2020

Louisiana Suggested Chemical Weed Management Guide

LSU AgCenter
Research · Extension · Teaching

LOUISIANA SUGGESTED CHEMICAL WEED MANAGEMENT GUIDE
2020
Table of Contents

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herbicide or certain uses of a herbicide be canceled by federal or state agencies, suggestions thus affected herein are no longer applicable.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 assure 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 (GPM) or larger. Considerable agitation is necessary to keep wettable powders in suspension. 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 that 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 applied 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 know that you are applying only the recommended amount.

Every herbicide has a rain-free (rain-fastness) time requirement to achieve proper efficacy. Herbicide labels should be consulted prior to application to determine the rain-free time requirement.

HANDLE PESTICIDES SAFELY

- Read the pesticide label prior to purchasing, mixing and applying the pesticide to ensure that the user has the correct product for the job and that the user knows how to use the product safely and correctly.
- Follow label directions.
- Observe safety precautions on the pesticide label, such as "Keep out of Reach of Children."
- Wear personal protective equipment that is listed on the label when performing pesticide handling tasks. The label will list the minimum amount that an applicator should wear.
- Do not eat, drink, use tobacco products, or go to the bathroom while handling pesticides. Be sure to wash your hands before doing any of the listed tasks after handling pesticides.
- Mix only the amount of pesticide you need. Do not store diluted pesticide for later use.
- Always store pesticides in their original containers. Never store pesticide in containers that can be confused for food or drink.
- Avoid mixing or applying pesticides near wells or open water.
- Refer the pesticide label under "Directions for Use" for more information on how to use the pesticide safely and correctly.
- At the completion of pesticide applications, the applicator should triple rinse the spray container.

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 these 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.

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 container label. Please consult Safety Data Sheets (SDS) for herbicides to determine toxicity information prior to use.

HERBICIDE LABELS

State and federal agencies regulate herbicide use through the issuance of herbicide labels, which are the directions for herbicide use and have the effect of federal law. 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. Herbicide users should understand three different types of labels, each addressed by a specific section of FIFRA.

SECTION 3 – The most comprehensive registration granted. This registration shows the United States 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 – A state will petition the U.S. EPA for an emergency exemption label to control a specific weed problem not adequately addressed by any Section 3-labeled herbicides that poses a threat to crop production. Before determining issuance of a Section 18 label, each Section 18 petition is scrutinized by U.S. EPA. If the label is issued, the herbicide use is very clearly defined. If the U.S. 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.

Worker Protection Standard (WPS)

The Environmental Protection Agency (EPA) Agricultural Worker Protection Standard (WPS) is aimed at reducing the risk of pesticide poisoning and injury among agricultural workers and pesticide handlers. Pesticide applicators must comply with this rule when using agricultural use pesticide products that reference the Worker Protection Standard, 40 CFR 170. In 2015, the EPA made major revisions to the Worker Protection Standard (WPS).

The LSU AgCenter has worked to provide an updated WPS Train-the-Trainer program that has been approved by the EPA. In Louisiana those employers that want to train their own workers and handlers must be a certified applicator and go through the new WPS Train-the-Trainer program with the LSU AgCenter. All workers and handlers must now be trained on an annual basis. If you went through a WPS Train-the-Trainer program prior to November of 2016 then you will have to attend a new WPS Train-the-Trainer program. Once you have completed that program WPS Trainer will be added to the back of your pesticide certification card and you will then be able to go to your normal recertification meeting to have that category recertified.

Training dates and locations can be found at www.lsuagcenter.com/pesticide
If you would like to participate in a WPS Train-the-Trainer Program, please email kbrown@agcenter.lsu.edu.

As part of the revised rule there are a few things that need to be pointed out.

- Workers and handlers must be trained every 12 months.
- WPS Trainers must go through the new EPA approved Train-the-Trainer Program (see information above).
- Workers and handlers must be trained by using EPA-approved training materials.
- No longer using the card system for records of training. You must maintain the following information:
  - Trained worker's printed name and signature.
  - Date of the training.
  - Information identifying which EPA-approved training materials were used.
  - The trainer's name and qualification to train.
    - The worker or handler employer's name. The LSU AgCenter has created a form that you are welcome to use. If you would like to download training verification form for WPS.
- Must retain records of training of workers and handlers for two years.
- Maintain the following information at a central location:
  - New safety poster: https://npsecstore.com/collections/posters.
  - Application records.
  - Emergency medical contact information.
  - SDS (safety information).
- When using a pesticide that requires a respirator, employers must:
  - Have an employee medically evaluated by a physician or other licensed health care professional.
  - Have employee go through an annual fit test for each type of respirator required by the pesticide product label.
  - Have the employee participate in annual training on how to properly use the respirator(s).
  - Maintain records for two years of the completion of the above requirements.

The How to Comply Manual is a great reference guide and can be ordered at npsecstore.com.

To get more information about the WPS revised rule, you will need to refer to the final rule at https://www.epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps.

Where to get updated information:

- www.lsuagcenter.com/pesticide.
- https://npsecstore.com/ (where to get the new poster).
- http://pesticideresources.org/stage//index.html (where to get EPA approved training materials).

Paraquat Training Requirements

Paraquat Dichloride, also known as paraquat, is a widely used product in Louisiana in many of the state's commodities. Since 2000, 17 deaths have been caused by accidental ingestion of paraquat in the U.S. Many of these deaths resulted from people illegally transferring the pesticide to beverage containers and the victim later mistaking it for a drink.

To assist in preventing these tragedies, product manufactures will be required by the Environmental Protection Agency (EPA) to have new label requirements that

emphasize paraquat toxicity and supplemental warning materials. Also, the new labels will restrict the use of paraquat products to certified applicators only. Companies are required to have the newly labeled product on the market after November 14, 2019; some may produce and sell newly labeled product before that date.

The new label requirements will require anyone handling paraquat to be a certified applicator and require handlers to complete a training module for certified applicators using paraquat. This training was developed by paraquat manufacturers as part of the EPA's 2016 risk mitigation requirements and has been approved by the EPA. The training covers paraquat toxicity, new label requirements and restrictions, consequences of misuse, and other important information.

Paraquat is a restricted use pesticide for use only by a certified applicator. This new restriction applies to mixing, loading, and applying paraquat, as well as other pesticide handling activities.

Applicators that are using this product, with the new label, will be required to be a certified pesticide applicator and must take an EPA approved training course. In addition to this training, applicators will be required to take a 15-question exam and score 100%. The certification awarded for this product specific training will be good for three years once an applicator has completed this training and passed the exam. The training is only available online at this time and is produced by the product manufacturer. The training can be found online at http://usparaquattraining.com.

Once applicators have completed the required training and testing for the product, they will receive a certificate documenting completion of the requirement. It is the applicator's responsibility to save that documentation. Applicators will need this documentation and current certification with the Louisiana Department of Agriculture and Forestry (LDAF) in order to purchase paraquat products.

In Summary, when purchasing the newly labeled product:

- Product may ONLY be mixed, loaded, or applied by certified applicator who has successfully completed the paraquat-specific training before use.
- Application "under the direct supervision" of a certified applicator is NO LONGER allowed.
- Training must be repeated every three years.
- Training is only available online currently at the link below: http://usparaquattraining.com
- Applicators should maintain their own certification records.

For more information on how to become a certified applicator in Louisiana, please contact the LSU AgCenter Pesticide Safety Education Program. www.lsuagcenter.com/pesticide

For more information from the EPA: https://www.epa.gov/pesticides/paraquat-certified-applicator-training-prevent-poisonings-now-available

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 and how those results affect herbicide use. Much more information is available at these internet sites: U.S. EPA Office of Pesticide Programs http://www.epa.gov/pesticides/; FDA (Food and Drug Administration) www.fda.gov/. In addition, herbicide labels and MSDS sheets can found at http://www.cdms.net/LabelsMsds/LMDefault.aspx, http://www.agrian.com/home/ or the herbicide manufacturer's website.

The information given here is for educational purposes only, References to commercial products, trade names, or suppliers are made with the understanding that no endorsement is implied and that no discrimination against other products or suppliers is intended. Additionally, references to commercial products do not guarantee or warrant the standards of those products.

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WEED RESISTANCE

Weed resistance is defined by the Weed Science Society of America (WSSA) as the inherited ability of a plant to survive and reproduce after exposure to a dose of herbicide normally lethal to the wild type. In a plant, resistance may be naturally occurring or induced by such techniques as genetic engineering or selection of variants produced by tissue culture or mutagenesis (WSSA). Repeated applications of the same herbicide or a different herbicide with a similar mode of action on the same field in consecutive years has contributed to the widespread occurrence of resistance to herbicides in several weed species around the world, in the U.S. and in Louisiana (see list below). Weed management programs must not solely depend on herbicides to be economically sustainable in the long term. A combination of the following management strategies is recommended:

1. Use residual herbicides.
2. Rotate different crops.
3. Rotate herbicides with different modes of action.
4. Tank-mix herbicides with different modes of action at full recommended rates.
5. Avoid sequential applications of the same herbicide.
6. Utilize tillage, cultivation or other cultural practices whenever and wherever feasible.
7. Clean equipment thoroughly before and after each use.
8. Control weeds on fallow ground or set aside to prevent spreading of documented or suspected resistant weeds.

If you suspect resistance after a herbicide application, attempt to eradicate the escapes using mechanical methods (e.g., hand-removal, tillage). DO NOT ALLOW WEEDS TO PRODUCE SEED. If seeds are produced, collect a seed sample from suspect plants and take to your parish LSU AgCenter extension agent who will have them screened by an LSU AgCenter scientist and inform you if the population is resistant.

HERBICIDE-RESISTANT WEEDS IN LOUISIANA

Weed	Herbicide
Amazon sprangletop	cyhalofop-butyl, fenoxaprop-P-butyl
Barnyardgrass	propanil, quinclorac, imazethapyr
Common cocklebur	MSMA, DSMA
Italian ryegrass	glyphosate
Itchgrass	fluazifop-P-butyl
Johnsongrass	glyphosate, fluazifop-P-butyl, clethodim
Palmer amaranth	glyphosate
Rice flatsedge	halosulfuron
Waterhemp	glyphosate

HERBICIDE MODE OF ACTION

WSSA Group	HRAC Group	Site of Action	Chemical Family	Active Ingredient
1	**A**	Inhibition of acetyl CoA carboxylase (ACCase)	Aryloxyphenoxy-propionate 'FOPs'	clodinafop cyhalofop-butyl diclofop-methyl fenoxaprop-P-ethyl fluazifop-P-butyl quizalofop-P-ethyl
			Cyclohexanedione 'DIMs'	clethodim sethoxydim tralkoxydim
			Phenylpyrazoline 'DEN'	pinoxaden
2	**B**	Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS)	Sulfonylurea	bensulfuron-methyl chlorimuron-ethyl chlorsulfuron flazasulfuron foramsulfuron halosulfuron-methyl iodosulfuron mesosulfuron metsulfuron-methyl nicosulfuron primisulfuron-methyl prosulfuron rimsulfuron sulfometuron-methyl sulfosulfuron thifensulfuron-methyl tribenuron-methyl trifloxysulfuron
			Imidazolinone	imazamox imazapic imazapyr imazaquin imazethapyr
		Inhibition of acetolactate synthase ALS (acetohydroxyacid synthase AHAS): continued	Triazolopyrimidine	cloransulam-methyl diclosulam flumetsulam penoxsulam

WSSA Group	HRAC Group	Site of Action	Chemical Family	Active Ingredient
			Pyrimidinyl(thio)benzoate	bispyribac-Na pyrithiobac-Na
5	**C1**	Inhibition of photosynthesis at photosystem II	Triazine	atrazine prometryn simazine
			Triazinone	hexazinone metribuzin
			Uracil	bromacil terbacil
7	**C2**	Inhibition of photosynthesis at photosystem II	Urea	diuron fluometuron (see F3) linuron siduron tebuthiuron
			Amide	propanil
6	**C3**	Inhibition of photosynthesis at photosystem II	Nitrile	bromoxynil
			Benzothiadiazinone	bentazon
22	**D**	Photosystem-I-electron diversion	Bipyridylium	diquat paraquat
14	**E**	Inhibition of protoporphyrinogen oxidase (PPO)	Diphenylether	acifluorfen-Na fomesafen lactofen oxyfluorfen
			Phenylpyrazole	pyraflufen-ethyl
			N-phenylphthalimide	flumioxazin flumiclorac-pentyl
		Inhibition of protoporphyrinogen oxidase (PPO): continued	Thiadiazole	fluthiacet-methyl
			Oxadiazole	oxadiazon
			Triazolinone	carfentrazone-ethyl sulfentrazone
12	**F1**	Inhibition of carotenoid biosynthesis at the phytoene desaturase step (Bleacher)	Pyridazinone	norflurazon
27	**F2**	Inhibition of 4-hydroxyphenyl-pyruvate-dioxygenase (4-HPPD) (Bleacher)	Triketone	mesotrione tembotrione
			Isoxazole	isoxaflutole
			Pyrazolone	topramezone
13		Inhibition of carotenoid biosynthesis (unknown target) (Bleacher)	Isoxazolidinone	clomazone
			Urea	fluometuron (see C2)

WSSA Group	HRAC Group	Site of Action	Chemical Family	Active Ingredient
9	**G**	Inhibition of EPSP synthase	Glycine	glyphosate
10	**H**	Inhibition of glutamine synthetase	Phosphinic acid	glufosinate-ammonium
18	**I**	Inhibition of DHP (dihydropteroate) synthase	Carbamate	asulam
3	**K1**	Microtubule assembly inhibition	Dinitroaniline	benefin = benfluralin ethalfluralin oryzalin pendimethalin trifluralin
			Pyridine	dithiopyr
			Benzamide	propyzamide = pronamide
			Benzoic acid	DCPA = chlorthal-dimethyl
15	**K3**	Inhibition of VLCFAs (Inhibition of cell division)	Chloroacetamide	acetochlor alachlor dimethenamid-P metolachlor
			Acetamide	napropamide
			Oxyacetamide	flufenacet
			Pyrazole	pyroxasulfone
20	**L**	Inhibition of cell wall (cellulose) synthesis	Nitrile	dichlobenil
21			Benzamide	isoxaben
8	**N**	Inhibition of lipid synthesis - not ACCase inhibition	Thiocarbamate	butylate EPTC molinate thiobencarb = benthiocarb
			Phosphorodithioate	bensulide
			Benzofuran	ethofumesate
4	**O**	Action like indole acetic acid (synthetic auxins)	Phenoxy-carboxylic-acid	2,4-D 2,4-DB MCPA mecoprop = MCPP = CMPP
			Benzoic acid	dicamba
			Pyridine carboxylic acid	aminopyralid clopyralid florpyrauxifen fluroxypyr halauxifen picloram triclopyr
			Quinoline carboxylic acid	quinclorac
			Arylpicolinate	halauxifen

WSSA Group	HRAC Group	Site of Action	Chemical Family	Active Ingredient
19	**P**	Inhibition of auxin transport	Phthalamate Semicarbazone	naptalam diflufenzopyr-Na
25	**Z**	Unknown herbicide mode of action	Organoarsenical Unclassified	DSMA and MSMA aminocyclopyrachlor

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

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 utilization. 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, rye, vetch, winter peas and tillage radish among others. Consequently, proper weed identification and herbicide selection are keys to a successful preplant burndown weed control program.

More than 20 "winter weeds" are commonly found in fields throughout Louisiana. However, only a few key species necessitate selection of the most effective herbicide program. Glyphosate and paraquat continue to be the "backbone" of most burndown herbicide programs. Each product exhibits specific strengths and weaknesses. Tank-mixtures with other herbicides 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 can be beneficial when "hard water" (water containing mineral salts, including iron, calcium and magnesium) is used as the carrier. These conditions are more often observed in private wells and not municipal water sources.

Glyphosate provides good-to-excellent control of annual bluegrass, Carolina foxtail, little barley, buttercup species, chickweed species, dandelion, horseweed (mare's-tail), shepherd's-purse, bittercress and Virginia pepperweed. Control of geranium species, curly dock, henbit, cutleaf evening-primrose, smartweed species and legume cover crops has been poor to fair. Tank-mixture with other herbicides can improve control of these weeds as presented in Table 1.

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, horseweed (mare's-tail), smartweed species, swinecress, legume cover crops and Virginia pepperweed has been poor. Tank-mix partners increase activity of paraquat on these species (Table 1).

Liberty 280 SL is effective on numerous winter weeds found in Louisiana (Table 1). Activity of the herbicide is under higher temperatures than the activity observed with glyphosate or paraquat. Although it is an excellent burndown herbicide, producers are limited in the amount of Liberty 280 SL that can be used per season including burndown timing. In some cases, producers are well advised to save their Liberty 280 SL for managing weeds within the growing crop.

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 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. Cutworms are able to feed on decaying vegetation. Therefore, a herbicide application six to eight weeks prior to planting is preferable. Labeled pyrethroid insecticides can be used in combination with a burndown herbicide or at-planting[1] 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. Recent research has shown that even when insects are managed, weeds like cutleaf evening-primrose and swinecress will reduce crop yield when not removed well in advance of planting. In a five-year study, corn yield was 15 to 25 percent higher when weeds were removed four weeks before planting compared to two weeks.

USE OF FALL- OR SPRING-APPLIED RESIDUAL HERBICIDES FOR MANAGING TROUBLESOME WEEDS

Increased problems in managing weeds like henbit and Italian ryegrass in the spring have led to increased interest in fall herbicide programs. Research has shown that an application of a residual herbicide in the fall can assist spring herbicide applications for preplant burndown in overall management of numerous troublesome weeds. Applications in Louisiana are optimum beginning around November 15. Numerous herbicides provide good control of grass and broadleaf winter annual weeds (Table 2).

In some cases, the soil 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.**

Following the spring burndown herbicide application, weeds may re-grow or new weeds may germinate when the treatment is applied six to eight weeks prior to planting. In these situations, use of residual herbicides such as Goal 2XL, Valor, Canopy EX, Envive, Enlite, Leadoff, and Valor XLT with glyphosate, paraquat, or

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

glufosinate can be beneficial in increasing control of existing weeds or provide soil residual control. However, they perform best as residual herbicides used earlier in the season (January and early February) or closer to planting. 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 burndown timings. Sequential applications of glyphosate or paraquat are also very effective and may eliminate the need for tank-mixes. Glyphosate applied alone or in tank mixture six weeks prior to planting followed by paraquat or glufosinate at planting is an excellent weed control program.

Plant-back restrictions can influence which residual herbicide that is selected. Table 4 provides a list of the plant-back restrictions for commonly used fall- and spring-applied herbicides for major crops in Louisiana.

GLYPHOSATE-RESISTANT HORSEWEED (MARE'S-TAIL) and ITALIAN RYEGRASS

Glyphosate-resistant horseweed (mare's-tail) is present in Louisiana. In Louisiana, few acres receive a burndown application composed strictly of glyphosate because of weeds that are difficult to control with glyphosate alone. Thorough scouting and tank-mixes with herbicides will control glyphosate-resistant horseweed (mare's-tail). It is recommended that 8 to12 oz/A labeled dicamba formulations be tank-mixed with glyphosate when horseweed (mare's-tail) is present, whether glyphosate-resistance is suspected or not. Herbicides such as Leadoff, Canopy EX, Envive, or 2,4-D can exhibit good activity on emerged horseweed (mare's-tail) but not to the level of dicamba. Fall application of Leadoff, Canopy EX, Envive, Envoke, Valor XLT, Fierce, or Valor prior to horseweed (mare's-tail) emergence provides excellent residual control. Please consult individual product labels for rates, precautions, and plant-back restrictions.

Preliminary data indicates that glyphosate-resistant Italian ryegrass is present in Louisiana. Producers are encouraged to closely monitor Italian ryegrass populations. Mississippi State University weed scientists have developed a glyphosate-resistant Italian ryegrass management plan that has been adopted by LSU AgCenter weed scientists. Management of glyphosate-resistant Italian ryegrass depends upon the crop to be planted in the spring and can be divided into a fall, winter or spring management timing, but research has shown greater Italian ryegrass control when control measures are initiated in the fall followed by a winter or spring herbicide application. Fields should be double-disked (all crops) or treated with Command (rice only) at 2 pt/A, Boundary (soybean) at 2.0 pt/A, Dual Magnum or equivalent (corn, cotton, and soybean) at 1.33 to 1.67 pt/A, Zidua (corn, cotton, soybean) at 2.5 oz/A, or trifluralin (cotton and soybean) at 3 pt/A in mid-October to mid-November. Emerged glyphosate-resistant Italian ryegrass will not be controlled by these products; therefore, these products should be tank-mixed with paraquat at 0.5 to 0.75 lb a.i./A. Regardless of which fall control measure is utilized, fields should be scouted in January/February, and if glyphosate-resistant Italian ryegrass has emerged, Select Max at 12 to 16 oz/A (or equivalent rate of 1, 2 or 3 lb clethodim formulation) should be applied. Preplant applications of Select Max or any other clethodim formulation should be made at least 30 days before planting corn or rice. Multiple applications of Select Max or any other clethodim formulation are discouraged to prevent development of resistance to this herbicide. If no control measures are initiated in the fall or winter, or if glyphosate-resistant Italian ryegrass was not observed earlier, paraquat at 0.75 to 1.0 lb a.i./A should be applied when resistance is identified. Research has shown that the addition of atrazine (corn) at 1 qt/A, metribuzin (soybean) at 4 oz/A, or diuron (cotton) at 1.5 pt/A will increase efficacy of paraquat against glyphosate-resistant Italian ryegrass. Sequential applications should be based on careful scouting for emerged glyphosate-resistant Italian ryegrass.

SUMMARY

Burndown 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.

Guidelines for Choosing a Burndown 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, horseweed (mare's-tail), swinecress, speedwell, groundsel, Virginia pepperweed or wheat is the target vegetation. Use paraquat if a geranium species or henbit is the primary weed present.
4. If glyphosate-resistant Italian ryegrass or horseweed (mare's-tail) is suspected or confirmed, utilize alternative/complimentary residual or postemergence herbicides based upon research.
5. 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.
6. Carolina foxtail, curly dock, cutleaf evening-primrose, clover species, dandelion, groundsel, henbit, horseweed (mare's-tail), smartweed, speedwell, swinecress, Virginia pepperweed and legume cover crop control can be increased when paraquat is tank-mixed with other herbicides.
7. Consider using an insecticide program that controls cutworms if any live vegetation is present at planting.

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

Table 1. Effectiveness of selected spring-applied herbicides and/or herbicide combinations for controlling winter vegetation.

	Paraquat	Paraquat + Goal 2XL	Paraquat + Harmony Extra	Paraquat + Firstshot	Paraquat + Clarity	Paraquat + 2,4-D	Glyphosate	Glyphosate + Goal	Glyphosate + Harmony Extra	Glyphosate + FirstShot	Glyphosate + Clarity	Glyphosate + 2,4-D	Clarity	2,4-D	Glyphosate + Valor	Glufosinate
Annual bluegrass (2-6")	9	9	9	9	9	9	9	9	9	9	9	9	0	0	9	9
Ryegrass (6-10")	4	5	5	5	4	4	7	7	7	7	7	7	0	0	7	6
Carolina foxtail (2-6")	8	9	8	8	8	8	9	9	9	9	8	9	0	0	9	9
Little barley (2-6")	9	9	9	9	9	9	9	9	9	9	9	9	0	0	9	9
Buttercups (2-6")	9	9	9	9	9	9	9	9	9	9	9	9	-	9	9	9
Geranium spp. (2-6")	9	9	9	9	9	9	5	6	8	8	7	8	5	6	6	9
Chickweeds (2-4")	9	9	9	9	9	9	9	9	9	9	9	9	3	3	9	9
Curly dock (6-8")	4	5	7	7	7	7	6	7	9	9	8	9	8	7	8	8
Cutleaf eveningprimrose (6-8")	4	7	8	8	8	9	4	6	7	7	8	9	8	9	6	8
Cutleaf eveningprimrose (2-5")	4	7	8	8	8	9	5	8	7	7	8	9	8	9	8	9
Clovers/medics (2-6")	6	8	9	9	8	8	5	7	8	8	9	9	9	9	-	9
Dandelion (4-6")	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Groundsel (2-4")	7	9	9	9	9	9	9	9	9	9	9	9	-	9	9	9
Henbit (6-8")	8	9	9	9	8	8	6	9	9	9	8	7	6	5	9	9
Horseweed (mare's-tail) (4-10")	5	7	7	7	6	6	9	9	9	9	9	9	9	6	9	9
Smartweed spp. (2-6")	4	7	9	9	8	6	7	8	9	9	9	8	8	6	9	-
Purslane speedwell (2-4")	7	8	9	9	8	8	9	9	9	9	9	9	-	5	9	-
Shepherd's purse (6-10")	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
Smallflower bittercress (6-10")	9	9	9	9	9	9	9	9	9	9	9	9	7	7	9	-
Swinecress (2-4")	2	3	7	7	6	6	7	8	9	9	8	8	7	6	8	9
Legume cover crops (6-8")	6	8	9	9	9	9	5	7	8	8	9	9	9	9	7	9
Virginia pepperweed (4-6")	2	7	7	7	9	9	9	9	9	9	9	9	-	3	9	-
Wheat (8-12")	7	8	7	7	6	6	9	9	9	9	8	9	0	0	9	7

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

Table 2. Effectiveness of selected fall-applied herbicide combinations for control of winter annual weeds 90 days after application.[1]

	annual bluegrass	buttercup species	chickweed species	cutleaf eveningprimrose	henbit	swinecress	shepherd's-purse
Canopy EX[2]	7	9	9	7	8	8	8
Dual Magnum	8	7	7	5	7	7	7
Enlite[2]	7	9	9	7	7	8	8
Envive[2]	7	9	9	7	8	8	8
Fierce	8	9	9	7	9	8	8
Goal/Galigan[3]	7	9	9	8	9	9	9
LeadOff	8	9	9	7	9	8	8
Valor	6	9	9	7	8	8	8
Valor XLT[2]	8	9	9	7	9	8	8

[1] Glyphosate at 1 lb/A or paraquat (Gramoxone SL at 1 qt/A) was tank-mixed with each residual herbicide.
[2] For use only when soybeans will be planted the following spring.
[3] Goal/Galigan must be tilled, moved, or in some way disturbed prior to planting.

Table 3. Effectiveness of burndown herbicides used in corn four weeks after application.[1]

	annual bluegrass	Italian ryegrass	Carolina foxtail	little barley	Carolina geranium	chickweed	curly dock	cutleaf evening-primrose	henbit	horseweed	speedwell	shepherdspurse	bittercress	swinecress	smartweed
2,4-D[3]	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 + Banvel/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 + LeadOff	9	8	8	9	8	9	8	9	9	8	9	9	9	9	8
paraquat[3]	8	4	7	8	8	9	4	5	5	5	6	8	8	2	4
paraquat + Goal/Galigan	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 burndown application timing and herbicide rate; (2) if surfactant or crop oil concentrate is needed in the burndown treatment; and (3) the required time period between burndown application and crop planting.
[2] Small cutleaf eveningprimrose only (4- to 5-inch rosette or less).
[3] Numerous formulations of 2,4-D and paraquat are available.

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

Table 4. Plant back restrictions (months (m) or days (d) before planting) for commonly used fall- and spring-applied burndown herbicides.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean
2,4-D	See label	See label	See label	See label	See label
Aim	none	none	none	none	none
Boundary	4m	12m	12m	8m	none
Canopy EX	See label	See label	See label	See label	none
dicamba	See label	See label	See label	See label	See label
Diuron	See label	See label	See label	See label	See label
Dual Magnum	none	none	none	12 m	none
Enlite	9m	9m	9m	9	none
Envive	see label	see label	12m	see label	none
Fierce	7d-1m	45d-2m	11-12m	10-12m	none
FirstShot	14d	14d	14d	0d	3/7d
Goal/Galigan	10m	7d	10m	10m	7d
Harmony GT XP	none	45d	45d	45d	none
LeadOff	none	30d (see label)	10m	10m	30d (see label)
glufosinate	none	none	180d	none	none
Valor	See label	See label	See label	See label	none
Valor XLT	10m (soil pH < 7.0) 18m (soil pH > 7.0)	10m (soil pH < 7.0) 30m (soil pH > 7.0)	10m (soil pH < 7.0) 18m (soil pH > 7.0)	9m (soil pH < 7.0) 18m (soil pH > 7.0)	none
Zidua	none	1-4m	6-12m	10-24m	0-4m

[1] Always consult label for specific requirements/precautions and differing restrictions based on rate, soil type, rainfall/irrigation, and/or pH.

General Fall- and Spring-Applied Programs			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
paraquat @ 0.47-0.94 lb/A	paraquat 2 or 3 lb/gal formulations @ 1.9- 3.8 pt/A or 1.25 – 2.5 pt/A	Most small annual grasses and broadleaf weeds including glyphosate-resistant ryegrass. Fair to poor activity on horseweed (mare's-tail), dock, cutleaf eveninggprimrose, smartweed, swinecress, and Virginia pepperweed.	Results in rapid plant desiccation. Provides no soil residual weed control. Use higher rates (2 – 2.5 pt/A) for ryegrass control. Labeled tank mixtures with other herbicides increases control of broadleaf weeds mentioned. Apply with NIS @ 1 qt/100 gal.
thifensulfuron methyl + titribenuron methyl @ 0.016 – 0.25 lb/A	FirstShot @ 0.5 - 0.8 oz/A	Smartweed, knotweed, dock,cutleaf evening-primrose, henbit, and other small seeded winter broadleaf weeds	Apply with glyphosate, or paraquat for improved control of annual grasses and select broadleaf weeds, especially at lower labeled use rates.
glyphosate[2] @ 1.0 lb/A	glyphosate (4 or 5 lb/gal formulations) @ 1.0qt/A or 22 oz/A	Good activity on most emerged annual grass and broadleaf weeds. Fair activity on dock, cutleaf eveningprimrose, smartweed,	Provides no soil residual activity. Labeled tank mixtures with other herbicides increases control of broadleaf weeds mentioned.

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

General Fall- and Spring-Applied Programs			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
		swinecress, buttercup, geranium, and henbit.	
glufosinate @ 0.53 – 0.79 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 29 - 43 oz/A	Annual grass and broadleaf weeds. Good alternative for control of glyphosate-resistant horseweed (mare's-tail).	Provides no soil residual activity. Optimum results have been obtained when applied under warm, high humidity conditions with bright sunlight between sunrise and 2 hrs before sunset. Do not use air induction spray tips due to potential coverage issues. Apply in a minimum of 15 GPA. Consult label for allowed tank mixtures with other herbicides listed above and below.
pyroxasulfone + flumioxazin @ 0.143-0.214 lb/A	Fierce @ 3-4.5 oz/A	Annual grass and broadleaf weeds. Good residual control of glyphosate-resistant ryegrass and horseweed (mare's-tail) with fall application.	Labeled primarily for residual fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
S-metolachlor + metribuzin @ 1.63 lb/A	Boundary @ 2 pt/A	Annual grass and broadleaf weeds. Good residual control of glyphosate-resistant ryegrass and horseweed (mare's-tail) with fall application.	Labeled primarily for residual fall and spring burndown application. Fall application is labeled from September 1-November 30. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
pyroxasulfone @ 0.053-0.213 lb/A	Zidua WG @ 1 - 2 oz/A Zidua SC @ 1.75 – 2 oz/A	Annual grass and broadleaf weeds. Good residual control of glyphosate-resistant ryegrass with fall application.	Labeled for residual fall and spring burndown application. Fall application is labeled from September 1 – December 1. Apply with glyphosate or paraquat for control of emerged grasses and broadleaves.
carfentrazone @ 0.016- 0.031 lb/A	Aim @ 1.0–1.6 oz/A.	Morningglory, hemp sesbania, pigweed, and other broadleaves. May be used to control cotton plants in replant situations.	Apply prior to cotton emergence. Provides no residual soil activity or control of emerged grasses. Apply with glyphosate or paraquat for control of emerged grasses and improved control of broadleaves. Consult label for adjuvant requirements.
2,4 D @ 0.5-1.0 lb/A	2,4-D (4L formulations) @ 1 - 2 pt/A	Good activity on buttercup, cutleaf eveningprimrose, dock, and glyphosate-resistant horseweed (mare's-tail). Fair activity on geranium and hernbit but poor on chickweed.	Provides minimal residual soil activity or control of emerged grasses. Apply with glyphosate or paraquat for control of emerged grasses and improved control of broadleaves.
dicamba @ 0.25 – 0.5 lb/A	@ Clarity @ 8 - 16 oz/A Engenia @ 6.4 – 12.8 oz/A	Good activity on glyphosate-resistant horseweed (mare's-tail), chickweed,	Provides minimal residual soil activity or control of emerged grasses. Apply with

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

General Fall- and Spring-Applied Programs			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Xtendimax @ 11 – 22 oz/A FeXapan @ 11 – 22 oz/A	and dock. Fair activity on geranium and buttercup.	glyphosate or paraquat for control of emerged grasses and improved control of broadleaves.
flumioxazin @ 0.032-0.064 lb/A	Valor SX @ 1 - 2 oz/A	Good residual activity on glyphosate-resistant horseweed (mare's-tail) in fall and annual broadleaf weeds in fall and spring. Very good residual control of smartweed.	Labeled primarily at higher rate for residual fall and spring burndown application. Lower rate aids in speed of activity in glyphosate tankmixes. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
oxyfluorfen @ 0.25-0.5 lb/A	Goal 2XL/Galigan 1 - 2 pt/A	Good residual activity on annual grass and broadleaf weeds including henbit, geranium, and smartweed	Provides good residual control plus activity on select emerged weeds. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
diuron @ 0.5-1.6 lb/A	Diuron 4L @ 0.5 – 1.6 qt/A	Most small-seeded annual grasses and broadleaf weeds	Provides good residual control plus activity on select emerged weeds. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
chlorimuron + metribuzin @ 0.281 lb/A	Canopy @ 6 oz/A	Most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including glyphosate resistant horseweed (mare's-tail) from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
chlorimuron + tribenuron @ 0.37 lb/A	Canopy EX @ 2 oz/A	Most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including glyphosate resistant horseweed (mare's-tail) from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
flumioxazin + chlorimuron @ 0.076 lb/A	Valor XLT @ 3 oz/A	Most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including glyphosate resistant horseweed (mare's-tail) from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
chlorimuron + flumioxazin + thifensulfuron @ 0.09 lb/A	Envive @ 3.5 oz/A	Most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including glyphosate resistant horseweed (mare's-tail) from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
chlorimuron + flumioxazin + thifensulfuron @ 0.105 lb/A	Enlite @ 3.5 oz/A	Most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with

GUIDELINES FOR MANAGING WINTER VEGETATION[1]

General Fall- and Spring-Applied Programs			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
		glyphosate resistant horseweed (mare's-tail) from fall application.	glyphosate or paraquat for improved control of emerged grasses and broadleaves.
rimsulfuron + thifensulfuron @ 0.5 oz/A	Leadoff @ 1.5 oz/A	Dock, smartweed, henbit and most small-seeded annual broadleaf weeds. Excellent residual control of annual winter weeds including glyphosate resistant horseweed (mare's-tail) from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
Thifensulfuron methyl @ 0.014 – 0.028 lb/A	Harmony GT XP @ 0.3 – 0.6 oz/A	Most small-seeded annual broadleaf weeds and dock. Excellent residual control of annual winter weeds from fall application.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Higher rate required for residual control of winter weeds from fall application. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves.
s-metolachlor @ 1.25 – 1.6 lb/A	Dual Magnum @ 1.33 – 1.67 pt/A	Glyphosate-resistant Italian ryegrass and small seeded annual winter weeds	Apply to prepared seedbeds between September 1 and December 1. Optimum control is generally observed when applied from late October to mid-November. Mix with paraquat to control emerged ryegrass. Incorporation to a depth of 2-3 inches will be beneficial if activating rainfall is not received soon after application.
saflufenacil @ 0.022 – 0.044 lb/A oz/A	Sharpen @ 1- 2 oz/A	Good activity on most annual broadleaf winter weeds.	Labeled for fall and spring burndown application. Optimum fall timing is late October to mid-November. Apply with glyphosate or paraquat for improved control of emerged grasses and broadleaves. Higher rate required for residual control of winter weeds from fall application. See label for specific adjuvant requirements with application.

CORN WEED MANAGEMENT

	barnyardgrass	broadleaf signalgrass	crabgrass	foxtail	seedling johnsongrass	rhizome johnsongrass	yellow nutsedge	purple nutsedge	Palmer amaranth	prickly sida	hemp sesbania	morningglory	sicklepod	hophornbeam copperleaf	smellmelon
PREEMERGENCE HERBICIDES:[1]															
atrazine (numerous formulations)	7	7	6	7	5	I	5	0	8	8	8	8	8	9	5
Anthem, Anthem Maxx	9	9	9	9	9	I	-	-	8	7	7	7	6	8	8
Bicep II Magnum, Cinch ATZ	9	8	9	9	8	I	9	I	8	8	8	8	8	9	9
S-metolachlor (numerous formulations)	8	8	9	9	7	I	7	I	9	2	2	2	2	2	I
Corvus	8	8	8	-	9	8	-	-	7	8	8	8	8	7	8
Outlook	8	8	9	9	7	I	7	I	8	2	2	2	2	2	I
Harness Xtra	9	9	9	9	7	I	6	I	9	8	8	8	8	9	9
Instigate + atrazine	8	-	-	-	8	6	-	-	9	8	8	9	9	9	8
Keystone NXT	9	9	9	-	4	I	-	-	8	8	8	8	5	9	8
Lexar EZ	9	9	9	9	7	I	9	I	9	8	8	8	8	9	9
Sharpen	I	I	I	I	I	I	-	-	9	7	6	6	5	7	7
Verdict	8	8	9	9	7	I	7	I	8	8	8	8	8	8	8
Zidua WG/Zidua SC	9	9	9	9	9	I	-	-	8	7	7	7	6	8	8
POSTEMERGENCE HERBICIDES:															
2,4-D	I	I		I	0	0	3	2	8	8	8	9	8	8	8
Accent Q	8	8	4	8	9	8	5	4	5	2	2	6	5	I	I
Armezon or Impact + atrazine	5	5	5	-	3	I	-	-	9	8	8	8	8	8	8
atrazine (numerous formulations)	7	5	6	7	3	3	3	I	8	8	7	8	7	9	9
Clarity/Banvel	0	0	0	0	0	0	0	3	8	9	9	9	7	8	8
Callisto + atrazine	7	5	6	7	3	3	3	I	9	8	8	9	8	9	9
Capreno + atrazine	9	9	9	9	8	8	-	-	8	8	9	9	9	8	9
Status	3	3	0	0	3	8	3	5	8	9	9	9	8	8	8
glyphosate[2]	9	9	9	9	9[3]	9[3]	8	8	9[3]	8	7	8	9	8	8
Halex GT[2] + atrazine	9	9	9	9	9[3]	9[3]	8	8	9	9	9	8	9	9	9
Laudis + atrazine	4	4	4	4	3	3	-	-	8	8	8	8	8	8	8
Liberty 280SL[3]	8	8	8	8	8	7	7	9	8	9	9	9	9	9	9
Realm Q + atrazine	9	-	-	-	8	8	-	-	9	8	9	9	9	9	9
Steadfast Q	9	9	8	9	9	8	5	5	-	3	3	7	6	7	7
LAYBY HERBICIDES:															
atrazine	4	4	4	4	4	I	2	0	8	0	7	8	6	9	9
diuron	6	6	6	6	6	I	2	I	8	7	6	7	7	9	9

[1] Preemergence herbicides must be activated by rainfall or overhead irrigation.

[2] For use in Roundup Ready corn hybrids. Glyphosate-resistant Italian ryegrass, johnsongrass, Palmer amaranth, and waterhemp have been documented in Louisiana.

[3] For use only in Liberty Link corn hybrids.

CORN WEED MANAGEMENT

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
REMOVAL OF PARTIAL CORN STANDS FOR REPLANTING			
clethodim @ 0.045 lb/A	Select Max 1 EC @ 6 oz/A Add 1% v/v COC + 2.5-4 lb/A AMS; see label	Roundup Ready, Liberty Link, Herculex corn hybrids	Controls failed stands up to 12 inches tall. **Do not replant within 6 days of application.** Avoid off-site movement to emerged, non-target corn.
paraquat @ 0.63-0.75 lb/A + atrazine @ 0.5 lb/A	Paraquat (2 lb/gal formulation) @ 40-48 oz/A; Paraquat (3 lb/gal formulation) @ 26.9-32 oz/A + atrazine 4L @ 16 oz/A or atrazine 90 DF @ 0.55 lb/A Add 0.25% v/v NIS or 1% COC; see label	Roundup Ready, Liberty Link, Herculex corn hybrids	**Corn may be replanted immediately.** Avoid off-site movement to emerged, non-target corn.
paraquat @ 0.63-0.75 lb/A + diuron @ 0.5 lb/A	Paraquat (2 lb/gal formulation) @ 40-48 oz/A; Paraquat (3 lb/gal formulation) @ 26.9-32 oz/A + diuron 4L @ 16 oz/A or diuron 80 DF @ 0.63 lb/A Add 0.25% v/v NIS or 1% COC; see label	Roundup Ready, Liberty Link, Herculex corn hybrids	**Corn may be replanted immediately.** Avoid off-site movement to emerged, non-target corn
PREEMERGENCE:			
atrazine @ 2.0 lb/A (1.6 lb/A on highly erodible soils)	90 DF formulations @ 2.2 lb/A 4L formulations @ 2 qt/A Reduce rate by 25% on highly erodible soils.	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, load or use within 50 ft of a well. Use a device to prevent back siphoning when mixing.
pyroxasulfone @ 0.08 – 0.212 lb/A + fluthiacet-methyl @ 0.002 – 0.006 lb/A	Anthem @ 5-10 oz/A Anthem Maxx @ 2.5-5.5 oz/A Rate depends upon soil type. See label.	Most annual grasses	Apply to the bare soil surface after planting but before weeds emerge. May also be used after corn emergence; consult label. Organic matter influences use rate; consult label.
pyroxasulfone @ 0.11 – 0.25 lb/A + fluthiacet-methyl @ 0.003 – 0.007 lb/A + atrazine @ 0.9 – 2.0 lb/A	Anthem ATZ @ 1.75-4 pt/A Rate depends upon soil type. See label.	Most annual grasses and broadleaf weeds	Apply to the bare soil surface after planting but before weeds emerge. May also be used after corn emergence; consult label. An 18-month crop rotation restriction for all crops other than corn. Organic matter influences use rate; consult label.

