inches tall. Do not apply to corn treated with Counter 15 G; consult label for other restrictions.
bromoxynil @ 0.25 - 0.50 lb/A	Buctril @ 1.0 - 1.5 pt/A	Many broadleaf weeds	Apply before corn is 14" tall and weeds are in the 2-4 leaf stage. May serve as a replacement for 2,4-D in

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
	Adjuvants required; see label		phenoxy sensitive areas.
2,4-D amine @ 0.25 – 0.5 lb/A	2,4-D Amine @ 0.5-1.0 pt/A	Broadleaf weeds	Apply before corn is 15" tall or after grain is dented. Do not treat at tasseling and silking stage. If necessary to spray after corn is 15" tall but before tasseling, do not spray in whorl. Under certain conditions injury is possible; consult label.
dicamba 0.13 lb/A + diflufenzopyr @ 0.5 lb/A + nicosulfuron @ 0.031 lb/A	Celebrity Plus @ 4.7 oz/A Apply with NIS @ 2-4 pt/100 gal; use higher rate under drought conditions	Most broadleaves and grasses	Apply after corn is 4 inches tall up to 24 inches or the 6 leaf stage. Use drop nozzles after corn is 20 inches tall. During periods of rapid growth or stress temporary leaning may occur. Do not cultivate until corn recovers to avoid breaking the plants. Avoid contact with the whorl. Do not use on fields treated with Counter 15 G; consult label for other restrictions.
POST-EMERGENCE: continued			
dicamba @ 0.138-0.276 lb/A + diflufenzopyr @ 0.05-0.1 lb/A + a safener	Status @ 5-10 oz/A Apply with NIS @ 1qt/100 gal or COC @ 1-2 pt/A or MSO @ 1-2 pt/A	Most broadleaf weeds	Apply after corn is 4 inches tall (V2) up to 36 inches (V10). Do not apply within 15 days of tassel emergence. Can be mixed with atrazine for residual weed control. Do not mix with 2,4-D or more dicamba. Do not mix with EC herbicides, such as Dual, Lasso or Harness. Do not apply to stressed or injured corn.
nicosulfuron @ 0.023 lb/A + rimsulfuron @ 0.012 lb/A + safener	Steadfast Q @ 1.5 oz/A Apply with COC @ 1 qt/100 gal or MSO @ 2 pt/100 gal or NIS @ 2 pt/100 gal plus 2 qt/A UAN; consult label for correct adjuvant system when mixing with other herbicides.	Most annual grasses, Johnson grass, and some broadleaf weeds. Better on annual grasses than Accent alone.	Apply to corn up to 20 inches tall. Don't apply after the 6 leaf stage. Can be mixed with other herbicides, including atrazine, for broad-spectrum and/or residual weed control. Not all tank-mixes can be applied to corn taller than 12 inches; consult label. Best results are observed when corn is less than 12 inches tall and weeds are less than 4 inches tall. Do not apply to corn treated with Counter 15 G; consult label for other restrictions.
primisulfuron @ 0.51 oz/A	Beacon @ 0.76 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100 gall	Johnson grass and pigweeds	Apply when corn is 4-20" tall and seedling Johnson grass is 4-12" tall or rhizome Johnson grass is 8-16 inches tall. Do not use if Counter 15 G was used at planting; consult label for other restrictions.

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
prosulfuron @ 0.285 oz/A + primisulfuron @ 0.285 oz/A	Exceed WDG @ 1 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100 gall	Broadleaves and some grass suppression	Apply when corn is 4-48" tall. Direct applications when corn is 24-48" tall. Do not apply to non-IR corn if any organophosphate (OP) insecticide was used prior to or during planting. Consult label for additional information.
dicamba @ 0.28-0.48 lb/A + atrazine @ 0.53-0.92 lb/A	Marksman WD @ 2 pt/A on coarse soil 3.5 pt/A on med-heavy soil Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal	Broadleaves	Apply to corn after emergence up to the 5th leaf stage or 8 inches tall, whichever occurs first. May tank-mix with other herbicides. Observe maximum atrazine rates on label. Consult label for crop rotation restrictions and additional information.
halosulfuron-methyl @ 0.032-0.063 lb/A	Permit 75WG @ 2/3-1 1/3 oz/A Apply with NIS Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal	Purple and yellow nutsedge, common cocklebur	Apply to spiking corn thru lay-by. Do not exceed two applications with a total of 2 2/3 oz/A/season Permit. May tank-mix with other herbicides for broad-spectrum weed control; consult label. Consult label for recrop intervals and other information.
halosulfuron-methyl @ 0.031-0.062 lb/A + dicamba @ 0.14-0.28 lb/A	Yukon 67.5 WSG @ 4-8 oz/A Apply with NIS Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal	Nutsedge, morningglories, ragweed	Apply at spike to 36 inch corn. Do not exceed 8 oz/a/season. May tank-mix with other herbicides for broadspectrum weed control; consult label. Consult label for recrop intervals and other information.
POST-EMERGENCE: continued			
flumetsulam + clopyralid	Hornet @ 4 oz/A of coarse soil 4-5 oz/A on med-heavy soil Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100 gall	Many broadleaf weeds, including prickly sida. Weak on some morningglory species; can be mixed with atrazine at reduced rates; consult label	Apply from emergence up to 20 inch corn. Can be applied as a directed treatment up 36 inch corn. Works best on small weds and before corn is 2 inches tall. Do not use if soil pH >7.8. Do not use if OM <1.5%. Do not use if Counter or Thimet insecticides have been used; consult label for other restrictions. Limited use due to rotation restrictions; see label.
DIRECT POST-EMERGENCE/LAY-BY:			
paraquat @ 0.26-0.64 lb/A	Gramoxone Inteon @ 16-40 oz/A Apply with NIS @ 1 qt/100 gal	Annual grasses and weeds less than 4" tall	Apply after corn is 10" tall. Directed spray only. Avoid all spray contact with corn foliage. Use low pressure and large droplets. Use 20-40 GPA.
atrazine @ 1-2 lb/A	Atrazine 4L @ 1-2 qt/A	Most annual weeds	Apply after last cultivation when corn is 20-30" tall. Use drop nozzles to keep spray off corn leaves. Do not exceed a total of 2.5 lb/A/ season. Apply in 10-20 GPA.
linuron @ 0.63-1.5 lb/A	Linex 4L @ 1.25-3 pt/A Apply with NIS @ 2 qt/A	Most annual weeds	Apply when corn is at least 15" tall and weeds are not more than 8" tall. Use as a directed spray. Foliar burn of corn may result from contact by spray. Do not apply to sandy or sandy loam soils. Apply in 20 GPA. Consult label for recrop intervals and other information.

CORN[1,2]

Active Ingredient and Rate[3]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
diuron @ 0.6 - 0.75lb/A	Karmex DF @ 0.75-1.0 lb/A Direx 4L @ 1.25-1.5 pt/A	Most annual weeds	Apply after last cultivation when corn is 20 to 30" tall. Do not apply over top of corn. Apply as directed spray. Add surfactant if small weeds are present. Apply lower rate to light soil. Apply in 20 gal water per acre.
HARVEST AIDS:			
carfentrazone @ 0.031 lb/A	Aim @ 1.9 oz/A Apply with COC @ 1 gal/100 gal	Better on vines than pigweed, sickelpod, etc	Apply after grain has begun to dry down. Use a minimum volume of 10 gallons by ground and 5 gallons by air. Do not apply within 3 days of harvest.
paraquat @ 0.3 - 0.49 lb/A	Gramoxone Inteon @ 1.2-2.0 pt/A Apply with NIS @ 1 qt/100 gal	Grasses and broadleaves	Apply after black layer has formed. Use a minimum of 20 gallons by ground or 5 gallons by air. Apply at least 7 days prior to harvest.

[1] Refer to the burn-down section of this guide for suggestions on managing cool-season weeds.

[2] Suggestions are for field corn grown for grain. Consult labels before using these herbicides on corn grown for seed or silage.

[3] Refer to the herbicide resistance section of this guide for suggestions on herbicide resistance management.

[4] Dual is manufactured by Syngenta Crop Protection, has been extensively used in corn production and has the common name metolachlor. When metolachlor is manufactured, it contains a 1:1 ratio of two metolachlor isomers; the *–R* and the *–S* isomer. The *–S* isomer has greater herbicidal activity than the –R isomer, which allows for a reduction in the amount of –S isomer herbicide needed to obtain similar weed control compared to the –R isomer herbicide. To differentiate between metolachlor herbicides containing the *–R* or *–S* isomer consult the label under the "active ingredients" section. The –R isomer is denoted by metolachlor while the *–S* isomer is denoted by acetamide –(s). Alternatively, according to the Syngenta Crop Protection labels, if the trade names Bicep or Dual include the word "Magnum" (Dual Magnum, Dual II Magnum, Bicep II Lite Magnum), the *–S* isomer is an active ingredient. If the trade name does not include "Magnum", the metolachlor *–R*:*-S* isomer ratio is 1:1 (Dual II, Bicep II, Bicep Lite II).

[5] See "Appendix A" for **GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS.**

COTTON

TABLE 1. Effectiveness of selected cotton herbicides.

	copperleaf	smellmelon	Bermuda grass	rhizome Johnson grass	seedling Johnson grass	annual grasses	nutsedge	spotted spurge	teaweed	pigweed	morning glory	cocklebur	hemp sesbania	sicklepod
PRE-EMERGENCE HERBICIDES:														
Command	6	6	3	9	8	9	0	4	8	4	6	6	1	-
Cotoran, Meturon or Fluometuron	9	9	0	7	7	8	0	5	8	9	8	6	8	-
Dual (all formulations)	1	1	0	7	6	8	-	6	4	8	4	1	3	-
Karmex DF or Direx 4L	7	7	0	7	6	7	0	4	7	9	6	3	7	-
Treflan or Prowl	1	1	2	9	8	9	0	2	2	8	4	1	1	-
Solicam DF	7	8	3	7	6	8	4	7	8	8	6	4	5	-
Treflan or Prowl + Cotoran,	9	9	0	9	9	9	0	6	8	9	9	8	8	-
Treflan, or Prowl + Karmex	8	8	0	9	9	9	0	5	7	9	8	5	8	-
Treflan or Prowl + Solicam DF	8	9	3	9	9	8	4	8	8	9	6	4	5	-
Staple LX + Cotoran	9	9	0	9	7	8	3	9	9	9	8	6	8	-
POST-EMERGENCE HERBICIDES:														
Aim	-	8	0	0	0	0	0	-	0	8	9	9	9	6
Aim + MSMA	5	5	0	4	8	8	8	-	7	8	9	9	9	8
Aim + glyphosate	9	9	7	8	9	9	7	-	8	9	9	9	9	9
Assure II/Targa	0	0	8	8	9	9	0	0	0	0	0	0	0	0
Cobra + MSMA	9	9	0	6	9	7	6	7	8	9	9	8	8	6
Cotoran, Meturon or Fluometuron	8	8	0	4	7	6	3	6	6	7	5	6	5	-
Caparol or Cotton-Pro	8	8	0	4	8	7	5	6	7	8	8	7	6	-
Caparol or Cotton-Pro + MSMA	9	9	0	4	9	8	7	6	8	9	9	8	7	8
Cotoran + MSMA	9	9	0	4	8	8	6	7	7	9	8	8	6	8
Envoke	8	9	0	6	6	5	8	1	3	9	8	7	8	8
Fusilade DX	0	0	8	8	9	9	0	0	0	0	0	0	0	0
glyphosate	9	9	7	8	9	9	7	9	8	9	8	8	8	8
Goal + MSMA	9	9	0	5	9	8	7	8	7	8	9	8	7	8
Ignite 280	10	10	6	8	9	9	4	9	9	9	10	9	9	9
Karmex or Direx	7	7	0	4	8	6	0	3	7	8	7	7	6	8
Karmex or Direx + MSMA	8	8	0	4	9	9	7	4	8	9	8	8	6	8
Linex + MSMA	9	9	0	4	9	8	6	6	8	9	9	8	7	8
Poast Plus	0	0	8	8	9	9	0	0	0	0	0	0	0	0
Select	0	0	8	8	9	9	0	0	0	0	0	0	0	0
Sequence	9	9	7	8	9	9	7	9	8	9	8	8	8	8
Staple LX	2	4	0	4	6	5	5	1	8	9	8	7	8	6
Staple LX + glyphosate	9	9	7	8	9	9	7	9	9	9	9	9	9	8
Suprend	8	9	0	4	8	7	8	6	7	9	8	7	8	8
Valor	9	9	0	0	0	0	3	-	8	9	9	9	9	8

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
s-metolachlor @ 1.0 - 1.9 lb/A	Dual Magnum @ 1.33-1.67 pt/A	Italian ryegrass	This is a 24-C label to control glyphosate resistant ryegrass and expires January 26, 2014. Apply to prepared seedbeds between September and November. Best control is generally observed from late-October to mid-November. Will not control emerged ryegrass. Mix with paraquat to control emerged ryegrass. Incorporation will be beneficial if an activating rainfall is not received soon after application. Don't incorporate deeper 2-3 inches. The maximum combined fall and spring metolachlor rate is 2.54 lb ai/A.
flumioxazin @ 0.032 - 0.064 lb/A	Valor SX @ 1 – 2 oz/A	Residual control of pigweed and control and/or partial control of other broadleaf weeds. Mix with other herbicides to burn-down existing vegetation.	Apply 30 days before planting. Do not plant until at least one-inch of rainfall or overhead irrigation has been received following application.
fomesafen @ 0.25 lb/A	Reflex 2 EC @ 1 pt/A	Residual control of pigweed and control and/or partial control of other broadleaf weeds, sedges, and grasses. Mix with other herbicides to burn-down[1] existing vegetation.	This is a 24 C label for weed control in cotton and expires February 23, 2014. Apply 14-21 days before planting. Do not plant until at least 0.5-inch of rainfall or overhead irrigation has been received following the application. Plant at least 0.75 inches deep. Do not use on light/coarse textured soils. Cotton plants may exhibit some crinkling or spotting on foliage or stunting, but plants normally outgrow these effects.
PRE-PLANT INCORPORATED:			
pendimethalin @ 0.50 - 1.5 lb/A	Prowl 3.3 EC 1.2-1.8 pt/A on coarse soil 1.8- 2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil Prowl H2O @ 1-2 pt/A on coarse soil 2 pt/A on medium soil 3 pt/A on heavy soil	Most annual grasses, seedling Johnson grass and fair control of some broadleaf weeds	Apply before planting and incorporate up to 1/2" deeper than the seed is planted. Incorporation will be necessary if sufficient rain-fall is received within 7 days.
trifluralin @ 0.5 - 1.5 lb/A	Treflan, Trifluralin, Trific, Trilin, Tri 4 and other 4L formulations @ 1-1.5 pt/A on coarse soil 1.5- 2 pt/A on medium soil 3 pt/A on heavy soil	Most annual grasses, Johnson grass from seed and fair control of some broadleaf weeds	Apply prior to or after planting. Incorporate up to 1/2" deeper than seed if applied pre-plant or almost to seed if applied after planting.

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
clomazone @ 0.5 - 1.25 lb/A	Command 3 ME @ 1.3 - 3.3 pt/A	Most annual grasses and good control of wild poinsettia, spurred anoda, velvetleaf and itchgrass	Apply before or after planting. Requires the use of disulfoton or phorate applied infurrow to "safen" cotton from injury. Read and follow label instructions concerning application conditions and buffer zones to reduce nontarget drift injury. **Excessive rainfall at planting may lead to injury.**
metolachlor[3] @ 0.49 - 1.3 lb/A	Parallel 7.8 EC, Parrlay 8 EC @ 0.5-1.0 pt/A on coarse soil 0.67-1.33 pt/A on medium soil 1.0-1.33 pt/A on heavy soil	Most annual grasses	Apply after planting before weeds emerge. May also be applied before planting or pre-plant incorporated. Cotton should be planted 1.5 inches deeper than incorporated zone.
S-metolachlor[3] @ 1.5 - 2.0 lb/A	Dual Magnum, Dual II Magnum @ 1.0-1.33 pt/A on medium soil 1.33 pt/A on heavy soil	Most annual grasses	Apply after planting before weeds emerge. May also be applied before planting. Cotton should be planted 1.5 inches deeper than incorporated zone.
fluometuron @ 0.8 - 2.0 lb/A	Cotoran 80WP, Meturon 80DF, Fluometuron 80DF @ 1.0 lb/A on light soil 1.5 lb/A on medium soil 2.5 lb/A on heavy soil Cotoran, Meturon 4L @ 0.8 qt/A on coarse soil 1.2 qt/A on medium soil 2.0 qt/A on heavy soil	Most small-seeded annual grasses and broadleaf weeds	Apply at planting. Cover seed at least 1/2" deep. Apply to soil surface behind press wheel.
pendimethalin @ 0.5 - 1.5 lb/A	Prowl 3.3, Pendimax @ 1.2-2.4 pt/A on coarse soil 1.8-2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil Prowl H2O @ 1-2 pt/A on coarse soil 2 pt/A on medium soil 3 pt/A on heavy soil	Annual grasses and some broadleaf weeds	Apply at planting. Rainfall required within 7 days for activation. Can be used in no-till or reduced till cotton where incorporation cannot be used.
pyrithiobac @ 0.03 - 0.05 oz/A + fluometuron @ 0.8 - 2 lb/A	Staple LX @ 1.3- 2.1 fl. oz./A + flumeturon as above	Better control of yellow nutsedge and certain broadleaf weeds	Apply at planting. Best control is achieved with sequential post emergence Staple LX treatments. Follow label directions.
norflurazon @ 1.0 - 2.0 lb/A	Solicam DF @ 1.25 lb/A on light soil 1.9 lb/A on medium soil 2.5 lb/A on heavy soil	Most small-seeded annual grasses and broadleaf weeds. Fair control of nutsedge.	Apply at planting. Can be applied up to 30 days before planting. Can be incorporated before planting at the same rate as the surface application or split 1/2 PPI and ½ PRE.

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE:			
quizalofop @ 0.06 - 0.15 lb/A	Assure II/Targa @ 5 - 10 oz/A Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal	Annual grasses and perennial grasses	Apply before grasses exceed height for treatment. Use 5-8 oz/A on annual grasses and 10 oz/A on perennial grasses.
trifloxysulfuron-sodium @ 0.0047 - 0.007 lb/A	Envoke @ 0.1-0.15 oz/A. Apply with NIS @ 1 qt/100 gal	Broadleaves (including sicklepod) and sedges; weak on prickly sida	Apply after cotton reaches the 5 true leaf stage. Do not apply to cotton that is stressed. Do not tankmix with any EC formulated product as increased injury may be observed. Consult label for approved tank-mixes. Do not tank-mix with grass herbicides as grass control will be reduced. Not labeled for aerial application.
fluazifop @ 0.125 - 0.50 lb/A	Fusilade DX @ 0.37 - 0.75 pt/A Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal.	Annual and perennial grasses	Apply before annual grasses reach 4 inches and Johnson grass reaches 2 feet. Use the highest rate on Bermuda grass with runners. Activity may be reduced if mixed with other herbicides. Use lowest range of rates for shatter cane and seedling Johnson grass.
fenoxaprop-ethyl + fluazifop @ 0.15 lb/A	Fusion @ 10 oz/A. Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal.	Same as above	Same as above
sethoxydim @ 0.19 - 0.47 lb/A	Poast Plus @ 1.5- 2.25 pt/A Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal.	Annual and perennial grasses	Apply at 1.5 pt/A before annual grasses reach 4 inches and Johnson grass reaches 2 feet. Use 2.25 pt/A to control Bermuda grass with 4-6 inch runners. Application to larger grasses or grasses under stress will result in reduced control. Activity may be reduced if mixed with other herbicides.
pyrithiobac @ 0.065 - 0.095 lb/A	Staple LX @ 2.6-3.8 fl. oz/A Apply with NIS @ 1 qt/100 gal	Pigweed, cocklebur, morning-glory, prickly sida and other broadleaf weeds	Apply when weeds are small and actively growing. Weak on sicklepod. Can be banded. Spray grade nitrogen fertilizer or ammonium sulfate may improve weed control. Refer to label.
glyphosate[4] @ 0.7 - 1.0 lb/A	Roundup PowerMax @ 22 oz/A Touchdown Total @ 24 oz/A 4L formulations @ 32 oz/A	Most broadleaf weeds and grasses	**USE ON ROUNDUP READY FLEX VARIETIES ONLY:** No restriction on cotton size. Larger cotton may interfere with spray coverage resulting in reduced weed control. Allowing weeds to compete with cotton for an extended period may reduce cotton yield. Can be mixed with insecticides and PGRs. Air induction nozzles may reduce insecticide efficacy. Total in crop applications of OriginalMax or WeatherMax cannot exceed 4 qt/A from at-crack applications to 60% open bolls. Consult label for approved formulations. Do not

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
			add surfactants or products with surfactants.
POST-EMERGENCE: continued			
clethodim @ 0.05 - 0.12 lb/A	Select Max @ 6-16 oz./A Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. Use 6-8 oz/A to control annual grasses, 8-10 oz/A to control Johnson grass and 8-16 oz/A to control Bermuda grass.
glyphosate[4] @ 0.7 - 1.3 lb/A + S-metolachlor[3] @ 0.94 - 1.5 lb/A	4 L glyphosate @ 23-36 oz/A + Dual Magnum @ 1 -1.6 pt/A **or** Sequence 5.25 L @ 2.5-4.0 pt/A	Most broadleaf weeds and grasses	**USE ON ROUNDUP READY FLEX VARIETIES ONLY:** No restriction on cotton size. See other cautions above. DO NOT mix with Staple LX. Can be applied in first or second overtop application to provide residual control. Do not use additional surfactant. Check label for approved products. Don't exceed 3.5 pt/A/season
glyphosate + pyrithiobac @ 1.0 + 0.021 - 0.032 lb/A	Glyphosate (4 lb/gal formulations) + Staple LX @ 1.0 qt/A + 0.8 – 1.7 oz/A	Most broadleaf weeds and grasses	**USE ON ROUNDUP READY FLEX VARIETIES ONLY:** No restriction on cotton size. See comments for glyphosate and pyrithiobac tank-mix. DO NOT mix with any metolachlor product. DO NOT exceed a total of 2 oz pyrithiobac/year.
glufosinate @ 0.42 - 0.52 lb/A	Ignite 280 @ 22-29 oz/A	Broadleaves and grasses. Consult label for rates and size restrictions	**LIBERTY-LINK VARIETIES ONLY:** Apply from cotton emergence to early bloom. Time applications to weed size, not crop stage. Weak on sedges, large goosegrass & signalgrass. Pigweeds may not be effectively controlled if larger than 4-5 inches. Prowl PRE may aid in pigweed control in this system. Do not apply more than 87 oz/A/season. 70 days to harvest. Do not use air induction spray tips. Apply in a minimum of 15 GPA.
glufosinate @ 0.42 - 0.52 lb/A + pyrithiobac @ 0.021 - 0.032 lb/A	Ignite 280 @ 22-29 oz/A + Staple LX @ 0.8-1.7 oz/A	Most broadleaf weeds and grasses	**LIBERTY-LINK VARIETIES ONLY:** Broadcast to improve pigweed control. Maximum use rate for pyrithiobac is 2 oz/year.
glufosinate @ 0.42 - 0.52 lb/A + metolachlor[3] @ 0.47 - 1.27 lb/A	Ignite 280 @ 22-29 oz/A + Dual Magnum @ 0.5 - 1.33 pt/A	Broadleaves and grasses. Consult label for rates and size restrictions	**LIBERTY-LINK VARIETIES ONLY:** See above comments. Apply in a minimum of 15 GPA. Do not use air induction spray tips. DO NOT mix with Staple LX. Apply at cotton emergence to early bloom. Time applications to weed size, not crop stage.
glufosinate @ 0.78 lb/A	Ignite 280 @ 43 oz/A	Salvage situation if broadleaf and grass weed size is large	**LIBERTY-LINK VARIETIES ONLY:** See note above. DO NOT exceed 29 oz/A in sequential application. Do not apply more than 72 oz/A/season.

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE:			
The following herbicides can be applied singly with a surfactant or in combination MSMA as a directed spray. MSMA use in cotton is limited to one application/year not to exceed 2 lbs/A. A 50-foot buffer zone is required around permanent water bodies of water. Glyphosate[4] and Ignite 280 can also be tank-mixed with many of the following products according to label directions. Use glyphosate[4] and Ignite 280 with the appropriate herbicide resistant cotton variety.			
carfentrazone @ 0.012 - 0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Broadleaf weeds, except prickly sida	Apply after cotton is 12" tall. Avoid contact with cotton above the bark layer. Does not control grasses. Do not apply more than 3.25 oz/A/year as a lay-by or post-direct application. May improve morning glory and sesbania control with glyphosate.
fluometuron @ 0.8 - 1.2 lb/A	Cotoran/Meturon, Fluometuron 80DF @ 1.0 - 1.5 lb/A Cotoran/Meturon 4L @ 0.8-1.2 qt/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Annual seedling grasses and broadleaf weeds	Apply after cotton is 3" tall. Two POST applications can be providing fluometuron was not used PRE. Make one early-POST application if fluometuron was used PRE.
lactofen @ 0.19 lb/A	Cobra 2 EC @ 12.5 oz/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Broadleaf weeds	Apply after cotton is 8" tall. Apply as a directed spray only.
prometryn @ 0.5 - 0.7 lb/A	Caparol 80 WP @ 0.50-0 .80 lb/A Caparol 4L/Cotton-Pro @ 0.5-0.7 qt/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Annual seedling grassy and broadleaf weeds	Apply after cotton is 3" tall. Directed spray only. If MSMA is added, do not apply after first bloom.
diuron @ 0.2 - 0.4 lb/A	Direx 4L @ 0.4-0.8 pt/A Karmex DF @ 4.0-8.0 oz/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Annual seedling grasses and broadleaf weeds less than 3" tall and actively growing	Apply after cotton is 6" tall and actively growing. Directed spray only. If MSMA is added, do not apply after first bloom.
oxyfluorfen @ 0.25 - 0.50 lb/A	Goal 2XL @ 1.0 - 2.0 pt/A Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.	Annual seedling grassy and broadleaf weeds	Apply after cotton is 8" tall. Apply as a directed spray. Use low pressure and large droplets. Avoid contact with cotton.
fomesafen @ 0.25 - 0.375 lbs/A	Reflex 2 EC @ 1-1.5 pt/A Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Controls broadleaves with some soil residual.	Apply after cotton is at least 6" tall. May be used as lay-by or under hooded sprayers. Do not apply Reflex later than 70 days before harvest. Do not apply more than 1.5 pints per acre of Reflex in any year. Avoid spray contact with cotton leaves. May be tank-mixed with other products, especially grass herbicides to provide

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
			broad spectrum weed control.
DIRECTED POST-EMERGENCE: continued			
linuron @ 0.50 - 0.75 lb/A	Linex 4L @ 1.0-1.5 pt/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal.	Annual seedling grassy and broadleaf weeds	Apply After cotton is 8" tall. Apply as a directed spray only.
trifloxysulfuron-sodium @ 0.7 - 0.01 lb/A + prometryn @ 0.8 - 1.2 lb/A	Suprend @ 1-1.5 lb/A. Apply with NIS @ 1qt/100 gal 0r COC @ 1gal/100 gal	Select grasses and many broadleaves. Good on sicklepod.	Apply after cotton is at least 6" tall. May be tank-mixed with diuron, MSMA, glyphosate or Cobra for improved control of existing grasses.
LAY-BY (one application):			
diuron @ 0.4 -1.2 lb/A	Karmex 80 DF @ 0.5 lb/A on light soil 1.0 lb/A on medium soil 1.5 lb/A on heavy soil Direx 4L @ 1.5 pt/A on medium soil 2.0 pt/A on heavy soil	Most small-seeded annual grasses and broadleaf weeds. Weak on signalgrass and browntop millet.	Apply when cotton is at least 15" tall to a clean field. Apply with 4 nozzles per row or one flooding nozzle adjusted to completely cover the row but to keep spray off the cotton plants. Actively growing weeds up to 3" tall can be controlled by adding 1 pt of surfactant per 25 gal of spray mixture.
prometryn @ 0.8 - 1.6 lb/A	Caparol 80 WP @ 1.5 lb/A on light soil 1.75 lb/A on medium soil 2.0 lb/A on heavy soil Caparol 4L, Cotton-Pro @ 2.4 pt/A on light soil 2.8 pt/A on medium soil 3.2 pt/A on heavy soil	Most small-seeded annual grasses and broadleaf weeds	Apply when cotton is at least 15" tall to a clean field. (Same remarks as for single application of diuron for lay-by.)
linuron @ 0.5 - 1.5 lb/A	Linex 4L @ 1 pt/A on light soil 2 pt/A on medium soil 3 pt/A on heavy soil	Most small-seeded annual grasses and broadleaf weeds	Same remarks as for single application of diuron for lay-by. Use this treatment if fall seeded crops will be grown.
fluometuron @ 1.0 lb/A	Cotoran, Meturon, Fluometuron 80 DF @ 1.25 lb/A Cotoran or Meturon 4L @ 1.00 qt/A	Most annual grasses with fair control of broadleaf weeds	Apply when cotton is at least 15" tall to a clean field. (Same remarks as for single application of diuron for lay-by.)
flumioxazin @ 0.032 - 0.064 lb/A	Valor SX @ 1- 2 oz/A Apply with NIS @ 1qt/100gal.	Pigweeds, prickly sida, copperleaf, morninglory, sicklepod, cocklebur	Apply post-directed when cotton is at least 16" tall and has at least 2" of bark. Do not apply more than 2 oz/A/application or more than 4 oz/A/season. Do not use crop oil concentrate, organo-silicant surfactants, or methylated seed oils. Valor will control emerged weeds given sufficient spray coverage. Good residual control

COTTON[1]

Active Ingredient and Rate[2]	Active Ingredient and Rate	Weeds Controlled	Remarks and Precautions
			of broadleaves with suppression of grasses.
SPOT TREATMENT:			
fluazifop-P-butyl @ 1.0 lb/100 gal water	Fusilade @ 2 qt/100 gal water. Apply with NIS @ 1qt/100 gal or COC @ 1 gal/100 gal	Johnson grass	Same as above Apply to rapidly growing grass 1-2 feet tall. Spray to wet.
clethodim @ 0.33 - 0.67 lb/100 gal water	Select @ 44- 88 oz/100 gal water Apply with NIS @ 1qt/100 gal or COC @ 1 gal/100 gal	Same as above	Same as above
sethoxydim @ 1.0 lb/100 gal of water	Poast Plus at 1.0 gal/100 gal water. Apply with NIS @ 1 qt/100 gal	Johnson grass	Same as above Apply to rapidly growing grass 1-2 feet tall. Spray to wet.
glyphosate[4] @ 4 - 8 lb/100 gal of water	Glyphosate (4 lb/gal formulations) @ 1.0-2.0 gal/ 100 gal of water	Grasses or broadleaf weeds	Apply to rapidly growing weeds. Thoroughly wet the weed foliage and keep spray off of the crop plants. May be used as a salvage application after 20% cracked bolls.
ROPE WICK APPLICATIONS:			
glyphosate[4] @ 2.0 lb/1.0 gal of water	Glyphosate (4 lb/gal formulations) @ 0.5 gal/1.0 gal of water	Johnson grass	Apply when Johnson grass is at least 12" taller than crop. The rope wick should remain moist for best results. Repeated applications may be necessary.

[1] Refer to the burn-down section of this guide for suggestions on managing cool season weeds.

[2] Refer to the herbicide resistance section of this guide for suggestions on herbicide resistance management.

[3] Dual is manufactured by Syngenta Crop Protection, has been extensively used in cotton production and has the common name metolachlor. When metolachlor is manufactured, it contains a 1:1 ratio of two metolachlor isomers; the *–R* and the *–S* isomer. The *–S* isomer has greater herbicidal activity than the –R isomer, which allows for a reduction in the amount of –S isomer herbicide needed to obtain similar weed control compared to the –R isomer herbicide. To differentiate between metolachlor herbicides containing the *–R* or *–S* isomer consult the label under the "active ingredients" section. The –R isomer is denoted by metolachlor while the *–S* isomer is denoted by acetamide –(s). Alternatively, according to the Syngenta Crop Protection labels, if the trade names Bicep or Dual include the word "Magnum" (Dual Magnum, Dual II Magnum, Bicep II Lite Magnum), the *–S* isomer is an active ingredient. If the trade name does not include "Magnum", the metolachlor *–R*:*-S* isomer ratio is 1:1 (Dual II, Bicep II, Bicep Lite II).

[4] See "Appendix A" for **GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS.**

GRAIN SORGHUM[1,2]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:[1]			
dicamba @ 0.25 lb/A	Banvel, Clarity @ 0.5 pt/A Banvel SGF @ 1 pt/A	Most broadleaf weeds; see label	Apply at least 15 days prior to planting for emerged weeds. Effective for controlling broadleaf weeds which have emerged before planting: henbit, smartweed, etc. If grass is present, mix with glyphosate or paraquat.
PRE-EMERGENCE:			
atrazine @ 1.6-2.0 lb/A	Dry products (80%) @ 2.0-2.5 lb/A on med-heavy soil 4L products @ 3.5-4 pt/A on med-heavy soil 5L products @ 2.5-3.2 pt/A on med-heavy soil	Most annual small seeded broadleaf weeds and some grasses	Apply after planting before weeds and crop emerge. Do not apply to soils with less than 1% OM or to soils of lighter texture than silt loams. Only sorghum or corn should be planted within 1 year on soil treated with atrazine. Do not exceed 2.0 lb ai/A/applications or 2.5 lb ai/A/year. Follow the label concerning maximum atrazine rates.
s–metolachlor @ 1.0-1.9 lb/A	Dual II Magnum, Dual Magnum, Cinch @ 1.0-1.33 pt/A on light soil 1.33-1.5 pt/A on medium soil 1.33-1.67 pt/A on heavy soil	Most annual grasses and some broadleaf weeds	Apply after planting before weeds and crop emerge. Do not apply to light soils or any soils with less than 1% organic matter. **Must use safened seed.**
s-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Bicep II Magnum @ 1.6 qt/A on medium soil 2.1 qt/A on heavy soil	Most small seeded annual grasses and broadleaf weeds	Apply after planting before weeds and crop emerge. See comments for atrazine and s-metolachlor. Use Bicep Lite if another atrazine application will be needed at lay-by. **Do not use on coarse textured soils**. **Must use safened seed.**
s-metolachlor @ 0.75-1.25 lb/A + atrazine @ 0.6-1.0 lb/A	Bicep Lite II Magnum @ 1.1-1.5 qt/A on medium soil 1.5 qt/A on heavy soil		
dimethenamid @ 0.56- 0.84 lb/A	Outlook 6L @ 12-14 oz/A on coarse soil 14-18 oz/A on med-heavy soil	Most annual grasses, pigweeds, and some sedges	Apply after planting before weeds emerge. **Must use safened seed.** Do not use on sweet or forage sorghum. If soil organic matter 3% or more, consult label for proper rate.
dimethenamid @ 0.53-0.85 lb/A + atrazine @ 1.0-1.65 lb/A	Guardsman Max @ 3-4 pt/A on med-heavy soil	Most annual small seeded grasses and broadleaf weeds	Apply after planting before weeds emerge. See comments for dimethenamid and atrazine. Adjust rates per label if OM > 3%.Apply at planting. **Must use safened seed.** Do not use on sweet or forage sorghum. **Do not use on coarse textured soils**.
alachlor @ 2.0 - 3.0 lb/A	Micro-tech @ 2.5 qt/A on coarse soil 2.5-3 qt/A on med-heavy soil	Most annual grasses including signalgrass, seedling Johnson grass and pigweeds	Apply after planting before weeds emerge. Poor control of most large seeded broadleaf weeds. Mix with atrazine for improved broadleaf weed control; consult label. Adjust rate per label if OM > 3%. **Must use safened seed**

GRAIN SORGHUM[1,2]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
alachlor @ 1.25-2.3 lb/A + atrazine @ 0.75-1.4 lb/A	Lariat @ 2.0-3.0 qt/A on medium soil 2-3.75 qt/A on heavy soil	Most small seeded annual grasses (including fall panicum) and broadleaf weeds	Apply after planting before weeds emerge. See comments for alachlor and atrazine. Adjust rates per label if OM > 3%. **Do not use on coarse textured soils**. **Must use safened seed.**
POSTEMERGENCE:			
2,4-D amine @ 0.5 lb/A	2,4-D amine @ 1.0 pt/A	Small broadleaf weeds	Apply after sorghum is 4-6" tall until flowering. Use directed application taken care to keep 2,4-D out of whorl once sorghum is 10"-12" tall. Do not use when sorghum is flowering.
atrazine @ 1.25 - 2.5 lb/A	4L formulations @ 2.4 pt/A on sandy loam soil 4.0 pt/A on med-heavy soil 5L formulations @ 2.0 pt/A on sandy loam soil 3.2 pt/A on med-heavy soil	Most effective on broadleaf weeds	Apply before weeds are 1 1/2" tall and after sorghum has completely emerged. Weeds larger than 1.5 inches tall may not be killed. Low rate for broadleaf control only. Do not apply to coarse textured soils. Preferred application as directed spray but may be applied overtop where sorghum is not under stress. Sorghum should not be grazed within 21 days. Do not apply more than 2.5 lb ai/A/season. Follow label restrictions concerning maximum atrazine rates.
atrazine @ 1-2.0 lb//A	24L formulations @ 2-4 pt/A 5L formulations @ 1.6-3.2 pt/A 2.0 pt/A on sandy loam soil 3.2 pt/A on med-heavy soil Apply with COC @ 1gal/100gal	Most effective on broadleaf weeds	Apply before weeds are 1.5 inches tall and after sorghum is 4 to 6 inches tall. Weeds larger than 1.5" tall may not be killed. Do not apply to sandy loam or lighter soil textures. Preferred application as directed spray but may be applied overtop where sorghum is not under stress. Sorghum should not be grazed within 21 days. Don't exceed 2.5 lb ai/A/season. Follow label restrictions concerning maximum atrazine rates.
quinclorac @ 0.25-0.375 lb/A + atrazine @ 0.5-1.0 lb/A	Paramount @ 5.3-8 oz/A + 1-2 pt/A atrazine (4L) Apply with COC @ 2 pt/A	Broadleaf weeds controlled by atrazine plus improved grass control	See comments for atrazine plus crop oil above. Paramount can be applied to grain sorghum from emergence up to 12 inches tall. Apply when weeds are small and actively growing. See label.
dicamba @ 0.25 lb/A	Banvel, Clarity @ 0.5 pt/A Banvel SGF @ 1 pt/A	Most broadleaf weeds; see label	Apply at Spike to 15" tall sorghum. Optimal timing is 3-5 leaf sorghum, when weeds are less than 3" tall. Effective for controlling small broadleaf weeds like morningglory, smartweed, etc. Mixing with atrazine adds to residual control (up to 12" tall sorghum). Use drop nozzles if sorghum is taller than 8".
halosulfuron @ 0.031-0.047 lb/A	Permit @ 0.67-1.0 oz/A Apply with COC @ 1 gal/100gal or NIS @ 1 qt/100 gal	Selected broadleaves and sedges	Apply to Sorghum 2-leaf to lay-by (before grain head emergence). Use only a single application with the total rate not to exceed 1.0 oz/A per season.

GRAIN SORGHUM[1,2]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POSTEMERGENCE: continued			
halosulfuron @ 0.031-0.047 lb/A + dicamba @ 0.14-0.21 lb/A	Yukon 67.5 WSG @ 4- 6 oz/A Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100gal	Nutsedge, morningglories, ragweed.	Apply to 2 leaf to 15 inch sorghum. Do not exceed 8 oz/a/season.
bromoxynil @ 0.25-0.375 lb/A	Buctril 2EC @ 1.0-1.5 pt/A	Many broadleaf weeds	Apply to sorghum from the 3 leaf to pre-boot stage. Do not use the 1.5 pt/A until grain sorghum has 4 leaves. Best when used on small weeds (2-4 leaf). May serve as a replacement for 2,4-D in phenoxy sensitive areas. Consult label for additional information.
PREHARVEST:			
Sodium chlorate @ 4.5-6 lb/A	Various products; consult label for rates.	Desiccation of green vegetation.	Apply 7 to 10 days prior to harvest. Follow label directions.
carfentrazone @ 0.016 lb/A	Aim @ 1.0 oz/A	Desiccation of morningglories	Apply 3 days prior to harvest. Thorough coverage is essential; use at least 10 GPA. Tank mixture can include sodium chlorate.
Spot treatment for control of Johnson grass and other weeds. Mix 1 to 2 gallons Roundup Ultra[4] per 100 gallons of water. Spray weeds to point of drip before grain sorghum heads. Sprayed sorghum and weeds will be killed. Apply with caution to prevent excessive crop injury.			

FOOT NOTES

[1] Refer to the burn-down section of this guide for suggestions on managing cool season weeds.

[2] Refer to the herbicide resistance section of this guide for suggestions on herbicide resistance management.

[3] Dual is manufactured by Syngenta Crop Protection, has been extensively used in corn production and has the common name metolachlor. When metolachlor is manufactured, it contains a 1:1 ratio of two metolachlor isomers; the *–R* and the *–S* isomer. The *–S* isomer has greater herbicidal activity than the –R isomer, which allows for a reduction in the amount of –S isomer herbicide needed to obtain similar weed control compared to the –R isomer herbicide. To differentiate between metolachlor herbicides containing the *–R* or *–S* isomer consult the label under the "active ingredients" section. The –R isomer is denoted by metolachlor while the *–S* isomer is denoted by acetamide –(s). Alternatively, according to the Syngenta Crop Protection labels, if the trade names Bicep or Dual include the word "Magnum" (Dual Magnum, Dual II Magnum, Bicep II Lite Magnum), the *–S* isomer is an active ingredient. If the trade name does not include "Magnum", the metolachlor *–R*:*-S* isomer ratio is 1:1 (Dual II, Bicep II, Bicep Lite II).

[4] See "Appendix A" for glyphosate products and their surfactant requirements.

SOYBEANS

TABLE1. Effectiveness of selected soybean herbicides.

	itchgrass	seedling Johnson grass	annual grasses	red rice	pigweed	prickly sida	hemp sesbania	morning glory	cocklebur	sicklepod	texasweed	redweed	jointvetch	wild poinsettia	copperleaf	smellmelon
PRE-EMERGENCE HERBICIDES:																
Authority MTZ	-	5	5	-	9	9	9	9	-	8	-	9	8	-	9	9
Boundary	-	8	9	-	9	8	9	9	-	9	-	9	7	-	9	8
Canopy EX	I	4	5	4	9	8	7	9	9	6	8	8	8	9	9	-
Canopy DF	I	6	8	6	9	9	8	8	8	8	7	9	5	8	9	-
Command	8	9	9	7	4	9	I	4	4	I	I	8	2	9	6	-
Dual Magnum	I	7	9	8	9	5	2	I	I	2	3	7	I	3	5	7
Envive/Enlite	-	6	7	7	8	7	7	8	8	8	-	8	8	-	8	8
FirstRate	I	2	3	I	3	7	3	9	9	6	-	-	-	8	5	-
Linex	I	5	8	5	9	8	5	3	4	3	4	9	4	5	7	-
Outlook	I	7	9	8	9	5	2	I	I	2	3	7	I	2	5	7
Prowl	8	9	9	6	9	I	I	3	0	2	0	2	I	I	0	6
Prowl H_2O	I	8	8	7	8	5	3	6	9	5	6	7	I	6	6	6
Pursuit	I	8	8	7	8	5	3	6	9	5	6	7	I	6	6	-
Scepter DG	I	6	8	7	9	8	3	7	9	5	8	7	I	7	7	-
Metribuzin 75 DF	I	6	8	6	9	9	8	5	6	4	6	9	6	7	9	-
Treflan	8	9	9	6	9	I	I	3	0	2	0	2	I	I	0	-
Valor	0	2	6	0	9	8	8	8	-	8	8	8	5	8	8	7
POST-EMERGENCE HERBICIDES:																
Assure II	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0
Basagran	0	0	0	0	4	8	6	4	9	I	2	7	2	5	4	5
Classic	0	0	0	0	9	2	8	8	8	8	2	8	7	8	3	4
Cobra	I	3	3	I	9	8	9	8	8	3	7	8	6	8	8	9
FirstRate	0	3	3	0	6	8	7	9	9	4	-	8	-	8	7	6
Frontrow	0	2	3	0	3	8	4	9	9	6	-	8	-	6	6	6
Flexstar	0	2	4	0	9	3	9	8	8	3	6	5	7	8	9	9
Fusilade DX	9	9	9	7	0	0	0	0	0	0	0	0	0	0	0	0
Fusion	8	9	9	7	0	0	0	0	0	0	0	0	0	0	0	0
glyphosate[1]	9	9	9	9	9	8	7	8	9	8	9	8	7	9	9	9
glyphosate[1] + Classic	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
glyphosate[1] + Blazer	9	9	9	9	9	8	9	9	9	9	9	8	7	9	9	9
glyphosate[1] + ET	-	9	9	9	9	9	9	9	9	9	-	-	-	-	9	9
glyphosate[1] + Flexstar	9	9	9	9	9	8	9	9	9	9	9	9	7	9	9	9
glyphosate[1] + FirstRate	9	9	9	9	9	9	7	9	9	9	9	8	7	9	9	9
glyphosate[1] + Resource	9	9	9	9	9	8	7	9	9	9	9	8	7	9	9	9

SOYBEANS

TABLE1. Effectiveness of selected soybean herbicides.

	itchgrass	seedling Johnson grass	annual grasses	red rice	pigweed	prickly sida	hemp sesbania	morning glory	cocklebur	sicklepod	texasweed	redweed	jointvetch	wild poinsettia	copperleaf	smellmelon
Poast Plus	9	8	9	7	0	0	0	0	0	0	0	0	0	0	0	0
POST-EMERGENCE HERBICIDES: continued																
Pursuit	8	8	8	8	9	4	2	7	9	3	7	6	2	6	4	5
Scepter DG	5	6	7	7	9	6	3	7	9	5	7	5	0	8	2	3
Select	9	9	9	8	0	0	0	0	0	0	0	0	0	0	0	0
Sequence	9	9	9	9	9	8	7	8	9	9	9	8	7	9	9	9
Storm	1	4	3	1	9	8	9	8	9	4	6	8	5	8	9	9
Ultra Blazer	0	2	3	0	8	3	9	8	6	3	5	3	5	8	8	8
DIRECTED POST-EMERGENCE HERBICIDES:																
2,4 – DB	0	0	0	0	9	4	6	9	9	4	4	4	6	5	5	6
paraquat	4	5	9	7	9	6	5	6	4	6	3	5	7	9	8	8
Linex, Lorox	2	2	4	2	9	7	9	8	6	5	7	4	9	7	8	8
Linex or Sencor + 2,4-DB	2	5	6	2	9	8	9	9	9	7	7	4	9	8	9	9
Metribuzin 75 DF	2	5	8	2	8	7	8	7	7	6	7	4	8	7	9	9

[1] Roundup Ready varieties only.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
S-metolachlor @ 1.0 - 1.9 lb/A	Dual Magnum @ 1.33-1.67 pt/A	Italian ryegrass; fall treatment	This is a 24-C label to control glyphosate resistant ryegrass and expires January 26, 2014. Apply to prepared seedbeds between September and November. Best control is generally observed from late-October to mid-November. Will not control emerged ryegrass. Mix with paraquat to control emerged ryegrass. Incorporation will be beneficial if an activating rainfall is not received soon after application. Don't incorporate deeper 2-3 inches. The maximum combined fall and spring metolachlor rate is 2.54 lb ai/A.
chlorimuron @ 0.005 - 0.02 lb/A + thifensulfuron @ 0.006 - 0.015 lb/A + flumioxazin @ 0.02 - 0.06 lb/A	Envive @ 3.5 oz/A or Enlite @ 2.8 oz/A	Many winter annuals	Apply before planting **as part of** a burn-down program. Consult label for pH, OM and re-crop restrictions.
chlorimuron @ 0.028 lb/A + tribenuron @ 0.008 lb/A	Canopy EX @ 2 oz/A	Many winter annuals	Apply before planting **as part of** a burn-down program. Do not apply within 7 days of planting. Consult label for pH, OM and re-crop restrictions.
trifluralin @ 0.5 - 1.5 lb/A	Treflan, Trifluralin, Trific, Trilin, Tri-4 – 4 EC @ 1.0-1.5 pt/A on light soil 1.5-2.25 pt/A on medium soil 2.0-3.0 pt/A on heavy soil	Most annual grasses, seedling Johnson grass and fair control of some broadleaf weeds	Apply before planting and incorporate 2-3" deep. Trifluralin can be applied at rates higher than listed to control certain annuals and to suppress rhizome Johnson grass; consult label.
pendimethalin @ 0.5 - 1.5 lb/A	Prowl 3.3 EC @ 1.2-1.8 pt/A on light soil 1.8-2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil	Most annual grasses, seedling Johnson grass and fair control of some broadleaf weeds	Before planting, incorporate 2-3" deep within 7 days of application if sufficient rainfall has not been received. Highest rates for high OM soils. Prowl can be applied at rates higher than listed to control certain annuals and to suppress rhizome Johnson grass; consult label.
flumetsulam @ 0.05 - 0.066 lb/A + pendimethalin or trifluralin @ 0.5 - 1 lb/A	Python 80 WDG @ 0.8-0.89 oz/A on light soil 0.89-1.0 oz/A on med-heavy soil Rates for pendimethalin or trifluralin are listed above.	Most annual grasses and selected broadleaf weeds	Apply before planting and incorporate 1-3" deep. Do not apply to soils with pH above 7.8. Do not rotate with cotton for 18 months or grain sorghum for 12 months following application. See label for other restrictions. See comments for pendimethalin or trifluralin.
Chlorimuron @ 0.04 - 0.07 lb/A +metribuzin @ 0.24 - 0.43 lb/A + pendimethalin or trifluralin @ 0.5 - 5 lb/A	Canopy 75 DF @ 6 oz/A on light soil 8 oz/A on medium soil 10.7 oz/A on heavy soil Rates for pendimethalin or trifluralin are listed above.	Morninglories, yellow and purple nutsedge, pigweeds, prickly sida, wild poinsettia and other broadleaf weeds	Apply and incorporated up to 30 days before. May also be applied at planting or before emergence. **DO NOT apply to emerged crop.** Do not apply to land to be rotated to cotton the next year. Soil pH > 7.0 greatly reduces rotational flexibility. Do not use on soils with pH > 7.5. Crop stunting may occur if excessive rainfall occurs after application but before soybean emergence. Consult label.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT: continued			
clomazone @ 0.75 - 1.0 lb/A	Command 3ME @ 2.0-2.67 pt/A on light-med. soil 2.67 pt/A on heavy soil	Most annual grasses and some broadleaf weeds	Apply before planting with or without incorporation. If PPI, incorporate 1-3" deep within 3 hours. Do not incorporate for itchgrass control. Consult label for rotational restrictions.
Some fields are heavily infested with both grasses, especially seedling Johnson grass and broadleaf weeds. Combinations of a pre-plant incorporated and a surface applied material or mixtures of surface applied herbicides may provide better weed control than a single material. Each component of the mixture or combination should be applied at the same rate as if it is being applied alone unless the label specifically states otherwise. Check these labels. Several herbicide mixtures are currently available as prepackaged mixes. See the section on prepackaged mixes.			
PRE-EMERGENCE -SURFACE APPLIED:			
alachlor @ 2.0 - 3 .0 lb/A	Microtech @ 2.0 qt/A on light soil 2.5 qt/A on medium soil 3.0 qt/A on heavy soil	Most annual grasses, red rice, Johnson grass from seed and fair control of some broadleaf weeds	Apply after planting and before weeds emerge. May be incorporated. Shallow incorporation (1-2") with a spike tooth harrow or rolling cultivator is required to control red rice under low rainfall conditions. Also available in granular formulation. Consult label.
chlorimuron @ 0.04 - 0.07 lb/A +metribuzin @ 0.24 - 0.43 lb/A	Canopy 75 DF @ 6 oz/A on light soil 8 oz/A on medium soil 10.7 oz/A on heavy soil Exact rate is dependent on soil organic matter %; consult label.	Annual grasses and most broadleaf weeds	Apply at pre-plant incorporated or surface applied at planting. **Do not use post-emergence.** Follow labeled rotational crop restrictions. Follow sprayer cleanup instructions before spraying subsequent crops. Do not apply to soils with a pH greater than 7.5. Do not apply to sensitive varieties.
dimethenamid-P @ 0.76 - 1.3 lb/A	Outlook 6EC @ 12-14 oz/A on light soil 14-18 oz/A on med-heavy soil	Most annual grasses, red rice, Johnson grass from seed and fair control of some broadleaf weeds	Apply after planting before weeds emerge.
flumioxazin @ 0.063 lb/A	Valor SX @ 2 oz/A	Broadleaves with some suppression of annual grasses	Apply after planting before weeds emerge. Consult label for tank-mixes to improve grass control.
S-metolachlor[3] @ 0.96 - 1.91 lb/A	Dual II Magnum, Dual Magnum @ 1.0-1.33 pt/A on light soil 1.33-.67 pt/A on medium soil 1.33-2.0 pt/A on heavy soil	Most annual grasses, red rice, Johnson grass from seed and fair control of some broadleaf weeds	Apply at pre-plant incorporated, surface applied, or pre-plant. Apply after planting and before weeds emerge. May be incorporated. Shallow incorporation (1-2") with a spike tooth harrow or rolling cultivator is required to control red rice under low rainfall conditions.
metolachlor[3] @ 1.5 - 2.5 lb/A	Dual II, others @ 1.5-2.0 pt/A on light soil 2.0-2.5 pt/A on medium soil	See comments above.	See comments above.
chlorimuron @ 0.005 - 0.02 lb/A+ thifensulfuron @ 0.006 - 0.015 lb/A + flumioxazin @ 0.02 - 0.06 lb/A	Envive @ 3.5 oz/A or Enlite @ 2.8 oz/A	Broadleaf and grass weeds	Apply before planting. Consult label for pH, OM and re-crop restrictions to determine whether to use Envive or Enlite.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE -SURFACE APPLIED: continued			
S-metolachlor @ 0.98 lb/A + metribuzin @ 0.24 lb/A	Boundary 6.5 EC @ 1.5 pt/A	Most annual grasses and selected broadleaf weeds	Apply before planting. Ensure soybean variety is tolerant of metribuzin prior to use.
flumetsulam @ 0.05 - 0.066 lb/A + metolachlor @ 1.5 -2.5 lb/A	Python 80 WDG + Dual @ 0.8-0.89 oz/A on light soil 0.89-1.0 oz/A on med-heavy soil Dual rates are listed above.	Most annual grasses and selected broadleaf weeds	Apply at pre-plant incorporated or surface applied at planting. Weed control data are currently incomplete. Consult label for more information on rates and re-crop intervals.
linuron @ 0.50 - 1.0 lb/A	Lorox 50DF @ 0.66-1.25 lb/A on light soil 1.0-1.66 lb/A on medium soil 1.25-2.0 lb/A on heavy soil Linex 4L @ 1.0-2.33 pt/A on light-med soil 1.33-2.66 pt/A on heavy soil	Most small seeded annual grasses and broadleaf weeds	Apply at planting. Exact rate depends on soil organic matter. Consult label. Plant seed at least 3/4" deep. Not recommended on soils lighter than sandy loams. Injury may occur on light soils if heavy rainfall occurs soon after application. Do Not exceed 2 lb/A in a single application.
imazaquin @ 0.125 lb/A	Scepter 70DG @ 2.8 oz/A	Annual grasses and most broadleaf weeds	Surface applied, pre-plant incorporate, or at planting. Scepter can be applied PPI within 30 days of planting. A sequential post-emergence application may be required for hard to kill weeds such as sicklepod. Observe rotational restrictions.
imazethapyr @ 0.063 lb/A	Pursuit 70DG @ 1.44 oz/A	Annual grasses and broadleaf weeds	Apply at pre-plant incorporated or surface applied at planting. Control similar to Scepter. Better on grasses and weaker on certain broadleaf weeds. 18 month rotational restriction for rice and cotton.
metribuzin @ 0.25 - 0.75 lb/A	Metribuzin 75DF @ 0.30 - 0.67 lb/A on medium soil 0.67-1.0 lb/A on heavy soil	Annual grasses and most broadleaf weeds such as cocklebur, prickly sida, hemp sesbania, & wild poinsettia	Apply at planting. Plant seed 1 1/2" deep. On light soils O.M. content should be 2% or greater. Best performance expected on river bottom soils and medium to heavy soils in the rice area. High rate for Miss. Delta clays. Do not apply to sensitive varieties. Sencor is labeled for use on light (sandy) soils to control sicklepod at 0.25-0.38 lb/A active ingredient.
pendimethalin @ 0.5 - 1.5 lb/A	Prowl 3.3 or Pendimax @ 1.2-2.4 pt/A on light soil 1.8-2.4 pt/A on medium soil 2.4-3.6 pt/A on heavy soil Prowl H_2O @ 1-2 pt/A on light soil 2 pt/A on medium soil 3 pt/A on heavy soil	Most annual grasses, Johnson grass from seed and fair control of some broadleaf weeds	Apply at planting. Highest rates for high organic matter soils.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE -SURFACE APPLIED: continued			
S-metolachlor @ 1.09 lb/A + fomesafen @ 0.25 lb/A	Prefix 5.3 EC @ 2.0 pt/A	Annual grasses and broadleaf weeds.	Before, during or after crop emergence. Must have rainfall for activation. Excellent choice for pigweed control. Post-emergence applications must be applied from 3rd soybean trifoliate or earlier.
sulfentrazone @ 0.158 lb/A + metribuzin @ 0.315 lb/A	Authority MTZ @ 12-14 oz/A on light soil 14-16 oz/A on medium soil 16-18 oz/A on heavy soil	Annual grasses and broadleaf weeds such as morning glory and pigweed.	Before, during or after planting, but before crop emergence. Soybean cultivars may differ in tolerance to Authority MTZ, so check label for specific cultivars.
POST-EMERGENCE:			
bentazon @ 0.75 - 1.5 lb/A	Basagran 4L @ 1.5 - 3.0 pt/A. Apply with COC @ 1gal/100gal	Cocklebur, prickly sida. Fair on other broadleaf weeds	Apply after soybean plants have first trifoliate leaves. Add 1 pt. of nonionic surfactant per 50 gallons of water when targeting weeds other than cocklebur.
acifluorfen @ 0.25 - 0.5 lb/A	Ultra Blazer 2L @ 0.5-1.5 pt/A Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label.	Hemp sesbania, most morninglories, smellmelon, pigweed and other broadleaf weeds.	Apply when seedling weeds are in 2-4 leaf stage and actively growing. Use 1.0 pt/A for hemp sesbania and showy crotalaria that is actively growing but before flowering. Rate is dependent on weed spectrum and size. Consult label. Maximum rate .5 pt/A/application and 2 pt/A/season.
acifluorfen @ 0.25 - 0.5 lb/A + bentazon @ 0.75 - 1.5 lb/A	Blazer + Basagran as above or Storm @ 1.5 pt/A Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label.	Hemp sesbania, morninglories, smellmelon, pigweed, prickly sida, cocklebur, other broadleaf weeds	Application same as above. Choose most serious weed pest and use the full rate of whichever herbicide is considered most effective plus 1.0 pt. of the herbicide. Read and follow label instructions. Storm at 1.5 pt/A is equivalent to 1 pt of each herbicide in a tank-mix.
chlorimuron @ 0.008 - 0.012 lb/A	Classic 25DG @ 0.5-0.75 oz/A. Apply with NIS @ 1 qt/100 gal.	Morninglories, pigweed, sicklepod, hemp sesbania	Apply after soybeans have 1st trifoliate leaves and when weeds have 2-6 leaves. See label for re-crop intervals. Clean sprayer thoroughly before spraying other crops. Don't apply to soils with a pH higher than 7.5. May tank mix with glyphosate in Roundup Ready soybeans.
cloransulam-methyl @ 0.016/A	FirstRate @ 0.30 oz/A. Apply with NIS @ 1 qt/100 gal.	Cocklebur and morninglories	Apply before weeds exceed height limitations (generally 2-4" tall) and prior to soybeans reaching 50% flowering stage. Application prior to full emergence of first soybean trifoliate may cause temporary chlorosis. May tank mix with other soybean herbicides, including glyphosate in Roundup Ready soybeans. May reduce grass control when mixed with some grass herbicides.
cloransulam-methyl + flumetsulam @ 0.016 lb/A + 0.006 lb/A	Frontrow @ 0.42 oz/A. Apply with NIS @ 1 qt/100 gal.	Cocklebur, prickly sida, annual morninglories	Apply to actively growing weeds before maximum growth stage is exceeded; 2- 4 true leaves. May be applied with other herbicides, including glyphosate in Roundup Ready soybeans. May reduce grass activity when mixed with some grass herbicides. Consult label.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
imazethapyr @ 0.06 lb/A	Pursuit DG @ 1.44 oz/A Apply with NIS @ 1 qt/100 gal.	Annual grasses and certain broadleaf weeds	Apply before weeds are 3" in height. See comments in pre-emergence section. See label for re-crop intervals.
imazaquin @ 0.125 lb/A	Scepter 70DG @ 2.8 oz/A 2.0 oz/A for cocklebur Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label.	Cocklebur, pigweed, wild poinsettia	Apply after soybeans have emerged but before cocklebur and pigweed are 12" tall (6" for wild poinsettia). A sequential treatment of Scepter PPI or pre-emergence followed by Scepter applied post-emergence not only improves control of sicklepod but improves control of many other weeds as well. Follow rotational crop restrictions.
lactofen @ 0.15 - 0.19 lb/A	Cobra 2L @ 10.0-12.5 oz/A. Apply with NIS @ 1 qt/100 gal.	Some morninglories, cocklebur, pigweeds, prickly sida, ballonvine, smellmelon, copperleaf	Apply before weeds exceed height limitations. Application may cause moderate burn. Soybeans normally recover in 10 days without loss of yield.
fomesafen @ 0.25 - 0.35 lb/A	Reflex 2L, Dawn @ 1-1.5 pt/A Flexstar, Rhythm 1.88L @ 1-1.5 pt/A. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label.	Morninglories, cocklebur, pigweed, hemp sesbania and suppression of grasses	Apply before weeds exceed height limitations. Soybeans are very tolerant to Reflex. May be mixed with grass herbicides. Rotation interval: 4 months small grains; 10 months beans, corn, cotton and rice. Injury may be observed under hot, humid conditions.
fluthiacet @ 0.0035 - 0.006 lb/A	Cadet 91 EC @ 0.5 to 0.9 oz/A Apply 0.25% v/v NIS; see label.	Morninglories, pigweeds, and hemp sesbania	Apply with weeds are 2- to 4-inches. Add glyphosate to improve broadleaf control and to provide grass control. Add 0.25% v/v of NIS is applied alone.
pyraflufen ethyl @ 0.0008 - 0.0012 lb/A	ET @ 0.5 to 0.75 oz/A Apply 0.25% v/v NIS; see label.	Morninglories, pigweeds, and hemp sesbania	Apply with weeds are 2- to 4-inches. Add glyphosate to improve broadleaf control and to provide grass control. Add 0.25% v/v of NIS is applied alone. Expect slight burning of soybean leaves for 7-10 day after application.
fluazifop-P-butyl @ 0.125 - 0.50 lb/A	Fusilade DX @ 0.37-0.75 pt/A Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment; consult label. Use the highest rate for Bermuda grass with runners 4-6" long. Application to larger grasses or grasses under stress will result in reduced control. Activity may be reduced if mixed with other herbicides.
clethodim @ 0.09 - 0.25 lb/A	Select 2 EC @ 6-16 oz/A. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label.	Annual and perennial grasses	Application same as above. Refer to label for rate for specific grass species. Same as above. Addition of a spray-grade nitrogen fertilizer or ammonium sulfate may further improve weed control. Refer to label.
fenoxyprop - ethyl @ 0.02 - 0.05 lb/A + fluazifop-P-butyl @ 0.06 - 0.19 lb/A	Fusion @ 4.0 - 14.0 oz/A. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label	Annual and perennial grasses	Same as above. Aerial applications require adjuvant adjustment. Consult label to determine proper application timing if using a broadleaf tank-mix or broadleaf sequential herbicide.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
sethoxydim @ 0.19 - 0.47 lb/A	Poast Plus @ 1.5-2.25 pt/A Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. In general use 0.5 pt/A for annual grasses up to 4" tall, 1.5 pt/A for Johnson grass 1–2 ft tall and 2.25 pt/A for Bermuda grass with 4-6" runners. Application to larger grasses or grasses under stress will result in reduced control. Activity may be reduced if mixed with other herbicides. Consult labels for retreatment rates.
quizalofop @ 0.10 - 0.20 lb/A	Assure II @ 5-10 oz/A. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100gal; see label	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. Application to larger grasses or grasses growing under stress will result in reduced control.
tillage	rotary hoe	Small seedling grassy and broadleaf weeds	Apply as soon as soybeans are up to a stand or before if soil crusts enough to prevent emergence. PRE herbicides may remain more effective following rotary hoeing. Not effective if soil is damp or wet. Effective if soil is crusted. May be used repeatedly until 3rd set of true leaves are expanded. Soybean seedlings may be injured if hoed when fully turgid.
ROUNDUP READY: Programs			
glyphosate[4] @ 0.7-1.0 lb/A	Roundup PowerMax @ 22 oz/A Touchdown Total @ 24 oz/A 4 lb/gal formulations @ 32 oz/A	Most broadleaf weeds and grasses	**FOR USE IN ROUNDUP READY VARIETIES ONLY.** See Herbicide-Tolerant Soybean Varieties on last page for further information.
glyphosate[4] @ 0.7-1.3 lb/A + S-metolachlor[3] @ 0.94-1.5 lb/A	Glyphosate (4 lb/gal formulations) @ 23-36 oz/A + Dual Magnum @ 1 -1.6 pt/A **or** Sequence 5.25 L @ 2.5-4.0 pt/A	Most broadleaf weeds and grasses	**FOR USE IN ROUNDUP READY VARIETIES ONLY.** Apply from soybean cracking to third trifoliate. See Herbicide-Tolerant Soybean Varieties on last page for further information.
Glyphosate[4] @ 1-1.5 lb/A + fomesafen @ 0.25-0.38 lb/A	Glyphosate (4 lb/gal formulations) @ 1-1.5 qt/A + Reflex @ 1-1.6 pt/A **or** Flexstar GT 3.5 @ 3.5 - 5.3 pt/A	Most broadleaf weeds and grasses. Good option for increased control of morning glory, hemp sesbania, and smellmelon	**FOR USE IN ROUNDUP READY VARIETIES ONLY.** See Herbicide-Tolerant Soybean Varieties on last page for further information.
STS/ROUNDUP READY: Programs			
glyphosate[4] @ 1 lb/A + chlorimuron @ 0.013-.02 lb/A + thifensulfuron @ 0.013-0.02 lb/A	Glyphosate (4 lb/gal formulations) @ 1 qt/A + Synchrony XP @ 0.75-1.125 oz/A	Broadleaf and grass weed control	**Apply only to STS/RR soybean varieties.** Apply after first trifoliate leaf. See Herbicide-Tolerant Soybean Varieties on last page for further information.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
LIBERTY LINK: Programs			
glufosinate @ 0.4 lb/A	Ignite 280 SL @ 22 oz/A	Most broadleaf weeds. Control of small grass weeds in weeds are < 3-inches.	**FOR USE IN LIBERTY LINK VARIETIES ONLY.** Two to three applications and/or the use of residual herbicides are recommended. Make first application 7-10 days after emergence on 2-3 inch weeds. Make the second application 10-14 days later. Make the third application as needed on 2-3 inch weeds. Do not exceed 65 oz/A/year. Use residual in burn-down orat planting. See Herbicide-Tolerant Soybean Varieties on last page for further information.
glufosinate @ 0.4 lb/A + S-metolachlor @ 0.9 lb/A	Ignite 280 SL @ 22 oz/A + Dual Magnum @ 1.0 pt/A	Broadleaf and grass weed control. Good option where no residual was used at burn-down or at planting.	Good option where no residual was used at burn-down or at planting. See comments above for Ignite and Dual II magnum. See Herbicide-Tolerant Soybean Varieties on last page for further information.
DIRECTED POST-EMERGENCE:			
2,4-DB @ 0..2 lb/A	Various formulations @ 1pt/A; consult product labels for correct rate and surfactant requirements,	Annual morning glory and cocklebur, pigweed and prickly sida	Apply after soybeans are 8" tall. Apply to lower 3" of soybean as a **directed spray**. Repeat once if necessary. Do not apply to soybeans showing root rot symptoms.
paraquat @ 0.07-0.12 lb/A	paraquat @ 4.5-8 oz/A Surfactant required; consult label.	Seedling grasses such as seedling Johnson grass, crabgrasses, signalgrass, barnyardgrass, goosegrass	Apply when grasses and pigweed are 2-4" tall and soybeans are at least 8". **Directed Spray Only**. Good coverage necessary for control. Soybeans treated topically will be killed. Do not exceed 30 lbs. pressure. Do not graze treated areas. Apply low rate to weeds 2" tall and higher rate to grasses 2-4" tall and pigweeds 2-3" tall. Consult the label.
linuron @ 0.25 - 1.0 lb/A	Lorox 50DF @ 0.5 - 2.0 lb/A Linex 4L @ 0.5 - 2.0 pt/A Add 0.25% v/v nonionic surfactant.	Grasses and small broadleaf weeds such as crabgrass, cocklebur, hemp sesbania 12"-15" tall, etc	Apply after soybeans are 8" and weeds less than 6" tall. **Directed spray only**. Severe injury to soybeans may occur if spray strikes mid to upper portions of soybean plants. Low rate for smaller weeds, higher rate for larger weeds. Consult the label.
linuron @ 0.25 - 0.5 lb/A + 2,4-DB @ 0.2 lb/A	Linuron and 2,4-DB rates as above Add 0.25% v/v nonionic surfactant.	Grasses and small broadleaf weeds such as crabgrass, cocklebur and hemp sesbania	Apply after soybeans are 8" tall and weeds less 6" tall. **Directed spray only**. Severe injury to soybeans may occur if spray strikes mid to upper portions of soybean plants. Low rate for smaller weeds, higher rate for larger weeds. Consult the label.
metribuzin @ 0.25 - 0.50 lb/A	Metribuzin 75 DF @ 0.33 - 0.67 lb/A Add 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate.	Grasses and broadleaf weeds such as cocklebur, dayflower, prickly sida, hemp sesbania and others	Apply After soybeans are 8" tall and before grasses are 1" tall and broadleaf weeds are 3" tall. **Directed Spray Only.** Spray only the lower 1/4 to 1/3 of soybean plants. Do not apply to sensitive varieties. Higher rate required to control sesbania and prickly sida. Consult the label.