CORN WEED MANAGEMENT

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
S-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Bicep II Magnum / Cinch ATZ @ 1.3-2.1 qt/A Rate depends upon soil type. See label.	Most small-seeded annual grasses and broadleaf weeds	See comments for atrazine and S-metolachlor. Apply to the bare soils surface after planting but before weeds emerge Do not apply with liquid fertilizer. See the Bicep II Magnum or Cinch ATZ label for other tank-mixtures.
thiencarbazone-methyl @ 0.02-0.033 lb/A + isoxaflutole @ 0.049-0.082	Corvus @ 3.33-5.6 oz/A Rate depends upon soil type. See label.	Seedling and rhizome johnsongrass. Most annual grasses and broadleaf weeds.	Do not apply if water table is less than 25 feet below ground surface. Consult label for crop rotation restrictions. Organic matter and soil pH influence use rate; consult label. Do not use on fields treated with organophosphate or carbamate insecticides. Tank-mixing Corvus with atrazine at 1.5 lb/A will increase spectrum of weeds controlled; consult label.
S-metolachlor[3] @ 0.95-1.27 lb/A	Various Trade Names 7.64 lb/gal formulation @ 1-1.33 pt/A Rate depends upon soil type. See label.	Most annual grasses including broadleaf signalgrass, seeding johnsongrass 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.
acetochlor @ 1.9-2.8 lb/A + atrazine @ 0.76-1.1	Harness Xtra @ 1.8-2.6 qt/A Rate depends upon soil type. See label.	Most annual grasses and broadleaf weeds	Apply after planting before weeds emerge. See comments for acetochlor and atrazine. Adjust rates per label if OM > 3%.
acetochlor @ 1.1-1.9 lb/A + atrazine @ 0.9-1.6 lb/A	Keystone Nxt @ 1.4-2.5 qt/A Rate depends upon soil type. See label.	Most annual grasses and broadleaf weeds	Apply after planting before weeds emerge. See comments for acetochlor and atrazine. Adjust rates per label if OM > 3%.
rimsulfuron @ 0.02 lb/A + mesotrione @ 0.16 lb/A	Instigate @ 6 oz/A	Most annual grasses and broadleaf weeds	Apply before or after planting. Do not apply Callisto, Laudis or Armezon/Impact in same season as Instigate. Do not apply to coarse textured soils. Do not apply organophosphate insecticide in same season. Allow four weeks after application to apply another herbicide containing rimsulfuron. Tank-mixing atrazine at 1.5 lb/A will increase spectrum of weeds controlled.
S-metolachlor @ 1.3 lb/A + atrazine @ 1.3 lb/A + mesotrione @ 0.168 lb/A	Lexar EZ @ 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 layby following this treatment. 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

CORN WEED MANAGEMENT

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			other OP insecticides were used at planting; consult label.
PREEMERGENCE continued:			
dimethenamid @ 0.56- 0.84 lb/A	Outlook 6L @ 12-18 oz/A Rate depends upon soil type. See label.	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.
saflufenacil @ 0.05-0.07 lb/A	Sharpen @ 2-3 oz/A	Broadleaf weeds. Does not control grasses.	Use lower rates on coarse soils. Sharpen should be applied with additional herbicide for control of grasses. Do not apply after corn emergence. Do not apply where an organophosphate or carbamate insecticide is planned. Do not apply more than 6 oz/A per year.
saflufenacil @ 0.02-0.03 lb/A + dimethenamid-P @ 0.07-0.12 lb/A	Verdict @ 10-18 oz/A Rate depends upon soil type. See label.	Small seeded grasses and broadleaf weeds	Apply to the soil surface after planting, but before corn and weed emergence. Application following corn emergence will cause severe corn injury. Do not use on fields treated with organophosphate or carbamate insecticides. Tank-mixing Verdict with atrazine at 1.5 lb/A will increase spectrum of weeds controlled.
pyroxasulfone @ 0.08-0.21lb/A	Zidua WG @ 1.5-4 oz/A Zidua SC @ 2.5-6.5 oz/A Rate depends upon soil type. See label.	Most annual grasses and broadleaf weeds	Apply to the bare soil surface after planting but before weeds emerge. May also be used before planting; consult label. Only crops listed on Zidua label can be planted the following year. Tank-mixing Zidua with atrazine at 1.5 lb/A will increase spectrum of weeds controlled.
POSTEMERGENCE:			
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 inches tall or after grain is dented. Do not treat at tasseling and silking stage. If necessary, to spray after corn is 15 inches tall but before tasseling, do not spray in whorl. Under certain conditions injury is possible; consult label.
nicosulfuron @ 0.0.31 lb/A	Accent Q @ 0.9 oz/A Add 0.25% v/v NIS or 1% COC; see label plus 2 qt/A UAN; consult label for correct adjuvant system when mixing with other herbicides.	Annual grasses, johnsongrass, pigweeds and morninglories. Can be erratic on broadleaf signalgrass, crabgrass and yellow foxtail.	Apply to corn up to 20 inches tall. Do not broadcast after the 6-leaf stage. Can be applied with drop nozzles up to 36 inches tall (V10) corn; consult label. Do not apply to corn treated with Counter 15 G; consult label. Tank-mixing Accent Q with atrazine at 1.0 lb/A and/or glyphosate (Roundup Ready corn) will broaden the spectrum of weeds controlled. If tank-mixed with atrazine, observe 12-inch corn application limit. See the Accent Q label for other tank-mixtures.
pyroxasulfone @ 0.081 – 0.195 lb/A + fluthiacet-methyl @ 0.002 – 0.006 lb/A	Anthem @ 4-12 oz/A	Most annual grasses and broadleaf weeds	Apply before corn exceeds V4 growth stage. Better results if applied for residual control of weeds. May also

CORN WEED MANAGEMENT

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Anthem Maxx @ 2-6 oz/A Add 0.25% v/v NIS or 1% COC; see label Rate depends upon soil type. See label.		be used before or at planting; consult label. An 18-month crop rotation restriction for all crops other than corn. Tank-mixing Anthem with atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Anthem label for other tank-mixtures.
POSTEMERGENCE continued:			
toporamazone @ 0.016 lb/A	Armezon or Impact @ 0.75 oz/A Apply with 1% v/v MSO or COC and 28%-32% 1.25-2.5% v/v UAN or 8.5-17% w/v AMS	Annual grasses and broadleaf weeds	Apply to corn up V8 growth stage. Tank-mixing Armezon or Impact with atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. If tank-mixed with atrazine, observe 12-inch corn application limit. See the Armezon or Impact label for other tank-mixtures.
atrazine @ 2.0 lb/A	90 DF formulations @ 2.2 lb/A 4L formulations @ 2 qt/A Add 1% v/v COC	Most broadleaf weeds and some grasses; grasses must be very small to obtain control.	Apply before weeds exceed 1.5 inches or corn exceeds 12 inches 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. Tank-mixing atrazine with glyphosate (Roundup Ready corn) or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the atrazine label for other tank-mixtures.
S-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Bicep II Magnum @ 1.3-2.1 qt/A Rate depends upon soil type. See label.	Most small seeded annual grasses and broadleaf weeds	See comments for atrazine and S-metolachlor above. Apply before weeds emerge and corn reaches the V4 growth stage or 12 inches in height. Do not apply with liquid fertilizer. Tank-mixing atrazine with glyphosate (Roundup Ready corn) or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Bicep II Magnum label for other tank-mixtures.
mesotrione @ 0.094 lb/A	Callisto @ 3 oz/A Add 1% v/v COC	Many broadleaf weeds, including copperleaf, broadleaf signalgrass (<2 inches) and large crabgrass (<2 inches); weak on most grasses; Callisto alone will not control prickly sida and most morningglories.	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 planting; consult label for other use restrictions. Do not tank-mix with MSO blend adjuvants. Tank-mixing Callisto with atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Callisto label for other tank-mixtures.
thiencarbazone-methyl @ 0.13 lb/A + tembotrione @ 0.07 lb/A	Capreno @ 3 oz/A Add 1% v/v COC	Seedling and rhizome johnsongrass. Most annual grasses and broadleaf weeds.	Apply before corn exceeds 12 inches in height. Corn injury may occur is rainfall does not occur within 3 weeks after application. Do not use on fields treated with Counter; consult label. Tank-mixing Capreno with

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Capreno label for other tank-mixtures.
POSTEMERGENCE continued:			
dicamba @ 0.25-0.5 lb/A	Clarity or Banvel @ 0.5-1 pt/A Add 0.25% v/v NIS; consult label for precautions	Most broadleaf weeds	Apply after corn emergence before the 5-leaf stage or corn is 8 inches tall. During periods of rapid growth temporary leaning may occur. Do not cultivate until corn recovers. Do not use crop oil. May be used on corn 8-24 inches tall at a reduced rate; consult label. Tank-mixing Clarity or Banvel with atrazine at 1.0 lb/A and/or glyphosate (Roundup Ready corn) will broaden the spectrum of weeds controlled. See the Clarity or Banvel label for other tank-mixtures.
glyphosate[4] @ 0.94-1.05 lb/A + *S*-metolachlor @ 0.94-1.05 lb/A + mesotrione @ 0.09-0.11 lb/A	Halex GT[5] @ 3.6-4.0 pt/A Add 0.25% v/v NIS @ plus 8.5-17% w/v AMS	Most annual grass and broadleaf weeds; good residual control is tank-mixed with atrazine.	**Glyphosate-tolerant Corn Only.** Apply from emergence 30-inch tall corn or V8 growth stage. 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. Tank-mixing Halex GT with atrazine at 1.0 lb/A will broaden the spectrum of weeds controlled.
topramezone @ 0.016-0.02 lb/A + atrazine @ 1.14-1.53 lb/A	Impact Z @ 8-10.7 oz/A Add 1-1.5% v/v MSO If applied to small corn, use 0.25% v/v NIS	Annual grass and broadleaf weeds; higher rate required for annual grass control	Corn under environmental stress may show transient bleaching on leaves following application. Do not apply if corn greater than 12 inches tall. Should be tank-mixed with glyphosate to broaden weed spectrum.
tembotrione @ 0.08 lb/A	Laudis @ 3 oz/A Add 1% v/v MSO	Many broadleaf weeds. Laudis alone will not control most morningglories.	Apply before weeds are 4 inches tall. Do not use if Counter was used at planting. Consult label for other use restrictions. Tank-mixing Laudis with atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Laudis label for other tank-mixtures.
S-metolachlor @ 1.3 lb/A + atrazine @ 1.3 lb/A + mesotrione @ 0.168 lb/A	Lexar EZ @ 3 qt/A	Most small seeded grasses and broadleaf weeds	See comments in preemergence section. Apply before weeds emerge and corn is 12 inches tall. If weeds are present, apply with NIS at 1qt/100 gal. Do not apply with liquid fertilizer. Tank-mixing Lexar EZ with glyphosate (Roundup Ready corn) or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled. See the Lexar EZ label for other tank-mixtures.
glufosinate[5] @ 0.40 lb/A	Liberty 280 @ 22 oz/A	Many annual grasses and broadleaf weeds. Adhere to	**Liberty Link Corn Only.** Apply from emergence through V5. Apply before weeds are 2-3 inches tall with

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
		weed size restrictions on label or unsatisfactory control will result.	atrazine at 1.0 lb/A 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.
POSTEMERGENCE continued:			
halosulfuron-methyl @ 0.032-0.063 lb/A	Permit 75WG @ 0.67-1.33 oz/A Add 0.25% v/v NIS or 1% v/v COC	Purple and yellow nutsedge, common cocklebur	Apply to spiking corn thru layby. 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.
rimsulfuron @ 0.02 lb/A + mesotrione @ 0.08 lb/A	Realm Q @ 4 oz/A Add 0.25% v/v NIS or 1% v/v COC	Most annual grasses and broadleaf weeds	Do not apply to corn taller than 20 inches or plants with 7 or more collars. Do not apply to sweet corn. Do not tank-mix with organophosphate insecticide. Apply organophosphate insecticide either 7 days before or 3 days after Realm Q application. Tank-mix with atrazine, glyphosate or Liberty to broaden spectrum of weeds controlled. Glyphosate and Liberty in Roundup Ready or Liberty Link corn hybrids, respectively.
rimsulfuron @ 0.014 lb/A + thifensulfuron-methyl @ 0.003	Resolve Q @ 1.25 oz/A Apply with 1% v/v COC + 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. Tank-mixing atrazine at 1 lb/A and/or glyphosate (Roundup Ready corn) will broaden the spectrum of weed controlled.
glyphosate[4,5] @ 1-1.125 lb/A	Roundup PowerMax II @ 32 oz/A 4L formulations @ 32 oz/A	Most annual grasses and broadleaf weeds	**Glyphosate-tolerant Corn Only.** Apply from corn emergence until 8 leaves with collars (or 30 inches). Consult product labels for glyphosate products cleared on Roundup Ready corn. No more than 64 oz/A between emergence and V8 or 30 inches.
dicamba @ 0.138-0.276 lb/A + diflufenzopyr @ 0.05-0.1 lb/A	Status @ 5-10 oz/A Add 0.25% v/v NIS or 1% v/v COC or MSO	Most broadleaf weeds	Apply after corn is 4 inches tall (V2) up to 36 inches (V8). Do not apply within 15 days of tassel emergence. Do not mix with 2,4-D or more dicamba. Do not mix with EC formulation herbicides. Do not apply to stressed or injured corn. Tank-mixing Status with atrazine at 1.0 lb/A, glyphosate (Roundup Ready corn) and/or Liberty (Liberty Link corn) will broaden the spectrum of weeds controlled.
nicosulfuron @ 0.023 lb/A + rimsulfuron @ 0.012 lb/A	Steadfast Q @ 1.5 oz/A Add 1% v/v COC or MSO consult label for correct adjuvant system	Most annual grasses, johnsongrass and some broadleaf weeds. Better on	Apply to corn up to 20 inches tall. Do not apply after the V5 growth stage. Do not apply to corn treated with Counter 15 G; consult label for other restrictions. Tank-mixing Accent Q with atrazine at 1.0 lb/A and/or

CORN WEED MANAGEMENT

CORN[1,2]			
Active Ingredient and Rate[1]	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	when mixing with other herbicides.	annual grasses than Accent alone.	glyphosate (Roundup Ready corn) will broaden the spectrum of weeds controlled. If tank-mixed with atrazine, observe 12-inch corn application limit. See the Steadfast Q label for other tank-mixtures.
DIRECT POSTEMERGENCE/LAYBY:			
paraquat @ 0.26-0.64 lb/A	Paraquat (2 lb/gal formulation) @ 16-40 oz/A; Paraquat (3 lb/gal formulation) @ 11-27 oz/A Add 0.25% v/v NIS	Annual grasses and weeds less than 4 inches tall	Apply after corn is 10 inches 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	80 DF formulations @ 1.25-2.5 lb/A 90 DF formulations @ 1.1-2.2 lb/A 4L formulations @ 1-2 qt/A 5L formulations @ 0.8-1.6 qt/A	Most annual weeds	Apply after last cultivation when corn is 20-30 inches 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.
diuron @ 0.6 - 0.75lb/A	Karmex DF @ 0.75-1.0 lb/A Direx 4L/Diuron 4L @ 1.25-1.5 pt/A	Most annual weeds	Apply after last cultivation when corn is 20 to 30 inches 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 @ 0.016-0.031 lb/A	Aim @ 1-2 oz/A Add 1% v/v COC	Better on vines than pigweed, sicklepod, 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 @ 0.3-0.5 lb/A	Paraquat (2 lb/gal formulation) @ 1.2-2 pt/A; Paraquat (3 lb/gal formulation) @ 0.8-1.3 pt/A Add 0.25% v/v NIS	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.
sodium chlorate @ 6 lb/A	6 lb/gal formulation @ 1 gal/A 5 lb/gal formulation @ 1.2 gal/A 3 lb/gal formulation @ 2 gal/A	Desiccation of green vegetation	Apply to corn field where grasses make harvest difficult. Apply at least 14 days before anticipated harvest date on clear days when temperatures are expected to exceed 70°F. **DO NOT** graze treated fields or feed fodder, forage or residual seeds within 14 days of application.

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

[2] Refer to the burndown section of this guide for suggestions on managing cool season weeds.

[3] Metolachlor contains a 1:1 ratio of two metolachlor isomers (-R and –S). S-metolachlor contains only the –S isomer. The –S isomer has greater herbicidal activity than the –R isomer. On the herbicide label, the –R isomer is denoted by metolachlor while the –S isomer is denoted by acetamide –(s). Alternatively, if the trade names Bicep or Dual include the word "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.

[4] For use only in Roundup Ready corn hybrids. Glyphosate-resistant Italian ryegrass, johnsongrass, Palmer amaranth and waterhemp have been documented in Louisiana.

[5] For use only in Liberty Link corn hybrids.

TABLE 1. Weed response to selected cotton herbicides.

	hophornbeam copperleaf	smellmellon	bermudagrass	rhizome johnsongrass	seedling Johnson grass	annual grasses	yellow nutsedge	prickly sida	pigweed	morningglory	hemp sesbania	sicklepod
PREEMERGENCE HERBICIDES:												
Command 3ME	6	6	3	9	8	9	0	8	4	6	I	2
Cotoran, Meturon or Fluometuron	9	9	0	7	7	8	0	8	9	8	8	7
S-metolachlor/metolachlor (all formulations)	I	I	0	7	6	8	-	4	8	4	3	2
Diuron	7	7	0	7	6	7	0	7	9	6	7	8
Treflan or Prowl	I	I	2	9	8	9	0	2	8	4	I	2
Solicam DF	7	8	3	7	6	8	4	8	8	6	5	-
Treflan or Prowl + Cotoran,	9	9	0	9	9	9	0	8	9	9	8	7
Treflan, or Prowl + Diuron	8	8	0	9	9	9	0	7	9	8	8	8
Staple LX + Cotoran	9	9	0	9	7	8	3	9	9	8	8	8
POSTEMERGENCE HERBICIDES:												
Aim/ET	-	8	0	0	0	0	0	0	8	9	9	6
Aim/ET + MSMA	5	5	0	4	8	8	8	7	8	9	9	8
Aim/ET + glyphosate	9	9	7	8	9	9	7	8	9	9	9	9
Assure II	0	0	8	8	9	9	0	0	0	0	0	0
Cobra + MSMA	9	9	0	6	9	7	6	8	9	9	8	6
Cotoran, Meturon or Fluometuron	8	8	0	4	7	6	3	6	7	5	5	6
Caparol or Cotton-Pro	8	8	0	4	8	7	5	7	8	8	6	7
Caparol or Cotton-Pro + MSMA	9	9	0	4	9	8	7	8	9	9	7	8
Cotoran + MSMA	9	9	0	4	8	8	6	7	9	8	6	8
Envoke	8	9	0	6	6	5	8	3	9	8	8	8
Fusilade DX	0	0	8	8	9	9	0	0	0	0	0	0
glyphosate	9	9	7	8	9	9	7	8	9	8	8	8
glyphosate+ Warrant	9	9	7	8	9	9	7	8	9	8	8	8
Goal + MSMA	9	9	0	5	9	8	7	7	8	9	7	8
Liberty 280 SL	10	10	6	8	9	9	4	9	9	10	9	9
Liberty 280 SL + Dual Magnum	10	10	6	8	9	9	4	9	9	10	9	9
Liberty 280 SL + Staple LX	10	10	6	8	9	9	4	9	9	10	9	9

	hophornbeam copperleaf	smellmellon	bermudagrass	rhizome johnsongrass	seedling Johnson grass	annual grasses	yellow nutsedge	prickly sida	pigweed	morningglory	hemp sesbania	sicklepod
POSTEMERGENCE HERBICIDES continued:												
diuron	7	7	0	4	8	6	0	7	8	7	6	8
diuron + MSMA	8	8	0	4	9	9	7	8	9	8	6	8
Linex + MSMA	9	9	0	4	9	8	6	8	9	9	7	8
Poast Plus	0	0	8	8	9	9	0	0	0	0	0	0
Select Max/other clethodim formulations	0	0	8	8	9	9	0	0	0	0	0	0
Sequence	9	9	7	8	9	9	7	8	9	8	8	8
Staple LX	2	4	0	4	6	5	5	8	9	8	8	6
Staple LX + glyphosate	9	9	7	8	9	9	7	9	9	9	9	8
Suprend	8	9	0	4	8	7	8	7	9	8	8	8
Valor	9	9	0	0	0	0	3	8	9	9	9	8

COTTON WEED MANAGEMENT

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT:			
s-metolachlor @ 1.25 - 1.6 lb/A	Dual Magnum 7.62 @ 1.33-1.67 pt/A	**Glyphosate-resistant Italian ryegrass** and small-seeded annual winter weeds	Apply to prepared seedbeds between September 1 and December 1. Optimum control is generally observed when applied from late October to mid-November. Mix with paraquat to control emerged ryegrass. Incorporation to a depth of 2-3 inches will be beneficial if activating rainfall is not received soon after application. Refer to label for maximum combined fall and spring amounts.
pyroxasulfone@ 0.053 – 0.106 lb/A	Zidua WG @ 1 - 2 oz/A Zidua SC @ 1.75 – 2 oz/A	**Glyphosate-resistant Italian ryegrass** and small seeded annual winter weeds	Apply to prepared seedbeds between September 1 and December 1. Optimum control is generally observed when applied from late October to mid-November. Mix with paraquat to control emerged ryegrass. Incorporation to a depth of 2-3 inches will be beneficial if activating rainfall is not received soon after application. Refer to label for maximum combined fall and spring amounts.
diuron @ 0.5 – 1.6 lb/A	Diuron 4L @ 0.5 – 1.6 qt/A	Good residual control of morninglory, pigweed, and small seeded annual grasses	Apply 15 to 45 days prior to planting. Avoid tillage or "dragging" of beds after application to prevent cotton injury and/or maximize weed control. Rainfall or irrigation amounts of 0.5 inch or greater between application and planting lessen likelihood of crop injury. Mix with other herbicides such as glyphosate or paraquat to completely burn-down existing vegetation.
flumioxazin @ 0.032 - 0.064 lb/A	Valor SX WDG @ 1 – 2 oz/A	Good residual control of pigweed, morningglory, hemp sesbania, prickly sida, and hophornbeam copperleaf. Some annual grass suppression**. Excellent residual control of glyphosate-resistant horseweed (mare's-tail)** and small seeded annual winter weeds when applied from late October to mid-November.	Plant at least 30 days after application AND at least 1 inch of rainfall or overhead irrigation has been received. Mix with other herbicides such as glyphosate or paraquat to completely burn-down existing vegetation.
fomesafen @ 0.25 lb/A	Reflex @ 1 pt/A	Good residual control of pigweed, morninnglory and other broadleaf weeds. Some suppression of yellow nutsedge and annual grasses.	Plant at least 21 days after application on medium or fine textured soils AND at least 0.5 inch of rainfall or overhead irrigation has been received. Do not disturb or re-work seedbed after application. Plant at least 0.75 inches deep. Cotton plants may exhibit some crinkling or spotting on foliage or stunting, but plants

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			normally outgrow these effects. Mix with other herbicides such as glyphosate or paraquat to completely burn-down existing vegetation.
PREPLANT INCORPORATED:			
pendimethalin @ 0.5 - 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 johnsongrass, pigweed and suppression of morningglory.	Apply up to 60 days before planting and incorporate in the top 2 inches within 7 days of planting within 7 days prior to planting.
trifluralin @ 0.5 - 1.5 lb/A	Treflan, Trifluralin, 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, seedling johnsongrass, pigweed, and suppression of morningglory	Apply prior to planting (immediately preferred) and incorporate in the top 2 to 3 inches of the final seedbed within 24 hr of application.
PREEMERGENCE:			
clomazone @ 0.5 - 1.25 lb/A	Command 3 ME @ 1.3 - 3.3 pt/A	Most annual grasses, rhizome and seedling johnsongrass, prickly sida, wild poinsettia, spurred anoda, velvetleaf and itchgrass. Fair to poor control of entireleaf morningglory, hemp sesbania, pigweed, smellmelon, and hophornbeam copperleaf.	Apply before or after planting prior to cotton emergence. Requires the use of disulfoton or phorate insecticides at a minimum of 0.75 lb ai/A applied in furrow to protect cotton from injury. Read and follow label instructions concerning application conditions and buffer zones to reduce nontarget drift injury.
acetochlor @ 0.94 - 1.5 lb/A	Warrant @ 1.25 - 2 qt/A	Good pigweed control and good to fair control of most annual grasses and small-seeded broadleaves.	Consult label for rate range considering soil type and O.M. content. Emerged weeds are not controlled and require addition of a labeled postemergence herbicide such as glyphosate or glufosinate. Please see label for appropriate tank mix partners and related information.
metolachlor[2] @ 0.49 - 1.3 lb/A	Parallel 7.8EC/others @ 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 and pigweed. Suppression of yellow nutsedge, morningglory, and hophornbeam copperleaf.	Apply at/after planting before weeds emerge.
s-metolachlor[2] @ 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 and pigweed. Suppression of yellow nutsedge, morningglory, and hophornbeam copperleaf	Apply at/after planting before weeds emerge.

COTTON WEED MANAGEMENT

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
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/after planting before weeds and cotton emerge. Wheat can be planted 3 months after application. Temporary chlorosis can occur under cool, wet environmental conditions after planting.
pendimethalin @ 0.5 - 1.5 lb/A	Prowl 3.3 @ 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	Most annual grasses, seedling johnsongrass, pigweed and suppression of morningglory.	Apply at/after planting before weeds and cotton emerge.
pyrithiobac @ 0.03 - 0.053 oz/A + fluometuron @ 0.8 - 2 lb./A	Staple LX @ 1.3- 2.1 fl. oz./A + Cotoran et al as above	Weeds listed under fluometuron with improved yellow nutsedge activity	Apply at/after planting before weeds and cotton emerge.
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 pigweed and nutsedge.	Apply at/after planting before weeds and crop emerge. Can be applied up to 30 days before planting.
fluridone + fluometuron @ 0.9 – 1.2 lb/A	Brake FX @ 32 oz/A on light soil 32 to 42 oz/A on medium and heavy soil	Annual grasses, pigweed, and other small seeded broadleaves. Some suppression of nutsedge.	Apply at/after planting before weeds and crop emerge. Can be applied up to 14 days prior to planting. Provides very long residual control when receiving adequate rainfall/irrigation for activation. Excellent pigweed material.
fluridone + fomesafen @ 0.23 – 0.44 lb/A	Brake F16 @ 11 – 21 oz/A	Annual grasses, pigweed, and other small seeded broadleaves. Some suppression of nutsedge.	Apply at/after planting before weeds and crop emerge. Can be applied up to 14 days prior to planting. Provides very long residual control when receiving adequate rainfall/irrigation for activation. Excellent pigweed material.
POSTEMERGENCE:			
quizalofop P-ethyl @ 0.034 - 0.083 lb/A	Assure II @ 5 - 12 oz/A	Annual and perennial grasses and susceptible volunteer corn.	Apply before grasses exceed height for treatment stated on label. Use 5 - 8 oz/A on small annual grasses/volunteer corn and 10-12 oz/A on perennial and larger annual grasses. Apply with

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal. Tank mixtures with other herbicides may reduce activity.
POSTEMERGENCE continued:			
trifloxysulfuron-sodium @ 0.0047 - 0.007 lb/A	Envoke @ 0.1-0.15 oz/A.	Sicklepod, morningglory, hemp sesbania, pigweed, yellow nutsedge, and small volunteer soybean. Suppression of annual grasses, seedling johnsongrass, glyphosate-resistant horseweed (mare's-tail), and purple nutsedge. Weak on prickly sida.	Apply after cotton reaches the 5-true-leaf stage. Do not apply to cotton that is stressed. Consult label for approved tank-mixes. Do not tankmix with grass herbicides as grass control can be reduced. Apply with NIS @ 1 qt/100 gal
fluazifop @ 0.093 - 0.188 lb/A	Fusilade DX @ 6 - 12 oz/A	Annual and perennial grasses and susceptible volunteer corn.	Apply before grasses exceed height for treatment stated on label. Use 6 - 8 oz/A on small annual grasses/volunteer corn and 10-12 oz/A on perennial and larger annual grasses. Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal. Tank mixtures with other herbicides may reduce activity.
fenoxaprop-ethyl + fluazifop @ 0.08 – 0.24 lb/A	Fusion @ 4 - 12 oz/A.	Same as above for fluazifop.	Same as above for fluazifop.
sethoxydim @ 0.188 - 0.28 lb/A	Poast Plus @ 1.5- 2.25 pt/A	Annual and perennial grasses	Apply before grasses exceed height for treatment stated on label. Use 1.5 pt/A on small annual grasses/volunteer corn and 2.25 pt/A on perennial and larger annual grasses. Apply with Dash HC, Sundance HC, MSO, or COC at labeled rates. Tank mixtures with other herbicides may reduce activity.
pyrithiobac @ 0.065 - 0.095 lb/A	Staple LX @ 2.6-3.8 fl. oz/A	Pigweed, cocklebur, morningglory, hemp sesbania, and other broadleaf weeds. Suppression of sicklepod, glyphosate-resistant horseweed (mare's-tail), small volunteer soybean, prickly sida, yellow nutsedge, and seedling johnsongrass.	Apply when weeds are small and actively growing. Temporary cotton injury seen as chlorosis (yellowing) may occur following application. Consult label for approved tank-mixes. Do not tank-mix with grass herbicides as grass control can be reduced. Apply with NIS @ 1 qt/100 gal.
clethodim @ 0.08 - 0.25 lb/A	Select Max @ 10-32 oz./A 2 lb formulations @ 6 – 16 oz/A	Annual and perennial grasses and susceptible volunteer corn.	Apply before grasses exceed height for treatment stated on label. Use 8 - 12 oz/A on small annual grasses/volunteer corn and 12-16 oz/A on perennial and larger annual grasses. Apply with NIS @ 1 qt/100 gal or COC @ 1 gal/100 gal. Tank mixtures with other herbicides may reduce activity.

COTTON WEED MANAGEMENT

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
glyphosate[3] @ 1.0 lb/A	5 L formulations @ 22 oz/A 4L formulations @ 32 oz/A	Most small broadleaf weeds and grasses and yellow nutsedge. Good to fair activity on larger mornnnglory, yellow nutsedge, prickly sida and hemp sesbania. Suppression of purple nutsedge, smartweed, and redvine.	**USE ON ROUNDUP READY FLEX, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** No restriction on cotton size. Larger cotton may interfere with spray coverage, resulting in reduced weed control. Can be mixed with insecticides and PGRs. Air induction nozzles may reduce insecticide efficacy. Consult labels for maximum application rates and approved formulations/tankmixes/additives, .
POSTEMERGENCE continued:			
glyphosate[3] @ 1.0 lb/A + s-metolachlor or metolachlor @ 0.95 - 1.33 lb/A	5 L formulations @ 22 oz/A 4 L formulations @ 32 oz/A + Dual Magnum **or** label approved metolachlor formulations @ 1 – 1.33 pt/A **or** Sequence 5.25 L @ 2.5-4.0 pt/A	See comments in glyphosate and s-metolachlor/metolachlor sections above.	**USE ON ROUNDUP READY FLEX, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND 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. Consult labels for maximum application rates and approved formulations/tank mixes/additives,
glyphosate + pyrithiobac @ 1.0 + 0.0325 - 0.095 lb/A	Glyphosate (4 or 5 L formulations) + Staple LX @ 32 or 22 oz/A + 1.3 – 3.8 oz/A	See comments in glyphosate and pyrithiobac sections above.	**USE ON ROUNDUP READY FLEX, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** No restriction on cotton size. See other cautions above. DO NOT mix with ANY metolachlor formulations. Can be applied in first or second overtop application to provide residual control. Consult labels for maximum application rates and approved formulations/tankmixes/additives,
glufosinate @ 0.4 - 0.59 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 22-32 oz/A	Most small annual broadleavesinlcuding glyphosate-resistant horseweed (mare's-tail) and annual grasses and seedling johnsongrass. Fair to poor control of large (>3 – 4 inches) pigweed, goosegrass, broadleaf signalgrass, and nutsedge.	**LIBERTY-LINK, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** Apply from cotton emergence to early bloom. Time applications to weed size stated on label, not crop stage. Use lower rates on small actively growing weeds. Optimum results have been obtained when applied under warm, high humidity conditions with bright sunlight between sunrise and 2 hours before sunset. Do not use air induction spray tips due to potential coverage issues. Apply in a minimum of 15 GPA. Consult labels for maximum application rates and approved formulations/tank mixes/additives,

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
glufosinate @ 0.4- 0.59 lb/A + pyrithiobac @ 0.0325- 0.095 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 22 – 32 oz/A + Staple LX @ 1.3 -3.8 oz/A	See comments in glufosinate and pyrithiobac sections above.	**LIBERTY-LINK, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** Apply from cotton emergence to early bloom. Time applications to weed size stated on label, not crop stage. Use lower rates on small actively growing weeds. Can be applied in first or second overtop application to provide residual control. See other cautions above. Consult labels for maximum application rates and approved formulations/tank mixes/additives,
glufosinate @ 0.4 - 0.59 lb/A + s-metolachlor or metolachlor @ 0.95 - 1.33 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 22 – 32 oz/A + Dual Magnum **or** label approved metolachlor formulations @ 1 – 1.33 pt/A	See comments in glufosinate and s-metolachlor/metolachlor sections above.	**LIBERTY-LINK, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** Apply from cotton emergence to early bloom. Time applications to weed size stated on label, not crop stage. Use lower rates on small actively growing weeds. Can be applied in first or second overtop application to provide residual control. See other cautions above. Consult labels for maximum application rates and approved formulations/tank mixes/additives,
glufosinate @ 0.79 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 43 oz/A	Salvage situation for large broadleaf and grass weeds.	**LIBERTY-LINK, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** See other cautions above.
glufosinate @ 0.4 – 0.53 lb/A + glyphosate @ 1.0 lb/A	glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 22 – 29 oz/A + glyphosate (4 or 5 L formulations) @ 32 or 22 oz/A	See comments in glufosinate and glyphosate sections.	**LIBERTY-LINK, GLYTOL/LIBERTY LINK, ENLIST, AND XTEND VARIETIES ONLY:** See other cautions above. Improved control of larger (>3 - 4 inches) grasses, sedges, and pigweeds as compared to glufosinate alone. See labels for approved residual herbicide tank mixes and corresponding comments above.
dicamba @ 0.5 lb/A	Engenia @ 12.5 oz/A **OR** FeXapan @ 22 oz/A **OR** XtendiMax @ 22 oz/A	Most small broadleaf weeds including glyphosate-resistant horseweed (mare's-tail) and redvine. Expect poor control of hophornbeam copperleaf and prickly sida if	**FOR USE IN XTEND VARIETIES ONLY.** Federal and state labels contain numerous restrictions for use. See labels/websites for further information including training requirements prior to purchase and use. All labeled dicamba formulation can be tank-mixed with glyphosate or other herbicides to broaden the weed spectrum. Please see company websites for list of products that can be legally

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			tank-mixed and corresponding comments above. A limited amount of residual activity on broadleaves can be achieved with adequate rainfall or irrigation after application.
POSTEMERGENCE continued:			
2,4-D choline @ 0.75-1.0 lb/A + glyphosate @ 0.7-0.94 lb/A	Enlist Duo @ 56-75 oz/A	See comments in 2,4-D choline and glyphosate sections.	**FOR USE IN ENLIST VARIETIES ONLY.** Only labeled for use in Enlist cotton. Apply no later than mid-bloom. Federal and state labels contain numerous restrictions. See label/website for further information including training requirements prior to purchase and use. Enlist Duo can be tank-mixed with other herbicides to broaden the weed spectrum. Please see company website for list of products that can be legally tank-mixed.
2,4-D choline @ 0.7-0.95 lb/A	Enlist One @ 24-32 oz/A	Most small broadleaf weeds. Fair control of glyphosate-resistant horseweed (mare's-tail).	**FOR USE IN ENLIST VARIETIES ONLY.** Only labeled for use in Enlist cotton. Apply no later than mid-bloom. Federal and state labels contain numerous restrictions for use. See label/website for further information including training requirements prior to purchase and use. Can be tank-mixed with other herbicides to broaden the weed spectrum. Please see company website for list of products that can be legally tank-mixed and corresponding comments above. .
2,4-D choline @ 0.7-0.95 lb/A + glufosinate @ 0.4 - 0.53 lb/A	Enlist One @ 24-32 oz/A + glufosinate 2.34 formulations (Liberty 280 SL, Cheetah etc.) @ 22-29 oz/A	See comments in 2,4-D choline and glufosinate sections.	**FOR USE IN ENLIST VARIETIES ONLY.** Only labeled for use in Enlist cotton. Apply no later than mid-bloom. Federal and state labels contain numerous restrictions. See label/website for further information including training requirements prior to purchase and use.
DIRECTED POSTEMERGENCE:			
The following herbicides can be applied singly with a surfactant or in combination with MSMA where labeled as a directed spray for improved control of emerged grasses and nutsdge from 3-inch cotton to first bloom. MSMA use in cotton is			

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
limited to two applications per year, not to exceed 2 lbs/A each, with the second application being a salvage treatment. A 50-foot buffer zone is required around permanent water bodies or aquatic habitats. Glyphosate[4] and glufosinate can also be tank mixed with many of the following products according to label directions for improved control of emerged grass and broadleaves. Use glyphosate and glufosinate with the appropriate herbicide resistant cotton variety.			
DIRECTED POSTEMERGENCE continued:			
carfentrazone @ 0.012 - 0.025 lb/A	Aim 2 EC @ 0.75-1.6 oz/A.	Mornninglory, purslane, smartweed, hemp sesbania. Suppression of small prickly sida.	Application to cotton at the 5 to 6 node or less growth stage must be with hooded or shielded sprayer to avoid plant contact. Can be applied to 12" or greater cotton as a directed layby spray to the base of the plant to minimize contact to non-bark tissue. Does not control grasses nor provide residual control. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.
pyraflufen ethyl @ 0.0008125 – 0.00325 lb/A	ET @ 0.5 to 2 oz/A.	Mornninglory, purslane, smartweed, hemp sesbania. Suppression of small prickly sida.	Apply only with hooded spray equipment to plants with less than 3-inch stem bark. May be applied with post-directed equipment up to 1 oz/A to cotton 18 inches in height with at least 3 inches stem bark as a layby spray. Does not control grasses nor provide residual control. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100 gal.
fluometuron @ 1.0 - 2.0 lb/A	Cotoran/Meturon, Fluometuron 80DF @ 1.25 - 2.5 lb/A Cotoran/Meturon 4L @ 1.0 - 2.0 qt/A.	Annual seedling grasses and broadleaf weeds.	Apply after cotton is 3 inches tall to layby. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.
lactofen @ 0.195 lb/A	Cobra @ 12.5 oz/A.	Mornninglory, purslane, smartweed, hemp sesbania. Suppression of small prickly sida.	Apply after cotton is 6 inches tall as a directed spray no higher than 2–3 inches on the stem or after 12 inches tall as a layby treatment. Does not control grasses nor provide residual control. Apply with NIS @ 1qt/100 gal or COC @

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			1gal/100 gal for post-directed applications and COC @ 1 gal/100 gal for layby application.
DIRECTED POSTEMERGENCE continued:			
flumioxazin @ 0.063	Valor @ 2 oz/A	See comments in flumioxazin section above.	Apply when cotton is at least 6 inches as a directed spray through shielded or hooded spray equipment. Directed spray layby applications can be made once cotton reaches 16 inches in height. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100 gal. Fierce is a flumioxazin containing herbicide labeled for post directed application in cotton. Refer to the label for application information.
Pyroxasulfone @ 0.04 – 0.114 lb/A	Zidua 85 WG @ 0.75 – 2.1 oz/A Zidua SC @ 1.25 – 3.5 oz/A	Most annual grasses and pigweed. Suppression of yellow nutsedge, morningglory, and hophornbeam copperleaf.	Apply as a directed spray form the 5-leaf stage to beginning bloom. Apply with NIS @ 1 qt/100gal or COC @ 1 gal/100 gal. Additional post directed herbicides labeled for cotton contain pyroxasulfone in the formulation including Anthem Flex and Fierce. Refer to these individual labels for application information.
prometryn @ 0.5 - 0.65 lb/A	Caparol 4L/Cotton Pro and other prometryn 4 lb formulations @ 1.0 - 1.3 pt/A.	Annual seedling grasses and broadleaf weeds.	Apply after cotton is 6 inches tall to layby with shielded or hooded spray equipment. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.
diuron @ 0.2 - 0.4 lb/A	Direx 4L/ 4 lb diruon formulations @ 0.4-0.6 qt/A Karmex DF @ 8-12 oz/A.	Annual seedling grasses and broadleaf weeds.	Apply after cotton is 6 inches tall to layby and actively growing as a directed spray. Provides longer residual control in comparison to other post directed herbicides. Apply 12.8 oz/A of the liquid formulation or 8 oz/A of the dry formulation to 6 – 8 inch cotton. Apply 19.2 oz/A of the liquid formulation or 12 oz/A of the dry formulation to 8 – 12 inch cotton. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.
oxyfluorfen @ 0.25 - 0.50 lb/A	Goal 2XL @ 1.0 - 2.0 pt/A	Annual seedling grasses and broadleaf weeds	Apply after cotton is 6-8 inches tall as a directed spray. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal.
fomesafen @ 0.25 - 0.375 lbs/A	Reflex 2 EC @ 1-1.5 pt/A	Small annual broadleaf weeds	Apply after cotton is at least 6 inches tall through layby as a directed spray. Use shielded or hooded spray equipment for applications to 6 to 12 inch cotton. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal. Additional post directed herbicides labeled for cotton contain fomesafen

COTTON			
Active Ingredient and Rate	**Formulated Material and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			in the formulation including Cheetah Max, Prefix, and Flexstar GT. Refer to these individual labels for application information.
DIRECTED POSTEMERGENCE continued:			
trifloxysulfuron-sodium @ 0.007 - 0.01 lb/A + prometryn @ 0.79 - 1.18 lb/A	Suprend @ 1-1.5 lb/A	Annual seedling grasses and broadleaves. See comments in triflosysulfuron-sodium and prometryne sections above.	Apply after cotton is at least 6 inches tall. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal
LAYBY (one application):			
diuron @ 0.8 -1.2 lb/A	Karmex DF @ 1.0 – 1.5 lb/A Direx 4L/4 lb diuron formulations @ 1.6 - 2.4 pt/A	See comments in diuron section above	Apply when cotton is at least 12 inches tall as a directed spray. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal
prometryn @ 0.8 - 1.6 lb/A	Caparol 80 WP @ 1.5 lb/A on sandy soil 1.75 lb/A on loam soil 2.0 lb/A on clay soil Caparol 4L, Cotton-Pro @ 2.4 pt/A on sandy soil 2.8 pt/A on loam soil 3.2 pt/A on clay soil	See comments in prometryn section above.	Apply to cotton at least 12 inches as a directed spray. Apply with NIS @ 1qt/100 gal or COC @ 1gal/100 gal
linuron @ 0.5 - 1.5 lb/A	Linex 4L @ 1.0 – 3.0 pt/A	Good morningglory, hophornbeam copperleaf, and purslane control. Good to fair activity on annual grasses, pigweed, and sicklepod.	Apply as a directed spray at 1 pt/A for cotton at least 12 inches and 1 – 1.5 pt/A for cotton at least 18 inches in height. Apply with surfactant at 1 pt per 25 gallons of spray mixture. Sequential treatments can be made 1 week apart. A single 2 – 3 pt/A application can be made once cotton reaches 20 inches.
flumioxazin @ 0.032 - 0.064 lb/A	Valor @ 1- 2 oz/A	See comments in flumioxazin section above.	Apply when cotton is at least 16 inches tall as a directed spray. Apply with NIS @ 1qt/100gal.

GRAIN SORGHUM WEED MANAGEMENT

	barnyardgrass	broadleaf signalgrass	crabgrass	foxtail	seedling johnsongrass	rhizome johnsongrass	yellow nutsedge	purple nutsedge	Palmer amaranth	prickly sida	hemp sesbania	morningglory	sicklepod	hophornbeam copperleaf	smellmelon
PREEMERGENCE HERBICIDES:[1]															
atrazine (numerous formulations)	7	7	6	7	5	1	5	0	8	8	8	8	8	9	5
atrazine + metolachlor/S-metolachlor + safener	9	8	9	9	8	1	9	1	8	8	8	8	8	9	9
metolachlor/S-metolachlor + safener	8	8	9	9	7	1	7	1	9	2	2	2	2	2	1
Outlook	8	8	9	9	7	1	7	1	8	2	2	2	2	2	1
Lexar EZ	9	9	9	9	7	1	9	1	9	8	8	8	8	9	9
Sharpen	1	1	1	1	1	1	-	-	9	7	6	6	5	7	7
Verdict	8	8	9	9	7	1	7	1	8	8	8	8	8	8	8
POSTEMERGENCE HERBICIDES:															
2,4-D	1	1		1	0	0	3	2	8	8	8	9	8	8	8
atrazine (numerous formulations)	7	5	6	7	3	3	3	1	8	8	7	8	7	9	9
Clarity/Banvel	0	0	0	0	0	0	0	3	8	9	9	9	7	8	8
Facet + atrazine	8	8	7	7	4	0	3	1	8	8	9	9	7	8	7
Huskie + atrazine	6	6	6	-	3	3	-	-	9	9	8	9	8	8	7
Peak	0	0	0	0	0	0	0	0	7	9	8	8	8	-	-
Permit	0	3	3	-	3	3	9	7	6	7	4	5	6	-	-
Yukon	0	3	3	-	3	3	9	7	9	8	9	9	8	6	8
LAYBY HERBICIDES:															
atrazine	4	4	4	4	4	1	2	0	8	0	7	8	6	9	9
diuron	6	6	6	6	6	1	2	1	8	7	6	7	7	9	9

GRAIN SORGHUM WEED MANAGEMENT

GRAIN SORGHUM			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREEMERGENCE[1]:			
S-metolachlor[2] @ 0.9-1.4 lb/A	Dual Magnum/Cinch @ 1-1.6 pt/A	Yellow nutsedge, annual grasses, pigweed	**Use with Concep-treated grain sorghum seed only**. Incorporate thoroughly in top 2 inches within 14 days of planting.
atrazine @ 2.0 lb/A	90 DF formulations @ 2.2 lb/A 4L formulations @ 2 qt/A Reduce rate by 25% on highly erodible soils.	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.
dimethenamid-P @ 0.56-0.98 lb/A	Outlook 6L @ 12-21 oz/A Rate depends upon soil type. See label.	Yellow nutsedge, annual grasses, pigweed	**Use with Concep-treated grain sorghum seed only**. Do not use on forage sorghum. See label for tank-mix applications and for restrictions.
S–metolachlor[2] @ 1.0-1.9 lb/A	Various formulations - see product label for specific rates.	Most annual grasses and some broadleaf weeds	**Use with Concep-treated grain sorghum seed only**. Apply after planting before weeds and crop emerge. Do not apply to light soils or any soils with less than 1% organic matter.
S-metolachlor @ 0.75-1.25 lb/A + atrazine @ 1.0-1.63 lb/A	Various formulations - see product label for specific rates.	Most small-seeded annual grasses and broadleaf weeds	**Use with Concep-treated grain sorghum seed only**. 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 layby. **Do not use on coarse textured soils**. Injury can occur if applied when soils are cool and wet during early growth of grain sorghum.
S-metolachlor @ 1.3 lb/A + atrazine @ 1.3 lb/A + mesotrione @ 0.168 lb/A	Lexar EZ @ 3 qt/A	Most small-seeded grasses and broadleaf weeds	**Use with Concep-treated grain sorghum seed only**. Can be applied preplant (up to 21 days before planting) to preemergence. Do not apply to sand, sandy loam or loamy sand soils. Do not apply to forage sorghum, sweet sorghum, sudangrass or sorghum-sudangrass, or dual-purpose sorghum. Postemergence application will cause severe grain sorghum injury. Injury can occur if applied when soils are cool and wet during early growth of grain sorghum.
saflufenacil @ 0.02-0.05 lb/A + dimethenamid-P @ 0.16-0.39 lb/A	Verdict @ 4-12 oz/A Rate depends upon soil type. See label.	Small-seeded grasses and broadleaf weeds	**Use with Concep-treated grain sorghum seed only**. Can be applied preplant to preemergence. Rates depend upon soil texture. Postemergence application to grain sorghum will cause severe injury. Injury can occur if applied when soils are cool and wet during early growth of grain sorghum.