SOYBEANS[1]

Active Ingredient and Rate[2]	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE: continued			
metribuzin @ 0.25 - 0.50 lb/A + 2,4-DB @ 0.2 lb/A	Rates as above Add 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate.	Grasses and small broadleaf weeds	Apply after soybeans are 8" tall. **Directed Spray Only.** Severe injury to soybeans may occur if spray strikes mid to upper portions of soybean plants. Low rate for smaller weeds, higher rate for larger weeds.
PRE-HARVEST DESSICANTS:			
carfentrazone @ 0.023 lb/A	Aim 2EC @ 1.4 oz/A Add 1% v/v crop oil concentrate.	Better on vines than pigweed, sicklepod, etc.	Apply after crop has matured and grain has begun to dry down. More effective on annual vines. Do not apply within 3 days of harvest. Apply in 10 gallons by ground, 5 gallons by air.
paraquat @ 0.126 - 0.25 lb/A	paraquat @ 8 - 16 oz/A Add 0.25% v/v nonionic surfactant.	Desiccation of weeds and soybeans only.	Indeterminate varieties: 65% of pods are mature or moisture content is 30% or less. Determinate varieties: 50% leaf drop and remaining leaves are yellow. Some drought stressed weeds will not be desiccated. Do not graze or harvest for hay. Apply in 10 gals by ground, or 5 gals by air. Do not apply within 15 days of harvest. Immature soybeans will be injured.
sodium chlorate	Sodium Chlorate @ 6 lb/gallon product 1 gallon 3 lb/gallon product 2 gallons	Desiccation only. Level of weed control is affected by environmental conditions.	Apply 7 to 10 days before harvest. Apply in 20 gallons by ground, 5 gallons by air. Check label for environmental conditions most favorable for desiccation. Apply under high temperatures and humidity.
SPOT TREATMENTS:			
sethoxydim @ 1.0 lb/100 gal water	Poast Plus at 1.0 gal/100 gal water. Add 1% v/v crop oil concentrate.	Johnson grass, Bermuda grass, itchgrass, and other weeds	Apply to rapidly growing grass 1-2 feet tall. Spray to wet.
fluazifop-P-butyl @ 1.0 lb/100 gal water	Fusilade DX @ 2 qt/100 gal water. Add 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate.	Same as above	Same as above
clethodim @ 0.33 – 0.67 lb/100 gal water	Select @ 44 – 88 oz/100 gal water. Add 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate.	Same as above	Same as above
glyphosate[4] @ 4 – 8 lb/100 gal of water	Glyphosate (4 lb/gal formulations) @ 1.0-2.0 gal/ 100 gal of water	Grass and broadleaf Weeds	Apply to rapidly growing weeds. Thoroughly wet the weed foliage and keep spray off of the crop plants. May be used as a salvage application after 20% cracked bolls.
ROPE WICK APPLICATORS			
glyphosate @ 2.0 lb/1.0 gal of water	Glyphosate (4 lb/gal formulations) @ 0.5 gal/1.0 gal of water	Johnson grass	Apply when Johnson grass is at least 12" taller than crop. The rope wick should remain moist for best results. Repeated applications may be necessary.

FOOTNOTES

[1] Refer to the burn-down section of this guide for suggestions on managing cool season weeds.
[2] Refer to the herbicide resistance section of this guide for suggestions on herbicide resistance management.
[3] Dual is manufactured by Syngenta Crop Protection, has been extensively used in cotton production and has the common name metolachlor. When metolachlor is manufactured, it contains a 1:1 ratio of two metolachlor isomers; the –*R* and the –*S* isomer. The –*S* isomer has greater herbicidal activity than the –R isomer, which allows for a reduction in the amount of –S isomer herbicide needed to obtain similar weed control compared to the –R isomer herbicide. To differentiate between metolachlor herbicides containing the –*R* or –*S* isomer consult the label under the "active ingredients" section. The –R isomer is denoted by metolachlor while the –*S* isomer is denoted by acetamide –(s). Alternatively, according to the Syngenta Crop Protection labels, if the trade names Bicep or Dual include the word "Magnum" (Dual Magnum, Dual II Magnum, Bicep II Lite Magnum), the –*S* isomer is an active ingredient. If the trade name does not include "Magnum", the metolachlor –*R*:-*S* isomer ratio is 1:1 (Dual II, Bicep II, Bicep Lite II).
[4] See "Appendix A" for **GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS.**

HERBICIDE-TOLERANT SOYBEAN VARIETIES

Roundup Ready Soybeans: These varieties are tolerant to overtop applications of glyphosate herbicide. The initial application of glyphosate should be made at 1.0 quarts/acre for the 4 lb ai/gal formulation when weeds are less than 4-inches tall. If the first application is made to weeds 5-12 inches tall, increase the glyphosate rate to 1.5 quarts/acre. Numerous formulations of glyphosate are available for use and are shown in Appendix A; therefore, rates may differ depending upon glyphosate formulation used. Additionally, ensure that the formulation is labeled for use in Roundup Ready soybean. Consult the product label for use requirements. Remember that the longer the weeds remain in the field, the larger they become and longer they compete with the soybean. Since some morningglories, hemp sesbania, yellow and purple nutsedge, and dayflower are not controlled with one application, two applications of glyphosate are often needed. Sequential treatments may be needed, depending upon weed pressure, growing conditions, and other factors. If applying glyphosate by air, be extremely careful to prevent off-site herbicide movement.

Classic + glyphosate tank mix: Classic (active ingredient chlorimuron) at 0.25 to 0.33 oz product/acre + glyphosate may be tank-mixed for improved post-emergence and perhaps some pre-emergence weed control in Roundup Ready soybean. A non-ionic surfactant at 0.25% v/v may be needed if glyphosate formulation does not contain a pre-loaded surfactant. Check the glyphosate to determine if additional surfactant is needed. Apply this tank-mix at the proper weed height and after the first soybean trifoliate leaf has expanded. Classic and all herbicides that contain chlorimuron have the tendency to persist in the soil is soil pH is greater than 7.0. If soil pH is greater than 7.5, do not apply Classic or chlorimuron containing herbicides.

Other glyphosate tank-mixes: Glyphosate may also be tank-mixed with Ultra Blazer, First Rate, Reflex, etc. for increased broadleaf weed control in Roundup Ready soybean. The best choice depends upon the weed spectrum present. Be certain to scout fields and choose an appropriate herbicide based on weed spectrum. Ultra Blazer is a good choice if hemp sesbania is present, but is somewhat weak on jointvetch. First Rate is a good choice if prickly sida and/or palmleaf morning glory is present. See Table 2 in soybean weed control section for addition information.

(**STS) Sulfonylurea tolerant soybean:** These varieties are tolerant to herbicides such as Classic, Canopy, or Synchrony STS (members of the sulfonylurea herbicide family). These varieties allow utilization of the sulfonylurea herbicides in high pH soils in the current crop year and in following crops. Soybean varieties are available that are tolerant to both glyphosate and sulfonylurea herbicides (STS/RR varieties).

Liberty Link soybean: These varieties are tolerant to overtop applications of Ignite 280 (glufosinate). The initial application of Ignite 280 should be made at 22 oz product/A, 7-10 days after soybean emergence. A sequential application of Ignite 280 should follow 10 – 14 days later or to 2-4 inch weeds. A maximum of 65 oz product/A/year can be applied. Do not apply past first bloom. Ignite 280 should provide good control of most broadleaf weeds, but is weak on grass weeds. For acceptable grass weed control, Ignite 280 should be applied to grasses less than 3 inches tall. The Liberty Link soybean weed control system works very well with a residual herbicide that provides grass control. In addition, metolachlor containing products may be tank-mixed with Ignite 280 to provide residual control of some small-seeded broadleaf and grass weeds. If Liberty Link soybean is planted in an area with known large grassy weed populations, then a graminicide such Select Max, Fusilade, etc. should be budgeted to control late-season grass problems.

RICE

TABLE 1. Effectiveness of selected pre-plant and pre-emergence rice herbicides on certain weeds.

	palmleaf morning glory	eclipta	barnyard grass	red rice	sprangletop	signal grass	fall panicum	sedge	alligator weed	ducksalad	redstem	hemp sesbania	waterhyssop	jointvetch	smartweed	dayflower	Texas weed
PRE-PLANT BURN-DOWN:																	
2,4-D	9	9	0	0	0	0	0	5	8	8	9	9	9	8	5	7	9
Gramoxone Inteon	8	9	9	8	9	9	9	5[1]	6	7	9	9	7	8	4	7	9
Grandstand	9	8	0	0	0	0	0	5	9	7	9	9	8	8	5	7	9
Roundup	7	8	9	7	9	9	9	7	7	7	9	7	7	7	6	6	9
FirstShot	-	7	0	0	0	0	0	5	9	7	-	8	-	8	9	-	-
Sharpen	8	7	0	0	0	0	0	3	3	3	8	8	-	7	7	4	6
PRE-PLANT INCORPORATED, PRE-PLANT or PRE-EMERGENCE:																	
Bolero PPS[2]	4	0	8	8	8	7	6	5	4	7	3	0	6	4	5	7	5
Bolero (DPRE)	5	8	8	0	8	5	7	5	4	8	8	6	8	5	5	8	6
Clearpath	8	8	9	8	8	9	5	9	6	8	8	7	6	7	6	7	8
Command	0	0	9	0	8	8	9	0	0	7	0	0	0	0	2	7	0
Facet (PRE drill-seeded)	8	8	9	0	0	9	5	2	4	3	4	7	6	7	0	5	4
Newpath PPI/PRE	8	6	8	8	8	9	5	9	6	8	8	4	6	4	6	7	8
pendimethalin + Facet (DPRE)	8	8	9	0	9	8	5	4	6	3	2	8	4	7	0	3	6

[1]Annual sedge suppression;
[2]With proper water management

RICE

TABLE 2. Effectiveness of selected post-emergence rice herbicides on certain weeds.

	palmleaf morning glory	eclipta	barnyard grass	red rice	sprangletop	signal grass	fall panicum	sedge	alligator weed	ducksalad	redstem	hemp sesbania	waterhyssop	jointvetch	smartweed	dayflower	Texas weed
2,4-D amine	9	9	0	0	0	0	0	2[1]	8	9	9	9	9	7	6	8	9
Aim[3]	8	6	0	0	0	0	0	5	5	4	6	9	7	4	8	5	6
Aim + Grandstand	9	8	0	0	0	0	0	5	8	6	9	9	8	9	8	6	7
Basagran	8	8	0	0	0	0	0	8	4	8	9	4	8	3	7[4]	9	2
Beyond	8	6	8	9	7	9	7	8	3	2	8	3	6	3	5	6	7
Blazer	5	4	0	0	0	0	0	0	4	3	9	9	0	0	0	0	5
Bolero + propanil	5	9	9	0	9	9	8[4]	7	5	7[4]	7[4]	9	9	8[4]	6[4]	8[4]	8
Broadhead	8	9	9	0	0	9	5[4]	5	6	4	6	9	7	7	8	5	6
Clearpath	8	9	9	8	6	9	6	8	6	3	3	8	6	8	6	6	7
Clincher[2]	0	0	9	0	9	9	8	0	0	0	0	0	0	0	0	0	0
Facet	8	9	9	0	0	9	5[4]	4	6	3	3	8	3	8	0	3	6
Facet + propanil	8	9	9	0	7[4]	9	8[4]	5[1]	6	7[4]	7[4]	9	8	9[4]	6[4]	7[4]	8
Grandstand	9	8	0	0	0	0	0	5	7	3	9	7	8	8	7	6	9
Grasp	3	7	9	0	3	3	3	8	7	8	8	9	7	7	8	7	6
League	9	8	0	0	0	0	0	8	6	7	8	9	-	8	-	8	8
Londax[2]	5	8	0	0	0	0	0	8	7	9	9	6	9	6	6	8	8
Newpath	8	6	8	8	6	9	4	8	3	2	8	3	6	3	4	6	7[3]
Permit/Halomax	7[3]	2	0	0	0	0	0	9	4	5	8	9	4	9	4	8	7[3]
Permit/Halomax + Londax	7[3]	8	0	0	0	0	0	9	7	9	9	9	9	9	6	8	8
Permit Plus	7[4]	9	0	0	0	0	0	9	6	7	9	9	6	9	8	8	7[4]
Propanil	5	8	9	0	7[4]	9	8[4]	4[1]	5	6[4]	7[4]	7	8	8[4]	6[4]	6[4]	6
propanil + Aim	9	8	9	0	7	9	8[4]	6	5	6	7	9	8	9	8[4]	6	6
propanil + Londax	9	9	9	0	7[4]	9	8[4]	9	7	7	9	9	8	9[4]	8	8[4]	9
propanil + Permit/Halomax	9	9	9	0	7	9	8	9	5	5	8	9	9	9	5	8	7[4]
pendimethalin + Facet	8	8	9	0	8	9	5[4]	4	6	3	2	8	4	7	0	3	6
pendimethalin + propanil	5	9	9	0	9	9	8[4]	5	5	7	9	9	8[4]	8[4]	6[4]	7	6
RebelEX	3	7	9[4]	0	9[4]	9[4]	8[4]	8	7	8	8	9	7	7	8	7	6
Regiment	8	6	9	0	3	3	0	7[1]	7	8[4]	8	8	7	8	7	7	8
RiceBeaux	5	9	9	0	9	9	8[2]	7	5	7[2]	7[2]	9	9	8[2]	6[2]	8[2]	0
Ricestar HT	0	0	9	0	8	9	7[4]	0	0	0	0	0	0	0	0	0	0
Strada	7	8	0	0	0	0	0	8	5	7	9	9	8	9	6	9	6

[1]Annual sedge suppression
[2]With proper water management;
[3]Weeds must be < 4 inches tall
[4]Controlled only when small (< 2 leaf).

RICE

Table 3. Activity of selective herbicide programs for perennial grass control[1]

	Brook paspalum	Knotgrass	Creeping rivergrass[4]	Water paspalum
Command PRE[2]	4	5	4	5
Command PRE fb Clincher[3]	5	9	8	8
Command + Facet PRE[2]	4	5	4	5
Command + Facet PRE[2] fb Clincher[3]	5	9	8	9
Command PRE fb Grasp[3]	5	5	7	5
Facet + pendimethalin DPRE[2]	4	6	5	7
Facet + pendimethalin DPRE fb Clincher[3]	6	9	7	9
Grasp[3]	4	2	6	2
Clincher fb Clincher[3]	7	9	8	9
Newpath fb Beyond[3]	7	9	8	8
Newpath fb Newpath[3]	7	9	8	8
Regiment fb Regiment[3]	3	2	7	2
Ricestar HT fb Ricestar HT[3]	3	4	5	6
propanil[3]	2	3	2	2

[1] Control rating is based on herbicides applied to small actively growing plant segments.
[2] Two weeks after application.
[3] One month after application.
[4] Also referred to as perennial barnyard grass.

RICE

Table 4. Crawfish production and rice herbicides.

2,4-D	May be toxic to aquatic invertebrates.	Beyond	Crawfish production not specifically mentioned.
Londax	Do not harvest crawfish prior to harvesting rice.	Newpath	Crawfish production not specifically mentioned.
Regiment	Crawfish not specifically mentioned.	Strada	Crawfish production not specifically mentioned.
Aim	Commercial crawfish not specifically mentioned; however, herbicide is moderately toxic to fish.	Bolero	Crawfish production not specifically mentioned. Toxic to shrimp.
Basagran	Do not use Basagran on rice fields in which the commercial cultivation of crawfish is practiced.	Clearpath	Do not use treated rice fields for aquaculture of edible fish and crustaceans (crawfish).
Broadhead	Do not use treated rice fields for aquaculture of edible fish and crustaceans (crayfish)	Duet	Do not apply to fields where commercial crawfish farming is practiced.
Command	Do not apply on rice fields in which concurrent crawfish farming is included in the cultural practices.	Grandstand	Do not commercially grow shellfish or crustaceans on treated acres during the year of treatment.
Facet	Do not use treated fields for aquaculture of edible fish or crawfish.	Grasp	Except for crawfish, do not fish or commercially grow fish, shellfish or crustaceans on treated acres during the year of treatment.
Clincher	Do not fish or commercially grow fish, shellfish or crustaceans on treated acres during the year of treatment.	RiceBeaux	Applications to fields where catfish/crayfish farming is practiced and draining water from treated fields into areas where catfish farming is practiced is prohibited during 12 months following treatment. Do not use adjacent to catfish/crayfish ponds.
Prowl/pendimethalin	Crawfish not specifically mentioned. Product may be hazardous to aquatic animals.	Ricestar HT	Ricestar must not be applied to fields where crawfish are cultured commercially.
propanil	Crawfish not specifically mentioned in restrictions. Commercial catfish production prohibited.	Storm	Do not use Storm on rice fields where commercial crawfish production is practiced.
Ultra Blazer	Do not harvest crawfish from treated rice areas for food.	Roundup and glyphosate formulations	Crawfish production not mentioned in restrictions. Cannot be applied to areas where surface water is present. Refer to individual glyphosate labels.
Permit/Halomax	Crawfish production not specifically mentioned in restrictions.	PermitPLUS	Crawfish not specifically mentioned
League	Do not apply to rice fields if fields are used for the aquaculture of edible fish and/or crustaceans	Sharpen	Crawfish not specifically mentioned

RICE[1]

Active Ingredient[2] and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT BURN-DOWN:			
2,4-D @ 0.5-1.0 lb/A	2,4-D @ 1.0-2.0 pt of 4 lb/gal material	Most broadleaf weeds.	Labels differ in the time interval between application and planting. Follow label restrictions regarding application timing and total amount of 2,4-D that can be applied per season.
paraquat @ 0.6-0.75 lb/A	Gramoxone Inteon @ 2-3 pt/A Apply with NIS @ 1-2 pt/100 gal	Most annual broadleaf weeds and grasses	Apply near planting and when weeds are less than 6 inches tall. Especially useful on small red rice immediately before flooding to water-seed. Apply 2 days before establishing a flood. Avoid nontarget drift.
triclopyr @ 0.375 lb//A	Grandstand @ 1.0 pt/A Surfactant required; see label.	Good on alligator weed and other perennial broadleaf weeds	Apply 21 days prior to planting. May be useful where 2,4-D use is restricted.
glyphosate @ 0.5-2.0 lb/A	4 L glyphosate formulations[3] @ 1-4 pt/A	Most annual grasses and many broadleaf weeds	Apply 7-14 days prior to planting. For use in reduced-till or no-till rice. Allow 5-7 days between application and flooding for planting.
thifensulfuron @ 0.0164-0.025 lb/A + tribenuron @ 0.0164-0.025 lb/A	FirstShot @ 0.5-0.8 oz/A Adjuvant required; consult label	Curly dock, henbit, smartweed, garlic	Apply before planting with other burn-down products like glyphosate or paraquat.
halosulfuron @ 0.032-1.33 oz/A	Permit/Halomax @ 0.66-1.33 oz/A Adjuvant required; consult label	Sedges, hemp sesbania, jointvetch	This is a 24C label that was approved March 10, 2008 and will expire in 5 years. Use as part of a pre-plant or at planting burn-down treatment. Safe on soil pHs up to 8. May injure rice under certain environmental conditions; see label.
saflufenacil @ 0.02-0.04 lb/A	Sharpen @ 1-2 oz/A Adjuvant required; consult label	broadleaf weeds	Apply in mixture with glyphosate, do not apply more than 2 oz/A/season. Allow 15 days prior to planting and 45 days prior to permanent flood establishment.
PRE-PLANT:			
thiobencarb @ 4.0 lb/A	Bolero 10G @ 40 lbs/A	Barnyard grass, sedges, partial control of red rice	Apply after flooding before seeding into "clear water". Do not disturb field after application**. Don't use if fields were cultivated while flooded.**
thiobencarb @ 4.0 lb/A	Bolero 8 EC @ 4 pt/A	Barnyard grass and annual sedges. Partial control of red rice. Ducksalad and waterhyssop on silt loam soils	Apply immediately after soil preparation and before flooding for water-seeding. Apply to seedbed free of vegetation. Field should be flooded, seeded with pre-sprouted seed, drained to optimize stand, and re-flooded when seedlings have rooted (within 5 days).
PRE-EMERGENCE:			
clomazone @ 0.3-0.5 lb/A	Command 3 ME @ 0.8-1 pt/A on light soil 1-1.33 pt/A on heavy soil	Annual grasses	Apply after planting before rice and weeds have emerged. **Consult label before applying by air.** Adhere to buffer zone restrictions. Medium grain varieties may be more sensitive to Command.

RICE[1]

Active Ingredient[2] and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
quinclorac @ 0.25-0.5 lb/A	Facet L @ 0..67-0.89 qt/A on light soil 0.89-1 qt/A on medium soil 1-1.3 qt/A on heavy soil	Barnyard grass, hemp sesbania, Broadleaf signal grass, morning glory Does not control sprangletop	**Drill-seeded rice only.** Apply after planting before rice and weeds have emerged. Do not use on sand or loamy sand. Can injure rice that is not covered with soil. Rainfall or flushing needed to activate.
DELAYED PRE-EMERGENCE:			
thiobencarb @ 4.0 lb/A	Bolero @ 4 pt/A	Barnyard grass, sprangletop, annual sedges, suppression of broadleaf weeds	Apply after planting dry-seeded rice once soils have been sealed by rainfall or a flush, but 1-5 days before rice emerges. Don't allow soil to dry and crack. Control usually will not exceed 3 wks.
quinclorac @ 0.19-0.375 lb/A + pendimethalin @ 1 lb/A	Facet 75 DF @ 0.25-0.5 lb/A or Facet L @ 0.5-1 qt/A + pendimethalin 3.3 EC @ 2.4 pt/A **or** Prowl H2O @ 2.1 pt/A	Barnyard grass, broadleaf signal grass, sprangletop, morning glory, hemp sesbania, northern jointvetch	**Drill-seeded rice only.** Apply 5-9 days after planting to soil that has been sealed by rain or a flush. Drain surface water before application. Rice seed exposed to spray may be severely injured. Rice seed must have imbibed water prior to application. Rainfall or flush required for reactivation.
POST-EMERGENCE:			
2,4-D @ 1.25-1.5 lb/A	2,4-D (3.8 L) @ 2.5-3.0 pt/A	Most broadleaf weeds, seedling sedges	Apply after rice tillers, but before panicle initiation. Best time is at the first green ring which is the beginning of elongation, but apply up to second green ring. Earlier or later applications may result in rice injury. Rice should have a shallow flood at the time of treatment.
carfentrazone @ 0.025-0.05 lb/A	Aim 2 EC @ 1.6-3.2 oz/A	Hemp sesbania, red stem, toothcup, palmleaf morning glory, 1-2 leaf jointvetch	Apply to rice with at least 2-3 leaves and actively growing. Add surfactant only when large weeds are present. Expect injury with high temperatures and humidity.
thiobencarb @ 3.0 lb/A + propanil @ 3.0 lb/A	Bolero @ 3.0 pt/A + propanil @ 3.0 lb/A (see propanil label for appropriate amount) RiceBeaux @ 4 qt/A	Annual grasses, some sedges, small broadleaf weeds	**In dry-seeded** rice apply after emergence if soil is wet. If soil is dry wait until rice has 2-3 leaves. **In water-seeded** apply after rice has 2 leaves. Treatment will provide residual activity if field is flushed or flooded within 3 days. Do not submerge rice when applying the permanent flood.
carfentrazone @ 0.00975- 0.02 lb/A + quinclorac @ 0.165-0.35 lb/A	Broadhead @ 4-12.1 oz/A	Barnyard grass, signal grass, joint Hemp sesbania, red stem, toothcup, palmleaf morning glory, hemp sesbania, 1-2 leaf jointvetch	A prepackage mixture of quinclorac plus carfentrazone (Aim) for control of broadleaf weeds and grasses. Quinclorac provides both residual and post-emergence activity and carfentrazone provides only post-emergence activity. The product is labeled as pre-plant, pre-emergence, and Post-emergence to rice; however, it has a better fit as a Post-emergence herbicide. Rice should have at least 2 true leaves before Broadhead is applied post-emergence.

RICE[1]

Active Ingredient[2] and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
clomazone @ 0.3-0.5 lb/A	Command 3 ME @ 0.8-1.33 pt/A Impregnate on 150 lb/A fertilizer	Barnyard grass, broadleaf signal grass, junglerice, sprangletop, ducksalad	**Water seeded rice only**: Apply when rice is pegging and actively growing with 1-2 visible leaves. Allow 24-48 hours before flushing or establishing a pinpoint flood. Hybrids, medium and short grain cultivars may be more sensitive.
cyhalofop @ 0.25-0.28 lb/A	Clincher @ 13-15 oz/A Adjuvants are required; consult label	Barnyard grass, broadleaf signal grass, fall panicum, junglerice, knotgrass, sprangletop	Apply pre-flood on 1-3 leaf grass or post-flood on 1-2 tiller grass. Use 13 oz/A when applied early. Use 15 oz/A when applied on larger grasses or perennials. Best activity under saturated soil conditions. Refer to label for approved tank-mixes, additives and adjuvants.
bentazon @ 0.75-1.0 lb/A	Basagran @ 1.5-2.0 pt/A Adjuvant is generally needed. Consult label.	Redstem, ducksalad dayflower, some sedges	Apply before weeds exceed labeled heights. Lowering of the flood may be necessary to expose weeds to insure proper coverage. Refer to label for tank-mix options.
propanil @ 3.0-6.0 lb/A	Sold under various trade names. 4 L/SC/EC @ 3-6 qt/A 80 DF @ 3.5-7 lb/A Consult labels; dry and non-EC formulations require the addition of adjuvants.	Most annual grasses, some sedges, broadleaf weeds in the seedling stage	Apply to grasses before the 4 leaf stage. Usually within 10-14 days after seeding. Use 3 lb for grass in the 1-2 leaf stage; add 1lb for each additional leaf. Use 5-6 lb on 5 leaf-tillering grasses; control usually not satisfactory.
bensulfuron @ 0.45-0.6 oz/A	Londax 60 DF @ 0.75-1.0 oz/A Adjuvant required; consult label.	Eclipta, gooseweed, redstem, Sedges	Apply 1-7 days following permanent flood. Need 3-4 leaves above water level at the time of treatment.
bensulfuron @ 0.6 oz/A + propanil @ 3.0-4.0 lb/A	Londax 60 DF @ 1.0 oz/A + propanil @ 3.0-4.0 lb/A See propanil label for appropriate amount and adjuvant requirements.	Eclipta, gooseweed, palmleaf morning glory, Texas weed, sedges, grasses	Apply before permanent flood. Good for controlling aquatic weeds where 2,4-D cannot be used.
quinclorac @ 0.375-0.50 lb/A	Facet 75DF @ 0.50-0.67 lb/A Facet L @ 1-1.3 qt/A Apply with COC @ 2 pt/A	Barnyard grass, signal grass, jointvetch, hemp sesbania. Suppression of alligator weed at the highest rate.	**In water-seeded** rice apply after the 2 leaf rice stage. **In dry-seeded rice** apply after emergence. Does not control sprangletop. After application, flushing may be required for reactivation.
quinclorac @ 0.375 lb/A + propanil @ 3.0 lb/A	Facet 75DF @ 0.50 lb or Facet L @ 1qt/A + propanil @ 3.0 lb/A (see propanil label for appropriate amount)	Same as above plus increased control of sprangletop, some sedges	For timing, see quinclorac comments above. Follow directions on propanil label for adjuvants.

RICE[1]

Active Ingredient[2] and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
triclopyr @ 0.375 lb/A	Grandstand @ 1.0 pt/A Apply with NIS or COC; consult label.	Alligator weed, Texas weed, jointvetch, other broadleaf weeds Sesbania control is improved with propanil; see label.	Apply when weeds are small. Rice must be in the 3-4 leaf to 1/2" internode stage. Weak on ducksalad, overlapping of swaths may result in rice injury. Do not "dress" ends of field. Two applications per season are allowed.
bispyribac-sodium @ 0.32-0.63 oz/A	Regiment 80 WP @ 0.4-0.8 oz/A Adjuvant required; consult label.	Barnyard grass, junglerice, nutsedge, small broadleaf weeds Little to no control of sprangletop, signal grass, fall panicum.	Apply to rice that is at least 3 leaves. Barnyard grass should be 1 leaf-tillering. Broadleaf weeds should be 1-4 leaf. Controls large barnyard grass and junglerice and suppresses some perennial *Echinochloa* species.
penoxsulam @ 0.032-0.036 lb/A	Grasp @ 2-2.3 oz/A Apply with COC or MSO @ 1 qt/A.	Barnyard grass, junglerice, ducksalad, annual sedges, small actively growing weeds. Little to no control of sprangletop, signal grass, fall panicum.	**In drill-seeded** rice apply from emergence up to 60 days before harvest. **In water-seeded** rice apply from pegging-1 leaf (no exposed roots) up to 60 days before harvest. Consult label for rates used post-flood or on larger weeds. Refer to label for surface irrigation and permanent flood establishment
bensulfuron @ 0.6-1.0 oz/A	Londax 60 DF @ 1.0-1.60 oz/A	Aquatic broadleaf weeds, sedges. Suppression of alligator weed.	Apply into flood when weeds are small and submerged. Alligator weed cannot be well established. Control may be reduced under cold water conditions. Londax may be applied impregnated on dry fertilizer. May not control certain populations of ducksalad.
halosulfuron @ 0.023-0.063 lb/A	Permit/Halomax @ 0.5-1.333 oz/A Apply with NIS @ 1qt/A	Sedges, hemp sesbania, jointvetch	Apply after rice emergence to 48 days before harvest. Do not use more than 1.33 oz/A/season. Consult label for post-flood applications.
bensulfuron @ 0.028-0.04 lb/A + halosulfuron @ 0.012-0.023 lb/A	Londax @ 0.75-1 oz/A + Permit/Halomax @ 0.25-0.5 oz/A Adjuvant required; consult label.	Sedges, hemp sesbania, jointvetch, most aquatic weeds	See comments for bensulfuron and halosulfuron.
halosulfuron @ 0.03 lb/A + thifensulfuron@ 0.004 lb/A	PermitPLUS @ 0.75 oz/A Adjuvant required; consult label.	Sedges, hemp sesbania, jointvetch, most aquatic weeds	May be applied as a burn-down application along with glyphosate. Apply after rice emergence to 48 days before harvest. Do not use more than 1.5 oz/A/season.
imazosulfuron @ 0.15-1.19 lb/A	League @ 3.2-4 oz/A Adjuvant required; consult label.	Sedges, hemp sesbania, jointvetch, Texas weed	Apply to rice in the 2 leaf stage up to 2" internode. Do not apply more than 6.2 oz/A/season.
orthosulfamuron @ 0.053-0.065 lb/A	Strada 50 WG @ 1.7-2.1 oz/A Adjuvant required; consult label.	Annual sedges, hemp sesbania, jointvetch	Apply after the 2-3 leaf rice stage to actively growing weeds with 1-4 leaves. Strada may be mixed with other herbicides to broaden spectrum; see label.

RICE[1]

Active Ingredient[2] and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
penoxulam 0.03-0.04 lb/A @ + cyhalofop @ 0.22-0.28 lb/A	RebelEX @ 16-20 oz/A	Barnyard grass, broadleaf signal grass, fall panicum, junglerice, knotgrass, sprangletop, ducksalad, hemp sesbania, annual sedges	A prepackage mixture of Clincher plus Grasp. Apply to small actively growing weeds. Grasses should not exceed the 3-leaf stage to avoid antagonism. Field should be wet for maximum Clincher activity; however, plant should be 75% exposed for Grasp activity.
fenoxaprop @ 0.059-0.109 lb/A	Ricestar HT 0.58 EC @ 13-24 oz/A	Barnyard grass, broadleaf signal grass, junglerice, sprangletop.	Apply 13 oz/A on 1-2 leaf grasses and up to 24 oz/A on larger grasses. Activity decreases on grasses with more than 4 leaves. Do not apply more than 30 oz/A/season. Tank-mix with only approved herbicides, see label.
aciflurofen @ 0.125 lb/A	Ultra Blazer 2L @ 0.5 pt/A Apply with NIS @ 1 qt/100 gal	Hemp sesbania	Apply after sesbania is above rice plants but before sesbania flowers. Do not apply within 50 days of harvest. Refer to label for tank-mixes.
HERBICIDE-TOLERANT RICE:			
imazamox @ 0.031-0.047 lb/A	Beyond @ 4-6 oz/A POST Adjuvant required; consult label.	Red rice, barnyard grass, broadleaf signal grass, junglerice, sedges. Some broadleaf weeds.	Apply after one application of imazethapyr on rice 4-leaf up to 14 days after PI. Approved for tolerant Clearfield rice cultivars and Clearfield hybrids. Refer to label for approved tank-mixes.
imazethapyr @ 0.063 lb/A + quinclorac @ 0.312 lb/A	Clearpath @ 0.5 lb/A Adjuvant required; consult label.	Red rice, hemp sesbania, barnyard grass, broadleaf signal grass, junglerice, sedges	Apply pre-plant up to 7 days prior to planting, pre-emergence, or post-emergence (up to 5 leaf rice if drill-seeded, and 2-leaf rice if water-seeded). Approved for tolerant Clearfield rice cultivars and Clearfield hybrids. Refer to label for tank-mixes. **Must be preceded or followed by a 2nd imazethapyr application.**
imazethapyr @ 0.063-0.094 lb/A	Newpath @ 4-6 oz/A Adjuvant required; consult label.	Red rice, barnyard grass, broadleaf signal grass, junglerice	**Two applications required:** The first application can be lightly incorporated before planting or applied pre-emergence or at the spike-leaf rice stage. The second application should be applied to 3-5leaf rice or 10-14 days after the spiking treatment. Approved for tolerant Clearfield rice cultivars and Clearfield hybrids.
SALVAGE TREATMENT:			
fenoxaprop	Ricestar HT @ 12 oz/A + Whip 360 @ 5 oz/A or Ricestar HT @ 9 oz/A + Whip 360 @ 8 oz/A	Barnyard grass, broadleaf signal grass, junglerice, sprangletop	Apply to 4 leaf-tillering grasses. As grass size increases reduce the rate of Ricestar and add Whip 360. When adding Whip 360 refer to label for application precautions. Do not apply Ricestar + Whip to aromatic, short, and medium grain rice varieties.

RICE

ADDITONAL COMMENTS/FOOTNOTES

RATOON CROP HERBICIDES:

2,4-D, Basagran, Grandstand, and Grasp are also labeled for ratoon (stubble) crop rice. See labels for rates and timing of application.. Refer to individual 2,4-D label for specific mention of use on ratoon rice.

OTHER LABELED HERBICIDES:

Several additional herbicides have been labeled for rice. Although not generally recommended by the LSU Agricultural Center for all rice farmers, these materials may have some use in certain situations.

pendimethalin + propanil (post-emergence)	Apply 1.8-2.4 pts/A of pendimethalin (Use higher rates on heavier soils) + 3.0-4.0 qts/A of propanil. Apply when barnyard grass is in the 1 to 3-leaf stage of growth. Reflooding or flushing of field may be delayed. Rainfall or flushing of field within 7 days is required to activate pendimethalin. If used on water-seeded rice do not apply before the 3 to 4-leaf stage.
pendimethalin (delayed - drill-seeded)	Apply 1.8-2.4 pt/A of pendimethalin (use higher rates on heavier soils). Apply after rice seed has absorbed water and germinated. Soil should be sealed from rainfall or flushing before application. May be mixed with Roundup Ultra or Facet.

FOOTNOTES

[1] Refer to the burn-down section of this guide for additional suggestions on managing cool season weeds. **Water-seeded, no-till systems.** Research has shown that dense vegetation may be effectively killed with herbicides but stand establishment is difficult because of inadequate soil/seed contact due to mats of dead vegetation. Additional research has shown that soil that has been kept free of vegetation all winter will become compacted and rice seedling may have difficulty "pegging" and will tend to drift.

[2] Certain populations of barnyard grass, ducksalad, and pickerelweed have become resistant to some traditional herbicides. If this occurs use alternative herbicides. Contact your local county agent for recommendations. Also refer to the herbicide resistance section of this guide for suggestions on herbicide resistance management.

[3] See "Appendix A" for **GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS.**

SMALL GRAINS

Table 1. Effectiveness of selected small grain herbicides 4 weeks after application.[1]

	annual bluegrass	annual ryegrass	canary grass	little barley	wild garlic	wild onion	henbit	curly dock	swinecress	vetch	buttercup	shepherd's purse	bittercress	cutleaf evening primrose	chickweed
PRE-PLANT:															
Finesse	9	7	-	3	5	5	9	8	9	3	9	9	9	9	9
PRE-EMERGENCE:															
Finesse	9	7	-	3	5	5	9	8	9	3	9	9	9	9	9
POST-EMERGENCE:															
2,4-D	0	0	0	0	6	8	7	9	8	9	9	9	9	9	8
dicamba plus 2,4-D	0	0	0	0	8	9	8	9	9	9	9	9	9	9	9
Harmony Extra	0	0	0	0	9	7	8	9	8	8	9	9	9	8	9
Hoelon	0	9[3]	8	5	0	0	0	0	0	0	0	0	0	0	0
metribuzin	9	7[4]	6	7	0	0	9	7	8	3	9	9	9	8	9
Osprey	9	9[5]	8	5	5	5	9	7	8	3	9	9	6	6	7
Axial	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0
Powerflex	8[6]	9[5]	9	3	5	5	9	9	9	9[7]	9	9	9	9	9
Prowl H_2O[2]	9	7	8	3	0	0	9	3	-	0	-	-	-	3	-
Finesse	9	7[5]	-	0	6	6	9	8	8	3	8	9	9	8	9

[1] Not all small grain herbicides are listed. Not all the herbicides or their use patterns are labeled or safe on all small grains. Here is a summary of which crop/use pattern is labeled on small grains grown in Louisiana: **Wheat** – All herbicides listed are labeled. **Barely** – Do not use Osprey or Powerflex at any time or Finesse pre-plant or pre-emergence. **Oats** – Only 2, 4-D and Harmony Extra are labeled. **Rye** – Only 2, 4-D is labeled.

[2]Prowl H_2O will not control emerged weeds. Apply after wheat emerges but before weeds emerge. Use as a residual component with post-emergence herbicides.

[3]Will not control ACCase resistant ryegrass.

[4]This rating is based on fall applications made to wheat with two to three leaves before ryegrass emerges. Later applications are not effective.

[5]Will not control ALS resistant ryegrass.

[6]Not listed on the label, but fall applications have controlled small bluegrass in Louisiana. Spring applications do not consistently control bluegrass.

[7]Expect regrowth four to six weeks after application; follow up applications of 2,4-D or Harmony usually are required.

SMALL GRAINS

Table 2. Winter wheat response to 3 and 6 oz/A metribuzin (75 DF) applied to 2-3 leaf wheat[1].

Variety	Wheat Yield Reduction (%) 3 oz/A	6 oz/A	Variety	Wheat Yield Reduction (%) 3 oz/A	6 oz/A
Excellent tolerance: no injury or yield loss expected[2]					
USG 3438	0	0			
Good tolerance: injury and/or yield loss possible[2]					
AGS 2035	0	0	Pioneer 26R61	0	0
Coker 9553	0	0	Progeny 117	0	1
Croplan 8302	0	0	Progeny 185	1	0
Delta King 909	0	2	Terral LA21	0	0
Delta King 9577	0	0	Terral TV8861	0	0
Dixie 454	0	1	USG 3120	0	0
Dyna-Gro Oglethorpe	0	0	USG 3201	0	0
Magnolia	0	8			
Fair tolerance: injury probable and yield loss possible[2]					
AGS 2026	0	0	Dixie 427	0	0
AGS 2031	0	5	Dyna-Gro Baldwin	0	0
Delta Grow 1600	0	0	Pioneer 26R87	0	11
Delta Grow 5900	0	10	Progeny 166	0	1
Delta Grow 8300	0	0	Terral TV8581	0	0
Delta King 9108	0	2			
Poor tolerance: injury and yield loss probable[2]					
AGS 2060	0	26	Terral LA 841	0	21
Coker 9700	1	5	UGS 3295	0	9
Delta Grow 5000	0	17	USG 3555	7	15
Oakes	6	15			

[1]Data is averaged across trials conducted in Alexandria, Winnsboro and Saint Joseph, La.

[2]Rankings are based visual ratings recorded 1 through 13 weeks after application and yield loss. Visual injury and yield loss data following 6 oz/A metribuzin were used to determine the level of tolerance.

SMALL GRAINS

Table 3. Control strategies for selected weeds[1].

Weed Problem	Suggested Management Strategies
General weed control	The best weed control and wheat yields are observed when weeds are managed in the fall. Fields should be treated with glyphosate or paraquat prior to or at planting to ensure wheat emerges before weeds.
Ryegrass	Two applications are usually required to manage ryegrass. The first application should be applied in the fall and the second application should be applied in the winter (January or February). Metribuzin, Finesse, Osprey and Powerflex are good choices for managing ryegrass in the fall. Metribuzin must be applied at the 2-3 leaf wheat stage before ryegrass emerges. To control ryegrass Finesse should be applied pre-plant or pre-emergence before wheat and ryegrass emerge. When using Finesse, fields must be fallowed or planted to STS soybeans. Powerflex and Osprey should be applied post-emergence when ryegrass reaches the 2 to 3 leaf stage. Finesse, Powerflex and Osprey will not control ALS resistant ryegrass. Hoelon and Axial are the best choices for managing ryegrass in January or February. Hoelon will not control ACCase resistant ryegrass or ryegrass that has tillered. Axial has been the most consistent herbicide for managing ryegrass in February.
vetch	Two applications are often required to manage severe infestations. Powerflex and Harmony Extra can be used in the fall for control. In most situations, Powerflex in the fall followed by Harmony Extra in January or February is the best control strategy. 2,4-D can also be used after wheat has finished tillering and before jointing.
little barley	Start clean and then apply metribuzin as soon as wheat reaches the 2-3 leaf stage. A second application may be required after wheat begins to tiller. Osprey, Powerflex and Axial may provide some suppression but will not control little barley.

[1]See next section for more information regarding specific herbicides. Labels and recommendations may change. Always consult the label before using suggested herbicides.

SMALL GRAINS (Wheat, Barley, Oats and Rye)[1]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
chlorsulfuron @ 0.016 lb ai/A + metsulfuron @ 0.003 lb ai/A	Finesse @ 0.4 oz/A	Most common broadleaf weeds and annual bluegrass. Suppresses ryegrass.	**Wheat only:** Apply before planting. Drill wheat at least 1 inch deep or injury may occur. Do not use if wheat will be broadcast-seeded. Can be mixed with glyphosate to control emerged weeds. Extremely long rotation interval for most crops grown in Louisiana. STS soybeans can be grown 6 months after application; all other crops can be grown 18 months after application. Do not use an organophosphate insecticide within 60 days of application. Can be applied in a liquid nitrogen solution. No grazing restrictions.
PRE-EMERGENCE:			
chlorsulfuron @ 0.0195 lb ai/A + metsulfuron @ 0.004 lb ai/A	Finesse @ 0.5 oz/A	Most common broadleaf weeds and annual bluegrass. Suppresses ryegrass.	**Wheat only:** See comments on pre-plant section.
POST-EMERGENCE:			
2,4-D amine @ 0.5 - 1.0 lb/A 2,4-D ester @ 0.5 – 1.0 lb/A 2,4-D acid @ 0.2 – 0.7 lb/A	Various @ 1.0 - 2 pt/A* Various @ 1.0 – 2 pt/A* Barrage @ 6 -13 oz/A Unison @ 1.0 – 3.25 pt/A * Based on 4 lb/gal product. See product labels for correct rate.	Dock, plantain, mustard and other broadleaf weeds. Also winter peas and vetch **Wild onion or wild garlic**. Use the highest labeled rate. Control will not be complete, but aerial bulblet formation will be reduced. Less effective on wild garlic than on wild onion.	Application timing and grazing restrictions may vary; always refer to the label. Most labels allow applications after the onset of tillering. Applications are safest after 2-3 tillers have formed. Do not apply at panicle initiation, panicle differentiation, boot or heading stages. Panicle initiation and differentiation occur around the time the first internode is 0.5 inches long. Choose sunny days for making the application. LVE formulation is more compatible with nitrogen solutions. Do not graze or feed forage from treated fields within two weeks after treatment. D not to exceed these rates or severe injury may occur. **If used on oats or rye make application only after tillering is complete and before jointing.**
dicamba @ 0.125 lb/A + 2,4-D amine @ 1 lb/A	Clarity/Banvel @ 4 oz/A + 2,4-D amine @ 2.0 pt/A	Most broadleaf weeds, winter peas and vetch. More effective on wild onion and wild garlic than 2,4-D alone.	**Wheat and Barley:** Do not use unless potential injury is acceptable. Application timing same as for 2,4-D, except that this combination may not be used after jointing.
thifensulfuron @ 0.009- 0.018 lb/A + tribenuron @ 0.0.0045 - 0.009 lb/A oz/A	Harmony Extra SG @ 0.45–0.9 oz/A Apply with NIS @ 1-2 pt/100 gal	Wild garlic and many broadleaf weeds. Use 0.75 to 0.9 oz/A for wild garlic. Does not control wild onion.	**Wheat, Barley and Oats:** Apply after the 2 leaf stage but before the flag leaf emerges. Do not use with nitrogen.

SMALL GRAINS (Wheat, Barley, Oats and Rye)[1]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE:			
diclofop @ 0.80–1.5 lb/A	Hoelon @ 2.0–3.33 pt/A	Annual Ryegrass Does not control annual bluegrass.	**Wheat and Barley:** Apply 2.0 to 2.66 pts/A to ryegrass from emergence until the 2-leaf stage. Use 2.66 to 3.33 pt/A from the 3 leaf stage to tillering. Do not mix with other herbicides.
metribuzin @ 0.14 lb/A	various 75DF @ 3.0 oz/A	Annual bluegrass, henbit and chickweed	**Wheat and Barley:** Apply between the 2 leaf and 2 tiller crop stage before weeds emerge. Injury may occur when applications are made to waterlogged soils. Some varieties may be sensitive to metribuzin.
mesosulfuron-methyl 0.013 lb/A	Osprey @ 4.75 oz/A Apply with MSO @ 1.5 pt/A	Annual bluegrass, limited broadleaf weed control Good control of non-ALS resistant ryegrass.	**Wheat only:** Apply when ryegrass is in the 1-leaf to 2-tiller stage. Can be applied from wheat emergence to jointing. Best results are obtained if applications are made before ryegrass tillers. Some transient leaf burn may occur if applied with nitrogen fertilizers. Can be tank-mixed with some broadleaf herbicides, insecticides and fungicides; consult label. See label for rotation intervals.
pinoxaden @ 0.054	Axial XL @ 16.4 oz/A	Ryegrass – **Will not kill Hoelon resistant ryegrass.** Does not control annual bluegrass.	**Wheat and Barley:** Apply between the 2 leaf and pre-boot stage. For optimum control apply prior to the 3 tiller stage of ryegrass. Can be tank – mixed with some broadleaf herbicides, insecticides and fungicides. Consult label for approved pesticides. Do not graze within 30 days of application or harvest within 60 days of application. Straw can be fed to livestock 60 days after application. Rotation restrictions: 0 days – wheat and Barley; 30 days –leafy and root crops; 120 days – all other crops.
pyroxsulam @ 0.016 lb ai/A	Powerflex @ 3.5 oz/A Apply with NIS @ 0.25 to 0.5 % v/v plus 1 to 2 qt/A UAN or 1.5 to 3 lb/A AMS; COC @ 1 to 1.25 % v/v; or MSO @ 1% v/v.	Most common broadleaf weeds, including vetch. Good annual bluegrass control when applied in the fall. Excellent control of non-ALS resistant ryegrass.	**Wheat only.** Apply anytime between the 3 leaf stage and jointing. Best results are obtained when applied in the fall to actively growing weeds. COC or MSO may be required with spring applications, large weeds or under poor growing conditions. COC and MSO increase the risk of injury. Do not apply liquid fertilizer within 7 days of an application. Do not graze within 7 days or cut hay within 28 days of an application. Do not apply organophosphate insecticides within 5 days of an application. Cotton, soybean, grain sorghum and sunflowers can be planted 3 months after application. Corn can be planted 9 months after application. The rotation interval for rice and sweet potatoes is 12 months.

SMALL GRAINS (Wheat, Barley, Oats and Rye)[1]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
Post-emergence: continued			
pendimethalin @ 0.7 to 1.4 lbs ai/A	Prowl H_20: Coarse soil -1 to 2 pts/A Medium soil – 1.5 to 3 pts/A Fine soil- 2 to 3 pts/A In most situations use 1.5, 2.1, or 2.6 pts/A coarse medium, or heavy soil, respectively.	Residual/pre-emergence control of many broadleaf weeds and annual grasses. Suppresses ryegrass.	**Wheat only**. Apply after wheat reaches the 1-leaf stage until flag leaf emergence. Wheat should be planted 0.5 to 1 inch deep. Must be applied before weeds emerge. May be applied with any herbicide labeled for wheat. Applications before wheat emerges may result in severe stand reductions. Do not harvest hay or forage within 28 or 11 days of application, respectively. Do not apply within 60 days of harvest.
chlorsulfuron @ 0.016 lb ai/A + metsulfuron @ 0.003 lb ai/A	Finesse @ 0.4 oz/A Apply with NIS @ 1-2 pt/A	Most common broadleaf weeds and annual bluegrass. Suppresses ryegrass.	**Wheat and Barley:** Apply anytime between the 1 leaf and boot stage. Do not apply in any boot or heading stage. Extremely long rotation interval for most crops grown in Louisiana. STS soybeans can be grown 6 months after application; all other crops can be grown 18 months after application. Do not use an organophosphate insecticide within 60 days of application. Can be applied in a liquid nitrogen solution. No grazing restrictions.

[1] Not all small grain herbicides are listed. Not all the herbicides or their use patterns are labeled or safe on all small grains. Here is a summary of which crop/use pattern is labeled on small grains grown in Louisiana: **Wheat** – All herbicides listed are labeled. **Barely** – Do not use Osprey or Powerflex at any time or Finesse pre-plant or pre-emergence. **Oats** – Only 2, 4-D and Harmony Extra are labeled. **Rye** – Only 2, 4-D is labeled.

SUGARCANE WEED MANAGEMENT

The Sugarcane Weed Management Guide is prepared as a joint effort between Dr. Jim Griffin, School of Plant, Environmental and Soil Sciences, LSU AgCenter, Baton Rouge, La., and Dr. Caleb Dalley, USDA-ARS, Sugarcane Research Unit, Houma, La. The sections in the guide are in chronological order based on the sugarcane growing season from at-planting through harvest. Also included are sections on fallow and ditchbank weed control. For additional information concerning herbicides listed in this weed guide, consult the herbicide label. Expected weed control with sugarcane herbicides is provided in Table 1. Herbicides registered for use in sugarcane in Louisiana are included in Table 2. A listing of glyphosate products with surfactant recommendations is provided in Table 3. Information related to weed management programs for sugarcane and other crops can be found at http://www.lsuagcenter.com/en/communications/publications/management_guides/2011+Louisiana+Suggested+Chemical+Weed+Management+Guide.htm.

Rates for herbicides are expressed on a broadcast basis. To calculate band rate, for liquid and dry formulations, use the formula provided below.

$$\frac{\text{Band width in inches}}{\text{Row width in inches per acre per acre}} \times \text{Broadcast RATE} = \text{Band RATE}$$

AT-PLANTING WEED CONTROL (AUGUST/SEPTEMBER)

Herbicides may be applied on a band to the top of the row or broadcast. A broadcast application will help reduce weed encroachment from the row middles. Herbicide should be applied immediately after the row has been rolled or packed. Because residual weed control for herbicides applied at planting can be expected for about 60 days, a follow-up application of herbicide may be needed to prevent re-establishment of summer weeds and to control winter weeds. See "At-Planting Pre-emergence Split Application Programs" and "Post-emergence Weed Control (September-November)" sections. Herbicide application also will be needed on fields harvested for seed, especially where Bermuda grass, Johnson grass, and itch grass are a problem.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
AT-PLANTING PRE-EMERGENCE (AUGUST/SEPTEMBER):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine/**others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22- 4.44 lb/A	Annual summer and winter broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ** 45 DF @ 16 - 33 oz/A *See table below for equivalent rates of Spartan 4F and metribuzin 75DF*	Morning glory (tie-vine) and other broadleaf weeds, and nutsedge	Use higher rate on clay soils and soils with organic matter higher than 2%. At the highest rate of 33 oz/A the amount of metribuzin in Authority MTZ is not sufficient to provide grass control.
mesotrione @ 0.19 - 0.24 lb/A	**Callisto** 4L @ 6 - 7.7 oz/A	Annual summer and winter broadleaf weeds	Use higher rate on heavy soils or when sugarcane is planted prior to early September.
clomazone @ 1.0 - 1.25 lb/A	**Command 3ME** @ 2.66 - 3.33 pt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Addition of diuron or metribuzin can provide broadleaf weed control and Bermuda grass suppression. Bleaching can occur where sugarcane has less than two inches of soil cover.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx/**others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3 qt/A	Broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
AT-PLANTING PRE-EMERGENCE (AUGUST/SEPTEMBER):			
	80 DF formulation @ 3 - 3.75 lb/A		
hexazinone plus diuron @ 0.5 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	Can provide Bermuda grass suppression. Can be applied with pendimethalin to improve itch grass control. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A.
pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H_2O/**others *(See Table 2)* 3.3EC formulation @ 2.4 - 3.6 qt/A 3.8CS @ 2.1 - 3.1 qt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	May be applied to the soil surface or incorporated. Use higher rate on heavy soils. Should be applied with other herbicides for broadleaf weed control.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin/Sencor/**others *(See Table 2)* 75 DF formulation @ 2.0 - 4.0 lb/A	Seedling Johnson grass and other annual grass and broadleaf weeds	Safe to sugarcane on all soil types. Use higher rate on heavy soils and when sugarcane is planted prior to early September. Can provide suppression of Bermuda grass at higher rates. Addition of pendimethalin can improve control of browntop panicum and itch grass.
terbacil @ 0.8 - 1.2 lb/A	**Sinbar** 80WP @ 1.0 - 1.5 lb/A (1.0 lb/A on very sandy soils)	Seedling Johnson grass and other grass and broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Can provide suppression of Bermuda grass at higher rates. Addition of pendimethalin can improve control of browntop panicum and itch grass.
sulfentrazone @ 0.31 - 0.38 lb/A	**Spartan 4F** @ 10.0 - 12.0 oz/A *See table below for equivalent rates of Spartan 4F when using Authority MTZ*	Broadleaf weeds and nutsedge	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
trifluralin @ 2.0 - 4.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4 lb/gallon formulation @ 1.0 - 2.0 qt/A (banded)	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Roll or pack rows and incorporate herbicide within 24 hours after application. Avoid incorporation at a depth that will damage seed pieces. Can provide suppression of Bermuda grass at higher rates. Other herbicides should be applied to the soil surface for broadleaf weed control.
flumioxazin @ 0.19 - 0.25 lb/A	**Valor SX** 51WG @ 6.0 - 8.0 oz/A	Annual broadleaf weeds	Use higher rate on heavy soils or when sugarcane is planted prior to early September. Do not apply after sugarcane emergence.

Equivalent rate in product per acre of Spartan 4F and Metribuzin 75DF based on Authority MTZ rate.

SUGARCANE WEED MANAGEMENT

Authority MTZ 45 DF[1] Rate/A	Equivalent Rate/A of Spartan 4F Based on Authority MTZ Rate	Equivalent Rate/A of Metribuzin 75DF Based on Authority MTZ Rate
16 oz	5.8 oz	0.36 lb (5.8 oz)
18 oz	6.5 oz	0.41 lb (6.5 oz)
20 oz	7.2 oz	0.45 lb (7.2 oz)
22 oz	7.9 oz	0.50 lb (7.9 oz)
24 oz	8.6 oz	0.54 lb (8.6 oz)
26 oz	9.4 oz	0.59 lb (9.4 oz)
28 oz	10.1 oz	0.63 lb (10.1 oz)
30 oz	10.8 oz	0.68 lb (10.8 oz)
32 oz	11.5 oz	0.72 lb (11.5 oz)
33 oz	11.9 oz	0.74 lb (11.9 oz)

[1] Authority MTZ contains 0.45 pounds active ingredient per pound: 0.18 pounds sulfentrazone (the active ingredient in Spartan 4F) and 0.27 pounds metribuzin (the active ingredient in Metribuzin/ Sencor/others).

AT-PLANTING PRE-EMERGENCE SPLIT APPLICATION PROGRAMS

A split application program with herbicide applied at planting and around 60 days later will provide extended residual control of Bermuda grass, Johnson grass, and itch grass. In some cases where split application programs are used, beds in the spring are essentially free of winter weeds. Programs that can be successful in suppressing Bermuda grass include:

Command at 3.3 pt/A plus **Diuron/Direx 4L**/others at 2.5 lbs/A at planting followed 60 days later by **Metribuzin/Sencor**/others at 1.5 lb/A
Command at 3.3 pt/A plus **Metribuzin/Sencor**/others at 1.0 lb/A at planting followed 60 days later by **Metribuzin/Sencor**/others at 1.5 lb/A
DuPont K-4 at 4 lb/A at planting followed 60 days later by **Metribuzin/Sencor**/others at 1.5 lb/A
Metribuzin/Sencor/others at 2 to 3 lb/A at planting followed 60 days later by **Metribuzin/Sencor**/others at 1.5 lb/A
Treflan/Trifluralin/others at 1.5 to 2 qt/A banded (3 to 4 qt/A broadcast) and incorporated at planting followed 60 days later by **Metribuzin/Sencor**/others at 1.5 lb/A

Another option for Bermuda grass would be to apply herbicide at planting on a band and sink the middles prior to the follow-up application. This program will reduce cost up front but will require an additional tillage operation and favorable weather conditions. If tillage cannot be performed, encroachment of Bermuda grass from the row middles can result in a severe weed problem the following year.

WEED CONTOL IN SUGARCANE HARVESTED FOR SEED AND IN SUCESSION PLANTED SUGARCANE

Although shading from the crop canopy will suppress growth of weeds, once sugarcane is harvested for seed, Bermuda grass will rapidly initiate new growth. Any of the herbicide programs listed for use at planting also can be used in fields where sugarcane was harvested for seed or where sugarcane was harvested early and delivered to the mill. Herbicides listed for use at planting also may be used when sugarcane is succession planted. Rates may be reduced slightly (25 percent) due to the later planting date and to minimize the chance of sugarcane injury.

RESIDUAL CONTROL OF WINTER WEEDS (OCTOBER/NOVEMBER)

For residual control of winter grass and broadleaf weeds apply **Atrazine/**others, **Diuron/Direx**/others, **DuPont K-4, Metribuzin/Sencor**/others, or **Sinbar** in October/November to early-harvested sugarcane, newly planted sugarcane, or sugarcane harvested for seed. Herbicide rates specified in the "At-Planting Weed Control (August/September)" section can be reduced by 25 percent for November applications. Where a follow-up application is being made, selecting a herbicide other than the one previously applied should be considered to reduce risk of crop injury and development of herbicide resistant weeds. If weeds are present, nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution.

SUGARCANE WEED MANAGEMENT

POST-EMERGENCE WEED CONTROL (SEPTEMBER-NOVEMBER)

Johnson Grass and Itch grass (September/October): In early-planted sugarcane or in sugarcane harvested for seed, Johnson grass may reinfest fields prior to winter. When applied in October to actively growing Johnson grass 12 to 18 inches tall, Asulox/Asulam at 3 qt/A or **Envoke** at 0.2 oz/A plus **Asulox/Asulam** (*See Table 2 Glossary of Herbicides)* at 2 qt/A plus nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water has controlled Johnson grass and reduced reinfestation the following spring. **Asulox/Asulam** alone and with **Envoke** also controls large itch grass (more than 6 inches). *For additional information on **Asulox/Asulam** and Envoke see the "Post-emergence Weed Control - Johnson grass and Other Grasses (March/April)" section.*

Purple and Yellow Nutsedge (September/October): To control nutsedge 4 to 12 inches in height in early planted sugarcane apply **Permit/**others (*See Table 2 Glossary of Herbicides)* at 1.0 to 1.33 oz/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water. To control 2 to 6 inch yellow nutsedge or to suppress 2 to 4 inch purple nutsedge, apply **Envoke** at 0.2 oz/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water. The higher rate of Permit/others is needed when nutsedge is large and the population is dense. For best results herbicide application should be made before nutsedge is 6 inches tall. If application is delayed until nutsedge forms a dense mat on the soil surface a sizeable tuber population will have developed underground and control will be reduced. Activity of both Permit/others and Envoke is slow and four weeks may be needed to maximize control. Sugarcane is very tolerant to overtop application of Permit/others. No more than three applications of Permit/others can be made per year and no more than 2.33 oz should be applied per acre per year. Envoke can cause some yellowing and white banding on sugarcane leaves as well as slight stunting but sugarcane growth and emergence in spring has not been affected. Envoke will also provide some residual control of winter weeds. Other herbicides may be applied with Permit/others or Envoke for additional weed control. *For additional information on Permit/others and Envoke see the "Post-emergence Weed Control - Purple and Yellow Nutsedge (March/April)" section.*

Yukon, a 67.5 percent WG premix of halosulfuron (the active ingredient in Permit/others) and dicamba (the active ingredient in Clarity/Vision), can provide control of both nutsedge and broadleaf weeds. For Yukon, a 4 oz/A rate is equivalent to 0.67 oz/A Permit and 4.5 oz/A Clarity/Vision; a 6 oz/A rate is equivalent to 1.0 oz/A Permit and 6.6 oz/A Clarity/Vision; and a 8 oz/A rate is equivalent to 1.3 oz/A Permit and 9.0 oz/A Clarity/Vision. Pre-emergence and post-emergence application of **Spartan 4F** at 8 to 12 oz/A or **Authority MTZ** at 22 - 33 oz will also control purple and yellow nutsedge as well as many broadleaf weeds. Rates vary with soil type and with nutsedge population and size. *See "At-Planting Weed Control (August/September)" section for more information.* Spartan and Authority MTZ have excellent crop safety when applied pre-emergence but will injure sugarcane when applied post-emergence. *See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF.*

Bermuda Grass (September-November): Shielded application of **glyphosate** to row sides and middles after planting or early harvest has provided good to excellent control of emerged Bermuda grass (See Table 3 Glyphosate Products). Apply 2 to 3 qt/A of the 4.0 lb ai/gallon formulation or equivalent rate based on active ingredient in 5 to 20 gal of water per acre as a shielded application. *Information on glyphosate can be found in the "Fallow Weed Control" section.* Severe injury will occur if glyphosate comes in contact with sugarcane foliage.

Broadleaf Weeds (September-November): Apply **Weedmaster/Brash**/others at 0.5 to 1.0 qt/A, **2,4-D** (3.8L formulation) at 0.5 to 1.5 qt/A, **Unison** (1.74 L formulation) at 24 to 64 oz/A, or **Clarity/Vision/**others at 0.5 to 1.0 pt/A when air temperature is above 65° F (*See Table 2 Glossary of Herbicides). Additional information related to these herbicides is provided in the "After Lay-by Weed Control (July-Harvest)" section.*

2,4-D Formulations: Acid, amine salt, and ester formulations of **2,4-D** are available (*See Table 2 Glossary of Herbicides)*. Since only the acid form of 2,4-D is active in controlling weeds, the herbicide concentration on the label is provided in lb of ae (acid equivalent) per gal instead of lb of ai (active ingredient) per gal, as is the case with most other herbicides. Amine salt and ester formulations of 2,4-D range from 3.8 to 5.6 lb ae/gal. These numbers are important in determining the amount of formulated product to apply per acre. The lower the lb ae/gal the more formulated product required. For example, a 32 fluid oz rate (1 qt/A) of a 3.8L formulation would correspond to 21.7 oz for a 5.6L formulation. **Unison** is an acid formulation of 2,4-D and contains 1.74 lb ae/gal. The rate range for Unison is 24 to 64 oz/A and rate, like other formulations, is dependent on weed spectrum, density, and size. Unison is less volatile (susceptible to changing from a liquid to a gas where off-target movement can occur) than other 2,4-D formulations. Caution should be used anytime 2,4-D is applied near sensitive plants regardless of formulation.

SUGARCANE WEED MANAGEMENT

WINTER WEED CONTROL (JANUARY-MARCH)

Broadleaf Weeds: Apply **Weedmaster/Brash**/others at 0.5 to 1.0 qt/A, **2,4-D** (3.8L formulation) at 0.5 to 1.5 qt/A, **Unison** (1.74 L formulation) at 24 to 64 oz/A, or **Clarity/Vision/**others at 0.5 to 1.0 pt/A after broadleaf weeds have emerged and when air temperature is above 65° F (*See Table 2 Glossary of Herbicides).* The higher rate should be used when broadleaf weeds are large and clover or vetch is present. *Information related to these herbicides and 2,4-D formulations is provided in the "After Lay-by Weed Control (July-Harvest)" section.* **Atrazine**/others, **Diuron/Direx**/others, **DuPont K-4**, **Metribuzin/Sencor**/others, or **Valor** (prior to sugarcane emergence) may be added to improve post-emergence weed control and to provide soil residual activity.

Grass and Broadleaf Weeds: Gramoxone Inteon at 3 pt/A or **Paraquat/**others 3L (*See Table 2 Glossary of Herbicides)* at 2 pt/A plus nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal can be applied to sugarcane with no more than 4 leaves to control ryegrass, rescuegrass, timothy grass, and winter annual bluegrass as well as some broadleaf weeds. **Atrazine/**others, **Diuron/Direx**/others, **DuPont K-4**, **Metribuzin/Sencor**/others, or **Valor** (prior to sugarcane emergence) may be added to improve burndown and provide soil residual activity. **Gramoxone Inteon/Paraquat**/others can also be applied with **Weedmaster/Brash**/others, **2,4-D,** or **Clarity/Vision**/others. Annual bluegrass can be controlled with **Direx/**others at 2.5 lb/A, **DuPont K-4** at 3 lb/A, **Metribuzin/Sencor**/others at 1.33 lb/A, or **Sinbar** at 1.25 lb/A plus a non-ionic surfactant or crop oil concentrate. If herbicides with soil residual activity are applied prior to March 1, schedule lay-by cultivation and herbicide application earlier than normal to avoid weed reinfestation. Selection of a herbicide other than the one previously applied should be considered to reduce risk of crop injury and development of herbicide resistant weeds.

SPRING WEED CONTROL (FEBRUARY/MARCH)

Herbicide programs should be implemented in February or March after residue from the previous harvest has been removed**.** If weeds are present, nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution. In most cases herbicide is banded on the top of the row following cultivation of the row sides and middles. If winter broadleaf weeds are present **Weedmaster/Brash**/others at 0.5 to 1.0 qt/A, **2,4-D** (3.8L formulation) at 0.5 to 1.5 qt/A, **Unison** (1.74 L formulation) at 24 to 64 oz/A, or **Clarity/Vision/**others at 0.5 to 1.0 pt/A can be added (*See Table 2 Glossary of Herbicides).* The higher rate should be used when broadleaf weeds are large and clover or vetch is present.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE (FEBRUARY/MARCH):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine/**others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
mesotrione @ 0.19 - 0.24 lb/A	**Callisto** 4L @ 6 - 7.7 oz/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
clomazone @ 1.0 - 1.25 lb/A	**Command 3ME** @ 2.66 - 3.33 pt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Bleaching/whitening of sugarcane can occur if the crop is emerged at application. Can suppress Bermuda grass at higher rates if applied with diuron or metribuzin.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3.0 qt/A 80 DF formulation @ 3.0 - 3.75 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils. **Can be applied overtop of sugarcane until daily maximum temperatures for the week preceding application average 80 degrees F or greater.**
hexazinone plus diuron @ 0.5 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4.0 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	For Bermuda grass suppression apply at the higher rate. Can be applied with pendimethalin to improve itch grass control. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE (FEBRUARY/MARCH):			
			4 lb/A. **See precaution above related to diuron application and temperature.**
pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H_2O/**others *(See Table 2)* 3.3EC formulation @ 2.4 - 3.6 qt/A 3.8CS @ 2.1 - 3.1 qt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	May be applied to the soil surface or incorporated. Use higher rate on heavy soils. Should be applied with other herbicides for broadleaf weed control.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin/Sencor/**others *(See Table 2)* 75 DF formulation @ 2.0 - 4.0 lb/A	Seedling Johnson grass and other annual grass and broadleaf weeds	Safe to sugarcane on all soil types. Use higher rate on heavy soils or when sugarcane is planted prior to early September. Can provide suppression of Bermuda grass at higher rates. Addition of pendimethalin can improve control of browntop panicum and itch grass.
trifluralin @ 4.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4 lb/gallon formulation @ 2.0 qt/A (banded)	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Incorporate within 24 hours after application. Can provide suppression of Bermuda grass at higher rates. Other herbicides should be applied for broadleaf weed control.
flumioxazin @ 0.13 - 0.25 lb/A	**Valor SX** 51WG @ 4.0 - 8.0 oz/A	Annual broadleaf weeds	Can provide residual control when applied at 6 to 8 oz/A. Do not apply after sugarcane emergence.

POST-EMERGENCE WEED CONTROL (MARCH/APRIL)

Johnson Grass and Other Grasses (March/April)

Asulox/Asulam can be applied broadcast, banded, or as a spot treatment. Nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water should be added to the spray solution. If water pH is above 9.0, addition of a buffer may be beneficial. At application, average air temperature should be at least 60°F. A 20-hour rain-free period following Asulox application may be needed to maximize control.

First Application - Apply 4 qt/A **Asulox/Asulam** broadcast (or the correct proportion if applying on a band) in 15 to 30 gal of water per acre to actively growing Johnson grass 12 to 18 inches tall and to itch grass less than 8 inches tall. If applying on a band, outside nozzles should be mounted on drops and band width should be wide enough to ensure thorough wetting of all foliage. Asulox applied at 3 to 4 qt/A also controls browntop panicum, foxtails, goosegrass, and barnyardgrass/junglerice when 6 to 8 inches tall. Vaseygrass that is less than 8 inches tall can be partially controlled with Asulox at 4 qt/A, but activity is very slow.

Second Application - A second application of **Asulox/Asulam** at 3 to 4 qt/A broadcast (or the correct proportion if applying on a band) can increase Johnson grass control, but may not increase sugarcane yield over that obtained with a single Asulox application in March/April. This may be beneficial in the plant cane or first stubble crop to reduce infestations in subsequent crops. The second application of Asulox should be made to Johnson grass regrowth, usually about eight weeks after the first application. Sugarcane injury is more likely when Asulox is applied to sugarcane stressed from drought or excessive soil moisture and high temperature, especially after June 1.

Spot Treatment - The most accurate and economical method of spot treating is to use a calibrated sprayer at a constant speed with the operator turning the spray nozzles on and off as needed. If a high-volume "cattle gun" type nozzle is used for spot treatment, apply a 2% solution of **Asulox/Asulam** (2 gal of herbicide plus 98 gal of water). Spray to wet foliage but do not drench as sugarcane injury can be greater compared with spot treating using a calibrated sprayer.

Aerial Application - **Asulox/Asulam** may also be applied by air using the same rates specified above. Spray volume should be a minimum of 5 gal per acre. After calculating the actual sugarcane acreage to be treated, acreage should be increased to account for ditchbanks and headlands also receiving application.

SUGARCANE WEED MANAGEMENT

Envoke: Envoke 75DF can be applied post-emergence overtop to plant or ratoon cane up to 24 inches tall at 0.3 oz/A broadcast (or the correct proportion if applying on a band) or as a directed application at 0.3 to 0.6 oz/A to sugarcane 18 inches tall at lay-by. Nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water should be added to the spray solution. **Envoke** applied overtop of sugarcane can cause some yellowing and white banding on leaves present in the whorl at application as well as slight stunting but recovery is rapid and no negative effect on sugarcane yield has been observed. Envoke at 0.3 oz/A will suppress but will not control rhizome Johnson grass or large itch grass. Combinations of **Envoke** with **Asulox/Asulam** provide complementary broadleaf and grass weed control. Envoke at 0.3 oz/A applied with Asulox at 2 qt/A (half rate) plus nonionic surfactant or crop oil concentrate has improved control of large rhizome Johnson grass (more than 18 inches) when compared with Asulox applied alone at 4 qt/A (full rate). Envoke at 0.2 oz/A applied with Asulox at 2 qt/A controlled large itch grass (more than 6 inches) better than Asulox applied alone at 4 qt/A. For ground application use a minimum of 10 gal of water per acre (broadcast basis). Higher spray volume of at least 20 gal per acre should be used for heavy weed infestations to ensure adequate spray coverage. **Envoke cannot be applied aerially**. **For both Asulox/Asulam and Envoke, DO NOT cultivate, fertilize or otherwise disturb the Johnson grass root system 7 days before or after application**.

Purple and Yellow Nutsedge (March/April): Apply **Permit/**others at 1.0 to 1.33 oz/A, **Yukon** at 6 to 8 oz/A, or **Envoke** at 0.2 oz/ with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water. **Spartan** and **Authority MTZ** will cause injury if applied overtop of sugarcane. See "Post-emergence Weed Control (September-November)" section for additional information.

LAY-BY WEED CONTROL (MAY/JUNE)

Herbicides at lay-by are applied broadcast and directed underneath the sugarcane canopy usually following the last cultivation. It is necessary that the lower canopy be contacted by the spray to assure weed control both in 5tthe sugarcane drill and in the row middles. If weeds are present, nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution for herbicides with post-emergence activity. *Information related to post-emergence activity of herbicides can be found in the "After Lay-by Weed Control (July-Harvest)" section.*

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE LAY-BY (MAY/JUNE):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine/**others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Morning glory (tie-vine) and other broadleaf weeds	Use higher rate on heavy soils and where morning glory (tie-vine) is a problem weed. Residual red morning glory control can be expected for around 35 days. Residual control of tie-vine can be extended by applying atrazine a few weeks after the lay-by cultivation.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ** 45 DF @ 16 - 33 oz/A *See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF*	Morning glory (tie-vine) and other broadleaf weeds, and nutsedge	Use higher rate on clay soils and/or soils with organic matter content higher than 2%. At the highest rate of 33 oz/A the amount of metribuzin in Authority MTZ is not sufficient to provide grass control. See information below for Spartan 4F concerning red morning glory control. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Do not apply more than 33 oz/A in one growing season and within 120 days of harvest.
mesotrione @ 0.19 - 0.24 lb/A	**Callisto** 4L @ 6 - 7.7 oz/A	Morning glory (tie-vine) and other broadleaf weeds	Use higher rate on heavy soils. Should be applied with other herbicides for grass control.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE LAY-BY (MAY/JUNE):			
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3 qt/A 80 DF formulation @ 3.0 - 3.75 lb/A	Seedling broadleaf weeds	Apply when sugarcane is 30 inches or taller. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.**
hexazinone plus diuron @ 0.27 - 0.4 lb/A + @ 0.94 - 1.4 lb/A	**DuPont K-4** 60DG @ 2 - 3 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	Apply when sugarcane is 30 inches or taller. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Addition of pendimethalin can improve itch grass control. Velpar 2L at 0.8 qt/A and Direx 4L at 1.4 qt/A can be combined to closely represent the equivalent rate of 3 lb/A of DuPont K4. **If DuPont K-4 was applied in the spring do not apply more than 2 lb/A at lay-by.**
pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC formulation @ 2.4 - 3.6 qt/A 3.8CS @ 2.1 - 3.1 qt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	May be applied to soil surface or soil incorporated. Use higher rate if surface applied or if itch grass is a problem. For additional weed control, such as morning glory, atrazine, diuron, DuPont K-4, metribuzin, or Spartan may be applied with pendimethalin. See precautions for diuron, DuPont K4, and Spartan.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin/Sencor**/others *(See Table 2)* 75 DF formulation @ 2.0 - 4.0 lb/A	Seedling Johnson grass and other annual grass and broadleaf weeds	Addition of pendimethalin can improve control of browntop panicum and itch grass. Residual control of red morning glory can be expected for around 35 days.
sulfentrazone @ 0.19 - 0.25 lb/A	**Spartan 4F** @ 6.0 - 8.0 oz/A *See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF*	Broadleaf weeds and nutsedge	Use higher rate on heavy soils and where morning glory (tie-vine) is a problem weed. Residual red morning glory control around 90% can be expected for 50 days and control around 80% can be expected at 70 days. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Do not apply within 120 days of harvest. **Can be applied more than once during the growing season but total usage per twelve-month period cannot exceed 12 oz/A.**
trifluralin @ 3.0 - 4.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4 lb/gallon formulation @ 3- 4 qt/A (broadcast)	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Incorporate within 24 hours after application. Other herbicides should be applied to the soil surface for broadleaf weed control.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE LAY-BY (MAY/JUNE):			
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WG @ 3.0 - 8.0 oz/A	Broadleaf weeds	**Apply when sugarcane is at least 24 inches in height and has begun to joint. Spray contact with more than the lower six inches of sugarcane plants will result in severe injury**. Residual red morning glory control can be expected for around 35 days. Valor can be applied at a maximum rate of 12 oz/A per crop year. Do not apply within 90 days of harvest.

AFTER LAY-BY WEED CONTROL (JULY-HARVEST)

Morning glory or tie-vines can cause significant problems at sugarcane harvest. To control morning glory and other broadleaf weeds, herbicides can be applied over the crop canopy by air or ground sprayer, or herbicides can be directed underneath the crop canopy. Coverage of the entire morning glory plant with spray solution will provide the most consistent control. Nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE AFTER LAY-BY (JULY-HARVEST):			
2,4-D @ 0.47 - 1.42 lb/A	**2,4-D** products 3.8L formulation @ 1.0 - 1.5 qt/A *(See Table 2)* *See information below on 2,4-D formulations*	Morning glory (tie-vine) and other broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Note: Use of 2,4-D is restricted in some parishes. Check local restrictions before application. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting. See information below on 2,4-D formulations.**
atrazine @ 2.0 - 4.0 lb/A	**Atrazine**/others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Morning glory (tie-vine) and other broadleaf weeds	Apply with surfactant overtop or directed before row closure occurs. Use higher rate if vines are climbing sugarcane plants.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ** 45 DF @ 16 – 33 oz/A *See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF*	Morning glory (tie-vine) and other broadleaf weeds, and nutsedge	Apply with surfactant as a directed treatment. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Do not apply more than 33 oz/A in one growing season and within 120 days of harvest.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE AFTER LAY-BY (JULY-HARVEST):			
mesotrione @ 0.09 lb/A	**Callisto** 4L @ 3 oz/A	Morning glory (tie-vine) and other annual broadleaf weeds	Can be applied over the top or as a directed spray. Only one application can be made if Callisto was applied pre-emergence earlier in the season. Do not harvest sugarcane within 114 days following an over the top application and within 100 days following a directed spray.
dicamba @ 0.5 - 0.75 lb/A	**Clarity/Vision**/others *(See Table 2)* 4L formulation @ 16 - 24 oz/A 3.8L formulation @ 17 to 25 oz/A	Morning glory (tie-vine) and other broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Can be used in areas where 2,4-D use is restricted. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting.**
trifloxysulfuron-sodium @ 0.014 - 0.028 lb/A	**Envoke** 75DF @ 0.3 - 0.6 oz/A	Morning glory (tie-vine) and other broadleaf weeds, itch grass and other annual grasses, and purple and yellow nutsedge	Apply as a directed treatment with nonionic surfactant at 1 qt per 100 gallons. Do not apply within 100 days of harvest. A maximum of 3 applications or 1.5 oz/A may be applied per growing season.
paraquat @ 0.50 - 1.0 lb/A	**Gramoxone Inteon/Paraquat**/ others *(See Table 2)* 2L formulation @ 2.0 - 4.0 pt/A 3L formulation @ 1.33 - 2.67 pt/A	Small grass and broadleaf weeds, and Bermuda grass suppression	Apply with surfactant as a directed treatment to the row middles in late June to desiccate Bermuda grass. **Herbicide contact to young sugarcane tillers and leaves can cause significant injury.**
halosulfuron @ 0.03 - 0.06 lb/A	**Permit**/others *(See Table 2)* 75DF formulation @ 0.67 - 1.33 oz/A	Purple and yellow nutsedge	Apply as a directed treatment at 1 to 1.33 oz/A with surfactant to nutsedge growing under the crop canopy.
sulfentrazone @ 0.19 - 0.25 lb/A	**Spartan 4F** @ 6.0 - 8.0 oz/A *See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF*	Morning glory (tie-vine) and other broadleaf weeds and nutsedge	Apply with surfactant as a directed treatment at the higher rate if morning glory is climbing sugarcane plants. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** If applied in the spring or at lay-by do not reapply. Do not apply within 120 days of harvest.
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WG @ 3.0 - 8.0 oz/A	Morning glory (tie-vine) and other broadleaf weeds and some annual grasses	**Apply as a directed treatment after sugarcane has begun to joint. Spray contact with more than the lower six inches of sugarcane plants will result in severe injury**. Residual red morning glory control can be expected for around 35 days. Valor can be applied at a maximum rate of 12 oz/A per crop year. Do not apply within 90 days of harvest.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE AFTER LAY-BY (JULY-HARVEST):			
2,4-D plus dicamba @ 0.36 - 0.72 lb/A + 0.12 - 0.24 lb/A	**Weedmaster/Brash**/others *(See Table 2)* 3.8L formulation @ 0.5 - 1.0 qt/A	Morning glory (tie-vine) and other annual broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Note: Use of 2,4-D is restricted in some parishes. Check local restrictions before application. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting.**
halosulfuron plus dicamba @ 0.03-0.06 lb/A + 0.14 - 0.28 lb/A	**Yukon** 67.5 WG @ 4 to 8 oz/A	Purple and yellow nutsedge, small morning glory (tie vines), and other broadleaf weeds	Apply as a directed treatment at 1 to 1.33 oz/A with surfactant to nutsedge growing under the crop canopy. A 8 oz/A rate is equivalent to 1.3 oz/A Permit and 9.0 oz/A Clarity/Vision.

2,4-D Formulations: Acid, amine salt, and ester formulations of **2,4-D** are available (*See Table 2 Glossary of Herbicides)*. Since only the acid form of 2,4-D is active in controlling weeds, the herbicide concentration on the label is provided in lb of ae (acid equivalent) per gal instead of lb of ai (active ingredient) per gal, as is the case with most other herbicides. Amine salt and ester formulations of 2,4-D range from 3.8 to 5.6 lb ae/gal. These numbers are important in determining the amount of formulated product to apply per acre. The lower the lb ae/gal the more formulated product required. For example, a 32 fluid oz rate (1 qt/A) of a 3.8L formulation would correspond to 21.7 oz for a 5.6L formulation. **Unison** is an acid formulation of 2,4-D and contains 1.74 lb ae/gal. The rate range for Unison is 24 to 64 oz/A and rate, like other formulations, is dependent on weed spectrum, density, and size. Unison is less volatile (susceptible to changing from a liquid to a gas where off-target movement can occur) than other 2,4-D formulations. Caution should be used anytime 2,4-D is applied near sensitive plants regardless of formulation.

FALLOW WEED CONTROL

Weed control programs during the fallow period can include use of tillage (deep plowing/disking) and herbicides. Frequent and timely cultivation, where weeds are destroyed and prevented from reestablishing can be an effective management tool especially in dry years. Tillage, especially tillage just prior to planting, can reduce soil moisture in the seedbed, which in dry years can hinder plant cane emergence and growth. Apply pre-emergence herbicides to a weed-free and clod-free bed. Packing of the row top prior to application may improve weed control.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE FALLOW:			
atrazine @ 2 - 4 lb/A	**Atrazine**/others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Broadleaf weeds	Use higher rate on heavy soils and when control in excess of 45 days is needed.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3.0 qt/A 80 DF formulation @ 3.0 - 3.75 lb/A	Broadleaf weeds	Use higher rate on heavy soils and when control in excess of 45 days is needed.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE FALLOW:			
hexazinone plus diuron @ 0.50 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4.0 lb/A	Seedling Johnson grass, browntop panicum, doveweed, and other annual grass and broadleaf weeds	Apply to a clean seedbed at least 60 days prior to planting. Can be reapplied at planting but no more than 11.25 lbs can be applied per acre per year. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A.
EPTC @ 3.0 - 6.1 lbs/A	**Eptam 7-E** @ 3.5 - 7 pt/A	Annual grass and broadleaf weeds	Must be thoroughly incorporated 2 to 4 inches deep immediately following application. For Bermuda grass and Johnson grass suppression, plants should be turned under and chopped thoroughly prior to treatment. Must be applied 45 days prior to planting sugarcane.
halosulfuron @ 0.03- 0.06 lb/A	**Permit/**others *(See Table 2)* 75 DF formulation @ 0.67 - 1.33 oz/A	Purple and yellow nutsedge	A rate of 1 to 1.33 oz/A with surfactant is recommended for control of nutsedge. Can be applied with other herbicides. Do not exceed 2.67 oz/A in one growing season.
pendimethalin @ 2.5 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC formulation @ 3 qt/A 3.8CS @ 2.6 qt/A	Seedling Johnson grass, itch grass, browntop panicum, other annual grasses	Apply to clean seedbed or incorporate 4 inches deep at least 60 days prior to planting.

POST-EMERGENCE FALLOW:

Glyphosate and Glyphosate Mixtures: Post-emergence herbicides should be applied to actively growing weeds. Several formulations of **glyphosate** are available with the most common being 4L and 5.5L formulations (*See Table 3 Glyphosate Products).* A 32 oz/A rate (1 qt/A) of a 4L formulation would correspond to 26 oz/A of a 5L formulation and 23 oz/A of a 5.5L formulation. Most formulations of glyphosate contain some surfactant. The need for additional surfactant is based on how much surfactant is present in the formulation and the quality of the surfactant. The herbicide label may state that no additional surfactant is needed or recommended; that surfactant may be added; or that surfactant is required and the amount is specified. See Table 3 for information concerning need for surfactant with the various glyphosate products. Always consult the label for specific information on the need for surfactants and other adjuvants.

Johnson Grass in Fallow: For control of Johnson grass and other weeds, rates of 1 to 2 qt/A of the 4L glyphosate formulation is sufficient (*See Table 3 Glyphosate Products)*. Do not cultivate for 7 days after application to allow adequate time for the glyphosate to be taken into the plant and moved to underground rhizomes. Under heavy weed infestation, two to three weeks between glyphosate application and planting will allow time for Johnson grass to desiccate and will promote more efficient opening of rows and covering of planted sugarcane. When applying 2,4-D in combination with glyphosate for additional broadleaf weed control, use the high end of the glyphosate rate to avoid a possible reduction in grass control (antagonism).

Broadleaf Weeds in Fallow: Atrazine/others at 1 to 2 qt/A, **Aim** 2EC at 1 to 2 oz/A, and **Valor** at 3 to 4 oz/A can be applied to control broadleaf weeds and in particular morning glory (tie-vine). The higher rates should be applied to control large vining weeds. Atrazine/others and Aim can be applied any time during the fallow period. Valor can be applied from 2 weeks prior to planting to before sugarcane emerges. Some residual weed control can be expected with **Atrazine**/others and **Valor**, but **Aim** has no soil residual activity. Nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution. If applied with glyphosate, surfactant present in the glyphosate formulation may be adequate. See Table 3 for information concerning need for surfactant with the various glyphosate products. Always consult the label for specific information on the need for surfactants and other adjuvants.

SUGARCANE WEED MANAGEMENT

Bermuda Grass in Fallow: In fields where Bermuda grass population is high, tillage in combination with glyphosate is most effective. Apply 2 to 3 qt/A of the 4L glyphosate formulation for control of Bermuda grass with less than 8 inch runners. See Table 3 for information concerning need for surfactant with the various glyphosate products. Always consult the label for specific information on the need for surfactants and other adjuvants. Retreatment with 2 to 3 qt/A may be necessary to maintain control. Do not cultivate for 7 days after application to allow adequate time for the glyphosate to be taken into the plant and moved to underground rhizomes. Under heavy weed infestation, two to three weeks between glyphosate application and planting will allow time for Bermuda grass to desiccate and will promote more efficient opening of rows and covering of planted sugarcane. **Multiple applications of glyphosate are more effective in controlling Bermuda grass than a single application.**

Purple and Yellow Nutsedge in Fallow: Permit/others at 1.0 to 1.33 oz/A, **Yukon** at 6 to 8 oz/A, and **Envoke** at 0.15 to 0.2 oz/A applied with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water will provide some control of nutsedge. The higher rate is needed when nutsedge is large and the population is dense. For best results herbicide application should be made before nutsedge is 6 inches tall. If application is delayed until nutsedge forms a dense mat on the soil surface a sizeable tuber population will have developed underground and control will be reduced. **Permit/**others, **Yukon**, and **Envoke** can be applied with glyphosate products without negatively affecting grass control. If applied with glyphosate, surfactant present in the glyphosate formulation may be adequate. See Table 3 for information concerning need for surfactant with the various glyphosate products. Always consult the label for specific information on the need for surfactants and other adjuvants. If two applications of glyphosate are planned, **Permit**/others, **Yukon**, or **Envoke** should be applied with glyphosate in the first application. The follow up application of glyphosate alone should be effective on nutsedge regrowth. **Yukon**, a premix of halosulfuron (the active ingredient in Permit) and dicamba (the active ingredient in Clarity/Vision/others) and Envoke will also provide some control of broadleaf weeds. For **Yukon**, a 6 oz/A rate is equivalent to 1.0 oz/A **Permit** and 6.6 oz/A **Clarity/Vision** and a 8 oz/A rate is equivalent to 1.3 oz/A **Permit** and 9.0 oz/A **Clarity/Vision**. As also noted for glyphosate, do not cultivate for 7 days after application of **Permit**/others, **Yukon**, or **Envoke** to allow adequate time for movement of herbicide to underground nutsedge tubers.

In situations where nutsedge and others weeds may interfere with row opening at planting, **Gramoxone Inteon** at 3 pt/A or **Paraquat/**others 3L at 2 pt/A plus nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal can be applied 1 to 2 weeks before planting to desiccate weeds. Because herbicide does not move to underground nutsedge tubers, rapid reestablishment should be expected and use of **Permit**/others, **Yukon**, **Envoke**, **Authority MTZ**, **or Spartan** in September or October should be considered. See "At-Planting Weed Control (August/September)" and "Post-emergence Weed Control (September-November)" sections.

Doveweed in Fallow: Doveweed is a summer annual weed that emerges from mid-June through September. Doveweed as well as many other members of the dayflower family are poorly controlled with glyphosate. In fallow programs where glyphosate is the only herbicide used for weed control, doveweed can form a dense mat across the row and can interfere with row opening at planting. In fields with a known history of doveweed, **glyphosate** should be applied with **DuPont K-4** at 2 to 3 lb/A, **Metribuzin/Sencor/**others at 1.3 lb/A, or **Valor SX** at 6 to 8 oz/A in June to control weeds on formed beds. This application should provide pre-emergence control of doveweed up to 60 days after application. For emerged doveweed, effective control may be obtained with **Gramoxone Inteon** at 3 pt/A or **Paraquat/**others 3L at 2 pt/A, **Atrazine**/others at 4 qt/A, or **Metribuzin/Sencor**/others at 1.5 lb/A applied 1 to 3 weeks before planting. Nonionic surfactant at 1 to 2 qt/100 gal or crop oil concentrate at 2 to 4 qt/100 gal should be added to the spray solution for post-emergence applications. Application of **Gramoxone Inteon** at 2 pt/A or **Paraquat/**others 3L at 1.33 pt/A with **Atrazine**/others at 2 qt/A or application of **Metribuzin/ Sencor**/others at 1 lb/A with **Weedmaster/Brash**/others at 1.5 pt/A were effective when planting was delayed beyond 3 weeks after application.

No-Tillage Fallow Program: In a no-tillage program, sugarcane stubble must be destroyed with herbicide. To obtain around 90% control of sugarcane stubble, glyphosate rate based on a 4L formulation is 1.0 qt/A (6 inch stubble), 1.5 qt/A (10 inch stubble), 2.0 qt/A (16 inch stubble), and 2.5 qt/A (18 inch stubble) (*See Table 3 Glyphosate Products)*. Typically in a no-tillage program a second glyphosate application will be needed to control weeds and any sugarcane regrowth that might occur. It is important that the first glyphosate application be made by the end of April to allow for sugarcane to completely decompose before rows are worked at planting. In fields where Bermuda grass population is high, a no-tillage program where glyphosate is used for weed control may not be as effective as glyphosate in combination with tillage.

Note: Glyphosate herbicides can be applied by air, but extreme caution should be used due to problems with off-target movement and damage to sugarcane and other crops in areas adjacent to treated fields.

SUGARCANE WEED MANAGEMENT

DITCHBANK WEED CONTROL

Problem weeds such as Johnson grass, itch grass, Bermuda grass, poppingweed (*Equisetum*/horsetail), and *Rubus* species (briars) should be controlled on ditchbanks. This will aid in field drainage and prevent weed movement into adjacent sugarcane fields. These recommendations are for non-irrigation, drainage ditch use only. **DO NOT** apply herbicides to a ditch when water is present unless specifically allowed based on the herbicide label. Herbicides should be applied in a minimum of 20 gal of water per acre spray volume.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL:			
2,4-D plus triclopyr @ 2 lb/A + 1 lb/A	**Crossbow** 3L @ 4.0 qt/A	Poppingweed, briars, and woody species	Best control obtained when applied to young poppingweed, less than 2 years old. For control of briars and smaller diameter woody species, apply at 1.0 to 1.5 gal/100 gal of water and add nonionic surfactant at 1 qt/100 gal of water. Apply in a spray volume of 40 to 60 gal per acre to thoroughly soak all stems and plant crowns at the soil line. **This product contains 2,4-D and use may be restricted in some areas of the state.**
diuron @ 2.0 - 15.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.0 - 15.0 qt/A 80 DF formulation @ 2.5 - 18.8 lb/A	Annual grass and broadleaf weeds	Provides residual control of many annual weeds. Addition of nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 2 to 4 qt/100 gal of water will increase contact activity on small, emerged weeds no more than 3 in tall. Herbicide activity will be improved if soil in the ditch is moist at application. Do not allow herbicide to contact roots of desirable plants when applied at the higher rates.
hexazinone plus diuron @ 0.5 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4.0 lb/A	Most ditchbank weeds including some control of poppingweed	Will not control rhizome Johnson grass or curly dock. Do not use on out-flow ditches or ditches not directly between two cane fields. Very slow activity on poppingweed. Inclusion of 2 qt/A of a 4L glyphosate formulation or 2.67 qt/A of a 6L MSMA formulation has increased rhizome Johnson grass and curly dock control. Apply in a spray volume of at least 40 gal per acre to thoroughly cover the soil and foliage and soak all stems and plant crowns at the soil line. Nonionic surfactant at 1 qt/100 gal of water or crop oil concentrate at 1 gallon/100 gal of water should be added. **Hexazinone (Velpar) is extremely water-soluble and may move down the ditch.**

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL:			
triclopyr @ 2.0 - 3.0 lb/A	**Garlon**/others *(See Table 2)* 4 lb/gallon formulation @ 2.0 - 3.0 qt/A or 3 lb/gallon formulation @ 2.7 - 4.0 qt/A	Poppingweed, briars, and woody species	Control is greater when applied to young poppingweed, less than 2 years old. For control of briars and smaller diameter woody species, apply at 1.5 pt/A of 4L formulation or 2 pt/A of 3A formulation plus nonionic surfactant at 1 to 2 qt/100 gal of water. Apply in a spray volume of 40 to 60 gal per acre to thoroughly soak all stems and plant crowns at the soil line. Note: Garlon 4 at 1 gallon per 80 gallons water plus 1% Roundup has been effective on poppingweed when plants were thoroughly wetted.
triclopyr plus glyphosate	**Garlon**/others *(See Table 2)* **Roundup**/others *(See Table 3)* *See Remarks and Precautions for rates and mixing instructions*	Poppingweed and other ditchbank weeds	For a 100 gallon total spray mix, include 5 qt of Garlon 4, Triquad 4L, or other triclopyr product with a 4L concentration and 4 qt of a Roundup/glyphosate product with a 5.5L concentration or 5.5 quarts of a 4L glyphosate product. If the glyphosate formulation does not contain surfactant, add nonionic surfactant at 2 quarts per 100 gallons of water. Because herbicide rates are not specified in product per acre, spray volume (gallons per acre) will affect herbicide rate per unit area treated, number of acres of ditchbank treated, and cost per acre. In general, spray volume should be in the range of 20 to 40 gallons per acre. A standard multi-nozzle spray boom positioned over the ditch, a hand gun (cattle gun sprayer), or a single stationary nozzle sprayer can be used for application. It is important that poppingweed foliage be well covered. Herbicide should not be applied to a ditch when water is present unless specifically allowed based on the herbicide label. Note: Treating only the bottom of the ditch and not the sides will allow for water movement and will also help to reduce ditchbank erosion.
MSMA @ 4.0 lb/A	**MSMA** /others *(See Table 2)* 6 lb/gallon formulation @ 2.68 qt/A	Johnson grass and itch grass	Apply and repeat as necessary. If nonionic surfactant is not present in the formulation, add nonionic surfactant at 1 qt/100 gal of water. If the objective of ditchbank weed control is to encourage Bermuda grass growth for ditchbank stabilization, application of MSMA alone would be an excellent choice. Mixing can be a problem when MSMA is applied with some broadleaf herbicides. Note: As it stands now, use of MSMA on roadsides and ditchbanks is allowed until the end of 2012.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL:			
pendimethalin @ 2.5 - 3.3 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC formulation @ 3.0 - 4.0 qt/A 3.8CS formulation @ 2.6 - 3.5 qt/A	Seedling Johnson grass, itch grass, and other annual grasses	Apply in a minimum of 20 gal per acre spray volume prior to weed emergence; will NOT control emerged weeds. May apply with post-emergence herbicides to provide residual activity.
glyphosate @ 1.0 - 5.0 lb/A	**Roundup**/others *(See Table 3)* 4L formulation @ 1.0 to 5.0 qt/A 5L formulation @ 0.8 to 4.0 qt/A 5.5L formulation @ 0.7 to 3.6 qt/A	Johnson grass, itch grass, and other weeds	Johnson grass, itch grass, and most other weeds are controlled at 1 to 2 qt/A of the 4L glyphosate formulation. Apply 2 to 3 qt/A for control of Bermuda grass with less than 8 inch runners. Retreatment with 2 to 3 qt/A may be necessary to maintain Bermuda grass control. Application with diuron at 5.0 lb ai/A (see information on diuron) or DuPont K-4 at 3.75 to 4 lb/A (see information on DuPont K-4) can increase initial control and provide extended control of many annual weeds. Do not allow herbicide to contact foliage of desirable plants.
2,4-D plus dicamba @ 0.36 - 2.15 lb/A + 0.12 - 0.75 lb/A	**Weedmaster/Brash**/others *(See Table 2)* 3.8L @ 0.5 - 3.0 qt/A	Broadleaf weeds	Use 1 qt/A to control annual broadleaf weeds and 1 to 3 qt/A for suppression of perennial weeds. **This product contains 2,4-D and use may be restricted in some areas of the state.**

SUGARCANE WEED MANAGEMENT

TABLE 1. EFFECTIVENESS OF SELECTED SUGARCANE HERBICIDES APPLIED PRE-EMERGENCE AND POST-EMERGENCE IN-CROP AND IN FALLOW.

Weed control estimates represent 28 to 35 days after application of pre-emergence herbicides and 14 to 21 days after application of post-emergence herbicides at the high end of the rate range. A value of 0 = no control and 10 = 100% control.

	Seedling Johnson grass	Rhizome Johnson grass	Itch grass (Raoulgrass)	Bermuda grass[1]	Browntop Panicum	Annual Grasses	Morning glory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
Pre-emergence Application:												
Atrazine/others	2	0	2	0	4	5	**8**	**9**	2	5	**8**	**9**
Authority MTZ	5	0	2	1	5	5	**9**	**8**	7	-	5	**8**
Callisto	2	0	0	0	5	5	7[6]	**8**	2	**8**	3	**7**
Command	**8**	2	**8**	6	**8**	**8**	3	3	2	-	7	2
Command plus Direx	**9**	2	**8**	**8**	**9**	**9**	6	**8**	2	-	7	**8**
Diuron/Direx/others	7	0	5	1	6	6	6	**8**	2	3	7	**8**
DuPont K-4	**8**	2	7	7	**8**	**9**	7	**8**	5	**9**	**8**	**8**
Eptam[4]	**8**	6	-	6	-	-	7	6	5	-	2	2
Prowl/others	**8**	2	**8**	2	**8**	**9**	2	2	3	0	6	2
Prowl plus DuPont K-4	**8**	2	**8**	5	**9**	**9**	7	**8**	3	-	7	**8**
Prowl plus Metribuzin/Sencor/others	**9**	2	**8**	5	**9**	**9**	**8**	**9**	4	-	**8**	**8**
Metribuzin/Sencor/others	**9**	0	2	6	6	**9**	**8**	**9**	5	-	**8**	**8**
Sinbar	**9**	0	2	**8**	3	**9**	7	7	5	-	6	5
Spartan	4	0	2	0	3	4	**9**	**8**	7	-	4	**8**
Treflan/Trifluralin/others[4]	**9**	6	**9**	7	**9**	**9**	2	2	5	-	**8**	2
Valor	3	0	2	0	3	4	**8**	**9**	2	-	**8**	**9**
Post-emergence Application:												
Aim	0	0	0	0	0	0	**9**	**8**	0	0	-	-
Asulox/Asulam[5]	**8**	7	7	2	**8**	**9**	0	0	0	-	-	-

SUGARCANE WEED MANAGEMENT

	Seedling Johnson grass	Rhizome Johnson grass	Itch grass (Raoulgrass)	Bermuda grass[1]	Browntop Panicum	Annual Grasses	Morning glory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
Atrazine/others	2	0	2	0	2	6	**9**	**9**	2	7	4	7
Callisto	0	0	1	0	4	4	7[6,7]	**8**	2	-	-	**8**
Clarity/Vision/others	0	0	0	0	0	0	**9**	**9**	3	6	0	**9**
Diuron/Direx/others	6	2	5	0	5	**8**	7	**8**	2	-	6	6
Envoke[5]	7	4	**8**	1	7	**9**	6	**8**	7	2	-	-
Envoke + Asulox/Asulam[5]	**8**	7	**9**	2	**8**	**9**	6	**8**	7	2	7	7
Glyphosate herbicides	**9**	**9**	**9**	**8**	**9**	**9**	6	7	6	4	**8**	**8**
Gramoxone Inteon/ Paraquat/others	**8**	2	**8**	4	**8**	**9**	**8**	**8**	2	**8**[6]	**8**	**8**
Permit/others	1	0	0	0	0	1	4	4	**8**	0	0	0
Spartan	2	0	2	0	2	4	**9**	**8**	7	-	3	**8**
Valor	2	0	2	0	3	4	**9**	**8**	2	5[6]	2	**8**
Weedmaster/Brash/others	0	0	0	0	0	0	**9**	**9**	3	6	0	**9**
Yukon	0	0	0	0	0	0	**8**	**8**	**8**	6	0	**8**
2,4-D/others	0	0	0	0	0	0	**9**	**9**	3	6	0	**9**

[1] Expected control level with application at planting prior to weed emergence and following a good fallow program or when applied in late winter prior to weed emergence from the winter dormant period.

[2] Winter grasses include ryegrass, rescuegrass, and timothy grass.

[3] Winter broadleaf weeds include sowthistle, wild geranium, and clovers.

[4] Herbicide must be incorporated.

[5] Requires 28 to 35 days to reach maximum control.

[6] Addition of atrazine improves control.

[7] For best results, apply before morning glory exceed 5 inches in height.

SUGARCANE WEED MANAGEMENT

TABLE 2. GLOSSARY OF HERBICIDES REGISTERED FOR USE IN SUGARCANE IN LOUISIANA.[1]

Common chemical name	Company	Trade name and formulation
asulam	Bayer CropScience	Asulox XP - 3.12 lb/gal; Asulox - 3.34 lb/gal
	Helena Chemical	Asulam - 3.34 lb/gal
	United Phosphorus	Asulox - 3.34 lb/gal; Asulox XP - 3.12 lb/gal
	AgriSolutions (Agriliance)	Asulam 3.3 - 3.3 lb/gal liquid
atrazine	Drexel Chemical	Atra-5 - 5 lb/gal; Atrazine 4L - 4 lb/gal; Atrazine 90DF — 90% DF
	Helena Chemical	Atrazine 4L - 4 lb/gal; Atrazine 4F - 4 lb/gal; Atrazine 90-DG
	Loveland Products	Atrazine 4L - 4 lb/gal; Atrazine 90 WDG - 90% WDG
	Makhteshim Agan of N.A.	Atrazine 4L - 4 lb/gal; Atrazine 90DF 90% dry flowable
	Sipcam	Atrazine 4L - 4 lb/gal liquid; Atrazine 90DF - 90% dry flowable
	Southern States Cooperative	Atrazine 4L - 4 lb/gal
	Syngenta Crop Protection	AAtrex 4L - 4 lb/gal; AAtrex Nine - 85.5% WDG
	Tenkoz	Atrazine 4L- 4 lb/gal; Atrazine 4F - 4 lb/gal; Atrazine 90DF - 90% dry flowable
	Universal Crop Protection Alliance	Atrazine 4L - 4 lb/gal liquid; Atrazine 90 - 90% dry flowable
	AgriSolutions (Agriliance)	Atrazine 4L - 4 lb/gal liquid; Atrazine 90DF - 90% dry flowable
carfentrazone-ethyl	FMC	Aim EW - 1.9 lb/gal; Rage D-Tech - 0.13 lb/gal carfentrazone and 2,4-D ester
	Helena	Shutout - 0.05 lb/gal carfentrazone + mecoprop-p acid + 2,4-D ester
clomazone	FMC	Command 3ME - 3 lb/gal
	Helena Chemical	Command 3 ME - 3 lb/gal
2,4-D amine	Alligare	2,4-D Amine - 3.8 lb/gal
	Albaugh/AgriStar	2,4-D Amine 4 - 3.8 lb/gal
	Dow Agro Sciences	Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Helena Chemical	2,4-D Amine 4 - 3.8 lb/gal liquid; Sinker Ball - 1.74 lb/gal; Opti-Amine; 2,4-D Amine - 3.8 lb/gal liquid; Unison - 1.74 lb/gal; Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Loveland Products	Amine 4 - 3.74 lb/gal; Saber - 3.8 lb/gal; Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Nufarm	UAP Timberland Platoon - 3.8 lb/gal; Weedar 64 - 3.8 lb/gal
	Tenkoz	Amine 4 - 3.8 lb/gal
2,4-D (ester)	AgriSolutions (Winfield Solutions)	2,4-D LV6 - 5.6 lb/gal
	Albaugh/AgriStar	2,4-D LV4 - 3.8 lb/gal; 2,4-D LV6 - 5.5 lb/gal
	Helena Chemical	2,4-D LV4 - 3.8 lb/gal; Barrage HF - 4.7 lb/gal
	Loveland Products	Low Vol 4 - 3.8 lb/gal; Low Vol 6 - 5.6 lb/gal; Salvo - 5 lb/gal; Whiteout - 3.7 lb/gal

SUGARCANE WEED MANAGEMENT

TABLE 2. GLOSSARY OF HERBICIDES REGISTERED FOR USE IN SUGARCANE IN LOUISIANA.[1]

	Nufarm	Weedone LV4 EC - 3.8 lb/gal
	Tenkoz	Lo-Vol 4 2,4-D Low Volatile - 3.8 lb/gal; Lo-Vol 6 2,4-D Low Volatile - 5.5 lb/gal
	Universal Crop Protection Alliance	2,4-D Lo-V Ester Weed Killer - 3.76 lb/gal liquid
dicamba	AgriSolutions (Agriliance)	Sterling - 4 lb/gal
	Albaugh/AgriStar	Vision - 3.8 lb/gal
	Alligare	Cruise Control - 4 lb/gal
	Arysta LifeScience	Banvel - 4 lb/gal
	AXSS USA	Dicamba 4 DMA - 4 lb/gal
	BASF	Clarity - 4 lb/gal
	Gharda USA	Oracle Dicamba Ag. - 4 lb/gal liquid
	Loveland	Rifle - 4 lb/gal
	Nufarm	Diablo - 4 lb/gal
	Trace Mountain	Dicamba 4 - 4 lb/gal
	Universal Crop Protection Alliance	Dicamba - 4 lb/gal
dicamba + 2,4-D	AgriSolutions (Winfield Solutions)	Brash - 4 lb/gal
	Albaugh/AgriStar	Range Star - 4 lb/gal
	Arysta LifeScience North America	Banvel + 2,4-D - 3.8 lb/gal
	BASF	Weedmaster - 3.8 lb/gal
	Loveland	Rifle-D - 3.8 lb/gal
	Nufarm	Weedmaster - 3.8 lb/gal; Kambamaster - 3.8 lb/gal
diuron	AgriSolutions (Agriliance)	Diuron 4L - 4 lb/gal
	AgriSolutions (Winfield)	Diuron 80DF - 80% DF
	Alligare	Diuron 80DF - 80% DF
	Drexel Chemical	Diuron 4L - 4 lb/gal; Diuron 80W - 80 WP
	DuPont	Direx 4L - 4 lb/gal; Karmex XP - 80% DF
	Griffin	Direx 4L; Direx 80DF - 80% DF; Karmex DF - 80%; Karmex XP - 80% DF
	Loveland	Diuron 4L Herbicide - 4 lb/gal; Diuron 80WDG Weed Killer - 80% DG
	Makhteshim Agan of N.A.	Diuron 80DF - 80% DF; Diuron 4L - 4 lb/gal
EPTC	Gowan	Eptam 7E - 7 lb/gal
flumioxazin	Valent USA	Valor SX - 51.0% WDG
glyphosate	See Table 3	See Table 3
halosulfuron	Aceto Agricultural Chemicals Corp.	Halomax - 75 DF
	Gowan	Permit - 75% WDG; Yukon - 67.5% WDG (12.5% halosulfuron and 55.0% dicamba)

SUGARCANE WEED MANAGEMENT

TABLE 2. GLOSSARY OF HERBICIDES REGISTERED FOR USE IN SUGARCANE IN LOUISIANA.[1]

hexazinone	DuPont	Velpar L - 2 lb/gal; Velpar DF - 75% DG; Velpar K-4 Max - 78.8 DG (17.3% hexazinone and 61.5% diuron)
mesotrione	Syngenta Crop Protection	Callisto - 4 lb/gal; Callisto Xtra - 3.7 lb/gal (0.5 lb/gal mesotrione and 3.2 lb/gal atrazine)
metribuzin	Bayer CropScience	Metribuzin DF - 75% dry flowable; Sencor DF - 75% dry flowable
	Loveland Products	Metribuzin 75 - 75DF
	Makhteshim Agan of N.A.	Metribuzin 75DF - 75DF
	United Phosphorus, Inc.	Tricor 75DF - 75DF
	AgriSolutions (Winfield Solutions)	Dimetric DF - 75DF
paraquat dichloride	Makhteshim Agan of N.A.	Parazone 3SL - 3 lb/gal
	Source Dynamics	Paraquat Conc. - 3 lb/gal
	Syngenta Crop Protection	Gramoxone Inteon - 2 lb/gal liquid
pendimethalin	BASF	Prowl 3.3EC - 3.3 lb/gal; Prowl H20 - 3.8 lb/gal
	Dow AgroSciences	Pendimax 3.3 - 3.33/gal liquid
	Helena Chemical	Pendimethalin - 3.3 lb/gal
	Lesco	Pre-M 3.3EC - 3.3 lb/gal
	Loveland Products	Stealth - 3.3 lb/gal
	Tenkoz	Acumen - 3.3 lb/gal
	Winfield Solutions	Framework 3.3 EC - 3.3 lb/gal
sulfentrazone	FMC	Spartan 4F - 4 lb/gal; Spartan Advance - 4.6 lb/gal (0.56 sulfentrazone + 4.04 lb/gal glyphosate); Spartan Charge - 3.5 lb/gal (3.15 sulfentrazone + 0.35 carfentrazone); Authority MTZ - 45% DF (0.18 lb sulfentrazone + 0.27 lb metribuzin)
terbacil	DuPont	Sinbar - 80% WP
	Tessenderlo Kerley	Sinbar - 80% WP
triclopyr	Albaugh/AgriStar	AgriStar Triclopyr 3A - 3 lb/gal; Triclopyr R&P - 4 lb/gal
	Alligare	Triclopyr 3 - 3 lb/gal; Triclopyr 4 - 4 lb/gal
	Dow AgroSciences	Garlon 3A, Element 3A - 3 lb/gal; Garlon 4, Garlon 4 Ultra, Element 4 - 4 lb/gal; Pathfinder II - 1 lb/gal; Remedy, Remedy Ultra - 4 lb/gal
	Helena	Trycera - 2.87 lb/gal
	Nufarm	Platform - 3 lb/gal; Relegate RTU - 0.75 lb/gal; Relegate - 4 lb/gal; Tahoe 3A - 3 lb/gal; Tahoe 4A - 4 lb/gal
	Makhteshim Agan of N.A.	Triquad - 4 lb/gal; Triclopyr 3SL - 3 lb/gal
	Vegetation Management	Triclopyr 3SL - 3 lb/gal; Triclopyr 4EC - 4 lb/gal
triclopyr + 2,4-D	Dow AgroSciences	Crossbow - 1 lb/gal triclpyr + 2 lb/gal 2,4-D

SUGARCANE WEED MANAGEMENT

TABLE 2. GLOSSARY OF HERBICIDES REGISTERED FOR USE IN SUGARCANE IN LOUISIANA.[1]

	Helena	Crossbow - 1 lb/gal triclpyr + 2 lb/gal 2,4-D
	Loveland Products	Crossbow - 1 lb/gal triclpyr + 2 lb/gal 2,4-D
	Tenkoz	Crossbow - 1 lb/gal triclpyr + 2 lb/gal 2,4-D
trifloxysulfuron-sodium	Syngenta Crop Protection	Envoke 75WG
trifluralin	AgriSolutions (Winfield Solutions)	Trust - 4 lb/gal
	Albaugh/AgriStar	Trifluralin 4EC - 4 lb/gal
	Dow AgroSciences	Treflan HFP - 4 lb/gal
	Helena Chemical	Treflan 4EC - 4 lb/gal
	Loveland Products	Treflan 4L - 4 lb/gal; Trifluralin 4HF - 4 lb/gal
	Makhteshim Agan of N.A.	Triflurex HFP - 4 lb/gal
	Tenkoz	Trifluralin 4 EC - 4 lb/gal
	TriCorp	Trilin - 4 lb/gal
	Universal Crop Protection Alliance	Trifluralin 4EC - 4 lb/gal

[1]Information provided by the Louisiana Department of Agriculture and Forestry through the Pesticide Registration web site. This list is not inclusive of all products available. See herbicide label for specific crops and uses. The LSU AgCenter does not recommend or endorse specific herbicide brands.