GRAIN SORGHUM WEED MANAGEMENT

GRAIN SORGHUM			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
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 inches tall until flowering. Use directed application taken care to keep 2,4-D out of whorl once sorghum is 10-12 inches tall. Do not use when sorghum is flowering.
atrazine @ 1.0-2.0 lb//A	90 DF formulations @ 1.11-2.2 lb/A 4L formulations @ 1-2 qt/A Add 1% v/v COC	Most effective on broadleaf weeds	Apply before weeds are 1.5 inches tall and after sorghum is 4-6 inches tall. Weeds larger than 1.5 inches 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. Do not exceed 2.5 lb ai/A/season. Follow label restrictions on maximum atrazine rates.
bromoxynil @ 0.18-0.22 lb/A + pyrasulfotole @ 0.03-0.39 lb/A	Huskie @ 12.8-16 oz/A Add 0.25% v/v NIS	Broadleaf weeds	Apply from 3-leaf to 30-inch grain sorghum or until flag leaf emerges. Use high rate for morningglory and pigweed control. Weeds must be small for acceptable results. Expect some temporary injury following application. Atrazine at 0.5-1 lb/A should be tank-mixed to broaden the weed spectrum.
dicamba @ 0.25 lb/A	Clarity or Banvel @ 0.5 pt/A	Most broadleaf weeds; see label	Apply at Spike to 15-inch tall sorghum. Optimal timing is 3 to 5 leaf sorghum, when weeds are less than 3 inches tall. Effective for controlling small broadleaf weeds like morningglory, smartweed, etc. Mixing with atrazine adds to residual control (up to 12 inches tall sorghum). Use drop nozzles if sorghum is taller than 8 inches.
halosulfuron @ 0.031-0.047 lb/A	Permit @ 0.67-1.0 oz/A Add 1% v/v COC or 0.25% v/v NIS	Selected broadleaves and sedges	Apply to sorghum 2-leaf to layby (before grain head emergence). Use only a single application with the total rate not to exceed 1.0 oz/A per season.
halosulfuron @ 0.031-0.047 lb/A + dicamba @ 0.14-0.21 lb/A	Yukon 67.5 WSG @ 4- 6 oz/A Add 1% v/v COC or 0.25% v/v NIS	Nutsedge, morningglories, common ragweed	Apply to 2-leaf to 15-inch sorghum. Do not exceed 8 oz/A/season.
prosulfuron @ 0.027 lb/A	Peak @ 0.75 oz/A Add 0.25% v/v NIS	Most broadleaf weeds	See crop rotation section on label for precautions about rotational. Do not apply to grain sorghum under stress from moisture or cold weather. Do not apply to sorghum that has been treated with an organophosphate insecticide at planting or within 15

GRAIN SORGHUM WEED MANAGEMENT

GRAIN SORGHUM			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			day of postemergence organophosphate insecticide application.
POSTEMERGENCE continued:			
quinclorac @ 0.25-0.375 lb/A + atrazine @ 0.5-1.0 lb/A	Facet L @ 22-32 oz/A + 1-2 pt/A atrazine (4L) Add 1% v/v COC	Broadleaf weeds controlled by atrazine plus improved grass control	See comments for atrazine plus crop oil above. Facet L can be applied to grain sorghum from emergence up to 12 inches tall. Apply when weeds are small and actively growing. See label.
PREHARVEST:			
carfentrazone @ 0.016 lb/A	Aim @ 1.0 oz/A Add 0.25% v/v NIS	Desiccation of morninglories	Apply 3 days prior to harvest. Thorough coverage is essential; use at least 10 GPA. Tank mixture can include sodium chlorate.
glyphosate @ 0.77-1.0 lb/A	Roundup PowerMax II @ 22 oz/A 4L formulations @ 32 oz/A	Grass and broadleaf weeds, grain sorghum regrowth	May be applied prior to harvest after grain sorghum has reached 30% moisture or less. Allow a minimum of 7 days preharvest interval. Not recommended for grain sorghum grown for seed. Consult label.
sodium chlorate @ 6 lb/A	6 lb/gal formulation @ 1 gal/A 5 lb/gal formulation @ 1.2 gal/A 3 lb/gal formulation @ 2 gal/A	Desiccation of green vegetation	Apply 7-10 days prior to harvest. Follow label directions.

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

[2] 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).

TABLE 1. Effectiveness of selected preplant and preemergence rice herbicides on certain weeds.

	Palmleaf m-glory	eclipta	barnyardgrass	red rice	sprangletop	signalgrass	fall panicum	sedge	alligatorweed	ducksalad	redstem	hemp sesbania	waterhyssop	jointvetch	smartweed	dayflower	Texasweed
PREPLANT BURNDOWN:																	
2,4-D	9	9	0	0	0	0	0	5	8	8	9	9	9	8	5	7	9
FirstShot	7	7	0	0	0	0	0	5	9	7	6	8	-	8	9	-	-
Gambit	9	9	0	0	0	0	0	9	8	9[4]	9	9	7	9	9	8	8[3]
Gramoxone SL	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
LeadOff	5	-	8	6	7	5	8	5	-	-	-	7	-	7	8	-	-
Permit/Halomax	7	8	0	0	0	0	0	9	4	9	9	9	9	9	6	8	8
Roundup	7	8	9	7	9	9	9	7	7	7	9	7	7	7	6	6	9
Sharpen	8	8	0	6	6	5	6	6	7	8	9	8	6	9	7	7	8
PREPLANT INCORPORATED, PREPLANT, PREEMERGENCE or DELAYED PREEMERGENCE:																	
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	5	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
Obey PRE	8	9	9	0	8	9	8	2	4	7	4	7	6	7	2	7	4
pendimethalin + Facet DPRE	8	8	9	0	9	8	5	4	6	3	2	8	4	7	0	3	6
pendimethalin DPRE	0	0	8	0	8	8	7	0	0	0	0	0	0	0	0	0	0
RiceOne	0	0	9	0	8	9	9	0	0	7	0	0	0	5	2	7	0
Sharpen PRE	8	7	4	4	4	4	6	6	4	4	6	7	6	7	6	7	7

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

TABLE 2. Effectiveness of selected postemergence rice herbicides on certain weeds.

	palmleaf morningglory	eclipta	barnyardgrass	red rice	sprangletop	signalgrass	fall panicum	sedge	alligatorweed	ducksalad	redstem	hemp sesbania	waterhyssop	jointvetch	smartweed	dayflower	Texasweed
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	6	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]	4	8	9	4	8	3	7[4]	9	2
Beyond or Postscript	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 L	8	9	9	0	0	9	5[4]	4	6	3	3	8	3	8	0	3	6
Facet L + 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
Gambit	9	9	0	0	0	0	0	9	8	9[4]	9	9	7	9	9	8	8[3]
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	8	8	0	0	0	0	0	8	6	7	8	9	7	8	8	8	8
Londax[2]	5	8	0	0	0	0	0	8	7	9	9	6	9	6	6	8	8
Loyant	9	9	6[4]	0	6[4]	6[4]	6[4]	8	9	9	8	9	8	9	9	8	4
Newpath or Preface	8	6	8	8	6	9	4	8	3	2	8	3	6	3	4	6	7[3]
Obey	8	9	9	0	8	9	8	2	4	7	4	7	6	7	2	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
Permit/Halomax	7[3]	8	0	0	0	0	0	9	4	5	8	9	4	9	4	8	7[3]
Permit Plus	7	9	0	0	0	0	0	9	6	7	9	4	6	9	8	8	7
Permit/Halomax + Londax	7[3]	8	0	0	0	0	0	9	7	9	9	9	9	9	6	8	8
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

	palmleaf morningglory	eclipta	barnyardgrass	red rice	sprangletop	signalgrass	fall panicum	sedge	alligatorweed	ducksalad	redstem	hemp sesbania	waterhyssop	jointvetch	smartweed	dayflower	Texasweed
propanil + Aim	9	8	9	0	7[4]	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[4]	9	8[2]	9	5	5	8	9	9	9	5	8	8[4]
Provisia	0	0	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0
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[4]	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
Sharpen	8	8	0	6	6[4]	5[4]	6[4]	6[1]	7	8	9	8	6	9	7	7	8[3]
Strada	7	8	0	0	0	0	0	5	5	7	9	9	8	9	6	9	6
Strada PRO	7	8	0	0	0	0	0	9	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).

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

Herbicide Program	Brook paspalum	Knotgrass	Creeping rivergrass[4]	Water paspalum	Nealley's sprangletop
Command PRE[2]	4	5	4	5	5
Command PRE fb Clincher[3]	5	9	8	8	7
Command + Facet PRE[2]	4	5	4	5	6
Command + Facet PRE[2] fb Clincher[3]	5	9	8	9	7
Command PRE fb Grasp[3]	5	5	7	5	5
Facet + pendimethalin DPRE[2]	4	6	5	7	6
Facet + pendimethalin DPRE fb Clincher[3]	6	9	7	9	7
Clincher fb Clincher[3]	7	9	8	9	8
Grasp[3]	4	2	6	2	0
Loyant[1]	4	6	6	5	6
Newpath fb Beyond[3]	7	9	8	8	5
Newpath fb Newpath[3]	7	9	8	8	5
propanil[3]	2	3	2	2	6
Provisia fb Provisia	5	9	7	9	9
Regiment fb Regiment[3]	3	2	7	2	4
Ricestar HT fb Ricestar HT[3]	3	4	5	6	9

[1] Control rating is based on herbicides applied to small, actively growing plant segments. [2] Ratings taken 2 weeks after application. [3] Ratings taken 1 month after application.

[4] Also referred to as perennial barnyardgrass.

Table 4. Crawfish production and rice herbicides.

2,4-D	May be toxic to aquatic invertebrates.	Newpath or Preface	Crawfish production not specifically mentioned.
		Loyant	Except for crawfish, do not fish or commercially grow fish, shellfish, or crustaceans on treated acres during the year of Loyant treatment.
Aim	Commercial crawfish not specifically mentioned; however, herbicide is moderately toxic to fish.	Obey	Do not apply on rice fields in which concurrent crawfish or catfish farming are included in the cultural practices.
Basagran	Do not use Basagran on rice fields in which the commercial cultivation of crawfish is practiced.	propanil	Crawfish not specifically mentioned in restrictions. Commercial catfish production prohibited.
Beyond or Postscript	Crawfish production not specifically mentioned.	Prowl/pendimethalin	Crawfish not specifically mentioned. Product may be hazardous to aquatic animals.
Bolero	Crawfish production not specifically mentioned. Toxic to shrimp.	Permit/Halomax	Crawfish not specifically mentioned.
Broadhead	Do not use treated rice fields for aquaculture of edible fish and crustaceans (crawfish).	Permit Plus	Crawfish not specifically mentioned.
Clincher	Do not fish or commercially grow fish, shellfish or crustaceans on treated acres during the year of treatment.	Provisia	Crawfish not specifically mentioned; however, do not allow Provisia rice go to seed in a non-rice year. This includes any fallow or crawfish production fields.
Clearpath	Do not use treated rice fields for aquaculture of edible fish and crustaceans (crawfish).	Ultra Blazer	Do not harvest crawfish from treated rice areas for food.
Command, RiceOne	Do not apply on rice fields in which concurrent crawfish farming is included in the cultural practices.	RebelEX	Do not fish or commercially grow fish, shellfish or crustaceans on treated acres during the year of treatment.
Duet	Do not apply to fields where commercial crawfish farming is practiced.	RiceBeaux	Applications to fields where catfish/crawfish 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/crawfish ponds.
Facet	Do not use treated fields for aquaculture of edible fish or crawfish.		
		RiceOne	Do not apply on rice fields in which concurrent crawfish farming is included in the cultural practices.
Gambit	Do not commercially grow fish, shellfish, or crustaceans on treated acres during the year of treatment.	Ricestar HT	Ricestar must not be applied to fields where crawfish are cultured commercially.
Grandstand	Do not commercially grow shellfish or crustaceans on treated acres during the year of treatment.	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.
Grasp	Except for crawfish, do not fish or commercially grow fish, shellfish or crustaceans on treated acres during the year of treatment.	Strada, Strada PRO, Strada XT	Crawfish production not specifically mentioned.
GraspXtra	Do not apply later than three months prior to crawfish production.	Storm	Do not use Storm on rice fields where commercial crawfish production is practiced.
Londax	Do not harvest crawfish prior to harvesting rice.	Sharpen	May be applied to rice fields used for crustaceans, including crawfish production and commercial fish production.

RICE WEED MANAGEMENT

RICE[1]			
Active Ingredient[2] and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT BURNDOWN:			
2,4-D @ 0.5-1 lb/A	2,4-D @ 1-2 pt of 4 lb/gal material	Most broadleaf weeds	Labels differ between application timing and planting. Follow label restrictions regarding application timing and total amount of 2,4-D applied per season.
prosulfuron plus halosulfuron @ 0.094-0.099 lb/A	Gambit 79 DF @ 1-2 oz/A	Most annual broadleaf weeds and sedges	1.5 oz/A is adequate in a burndown weed management program with glyphosate.
paraquat @ 0.6-0.75 lb/A	Gramoxone SL @ 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 pt/A Consult label for adjuvant requirement.	Good on alligatorweed 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 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 Consult label for adjuvant requirement.	Curly dock, henbit, smartweed, garlic	Apply before planting with other burndown products, like glyphosate or paraquat.
rimsulfuron @ 0.0155-0.021 lb/A + tribenuron @ 0.0155-0.021 lb/A	LeadOff @ 1.5-2 oz/A Consult label for adjuvant requirement.	Annual grass and broadleaf weeds; control or suppression of many sedge species	This is a 24C label that was approved Dec. 5, 2012 and will expire Dec. 5, 2017. There is a 60-day recropping restriction for rice with soil pH 6.5 or less at 1.5 oz/A and 90 days at 2 oz/A.
halosulfuron @ 0.031 lb/A	Permit/Halomax @ 0.66 oz/A Consult label for adjuvant requirement.	Sedges, hemp sesbania, jointvetch	Use as part of a preplant or burndown treatment. Safe on soil pH up to 8. May injure rice under certain environmental conditions.
saflufenacil @ 0.04 lb/A	Sharpen @ 2 oz/A Consult label for adjuvant requirement.	Annual broadleaf and grass weeds and suppression of sedges and aquatics	Grasses must be less than 2- to 3-leaf. Apply in mixture with glyphosate to broaden weed spectrum.
PREPLANT:			
thiobencarb @ 4 lb/A	Bolero 10G @ 40 lbs/A	Barnyardgrass, sedges, partial control of red rice	Apply after flooding before seeding into "clear water." Do not disturb field after application**. Do not use if fields were cultivated while flooded.**
thiobencarb @ 4 lb/A	Bolero @ 4 pt/A	Barnyardgrass 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).

RICE WEED MANAGEMENT

RICE[1]			
Active Ingredient[2] and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
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.
quinclorac @ 0.25-0.5 lb/A	Facet L @ 22-28 oz/A on light soil 32 oz/A on medium soil 43 oz/A on heavy soil	Barnyardgrass, hemp sesbania, broadleaf signalgrass, morningglory Does not control sprangletop.	**Drill-seeded rice only.** Apply after planting prior to emergence. Do not use on sand or loamy sand. Injury can occur on rice not covered with soil. Rainfall or flushing needed to activate. No more than 43 oz/A/season.
clomazone @ 0.244-0.488 lb/A+ quinclorac @ 0.244-0.488 lb/A	Obey @ 26-52 oz/A 26-39 oz/A on light soil 39 oz/A on medium soil 52 oz/A on heavy soil	Barnyardgrass, broadleaf signalgrass, fall panicum, sprangletop (spp.), elicpta, jointvetch, morningglory	Apply 14 days before planting through planting but before weed emergence. If weeds emerged before application, consult label for proper adjuvant.
saflufenacil @ 0.04 lb/A	Sharpen @ 2 oz/A Consult label for adjuvant requirement.	Annual broadleaf and grass weeds and suppression of sedges and aquatics	Grasses must be less than 2- to 3-leaf. Refer to label for proper adjuvant. Apply in mixture with glyphosate to broaden weed spectrum.
DELAYED PREEMERGENCE:			
clomazone @ 0.3-0.42 lb/A pendimethalin @ 0.6-1 lb.A	RiceOne @ 35-50 oz/A 35 oz/A on light soil 35-50 on medium and heavy soil	Barnyardgrass, broadleaf signalgrass, sprangletop, and other annual grass weeds	**Drill-seeded rice only.** Apply 4-9 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.
thiobencarb @ 4 lb/A	Bolero @ 4 pt/A	Barnyardgrass, 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 three weeks.
quinclorac @ 0.19-0.375 lb/A + pendimethalin @ 1 lb/A	Facet L @ 0.1625-32 oz/A + pendimethalin 3.3 EC @ 2.4 pt/A **or** Prowl H2O @ 2.1 pt/A	Barnyardgrass, broadleaf signalgrass, sprangletop, morningglory, hemp sesbania, northern jointvetch	**Drill-seeded rice only.** Apply 4-9 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.
pendimethalin @ 1 lb/A	pendimethalin 3.3 EC @ 2.4 pt/A **or** Prowl H2O @ 2.1 pt/A	Barnyardgrass, broadleaf signalgrass, sprangletop,	**Drill-seeded rice only.** Apply 4-9 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.

RICE WEED MANAGEMENT

RICE[1]			
Active Ingredient[2] and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE:			
2,4-D @ 1.25-1.5 lb/A	2,4-D (3.8 L) @ 2.5-3 pt/A	Most broadleaf weeds and seedling sedges	Apply after rice tillers but before panicle initiation. Best application time is at the rice first green ring at beginning of joint elongation but may be applied 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 to 1.6 oz/A	Hemp sesbania, red stem, toothcup, palmleaf morningglory, 1- to 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 lb/A + propanil @ 3 lb/A	Bolero @ 3 pt/A + propanil @ 3 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** rice, 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	Barnyardgrass, signalgrass, Hemp sesbania, red stem, toothcup, palmleaf morningglory, hemp sesbania, 1- to 2-leaf jointvetch vetch	A prepackaged mixture of quinclorac plus carfentrazone (Aim) for control of broadleaf weeds and grasses. Quinclorac provides residual and postemergence activity and carfentrazone provides postemergence activity. The product is labeled as preplant, preemergence and postemergence to rice. Rice should have 2 leaves before applied postemergence.
bentazon @ 0.75-1 lb/A	Basagran @ 1.5-2 pt/A Consult label for adjuvant requirement.	Redstem, ducksalad, dayflower, some sedges	Apply before weeds exceed labeled heights. Lowering of the flood may be necessary to expose weeds to ensure proper coverage. Refer to label for tank-mix options.
clomazone @ 0.3-0.5 lb/A	Command 3 ME @ 0.8-1.33 pt/A Impregnate on 150 lb/A fertilizer	Barnyardgrass, 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 Consult label for adjuvant requirement.	Barnyardgrass, broadleaf signalgrass, fall panicum, junglerice, knotgrass, Sprangletop	Apply pre-flood on 1- to 3-leaf grass or post-flood on 1- to 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.
quinclorac @ 0.375-0.50 lb/A	Facet L @ 32-43 oz/A Apply with COC @ 2 pt/A	Barnyardgrass, signalgrass, jointvetch, hemp sesbania Suppression of alligatorweed 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 lb/A	Facet L @ 43 oz/A + propanil @ 3 lb/A	Same as above plus increased	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**
	See propanil label for adjuvant requirement.	control of sprangletop, some sedges	
POSTEMERGENCE continued:			
prosulfuron plus halosulfuron @ 0.094-0.099 lb/A	Gambit 79 DF @ 1-2 oz/A	Activity on most annual broadleaf weeds and sedges	1-2 oz/A per application not to exceed 2 oz/A per year. Wait 3-4 days before establishing permanent flood after application.
triclopyr @ 0.375 lb/A	Grandstand @ 1 pt/A Apply with NIS or COC; consult label.	Alligatorweed, Texasweed, jointvetch, other broadleaf weeds Sesbania control is improved with propanil; see label.	Apply when weeds are small. Rice must be in the 3- to 4-leaf to 1/2-inch 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.
penoxsulam @ 0.032-0.036 lb/A	Grasp @ 2-2.3 oz/A Apply with COC or MSO @ 1 qt/A.	Barnyardgrass, junglerice, ducksalad, annual sedges, small actively growing weeds Little to no control of sprangletop, signalgrass, fall panicum	**In drill-seeded** rice, apply from emergence up to 60 days before harvest. **In water-seeded** rice, apply from pegging-one-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.
penoxsulam @ 0.032-0.042 lb/A + triclopyr @ 0.25- 0.35 lb/A	Grasp Xtra @ 16-22 oz Apply with COC or MSO @ 1 qt/A.	Barnyardgrass, junglerice, ducksalad, annual sedges, small actively growing weeds	**In drill-seeded rice, 2**- to 3-leaf to 1/2-inch internode. **In water-seeded rice,** 3- to 4-leaf to 1/2-inch. Do not apply more than 22 oz/A/year.
imazosulfuron@ 0.15 -0.3 lb/A	League @ 3.2-6.4 oz/A Consult label for adjuvant requirement.	Sesbania, ducksalad, nutsedge	Apply postemergence. Slight injury can occur on medium- and short-grain rice.
florpyrauxifen @ 0.026 lb/A	Loyant @ 16 oz/A See Loyant label for approved surfactant	Suppression of barnyardgrass and other annual grasses. Activity on many broadleaf weeds and annual sedges.	Apply to small actively growing grass and broadleaf weeds 1-4 leaf. Activity on rice flatsedge and suppression of yellow nutsedge. Apply when adequate soil moisture is present. If target weeds under moisture stress do not apply.
bensulfuron @ 0.6-1 oz/A	Londax 60 DF @ 1-1.6 oz/A	Aquatic broadleaf weeds, gooseweed, sedges; suppression of alligatorweed	Apply into flood when weeds are small and submerged. Alligatorweed 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.
bensulfuron @ 0.6 oz/A + propanil @ 3-4 lb/A	Londax 60 DF @ 1 oz/A + propanil at 3-4 lb/A	Eclipta, gooseweed, palmleaf morningglory, Texasweed, sedges, grasses	Apply before permanent flood. Good for controlling aquatic weeds where 2,4-D cannot be used.

RICE[1]			
Active Ingredient[2] and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	See propanil label for adjuvant requirements.		
POSTEMERGENCE continued:			
clomazone 0.3-0.488 lb/A + quinclorac 0.3-0.488 lb/A	Obey @ 32-52 oz/A 32 oz/A on light soil 32-43 oz/A on medium soil 43-52 oz/A on heavy soil Consult label for proper adjuvant.	Barnyardgrass, broadleaf signalgrass, fall panicum, sprangletop (spp.), elicpta, jointvetch, morningglory	Apply postemergence to rice from the 2- to 5-leaf stage. Application will control emerged and provide residual activity.
halosulfuron @ 0.023-0.063 lb/A	Permit/Halomax @ 0.5-1.34 oz/A Apply with COC @ 1qt/A	Sedges, hemp sesbania, jointvetch	Apply after rice emergence to 48 days before harvest. Do not use more than 1.34 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	Sedges, hemp sesbania, jointvetch, most aquatic weeds	See comments for bensulfuron and halosulfuron. Adjuvant required; consult label.
halosulfuron @ 0.023-0.063 lb/A + propanil @ 3-4 lb/A	Permit/Halomax @ 0.5-1.333 oz/A + propanil at 3-4 lb/A See propanil label for adjuvant requirements.	Sedges, hemp sesbania, jointvetch, grasses	Broad-spectrum weed control. Consult label for post-flood applications.
propanil @ 3-6 lb/A	Sold under various trade names. 4 L/SC/EC @ 3-6 qt/A 80 DF @ 3.5-7 lb/A	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- to 2-leaf stage; add 1lb for each additional leaf. Use 5-6 lb on 5-leaf to tillering grasses; control usually not satisfactory. Consult label for adjuvants requirement.
bispyribac-sodium @ 0.32-0.63 oz/A	Regiment 80 WP @ 0.4-0.8 oz/A Consult label for adjuvant requirement.	Barnyardgrass, junglerice, nutsedge, small broadleaf weeds; little to no control of sprangletop, signalgrass, fall panicum	Apply to rice that is at least 3 leaves. Barnyardgrass should be 1-leaf-tillering. Broadleaf weeds should be 1- to 4-leaf stage. Controls large barnyardgrass and junglerice and suppresses some perennial *Echinochloa* species.
saflufenacil @ 0.02 lb/A	Sharpen @ 1 oz/A Consult label for adjuvant requirement.	Annual broadleaf and grass weeds and suppression of sedges and aquatics	Grasses must be less than 2- to 3-leaf. Refer to label for proper adjuvant.
orthosulfamuron @ 0.053-0.065 lb/A	Strada 50 WG @ 1.7-2.1 oz/A Consult label for adjuvant requirement.	Annual sedges, hemp sesbania, jointvetch	Apply after the 2- to 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**
POSTEMERGENCE continued:			
orthosulfamuron @ 0.053-0.065 lb/A + halosulfuron @ 0.0155-0.0186 lb/A	Strada PRO 54 WG @ 2.08-2.5 oz/A Consult label for adjuvant requirement.	Annual sedges, rice flatsedge, yellow nutsedge, hemp sesbania, jointvetch	Apply to emerged weeds from prior to rice emergence until after permanent flood establishment. Do not apply past 1/2-inch internode.
orthosulfamuron 0.0406 - 0.0625 lb/A + quinclorac @ + 0.2438 - 0.375 lb/A	Strada XT 70WG 6.5-10 oz/A. Consult label for adjuvant requirement.	Barnyardgrass, broadleaf signalgrass, morningglory, hemp sesbania, flatsedge, northern jointvetch	Apply before or after rain or flushing. Rice seed exposed to spray may be severely injured. Best weed control is obtained if soil surface is smooth and wet, especially on clays. Rice seed exposed to Strada XT may be severely injured. Do not use preemergence in water-seeded rice production.
penoxulam 0.03-0.04 lb/A @ + cyhalofop @ 0.22-0.28 lb/A	RebelEX @ 16-20 oz/A	Barnyardgrass, broadleaf signalgrass, fall panicum, junglerice, knotgrass, sprangletop, ducksalad, hemp sesbania, annual sedges	A prepackaged 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	Barnyardgrass, broadleaf signalgrass, junglerice, sprangletop	Apply 13 oz/A on 1- to 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 per year. Tank-mix with only approved herbicides. See label.
aciflurofen @ 0.125 lb/A	Ultra Blazer 2 L @ 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 to 0.047 lb/A	Beyond or Postscript@ 4-6 oz/A POST Consult label for adjuvant requirement.	Red rice, barnyardgrass, broadleaf signalgrass, 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 Consult label for adjuvant requirement.	Red rice, hemp sesbania, barnyardgrass, broadleaf signalgrass, junglerice, sedges	Apply preplant up to 7 days prior to planting, preemergence, or postemergence (up to 5- leaf rice if drill-seeded and 2-leaf rice if water-seeded). Refer to label for tank-mixes. Must be preceded or followed by a Newpath or Beyond application.
imazethapyr @ 0.063-0.094 lb/A	Newpath or Preface @ 4-6 oz/A Consult label for adjuvant requirement.	Red rice, barnyardgrass, broadleaf signalgrass, junglerice	**Two applications required.** The first application can be lightly incorporated before planting or applied preemergence or at the spike-leaf rice stage. The second application should be applied to 3- to 5-leaf rice or 10-14 days after the spiking treatment. Beyond can be substituted for second application.

RICE WEED MANAGEMENT

RICE[1]			
Active Ingredient[2] **and Rate**	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
quizalofop @ 0.089-0.124 lb/A	Provisia @ 13-18 oz/A Apply with COC @ 1% v/v	Barnyardgrass, broadleaf signalgrass, junglerice, red rice, sprangletop, and perennial grass weed,	Apply 13-18 oz/A on 1- to 2-leaf grasses and up to 18 oz/A on larger grasses. Do not apply more than 31 oz/A per year. Tank-mix with only approved herbicides. See label.
SALVAGE TREATMENT:			
halosulfuron @ 0.047-0.063 lb/A	Permit/Halomax @ 1-1.34 oz/A Apply with COC @ 1qt/A	Sedges, hemp sesbania, jointvetch	Apply up to 48 days before harvest. Do not use more than 1.34 oz/A/season.
fenoxaprop @ 0.109 lb/A	Ricestar HT @ 24 oz/A	Barnyardgrass, broadleaf signalgrass, junglerice, sprangletop	Apply to four-leaf to tillering grasses. As grass size increases, activity is delayed.

ADDITONAL COMMENTS/FOOTNOTES

RATOON CROP HERBICIDES:
*HiDep 2,4-D, Basagran, Grandstand, and Grasp are also labeled for ratoon (stubble) crop rice. See labels for rates and timing of application. 2,4-D Dacamine production has been discontinued, and supply is very limited.

[1] Refer to the burndown 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 killed effectively 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 kept free of vegetation all winter will become compacted, and rice seedlings may have difficulty "pegging" and will tend to drift.

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

SOYBEAN WEED MANAGEMENT

	itchgrass	seedling johnsongrass	annual grasses	red rice	Palmer amaranth	prickly sida	hemp sesbania	morningglory	cocklebur	sicklepod	Texasweed	redweed	jointvetch	wild poinsettia	hophornbeam copperleaf	smellmelon
PREEMERGENCE HERBICIDES[1]:																
Authority Elite / BroadAxe	1	7	9	-	9	9	8	9	-	8	-	8	8	8	8	8
Authority First / Sonic	-	7	7	-	8	8	8	9	-	8	-	-	-	-	9	8
Authority MTZ	-	5	5	-	9	9	9	9	-	8	-	9	8	-	9	9
Authority XL	-	6	7	-	9	9	9	9	-	9	-	9	8	-	9	9
Boundary	-	8	9	-	9	8	9	5	-	9	-	9	7	-	9	8
Canopy EX	1	4	5	4	9	8	7	8	9	6	8	8	8	9	9	7
Canopy DF	1	6	8	6	9	9	8	8	8	8	7	9	5	8	9	7
Command	8	9	9	7	4	9	1	4	4	1	1	8	2	9	6	-
Dual Magnum	1	7	9	8	9	5	2	3	1	2	3	7	1	3	5	7
Envive / Enlite	-	6	7	7	8	7	7	8	8	8	-	8	8	-	8	8
Fierce	-	7	7	7	9	8	8	9	-	8	-	9	8	-	9	9
FirstRate	1	2	3	1	7	5	3	8	9	6	-	-	-	8	5	5
metribuzin	1	6	8	6	8	8	8	5	6	4	6	9	6	7	9	6
Outlook	1	7	9	8	8	5	2	1	1	2	3	7	1	2	5	7
Prefix	-	7	8	8	9	7	9	9	8	6	-	9	8	9	9	9
Prowl/Prowl H_2O	8	9	9	6	8	1	1	3	0	2	0	2	1	1	0	6
Pursuit	1	8	8	7	8	5	3	6	9	5	6	7	1	6	6	-
Sharpen	-	4	2	0	7	6	6	8	-	5	-	-	-	-	8	6
Trivence	-	-	8	-	8	8	8	8	-	8	-	-	-	-	9	8
Valor	0	2	6	0	9	8	8	8	-	8	8	8	5	8	8	7
Valor XLT	-	4	6	0	9	9	9	9	-	8	-	9	9	-	9	9
Verdict	-	7	9	-	9	8	8	9	-	8	-	-	-	-	9	9
Zidua	-	8	9	9	9	8	8	7	-	8	-	9	8	-	8	8
POSTEMERGENCE HERBICIDES:																
Assure II	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0
Basagran	0	0	0	0	5	8	6	4	9	1	2	7	3	5	4	5
Classic	0	0	0	0	9	2	8	8	8	8	2	8	7	8	6	4
Cobra	1	3	3	1	9	8	9	9	8	6	7	8	6	8	9	9
dicamba (XtendiMax, Engenia, FeXapan)[2]	-	0	0	0	6	2	8	8	9	8	-	-	-	-	1	7
Enlist Duo[3]	-	9	9	9	8	8	8	9	9	8	-	-	-	-	9	9
Enlist One[3]	-	0	0	0	7	7	7	8	9	7	-	-	-	-	8	8
Enlist One + Liberty 280SL[3]	-	5	5	-	9	9	9	9	9	9	-	-	-	-	9	9
FirstRate	0	3	3	0	7	8	7	9	9	4	-	8	-	8	7	6
Reflex/Flexstar/Dawn/Rhythm	0	2	4	0	9	3	9	9	8	6	6	5	7	8	9	9
Flexstar GT 3.5	9	9	9	9	9	8	9	9	9	9	9	9	7	9	9	9
Fusilade DX	9	9	9	7	0	0	0	0	0	0	0	0	0	0	0	0

SOYBEAN WEED MANAGEMENT

	itchgrass	seedling johnsongrass	annual grasses	red rice	Palmer amaranth	prickly sida	hemp sesbania	morningglory	cocklebur	sicklepod	Texasweed	redweed	jointvetch	wild poinsettia	hophornbeam copperleaf	smellmelon
glyphosate[2,3,4,6]	9	9	9	9	9	8	7	8	9	8	9	8	7	9	9	9
glyphosate[2,3,4,6] + Classic	9	9	9	9	9	9	9	9	9	9	9	9	8	9	9	9
glyphosate[2,3,4,6] + Ultra Blazer	9	9	9	9	9	8	9	9	9	9	9	8	7	9	9	9
glyphosate[2,3,4,6] + ET	9	9	9	9	9	9	9	9	9	9	-	-	-	-	9	9
glyphosate[2,3,4,6] + Prefix	9	9	9	9	9	8	9	9	9	9	9	9	7	9	9	9
glyphosate[2,3,4,6] + FirstRate	9	9	9	9	9	9	7	9	9	9	9	8	7	9	9	9
glyphosate[2,3,4,6] + Marvel SC	9	9	9	9	9	8	9	9	-	9	-	-	-	-	9	9
glyphosate[2,3,4,6] + Reflex/Flexstar	9	9	9	9	9	8	9	9	9	9	9	9	8	9	9	9
glyphosate[2,3,4,6] + Resource	9	9	9	9	9	8	7	9	9	9	9	8	7	9	9	9
glyphosate[2,3,4,6] + Warrant	-	7	9	-	9	8	7	7	-	9	9	8	7	9	-	-7
glyphosate[2,3,4,6] + Zidua	-	9	9	9	9	9	8	8	-	9	9	9	8	9	9	9
Liberty 280SL[3,5,6]	3	7	7	-	7	8	9	9	-	9	-	-	-	-	7	8
Liberty 280SL[3,5,6] + Classic	3	7	7	-	9	9	9	9	-	9	-	-	-	-	9	8
Liberty 280SL[3,5,6] + Ultra Blazer	3	7	7	-	9	9	9	9	-	9	-	-	-	-	9	8
Liberty 280SL[3,5,6] + FirstRate	3	7	7	-	9	9	9	9	-	9	-	-	-	-	9	8
Liberty 280SL[3,5,6] + Reflex/Flexstar	3	7	7	-	9	9	9	9	-	9	-	-	-	-	9	8
Liberty 280SL[3,5,6] + Prefix	3	7	7	-	9	9	9	9	-	9	-	-	-	-	9	8
Liberty 280SL[3,5,6] + Resource	3	7	7	-	9	8	9	9	-	9	-	-	-	-	9	8
Poast Plus	9	8	9	7	0	0	0	0	0	0	0	0	0	0	0	0
Pursuit	8	8	8	8	9	4	2	7	9	3	7	6	2	6	4	5
Select Max/others	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	9	9	4	6	8	5	8	9	9
Ultra Blazer	0	2	3	0	8	3	9	9	6	3	5	3	5	8	8	8
LAYBY HERBICIDES																
2,4-DB	0	0	0	0	8	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
linuron	2	2	4	2	9	7	9	8	6	5	7	4	9	7	8	8
linuron or metribuzin + 2,4-DB	2	5	6	2	9	8	9	9	9	7	7	4	9	8	9	9
metribuzin	2	5	8	2	8	7	8	7	7	6	7	4	8	7	9	9

[1] Preemergence herbicides must be activated by rainfall or overhead irrigation.
[2] For use in Xtend varieties.
[3] For use in Enlist varieties.
[4] For use in Roundup Ready/Roundup Ready 2, Xtend, and Enlist varieties.
[5] For use in Liberty Link varieties.
[6] For use in Liberty Link GT27 varieties.

SOYBEAN WEED MANAGEMENT

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT[1]:			
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 johnsongrass; fair control of some broadleaf weeds	Apply before planting and incorporate 2-3 inches deep. Trifluralin can be applied at rates higher than listed to control certain annuals and to suppress rhizome johnsongrass; 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 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, seedling johnsongrass; fair control of some broadleaf weeds	Before planting, incorporate 2-3 inches deep within 7 days of application if sufficient rainfall has not been received. Highest rates for high organic matter soils. Prowl can be applied at rates higher than listed to control certain annuals and to suppress rhizome johnsongrass; consult label.
PREEMERGENCE:			
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, broadleaf weeds	Apply at preplant incorporated or surface- applied at planting. **Do not use postemergence.** 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. Soils with pH of 7.0 – 7.4, use 4 oz./A of Canopy 75 DF to reduce potential injury. Do not apply to metribuzin sensitive varieties.
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, organic matter and recrop restrictions to determine whether to use Envive or Enlite.
chlorimuron @ 0.06-0.1 lb/A + flumioxazin 0.09-0.16@ lb/A + metribuzin 0.22-0.37	Trivence @ 6-10 oz/A	Annual grass, broadleaf weeds	Do not apply soils with soil pH greater than 7 or history of nutrient deficiency such as iron chlorosis. Use rate dependent based upon soil pH and soil type. Please consult label.
clomazone @ 1-1.25 lb/A	clomazone (3 lb/gal formulation) @ 2.6-3.3 pt/A	Annual grasses, prickly sida purslane, spotted spurge, velvetleaf	Do not apply within 1,500 feet of towns, subdivisions, commercial vegetables, greenhouses, or nurseries. Do not graze or feed forage, hay, or straw from treated fields to livestock. Do not apply with aerial equipment.
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, johnsongrass from seed; fair control of some broadleaf weeds	Apply after planting before weeds emerge.
flumetsulam @ 0.05 - 0.067 lb/A	Python 80 WDG @ 1-1.33 oz/A	Annual broadleaf weeds	Do not apply more than 1.4 oz of Python per year. Do not apply to soils with pH of 7.8 or higher. Do not

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			apply with aerial equipment. Consult label for more information on rates and recrop intervals.
PREEMERGENCE continued:			
flumioxazin @ 0.063 lb/A	Valor SX @ 2 oz/A	Broadleaves, some suppression of annual grasses	Apply after planting before weeds emerge. Consult label for tank-mixes to improve grass control. Soybean injury is possible under cool and wet conditions following planting or when incorporating rainfall occurs as seedlings are cracking. Do not tank-mix with metolachlor/S-metolachlor or dimethenamid-P
metribuzin @ 0.25 - 0.75 lb/A	75% formulation @ 5.33-13.4 oz/A OR 4 lb/gal formulation @ 8 to 20 oz/A	Annual grasses, most broadleaf weeds such as cocklebur, prickly sida, hemp sesbania, wild poinsettia	Injury may occur on soils with calcareous surface or pH 7.5 or greater, soils with less than 0.5% organic matter, when soybean planted less than 1.5 inches deep, and when heavy rains follow application and field are poorly drained. Differential sensitivity among soybean varieties have been documented. See label for list.
pendimethalin @ 0.5 - 1.5 lb/A	Prowl 3.3 or Pendimax @ 1.2-3.6 pt/A Prowl H_2O @ 1-3 pt/A Rate depends upon soil type. See label.	Most annual grasses, johnsongrass from seed; fair control of some broadleaf weeds	Apply at planting. Highest rates for high organic matter soils.
pyroxasulfone @ 0.08 – 0.18 lb/A	Zidua WG @ 1.5-3.5 oz/A Zidua SC @ 2.5-5.75 oz/A Rate depends upon soil type. See label.	Annual grass, broadleaf weeds	May be applied preplant or preemergence. Must have rainfall for activation. Do not apply if soybeans have begun to emerge.
pyroxasulfone @ 0.08 – 0.1lb/A + flumioxazin @ 0.06 – 0.08 lb/A	Fierce 76 WDG @ 3 – 3.75 oz/A	Annual grass, broadleaf weeds	May be applied preplant or preemergence. Must have rainfall for activation. See Remarks and Precautions for flumioxazin.
pyroxasulfone @ 0.07 – 0.163 lb/A + fluthiacet-methyl @ 0.002 – 0.005 lb/A	Anthem @ 4-10 oz/A Anthem Maxx @ 2-5 oz/A Rate depends upon soil type. See label.	Most annual grasses	Apply to the bare soil surface after planting but before weeds emerge. Organic matter influences use rate, consult label.
pyroxasulfone @ 0.058-0.102 lb/A + flumioxazin @ 0.046-0.081 lb/A + chlorimuron @ 0.013-0.022 lb/A	Fierce XLT @ 3-3.75 oz/A	Annual grass, broadleaf weeds	Do not apply more than 3.75 oz/A on soils with pH greater than 6.8. See Remarks and Precautions for flumioxazin.

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
saflufenacil @ 0.02-0.04 lb/A + dimethenamid-P @ 0.2-0.39 lb/A	Verdict @ 5-10 oz/A	Annual grass, broadleaf weeds	Preplant interval depends upon rate. Soybean can be planted immediately following 5 oz/A, 14 days after 7.5 oz./A and 30 days after 10 oz./A. Do not apply to emerged soybean because severe injury will occur.
sulfentrazone @ 0.19 - 0.37 lb/A + chlorimuron @ 0.025 – 0.05 lb/A	Authority XL @ 5-9.6 oz/A Rate depends upon soil type. See label.	Annual grass, broadleaf weeds	Before, during or after planting, but before crop emergence. Consult label for pH, organic matter and recrop restrictions to determine whether to use Authority XL.
sulfentrazone @ 0.25-0.31 lb/A + cloransulam @ 0.03-0.04 lb/A	Authority First OR Sonic @ 6.45-8 oz/A Rate depends upon soil type. See label.	Broadleaf weeds with grass suppression	Before, during or after planting but before crop emergence. Consult label for recropping intervals.
sulfentrazone @ 0.1 – 0.2 lb/A + *S*-metolachlor 0.94 – 1.6 lb/A	Authority Elite OR BroadAxe @ 19-32 oz/A Rate depends upon soil type. See label.	Annual grasses, annual sedges, broadleaf weeds	Before, during or after planting, but before crop emergence. Consult label for recropping intervals.
sulfentrazone @ 0.14 – 0.2 lb/A + metribuzin @ 0.2 – 0.3 lb/A	Authority MTZ @ 12-18 oz/A Rate depends upon soil type. See label.	Annual grasses, broadleaf weeds	Before, during or after planting but before crop emergence. Soybean cultivars may differ in tolerance to Authority MTZ; check label for specific cultivars.
S-metolachlor[2] @ 0.96 - 1.91 lb/A	Various Trade Names 7.62 lb/gal formulation @ 1-1.67 pt/A Rate depends upon soil type. See label.	Most annual grasses, red rice, johnsongrass from seed; fair control of some broadleaf weeds	Apply at preplant incorporated, surface applied or preplant. Apply after planting and before weeds emerge. May be incorporated.
metolachlor[2] @ 1.5 - 2.5 lb/A	Various Trade Names 8 lb/gal formulation @ 1.5-2.5 pt/A Rate depends upon soil type. See label.	See comments above.	See comments above for *S*-metolachlor.
S-metolachlor @ 1.09 lb/A + fomesafen @ 0.25 lb/A	Prefix 5.3 EC @ 2.0 pt/A	Annual grasses, broadleaf weeds	Before, during or after crop emergence. Must have rainfall for activation. Excellent choice for pigweed control. Postemergence applications must be applied no later than 90 days before harvest.
S-metolachlor @ 0.98-1.31 lb/A + metribuzin @ 0.23-.0.31 lb/A	Boundary 6.5 EC @ 1.5-2 pt/A	Most annual grasses, selected broadleaf weeds	Apply before planting. Ensure soybean variety is tolerant of metribuzin prior to use.