SUGARCANE WEED MANAGEMENT

TABLE 3. GLYPHOSATE PRODUCTS REGISTERED FOR USE IN LOUISIANA WITH SURFACTANT RECOMMENDATIONS.[1]

Product	Manufacturer or Distributor	Glyphosate concentration[2]		Need for non-ionic surfactant[3]	Rate equivalent based on 4 lb ai/gal product		
		Acid equivalent (a.e)	Active ingredient (a.i.)		1.0 qt	1.5 qt	2.0 qt
Abundit Extra	Nufarm	3	4	No	1.0	1.5	2.0
Atila	Nufarm	3	4	May be added*	1.0	1.5	2.0
Atila Extra	Nufarm	3	4	No	1.0	1.5	2.0
Atila Plus	Nufarm	3	4	No	1.0	1.5	2.0
Buchaneer	Tenkoz	3	4	May be added**	1.0	1.5	2.0
Buchaneer Plus	Tenkoz	3	4	May be added***	1.0	1.5	2.0
Buchaneer 5	Tenkoz	-	5	May be added*	0.8	1.2	1.6
Cornerstone	AgriSolutions (Winfield)	3	4	May be added**	1.0	1.5	2.0
Cornerstone Plus	AgriSolutions (Winfield)	3	4	May be added***	1.0	1.5	2.0
Cornerstone 5 Plus	AgriSolutions (Winfield)	4	5.5	Can be added****	0.75	1.1	1.5
Credit 41	Nufarm	3	4	No	1.0	1.5	2.0
Credit 41 Extra	Nufarm	3	4	No	1.0	1.5	2.0
Credit Mixed Salt	Nufarm	3	3.4	May be added*	1.15	1.7	2.3
Credit Extra Mixed Salt	Nufarm	3	3.4	May be added*	1.15	1.7	2.3
Credit Duo	Nufarm	3	4	May be added*	1.0	1.5	2.0
Credit Duo Extra	Nufarm	3	4	No	1.0	1.5	2.0
Credit Systemic	Nufarm	3	4	May be added*	1.0	1.5	2.0
Credit Systemic Extra	Nufarm	3	4	No	1.0	1.5	2.0
Credit Xtreme	Nufarm	-	4.5	No	0.9	1.3	1.8
Crop-Sure Glyphosate Plus	Universal Crop Protection	3	4	May be added***	1.0	1.5	2.0
Czar	Fusion Technologies	3	4	No	1.0	1.5	2.0
Deal	Tenkoz	3	4	May be added**	1.0	1.5	2.0
Deal Plus	Tenkoz	3	4	May be added***	1.0	1.5	2.0
Debit TMF	Nufarm	4	5.4	Yes*	0.75	1.1	1.5
Durango	Dow AgroSciences	4	5.4	No	0.75	1.1	1.5

SUGARCANE WEED MANAGEMENT

TABLE 3. GLYPHOSATE PRODUCTS REGISTERED FOR USE IN LOUISIANA WITH SURFACTANT RECOMMENDATIONS.[1]

Product	Manufacturer or Distributor	Glyphosate concentration[2]		Need for non-ionic surfactant[3]	Rate equivalent based on 4 lb ai/gal product		
		Acid equivalent (a.e)	Active ingredient (a.i.)		1.0 qt	1.5 qt	2.0 qt
Durango DMA	Dow AgroSciences	4	5.4	No	0.75	1.1	1.5
Four Power Plus	Loveland	3	4	No	1.0	1.5	2.0
Genesis Extra	Farm Advantage	3	4	May be added**	1.0	1.5	2.0
Genesis Extra II	Farm Advantage	3	4	May be added**	1.0	1.5	2.0
Gly-4	Universal Crop Protection	3	4	May be added**	1.0	1.5	2.0
Gly-4 Plus	Universal Crop Protection	3	4	May be added***	1.0	1.5	2.0
Glycana Plus 41	Arcana	3	4	No	1.0	1.5	2.0
Glyfine Plus	Aceto	3	4	May be added***	1.0	1.5	2.0
Glyfos	Cheminova	3	4	May be added**	1.0	1.5	2.0
Glyfos X-tra	Cheminova	3	4	No	1.0	1.5	2.0
Glypho 41	UPI	3	4	May be added***	1.0	1.5	2.0
Glyphogan	Makhteshim Agan of N.A.	3	4	May be added**	1.0	1.5	2.0
Glyphomax XRT	Dow AgroSciences	4	5.4	No	0.75	1.1	1.5
Glyphosate 4	Alligare	3	4	May be added**	1.0	1.5	2.0
Glyphosate 41 Plus	CropSmart	3	4	May be added**	1.0	1.5	2.0
Glyphosate Plus	Crop-Sure	3	4	May be added***	1.0	1.5	2.0
Glyphosate 5.4	Alligare	4	5.4	Yes**	0.75	1.1	1.5
Gly Pho-Sel Pro 41%	Agrisel	3	4	No	1.0	1.5	2.0
Glysort	Glysortia	3	4	May be added**	1.0	1.5	2.0
Glysort Plus	Glysortia	3	4	No	1.0	1.5	2.0
Gly Star Gold	Albaugh	3	4	No	1.0	1.5	2.0
Gly Star Original	Albaugh	3	4	May be added**	1.0	1.5	2.0
Gly Star Plus	Albaugh	3	4	No	1.0	1.5	2.0
Gly Star Pro	Albaugh	3	4	No	1.0	1.5	2.0
GlySupreme Plus	MEY Corp.	3	4	No	1.0	1.5	2.0
Grandslam 4XS	AGRI Packaging & Logistics	3	4	May be added***	1.0	1.5	2.0

SUGARCANE WEED MANAGEMENT

TABLE 3. GLYPHOSATE PRODUCTS REGISTERED FOR USE IN LOUISIANA WITH SURFACTANT RECOMMENDATIONS.[1]

Product	Manufacturer or Distributor	Glyphosate concentration[2]		Need for non-ionic surfactant[3]	Rate equivalent based on 4 lb ai/gal product		
		Acid equivalent (a.e)	Active ingredient (a.i.)		1.0 qt	1.5 qt	2.0 qt
Helosate 70	Helm Agro US	4.72	6.3	May be added**	0.64	1.0	1.3
Helosate Plus	Helm Agro US	3	4	May be added**	1.0	1.5	2.0
Helosate Pro	Helm Agro US	3	4	May be added**	1.0	1.5	2.0
Honcho	Monsanto	3	4	May be added***	1.0	1.5	2.0
Honcho Plus	Monsanto	3	4	May be added***	1.0	1.5	2.0
Hoss Ultra	Helena	3	4	No	1.0	1.5	2.0
Lajj Plus	Northmoose Chemicals	3	4	No	1.0	1.5	2.0
Mad Dog	Loveland	3	4	May be added**	1.0	1.5	2.0
Mad Dog Plus	Loveland	3	4	No	1.0	1.5	2.0
Makaze	Loveland	3	4	No	1.0	1.5	2.0
Meychem 41% Glyphosate	MEY Corporation	3	4	Can be added****	1.0	1.5	2.0
Mirage	Loveland	3	4	May be added**	1.0	1.5	2.0
Mirage Plus	Loveland	3	4	No	1.0	1.5	2.0
Rascal	Winfield Solutions	3	4	May be added***	1.0	1.5	2.0
Rascal Plus	Winfield Solutions	3	4	May be added***	1.0	1.5	2.0
Rascal Plus Glyphosate 41%	Agriliance	3	4	May be added***	1.0	1.5	2.0
Reserve 41 Plus	National Ag Chem Assoc.	3	4	No	1.0	1.5	2.0
Roughneck	Nufarm	3	4	No	1.0	1.5	2.0
Roundup Original	Monsanto	3	4	May be added***	1.0	1.5	2.0
Roundup OriginalMax	Monsanto	4.5	5.5	May be added*****	0.75	1.1	1.5
Roundup PowerMax	Monsanto	4.5	5.5	May be added*****	0.75	1.1	1.5
Roundup WeatherMax	Monsanto	4.5	5.5	No	0.75	1.1	1.5
StrikeOut Loaded	Libertas Now	3	4	May be added**	1.0	1.5	2.0
Tomahawk	United Suppliers	3	4	May be added****	1.0	1.5	2.0
Tomahawk 5	United Suppliers	4	5.4	Yes***	0.75	1.1	1.5
Touchdown HiTech	Syngenta	5	--	Yes****	0.6	0.9	1.2

SUGARCANE WEED MANAGEMENT

TABLE 3. GLYPHOSATE PRODUCTS REGISTERED FOR USE IN LOUISIANA WITH SURFACTANT RECOMMENDATIONS.[1]

Product	Manufacturer or Distributor	Glyphosate concentration[2]		Need for non-ionic surfactant[3]	Rate equivalent based on 4 lb ai/gal product		
		Acid equivalent (a.e)	Active ingredient (a.i.)		1.0 qt	1.5 qt	2.0 qt
Touchdown Total	Syngenta	4.17	--	No	0.72	1.1	1.44
Traxion	Syngenta	4.17	--	No	0.72	1.1	1.44
Willowood Glyphosate 41%	Willowood LLC	3	4	No	1.0	1.5	2.0
Wise Up Plus	MEY Corporation	3	4	No	1.0	1.5	2.0
Z-Glyphosate 41 Max	Fusion Technologies	3	4	No	1.0	1.5	2.0

[1] Information provided by the Louisiana Department of Agriculture and Forestry through the Pesticide Registration web site. This list does not include all available glyphosate products. See herbicide label for specific crops and uses. The LSU AgCenter does not recommend or endorse specific herbicide brands.

[2] Glyphosate concentration can be expressed based on "acid equivalent" (a.e.) or on "active ingredient" (a.i.). Both concentrations are usually provided on the herbicide label. For glyphosate products the active portion of the herbicide molecule (the part that provides weed control) is the acid. In order to formulate a usable and stable product, the glyphosate parent acid is attached to a salt (e.g. isopropyl amine, potassium, etc.), increasing the molecular weight of the molecule, but not affecting herbicidal activity. Therefore, the a.i. designation is always a larger number.

[3] Most formulations of glyphosate contain some surfactant. The need for additional surfactant is based on how much surfactant is present in the formulation and the quality of the surfactant. The herbicide label may state that no additional surfactant is needed or recommended; that surfactant may be added; or that surfactant is required and the amount is specified. It is critical that surfactant be added if required. Always consult the label for specific information on the need for surfactants and other adjuvants. For the products listed in the Table 3 in regard to the need for surfactant, **No=** Label specifies that surfactant is not needed or nothing is included in reference to surfactant; **Yes=** * For surfactant at least 80% active, add 2 or more quarts unless otherwise indicated in specific crop or non-crop directions for using the product, ** For surfactant at least 50% active, add 2 or more quarts per 100 gallons water, *** For surfactant at least 70% active, add 2 to 4 quarts per 100 gallons water, **** For surfactant at least 75% active, add at 0.25 to 0.5%; **May be or Can be applied=** * For surfactant at least 80% active, add at 0.375% volume ** For surfactant at least 70% active, add at 0.5% volume; less than 70% active ingredient add at 1% volume, *** Use surfactant at least 70% active, **** Surfactant active ingredient and rate not specified, ***** Recommended when carrier volume is above 30 gallons per acre or when product application rate is less than 16 oz/A; use surfactant at least 70% active and add at 0.25 to 0.5% volume; less than 70% active ingredient add at 1% volume. Note: 0.25% volume = 1 qt/100 gal; 0.375% volume = 1.5 qt/100 gal; 0.5% volume = 2 qt/100 gal; 1% volume = 4 qt (1 gal) /100 gal.

Note: For AMS (ammonium sulfate), labels for all glyphosate products state that addition of AMS may increase performance.

PEANUTS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
benefin @ 1.1-1.5 lb/A	Balan @ 3.0 qt/A on light soil 4.0 qt/A on medium soil	Most annual grasses, weak on most large seeded broadleaf weeds	Incorporate into the upper 3" of soil immediately after application 3 weeks before or immediately before planting.
vernolate @ 2.5 lb/A	Vernam 6E @ 3.5 pt/A	Most annual weeds and nutsedge. Fair control of signalgrass.	Incorporate into upper 2 to 3" of soil with power tiller or disk immediately after application and before planting. Subsurface injection improves crop tolerance and weed control.
benefin @ 1.1-1.5 lb/A + vernolate @ 2.5 lb/A	As above for each	As above.	A combination of Balan and Vernam controls more types of weeds than either applied alone.
pendimethalin @ 0.74-0.99 lb/A	Prowl 3.3 EC @ 1.8-2.4 pt/A	Annual grasses and small-seeded broadleaves	Apply at pre-plant incorporated up to 60 days before planting. For best performance incorporate within 7 days of applications.
flumioxazin @ 0.096lb/A	Valor @ 3 oz/A	Pigweeds, sida and other broadleaf weeds. Some grass suppression.	Apply before planting; see label for more information.
PRE-EMERGENCE:			
s-metolachlor @ 0.95 - 1.27 lb/A	Dual Magnum @ 1-1.33 pt/A	Annual grasses and pigweed; poor control of large seeded broadleaf weeds	Apply to the soil surface after planting and before weeds emerge. May be tank-mixed with other PRE herbicide; consult label.
alachlor @ 2.0-3.0 lb/A	Lasso @ 2.0 qt/A on light soil 3.0 qt/A on medium soil	As above.	As above.
flumioxazin @ 0.096lb/A	Valor @ 3 oz/A	Pigweeds, sida and other broadleaf weeds. Some grass suppression.	Apply within two days of planting. Do not apply if peanuts have begun to crack.
POST-EMERGENCE:			
bentazon @ 0.75-1.0 lb/A	Basagran @ 1.5-2.0 pts/A	Cocklebur, prickly sida, common ragweed, smartweed	Apply overtop to small weeds. Do not apply to peanuts under stressed conditions. See label or detail.
2,4-DB @ 0.2-0.3 lb/A	Butoxone or Butyrac @ 1.0-1.5 pts/A	Cocklebur, morningglory and fair control of other broadleaf weeds	Apply when weeds are small and actively growing. Low rates control cocklebur, highest rate for other weeds. See label for restrictions.
sethoxydim @ 0.19-0.38 lb/A	Poast @ 1.0-2.0 pt/A Apply with COC @ 2 pt/A	Annual and perennial grasses	Apply before grasses exceed height limit. Do not apply to grasses under stress. Do not apply within 70 days of harvest.
clethodim @ 0.09 – 0.25 lb/A	Select 2EC @ 6–16 oz/A Apply with COC @ 2 pt/A	Annual and perennial grasses.	Apply before grasses exceed height limit. Do not apply within 40 days of harvest. Other clethodim formulations have similar labeling.
acifluorfen @ 0.37-0.50 lb/A	Ultra Blazer @ 1.5-2.0 pts/A Adjuvant required; see label	Pigweed, morningglory, wild poinsettia, and sesbania	Apply to o small, actively growing weeds. Do not apply Ultra Blazer within 75 days of harvest.

HOME GARDENS

Active Ingredient	Product Rate per 1000 sq ft/1 gal[1]	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:		
glyphosate[1]	Roundup Ultra/others @ 0.5-1oz/1000 sq ft. Several brands available; consult labels for proper rates.	Apply at post-emergence on weeds. A nonselective, post-emerge to be used before planting or crop emergence on actively growing weeds. Avoid spray drift to desirable plants. Spray weeds to wet but not to drip. Crops labeled include beets, carrots, celery, corn, cole crops, English and southern peas, Irish potatoes, Jerusalem artichoke, lima and snap beans, lettuce, greens, okra, onion, garlic, peanuts, radish, soybeans, sweet potatoes and asparagus (before spears appear).
trifluralin	Treflan 4 EC @ 1/3 fl oz/1,000 sq ft on medium soil 1/2 fl oz/1,000 sq ft on heavy soils	Apply before planting and incorporate. Use on snap or lima beans, cole crops, Irish potatoes, sunflowers and greens. Incorporate before transplanting tomatoes, cole crops, pepper and celery. Also for asparagus beds and at half rate post-emergence (crop) between onion rows. Treflan controls many small seeded broadleaf weeds (pigweeds) and annual grasses.
PRE-EMERGENCE: (before crops or weeds emerge)		
glyphosate[1]	Roundup Ultra/others @ 0.5-1oz/1000 sq ft. Several brands available; consult labels for proper rates.	Apply at post-emergence on weeds. A nonselective, post-emerge to be used before planting or crop emergence on actively growing weeds. Avoid spray drift to desirable plants. Spray weeds to wet but not to drip. Crops labeled include beets, carrots, celery, corn, cole crops, English and southern peas, Irish potatoes, Jerusalem artichoke, lima and snap beans, lettuce, greens, okra, onion, garlic, peanuts, radish, soybeans, sweet potatoes and asparagus (before spears appear).
metolachlor	Dual 8E @ 1/2 oz/1,000 sq ft on sandy soil 1.0 fl. oz/1,000 sq ft on medium-heavy soil Dual 25G @ 2.2 oz/1,000 sq ft on sandy soil 3.6 oz/1,000 sq ft on med-heavy soil	Apply before or after planting snap or lima beans, soybeans, sweet corn, peanuts, popcorn, Irish potatoes, southern peas, English peas and chickpeas. Apply after planting snap or lima beans, sweet corn, peanuts, popcorn, Irish potatoes, southern pecans, English peas and chickpeas Provides good residual grass control and controls some broadleaf weeds. Will not control emerged weeds.
DCPA	Dacthal 75% WP @ 4.0 oz/1,000 sq ft on sandy soil 5.0 oz./1,000 sq. ft. on med-heavy soil	Apply after planting snap beans (not limas), southern peas, greens, radish, garlic, onion, cole crops, Irish or sweet potatoes. Apply after transplanting tomatoes, peppers, cole crops and cucurbits. Apply 4-6 weeks after transplanting eggplants. Control many annual grasses and some broadleaf weeds.
POST-EMERGENCE: (after crop and weeds emerge)		
bentazon	Basagran 4 EC @ 1/2-3/4 oz/1000 sq ft	Snap or lima beans, mint, southern peas, peanuts, English peas and corn. Apply to small actively growing broadleaf weeds and yellow nutsedge. This treatment will not kill grasses. May need an adjuvant; see label.

HOME GARDENS

Active Ingredient	Product Rate per 1000 sq ft/1 gal[1]	Remarks and Precautions
POST-EMERGENCE: (after crop and weeds emerge): continued		
fluazifop	Fusilade DX @ 0.5 oz/1000 sq ft Apply with NIS @ 0.33 oz/gal	Spray on young actively growing grassy weeds. Spray to wet weed foliage. Use on asparagus, carrots, onions, spinach, sweet potatoes, hot peppers and non-bell peppers.
sethoxydim	Poast @ 1 oz/1000 sq ft Apply with COC @ 1 oz/A	Spray on young, actively growing grassy weeds. Spray to wet weed foliage. Use on asparagus, beans, cole crops, cabbage, cucumbers, peanuts, greens, lettuce, melons, peas, peppers, pumpkins, potatoes, squash or tomatoes.

[1] The rates given in column 2 (Product Rate) are based on the amount of material needed to treat 1,000 square feet. This amount of herbicide plus adjuvant (if required) should be diluted in 1 gallon of water and evenly distributed over 1,000 square feet. To find the amount of product needed if the area treated is different from 1,000 square feet, use the following formula: [product rate, in oz (column 2) x (area to be treated, in square feet ÷ 1,000)]. To find the volume necessary to spray, use the following formula: [area to be treated, in square feet ÷ 1,000]. Example: area to be treated is 2,500 square feet. Want to spray Fusilade DX @ 0.5 oz/1,000 square feet. Total product needed: [0.5 x (2,500 ÷1000)] or 1.25 oz. Total volume needed is [2,500 ÷ 1,000] or 2.5 gallons.

[2] Refer to "Appendix A" for more information on various glyphosate brands and formulations.

LAWNS and TURF

TABLE 1. Turfgrass tolerance to selected herbicides*

PRE-EMERGENCE HERBICIDES	Bermuda grass	Centipede	St. Augustine	Zoysia
atrazine	D	T	T	T
benefin	T	T	T	T
benefin + oryzalin	T	T	T	T
bensulide	T	T	T	T
bensulide + oxadiazon	T	NR	NR	T
dithiopyr	T	T	T	T
isoxaben	T	T	T	T
metolachlor	T	T	T	T
oryzalin	T	T	T	T
oxadiazon	T	NR	T	T
pendimethalin	T	T	T	T
prodiamine	T	T	T	T
pronamide	T	T	T	R
simazine	I	T	T	T
sulfentrazone + prodiamine	T	T	NR	T

POST-EMERGENCE HERBICIDES	Bermuda grass	Centipede	St. Augustine	Zoysia
2,4-D	T	I	I	T
2,4-D + mecoprop + dicamba	T	I	I	T
atrazine	D	T	T	T
bentazon	T	T	T	T
carfentrazone	T	T	T	T
chlorsulfuron	T	T-I	T-I	T
clopyralid	T	T	T	T
dicamba	T	I	I	T
diclofop	T	NR	NR	NR
fenoxaprop	NR	NR	NR	T
fluazifop	NR	NR	NR	I
foramsulfuron	T	NR	NR	T
halosulfuron	T	T	T	T
imazaquin	T	T	T	T
mecoprop	T	I	I	T
metribuzin	T-I	NR	NR	NR
metsulfuron	T	T	T	T
MSMA	T	NR	NR	T-I
pronamide	T	NR	NR	NR
rimsulfuron	T	T	NR	T
sethoxydim	NR	T	NR	NR
sulfentrazone	T	T	NR	T
sulfosulfuron	T	T	T	T
triclopyr + clopyralid	I	I	NR	I
trifoxyfulfuron	T	NR	NR	T
iodosulfuron	T	T	T	T

***Abbreviations:**

T= tolerant at labeled rates

I = Intermediate safety

NR = Not recommended/labeled – severe injury potential

D = Dormant

GENERAL HOME LAWN WEED CONTROL

Home lawn broadleaf weed control often can be accomplished using selective post-emergence formulations that contain two or more herbicides. Formulations are available for most southern grasses. Examples are: Bayer Advanced Southern Weed Killer, GreenLight Wipe Out, Spectrum 33 Plus, Trimec, Ferti-lome's Weed Out, Ortho Weed-B-Gon, Atrazine, H and Weed Free Zone. Most labels will stress their use on younger weeds growing in the cooler midspring to early summer period. A temporary discoloration of the lawn usually occurs. Repeat application in three to four weeks if needed on persistent weeds. **WARNING:** Some of these products contain phenoxy herbicides; avoid drift, keep away from gardens and clean sprayers thoroughly with ammonia. Atrazine-containing products enter through roots and leaves and work slower. **Note that MSMA is no longer available for home lawn use.**

Many manufacturers now offer herbicides impregnated on fertilizer for homeowner use. Many of these products work sufficiently. These products, however, have to be applied according to their intended use. Those products containing a pre-emergence herbicide (see following table) have to be applied before the weed emerges. For crabgrass, application is typically in early March in northern areas of Louisiana and mid-to late February in the southern portion of the state. A good rule of thumb is that *Forsythia plants begin to bloom just prior to crabgrass emergence*. If sufficient rainfall is not received, irrigation should be applied to activate the herbicide. Be sure to read and follow the manufacturer's label for maximum weed control and application instructions. Use a good quality spreader and make every effort to apply the product uniformly to the lawn. A good practice to ensure uniform application is to apply one-half of the desired amount in one direction across the lawn and the second half of the desired amount perpendicular to the first application.

The best defense against weeds in a home lawn is to have a dense, healthy turf canopy. Be certain to remove no more than one-third of the height of the turf in a single mowing. Removing excess turf tends to leave holes in the canopy that weeds often will invade. Follow a recommended fertility regimen for your specific turf species and location. Overfertilization also can cause detrimental effects to the turf and leave voids in which weeds can establish.

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES:			
atrazine @ 1.0-2.0 lbs/A	Aatrex and Various other formulations (See labels) @ 1.0-2.0 qt/A or 0.75-1.5 fl oz/1000 sq. ft.	*Poa*, winter annuals such as henbit, chickweeds and lawn burweed.	**Restricted use.** Safely applied to St. Augustine, centipede, zoysia and dormant Bermuda grass late fall or early winter. Do not use in overseed areas. **Do not apply near drip-line of trees and shrubs.**
benefin @ 2.0 – 3.0 lb/A	Balan 2.5 G @ 120 lb/A or 2.75 lb/1000 sq. ft.	Crabgrass, goosegrass, *Poa annua* (annual bluegrass) and certain other annuals.	Apply in late February to early March in south La. & early to mid March in north LA for many summer annual grasses and broadleaf weeds. Retreat in mid-September in north LA & early to mid-October in south LA for winter annuals. Do not seed treated areas within 4 months of last application. Use on established turf only.
bensulide @ 7.5 - 12.5 lb/A	Bensumec 4 EC @ 1.9 – 3.1 gal/A or 5.6 oz to 11.2 oz/1000 sq. ft. Pre-San 7 G @ 107 – 180 lb/A or 2.46 lb to 4.1 lb/1000 sq. ft.	Crabgrass, goosegrass, *Poa annua* and small seeded broadleaves.	Apply in February - early March in south LA & early March in north LA. Apply in mid Sept. in north LA & early Oct. in south LA for *Poa*. Do not seed treated areas within 4 months of last application. Use on established turf only. **Labeled for established Bermuda grass greens.**
dithiopyr @ 0.38 lbs/A	Dimension 1 EC @ 2 qt/A or 1.5 oz/1000 sq. ft. Dimension Ultra 40 WP @ 0.95 lb/A or 0.35 oz/1000 sq. ft.	Crabgrass, *Poa*, foxtail, crowfoot barnyard grass, goosegrass and small seeded annual broadleaves.	May tank mix with compatibles. Delay overseeding or sprigging for 3 mos. after application. Provides PRE control of several annual grasses and limited POST control of crabgrass. Apply on established turf only. May be used on all southern turf species.
isoxaben @ 0.5-1.0 lbs/A	Gallery 75 DF @ 0.7 – 1.3 lbs/A or 0.25-0.5 oz/1000 sq. ft.	Many broadleaves. No grasses are controlled.	Do not apply through irrigation. Keep in agitation. Can tank mix with other products. All established turfgrasses are tolerant.
bensulide + oxadiazon @ 6 + 1.5 lb/A	Goosegrass/ Crabgrass Control @ 6.56 G @ 116 lb/A or 2.6 lb/1000 sq. ft.	Crabgrass, goosegrass, *Poa annua*	Apply on established zoysia, perennial ryegrass and Bermuda grass. **May be applied to established greens and tee boxes.**
prodiamine @ 0.75 - 1 lb/A	Barricade 65 WG @ 0.75 – 1.5 lbs/A or 0.28 - 0.4 oz/ 1000 sq. ft. Barricade 4L @ 0.625 – 3 pt/A or 0.23 – 1.1 oz/1000 sq. ft.	Crabgrass, *Poa annua*, foxtail, crowfootgrass, barnyard grass, goosegrass and small seeded annual broadleaves.	On established turf, including ryegrass. Long residual. Use caution if winter kill of existing turf is suspected. All southern grasses are tolerant.
pronamide @ 0.5 lb/A	Kerb 50W @ 1 lb/A or 0.37 oz/1000 sq. ft.	Pre or early post in fall or winter for control of *Poa annua*.	Use on dormant or active Bermuda grass for *Poa.* Ryegrass overseed, fescues and bentgrass will be injured. Acts mainly through root absorption. Beware of runoff onto sensitive grasses. Do not use within 70 days prior to overseeding. Post-emergence activity is slow (1 to 2 months). **May be applied to established greens and tee boxes. Restricted use.**

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES: continued			
pendimethalin @ 1.7 – 3.0 lb/A	Pendulum 3.3 EC @ 3.6–4.8 pt/A or 1.3–1.8 oz/ 1000 sq. ft. Pendulum AquaCap 3.8 @ 3.1 – 6.2 pt/A or 1.15 oz – 2.3 oz/1000 sq. ft. Pendulum 2G @ 75–150 lb/A or 1.7 – 3.4 lb/1000 sq. ft.	Goosegrass, crabgrass and small seeded broadleaves.	For established warm season grasses. Not for spring use when turf suffers from severe winter kills. Irrigate after application. All southern grasses are tolerant.
metolachlor @ 1.2 – 2.6 lbs/A .	Pennant Magnum 7.62 EC @1.3 - 2.6 pt/A or 0.48-0.96 oz/1000 sq. ft	*Poa*, goosegrass ,crabgrass plus yellow nutsedge, some annual sedges and small seeded broadleaves.	For warm season turfs. Not for tees or greens. Do not overseed 4 months prior or 6 months after. Also for ornamentals.
sulfentrazone + prodiamine	Echelon 4 SC @ 0.5 – 2.25 pt/A or 0.184 – 0.826 oz/1000 sq. ft.	Annual grasses, annual sedges, yellow nutsedge, certain broadleaf weeds.	Apply safely to Bermuda grass, centipede grass, zoysia and seashore paspalum after the second mowing. **Do not apply on St. Augustine grass.**
oxadiazon @ 2.0-4.0 lb/A	Ronstar 2 G @ 100 – 200 lb/A or 2.3 – 4.6 lb/1000 sq. ft. Regal Ronstar 2 G @ 100 – 200 lb/A or 2.3 – 4.6 lb/1000 sq. ft. Ronstar 50 WP@ 4 – 6 lb/A or1.5 – 2.2 oz/1000 sq. ft.	Poa annua, crabgrass, goosegrass, oxalis, many other annual grasses and broadleaf weeds.	For use on established St. Augustine, zoysia and Bermuda grass only. Do not exceed 150 lb/acre (3 lb active) on St. Augustine turf. May cause temporary discoloration. **Do not apply to centipede grass or Bermuda grass golf greens**. Can split applications 30 days apart. 50WP for dormant turf. Apply 50 WP several weeks prior to greenup.
fenarimol @1.4 - 2.0 lb/A	Rubigan 50WSP @ 44 – 65 oz/A or 1 – 1.5 oz/1000 sq. ft. repeat in 10-14 days	*Poa annua*	Apply to greens and tees prior to overseeding in 2 to 3 applications. The final application should be made 2 weeks prior to overseed. Acts by reducing *Poa annua* growth to allow overseed to dominate on Bermuda greens. Rubigan is an effective, locally systemic, broad spectrum fungicide for dollarspot and brown patch. Single, double or triple split application. Single applicatons provide poor *Poa annua* control.
oryzalin @ 3.0 lb/A	Surflan 4 AS @ 3 qt/A or 2.2 oz/1000 sq. ft.	Crabgrass, rye, goosegrass and barnyard grasses, foxtails and *Poa annua* as well as many broadleaves.	Not for greens or tees. Delay reseeding 3-4 months. Safe for all established warm season grasses.
simazine @ 1 – 2 lb/A	Simazine 4 L @ 1 – 2 qt/A or 0.75 – 1.5 oz/1000 sq. ft.	Provides excellent control of *Poa annua* as well as many winter broadleaves.	Safely applied to St. Augustine, centipede, zoysia and Bermuda grass late fall or early winter. Do not use in overseed areas.

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES: continued			
dimethenamid 1.0 to 1.5 lb/A	Tower 6 EC @ 21 - 32 oz/A or 0.48 – 0.73 oz/1000 sq. ft.	Pre-emergence on most annual grasses, certain broadleaf weeds, doveweed + yellow nutsedge	Most established southern grasses grown in LA. Good pre-emergence control of yellow nutsedge.
indazaflam 0.027 to 0.07	Specticle 20 WP @ 2.1 – 5.7 oz/A or 0.048 – 0.130 oz/1000 sq. ft.	Pre-emergence on most annual grasses and certain broadleaf weeds	Well established grasses only. Long residual control with higher rates. Reduced rates on St. Augustine grass and centipede grass.
SELECTIVE POST-EMERGENCE HERBICIDES:			
atrazine @ 1.0-2.0 lbs/A	Aatrex and Various other formulations (See labels) @ 1.0 – 2.0 qt/A or 0.75 – 1.5 fl oz/1000 sq. ft.	Florida betony, *Poa*, dollarweed, lespedeza, henbit, lawn burweed.	**Restricted use.** Safely applied to St. Augustine, centipede, zoysia and dormant Bermuda grass in early winter for several winter weeds. Do not use in overseed areas. **Do not apply near drip-line of trees and shrubs.**
simazine @ 1 – 2 lb/A	Simazine 4 L @ 1 – 2 qt/A or 0.75 – 1.5 oz/1000 sq. ft.	Good post control of *Poa annua* as well as many winter broadleaves.	Safely applied to St. Augustine, centipede, zoysia and Bermuda grass late fall or early winter. Do not use in overseed areas. Apply after last home game on nonover-seeded football fields.
fenoxaprop @ 0.57 – 0.174 lb/A	Acclaim 0.57 EC @ 13 – 39 fl oz/A 0.75 – 1 fl oz/1000 sq. ft	Early post-emergence to several annual grasses and bermudgrass suppression.	Can be safely applied to zoysia. Suppresses of Bermuda grass infesting zoysia.
asulam @1.7-2.1 lb/A	Asulox 3.3 EC @ 4-5 pts/A 1.5 - 1.8 oz/1000 sq. ft.	Crabgrass, goosegrass and sandbur.	Post-emergence use in Tifway 419 bermuda and St. Augustine grass sod**. Do not apply to residential turf**. Do not apply to freshly mowed or stressed turf. Do not use surfactant. One application per season. Some discoloration may occur, especially in hot weather.
dicamba @ 0.25 – 0.5 lb/A	Banvel 4S @ 0.5-1 pt/A or 1-2 teaspoons/1000 sq. ft.	Annual and biennial broadleaves, woody brush and vines. Chickweed, white clover, henbit, burweed, wild strawberry, curly dock, spotted spurge.	Use on deep-rooted, stubborn broadleaves. Apply sufficient gallons to coat foliage down to base of plant. Repeat application may be needed. Do not exceed 0.5 lb per acre per year. Applications over 0.25 lb./A may temporarily stunt and discolor some grasses. Apply no more than 0.5 pt/A to St. Augustine grass. May be tank mixed with 2,4-D, MCPP, MCPA (consult label).
bentazon @ 1.0 – 2.0 lb/A	Basagran T/O or Lescogran 4 SL 1 - 2 qt/A or 0.75-1.5 oz/1000 sq. ft.	Yellow nutsedge and annual sedges and green kyllinga with repeat applications.	Use on established warm season grasses turf. Can repeat at 10 to 14 days. Do not apply more than 3 qt/A/season. Do not mow 3-5 days before or after application. May add crop oil concentrate.
sulfosulfuron @ 0.05 - .09 lb/A	Certainty 75 WG @ 1.25 – 2.0 oz/A or 0.03 – 0.04 oz/1000 sq. ft.	Yellow and purple nutsedge and green kyllinga plus johnsongrass	Safe on all warm season turfgrasses and very effective on most sedges including green kyllinga. Additionally, herbicide controls johnsongrass.

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
SELECTIVE POST-EMERGENCE HERBICIDES: continued			
ethofumesate @ 1.0-2.0 lbs/A	Prograss 1.5 F @1.0 – 2.0 gallons/A or 3 - 6 oz/1000 sq. ft. lt soil 3.5-4 oz/1000 sq. ft. med-hvy soil	Annual grasses (*Poa annua*), pigweed, chickweed, purslane, barnyard grass, crabgrass and foxtail. Suppresses nutsedge.	Apply pre or early post-emerge. Hastens or extends dormancy in bermuda. Therefore, apply 3-4 wks after overseeding. Do not overlap. Repeat once for extended control. Overseed only with perennial ryegrass. Maximum 8 pt/A/season. Seasonal influences on Bermuda grass recovery can be significant for Baton Rouge and southward.
dicamba diglycolamine @ 0.09-1lb/A	Clarity @ 3-32 oz/A or 0.07-0.74 oz/1000 sq. ft.	Same weeds controlled with Banvel	After green-up. To avoid injury to newly emerged grasses, wait until after the second mowing to apply. Applications of more than 16 oz/A may discolor susceptible grasses. Consult label. Do not exceed 32 oz/A/yr. See recommendations for sensitive grasses.
triclopyr plus clopyralid @ 0.09 – 0.19 lb/A.	Confront 3 SL @ 1.5-2.0 pt/A or 0.5-0.75 oz/1000 sq. ft or Pump-up sprayer @ 1 tablespoon / gal for spot treatments	Many annual and perennial broadleaves (like phenoxies). Black medic, white clover, chickweed, burweed, lespedeza, wild violet, Virginia buttonweed	Post-emergence on active weeds. Repeat if necessary. May be used on Bermuda grass, centipede grass and zoysia. Do not apply on St. Augustine grass. Avoid drift and contact of shrubs. Not for golf greens or tees. A maximum 2 qts/A/yr. **Do not apply to residential turf.**
quinclorac @ 0.75/A	Drive 75 DF 1 lb/A or 0.367 oz//1000 sq. ft. Drive XLR 8 @ 64 oz/A or 1.45 oz/1000 ft^2	Crabgrass, barnyard grass, lespedeza, clover and suppression of torpedo grass	For Bermuda grass and zoysia. **Do not apply to centipede, St. Aug., or bahiagrass.** Three 0.67 lb/A applications needed for torpedo grass management.
Quinclorac, sulfentrazone, dicamba,2,4-D @ 1.1 to 1.6 lb/A	Q4 Plus @ 5 to 7 pt/A or 1.8 to 2.6 oz/1000 ft^2	Crabgrass, barnyard grass, broadleaf signalgrass, foxtail, lespedeza, clover, Florida betony, yellow nutsedge	Warm season application is limited to Bermuda grass. Reduced crabgrass control at 3 to 4 tillers. Apply at least 2 days before mowing or 2 days after. **Do not apply to centipede grass or St. Augustine grass.**
diclofop @ 0.75-1.5 lb/A	Illoxan 3EC @ 32 - 44 oz/A 0.75 - 1.0 oz/1000 sq. ft.	Goosegrass infesting Bermuda grass on golf courses including greens	Post-emergence control of goosegrass up to 1 tiller. Apply on established Bermuda grass. Do not tank-mix with fertilizers or other pesticides. Do not overseed treated area for at least 2 months following application. Avoid mowing treated areas for 36 hours. **Restricted use.**
imazaquin @ 0.38 - 0.5 lb/A	Image 70 DG @ 8.6 – 11.4 oz or 0.2 – 0.26 oz/1000 sq. ft.	Chickweed, henbit, clover, parsley piert, geranium, pigweed, onions, purple nutsedge, burweed, sandbur; kyllinga and dollarweed suppression.	Can be used on all warm season grasses. However, do not apply to dormant or transitional St. Augustine grass. Do not tank mix with other post-emergence herbicides. Not for cool season grasses or golf greens. Some yellowing may occur especially in tire tracks or low areas. Can repeat for improved control. Add a nonionic surfactant 0.25%. MSMA will improve sedge control.

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
SELECTIVE POST-EMERGENCE HERBICIDES: continued			
clopyralid @ 0.09 -0.5 lb/A	Lontrel 3 EC @ 0.25-1.33 pt/A 0.1 – 0.5 oz/1000 sq. ft. No surfactant is needed.	Broadleaf weeds including legumes and buttonweed	Safely applied to all warm season grasses. Do not use on putting greens or tees. Can provide effective control of Virginia buttonweed but repeated applications may be necessary. Avoid drift to susceptible ornamental plants. **Do not apply to residential turf.**
metsulfuron @ 0.01 – 0.038 lb/A	Manor 60 WDG @ 0.33 – 1 oz/A or 0.007 – 0.023 oz/1000 sq. ft. Blade 60 WDG @ 0.33 – 1 oz/A or 0.007 – 0.023 oz/1000 sq. ft.	Pensacola bahiagrass, clovers, rose (pink) woodsorrel, many winter broadleaves, suppresses VA. buttonweed with 2 applications sprayed 6 weeks apart.	Controls a wide range of broadleaf weeds. Labeled for St. Aug., Bermuda grass, zoysia, centipede grass. Do not exceed 0.5 oz/A on centipede grass. Do not overseed for 8 weeks after application.
MSMA @ 2.0–3.0 lb/A	MSMA 6 SL @ 1.3 - 2 qt/A or 1.0 - 1.5 oz/1000 sq. ft. MSMA 6.6 SL @ 1.2 – 1.8 qt/A or 1.0 - 1.3 oz/1000 sq. ft	Bahiagrass, crabgrass, dallisgrass, nutsedges	Bermuda grass and zoysia are tolerant. 6 lb/gallon formulation has surfactant but 6.6 lb/gallon formulation does not. Best performance can be expected when air temperatures are at least 80 degrees. Repeat applications are required 7-10 days apart. Dallisgrass control requires multiple applications. **Emerald zoysia is susceptible to MSMA. See new restrictions on label**
halosulfuron @ 0.03-0.06 lb/A	Sedgehammer 75 WDG @ 0.6 - 1.33 oz/A or 0.138 – 0.03 oz/1000 sq. ft. or 0.25 teaspoon/gal spot spray	Nutsedges (purple & yellow) Suppression of kyllinga species.	Post-emergence with repeat application necessary within 6 weeks with heavy infestations. Use nonionic surfactant. Can be used on all warm season grasses.
chlorosulfuron @ 0.05 – 0.25 lb/A	Corsair 75 WDG @ 1 – 5.33 oz/A or 0.02 – 0.122 oz/1000 sq. ft.	VA buttonweed suppression with 2 applications spaced 6 weeks apart. white clover, wild garlic	Some discoloration and delayed greenup in St. Augustine grass. Good activity on most broadleaf weeds.
trifloxysulfuron @ 0.015 - 0.02 lb/A	Monument 75 WG @ 0.33- 0.56 oz/A or 0.007- 0.011 oz/1000 sq. ft. Spot treatment @ 0.0176 oz/gallon + 2 teaspoons of nonionic surfactant.	Purple, yellow and annual sedges plus green kyllinga, oxalis, white clover, spotted spurge, *Poa*, ryegrass overseed, Virginia buttonweed	Bermuda grass and zoysia only. Excellent sedge and green kyllinga control. Suppresses Virginia buttonweed. Repeat applications may be needed 4 wks after initial application for buttonweed. Use rates 0.1 to 0.3 oz/A for overseed removal. Allow 6 wks between last application and overseeding with ryegrasses.
rimsulfuron @ 0.031- 0.062 lb/A	TranXit GTA 25 DF @ 1 – 2 oz/A or 0.046 – 0.09 oz/1000 sq. ft.	*Poa annua,* perennial ryegrass overseed	*Poa annua* control in nonoverseeded Bermuda grass. Transitional aid for the removal of ryegrass overseeds. **May be used on established Bermuda grass golf greens and tees.**
Iodosulfuron, thiencarbazone, dicamba @ 0.10 to 0.21 lb/A	Celsius 68 WG @ 2.5 to 4.9 oz/A or 0.057 to 0.113 oz/1000 ft^2	Broadleaf weeds such as white clover, chickweed and suppression of dallisgrass with sequential applications or applied as spot treatments	Excellent safety on most lawn grasses grown in LA. Good safety on St. Augustine grass in hot weather. **Do not apply to a turf overseeded with cool season grasses such as perennial ryegrass.**

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
SELECTIVE POST-EMERGENCE HERBICIDES: continued			
flazasulfuron @ 0.012 to 0.047 lb/A	Katana 25 DF @ 0.75 to 3.0 oz/A or 0.0172 to 0.068 oz/1000 ft^2	Effective removal of perennial ryegrass and Poa trivialis. Also controls annual bluegrass, blue-eyed grass and newly emerged crabgrass.	Bermuda grass or zoysia with some limited low rate use in centipede grass. **Do not apply on golf greens.**
foramsulfuron @ 0.013 – 0.04 lb/A	Revolver 0.19 SL @ 8.8 – 26.2 fl oz/A or 0.20 – 0.60 oz/1000 sq. ft	Goosegrass, annual bluegrass, removal of winter overseed	Bermuda grass and Meyer zoysia only. Apply higher rates for goosegrass control. Not labeled for residential turf. Rainfast within 2 hours. Works more slowly in cool weather. **May be applied to greens.**
metribuzin @ 0.2-0.5 lb/A	Sencor 75 DF @ 5.3-10.5 oz/A or 0.12-0.24 oz/1000 sq. ft.	Chickweed, henbit, spurweed, Speedwell, goosegrass when tankmixed with MSMA.	Post-emergence on dormant Bermuda grass turf (use higher rates). Actively growing turf (mid spring) Bermuda grass only. Do not apply on golf greens, tees or aprons. Delay mowing for at least 3 days before spray. Don't exceed 1.5 lb/A/season or more than 1 application on dormant or 2 applications on active turf. Mix with MSMA at 0.1-0.2 lb/A for goosegrass control.
2,4-D + MCPP + dicamba @ 0.68 – 1.35 lb/A	Trimec Classic 2.7 EC @ 2 – 4 pt/A (consult label for other turf) or 0.75 – 1.5 oz/1000 sq. ft. for hybrid Bermuda and 1 oz/1000 sq. ft. for St. Augustine grass or centipede grass	Virginia buttonweed, Henbit, lespedeza, clovers, dandelion, dock, burweed, bull thistle, wild strawberry and many other broadleaves	Consult label for specific turf rates. Provides good control of many broadleaf weeds. Avoid nontarget drift. For clover, 4 pints/A is recommended. Maximum of 2 applications per year. Do not apply when temperatures exceed 85 F.
2,4-D + MCPP + dicamba + carfentrazone @ 0.1519 – 0.6075 lb/A	Speed Zone South 2.2 EC @ 1.5 – 6 pt/A or 0.55 – 2.2 oz/1000 sq. ft. for hybrid Bermuda 1 oz/1000 sq. ft. for St. Augustine grass or centipede grass	Virginia buttonweed, Henbit, lespedeza, clovers, dandelion, dock, lawn burweed, bull thistle, wild strawberry and many other broadleaves	May be used in most warm season turfgrass. Consult label for specific turf rates. Provides good control of many broadleaf weeds. Avoid nontarget drift. Do not apply when temperatures exceed 85 F.
2,4-D amine @ 0.75 - 1 lb/A	2,4-D amine 3.84 EC @ 1.5 – 2.0 pt/A or 1.0 oz or 2 tablespoons/ 2 gals water/1000 sq. ft. Spot treatments @ 0.5 oz/gallon/1000 sq. ft in St. Augustine grass	Many annual, biennial and perennial broadleaf weeds.	After broadleaf weeds emerge and are actively growing. Treat sensitive grasses only in mid spring. St. Augustine grass is the most sensitive warm season turf-use spot treatments instead of broadcast. Apply on sunny days when the temperature is well above 60F and there is little wind presence. Prevent contact with desirable adjacent plants. Use only on established turf. Do not treat grasses while breaking dormancy. More than one application may be required for certain weeds. Use ester formulation for hard to kill weeds but expect more turf damage & drift. Do not use 2,4-D near greenhouses. Some incompatibility possible when mixed with MSMA. **Restricted use. Observe regionalized rules concerning 2,4-D use in cotton producing**

LAWNS and OTHER TURF AREAS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
			areas of the state.
SELECTIVE POST-EMERGENCE HERBICIDES: continued			
2,4-D + MCPP + dicamba @ 0.375 - 0.75 lb/A	Trimec Southern 3 EC @ 1 – 2 pt/A or 0.37 – 1 oz/1000 sq. ft. (consult label for specific turf)	Henbit, lespedeza, clovers, dandelion, dock, lawn burweed, bull thistle, wild strawberry and many other broadleaves.	May be applied to most southern turf. However, use rates vary for particular grass species. Use 1.5 pt/A in St. Augustine grass. Contains less 2,4-D than Trimec Classic. Do not apply when temperatures exceed 90 F.
sethoxydim @ 0.28/A	Segment 1 EC @ 2.25 pt/A or 0.83 fl oz/1000 sq. ft.	Crabgrass, goosegrass and other annual grasses. Temporary torpedo grass suppression. Poor control of carpet grass.	Post-emergence on grassy weeds in centipede. May be used on seedling centipede grass (delay application until 3 in. of new stolon growth) and established centipede grass. Apply at 1.5 pt/A rate for seedling centipede grass. Ensure good coverage of target foliage. Use during good growing conditions. If centipede is cold stressed, delay application until 3 weeks after green up. Maximum of 2 applications/year on established centipede. Will not control torpedo grass. For bahiagrass suppression, reapply 10 to 14 days after first application. Some limited torpedo grass suppression with 2 applications spaced 3 weeks apart. Poor activity on *Poa annua.*
NONSELECTIVE POST-EMERGENCE HERBICIDES:			
cacodylic acid @ 8 lb/A	Phytar 560 2.48 EC@ 12 TBL in 3 gal water for 816 sq. ft.	Most annual vegetation contacted	**REFER TO LABEL FOR COMPLETE INSTRUCTIONS**. A nonselective contact herbicide to control top growth of weeds. Similar to paraquat in activity. One tablespoon of surfactant/3 gal water is usually beneficial for spot treatments.
dazomet @346.5 lb/A	Basamid 99 G @ 350 lb/A or 8 lb/1000 sq. ft.	Soil treatment that kills most weeds prior to planting.	Follow label carefully. Apply prior to planting. Soil fumigant used 2-4 weeks ahead of planting depending on soil temperature. Toxic to fish.
diquat 0.25 - 0.5 lb/A	Reward 2 SL @ 1 - 2 pt/A 0.4 – 4.4 fl oz/1000 sq. ft. Various other formulations	Most annual weeds	Use on dormant bermuda and for edging. Top burn kill; same as paraquat. Presently a 24C label. Add a nonionic surfactant, if advised. Not effective on perennial weeds.
glufosinate – ammonium @ 0.75 – 1.5 lb/A	Finale 1 SL @ 3-6 qt/A or spot treatment 1.5-4.0 oz/gal	Most weeds	Nonselective burndown like paraquat. Locally systemic. Many tankmix combinations. Use 20-40 g/A for sufficient coverage.
glyphosate @ 1.0-5.0 lb	Roundup Pro 4 SL and others @ 1--1.5 qt/A for annuals or 2.5-5 qt/A for perennials & turf renovation 0.75–3 oz/1000 sq. ft. or Spot treatments @ 1-2% solution	Most grasses and herbaceous broadleaves	This nonselective herbicide is systemic. Spray foliage only to wet. Leaves should have no heavy dust cover. Use when no rain expected for at least 6 hours. Plants should not be stressed. Use when target vegetation is actively growing. For turf renovation, wait 7-10 days before cultivating. Not for use on dormant St. Augustine, Centipede or Carpet grass.

FRUIT CROPS

STRAWBERRIES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
FALLOW BED:			
oxyfluorfen @ 0.25-0.50 lb/A	Goal 1.6E @ 1.25-2.5 pt/A	Winter annual broadleaf weeds such as Carolina geranium and evening primrose.	Apply to fallow beds. May retreat on 30-day intervals up to planting. Apply to clean, smooth, established beds. Rainfall (0.25") is necessary to activate chemical.
PRE-EMERGENCE:			
simazine @ 1-2 lb/A	Princep 4L @ 1-2 qt/A	Annual bluegrass, large crabgrass, henbit, evening primrose, chickweed and other weeds listed on the label.	Apply to furrows between raised beds covered with plastic mulch in a min. of 20 gals of water/acre after transplanting when the furrows are firm, free of standing water and prior to weed emergence. (Section 24C label).
napropamide @ 4.0 lb/A	Devrinol 50DF @ 8.0 lb/A Devrinol 2 EC @ 2 gal/A	Annual grasses and broadleaf weeds.	Apply after planting or to established beds before weeds emerge. Must irrigate within 24 hrs with sufficient water to wet soil 2-4". Do not apply after bloom.
flumioxazin @ 0.1lb/A	Chateau WDG and SW @3 oz/A	Broadleaf weeds	Apply to row middles with a hooded sprayer for pre-emergence control for broadleaf weeds before weeds emerge. Do not apply after fruit set. Do not allow spray or spray drift to come in contact with the fruit foliage. Crop spotting may occur if an adjuvant is added. Application after fruit set may result in spotting of fruit and should be avoided. Supplemental Label. Label must be in the procession of the user at time of application. Refer label for additional precautionary statements
pendimethalin @ 0.72 1.44lb/A	Prowl H_2O@ 1.5 -3.0 pts/A Coarse soil 1.5 pts/A5 Medium soils 2.0 to 2.5pts/A Fine soils 2.5 to 3.0 pts/A	Broadleaf weeds and annual grasses	Apply to row middles. Do not apply within 35 day of harvest. DO NOT apply more than 3.0 pints per acre per application. DO NOT apply more than 6.0 pints per acre per season.
POST-EMERGENCE:			
sethoxydim @ 0.3-0.5 lb/A	Poast @ 1.5-2.5 pts/A Apply with COC @ 2 pt/A	Perennial and annual grasses. Pump up sprayer: .3-2 oz/gal Poast + 1.3 oz/gal COC	Apply to actively growing grasses before they exceed labeled heights. Bearing and non-bearing. Use flat fan nozzle tips. Do not apply within 7 days of harvest. Do not exceed 2.5 pts of Poast per season.
clethodim @ 0.1-0.125 lb/A	Select @ 6-8oz/A Apply with COC @ 2 pt/A	Annual and perennial grasses and annual bluegrass. Pump up sprayer: 0.33-0.66 oz/gal Select + 1.3 oz/gal COC)	Apply at post-emergence to actively growing grasses. Do not apply under stressed conditions or if rainfall is expected within 4 days of harvest. Do not apply more than 8 oz/A in a single application. For repeat applications make at a minimum of 14- day intervals.
DIRECTED POST-EMERGENCE:			
simazine @ 1-2 lb/A + paraquat @ 0.49 lb/A	Princep 4L @ 1-2 qt/A + Gramoxone Extra @ 2 pt/A Apply with NIS @ 1-2 pt/100 gal	Weeds controlled by Princep 4L plus those controlled by Gramoxone Extra	Apply between beds covered with plastic mulch as a directed spray in 20 GPA. Apply after transplanting when furrows are firm and free of standing water. See comments above for paraquat and simazine.

FRUIT CROPS

STRAWBERRY

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE: continued			
carfentrazone @ 0.008-0.025/A	Aim 2EC @ 0.5-.6 oz Apply with COC @ 1 gal/100 gal or NIS @ 2 pts/100 gal.		
paraquat @ 0.49 lb/A	Gramoxone Inteon @ 32 oz/A Apply with NIS @ 1 pt/100 gal Pump up sprayer: 0.5 oz/gal Gramoxone + 0.5 oz/gal NIS	Annual broadleaf and grasses; suppression of perennials in the interspaces and around base of bushes or vines.	Apply in a minimum of 20 gal water/A as a directed spray between rows. Use shields to avoid injury. Do not apply within 3 days of harvest. Do not apply more than 3 times per season. Do not allow spray to contact plants.

BLACKBERERRIES: Also Trailing Blackberries (Dewberries)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
simazine @ 2-4 lbs/A	Simazine 4L, Princep @ 2-4 qt/A Simazine 90DF, Princep 90, Caliper @ 2.2-4.4 lbs/	Annual weeds and grasses	Apply as pre-emergence spring application or as split applications once in spring and once in fall. On plants less than 6 months old, use one-half rate. Do not apply when fruit is present. Do not contact fruit, foliage or stems. Use minimum of 40 gallons water per acre.
oryzalin @ 2-6 lbs/A	Surflan A.S. @ 2.0-6.0 qts/A Oryzalin 4 A.S. @2.0-6.0 qts/A	Annual grasses and certain annual broadleaf weeds	Apply before annual weeds emerge. Can be applied to new plantings after soil has settled. Use low rate for short-term control; high rate for long-term control. Apply in strip in plant rows; do not apply to row middles or drive rows.
POSTMERGENCE:			
fluazifop @ 0.19-0.37 lb/A	Fusilade DX @ 12-24 fl oz/A Add COC or NIS; see label	Perennial and annual grasses	Apply at post-emergence to NON-BEARING plants that will not be harvested within 1 year. DO NOT contact foliage.
sethoxydim @ 0.3-0.5 lb/A	Poast @ 1.5-2.5 pt/A Add COC or NIS; see label	Perennial and annual grasses	Apply at post-emergence. Do not apply within 30 days of harvest.
DIRECTED POST-EMERGENCE:			
paraquat @ 0.5-1.0 lb/A	Gramoxone Inteon @ 2-4 pt/A Apply with approved adjuvant; see label.	Annual weeds and grasses; top kill and suppression of perennials in the interspaces and around base of bushes or vines	Apply at post-emergence as a coarse directed spray to avoid injury. Apply before emergence of new canes or shoots. Apply in 50 gal water.

FRUIT CROPS

BLUEBERRIES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
simazine @ 2-4 lbs/A	Simazine 4L, Princep @ 2-4 qt/A Simazine 90DF, Princep 90, Caliper @ 2.2-4.4 lbs/	Annual weeds and grasses	Make single application in spring before bud break and before weed emergence or split applications once in spring and once in fall. On plants less than 6 months old use one-half rate.
norflurazon @ 2.0-3.9 lbs/A	Solicam DF @ 2.5-5.0 lbs/A	Annual grasses and broadleaf weeds	Apply in fall or early spring prior to weed emergence. Delay applications until 6 months after planting. Avoid contact of fruit or and foliage. Do not apply within 60 days of harvest.
oryzalin @ 2-6 lbs/A	Surflan A.S. @ 2-6 qt/A Oryzalin 4 A.S. @2-6 qts/A	Annual grasses and broadleaf weeds	Apply at pre-emergence. DO NOT apply to newly established plants until soil has settled. Apply before annual weeds emerge.
POST-EMERGENCE:			
fluazifop @ 0.19-0.37 lbs/A	Fusilade DX @ 12-24 fl oz/A	Perennial and annual grasses	Apply at post-emergence. Apply to NON-BEARING bushes only that will not be harvested within one year. Direct spray. DO NOT contact foliage. Always use a crop oil concentrate or a nonionic surfactant. Broadleaf weeds and nutsedge will not be controlled.
sethoxydim @ 0.3-0.5 lb/A	Poast @ 1.5-2.5 pt/A	Perennial and annual grasses	Apply at post-emergence. Apply to bearing or non-bearing bushes. Direct spray. Use flat nozzle tips. Always use a non phytotoxic oil concentrate. Broadleaf weeds and nutsedge will not be controlled.
clethodim @ 0.09-0.13 lb/A	Select @ 6-8 fl oz./A	Annual and perennial grasses	Apply before grasses exceed height limitations. Always add an adjuvant or crop oil concentrate to the spray application. Refer to label. **Apply to non-bearing plants only.**
DIRECTED POST-EMERGENCE:			
paraquat @ 0.5 – 1.0 lb/A	Gramoxone Inteon @ 2–4 pt/A	Annual broadleaf weeds and grasses; top kill and suppression of perennials in the interspaces around base of bushes or vines	Apply as a directed spray before emergence of new canes or shoots. Apply in water at 50 GPA. Add an approved nonionic surfactant at 1-2 pt/100 gal spray. Apply as a coarse directed spray to avoid drift injury from the fine spray mist.