SOYBEAN WEED MANAGEMENT

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
S-metolachlor @ 0.85-1.9 lb/A + metribuzin @ 0.19-0.42 lb/A + fomesafen @ 0.17-0.38 lb/A	Intimidator 4.8 EC @ 32-72 oz/A 32 oz/A = 0.19 lb/A of metribuzin 40 oz/A = 0.23 lb/A of metribuzin 60 oz/A = 0.35 lb/A of metribuzin 72 oz/A = 0.42 lb/A of metribuzin	Annual grasses, broadleaf weeds	Do not exceed 72 oz/A per season. Do not exceed 0.38 lb/A of fomesafen per acre per season. When selecting product rate, ensure amount of metribuzin applied is safe for soil type and pH. See Remarks and Precautions for metribuzin.
POSTEMERGENCE:			
acetochlor @ 0.94-1.5 lb/A	Warrant @ 1.25-2 qt/A Rate depends upon soil type and organic matter. See label.	Annual grasses, small-seeded broadleaves	Postemergence surface applied from emergence to R2. Optimum timing of application is V2-V3. Emerged weeds are not controlled and require addition of a labeled postemergence herbicide.
acifluorfen @ 0.25 - 0.5 lb/A	Ultra Blazer 2L @ 0.5-1.5 pt/A Add 0.25% v/v NIS or 1% v/v COC; see label	Hemp sesbania, most morningglories, smellmelon, pigweed, other broadleaf weeds	Apply when seedling weeds are in 2- to 4-leaf stage and actively growing. Use 1.0 pt./A for hemp sesbania that is actively growing but before flowering. Rate is dependent on weed spectrum and size. Consult label. Maximum rate 0.5 pt./A/application and 2 pt./A/season.
acifluorfen @ 0.25-0.5 lb/A + bentazon @ 0.75-1.5 lb/A	Storm @ 1-1.5 pt/A Add 0.25% v/v NIS or 1% v/v COC; see label	Hemp sesbania, morningglories, 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 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.
bentazon @ 0.75 - 1.5 lb/A	Basagran 5L @ 1.2 – 2.4 pt/A Add 1% v/v COC; see label	Cocklebur and prickly sida; fair on other broadleaf weeds	Apply after soybean plants have first trifoliate leaves.
chlorimuron @ 0.008 - 0.012 lb/A	Classic 25DG @ 0.5-0.75 oz/A Add 0.25% v/v NIS; see label	Morninglories, pigweed, sicklepod, hemp sesbania	Apply after soybeans have first trifoliate leaves and when weeds have two to six leaves. See label for recrop intervals. Don't apply to soils with a pH higher than 7.5.
clethodim @ 0.09 - 0.25 lb/A	Select Max @ 12-32 oz/A. 2 lb/gal formulation @ 6-16 oz/A Add 0.25% v/v NIS or 1% v/v COC ; see label	Annual and perennial grasses	Application same as above. Refer to label for rate for specific grass species. Addition of a spray-grade nitrogen fertilizer or ammonium sulfate may further improve weed control. See label.
cloransulam-methyl @ 0.016/A	FirstRate @ 0.30 oz/A Add 0.25% v/v NIS; see label	Horseweed (mare's-tail), cocklebur, and morningglories, specifically palmleaf morningglory	Apply before weeds exceed height limitations (generally 2-4 inches 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.
fomesafen @ 0.25 - 0.35 lb/A	Reflex 2L, Dawn @ 1-1.5 pt/A Flexstar, Rhythm 1.88L @ 1-1.5 pt/A	Morninglories, cocklebur, pigweed, hemp sesbania, suppression of grasses	Apply before weeds exceed height limitations. Soybeans are very tolerant to fomesafen. May be mixed with

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Add 0.25% v/v NIS or 1% v/v COC; see label		grass herbicides. Injury may be observed under hot, humid conditions.
POSTEMERGENCE continued:			
fomesafen @ 0.12-0.18 lb/A + fluthiacet-methyl @ 0.007-0.01 lb/A	Marvel SC @ 5-7.25 oz/A Add 0.25% v/v NIS; see label	Broadleaf weeds	Apply when weeds are 2 inches. Add non-selective herbicide to improve broadleaf control and to provide grass control.
flumiclorac @ 0.023-0.054 lb/A	Resource @ 4-8 oz/A Add 1% v/v COC; see label	Common ragweed, prickly sida, and velvetleaf	Apply when weeds are 2 inches. Add non-selective herbicide to improve broadleaf control and to provide grass control.
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	Morningglories, pigweeds, hemp sesbania	Apply when weeds are 2 inches. Add non-selective herbicide to improve broadleaf control and to provide grass control.
fluazifop-P-butyl @ 0.125 - 0.50 lb/A	Fusilade DX @ 0.37-0.75 pt/A Add 0.25% v/v NIS or 1% v/v COC ; see label	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. Use the highest rate for bermudagrass with runners 4-6 inches long. Application to larger grasses or grasses under stress may result in reduced control.
imazethapyr @ 0.06 lb/A	Pursuit DG @ 1.44 oz/A Add 0.25% v/v NIS; see label	Annual grasses and certain broadleaf weeds	Apply before weeds are 3 inches tall. See comments in preemergence section. See label for recrop intervals.
lactofen @ 0.15 - 0.19 lb/A	Cobra 2L @ 10.0-12.5 oz/A. Add 0.25% v/v NIS; see label	Morningglories, cocklebur, pigweeds, prickly sida, ballonvine, smellmelon, copperleaf	Apply before weeds exceed height limitations. Application may cause moderate burn; however, soybeans normally recover in 10 days without loss of yield.
pyraflufen ethyl @ 0.0008 - 0.0012 lb/A	ET @ 0.5 to 0.75 oz/A Apply 0.25% v/v NIS; see label	Morningglories, pigweeds, hemp sesbania	Apply when weeds are 2-4 inches. Add non-selective herbicide to improve broadleaf control and to provide grass control. Add 0.25% v/v of NIS if applied alone. Expect burning of soybean leaves for seven to 10 days after application.
pyroxasulfone @ 0.053 – 0.189 lb/A	Zidua WG @ 1-3.5 oz/A Zidua SC @ 1.75-5.75 oz/A Rate depends upon soil type. See label.	Annual grass, some broadleaf weeds	Apply between emergence and V6 soybean growth stages. Optimum timing is V2-V3. Emerged weeds are not controlled and require addition of a labeled postemergence herbicide.
pyroxasulfone @ 0.07 – 0.186 lb/A + fluthiacet-methyl @ 0.002 – 0.006 lb/A	Anthem @ 4-11 oz/A Anthem Maxx @ 2-5.7 oz/A Rate depends upon soil type. See label.	Annual grasses, some broadleaf weeds	Apply between V1 and V3 soybean growth stages. Optimum timing is V2-V3. Control of emerged weeds is minimal, thus addition of a labeled postemergence herbicide is required. Organic matter influences use rate on coarse textured soil, consult label.
sethoxydim @ 0.19 - 0.47 lb/A	Poast Plus @ 1.5-2.25 pt/A	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. In general use 0.5 pt./A for annual grasses up

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Add 0.25% v/v NIS or 1% v/v COC; see label		to 4 inches tall, 1.5 pt/A for johnsongrass 1-2 feet tall and 2.25 pt./A for bermudagrass with 4- to 6-inch runners. Application to larger grasses or grasses under stress may result in reduced control. Activity may be reduced if mixed with other herbicides. Consult labels for retreatment rates.
POSTEMERGENCE continued:			
S-metolachlor[2] @ 0.96 - 1.25 lb/A	Various Trade Names 7.62 lb/gal formulation @ 1-1.33 pt/A	Most annual grasses, red rice, seedling johnsongrass; fair control of some broadleaf weeds	Postemergence applications must be applied no later than 90 days before harvest. Optimum timing is V2-V3. Emerged weeds are not controlled and require addition of a labeled postemergence herbicide.
metolachlor[2] @ 1.5 - 2 lb/A	Various Trade Names 8 lb/gal formulation @ 1.5-2 pt/A Rate depends upon soil type. See label.	See comments above.	See comments above for *S*-metolachlor.
S-metolachlor @ 1.09 lb/A + fomesafen @ 0.25 lb/A	Prefix 5.3 EC @ 2.0 pt/A	Annual grasses, broadleaf weeds	Before, during or after crop emergence. Must have rainfall for activation. Excellent choice for pigweed control. Postemergence applications must be applied no later than 90 days before harvest.
quizalofop @ 0.10 - 0.20 lb/A	Assure II @ 5-10 oz/A Add 0.25% v/v NIS or 1% v/v COC; see label	Annual and perennial grasses	Apply before grasses exceed height recommended for treatment. Application to larger grasses or grasses growing under stress may result in reduced control.
glyphosate[3] @ 0.7-1.5 lb/A	Various formulations. See product label for specific rates.	Most broadleaf weeds and grasses	**FOR USE IN ROUNDUP READY/ROUNDUP READY 2 VARIETIES, XTEND, ENLIST, and LIBERTY LINK GT27 ONLY.** See Herbicide-Tolerant Soybean Varieties on last page of this section for further information. If glyphosate-resistant weed species is present, do not expect control. Multiple residual herbicides can be tank-mixed with glyphosate to broaden weed spectrum.
glyphosate[3] @ 1-1.5 lb/A + fomesafen @ 0.25-0.38 lb/A	Flexstar GT 3.5 @ 3.5 - 5.3 pt/A **OR** Glyphosate (4 lb/gal formulations) @ 1-1.5 qt/A + Reflex @ 1-1.6 pt/A	Most broadleaf weeds and grasses; good option for increased control of morningglory, hemp sesbania, smellmelon	**FOR USE IN ROUNDUP READY/ROUNDUP READY 2 VARIETIES, XTEND, ENLIST, and LIBERTY LINK GT27 ONLY.** See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
glyphosate[3] @ 0.7-1.3 lb/A + *S*-metolachlor[2] @ 0.94-1.5 lb/A	Sequence 5.25 L @ 2.5-4.0 pt/A **OR** Glyphosate (4 lb/gal formulations) @ 23-36 oz/A + Dual Magnum @ 1 -1.6 pt/A	Most broadleaf weeds and grasses	**FOR USE IN ROUNDUP READY/ROUNDUP READY 2 VARIETIES, XTEND, ENLIST, and LIBERTY LINK GT27 ONLY.** Apply from soybean cracking to 90 days before soybean harvest. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
chlorimuron @ 0.013-0.02 lb/A + thifensulfuron @ 0.013-0.02 lb/A +glyphosate[3] @ 0.7-1.0 lb/A	Synchrony XP @ 0.75-1.125 oz/A + Roundup PowerMax @ 22 oz/A 4 lb/gal formulations @ 32 oz/A	Broadleaf and grass weed control	**FOR USE IN STS/RR OR BOLT SOYBEAN VARIETIES ONLY.** Apply after first trifoliate leaf. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
glufosinate @ 0.4 lb/A	Liberty 280SL @ 29-36 oz/A	Most broadleaf weeds; good control of small grasses and pigweed if not taller than 3-inches.	**FOR USE IN LIBERTY LINK, ENLIST, AND LIBERTY LINK GT27 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- to 3-inch weeds. Make the second application 10-14 days later. Make the third application as needed on 2- to 3-inch weeds. Do not exceed 65 oz./A/year. Multiple residual herbicides can be tank-mixed with glyphosate to broaden weed spectrum. Use residual in burndown or at planting. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
glufosinate @ 0.4 lb/A + S-metolachlor @ 0.9 lb/A	Liberty 280SL @ 29-36 oz/A + Dual Magnum @ 1.0 pt/A	Broadleaf and grass weed herbicide; good option where residual was not used preplant or at planting.	**FOR USE IN LIBERTY LINK, ENLIST, AND LIBERTY LINK GT27 VARIETIES ONLY.** Good option when a residual was not used at burndown or at planting. See comments above for Liberty and Dual II Magnum. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
dicamba @ 0.5 lb/A	Engenia @ 12.5 oz/A **OR** FeXapan @ 22 oz/A **OR** XtendiMax @ 22 oz/A	Broadleaf weeds. Poor control of hophornbeam copperleaf and prickly sida	**FOR USE IN XTEND VARIETIES ONLY.** Only Engenia, FeXapan, and XtendiMax are labeled for use in Xtend soybean. Federal and state labels contain numerous restrictions. See label for further information. All labeled dicamba formulation can be tank-mixed with glyphosate or other herbicides to broaden the weed spectrum. Please see company websites for list of products that can be legally tank mixed. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
2,4-D choline @ 0.7-0.95 lb/A	Enlist One @ 1.5-2 pt/A	Broadleaf weeds	**FOR USE IN ENLIST VARIETIES ONLY.** Only Enlist One and Enlist Duo are labeled for use in Enlist soybean. **DO NOT** apply past the R2 (full flower) soybean growth stage. A minimum of 12 days between sequential applications is required. Federal label contains additional rules and restrictions. See label for further detail. Please see company websites for list of products that can be legally tank-mixed. See Herbicide-

SOYBEAN WEED MANAGEMENT

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			Tolerant Soybean Varieties on last page of this section for further information.
2,4-D choline @ 0.7-0.95 lb/A + glyphosate @ 0.74-1 lb/A	Enlist Duo @ 3.5-4.75 pt/A	Annual grass and broadleaf weeds	**FOR USE IN ENLIST VARIETIES ONLY.** Only Enlist One and Enlist Duo are labeled for use in Enlist soybean. **DO NOT** apply past the R2 (full flower) soybean growth stage. A minimum of 12 days between sequential applications is required. Federal label contains additional rules and restrictions. See label for further detail. Please see company websites for list of products that can be legally tank-mixed. See Herbicide-Tolerant Soybean Varieties on last page of this section for further information.
LAYBY:			
2,4-DB @ 0.2 lb/A	Various formulations @ 0.8-0.9 pt/A; consult product labels for correct rate and surfactant requirements,	Annual morningglory, cocklebur, pigweed, prickly sida	Apply after soybeans are 8 inches tall. Apply to lower 3 inches of soybean plants 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 (2 lb/gal formulation) @ 4.5-8 oz/A; paraquat (3 lb/gal formulation) @ 3-5.1 oz/A) Add 0.25% v/v NIS or 1% v/v COC ; see label	Seedling grasses such as seedling johnsongrass, crabgrasses, signalgrass, barnyardgrass, goosegrass	Apply when grasses and pigweed are 2-4 inches tall and soybeans are at least 8 inches. **Directed Spray Only**. Good coverage necessary for control. Soybeans treated topically will be killed. Do not exceed 30 lb. pressure. Do not graze treated areas. Apply low rate to weeds 2 inches tall and higher rate to grasses 2-4 inches tall and pigweeds 2-3 inches tall. Consult the label.
linuron @ 0.5-1 lb/A	4 lb/gal formulation @ 1-2 pt/A 50% formulation @ 1-2 lb/A Add 0.25% v/v NIS or 1% v/v COC; see label	Annual grass and broadleaf weeds	Apply only single application as directed spray to base of soybean no higher than 2-3 inches above the ground.
metribuzin @ 0.25 - 0.50 lb/A	75% formulation @ 5.33-10.67 oz/A OR 4 lb/gal formulation @ 8 to 16 oz/A Add 0.25% v/v NIS or 1% v/v COC; see label	Grasses, broadleaf weeds such as cocklebur, dayflower, prickly sida, hemp sesbania and others	Apply after soybeans are 8 inches tall and before grasses are 1 inch tall and broadleaf weeds are 3 inches tall. **Directed spray only.** Spray only the lower quarter to third of soybean plants. Do not apply to sensitive varieties. Higher rate required to control sesbania and prickly sida and to suppress morningglory, spotted spurge and wild poinsettia. Consult the label.
metribuzin @ 0.25 - 0.50 lb/A + 2,4-DB @ 0.2 lb/A	Rates as above Add 0.25% v/v NIS or 1% v/v COC; see label	Grasses and small broadleaf weeds	Apply after soybeans are 8 inches 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.

SOYBEAN WEED MANAGEMENT

SOYBEAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREHARVEST DESSICANTS:			
carfentrazone @ 0.016-0.023 lb/A	Aim 2EC @ 1-1.5 oz/A Add 1% v/v COC	Better on morninglories 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 gal. by ground, 5 gal. by air.
saflufenacil @ 0.022-0.045 lb/A	Sharpen @ 1 - 2 oz/A Add 1% MSO + 8.5 lb/100 gal AMS	Morninglories and other broadleaf weeds	Apply once soybean has reached physiological maturity (all pods and seeds have no green color). Indeterminate varieties: 65% brown pods, more than 70% leaf drop, 30% or less seed moisture. Determinate varieties: more than 50% leaf drop and remaining leaves are yellowing. Preharvest interval is 3 days.
paraquat @ 0.13 - 0.25 lb/A	paraquat (2 lb/gal formulation) @ 8 - 16 oz/A; paraquat (3 lb/gal formulation) @ 5.4-10.7 oz/A Add 0.25% v/v NIS; see label	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 20 gal. by ground or 5 gal. by air. Preharvest interval is 15 days. Immature soybeans will be injured.
sodium chlorate @ 6 lb/A	6 lb/gal formulation @ 1 gal/A 5 lb/gal formulation @ 1.2 gal/A 3 lb/gal formulation @ 2 gal/A	Desiccation only. Level of weed control is affected by environmental conditions.	Apply 7-10 days before harvest. Apply in 20 gal. by ground, 5 gal. by air. Check label for environmental conditions most favorable for desiccation. Apply under high temperatures and humidity.

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

[2] 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. Alternatively, according to the Syngenta Crop Protection labels, if the trade names include the word "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.

[3] See "Appendix A" for glyphosate products and their surfactant requirements**.** Glyphosate-resistant Italian ryegrass, johnsongrass, Palmer amaranth and waterhemp have been documented in Louisiana.

SOYBEAN WEED MANAGEMENT

HERBICIDE-TOLERANT SOYBEAN VARIETIES

Roundup Ready Soybean. These varieties are tolerant to overtop applications of glyphosate. The initial application of glyphosate should be made at 0.7 to 1 lb/A 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 lb/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. Do not apply past first bloom. 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 morninglories, hemp sesbania, yellow and purple nutsedge and dayflower are not controlled with one application, two applications of glyphosate often are 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 target movement. In addition, weeds resistant to glyphosate have been identified in Louisiana; therefore, programs with multiple herbicidal modes of action applied as residual (preemergence and postemergence) in conjunction with glyphosate is a must.

Sulfonylurea tolerant soybean (STS) or BOLT. 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 or BOLT varieties).

Liberty Link soybean. These varieties are tolerant to overtop applications of Liberty (glufosinate). The initial application of Liberty 280 should be made at 29 to 36 oz product/A, 7-10 days after soybean emergence. A sequential application of Liberty should follow 10-14 days later or to 2- to 4-inch weeds. A maximum of 65 oz product/A/year can be applied. Do not apply past first bloom. Liberty 280 should provide good control of most broadleaf weeds but is weak on grass weeds. For acceptable grass weed control, Liberty 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. Metolachlor or *S*-metolachlor containing products may be tank-mixed with Liberty to provide residual control of some small-seeded broadleaf and grass weeds. Liberty may also be tank-mixed with Classic, Flexstar, FirstRate, Ultra Blazer, etc. for increased broadleaf weed control in Liberty Link soybean. If Liberty Link soybean is planted in an area with known large grassy weed populations, a graminicide such Select Max, Fusilade, etc. should be budgeted to control late-season grass problems.

Xtend soybean. These varieties are resistant to applications of dicamba and glyphosate. The initial application of dicamba plus glyphosate should be made when weeds are no more than 3-inches tall. LSU AgCenter data indicates that weed management programs in Xtend soybean should contain residual herbicides applied preemergence and early-postemergence to ensure season-long weed control. BASF, DuPont, and Bayer provide websites listing which herbicides can be legally tank-mixed with their dicamba product. Implementation of a weed management program containing residual herbicides preemergence and postemergence is critical if dicamba will be applied for control of herbicide-resistant weeds (ex. glyphosate-resistant Palmer amaranth or waterhemp) as dicamba applied alone or when tank-mixed with glyphosate will not provide season-long control of herbicide-resistant weeds. An alternative herbicide is required if hophornbeam copperleaf and/or prickly sida are present in fields as dicamba will not provide acceptable control.

Enlist soybean. These varieties are resistant to applications of 2,4-D choline, glyphosate, and glufosinate. The initial application of 2,4-D choline with or without glyphosate or glufosinate should be made when weeds are no more than 3-inches tall. LSU AgCenter data indicates that weed management programs in Enlist soybean should contain residual herbicides applied preemergence and early-postemergence to ensure season-long weed control. Corteva Agriscience provides a website listing which herbicides can be legally tank-mixed with their Enlist One or Enlist Duo. Implementation of a weed management program containing residual herbicides preemergence and postemergence is critical if 2,4-D choline will be applied for control of herbicide-resistant weeds (ex. glyphosate-resistant Palmer amaranth or waterhemp) as 2,4-D applied alone or when tank-mixed with glyphosate or glufosinate will not provide season-long control of herbicide-resistant weeds.

SMALL GRAINS WEED MANAGEMENT

	annual bluegrass	annual ryegrass	canarygrass	little barley	wild garlic	wild onion	henbit	curly dock	swinecress	vetch	buttercup	Shepherd's-purse	bittercress	cutleaf eveningprimrose	chickweed
PREPLANT:															
Finesse	9	7	-	3	5	5	9	8	9	3	9	9	9	9	9
Sharpen	I	I	-	-	-	-	8	8	8	8	8	8	8	8	8
PREEMERGENCE:															
Finesse	9	7	-	3	5	5	9	8	9	3	9	9	9	9	9
POSTEMERGENCE:															
Anthem Flex	8	8	-	-	-	-	8	-	8	0	7	7	-	-	8
Zidua WG/Zidua SC	8	8	-	-	-	-	8	-	8	0	7	7	-	-	8
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 HL	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 pattern is labeled or safe on all small grains. Following is a summary of which crop/use pattern 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 preplant or preemergence. **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 postemergence herbicides.

[3]Will not control ACCase resistant ryegrass.

[4]This rating is based on fall applications made to wheat with 2-3 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 4-6 weeks after application; follow up applications of 2,4-D or Harmony are usually required.

Table 2. 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, Powerflex, Anthem Flex and Zidua are good choices for managing ryegrass in the fall. Metribuzin must be applied at the 2- to 3-leaf wheat stage before ryegrass emerges. To control ryegrass, Finesse should be applied preplant or preemergence before wheat and ryegrass emerge. When using Finesse, fields must be fallowed or planted to STS soybeans. Powerflex and Osprey should be applied postemergence when ryegrass reaches the 2- to 3-leaf stage. Finesse, Powerflex and Osprey will not control ALS resistant ryegrass. Anthem Flex and Zidua have to be applied as a delay-PRE following 80% wheat emergence. Hoelon and Axial XL 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 apply metribuzin as soon as wheat reaches the 2- to 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 WEED MANAGEMENT

SMALL GRAINS[1]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREEMERGENCE:			
chlorsulfuron @ 0.0078-0.0195 lb/A + metsulfuron @ 0.0016-0.0039 lb/A	Finesse Cereal and Fallow 75 DF @ 0.2-0.5 oz/A	Most common broadleaf weeds and annual bluegrass. Suppresses ryegrass.	**Wheat only:** Do not apply to soils with a pH above 7.9. 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.
POSTEMERGENCE:			
pyroxasulfone @ 0.06-0.131 lb/A + carfentrazone @ 0.004-0.009 lb/A	Anthem Flex @ 2-4.5 oz/A	Annual bluegrass, ryegrass, other small-seeded broadleaf weeds	**DELAYED PREEMERGENCE TO EARLY POSTEMERGENCE ONLY.** Do not apply until 80% of the wheat has germinated and the shoot is at least 1/2 inch tall up to the 4th tiller stage. Do not apply seed wheat deeper than 1.5 inches, but seed at least 1 inch deep. Excessive rainfall or poor environmental conditions after application can lead to injury. Do not apply to broadcast seeded wheat.
pyroxasulfone @ 0.05-0.08 lb/A	Zidua WG @ 1-1.5 oz/A Zidua SC @ 1.75-4 oz/A	Annual bluegrass, ryegrass, other small-seeded broadleaf weeds	**DELAYED PREEMERGENCE TO EARLY POSTEMERGENCE ONLY.** Do not apply until 80% of the wheat has germinated and the shoot is at least 1/2 inch tall up to the 4th tiller stage. Do not apply seed wheat deeper than 1.5 inches, but seed at least 1 inch deep. Excessive rainfall after application or poor environmental conditions can lead to injury. Do not apply to broadcast seeded wheat.
2,4-D amine @ 0.5 - 1.0 lb/A 2,4-D ester @ 0.21 – 0.5 lb/A 2,4-D acid @ 0.21 – 0.7 lb/A	Various formulations. See product label for specific rates.	Dock, plantain, mustard and other broadleaf weeds, plus winter peas and vetch **Wild onion or wild garlic**. Use 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 2 weeks after treatment. Do not exceed these rates, or severe injury may occur. **If used on oats or rye, make**

SMALL GRAINS[1]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			application only after tillering is complete and before jointing.
POSTEMERGENCE continued:			
dicamba @ 0.125 lb/A + 2,4-D amine @ 1 lb/A	4 lb/gal dicamba formulation @ 4 oz/A + Various 2,4-D formulations. See product label for specific rates.	Most broadleaf weeds, winter peas, vetch. More effective on wild onion and wild garlic than 2,4-D alone	**Wheat, 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.
diclofop @ 0.80–1.5 lb/A	Hoelon @ 2.0–3.33 pt/A	Annual ryegrass. Does not control annual bluegrass.	**Wheat, Barley:** Apply 2.0-2.66 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 @ 0.094-0.14 lb/A	75 DF formulation @ 2-3 oz/A 4 lb/gal formulation @ 3-4.5 oz/A	Annual bluegrass, henbit, chickweed	**Wheat, 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. Do not use if wheat has been broadcast-seeded.
mesosulfuron-methyl 0.013 lb/A	Osprey @ 4.75 oz/A Add MSO @ 1.3-1.5 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.
pendimethalin @ 0.7 to 1.4 lbs ai/A	Prowl H_20 @ 1-3 pt/A Rate depends upon soil type. See label.	Residual/preemergence 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.
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 preboot 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

SMALL GRAINS WEED MANAGEMENT

SMALL GRAINS[1]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			and Barley; 30 days – leafy and root crops; 120 days – all other crops.
POSTEMERGENCE continued:			
pyroxsulam @ 0.002 lb ai/A	Powerflex HL @ 2 oz/A Add 0.25-0.5% v/v NIS + plus 1 to 2 qt/A UAN or 1.5 to 3 lb/A AMS; 1 to 1.25 % v/v COC; or 1% v/v MSO.	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 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.
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, Oats:** Apply after the 2-leaf stage but before the flag leaf emerges. Do not use with nitrogen.
PREHARVEST DESSICANTS:			
carfentrazone @ 0.016-0.032 lb/A	Aim @ 1-2 oz/A Add 0.25% v/v NIS	Broadleaf weeds	**Wheat only.** Do not apply until grain contains less than 30% moisture. Preharvest interval is 3 days. Allow up to 10 days for optimum desiccation effect.
saflufenacil @ 0.02-0.04 lb/A	Sharpen @ 1-2 oz/A Add 1% MSO + AMS	Broadleaf weeds	**Wheat and Barley:** Do not apply until grain contains less than 30% moisture. Preharvest interval is 3 days. Allow up to 10 days for optimum desiccation effect.

[1] Not all small grain herbicides are listed. Not all the herbicides or their use patterns are labeled for or safe on all small grains. Following is a summary of which crop/use pattern labeled on small grains grown in Louisiana. **Wheat:** all herbicides listed are labeled. **Barely:** do not use Osprey or Powerflex at anytime or Finesse preplant or preemergence. **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 by Dr. Al Orgeron, Area Pest Management Specialist, LSU AgCenter, Hammond, La, and Dr. Douglas Spaunhorst, USDA-ARS, Sugar Research Unit, Houma, La. The sections in the guide are in chronological order based on the sugarcane growing season from 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. A listing of various herbicides by common name and trade name is included in Table 2. Table 3 is a listing of herbicides registered for use on ditchbanks. Provided in Table 4 is a listing of glyphosate products with surfactant recommendations. Information related to weed management programs for crops grown in Louisiana can be found at https://www.lsuagcenter.com/portals/communications/publications/management_guides. Follow the link for the Suggested Weed Chemical Control Guide for the most current information.

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

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

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. When rainfall of about one half-inch is received within 10 days after herbicide application, residual weed control can be expected for about 60 days. A follow-up herbicide application about 60 days after planting can extend the control of summer weeds and also can provide residual control of winter weeds, resulting in cleaner beds in spring. See "At-Planting Preemergence Split Application Programs" and "Postemergence Weed Control (September-November)" sections. Herbicide programs described in this section also can be used in sugarcane harvested for seed and in sugarcane harvested early during grinding.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled (*See Table 1*)	Remarks and Precautions
AT-PLANTING PREEMERGENCE (AUGUST/SEPTEMBER):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine**/others *(See Table 2)* 4L @ 2.0 – 4.0 qt/A 90DF @ 2.2 - 4.4 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** 45DF @ 16 - 33 oz/A	Morningglory (tie-vine), divine nightshade, and other broadleaf weeds and nutsedge	Use higher rate on heavy soils and soils with organic matter higher than 2 percent. At the highest rate of 33 oz/A the amount of metribuzin in Authority MTZ is not sufficient to provide grass control. A 16 oz rate of Authority MTZ contains 0.27 lb of metribuzin; A 33 oz rate of Authority MTZ contains 0.56- lb of metribuzin.
mesotrione @ 0.19 - 0.24 lb/A	**Callisto** 4L/others @ 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 plus diuron @ 2.5 lb/A	**Command 3ME** @ 2.7 - 3.3 pt/A plus **Diuron/Direx**/others *(See Table 2)* 4L at 2.5 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses; bermudagrass suppression	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Bleaching can occur when sugarcane has less than 2 inches of soil cover.
clomazone @ 1.0 - 1.25 lb/A plus metribuzin @ 0.75 lb/A	**Command 3ME** @ 2.7 - 3.3 pt/A plus **Metribuzin**/others *(See Table 2)* 75DF @ 1.0 lb/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses; bermudagrass suppression	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Bleaching can

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled (*See Table 1*)	Remarks and Precautions
AT-PLANTING PREEMERGENCE (AUGUST/SEPTEMBER):			
			occur when sugarcane has less than 2 inches of soil cover.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4L @ 2.4 – 3.0 qt/A 80DF @ 3.0 - 3.8 lb/A	Broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin**/others *(See Table 2)* 75DF @ 2.0 - 4.0 lb/A	Seedling johnsongrass and other annual grasses 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 bermudagrass suppression at higher rates. Addition of pendimethalin can improve control of browntop millet and itchgrass.
S-metolachlor @ 1.71 - 2.33 lb/A plus atrazine @ 0.64 - 0.88 lb/A mesotrione @ 0.71 – 0.23 lb/A	**Lumax EZ** 3.7 L @ 2.75 – 3.75 qt/A	Browntop millet, other annual grasses, morningglory (tie-vine), divine nightshade, and other broadleaf weeds; yellow nutsedge and seedling johnsongrass suppression	Use the higher rate on heavier soils, soils with higher organic matter content, and when sugarcane is planted prior to early September. When applied alone, Lumax EZ poorly controlled itchgrass; however, the addition of clomazone or pendimethalin can improve control of johnsongrass and itchgrass.
pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC @ 2.4 - 3.6 qt/A 3.5EW @ 2.25 - 3.4 qt/A 3.8CS @ 2.1 - 3.1 qt/A	Seedling johnsongrass, itchgrass, browntop millet 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. Addition of metribuzin can improve control of bermudagrass.
terbacil @ 0.8 - 1.2 lb/A	**Sinbar** 80WDG @ 1.0 - 1.5 lb/A (1.0 lb/A on very sandy soils)	Seedling johnsongrass and other grass and broadleaf weeds; bermudagrass suppression	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Addition of pendimethalin can improve control of browntop millet and itchgrass.
Pendimenthalin @ 1.99 – 2.90 lb/A plus metribuzin @ 0.76 -1.1 lb/A	**Tripzin ZC** @ 2.75 - 4 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses and broadleaf weeds	Use higher rate on heavy soils.
sulfentrazone @ 0.31 - 0.38 lb/A	**Spartan 4F/others** @ 10.0 - 12.0 oz/A	Divine nightshade, broadleaf weeds and nutsedge	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Poor control of smallflower morningglory.
sulfentrazone @ 0.31 - 0.38 lb/A plus carfentrazone-ethyl @ 0.035 - 0.041 lb/A	**Spartan Charge** 3.5 SE @ 12.8 - 15.2 oz/A	Divine nightshade, broadleaf weeds and nutsedge	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Poor control of smallflower morningglory.
trifluralin @ 1.0 - 2.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4L @ 1.0 - 2.0 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses; bermudagrass suppression	Roll or pack rows and incorporate herbicide within 24 hours after application. Avoid incorporation at a depth that will damage seed pieces. Other herbicides

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled (*See Table 1*)	Remarks and Precautions
AT-PLANTING PREEMERGENCE (AUGUST/SEPTEMBER):			
			should be applied to the soil surface for broadleaf weed control.
flumioxazin @ 0.19 - 0.25 lb/A	**Valor SX** 51WDG @ 6.0 - 8.0 oz/A	Divine nightshade and annual broadleaf weeds	Use higher rate on heavy soils or when sugarcane is planted prior to early September. Do not apply after sugarcane emergence.
hexazinone @ 0.5 lb/A plus diuron @ 2.5 lb/A	**Velpar** 2L @ 1.0 qt/A or **Velossa** 2.4L @ 1.6 pt/A plus **Diuron/Direx**/others *(See Table 2)* 4L at 2.5 qt/A	Seedling johnsongrass, browntop millet and other annual grass and broadleaf weeds; bermudagrass suppression	Apply before sugarcane emerges. Application to coarse-textured soils that are low in organic matter may result in sugarcane chlorosis (yellowing) and stunting.
hexazinone @ 0.5 lb/A plus metribuzin @ 1.5 lb/A	**Velpar** 2L at 1.0 qt/A or **Velossa** 2.4L @ 1.6 pt/A plus **Metribuzin**/others *(See Table 2)* 75DF @ 2.0 lb/A	Seedling johnsongrass, browntop millet and other annual grass and broadleaf weeds; bermudagrass suppression	Apply before sugarcane emerges. Application to coarse-textured soils that are low in organic matter may result in sugarcane chlorosis (yellowing) and stunting.

SUGARCANE WEED MANAGEMENT

AT-PLANTING PREEMERGENCE SPLIT APPLICATION PROGRAMS

A split application program with herbicide applied at planting and around 60 days later will provide extended residual control of bermudagrass, johnsongrass and itchgrass. 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 bermudagrass include:

Command at 3.3 pt/A plus **Diuron/Direx**/others at 2.5 qt/A at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A
Command at 3.3 pt/A plus **Metribuzin**/others at 1.0 lb/A at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A
Metribuzin/others at 2 to 3 lb/A at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A
Velpar at 1 qt/A or **Velossa** at 1.6 pt/A plus **Diuron/Direx**/others at 2.5 qt/A at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A
Velpar at 1 qt/A or **Velossa** at 1.6 pt/A plus **Metribuzin**/others at 1.0 lb/A at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A
Treflan/Trifluralin/others at 1.5 to 2 qt/A and incorporated at planting followed 60 days later by **Metribuzin**/others at 1.5 lb/A

Another option for bermudagrass 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 bermudagrass from the row middles can result in a severe weed problem the following year.

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

Although shading from the crop canopy will suppress growth of weeds, once sugarcane is harvested for seed, bermudagrass will rapidly initiate new growth. Any of the herbicide programs listed for use at planting can also 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 may also 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 **Lumax EZ, Atrazine**/others, **Diuron/Direx**/others, **Velpar** plus **Diuron/Direx**/others, **Metribuzin**/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.

POSTEMERGENCE WEED CONTROL (SEPTEMBER-NOVEMBER)

Johnsongrass and Itchgrass (September/October): In early planted sugarcane or in sugarcane harvested for seed, johnsongrass may reinfest fields prior to winter. When applied in October to actively growing johnsongrass 12 to 18 inches tall, **Asulox/Asulam** 3.3L at 3 qt/A or **Envoke** 75WG 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 johnsongrass and reduced reinfestation the following spring. **Asulox/Asulam** alone and with **Envoke** also controls large itchgrass (more than 6 inches). *For additional information on **Asulox/Asulam** and Envoke see the "Postemergence Weed Control - Johnsongrass and Other Grasses (March/April)" section.*

Purple and Yellow Nutsedge (September/October): To control purple and yellow nutsedge 4 to 12 inches in height in early planted sugarcane apply **Permit/**others 75WDG (*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** 75 WG 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 "Postemergence Weed Control - Purple and Yellow Nutsedge (March/April)" section.*

Yukon, a 67.5 percent WDG 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 75 WDG and 4.5 oz/A Clarity/Vision 4L; a 6 oz/A rate is equivalent to 1 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.

Bermudagrass (September-November): Shielded application of **glyphosate** to row sides and middles after planting or early harvest has provided good to excellent control of emerged bermudagrass (See Table 4 Glyphosate Products). Apply 2 to 3 qt/A of the 4 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.

Armezon (September-November): In early planted sugarcane or in sugarcane harvested for seed, bermudagrass may infest fields prior to winter. When applied to actively growing bermudagrass, Armezon 2.8 SC at 1 to 2 oz/A plus methylated seed oil or crop oil concentrate at 4 qt/100 gal of water plus approved nitrogen fertilizers has shown to suppress bermudagrass and may result in fewer bermudagrass stolons in spring.

Broadleaf Weeds (September-November): Apply **Weedmaster/Brash**/others 3.8L at 0.5 to 1 qt/A, **2,4-D** 3.8L at 0.5 to 1.5 qt/A, **Unison** 1.74L at 24 to 64 oz/A,**Clarity/Vision/**others 4L at 0.5 to 1.0 pt/A, or **Engenia** 5L at 6.4 to 12.8 oz/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 Layby 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.

POSTEMERGENCE WEED CONTROL WINTER WEED CONTROL (JANUARY-MARCH)

Broadleaf Weeds: Apply **Weedmaster/Brash**/others 3.8L at 0.5 to 1.0 qt/A, **2,4-D** 3.8L at 0.5 to 1.5 qt/A, **Unison** 1.74L at 24 to 64 oz/A, **Clarity/Vision**/others 4L at 0.5 to 1.0 pt/A, or **Engenia** 5L at 6.4 to 12.8 oz/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 Layby Weed Control (July-Harvest)" section.* **Atrazine**/others, **Diuron/Direx**/others, **Velpar** plus **Diuron/Direx**/others, **Metribuzin**/others, or **Valor** (prior to sugarcane emergence) may be added to improve postemergence weed control and to provide soil residual activity.

Grass and Broadleaf Weeds: Gramoxone SL 2L 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, **Velpar** plus **Diuron/Direx**/others, **Metribuzin**/others, or **Valor** (prior to sugarcane emergence) may be added to improve burndown and provide soil residual activity. **Gramoxone SL/Paraquat**/others can also be applied with **Weedmaster/Brash**/others, **2,4-D,** or **Clarity/Vision**/others. Annual bluegrass can be controlled with **Diuron/Direx**/others 4L at 2.5 lb/A, **Velpar** 2L at 0.8 qt/A plus **Diuron/Direx**/others 4L at 1.4 qt/A, **Metribuzin**/others at 1.33 lb/A, or **Sinbar** at 1.25 lb/A plus a nonionic surfactant or crop oil concentrate. If herbicides with soil residual activity are applied prior to March 1, schedule layby 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.

SUGARCANE WEED MANAGEMENT

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 3.8L at 0.5 to 1.0 qt/A, **2,4-D** 3.8L at 0.5 to 1.5 qt/A, **Unison** 1.74L at 24 to 64 oz/A, or **Clarity/Vision**/others 4L 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
PREEMERGENCE (FEBRUARY/MARCH):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine**/others *(See Table 2)* 4L @ 2 - 4 qt/A 90DF @ 2.2 - 4.4 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
mesotrione @ 0.09lb/A	**Callisto** 4L/others @ 3 oz/A	Seedling broadleaf weeds	Addition of atrazine can improve broadleaf weed control.
mesotrione @ 0.08 - 0.09 lb/A plus atrazine @ 0.5 – 0.6 lb/A	**Callisto Xtra** @ 20 - 24 oz/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
clomazone @ 1.0 - 1.25 lb/A plus diuron @ 2.5 lb/A	**Command 3ME** @ 2.7 - 3.3 pt/A plus **Diuron/Direx**/others *(See Table 2)* 4L at 2.5 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses; bermudagrass suppression	Bleaching/whitening of sugarcane can occur if the crop is emerged at application.
clomazone @ 1.0 - 1.25 lb/A plus metribuzin @ 0.75 lb/A	**Command 3ME** @ 2.7 - 3.3 pt/A plus **Metribuzin**/others *(See Table 2)* 75DF @ 1.0 lb/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses; bermudagrass suppression	Bleaching/whitening of sugarcane can occur if the crop is emerged at application.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4L @ 2.4 - 3.0 qt/A 80DF @ 3.0 - 3.8 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils. Application **can be applied overtop of sugarcane until daily maximum temperatures for the week preceding application average 80 degrees F or greater.**
S-metolachlor @ 0.93 – 1.87 lb/A plus atrazine @ 0.35 - 0.70 lb/A mesotrione @ 0.09 – 0.19 lb/A	**Lumax EZ** 3.7 L @ 1.5 – 3.0 qt/A	Browntop millet, other annual grasses, morningglory (tie-vine), divine nightshade and other broadleaf weeds; yellow nutsedge and seedling johnsongrass suppression	Use higher rate on heavy soils. Addition of pendimethalin can improve control of johnsongrass and itchgrass. If applied at planting or in fall, the cumulative yearly amount of Lumax EZ cannot exceed 5.25 qt/A.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin**/others *(See Table 2)* 75DF @ 2.0 - 4.0 lb/A	Seedling johnsongrass and other annual grass and broadleaf weeds	Safe to sugarcane on all soil types. Use higher rate on heavy soils. Can provide suppression of bermudagrass at higher rates. Addition of pendimethalin can improve control of browntop millet and itchgrass.
pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC @ 2.4 - 3.6 qt/A 3.8CS @ 2.1 - 3.1 qt/A	Seedling johnsongrass, itchgrass, browntop millet 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. Addition of metribuzin can improve control of bermudagrass.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PREEMERGENCE (FEBRUARY/MARCH):			
Pendimenthalin @ 1.99 – 2.90 lb/A plus metribuzin @ 0.76 -1.1 lb/A	**Tripzin ZC** @ 2.75 - 4 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses and broadleaf weeds	Use higher rate on heavy soils.
trifluralin @ 2.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4L @ 2.0 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses	Incorporate within 24 hours after application. Can provide suppression of bermudagrass. Other herbicides should be applied for broadleaf weed control.
flumioxazin @ 0.13 - 0.25 lb/A	**Valor SX** 51WDG @ 4.0 - 8.0 oz/A	Divine nightshade and annual broadleaf weeds	Can provide residual control when applied at 6 to 8 oz/A. **Do not apply after sugarcane emergence.**
hexazinone @ 0.5 lb/A plus diuron @ 2.5 lb/A	**Velpar** 2L @ 1.0 qt/A or **Velossa** 2.4L @ 1.6 pt/A plus **Diuron/Direx**/others *(See Table 2)* 4L at 2.5 qt/A	Seedling johnsongrass, browntop millet and other annual grass and broadleaf weeds; bermudagrass suppression	Apply to sugarcane before active tillering begins. Application to coarse-textured soils that are low in organic matter may result in sugarcane chlorosis (yellowing) and stunting.
hexazinone @ 0.5 lb/A plus metribuzin @ 1.5 lb/A	**Velpar** 2L at 1.0 qt/A or **Velossa** 2.4L @ 1.6 pt/A plus **Metribuzin**/others *(See Table 2)* 75DF @ 2.0 lb/A	Seedling johnsongrass, browntop millet and other annual grass and broadleaf weeds; bermudagrass suppression	Apply to sugarcane before active tillering begins. Application to coarse-textured soils that are low in organic matter may result in sugarcane chlorosis (yellowing) and stunting.

POSTEMERGENCE WEED CONTROL (MARCH/APRIL)

Johnsongrass 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 the pH of water 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** 3.3L broadcast (or the correct proportion if applying on a band) in 15 to 30 gal of water per acre to actively growing johnsongrass 12 to 18 inches tall and to itchgrass 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 millet, 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 johnsongrass 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 johnsongrass 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.

Envoke - **Envoke** 75WG can be applied postemergence 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 layby. 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 johnsongrass or large itchgrass. Combinations of **Envoke** with **Asulox/Asulam** provide complementary broadleaf and grass weed control. Envoke at 0.3 oz/A applied with Asulox 3.3 L at 2 qt/A (half rate) plus nonionic surfactant or crop oil concentrate has improved control of large rhizome johnsongrass (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 itchgrass (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 johnsongrass root system 7 days before or after application**.

Purple and Yellow Nutsedge (March/April): Apply **Permit**/others 75WDG at 1.0 to 1.33 oz/A, **Yukon** 67.5 WDG at 6 to 8 oz/A, or **Envoke** 75 WG at 0.2 oz/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water.

Divine Nightshade (March/April): Clarity/**Vision**/others 4L at 1.0 qt/A, **Callisto** 4L at 3 oz/A plus **Atrazine**/others at 2 qt/A, or **Callisto Xtra** at 24 oz/A plus **Atrazine**/others at 1.5 qt/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water will provide limited control of divine nightshade. EPA has granted a Section 18 Quarantine Emergency Exemption for use of **Trycera** to manage divine nightshade until May 31, 2020. **Trycera** may be applied from October1 to May 31, in all commercial sugarcane parishes at 0.7 to 2.1 qt/A. Application is limited to ground rig application, and a minimum of 15 gallons per acre should be used. Addition of nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water is recommended.

Bermudagrass (March/April): Armezon 2.8 SC at 1 to 2 oz/A plus methylated seed oil or crop oil concentrate at 4 qt/100 gal of water plus approved nitrogen fertilizers will provide three to five weeks of bermudagrass suppression. Sequential application may be applied 14 days after the initial treatment. **Armezon** can be tank-mixed with other herbicides registered in sugarcane such as **Atrazine**, **Metribuzin**, or **Prowl**. Applicators must follow label restrictions for the most restrictive tank-mix product. The maximum yearly use rate for **Armezon** is 4 oz/A. Research has shown reduced bermudagrass suppression when **Armezon** and **Metribuzin** were tank-mixed. Delay cultivation for two to three weeks following application.

LAYBY WEED CONTROL (MAY/JUNE)

Herbicides at layby 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 the 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 postemergence activity. *Information related to postemergence activity of herbicides can be found in the "After Layby Weed Control (July-Harvest)" section.*

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PREEMERGENCE LAYBY (MAY/JUNE):			
atrazine @ 2.0 - 4.0 lb/A	**Atrazine**/others *(See Table 2)* 4L @ 2 - 4 qt/A 90DF @ 2.2 - 4.4 lb/A	Morningglory (tie-vine) and other broadleaf weeds	Use higher rate on heavy soils and where morningglory (tie-vine) is a problem weed. Residual red morningglory control can be expected for around 35 days. Residual control of tie-vine can be extended by applying atrazine a few weeks after the layby cultivation.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ** 45DF @ 16 - 33 oz/A	Morningglory (tie-vine), divine nightshade, 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 morningglory control. **Injury will occur if**

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PREEMERGENCE LAYBY (MAY/JUNE):			
			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 @ 0.09 lb/A	**Callisto** 4L/other @ 3 oz/A	Morningglory (tie-vine) and other broadleaf weeds	Addition of atrazine can improve broadleaf weed control, as well as provide postemergence control of divine nightshade. Should be applied with other herbicides for grass control.
mesotrione @ 0.08 - 0.09 lb/A plus atrazine @ 0.5 - 0.6 lb/A	**Callisto Xtra** @ 20 - 24 oz/A	Morningglory (tie-vine) and other broadleaf weeds	Use higher rate on heavy soils. Should be applied with other herbicides for grass control. Addition of atrazine can improve postemergence control of divine nightshade.
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 - 3.8 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.**
S-metolachlor @ 0.93 – 1.87 lb/A plus atrazine @ 0.35 - 0.70 lb/A mesotrione @ 0.09 – 0.19 lb/A	**Lumax EZ** 3.7 L @ 1.5 – 3.0 qt/A	Browntop millet, other annual grasses, morningglory (tie-vine), divine nightshade and other broadleaf weeds; yellow nutsedge and seedling johnsongrass suppression	Use higher rate on heavy soils. Do not apply to sugarcane greater than 60 inches in height and within 100 days of harvest. Addition of pendimethalin can improve control of seedling johnsongrass and itchgrass. Do not apply more than 5.25 qt/A per year.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin**/others *(See Table 2)* 75DF @ 2.0 - 4.0 lb/A	Seedling johnsongrass and other annual grass and broadleaf weeds	Addition of pendimethalin can improve control of browntop millet and itchgrass. Residual control of red morningglory can be expected for around 35 days.
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 johnsongrass, itchgrass, browntop millet and other annual grasses	May be applied to soil surface or soil incorporated. Use higher rate if surface applied or if itchgrass is a problem. For additional weed control, such as morningglory, atrazine, diuron, metribuzin, or Spartan may be applied with pendimethalin. See precautions for diuron and Spartan.
Pendimenthalin @ 1.99 – 2.90 lb/A plus metribuzin @ 0.76 -1.1 lb/A	**Tripzin ZC** @ 2.75 - 4 qt/A	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses and broadleaf weeds	Use higher rate on heavy soils.
sulfentrazone @ 0.19 - 0.25 lb/A	**Spartan 4F/others** @ 6.0 - 8.0 oz/A	Divine nightshade, broadleaf weeds and nutsedge	Use higher rate on heavy soils and where morningglory (tie-vine) is a problem weed. Residual red morningglory control around 90% can be expected for 50 days and control around 80% can be expected at 70 days. Poor control of smallflower morningglory. **Injury will occur if herbicide**

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PREEMERGENCE LAYBY (MAY/JUNE):			
			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.**
sulfentrazone @ 0.31 - 0.38 lb/A plus carfentrazone-ethyl @ 0.035 - 0.041 lb/A	**Spartan Charge** 3.5 SE @ 12.8 - 15.2 oz/A	Divine nightshade, broadleaf weeds and nutsedge	Use higher rate on heavy soils and where morningglory (tie-vine) is a problem weed. Residual red morningglory control around 90% can be expected for 50 days and control around 80% can be expected at 70 days. Poor control of smallflower morningglory. **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 15.2 oz/A.**
trifluralin @ 1.5 - 2.0 lb/A	**Treflan/Trifluralin**/others *(See Table 2)* 4L @ 1.5 - 2 qt/A)	Seedling johnsongrass, itchgrass, browntop millet and other annual grasses	Incorporate within 24 hours after application. Other herbicides should be applied to the soil surface for broadleaf weed control.
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WDG @ 3.0 - 8.0 oz/A	Divine nightshade and 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 morningglory 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 LAYBY WEED CONTROL (JULY-HARVEST)

Morningglory or tie-vines can cause significant problems at sugarcane harvest. To control morningglory 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 morningglory 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
POSTEMERGENCE AFTER LAYBY (JULY-HARVEST):			
2,4-D @ 0.47 - 1.42 lb/A	**2,4-D** 3.8L @ 1.0 - 1.5 qt/A *(See Table 2)* *See information below on 2,4-D formulations*	Morningglory (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 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)* 4L @ 2 - 4 qt/A 90DF @ 2.2 - 4.4 lb/A	Morningglory (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** 45DF @ 16 – 33 oz/A	Morningglory (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.
mesotrione @ 0.09 lb/A	**Callisto** 4L/others @ 3 oz/A	Morningglory (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 preemergence 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. Addition of atrazine can improve postemergence control of Merrill's nightshade.
mesotrione @ 0.08 - 0.09 lb/A plus atrazine @ 0.5 - 0.6 lb/A	**Callisto Xtra** @ 20 - 24 oz/A	Morningglory (tie-vine) and other broadleaf weeds	Can be applied over the top or as a directed spray. Only one application can be made if Callisto was applied preemergence 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. Addition of atrazine can improve postemergence control of Merrill's nightshade.
dicamba @ 0.5 - 0.75 lb/A	**Clarity/Vision**/others *(See Table 2)* 4L @ 16 - 24 oz/A **Engenia** 5L @ 12.8 oz/A	Morningglory (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**

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POSTEMERGENCE AFTER LAYBY (JULY-HARVEST):			
			seed cane sources 7 weeks prior to harvest and planting.
trifloxysulfuron-sodium @ 0.014 - 0.028 lb/A	**Envoke** 75WG @ 0.3 - 0.6 oz/A	Morningglory (tie-vine) and other broadleaf weeds, itchgrass 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. Do not apply aerially.
paraquat @ 0.50 - 1.0 lb/A	**Gramoxone SL/Paraquat**/others *(See Table 2)* 2L @ 1.0 – 3.0 pt/A 3L @ 0.7 – 2.0 pt/A	Small grass and broadleaf weeds and bermudagrass suppression	Apply with surfactant as a directed treatment to the row middles in late June to desiccate bermudagrass. **Herbicide contact to young sugarcane tillers and leaves can cause significant injury.**
halosulfuron @ 0.03 - 0.06 lb/A	**Permit**/others *(See Table 2)* 75WDG @ 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/others** @ 6.0 - 8.0 oz/A	Morningglory (tie-vine) and other broadleaf weeds and nutsedge	Apply with surfactant as a directed treatment at the higher rate if morningglory is climbing sugarcane plants. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** If applied in the spring or at layby do not reapply. Do not apply within 120 days of harvest.
sulfentrazone @ 0.31 - 0.38 lb/A plus carfentrazone-ethyl @ 0.035 – 0.041 lb/A	**Spartan Charge** 3.5 SE @ 12.8 – 15.2 oz/A	Broadleaf weeds and nutsedge	Apply with surfactant as a directed treatment at the higher rate if morningglory is climbing sugarcane plants. Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves. If applied in the spring or at layby do not reapply. 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 15.2 oz/A.
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WDG @ 3.0 - 8.0 oz/A	Morningglory (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 morningglory 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.
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 @ 0.5 - 1.0 qt/A	Morningglory (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**

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POSTEMERGENCE AFTER LAYBY (JULY-HARVEST):			
			cane crop, do not apply to seed cane sources 7 weeks prior to harvest and planting.
halosulfuron plus dicamba @ 0.03-0.06 lb/A + 0.14 - 0.28 lb/A	**Yukon** 67.5WDG @ 4 to 8 oz/A	Purple and yellow nutsedge, small morningglory (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 preemergence 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
PREEMERGENCE FALLOW:			
atrazine @ 2 lb/A	**Atrazine**/others *(See Table 2)* 4L @ 2 qt/A 90DF @ 2.2 lb/A	Broadleaf weeds	Apply to weed free beds. Do not apply more than 10 qt/A or 11.1 lb/A per crop year.
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 bermudagrass and johnsongrass 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)* 75WDG @ 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 2.7 oz/A in one growing season.
pendimethalin @ 2.5 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC @ 3 qt/A 3.8CS @ 2.6 qt/A	Seedling johnsongrass, itchgrass, browntop millet, other annual grasses	Apply to clean seedbed or incorporate 4 inches deep at least 60 days prior to planting.

SUGARCANE WEED MANAGEMENT

Glyphosate and Glyphosate Mixtures: Postemergence 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 4 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 4 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.

Johnsongrass in Fallow: For control of johnsongrass and other weeds, rates of 1 to 2 qt/A of the 4L glyphosate formulation is sufficient (*See Table 4 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 johnsongrass 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 4L at 1 to 2 qt/A, **Aim** 2EC at 1 to 2 oz/A, and **Valor** 51WDG at 3 to 4 oz/A, can be applied to control broadleaf weeds and in particular morningglory (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 or **Valor**; however, **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 4 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.

Bermudagrass in Fallow: In fields where bermudagrass 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 bermudagrass with less than 8-inch runners. See Table 4 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 bermudagrass to desiccate and will promote more efficient opening of rows and covering of planted sugarcane. **Multiple applications of glyphosate are more effective in controlling bermudagrass than a single application.**

Purple and Yellow Nutsedge in Fallow: Permit/others 75 WDG at 1.0 to 1.33 oz/A, **Yukon** 67.5 WDG at 6 to 8 oz/A and **Envoke** 75WG 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 4 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** 75WDG and 6.6 oz/A **Clarity/Vision** 4L 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 other weeds may interfere with row opening at planting, **Gramoxone SL** 2L 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, consider applying Authority MTZ, or Spartan at-planting or the use of **Permit**/others, **Yukon**, **Envoke**, in September or October. See "At-Planting Weed Control (August/September)" and "Postemergence Weed Control (September-November)" sections.

SUGARCANE WEED MANAGEMENT

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 **Metribuzin**/others 75DF at 1.3 lb/A or **Valor SX** 51WDG at 6 to 8 oz/A in June to control weeds on formed beds. Metribuzin/others 75DF should provide preemergence control of doveweed up to 60 days after application. For emerged doveweed, effective control may be obtained with **Gramoxone SL** 2L at 3 pt/A or **Paraquat**/others 3L at 2 pt/A, **Atrazine**/others 4L at 2 qt/A, or **Metribuzin**/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 postemergence applications. Application of **Gramoxone SL** 2L at 2 pt/A or **Paraquat**/others 3L at 1.33 pt/A with **Atrazine**/others at 2 qt/A or application of **Metribuzin**/others 75DF at 1 lb/A with **Weedmaster/Brash**/others 3.8L 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 4L should be applied at 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 4 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 bermudagrass 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.

DITCHBANK WEED CONTROL

Problem weeds, such as johnsongrass, itchgrass, bermudagrass, 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 nonirrigation 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 gallons 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 @ 2.0 + 1.0 lb/A	**Crossbow** 3L @ 4.0 qt/A (*See Table 3*)	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)* 4L @ 2.0 - 15.0 qt/A 80DF @ 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.
triclopyr @ 2.0 - 3.0 lb/A	**Garlon**/others *(See Table 3)* 4L @ 2.0 - 3.0 qt/A or 3L @ 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 3)* **Roundup**/others *(See Table 4)* *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

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL:			
			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.
pendimethalin @ 2.5 - 3.3 lb/A	**Prowl/Prowl H_2O**/others *(See Table 2)* 3.3EC @ 3.0 - 4.0 qt/A 3.8CS @ 2.6 - 3.5 qt/A	Seedling johnsongrass, itchgrass 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 postemergence herbicides to provide residual activity.
glyphosate @ 1.0 - 5.0 lb/A	**Roundup**/others *(See Table 4)* 4L @ 1.0 to 5.0 qt/A 5L @ 0.8 to 4.0 qt/A 5.5L @ 0.7 to 3.6 qt/A	Johnsongrass, itchgrass and other weeds	Johnsongrass, itchgrass 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 bermudagrass with less than 8-inch runners. Retreatment with 2 to 3 qt/A may be necessary to maintain bermudagrass control. Application with diuron at 5.0 lb ai/A (see information on diuron) or Velpar 2L at 1.0 qt/A or Velossa 2.4L at 1.6 pt/A and Diuron/Direx/others 4L at 2.5 qt/A can increase initial control and provide extended control of many annual weeds. Do not allow herbicide to contact foliage of desirable plants.
hexazinone @ 0.5 lb/A plus diuron @ 2.5 lb/A	**Velpar** 2L @ 1.0 qt/A or **Velossa** 2.4L @ 1.6 pt/A plus **Diuron/Direx**/others *(See Table 2)* 4L at 2.5 qt/A	Most ditchbank weeds including some control of poppingweed	Will not control rhizome johnsongrass 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 johnsongrass 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.

SUGARCANE WEED MANAGEMENT

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL:			
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 PREEMERGENCE AND POSTEMERGENCE IN-CROP AND IN FALLOW.

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

	Seedling Johnsongrass	Rhizome Johnsongrass	Itchgrass (Raoulgrass)	Bermudagrass[1]	Browntop Millet	Annual Grasses	Morningglory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
PREEMERGENCE 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	5[6]	**8**	2	**8**	3	**7**
Command	**8**	2	**8**	6	**8**	**8**	3	3	2	-	7	2
Command plus Diuron/Direx/ others or Metribuzin/others	**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**
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 Velpar/Velossa + Diuron/Direx/others	**8**	2	**8**	5	**9**	**9**	7	**8**	3	**9**	7	**8**
Prowl plus Metribuzin/others	**9**	2	**8**	5	**9**	**9**	**8**	**9**	4	**9**	**8**	**8**
Lumax EZ	7	0	2	0	**9**	**9**	**8**	**9**	7	**8**	**9**	**9**
Metribuzin/others	**9**	0	2	6	6	**9**	**8**	**9**	5	**9**	**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**
Spartan Charge	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**	6	-	**8**	**9**
Velpar/Velossa + Diuron/Direx/ others or Metribuzin/others	**8**	2	7	7	**8**	**9**	7	**8**	5	**9**	**8**	**8**
POSTEMERGENCE APPLICATION:												
Aim	0	0	0	0	0	0	**9**	**8**	0	0	-	-
Armezon	-	1	1	5	-	**8**	-	**8**	-	-	-	-
Asulox/Asulam[5]	**8**	7	7	2	**8**	**9**	0	0	0	-	-	-
Atrazine/others	2	0	2	0	2	6	**9**	**9**	2	7	4	7
Callisto	0	0	1	0	4	4	6[6,7]	**8**	2	-	-	**8**
Callisto + Atrazine/others	2	0	2	0	6	7	**9**	**8**	2	7	4	7
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 SL/ 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**
Spartan Charge	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 morningglory exceed 5 inches in height.

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

Common name	Trade Name	Manufacturer or Distributor	Group No. Based on Mechanism of Action	EPA Registration No.
2,4-D	SAVAGE DRY SOLUBLE	Loveland Products, Inc.	Group 4	34704-606
2,4-D	UNISON NOVEL BROADLEAF	Helena Chemical Company	Group 4	5905-542
2,4-D, 2-ethylhexyl ester	LO-VOL 4 SOLVENTLESS	TENKOZ, Inc.	Group 4	71368-14-55467
2,4-D, 2-ethylhexyl ester	WEEDONE LV4 SOLVENTLESS	Nufarm Agricultural Products	Group 4	71368-14
2,4-D, diethanolamine salt + 2,4-D, dimethylamine salt	HI-DEP	PBI Gordon Corporation	Group 4; Group 4	2217-703
2,4-D, dimethylamine salt	2,4-D AMINE 4 (AGRI STAR)	Albaugh, Inc./Agri Star	Group 4	42750-19
2,4-D, dimethylamine salt	2,4-D AMINE-4	Winfield Solutions LLC	Group 4	1381-103
2,4-D, dimethylamine salt	AMINE 4 2,4-D	Loveland Products, Inc.	Group 4	34704-120
2,4-D, dimethylamine salt	AMINE 4 2,4-D HERBICIDE	TENKOZ, Inc.	Group 4	42750-19-55467
2,4-D, dimethylamine salt	AMINE 4 2,4-D, TENKOZ	TENKOZ, Inc.	Group 4	71368-1-55467
2,4-D, dimethylamine salt	CLEAN AMINE	Loveland Products, Inc.	Group 4	34704-120
2,4-D, dimethylamine salt	OPTI-AMINE	Helena Chemical Company	Group 4	5905-501
2,4-D, dimethylamine salt	SABER	Loveland Products, Inc.	Group 4	34704-803
2,4-D, dimethylamine salt	SOLUTION WATER SOLUBLE	Nufarm Agricultural Products	Group 4	228-260
2,4-D, dimethylamine salt	WEEDAR 64	Nufarm Agricultural Products	Group 4	71368-1
2,4-D, dimethylamine salt	WEEDESTROY AM-40 AMINE SALT	Nufarm Agricultural Products	Group 4	228-145
2,4-D, dimethylamine salt + Dicamba, dimethylamine salt	BRASH HERBICIDE	Winfield Solutions LLC	Group 4; Group 4	1381-202
2,4-D, dimethylamine salt + Dicamba, dimethylamine salt	RANGESTAR	Albaugh, Inc./Agri Star	Group 4; Group 4	42750-55
2,4-D, dimethylamine salt + Dicamba, dimethylamine salt	RIFLE-D	Loveland Products, Inc.	Group 4; Group 4	34704-869
2,4-D, dimethylamine salt + Dicamba, dimethylamine salt	WEEDMASTER	Nufarm Agricultural Products	Group 4; Group 4	71368-34
2,4-D + Dicamba	LATIGO	Helena Chemical Company	Group 4; Group 4	5905-564
Asulam-sodium	ASULAM HERBICIDE	Loveland Products, Inc.	Group 18	34704-904
Asulam-sodium	ASULOX	United Phosphorus, Inc.	Group 18	70506-139
Atrazine	AATREX 4L HERBICIDE	Syngenta Crop Protection, LLC	Group 5	100-497
Atrazine	AATREX NINE-O	Syngenta Crop Protection, LLC	Group 5	100-585
Atrazine	ATRAZINE 4 L	Winfield Solutions LLC	Group 5	1381-158
Atrazine	ATRAZINE 4 L HERBICIDE	Helena Chemical Company	Group 5	5905-470
Atrazine	ATRAZINE 4L	Loveland Products, Inc.	Group 5	34704-69
Atrazine	ATRAZINE 4L (DREXEL)	Drexel Chemical Company	Group 5	19713-11
Atrazine	ATRAZINE 4L HERBICIDE	MANA - Makhteshim Agan of North America, Inc.	Group 5	66222-36
Atrazine	ATRAZINE 4L HERBICIDE	TENKOZ, Inc.	Group 5	100-497-55467
Atrazine	ATRAZINE 90 DF	Winfield Solutions LLC	Group 5	9779-253

SUGARCANE WEED MANAGEMENT

Common name	Trade Name	Manufacturer or Distributor	Group No. Based on Mechanism of Action	EPA Registration No.
Atrazine	ATRAZINE 90 DF HERBICIDE	MANA - Makhteshim Agan of North America, Inc.	Group 5	66222-37
Atrazine	ATRAZINE 90 WDG	Loveland Products, Inc.	Group 5	34704-622
Atrazine	ATRAZINE 90DF HERBICIDE	TENKOZ, Inc.	Group 5	100-585-55467
Atrazine	HELENA ATRAZINE 4F	Helena Chemical Company	Group 5	100-497-5905
Carfentrazone-ethyl	AIM EC HERBICIDE	FMC Corporation Agricultural Products Group	Group 14	279-3241
Carfentrazone-ethyl	AIM EW HERBICIDE	FMC Corporation Agricultural Products Group	Group 14	279-3242
Clomazone	COMMAND 3 ME	Helena Chemical Company	Group 13	279-3158-5905
Clomazone	COMMAND 3ME	FMC Corporation Agricultural Products Group	Group 13	279-3158
Dicamba	VISION HERBICIDE	Helena Chemical Company	Group 4	5905-576
Dicamba, diglycolamine salt	CLARITY HERBICIDE	BASF Ag Products	Group 4	7969-137
Dicamba, diglycolamine salt	CLASH	Nufarm Agricultural Products	Group 4	228-615
Dicamba, diglycolamine salt	DETONATE	TENKOZ, Inc.	Group 4	7969-137-55467
Dicamba, diglycolamine salt	STERLING BLUE	Winfield Solutions LLC	Group 4	7969-137-1381
Dicamba, diglycolamine salt	STRUT	Loveland Products, Inc.	Group 4	34704-1043
Dicamba, dimethylamine salt	BANVEL HERBICIDE	Arysta LifeScience North America LLC	Group 4	66330-276
Dicamba, dimethylamine salt	DIABLO HERBICIDE	Nufarm Agricultural Products	Group 4	228-379
Dicamba, dimethylamine salt	RIFLE	Loveland Products, Inc.	Group 4	34704-861
Dicamba, BAPMA salt	ENGENIA	BASF Ag Products	Group 4	7969-345
Diuron	DIREX 4 L	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-54
Diuron	DIREX 4L HERBICIDE	DuPont Crop Protection	Group 7	352-678
Diuron	DIURON 4 L	Winfield Solutions LLC	Group 7	9779-329
Diuron	DIURON 4L	Drexel Chemical Company	Group 7	19713-36
Diuron	DIURON 4L HERBICIDE	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-54
Diuron	DIURON 80	Drexel Chemical Company	Group 7	19713-274
Diuron	DIURON 80 WDG WEED KILLER	Loveland Products, Inc.	Group 7	34704-648
Diuron	DIURON 80DF	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-51
Diuron	DIURON-4L HERBICIDE	Loveland Products, Inc.	Group 7	34704-854
Diuron	PARROT DF	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-51
Diuron	SEKOR 4L	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-54
Diuron	SUPERDI 4L	MANA - Makhteshim Agan of North America, Inc.	Group 7	66222-54
EPTC	EPTAM 7-E	Gowan Company	Group 8	10163-283

SUGARCANE WEED MANAGEMENT

Common name	Trade Name	Manufacturer or Distributor	Group No. Based on Mechanism of Action	EPA Registration No.
Flumioxazin	VALOR SX	Valent U.S.A. Corporation Agricultural Products	Group 14	59639-99
Halosulfuron-methyl	PERMIT	Gowan Company	Group 2	81880-2-10163
Halosulfuron-methyl	SANDEA	Gowan Company	Group 2	81880-18-10163
Halosulfuron-methyl + Dicamba, sodium salt	YUKON HERBICIDE	Gowan Company	Group 4; Group 2	81880-6-10163
Hexazinone	VELOSSA	Helena Chemical Company	Group 5	5905-579
Hexazinone	VELPAR DF	DuPont Crop Protection	Group 5	352-581
Hexazinone	VELPAR L HERBICIDE	DuPont Crop Protection	Group 5	352-392
Mesotrione	CALLISTO	Syngenta Crop Protection, LLC	Group 27	100-1131
Mesotrione	MESOTRYONE	Drexel Chemical Company	Group 27	19713-685
Mesotrione + Atrazine	CALLISTO XTRA	Syngenta Crop Protection, LLC	Group 5; Group 27	100-1359
Metribuzin	DIMETRIC DF 75%	Winfield Solutions LLC	Group 5	1381-197
Metribuzin	GLORY	MANA - Makhteshim Agan of North America, Inc.	Group 5	66222-106
Metribuzin	METRI 4F	United Phosphorus, Inc.	Group 5	70506-68
Metribuzin	METRI DF HERBICIDE	United Phosphorus, Inc.	Group 5	70506-103
Metribuzin	METRIBUZIN 75	Loveland Products, Inc.	Group 5	34704-876
Metribuzin	METRIBUZIN 75DF	MANA - Makhteshim Agan of North America, Inc.	Group 5	66222-106
Metribuzin	TRICOR 4F	United Phosphorus, Inc.	Group 5	70506-68
Metribuzin	TRICOR DF	United Phosphorus, Inc.	Group 5	70506-103
Paraquat dichloride	BONFIRE	United Phosphorus, Inc.	Group 22	70506-239
Paraquat dichloride	FIRESTORM	Chemtura USA Corporation	Group 22	82557-1-400
Paraquat dichloride	GRAMOXONE INTEON	Syngenta Crop Protection, LLC	Group 22	100-1217
Paraquat dichloride	GRAMOXONE SL	Syngenta Crop Protection, LLC	Group 22	100-1217
Paraquat dichloride	GRAMOXONE SL 2.0	Syngenta Crop Protection, LLC	Group 22	100-1431
Paraquat dichloride	HELMQUAT 3SL	HELM AGRO US, Inc.	Group 22	74530-48
Paraquat dichloride	PARAQUAT CONCENTRATE	Solera Source Dynamics, LLC	Group 22	82542-3
Paraquat dichloride	PARA-SHOT 3.0	Sharda USA LLC	Group 22	83529-27
Paraquat dichloride	PARAZONE 3SL	MANA - Makhteshim Agan of North America, Inc.	Group 22	66222-130
Paraquat dichloride	QUIK-QUAT	Drexel Chemical Company	Group 22	19713-617
Pendimethalin	ACUMEN	TENKOZ, Inc.	Group 3	241-337-55467
Pendimethalin	FRAMEWORK 3.3 EC	Winfield Solutions LLC	Group 3	1381-216
Pendimethalin	PENDANT 3.3 EC	Winfield Solutions LLC	Group 3	241-337-1381
Pendimethalin	PENDIPRO 3.3 EC	Independent Agribusiness Professionals, Inc.	Group 3	241-337-71058
Pendimethalin	PROWL 3.3 EC HERBICIDE	BASF Ag Products	Group 3	241-337
Pendimethalin	SATELLITE 3.3 HERBICIDE	United Phosphorus, Inc.	Group 3	70506-318
Pendimethalin	SATELLITE FLEX HERBICIDE	United Phosphorus, Inc.	Group 3	70506-324
Pendimethalin	PROWL H2O	BASF Ag Products	Group 3	241-418

SUGARCANE WEED MANAGEMENT

Common name	Trade Name	Manufacturer or Distributor	Group No. Based on Mechanism of Action	EPA Registration No.
Pendimethalin	SATELLITE HYDROCAP HERBICIDE	United Phosphorus, Inc.	Group 3	70506-230
Pendimethalin	STEALTH	Loveland Products, Inc.	Group 3	34704-868
Pendimethalin + metribuzin	TRIPZIN ZC	United Phosphorus, Inc.	Group 3; Group 5	70506-330
S-metolachlor + atrazine + mesotrione	LUMAX EZ	Syngenta Crop Protection, LLC	Group 15; Group 5; Group 27	100-1442
Sulfentrazone	SPARTAN 4F HERBICIDE	FMC Corporation Agricultural Products Group	Group 14	279-3220
Sulfentrazone	VANDAL 4SC	Loveland Products, Inc.	Group 14	89168-48 89391
Sulfentrazone	SHUTDOWN HERBICIDE	United Phosphorus, Inc.	Group 14	70506-326
Sulfentrazone + Carfentrazone-ethyl	SPARTAN CHARGE HERBICIDE	FMC Corporation Agricultural Products Group	Group 14; Group 14	279-3337
Sulfentrazone + Metribuzin	AUTHORITY MTZ DF	FMC Corporation Agricultural Products Group	Group 5; Group 14	279-3340
Terbacil	SINBAR WDG	Tessenderlo Kerley, Inc. (NovaSource)	Group 5	61842-27
Topramezon	ARMEZON	BASF Ag Products	Group 27	7969-262
Triclopyr[2]	TRYCERA	Helena Chemical Company	Group 4	5905-580
Trifloxysulfuron-Sodium	ENVOKE	Syngenta Crop Protection, LLC	Group 2	100-1132
Trifluralin	DINTEC TREFLAN 4D HERBICIDE	Dintec Agrichemicals	Group 3	68156-4
Trifluralin	TREFLAN 4 EC HERBICIDE	Helena Chemical Company	Group 3	5905-532
Trifluralin	TREFLAN 4L	Loveland Products, Inc.	Group 3	34704-853
Trifluralin	TREFLAN HFP	Dow AgroSciences LLC	Group 3	62719-250
Trifluralin	TREFLAN TR-10 HERBICIDE	Dow AgroSciences LLC	Group 3	62719-131
Trifluralin	TRIFLURALIN 10G	Loveland Products, Inc.	Group 3	34704-790
Trifluralin	TRIFLURALIN 4 E.C., HELENA	Helena Chemical Company	Group 3	5905-519
Trifluralin	TRIFLURALIN 4 EC (AGRI STAR)	Albaugh, Inc./Agri Star	Group 3	42750-32
Trifluralin	TRIFLURALIN 4 EC, TENKOZ	TENKOZ, Inc.	Group 3	62719-250-55467
Trifluralin	TRIFLURALIN 4EC, TENKOZ	TENKOZ, Inc.	Group 3	66222-46-55467
Trifluralin	TRIFLURALIN HF	Loveland Products, Inc.	Group 3	34704-792
Trifluralin	TRIFLUREX HFP	MANA - Makhteshim Agan of North America, Inc.	Group 3	66222-46
Trifluralin	TRUST 10G	Winfield Solutions LLC	Group 3	62719-131-1381
Trifluralin	TRUST HERBICIDE	Winfield Solutions LLC	Group 3	1381-146

[1]Information provided by the Louisiana Department of Agriculture and Forestry through the Pesticide Registration website and from the CDMS website. 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.

[2]EPA has granted a Section 18 Quarantine Emergency Exemption for use of **Trycera** to manage divine nightshade until May 31, 2020. **Trycera** may be applied from October1 to May 31 in all commercial sugarcane parishes at 0.7 to 2.1 qt/A. Application is limited to ground rig application, and a minimum of 15 gallons per acre should be used.

TABLE 3. GLOSSARY OF HERBICIDES REGISTERED FOR USE ON SUGARCANE DITCHBANKS IN LOUISIANA.[1]

Common name	Trade Name	Manufacturer or Distributor	Group No. Based on Mechanism of Action	EPA Registration No.
2,4-D, butoxyethyl ester+ Triclopyr, butoxyethyl ester	CANDOR	Nufarm Agricultural Products	Group 4; Group 4	228-565
2,4-D, butoxyethyl ester+ Triclopyr, butoxyethyl ester	CROSSBOW HERBICIDE	Dow AgroSciences LLC	Group 4; Group 4	62719-260
2,4-D, butoxyethyl ester+ Triclopyr, butoxyethyl ester	CROSSBOW L	Loveland Products, Inc.	Group 4; Group 4	62719-260-34704
2,4-D, butoxyethyl ester+ Triclopyr, butoxyethyl ester	CROSSBOW, TENKOZ	TENKOZ, Inc.	Group 4; Group 4	62719-260-55467
2,4-D, dimethylamine salt+ Triclopyr, triethylamine salt	AQUASWEEP	Nufarm Agricultural Products	Group 4; Group 4	228-316
Triclopyr	TRYCERA	Helena Chemical Company	Group 4	5905-580
Triclopyr	ELEMENT 4	Dow AgroSciences LLC	Group 4	62719-40
Triclopyr	RELEGATE RTU	Nufarm Agricultural Products	Group 4	228-552
Triclopyr, butoxyethyl ester	GARLON 4	Dow AgroSciences LLC	Group 4	62719-40
Triclopyr, butoxyethyl ester	GARLON 4 ULTRA	Dow AgroSciences LLC	Group 4	62719-527
Triclopyr, butoxyethyl ester	PATHFINDER II	Dow AgroSciences LLC	Group 4	62719-176
Triclopyr, butoxyethyl ester	REMEDY ULTRA	Dow AgroSciences LLC	Group 4	62719-552
Triclopyr, butoxyethyl ester	TAHOE 4E HERBICIDE	Nufarm Agricultural Products	Group 4	228-517
Triclopyr, triethylamine salt	GARLON 3A	Dow AgroSciences LLC	Group 4	62719-37
Triclopyr, triethylamine salt	PLATFORM HERBICIDE	Nufarm Agricultural Products	Group 4	228-520
Triclopyr, triethylamine salt	TAHOE 3A	Nufarm Agricultural Products	Group 4	228-520

[1]Information provided by the Louisiana Department of Agriculture and Forestry through the Pesticide Registration website and from the CDMS website. 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.

TABLE 4. GLYPHOSATE PRODUCTS REGISTERED FOR USE IN LOUISIANA WITH SURFACTANT RECOMMENDATIONS.[1]

					Rate Equivalent Based on 4 lb ai/gal Product	Rate Equivalent Based on 4 lb ai/gal Product	Rate Equivalent Based on 4 lb ai/gal Product
Trade Name	**Manufacturer or Distributor**	**Glyphosate Concentration[2] Acid equivalent (a.e)**	**Glyphosate Concentration[2] Active ingredient (a.i.)**	**Need for Nonionic Surfactant[3]**	**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
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

SUGARCANE WEED MANAGEMENT

Trade Name	Manufacturer or Distributor	Glyphosate Concentration[2] Acid equivalent (a.e)	Glyphosate Concentration[2] Active ingredient (a.i.)	Need for Nonionic Surfactant[3]	Rate Equivalent Based on 4 lb ai/gal Product 1.0 qt	Rate Equivalent Based on 4 lb ai/gal Product 1.5 qt	Rate Equivalent Based on 4 lb ai/gal Product 2.0 qt
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
Helosate 70	Helm Agro US	4.72	6.3	May be added**	0.64	1.0	1.3
Helosate 75 SG	Helm Agro US	68.9	75	May be added**	1.3[4]	2.0[4]	2.6[4]
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

SUGARCANE WEED MANAGEMENT

Trade Name	Manufacturer or Distributor	Glyphosate Concentration[2] Acid equivalent (a.e)	Glyphosate Concentration[2] Active ingredient (a.i.)	Need for Nonionic Surfactant[3]	Rate Equivalent Based on 4 lb ai/gal Product 1.0 qt	Rate Equivalent Based on 4 lb ai/gal Product 1.5 qt	Rate Equivalent Based on 4 lb ai/gal Product 2.0 qt
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
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 website and the CDMS website. 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 usually are provided on the herbicide label. For glyphosate products, the active portion of the herbicide molecule (the part that provides weed control) is the acid. 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 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 percent active, add 2 or more quarts unless otherwise indicated in specific crop or noncrop directions for using the product, ** For surfactant at least 50 percent active, add 2 or more quarts per 100 gallons water, *** For surfactant at least 70 percent active, add 2 to 4 quarts per 100 gallons water, **** For surfactant at least 75 percent active, add at 0.25 to 0.5 percent; **May be or Can be applied=** * For surfactant at least 80 percent active, add at 0.375 percent volume ** For surfactant at least 70 percent active, add at 0.5 percent volume; less than 70 percent active ingredient add at 1 percent volume, *** Use surfactant at least 70 percent 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 percent active and add at 0.25 to 0.5 percent volume; less than 70 percent active ingredient add at 1 percent volume. Note: 0.25 percent volume = 1 qt/100 gal; 0.375 percent volume = 1.5 qt/100 gal; 0.5 percent volume = 2 qt/100 gal; 1 percent volume = 4 qt (1 gal) /100 gal.

[4] Rate in pounds/A.

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

PEANUT WEED MANAGEMENT

PEANUT			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT:			
ethalfluralin @ 0.56-1.13 lb/A	Sonalan HFP @ 1.5-3.0 pt/A	Most annual grasses; many small-seed annual broadleaf weeds	Soil incorporate 2-3 inches deep soon after application. Bedding must not expose untreated soil. Use low rate for light and high rate for heavy soils.
pendimethalin @ 0.74-0.99 lb/A	Prowl 3.3 EC @ 1.8-2.4 pt/A Prowl H_2O @ 2 pt/A	Annual grasses; small-seeded broadleaves	Apply at preplant incorporated up to 45 days before planting. For best performance incorporate within 7 days of applications.
PREPLANT/PREEMERGENCE:			
diclosulam @ 0.024 lb/A	Strongarm @ 0.45 oz/A	Broadleaf weeds	Soil incorporate 1-3 inches deep. Should be tank-mixed with a grass herbicide. If surface-applied, at least 0.25-0.5 inches of supplemental moisture is needed for activation. See label for complete rotation restrictions: cotton = 10 months; corn = 18 months (IR hybrids = 10 months); soybean = 0 months.
flumioxazin @ 0.096lb/A	Valor @ 3 oz/A	Pigweeds, sida; other broadleaf weeds; some grass suppression.	Apply after planting, but no later than 2 days after planting. Do not irrigate when peanuts are cracking. Rainfall or irrigation at cracking will cause temporary crop injury that should result in reduced yields if applied according to the label.
imazethapyr @ 0.0625 lb/A	Pursuit 2E @ 4 oz/A Rate may be split 4 oz/A preplant incorporated or preemergence followed by 4 oz/A postemergence	Several broadleaf weeds, many annual grasses, yellow nutsedge, purple nutsedge	Do not apply more than 4 oz./A of Pursuit during the growing season. Do not graze or feed treated forage to livestock. See label for complete rotation restrictions: cotton = 18 months; wheat = 4 months.
metolachlor @ 1.5-2 lb/A or *S*-metolachlor @ 1 - 1.5 lb/A	Various formulations. See product label for specific rates.	Annual grasses and pigweed; poor control of large-seeded broadleaf weeds	For preplant incorporation, apply within 14 days of planting. For preemergence (soil surface), apply after planting and before weeds emerge. May be tank-mixed with other PRE herbicide; consult label.
POSTEMERGENCE:			
2,4-DB @ 0.2-0.4 lb/A	1.75 lb/gal formulation @ 0.9-1.75 pt/A 2 lb/gal formulation @ 0.8-1.6 pt/A	Cocklebur, morningglory; fair control of other broadleaf weeds	Apply when weeds are small and actively growing, 2-12 weeks after planting. Low rates control cocklebur, highest rate for other weeds. Do not apply within 30 days of harvest. See label for restrictions.
acifluorfen @ 0.25-0.50 lb/A	Ultra Blazer @ 1.0-2.0 pts/A Add 0.25% v/v NIS	Pigweed, morningglory, wild poinsettia, sesbania	Apply when weeds have 2-4 leaves. Do not apply to crop or weeds under stress. Do not apply Ultra Blazer within 75 days of harvest. Do not apply more than 2 pts/A during growing season. Rainfall received within 6 hours of application may reduce control. Do not graze or feed treated foliage to livestock.

PEANUT WEED MANAGEMENT

PEANUT			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
bentazon @ 0.75-1.0 lb/A	Basagran 4 lb/gal formulation @ 24-32 oz/A 5 lb/gal formulation @ 19.3-25.7 oz/A Add 1% v/v COC	Several broadleaf weeds; little to no control of morningglory species	Early postemergence when weeds are small and actively growing. Thorough coverage of weeds is essential. Do not apply if peanuts are under stress.
bentazon @ 0.5 lb/A + aciflurofen @ 0.25 lb/A	Storm 4EC @ 1.5 pt/A Add 0.25% v/v NIS	Several broadleaf weeds; increased control of morninglories over Basagran alone	Do not apply if peanuts are under stress. Do not apply more than a total of 1.5 pints of Storm within 75 days of peanut harvest.
clethodim @ 0.06 – 0.25 lb/A	1 lb/gal formulation @ 12-32 oz/A 2 lb/gal formulation @ 6–16 oz/A Add 0.25% v/v NIS or 1% v/v COC; see label	Annual and perennial grasses	Apply before grasses exceed height limit. Do not apply within 40 days of harvest. Other clethodim formulations have similar labeling.
imazapic @ 0.063 lb/A	Cadre @ 4 oz/A Add 0.25% v/v NIS	Several broadleaf species and nutsedge species; control or suppression of some grass species	See label for details, precautions and plant-back intervals. For sicklepod, apply in combination with 2,4-DB.
imazethapyr @ 0.063 lb/A	Pursuit @ 4 oz/A Rate may be split 2 oz/A preplant incorporated or preemergence followed by 2 oz/A postemergence Add 0.25% v/v NIS	Several broadleaf weeds, many annual grasses, yellow nutsedge, purple nutsedge	Do not (1) apply more than 4 oz./A of Pursuit during the growing season; (2) graze or feed treated forage to livestock; or (3) apply within 45 days of harvest. See label for complete rotation restrictions: cotton = 18 months; wheat = 4 months.
lactofen @ 0.195 lb/A	Cobra 2EC @ 12.5 oz/A Add 1% v/v COC	Control of pigweeds, morninglories, copperleaf, wild poinsettia, eclipta	Apply after peanuts reach the 6 true-leaf stage. Preharvest interval is 90 days.
paraquat @ 0.125 lb/A	paraquat (2 lb/gal formulation) @ 8 oz/A; paraquat (3 lb/gal formulation) @ 5.33 oz/A Add 0.25% v/v NIS	Several grass and broadleaf weeds; when used alone, not effective on prickly sida or tropic croton	Apply at cracking or early postemergence up to 14 days after ground cracking. After that time, use in combination with Basagran or Storm. Peanut foliage injury is usually temporary. Conditions of high humidity, wet foliage and/or wet soils result in greater foliage burn. Thrips injury retards crop recovery.
paraquat @ 0.189 lb/A + bentazon @ 0.25-0.5 lb/A OR + bentazon @ 0.33-0.5 lb/A + aciflurofen @ 0.17-0.25	paraquat (2 lb/gal formulation) @ 12 oz/A; paraquat (3 lb/gal formulation) @ 8 oz/A + Basagran @ 0.5-1.0 pt/A	Small, emerged annual grass and many broadleaf weeds	Apply at cracking or early postemergence up to 28 days after ground cracking. Do not apply after flower initiation. Do not make more than 2 applications per crop. One pint is needed for nutsedge control. Use 0.5 pt./A of Basagran if added only as a safener.