FRUIT CROPS

CITRUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
bromacil @ 1.6-4.8 lbs/A + diuron @ 1.6-4.8 lbs/A	Krovar I DF @ 2-6 lb/A Trees 3 years old and older: 2-4 lb/A on light soil 4-6 lb/A on heavy soil Make two applications (spring and summer) to control perennial weeds: 2 lbs/A on coarse soils 3 lbs/A on fine soils Use 2-4 lb/A on trees 1-3 years old	Most annual weeds and perennials such as johnsongrass and bermudagrass	Apply at late winter, early spring, shortly before weeds emerge. Spray on bare ground. Apply with a properly calibrated fixed boom power sprayer as a band or broadcast treatment beneath and/or between trees. Use a minimum of 30 gal/A. Avoid overlapping, and shut off spray boom while starting, turning, slowing, or stopping or injury to trees may result. Continuous agitation in the spray tank is required to keep the material in suspension. Best results are obtained if treatment is made to moist soil, or moisture is supplied within two weeks after application. Use higher rates for maximum suppression of perennials. NOTE: Avoid contact with fruit and foliage. Temporary yellowing of citrus leaves may occur following treatment. Because injury to citrus trees may result, do not use on soils low in organic matter (less than 1%), poorly drained soils, gravelly soils, nor thinly covered or exposed subsoils. Do not treat diseased trees such as those with root rot. Do not use in citrus groves interplanted with other trees or desirable plants or in home citrus plantings or in areas where roots of valuable plants or trees may grow into the treated soil.
bromacil @ 1.6-4.6 lb/A	Hyvar X @ 4-5 lbs/A on light soils 5-6 lbs/A on medium soils 6-8 lbs/A on heavy soils If two applications (spring and summer) apply at least 60 days apart at 3-4 lbs/A. Use 3/3 lb/A on established trees established 1-3 years old	Annual grasses, broadleaf weeds, perennial weeds and sedges	**Apply on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** as a single pre-emergence treatment in late winter, early spring. Apply just before weed growth to bare ground. Two applications required to control perennial weeds. Hyvar is toxic to many trees and plants. Consult label before use. Apply with a properly calibrated fixed-boom sprayer as a band treatment beneath the trees. Use a minimum of 30 gallons/A to obtain uniform coverage. Continuous agitation in the spray tank is required to keep the material in suspension. NOTE: Avoid contact with fruit and foliage. Temporary yellowing of citrus leaves may occur following treatment. Because injury to citrus trees may result, do not use on soils low in organic matter (less than 1%), poorly drained soils, gravelly soils, nor thinly covered or exposed subsoils. Do not treat diseased trees.

FRUIT CROPS

CITRUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
pendimethalin	Prowl H_2O @ 2.0 to 6.3qts/A Rate 2.0 qts/A Rate 4.0 to 6.3 qts/A	Annual grasses and certain broadleaf weeds.	**Citrus bearing trees.** Apply Prowl H_2O as a broadcast or banded treatment using ground equipment before weed emergence. Apply the spray directly to the ground beneath the trees and/or in areas between rows. Prowl H_2O may be applied either in a single application or sequentially with an interval of 30 days or more. Apply Prowl H_2O at between 2.0 to 6.3 quarts per acre depending on the grower's weed control program, level of weed infestation, and desired use strategy. Do not to exceed a total of 6.3 quarts/A per year in citrus. DO NOT apply within 1 day of harvest of citrus fruit. Spectrum of broadleaf weeds controlled can be increased by tank mixing with other pre-emergence chemicals. Tank mikes with post emergence herbicides should be used to control existing weeds
pendimethalin	Prowl H_2O @ 2.0 to 6.3qts/A Rate 2.0qts/A Rate 4.0 to 6.3qts/A Pendimax 3.3, Prowl 3.3 Short-term control (4 months)-2.4qts/A Long-term control (6 to 8 months) 4.8qts/A	Annual grasses and certain broadleaf weeds. **No post activity;** destroy existing weeds before or during application. May be used in combination with a herbicide registered for use in the specific nonbearing crop to remove existing vegetation.	**Nonbearing and newly transplanted trees.** **Pre-emergence after planting**. Apply the spray in a band directly to the ground under trees. Do not apply to newly transplanted trees or vines until ground has settled and no cracks are present. **Pre-plant surface, prior to transplanting.** Uniformly apply in a band or broadcast before planting. Avoid root contact with treated soil when placing transplants into the hole or injury may occur. **Pre-plant Incorporated.** Incorporate to a depth of 1 to 2 inches. Application and incorporation must be made prior to transplanting to avoid mechanical injury to the crop. Avoid root contact with treated soil when placing transplants into the hole or injury may occur. May be applied either in a single application or sequentially with an interval of 30 days or more. **DO NOT apply more than 6.3 quarts of Prowl H_2O per acre per year in citrus. DO NOT apply more than 7.3 quarts of Prowl 3.3 EC per acre per year in citrus. Do not apply to newly seeded nursery stock.**

FRUIT CROPS

CITRUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
oxyfluorfen @ 1.5 lb/A	Galigan 2E, Goal 2 XL @ 6 pts/A Apply with NIS @ 2 pts/100 gal	Broadleaf weeds	**Apply on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** only after foliage has fully hardened off. Non-bearing trees. Do not apply during periods of new foliage growth. Use a low pressure sprayer and direct at base of plant. Avoid spray contact on foliage. Use 40 gals water/A for PRE applications and 40 to 100 gals for Post applications. Do not apply more than 16 pts Goal in one year. Check label for approved tank-mixes with other herbicides.
POST-EMERGENCE:			
paraquat @ 0.64-1.0 lbs/A	Gramoxone Inteon @ 2-4 pts/A Apply with NIS @ 1-2pt/100gal or COC @ 1 gal/100 gal Pump up sprayer: 0.5-1 oz/gal Gramoxone + 0.33 0.66oz NIS/gal)	Annual grasses and broadleaf weeds and grasses; top kill and suppression of perennials	Apply to emerged weeds when they are small (1-6" in height). Apply in 30 gal water. Do not allow spray to contact green stems, fruit or foliage because injury may result. Do not spray under windy conditions. Use a shield for young trees. Do not allow animals to graze treated areas. Do not apply this product through any type of irrigation system. Check label for tankmixes with other herbicides.
carfentrazone @ 0.008-0.025/A	Aim 2EC @ 0.5-2.0 oz/A Apply with COC @ 1 gal/100 gal or NIS @ 2 pts/100 gal	Broadleaf weeds, bristly mallow.	**Apply on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** to control broadleaves between rows. Apply to actively growing weeds up to 4 inches tall and rosettes less than 3 inches across. Does not control grasses. Apply with hooded sprayer to protect crop. Extreme caution must be used during applications when desirable fruit and/or foliage are present in order to avoid fruit spotting and/or leaf necrosis. Do not allow spray mist of Aim EC to come in contact with green stem tissue, foliage, blooms or fruit. On seedling or newly transplanted trees do not allow spray to contact green bark of trunk area. Coverage is essential for satisfactory performance. Can be tank mixed with other registered herbicides. Do not apply more than 7.9 oz/A/season. 3 day pre-harvest limit.
sethoxydim @ 0.28-0.47/A	Poast 1.5 EC @ 1.5-2.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply post-emergence on **grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma**. Check label for maximum weed height and rates. Bearing and non bearing trees. 15 days to harvest. Apply in 10-20 gallons water per acre with 40-60 psi. Direct away from foliage and fruit. A slight leaf speckling

FRUIT CROPS

CITRUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
			or burn can occur.
POST-EMERGENCE: continued			
glyphosate[1] @ 0.5-5 lb/A	4L formulations: @ 1-3 pt/A on annual weeds 4-10 pt/A on perennial weeds 5.5L formulations: 0.75-2 pt/A on annual weeds 3-7 pt/A on perennial weeds	Most emerged annual and perennial grass and broadleaf weeds	**In grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** apply to actively growing weeds at the recommended growth stage for each species. Recommended for established groves (See label instructions). Provides top kill plus destruction of roots, rhizomes, etc. Not a residual herbicide. Follow with a label-approved program for effective annual and perennial seasonlong weed control. Spray may come in contact with brown bark area of trunk without injury. Do not spray green bark. Do not allow spray to contact foliage of tree. Avoid contact with root suckers or water sprouts growing at base of tree. Do not mow or till prior to treatment.

FRUIT CROPS

GRAPES (Muscadine and Bunch)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
diuron @ 1.6-4 lbs/A	Diuron 4L @ 1.6-4 qt/A Karmex DF, Diuron 80 DF @ 2-5 lbs/A	Annual weeds	Apply only under vines established 3 years in the spring before annual weeds emerge. DO NOT apply to vines with trunks less 1.5" diameter. DO NOT use on soils with less than 1% organic matter. Severe injury may occur if heavy rainfall or more than 1" of irrigation water follows treatment.
oxyfluorfen @ 1.2-2 lbs/A	Goal 2XL, Galigan @ 5-6 pts/A Goal Tender @ 2.5 -4.0 pts/A	Pre-emergence control of broadleaf and some grass weeds. Provides burndown of young emerged weeds.	DORMANT SEASON APPLICATION ONLY, apply prior to bud swell or after vines have initiated dormancy in the fall. Use in minimum of 20 gallons of water per acre or 40 gallons if weeds are present. Vines must be on trellis wire a minimum of 3 feet from soil surface.
simazine @ 2-4.8 lbs/A	Princep Caliper 90, Simizine 90 DF @ 2.2-5.3 lbs/A Princep 4L, Simazine 4L @ 1.6-4 qts/A	Annual grasses and certain broadleaves	Use only under vines established for 3 years. Apply in fall or spring. If applied in the fall, follow with a different pre-emergence herbicide in spring. DO NOT use on sandy, sandy loam, or gravelly soils.
oryzalin @ 2-6 lbs/A	Surflan A.S., Oryzalin 4 A.S. @ 2-6 qts/A	Annual grasses and certain annual broadleaf weeds	Apply in spring to bearing vines. DO NOT apply to newly established vines until soil is settled. Existing weed growth should be destroyed by shallow tillage or other treatment. Irrigation needed (1 1/2") within 21 days to move Surflan into weed germination zone.
POST-EMERGENCE:			
fluazifop @ 0.19-.37 lbs/A	Fusilade DX @ 12-24 oz/A Adjuvant required; see label	Perennial and annual grasses	Apply at post-emergence to NONBEARING vines not harvested within 1 year. Use flat fan nozzle and do not contact foliage.
sethoxydim @ 0.3-0.5 lbs/A	Poast @ 1.5-2.5 pts/A Always use nonphytotoxic oil concentrate.	Annual grasses, some perennial grasses	Apply at post-emergence to bearing and non-bearing vines. Use flat fan nozzle tips. Use low rate on annual grasses up to 6" tall; high rate on annual grasses up to 12" tall.
DIRECTED POST-EMERGENCE:			
paraquat @ 0.64-1.0 lbs/A	Gramoxone Inteon @ 2.5-4 pt/A Add an approved nonionic surfactant at 1-2 pt/100 gal. spray	Annual grasses and broadleaf weeds; top kill and suppression of perennials in the interspaces and around base of bushes or vines	Apply when grasses are succulent and new growth is from 1-6" high. Apply as directed spray in 30 gal water. For mature, woody weeds, late germinating weeds and perennials, retreatment or spot treatment may be necessary. Do not allow spray to contact green stems, fruit or foliage. Do not spray under windy conditions and use shield for young vines. Do not allow animals to graze on treated areas.

FRUIT CROPS

GRAPES (Muscadine and Bunch)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE: continued			
glyphosate @ 1-5 lbs/A	Glyfos, Honcho, Glyphyogan and various generic 4lb/gal formulations @ 1-5 qts/A. Various Roundup formulations, See label for rates.	Annual and perennial weeds	Apply at post emergence. Use lower rates for easier to control annual easier to control weeds and higher rates on harder to control weeds. DO NOT allow spray to contact foliage or green bark of canes. Allow a minimum of 14 days between last application and harvest. Wiper applicator: 33% solution can be used.

MAYHAWS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMER**GENCE**			
oxyfluorfen @ 1.25-2.0 lb/A	Goal 2XL, Galigan @ 5-6 pt/A GoalTender @ 2.5–4 pt/A	Pre-emergence control of broadleaf and some grass weeds. Provides burndown of young, emerged weeds.	**Dormant season application only**, apply prior to bud swell or after trees have initiated dormancy in the fall. Use in minimum of 20 gallons of water per acre or 40 gallons if weeds have emerged.
oryzalin @ 2-6 lb/A	Surflan A.S., Oryzalin 4 A.S. @ 2.0-6.0 qts/A	Annual grasses and certain annual broadleaf weeds	Apply before annual weeds emerge. Can be applied to new plantings after soil has settled. Use low rate for short-term control; high rate for long-term control. Apply in strip in tree rows; do not apply to row middles or drive rows.
DIRECTED POST-EMERGENCE:			
glyphosate[1] @1-5 lb/A	Glyfos, Honcho, Glyphyogan and other 4 lb/gal formulations @ 1-5 qt/A. Various Roundup formulations, See label for rates.	Annual and perennial weeds	For use on bearing and non-bearing trees. DO NOT allow spray to contact green shoots or foliage. Allow a minimum of 1 day between application and harvest. Use lower rates for easier to kill annuals and higher rates for harder to kill weeds.

FRUIT CROPS

PEACHES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
diuron @ 1.6-2.2 lbs/A	Diuron 4L @ 1.6-2.2 qt/A Karmex DF, Diuron DF @ 2-2.75 lb/A	Annual weeds	Use only where peach trees have been established for at least 3 years. Apply as directed spray, avoiding contact of fruit and foliage with spray. Do not use on sand, loamy sand, gravelly soils, or exposed subsoils. Do not use on soils with less than 1% organic matter. Can also be tank-mixed with other soil active herbicides for improved control of a wider range of weed species.
terbacil @ 1.6-3.2 lbs/A	Sinbar 80W @ 2-4 lbs/A	Annual weeds	Apply in the spring. Use Sinbar only under trees established in the orchard for at least 3 years. Some chlorosis of weakened trees occurs. Control of established perennial weeds may be erratic. DO NOT use on sandy, sandy loam, gravelly soils, on eroded areas where subsoil tree roots are exposed, or on any soil with less than 1% organic matter.
diuron @ 0.8-1.6 lbs/A + terbacil @ 0.08-1.6 lbs/A	Karmex DF @ 1.0-2.0 lbs/A + Sinbar 80W @ 1.0-2.0 lb/A	Annual weeds	Apply in spring or after harvest in the fall before weeds emerge or less than 2" tall. Use this tank-mix only under trees established for at least 2 years. The combination provides improved weed control over Karmex or Sinbar alone. DO NOT USE on sandy, loamy, or gravelly soils.
norflurazon @ 2.0–3.9 lb/A	Solicam DF @ 2.5-5.0 lb/A	Annual grasses and broadleaf weeds	Apply prior to weed seed germination and rainfall or irrigation is likely within 4 weeks of application. Apply post-harvest in the fall or early spring. Delay application to newly established trees until 18 months after planting if west of the Mississippi River, and 6 months if east of the river. Do not apply within 60 days of harvest. Use the low rate on coarse-textured soils, high rate on fine-textured soils. Make one application per year. DO NOT graze treated areas.
oryzalin @ 2-6 lbs/A	Surflan A.S., Oryzalin 4 A.S. @ 2.0-6.0 qts/A	Annual grasses and certain annual broadleaf weeds	Apply before annual weeds emerge. Can be applied to new plantings after soil has settled. Apply in strip in tree rows; do not apply to row middles or drive rows.
simazine @ 2.0-4.0 lbs/A	Princep Caliber 90 @ 2.2-4.4 lbs/A Princep 4L, Simazine 4L @ 1.6-4 qts/A	Annual grasses and certain broadleaf weeds	Use simazine ONLY under trees established in the orchard for 1 year. Apply in fall or spring. Fall application controls a broader weed spectrum than a spring application. If applied in the fall, follow a different pre-emergence herbicide in the spring. Use the low rate on coarse-textured soils. Some chlorosis may be observed in areas where little or no topsoil is present. DO NOT apply to gravelly, sandy or sandy loam soils.

FRUIT CROPS

PEACHES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
oxyfluorfen @ 1.25-2 lb/A	Goal 2XL @ 5-8 pts/A	Pre-emergence control of broadleaf and some grass weeds. Provides burndown of young emerged weeds.	Apply as a directed spray to the soil and the base of trees. For additional post-emergence weed control, Goal 2XL may be tank mixed with Simazine or Surflan. When tank-mixing, always read and follow all product labels. **APPLY ONLY TO DORMANT TREES prior to bud swell.**
pendimethalin	Prowl H_2O @ 2.0 to 4.2 qts/A	Annual grasses and certain broadleaf weeds. **No post activity;** destroy existing weeds before or during application. May be used in combination with a herbicide registered for use in the specific nonbearing crop to remove existing vegetation.	Nonbearing and bearing trees. DO NOT apply to newly planted trees until the soil has settled and no cracks are present. Adequate rainfall or irrigation within 7 days of application is necessary for optimum herbicide performance. Apply in combination with non-selective POST herbicide for control of emerged weeds. Sequential applications may be used so long as total use rate does not exceed 4.2 qt/A. Minimum time between applications is 30 days. **DO NOT apply more than 4.2 quarts of Prowl H_2O per acre per year in peach and nectarine. The preharvest interval for Prowl H_2O is 60 days.**
clethodim @ 0.09-0.13 lb/A	Select @ 6-8 fl oz./A	Annual and perennial grasses	Apply before grasses exceed height limitations. Always add an adjuvant or crop oil concentrate to spray. Refer to label. **Apply to non-bearing plants only**
DIRECTED POST-EMERGENCE:			
paraquat @ 0.64-1.0 lb/A	Gramoxone Inteon @ 2.5–4 pt/A	Annual grasses and broadleaf weeds; top kill and suppression of perennials	Apply as a directed spray when weeds and grasses are succulent and new growth is from 1-6" high. Apply in water at 30-150 GPA. For mature, woody weeds, green suckers, late germinating weeds, re-treatment or spot treatment may be necessary. Do not allow spray to contact green stems, fruit or foliage. Do not spray under windy conditions. Use a shield for young trees. Do not harvest within 14 days of application. No more than 3 applications per year may be used.
fluazifop @ 0.19–0.37 lb/A	Fusilade DX @ 12-24 oz/A Apply with COC @ 1 qt/25 gal or NIS @ 0.5 pt/25 ga	Perennial and annual grasses	Apply to trees that will not be harvested within 14 days of application. Apply as a directed spray using 25 gal water/acre 30 to 60 psi pressure. Use flat fan nozzle tips and do not contact tree foliage.
sethoxydim @ 0.3-0.5 lbs/A	Poast @ 1.0-2.5 pts/A Apply with a non phytotoxic oil concentrate @ 1 qt/A	Annual and perennial grasses	Apply as a directed spray using 20 to 50 gal water/A at 40-60 psi pressure. Use flat fan nozzle tips. Use low rate on annual grasses up to 6 inches tall, and high rate on annual grasses up to 12 inches tall. Do not apply within 25 days of harvest.

FRUIT CROPS

PECANS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
oxyfluorfen @ 1.25 – 2.0 lb/A	Goal 2XL, Galigan @ 5-6 pt/A GoalTender @ 2.5 – 4 pt/A	Pre-emergence control of broadleaf and some grass weeds. Provides burndown of young, emerged weeds.	Dormant season application, apply prior to bud swell or after trees have initiated dormancy in the fall and after harvest. Use in minimum of 40 gallon of water per acre.
norflurazon @ 2-3.9 lbs/A	Solicam DF @ 2.5-5.0 lb/A	Annual grasses and broadleaf weeds	Apply at pre-emergence. Apply only to trees planted at least 18 months west of Mississippi River or 6 months east of Mississippi River. Apply post-harvest in the fall or early spring. Fall application controls a broader weed spectrum than spring. Use the low rate on coarse-textured soils, high rate on fine-textured soils. DO NOT graze treated areas.
oryzalin @ 2-6 lbs/A	Surflan A.S., Oryzalin 4 A.S. @ 2.0-6.0 qts/A	Annual grasses and broadleaf weeds	Use for control of annual grasses and certain broadleaf weeds. Use low rate for shorter control (2-4 mos.); high rate for long term control (6-8 mos.). DO NOT apply to newly-planted trees until soil has settled and no cracks are present. Apply before annual weeds emerge in the spring. Existing weed growth should be destroyed by shallow tillage or by a tank mixture with paraquat (1-2 qts/A + 8 oz. nonionic surfactant/100 gal. of spray solution) or Roundup (1-5 qts/A + surfactant).
pendimethalin	Prowl H_2O @ 2.0 to 6.3qts/A	Annual grasses and certain broadleaf weeds. **No post activity;** destroy existing weeds before or during application. May be used in combination with a herbicide registered for use in the specific nonbearing crop to remove existing vegetation.	**Nonbearing and bearing trees.** Apply the spray in a band directly to the ground under trees. Apply after ground has settled around newly transplanted trees with no visible cracks present. Requires rainfall within 21 days of application to activate the herbicide. May be applied either in a single application or sequentially with an interval of 30 days or more. Contact by the spray mixture with leaves, shoots, or buds may cause injury. **DO NOT apply more than 6.3 quarts of Prowl H_2O per acre per year in pecan.**
simazine @ 2.0-4.0 lbs/A	Princep Caliber 90 @ 2.2-4.4 lbs/A Princep 4L, Simazine 4L @ 2-4 qts/A	Annual grasses and certain broadleaf weeds	Use simazine ONLY under trees established in the orchard for 2 years. For use on nonbearing and bearing trees. PHI – do not apply when nuts are on the ground. Apply in fall or spring. Fall application controls a broader weed spectrum than a spring application. If applied in the fall, follow a different pre-emergence herbicide in the spring. Use the low rate on coarse-textured soils. Some chlorosis may be observed in areas where little or no topsoil is present. DO NOT apply to gravelly, sandy or sandy loam soils. Do not allow animals to graze in treated areas.

FRUIT CROPS

PECANS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE:			
fluazifop @ 0.19-0.37 lbs/A	Fusilade 2000 @ 2-3 pts/A Always use a non phytotoxic crop oil concentrate or a nonionic surfactant.	Perennial and annual grasses	Apply as a directed spray using 25 gal/water/acre and 30 to 60 psi pressure. Use flat fan nozzle tips and DO NOT contact pecan tree foliage. Do not apply if nuts are on the ground.
paraquat @ 0.64-1.0 lbs/A	Gramoxone Inteon @ 2.5–4 pt/A Add an approved nonionic surfactant at 1-2 pt/100 gal/spray.	Annual grasses and broadleaf weeds; top kill and suppression of perennials.	Apply as directed spray when weeds are young and succulent (16" tall). Mature weeds are less susceptible. Apply in 30 gallons of water. Thorough weed coverage; is essential repeat as necessary. Spray drift will cause injury. Do not allow spray to contact foliage, fruit, or stems. Do not graze livestock on treated areas.
sethoxydim @ 0.3-0.5 lb/A	Poast @ 1.5-2.5 pts/A Always use a non-phytotoxic oil concentrate (1 qt/A).	Annual and perennial grasses	Apply as directed spray to non-bearing trees that will not be harvested within 1 year of application. Apply in water at 20-50 gal GPA using 40-60 PSI. Use flat fan nozzle tips. Use low rate on grasses up to 6 inches tall, and high rate on grasses up to 12 inches tall.
glyphosate[1] @ 1-5 lbs/A	Glyfos, Honcho, Glyphyogan and other 4 lb/gal formulations @ 1-5 qt/A.	Annual and perennial weeds	Apply as a directed spray; DO NOT allow spray to contact green shoots or foliage. Allow a minimum of 3 days between application and harvest. Use lower rates for easier to control annual weeds and higher rates for harder to control weeds.
CHEMICAL MOWING:			
glyphosate See label	Roundup and various generic formulations of glyphosate. See Label	Vegetation and bahiagrass seed head suppression.	Apply 1 to 2 weeks after full greening of bahiagrass. For suppression in pecan row middles. Applications must be made prior to Seed head emergence. To extend period of growth suppression, apply up to two sequential applications at 45-day intervals. Sequential applications must be made prior to seedhead emergence.

FOOTNOTES – ALL FRUIT CROPS

[1] Refer to "Appendix A" for glyphosate formulations and required surfactants for various glyphosate products.

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES:			
benefin + oryzalin @ 4.0-6.0 lb /A	XL 2 G @200-300 lb/A or 4.5-7 lb/1000 sq. ft.	Annual grasses and some broadleaves	May be used in commercial nursery production and landscape beds. Several annual and perennial landscape plants are tolerant. Consult product label.
bensulide @ 7.5-12.5 lb/A	Betasan 4E @ 15-25 pts/A or 5.6-7.3 oz/1000 sq. ft.	Annual grasses and some broadleaves	Several tolerant annual and perennial ornamentals. Check label for tolerant species and susceptible weeds. Irrigate to move product into weed seed germination zone. Do not use peat moss prior to application. May be used in landscape beds.
DCPA @ 10-15 lb/A	DCPA 5 G @ 218 lb/A or 5 lb/1000 sq. ft.	Annual grasses and some broadleaves	Several tolerant ornamentals. Commercial ornamental production and landscape bed use allowed. Consult label. Do not apply to pansies or phlox in landscape beds.
dimethenamid + pendimethalin @ 1.75 – 3.5 lb/A	FreeHand 1.75G @ 100 – 200lb/A or 2.3 – 4.6 lb/1000 sq .ft	Annual grasses, spurge, chickweed, oxalis, groundsel, bittercress, eclipta, yellow nutsedge and annual sedges	Labeled for commercial nursery and landscapes. Broad spectrum herbicide with several weeds listed on the product label. Controls yellow nutsedge and annual sedges. Several shrubs and trees listed on label. Very few bedding plants are listed. Consult product label before applying.
isoxaben @ 0.5-1.0 lb/A	Gallery 75DF @0.66-1.33 lb/A or 0.24 –0.48 oz/1000 sq. ft.	Several broadleaves such as spurge, common purslane, pigweed, chickweed, oxalis	Several perennial groundcovers and woody ornamentals are tolerant in landscape plantings. Safe on several container trees and shrubs. Consult label for tolerant ornamental species and susceptible weeds. Application rates based on weed and ornamental species. One of the better broadleaf weed herbicides but does not control annual grasses and should be tank-mixed with another herbicide for broad spectrum weed control. **Do not apply to annual beds.**
prodiamine @ 0.65-0.75 lb/A	Barricade 65WG and Regalkade 65 WG @ 1.0-1.15 lb/A or 0.36–0.42oz/1000 sq. ft.	Grasses and small seeded broadleaves like pigweed, spurge, and purslane.	Labeled for commercial nursery production as well as landscape beds. Can be used in perennial and wildflower plantings. Use higher rate of application for longer control. Do not exceed 2.3 lb/A annually. Useful in landscape beds and safe on several annual and perennial bedding plants. Similar weed control spectrum as Surflan and Pendulum.
oxyfluorfen + pendimethalin @ 2 lb/A	OH II 2 G @ 100 lb/A or 2.3 lb/1000 sq. ft.	Annual grasses, Spurge, chickweed, oxalis, groundsel, bittercress, eclipta	For container and field grown ornamentals. Check label for tolerant ornamental species and susceptible weeds. Can be used for container or field grown ornamentals. Excellent control of several hard to manage weeds. Some suppression of *Phyllanthus* species. **Do not use on bedding plants.**

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES: continued			
napropamide @ 4-6 lb/A	Devrinol 50WP @ 8-12 lb/A 3-4.4 oz/1000 sq. ft Devrinol 5G @ 43 – 87 lb/A or 1 - 2 lb/1000 sq. ft.	Annual grasses and broadleaves	Several species of deciduous and evergreen trees and shrubs. Container grown *Juniperus, Rhododendron, Pittosporum, Euonymous* are common tolerant ornamentals. Check label for tolerant ornamental species and list of susceptible weeds. Mechanically incorporate or apply irrigation immediately to activate. Also labeled for highways, industrial, and foundation plantings.
oxadiazon @ 2-4 lb/A	Ronstar 2 G @ 100-200 lb/A or 2.25-4.5 lb/1000 sq. ft.	Annual grasses and broadleaves. Weak on chickweed.	Check label for tolerant ornamental species and susceptible weeds. Injury has been observed on ajuga, liriope, and mondograss. Wash granules off foliage. **Not labeled for residential areas.**
oxyfluorfen + oryzalin @ 2.0 lb/A	Rout 2 G @ 100 lb/A or 2.3 lb/1000 sq. ft.	Annual grasses, spurge, chickweed, oxalis, groundsel, Bittercress, eclipta	For container and field grown ornamentals. Several perennial and woody ornamentals are tolerant. Do not apply to wet foliage. Water in to activate. Do not apply to plants that are breaking dormancy or making a flush of growth. Excellent broadleaf and grass control. Do not wait longer than 3 months before reapplying. Apply 2 wks prior to greenhouse enclosure. **Do not use on bedding plants.**
isoxaben + oxyfluorfen + trifluralin @ 1.25 – 2 lb/A	Showcase @ 100 – 200 lb/A or 2.3 – 4.6 lb/1000 sq. ft.	Annual grasses and several hard to control broadleaves including eclipta	Many container and field grown ornamentals are tolerant. Consult product label for tolerant ornamental species and susceptible weeds. Can be used for landscapes, field and container production. Excellent broad spectrum weed control. Improved control of *Phyllanthus.* **Do not apply to bedding plants.**
trifluralin + isoxaben @ 2.5-5.0 lb/A	Snapshot 2.5 TG @ 100-200 lb/A or 2.3 - 4.6 lb/1000 sq. ft.	Annual grasses and broadleaves	Several perennial groundcovers and woody ornamentals are tolerant. Consult product label for tolerant ornamental species and susceptible weeds. Several herbaceous species listed. Can be used for landscapes, field and container production. Excellent broad spectrum weed control. However, poor to fair on *Phyllanthus.* **Do not apply to bedding plants.**
oryzalin @ 2.0-4.0 lb /A	Surflan 4 AS @ 2-4 qt/A or 1.5-3.0 oz/1000 sq. ft.	Annual grasses and some small seeded broadleaves	Can be used for landscapes, field and container production. Check label for tolerant ornamental species and list of susceptible weeds. Similar weed spectrum as Pendulum and Barricade or Regalkade.
norflurazon @ 2.4 lb /A	Predict 80DF @ 3 lb/A or 1.1 oz/1000 sq. ft.	Annual grasses and broadleaves	Check label for tolerant ornamental species and susceptible weeds. Apply as broadcast or as a band treatment in fall and spring.

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES: continued			
flumioxazin @ 0.38 lb/A	Broadstar 0.25 G @ 150 lb/A 3.44 oz/1000 sq. ft.	Doveweed, liverwort, bittercress, spurges, and other broadleaf weeds	Apply at pre-emergence. Provides 8-12 weeks of control. Several trees, shrubs and groundcovers are listed as tolerant. Container and field grown plants only. Some potential for injury so consult product label for tolerant plant species. Has good activity on *Phyllanthus* (chamberbitter). **Do not apply in landscapes.**
flumioxazin @ 0.25 – 0.38 lb/A	Sureguard 51 WG @ 8 – 12 oz/A or 0.18–0.28 oz/1000 sq. ft.	Doveweed, liverwort, bittercress, spurges, and other broadleaf weeds	Provides pre-emergence and some post-emergence control. Container and field production of several woody ornamentals. For commercial ornamental production: Good fit for field production as a directed spray. Useful in container nurseries to maintain weed free production areas. Same active ingredient that is found in the granular herbicide Broadstar. (Broadstar is a better fit for container use). Excellent pre and post control of doveweed. Can now be used as directed sprays in commercial or residential landscapes around woody ornamentals. Apply at least 30 days after planting new woody transplants. Consult supplemental label.
oxyfluorfen @ 0.25-1.0 lb/A	Goal T/O 1.6E @1.25-5 pts/A or 0.46-1.84 z/1000 ft2	A few annual grasses and several broadleaves including bittercress.	Apply at pre-emergence in conifers and several field grown trees. Herbicide has some post-emergence activity. Good activity on several broadleaf weeds including winter annuals.
pronamide @ 1.0-2.0 lb/A	Kerb 50 WSP @ 2.0-4.0 lb/A	Grasses and some broadleaves	Apply at pre-emergence and has some post-emergence activity on annual bluegrass. Check label for tolerant ornamental species and susceptible weeds. **RESTRICTED USE**
pendimethalin @ 1.7 – 3.0 lb/A	Pendulum 3.3 EC @ 3.6–4.8 pt/A or 1.3–1.8 oz/ 1000 sq. ft. Pendulum AquaCap 3.8 @ 3.1 – 6.2 pt/A or 1.15 oz – 2.3 oz/1000 sq. ft. Pendulum 2G @ 75–150 lb/A or 1.7 – 3.4 lb/1000 sq. ft.	Annual grasses and broadleaves	Most annual and perennial ornamentals are tolerant. Can be used in landscape beds due to good ornamental tolerance. Consult label for list of tolerant plants.
simazine @ 2.0-4.0 lb/A	Princep 4L @ 2-4 qt/A or 0.73-2.20 oz/1000 sq. ft.	Annual grasses and winter broadleaves	Several field grown conifer including Christmas trees and deciduous trees weeds. Apply in at least 25 gal water/A in fall or spring. Do not apply to plantings less than 1 year old. **Do not apply to landscape beds.**

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE HERBICIDES: continued			
metolachlor @ 1.2 – 2.45 lbs/A	Pennant Magnum 7.62 EC @1.3 - 2.6 pt/A or 0.48-0.96 oz/1000 sq. ft	Annual grasses plus yellow nutsedge, some annual sedges, and small seeded broadleaves.	Registered for commercial ornamental production and landscape areas Many tolerant ornamentals including several annual and perennial landscape plants. Check label for tolerant ornamental species and susceptible weeds. Rates vary for different soil types and control time desired. Similar weed control spectrum as Pendulum but additionally controls yellow nutsedge.
oxadiazon @ 2.0-4.0 lb/A	Ronstar 2G @ 100-200 lb/A 2.30 – 4.60 lb/1000 sq. ft.	Annual grasses and broadleaves	May be used in container and field commercial nursery production. Check label for tolerant ornamentals and list of susceptible weeds. Do not apply to annuals. Weak on chickweed. **Cannot be used in residential landscape beds.**
trifluralin (2.0%) + isoxaben (0.5%) @ 2.5-5.0 lb	Snapshot 2.5TG @ 2.3 – 4.6 oz/1000 ft2 100-200 lb/A	Annual grasses and broadleaves	Check label for tolerant ornamental species and list of susceptible weeds. Application rate determined by weed species desiring to control.
oryzalin @ 2.0-4.0 lb ai/A	Surflan 4 AS @ 2.0 – 4.0 qt/A or 1.5–3.0 oz/1000 sq. ft.	Annual grasses and broadleaves	Labeled for commercial nursery production and landscape beds. Several tolerant annual and perennial ornamentals. Slightly more injury potential with this herbicide than similar herbicides (Pendulum, Barricade etc.) because product is more water soluble. Consult product label. Rain or irrigation needed to activate. Low rate: 2-4 Months control. High rate: 6-8 mos. control.
POST-EMERGENCE HERBICIDES:			
clopyralid @ 0.09 – 0.50 lb/A	Lontrel 3 EC @ 0.25 – 1.33 pt/A or 0.125oz – 0.5 oz/1000 sq. ft.	Legumes and asters, thistles	Labeled for use in certain woody tree and shrubs as over the top or directed sprays field nurseries and landscape plantings. May also be used in field grown lilies. Apply no more than 1.33 pt/A per season. Mimosa, redbud, locust will be injured or killed by Lontrel. **Do not apply to residential landscape plantings or container ornamentals.**
oxyfluorfen @ 0.25-0.50 lb/A	Goal T/O 1.6E @ 0.46 – 0.92 oz/1000 ft2 or 1.25-2.5 pts/A	Annual grasses and broadleaves including bittercress, chickweed.	Control of small actively growing weeds in conifers and several field grown trees. Works by contact so good coverage is a must.
bentazon @ 0.75-1.0 lb/A	Basagran T/O 4L @ 1.5-2.0 pts/A or 0.5 -.75 oz/1000 sq. ft	yellow nutsedge and annual sedges	Post-emergence directed spray in many established ornamental beds. Not systemic so weed coverage is very important. Will not control purple nutsedge. Control optimized by a second application within 10 days. Check label for recommended uses. Crop oil additions will increase activity.

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE HERBICIDES:			
flumioxazin @ 0.25 – 0.38 lb/A	Sureguard 51 WG @8 – 12 oz/A or 0.18–0.28 oz/1000 sq. ft.	Doveweed, bittercress, spurges, and other broadleaf weeds	Apply at pre-emergence and post-emergence. Container and field production of several woody ornamentals. For commercial ornamental production: Good fit for field production as a directed spray. Useful in container nurseries to maintain weed free production areas. Same active ingredient that is found in Broadstar. Excellent pre and post control of doveweed. Can be used as directed sprays in commercial or residential landscapes around woody ornamentals. Apply at least 30 days for new woody transplants.
POST-EMERGENCE GRASS KILLING HERBICIDES:			
fenoxaprop @ 0.1-0.3 lb/A	Acclaim1EC @ 4-45 oz/A 0.34-1.0 oz/1000 sq. ft.	Annual grasses and suppression of perennial grasses.	Apply at post-emergence. Apply herbicide to actively growing grasses. More active on annual than perennial grasses. Can be used over the top of many herbaceous and woody ornamentals. Ornamental grasses may be injured or killed. Check label for recommended uses.
sethoxydim @ 0.3-0.5 lb/A	Segment 1EC @ 36-60 oz/A or 0.82–1.65 oz/1000 sq. ft.	Annual and perennial grasses	Herbicide only controls grasses. Several non-grass ornamentals are tolerant for over the top applications but consult product label for sensitive plants. Limited suppression of torpedograss with multiple applications.
clethodim @ 0.125-0.25 lb	Envoy 0.94EC @ 17-34 oz/A or 0.39 – 0.78/1000 sq. ft.	Annual and perennial grasses	Apply post-emergence for actively growing grasses. Add 0.25% v/v nonionic surfactant (1 pt/50 gal). Crop oil concentrate not recommended.
fluazifop @ 0.25-0.40 lb/A	Fusilade II EC @ 17-26 oz/A Spot sprays 0.75 oz//gallon	Annual and perennial grasses	Herbicide only controls grasses. Several non-grass ornamentals are tolerant for over the top applications but consult product label for sensitive plants. There are juniper and azalea cultivar restrictions. Somewhat better on torpedograss with multiple applications when compared to sethoxydim. Add a NIS at 0.25% v/v.
SEDGE KILLING HERBICIDES FOR LANDSCAPE :			
sulfosulfuron @ 0.05 - .09 lb/A	Certainty 75 WG @ 1.25 – 2.0 oz/A or 0.03 – 0.04 oz/1000 sq. ft. Apply with non-ionic surfactant.	Yellow and purple nutsedge and green kyllinga plus Johnson grass	Now labeled for sedge control in ornamentals. Apply as a directed spray around woody ornamentals. Several landscape and field nursery plants will tolerate over the top applications. Consult product's supplemental label
imazaquin @ 0.38 - 0.5 lb/A	Image 70 DG @ 8.6 – 11.4 oz or 0.2 – 0.26 oz/1000 sq. ft.	Suppresses green kyllinga, yellow and purple nutsedge. Weaker on yellow nutsedge. Good on purple nutsedge. Broadleaves, suppression of dollarweed.	Landscape use only. Check label for tolerant ornamental species and susceptible weeds. Limited number of ornamentals that will tolerate over the top applications on label. Liriope and mondograss will tolerate certain rates in over the top applications.

COMMERCIAL NURSERY and LANDSCAPES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
SEDGE KILLING HERBICIDES FOR LANDSCAPE : continued			
halosulfuron @ 0.03-0.06 lb/A	Sedgehammer 75 WDG @ 0.6 - 1.33 oz/A or 0.138 – 0.03 oz/1000 sq. ft. 0.25 teaspoon/gal spot spray	Nutsedges (purple and yellow) Suppression of kyllinga species.	Landscape beds only. Apply as a directed spray around woody ornamentals. Very effective on yellow and purple nutsedge. Add a non-ionic surfactant.
NON-SELECTIVE HERBICIDES			
glyphosate @ 1.0-5.0 lb/A	Roundup Pro 41% and generics @ 1-5 qt/A or 1.5-3.7 oz/1000 ft2 Use 2% solution for spot treatments.	Grasses and broadleaves	Check label for recommended uses. Nonselective so avoid all drift. Labeled for greenhouse use. Consider wiping in landscape beds
potassium salt	Sharpshooter 18% @ 5.5-11 oz/qt/water	Grasses and broadleaves	Apply at post-emergence. Check label for recommended uses. Nonselective. Apply to young, succulent, actively growing weeds. Labeled for greenhouse use. Good activity on small annual weeds. Very poor control on perennial weeds.
paraquat @ 0.6-0.9 lb/A	Gramoxone Max @ 0.66 oz/1000 ft2 1.8 pt/A	Annual grasses and broadleaves	Apply at post-emergence in field produced woody ornamentals. Check label for recommended uses. Nonselective. Poor on perennial weeds. **RESTRICTED USE.**
diquat @ 0.25 – 0.50 lb/A	Reward @ 1 – 2 pt/A or 0.36 – 0.72 oz	Most annual grasses and broadleaves.	Contact herbicide labeled for use in commercial greenhouses and nurseries. Post directed in field ornamentals. Good coverage is a must. Add a non-ionic surfactant at 0.25% v/v. Poor on perennial weeds.

VEGETABLE CROPS (COMMERCIAL)

ARTICHOKES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
pronamide @ 2-4 lbs/A	Kerb 50 W @ 4-8 lb/A	Broadleaf weeds and annual grasses	Apply after transplanting but before new shoots develop 3-4 new leaves. Do not apply within 60 days of harvest. Refer to label for plant back restrictions.
POST-EMERGENCE:			
sethoxydim @ 0.09-0.47 lb/A	Poast @ 0.5-2.5 pts/A Mix with COC @ 2 pts/A Pump up sprayer: 1/3-2 oz/gal Poast + 1.3 oz/A gal COC	Annual and perennial grasses	Consult label for recommended adjuvants and rates. Do not apply within 7 days of harvest. Use with caution when temperatures exceed 90 degrees F and relative humidity is 60% or higher because of potential leaf injury. Not recommended when temperatures exceed 100 degrees F.
DIRECTED POST-EMERGENCE:			
oxyfluorfen @ 1-1.5lbs/A	Goal @ 4-6 pts/A Goaltender @ 2-3 pts/A Galigan @ 4-6 pts/A Galigan H2O @ 2-3 pts/A	Broadleaf weeds pre-emergence to 8 leaf stage	DO APPLY OVER THE TOP. Apply as a directed spray to the soil surface between rows and at the base of the plant in 40 GPA. Separate applications by 8 to 10 weeks or a single application can be made. 5 DTH Check label for rates.
pronamide @ 2-4 lbs/A	Kerb 50 W @ 4-8 lb/A	Broadleaf weeds and annual grasses	Application maybe directed to soil surface between the rows. Consult label for recommended adjuvants. Do not apply within 60 days of harvest. Refer to label for plant back restrictions.
paraquat @ 0.63-1.0 lbs/A	Gramoxone Inteon @ 2.5-4 pts/A Firestorm @ 1.7-2.7 pts/A Parazone @ 1.7-2 .7 pts/A Mix with NIS @ 1-2 pts/100 gal or with COC @ 1 gal/100 gal	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennial weeds.	Apply to row middles using a hooded sprayer in a minimum of 20 gal. of water/A. Surfactant is required; consult labels. Do not apply within 24 hours of harvest. Don't exceed 3 applications/year.
glyphosate @ 0.5-1.4 lbs/A	Roundup Weathermax @ 11-32 oz/A Various 4 L brands @ 16-45 oz/A Various 5 L brands @ 11-32 oz/A	Most emerged weeds	Apply to row middles using a hooded or shielded sprayer or a wiper applicator. To avoid injury keep herbicide off foliage, shoots, stems, exposed roots and fruit. Do not apply within 14 days of harvest.

VEGETABLE CROPS (COMMERCIAL)

ASPARAGUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
diuron @ 0.75-3.0 lbs/A	Direx 4 L, Diuron 4L @ 1.5-3 pt/A on light soil 3-6 pt/A on clay soil Direx 80DF, Diuron 80WP, Karmex 80DF @ 1-2 lb/A on light soil 2-4 lb/A clay	Annual broadleaf and grass weeds	No earlier than 4 weeks before spear emergence and no later than early spear emergence. Do not apply to young plants during first growing season after setting or on plants with exposed roots. Check label for tank-mixes with other herbicides.
linuron @ 1.0-2.0 lbs/A	Lorox 50 DF @ 2-4 lb/A	Most small seeded annual grasses and broadleaf weeds.	Established beds apply before cutting season. Lorox can be used on newly planted crowns. 1 day to harvest.
paraquat @ 0.63-1.0 lbs/A	Gramoxone Inteon @ 2.5-4 pts/A Firestorm @ 1.7-2.7 pts/A Parazone @ 1.7-2 .7 pts/A Mix with NIS @ 1-2 pts/100 gal or with COC @ 1 gal/100 gal	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennial weeds.	Apply in a minimum of 20 gallons water/A to control emerged weeds before spears emerge or after last harvest.
metribuzin @ 1-2 lbs/A	Sencor 4 FL@ 2-4 pt/A Sencor 75DF, Metribuzin 75DF @ 1.33-2.67 lb/A	Annual broadleaf weeds and grasses	Early spring before spears and ferns emerge. Do not use on young plants during first growing season after setting crowns.
terbacil @ 0.8-2 lbs/A	Sinbar WP @ 1.5-2.5 lbs/A	Annual broadleaf weeds and grasses	Use only on established beds. Apply prior to spear and weed emergence or to small weeds. Do not use on areas where subsoil or roots are exposed.
norflurazon @ 2-4 lbs/A	Solicam DF @ 2.5-5 lbs/A	Most small seeded annual grasses and broadleaf weeds. Fair on nutsedge.	Use on plantings that have been established for at least one year.
flumioxazin 0.188 lbs/A	Chateau @ 6 oz/A NIS at 1 quart/100 gals if weeds are present	Annual grasses and broadleaf weeds	Apply only to dormant asparagus no sooner than 14 days before spears emerge or after last harvest. Do not apply more than 6 oz/A during a single growing season. Provides residual weed control. Can be tank mixed with paraquat for control of emerged weeds. Apply in a minimum of 15 GPA.
POST-EMERGENCE:			
diuron @ 0.75-3.0 lbs/A	Direx 4 L, Diuron 4L @ 1.5-3 pt/A on light soil 3-6 pt/A on clay soil 80 DF - Direx, Diuron, Karmex @ 1-2 lb/A on light soil 2-4 lb/A clay	Annual broadleaf and grass weeds	Early spear emergence; second application immediately following harvest. Do not apply to young plants during first growing season or on plants with exposed roots. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

ASPARAGUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
halosulfuron @ 0.024-0.072 oz/A	Sandea 75 DF @ 0.5-1.5 oz./A	Yellow and purple nutsedge. Several broadleaf weeds.	Apply before or during harvest. Do not use NIS or COC because unacceptable crop injury may occur. Contact with ferns may result in temporary yellowing. Under heavy nutsedge pressure, use split applications. Do not exceed 2 oz/A/year.
fluazifop-P-butyl @ 0.1-0.375 lb/A	Fusilade DX @ 0.375 – 1.5 pt/A Mix with COC @ 1-2 pts/25 gal or with NIS @ 0.5-1 pt/25 gal	Annual and perennial grasses	Apply to actively growing grasses before they exceed the recommended growth stages shown on the label. One day to harvest. Make sequential applications at least 14 days apart. Max use rate is 3 pts/season.
paraquat @ 0.63-1.0 lbs/A	Gramoxone Inteon @ 2.5-4 pts/A Firestorm @ 1.7-2.7 pts/A Parazone @ 1.7-2 .7 pts/A Mix with NIS @ 1-2 pts/100 gal	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennial weeds.	Surfactant required; check label for recommendations. Apply in a minimum of 20 gallons water/A. Use on asparagus at least 2 years old. Do not apply within 6 days of harvest.
sethoxydim @ 0.09 -0.47 lbs/A	Poast 1.5 EC @ 0.5-2.5 pts/A Mix with COC @ 2 pts/A Pump up sprayer: 1/3-2 oz/gal Poast + 1.3 oz/A gal COC	Annual and perennial grasses	Apply to grasses before they exceed the recommended growth stages. One day to harvest. Don't apply more than 5 pts/season. Should be used with caution when temperatures exceed 90 degrees and relative humidity is 60% or higher.
clethodim@ 0.1-.125 lb /A	Select Max @ 12-16 oz/A Mix with NIS @ 2pt /100 gals	Annual and perennial grasses and annual blue grass	Check label for rates and restrictions on amount applied. For repeat applications, make on a minimum of a 14-day interval. 1 DTH
DIRECTED POST-EMERGENCE:			
linuron @ 0.5-1.0 lbs/A	Lorox 50 DF @ 1-2 lb/A	Most small seeded annual grasses and broadleaf weeds.	Established beds. Apply as a directed spray to base of ferns. Lorox can be used on newly planted crowns. Do not apply within one day of harvest.
glyphosate @ 0.5-1.4 lbs/A	Various 4 L brands @ 16-45 oz/A Various 5 L brands @ 11-32 oz/A	Most emerged weeds	Apply to row middles using a hooded or shielded sprayer or a wiper applicator. To avoid injury keep herbicide off foliage, shoots, stems, exposed roots and fruit. Do not apply within 14 days of harvest.
POSTHARVEST:			
metribuzin @ 1-2 lbs/A	Sencor 4 FL@ 2-4 pt/A Sencor 75DF, Metribuzin 75 DF @ 1.33-2.67 lb/A	Annual broadleaf weeds and grasses	After last harvest of season. Do not use first growing season after setting crowns.
paraquat @ 0.63-1.0 lbs/A	Gramoxone Inteon @ 2.5-4 pts/A Firestorm @ 1.7-2.7 pts/A Parazone @ 1.7-2 .7 pts/A	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennial weeds.	Apply in a minimum of 20 gallons water/A to control emerged weeds. Use on asparagus at least 2 years old. Mix with NIS @ 1-2 pts/100 gal
halosulfuron @ 0.024-0.072 oz/A	Sandea 75 DF @ 0.5-1.5 oz./A	Yellow and purple nutsedge. Several broadleaf weeds.	Apply after harvest with drop nozzles. Contact with ferns may result in temporary yellowing. Do not use an

VEGETABLE CROPS (COMMERCIAL)

ASPARAGUS

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
			adjuvant. Don't exceed 2 oz/A/year.
POSTHARVEST: continued			
diuron @ 0.75-3.0 lbs/A	Direx 4 L, Diuron 4L @ 1.5-3 pt/A on light soil 3-6 pt/A on clay soil Direx 80DF, Diuron 80WP, Karmex 80DF @ 1-2 lb/A on light soil 2-4 lb/A clay	Annual broadleaf and grass weeds	Early spear emergence; second application immediately following harvest. Do not apply to young plants during first growing season or on plants with exposed roots. Check label for tank-mixes with other herbicides.

SNAP and LIMA BEANS[3,4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
s-metolachlor @ 0.95-1.9 lb/A	Dual Magnum, Dual II Magnum @ 1-1.3 pts/A on coarse soil 1.3-1.67 pts/A on med.-fine soil	Many small seeded grasses, yellow nutsedge and pigweed.	Incorporate in top 2" of soil. Check label for tank-mixes with other herbicides. Consult label for rates on soils with more than 3% OM.
metolachlor @ 0.98-1.63 lbs/A	Medal, Stalwart, Parallel, Charger @ 1.0-1.3 pts/A on coarse soil @ 1.3-1.67 pts/A on med.-fine soil	Many small seeded grasses, yellow nutsedge and pigweed.	Incorporate in top 2" of soil. Check label for tank-mixes with other herbicides. Higher rates can be used on soils with greater than 3% organic matter; consult label.
pendimethalin[2] @ 0.5-1.5 lbs/A	Prowl 3.3, Pendimax 3.3 @ 1.2-1.8 pts/A on light soil 1.8-2.4 pts/A on med. soil 1.8-3.6 pts/A on heavy soil Prowl H2O @ 1-1.6 pts/A on light soil 1.6-2.1 pts/A on med. soil 2.1-3.2 pts/A on heavy soil	Many small seeded grasses and broadleaves, including annual spurge, reduction from competition from smartweed and velvetleaf	If replanting is necessary, do not work soil deeper than the treated zone. Do not apply after planting (surface treatment) or serious injury can result. Check label for tank-mixes with other herbicides.
imazethapyr @ 0.023 lb/A on snap bean; 0.047 lb/A on lima bean	Pursuit 2 EC @ 1.5 oz/A snap bean 3 oz/A lima bean Pursuit DG @ 1.08 oz/A lima bean	Several broadleaf weeds including morningglory, pigweed, smart weed and purslane	May be tank-mixed with a grass herbicide. Check label for plant-back restrictions.
trifluralin[2] @ 0.5-.75 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med.-heavy soil 60 DF products @	Small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in top 2" of soil just before planting. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

SNAP and LIMA BEANS[3,4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
	0.8 lb/A on light soil 1.33 lbs/A on med.-heavy soil		
alachlor[2] @ 1.5-3 lbs/A	Lasso, Micro Tech @ 1.5-2 qt/A on light soil 2.5-3 qt/A on med.-heavy soil Partner WDG @ 3.8-4.2 lbs/A on light soil 4.2-4.5 lb/A on med-heavy soil	Small seeded annuals	**Apply to lima beans only.** May delay maturity and/or reduce yields if cold, wet soil conditions occur after planting. Check label for tank-mix options.
PRE-EMERGENCE:			
s-metolachlor @ 0.95-1.9 lb/A	Dual Magnum, Dual II Magnum @ 1-1.3 pts/A on coarse soil 1.3-1.67 pts/A on med.-fine soil	Many small seeded grasses, yellow nutsedge and pigweed. Most effective on nutsedge when incorporated.	Check label for tank-mixes with other herbicides. Higher rates can be used on soils with greater than 3% organic matter; consult label.
PRE-EMERGENCE: continued			
metolachlor @ 0.98-1.63 lbs/A	Medal, Stalwart, Parallel, Charger @ 1.0-1.3 pts/A on coarse soil @ 1.3-1.67 pts/A on med.-fine soil	Many small seeded grasses, yellow nutsedge and pigweed. Most effective on nutsedge when incorporated.	Check label for tank-mixes with other herbicides. Higher rates can be used on soils with greater than 3% organic matter; consult label.
imazethapyr @ 0.023 lb/A	Pursuit 2 EC @ 1.5 oz/A	Several broadleaf weeds including morningglory, pigweed, smart weed and purslane	**Apply to snap beans only.** May be tank-mixed with a grass herbicide. Check label for plant-back restrictions.
halosulfuron-methyl @ 0.024-0.036 lb/A	Sandea 75 DG @ 0.5- 0.7 oz/A	Nutsedge and other broadleaf weeds.	Apply following planting; prior to cracking. Will provide residual weed control.
fomesafen @ 0.188 lbs/a	Reflex 2 EC @1.5 pts/acre	many broadleaf weeds	**Snap beans only.** Apply pre-plant surface and pre-emergence. Check label for tank mixers. Total use cannot exceed 1.5 pt per acre. Check label for instructions and precautions
POST-EMERGENCE:			
quizalofop @ 0.04–0.08 lbs/A	Assure II @ 6-12 oz/A Targa @ 6-12 oz/A Mix with COC @ 1gal/100 gal or with NIS @ 1qt/100 gal Pump up sprayer: 1 tbsp herbicide + 2.5 tbsp COC or 2 tsp NIS	Annual and perennial grasses	Surfactant required; consult label for recommendations. Do not apply within 15 days of harvest. Maximum use rates are 14 oz/acre/season. Check label for rates on specific weeds and weed sizes.
bentazon @ 0.5-1 lb/A	Basagran @ 1-2 pt/A	Common purslane, velvetleaf, common ragweed, mustard, wild sunflowers, smartweed, hairy nightshade, cocklebur, giant	Apply when weeds are small and actively growing after beans form two fully expanded trifoliate leaves. Do not apply to beans that have been subjected to stress (hail, flooding, drought, injury from other herbicides or

VEGETABLE CROPS (COMMERCIAL)

SNAP and LIMA BEANS[3,4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
		ragweed, prickly sida, yellow nutsedge and other broadleaf weeds. No grass control.	widely fluctuating temperatures). Rates are highly dependent on size and age of weeds. Check label for more specific rates. Do not apply within 30 days of harvest. Two applications 7 to 10 days apart may be required to control yellow nutsedge.
halosulfuron-methyl @ 0.024 to 0.036 lb/A	Sandea 75 DG @ 0.5 to 0.7 oz/A	Nutsedge and other broadleaf weeds.	Apply after the 2 to 3 trifoliate stage prior to flowering. May cause temporary stunting, which could delay maturity.
sethoxydim @ 0.1-0.47 lbs/A	Poast @ 0.75-2.5 pts/A Mix with COC @ 2 pts/A Pump up sprayer: 1/3-2 oz/gal Poast + 1.3 oz/A gal COC	Annual and perennial grasses	Apply to actively grasses before they exceed labeled heights; consult label. Do not apply within 15 days of harvest. Adjust pressure (40-60 psi), spray volume (5-20 gal/A) and boom height to ensure thorough coverage. Do not apply more than 4 pts/A/year. Use caution when temperatures and relative humidity are high.
POST-EMERGENCE: continued			
halosulfuron-methyl @ 0.024 to 0.036 lb/A	Sandea 75 DG @ 0.5 to 0.7 oz/A	Nutsedge and other broadleaf weeds.	Apply after the 2 to 3 trifoliate stage prior to flowering. May cause temporary stunting, which could delay maturity.
fomesafen @ 0.125-0.375 pt/A	Reflex 2 EC @ 0.5-1.5 pt/A Mix with NIS @ 1qt/100 gal	Many broadleaf weeds.	**Apply to snap beans only.** Snap beans should have at least 1 expanded trifoliate leaf. Total use cannot exceed 1.5 pt /acre. Do not apply within 30 days of harvest. See label for further instructions and tank-mixes.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim 2EC @ .75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Mix with NIS @ 2 pt/100 gal or COC @1 gal/100 gal	Most emerged broadleaf weeds. No grass control.	Apply using hoods or shields. Crops contacted will be injured. Most effective on weeds less than 4 inches tall. Can be tank mixed with other herbicides.
glyphosate @ 0.5-1.4 lbs/A	Roundup Weathermax @ 11-32 oz/A Various 4 L brands @ 16-45 oz/A Various 5 L brands @ 11-32 oz/A	Most emerged weeds	Apply to row middles using a hooded or shielded sprayer or a wiper applicator. To avoid injury keep herbicide off foliage, shoots, stems, exposed roots and fruit.

VEGETABLE CROPS (COMMERCIAL)

BEETS[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
cycloate[2] @ 3-4 lb/A	Ro-Neet 6-E @ 4.0 pt/A on light soil 4.7 pt/A on medium soil 5.3 pt/A on heavy soil	Many small-seeded annual grasses and broadleaf weeds	Incorporate thoroughly in top 2" of soil 5 to 7 days before planting.
PRE-EMERGENCE:			
pyrazon @ 3.2-3.7 lb/A	Pyramin DF @ 4.6 lb/A on light-med. soil 5.4 lb/A on heavy soil	Many small-seeded annual grasses and broadleaf weeds	Apply after planting before weeds emerge. If rainfall does not occur within 5-10 days after treatment, beets should be irrigated or shallowly cultivated.
cycloate @ 3-4 lb/A	Ro-Neet 6-E @ 4.0 pt/A on light soil 4.7 pt/A on medium soil 5.3 pt/A on heavy soil	Many small-seeded annual grasses and broadleaf weeds	Apply at planting. Incorporate thoroughly in top 2" of soil 5 to 7 days before planting to reduce risk of temporary crop injury.
POST-EMERGENCE:			
pyrazon @ 3.2-3.7 lb/A	Pyramin DF @ 4.6 lb/A on light-med. soil 5.4 lb/A on heavy soil	Many small-seeded annual grasses and broadleaf weeds	Apply after beets have 2 expanded true leaves and before any weeds have more than 2 to 4 true leaves.
sethoxydim @ 0.2-0.3 lb/A	Poast @ 1-1.5 pts/A Mix with COC @ 2 pts/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/A gal COC	Annual and perennial grasses.	Apply to small actively growing grasses. Consult label for application timing. Do not apply within 60 days of harvest. Do not apply Poast on days that are unusually hot and humid. Adding COC to Poast may increase injury.
phenmedipham @ 0.5-1.0 lb/A	Spin-Aid @ 3-6 pts/A	Several broadleaf weeds	Apply when beets are past the 4 to 6 leaf stage and weeds are at the 2-leaf stage. Do not apply within 60 days of harvest.
clopyralid @ 0.187 lb/A	Stinger 3 EC @ 0.5 pt/A	Broadleaf weeds; controls most legumes	Apply to small actively growing weeds. 30 days before harvest.
clethodim @ 0.094-0.125 lb/A	Select @ 6-8 oz/A Mix with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses and annual bluegrass	Apply at to actively growing grasses. Do not apply more than 8 oz/A in a single application. Do not apply to stressed weeds or when rainfall is expected within 1 hour. Wait at least 14 days before repeating applications.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40 DF @ 0.33-1.0 oz/A Mix with COC @ 1.3 oz/gal or NIS @ 0.33 oz/gal	Most emerged broadleaf weeds No grass control	Apply using hoods or shields. Will injure contacted crops. Most effective on small weeds. Can be mixed with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

BEETS[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECT POST-EMERGENCE: continued			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	To avoid severe crop injury, do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Apply to row middles only with a hooded sprayer, shielded sprayer, or a wiper applicator. Do not apply within 14 days of harvest.
POST HARVEST:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply after harvest is complete.