PEANUT WEED MANAGEMENT

PEANUT			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	OR + Storm @ 1.0-1.5 pt/A Add 0.25% v/v NIS		
POSTEMERGENCE continued:			
sethoxydim @ 0.19-0.38 lb/A	Poast Plus @ 1.0-2.0 pt/A Add 1% v/v COC	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.
PREHARVEST DESICCANT:			
carfentrazone @ 0.032 lb/A	Aim 2 EC @ 2 oz/A	morningglory and pigweed	Apply at least 7 days before harvest. Do not apply more than 2 oz/A as a harvest aid.

HOME GARDEN WEED MANAGEMENT

HOME GARDENS		
Active Ingredient	**Product Rate per 1000 sq ft/1 gal[1]**	**Remarks and Precautions**
BURNDOWN:		
glyphosate[1]	Roundup Ultra/others @ 0.5-1oz/1,000 sq ft. Several brands available; consult labels for proper rates.	Apply postemergence on weeds. May be used before planting or after crop emergence with a covered hooded sprayer on actively growing weeds. Consult product label for plant back intervals on applications prior to planting. 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).
PRE-PLANT INCORPORATED:		
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.
PREEMERGENCE (before crops or weeds emerge):		
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	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. Controls many annual grasses and some broadleaf weeds.
POSTEMERGENCE (after crop and weeds emerge):		
bentazon	Basagran 4 EC @ 1/2-3/4 oz/1,000 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. Very effective on yellow nutsedge. Needs an adjuvant; see label.

HOME GARDEN WEED MANAGEMENT

HOME GARDENS		
Active Ingredient	**Product Rate per 1000 sq ft/1 gal[1]**	**Remarks and Precautions**
clethodim	Clethodim 2 EC and others @ 0.13 – 0.36 oz/1,000 sq ft	Several vegetables listed on label. Add a crop oil concentrate for improved control. Observe minimum application to harvest intervals found on the product label.
fluazifop	Fusilade DX @ 0.5 oz/1,000 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. Effective on johnsongrass and bermudagrass. Observe minimum application to harvest intervals found on the product label.
POSTEMERGENCE (after crop and weeds emerge) continued:		
sethoxydim	Poast & various other trade names @ 1 oz/1000 sq ft Consult product label concerning surfactants	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. Sethoxydim may be found under various trade names like Poast, Hi-Yield Grass Killer, Bonide Grass Beater and Ferti-lome Over the Top II. Observe minimum application to harvest intervals found on the product label.

[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 gal. of water and evenly distributed over 1,000 sq. ft. To find the amount of product needed if the area treated is different from 1,000 sq. ft., use the following formula: [product rate, in oz. (column 2) x (area to be treated, in sq. ft. ÷ 1,000)]. To find the volume necessary to spray, use the following formula: [area to be treated, in sq. ft. ÷ 1,000]. Example: area to be treated is 2,500 sq. ft. Want to spray Fusilade DX @ 0.5 oz/1,000 sq. ft. Total product needed: [0.5 x (2,500 ÷1000)] or 1.25 oz. Total volume needed is [2,500 ÷ 1,000] or 2.5 gal.

TABLE 1. Turfgrass tolerance to selected herbicides*

PREEMERGENCE HERBICIDES	bermudagrass	centipedegrass	St. Augustinegrass	zoysiagrass
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
indaziflam	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
simazine	I	T	T	T
sulfentrazone + prodiamine	T	T	NR	T

POSTEMERGENCE HERBICIDES	bermudagrass	centipedegrass	St. Augustinegrass	Zoysiagrass
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
imazaquin	T	T	T	T
iodosulfuron + thiencarbazone + dicamba	T	T	T	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
thiencarbazone + foramsulfuron + halosulfuron	T	NR	NR	NR

*Abbreviations:
T= Tolerant at labeled rates
I = Intermediate safety
NR = Not recommended/labeled – severe injury potential
D = Dormant

LAWN AND TURF WEED MANAGEMENT

GENERAL HOME LAWN WEED CONTROL

Home lawn broadleaf weed control can often be accomplished using selective postemergence formulations that contain two or more herbicides. Formulations are available for most Southern grasses. Examples are Bayer Advanced Southern Weed Killer, Trimec Southern, Ferti-lome Weed Free Zone, Ortho Weed-B-Gon, Atrazine, MSM Turf (metsulfuron). Most labels will stress their use on younger weeds growing in the cooler mid-spring to early summer period. A temporary discoloration of the lawn usually occurs. Repeat application in 3-4 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 more slowly. **Note that MSMA is no longer labeled for home lawn use; however, existing quantities of MSMA purchased prior to 2010 may have a product label that allows for use on home lawns.**

Many manufacturers offer herbicides impregnated on fertilizer for homeowner use. However, these products have to be applied according to their intended use. Products containing a preemergence herbicide have to be applied before the weed emerges. For crabgrass, application is typically 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.

Virginia buttonweed infesting St. Augustinegrass, centipedegrass, bermudagrass and zoysiagrass lawns: A herbicide program approach is necessary for managing Virginia buttonweed. Apply "trimec" type products, such as Weed B Gon or Weed Free Zone, on newly emerged buttonweed starting in mid- to late April when temperatures are less than 85 degrees. Repeat application within two weeks if possible. Once temperatures exceed 85 degrees, apply metsulfuron or Celsius every four to six weeks in lawns with very high buttonweed populations.

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. Maintain St. Augustinegrass at 3 inches. St. Augustinegrass will not tolerate short mowing. Centipedegrass, common bermudagrass and zoysiagrass should be maintained at 1.5 inches tall. Follow a recommended fertility regimen for your specific turf species and location.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
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.** Use only 1 qt./A per application. Safely applied to St. Augustine, centipede, zoysia and dormant bermudagrass 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 lbs./A	Balan 2.5 G @ 120 lbs./A or 2.75 lbs./1,000 sq. ft.	Crabgrass, goosegrass, *Poa annua* (annual bluegrass) and certain other annuals	Apply in late Feb. to early March in south La. and early to mid-March in north La. for many summer annual grasses and broadleaf weeds. Retreat in mid-Sept. in north La. and early to mid-Oct. 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 lbs./A	Bensumec 4 EC @ 1.9 – 3.1 gal./A or 5.6 oz. to 11.2 oz./1,000 sq. ft. Pre-San 7 G @ 107 – 180 lbs./A or 2.46 lb to 4.1 lbs./1000 sq. ft.	Crabgrass, goosegrass, *Poa annua* and small seeded broadleaves	Apply in Feb. to early March in south La. and early March in north La. Apply in mid-Sept. in north La. and 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 bermudagrass greens.**
dimethenamid @ 1.0 - 1.5 lbs./A	Tower 6 EC @ 21 - 32 oz./A or 0.48 – 0.73 oz./1,000 sq. ft.	Preemergence on most annual grasses, certain broadleaf weeds, doveweed, yellow nutsedge	Most established Southern grasses grown in La. Good preemergence control of yellow nutsedge. Apply in Feb. to early March in south La. & early March in north La. Apply in mid-Sept. in north La. & early Oct. in south La. for *Poa*.
dimethenamid + pendimethalin @ 1.75 – 3.5 lbs./A	FreeHand @ 100 – 200 lbs./A or 2.3 lb. – 4.6 lbs./1,000 sq. ft.	Preemergence on most annual grasses, certain broadleaf weeds, doveweed, yellow nutsedge	Most established Southern grasses grown in La. Good preemergence control of yellow nutsedge. Apply in Feb. to early March in south La. and early March in north La. Apply in mid-Sept. in north La & early Oct. in south La. for *Poa*.
dithiopyr @ 0.38 lb./A	Dimension 1 EC @ 2 qt./A or 1.5 oz./1,000 sq. ft. Dimension Ultra 40 WP @ 0.95 lb./A or 0.35 oz./1000 sq. ft.	Crabgrass, *Poa*, foxtail, crowfoot, barnyardgrass, goosegrass, 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.
indaziflam 0.015 – 0.04 lb./A	Specticle 20 WSP @ 1.2 – 3.5 oz./A or 0.028 – 0.080 oz./1,000 sq. ft. Specticle Flo @ 6 – 10 oz/A or 0.14 – 0.23/1000 sq. ft.	Crabgrass, *Poa*, foxtail, crowfoot, barnyardgrass, goosegrass, several annual broadleaves	Apply prior to weed emergence. Consider split applications approximately 60 days after the initial. Apply on established turf only. May be used on most Southern turf species. Do not use on greens.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
isoxaben @ 0.5-1.0 lb./A	Gallery 75 DF @ 0.7 – 1.3 lbs./A or 0.25-0.5 oz./1,000 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.
oxadiazon + bensulide @ 6 + 1.5 lbs./A	Goosegrass/Crabgrass Control @ 6.56 G @ 116 lbs./A or 2.6 lbs./1,000 sq. ft.	Crabgrass, goosegrass, *Poa annua*	Apply on established zoysia, perennial ryegrass and bermudagrass. **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./1,000 sq. ft. Barricade 4L @ 0.625 – 3 pt/A or 0.23 – 1.1 oz/1000 sq. ft.	Crabgrass, *Poa annua*, foxtail, crowfootgrass, barnyardgrass, goosegrass, small-seeded annual broadleaves	On established turf, including ryegrass. Long residual. Use caution if winter kill of existing turf is suspected. Most grasses are tolerant. Split applications for goosegrass.
prodiamine + imazaquin + simazine @ 1.875 – 2.5 lbs./A	Coastal @ 48 to 64 oz/A or 1.1 – 1.46 oz/1,000 sq. ft.	Crabgrass, goosegrass, foxtail, *Poa and* several summer and winter broadleaves including burweed and clovers	Application window is September 15 to May 31. 64 oz/A is recommended for fall weed control. Provides excellent control of crabgrass, *Poa* as well as many broadleaves. Labeled for bermudagrass (not for golf greens) including non-overseeded athletic fields, centipedegrass, St. Augustinegrass, and zoysiagrass.
pronamide @ 0.5 lb./A	Kerb 50W @ 1 lb./A or 0.37 oz./1,000 sq. ft.	Pre- or early post- in fall or winter for control of *Poa annua*	**May be applied to established greens and tee boxes.** Use on dormant or active bermudagrass 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. Postemergence activity is slow (1-2 mos). **Restricted use.**
pendimethalin @ 1.7 – 3.0 lbs./A	Pendulum 3.3 EC @ 3.6–4.8 pt./A or 1.3–1.8 oz./1,000 sq. ft. Pendulum AquaCap 3.8 @ 3.1 – 6.2 pt./A or 1.15 oz. – 2.3 oz./1,000 sq. ft. Pendulum 2G @ 75–150 lbs./A or 1.7 – 3.4 lbs./1,000 sq. ft.	Goosegrass, crabgrass, 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./1,000 sq. ft.	*Poa*, goosegrass, crabgrass, yellow nutsedge, some annual sedges, small-seeded broadleaves	For warm-season turfgrasses. Not for tees or greens. Do not overseed 4 months prior or 6 months after. Also used for ornamental beds.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
sulfentrazone + prodiamine	Echelon 4 SC @ 0.5 – 2.25 pt./A or 0.184 – 0.826 oz/1,000 sq. ft.	Annual grasses, annual sedges, yellow nutsedge, certain broadleaf weeds	Apply safely to bermudagrass, centipedegrass, zoysia and seashore paspalum after the second mowing. **Do not apply on St. Augustinegrass.**
oxadiazon @ 2.0-4.0 lbs./A	Ronstar 2 G @ 100 – 200 lbs./A or 2.3 – 4.6 lbs./1,000 sq. ft. Regal Ronstar 2 G @ 100 – 200 lbs./A or 2.3 – 4.6 lbs./1000 sq. ft. Ronstar 50 WP@ 4 – 6 lbs./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 bermudagrass only. Do not exceed 150 lbs./A (3 lb. active) on St. Augustine turf. May cause temporary discoloration. **Do not apply to centipedegrass or bermudagrass golf greens**. Can split applications 30 days apart. 50WP for dormant turf. Apply 50 WP several weeks prior to greenup. Commercial turf only.
fenarimol @1.4 - 2.0 lbs./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 2-3 applications. Final application should be made 2 weeks prior to overseed. Acts by reducing *Poa annua* growth to allow overseed to dominate on bermudagrass greens. Rubigan is an effective, locally systemic, broad spectrum fungicide for dollarspot and brown patch. Single, double or triple split application. Single applications provide poor *Poa annua* control.
oryzalin @ 3.0 lbs./A	Surflan 4 AS @ 3 qt./A or 2.2 oz./1,000 sq. ft.	Crabgrass, ryegrass, goosegrass, foxtails barnyard grasses, and *Poa annua* as well as many broadleaves	Not for greens or tees. Delay reseeding 3-4 mos. Safe for all established warm-season grasses.
simazine @ 1 – 2 lbs./A	Simazine 4 L @ 1 – 2 qt./A or 0.75 – 1.5 oz./1,000 sq. ft.	Provides good control of *Poa annua* as well as many winter broadleaves	Safely applied to St. Augustine, centipede, zoysia and bermudagrass late fall or early winter. Do not use in overseeded areas. May be applied Sept. 1 to June 1. Some triazine resistant *Poa* populations becoming more present in the state.
SELECTIVE POSTEMERGENCE:			
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./1,000 sq. ft.	Florida betony, *Poa*, dollarweed, lespedeza, henbit, lawn burweed	**Restricted use.** Safely applied to St. Augustine, centipedegrass, zoysiagrass and dormant bermudagrass 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 lbs./A	Simazine 4 L @ 1 – 2 qt./A or 0.75 – 1.5 oz./1,000 sq. ft.	Good post control of *Poa annua* and many winter broadleaves	Safely applied to St. Augustine, centipedegrass, zoysiagrass and bermudagrass fall or early winter. Do not use in overseeded areas. Apply after last home game on non-over-seeded football fields.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
SELECTIVE POSTEMERGENCE continued:			
fenoxaprop @ 0.57 – 0.174 lb./A	Acclaim 0.57 EC @ 13 – 39 fl. oz./A 0.75 – 1 fl. oz./1,000 sq. ft	Early postemergence: several annual grasses and bermudgrass suppression.	Can be safely applied to zoysiagrass. Suppresses bermudagrass infesting zoysia.
asulam @1.7– 2.1 lbs./A	Asulox 3.3 EC @ 4 – 5 pt./A 1.5 – 1.8 oz./1,000 sq. ft.	Crabgrass, goosegrass, sandbur	Postemergence: use in Tifway 419 bermudagrass and St. Augustinegrass 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. Injurious to centipedegrass.
dicamba @ 0.25 – 0.5 lb./A	Banvel 4S @ 0.5 –1 pt./A or 1-2 tsp./1,000 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. Augustinegrass. May be tank-mixed with 2,4-D, MCPP, MCPA (consult label).
bentazon @ 1.0 – 2.0 lbs./A	Basagran T/O or Lescogran 4 SL 1 –2 qt./A or 0.75-1.5 oz./1,000 sq. ft.	Yellow nutsedge and annual sedges; green kyllinga with repeat applications	Use on established warm-season grasses turf. Can repeat at 10-14 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./1,000 sq. ft.	Yellow and purple nutsedge, green kyllinga, johnsongrass	Safe on all warm-season turfgrasses and very effective on most sedges including green kyllinga also controls johnsongrass.
ethofumesate @ 1.0 – 2.0 lbs./A	Prograss 1.5 F @1.0 – 2.0 gal./A or 3 – 6 oz./1,000 sq. ft. on lt soil 3.5 – 4 oz/1,000 sq. ft. on med-hvy soil	Annual grasses (*Poa annua*), pigweed, chickweed, purslane, barnyardgrass, crabgrass, foxtail; suppresses nutsedge	Apply pre- or early post-emerge. Hastens or extends dormancy in bermudagrass. 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 bermudagrass 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./1,000 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./1,000 sq. ft. or pump-up sprayer @ 1 tbsp./gal. for spot treatments	Many annual and perennial broadleaves; black medic, white clover, chickweed, burweed,	Postemergence on active weeds. Repeat if necessary. May be used on bermudagrass, centipedegrass and zoysia. Do not apply on St. Augustinegrass. Avoid drift and contact of shrubs. Not for golf greens or tees. A

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
		lespedeza, wild violet, Virginia buttonweed	maximum 2 qt./A/yr. **Do not apply to residential turf.**
SELECTIVE POSTEMERGENCE continued:			
quinclorac @ 0.75/A	Drive 75 DF 1 lb./A or 0.367 oz./1,000 sq. ft. Drive XLR 8 @ 64 oz/A or 1.45 oz/1000 ft^2	Crabgrass, barnyardgrass, lespedeza, clover; suppression of torpedograss	For bermudagrass and zoysia. **Do not apply to centipedegrass, St. Augustinegrass or bahiagrass.** Three applications needed for torpedograss management.
quinclorac, sulfentrazone, dicamba,2,4-D @ 1.1 – 1.6 lbs./A	Q4 Plus @ 5 – 7 pt./A or 1.8 – 2.6 oz./1,000 ft^2	Crabgrass, barnyardgrass, broadleaf signalgrass, foxtail, lespedeza, clover, Florida betony, yellow nutsedge	Warm-season application is limited to bermudagrass. Reduced crabgrass control at 3 to 4 tillers. Apply at least 2 days before mowing or 2 days after. **Do not apply to centipedegrass or St. Augustinegrass.**
diclofop @ 0.75 – 1.5 lbs./A	Illoxan 3EC @ 32 – 44 oz./A 0.75 – 1.0 oz./1,000 sq. ft.	Goosegrass infesting bermudagrass on golf courses including greens	Postemergence control of goosegrass up to 1 tiller. Apply on established bermudagrass. 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. Herbicide no longer being produced.**
imazaquin @ 0.38 – 0.5 lb./A	Scepter, Image 70 DG @ 8.6 – 11.4 oz. or 0.2 – 0.26 oz./1,000 sq. ft.	Chickweed, henbit, geranium, pigweed, onions, purple nutsedge, burweed, sandbur; suppression of kyllinga and dollarweed	Can be used on all warm-season grasses. However, do not apply to dormant or transitional St. Augustinegrass. Do not tank-mix with other postemergence herbicides. Not for cool-season grasses or golf greens. Some yellowing may occur especially in tire tracks or low areas. Repeat for improved control.
clopyralid @ 0.09 – 0.5 lb./A	Lontrel 3 EC @ 0.25 – 1.33 pt./A 0.1 – 0.5 oz./1,000 sq. ft.	Broadleaf weeds, including legumes and buttonweed	Safely applied to all warm-season grasses. Do not use on putting greens or tees. No surfactant is needed. 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	Various trade names including: Blade, Manor, Mansion, MSM etc. 60 WDG @ 0.33 – 1 oz./A or 0.007 – 0.023 oz./1,000 sq. ft.	Pensacola bahiagrass, clovers, rose (pink) woodsorrel, spurge, lawn burweed and many other winter weeds. Virginia buttonweed suppression with 2 applications sprayed 6 weeks apart	Controls a wide range of broadleaf weeds. Labeled for St. Augustinegrass, bermudagrass, zoysiagrass, centipedegrass. Do not exceed 0.5 oz./A on centipedegrass. Do not overseed for 8 weeks after application. Be precise with applications. This is a low use rate herbicide.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
SELECTIVE POSTEMERGENCE continued:			
Metsulfuron + dicamba @ 0.187 – 0.285 lbs./A	Fahrenheit 38 WSG @ 3 – 12 oz/A or 0.07 – 0.275 oz./1,000 sq. ft.	Pensacola bahiagrass, clovers, rose (pink) woodsorrel, stinging nettle, many winter broadleaves; Suppression of Virginia buttonweed.	Apply from 3-12 oz./A in St. Augustinegrass, bermudagrass, and zoysiagrass. Use from 3 – 6 oz/A in centipedegrass. Apply at least 6 oz./A for buttonweed. Do not overseed for 60 days after application.
MSMA @ 2.0 – 3.0 lbs./A	MSMA 6 SL @ 1.3 – 2 qt./A or 1.0 – 1.5 oz./1,000 sq. ft. MSMA 6.6 SL @ 1.2 – 1.8 qt./A or 1.0 – 1.3 oz./1,000 sq. ft	Bahiagrass, crabgrass, dallisgrass, nutsedges	Bermudagrass and zoysia are tolerant. A 6 lbs./gal. formulation has surfactant, but 6.6 lbs./gal. 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. No longer labeled for lawns or sports fields. See application restrictions on product label.**
halosulfuron @ 0.03 – 0.06 lb./A	Sedgehammer 75 WDG @ 0.6 – 1.33 oz./A or 0.138 – 0.03 oz./1,000 sq. ft. or 0.25 tsp./gal. spot	Nutsedges (purple & yellow); suppression of kyllinga species	Postemergence with repeat application necessary within 6 weeks with heavy infestations. Use non-ionic surfactant. Can be used on all warm-season grasses.
trifloxysulfuron @ 0.015 – 0.02 lb./A	Monument 75 WG @ 0.33 – 0.56 oz./A or 0.007 – 0.011 oz./1,000 sq. ft. Spot treatment @ 0.0176 oz./gallon + 2 teaspoons of non-ionic surfactant.	Purple, yellow, annual sedges; green kyllinga, oxalis, white clover, spotted spurge, *Poa*, ryegrass overseed, Virginia buttonweed	Bermudagrass 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 – 0.3 oz./A for overseed removal. Allow 6 wks between last application and overseeding with ryegrasses. **May be applied on bermudagrass golf greens.**
rimsulfuron @ 0.031– 0.062 lb./A	TranXit GTA and generics 25 DF @ 1 – 2 oz./A or 0.046 – 0.09 oz./1000 sq. ft.	*Poa annua,* perennial ryegrass overseed	*Poa annua* control in non-overseeded bermudagrass. Transitional aid for the removal of ryegrass overseed. **May be used on established bermudagrass golf greens and tees.**
iodosulfuron + thiencarbazone + dicamba @ 0.10 – 0.21 lb./A	Celsius 68 WG @ 2.5 – 4.9 oz./A or 0.057 – 0.113 oz./1,000 sq. ft.	Broadleaf weeds such as white clover, chickweed, buttonweed; suppression of dallisgrass with sequential applications or applied as spot	Excellent safety on most lawn grasses grown in La. except carpetgrass. Good safety on St. Augustinegrass in hot weather. **Do not apply to a turf overseeded with cool-season grasses such as perennial ryegrass. Do not apply to carpetgrass.**
thiencarbazone + foramsulfuron+halosulfuron @ 0.037 – 0.121 lb./A	Tribute Total 60.5 WDG @ 1.0 – 3.2 oz./A or 0.02 – 0.07 oz./1000 sq. ft.	Several grassy and broadleaf weeds including ryegrass, *Poa,* clovers, buttonweed; suppression of dallisgrass	**Bermudagrass only.** Use a non-ionic surfactant. Provides good suppression of dallisgrass when applied in 2 applications in late summer to early fall @ 3.2 oz./A per application. Can be helpful in the management of buttonweed.

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
SELECTIVE POSTEMERGENCE continued:			
flazasulfuron @ 0.012 – 0.047 lb./A	Katana 25 DF @ 0.75 – 3.0 oz./A or 0.0172 – 0.068 oz./1000 ft^2	Effective removal of perennial ryegrass and *Poa* trivialis overseed; also controls annual bluegrass, blue-eyed grass and newly emerged crabgrass.	Bermudagrass or zoysia with some limited low rate use in centipedegrass. **Do not apply on golf greens.**
metribuzin @ 0.2 – 0.5 lb./A	Sencor 75 DF @ 5.3-10.5 oz./A or 0.12 – 0.24 oz./1,000 sq. ft.	Chickweed, henbit, burweed, Speedwell, goosegrass when tank-mixed with MSMA	Postemergence on dormant bermudagrass turf (use higher rates). Actively growing turf (mid-spring) bermudagrass only. Do not apply on golf greens, tees or aprons. Delay mowing for at least 3 days before spray. Do not exceed 1.5 lbs./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.
Penoxulam + sulfentrazone + 2,4-D + dicamba @ 0.48 – 0.50 lb./A	Avenue South 0.80 EC @ 3.1 – 5.0 pt./A or 1.10 to 1.80 oz./1000 ft^2	Dollarweed, clover, buttonweed, spurge	Good safety on St. Augustinegrass and safe for all Deep South turf varieties. Consult label for specific turf rates. Good control of many cool season and summer broadleaf weeds.
2,4-D + MCPP + dicamba @ 0.68 – 1.35 lbs./A	Trimec Classic 2.7 EC @ 2 – 4 pt./A (consult label for other turf) or 0.75 – 1.5 oz./1,000 sq. ft. for hybrid Bermuda and 1 oz./1,000 sq. ft. for St. Augustinegrass or centipedegrass	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 pt./A is recommended. Maximum of 2 applications per year. Do not apply when temperatures exceed 85 F.
2,4-D + MCPP + dicamba @ 0.375 – 0.75 lb./A	Trimec Southern 3 EC @ 1 – 2 pt./A or 0.37 – 1 oz./1,000 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. Augustinegrass. Contains less 2,4-D than Trimec Classic. Do not apply when temperatures exceed 90 degrees.
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./1,000 sq. ft. for hybrid Bermuda 1 oz./1,000 sq. ft. for St. Augustinegrass or centipedegrass	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 degrees.
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 tbsp./2 gal. water/1,000 sq. ft. Spot treatments @ 0.5 oz/gallon/1000 sq. ft in St.	Many annual, biennial and perennial broadleaf weeds.	St. Augustinegrass is the most sensitive warm-season turf. Use spot treatments instead of broadcast. Apply on sunny days when the temperature is well above 60 degrees and there is little wind presence. **Observe regional rules concerning 2,4-D use in cotton-producing areas of the state.**

LAWNS and OTHER TURF AREAS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
SELECTIVE POSTEMERGENCE continued:			
sethoxydim @ 0.28/A	Segment 1 EC @ 2.25 pt./A or 0.83 fl oz./1,000 sq. ft.	Crabgrass, goosegrass; other annual grasses; suppression of bermudagrass; temporary suppression of torpedograss; poor control of carpetgrass	Postemergence on grassy weeds in centipede. May be used on seedling centipedegrass (delay application until 3 in. of new stolon growth) and established centipedegrass. Apply at 1.5 pt./A rate for seedling centipedegrass. Ensure good coverage of target foliage. Use during good growing conditions. If centipedegrass is cold-stressed, delay application until 3 weeks after green up. A maximum 2 applications/year on established centipede. Only suppresses torpedograss. For bahiagrass suppression, reapply 10 – 14 days after first application. Some limited torpedograss suppression with 2 applications spaced 3 weeks apart.
SOIL FUMIGANT:			
dazomet @346.5 lbs./A	Basamid 99 G @ 350 lbs./A or 8 lbs./1,000 sq. ft.	Soil treatment that kills most weeds prior to planting.	Follow label carefully. Apply prior to planting. Fall for early spring planting. Soil fumigant used 2-4 weeks ahead of planting depending on soil temperature. Toxic to fish.
NON-SELECTIVE:			
diquat 0.25 – 0.5 lb./A	Reward 2 SL @ 1 – 2 pt./A 0.4 – 4.4 fl oz./1,000 sq. ft. Various other formulations	Most annual weeds	Use on dormant bermudagrass and for edging. Top burn kill; same as paraquat. Presently a 24C label. Add a non-ionic surfactant, if advised. Not effective on perennial weeds.
glufosinate – ammonium @ 0.75 – 1.5 lbs./A	Finale 1 SL @ 3 – 6 qt./A or spot treatment 1.5 – 4.0 oz./gal.	Most weeds, including Asian jasmine	Nonselective burndown like paraquat. Locally systemic. Many tank-mix 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 and turf renovation 0.75 – 3 oz./1,000 sq. ft. or Spot treatments @ 1 – 2% solution	Most grasses and herbaceous broadleaves	This nonselective herbicide is systemic. Spray foliage to wet. Leaves should have no heavy dust cover. Use when no rain is 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 carpetgrass.

STRAWBERRY			
Directed			
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./Ai	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 inch) is necessary to activate chemical.
PREEMERGENCE:			
simazine @ 1-2 lb./A	Princep 4L @ 1-2 qt/A	Annual bluegrass, large crabgrass, henbit, evening-primrose, chickweed, other weeds listed on the label	Apply to furrows between raised beds covered with plastic mulch in a min. of 20 gal. 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, broadleaf weeds	Apply after planting or to established beds before weeds emerge. Mechanically incorporate or irrigate into the soil to a depth of 1-2 inches within 24 hr. of application. Do not apply from bloom through harvest. Do not exceed a maximum application rate of 8 lb. per acre per crop cycle.
flumioxazin @ 0.1lb./A	Chateau WDG and SW @3 oz/A	Broadleaf weeds	Apply to row middles with a hooded sprayer for preemergence control for broadleaf weeds before weeds emerge. Apply a minimum of 30 days before transplant and prior to plastic mulch being laid. 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. Do not make more than one application per growing season.
pendimethalin @ 0.72 1.44 lb./A	Prowl H_2O@ 1.5 -3.0 pt./A Coarse soil 1.5 pt./A Medium soils 2.0 to 2.5pt./A Fine soils 2.5 to 3.0 pt./A	Broadleaf weeds, annual grasses	Apply to row middles. Do not apply within 35 days of harvest. DO NOT apply more than 3.0 pt. per acre per application. DO NOT apply more than 6.0 pt. per acre per season. Do not feed forage or graze livestock in treated fields. DO NOT apply if new growth has emerged.
POSTEMERGENCE:			
sethoxydim @ 0.28-0.47 lb./A	Poast @ 1-1.5 pt./A Apply with COC @ 2 pt./A Pump up sprayer: .3-2 oz/gal Poast + 1.3 oz/gal COC	Perennial and annual grasses	Sequential applications will be necessary for perennial grass control. The addition of a nonionic surfactant (1 qt/100 gal of water) or crop oil concentrate (1 gal/100 gal. of water) is necessary for optimum results. Apply to actively growing grasses before they exceed labeled heights. Bearing and nonbearing. Use flat fan nozzle tips. Do not apply within 7 days of harvest. Do not exceed 2.5 pt. of Poast per year.

STRAWBERRY			
Directed			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
clethodim @ 0.1-0.125 lb./A	Select @ 6-8oz/A Apply with COC @ 2 pt./A Pump up sprayer: 0.33-0.66 oz/gal Select + 1.3 oz/gal COC)	Annual and perennial grasses, annual bluegrass	Use high rate and sequential applications for perennial grasses (bermudagrass or johnsongrass). The addition of a nonionic surfactant at 0.25 % v/v (1 qt/100 gal. of spray solution) or crop oil concentrate at 1% v/v (1 gal per 100 gal. of spray solution) is required for optimum results. Apply at postemergence 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 POSTEMERGENCE:			
simazine @ 1-2 lb./A + paraquat @ 0.49 lb./A	Princep 4L @ 1-2 qt/A + Gramoxone SL @ 2 pt./A Apply with NIS @ 1-2 pt./100 gal	Weeds controlled by Princep 4L plus those controlled by Gramoxone SL	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.
carfentrazone @ 0.008-0.025/A	Aim 2EC @ 0.5-.6 oz Apply with COC @ 1 gal/100 gal or NIS @ 2 pt./100 gal.	Postemergent control of broadleaf weeds	Apply post-directed using hooded sprayer for control of emerged weeds in row middles. If crop is contacted, burning of contacted area will occur. Most effective on weeds less than 4 inches tall or rosettes less than 3 inches across. Use a crop oil concentrate at up to 1 gallon per 100 gallons solution or a nonionic surfactant at 2 pint per 100 gallons of spray solution. Coverage is essential for good weed control. Does not control grass weeds. May be applied as a preplant burndown treatment and/or as a postdirected spray on row middles. May be tank-mixed with other registered herbicides.
paraquat @ 0.49 lb,/A	Gramoxone SL @ 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	Contact kill of all green foliage. Do not allow drift or spray solution to contact crop or severe injury or crop death will occur. The addition of a nonionic surfactant at 0.25 % v/v (1 pt/50 gal. of spay solution) is required for optimum results. Apply in a minimum of 20 gal. water/A as a directed spray between rows. Use shields to avoid injury. Do not apply within 21 days of harvest. Do not apply more than 3 times per year. Do not allow spray to contact plants. Do not graze livestock in treated areas.

BLACKBERRY: Erect and Trailing Blackberry (Dewberry)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
simazine @ 2-4 lb./A	Simazine 4L, Princep @ 2-4 qt/A Simazine 90DF, Princep 90, Caliper @ 2.2-4.4 lb./A	Annual weeds and grasses	Tank mix with paraquat for postemergence weed control. The addition of oryzalin (Surflan) or norflurazon (Solicam) with simazine will extend residual grass control several weeks. Rate is soil-texture dependent. DO NOT apply after fruit set. Apply as preemergence 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 or illegal residues may result. Do not contact fruit, foliage or stems. Use minimum of 40 gal. of water per acre.
oryzalin @ 2-6 lb./A	Surflan 4 A.S. @ 2.0-6.0 qt/A Oryzalin 4 A.S. @2.0-6.0 qt/A	Annual grasses, certain annual broadleaf weeds	Oryzalin may be tank mixed with paraquat for postemergence weed control. In established plantings tank-mix with simazine for broad spectrum residual weed control. Total use rate cannot exceed 12 qts/A per year. Oryzalin may be applied sequentially so long as there is 2.5 months between applications. Apply before annual weeds emerge. Can be applied to new plantings after soil has settled and no cracks are present. Use low rate for short-term control (2-4 months); high rate for long-term control (6-8 months). Apply in strip in plant rows; do not apply to row middles or drive rows.
norflurazon @ 2.0–3.9 lb./A	Solicam 80 DF @ 1.25-5.0 lb/A	Annual grasses, broadleaf weeds	Apply to dormant blackberry and raspberry. Tank-mix with paraquat for control of emerged weeds. Residual control is expanded when Solicam is tank-mixed with simazine. 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 vines until 18 months after planting if west of the Mississippi River and 6 months if east of the river. The soil should be settled, firm and relatively free of weeds and debris at the time of application. 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. Solicam may result in temporary bleaching or chlorosis of the leaves from which the plant will recover. DO NOT graze treated areas.
napropamide @ 4.0 lb./A	Devrinol 50DF @ 8.0 lb/A	Annual grasses and broadleaf weeds	Apply to a weed free soil surface. May be applied to newly planted or to established crop. Do not exceed a

BLACKBERRY: Erect and Trailing Blackberry (Dewberry)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			maximum application rate of 8 lb. per acre per crop cycle. Rainfall or overhead irrigation within 1 to 2 days of application is needed for activation.
POSTMERGENCE:			
fluazifop @ 0.25-0.37 lb./A	Fusilade DX @ 16-24 fl oz/A Add COC or NIS; see label	Perennial and annual grasses	Apply at postemergence to NONBEARING plants that will not be harvested within 1 year. DO NOT contact foliage. Perennial grasses may require sequential applications for adequate control. Does not control nutsedge. Fusilade DX herbicide is rainfast 1 hour after application. Add a nonionic surfactant (1 qt/100 gal of water) or crop oil concentrate (1 gal./100 gal. of water). Do not apply more than a total of 48 oz./A per year. Do not apply more than 24 oz./A per application.
sethoxydim @ 0.3-0.5 lb/A	Poast @ 1-2.5 pt./A Add COC or NIS; see label	Perennial and annual grasses	Sequential applications will be necessary for perennial grass control. The addition of a nonionic surfactant (1 qt/100 gal of water) or crop oil concentrate (1 gal/100 gal. of water) is necessary. Do not apply within 50 days of harvest. Total use cannot exceed 5 pt/A per year. Apply at postemergence.
clethodim @ 0.07-0.12 lb/A	Select Max @ 12-16 fl. oz./A Select 2 EC @ 6-8 oz./A Add COC or NIS; see label	Annual and perennial grass weeds	Low rates are for annual grass weeds. High rates and sequential applications are for perennial grasses (bermudagrass or johnsongrass). The addition of a nonionic surfactant at 0.25 % v/v (1 qt/100 gal. of spray solution) is required. The **Select Max formulation** is labeled for bearing caneberries and can be applied up to within **7 days of harvest. All other clethodim formulations can only be used on non-bearing caneberries**. Apply as a directed spray to the base of the canes. The PHI for Select Max is 7 days.
DIRECTED POSTEMERGENCE:			
paraquat @ 0.5-1.0 lb/A	Firestorm 3SL @1.3-2.7 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	Do not allow herbicide to contact desirable foliage or green canes. Young plants must be shielded. The addition of a nonionic surfactant at 0.25 % v/v (1qt per 100 gal. of spray solution) is necessary for adequate control. Tank-mix with preemergence herbicides for residual control. DO NOT make more than 5 applications per year. Apply before emergence of new canes or shoots. Do not allow spray to contact green bark of canes or foliage. Apply in

BLACKBERRY: Erect and Trailing Blackberry (Dewberry)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			50 gal. of water. Maximum number of applications per year is 5.
carfentrazone @ up to 0.1 lb./A	Aim 2EC @ 0.8-2 oz./A 6.4 oz./A for primocane suppresion Apply with COC @ 1 gal/100 gal or NIS @ 2 pt./100 gal.	Post-directed application for control of primocanes and broadleaf weeds.	Aim may be tank-mixed with other herbicides registered in caneberries. Do not allow spray solution to contact desirable vegetation, flowers/bloom, or fruit. Every precaution should be taken to avoid herbicide injury related to herbicide drift. Use rate should not exceed 25 oz/A per year and there must be at least a 14-day interval between applications. The addition of a nonionic surfactant at 0.25% v/v (1 qt/100 gal. of spray solution) or crop oil concentrate at 1 to 2% v/v (1 to 2 gal/100 gal of spray solution) is necessary for optimum herbicide performance. May be applied to the bottom 18 inches of the canes and also to contact the soil out to 24 inches on each side of the plant row as a post-directed spray at intervals of 14-21 days. Apply when primocanes are 6 inches high using the maximum rate in a minimum of 20 gal. of water. Most sensitive annual weeds can be controlled using a 1- to 2-oz. rate. Aim has a 15 day PHI.

BLUEBERRY			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
simazine @ 2-4 lb./A	Simazine 4L, Princep @ 2-4 qt/A Simazine 90DF, Princep 90, Caliper @ 2.2-4.4 lb./A	Annual weeds and grasses	Tank-mix with glyphosate or Reckon for postemergence weed control. The addition of oryzalin or norflurazon with simazine will extend residual grass control several weeks. Rate is soil texture dependent. Do not apply when fruit is present. **Do not apply to blueberry planted less than 6 months in bark production system.** Make single application in spring before bud break and before weed emergence or split applications once in spring and once in fall. Do not apply when fruit is present.
norflurazon @ 2.0-3.9 lb./A	Solicam 80 DF @ 1.25-5.0 lb./A	Annual grasses, broadleaf weeds	Apply as a directed spray from fall to early spring when the crop is dormant and before weeds emerge. Application of Solicam may result in temporary bleaching or chlorosis of the leaves. Tank-mix with Reckon for control of emerged weeds. Tank-mix with simazine or diuron for expanded residual control. **Preharvest**

BLUEBERRY			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			interval is 60 days. Delay applications until 6 months after planting. May be used in bark bed production system. Avoid contact of fruit or and foliage. Rainfall or irrigation is required within 4 weeks of application.
PREEMERGENCE continued:			
oryzalin @ 2-6 lb./A	Surflan 4 A.S. @ 2-4 qt./A Oryzalin 4 A.S. @2-4 qt./A	Annual grasses, broadleaf weeds	Oryzalin may be tank-mixed with Reckon for postemergence weed control. Rainfall or irrigation is needed to activate oryzlin. In established plantings tank-mix with simazine for broad spectrum residual weed control. Apply at preemergence. DO NOT apply to newly established plants until soil has settled. Apply before annual weeds emerge.
flumioxazin @ 0.188-0.38 lb/A	Chateau SW @6-12 oz./A	Broadleaf and grass weeds	May be applied in season. Preharvest interval is 7 days. Do not apply to blueberries established less than 2 years unless they are protected from spray contact by non-porous wrap, grow tubes or waxed containers. Do not apply more than 12 oz per acre during a 12-month period. Do not make a sequential application within 30 days of the first application. Do not apply more than 6 oz. per acre per application to bushes less than 3 years old on soils having a sand plus gravel content greater than 80%. Apply at the base of the bush. Residual weed control will be reduced if emerged vegetation prevents Chateau from reaching the soil surface. 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.
napropamide @ 4.0 lb./A	Devrinol 50DF @ 8.0 lb/A Devrinol 2 XT @ 2 gal/A	Annual grasses, broadleaf weeds	Soil surface should be relatively free of weeds and plant residue. Rainfall or overhead irrigation within 1 to 2 days (summer) and 7 days (fall or spring) of application is needed for activation. May be applied to newly planted or to established crop. Do not exceed a maximum application rate of 8 lb. per acre per crop cycle.
pronamide @1.0-2.0 lb/A	Kerb 50 WP @ 2.0-4.0 lb./A Kerb 3.3 SC @ 2.5-5 pt/A	Preemergence control of certain annual and perennial broadleaf and grass weeds.	Apply as a directed spray in established blueberries only for early postemergence control of susceptible winter annual weeds, perennial grasses and chickweed and for preemergence control of these and other weeds. Optimal herbicide activity occurs when applications are made under cool temperature conditions and are followed by rainfall or overhead irrigation. Do not exceed maximum rate listed per year. Apply only in late fall or winter. Apply

BLUEBERRY			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			as a directed spray to the soil and the base of trees on bearing and nonbearing trees in the fall or early winter. Do not apply to newly established trees until the roots are well established.
POSTEMERGENCE:			
fluazifop @ 0.25-0.37 lb./A	Fusilade DX 2 EC @ 12-24 fl oz/A	Perennial and annual grasses	Sequential applications will be necessary for perennial grass control. The addition of a nonionic surfactant (0.25% v/v, 1 qt/100 gal of water) or crop oil concentrate (1 gal./100 gal. of water) is necessary. Do not apply within 1 year of harvest. Do not apply over the top or crop injury can occur. Apply at postemergence. Apply to NONBEARING bushes only that will not be harvested within one year. Direct spray. DO NOT contact foliage. Broadleaf weeds and nutsedge will not be controlled.
sethoxydim @ 0.28-0.47 lb/A	Poast 1.5 EC @ 1-2.5 pt./A	Perennial and annual grasses	Sequential applications will be necessary for perennial grass control. The addition of a nonionic surfactant (1 qt/100 gal of water) or crop oil concentrate (1 gal/100 gal of water) is necessary for optimum results. Do not apply within 30 days of harvest. Total use rate per season cannot exceed 5 pt/A. Apply at postemergence. Apply to bearing or nonbearing bushes. Direct spray. Use flat nozzle tips. Broadleaf weeds and nutsedge will not be controlled.
clethodim @ 0.07-0.12 lb/A	Select Max @ 9-16 fl oz./A	Annual and perennial grasses	Low rates are for annual grass weeds. High rates and sequential applications are for perennial grasses (bermudagrass or johnsongrass). Do not apply within 1 year of harvest. The addition of a nonionic surfactant at 0.25 % v/v (1 qt/100 gal of spray solution) is required. Best results occur when applications are made to actively growing grasses. **The Select Max formulation is registered for application in bearing blueberry and has a 14 day PHI. All other clethodim formulations are registered for application in non-bearing blueberry only.** Apply before grasses exceed height limitations.
DIRECTED POSTEMERGENCE:			
paraquat @ 0.5 – 1.0 lb./A	Gramoxone 2 SL @ 2–4 pt./A Firestorm 2 SL @ 2-4 pt./A Paraquat 2 SL @ 2-4 pt./A	Annual broadleaf weeds and grasses; top kill and suppression of	Do not allow herbicide to contact desirable foliage or uncallused bark. Young plants must be shielded. The addition of a nonionic surfactant at 0.25 % v/v (1qt per

BLUEBERRY			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Parazone 3 SL @ 1.3-2.7 pt./A	perennials in the interspaces around base of bushes or vines	100 gal. of spray solution) is necessary for adequate control. Tank-mix with preemergence herbicides for residual control. **Use of paraquat in rabbiteye blueberry can increase incidence of stem blight if herbicide contacts green stems. Rabbiteye producers should consider other nonselective postemergence options**. Apply as a directed spray before emergence of new canes or shoots. Apply in water at 50 GPA. Maximum number of applications per year is 5.

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
bromacil @ 1.6-4.8 lb./A + diuron @ 1.6-4.8 lb./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 & summer) to control perennial weeds: 2 lb./A on coarse soils 3 lb./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. Contact activity enhanced by surfactant.	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 2 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 or 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 lb./A on light soils 5-6 lb./A on medium soils 6-8 lb./A on heavy soils Rates are for trees established 4 or more years.	Annual grasses, broadleaf weeds, perennial weeds and sedges	**Apply on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** as a single preemergence 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.

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	If two applications (spring and summer) apply at least 60 days apart at 3-4 lb./A. Use 2/3 lb/A on trees established 1-3 years.		Apply with a properly calibrated fixed-boom sprayer as a band treatment beneath the trees. Use a minimum of 30 gal./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 or thinly covered or exposed subsoils. Do not treat diseased trees.
PREEMERGENCE continued:			
norflurazon @ 2.0–3.9 lb/A	Solicam DF @ 2.5-5.0 lb/A Do not exceed 10 lbs per year.	Annual grasses and broadleaf weeds; suppression of established nutsedge and perennial grasses	Controls annual and perennial grasses and certain broadleaf weeds. Spectrum of broadleaf weeds controlled increased by tank-mixing with simazine or diuron. Suppresses established nutsedge and perennial grasses; control requires repeat applications. Dense weed growth should be controlled with contact or systemic herbicides prior to Solicam application to allow maximum contact with the soil surface. Tank-mixes with postemergence contact or systemic herbicides may be used where weed growth is low growing and sparse. Solicam activity is highly dependent on good soil moisture following application, i.e., rainfall or irrigation. If no rainfall occurs within 4 weeks after application, the product must be incorporated by flood or sprinkler irrigation. Contact with tree canopy can result in a bleached appearance and some distortion of young growth flushes. Apply as a directed spray to the soil. Avoid contact with fruit or foliage. The soil should be settled, firm and relatively free of weeds and debris at the time of application. Soil should be free of depressions around trees where rain or irrigation water can concentrate. Solicam DF must be moved into the weed seed germination zone to be effective.
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, 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 2.0-6.3 qt. per acre depending on the grower's weed control program, level of weed

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			infestation and desired use strategy. Do not to exceed a total of 6.3 qt./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 preemergence chemicals. Tank-mixes with postemergence herbicides should be used to control existing weeds. Controls annual grasses. Does not control sedges. Spectrum of broadleaf weeds controlled is increased by tank-mixing with diuron. PHI is 1 day.
PREEMERGENCE continued:			
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, 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.** **Preemergence 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. **Preplant 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. **Preplant incorporated.** Incorporate to a depth of 1-2 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 qt. of Prowl H_2O per acre per year in citrus. DO NOT apply more than 7.3 qt. of Prowl 3.3 EC per acre per year in citrus. Do not apply to newly seeded nursery stock.**
oxyfluorfen @ 1.5 lb./A	Galigan 2E, Goal 2 XL @ 6 pt./A Apply with NIS @ 2 pt./100 gal	Broadleaf weeds	**Apply on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma** only after foliage has fully hardened off. Only apply to nonbearing 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 gal. water/A for

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			PRE applications and 40-100 gal. for POST applications. Do not apply more than 16 pt. Goal in one year. Check label for approved tank-mixes with other herbicides.
PREEMERGENCE continued:			
oryzalin @ 2-6 lb./A	Surflan A.S., Oryzalin 4 A.S. @ 2-6 qts/A	Annual grasses, certain annual broadleaf weeds	Apply in spring to bearing trees. DO NOT apply to newly established trees until soil is settled. Existing weed growth should be destroyed by shallow tillage or other treatment. Irrigation needed (1 1/2 inches) within 21 days to move Surflan into weed germination zone. Controls annual grasses and certain broadleaf weeds. Does not control perennial grasses or sedges. Spectrum of broadleaf weeds controlled is increased by tank-mixing with simazine, diuron, or Krovar I. Will not control weeds that have germinated prior to application. Tank-mixes with postemergence herbicides such as paraquat or glyphosate should be used to control existing weeds. Oryzalin will extend residual control of susceptible weeds when used in tank-mixes with other products.
rimsulfuron @ 0.0625	Matrix SG @ 4 oz/A	Broadleaf, grass, and nutsedge weeds	Trees must be established for 1 year before application. Avoid direct or indirect spray contact with crop foliage or fruit. Do not use MATRIX® SG in a spray solution with a pH of below 4.0 or above 8.0 to avoid degradation of the herbicide. Best results are obtained when the soil is moist at the time of application, and 1/2 inch of rainfall or sprinkler irrigation occurs within 2 weeks after application. Do not apply more than 4 oz. per acre per year. **The PHI is 3 days.**
POSTEMERGENCE:			
paraquat @ 0.64-1.0 lb./A	Gramoxone SL @ 2.5-4 pt./A Apply with NIS @ 1-2pt./100gal or COC @ 1 gal/100 gal Pump up sprayer: 0.5-1 oz./gal. Gramoxone + 0.33 0.66 oz. 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 inches tall). 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 tank-mixes with other herbicides. Maximum number of applications per year is 5. Controls all green weed tissue contacted. Rapid regrowth can be expected from perennial species. Addition of a surfactant is essential for maximum contact activity.

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
carfentrazone @ 0.008-0.025/A	Aim 2EC @ 0.5-2.0 oz./A Apply with COC @ 1 gal./100 gal. or NIS @ 2 pt./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. PHI is 3 days. An adjuvant is required such as a nonionic surfactant or crop oil concentrate.
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 postemergence on grapefruit, kumquat, lemon, lime, orange, tangelo, tangerine or satsuma**. Check label for maximum weed height and rates. Spray near bearing and nonbearing trees. PHI is 15 days. Apply in 10-20 gal. water per acre with 40-60 psi. Direct away from foliage and fruit. A slight leaf speckling or burn can occur. Controls annual and perennial grasses such as bermudagrass, guineagrass, and torpedograss. **Does not control broadleaf weeds**. Repeat applications (at 3-4-week intervals) may be required for control of more troublesome species.
glyphosate @ 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 season-long 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.

CITRUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
fluazifop @ 0.094-0.375 lb./A	Fusilade DX @ 12-24 oz/A Adjuvant required; see label	Perennial and annual grasses	Apply at postemergence to bearing and nonbearing **calamondin, citrus hybrids, grapefruit, kumquat, lemon, lime, mandarin (tangerine), orange (all), pummelo** and **satsuma** trees. Use flat fan nozzle; do not contact foliage. Maintain a minimum of 21 days between applications. Do not harvest citrus fruit within 14 days of last application. Controls annual grasses and perennials such as bermudagrass, guineagrass and torpedograss. Does not control broadleaf weed species. Repeat applications (at 3-4-week intervals) will be required for guineagrass and torpedograss. Guineagrass should be treated when 6-12 inches tall. Do not apply Fusilade to grasses under stressed conditions. Visible effects of herbicide activity on most grasses will be apparent in 2-3 weeks. If used according to label directions, Fusilade will not injure citrus. For spot treatment, use 1% v/v solution Fusilade with 1% crop oil concentrate or 0.25% nonionic surfactant in 30-40 gal per acre.

GRAPE (Muscadine and Bunch)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
diuron @ 1.6-4 lb./A	Diuron 4L @ 1.6-4 qt/A Karmex DF, Diuron 80 DF @ 2-3 lb./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 than 1.5 inches in diameter. DO NOT use on soils with less than 1% organic matter. Severe injury may occur if heavy rainfall or more than 1 inch of irrigation water follows treatment. Aerial application prohibited.
oxyfluorfen @ 1.2-2 lb./A	Goal 2XL, Galigan @ 5-6 pt./A Goal Tender @ 2.5 -4.0 pt./A	Preemergence control of broadleaf and some grass weeds; provides burndown of young, emerged weeds.	DORMANT SEASON APPLICATION ONLY. DO NOT apply after bud swell. Apply prior to bud swell or after vines have initiated dormancy in the fall. Use in minimum of 20 gal. of water per acre or 40 gal. if weeds are present. Vines must be on trellis wire a minimum of 3 feet from soil surface.

GRAPE (Muscadine and Bunch)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
simazine @ 2-4.8 lb./A	Princep Caliper 90, Simizine 90 DF @ 2.2-5.3 lb./A Princep 4L, Simazine 4L @ 1.6-4 qts/A	Annual grasses, certain broadleaves	Use only under vines established for 3 years. Apply in fall or spring. If applied in the fall, follow with a different preemergence herbicide in spring. DO NOT use on sandy, sandy loam or gravelly soils. Tank-mix with glyphosate, paraquat, or glufosinate for postemergence weed control. The addition of oryzalin (Surflan) or norflurazon (Solicam) or pendimethalin (Prowl H2O) with simazine will extend residual grass control several weeks.
oryzalin @ 2-6 lb./A	Surflan 4 A.S., Oryzalin 4 A.S. @ 2-6 qts/A	Annual grasses, 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 inches) within 21 days to move Surflan into weed germination zone. Oryzalin may be tank-mixed with paraquat, glyphosate, or Rely for postemergence weed control. In established vineyards tank-mix with simazine for expanded residual control of annual weeds.
norflurazon @ 2.0–3.9 lb/A	Solicam 80 DF @ 1.25-5.0 lb./A	Annual grasses, broadleaf weeds; suppression of established nutsedge and perennial grasses	Apply as a directed spray to the soil. Avoid contact with fruit or foliage. Soil should be settled, firm and relatively free of weeds and debris at the time of application. Solicam DF will not control emerged weeds. Tank-mix with glyphosate, paraquat or glufosinate for control of emerged weeds. Residual control is expanded when Solicam is tank-mixed with simazine or Karmex. Soil should be free of depressions around trees where rain or irrigation water can concentrate. Solicam DF must be moved into the weed seed germination zone to be effective. If no rainfall occurs within 4 weeks after application, the product must be incorporated by flood or sprinkler irrigation. Apply in fall or winter to vineyards having sandy loam or coarser textured soils.
flumioxazin @ 0.188-0.38 lb./A	Chateau 51WDG @ 6-12 oz./A Tuscany 51 WDG @ 6-12 oz./A Tuscany SC @ 6-12 fl oz./A	Broadleaf and grass weeds	Apply with hooded or shielded application equipment. Grapes established less than 2 years must be shielded with grow tubes. **Chateau may only be used in table grapes after completing harvest and before bud break. Chateau may be applied in vineyards producing grapes used for wine or juice after bud break so long as hooded application equipment is used. DO NOT tank-mix with glyphosate after bud break.** DO NOT apply more than 6 oz per acre to vines

GRAPE (Muscadine and Bunch)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			established less than 3 years planted on soils having a sand plus gravel content that exceeds 80%. Do not allow spray or spray drift to come in contact with the tree foliage. Do not make a sequential application within 60 days of the first application or apply less than 60 days before harvest. Moisture is necessary to activate herbicide on soil. Chateau has a 60-day PHI.
PREEMERGENCE continued:			
pendimethalin @ 3.04-5.99lb/A	Prowl H_2O@ 2-6 qt./A	Broadleaf weeds, annual grasses	In newly planted vineyards Prowl may only be applied once soil has settled after transplanting but prior to bud swell. In established vineyards Prowl may be used any time after harvest, through winter, and in the spring. Use rate cannot exceed 6 qt. per acre per year. Prowl has a 90 day PHI. Prowl should be tank-mixed with paraquat, glyphosate, or glufosinate for postemergence weed control. Do not feed forage or graze livestock in treated vineyards. Prowl H_2O may be applied as a single application or sequentially with a 30-day interval between applications. DO NOT apply more than 6.3 qt. per acre per season.
POSTEMERGENCE:			
fluazifop @ 0.25-0.375 lb./A	Fusilade DX @ 12-24 oz/A Adjuvant required; see label	Perennial and annual grasses	Sequential applications will be necessary for perennial grass (bermudagrass, etc.) control. The addition of a nonionic surfactant (1 qt./100 gal of spray solution) or crop oil concentrate (1 gal./100 gal. of spray solution) is necessary for optimum results. Do not apply within 1 year of harvest. Apply at postemergence to bearing and nonbearing vines. Use flat fan nozzle and do not contact foliage. Maintain a minimum of 14 days between applications. Do not apply more than 72 fl. oz. of Fusilade DX per acre per season to grapes. Do not harvest grapes within 50 days of last application.
sethoxydim @ 0.3-0.5 lb./A	Poast @ 1.5-2.5 pt./A Always use nonphytotoxic oil concentrate.	Annual grasses, some perennial grasses	Sequential applications will be necessary for perennial grass (bermudagrass, etc.) control. The addition of a nonionic surfactant (1 qt./100 gal of spray solution) or crop oil concentrate (1 gal./100 gal. of spray solution) is necessary for optimum results. PHI is 50 days. Total use cannot exceed 5 pt./A per year. Apply at postemergence to bearing and nonbearing vines. Use flat fan nozzle tips. Use low rate on annual grasses up to 6 inches tall; high rate on annual grasses up to 12 inches tall.

GRAPE (Muscadine and Bunch)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
DIRECTED POSTEMERGENCE:			
paraquat @ 0.64-1.0 lb./A	Gramoxone SL @ 2.5-4 pt./A Firestorm, Parazone, or Paraquat Concentrate 3 SL @ 1.7-2.7 pt./A	Annual grasses, broadleaf weeds; top kill and suppression of perennials in the interspaces and around base of bushes or vines	Do not allow herbicide to contact desirable foliage or immature, uncallused bark. Young vines must be shielded. Apply in a minimum spray volume of 20 gal./A with nonionic surfactant at 0.25 % v/v (1qt per 100 gal. of spray solution). Apply when grasses are succulent and new growth is from 1- to 6-inches 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 spray under windy conditions. Do not allow animals to graze on treated areas.
glyphosate @ 1-5 lb./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	DO NOT allow spray solution to contact green bark, foliage, or suckers. Tank-mix with preemergence herbicides for residual control. Do not apply within 14 days of harvest. Generic formulations may require the addition of a surfactant. Refer to label for application directions for hard to control perennial species. Apply at postemergence. Use lower rates for easier-to-control annual easier-to-control weeds and higher rates on harder to control weeds. Wiper applicator: 33% solution can be used.
glufosinate-ammonium @ 0.88-1.5 lb/A	Cheetah Lifeline, Reckon 280, or Rely 280 @48-82 oz/A	Postemergent control of grass and broadleaf weeds, both annual and perennial	Do not allow herbicide to contact desirable foliage or immature, uncallused bark. Apply in a minimum spray volume of 20 gal./A. Do not apply within 14 days of harvest. Lower rates may be used to control weeds less than 3 tall. Higher rate is needed for larger weeds 3- to 6-inches tall. Do not make more than 3 applications per year. Do not graze, harvest and/or feed treated vineyard cover crops to livestock.

MAYHAW			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE			
oxyfluorfen @ 1.25-2.0 lb/A	Goal 2XL, Galigan @ 5-6 pt./A GoalTender @ 2.5–4 pt./A	Preemergence 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 gal. of water per acre or 40 gal. if weeds

MAYHAW			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			have emerged. Sprays should be directed toward the soil and bottom of dormant trees.
PREEMERGENCE continued:			
flumioxazin @ 0.188-0.38 lb/A	Chateau SW @6-12 oz/A	Broadleaf and grass weeds	Can only be applied as a uniform band directed at the base of the trunk prior to bud break. Do not allow spray or spray drift to come in contact with the tree foliage. Do not apply to trees established less than one year, unless protected from spray contact by nonporous wraps, grow tubes, paint or waxed containers. Do not make a sequential application within 60 days of the first application or 60 days to harvest. Application must be incorporated with a minimum of 1/2 inch of water within 48 hours after application. Do not apply to farm alleys or roads where traffic may result in treated dust settling onto crops or other desirable vegetation.
oryzalin @ 2-6 lb/A	Oryzalin 4 A.S. @ 2.0-6.0 qts/A	Annual grasses, 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.
rimsulfuron @ 0.0625	Matrix SG @ 4 oz/A	Broadleaf, grass, and nutsedge weeds	Trees must be established for 1 year before application. Avoid direct or indirect spray contact with crop foliage or fruit. Do not use MATRIX® SG in a spray solution with a pH of below 4.0 or above 8.0 to avoid degradation of the herbicide. Best results are obtained when the soil is moist at the time of application, and 1/2 inch of rainfall or sprinkler irrigation occurs within 2 weeks after application. **The PHI is 7 days.**
DIRECTED POSTEMERGENCE:			
glyphosate @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 nonbearing 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.
carfentrazone @ 0.016-0.031 lb/A	Aim 2EC @ 1-2 oz/A Apply with COC @ 1 gal./100 gal. or NIS @ 2 pt./100 gal.	Post-directed application for control of susceptible broadleaf weeds	Lower rates may be used to control small seedling weeds at the 2- to 3-leaf stage. Higher rate is needed for larger weeds up to the 6-leaf stage. Applications to weeds beyond the 6-leaf stage may result in only partial control. Do not apply within 3 days of harvest.

MAYHAW			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
DIRECTED POSTEMERGENCE continued:			
glufosinate-ammonium @ 0.88-1.02 lb/A	Rely 280 @48-56 oz./A Cheetah @48-56 oz./A	Postemergent control of grasses and broadleaf weeds	Apply as a directed spray to control undesirable vegetation. Lower rates may be used to control weeds less than 3 inches tall. Higher rate is needed for larger weeds 3-6 inches tall. Warm temperatures, high humidity and bright sunlight improve performance of glufosinate. Do not graze, harvest and/or feed treated orchard cover crops to livestock.
pyraflufen ethyl@ 0.02-0.08 oz./A	Venue @ 1-4 oz./A	Broadleaf weeds	Trees established less than 1 year should be protected with nonporous wraps, grow tubes or waxed containers. Do not exceed 6.8 fluid oz. per acre per season. Do not exceed 3 applications per season.

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
diuron @ 1.6-2.2 lb./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. Addition of surfactant will help with burndown action. Karmax DF and Direx 4L have a 20-day PHI. Other diuron formulations may have a 90-day PHI.
terbacil @ 1.6-3.2 lb./A	Sinbar 80W @ 2-4 lb./A	Annual weeds	Use for annual weed control and perennial broadleaf weed suppression. Use only under trees in BEARING ORCHARDS that have been established for at least 3 years. Apply in the spring or after harvest in the fall before weeds emerge or before weeds exceed 2" tall. Some chlorosis of weakened trees may occur. DO NOT use on sand, loamy sand, or gravelly soils or on eroded areas where tree roots are exposed. Rate is soil texture dependent. See label for details. DO NOT use on any soil with less than 1% organic matter. Use rate cannot exceed

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			3 lb./A unless soil organic matter is >2%. Sinbar tank-mixed with rimsulfuron or diuron provides excellent residual control of broadleaf and grass weeds.
PREEMERGENCE continued:			
diuron @ 0.8-1.6 lb./A + terbacil @ 0.08-1.6 lb./A	Karmex DF @ 1.0-2.0 lb./A + Sinbar 80W @ 1.0-2.0 lb/A	Annual weeds	Use for broad spectrum weed control only under trees established in the orchard for at least 3 years. Apply in spring or after harvest in the fall before weeds emerge or after weeds emerge but are less than 2" tall. Research has shown this combination provides a longer period of weed control and controls a broader weed spectrum than either component herbicide used alone. DO NOT use on sandy, loamy sand, or gravelly soils or on eroded areas where subsoil or tree roots are exposed.
norflurazon @ 2.0–3.9 lb./A	Solicam DF @ 2.5-5.0 lb./A	Annual grasses, broadleaf weeds	Use for control of annual grasses, broadleaf weeds, and suppression of some perennials. Do not apply to newly transplanted trees until 18 months after planting. Apply to soil that is firm and free of depressions in which rain or irrigation water could accumulate. Apply either post-harvest in fall or in early spring. Fall applications control a broader weed spectrum than spring applications. Use the low rate on coarse textured soils; high rate on fine textured soils. May be tank-mixed with simazine for broader spectrum weed control. Add paraquat for control of emerged weeds. Rapidly hydrolyzed in soil, use low rates and split applications for maximum effectiveness. Do not apply within 60 days of harvest. Make one application per year. DO NOT graze treated areas.
oryzalin @ 2-6 lb./A	Surflan A.S., Oryzalin 4 A.S. @ 2.0-6.0 qt./A	Annual grasses, certain annual broadleaf weeds	Use on non-bearing trees for control of annual grasses and small seeded broadleaf weeds. Use low rate for short term control (2 to 4 months). DO NOT apply to newly transplanted trees until soil has settled and no cracks are present. Apply before annual weeds emerge in the spring or add paraquat for control of emerged weeds. May be tank-mixed with Goal, simazine, paraquat, Princep, glyphosate or Solicam. Oryzalin may be applied as sequential applications so long as total use rate does not exceed 12 qt. per acre per year and there is at least 2.5 months between applications. Apply in strip in tree rows; do not apply to row middles or drive rows.
PREEMERGENCE continued:			

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
simazine @ 2.0-4.0 lb./A	Princep Caliber 90 @ 2.2-4.4 lb./A Princep 4L, Simazine 4L @ 1.6-4 qts/A	Annual grasses, certain broadleaf weeds	Use for control of annual broadleaf weeds ONLY under trees established in the orchard for at least 1 year. Apply only once per year. 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 loamy sand soils. Add paraquat for control of emerged weeds. Tank-mixing simazine with oryzalin, Prowl H2O, or Solicam will greatly improve residual control of annual grass 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 preemergence herbicide in the spring.
oxyfluorfen @ 1.25-2 lb/A	Goal 2XL @ 5-8 pt./A Goal Tender 4EC @ 2.5-4 pt./A	Preemergence control of broadleaf and some grass weeds; provides burndown of young emerged weeds.	Apply ONLY to DORMANT bearing and non-bearing trees for control of certain annual broadleaf weeds. DO NOT apply during the growing season or bud swell stage of growth. Has both contact postemergence and residual activity. Use higher rates for preemergence treatments. May be tank-mixed with simazine, Devrinol, Surflan, or paraquat. When tank-mixing, always read and follow all product labels.
pendimethalin @ 1.9-3.99 lb./A	Prowl H_2O@ 2.0 -4.2 qt./A	Broadleaf weeds, annual grasses	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. The pre-harvest interval for Prowl H2O in stone fruit is 60 days. Appropriate preemergence tank-mix partners include simazine and Matrix. Sequential applications may be used so long as total use rate does not exceed 4.2 qt/A per year. Allow at least 30 days between applications. All other formulations of pendimethalin may be used in non-bearing orchards only. Do not feed forage or graze livestock in treated orchards.
pronamide @1.0-2.0 lb/A	Kerb @ 2.0-4.0 lb./A	Preemergence control of certain annual and perennial broadleaf and grass weeds.	Apply as a directed spray to the soil and the base of trees on bearing and nonbearing trees in the fall or early winter. Do not apply to newly established trees until the roots are well-established. Rainfall or irrigation is required after application.
rimsulfuron @ 0.0625	Matrix SG @ 4 oz/A	Broadleaf, grass, and nutsedge weeds	Apply as a band or broadcast application. DO NOT apply within 14 days of harvest. Rainfall within 3 weeks of application is necessary for optimum herbicide

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			performance. Spray solutions must have a pH ranging from 4.0 to 8.0 to prevent herbicide degradation. Rimsulfuron has postemergence activity on certain weeds including henbit, common chickweed, horseweed, wild mustard, wild radish, and pigweed species. Rimsulfuron may be tank-mixed with oryzalin, Solicam, diuron, Sinbar, glyphosate, or paraquat. Tree must be established for at least 1 year. Sequential applications can be made so long as total use rate does not exceed 4 oz/A per year and application is made in a band on less than 50% of the orchard floor. Rimsulfuron will provide POST control of certain weeds (see label for details). POST horseweed control can be obtained when rimsulfuron is applied to horseweed. Avoid direct or indirect spray contact with crop foliage or fruit.
POSTEMERGENCE:			
clethodim @ 0.07-0.12 lb./A	Select Max @ 9-16 fl. oz./A	Annual and perennial grasses	Use for control of annual and perennial grasses. Use higher rates for perennial grasses. Add crop oil concentrate (1 gal/100 gal of spray solution, but not less than 1 pt./acre). Make application to Johnsongrass – 12" to 18" tall; bermudagrass – 3" tall or with 4" to 8" runners; annual grasses – 2" to 8" tall. Clethodim does not control nutsedge(s). Sequential applications will be necessary for perennial grass control. For Select Max, add a surfactant at 0.25% v/v (1 qt./100 gal of spray solution). Select Max has a 14-day PHI for peach and can only be used on non-bearing nectarine. All other formulations are registered for use in only nonbearing peach and nectarine plantings.
DIRECTED POSTEMERGENCE:			
paraquat @ 0.64-1.0 lb./A	Gramoxone 2 SL @ 2.5–4 pt./A Firestorm, Parazone, or Paraquat Concentrate @ 1.75-2.7 pt./A	Annual grasses, broadleaf weeds; top kill and suppression of perennials	Use for broad spectrum, contact control of emerged weeds. Apply as a directed spray in high spray volumes (20+ gpa) with 1 qt. surfactant/100 gal of spray solution. Apply when broadleaf weeds and annual grasses are succulent and 1" to 6" tall. DO NOT allow spray drift to contact foliage or green bark of trees since severe damage may occur. May be tank-mixed with certain pre-emergence herbicides to provide post-emergence and residual weed control. Paraquat has a 14-day PHI for peach and a 29-day PHI for nectarine. For mature, woody

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			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. No more than 3 applications per year may be used.
DIRECTED POSTEMERGENCE continued:			
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 gal.	Perennial and annual grasses	Use for control of annual and perennial grasses in BEARING or non-bearing trees. Low spray volumes (10 gpa) generally improve control. Add crop oil concentrate (1 gal/100 gal of spray solution). Make application to Johnsongrass – 12" to 18" tall; bermudagrass – 3" tall or with 4" to 8" runners; annual grasses – 2" to 4" tall. Does not control nutsedge(s). Do not apply within 14 days of harvest. For control of perennial grasses, multiple applications may be necessary. Do not graze livestock on treated areas. Do not apply more than 72 fl. oz. of Fusilade per acre per year. Do not apply more than 24 fl. oz. of Fusilade per application. Do not apply more than 3 applications per year.
glufosinate-ammonium @ 0.88-1.02 lb/A	Rely 280 @48-56 oz./A Cheetah @48-56 oz./A	Postemergent control of grasses and broadleaf weeds	DO NOT SPRAY GREEN BARK, UNCALLUSED BARK OR DESIRABLE FOLIAGE UNLESS TREES ARE PROTECTED. Glufosinate should not be used on trees within 1 year of transplanting. Apply in a minimum of 20 gallons of water per acre as a directed spray under trees. Repeat applications may be necessary for control of perennial weeds. Glufosinate can be tank-mixed with diuron, Sinbar, Solicam, oryzalin, oxyfluorfen, rimsulfuron, simazine, flumioxazin, or 2,4- D amine. Glufosinate has a 14-day PHI. Do not apply more 164 fl. oz/A within a 12-month period. Allow at least 28 days between applications. Glufosinate formulations contain surfactant; therefore additional nonionic surfactants or crop oils are not necessary and may increase potential for injury. Glufosinate will control glyphosate resistant weeds. Lower rates may be used to control weeds less than 3 inches tall. Higher rate is needed for larger weeds 3-6 inches tall. Warm temperatures, high humidity and bright sunlight improve performance of glufosinate. Do not

PEACH			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			graze, harvest and/or feed treated orchard cover crops to livestock.
DIRECTED POSTEMERGENCE continued:			
sethoxydim @ 0.3-0.5 lb./A	Poast @ 1.0-2.5 pt./A Apply with a non-phytotoxic oil concentrate @ 1 qt./A	Annual and perennial grasses	Apply as a directed spray using 20-50 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. Does not control nutsedge.
carfentrazone @ 0.008-0.031 lb./A	Aim 2EC @ 0.5-2 oz./A Apply with NIS @ 1 qt./100 gal or COC @ 1 gal./100 gal	Postdirected application for control of susceptible broadleaf weeds.	Apply alone or tank-mix with preemergence herbicides. Apply in a minimum spray volume of 20 gpa. Do not allow Aim to contact green bark or desirable foliage or fruit. Trees 2 years old and younger must be protected with a shield or painted to prevent injury. Do not apply within 3 days of harvest. Best results are obtained when weeds are at the 2 to 3 leaf stage. Apply in combination with a nonionic surfactant (1 qt/100 gal of spray solution) or crop oil concentrate (1 gal/100 gal of spray solution). The addition of Aim to glyphosate will improve postemergence control of morning glory. Sequential applications may be used so long as there is at least 14 days between applications and total use rate for the year does not exceed 7.9 fl oz/A.

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
oxyfluorfen @ 1.25 – 2.0 lb/A	Goal 2XL, Galigan @ 5-6 pt./A GoalTender @ 2.5 – 4 pt./A	Preemergence 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 20 gal. of water per acre.
norflurazon @ 2-3.9 lb./A	Solicam 80DF @ 2.5-5.0 lb./A	Annual grasses, broadleaf weeds	Use for control of annual grasses, broadleaf weeds, and suppression of some perennials under bearing, non-bearing, or newly set trees. Apply to newly planted trees only after soil has settled around roots, at least 6 months after planting. Avoid contact with roots. Apply in the fall or early spring–fall applications control a broader weed spectrum than spring applications. DO NOT apply when nuts are on the ground at harvest. Use low rate on

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			coarse-textured soils, higher rates on fine-textured soils. Make only 1 application per year. DO NOT graze treated areas. May tank-mix with simazine or diuron for broader spectrum weed control. Add paraquat, glufosinate, or glyphosate for control of emerged weeds. DO NOT apply within 60 days of harvest. Sequential applications can be used so long as total use rate does not exceed maximum use rate for soil texture and crop.
PREEMERGENCE continued:			
oryzalin @ 2-6 lb./A	Surflan 4 A.S., Oryzalin 4 A.S. @ 2.0-6.0 qts/A	Annual grasses, broadleaf weeds	Use on non-bearing and bearing trees for control of annual grasses and small seeded broadleaf weeds. Use low rate for short-term control (2-4 months); high rate for long-term control (8-12 months). DO NOT apply to newly transplanted trees until soil has settled and no cracks are present. Apply before annual weeds emerge in the spring or add paraquat, Rely, or glyphosate for control of emerged weeds. Sequential applications may be used so long as total use rate does not exceed 12 qt./A/year and there are 2.5 months between applications. Use for control of annual grasses and certain broadleaf weeds. Use low rate for shorter control (2-4 months.); high rate for long term control (6-8 months.).
pendimethalin @ 1.9- 5.99lb/A	Prowl H_2O@ 2-6 qt./A	Broadleaf weeds, annual grasses	Control of annual grasses and broadleaf weeds such as pigweed. Most effective when adequate rainfall or irrigation is received within 7 days after application. DO NOT apply to newly transplanted trees until ground has settled around roots. Sequential applications may be used as long as total use rate does not exceed 6 qt./A and there are 30 days between applications. **Prowl H2 O has a 60-day PHI for pecans**; however, other pendimethalin formulations can only be used in non-bearing pecans. Do not feed forage or graze livestock in treated groves or orchards.
flumioxazin @ 0.188-0.38 lb/A	Chateau 51 WDG @ 6-12 oz./A Tuscany 51 WDG @ 6-12 oz./A	Broadleaf and grass weeds	DO NOT apply more than 6 oz./A/application to soils having a sand and/or gravel content > 80%. Trees established less than 1 year must be shielded with a grow tube or waxed container. DO NOT apply second application within 30 days of initial application. Applications after bud break can only be made with shielded application equipment. Once trees break dormancy apply with paraquat or glufosinate for non-selective postemergence control. Must use shielded

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			application equipment if using in non-dormant pecan trees. **Flumioxazin has a 60 day PHI for pecans**. Do not allow spray or spray drift to come in contact with the tree foliage. Moisture is necessary to activate herbicide on soil. Do not apply to farm alleys or roads where traffic may result in treated dust settling onto crops or other desirable vegetation.
PREEMERGENCE continued:			
napropamide @ 4.0 lb/A	Devrinol 50DF @ 8.0 lb/A Devrinol 2 EC @ 2 gal/A	Annual grasses, broadleaf weeds.	Apply to a weed-free soil surface. May be applied to newly planted or to established crop. Do not exceed a maximum application rate of 8 lb. per acre per crop cycle. Do not apply within 35 days of harvest.
rimsulfuron @ 0.0625	Matrix 25 WG, Solida 25 WG, or Pruvin 25 WG @ 4 oz./A	Broadleaf, grass, and nutsedge weeds	Provide PRE & POST control of broadleaf and annual grass weeds (see label for weed control POST). For broad spectrum residual control tank-mix with diuron, oryzalin, or Prowl H2 O. Use in orchards established at least 1 year. **Rimsulfuron has a 14-day PHI for pecan**. Sequential applications may be used so long as there are 30 days between applications and total use rate does not exceed 4 oz/A broadcast basis. Avoid direct or indirect spray contact with crop foliage or fruit. Do not use MATRIX in a spray solution with a pH of below 4.0 or above 8.0 to avoid degradation of the herbicide. Best results are obtained when the soil is moist at the time of application, and 1/2 inch of rainfall or sprinkler irrigation occurs within 2 weeks after application.
POSTEMERGENCE:			
clethodim @ 0.094-0.125 lb./A	Select @ 6-8 fl. oz/A Always add an adjuvant or crop oil concentrate to spray, see label.	Annual and perennial grasses	Use for control of annual and perennial grasses in NON-BEARING trees that will not be harvested within 1 year of application. Use higher rates and sequential applications for perennial grasses. Add a nonionic surfactant containing at least 80% ai at a rate of 1 qt./100 gal of spray solution (0.25% v/v). Make application to johnsongrass: 12-18" tall; bermudagrass: 3" tall or with 4-8" runners; annual grasses: 2-8" tall. Does not control nutsedge. Apply before grasses exceed height limitations. **Apply to nonbearing plants only.** Spray should be directed at the base of the tree, not on foliage. Do not graze treated areas.

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
DIRECTED POSTEMERGENCE:			
fluazifop @ 0.19-0.37 lb./A	Fusilade DX @ 12-24 oz./A Always use a non-phytotoxic crop oil concentrate or a nonionic surfactant.	Perennial and annual grasses	Use for control of annual and perennial grasses under bearing or non-bearing trees. Sequential applications will be necessary for control of perennial grass weeds like bermudagrass and johnsongrass. Low spray volumes (10 GPA) generally improve control. Add crop oil concentrate (1 qt./A). Make application to johnsongrass: 12-18" tall; bermudagrass: 3" tall or with 4-8" runners; annual grasses: 2-8" tall. Does not control nut sedge(s). **DO NOT apply when harvestable nuts are on the ground. DO NOT graze treated area. DO NOT apply within 30 days of harvest**.
paraquat @ 0.64-1.0 lb./A	Gramoxone SL @ 2.5–4 pt./A Firestorm 3 SL, Parazone, or Paraquat concentrate @ 1.75-2.7 pt./A Add an approved nonionic surfactant at 1-2 pt./100 gal/spray.	Annual grasses, broadleaf weeds; top kill and suppression of perennials	Use for broad spectrum, contact control of emerged weeds. Apply as a directed spray in at least 20 gal of water with 1-2 pt. surfactant/100 gal of spray mix or 1% crop oil concentrate (1 gal/100 gal spray mix). Apply when annual weeds are succulent and 1-6" tall. DO NOT allow spray drift to contact foliage or green bark of trees since severe damage may occur. DO NOT allow animals to graze on treated areas. May be tank-mixed with certain preemergence herbicides for effective residual weed control. DO NOT apply when nuts are on the ground. Thorough weed coverage is essential. Repeat as necessary. Spray drift will cause injury. Do not allow spray to contact foliage, fruit or stems. No more than 5 applications may be made annually. All applications must be made prior to shaking for harvest.
sethoxydim @ 0.19-0.47 lb./A	Poast @ 1.0-2.5 pt./A Always use a non-phytotoxic oil concentrate (1 qt./A).	Annual and perennial grasses	Use for control of annual and perennial grasses. Sequential applications will be necessary for control of perennial grass weeds like bermudagrass and johnsongrass. Low spray volumes (10 GPA) generally improve control. Add crop oil concentrate (1 qt./A). Use low rate on annual grasses up to 6" tall; higher rates on larger annual grasses and perennial grasses. Does not control nutsedge. **DO NOT harvest within 15 days of application**. Apply as directed spray to nonbearing trees that will not be harvested within 1 year of application.
glyphosate @ 1-5 lb./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

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			harder to control weeds. Try to avoid applications in late summer and fall. Trees are more sensitive to glyphosate during that time. Allow at least 3 days between last application and harvest.
DIRECTED POSTEMERGENCE continued:			
carfentrazone @ 0.016-0.031 lb/A	Aim 2EC @ 1-2 oz/A Apply with COC @ 1 gal/100 gal or NIS @ 2 pt./100 gal.	Post-directed application for control of susceptible broadleaf weeds	Apply alone or tank-mix with other herbicides for postemergence control of broadleaf weeds including pigweed, morning glory, lambs' quarters and prickly lettuce. DO NOT allow Aim to contact desirable foliage, flowers, or fruit. DO NOT apply within 3 days of harvest. Trees less than 2 years old must be shielded from direct contact with Aim. Sequential applications may be used as long as total use rate does not exceed 7.9 oz./A/ year and there are 14 days between applications. Best results obtained when applied to weeds in the 2-3 leaf stage. Apply in combination with a nonionic surfactant (1 qt./100 gal of spray solution) or crop oil concentrate (1 gal/100 gal of spray solution). Lower rates may be used to control small seedling weeds at the 2- to 3-leaf stage. Higher rate is needed for larger weeds up to the 6-leaf stage. Applications to weeds beyond the 6-leaf stage may result in only partial control.
glufosinate-ammonium @ 0.88-1.02 lb/A	Cheetah, Reckon 280, or Rely 280 @48-56 oz./A	Postemergent control of grasses and broadleaf weeds	Use for broad spectrum control of emerged weeds and grasses, both annuals and perennials. Apply as a directed spray in high spray volumes on nonbearing and bearing trees. Possesses contact and limited systemic activity but does well on wild brambles and perennial grasses. Does not have soil residual activity. DO NOT contact foliage or green bark. Glufosinate formulations are loaded with surfactant therefore NO additional nonionic surfactants or crop oil is needed. The addition of spray graded ammonium sulfate fertilizer at 8-10 lb/100 gal will enhance glufosinate activity. Do not apply this product within 14 days of nut harvest. Do not graze, harvest and/or feed treated orchard cover crops to livestock.
halosulfuron @0.032-0.63 oz./A	Sandea 75WDG @ 0.66-1.33oz./A	Postemergent control of yellow, purple and many other sedge species	For control of nutsedge, pigweed, radish, and cocklebur. Optimum application time is when actively growing sedges are at the 3- to 5-leaf stage. Apply as directed spray under trees established for at least 1 year. Avoid contact of spray with trunk, stem, roots, or tree foliage. May apply

PECAN			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			up to 2 applications. **DO NOT apply within 1 day of harvest**. See label for rate restrictions related to soil texture. Tank-mix with glyphosate for broad spectrum control. Use ONLY under trees established in the orchard for 1 year or more where soil is settled with no cracks.
CHEMICAL MOWING:			
glyphosate See label	Roundup and various generic formulations of glyphosate. See Label	Vegetation and bahiagrass seed head suppression	Use for vegetative suppression in row middles. Apply 1-2 weeks after full green-up of bahiagrass or bermudagrass, or after grass has been mowed to a uniform height of 3-4". Rates should vary depending on vigor of vegetative growth and canopy of the grove, with the higher rates for more vigorous grass stands where less shade occurs. Low spray volumes (10 GPA) improve control. See respective labels for surfactant requirements. Sequential applications can be made to maintain growth suppression and prepare the orchard floor for mechanical harvest. Sequential applications must be made prior to seedhead emergence. Allow a minimum of 21 days between the last application and harvest.

COMMERCIAL NURSERY AND LANDSCAPES WEED MANAGEMENT

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
benefin + oryzalin @ 4.0-6.0 lbs./A	XL 2 G @200-300 lbs./A or 4.5-7 lbs./1,000 sq. ft.	Annual grasses, some small seeded 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 lbs./A	Betasan 4E @ 15-25 pts/A or 5.6-7.3 oz/1000 sq. ft.	Annual grasses, some small seeded 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 lbs./A	DCPA 5 G @ 218 lbs./A or 5 lbs./1000 sq. ft.	Annual grasses, some small-seeded broadleaves	Several tolerant ornamentals. Commercial ornamental production and landscape bed use allowed. Consult label. Do not apply to pansies or phlox in landscape beds.
dithiopyr @ 0.5 lbs/A	Dimension 2 EW or Dithiopyr 2 L @ 2 pt/A or 0.73 or 0.73 oz/1,000 sq. ft.	Annual grasses, some small-seeded broadleaves. Early post control of crabgrass	May be used in commercial nursery production and landscape beds. Several annual and perennial landscape plants are tolerant to over the top or directed sprays. Consult product label.
dimethenamid + pendimethalin @ 1.75 – 3.5 lbs./A	FreeHand 1.75G @ 100 – 200 lbs./A or 2.3 – 4.6 lbs./1000 sq.ft	Annual grasses, spurge, chickweed, oxalis, groundsel, bittercress, eclipta. Suppression of *Phyllanthus*, doveweed, yellow nutsedge, 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. May be applied to annual bedding plants. Consult product label.
isoxaben @ 0.5-1.0 lb./A	Gallery 75DF @0.66-1.33 lbs/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 lbs./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 lbs./A annually. Useful in landscape beds and safe on several annual and perennial bedding plants. Similar weed control spectrum as Surflan and Pendulum.

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
oxyfluorfen + pendimethalin @ 2 lbs./A	OH II 2 G @ 100 lbs./A or 2.3 lbs./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.**
indaziflam @ 0.03-0.05 lbs/A	Specticle Flo @ 6 to 12 oz/A or 0.14 to 0.28 oz./ 1,000 sq. ft.	Highly effective on crabgrass and other annual grasses. Good control of several small-seeded broadleaves	Apply as directed spray in landscapes established for at least 4 months. For best results, apply before mulching. Do not use in or around bedding plants or herbaceous perennials. Herbicide is useful for hardscapes such as graveled areas. Do not exceed 18.5 oz/A/12-month period.
napropamide @ 4-6 lbs./A	Devrinol 50WP @ 8-12 lbs./A 3-4.4 oz/1000 sq. ft Devrinol 5G @ 43 – 87 lbs./A or 1 - 2 lbs./1000 sq. ft.	Annual grasses, 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 lbs./A	Ronstar 2 G @ 100-200 lbs./A or 2.25-4.5 lbs./1000 sq. ft.	Annual grasses, 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 lbs./A	Rout 2 G @ 100 lbs./A or 2.3 lbs./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 weeks prior to greenhouse enclosure. **Do not use on bedding plants.**
isoxaben + oxyfluorfen + trifluralin @ 1.25 – 2 lbs./A	Showcase @ 100 – 200 lbs./A or 2.3 – 4.6 lbs./1000 sq. ft.	Annual grasses, 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 lbs./A	Snapshot 2.5 TG and generics @ 100-200 lbs./A or 2.3 - 4.6 lbs./1000 sq. ft.	Annual grasses, broadleaves	Several perennial groundcovers and woody ornamentals are tolerant. Consult product label for tolerant ornamental species and susceptible weeds. Several

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			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.**
PREEMERGENCE continued:			
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, 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 lbs./A or 1.1 oz/1000 sq. ft.	Annual grasses, broadleaves	Check label for tolerant ornamental species and susceptible weeds. Apply as broadcast or as a band treatment in fall and spring.
flumioxazin @ 0.38 lb./A	Broadstar 0.25 G @ 150 lbs./A 3.44 oz/1000 sq. ft.	Doveweed, liverwort, bittercress, spurges, other broadleaf weeds	Apply at preemergence. 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 some preemergence activity on *Phyllanthus* (chamberbitter).
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, other broadleaf weeds	Provides preemergence and some postemergence 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 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, several broadleaves, including bittercress	Apply at preemergence in conifers and several field grown trees. Herbicide has some postemergence activity. Good activity on several broadleaf weeds including winter annuals.
pronamide @ 1.0-2.0 lbs./A	Kerb 50 WSP @ 2.0-4.0 lbs./A Kerb SC @ 0.9-1.8 oz/1000 sq. ft.	Grasses, some broadleaves	Apply at preemergence and has some postemergence activity on annual bluegrass. Check label for tolerant ornamental species and susceptible weeds. **RESTRICTED USE.**

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
pendimethalin @ 1.7 – 3.0 lbs./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 lbs./A or 1.7 – 3.4 lbs./1000 sq. ft.	Annual grasses, 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 lbs./A	Princep 4L @ 2-4 qt/A or 0.73-2.20 oz/1000 sq. ft.	Annual grasses, winter broadleaves	Several field grown conifer including Christmas trees and deciduous trees. Apply in at least 25 GPA in fall or spring. Do not apply to plantings less than 1 year old. **Do not apply to landscape beds.**
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, yellow nutsedge, some annual sedges small seeded broadleaves	Registered for commercial ornamental production and landscape areas. Several tolerant ornamentals including many 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. Does not control purple nutsedge.
oxadiazon @ 2.0-4.0 lbs./A	Ronstar 2G @ 100-200 lbs./A 2.30 – 4.60 lbs./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 2.5G, T/I 2.5 G@ 2.3 – 4.6 oz/1000 ft2 100-200 lbs./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, 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 months control.
POSTEMERGENCE:			
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, asters, thistles	Labeled for use in certain woody trees and shrubs as over-the-top or directed sprays in field nurseries and landscape plantings. May also be used in field-grown lilies.