CABBAGE, CAULIFLOWER, BROCCOLI and BRUSSELS SPROUTS[3,4,5,6]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
trifluralin[2] @ 0.5-1.0 lb/A for transplants 0.5-0.75 lb/A for direct seeded	Treflan HFP, Trifluralin, Trilin and other 4 EC products @ 0.75 or1 pt/A on light soil 1.0 or 1.5 pt/A on med-heavy soil 60 DF products @ 0.6 or 0.8 lb/A on light soil 0.8 or 1.33 lb/A on med-heavy soil Use the lower rate on direct seeded crops and the higher rate on transplants.	Small-seeded grasses, broadleaf weeds	Incorporate thoroughly in top 2" of soil just before transplanting or direct seeding. Direct seeded crops exhibit marginal tolerance to trifluralin at rates higher than 0.5 lb ai/A (1 pt/A). Stunting or reduced stands may occur. Do not exceed the 2 pt/A rate.
PRE-PLANT:			
oxyfluorfen @ 0.25-0.5 lb/A	Goal 1.6E or 2XL, Galligan @ 1.0 pt/A on coarse soil 2.0 pts/A on med to fine soil	Pennsylvania smartweed, pigweed, purslane and some grasses	**Transplants only.** Apply in at least 20 GPA. Do not exceed 40 psi pressure. Plant with minimal soil disturbance. May cause some leaf cupping.
DCPA @ 4.5-10.5 lbs/A	Dacthal 75WP @ 6-8 lb/A on light soil 8-10 lb/A on med soil 10-14 lb/A on heavy soil	Annual grasses and certain broadleaf weeds	**On direct seeded crops** apply just before planting in at least 20 gal water/A. A minimum of 1/3-1/2"of water is necessary to activate within 3- 5 days of application. If irrigation is unavailable, incorporate 1 to 2 inches to aid in weed control.

VEGETABLE CROPS (COMMERCIAL)

CABBAGE, CAULIFLOWER, BROCCOLI and BRUSSELS SPROUTS[3,4,5,6]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE:			
sethoxydim @ 0.09-0.28 lb/A	Poast @ 0.5-1.5 pts/A Mix with COC @ 2 pts/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/A gal COC	Annual and perennial grasses	**Do not use on Brussels sprouts.** Apply to small actively growing grasses; see label. Do not apply within 30 days of harvest. Adjust pressure (40-60 psi), spray volume (5-20 GPA), and boom height to ensure thorough coverage. Do not apply more than 3 pts/A/year. Rainfast in 1 hour.
clethodim @ 0.1-0.125 lb/A	Select @ 6-8 oz/A Mix with COC at 1 gal/100gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	**Suggested for direct-seeded crops. Do not use on Brussels sprouts.** Apply to actively growing grasses. For repeat applications, make on a minimum of 14-day intervals. Rainfast in 1 hour. Do not apply within 30 days of harvest. Do not apply more than 8 oz/A in a single application.
clopyralid @ 0.9-0.187 lbs/A	Stinger 3 EC @ 0.25-0.5 pt/A	Broadleaf weeds, including clover	**Suggested for direct-seeded crops. Do not use on Brussels sprouts.** Apply when weeds are small and actively growing. Do not apply within 30 days of harvest.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	**Suggested for direct-seeded crops. Do not use on Brussels sprouts.** To avoid severe crop injury, do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Apply to row middles only with a hooded sprayer, shielded sprayer, or a wiper applicator. Do not apply within 14 days of harvest.
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40 DF @ 0.33-1.0 oz/A Mix with COC @ 1.3 oz/gal or NIS @ 0.33 oz/gal	Most emerged broadleaf weeds No grass control	**Do not use on Brussels sprouts.** Apply using hoods or shields. Will injure contacted crops. Most effective on small weeds. Can be mixed with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

CARROTS[3,4,5]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
trifluralin[2] @ 0.5-1lb/A	Treflan HFP, Trifluralin, Trilin and other 4 EC products @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A heavy soil 60 DF products @ 0.875 lb/A on light soil 1.33 lb/A on medium soil 1.6 lb/A on heavy soil	Small-seeded grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in top 2" of soil just before planting.
PRE-EMERGENCE:			
linuron @ 0.5-1.5 lb/A	Lorox DF @ 1.5 lb/A on light soil 2-2.5 lb/A on medium soil 3.0 lb/A on heavy soil	Broadleaf weeds, some grasses and yellow nutsedge	Apply after planting before carrots or weeds emerge. Plant seed 1/2 inch deep. Be aware of replant restrictions.
POST-EMERGENCE:			
linuron @ 0.5-1.5 lb/A	Lorox DF @ 1.5 lb/A on light soil 2-2.5 lb/A on medium soil 3.0 lb/A on heavy soil	Broadleaf weeds, some grasses and yellow nutsedge	Apply after carrots are at least 3" tall and before grasses are 2" and broadleaves are 6". Do not tank-mix with other pesticides. Be aware of replant restrictions.
fluazifop @ 0.1-0.375 lb/A	Fusilade DX @ 0.375-1.5 pt/A Mix 6-12 oz of Fusilade with 1-2 pts COC or 0.5-1 pt NIS in 25 gal of water.	Annual and perennial grasses	Apply to actively growing grasses before they exceed the labeled growth stages. Use sufficient spray volume (5-40 gals/A) and pressure (40-60 psi) to ensure adequate coverage. Do not harvest carrots within 45 days after application. Maximum use rate is 48 oz/A/season. Do not apply to stressed grasses or when rainfall is expected within 1 hour.
sethoxydim @ 0.09-0.47 lb/A	Poast @ 0.5-2.5 pt/A Mix with 2 pt/A COC Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply before grasses exceed height labeled heights. Adjust pressure (40-60 psi), spray volume (5-20 gal/A) and boom height to aid in coverage. Do not apply within 30 days of harvest. Maximum use rate is 3 pt/A. Rainfast in 1 hour.
clethodim @ 0.1-0.125 lb/A	Select @ 6-8 oz/A Mix with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses and annual bluegrass	Apply post-emergence to actively growing grasses. Do not apply under stressed conditions or if rainfall is expected within 1 hour. Do not apply within 30 days of harvest. Do not apply more than 8 oz/A in a single application. For repeat applications, make on a minimum of 14 day interval.

VEGETABLE CROPS (COMMERCIAL)

CARROTS[3,4,5]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
metribuzin @ 0.25 lb/A	Sencor FL @ 0.5 pt/A Sencor DF @ 0.33 lb/A	Many broadleaf weeds	Apply after carrots reach the 5-6 leaf stage but before weeds are 1 inch high. Do not apply within 3 days after a period of cool, wet or cloudy weather or crop injury will occur. Second application can be made after an interval of at least 3 weeks. Days to harvest – 60. Check label for crop rotation.
Stoddard solvent	Varsol @ 40-60 gal/A	Many annual grasses and broadleaf weeds	Do not apply later than 6 weeks before harvest. Apply before weeds are 1" tall. Works best on warm sunny days.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply to row middles only using a hooded sprayer, shielded sprayer, or a wiper applicator. May, also, be used after harvest. To avoid severe crop injury do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.
pendimethalin @ 1lb/A	Prowl H2O @ 2 pt/A	Annual grasses and broadleaf weeds	May be applied as a directed spray to the soil between rows after the last mechanical cultivation. DO NOT ALLOW THE SPRAY TO CONTACT THE CARROT PLANTS OR INJURY MAY OCCUR. Do not apply more than 2.0 pints per acre per season. 60 DTH. Do not feed forage or graze livestock in treated fields.

VEGETABLE CROPS (COMMERCIAL)

SWEET CORN[3,4]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/ PRE-PLANT INCORPORATED:			
atrazine @ 1-2.0 lb/A	4L formulations @ 2 pt/A on coarse soil 3 pt/A on medium soil 4 pt/A on fine soil Multiply the 4 L rate by 0.8 when using a 5 L atrazine. 80 DF formulations @ 1.25 lbs/A on coarse soil 1.90 lbs/A on medium soil 2.50 lbs/A on fine soil Multiply the 80 DF rate by 0.88 when using a 90 DF atrazine.	Many small seeded annual grasses and broadleaf weeds	Apply to surface of freshly moist cultivated soil. Do not plant treated areas with any crop except corn or grain sorghum until the following year. Do not apply more than 2.0 lb ai/A per application or 2.5 lb ai/year. Check label for tank-mixes with other herbicides. Do not mix, load or use within 50 ft of a well. Use a device to prevent back siphoning when mixing.
s-metolachlor @ 1.25-1.56 lb/A + atrazine @ 1.63-2.0 lb/A s-metolachlor @ 1.25-1.83 lb/A + atrazine @ 1-1.5 lb/A	Bicep II Magnum @ 2.1-2.6 qt/A Bicep Lite II Magnum @ 1.5 to 2.2 qt/A	Most small seeded annual grasses and broadleaf weeds.	See comments for atrazine and s-metolachlor. Do not exceed more than 2.0 lb ai/A atrazine per application (2.6 qt/A Bicep II or 3 qt/A Bicep Lite). Bicep Lite at 3 qt/A would injure corn. The maximum use rate for atrazine is 2.5 lb ai/A/year. Use Bicep Lite if another atrazine application is expected.
alachlor @ 2-4 lb/A	Lasso 4EC or MT @ 4 pt/A on light soil 6 pt/A on medium soil 8 pt/A on heavy soil Partner WDG @ 3 lb/A on light soil 4 lb/A on medium soil 6 lb/A on heavy soil	Many small seeded annual grasses and broadleaf weeds	Apply to surface of freshly cultivated soil. Do not forage or harvest immature corn within 12 weeks after treatment. Check label for tank-mixes with other herbicides.
alachlor @ 1.56-2.81 lb/A + atrazine @ 0.94-1.69 lb/A	Bullet @ 2.5 qt/A on coarse soil 3.5 qt/A on medium soil 4.0-4.5 qt/A on fine soil	Many small-seeded annual grasses and broadleaf weeds	See comments for atrazine. Do not exceed more than 2.0 lb ai/A atrazine per application (5.33 qt/A of Bullet). The maximum use rate for atrazine is 2.5 lb ai/A/year. Do not exceed 6.4 qts of Bullet/A per year.
PRE-EMERGENCE:			
S-metolachlor @ 0.95 – 1.91	Dual Magnum, Dual II Magnum @ 1-2 pt/A	Most annual grasses and pigweed	Apply to soil surface immediately after planting. Consult labels for approved tank mixes.
metolachlor @ 0.98-1.63 lbs/A	Medal, Stalwart, Parallel, Charger @ 1.0-1.3 pts/A on coarse soil @ 1.3-1.67 pts/A on med.-fine soil	Most annual grasses and pigweed	Apply to soil surface immediately after planting. Consult labels for approved tank mixes.
dimethenamid @ 0.94 -1.5 lb/A	Outlook @ 8-12 oz/A on coarse-med. soil 12-16 oz/A on fine soil	Most annual grasses, pigweeds, and some sedges	Apply to soil surface immediately after planting. Check with seed supplier for varietal tolerance. Consult label for approved tank-mixes.

VEGETABLE CROPS (COMMERCIAL)

SWEET CORN[3,4]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
atrazine @ 1-2.0 lb/A	Same as above.	Same as above.	Apply after planting before crop and weeds emerge. See additional comments above.
s-metolachlor @ 1.25-1.56 lb/A + atrazine @ 1.63-2.0 lb/A s-metolachlor @ 1.25-1.83 lb/A + atrazine @ 1-1.5 lb/A	Bicep II Magnum @ 2.1-2.6 qt/A Bicep Lite II Magnum @ 1.5-2.2 qt/A	Most small seeded annual grasses and broadleaf weeds.	See comments for atrazine and s-metolachlor. Do not exceed more than 2.0 lb ai/A atrazine per application (2.6 qt/A Bicep II or 3 qt/A Bicep Lite). The s-metolachlor rate in 3 qt/A Bicep Lite would injure corn. The maximum use rate for atrazine is 2.5 lb ai/A/year. Use Bicep Lite if another atrazine application is expected.
alachlor @ 2-4 lb/A	Lasso 4EC or MT @ 4 pt/A on light soil 6 pt/A on medium soil 8 pt/A on heavy soil Partner WDG @ 3 lb/A on light soil 4 lb/A on medium soil 6 lb/A on heavy soil	Many small seeded annual grasses and broadleaf weeds	Apply after planting before weeds and corn emerge. Do not forage or harvest immature corn within 12 weeks after treatment. Check label for tank-mixes with other herbicides.
alachlor @ 1.56-2.81 lb/A + atrazine @ 0.94-1.69 lb/A	Bullet @ 2.5 qt/A on coarse soil 3.5 qt/A on medium soil 4.0-4.5 qt/A on fine soil	Many small-seeded annual grasses and broadleaf weeds	Apply after planting before weeds and corn emerge. See comments for atrazine and alachlor. Do not exceed 6.4 qt of Bullet/A per year.
POST-EMERGENCE:			
dimethenamid @ 0.94 -1.5 lb/A	Outlook @ 8-12 oz/A on coarse-med. soil 12-16 oz/A on fine soil	Most annual grasses, pigweeds, and some sedges	Apply early post-emergence before corn reaches 8" tall and weeds exceed the 2 leaf stage. Check with seed supplier for varietal tolerance. Consult label for approved tank-mixes.
atrazine @ 1-2.0 lb/A	Rates as above. Apply with 1 pt/25 gal NIS or 1 qt/25 gal COC	Many small seeded annual grasses and broadleaf weeds	Apply before corn is 12" tall and pigweeds reach 6" and before other broadleaf weeds reach 4" and grasses reach 1.5". Do not apply when crop is under stress from prolonged wet or cold weather, poor fertility, is wet and succulent following a recent rain, or other factors. See additional comments above.
s-metolachlor @ 0.96-1.56 lb/A + atrazine @ 1.25-2.0 lb/A s-metolachlor @ .91-1.58 lb/A + atrazine @ 0.73-1.26 lb/A	Bicep II Magnum @ 1.6-2.6 qt/A Bicep Lite II Magnum @ 1.1-1.9 qt/A	Most small seeded annual grasses and broadleaf weeds.	Apply before weeds exceed the 2 leaf stage and corn exceeds 5". See comments for atrazine and s-metolachlor. Do not exceed more than 2.0 lb ai/A atrazine per application (2.6 qt/A Bicep II or 3 qt/A Bicep Lite). The s-metolachlor rate in 3 qt/A Bicep Lite would injure corn. The maximum use rate for atrazine is 2.5 lb ai/A/year. Use Bicep Lite if another atrazine application is expected.

VEGETABLE CROPS (COMMERCIAL)

SWEET CORN[3,4]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
bentazon @ 0.75-1.0 lb/A	Basagran @ 1.5-2 pts/A Mix with COC in some situations; consult label.	Many broadleaf weeds including annual morningglory, cocklebur, velvetleaf, Pennsylvania smartweed, prickly sida, dayflower and ragweed No grass control	Apply to small, actively growing weeds. Two applications of 5-14 days apart may be necessary to control morningglories at the 4th leaf and 4" tall stage. Addition of COC will increase control of morningglory, velvetleaf and ragweed. Check label for tank-mixes with other herbicides. Do not apply more than 4 pt/A per season.
halosulfuron @ 0.032 lb/A	Sempra, Sandea @ 0.66 oz/A Apply with NIS @ 1-2 pt/100 gal. of water or COC @ 1 gal/100 gal. of water	Nutsedge and some broadleaf weeds	User assumes all responsibility for use on sweet corn. May be applied over the top or with drop nozzles from spiking to lay-by. A sequential treatment of 0.66 oz/A directed to avoid application in the whorl may be made. Avoid cultivation for 7 days after application. Consult label for plantback restrictions. No more than 2 applications per season. Do not apply to crops under stress. Check label for weed stage development. Do not harvest within 30 days of application.

CUCURBITS (cucumber, squash, watermelon, pumpkin, cantaloupe)[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
ethalfluralin @ 1.13-1.7 lb/A	Curbit EC @ 3 pt/A on coarse soil 3-4 pt/A on medium soil 4-4.5 pt/A on fine soil	Certain annual grasses and broadleaf weeds. Replant only crops listed on the Curbit or other ethalfluralin labels.	Apply after planting before crop and weeds emerge. Band between rows after transplanting or seeded crop emerge. Do not use under or over row covers, hot caps, plastic mulch or other plant covers. Under cool weather that can delay early seedling emergence or growth (first planting of the season), Curbit can cause injury or crop failure. Crop residue, weeds, cloddy conditions, and wet soils may interfere with Curbit performance. Must be activated with 5 day with a 1/2" of rainfall or irrigation.
halosulfuron @ 0.024 - 0.36 lb/A	Sandea @ 1/2-3/4 oz/A	Nutsedge and some broadleaf weeds	**Cucumbers and cantaloupe only.** Apply after planting before weeds and crop emerge. Can also be applied 7 days prior to transplanting. May be applied as an under plastic mulch. Apply following final bed shaping and just prior to laying plastic. Wait 7 days after application to plant.

VEGETABLE CROPS (COMMERCIAL)

CUCURBITS (cucumber, squash, watermelon, pumpkin, cantaloupe)[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
ethalfluralin @ 0.4-1.2 lb/A + clomazone @ 0.125 – 0.325 lb/A	Strategy 2.1L @ 2.6 pt/A	Annual grasses and broadleaf weeds	Apply after seeding. **Do not apply prior to planting. Don not incorporate.** Can use in row middles.
clomazone @ 0.15 – 0..375 lb/A	Command 3ME @ 0.40 – 1.00 pt/A	Annual grasses and broadleaf weeds with some cocklebur control.	Apply to after planting. Foliar contact with drift or vapors may whiten plants. Symptoms are generally temporary, but may persist on some plants. Don't apply within 1,200 feet of sensitive areas; consult label. Rotation to all is 12 months. May be mixed with other herbicides. Some varieties may be sensitive; consult label. **Don't use on Jack-O-Lantern or squash.**
terbacil @ 0.1-0.2 lb/A	Sinbar 80 WP @ 2-4 oz/A	Broadleaf weeds	**For use on watermelons only.** Apply before crop or weeds emerge or apply before transplanting. Can be applied under plastic or to row middles. Can be applied over plastic mulch before punching holes. However, a ½ inch rain is required to wash off Sinbar before holes are punched or transplanted.
POST-EMERGENCE:			
clethodim @ 0.1 - 0.125 lb/A	Select Max @ 9-16 oz/A Arrow @ 6-8 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal clethodim + 1.3 oz/gal COC	Annual and perennial grasses	May also be applied to **musk melons**. Apply before grasses exceed recommend height; consult label. Do not apply under stressed conditions. Rain-fast in 1 hour. Don't harvest within 30 d. Don't apply more than 8 oz/A/application. Allow 14 d between applications.
POST-EMERGENCE: continued			
halosulfuron @ 0.024 - 0.36 lb/A	Sandea @ 1/2 -3/4 oz/A Apply with NIS @ 1 qt/ 100 gal of water	Yellow and purple nutsedge and some broadleaf weeds.	**Cucumbers and cantaloupe only.** Overtop application 14 days after transplanting. Avoid overtop application when temperature or humidity is high. Can be applied as a direct spray to row middles. 30 days to harvest cucumbers. 57 days to harvest cantaloupes. Long residual; see label for planting intervals DO NOT apply more than 2 oz/acre in a 12 month period.
sethoxydim @ 0.09-0.28 lbs/A	Poast @ 0.5-1.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast+ 1.3 oz/A COC/gal	Annual and perennial grasses	May also be applied to **musk melons**. Apply before grasses exceed recommend height; consult label. Adjust pressure (40-60 psi), spray volume (5-20 gal/A) and height of spray boom to ensure thorough coverage. Do not apply Poast within 14 days of harvest. Do not apply more than 3 pt/A/season. Poast plus COC should be used with caution when temperatures exceed 90° F and the relative humidity is 60% or higher because of potential leaf injury. Rainfast in 1 hour. Do not apply to grasses under stress.

VEGETABLE CROPS (COMMERCIAL)

CUCURBITS (cucumber, squash, watermelon, pumpkin, cantaloupe)[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply to row middles only using a hooded sprayer, shielded sprayer, or a wiper applicator. May, also, be used after harvest. To avoid severe crop injury do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.
halosulfuron @ 0.12- 0.18 lb/A	Sandea 75 DF @ ½ - 1 oz/A	Nutsedge and some broadleaf weeds	Apply to row middles. **For use in watermelons, pumpkins or squash only.**
trifluralin[2] @ 0.5-1lb/A	Treflan HFP, Trifluralin, Trilin and other 4 EC products @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A heavy soil 60 DF products @ 0.875 lb/A on light soil 1.33 lb/A on medium soil 1.6 lb/A on heavy soil	Small-seeded grasses, broadleaf weeds and seedling Johnson grass	**For use only on cucumbers, watermelons and canta-loupes**. Direct spray to row middles and/or beneath plants at the 3-4 true leaf stage. Incorporate within 24 hrs; adjust equipment to move treated soil around the base of plants. Do not harvest cucumbers or canta-loupes within 30 days or water-melons within 60 days. **Do not apply over the top of plants.**
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40DF @ @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC at 1 gal/100 gal	Most emerged broadleaf weeds No grass control	**Do not use on squash**. Apply post-emergence directed using hoods. Spray will injure crop. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control. Can be mixed with other herbicides to control grasses.
DIRECTED POST-EMERGENCE: continued			
ethalfluralin @ 0.4-1.2 lb/A clomazone @ 0.125-0.325lb/A	Strategy @ 2.1 L 2-3 pt/A	annual grasses and broadleaf weeds	Cucumbers, cantaloupes pumpkins watermelons and squash. May be applied post directed spray to row middles after crop emergence or transplanting. Do not apply over plants.

VEGETABLE CROPS (COMMERCIAL)

EGGPLANT[4,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-TRANSPLANT:			
napropamide @ 1-2 lb/A	Devrinol 50DF @ 2 lb/A on light soil 3 lb/A on medium soil 4 lb/A on heavy soil	Certain annual grasses and broadleaves	**Apply before transplanting; can only be used on trans-plants.** Incorporate 1-2" deep soon after application. Spray soil strip between rows of plastic after laying the mulch.
trifluralin[2] @ 0.5-1lb/A	Treflan HFP, Trifluralin, Trilin and other 4 EC products @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A heavy soil 60 DF products @ 0.875 lb/A on light soil 1.33 lb/A on medium soil 1.6 lb/A on heavy soil	Small-seeded grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in the top 2" of soil just before transplanting. Avoid trans-planting until temperatures have warmed in the spring. Eggplant tolerance may be marginal. Use with caution.
POST-EMERGENCE/POST TRANSPLANT:			
sethoxydim @ 0.188-0.28 lbs/A	Poast @ 0.5-1.5 pts/A Apply with COC @ 2 pts/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses before they exceed labeled heights; consult label. Adjust equipment to ensure good coverage. 20 days before harvest. Max use rate is 4.5 pt/A/yr. Rainfast in 1 hr. Poast plus COC may cause leaf burn.
clethodim @ 0.1 - 0.125 lb/A	Select @ 6-8 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses before they exceed labeled heights; consult label. 20 days before harvest. Max use rate is 8 oz/A/application. Rainfast in 1 h. Allow 14-days between applications.
DIRECTED POST-EMERGENCE/DIRECTED POST TRANSPLANT:			
paraquat @ 0.49 lb/A	Gramoxone Inteon @ 2 pt/A Firestorm, Parazone @ 1.7-2.7 pt/A Mix with NIS @ 1 pt/100 gal or COC @ 1 gal/100 gal Pump up sprayer: 0.33 oz/gal paraquat + 0.33-0.5 oz/gal NIS or 1.3 oz/gal COC.	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennials.	Apply after transplanting as a directed spray between rows. Use shields to protect crop. Use 20-100 gal of water/A. Don't exceed 30 psi nozzle pressure or spray under conditions that favor drift. Apply when weeds and grasses are 1-6" high. 30 days to harvest. Don't make more than 3 applications/season. Don't feed or graze treated areas.

VEGETABLE CROPS (COMMERCIAL)

EGGPLANT[4,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE/DIRECTED POST TRANSPLANT: continued			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply to row middles only using a hooded or shielded sprayer or a wiper applicator. May also be used post-harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.
halosulfuron @ 0.12 – 0.18 lb/A	Sandea @ ½ - 1 oz/A	Nutsedge and some broadleaf weeds	Apply to row middles; avoid contact with crop and plastic. Do not apply within 30 days of harvest. Long residual. Check label for re-crop intervals. Do not apply more than 2 oz/A/year.
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim 2 EC @ .75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Apply as directed spray using hoods. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control.

GREENS (collard, mustard and turnip)[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
trifluralin[2] @ 0.5-.75 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med.-heavy soil 60 DF products @ 0.8 lb/A on light soil 1.33 lbs/A on med.-heavy soil	Small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in top 2" of soil just before planting.
POST-EMERGENCE:			
sethoxydim @ 0.09-0.28 lbs/A	Poast @ 0.5-1.5 Apply with COC @ 2 pts/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	**Do not use on turnips.** Apply to actively growing grasses before they exceed labeled heights; consult label. Adjust equipment to ensure good coverage. 20 days before harvest. Max use rate is 4.5 pt/A/yr. Rainfast in 1 hr. Poast plus COC may cause leaf burn. Use with caution when temperatures exceed 90°F and the relative humidity is 60% or higher, or when temperatures reach 100°F.

VEGETABLE CROPS (COMMERCIAL)

GREENS (collard, mustard and turnip)[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
clethodim @ 0.1 - 0.125 lb/A	Select Max @ 9-16 oz/A Arrow @ 6-8 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal clethodim+1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses before they exceed labeled heights; consult label. Do not apply within 14 days of harvesting leaves, or 30 days of harvesting the root. Max use rate is 8 oz/A/application. Rainfast in 1 h.
clopyraild @ 0.187 lb/a	Stinger 3 ED 0.3-0.5 pt/a	Clover, legumes and other broadleaf weeds	Apply to crop when weeds are small and actively growing. 30 DTH mustard, collards, turnips roots, kale. 15 DTH turnips tops. Mustard green injury has been observed in some trials.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim2 EC @ .75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct application using a hooded sprayer. Spray will injure crop. Most effective when weeds are less than 4" tall. Good coverage equals good control.
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	**Not labeled for turnip.** Apply to row middles only using a hooded or shielded sprayer or a wiper applicator. May also be used post-harvest. To avoid severe injury to crop, do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.

VEGETABLE CROPS (COMMERCIAL)

GARLIC[3,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE:			
oxyfluorfen @ 0.25-0.5 lb/A	Goal 1.6E @ 1.25-2.5 pt/A Goal 2XL, Galligan 2 EC @ 1-2 pt/A	Annual broadleaf weeds	Apply a single application within 2 d of planting for pre-emergence control. See post-emergence section for additional comments.
pendimethalin @ 0.5-1.5 lbs/A	Prowl 3.3, Pendimax 3.3 @ 1.2-1.8 pts/A on light soil 1.8-2.4 pts/A on med. soil 1.8-3.6 pts/A on heavy soil Prowl H2O @ 1-1.6 pts/A on light soil 1.6-2.1 pts/A on med. soil 2.1-3.2 pts/A on heavy soil Pentagon DG @ 0.5-1.25 lb/A on light soil 1.25-1.7 lb/A on med. soil 1.25-2.5 lb/A on heavy soil	Many small seeded grasses and broadleaves, including annual spurge	Apply after planting before weeds and crop emerge. Treatment most effective when rainfall or overhead irrigation is received within 7 days after application. May be applied as split application both pre-emergence and post-emergence.
flumioxazin @ 0.188 lb/a	Chateau 51 WDG @ 6 oz/a	Annual grasses and broadleaf weeds	Application can be made within 3 days after planting. Apply prior to garlic and weed emergence. Do not apply more than 6 oz per growing season.
POST-EMERGENCE:			
bromoxynil @ 0.375-0.5	Buctril 2EC, Moxy 2EC @ 1.5-2 pt/A Buctril 4EC @ 0.75-1 pt/A	Many broadleaf weeds	Apply when garlic has 1-2 true leaves and less than 12" tall and weeds are 1-4" tall. Use a minimum spray volume of 20 gals/A. Do not apply within 112 days to harvest. Do not add surfactants. Use lower rate on small weeds and the higher rate on 4" weeds. Do not apply more than 0.5 lb ai/A/season.
fluazifop @ 0.1-0.375 lb/A	Fusilade DX @ 0.375-1.5 pt/A Apply with COC @ 1-2 pts/25 gal or NIS @ 0.5-1 pt/25 gal Pump up sprayer: 0.75 oz/gal Fusilade + 1.5 oz/gal COC or 0.5 oz/gal NIS	Annual and perennial grasses	Apply to actively growing grasses before they exceed the labeled heights; consult label. Use sufficient spray volume (5-40 gals/A) and pressure (40-60 psi) to ensure complete coverage. Do not harvest garlic within 45 days after application. Do not apply a total of more than 48 oz. of Fusilade DX per acre per season. Do not apply to grasses which are stressed. Do not apply if rainfall is expected within 1h.
dimethenamid-P @ 0.60-1.0 lb/A	Outlook 6 EC @ 12 – 21 oz/A	Annual grasses and pigweed.	Apply after the crop has reached the 2 true leaf stage until a minimum of 30 DTH. Application made prior to 2 true leaf stage may result in significant crop injury including possible stand reduction.

VEGETABLE CROPS (COMMERCIAL)

GARLIC[3,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
clethodim @ 0.1-0.125 lb/A	Select 2EC, Arrow @ 6-8 oz/A Select Max @ 9-16 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal clethodim+1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by grass species, stage and region. Do not apply under stressed conditions. Rainfast in 1 hr. Days to harvest = 45. Don't apply more than 0.5 lb ai/A/year. Apply in a minimum of 20 gals/A.
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses before they exceed labeled heights; consult label. Adjust equipment to ensure good coverage. 45 days before harvest. Max use rate is 3 pt/A/yr. Use with caution when temperatures exceed 90°F and the relative humidity is 60% or higher, or when temperatures reach 100°F.
oxyfluorfen @ 0.12 lb/A	Goal 1.6E @ 9.6 oz/A Goal 2XL, Galligan 2 EC @ 7.6 oz/A	Annual broadleaf weeds	Apply after garlic has 2 true leaves and weeds are in the 2 to 4 true leaf stage. Some garlic injury may result. Injury may be severe if applied under cool, wet conditions. Don't make more than 4 applications/year. Do not apply within 60 days of harvest.
pendimethalin @ 0.5-1.5 lbs/A	Prowl 3.3, Pendimax 3.3 @ 1.2-1.8 pts/A on light soil 1.8-2.4 pts/A on med. soil 1.8-3.6 pts/A on heavy soil Prowl H2O @ 1-1.6 pts/A on light soil 1.6-2.1 pts/A on med. soil 2.1-3.2 pts/A on heavy soil Pentagon DG @ 0.5-1.25 lb/A on light soil 1.25-1.7 lb/A on med. soil 1.25-2.5 lb/A on heavy soil	Many small seeded grasses and broadleaves, including annual spurge	Apply to garlic with 1-5 leaves. Treatment most effective when rainfall or overhead irrigation is received within 7 days after application. May be applied as split application both pre-emergence and post-emergence. Garlic treated post-emergence should not be harvested within 45 days after application.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 75-1.5 oz/A Aim 40 DF @ 0.33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control, but can be mixed with grass herbicides.	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective on weeds less than 4" tall. Coverage is critical to weed control.

VEGETABLE CROPS (COMMERCIAL)

GARLIC[3,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax, other 5L brands @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A	Most emerged weeds	Apply to row middles only using a hooded or shielded sprayer or a wiper applicator. May also be used post-harvest. Avoid crop injury by keeping herbicide off foliage, green shoots, stems, exposed roots or fruit.

LETTUCE, ENDIVE, ESCAROLE and RADICCHIO[3,4,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
benefin @ 1.12-1.5 lb/A	Balan DF @ 2.0 lbs/A on coarse-med soil 2.5 lbs/A on fine soil	Annual grasses and broadleaf weeds	**Lettuce and endive:** Incorporate into the top 2-3" of the final seed bed before seeding or transplanting. Check label for further information.
pronamide @ 1-2 lbs/A	Kerb 50-WP @ 2.0-3.0 lbs/A on coarse-med soil 3.0-4.0 lbs/A on fine soil	Annual grasses and broadleaves.	**Lettuce, endive and escarole:** Necessary to move herbicides into the root zone of germinating weeds by overhead sprinkler irrigation or rainfall 2-3 days after application. Can be incorporated shallowly and thoroughly before planting. Check rotation restrictions. Make only one application/year.
bensulide @ 5-6 lb/A	Prefar 4E @ 5-6 qt/A	Certain annual grasses and broadleaf weeds	**Lettuce:** Incorporate 1-2" before planting.
trifluralin[2] @ 0.5-.75 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med.-heavy soil 60 DF products @ 0.8 lb/A on light soil 1.33 lbs/A on med.-heavy soil	Small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	**Endive, escarole and radicchio:** Incorporate thoroughly in top 2" of soil just before planting. Cold, wet soil conditions just after planting may increase risk of crop injury. Do not seed until seedbed has warmed.
PRE-EMERGENCE:			
bensulide @ 5-6 lb/A	Prefar 4E @ 5-6 qt/A	Certain annual grasses and broadleaf weeds	**Lettuce:** Apply after planting to crops where the application can receive immediate irrigation.
pronamide @ 1-2 lbs/A	Kerb 50-WP @ 2.0-3.0 lbs/A on coarse-med soil 3.0-4.0 lbs/A on fine soil	Annual grasses and broadleaves.	**Lettuce, endive and escarole:** See comments above
POST-EMERGENCE:			
clethodim @ 0.1 - 0.125 lb/A	Select 2 EC, Arrow @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC @ 1 gal/100 gal	Annual and perennial grasses	**For use on leaf lettuce:** Apply to actively growing grasses. Do not apply more than 8 oz/A in a single application. Rainfast in 1 hour. Do not apply within 14 days of harvest. Allow 14 days between applications.

VEGETABLE CROPS (COMMERCIAL)

LETTUCE, ENDIVE, ESCAROLE and RADICCHIO[3,4,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
	Pump up sprayer: 0.33 to 0.66 oz/A clethodim + 1.3 oz/gal COC		
pronamide @ 1-2 lbs/A	Kerb 50-WP @ 2.0-3.0 lbs/A on coarse-med soil 3.0-4.0 lbs/A on fine soil	Annual grasses and broadleaves.	**Head lettuce, endive and escarole: Don't apply to leaf lettuce POST.** Apply before or after thinning before weeds germinate. Move herbicide into the root zone by overhead irrigation or rainfall within 2-3 days. Check rotation restrictions. 55 days to harvest. Make one application/year.
POST-EMERGENCE: conitnued			
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	**Lettuce:** Apply to actively growing grasses before they exceed labeled heights; consult label. Don't apply within 30 days of head lettuce harvest or within 15 days of leaf lettuce. Adjust pressure (40-60 psi), spray volume (5-20 gal/A) and height of spray boom to ensure thorough coverage. Do not apply more than 4.5 pts/A/year. Rainfast in 1 hour. Poast plus COC should be used with caution because of potential of leaf injury when temperature and RH are high.
fluazifop @ 0.1-0.375 lb/A	Fusilade DX @ 6-8 oz/A Apply with COC @ 1-2 pt/25 gal or NIS @ 0.5-1 pt/25 gal	Annual and perennial grasses	**Lettuce and endive:** Apply to actively growing grasses before they exceed labeled growth stages; consult label. Use sufficient spray volume (5-40 gal/A) and pressure to ensure complete coverage. Do not harvest lettuce within 28 days after application. Don't apply more than 48 oz/A/season.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 75-1.5 oz/A Aim 40 DF @ 0.33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control, but can be mixed with grass herbicides.	**Lettuce:** Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective on weeds less than 4" tall. Good coverage is critical.
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	**Lettuce:** Apply to row middles only using a hooded or shielded sprayer or a wiper applicator. May also be used post-harvest. Avoid injury by keeping herbicide off all plant parts. 14 days to har.

VEGETABLE CROPS (COMMERCIAL)

IRISH POTATOES[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
s-metolachlor @ 0.96-1.9 lb/A	Dual Magnum, Dual II Magnum @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A on heavy soil	Many small-seeded grasses, yellow nutsedge, pigweed, carpetweed	Incorporate in top 3" before planting.; consult label. If cool wet weather occurs after application, Dual delays maturity and reduces yields in early maturing varieties. Do not follow this treatment with a pre-emerge application. Do not harvest within 60 after planting. Check label for tank-mixes with other herbicides. Planting and later cultural practices should not bring untreated soil to the surface.
metolachlor @ 0.96-1.9 lb/A	Medal, Stalwart, Parallel, Charger 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A on heavy soil	Many small-seeded grasses, yellow nutsedge, pigweed, carpetweed	Incorporate in top 3" before planting.; consult label. If cool wet weather occurs after application, Dual delays maturity and reduces yields in early maturing varieties. Do not follow this treatment with a pre-emerge application. Do not harvest within 60 after planting. Check label for tank-mixes with other herbicides. Planting and later cultural practices should not bring untreated soil to the surface.
PRE-EMERGENCE:			
dimethenamid-P	Outlook 6EC @ 12-21 0z/A	Most annual grasses, broadleaf weeds, and yellow nutsedge.	Apply after planting or drag-off. Will not control emerged weeds.
rimsulfuron @ 0.016-0.023 lb/A	Matrix 25 DWG @ 1.0 -1½ oz/A	Most annual broadleaf weeds and some grasses.	Apply after drag-off or hilling but before potatoes and weeds emerge. If emerged weeds are present add 1-2 pts NIS /100 gals. See label for tank mixtures.
s-metolachlor @ 0.96-1.9 lb/A	Dual Magnum, Dual II Magnum @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A on heavy soil	Many small-seeded grasses, yellow nutsedge, pigweed, carpetweed	Apply after planting, drag-off or hilling before potatoes or weeds emerge; consult label. If cool wet weather occurs after application, Dual delays maturity and reduces yields in early maturing varieties. Do not use pre-emerge if Dual was used pre-plant. Do not harvest within 60 after planting. Check label for tank-mixes with other herbicides. Planting and later cultural practices should not bring untreated soil to the surface.
metribuzin @ 0.5-1 lb/A	Sencor 4L @ 1 pt/A on light soil 1.5 pt/A on medium soil 2 pt/A on heavy soil Sencor DF @ 0.66 lb/A on light soil 1 lb/A on medium soil 1.3 lb/A on heavy soil	Crabgrass, foxtail, seedling Johnson grass, fall panicum, signalgrass and several broadleaf weeds	Do not plant treated areas to crops other than potatoes for one year after treatment. Do not apply to sweet potatoes or yams. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

IRISH POTATOES[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE: continued			
linuron @ 0.75-2.0 lb/A	Lorox DF @ 1-1.5 lbs/A on coarse soil 1.5-2 lbs/A on medium soil	Most small seeded annual grasses and broadleaf weeds	Apply before crop emergence. Apply before grasses are 2" tall and before broadleaf weeds are 6" tall. Plant seed at least 2" deep. Do not spray over top of emerged potatoes. If emerged weeds are present, add NIS @ 1pt/25 gal. Best results are obtained when application is made to moist soil, followed within 2 weeks by 1-2" of rainfall. Check label for tank-mixes with other herbicides.
pendimethalin @ 0..51.5 lbs/A	Prowl/Pendimax 3.3EC @ 1.2 pts/A on coarse soil 2.4 pts/A on medium soil 3.6 pts/A on fine soil Prowl H2O @ 1.0 pts/A on coarse soil 2.0 pts/A on medium soil 3.0 pts/A on fine soil Pentagon DG @ 0.85-1.25 lb/A on coarse soil 1.25-1.7 lb on medium soil 1.7-2.5 lb on fine soil	Most annual grasses, seedling Johnson grass and fair control of some broadleaves.	Apply after planting before crop or weeds emerge or after drag off. Most effective when rainfall is received within 7 d of application. Incorporate 1-2 inches deep if it does not rain within 7 days. Check label for tank mixes with other herbicides. Do not apply before planting. Do not apply to sweet potatoes.
flumioxazin @ 0.047 lb/A	Chateau 51 WD @ 1.5 oz/A	Most annual broadleaf weeds and some grasses	Apply after hilling, before crop emerges. A minimum of 2 inches of soil must cover crop at the time of application. Check label for tank-mixes.
POST-EMERGENCE:			
clethodim @ 0.1 - 0.125 lb/A	Select @ 6 - 8 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. 30 days to harvest. Rainfast in 1 hour. Don't apply more than 8 oz/A/application. Allow 14 days between applications.
pendimethalin @ 0.75-1.5 lbs/A	Prowl/Pendimax 3.3EC @ 1.2 pts/A on coarse soil 2.4 pts/A on medium soil 3.6 pts/A on fine soil Prowl H2O @ 1.0 pts/A on coarse soil 2.0 pts/A on medium soil 3.0 pts/A on fine soil	Most annual grasses, seedling Johnson grass and fair control of some broadleaves. Will not control emerged weeds	Apply after crop emergence to 6" stage of growth. This treatment is most effective when adequate rainfall is received within 7 days after application. Do not apply if potatoes are under stress from cold/wet or hot/dry conditions or crop injury may occur. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

IRISH POTATOES[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POSTEMEERGENCE: continued			
sethoxydim @ 0.09-0.47 lbs/A	Poast @ 0.5-2.5 pt/A Apply with COC @ 2 pts/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. Do not apply Poast within 30 days of harvest. Do not apply more than a total of 5 pts/A in one season. Do not apply if rainfall is expected within one hour following application. Do not apply to grasses under stress.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply with a hooded sprayer in row middles, as shielded sprayer in row middles, as wiper applications in row middles or post harvest. To avoid severe injury to the crop do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit of crop. Do not apply with 14 days of harvest.
s-metolachlor @ 0.96-1.4 lb/A	Dual Magnum @ 1.67 pt/A	Many small-seeded grasses, yellow nutsedge, pigweed, carpetweed No control of emerged weeds	Apply as a directed spray after hilling/lay-by to row middles. May be applied over a previous Dual Magnum application. Do not exceed 3.6 pts/A of Dual Magnum in a single crop season. Potatoes should not be harvested 40 days after a lay-by application. If cool wet weather occurs after application, Dual may delay maturity and reduce yields in early maturing varieties.
metolachlor @ 0.96-1.4 lb/A	Medal, Stalwart, Parallel, Charger @ 1.67 pt/A	Many small-seeded grasses, yellow nutsedge, pigweed, carpetweed No control of emerged weeds	See comments for s-metolachlor.
carfentrazone-ethyl @ 0.012–0.024 lb/A	Aim 2EC @ 0.75-1.5 oz/A Aim 40DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC at 1 gal/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Coverage is critical.
HARVEST AIDE:			
endothall @ 0.75-1.0 lb/A	Des-I-Cate @ 1.5-2 gal/A Desicate II @ 1.5-2 qt/A	Desiccate potato vines	Apply to vines 10-14 days prior to harvest. In addition to facilitating harvest, it assists in setting potato skins. Apply in 20-100 GPA. Use higher rates for heavy vine growth. Only mechanically harvest treated potatoes. Culling of harvested potatoes is allowed.
diquat dibromide @ 0.25-0.5 lb/A	Reglone Diquat @ 1-2 pt/A Apply with NIS @ 1 pt/100 gal	Desiccate potato vines	Apply at least 7 days prior to harvest. Apply in 20-100 GPA/ Use higher volumes (40-100 gal) for heavy vine growth. Make a second application a minimum 5 days after first application where vine growth is dense. Do not exceed a total of 4 pt/A.

VEGETABLE CROPS (COMMERCIAL)

OKRA[3,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
trifluralin[2] @ 0.5-.1.0 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med 2.0 pts/A on heavy soil 60 DF products @ 0.87 lb/A on light soil 1.33 lbs/A on medium soil 1.66 lbs/A on heavy soil	Small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in top 2" of soil just before planting. Check label for rates of other formulations of trifluralin.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply with a hooded sprayer in row middles, as shielded sprayer in row middles, as wiper applications in row middles or post harvest. To avoid severe injury to the crop do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit of crop. Do not apply with 14 days of harvest.
carfentrazone-ethyl @ 0.012–0.024 lb/A	Aim 2EC @ 0.75-1.5 oz/A Aim 40DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC at 1 gal/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Coverage is critical.

VEGETABLE CROPS (COMMERCIAL)

ONIONS[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-TRANSPLANT:			
oxyfluorfen @ 0.25-0.5 lb/A	Goal 1.6E @ 1.25-2.5 pt/A Galligan 2 E @ 1.0-2.0 pt/A	Many annual broadleaf weeds	Apply after soil preparation, but prior to transplanting. Trans-planting should be completed with minimal soil disturbance. Do not exceed 2 pt/A as a result of multiple applications in one season. If less than 2 pt/A is applied as a pre- or post- transplant treatment, post-emergence applications can be made. **Do not apply to direct-seeded onions.**
PRE-EMERGENCE/POST-TRANSPLANT:			
oxyfluorfen @ 0.25-0.5 lb/A	Goal 1.6E @ 1.25-2.5 pt/A Galligan 2 E @ 1.0-2.0 pt/A	Many annual broadleaf weeds	**Transplant dry bulb only.** Onions are most tolerant to this application immediately following or within 2 days of transplanting. Do not disturb treated soil. Do not exceed 2 pt/A/year. If less than 2 pt/A is applied as a pre- or post-transplant treatment, POST applications can be made.
DCPA	Dacthal 75 WP @ 6-8 lb/A on light soil 8-10 lb/A on medium soil 10-14 lb/A on heavy soil	Annual grasses and certain broadleaf weeds	**Dry bulb onions direct seed or transplant.** Apply in at least 20 gal of water/A. A minimum of 1/3-1/2 inch of water is necessary to activate within 3-5 days of application. Do not incorporate.
POST-EMERGENCE:			
fluazifop @ 0.1-.375 lb/A	Fusilade DX @ 6-24 oz/A Apply with COC @ 1-2 pt/25 gal or NIS @ 0.5-1 pt/25 gal Pump up sprayer: 0.75 fl oz/gal Fusilade + 1.5 oz/gal COC	Annual and perennial grasses	**Dry bulb onions.** Apply to actively growing grasses before they exceed the recommended growth stages; consult label. 45 days to harvest. Use sufficient spray volume (5-40 gals/A) and pressure (40-60 psi) to ensure complete coverage. Do not apply more than 48 oz/A/season. Rainfast in 1 hour.
bromoxynil @ 0.25-0.375lb/A	Buctril, Moxy 2EC @ 1-1.5 pt/A Buctril 4EC @ 0.5 to .75 pt/A	Many broadleaf weeds	**Dry bulb onions.** Apply to onions with 2-5 true leaves. Water volume is important; use 50-70 gal/A. Soil and onion foliage should be dry at time of application, humidity should be low and dew should be dried. Do not treat if thrips damage or other damage has removed or reduced the waxy coating on the onion foliage. Even under ideal conditions some crop damage or death may occur.
dimethenamid-p @ 0.6 – 1.0 lb/A	Outlook 6 EC @ 12 – 24 oz/A	Most annual grasses and some broadleaf weeds	**Dry bulb onions.** Apply after onions have 2 true leaves. Do not apply within 30 days of harvest. If applications are made to transplant crop, DO NOT APPLY until transplants are in the ground and soil has settled around transplants with several days to recover.

VEGETABLE CROPS (COMMERCIAL)

ONIONS[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE: continued			
sulfuric acid	Battery Acid @ 3-5% solution of actual sulfuric acid	Emerged small broadleaf weeds and some grasses	**Dry bulb onions.** Apply after onions have reached the 2-4 leaf stage and weeds are in the 2-4 leaf stage. For best results apply on bright, sunny, and warm days. Apply in 40-60 gal of water for through coverage. P**our acid into water, never water into acid.** Wear protective clothing and eyewear.
oxyfluorfen @ 0.12 lb/A	Goal 1.6E @ 0.6 pt/A Galligan 2E @ 0.5 pt/A	Many annual broadleaf weeds	Apply when onions have at least 2-3 fully developed true leaves and when weeds are in the 2-4 leaf stage or 2 weeks after transplanting. 45 days to harvest. Don't apply to onions under stress. Multiple treatments may be applied. Maximum use rate is 2 pt/A/yr. Apply in a minimum of 40 gals of water/A with flat fan tips at 20 to 40 psi. Avoid windy days For dry bulb onions avoid application during extended periods of cloudy, humid weather when soil moisture is plentiful.
clethodim @ 0.1 - 0.125 lb/A	Select, Arrow @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses and bluegrass	**Dry bulb onions.** Apply to actively growing grasses. Rates vary grass species, stage and region; consult label. Rainfast in 1 hour. Days to harvest = 45. Maximum use rate is 0.5 lb ai/A/year. 20 gal/A min volume.
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	**Green and dry bulb onions.** Apply to actively growing grasses before recommended heights are exceeded; consult label. Adjust pressure (40-60 psi), spray volume (5-20 gal/A) and height of spray boom to ensure thorough coverage. **Do not apply within 30 days of harvest.** Do not apply more than 4.5 pt/A/season. Rainfast in 1 hour. Should be used with caution because of potential of leaf injury when temperatures exceed 90°F and relative humidity is 60% or higher, or the temperature exceeds 100°F.
pendimethalin @ 0.75-1.5 lbs/A	Prowl/Pendimax 3.3EC @ 1.2 pts/A on coarse soil 2.4 pts/A on medium soil 3.6 pts/A on fine soil Prowl H2O @ 1.0 pts/A on coarse soil 2.0 pts/A on medium soil 3.0 pts/A on fine soil	Many small seeded grasses and broadleaves	**Dry bulb onions direct seed or transplant.** Apply between the 2-9 true leaf stage. Do not apply within 45 days of harvest. Treatments are most effective when not more than 0.5" rainfall or overhead irrigation is received within 7 days after application. Heavy rains after application can cause crop injury.

VEGETABLE CROPS (COMMERCIAL)

ONIONS[3,4,5,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds	Apply with a hooded sprayer in row middles, as shielded sprayer in row middles, as wiper applications in row middles or post harvest. To avoid severe injury to the crop do not allow herbicide to contact foliage, green shoots, stems, exposed roots or fruit of crop. Do not apply with 14 days of harvest.
carfentrazone-ethyl @ 0.012–0.024 lb/A	Aim 2EC @ 0.75-1.5 oz/A Aim 40DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC at 1 gal/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Coverage is critical.
trifluralin @ 0.375-0.625 lb/A	Treflan HFP 4EC, Trifluralin 4EC, Trilin 4EC @ 0.75 pt/A on light oil 1.25 pt/A on med-heavy soil	Many small seed grasses and broadleaves	**Dry bulb onions direct seed or transplant.** Apply to row middles with shields. Incorporate within 1 day of application. Rate varies by soil type. Avoid contacting roots, bulbs or foliage with spray.

PEPPERS[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
trifluralin[2] @ 0.5-.1.0 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med 2.0 pts/A on heavy soil 60 DF products @ 0.87 lb/A on light soil 1.33 lbs/A on medium soil 1.66 lbs/A on heavy soil	Many small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	**Bell and hot pepper trans-plants only:** Incorporate thoroughly in top 2" of soil just before trans-planting.
oxyfluorfen @ 0.5-1.0 lbs/A	Goal @ 1-2 pts/A	Broadleaf weeds, some grasses, geranium, and cutleaf evening-primrose.	**Bell and hot pepper trans-plants only: Plastic culture only.** Apply to soil surface on preformed beds at least 30 days prior to transplanting. Incor-poration is not necessary, but it may result in less crop injury. Best results are obtained if plastic is applied soon after application.
pendimethalin @ 0.75-1.5 lbs/A	Prowl H2O @ 1.0-1,5 pt/A on coarse soil 1.5-2.0 pt/A on medium soil 2.0-3.0 pts/A on fine soil	Many small seeded grasses and broadleaves	Apply before transplanting, but not under plastic. **Do not apply before direct seeding hot peppers.** Incorporation is beneficial when rainfall does not occur to activate.

VEGETABLE CROPS (COMMERCIAL)

PEPPERS[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
napropamide[2] @ 1-2 lb/A	Devrinol 50DF @ 2 lb/A on light soil 4 lb/A on heavy soil Devrinol 2EC @ 0.5 gal/A on light soil 1.0 gal/A on heavy soil	Many small-seeded annual grasses and broadleaves.	**Hot pepper only:** Can be used on direct-seeded or transplanted crops. Apply to well worked soil and incorporate 1-2 inches in the same day.
clomazone @ 0.25-1.0 lb/A	Command 3ME @ 0.67-2.67 ptsA	Most annual grasses and some small seeded broadleaf weeds	**Bell and hot pepper (except banana):** Do not use on banana peppers. Incorporate 1 inch or less before planting. Plant seed or transplants below the chemical barrier. Foliar contact with spray drift may cause temporary whitening of plants. Whitening may persist on some plants. Do not apply Command 3ME within 1,200 sensitive areas, see label.
PRE-EMERGENCE:			
halosulfuron @ 0.024-0.048 lb/A	Sandea @ 0.5 - 1 oz/A Apply with NIS @ 1 qt/100 gal	Nutsedge and some broadleaf weeds	**Bell and hot pepper trans-plants only: Apply to row middles between plastic only.** Don't allow Sandea to contact the crop or plastic. Early season application will give post- and pre-emerge control. Do not apply more than 2 oz/A in a 12-month period. Long residual. Check label for recrop intervals.
POST-EMERGENCE:			
clethodim @ 0.1 - 0.125 lb/A	Select, Arrow @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	**Bell and hot pepper trans-plants only:** Apply to actively growing grasses. Rainfast in 1 hour. Days to harvest=20. Do not apply more than 8 oz/A per application. Allow 14-days between applications.
fluazifop @ 0.094-0.375 lb/A	Fusilade DX @ 0.375 - 1.5 pt/A Apply with COC @ 1-2 pt/25 gal or 0.5-1 pt/25 gal NIS Pump up sprayer: 0.75 oz/gal Fusilade + 1.5 oz/gal COC or 1/2 oz/gal NIS	Annual and perennial grasses	**Not labeled on bell peppers. Special local need label for Louisiana.** Use on Tabasco, other hot, and non-bell type peppers. Apply to actively growing grasses before they exceed the recommended stages; consult label. Use sufficient spray volume (5-40 gals/A) and pres-sure (40-60 psi) to ensure complete coverage. Do not harvest within 45 days after application. Do not apply more than 48 oz/A/season Fusilade DX. When grass foliage is dense, use 60 psi and minimum of 20 gal/A. Best coverage is obtained when two nozzles are used, one directed to each side of the row.

VEGETABLE CROPS (COMMERCIAL)

PEPPERS[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
halosulfuron @ 0.024-0.048 lb/A	Sandea @ 0.5 - 1 oz/A + NIS at 1 qt/100 gals.	Nutsedge and some broadleaf weeds	**Bell and hot pepper trans-plants only: Apply to row middles between plastic only.** Don't allow Sandea to contact the crop or plastic. Early season application will give post- and pre-emerge control. Do not apply more than 2 oz/A in a 12-month period. Long residual. Check label for recrop intervals. 30 days to harvest.
sethoxydim @ 0.1-0.3 lb/A	Poast @ 0.5-1.5 pts/A Apply with 2 pt/A COC Pump up sprayer: 1.3-2 oz/gal Poast +1.3 oz/gal COC.	Annual and perennial grasses	**Bell and hot pepper trans-plants only:** Apply actively growing grasses before they exceed recommended heights; consult label. Adjust pressure (40-60 psi), spray volume (5-20 gals/A) and height of spray boom to ensure thorough coverage. 20 days to harvest. Do not apply more than 4 1/2 pts/A/season. Crop oil should be used with caution because of potential leaf injury when temperature exceeds 90°F and the relative humidity is 60% or higher, or anytime the temperature exceeds 100°F. Rainfast in 1 hour.
DIRECTED POST-EMERGENCE:			
pendimethalin @ 0.75-1.5 lbs/A	Prowl H2O @ 1.0-1,5 pt/A on coarse soil 1.5-2.0 pt/A on medium soil 2.0-3.0 pts/A on fine soil	Many small seeded grasses and broadleaves	Apply to row middles as a directed spray. Avoid contact with foliage and stems. 70 days to harvest.
DIRECTED POST-EMERGENCE: continued			
paraquat @ 0.49 lb/A	Gramoxone Inteon @ 2 pt/A Firestorm, Parazone @ 1.3 pt/A Apply with NIS @ 1 pt/100 gal or COC @ 1 gal/100 gal Pump up sprayer: 0.50 oz/gal paraquat + 0.33-0.5 oz/gal NIS or 1.3 oz/gal COC	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennials.	**Bell and hot pepper trans-plants only:** Apply to row middles using shields or hooded sprayers. Apply when weeds are 1-6" high. 30 days to harvest. Use 20-100 gals water/A. Do not exceed 30 PSI if prone to drift. Do not apply more than 3 times per season. Do not feed or allow animals to graze treated areas.
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 1.9 or 2 EC @ 0.75-1.5 oz/A Apply with COC @ 1 gal/100 gal or NIS at 2 pt/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	**Bell and hot pepper trans-plants only:** Apply to row middles using shields or hooded sprayers. Most effective when weeds are less than 4 inches tall or rosettes are less than 3 inches across. Injury will occur if crop is sprayed. Good coverage equals good weed control.

VEGETABLE CROPS (COMMERCIAL)

PEPPERS[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
glyphosate @ 0.5-0.94 lb/A	Roundup Weathermax @ 11-22 oz/A Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds.	**Bell and hot pepper trans-plants only:** Apply to row middles only with a hooded sprayer, shielded sprayer or a wiper applicator. Can be used post-harvest. Severe injury will occur if herbicide contacts foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.

SHALLOTS (dry bulbs)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
bensulide @ 5-6 lb/A	Prefar 4 EC @ 5 qt/A on light soil 6 qt/A on medium-fine soil	Some broadleaf and annual grasses	Incorporate to a depth of 1-2" before planting.
PRE-EMERGENCE:			
bensulide @ 5-6 lb/A	Prefar 4 EC @ 5 qt/A on light soil 6 qt/A on medium-fine soil	Some broadleaf and annual grasses	Apply pre-emergence only on crops where application is followed by immediate irrigation.
POST-EMERGENCE:			
sethoxydim @ 0.1-0.3 lb/A	Poast @ 0.5-1.5 pts/A Apply with 2 pt/A COC Pump up sprayer: 1.3-2 oz/gal Poast +1.3 oz/gal COC	Annual and perennial grasses	Apply actively growing grasses before they exceed labeled heights; consult label. Adjust equipment to ensure thorough coverage. Don't apply more than 4 1/2 pts/A/season. Use with caution because of potential leaf injury when temperature exceeds 90°F and the RH is 60% or higher, or anytime the temperature exceeds 100°F. Rainfast in 1 hour. 30 days to harvest.
clethodim @ 0.1 - 0.125 lb/A	Select, Arrow @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by species, stage and region; consult label. Rainfast in 1 hour. Do not apply more than 0.5 lb ai/A/ season. Days to harvest = 45. Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC
dimethenamid-p @ 0.6 – 1.0 lb/A	Outlook 6 EC @ 12 – 24 oz/A	Most annual grasses and some broadleaf weeds	Do not apply until transplants from bulbs have reached the 2 true leaf stage and the soil has settled around transplants for several days to recover. Do not apply more than 21 oz/A/season. Check label for tank-mixes and rotational restrictions.

VEGETABLE CROPS (COMMERCIAL)

SHALLOTS (dry bulbs)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
pendimethalin @ 0.75-1.5 lbs/A	Prowl/Pendimax 3.3EC @ 1.2 pts/A on coarse soil 2.4 pts/A on medium soil 3.6 pts/A on fine soil Prowl H2O @ 1.0 pts/A on coarse soil 2.0 pts/A on medium soil 3.0 pts/A on fine soil	Many small seeded grasses and broadleaves	Apply after crop reaches 2-9 leaf stage. Do not apply within 45 days of harvest. Most effective when rainfall or overhead irrigation is received within 7 days.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds.	Apply to row middles only with a hooded sprayer, shielded sprayer or a wiper applicator. Severe injury will occur if herbicide contacts foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.

SOUTHERN PEAS[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
s-metolachlor[2] @ 1.0-2.0 lb/A	Dual Magnum, Dual II Magnum @ 1 pt/A on light soil 1.5 pt/A on medium soil 2.0 pt/A on heavy soil	Many small seeded grasses, yellow nutsedge, pigweed, carpetweed.	Incorporate 2 inches deep before planting. Check label for tank mixes with other herbicides. Combine with another herbicide to increase spectrum of broadleaf weed control.
metolachlor[2] @ 1-2 lb/A	Medal, Stalwart, Parallel, Charger 1 pt/A on light soil 1.5 pt/A on medium soil 2.0 pt/A on heavy soil	Many small seeded grasses, yellow nutsedge, pigweed, carpetweed.	Incorporate 2 inches deep before planting. Check label for tank mixes with other herbicides. Combine with another herbicide to increase spectrum of broadleaf weed control.
pendimethalin @ 0.5-1.5 lb/A	Prowl 3.3 EC @ 1.2-1.8 lb/A on coarse soil 1.8-2.4 lb/A on medium soil 1.8-3.6 lb/A on fine soil Prowl H2O 1.5 PT/A on course soil 2.0 PT/A on medium soil 3.0 PT/A on fine soil	Annual grasses and broadleaf weeds	Incorporate thoroughly into the top 1-2" of soil up to 60 days prior to planting. Do not use pre-emergence. Cold wet soil conditions after planting may increase risk of crop injury. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

SOUTHERN PEAS[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
imazethapyr @ 0.064 lbs/A	Pursuit 2 EC @ 4 oz/A Pursuit 70 DG @ 1.5 oz/A	Several broadleaf weeds and reduces competition from morningglories.	Incorporate before planting. May cause crop injury. Use of Pursuit is at the user and/or grower risk. The use of trifluralin with Pursuit may increase the likelihood and severity of crop damage. Do not make more than one application of Pursuit for a year. Allow 30 days between application and harvest.
trifluralin[2] @ 0.5-.1.0 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med 2.0 pts/A on heavy soil 60 DF products @ 0.87 lb/A on light soil 1.33 lbs/A on medium soil 1.66 lbs/A on heavy soil	Many small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly in top 2" of soil just before planting. Cold, wet soil conditions after planting increase the risk of crop injury. Check label for rates of other trifluralin formulations.
PRE-EMERGENCE:			
s-metolachlor @ 1.0-2.0 lb/A	Dual Magnum, Dual II Magnum @ 1 pt/A on light soil 1.5 pt/A on medium soil 2.0 pt/A on heavy soil	Many small seeded grasses, yellow nutsedge, pigweed, carpetweed.	Apply after planting before weeds and crop emerge. Combine with other herbicides for improved broadleaf control; consult label. More effective on nutsedge when incorporated before planting.
PRE-EMERGENCE: continued			
metolachlor @ 1.0-2.0 lb/A	Medal, Stalwart, Parallel, Charger 1 pt/A on light soil 1.5 pt/A on medium soil 2.0 pt/A on heavy soil	Many small seeded grasses, yellow nutsedge, pigweed, carpetweed.	Apply after planting before weeds and crop emerge. Combine with other herbicides for improved broadleaf control; consult label. More effective on nutsedge when incorporated before planting.
imazethapyr @ 0.064 lbs/A	Pursuit 2 EC @ 4 oz/A Pursuit 70 DG @ 1.5 oz/A	Several broadleaf weeds and reduces competition from morningglories.	Apply after planting before crop and weeds emerge. May cause crop injury. Use of Pursuit is at the user and/or grower risk. The use of trifluralin prior to Pursuit may increase the likelihood and severity of crop damage. Do not make more than one application of Pursuit for a year. 30 days to harvest.
POST-EMERGENCE:			
quizalofop p-ethyl @ 0.04-0.08 lb/A	Assure II 0.88EC @ 6-12 oz/A Apply with COC @ 1gal/100 gal or NIS @ 1 qt/100 gal	Annual and perennial weeds.	Apply to actively growing grasses; consult label for application timing. COC may increase the likely hood of crop injury at high temperatures. Do not apply on unusually hot and humid days. 30 days to harvest.
bentazon @ 0.5 – 1.0 lb/A	Basagran 4SL @ 1.0 -2.0 pt/A	Annual broadleaf weeds and yellow nutsedge	Apply over the top when peas have at least 3 pairs of leaves. Do not add crop oil concentrate to the spray solution**.** Do not apply within 30 days of harvest. Do not apply when peas are in bloom.

VEGETABLE CROPS (COMMERCIAL)

SOUTHERN PEAS[3,4,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
imazethapyr @ 0.032- 0.064 lbs/A	Pursuit 2 EC @ 2-4 oz/A Pursuit 70 DG @ 0.72 - 1.44 oz/A Apply with NIS @ 2 pt/100 gal; Do not use COC or MSO	Several broadleaf weeds and reduce competition from morninglories.	Apply when peas are at least 3" tall, but before 5 nodes and flowering. Apply when weeds are 1-3 inches tall or have 1-4 leaves. May cause crop injury; user and/or grower assumes the risk. The use of trifluralin prior to Pursuit application may increase the likelihood and severity of crop damage. Check label for maximum number of leaves at which weeds should be sprayed post emergence. Do not make more than one application of Pursuit for a year. Allow 30 days between application and harvest.
sethoxydim @ 0.1-0.3 lb/A	Poast @ 0.5-1.5 pts/A Apply with 2 pt/A COC Pump up sprayer: 1.3-2 oz/gal Poast +1.3 oz/gal COC	Annual and perennial grasses	Apply at to small grasses; consult label for application timing. Do not apply on days that are hot and humid. Do not apply within 15 days of harvest.
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A AIM 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Directed applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control.
DIRECTED POST-EMERGENCE: continued			
glyphosate @ 0.5-0.94 lb/A	Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds.	Apply to row middles only with a hooded sprayer, shielded sprayer or a wiper applicator. Severe injury will occur if herbicide contacts foliage, green shoots, stems, exposed roots or fruit.

VEGETABLE CROPS (COMMERCIAL)

SPINACH[3]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT INCORPORATED:			
cycloate @ 3 lb/A	RoNeet 6EC @ 2 qt/A	Annual grasses and broadleaves	Incorporate 2 to 3 inches before planting.
POST-EMERGENCE:			
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pt/A Apply with COC @ 2 pt/A Pump up sprayer: 2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses. Does not control annual bluegrass	Apply actively growing grasses before they exceed labeled heights; consult label. Adjust pressure (40-60 psi), volume (5-20 gals/A) and boom height to ensure thorough coverage. Don't apply more than 3 pt/A per season. COC should be used with caution because of potential leaf injury when temperature exceeds 90°F and the relative humidity is 60% or higher, or anytime the temperature exceeds 100°F. Rainfast in 1 hour. 15 days to harvest.
clethodim @ 0.1 - 0.125 lb/A	Select, Arrow @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by grass species and stage; consul label. Rain fast in 1 hour. Do not apply more than 0.50 lb ai/A/year. Adding COC increases chances of crop injury, especially at high temperatures.
clopyralid @ 0.125-0.187 lb/A	Stinger 3 EC @ 0.66-0.5 pt/A	Broadleaf weeds	Apply to spinach in the 2-5 leaf stage when weeds are small and actively growing. Do not apply within 21 days of harvest. Will control most legumes.
phenmedipham @ 0.4-1.0 lb/A	Spin-Aid @ 3-6 pts/A Split rate: 2.5-3 pts/A followed by 2.5-3 pts/A	Selected broadleaf weeds	Apply to actively growing weeds in 11-22 gals/A of water when weeds are at the 2 leaf stage and spinach is past the 4-6 true leaf stage. Split rate: apply at 2-leaf stage of spinach, repeat 4-6 days later with 3 pt/A. May cause injury if the crop is under stress. Use when temperatures are below 75F and spray just before sunset to prevent possible injury. Some injury, stunting, chlorosis or tip burn, may be seen. Crops usually resume growth in 10 days. 40 days to harvest.
DIRECTED POST-EMERGENCE:			
glyphosate @ 0.5-0.94 lb/A	Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A	Most emerged weeds.	Apply to row middles only with a hooded sprayer, shielded sprayer or a wiper applicator. Severe injury will occur if herbicide contacts foliage, green shoots, stems, exposed roots or fruit. 14 days to harvest.
carfentrazone-ethyl @ 0.012 – 0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A AIM 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Directed applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control.

VEGETABLE CROPS (COMMERCIAL)

SWEET POTATOES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT:			
flumioxazin @ 0.063 – 0.079 lb/A	Valor SX @ 2-2.5 oz/A	Smellmelon, prickly sida, copperleaf, pigweeds May suppress annual sedges	Apply before transplanting to a clean seed bed. **Do not apply post-transplant as foliar burn will occur.**
POST-TRANSPLANT:			
clomazone @ 0.5-1.0 lbs/A	Command 3ME @ 1.33-2.33 pt/A	Annual grasses and broadleaf Weeds	Apply after transplanting before weeds emerge. Do not apply within 1,200 feet of sensitive areas; consult label. Sedges may become more problematic when Command is used. 125 days to harvest. Consult label for re-crop intervals.
s-metolachlor @ 1.0-2.0 lb/A	Dual Magnum @ 1.0 pt/A on light soil 1.33 pt/A on med-heavy soil	Many small seeded grasses, yellow nutsedge, pigweed, carpetweed	Apply after transplanting before weeds emerge. Don't incorpo-rate. Injury potential increases on sandy or loamy sand soils, especially if heavy rainfall occurs shortly after application. If irri-gation is used, don't apply more than ½ inch of water following a Dual Magnum application.
fluazifop @ 0.094-0.375 lb/A	Fusilade DX @ 0.375-1.5 pt /A Apply with COC @ 1-2 pt/25 gal or NIS @ 0.5-1 pt/25 gal	Annual and perennial grasses	Apply to actively growing grasses before they exceed the labeled growth stages. Use sufficient volume (5-40 gals/A) and pressure (40-60 psi) to ensure complete coverage. 55 days to harvest. Maximum season use rate is 48 oz/A.
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pts/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply actively growing grasses before they exceed labeled heights; consult label. Adjust pressure (40-60 psi), volume (5-20 gals/A) and boom height to ensure thorough coverage. Don't apply more than 2.5 pt/A per season. COC should be used with caution because of potential leaf injury when temperature exceeds 90°F and the relative humidity is 60% or higher, or anytime the temperature exceeds 100°F. Rainfast in 1 hour. 30 days to harvest.
clethodim @ 0.1 - 0.125 lb/A	Select @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by grass species and stage; consult label. Rain fast in 1 hour. 30 days to harvest.

VEGETABLE CROPS (COMMERCIAL)

TOMATOES[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-PLANT/PRE-PLANT INCORPORATED:			
S-metolachlor @ 0.95-1.58	Dual Magnum, Charger Basic @ 1.0-1.33 pt/A on coarse soil 1.33-1.67 pt/A on med-fine soil	Many small seeded grasses, yellow nutsedge and pigweed	Incorporate before transplanting or apply to the top of pressed bed as the last step before laying plastic. Minimize soil disturbance while transplanting. Do not plant when wet, cool and unfavorable growing conditions exist. S-metolachlor may damage weak transplants.
halosulfuron-methyl @ 0.024-0.048 lbs/A	Sandea 75 DG @ 0.5-1.0 oz/A	Yellow and purple nutsedge and some broadleaf weeds.	Apply before transplanting to soil surface. For applications under plastic; apply to preformed beds just prior to laying plastic mulch. Delay transplanting at least 7 days. Use the 1 oz/A rate for row middles. Don't make more than two applications. Don't use more than 2 oz/A/12 months.
metribuzin @ 0.25- 0.5 lb/A	Sencor 4 L @ 0.5-1 pt/A Sencor DF, Metribuzin DF @ 0.33-0.66 lb/A DF	Many broadleaf weeds and some grasses	Apply at pre-plant incorporate; apply dosage in 10-40 gal of water/A as a broadcast spray to the soil surface immediately before transplanting. Incorporate 2-4" deep with equipment mixing the chemical into the soil. Check label for tank mixes.
pendimethalin @ 0.75-1.5 lb/A	Prowl H2O @ 1.0-1.5 pt/A on coarse soil 1.5-2.0 pt/A on medium soil 1.5-3.0 pt/A on fine soil	Small seeded annual grasses and many broadleaf weeds	Apply before transplanting. Do not use under plastic mulch. If rainfall does not occur to activate herbicide, mechanical incorporation will be beneficial.
pebulate @ 4-10 lb/A	Tillam 6-E @ 2.66-6.66 qt/A	Some broadleaf weeds, annual grasses, purple and yellow nutsedge	Incorporate immediately after application. Can be used before mechanical transplanting. Check label for tank-mixes with other herbicides. Transplants may be set by hand if chemical resistant gloves are worn.
oxyfluorfen @ 0.5-1.0 lb/A	Goal 2 XL @ 1-2 pts/A	Broadleaf weeds, some grasses, Carolina geranium, and cutleaf eveningprimrose.	**Plastic culture only**: Apply to soil surface on preformed beds at least 30 days prior to trans-planting. Incorporation is not necessary, but it may result in less crop injury. Best results are obtained if plastic applied soon after application.
trifluralin[2] @ 0.5-.1.0 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med 2.0 pts/A on heavy soil 60 DF products @ 0.87 lb/A on light soil 1.33 lbs/A on medium soil 1.66 lbs/A on heavy soil	Many small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Incorporate thoroughly into top 2" of soil just before planting. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

TOMATOES[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE:			
rimsulfuron @ 0.25-0.5 oz/A	Matrix 25 WDG @ 1-2 oz/A Apply with NIS @ 1 qt/100 gal	Most broadleaf weeds.	Apply after the tomato plants have 2 true leaves. Weeds should be no more than 1" tall and actively growing. Do not apply within 45 days of harvest. See label for further instructions.
sethoxydim @ 0.1-0.3 lbs/A	Poast @ 0.5-1.5 pts/A Apply with COC @ 2 pt/A Pump up sprayer: 1.3-2 oz/gal Poast + 1.3 oz/gal COC	Annual and perennial grasses	Apply actively growing grasses before they exceed labeled heights; consult label. Adjust pressure (40-60 psi), volume (5-20 gals/A) and boom height to ensure thorough coverage. Don't apply more than 4.5 pt/A per season. COC should be used with caution because of potential leaf injury when temperature exceeds 90°F and the relative humidity is 60% or higher, or anytime the temperature exceeds 100°F. Rainfast in 1 hour. 20 days to harvest.
halosulfuron @ 0.024-0.048 lb/A	Sandea 75 DG @ 0.5-1.0 oz/A Apply with NIS @ 1 qt/100 gal	Yellow and purple nutsedge and broadleaf weeds.	Apply overtop 14 days after transplanting before bloom. If direct seeded apply after the 4-leaf stage before first bloom. Use shields to minimize crop contact after bloom. Can be applied to row middles at 1 oz/A; avoid contact with crop and/or plastic. If a second application is needed for nutsedge, spot treat only weed infested areas. Don't make more than two applications. Don't use more than 2 oz/A/12 months. 30 days to harvest.
clethodim @ 0.1 - 0.125 lb/A	Select @ 6 - 8 oz/A Select Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by grass species and stage; consult label. Rain fast in 1 hour. 20 days to harvest.
metribuzin @ 0.25-0.5 lb/A	Sencor 4L @ 0.5-0.75 pt/A Sencor DF, Metribuzin DF @ 0.33-0.5 lb/A DF	Many broadleaf weeds and annual grasses	Don't use on seeded crops before the 5-6 leaf stage. Don't use on transplants until they have recovered and new growth is evident. Apply in 20 or more gallons of water. Allow 14 days between applications to avoid severe injury. Don't apply within 24 hours or mix with other pesticides. Don't use more than 1.33 lb/A/season; or apply 1.33 lb/A within a 35 day period unless a portion of that is directed. Don't use hot caps within 7 days of application; or anytime afterwards. Don't apply within 3 days of cool, wet or cloudy weather. 7 days to harvest.

VEGETABLE CROPS (COMMERCIAL)

TOMATOES[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE:			
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Coverage is critical.
S-metolachlor @ 0.95-1.58	Dual Magnum, Charger Basic @ 1.0-1.33 pt/A on coarse soil 1.33-1.67 pt/A on med-fine soil	Many small seeded grasses, yellow nutsedge and pigweed Will not control emerged weeds.	Apply as a directed spray after the first rain or irrigation settles soil around transplants. Minimize contact with transplants. Apply in 20 gal/A of water. 90 days to harvest. May damage weak transplants. May be applied to row middles. Do not exceed the maximum allowed rate on label.
paraquat @ 0.49 lb/A	Gramoxone Inteon @ 2 pt/A Firestorm, Parazone @ 1.3 pt/A Apply with NIS @ 1 pt/100 gal or COC @ 1 gal/100 gal Pump up sprayer: 0.50 oz/gal paraquat + 0.33-0.5 oz/gal NIS or 1.3 oz/gal COC	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennials.	Apply to row middles using shields or hooded sprayers. Apply when weeds are 1-6" high. 30 days to harvest. Use 20-100 gals water/A. Don't exceed 30 PSI. Don't apply more than 3 times/season. Don't feed or graze treated areas. Use 20-100 gals of water/A. Do not apply more than 3 times per season. Do not allow animals to graze on treated areas. Do not exceed 30 psi nozzle pressure or spray under conditions that may cause excessive drift.
metribuzin @ 0.5-1 lb/A	Sencor 4L@ 1-2 pt/A 4L Sencor DF, Metribuzin DF @ 0.66-1.33 lb/A	Many broadleaf weeds and annual grasses	Direct spray on established tomatoes; avoid contact with foliage. This treatment is recommended for fields with a history of heavy weed pressure or difficult to control weeds. **See "POST-EMERGENCE" section for precautions.**
carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control; can be mixed with grass herbicides	Direct applications using hooded sprayers. Injury will occur if crop is sprayed. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control.
trifluralin[2] @ 0.5-.1.0 lb/A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pts/A on med 2.0 pts/A on heavy soil 60 DF products @ 0.87 lb/A on light soil 1.33 lbs/A on medium soil 1.66 lbs/A on heavy soil	Many small-seeded annual grasses, broadleaf weeds and seedling Johnson grass	Apply as a directed spray between rows and beneath plant and incorporate. Check label for tank-mixes with other herbicides.

VEGETABLE CROPS (COMMERCIAL)

TOMATOES[4,5,6,7]

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DIRECTED POST-EMERGENCE: continued			
trifloxysulfuron-sodium @ 0.0047-0.0094 lb/A	Envoke 75 DG @0.1-0.2 oz/A Apply with NIS @ 1 qt/100 gal	Nutsedge and broadleaf weeds	Apply as a directed spray on tomatoes grown on plastic. Crop should be transplanted for 14 days before application. Make application before fruit set and 45 days before harvest. See label for information on tank mixes with other herbicides.
pendimethalin @ 0.75-1.5 lb/A	Prowl H2O @ 1.0-1.5 pt/A on coarse soil 1.5-2.0 pt/A on medium soil 1.5-3.0 pt/A on fine soil	Small seeded annual grasses and many broadleaf weeds	Direct spray to row middles, avoiding contact with foliage or stems. If rainfall does not occur to activate herbicide, mechanical incorporation will be beneficial. Do not apply within70 days of harvest.

VEGETABLE CROPS (COMMERCIAL)

VEGETABLE CROP FOOTNOTES

[1]Apply specific dosage of herbicide in 50-100 gallons of water per acre.

[2]Better results have been obtained with incorporated herbicides when chemical are applied broadcast and incorporated at the correct depth. The row are then pulled up and planted.

[3]Beans, beets, carrots, cole crops, garlic, greens, lettuce, okra, onions, Irish potatoes, spinach, sweet corn, and sweet potatoes. Various brands of glyphosate- Rattler, Touchdown, Glyphomax, Glyphosate, Roundup Ultramax, Roundup Ultra. Check product label for rates. May be used before planting or before crop emergence. Application should be made on spray to wet basis, but not to point of runoff. Prior to transplanting crops into plastic mulch, remove product residue from plastic.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
[4]paraquat @ 0.49 lb/A	Gramoxone Inteon @ 2 pt/A Firestorm, Parazone @ 1.3 pt/A Apply with NIS @ 1 pt/100 gal or COC @ 1 gal/100 gal Pump up sprayer: 0.50 oz/gal paraquat + 0.33-0.5 oz/gal NIS or 1.3 oz/gal COC	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennials.	Apply before planting in a min. of 20 gallons of water/A to ensure good coverage. Minimize soil disturbance when planting. Labeled crops are: beans, carrots, cole crops, cucumbers, eggplant, greens, lettuce, melons, onions, peppers, Irish potatoes, pumpkins, squash, sweet corn and tomatoes.
[5]oxyfluorfen @ 0.5-1.0 lbs/A	Goal @ 1-2 pts/A	Broadleaf weeds, some grasses, geranium, and cutleaf evening-primrose.	Fallow bed treatment for carrots, Irish potatoes, onions, cabbage, cauliflower, pepper, tomato, cantaloupe, squash, watermelon, other cucurbits, broccoli and garlic. Apply to clean, smooth beds in the fall. Must be activated by 0.25 inches of rainfall. Consult label for planting intervals. Beds must be worked at least 2 inches deep before planting.
[6]paraquat @ 0.6-0.94 lb/A	Gramoxone Inteon @ 2.4-3.7pt/A Firestorm, Parazone @ 1.6-2.5 pt/A Apply with NIS @ 1 qt/100 gal	Emerged small annual broadleaf weeds and grasses. Top kill and suppression of perennials.	Apply after harvest to desiccate vegetable crop residue. Can be used on all vegetable crops. Thorough coverage is required. Do not feed treated crop to animals or humans. Do not allow livestock to graze treated areas.
[7]carfentrazone-ethyl @ 0.012-0.024 lb/A	Aim 2 EC @ 0.75-1.5 oz/A Aim 40 DF @ .33-1.0 oz/A Apply with NIS @ 2 pt/100 gal or COC @ 1 gal/100	Most emerged broadleaf weeds No grass control; can be mixed with other herbicides	Apply before planting. Can be used on all vegetable crops. Most effective when weeds are less than 4 in. tall. Good coverage equals good weed control. Can be mixed with other burndown materials.

PASTURE and FORAGES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PERMANENT PASTURES WITH WHITE OR LADINO CLOVER:			
2,4-D amine @ 0.75-1.0 lb/A	2,4-D Amine @ 1.5-2.0 pt/A Apply in 10-20 GPA by ground or 2 -5 GPA by air	Dock, plantain, bull thistle, buttercup and other winter or spring growing broadleaf weeds. Bitterweed, fleabane, ragweed, marsh elder, goatweed, pigweed and many other summer growing broadleaf weeds	Apply when weeds are small in October and November and/or February and March. May be sprayed in the summer and early fall if no 2,4-D susceptible plants are nearby. Fall spraying of dock is most effective. A second application may be required for complete kill at these rates. Do not apply 2,4-D if temperature is below 65° F. Some injury can be expected to established white or ladino clover. Do not apply 2,4-D in fall prior to seedling clover. Spray these weeds in the spring if cotton or other phenoxy susceptible crops are not nearby. Use the higher rate for fall spraying of more mature weeds.
2,4-D amine @ 1.0-2.0 lb/A	2,4-D Amine @ 1.0 - 2.0 qt/A Apply in 10-20 GPA by ground or 2 -5 GPA by air	Cypressweed, dog fennel, common mullein, jimsonweed	Apply when weeds are small, usually from April to June: but can be applied all summer and into early fall. Rates in excess of 1.0 lb Amine or 0.5 lb LVE 2,4-D will kill or severely injure clover. Lower rates of 2,4-D will control these weeds in seedling stage but higher rates required for more mature weeds.
paraquat @ 0.25 lb/A	Various @ 16 oz/A Apply with NIS @ 1.0 qt/100 gal	Little barley and annual broadleaf weeds such as buttercup, wild geranium etc	Apply during the winter before Bermuda grass breaks dormancy. Do not cut hay or graze within 40 days after treatment. If little barley is present, apply just before head emerges from boot.
PERMANENT PASTURE WITHOUT LEGUMES:			
Herbicide treatments suggested for use on permanent pastures with clovers can also be used on permanent pastures without clovers.			
2,4-D LVE @ 1.0 lb/A	2,4-D LVE @ 1.0 qt/A Use 20 GPA and apply with NIS @ 1 pt/100 gal water	Wild garlic and wild onions	Spray in late fall (October and November) and during February or early March. All legumes will be killed. Two applications for 2 to 3 years will be necessary for control. **DO NOT GRAZE DAIRY COWS ON TREATED AREAS WITHIN 7 DAYS OF APPLICATION .**
metsulfuron methyl @ 0.14 oz/A	Ally 60 DF, Farmsaver, Metsulfuron methyl @ 0.3 oz. Apply with NIS @ 1 qt/100 gal	Bahia grass and some broadleaf weeds.	Apply when weeds are actively growing. For use on common and hybrid Bermuda grass. There is no grazing restriction.
sulfosulfuron @ 0.06 to 0.09 lb/A	Outrider at 1.3 to 2.0 oz/A Apply with NIS @ 0.25 % v/v	Johnson grass and many sedges	Do not exceed 2.66 oz/A per season.
aminopyralid @ 0.06-0.11 lb/A	Milestone @ 4.0-7.0 oz/A	Horsenettle, tropical soda apple and green briar.	Apply when weeds are actively growing. Effective on young weeds where no soil residual is desirable.
aminopyralid @ 0.06 to 0.11 lb/A +	GrazonNext @ 1.5 to 2.6 pt/A	Horsenettle, thistles, tropical soda	GrazonNext will severely injure legumes. Do not plant

PASTURE and FORAGES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
2,4-D at 0.5 to 0.9 lb/A		apple and some other broadlieaf weeds	legumes into treated areas until a field bioassay proves it is safe to do so.
PERMANENT PASTURE WITHOUT LEGUME: continued			
dicamba @ 0.25-0.5 lb/A	Banvel, Clarity @ 0.5-1.0 pt/A Apply in 10-20 GA; see label for surfactant	Most broadleaf weeds and small brush.	Apply when weeds are actively growing. Do not use seed from treated grass for food or feed purposes. Do not graze meat animals within 30 days of slaughter. Do not graze dairy animals within 7 days at 0.5 lb/A or within 21 days @ 1.0 lb/A. Dairy animals should not be fed dry hay from treated area within 5 days.
metsulfuron methyl @ 0.19-0.75 oz/A + dicamba @ 0.13-0.50 lb/A + 2,4-D @ 0.36-1.44 lb/A	Cimarron Max @ 0.25-1.0 oz/A Part A + 1.0-4.0 pt/A Part B Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100gal	Most broadleaf weeds and bahia grass. Higher rates on more difficult to control weeds.	Apply when weeds are actively growing. For use on Bermuda grass. Do not use on bahia grass or temporary grass pastures. Do not use in 2,4-D restricted areas. Consult label for tolerance to other grass crop species.
triclopyr @ 0.25 lb/A + 2,4-D @ 0.50 lb/A	Crossbow @ 1.0 qt/A	Most broadleaf weeds. Also effective on briars and multiflora rose.	Apply in spring and summer. Do not use where dairy cattle will graze. Remove livestock from treated area at least three days before slaughter.
picloram @ 0.125-0.25 lb/A + 2,4-D @ 0.50-1.0 lb/A	Grazon P+D @ 2.0-4.0 pt/A	Most annual and perennial broadleaf weeds	Apply when weeds are small and actively growing. Good control of hard to kill weeds, especially dogfennel and horsenettle. Good control of Chinese tallow. **Limited grazing restrictions.** Do not apply around desirable trees and shrubs.
dicamba @ 0.13- 0.26 lb/A + diflufenzopyr @ 0.05-0.10 lb/A	Overdrive @ 4.0-8.0 oz/A Apply in 10-20 GPA with NIS @ 1 qt/100 gal	Pigweed, buttercup, horsenettle, broadleaf dock, other broadleaf weeds	Apply when plants are actively growing. Useful in many pasture situations. Recommended for use in 2,4-D restricted parishes and areas.
triclopyr @ 0.38 lb/a + fluroxpyr @ 0.13 lb/A	PastureGard @ 2 pt/A Apply in 10-20 GPA with NIS @ 1-2 qt/100 gal	Most annual and perennial broadleaf weeds.	Apply when weeds are actively growing. Can be used in 2,4-D restricted or banned areas. Do not use on forages grazed or fed to lactating dairy animals. Do not harvest hay for 14 days after application.
imazapic @ 0.0625-0.093 lb/A	Plateau, Panoramic @ 4-6 oz/A	Johnson grass, annual ryegrass, little barley, dallisgrass, vaseygrass and some broadleaves	Apply when Bermuda grass is dormant or after full greenup. Safe on common Bermuda grass and the following hybrids: Coastal, Alecia, Russel and Tifton. All hybrids have not been tested. DO NOT apply during greenup in the spring. Severe stunting and growth reduction will occur. Add 1-2 pts/A 2,4-D for additional broadleaf control if needed. No grazing restriction, 7 day haying restriction.
tebuthiuron @ 1.0-4.0 lb/A	Spike 20 P @ 20 lb/A	Most woody plants	Apply any time grass is dormant. Can cause temporary

PASTURE and FORAGES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
			damage to grasses. Spot treat where possible. Do not use in vicinity of desirable trees.
PERMANENT PASTURE WITHOUT LEGUME: continued			
triclopyr @ 1.0-1.5 lb/A	Remedy/Remedy Ultra @ 1.0-2.0 qt/A	Most woody brush. Can be mixed with 2,4-D to increase spectrum	Apply when brush is fully leafed out. Good control of Chinese tallow and berry briars. Good fencerow treatment. 14 day grazing restriction for lactating dairy cows. No grazing restrictions for other livestock at recommended rates. Can be used in 2,4-D restricted areas.
picloram @ 0.23 - 0.30 lb/A + fluroxpyr @ 0.18-0.24 lb/A	Surmount @ 2-3 pt/A Apply in 10-20 GPA with NIS @ 1-2 qt/100 gal - by ground	Good control of most hard to control woody species.	Apply when weeds are actively growing. Can be used in 2,4-D restricted or banned areas. Do not use on forages grazed or fed to lactating dairy animals. Do not harvest hay for 7 days after application. Livestock must be withheld for 3 days priors to slaughter.
picloram – see comments	Tordon 22K – see comments	Waxmyrtle and eastern red cedar	Apply in spring or fall. Apply as a spot treatment. Use 3 ml. (cc) of undiluted Tordon 22K per 3 ft. of plant height. Follow grazing restrictions.
hexazinone @ 0.75 lb/A	Velpar @ 3.0 pt/A	Smutgrass and certain broadleaf weeds	Apply when smutgrass is actively growing. For use on Bermuda grass and bahia grass pastures. Do not use on other desirable vegetation. Observe grazing restriction.
dicamba @ 0.13-25 lb/A + 2,4-D amine @ 0.37-0.75 lb/A	Weedmaster @ 1-2 pt/A OR Banvel, Clarity @ 0.25-0.50 pt/A + 2,4-D amine @ 0.75-1.5 pt/A	Several young broadleaf weeds .	Apply when weeds are actively growing. Consult label for weed species controlled by the different rates and for grazing and hay making restrictions of treated forage.
nicosulfuron @0.56-.84 + metsulfuron methyl @ 0.15-.23 oz/A	Pastora @ 1.0-1.5 oz/A Add 0.25% v:v nonionic surfactant.	Many annual and perennial grasses And broadleaf weeds	FOR BERMUDA GRASS ONLY! May be applied in season or as a late winter dormant application. In season application may result in temporary stunting of the Bermuda grass. Dormant season application has provided good control of ryegrass and other winter weeds. To reduce injury in-season applications should be made within 7 days of cutting for hay.
sulfosulfuron at 0.06 to 0.09 lb/A	Outrider at 1.3 to 2.0 oz/A plus ¼ % NIS (v/v)	Johnson grass and many sedges.	Apply to actively growing weeds. Do not exceed 2.66 oz/A per season.
aminopyralid @ 0.06 to 0.11 lb/A + 2,4-D at 0.49 to 0.87 lb/A	GrazonNext HL @ 1.2 to 2.1 pt/A	Horsenettle, thistles, tropical soda apples and some other broadleaf weeds	Note! Rate and formulation change from GrazonNext. GrazonNext HL. Apply to actively growing weeds. Will severly injure legumes. Follow label restrictions concerning replanting legumes into treated area.
triclopyr @ 0.375 to 0.56 lb/A +	PastureGard HL @ 1.0 to 1.5 pt/A	Most annual and perennial	Apply when weeds are actively Growing. Can be used

PASTURE and FORAGES

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
fluorxypyr @ 0.125 to 0.187 lb/A		broadleaf weeds.	in 2,4-D restricted or banned areas. Follow label for grazing and haying restrictions.
NOTE: Herbicide treatments recommended on permanent pastures are also recommended for Bermuda grass. Do not apply above mentioned herbicides to temporary broadleaf pastures such as alyce clover, peas, vetch, or clover. Currently there are no recommended herbicides for temporary broadleaf pastures.			
FORAGE SORGHUM OR SORGHUM SUDAN HYBRIDS			
atrazine @ 1.6-2.0 lb/A	AAtrex 4L @ 3.2-4.0 pt/A AAtrex 80W @ 2.0-2.5 lb/A AAtrex Nine-O @ 1.7-2.2 lb/A	Some grasses and broadleaf weeds	Apply after planting before crop and weeds emerge. Do not use on light soils.
2,4-D @ 1.0 lb/A	2,4-D Amine @ 1.0 qt/A	Annual broadleaf weeds	Apply after grass is well established and broadleaf weeds are small. Do not graze lactating dairy animals within 7 days after treatment.
dicamba @ 0.13-0.25 lb/A + 2,4-D amine @ 0.37-0.75 lb/A	Weedmaster @ 1.0-2.0 pt/A	Same as above	Same as above
BERMUDA GRASS ESTABLISHMENT (sprigging only):			
diuron @ 0.8-2.4 lb/A	Diuron 80 WP @ 1.0 to 3.0 lb Diuron 4L@ 1.6 to 4.8 pt/A	Many grasses and weeds; including crabgrass, pigweeds and morningglories	At sprigging only on sprigs placed at least 2 inches deep. May temporarily burn emerged Bermuda grass and can severely injure variety Alicia
diuron @ 0.8 to 2.4 lb/A	Diuron 80 WP at 1.0 to 3.0 lb, or 4L at 1.6 to 4.8 pt?A	Many annual grasses and weeds.	At sprigging only on sprigs plated at least 2 inches. May temporarily burn emerged Bermuda grass and can severly injure variety Alicia
ALFALFA			
benefin @ 1.12 - 1.5 lb/A	Balan 1.5/gal @ 3.0 qt/A on light soil 4.0 qt/A on heavy soil	Most annual grasses and many of the small seeded broadleaf weeds	Apply 2-3 weeks before planting up to planting. Incorporate thoroughly into upper 2-3 inches of soil immediately after application.
EPTC @ 3.0 lb/A	Eptam or GENEP @ 2.0 qt on all soils	Most annual grasses and broadleaf weeds and fair control of nutsedge	Apply just before planting. Incorporate thoroughly into upper 2- inches of soil immediately after application.
2,4-DB amine @ 1.0 lb/A	Butoxone or Butyrac @ 2.0 qt in 20 - 40 gal water	Annual and perennial broadleaf weeds including winter weeds such as dock, henbit, chickweed. Also annual summer broadleaf weeds in the seedling stage	Apply After alfalfa seedlings have 2 or more true leaves and weeds are in seedling stage. Do not graze or feed treated fields to livestock within 30 days after application. This material is similar to 2,4-D, therefore, apply so as to avoid drift.
sethoxydim @ 0.28 - 0.47 lb/A	Poast @ 1.5 - 2.5 pt/A + 2 pt/A COC in 5 - 20 gal water	Annual and perennial grasses	Apply before grasses exceed height limitations. Control generally better if application is made prior to cutting. Height limitations vary with the grass to be controlled. Follow label.
clethodim @ 0.125 - 0.25 lb/A	Select @ 8.0 - 16.0 oz/A + 1 qt/A or 1% v/v COC	Annual and perennial grasses	Apply before grasses exceed height limitations. Addition of a spray grade nitrogen fertilizer or ammonium sulfate may further improve weed control. Refer to label.

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Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
BARE GROUND HERBICIDES:		
CBPM (Pramitol 5PS) @ 1-2 lbs/l00 sq ft **or** Pramitol 25E @ 10-20 gal/A	Grasses and broadleaf weeds	Apply anytime to vegetation or soil. IF CBPM is used, broadcast pellets uniformly. If Pramitol 25E is used apply in 150-200 gallons of water. For faster top-kill of existing vegetation, use diesel oil in place of water for a carrier.
Hyvar X 80% WP @ 10-25 lb/A	Grasses and broadleaf weeds	Apply in spring and summer in 150-200 gallons of water. Do not use on irrigation ditches or near desirable trees. Apply with surfactant if weeds are present.
Karmex 80% DF @ 20-60 lb/A	Woody plants	Apply before weed growth begins in 150-200 gallons of water. Use lower rates on lighter soils.
Sahara DG @ 13-1 9 lb/A	Most annual and perennial weeds	Apply at pre-emergence or early post-emergence in 10-20 GPA of water. Always use a nonionic surfactant or crop oil concentrate for post-emergence applications.
Sodium chlorate @ 650-870 lb/A or 1.5-2 lb/l00 sq ft (Atlacide)	Johnson grass, Bermuda grass and most annual and seedling plants.	Apply to plants actively growing and before seed formation. Easily combustible after drying on clothes and plants. Less flammable when mixed with calcium chloride or borates.
Numerous other herbicide combinations containing borates, chlorates and/or residual compounds are available. Failure to list these in this publication does not indicate that they are ineffective as soil sterilants.		
ABATEMENT - NOT BARE GROUND:		
Arsenal and other imazapyr formulations @ 2.0 - 6.0 pt/A	Annual and perennial grasses and broadleaf weeds. Some brush control.	Apply at post-emergence to weeds. Good residual activity. For non-cropland use only.
Garlon 4 @ 1.0-2.0 pt/A	Many broadleaf weeds and some brush species.	Apply in spring and summer in 10-20 of water. Good brush control. Weak on some broadleaf weeds. Recommended for use in 2,4-D restricted parishes and areas.
Journey @ 10.7-16.4 oz/A	Johnson grass, vaseygrass, and certain broadleaf weeds.	Apply in spring and summer in 10-20 gallons of water with 0.5% V/V surfactant. Use at higher rate in spring for Bermuda grass release on noncrop areas where bahiagrass is not desirable. Lower rate may or may not control bahiagrass. Use in combination with mowing for best results.
Karmex 80DF @ 5-10 lb/A	Johnson grass, other grasses and most annual and perennial broadleaf weeds.	Apply in late winter or early spring in 100-150 gallons of water. Can be applied to fence rows including pasture fences for season-long weed control.
Karmex 80 DF @ 3.0 lb/A + MSMA @ 3.0 lb/A Hyvar X 80WP @ 1.5 lb/A + MSMA @ 3.0 lb/A	Johnson grass, dallisgrass and most annual grasses and broadleaf weeds.	Apply in the spring after grasses and broadleaf weeds are growing in 50 gal/A. Hyvar more effective on heavy or clay soil. Apply as a spray to remove grasses and weeds when a Bermuda grass sod is desired. Dry ditches, turn rows and fences except around pastures. Do not apply products containing arsenic along pasture fences. Add 0.50% nonionic surfactant.
Outrider @ 1.3 oz/A	Johnson grass	Apply at early post-emergence. For Bermuda grass and bahiagrass release on

NONCROPLAND

Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
		roadsides and other non crop areas. Apply with 0.5% surfactant.
ABATEMENT - NOT BARE GROUND: continued		
Oust XP @ 3-12 oz/A	Annual and perennial broadleaf weeds and grasses	Apply pre-emergence or early post-emergence. May be used at up to 10 oz/A for Bermuda grass "release" in noncrop areas. Avoid runoff onto crop land. Specific labels exist for the tank-mix of Roundup plus Oust XP for Bermuda grass release.
Overdrive @ 4.0 -8.0 oz/A	Many broadleaf weeds.	Apply in spring and summer in 10-20 gal. water.
Plateau @ 7 - 10 oz/A	Johnson grass, vaseygrass & certain broadleaf weeds.	Apply at early post-emergence for Bermuda grass release on roadsides and other noncrop areas. Apply with 0.5% surfactant.
Roundup Ultra/Pro OR other glyphosate formulations[1] (4 lb/gal) @ 1 - 5 qt/A	Annual and perennial broadleaf weeds and grasses	Apply to actively growing weeds. Use 1-1.5 pt/A for Bermuda grass release. High rates give non-selective control. Roundup Pro and Oust XP are currently registered to be tank-mixed at 1.0 pt plus 1.0 oz. Oust XP/A for Bermuda grass release in noncropland areas.
Spike 80WP @ 5-20 lb/A	Annual and perennial broadleaf grasses and woody plants	Apply in winter and early spring in 100-200 gallons of water. Use high rates for perennial grasses and woody plants. Don't use on fence rows.
Ureabor @ 1-3 lb/100 sq ft.	Annual and perennial broadleaf weeds	Apply when weeds are actively growing. **Noncrop areas only**. Can be applied dry or dissolved in water to spray.
Perspective @ 2-8 oz/A	Most annual and perennial broadleaf weeds	Do not apply around sensitive crops. Follow label instructions concerning addition of surfactants. Fairly long residual.
VEGETATION CONTROL UNDER ASPHALT PAVEMENT - CAUTION: Vegetation such as trees and shrubs may be damaged or even killed if their roots grow into the herbicide-treated soil.		
Borascu @ 4840 lb/A	All weeds controlled	Apply just ahead of prime coat. Apply dry and incorporate to a 4" depth. Thorough incorporation is needed for proper bonding of asphalt to base.
CBM (Sodium chlorate + sodium metaborate) @ 240 gal/A	All weeds controlled	Apply just ahead of prime coat in 200 gal of water/A. Weeds from adjacent areas may grow under edge of pavement.
Hyvar XL @ 12 gal/A or Hyvar X @ 30 lb/A	All grasses, sedges and broadleaf weeds	Apply after shaping and prior to compacting. After spraying incorporate into the top 6 inches of material with rotary equipment.
Pramitol 25E @ 25 gal/A or Pramitol 80 WP @ 60 lb/A	Same as above.	Same as above. Do not apply Pramitol under asphalt coating less than 3 inches.
Treflan @ 3.0 - 4.0 gal/A	Grasses and some broadleaf weeds	Same as above. Use sufficient water to ensure thorough wetting of the soil.
Spike 80W @ 5.0 - 20.0 lb/A	Broadleaf weeds and grasses	Same as above. Rate depends on weeds to be controlled. See label.
WEEDS IN EXISTING ASPHALT PAVEMENTS:		
Roundup Ultra, Roundup Pro, others @ (4 lb/gal) 5 qt/A	Same as above	Apply in 10-40 gal of water. Use 2 oz/ gallon of water per l000 sq ft. to control annual grasses. Bermuda grass, nutsedge, other perennial weeds use 3 oz per gallon water per l000 sq ft.)
Other treatments listed for soil sterilization can also be used to treat the soil under pavement. Hyvar is more effective in controlling nutsedge than many of the other herbicides listed. All of the soil sterilization treatments, except TCA, may injure vegetation some distance from the edge of the pavement. Hyvar, Karmex, AAtrex, Pramitol		

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Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
may injure trees adjacent to the treated area.		
FOLIAGE TREATMENTS NONSELECTIVE - GRASSES AND BROADLEAF WEEDS		
Arsenal and other imazapyr formulations @ 2.0 - 6.0 pt/A	Annual and perennial grasses and weeds. Some brush species.	Apply in 30 - 50 gal water/A. Good residual activity.
Finale @ 3.0 - 6.0 qt/A	Annual and perennial grasses and broadleaf weeds	Apply in 20 gal water/A. No residual activity. Fast acting.
Herbicidal Naphtha	Annual grasses and broadleaf weeds; top kill of perennial weeds.	Apply in 50 - 100 gal/A. Regrowth will occur from roots and other annual weeds will probably appear. Repeat as needed.
FOLIAGE TREATMENTS NONSELECTIVE - GRASSES AND BROADLEAF WEEDS: continued		
Roundup Ultra/Pro, others @ (4 lb/gal) 2 - 5 qt/A	Annual and perennial weeds	Apply in 10 - 40 gal of water per acre. Apply 1% solution to annual weeds and Johnson grass (1 1/4 oz Roundup/gal). Apply 2% solution to Bermuda grass and nutsedge (2 1/2 - 3 oz Roundup/gal).

[1] See "Appendix A" for more information on several glyphosate products and formulations.

WOODY PLANTS (Forestry)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
TREE INJECTOR:			
2,4-D amine	Various products ((4 lb/gal) @ 1.0-2.0 ml (cc) spacings in spring and early summer	Most oaks, hickory, pecan, hawthorn, elm and water locust. Hard to kill trees require continuous cuts.	Apply in all seasons but best results are in spring and early summer Rates apply to trees 4-9 inches in diameter measured at breast height (DBH). The injector bit must penetrate inner bark. Make each injection at ground line (473 ml = 1 pt). Hatchet and squirt bottles may also be used.
imazapyr @ 2 lb/gal	Chopper 8 - 12 fl oz/gal water or diesel. Apply 1 ml per injection or cut at 1" interval	Most hardwoods. Pines are resistant	Apply year round. Legumes (locusts) are not controlled
glyphosate @ 4 lb/gal	glyphosate @ 1 ml per 2-3" DBH	Oaks, sweet gum, poplar and sycamore	Apply From full leaf expansion until leaf drop in fall. The injector bit must penetrate inner bark.
2,4-D amine plus picloram	Tordon 101R or RTU @ 1.0 ml of undiluted material inject at 2-3" intervals.	Most species	Best results in spring and summer. Maple, blackgum, hollies, hickory and dogwood are more difficult to control. To control these species, apply in continuous cut.
APPLIED TO SOIL:			
tebuthiuron @ 1-4 lb/A	Spike 20P @ 5 - 20 lb/A Spike 80WP @ 1.25 - 6.0 lb/A	Most woody brush and trees	Apply any time the ground is not frozen. Distribute pellets uniformly.
imazapyr @ 0.5 to 1.0 lb/A	Chopper or Chopper Gen 2 at 1.0 to 2.0 qt/A	Weeds, vines and woody brush.	For site preparation prior to replanting pines, follow label for tolerances to different pine species. .
imazapyr 0.5% + diuron 2.0 G	Topsite 2.5G @ 200 lb/A	Most species	Apply year round. Some legumes are resistant.
hexazinone @ 3.6-6.3 lb/A	Velpar 90SP @ 4-8 lb/A Velpar L @ @ 1.8- 3.6 gal WK or Pronone 10G @ 5 -30 lbs/A	Willow, oak, gum and other trees and brushes	Apply between later winter and early summer. Apply Velpar in 50-200 gal of water + surfactant with handgun as individual stem treatments or as narrow bands 4 to 6 feet apart. Follow instructions on label. Apply Pronone 10G by hand or with spreader.
hexazinone @ 3.6-6.3 lb/A	Velpar L undiluted @ 4-8 ml per 2" stem diameter.	Willow, oak, maple, and other trees and brushes	Apply between later winter and early summer. Apply by "spot gun" to the soil at base of the stem.
BASAL BARK TREATMENT:			
triclopyr @ 1 lb/gal+ 2,4-D @ 2 lb/gal	Crossbow @ 115 oz/gal plus Penetrator or Cide Kick @ 13 fl oz/gal; makes 1 gal finished spray	Same as above. Very effective on briars and multiflora rose	Same as above. Apply as basal spray or with spot gun as thin line solid stream at 3-5 ml/second.
triclopyr @ 4 lb/gal	Garlon 4 @ 25 oz/al + diesel @ 90 oz/gal + Cide Kick or Penetrator @ 12 oz/gal; makes 1 gal finished pray	Most hardwoods up to 4" DBH. Better on thin bark species	Apply year round by hand with backpack sprayer as a narrow band or mist to lower 12" of stem. May also be applied with a spot gun set to deliver 3-5 ml/sec as a solid stream.
2,4DP + 2,4D	Weedone CB @ 5 gal/A	Most southern hardwoods up to 4" DBH	Apply spring through fall. Apply with hand pump sprayer to lower 18 -36" of stem.

WOODY PLANTS (Forestry)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
FOLIAGE SPRAY:			
imazapyr @ 0.5-.5 lbs/A	Arsenal 2 EC, Arsenal Powerline @ 2.0 - 6.0 pt/A	Most woody plants, grasses and broadleaf weeds	Apply at full-leaf in spring or summer. Good residual.
imazamox @ 0.5 to 1.0 lb/A	Clearcast @ 1.0 to 2.0 qt/A plus surfactactant	Effective on Chinese tallow tree and black willow, fair on sweet gum.	Only moderate injury on red oaks and hickory when applied at lower rate. Do not use nonselectively if injury to oaks, hickory, and other hardwoods can not be tolerated.
dicamba @ 0.5-1 lb/A + 2,4-D @ 2.0-6 lb/A	Brush Buster @ 0.5 - 1.0 gal per 50 gal of spray by ground or 3.0 gal/A by air	See Brush Buster label	Apply after leaves are fully developed and until 3 weeks before frost. Dicamba and amine 2,4-D may be tank-mixed in the proportions listed under active ingredients. See label for precautions.
triclopyr @ 1.0-1.5 lb/A + butoxyethyl 2,4-D @ 2.0 -3.0 lb/A	Crossbow @ 1.0-1.5 gal/100 gal water	Most woody plants. Especially good on briars, willow and tallow	Apply at full-leaf in spring or summer. Spray to give thorough coverage. Avoid drift to desirable vegetation.
metsulfuron methyl @ 0.04-0.16 lb/A	Escort XP @ 1 - 4 oz/A	Oaks, ash, elm and other woody species	Apply when brush is actively growing. Can be used over top of loblolly and slash pine for conifer release and preplant for site preparation.
triclopyr @ 1.0 - 2.0 lb/A	Garlon 4 @ 1.0-2.0 qt/A	Most woody plants	Apply at full-leaf in spring or summer. Spray to give thorough coverage. Avoid drift to desirable vegetation. Can be used in 2,4-D restricted areas.
glyphosate @ 2-5 lb/A	glyphosate @ 2-5 qt/A or 1.0-2.0% solution	Many trees, brush and herbaceous weeds	Apply at later summer and fall while plants are actively growing. May be aerially applied in 5-15 gpa water. Use 10-40 gpa water for ground rig. For percent solution, spray to wet.
fosamine @ 6-12 lb/A	Krenite @ 1 1/2-3 gal in 50 - 300 gal of water plus surfactant	Willow and certain other hardwoods	Apply in the 2 month period prior to fall leaf coloration. Ground application only on ditchbanks. Read label for specific instructions.
sulfometuron methyl @ 0.09-0.36 lb/A	Oust XP @ 2-4 oz/A	Many grass and broadleaf species.	When weeds are actively growing. Can be used over top of loblolly, longleaf and slash pine for conifer release and preplant for site preparation.
clopyralid @ 0.1-0.38 lb/A	Transline @ 0.25-1.0 pt/A	Good on legume species	Apply at full-leaf in spring or summer. Can be used in 2,4-D restricted areas.
fluroxypyr @ 0.14-0.25 lb/A	Vista @ 0.33-1.33 pt/A	Most herbaceous weeds and certain woody plants	Apply at full-leaf in spring or summer. Can be used in 2,4-D restricted areas.
aminocyclopyrachlor @ 0.27 lb/A +metsulfuron methyl @ 0.09 lb/A	Streamline @ 11 oz/A	Most brush species, vines and briars	Follow label instructions concerning adding of surfactants. Avoid drift to desirable plants. Will cause severe injury to bahiagrass.
CONTROL OF POISON IVY AND OTHER VINES ON TREE TRUNK			
Amitrol-T @ 3 oz/3 gal water plus 3 tablespoons surfactant	REFER TO LABEL FOR COMPLETE INSTRUCTIONS. Cut vine and spray foliage around the base of tree. Do not drench soil. Apply when ivy or other vines are in full leaf. Prevent drift. More than one application may be required.		

WOODY PLANTS (Forestry)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
CONTROL OF POISON IVY AND OTHER VINES ON TREE TRUNK: continued			
Gramoxone Max @ 7 TBS/gal water plus 1 TBS surfactant	REFER TO LABEL FOR COMPLETE INSTRUCTIONS. A nonselective, contact herbicide. Spray foliage of vine around base of tree after cutting vine. Do not allow drift to contact foliage of desirable plants. Thorough coverage of undesirable plants is necessary, but avoid drenching soil. If sprayed on the tree trunk, be sure that bark is well developed and shows no green. Avoid excessive wetting. Even under favorable conditions injury may occur.		
Roundup Ultra @ 4 - 5 qt/A broadcast or a 2.0% solution spray to wet.	Apply to actively growing plants before leaves develop fall leaf color. Repeat if required. Do not allow spray to contact desirable foliage.		
Vine-X - Ready to use	Product comes ready to use with built-in brush type applicator tip. Follow label instructions. Excellent on poison ivy and bush killer vine. If used correctly will not injure adjacent plants.		

AQUATIC WEEDS: ponds and lakes

Formulated Product and Rate	Types of Aquatic Weed or Site	Remarks and Precautions
FLOATING WEED (unattached, tops above water):		
Galleon @ 2 to 5.6 fl oz/A + 0.25% nonionic surfactant foliar or 25 to 75 ppb total water	water hyacinth, duckweed, common salvinia, giant salvinia*	Can be used to control floating weeds in 2,4-D restricted areas. Can also be used as an inwater application at 25 to 75 ppb. Note! With difficult to control weeds like giant salvinia a minimum 60 day contact time is required. Do not use this treatment if rapid dilution is expected.
Clearcast @ 16 to 64 oz/A + surfactant	water hyacinth and common salvinia.	Can be used to control water hyacinth in 2,4-D restricted areas.
2,4-D amine @ 4.0 lb/A in 100 gal water	Floating mats of alligatorweed, and water hyacinth	Apply on foliage when weeds are actively growing. Spray to uniformly wet foliage. Add ¼ % approved nonionic surfactant. Repeat in 4 to 6 weeks. Avoid use in waters used for irrigation.
Diquat/ Reward @ up to 1.0 gal/A + 1.0 qt of surfactant/100 gallons of water	Duckweeds, water hyacinth, and water lettuce	Apply on foliage when weeds are actively growing. Apply as a surface spray. Follow label for water restrictions after application.
Habitat @2-3 pts/A + 0.25 % nonionic surfactant	Duckweeds, water hyacinth	Apply when weeds are actively growing. Follow potable and irrigation water restrictions. Must be applied by certified commercial applicator only.
Rodeo or Aquamaster @ 4.0-6.0 pt/A plus surfactant	Water hyacinth	Rodeo or Aquamaster 4.0-6.0 pt/A plus 0.5% approved surfactant.
Diquat/Reward @ 1.0 gal/A	Common or giant salvinia	Apply 1.0 gal/A as a low or high volume spray plus 0.5% approved surfactant.
Aquamaster @ 2.0% v/v (2.5 oz/gal) +0.5% v/v approved surfactant (0.64 oz/A)	Common or giant salvinia	Spray to wet.
Clipper @ 6.0-12.0 oz/A + 0.5 v/v approved surfactant	Common or giant salvinia and Water lettuce	For use on water bodies with limited or no outflow. Very fast acting. May be tank mixed with 2,4-D to increase weed control spectrum.
NOTE: A ft (acre foot) = volume of water in an area having 1 acre of surface and a depth of 1 foot.		
EMERSED AND MARGINAL WEEDS (rooted under water, tops above water, or growing on wet soil):		
Galleon @ 2 to 5.6 fl oz/A + 0.25% nonionic surfactant.	Alligatorweed, parrotfeather and other weeds.	Can be used in 2,4-D restricted areas.
Clearcast @ 16 to 64 oz/A + surfactant	Alligatorweed, parrotfeather and sedges.	Can be used in 2,4-D restricted areas.
2,4-D low volatile ester (LVE) @ 4.0 lb/A in 100 gal water	Broadleaf species (Arrowhead, lotus, smart-weed, spatterdock, spikerush, waterprimrose, white water lily, yellow water lily)	Apply on foliage when weeds are actively growing. Spray to uniformly wet foliage. Add 10% fuel oil by volume or 1.0 qt. surfactant to spray mix. More than one application may be required for control of some species. Avoid use in waters for crop irrigation.
Habitat @ 1-6 pts/A plus 0.25% nonionic surfactant	Many grasses, rushes, sedges and broadleaf weeds. Especially useful for controlling trees and brush in water.	Apply when weeds and woody plants are actively growing. Follow potable and irrigation water restrictions. Must be applied by certified commercial applicator only.
Rodeo or Aquamaster @ 1.5-7.5 pt/A broadcast or 0.75-1.5% in spray to wet equipment plus 0.5% approved surfactant.	Broadleaf weeds, grasses and weedy species. (cattail, maidencane, smartweed, spatterdock, willowand others)	Apply to actively growing weeds. See label for proper stage of growth. No restrictions on the use of the water. Do not apply within 0.5 miles upstream of potable water intakes or in tidewater areas

AQUATIC WEEDS: ponds and lakes

Formulated Product and Rate	Types of Aquatic Weed or Site	Remarks and Precautions
EMERSED AND MARGINAL WEEDS (rooted under water, tops above water, or growing on wet soil): continued		
Renovate 3 @ 2-8 qt/A in 20-200 gal water	Broadleaf weeds, brush and trees	Apply to Water hyacinth, alligatorweed, water primrose, many tree species. Can be applied to impounded water only, not to flowing streams. Apply by air or ground. Add an approved aquatic surfactant at 0.5%.
SUBMERSED WEEDS (tops mostly underwater, usually rooted or anchored):		
Copper sulfate @ 2.0 -3.0 lb/A ft of water	Algae (scums and mosses)	Apply at bloom. Apply crystals or powder at any stage of algae growth by any method to give rapid and uniform distribution. Repeat as necessary to maintain control. Treat only a portion of the pond at once. Apply 3.0 lb/A ft. in ponds with soft water.
Endothall Aquathol liquid @ 1.0 - 2.0 gal/A Aquathol Granular @ 125 lb–250 lb/A (water 4-6 ft)	Coontail, fanwort, milfoil, pondweeds	Apply at active growth stage. Can be injected into the upper end of the pond or sprayed over surface of pond. Do not use fish for 3 days after treatment. Can be used for other uses within 7 days after treatment. **Read the label.**
Cutrine-Plus @ 0.6 gal/acre ft of water	Algae (scums and mosses)	Apply at bloom. Apply as a surface spray or injection. Toxicity to fish is dependent on water hardness. See label for directions.
Hydrothol 191 @ 0.6-3.6 pt/A ft of water	Algae (scums and mosses)	Apply at bloom. Apply as a surface spray. Follow label instructions concerning fish toxicity.
Sonar 5P @ 10-20 lb/surface acre Sonar AS @ 1.0-2.0 pt/surface acre Avast (see label for specific rates)	Coontail, fanwort, milfoil, hydrilla, elodea, naiad, pondweeds	Apply at active growth stage. Slow kill. Effective against most rooted plants. If water is deeper than 6 feet, increase rate by 50%.
Diquat or Reward @ 1.0 - 2.0 gal/surface-acre	Coontail, naiad, milfoil, giant salvinia, common salvinia.	Apply at active growth stage. Apply as a direct pour or subsurface injection. Short residual. Water may be used for irrigation 5 days after treatment.
Aqua-Kleen granules @ 100-200 lb/A	Coontail, naiads, milfoil	Apply after weeds begin to grow in spring. Granular 2,4-D. *Do not apply to water intended for agricultural use or potable water supplies.* Excellent for treating around docks, landings, etc.
Galleon @ 25 to 75 ppb as a total water treatment.	Hydrilla and naiads	60 day contact time required. Do not use in moving water or where rapid dilution is expected.
Clipper at 100 to 400 ppb as a total water treatment	Hydrilla and naiads	For use in water bodies with limited or no outflow. Fast acting, follow instructions on timing of application and possible oxygen depletion following application.

AQUATIC WEEDS: ponds and lakes

USE RESTRICTIONS for TREATED WATER (number of days)

	Human			Animal	Irrigation		
Herbicide	Drinking	Swimming	Fish consumption	Drinking	Turf	Forage	Food crops
Aquathol Granular	7	1	0	7	0	7	7
Aquathol K	7-25	1	0	7-25	0	7-25	7-25
Aquazine	365	21	0	365	365	365	365
Copper complexes	0	0	0	0	0	0	0
Copper sulfate	0	0	0	0	0	0	0
Dichlobenil[a]	-	-	90[b]	-	-	-	-
Diquat/Reward	2	0	0	1	2	5	5
Habitat	2	0	0	0	120[g]	120[g]	120[g]
Hydrothol	7-25	1	0	7-25	7-25	7-25	7-25
Rodeo/Glypro	0	0	0	0	0	0	0
Sonar/Avast	-[e]	0	0	0	30[d]	30[d]	30[d]
2,4-D	21[e]	-	-	21[e]	21[e]	21	21[e,f]
Galleon	0	0	0	0	H	365	i
Clearcast	0i	0	0	0	K	K	K
Clipper	0	0	0	0	5	5	5

[a] Do not use in human, animal or irrigation water.
[b] Not recommended for use in commercial fishing areas.
[c] See label for distance allowed from potable water intakes.
[d] Restriction suggested by manufacturer.
[e] Shorter interval may be used depending on amount of 2,4-D acid present.
[f] Do not use on irrigation ditches.
[g] Or until residues = 1.0 ppb.
[h] Concentration < 30 ppb.
[I] Concentration = 1 ppb, except rice = 30 ppb.
[j] Concentration < 50 ppb within 0.25 miles of water intake.
[k] See label.

HERBICIDE PRE-MIXES

A herbicide pre-mix is a mixture of two or more herbicides formulated together in the same container by the chemical manufacturer or re-formulator. Advantages of using pre-mixes include potential reduction in the amount of packaging material generated from herbicide application and potential reduction in the cost per unit of active ingredient. A disadvantage of a pre-mix may be that the proportions of the active ingredients may not be correct for use in certain situations and therefore may require the addition of more active ingredients.

Use the following pre-mix tables as general information – to be confirmed by the label affixed to the herbicide container. Pay close attention to the herbicide trade name. Some may seem very similar but may contain very different active ingredients. The use of a similar but improper herbicide for a particular purpose may result in unanticipated field observations after herbicide application ranging from no weed control to crop death. Additional pre-mixes, other than those listed in this table, may be available to growers. Note that some herbicides may be used in more than one crop and some of the listed herbicide pre-mixes are not currently recommended by the LSU Agricultural Center or may not be particularly suitable for use in Louisiana.

TABLE 1. Herbicide pre-mixes formulated as liquids.

Herbicide Trade Name	Components (pounds of active ingredient per gallon formulation)	Herbicide Trade Name	Components (pounds of active ingredient per gallon formulation)
RebelEX	penoxsulam = 0.25 + cyhalofop = 1.78	Grazon P+D	picloram = 0.54 + 2,4-D = 2
Backdraft	imazaquin = 0.25 + glyphosate 1.25	Guardsman Max	dimethenamid = 1.7 + atrazine = 3.3
Bicep Lite II Magnum	s-metolachlor = 3.33 + glyphosate = 2.67	G-Max Lite	dimethenamid = 2.25 + atrazine = 1.7
Broadstrike + Dual	metolachlor = 7.47 + flumetsulam = 0.20	Flexstar GT	glyphosate = 2.63 + fomesafen = 0.66
Broadstrike + Treflan	flumetsulam = 0.25 + treflan = 3.4	Harness Xtra	acetochlor = 4.3 + atrazine = 1.7
Bronco	alachlor 2.6 + glyphosate = 1.4	Journey	glyphosate = 1.5 + imazapic = 0.75
Bullet	alachlor = 2.5 + atrazine = 1.5	Laddok S-12	bentazon = 2.5 + atrazine = 2.5
Conclude Xact B Conclude Xact G	bentazon = 2.67 + aciflurofen = 1.33 + sethoxydim = 2.0	Lariat	alachlor = 2.5 + atrazine = 1.5
Confront	triclopyr = 2.25 + clopyralid = 0.75	Lightning	imazethapyr = 0.084 + imazapyr = 0.028
Crossbow	triclopyr = 1.0 + 2,4-D = 2.0	Lumax	*s*-metolachlor = 2.68 + atrazine = 1.0 + mesotrione = 0.268
Double play	EPTC = 5.6 + acetochlor = 3.0	Marksman	dicamba = 1.1 + atrazine = 2.1
Duet	propanil = 4 + bensulfuron = 14 grams	Pursuit Plus EC	imazethapyr = 0.2 + pendimethalin = 2.70
Exceed	prosulfuron = 0.285 + primisulfuron = 0.285	Sequence	glyphosate = 2.25 + *s*-metolachlor = 3.0
Weedmaster	dicamba = 1.0 + 2,4-D = 2.0	Squadron	imazaquin = 0.33 + pendimethalin = 2.00
Freedom	alachlor = 2.67 + trifluralin = 0.33	Storm	bentazon = 2.67 + basagran = 1.33
Fultime	acetochlor = 2.4 + atrazine = 1.6	Surmount	picloram = 1.19 + fluroxypyr = 0.96
Fusion	fluazifop = 2.0 + fenoxaprop = 0.56	Typhoon	fluazifop = 0.47 + fomesafen = 0.94

Table 2. Herbicide pre-mixes formulated as dry products.

Herbicide Trade Name	Components (percentage active ingredient per pound formulation)	Herbicide Trade Name	Components (percentage active ingredient per pound formulation)
Authority	sulfentrazone = 46.9 + chlorimuron = 9.4	FirstShot	thifensulfuron = 50 + tribenuron = 25
Authority MTZ	sulfentrazone = 0.18 + metribuzin = 0.27	Hornet	clopyralid = 60 + flumetsulam = 18.5
Basis	rimsulfuron = 50 + thifensulfuron = 25	K-4 (Velpar K-4 Max)	Hexazinone = 13.2 + diuron = 46.8
Canopy	chlorimuron = 10.7 + metribuzin - 64.3	Krovar	bromacil = 40 + diuron = 40
Canopy SP	chlorimuron = 8.3 + metribuzin - 50	Lightning	imazethapyr = 52.5 + imazapyr = 17.5
Canopy XL	chlorimuron = 9.4 + sulfentrazone = 46.9	Oustar	hexazinone = 63.2 +sulfometuron = 11.8
Sahara	imazapyr = 7.78 + diuron = 62.22	Snapshot	trifluralin = 2 + isoxaben = 0.5
Cimarron Max	dicamba = 1 lb/gal + 2,4-D = 2.87 lb/Gal metsulfuron = 0.75	Steadfast	nicosulfuron = 50 + rimsulfuron = 25
Celebrity Plus	dicamba = 46.6 + diflufenzopyr = 18.1 + nicosulfuron = 10.6	Steadfast ATZ	nicosulfuron = 2.7 + rimsulfuron = 1.3 + atrazine = 85.3
Distinct	diflufenzopyr = 0.20 + dicamba = 0.50	Suprend	prometryne = 79.3 + trifloxysufuron = 0.7
Exceed	prosulfuron = 28.5 + primisulfuron = 28.5	Synchrony XP	chlorimuron = 21.5 + thifensulfuron = 6.9
Finesse	chlorsulfuron = 62.5 + metsulfuron = 12.5	Broadhead	carfentrazone =3.9 + quinclorac = 66.1
Pastora	nicosulfuron = 56.2 + metsulfuron = 15	Capreno	thiencarbazone = 5.6 + tembotrione = 28.3

RE-CROP INTERVALS FOR SOME HERBICIDES USED IN LOUISIANA

Below is a list of commonly used herbicides in Louisiana that have rotational crop restrictions. When herbicides are applied (alone, as a tank mix or in a sequential program), follow the re-crop interval that is most restrictive for any applied herbicide. Soil pH, among other considerations, may affect herbicide selection. Extremes in environmental conditions, such as lower-than-normal temperature and/or rainfall after herbicide application, in addition to other factors, may affect the re-crop interval and may increase the potential for injury. Environmental conditions, such as temperature and rainfall after application, may affect the re-crop interval. These listings are minimum intervals between herbicide application and re-cropping, assuming herbicide application is at the proper rate and application timing. **The label should always be consulted prior to use to determine precautions, conditions or other restrictions that may alter the re-crop intervals.**

In the "ROTATE TO" column:
A. Numbers refer to months (m), days (d) or year (yr) that must pass between herbicide application and planting the next crop.
B. "None" indicates that no re-crop interval for the following crop was stated on the label.
C. Following spring or "2 springs following application" should be self-explanatory.

Table 1. Rotation interval for corn herbicides.

	Rotation Interval				
Herbicide Applied	Cotton	Soybeans	Rice	Grain Sorghum	Wheat
Accent-depends on soil pH	10m	15d	18m	10 or 18m	4m
Aatrex Nine-O	following spring	following spring	2yr	none	1yr
Beacon	8m	8m	8m	8m	3m
Bicep II, Bicep Magnum	Following spring	following spring	15m	none	3m
Broadstrike + Dual	22m	none	9m	18m	4.5m
Clarity	3m	3m	3m	none	none
Dual Magnum Dual II Magnum	none	none	following spring	none	4.5m
Exceed	10m	none	10m	10m	3m
Guardsman Max	following year	following year	2yr	none	following year
Harness	2 springs	following spring	2yr	following spring	1yr
Hornet; see label	18m	10.5-18m	6m	12m	4m
Lightning; see label	9.5-19 m	8.5 m d	40m	18m	4m
Lorox DF/Linex	4m	4m	4m	4m	4m
Outlook	following spring	none	following spring	following spring	4m
Permit	4m	9m	2m	2m	2m
Python WDG	18m	none	6m		
Prowl 3.3EC	none	none	none	none	4m
Resolve DF (1-2 ounces)	10m	10m	18m	18m	4m
Steadfast	10m	15d	10-18m	10-18m	4m
Surpass 100	2 springs	following spring	2yr	following spring	4m
Weedar 64	3m	following spring	none	none	none

Table 2 . Rotation interval for cotton herbicides.

	Rotation Interval				
Herbicide Applied	Soybean	Corn	Rice	Wheat	Grain Sorghum
Assure II	none	4m	4m	120d	120d
Buctril	180d	30d	180d	30d	30d
Command 3 ME	none	9m	9m	12m[1]	9m
Cotoran/Meturon	6m	6m	6m	6m	6m
Direx/Karmex	4m to 1yr[2]	4m to next yr[2]	4m to 1yr[2]	4m to 1yr[2]	4m to next yr[2]
Dual	none	none	spring	4.5m	none
Envoke	7m	7m	7m	3m	7m
Fusilade DX	none	2m	2m	2m	2m
Fusion	none	2m	2m	2m	2m
Goal	60d	10m	10m	10m	10m
Ignite	0d	0d	120d	70d	70d
Linex	4m	4m	4m	4m	4m
Prometryne (Caparol, Cotton-Pro)	next yr	next yr	next yr	next yr[3]	next yr
Prowl/Pendimax	none	none	none	4m	none
Select	none	none	none	none	none
Staple LX	10m	9m[4]	9m	4m	2yr
Suprend	next yr	next yr	next yr	next yr[3]	next yr
Trifluralin	none	none	none	none	none
Valor (layby application)	none	30d	30d	30d	30d
Zorial	45d	16m	16m	16m[5]	16m

1 Wheat may be planted as a cover crop but may not be harvested for food or feed or grazed if planted less than 9 months after application.
2 Interval depends on use pattern (Pre-, Post-, band or broadcast). Consult label for exact intervals.
3 Wheat may be planted for a cover crop the fall following application but may not be harvested for food or feed.
4 Can be planted the following year if Staple LX rate was less than 1.8 ounces per acre or if Staple LX rate was greater than 1.8 ounces per acre and applied to 50 percent of the row and ground tilled before corn is planted.
5 Wheat or other small grains can be planted as a cover crop or to prevent soil erosion but cannot be harvested for food or feed.

Table 3 . Rotation interval for rice herbicides.

	Rotation Interval				
Herbicide Applied	Cotton	Soybean	Corn	Grain sorghum	Wheat
Aim	none	none	none	none	none
Arrosolo	-	-	-		
Basagran	none	none	none	none	none
Beyond	9m	none	8.5m	9m	3m
Blazer	none	none	none	none	none
Bolero	6m	6m	6m	6m	6m
Clearpath	18m	10m	10m	18m	10m
Facet DF or GR	10m	10m	10m	10m	10m
Grandstand R	4m	4m	4m	4m	4m
Grasp	3m	3m	3m	3m	3m
Londax	4m	4m	4m	4m	4m
NewPath	18m	none	8.5m	18m	4m
Ordram 8E or 15G	-	-	-		
Permit	4m	9m	none	following spring	2m
Prowl	none	none	none	none	none
Stam	-	-	-		
Weedar 64	3m	following spring	none	none	none

Table 4. Rotation interval for soybean herbicides.

Herbicide Applied	Rotation Interval				
	Cotton	Corn	Rice	Grain Sorghum	Wheat
Authority Broadleaf or Canopy XL (see label)	18 or 30m	10 or 18m	10 or 18m	18m	4m
Basagran	none	none	none	none	none
Broadstrike + Dual	22m	none	9m	18m	4.5m
Broadstrike + Treflan	18m	8m	6m	18m	4m
Canopy *					
Soil pH < 7.0	10m	9/10m (non-IR)	10m	10m	4m
Soil pH > 7.0-7.5	18m	18m (non-IR) 8m (IR: soil pH up to 7.5)	18m	18m	4m
Classic	8m	7m	9m	9m	3m
Cobra	none	none	none	none	none
Commence	9m	9m	9m	12m	12m
Command 3ME	9m	9m	9m	9m	12m
Firstrate	9m	9m	9m	9m	4m
Flexstar HL	10m	10m	10m	10m	4m
FrontRow	9m	9m	see label	9m	4.5m
Fusilade DX	none	2m	2m	2m	2m
Fusion	none	2m	2m	2m	2m
Lexone,Sencor	8m	4m	8m	12m	4m
Lorox/Linex	4m	none	4m	none	4m
Prowl/Pendimax	none	none	none	none	none
Pursuit 70DG	18m	8.5m[1]	40m[1]	18m	4m
Reflex	10m	10m	10m	10m	4m
Sceptor 70DG	18m	9.5m	following spring	11m	4m
Select	none	none	none	none	none
Squadron	18m	9.5m	following spring	11m	4m
Strongarm	18m	none	6m		
Synchrony STS	8m	7m	9m		
Typhoon	10m	10m	10m	18m	4m
Ultra Blazer	none	none	none	none	none
Valor	30d	30d	30d	30d	30d

* NOTE: Rotation interval depends primarily upon Canopy rate and soil pH. Consult the label.

[1] No rotation restrictions for IMI corn or IMI rice.

RAIN-FREE REQUIREMENTS OF SELECTED HERBICIDES

Herbicide	Rain-free period (hours)	Herbicide	Rain-free period (hours)
2,4-D amine	4	Londax	4
2,4-D ester	4	MSMA/DSMA	24
2,4-DB	4	Osprey	4
Accent	4	Oust (post-emergence)	several
Aim	1	Peak	4
Ally/Escort XP/Manor	several	Permit/Sempra/Manage/Sandea	4
Arrosolo	6	Poast/Poast Plus/Vantage	1
Assure II	1	Reflex/Flexstar	4
Basagran	8	Regiment	8
Beacon	4	Remedy/Garlon/Turflon	4
Blazer	6	Reward	½
Buctril	4	Rodeo	6
Celebrity	4	Roundup Original	6
Clarity	4	Roundup SoluGran	6
Classic	4	Roundup Ultra	2
Clearpath	1	Roundup Ultra Max	2
Clincher	2	Select	1
Cobra	½	Stam	6
Envoke	3	Staple LX	4
Fusilade DX	1	Storm	8
Fusion	1	Touchdown IQ	2
Goal	several	Transline/Stinger/Lontrel	8
GramoxoneMax/Gramoxone Inteon	½	Typhoon	4
Grasp	1	Ultra Blazer	4
FirstShot	several	Valor (post-emergence)	1
Hoelon	4	Vista	1
Liberty/Finale/Ignite/Ignite 280	4	Whip/Acclaim/Whip 360	2

CALIBRATION PROCEDURES

Two calibration procedures will be shown. Use the one that best fits your needs. **For more detailed information, see LSU AgCenter Pub. 3057: Agricultural Sprayer Calibration.**

Calibration Procedure No. 1.

This procedure will calibrate your sprayer to apply 1/2 gallon of spray per inch of band width per acre. This is a satisfactory procedure for applying a set number of gallons of spray per acre.
Step 1. Select band width from column 1 in the Calibration Table below. Note that column 2 is the gallons to be applied per acre on weeds in the band - 1/2 gallon per inch of band width.
Step 2. Measure off distance in the field found in column 3 to the right of your band width. For a 12- inch band, measure off 273 feet.
Step 3. Time the sprayer in seconds as it travels over distance measured in step 2. Record the time carefully. The gear and throttle setting used should be the same as for spraying.
Step 4. Put in correct size nozzle tips. Suggested nozzle sizes are found in column 4 for pre-emergence and column 5 for post-emergence. Use 65- to 80- degree flat fan nozzle tips, properly screened.
Step 5. Adjust pressure to catch 1 pint of liquid per row in the same time as recorded in step 3. Spraying pressure normally should be between 20 and 35 psi. Change nozzle tips if pressure is too low or high.
Step 6. Adjust nozzles to give coverage of weeds in the band area. Final adjustment must be made

Calibration Table

1 Band Width Inches	2 Total Solution in Gallons/Acre	3 Distance in Feet to Apply 1 Pint to Each Row	4 Pre-emergence Nozzle Size* (Range)	5 Post-emergence Nozzle Size* (Range)
10	5	327	8001E - 8002E	800067 – 8001
12	6	273	8002E - 8003E	8001 – 80015
14	7	233	8002E - 8003E	8001 – 80015
16	8	204	8002E - 8004E	8001 - 8002
20	10	164	8003E – 8005E	80015-8002
Broadcast	20	82	8003 - 8005	80015 - 8002

*Catch the PINT of spray from all nozzles on the row. Nozzle sizes shown are based on field speeds of 4 to 6 miles per hour. Similar nozzle sizes are available from all manufacturers. Use of the nozzle listing above does not necessarily imply a recommendation of that brand only.

Calibration Procedure Number 2:

If for some reason you wish to apply a rate of spray other than that shown in Table 1, the following procedure will be of interest to you. Tests have shown that broadcast spray rates ranging from 15 to 40 gallons per acre give good results. Smaller rates are more difficult to apply accurately. This procedure determines the volume of spray your sprayer is applying. The 80-degree flat fan nozzles ranging in size from 8002E to 8005E for pre-emergence and 8002 to 8005 for post-emergence application or their equivalent should be used.

Step 1. Measure off the number of feet of row for the respective row spacing:

Row Spacing (Inches)	Row Length Measured (Feet)
30	136
32	127
34	120
36	114
38	108
40	102
42	97
48	85
60	68

Step 2. Time the sprayer in seconds as it travels over the distance measured above and collect the spray from all nozzles on one row in the same length of time. The throttle setting used both for timing the distance traveled and for collecting the spray should be the same as that to be used for spraying. Collect the spray from all nozzles on one row for the row length measured and record in fluid ounces the quantity of spray collected. Each fluid ounce of spray collected is equivalent to 1 gallon per acre of crop. When spraying vegetable transplants, apply 1 gallon of spray volume per inch of band width treated instead of the usual 1/2 gallon per inch rate. To determine the amount of commercial herbicide to apply on a band, regardless of row width, use the following equation:

[band width (inches) / row width (inches)] x rate per acre broadcast = amount needed for band treatment
Example: [12 inch band / 36 inch row] x 3.0 pints per acre broadcast = 1.0 pint to treat the band on 1 acre of land

Table 1. Time required to travel given distances.

	Travel Time (seconds)		
Speed (mph)	100 feet	200 feet	300 feet
3.0	23	45	68
3.5	20	39	58
4.0	17	34	51
4.5	15	30	45
5.0	14	27	41
6.0		23	34
7.0		19	29
8.0		17	26
9.0		15	23
10		14	20
11			19
12			17

CONVERSION FACTORS

Weights

1 U. S. ton = 2,000 pounds = 0.97 metric ton
1 pound = 16 ounces = 453.6 grams = 0.4356 kilograms
1 ounce = 20.35 grams

Temperature

°C = 5/9 (°F – 32)
°K = °C + 273.16
°F = (9/5 °C) + 32
°R = °F – 459.69

Speed

1 mph = 5,280 feet per hour = 88 feet per minute = 1.467 feet per second
1 meter per second = 196.85 feet/minute = 2.24 mph
1meter per second = 1.942 knots

Length

1 mile = 5280 feet = 1.6093 kilometers
1 yard = 3 feet = 36 inches = 91.44 centimeters
1 foot = 12 inches = 30.48 centimeters

Area

1 square mile = 640 acres
1 acre = 43.560 square feet
1 acre = 0.405 hectare
1 hectare = 2.47 acres
1 hectare = 10,000 m sq.
1 square yard = 9 square feet = 0.836 square meters
1 square foot = 144 square inches = 0.09 m sq.
1 square centimeter = 0.155 square inch
Number of Acres = [Length (feet) x width (feet)]/43,560

1 acre = 13,068 feet of 40 inch rows
= 13,756 feet of 36 inch rows
= 14,520 feet of 36 inch rows
= 16,335 feet of 32 inch rows
= 17,424 feet of 30 inch rows

Liquid Measure

1 tablespoon = 3 teaspoons (0.5 ounce)
1 ounce = 2 tablespoons
1 cup (1/2 pint) = 16 tablespoons (8 ounces)
1 pint (2 cups) = 32 tablespoons (16 ounces or 1 pound or 473 milliliters)
1 gallon = 231 inches cubed = 4 quarts = 8 pints = 16 cups = 8.4 pounds water
1 gallon = 128 fluid ounces = 3.785 liters = 3,785 milliliters = 3,785 cubic centimeters

1 quart = 2 pints = 4 cups = 32 ounces = 0.946 liter = 946 milliliters
1 pint = 2 cups = 16 ounces = 0.473 liter = 473 milliliters
1 cup = 8 ounces = 0.24 liter = 240 milliliters
1 fluid ounce = 8 ounces = 0.24 liter = 240 milliliters
1 tablespoons = 3 teaspoons = 0.5 ounce = 14.78 milliliters
1 teaspoons = 0.166 ounces = 4.92 milliliters
1 milliliter = 0.0338 fluid ounce

NOZZLE TYPES and SUGGESTED USES

Nozzle Type	Spray Pattern	Pressure (psi)	Suggested Use(s)
Flat fan	Fan-like pattern of medium droplet size. Not uniform across the pattern, overlap required.	20-40 (15-40 for LP nozzle)	Pre- or Post- broadcast booms. Numerous types available. 30 percent overlap of spray pattern required for uniform coverage. Boom height is extremely important to guarantee proper coverage.
Even Fan	Fan-like pattern similar to flat fan, except volume is uniform across the entire width.	20-40	Pre- and post-emergence. Good for banding.
Flooding Fan	Wide, flat pattern of course droplets.	10-30	Broadcast applications. Good for Chemical/fertilizer mixtures or lay-by. Requires 100 percent overlap.
Off-center flat fan	Flat fan pattern. Directed to one side of tip. Swath width of 12 to 144 inches.	20-40	Post-directed, low profile spraying.
Large off-center flat fan	Swath width directed to one side from 12 to 33 feet wide.	30-40	Herbicide application to ditches and roadsides.
Cone	Circular with heavy concentration of droplets on outside of pattern.	40-60	Good coverage of foliage. Insecticide, fungicide and growth regulator applications.
Whirl chamber	Hollow cone pattern.	5-20	Incorporation equipment.
Rotary atomizers	Flat plane similar to hollow cone. More uniform droplet size.	Device dependent	Low volume applicators.
Boomless nozzle cluster	Wide swath up to 60 feet. Pattern easily distorted by wind. High spray trajectory.	20-40	Pastures and broadcast sprayers where obstructions to booms exist.

RECOMMEDED PROCEDURES for REDUCING PESTICIDE DRIFT[1]

Recommended Procedure	Example	Explanation
Select a nozzle that produces coarse droplets.	Raindrop, wide-angle full cone, flooding.	Use large droplets tha can still provide good coverage.
Use the lower end of the pressure range.	Use 20 to 40 psi for Raindrop; less than 25 for other types.	Higher pressure generates more small droplets, increasing drift potential.
Lower the boom height.	Use as low a boom height as possible to maintain uniform distribution.	Higher boom height requires droplets to travel longer distances to the target, increasing possibility of off-target deposition.
Increase the nozzle size.	If normal spray volume is 15 to 20 gpa, increase to 25 to 30 gpa.	Diluted spray decreases the chances of drift injury.
Spray when wind speeds are less than 10 mph and moving away from sensitive plants.	Leave a buffer zone if sensitive plants are downwind. Spray buffer zones when wind speed is lower.	Chances of off-target deposition increases with wind speed.
Do not spray when the air is completely calm.	Absolutely calm air generally occurs in early morning or late afternoon.	Calm air reduces air mixing and makes it difficult for spray to settle. Fine spray can move long distances before depositing.
Use drift-control additive when needed.	Several long-chain polymers are available.	Drift-control additives increase the average droplet size produced by the nozzle.

*Prepared by the University of Illinois Cooperative Extension Service

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Acetochlor	Harness Surpass Topnotch Partner WDG	2-chloro-*N*-(ethoxymethyl)-*N*-(2-ethyl-6-methylphenyl) acetamide	Emulsifiable Concentrate (7.0, 3.2) Dry Granular (68%)	Dow Agrosciences Monsanto
Acifluorfen	Ultra Blazer	5[2-chloro-4 (trifluoromethyl)phenoxy]-2-nitrobenzoic acid	Liquid Concentrate(2.0)	UPI
Alachlor	Lasso Micro-Tech Lasso II	2-chloro-*N*-(2, 6diethylphenyl)-*N*-(methoxymethyl) acetamide	Emulsifiable liquid (4) Granular (15%)	Monsanto
Ametryn	Evik DF	*N*-ethyl-*N*'-(1-methylethyl)-6-(methylthio)-1,3,5-triazine-2,4-diamine	Water Dispersible Granule (76%)	Syngenta
Amitrole	Amitrole-T Weedazol	1*H*-1,2,4-triazol-3-amine	Emulsifiable Liquid (4)	Bayer ES
Asulam	Asulox Asulam 3.3 Asulam	methyl[(4-aminophenyl)sulfony]carbamate	Liquid Concentrate 3.34	Bayer CropScience Agriliance Helena
Atrazine	Aatrex 4L, NINE-O Atrazine 4L, 90DF Atrazine 90WDG Southern Turf others	6-chloro-*N*-ethyl-*N*'-(1-methylethyl)- 1,3,5-triazine-2,4-diamine	Wettable Powder (80%) Suspension 4L Dry Flowable (90%)	UHS UHP Syngenta Dow AgroSciences Makteshim Agriliance Helena
Benefin	Balan 2.5G Balan DF	*N*-butyl-*N*-ethyl-2,6-dinitro-4-trifluoromethyl) benzeneamine	Granular (2.5%) Dry Flowable (60%)	UAP
Bensulide	Betasan 4-E Turf Prefar 4-E	*0,0*-bis(1-methylethyl) *S*-[2-[(phenylsulfonyl)amino] ethyl] phosphorodithioate	Emulsifiable Liquid (4)	UHS Gowan
Bensulfuron	Londax	2-[[[[[(4,6-dimethoxy-2-pyrimidinyl)amino] carbonyl]amino]sulfonyl]methyl]benzoic acid	Dry Flowable 60%	UPI
Bentazon	Basagran T/O Lescogran Basagran	3-(1-methylethyl)-(1H)-2,1,3-benzothiadiazin-4-(*3H*)-one 2,2- dioxide	Liquid Concentrate(4) Soluble Granules (95%)	BASF Lesco Micro Flo Agrilliance
Bispyribac sodium	Regiment	sodium 2,6-bis[(4,6-dimethoxypyrimidin-twoyl) oxy]benzoate; propanil, *N*-(3,4-dichlorophenyl) propanamide	Water Soluble Powder (80%)	Valent USA
Borate-Chlorate Bromacil	Various Hyvar X	5-bromo-6-methyl-3-(1-methylpropyl)-2,4(1*H*, 3*H*)pyrimidinedione	Various Wettable Powder (80%) Water Soluble Powder (50%)	Various DuPont

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Bromoxynil	Buctril Nu Lawn Weeder Moxy Bromox Maestro D Maestro MA	3,5-dibromo-4-hydroxybenzonitrile	Emulsifiable Liquid (4,2,0.5)	Bayer CropScience MicroFlo Nufarm
Butylate	Sutan + 6.7E Genate +	*S*-ethyl-bis(2methylpropyl)carbamothioate	Emulsifiable Liquid (6.7)	Micro Flo
Carfentrazone	Aim	Ethyla,2-dichloro-5-[4-(difluromethyl)-4,5-dihydro-3-methyl-5-oxo1H-1,2,4-triazol-1-yl]-4-fluorobenzenepropanoate	Emulsifiable Concentrate (2)	FMC
Chlorimuron	Classic Skirmish	2-[[[[(4-chloro-6-methoxy-2-pyrimidinyl)amino] carbonyl] amino]sulfonyl]benzoic acid	Dispersible Granule (25%)	DuPont FMC
Chlorimuron + Metribuzin	Canopy SP	See chlorimuron and metribuzin	Dispersible Granule (75%)	DuPont
Chlorimuron + Sulfentrazone	Canopy XL	See chlorimuron PLUS *N*-[2,4-dichloro-5-[-4-(difluromethyl)-4,5-dihydro-3-methyl-5-*oxo*-1*H*-1,2,4-triazol-1-yl]phenyl]methanesulfonamide	Dry Flowable (56.3%)	DuPont
Chlorsulfuron	Glean Telar	2-chloro-*N*-[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]benzenesulfonamide	Dry Flowable (75%)	Dupont
Clethodim	Select Envoy Arrow Clethodim 2EC Volunteer	(*E,E*)-(±)-2-[1-[[(3-chloro-2-propenyl)oxy]imino] propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one	Emulsifiable Concentrate (0.94 or 2)	Valent Agriliance Makteshim Micro Flo Tenkoz
Cyhalofop	Clincher	R(+)2-2-(4-(4-cyano-2-fluorophenoxy)phenoxy) propanoic acid, n-butyl ester	Liquid Concentrate (2.38)	Dow AgroSciences
Clomazone	Command	2-(2-chlorophenyl) methyl-4,4-dimethyl-3-isoxazlidinone	Microencapsulated Flowable (3)	FMC Tenkoz UAP
Clopyralid	Transline Stinger Lontrel Reclaim	3,6-dichloro-2-pyridinecarboxylic acid	Liquid (3 lb ae/gal)	Dow AgroSciences
Cloransulam - methyl	Firstrate	N-(2-carbomethoxy-6-chloro-phenyl)-5-ethoxy-7-fluoro(1,2,4) triazolo-[1,5-c]pyrimidine-2-sulfonamide	Wettable Granular (84%)	Dow AgroSciences
Cloransulammethyl + flumetsulam	Frontrow	See cloransulam-methyl and flumetsulam	Wettable Granular (84% + 80%)	Dow AgroSciences
CuSO4	Blue stone Blue vitriol	Copper sulfate	100%	Various

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Cycloate	Ro-Neet	*S*-ethylcyclohexylethylcarbamothioate	Emulsifiable Liquid (6) Granular (10%)	Syngenta
DCPA	Dacthal 75W Turf Dacthal Flowable	dimethyl 2,3,5,6-tetrachloro-1,4-benzenedicarboxylate	Flowable Liquid (6.0) Wettable Powder (75%)	Syngenta Amvac
Dicamba	Banvel Banvel SFG Clarity Vanquish	3-6 dichloro-2-methoxybenzoic acid	Liquid Concentrate (4,2,4)	BASF MicroFlo Syngenta
Dicamba + amine 2,4-D	Weedmaster	See dicamba and amine 2,4-D	Emulsifiable Liquid 1 + 2.87 lb/gal	BASF
Dichlobenil	Casoron 4G Norosac 4	2,6-dichlorobenzonitrile	Granular (4%)	Uniroyal PBI Gordon
Diclofop	Hoelon 3EC	(±)-2-[4-(2,4-dichlorophenoxy)-phenoxy]propanoic acid	Emulsifiable Liquid (3)	Aventis
Dimethenamid	Outlook 6.0 Establish	2-chloro-*N*-[(1-methyl-2-methoxy)ethyl]-*N*-(2,4-dimethyl-thien-3-yl)-acetamide	Emulsifiable Liquid (6)	BASF Tenkoz
Dimethenamid + Atrazine	Guardsman Max G-Max-Lite	See dimethenamid and atrazine	Emulsifiable Concentrate (2.33 + 2.67) (1.7 + 3.3)	BASF
Diquat	Diquat Herbicide Reward Reward LS	6,7-dihydrodipyrido(l,2-a:2',l'-*c*)pyrazinediium ion	Liquid Concentrate (2)	Syngenta
Dithiopyr	Dimension EC Dimension WSP Dimension Ultra 40WP Dimension Ultra 2 SC	*S,S*-dimethyl 2-(difluoromethyl)-4-(2-methylpropyl)-6-(triflurormethyl)-3,5-pyridinedicarbothioate	Emulsifiable Concentrate (1, 2) Wettable Powder (40%)	Dow AgroSciences
Diuron	Karmex Direx 4L Direx 80DF Diuron DP Diruon 80 Diuron WD	N'(3,4-dichlorophenyl)-N,Ndimethylurea	Wettable Powder (80%) Flowable (4)	DuPont Griffin DuPont UAP-Platte Makteshim
DSMA	Various	disodium methanearsonate	Various	Various
Endothal	Aquathol	7-oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	Liquid (2) Granular (5%)	Pennwalt
EPTC	Eptam 7-E Eradicane 6.7-E Eptam 20-G Eradicane 25-G	*S*-ethyl dipropyl carbamothioate	Emulsifiable Liquid (7, 6.7) Granular (20%, 25%)	Syngenta Gowan

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Ethafluralin	Sonalan Curbit EC Sonolan 10G Sonolan HFP	*N*-ethyl-*N*-(2-methyl-2propenyl)-2,6-dinitro-4-(trifluoromethyl)benzenamine	Emulsifiable Liquid (3) Granular (10%)	UAP Dow AgroSciences
Ethofumesate	Prograss	(±)-2-ethoxy-2,3-dihydro-3,3-dimethyl-5-benzofuranyl Methanesulfonyl	Emulsifiable Concentrate (1.5)	Bayer ES
Fenoxapropethyl	Whip 360 Acclaim Extra	(±)-2-[4-[(6-chloro-2-benzoxazolyl)oxy] phenoxy] propanoic acid	Emulsifiable Liquid (0.57)	Bayer CropScience Bayer ES
Flumetsulam	Python WDG	*N*-(2,6-difluorophenyl)-5-methyl[1,2,4]triazolo[1,5-a]-pyrimidine-2-sulfonamide	Wettable Granule (80%)	Dow AgroSciences
Flumetsulam + metolachlor	Broadstrike + Dual	See flumetsulam and metolachlor	Emulsifiable Concentrate (0.20 + 7.47)	Dow AgroSciences
Flumetsulam + trifluralin	Broadstrike + Treflan	See flumetsulam and Treflan	Emulsifiable Concentrate (0.25 + 3.4)	Dow AgroSciences
Fomesafen	Reflex Flexstar HC	5-[2-chloro-4-(trifluoromethyl)phenoxy]-*N*-(methylsulfonyl)-2-nitrobenzamide	Liquid Concentrate (2,1.88)	Syngenta
Fluazifop-P-buty	Fusilade DX Fusilade II Turf + Ornamental Ornamec 170	(R)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl] oxy]phenoxy]propanoic acid	Emulsifiable Liquid (2.0, 0.125)	Syngenta PBI Gordon
Flumioxazin	Valor Broadstar Sureguard	2-{7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione	Water Dispersable Granule (51%) Granule (0.25%)	Valent
Fluometuron	Cotoran Meturon 4L Meturon 80DF Flo Met 4L Flo Met 80DF	*N*,*N*-dimethyl-*N'*-[3-trifluoromethyl)phenyl) urea	Wettable Powder (80%) Flowable (4)	Syngenta DuPont MicroFlo
Flumiclorac pentyl ester	Resource	[2-chloro-4-fluoro-5-(1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)phenoxy]acetic acid	Emulsifiable Concentrate (0.86)	Valent
Fluroxypyr	Vista Rely	[(4-amino-3,5-dichloro-6-fluoro-2-pyridinyl)oxy]acetic acid	Liquid Concentrate (1.5)	DowAgroSciences
Fosamine, ammonium salt	Krenite S	Ammonium ethylcarbamoylphosphonate	Water Soluble Liquid 4 lb/gal	DuPont
Glufosinate	Finale Liberty Derringer Derringer F Ignite Ignite 280	2-amino-4 (hydoxymethylphosphinyl) butanoic acid	Liquid Concentrate (1,1.66, 2.34)	Bayer CropScience Bayer ES

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
glyphosate[1]	See Appendix A	*N*-(phosphonomethyl)glycine	See Appendix A	See Appendix A
Halosulfuron	Manage Permit Sempra Sandea	methyl 5-[[(4,6-dimethoxy-2-pyrimidinyl)amino] carbonylaminosulfonyl]-3-chloro-1-methyl-1-H-pyrazol-4-carboxylate	Dry Granules (75%)	Monsanto Gowan
Herbicidal oil	Various	Naptha derivatives		Various
Hexazinone	Velpar DF Velpar L Velpar ULW DF	3-cyclohexyl-6-(dimethylamino)-1-methyl-l,3,5-triazine-2,4(l*H*,3*H*)-dione	Dispersible Granules (75%) Water Soluble Liquid (2) Soluble Granules (75%)	DuPont
Imazamox	Beyond	2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-(methoxymethyl)-3-pyridinecarboxylic acid	Liquid (1.0)	BASF
Imazapyr	Chopper 2AS Arsenal 2,4AC Stalker	(±)-(2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-*oxo*-1*H*-imidazol-2-yl]-3-pyridinecarboxylic acid	Liquid Concentrate (2,2,4)	BASF
Imazaquin	Scepter 70DG Image 1.5 LC	2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-*oxo*-1*H*-imidazol-2-yl]-3-quinolinecarboxylic acid)	Dry Flowable (0.7) Liquid Concentrate (1.5)	BASF
Imazaquin + pendimethalin	Squadron	see imazaquin and pendimethalin	Emulsifiable Concentrate (0.33 + 2.0)	BASF
Imazethapyr	Pursuit 70DG	2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-*oxo*-1*H*-imidazo1-2-yl]-5-ethyl-3-pyridinecarboxylic acid	Dry Flowable (70%)	BASF
Isoxaben	Gallery	*N*-[3-(1-ethyl-1-methylpropyl)-5-isoxazolyl]-2,6-dimethoxybenzamide and isomers	Dry Flowable (75%)	Dow AgroSciences
Lactofen	Cobra	(±)-2-ethoxy-1methyl— 2-oxoethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate	Emulsifiable Liquid (2)	Valent USA
Linuron	Lorox DF Linex 4L	*N'*-(3,4-dichlorophenyl)-*N*-methoxy-*N*methylurea	Wettable Powder (50%) Flowable (4)	DuPont
Mecoprop	MCPP-4 Amine	(±)-2-(4-chloro-2-methylphenoxy)propanoic acid	Liquid Concentrate (3.97)	SDS Riverside
Mesosulfuronmethyl	Osprey	2-[[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl] amino]sulfonyl]-4-[(methylsulfonyl)amino]methyl]benzoi c acid	Dry flowable (4.5)	Bayer CropScience
Mesotrione	Callisto	2-[4-(methylsulfonyl)-2-nitrobenzoyl]-1,3-cyclohexanedione	Flowable (4)	Syngenta
Metolachlor	Dual II Dual Magnum Dual II Magnum	2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl) acetamide	Emulsifiable Liquid (8, 7.8,7.64) Granular (25%)	Syngenta
Metolachlor + Atrazine	Bicep II Bicep Lite II Bicep II Magnum	See metolachlor and atrazine	Flowable (4.5, 5.5, 5.9)	Syngenta

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Metribuzin	Sencor DF Sencor 4 Metribuzin 75DF	4-amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4*H*)-one	Wettable Powder (50%) Flowable (4) Dry Flowable (75%)	Bayer CropScience
Metsulfuron	Ally EscortXP Cimmaron Manor Metsulfuron Methyl 60 DF Valuron 60DF	Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate	Water Dispersible Granules (60%)	DuPont Riverdale Farm Saver Makteshim
Molinate	Ordram	*S*-ethyl hexahydro-1*H*-azepine-1-carbothioate	Granular (15%) Emulsifiable Liquid(8)	Syngenta
Monuron	Various	*N*'-(4-chlorophenyl)-*N*,*N*-dimethylurea	Wettable Powder (80%) ML (28%)	Various
MSMA	Various	monosodium methanearsonate	Various	Various
Napropamide	Devrinol	*N*,*N*-diethyl-2-(1-naphthalenylenyloxy)propanamide	Wettable Powder (50%)Granular (5%)	Syngenta
Nicosulfuron	Accent	2-[[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-N,Ndimethyl-3-pyridinecarboxamide	Water Dispersible Granule (75%)	DuPont
Norflurazon	Zorial Solicam Predict	4-chloro-5-(methylamino)-2-(3-(trifluoromethyl) phenyl)-3-(2*H*)-pyridazinone	Wettable Powder (80%) Wettable Powder (60%)	Syngenta
Oryzalin	Surflan AS Oryzalin 4 AS	4-(dipropylamino)-3,5-dinitrobenzenesulfonamide	Liquid Concentrate (4)	Dow AgroSciences Farm Saver
Oxadiazon	Ronstar 50 WSP Ronstar G	3-[2,4-dichloro-5-(1-methylethoxy)phenyl]-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2-(3H)-one	Granular (2%) Soluble Powder (50%)	Bayer ES
Oxyfluorfen	Goal T/O Goal 2XL Delta Goal Goal Tender OxiFlo 2 EC Galigan Galigan Delta	2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluromethyl) benzene	Emulsifiable Concentrate (1.6, 2.0)	DowAgroSciences Farm Saver Makteshim
Paraquat	Gramoxone Max Cyclone Max Gramoxone Inteon	1,1'-dimethyl-4,4'-bipyridinium salt	Soluble Liquid (3.0, 3.0, 2.0)	Syngenta
PCP	Various	Pentachlorophenol	Various	Various
Pendimethalin	Prowl Prowl H2O Pendimax 3. Others	*N*-(l-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzeneamine	Emulsifiable Liquid (3.3) Dry Granular (60%) Granule (2%) Liquid (3.8)	BASF Dow AgroSciences Tenkoz Helena

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Penoxsulam	Grasp	2-(2,2-difluoroethoxy)-N-(5,8-dimethoxy [1,2,4] triazolo[1,5c]pyrimidin-2-yl)-6-(trifluoromethyl) benzenesolfonamide	Soluble concentrate (2)	Dow AgroSciences
Picloram	Tordon TordonK Tordon 101	K salt (4-amino-3,5,6-trichloropicolinicacid)	Granular (2%) Liquid (2)	Dow AgroSciences
Primisulfuron	Beacon	2-[[[[[4,6-bis(difluoromethoxy)-2-pyrimidinyl] amino]carbonyl]amino]sulfonyl]benzoic acid	Water Dispersible Granule (75%)	Syngenta
Prodiamine	Barricade 65 WG Factor Endurance	2,4 dinitro-*N3*,*N3*-dipropyl-6-(trifluoromethyl)-1,3-benzenediamine	Wettable Granular (65%)	Syngenta
Prometon	Pramitol	6-methoxy-*N*,*N*'-bis(1-methylethyl)-1,3,5-triazine-2,4-diamine	Emulsifiable Liquid (25%) Granular (5%) Wettable Powder (80%)	Syngenta
Prometryn	Caparol	*N*,*N*'-bis(1-methylethyl)-6-(methylthio)-1,3,5-triazine-2,4-diamine	Wettable Powder (80%) Flowable (4)	Syngenta Makteshim
Pronamide	Kerb WSP Kerb 50 WP	3,5-dichloro (N-1,1-dimethyl-2-propynyl)benzamide]	Wettable Powder (50%)	Dow AgroSciences
Propanil	Various	*N*-(3,4-dichlorophenyl)propanamide	Emulsifiable Liquid (4)	Various
Pyrithiobac	Staple LX, SP	2-chloro-6-[(4,6-dimethoxy-2-pyrimidinyl)thio] benzoic acid	Soluble Powder (85%) Liquid 3.2 lb ai/gal	DuPont
Quinclorac	Facet Drive	3,7-dichloro-8-quinolinecarboxylic acid	Wettable Powder (50%)	BASF TopPro Specialties
Quizalofop	Assure II Matador Targa	(±)-2-[4-[(6-chloro-2-quinoxalinyl)oxy]phenoxy] propanoic acid	Emulsifiable Concentrate (0.88)	DuPont FMC Gowan
Rimsulfuron	Matrix Tranxit Shade-Out Resolve DF	N-[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]-3-(ethylsulfonyl)-2-pyridinesulfonamide	Dispersible Granule (25%)	DuPont
hoxydim	Vantage Prestige Poast Poast HC	2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio) propyl]-3-hydroxy-2-cyclohexen-1-one	Emulsifiable Liquid (1.0, 1.5, 3.5)	BASF Micro Flo
Simazine	Princep 4L Princep Caliber 90 Princep Liquid Sim-Trol Simazine 4L Simazine 90 DF	6-chloro-*N*,*N*'-diethyl-1,3,5-triazine-2,4-diamine	Flowable (4) Wettable (90%)	Syngenta UAP-Platte Drexel Agrilliance
Sodium chlorate	Various	NaCl03	Various	Various

COMMON AND CHEMICAL NAMES OF HERBICIDES

Common Names	*Trade Names*	*Chemical Names*	*Formulations (lb./gal. or %)*	*Company*
Sulfentrazon + Metribuzin	Authority MTZ	N-[2,4 dichloro-5-[4-(difluoromethyl)-4,5-dihydro-3-methyl-5-oxo-1H-1,2,4,triazol-1-yl]phenyl]methanesulfonamide See metribuzin	Dispersible Granule (45%)	FMC
Sulfometuron	Oust XP	2-[[[[(4,6-dimethyl-2-pyrimidinyl)amino]carbonyl] amino]sulfonyl]benzoic acid	Dispersible Granule (75%)	DuPont
Sulfometuron + hexazinone	Oustar	See Oust and Velpar	Dispersable Granule (75%)	DuPont
Tebuthiuron	Spike 20P	*N*-[5-(1,1-dimethylethyl)-l,3,4-thiadiazol-2-yl)-*N*,*N*'-dimethylurea	Granular (20%)	Dow AgroSciences
Terbacil	Sinbar	5-chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1*H*,*3H*)-pyrimidinedione	Wettable Powder (80%)	DuPont
Thiobencarb	Bolero EC	*S*-[(4-chlorophenyl)]methyl]diethylcarbamothioate	Emulsifiable Liquid (8.0)	Valent
Triclopyr	Garlon 3EC Garlon 4 Crossbow Remedy Renovate	[(3,5,6-trichloro-2-pyridinyl)oxy]acetic acid	Emulsifiable Liquid (3, 1 lb triclopyr + 2 lb 2,4-D; 4.0)	Dow AgroSciences
Trifloxysulfuronsodium	Envoke	2-pyridinesulfonamide, N-[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]-3-(2,2,2-trifluoroethoxy)-, monosodium salt,monohydrate	Dispersible granule (70%)	Syngenta
Trifluralin	Treflan Trifluralin Trilin 4 Tri 4 Trific others	2,6-dinitro-N,N-dipropyl-4-(trifluromethyl) benzeneamine	Emulsifiable Liquid (4.5) Granular (5%, 10%)	Various
2,4-DB	Various	4-(2,4-dichlorophenoxy) butyric acid	Various	Various
2,4-D	Various Unison Barrage HF Opti-Amine	(2,4-dichlorophenoxy)acetic acid	Amines + Esters Liquid and Granular	Various Helena Helena Helena

RELATIVE TOXICITY OF HERBICIDES TO MAMMALS

Table 1. Explanation of how pesticide toxicity is classified.

Toxicity Rating[1]	Class	LD50 (mg/kg)[2]	Probable Lethal Dose for a 150 pound man
1	Extremely toxic	less than 5	A taste (less than 7 drops)
2	Very toxic	5 to 49	7 drops to 1 teaspoonful
3	Moderately toxic	50 to 499	1 teaspoonful to 1 ounce
4	Slightly toxic	500 to 4,999	1 ounce to 1 pint
5	Almost nontoxic	5,000 to 14,999	1 pint to 1 quart
6	Nontoxic	150,00 and above	More than 1 quart

[1] Numerical rating is based on the following classification: 1. Absorbed and poisonous; 2. Causes burns and blisters; 3. Moderately irritating; 4. Mildly irritating; and 5. Nonirritating

[2] Based on acute oral LD50 values for adult white rat with technical material. Toxicity of commercial formulations usually is less than technical material.

FOR INFORMATION ON TOXICOLOGY, ECOLOGICAL AND ENVIRONMENTAL EFFECTS OF PESTICIDES: NATIONAL PESTICIDE TELECOMMUNICATIONS NETWORK 1-800-858-7378 (OPEN 7 DAYS A WEEK FROM 6:30 a.m.-4:30 p.m. PACIFIC TIME)

Table 2. Relative toxicity of selected herbicides.

Common Name or Designation	Some Common Trade Names	LD50 mg/kg	Toxicity Rating	Dermal Response
	Weedazol	1,000	6	4
2,3,6-TBA	Trysben, Benzac	1,644	4	5
2,4,5-T	Various brands	300	3	4
2,4-D	Various brands	500	4	4
2,4-D + EPTC	Knoxweed	2,710	4	4
2,4-DB	Butyrac, Butoxone	500	4	4
2,4-DEP	Falone	850	4	4
Acetochlor	Harness, Surpass	2,148	4	4-5
Acifluorfen	Blazer	1,370	4	3
Acrolein	Aqualin	46	2	2
Alachlor	Lasso	1,200	4	3
Ametryn	Ametryne	965	4	-
Amiben	Amiben, Vegiben	3,500	4	-
Amitrole	Amino Triazole	5,000	4	
Amitrole-T	Amitrol-T, Cytrol	5,000	4-5	5
AMS	Ammate	1,600	4	5
AMS	Ammate X	3,900	4	5
Aromatic solvents	Various brands	--	3	--
Aspirin	(For comparison)	750	4	5

Table 2. Relative toxicity of selected herbicides.

Common Name or Designation	Some Common Trade Names	LD50 mg/kg	Toxicity Rating	Dermal Response
Asulam	Asulox	>5,000	5	4-5
Atrazine	AAtrex	3,080	4	5
Bandane	Bandane	540	4	--
Benefin	Balan	1000	5	--
Bensulfuron	Londax	>5,000	5	5
Bensulide	Betasan, Pre-san	770	4	--
Bentazon	Basagran	1,100	4	3-4
Borate	Borax, Borascu	2,500	4	4
Bromacil	Hyvar X	5,200	5	4
Bromoxynil	Buctril, Brominil	260	3	4
Butachlor	Machete	2,000	4	3
Butylate	Sutan	3,997	4	3
C-6313	Maloran	2,150	4	3
C-6989	Preforan	1,000	6	5
Carfentrazone	Aim	5,143	5	5
Cacodylic acid	Ansar 560, 120	1,000	4	--
Calcium arsenate	Various brands	35	2	4
Calcium cyanamide	Aero-Cyanamide	1,400	4	--
CDAA	Randox	750	4	2
CDEC	Vegadex	850	4	3
Chlorimuron	Classic	>4,000	4	5
Chloroxuron	Tenoran	3,700	4	5
Chlorsulfuron	Glean	5,545	5	5
CIPC	Chloro-IPC	5,000	5	5
Clethodim	Select	1,360	4	3-4
Clomazone	Command	1,406	4	4-5
Clopyralid	Stinger	4,300	4	4
Cloransulam-methyl	First Rate	>5,000	5	4-5
CMA	Super-Dal-E-Rad	400	3	--
Copper sulfate	Various brands	300	3	--
Cyanazine	Bladex	334	3	4
Cyhalofop	Clincher	1,612 to <5,000	4	
Dalapon	Dowpon, Basfapon	9,300	4	4
DCPA	Dacthal	300	4	5
Diallate	Avadex	395	3	3
Dicamba	Banvel	1,040	4	--
Dichlobenil	Casoran	4,250	4	4
Dichlone	Phygon	1,380	4	3
Dichlorprop	2,4-DP	800	4	5
Diclofop	Hoelon 3EC, Illoxan	557	4	4-5
Dimethenamid	Frontier	2,400	5	4
Diphenamid	Dymid, Enide	960	4	5

Table 2. Relative toxicity of selected herbicides.

Common Name or Designation	Some Common Trade Names	LD50 mg/kg	Toxicity Rating	Dermal Response
Diquat	Diquat	400	3	2
Dithiopyr	Dimension	3,600	4	3
Diuron	Karmex	3,400	4	4
DMPA	Zytron	1,000	4	-
DMTT	Mylone	500	4	4
DNBP	Sinox, Dow Chem	30	2	1
DNBP (amine)	Preemerge, Sinox PE	40	2	1
DSMA	Sodar, Ansar, Methar	600	4	5
Endothall	Endothal, Aquathol	35	2	3
EPTC	Eptam	1,630	4	--
Erbon	Baron, Novon	1,000	4	3
Ethofumesate	Prograss	<6,400	5	4
Fenac	Fenac	3,000	4	--
Fenoxaprop	Whip, Acclaim	3,310	4	4
Fenuron	Dybar	6,400	5	4
Fenuron + TCA	Urab	4,000	4	--
Fluazifop	Fusilade	4,350	4	3-4
Fluchloralin	Basalin	1,550	4	--
Flumetsulam	Broadstrike	>5,000	5	5
Flumiclorac	Resource	>5,000	5	4-5
Flumioxazin	Valor, Broadstar, Sureguard	>5,000	4	4
Fluometuron	Cotoran	8,900	5	5
Fluridone	Sonar	>10,000	5	4-5
Fluroxypyr	Vista	3,738	4	3-4
Fomesafen	Reflex	6,570	5	4
Fosamine	Krenite	>5,000	6	4
Gasoline	Various brands	--	3	--
Glufosinate	Liberty, Finale	1,910	4	4
Glyphosate	Roudup, others	5,400	5	5
Glyphosine	Polaris	1,950	4	5
Halosulfuron-methyl	Permit, Manage	8,866	5	5
Hexazinone	Velpar	1,690	4	5
Imazamethabenz-methyl	Assert	2,679	4	5
Imazapyr	Arsenal, Chopper, Contain	>5,000	5	5
Imazaquin	Scepter, Image	>5,000	5	4-5
Imazamox	Beyond, Raptor	>5,000	5	5
Imazethapyr	Pursuit	>5,000	5	4
Isopropalin	Paarlan	>5,000	5	3-4
Kerosene	Various brands	--	2-3	--
KOCN	Various brands	85	3	--
Lactofen	Cobra	2,533	4	4
Linuron	Lorox	1,196	4	5

Table 2. Relative toxicity of selected herbicides.

Common Name or Designation	Some Common Trade Names	LD50 mg/kg	Toxicity Rating	Dermal Response
MAMA	Ansar, Methar	720	4	--
MCPA	Various brands	700	4	4
Mecoprop	Mecoprop, Mecopex	650	4	--
Mesosulfuron-methyl	Osprey	>2,000	4	4
Metham	Vapam	820	4	820
Methyl bromide	Various brands	17 ppm air	2	1
Metolachlor	Dual	2,534	4	3-4
Metribuzin	Sencor, Lexone	1,200	4	5
Metsulfuron	Ally, Escort XP, Manor	>5,000	5	5
MH (amine)	MH-30	3,900	4	5
Molinate	Ordram	584	4	4
Monuron	Telvar	3,600	4	5
Monuron + TCA	Urox	2,300	4	--
MSMA	Weed-E-Rad, Ansar	700	4	--
Nicosulfuron	Accent	>5,000	5	4
Nitralin	Planavin	5,000	5	5
Nitrofen	Tok E-25	2,630	4	--
Norea	Herban	2,500	4	--
Norflurazon	Zorial,Solicam	>8,000	5	4
NPA	Alanap (Na. salt)	1,770	4	5
Oryzalin	Surflan	>500	4	4
Oxadiazon	Ronstar	>5,000	5	5
Oxyfluorfen	Goal	>5,000	5	2-3
Paraquat	Gramoxone Max	138	3	2
PBA	Benzac, Zobar	960	4	--
PCP (Na. salt)	Weedbeads	210	3	1
Pebulate	Tillam	1,120	4	--
Pelargonic acid	Scythe	5,000	5	2-3
Pendimethalin	Prowl, Pendulum	2,679	4	4
Petroleum solvents	Various brands	-	4	1
Picloram	Tordon	8,200	5	--
PMA	PMAS, Tat-C-Lect	40	2	2
Primisulfuron	Beacon	>5,000	5	4
Prodiamine	Barricade	1,5380	6	5
Prometone	Parmitol	2,276	4	--
Prometryne	Caparol	3,750	4	--
Pronamide	Kerb	5,620	5	4
Propachlor	Ramrod	1,900	4	1,3
Propanil	Stam F-34, Rogue	1,384	4	3-4
Propazine	Milogard	>5,000	4	--
Prosulfuron	Peak, Exceed	986	4	--
Pyriclor	Daxtron	80	3	5

Table 2. Relative toxicity of selected herbicides.

Common Name or Designation	Some Common Trade Names	LD50 mg/kg	Toxicity Rating	Dermal Response
Pyridate	Tough	4,690	4	4
Pyrithiobac-sodium	Staple LX	4,000	4	5
Quinclorac	Facet, Drive	>2,610	4	5
Quizalofop	Assure	1,480	4	3-4
Rimsulfuron	Basis	>5,000	5	55
Sethoxydim	Poast, Vantage	2,676	4	3-4
Sesone	Sesone	1,000	4	--
Siduron	Tupersan	7,500	5	4
Silvex	Kuron, Weedone-TP	500	4	4
Simazine	Princep	5,000	4	5
SMDC	Vapam	820	4	3
Sodium arsenate	Atlas A, Triox	10	2	1,2
Sodium Chlorate	DeFol, Atlacide	12,000	5	4
Solan	Solan	10,000	5	--
Sulfentrazone	Authority	2,689	4	4
Sulfometuron	Oust XP	>5,000	5	4
Sulfosate	Touchdown	748	4	--
Sulfosulfuron	Outrider, Maverick	>5,000	5	5
TABLE SALT	(For comparison)	3,320	4	5
TCA	Various brands	3,370	4	2
Tebuthiuron	Spike	400	3	4
Terbacil	Sinbar	5,000	5	5
Terbutol	Azak	34,600	6	--
Thiazopyr	Mandate, Visor	>5,000	5	5
Thifensulfuron	Pinnacle	>5,000	5	5
Thiobencarb	Bolero	920	4	4
Toxynil	Centrol, Bentrol	305	3	--
Tri-allate	Avadex BW	1,675	4	4
Triclopyr	Garlon	2,140	4	4-5
Tridiphane	Tandem	1,743	4	--
Trifloxysulfuron-sodium	Envoke	>5,000	5	5
Trifluralin	Treflan	500	4	--
Vernolate	Vernam	1,780	4	--

APPENDIX A

Table 1. GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS[1,2]

		AI Concentration[3]			Rate Equivalent (4 pounds active ingredient per gallon product)		
Product	Manufacturer or Distributor	Acid (acid equivalent)	Salt (active ingredient)	Surfactant Needed	1 pint	1.5 pints	2 pints
Aqua Neat	Cerexagri	4	5.4	Yes	0.75	1.0	1.5
Buchaneer	Tenkoz	3	4	Yes*	1.0	1.5	2.0
Buchaneer Plus	Tenkoz	3	4	Yes*	1.0	1.5	2.0
Clearout 41	Chemical Product Technol	3	4	Yes*	1.0	1.5	2.0
Clearout 41 Plus	Chemical Product Technol	3	4	Yes*	1.0	1.5	2.0
Cornerstone	Agriliance	3	4	Yes*	1.0	1.5	2.0
Cornerstone Plus	Agriliance	3	4	Yes*	1.0	1.5	2.0
Credit Systemic Herbicide	Nufarm	3	4	Yes*	1.0	1.5	2.0
Credit Extra	Nufarm	3	4	No	1.0	1.5	2.0
Credit Duo	Nufarm	3	3.97	Yes*	1.0	1.5	2.0
Credit Duo Extra	Nufarm	3	3.97	No	1.0	1.5	2.0
Durango	Dow AgroSciences	4	5.4	No	0.75	1.1	1.5
Extra Credit 5	Nufarm	3.7	5	Yes*	0.8	1.2	1.6
Gly Star Plus	Albaugh	3	4	No	1.0	1.5	2.0
Gly Star 5	Albaugh	4	5.4	Yes	0.75	1.1	1.5
Gly Star Original	Albaugh	3	4	Yes*	1.0	1.5	2.0
Gly-Flo	Micro-Flo	3	4	Yes*	1.0	1.5	2.0
Glyfos X-tra	Cheminova	3	4	No	1.0	1.5	2.0
Glyfos	Cheminova	3	4	Yes*	1.0	1.5	2.0
Glyphomax	Dow AgroSciences	3	4	Yes*	1.0	1.5	2.0
Glyphomax Plus	Dow AgroSciences	3	4	No	1.0	1.5	2.0
Glyphomax XRT	Dow AgroSciences	4	5.4	No	0.75	1.1	1.5
Glyphosate 41%	Helm Agro US	3	4	Yes*	1.0	1.5	2.0
Glyphosate 4	Farmsaver.com	3	4	Yes*	1.0	1.5	2.0
Glypro	Dow AgroSciences	4	5.4	Yes*	0.75	1.1	1.5
Glypro Plus	Dow AgroSciences	3	4	No	1.0	1.5	2.0

APPENDIX A

Table 1. GLYPHOSATE PRODUCTS, FORMULATIONS AND SURFACTANT RECOMMENDATIONS[1,2]

Product	Manufacturer or Distributor	AI Concentration[3]		Surfactant Needed	Rate Equivalent (4 pounds active ingredient per gallon product)		
		Acid (acid equivalent)	Salt (active ingredient)		1 pint	1.5 pints	2 pints
continued….							
Helosate Plus	Helm Agro US	3	4	Yes*	1.0	1.5	2.0
Honcho	Monsanto	3	4	Yes*	1.0	1.5	2.0
Honcho Plus	Monsanto	3	4	Yes*	1.0	1.5	2.0
Mirage	UAP/Loveland	3	4	Yes*	1.0	1.5	2.0
Mirage Plus	UAP/Loveland	3	4	Yes*	1.0	1.5	2.0
Rattler	Helena	3	4	Yes*	1.0	1.5	2.0
Rattler Plus	Helena	3	4	Yes*	1.0	1.5	2.0
Razor	Nufarm	3	4	Yes*	1.0	1.5	2.0
Roundup OriginalMax	Monsanto	4.5	5.5	No	0.67	1.0	1.3
Roundup WeatherMax	Monsanto	4.5	5.5	No	0.67	1.0	1.3
Touchdown HiTech	Syngenta	5	--	Yes	0.6	0.9	1.2
Touchdown Total	Syngenta	4.17	--	No	0.75	1.1	1.44

[1] Table adopted from University of Arkansas Division of Agriculture publication MP-44, "Recommended Chemicals for Weed and Brush Control."

[2] Other glyphosate products exist, and some products listed may not be available in Louisiana. See label for specific crops and uses. The LSU AgCenter does not recommend or endorse specific herbicide brands.

[3] Like a few other herbicides, glyphosate's active ingredient can be expressed as either a "salt" form or the "acid equivalent" of the actual glyphosate. The glyphosate molecule is attached to the salt it is formulated with and is the true active product. The salt itself does not contribute to weed control. Therefore, because salt formulations differ in weight, a better comparison among glyphosate products is the direct comparison of actual amount of glyphosate – i.e., the acid equivalent. Both concentrations generally are given on the label.

* Some formulations of glyphosate contain some surfactant. Additional surfactant is required with certain spray volumes, however. For other formulations, additional surfactant should not be added when the product is used alone. See label for specific surfactant rates and uses.

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