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			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.**
POSTEMERGENCE continued:			
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, 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, annual sedges and green kyllinga with repeated applications.	Postemergence 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 will increase activity.
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, other broadleaf weeds	Apply at preemergence and postemergence. 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 before new woody transplants.
POSTEMERGENCE 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, suppression of perennial grasses	Apply postemergence. 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 postemergence for actively growing grasses. Add 0.25% v/v non-ionic surfactant (1 pt./50 gal.). Crop oil concentrate not recommended. Better on perennial grasses than sethoxydim.

COMMERCIAL NURSERY AND LANDSCAPES WEED MANAGEMENT

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
fluazifop @ 0.25-0.40 lb./A	Fusilade II EC @ 17-26 oz/A Spot sprays 0.75 oz//gallon	Annual and perennial grasses. Good on vaseygrass. Some suppression of torpedograss with repeated applications.	Herbicide only controls grasses. Several non-grass ornamentals are tolerant for over the top applications but consult product label for sensitive plants. Restrictions on juniper and azalea cultivars. Somewhat more effective on torpedograss with multiple applications 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, green kyllinga, johnsongrass	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 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. **Azaleas may be injured by this herbicide.**
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 & yellow); suppression of kyllinga species	Apply as a directed spray around woody ornamentals in landscape plantings. Very effective on yellow and purple nutsedge. Add a non-ionic surfactant.
NON-SELECTIVE:			
glyphosate @ 1.0-5.0 lbs./A	Roundup Pro 41% and generics @ 1-5 qt/A or 1.5-3.7 oz/1000 ft2 Use 2% solution for spot treatments. Use a 10% solution for dollarweed, torpedograss and other hard to control perennials infesting landscape beds.	Grasses, broadleaves	Check label for recommended uses. Nonselective so avoid all drift. Labeled for greenhouse use. Consider wiping or paint brushing a 10% v/v solution instead of spraying in landscape beds for weeds such as dollarweed, Florida betony and torpedograss.
potassium salt	Sharpshooter 18% @ 5.5-11 oz/qt/water	Grasses, broadleaves	Apply postemergence. 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, broadleaves	Directed postemergence application in field produced woody ornamentals. Check label for recommended uses.

COMMERCIAL NURSERY and LANDSCAPES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			Nonselective. Poor on perennial weeds. **RESTRICTED USE.**
NON-SELECTIVE continued:			
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.
glufosinate ammonium @ 0.75 – 1.5 lbs./A	Finale 1 SL @ 3-6 qt/A or spot treatment 1.5-4.0 oz/gal	Nonselective control of several grasses and broadleaves	Mostly contact herbicide. Less effective on perennial plants due to limited translocation. Very good herbicide on escaped jasmine.

ARTICHOKE			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
pronamide @ 2-4 lbs./A	Kerb 50 W @ 4-8 lbs./A	Broadleaf weeds, 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.
POSTEMERGENCE:			
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 and relative humidity is 60% or higher because of potential leaf injury. Not recommended when temperatures exceed 100 degrees.
DIRECTED POSTEMERGENCE:			
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 preemergence and postemergence to the 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 8-10 weeks or a single application can be made. Check label for rates.
pronamide @ 2-4 lbs./A	Kerb 50 W @ 4-8 lbs./A	Broadleaf weeds, annual grasses	Application may be 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 lb./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 GPA. Surfactant is required; consult label. Do not apply within 24 hours of harvest. Do not exceed 3 applications per 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.

ASPARAGUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
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 lbs./A on light soil 2-4 lbs./A clay	Annual broadleaf and grass weeds	Apply 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 lbs./A	Most small-seeded annual grasses and broadleaf weeds	Established beds apply before cutting season. Lorox can be used on newly planted crowns. One day to harvest.
paraquat @ 0.63-1.0 lb./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 GPA 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 lbs./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 lb./A	Chateau @ 6 oz/A Add 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 a minimum of 15 GPA.
POSTEMERGENCE:			
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 lbs./A on light soil 2-4 lbs./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.

ASPARAGUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
halosulfuron @ 0.024-0.072 oz/A	Sandea 75 DF or Profine 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 pt./A/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 gal. 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. Don't apply more than 5 pt./A/season. Should be used with caution when temperatures exceed 90 degrees and relative humidity is 60% or higher. May be applied 1 day before harvest.
clethodim@ 0.1-.125 lb /A	Select, Arrow, Intensity, Clethodim Max @ 12-16 oz/A Mix with NIS @ 2pt /100 gals	Annual and perennial grasses, annual bluegrass	Check label for rates and restrictions on amount applied. For repeat applications, apply on a minimum 14-day interval. May be applied 1 day before harvest.
DIRECTED POSTEMERGENCE:			
linuron @ 0.5-1.0 lb.//A	Lorox 50 DF @ 1-2 lbs./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-lbs./A	Sencor 4 FL@ 2-4 pt/A Sencor 75DF, Metribuzin 75 DF @ 1.33-2.67 lbs./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 lb./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 GPA to control emerged weeds. Use on asparagus at least 2 years old. Mix with NIS @ 1-2 pt./100 gal.

ASPARAGUS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTHARVEST continued:			
halosulfuron @ 0.024-0.072 oz/A	Sandea 75 DF or Profine 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 adjuvant. Don't exceed 2 oz./A/year.
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 lbs./A on light soil 2-4 lbs./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]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT INCORPORATED:			
S-metolachlor @ 0.95-1.9 lbs./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 inches 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 inches 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 @ 0.8 lb./A on light soil 1.33 lbs./A on med.-heavy soil	Small-seeded annual grasses, broadleaf weeds and seedling johnsongrass	Incorporate thoroughly in top 2 inches of soil just before planting. Check label for tank-mixes with other herbicides.
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 lbs./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.
PREEMERGENCE:			
S-metolachlor @ 0.95-1.9 lbs./A	Dual Magnum, Dual II Magnum @ 1-1.3 pt/A on coarse soil 1.3-1.67 pt/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 more than 3% organic matter; consult label.

SNAP AND LIMA BEANS[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
metolachlor @ 0.98-1.63 lbs./A	Medal, Stalwart, Parallel, Charger @ 1.0-1.3 pt/A on coarse soil @ 1.3-1.67 pt/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 DF or Profine 75 DF @ 0.5-1.5 oz./A	Nutsedge and some broadleaf weeds	Apply following planting; prior to cracking. Will provide residual weed control.
fomesafen @ 0.188 lb./A	Reflex 2 EC @1.5 pt/acre	Many broadleaf weeds	**Snap beans only.** Apply preplant surface and preemergence. Check label for tank mixers. Total use cannot exceed 1.5 pt./A. Check label for instructions and precautions.
POSTEMERGENCE:			
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./A/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 ragweed, prickly sida, yellow nutsedge, other broadleaf weeds. No grass control.	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 widely fluctuating temperatures). Rates highly depend on size and age of weeds. Check label for more specific rates. Do not apply within 30 days of harvest. Two applications 7-10 days apart may be required to control yellow nutsedge.
halosulfuron-methyl @ 0.024 to 0.036 lb./A	Sandea 75 DF or or Profine 75 DF @ 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 pt/A Mix with COC @ 2 pt/A	Annual and perennial grasses	Apply to actively growing grasses before they exceed labeled heights. Do not apply within 15 days of harvest. Adjust pressure (40-60 psi), spray volume (5-20 GPA) and boom height to ensure thorough coverage. Do not

SNAP AND LIMA BEANS[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Pump up sprayer: 1/3-2 oz/gal Poast + 1.3 oz/A gal COC		apply more than 4 pt./A/year. Use caution when temperatures and relative humidity are high.
POSTEMERGENCE continued:			
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./A. Do not apply within 30 days of harvest. See label for further instructions and tank-mixes.
DIRECTED POSTEMERGENCE:			
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.

BEET[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT INCORPORATED:			
cycloate[2] @ 3-4 lbs./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 inches of soil 5-7 days before planting.
PREEMERGENCE:			
pyrazon @ 3.2-3.7 lbs./A	Pyramin DF @ 4.6 lbs./A on light-med. soil 5.4 lbs./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 lbs./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 inches of soil 5-7 days before planting to reduce risk of temporary crop injury.
POSTEMERGENCE:			
pyrazon @ 3.2-3.7 lbs./A	Pyramin DF @ 4.6 lbs./A on light-med. soil 5.4 lbs./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 pt/A Mix with COC @ 2 pt/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 pt/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	Solyx, 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, Arrow, Intensity, Clethodim @ 6-8 oz/A Mix with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 1.3 oz/gal COC	Annual and perennial grasses and annual bluegrass	Apply 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.

BEET[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
DIRECTED POSTEMERGENCE:			
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	Apply using hoods or shields. Will injure contacted crops. Most effective on small weeds. Can be mixed with other herbicides.
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.
POSTHARVEST:			
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.

COLE CROPS (Cabbage, Cauliflower, Broccoli, Brussels Sprouts)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT 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 lbs./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 inches 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.
PREPLANT:			
oxyfluorfen @ 0.25-0.5 lb./A	Goal 1.6E or 2XL, Galligan @ 1.0 pt/A on coarse soil 2.0 pt/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 lbs./A on light soil 8-10 lbs./A on med soil 10-14 lbs./A on heavy soil	Annual grasses and certain broadleaf weeds	**On direct-seeded crops,** apply just before planting in at least 20 GPA. A minimum of 1/3-1/2 inch of water is necessary to activate within 3-5 days of application. If irrigation is unavailable, incorporate 1-2 inches to aid in weed control.
POSTEMERGENCE:			
sethoxydim @ 0.09-0.28 lb./A	Poast @ 0.5-1.5 pt/A Mix with COC @ 2 pt/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 pt./A/year. Rainfast in 1 hour.
clethodim @ 0.1-0.125 lb./A	Select, Arrow, Intensity, Clethodim @ 6-8 oz/A Mix with COC at 1 gal/100gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 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.

COLE CROPS (Cabbage, Cauliflower, Broccoli, Brussels Sprouts)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
clopyralid @ 0.9-0.187 lb./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 POSTEMERGENCE:			
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.

CARROT[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT 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 lbs./A on medium soil 1.6 lbs./A on heavy soil	Small-seeded grasses, broadleaf weeds and seedling johnsongrass	Incorporate thoroughly in top 2 inches of soil just before planting.
PREEMERGENCE:			
linuron @ 0.5-1.5 lbs./A	Lorox DF @ 1.5 lbs./A on light soil 2-2.5 lbs./A on medium soil 3.0 lbs./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.
POSTEMERGENCE:			
linuron @ 0.5-1.5 lbs./A	Lorox DF @ 1.5 lbs./A on light soil 2-2.5 lbs./A on medium soil 3.0 lbs./A on heavy soil	Broadleaf weeds, some grasses and yellow nutsedge	Apply after carrots are at least 3 inches tall and before grasses are 2 inches and broadleaves are 6 inches. 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 pt 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 gal./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 lbs./A	Select, Arrow, Intensity, Clethodim @ 6-8 oz/A Mix with COC @ 1 gal/100 gal	Annual and perennial grasses and annual bluegrass	Apply postemergence 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.

CARROT[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 1.3 oz/gal COC		
POSTEMERGENCE 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- to 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. Apply at least 60 days before harvest. 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 inch tall. Works best on warm sunny days.
DIRECTED POSTEMERGENCE:			
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. Also, may 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 pt./A per season. Apply at least 60 days before harvest. Do not feed forage or graze livestock in treated fields.

SWEET CORN[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT INCORPORATED:			
atrazine @ 1-2.0 lbs./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 lbs./A + atrazine @ 1.63-2.0 lbs./A *S*-metolachlor @ 1.25-1.83 lbs./A + atrazine @ 1-1.5 lbs./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 lbs./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 lbs./A on light soil 4 lbs./A on medium soil 6 lbs./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 lbs./A + atrazine @ 0.94-1.69 lbs./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 qt. of Bullet/A per year.
PREEMERGENCE:			
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 pt/A on coarse soil @ 1.3-1.67 pt/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 lbs./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.

SWEET CORN[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
atrazine @ 1-2.0 lbs./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 lbs./A + atrazine @ 1.63-2.0 lbs./A *S*-metolachlor @ 1.25-1.83 lbs./A + atrazine @ 1-1.5 lbs./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 lbs./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 lbs./A on light soil 4 lbs./A on medium soil 6 lbs./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 lbs./A + atrazine @ 0.94-1.69 lbs./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.
POSTEMERGENCE:			
dimethenamid @ 0.94 -1.5 lbs./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 postemergence before corn reaches 8 inches 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 lbs./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 inches tall and pigweeds reach 6 inches and before other broadleaf weeds reach 4 inches and grasses reach 1.5 inches. 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 lbs./A + atrazine @ 1.25-2.0 lbs./A *S*-metolachlor @ .91-1.58 lbs./A + atrazine @ 0.73-1.26 lbs./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 inches. 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.

SWEET CORN[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
bentazon @ 0.75-1.0 lb./A	Basagran @ 1.5-2 pt/A Mix with COC in some situations; consult label.	Many broadleaf weeds including annual morningglory, cocklebur, velvetleaf, Pennsylvania smartweed, prickly sida, dayflower, ragweed and yellow nutsedge No grass control	Apply to small, actively growing weeds. Two applications of 5-14 days apart may be necessary to control morningglories at the 4-leaf and 4-inch-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	Sandea 75 DF, Profine 75 DF Sempra 75 DF @ 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 layby. 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 plant back 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)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
ethalfluralin @ 1.13-1.7 lbs./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 days with a1/2 inch of rainfall or irrigation.
halosulfuron @ 0.024 - 0.36 lb./A	Sandea 75 DF or Profine 75 DF @ 0.5-0.75 oz/A	Nutsedge and some broadleaf weeds	**Cucumbers and cantaloupe only.** Apply after planting before weeds and crop emerge. Also can 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.
ethalfluralin @ 0.4-1.2 lbs./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. Do not incorporate.** May be applied 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 1/2-inch rain is required to wash off Sinbar before holes are punched or transplanted.
POSTEMERGENCE:			
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Arrow @ 6-8 oz/A	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. Rainfast in 1 hour. May be applied a minimum of 30 days before harvest. Don't apply more than 8 oz./A/application. Allow 14 days between applications.

CUCURBITS (Cucumber, Squash, Watermelon, Pumpkin, Cantaloupe)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal clethodim + 1.3 oz/gal COC		
POSTEMERGENCE continued:			
halosulfuron @ 0.024 - 0.36 lb./A	Sandea 75 DF or Profine 75 DF @ 0.5-0.75 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 are high. Can be applied as a direct spray to row middles. Thirty days to harvest cucumbers; 57 days to harvest cantaloupes. See label for crop rotation intervals. DO NOT apply more than 2 oz./A in a 12-month period.
sethoxydim @ 0.09-0.28 lb./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 GPA) 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 degrees and the relative humidity is 60% or higher because of potential leaf injury. Rainfast in 1 hour. Do not apply to grasses under stress.
DIRECTED POSTEMERGENCE:			
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. Also, may 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 or Profine 75 DF @ 0.5-1.0 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 lbs./A on medium soil	Preemergence control only. Small-seeded grasses, broadleaf weeds and seedling johnsongrass	**For use only on cucumbers, watermelons and cantaloupes**. Direct spray to row middles and/or beneath plants at the 3- to 4-true-leaf stage. Incorporate within 24 hrs; adjust equipment to move treated soil around the base of plants. Do not harvest cucumbers or cantaloupes within 30 days or watermelons within 60 days. **Do not apply over the top of plants.**

CUCURBITS (Cucumber, Squash, Watermelon, Pumpkin, Cantaloupe)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	1.6 lbs./A on heavy soil		
DIRECTED POSTEMERGENCE continued:			
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 postemergence as a directed spray using hoods. Spray will injure crop. Most effective when weeds are less than 4 inches tall. Good coverage equals good weed control. Can be mixed with other herbicides to control grasses.
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, squash.** May be applied post-directed spray to row middles after crop emergence or transplanting. Do not apply over plants. Preemergence activity on weeds only.

EGGPLANT			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PRE-TRANSPLANT:			
napropamide @ 1-2 lbs./A	Devrinol 50DF @ 2 lbs./A on light soil 3 lbs./A on medium soil 4 lbs./A on heavy soil	Certain annual grasses and broadleaves	**Apply before transplanting; can only be used on transplants.** Incorporate 1- to 2-inches 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 lbs./A on medium soil 1.6 lbs./A on heavy soil	Small-seeded grasses, broadleaf weeds and seedling johnsongrass	Incorporate thoroughly in the top 2 inches of soil just before transplanting. Avoid transplanting until temperatures have warmed in the spring. Eggplant tolerance may be marginal. Use with caution.
POSTEMERGENCE/POST-TRANSPLANT:			
sethoxydim @ 0.188-0.28 lb./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. Apply a minimum 20 days before harvest. Maximum use rate is 4.5 pt./A/yr. Rainfast in 1 hour. Poast plus COC may cause leaf burn.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim @ 6-8 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 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 hour. Allow 14 days between applications.
DIRECTED POSTEMERGENCE/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	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 GPA. Do not exceed 30 psi nozzle pressure or spray under conditions that favor drift. Apply when weeds and grasses are 1-6 inches high. Apply a minimum of 30 days to harvest. Do not exceed 3 applications per season. Do not feed or graze treated areas.

EGGPLANT			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Pump up sprayer: 0.33 oz/gal paraquat + 0.33-0.5 oz/gal NIS or 1.3 oz/gal COC.		
DIRECTED POSTEMERGENCE/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. Also, may be used postharvest. 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 75 DF or Profine 75 DF @ 0.5-1.0 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 recrop 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 inches tall. Good coverage equals good weed control.

GREENS (Collard, Mustard, Turnip)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT INCORPORATED:			
trifluralin[2] @ 0.5-.75 lb./A	Treflan HFP, Trifluralin, Trilin, and other 4 EC products @ 1pt/A on light soil 1.5 pt/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 johnsongrass	Incorporate thoroughly in top 2 inches of soil just before planting.
POSTEMERGENCE:			
sethoxydim @ 0.09-0.28 lb./A	Poast @ 0.5-1.5 Apply with COC @ 2 pt/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 recommended heights. Adjust equipment to ensure good coverage. 20 days before harvest. Maximum use rate is 4.5 pt./A/yr. Rainfast in 1 hour. Poast plus COC may cause leaf burn. Use with caution when temperatures exceed 90 degrees and the relative humidity is 60% or higher, or when temperatures reach 100 degrees.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim 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 recommended heights; consult label. Do not apply within 14 days of harvesting leaves or 30 days of harvesting the root. Maximum use rate is 8 oz./A/application. Rainfast in 1 hour.
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. Apply at least 30 days before harvest for mustard, collards, turnips roots, kale and 15 days before harvest for turnip tops. Mustard green injury has been observed in some trials.
DIRECTED POSTEMERGENCE:			
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 inches tall. Good coverage equals good control.
glyphosate @ 0.5-0.94 lb./A	Roundup Weathermax @ 11-22 oz/A	Most emerged weeds	**Not labeled for turnip.** Apply to row middles only using a hooded or shielded sprayer or a wiper applicator.

GREENS (Collard, Mustard, Turnip)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A		Also, may 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.

GARLIC[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
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 days of planting for preemergence control. See postemergence section of product label for additional comments.
pendimethalin @ 0.5-1.5 lbs./A	Prowl 3.3, Pendimax 3.3 @ 1.2-1.8 pt/A on light soil 1.8-2.4 pt/A on med. soil 1.8-3.6 pt/A on heavy soil Prowl H2O @ 1-1.6 pt/A on light soil 1.6-2.1 pt/A on med. soil 2.1-3.2 pt/A on heavy soil Pentagon DG @ 0.5-1.25 lbs./A on light soil 1.25-1.7 lbs./A on med. soil 1.25-2.5 lbs./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 preemergence and postemergence.
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./A/growing season.
POSTEMERGENCE:			
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- to 2-true-leaf stage and less than 12 inches tall and weeds are 1-4 inches tall. Use a minimum spray volume of 20 gal./A. Do not apply within 112 days of harvest. Do not add surfactants. Use lower rate on small weeds and the higher rate on 4 inches 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 pt/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 GPA) 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./A of Fusilade DX per acre per season. Do not apply to grasses that are drought-stressed. Do not apply if rainfall is expected within 1hour.
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 days till harvest. Application made prior to the 2-true-leaf stage may result in significant crop injury including possible stand reduction.

GARLIC[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
clethodim @ 0.1-0.125 lb./A	Select, Arrow, Intensity, Clethodim 2EC, Arrow @ 6-8 oz/A Select, Arrow, Intensity, Clethodim 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 hour. May be applied a minimum of 45 days before harvest. Do not apply more than 0.5 lb. ai/A/year. Apply in a minimum of 20 GPA.
sethoxydim @ 0.1-0.3 lb./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 recommended heights. Adjust equipment to ensure good coverage 45 days before harvest. Maximum use rate is 3 pt./A/yr. Use with caution when temperatures exceed 90 degrees and the relative humidity is 60% or higher or when temperatures reach 100 degrees.
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. Do not make more than 4 applications per 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 pt/A on light soil 1.8-2.4 pt/A on med. soil 1.8-3.6 pt/A on heavy soil Prowl H2O @ 1-1.6 pt/A on light soil 1.6-2.1 pt/A on med. soil 2.1-3.2 pt/A on heavy soil Pentagon DG @ 0.5-1.25 lbs./A on light soil 1.25-1.7 lbs./A on med. soil 1.25-2.5 lbs./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 preemergence and postemergence. Garlic treated postemergence should not be harvested within 45 days after application.
DIRECTED POSTEMERGENCE:			
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 inches tall. Coverage is critical to weed control.

GARLIC[3]			
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 using only a hooded or shielded sprayer or a wiper applicator. Also, may be used post-harvest. Avoid crop injury by keeping herbicide off foliage, green shoots, stems, exposed roots or fruit.

VEGETABLE WEED MANAGEMENT

LEAFY VEGETABLES (Lettuce, Endive, Escarole, Radicchio)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT INCORPORATED:			
benefin @ 1.12-1.5 lbs./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 inches 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 & 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 lbs./A	Prefar 4E @ 5-6 qt/A	Certain annual grasses and broadleaf weeds	**Lettuce:** Incorporate 1-2 inches 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 pt/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 johnsongrass	**Endive, escarole and radicchio:** Incorporate thoroughly in top 2 inches 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.
PREEMERGENCE:			
bensulide @ 5-6 lbs./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 & escarole:** See comments above
POSTEMERGENCE:			
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim 2 EC, Arrow @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC @ 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/A clethodim + 1.3 oz/gal COC	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.
pronamide @ 1-2 lbs./A	Kerb 50-WP @ 2.0-3.0 lbs./A on coarse-med soil	Annual grasses and broadleaves.	**Head lettuce, endive & escarole: Do not apply to leaf lettuce POST.** Apply before or after thinning

LEAFY VEGETABLES (Lettuce, Endive, Escarole, Radicchio)[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	3.0-4.0 lbs./A on fine soil		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 per year.
POSTEMERGENCE continued:			
sethoxydim @ 0.1-0.3 lb./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. Do not 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 pt./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 POSTEMERGENCE:			
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 inches 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 using only a hooded or shielded sprayer or a wiper applicator. Also may be used post-harvest. Avoid injury by keeping herbicide off all plant parts. 14 days to harvest.

IRISH POTATO[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT INCORPORATED:			
S-metolachlor @ 0.96-1.9 lbs./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 inches 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 preemergence application. Do not harvest within 60 days after application. Check label for tank-mixes with other herbicides. Planting and future cultural practices should not bring untreated soil to the surface.
metolachlor @ 0.96-1.9 lbs./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 inches 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 days after application. Check label for tank-mixes with other herbicides. Planting and future cultural practices should not bring untreated soil to the surface.
PREEMERGENCE:			
dimethenamid-P	Outlook 6EC @ 12-21 oz/A	Most annual grasses, broadleaf weeds, 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 pt. of NIS/100 gal. See label for tank-mixtures.
S-metolachlor @ 0.96-1.9 lbs./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 preplant. 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 lbs./A on heavy soil	Crabgrass, foxtail, seedling johnsongrass, fall panicum, broadleaf signalgrass, 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.

IRISH POTATO[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE continued:			
linuron @ 0.75-2.0 lbs./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 inches tall and before broadleaf weeds are 6 inches tall. Plant seed at least 2 inches 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 inches of rainfall. Check label for tank-mixes with other herbicides.
pendimethalin @ 0.75-1.5 lbs./A	Prowl/Pendimax 3.3EC @ 1.2 pt/A on coarse soil 2.4 pt/A on medium soil 3.6 pt/A on fine soil Prowl H2O @ 1.0 pt/A on coarse soil 2.0 pt/A on medium soil 3.0 pt/A on fine soil Pentagon DG @ 0.85-1.25 lbs./A on coarse soil 1.25-1.7 lb on medium soil 1.7-2.5 lb on fine soil	Most annual grasses, seedling Johnsongrass; good control of some small-seeded broadleaves such as pigweed	Apply after planting before crop or weeds emerge or after drag off. Most effective when rainfall is received within 7 days 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.
POSTEMERGENCE:			
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim @ 6 - 8 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 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 pt/A on coarse soil 2.4 pt/A on medium soil 3.6 pt/A on fine soil Prowl H2O @ 1.0 pt/A on coarse soil	Most annual grasses, seedling johnsongrass; good control of some small-seeded broadleaves such as pigweed; will not control emerged weeds	Apply after crop emergence to 6-inch 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.

IRISH POTATO[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	2.0 pt/A on medium soil 3.0 pt/A on fine soil		
POSTEMEERGENCE: continued			
sethoxydim @ 0.09-0.47 lb./A	Poast @ 0.5-2.5 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 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 pt./A in one season. Do not apply if rainfall is expected within one hour following application. Do not apply to grasses under stress.
DIRECTED POSTEMERGENCE:			
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 postharvest. 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 within 14 days of harvest.
S-metolachlor @ 0.96-1.4 lbs./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/layby to row middles. May be applied over a previous Dual Magnum application. Do not exceed 3.6 pt./A of Dual Magnum in a single crop season. Potatoes should not be harvested 40 days after a layby application. If cool, wet weather occurs after application, Dual may delay maturity and reduce yields in early maturing varieties.
metolachlor @ 0.96-1.4 lbs./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 inches tall. Coverage is critical.
HARVEST AID:			
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.

IRISH POTATO[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
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 GPA) 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.

OKRA[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT 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 pt/A on med 2.0 pt/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 johnsongrass	Incorporate thoroughly in top 2 inches of soil just before planting. Check label for rates of other formulations of trifluralin.
DIRECTED POSTEMERGENCE:			
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 postharvest. 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 inches tall. Coverage is critical.

ONION[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PRETRANSPLANT:			
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. Transplanting 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, postemergence applications can be made. **Do not apply to direct-seeded onions.**
PREEMERGENCE/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 lbs./A on light soil 8-10 lbs./A on medium soil 10-14 lbs./A on heavy soil	Annual grasses and certain broadleaf weeds	**Dry bulb onions direct-seed or transplant.** Apply in at least 20 GPAA. A minimum of 1/3-1/2 inch of water is necessary to activate within 3-5 days of application. Do not incorporate.
POSTEMERGENCE:			
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 GPA) 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 GPA. Soil and onion foliage should be dry at time of application, humidity should be low and dew should be dried. Do not treat if thrip 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

ONION[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			settled around transplants with several days to recover.
POSTEMERGENCE 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- to 4-leaf stage and weeds are in the 2- to 4-leaf stage. For best results apply on bright, sunny and warm days. Apply in 40-60 gal. of water for through coverage. **Pour 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- to 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 gal. 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, Intensity, Clethodim, Arrow @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 1.3 oz/gal COC	Annual and perennial grasses and bluegrass	**Dry bulb onions.** Apply to actively growing grasses. Rates vary by grass species, stage and region; consult label. Rainfast in 1 hour. Apply a minimum of 45 days before harvest. Maximum use rate is 0.5 lb. ai/A/year. 20 GPA minimum volume.
sethoxydim @ 0.1-0.3 lb./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 degrees and relative humidity is 60% or higher or the temperature exceeds 100 degrees.

ONION[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
pendimethalin @ 0.75-1.5 lbs./A	Prowl/Pendimax 3.3EC @ 1.2 pt/A on coarse soil 2.4 pt/A on medium soil 3.6 pt/A on fine soil Prowl H2O @ 1.0 pt/A on coarse soil 2.0 pt/A on medium soil 3.0 pt/A on fine soil	Many small-seeded grasses and broadleaves	**Dry bulb onions direct seed or transplant.** Apply between the 2- to 9-true-leaf stage. Do not apply within 45 days of harvest. Treatments are most effective when not more than 0.5 inch of rainfall or overhead irrigation is received within 7 days after application. Heavy rains after application can cause crop injury.
DIRECTED POSTEMERGENCE:			
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 postharvest. 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 inches 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 broadleave	**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			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT 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 pt/A on med 2.0 pt/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 johnsongrass	**Bell and hot pepper transplants only:** Incorporate thoroughly in top 2 inches of soil just before transplanting.
oxyfluorfen @ 0.5-1.0 lb./A	Goal @ 1-2 pt/A	Broadleaf weeds, some grasses, geranium and cutleaf evening primrose.	**Bell and hot pepper transplants only; Plastic culture only:** Apply to soil surface on preformed beds at least 30 days prior to transplanting. Incorporation 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 pt/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.
napropamide[2] @ 1-2 lb./A	Devrinol 50DF @ 2 lbs./A on light soil 4 lbs./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 ptA	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.
metolachlor @ 0.48 – 0.95 lb./A	Dual Magnum 7.62 EC @ 0.5 – 1.0 pt/A	Most annual grasses and some small-seeded broadleaf weeds as well as yellow nutsedge	**Special local need label; Bell and non-bell peppers <u>excluding</u> tabasco:** Apply broadcast preplant <u>nonincorporated</u> prior to transplanting. No activity on existing weeds. Apply to weed-free prepared area prior to weed emergence.

PEPPERS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
halosulfuron @ 0.024-0.048 lb./A	Sandea 75 DF or Profine 75 DF @ 0.5 - 1 oz/A Apply with NIS @ 1 qt/100 gal	Nutsedge and some broadleaf weeds	**Bell and hot pepper transplants only: Apply to row middles between plastic only.** Don't allow herbicide to contact the crop or plastic. Early season application will give post- and preemergence control. Do not apply more than 2 oz./A in a 12-month period. Check label for recrop intervals.
POSTEMERGENCE:			
metolachlor @ 0.48 – 0.95 lb./A	Dual Magnum 7.62 EC @ 0.5 – 1.0 pt/A	Most annual grasses and some small-seeded broadleaf weeds as well as yellow nutsedge	**Special local need label for Louisiana; Labeled for bell and non-bell peppers excluding tabasco:** Apply broadcast within 48 hours after transplanting. No activity on existing weeds. Apply to weed-free prepared area prior to weed emergence.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim, Arrow @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 1.3 oz/gal COC	Annual and perennial grasses	**Bell and hot pepper transplants only:** Apply to actively growing grasses. Rainfast in 1 hour. Apply a minimum of 20 days before harvest. 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 GPA) and pressure (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 & minimum of 20 GPA. Best coverage is obtained when two nozzles are used, one directed to each side of the row.
halosulfuron @ 0.024-0.048 lb./A	Sandea 75 DF or Profine 75 DF @ 0.5 - 1 oz/A + NIS at 1 qt/100 gals.	Nutsedge and some broadleaf weeds	**Bell and hot pepper transplants only: Apply to row middles between plastic only.** Don't allow herbicide 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.

PEPPERS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE continued:			
sethoxydim @ 0.1-0.3 lb./A	Poast @ 0.5-1.5 pt/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 transplants only:** Apply TO actively growing grasses before they exceed recommended heights. Adjust pressure (40-60 psi), spray volume (5-20 GPA) and height of spray boom to ensure thorough coverage. Apply at least 20 days before harvest. Do not apply more than 4 1/2 pt./A/season. Crop oil should be used with caution because of potential leaf injury when temperature exceeds 90 degrees and the relative humidity is 60% or higher, or anytime the temperature exceeds 100 degrees. Rainfast in 1 hour.
DIRECTED POSTEMERGENCE:			
S-metolachlor @ 1.23 – 2.48 lbs./A	Dual Magnum 7.62 EC @ 1.3 – 2.6 pt/A	Most annual grasses and some small-seeded broadleaf weeds as well as yellow nutsedge	**Special local need label; postemergence directed spray at layby in <u>tabasco peppers only</u>:** Do <u>not</u> apply over the top or as a band over tabasco peppers. Dual has no activity on emerged weeds. Apply to weed-free tilled or plowed soil.
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 pt/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.
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 transplants only:** Apply to row middles using shields or hooded sprayers. Apply when weeds are 1-6 inches high. 30 days to harvest. Use 20-100 gal. 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 transplants 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 is essential for good weed control.
glyphosate @ 0.5-0.94 lb./A	Roundup Weathermax @ 11-22 oz/A	Most emerged weeds	**Bell and hot pepper transplants only:** Apply to row middles only with a hooded sprayer, shielded sprayer or a wiper applicator. Can be used post-harvest. Severe

PEPPERS			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Various 4 L brands @ 16-30 oz/A Various 5 L brands @ 11-24 oz/A		injury will occur if herbicide contacts foliage, green shoots, stems, exposed roots or fruit. Do not apply within 14 days of harvest.

SHALLOT (Dry Bulbs)			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT INCORPORATED:			
bensulide @ 5-6 lbs./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 inches before planting.
PREEMERGENCE:			
bensulide @ 5-6 lbs./A	Prefar 4 EC @ 5 qt/A on light soil 6 qt/A on medium-fine soil	Some broadleaf and annual grasses	Apply preemergence only on crops where application is followed by immediate irrigation.
POSTEMERGENCE:			
sethoxydim @ 0.1-0.3 lb./A	Poast @ 0.5-1.5 pt/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 pt./A/season. Use with caution because of potential leaf injury when temperature exceeds 90 degrees and the RH is >60% or anytime the temperature exceeds 100 degrees. Rainfast in 1 hour. 30 days to harvest.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim, Arrow @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim 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. Apply a minimum of 45 days before harvest. Pump up sprayer: 0.33 to 0.66 oz./gal Select, Arrow, Intensity, Clethodim + 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.
pendimethalin @ 0.75-1.5 lbs./A	Prowl/Pendimax 3.3EC @ 1.2 pt/A on coarse soil 2.4 pt/A on medium soil 3.6 pt/A on fine soil Prowl H2O @ 1.0 pt/A on coarse soil 2.0 pt/A on medium soil 3.0 pt/A on fine soil	Many small-seeded grasses and broadleaves	Apply after crop reaches 2- to 9-leaf stage. Do not apply within 45 days of harvest. Most effective when rainfall or overhead irrigation is received within 7 days.
DIRECTED POSTEMERGENCE:			
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 PEA[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT INCORPORATED:			
S-metolachlor[2] @ 1.0-2.0 lbs./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 lbs./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 lbs./A	Prowl 3.3 EC @ 1.2-1.8 lbs./A on coarse soil 1.8-2.4 lbs./A on medium soil 1.8-3.6 lbs./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 inches of soil up to 60 days prior to planting. Do not use preemergence. Cold, wet soil conditions after planting may increase risk of crop injury. Check label for tank-mixes with other herbicides.
imazethapyr @ 0.064 lb./A	Pursuit 2 EC @ 4 oz/A Pursuit 70 DG @ 1.5 oz/A	Several broadleaf weeds; reduces competition from morninglories	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. Observe plant back interval for other crops.
trifluralin[2] @ 0.5-.1.0 lb./A	Treflan HFP, Trifluralin, Trilin and other 4 EC products @ 1pt/A on light soil 1.5 pt/A on med 2.0 pt/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 johnsongrass	Incorporate thoroughly in top 2 inches 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.

SOUTHERN PEA[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREEMERGENCE:			
S-metolachlor @ 1.0-2.0 lbs./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.
metolachlor @ 1.0-2.0 lbs./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 lb./A	Pursuit 2 EC @ 4 oz/A Pursuit 70 DG @ 1.5 oz/A	Several broadleaf weeds; reduces competition from morninglories	Apply after planting, before crop and weeds emerge. May cause crop injury. Use of Pursuit is at the user's and/or grower's risk. The use of trifluralin prior to Pursuit may cause crop damage. Do not exceed one Pursuit application per year. Pursuit must be applied at least 30 days before harvest. Observe plant back interval for other crops.
POSTEMERGENCE:			
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. Apply at least 30 days before 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.
imazethapyr @ 0.032- 0.064 lb./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; reduces competition from morninglories	Apply when peas are at least 3 inches tall, but before 5 nodes and flowering. Apply when weeds are 1-3 inches tall or have 1-4 leaves. May cause crop injury; applicator and/or grower assumes the risk. The use of trifluralin prior to Pursuit may cause crop damage. Do not exceed one Pursuit application per year. Pursuit must be applied at least 30 days before harvest. Check label for maximum number of leaves at which weeds should be sprayed postemergence.
sethoxydim @ 0.1-0.3 lb./A	Poast @ 0.5-1.5 pt/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 to small, actively growing grasses; consult label for application timing. Do not apply on days that are hot and humid. Do not apply within 15 days of harvest.

SOUTHERN PEA[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
DIRECTED POSTEMERGENCE:			
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 inches tall. Good coverage equals good weed control.
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.

SPINACH[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT INCORPORATED:			
cycloate @ 3 lbs./A	RoNeet 6EC @ 2 qt/A	Annual grasses and broadleaves	Incorporate 2-3 inches before planting.
POSTEMERGENCE:			
sethoxydim @ 0.1-0.3 lb./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 GPA) 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 degrees and the relative humidity is 60% or higher or anytime the temperature exceeds 100 degrees. Rainfast in 1 hour. Apply at least 15 days before harvest.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim, Arrow @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 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 lbs. 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- to 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 pt/A Split rate: 2.5-3 pt/A followed by 2.5-3 pt/A	Select, Arrow, Intensity, Clethodimed broadleaf weeds	Apply to actively growing weeds in 11-22 GPA of water when weeds are at the 2-leaf stage and spinach is past the 4- to 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 75 degrees, 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. Apply at least 40 days before harvest.
DIRECTED POSTEMERGENCE:			
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.

SPINACH[3]			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and 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	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 inches tall. Good coverage equals good weed control.

SWEET POTATO			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT:			
flumioxazin @ 0.063 – 0.079 lb./A	Valor SX @ 2-2.5 oz/A	Smellmellon, 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 lb./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 recrop intervals.
S-metolachlor @ 1.0-2.0 lbs./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. Do not incorporate. Injury potential increases on sandy or loamy sand soils, especially if heavy rainfall occurs shortly after application. If irrigation is used, don't apply more than 1/2 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 GPA) and pressure (40-60 psi) to ensure complete coverage. Apply at least 55 days before harvest. Maximum season use rate is 48 oz./A.
sethoxydim @ 0.1-0.3 lb./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 actively growing grasses before they exceed labeled heights; consult label. Adjust pressure (40-60 psi), volume (5-20 GPA) 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 degrees and the relative humidity is 60% or higher or anytime the temperature exceeds 100 degrees. Rainfast in 1 hour. Apply at least 30 days before harvest.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 1.3 oz/gal COC	Annual and perennial grasses	Apply to actively growing grasses. Rates vary by grass species and stage; consult label. Rainfast in 1 hour. Apply at least 30 days before harvest.

TOMATO			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PREPLANT/PREPLANT 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, 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 lb./A	Sandea 75 DF or Profine 75 DF @ 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. Do not make more than 2 applications. Do not apply 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 preplant incorporate; apply dosage in 10-40 GPA as a broadcast spray to the soil surface immediately before transplanting. Incorporate 2-4 inches deep with equipment mixing the chemical into the soil. Check label for tank-mixes.
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 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 lbs./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 pt/A	Broadleaf weeds, some grasses, Carolina geranium, cutleaf evening primrose	**Plastic culture only**: Apply to soil surface on preformed beds at least 30 days prior to transplanting. Incorporation is not necessary, but it may result in less crop injury. Best results are obtained if plastic is 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 pt/A on med 2.0 pt/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 johnsongrass	Incorporate thoroughly into top 2 inches of soil just before planting. Check label for tank-mixes with other herbicides.

TOMATO			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
POSTEMERGENCE:			
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 inch tall and actively growing. Do not apply within 45 days of harvest. See label for further instructions.
sethoxydim @ 0.1-0.3 lb./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 pressure (40-60 psi), volume (5-20 GPA) 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 degrees and the relative humidity is 60% or higher, or anytime the temperature exceeds 100 degrees. Rainfast in 1 hour. Apply at least 20 days before harvest.
halosulfuron @ 0.024-0.048 lb./A	Sandea 75 DF or Profine 75 DF @ 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. Do not make more than 2 applications. Do not use more than 2 oz./A/12 months. Apply at least 30 days before harvest.
clethodim @ 0.1 - 0.125 lb./A	Select, Arrow, Intensity, Clethodim @ 6 - 8 oz/A Select, Arrow, Intensity, Clethodim Max @ 9-16 oz/A Apply with COC at 1 gal/100 gal Pump up sprayer: 0.33 to 0.66 oz/gal Select, Arrow, Intensity, Clethodim + 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. Apply at least 20 days before 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	Do not use on seeded crops before the 5- to 6-leaf stage. Do not use on transplants until they have recovered and new growth is evident. Apply in 20 or more gal. of water. Allow 14 days between applications to avoid severe injury. Do not apply within 24 hours or mix with other pesticides. Do not use more than 1.33 lbs./A/season or apply 1.33 lbs./A within a 35-day period unless a portion of that is directed. Do not use hot caps within 7 days of application or

TOMATO			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			anytime afterwards. Do not apply within 3 days of cool, wet or cloudy weather. Apply at least 7 days before harvest.
DIRECTED POSTEMERGENCE:			
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 inches tall. Coverage is critical.
S-metolachlor @ 0.95-1.58 lb./A	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 GPA of water. Apply at least 90 days before 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 inches high. 30 days to harvest. Use 20-100 GPA. Do not exceed 30 psi nozzle pressure or spray under conditions that may cause excessive drift. Don't apply more than 3 times per season. Do not feed or graze treated areas.
metribuzin @ 0.5-1 lb./A	Sencor 4L@ 1-2 pt/A 4L Sencor DF, Metribuzin DF @ 0.66-1.33 lbs./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 "POSTEMERGENCE" 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 inches tall. Good coverage is important to maximize 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 pt/A on med 2.0 pt/A on heavy soil 60 DF products @ 0.87 lb./A on light soil 1.33 lbs./A on medium soil	Many small-seeded annual grasses, broadleaf weeds and seedling johnsongrass	Apply as a directed spray between rows and beneath plant and incorporate. Check label for tank-mixes with other herbicides.

TOMATO			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	1.66 lbs./A on heavy soil		
DIRECTED POSTEMERGENCE 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 H_2O @ 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 within 70 days of harvest.
[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 minimum of 20 GPA 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 lb./A	Goal @ 1-2 pt/A	Broadleaf weeds, some grasses, geranium, 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 inch 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 inches tall. Good coverage equals good weed control. Can be mixed with other burndown materials.

[1]Apply specific dosage of herbicide in 50-100 GPA.

[2]Better results have been obtained with incorporated herbicides when chemicals are applied broadcast and incorporated at the correct depth. The row should then be 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. Applications 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.

PASTURE AND FORAGES WEED MANAGEMENT

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 @ 0.5-1.0 lb./A	2,4-D Amine @ 1-2.0 pt/A Apply in 10-20 GPA by ground or 2 -5 GPA by air	Buttercup and other winter or spring-growing broadleaf weeds.	Apply when weeds are small in Oct. and Nov. and/or Feb. and March. Fall spraying of dock is effective. Do not apply 2,4-D if temperature is below 65 degrees. Some injury can be expected to established white or ladino clover. Do not apply 2,4-D in fall on seedling clover. For buttercup control and white clover release, apply no more than 1 pt/A from December- early March. Use the higher rate for fall spraying of more mature weeds.
2,4-D amine @ 0.75 -1.0 lb./A	2,4-D Amine @ 0.75 - 1.0 qt/A Apply in 10-20 GPA by ground or 2 -5 GPA by air	Summer weeds: Dogfennel <6", common mullein, bitterweed, fleabane, ragweed, marsh elder, goatweed, pigweed and many other summer broadleaf weeds	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 – 0.5 lb./A	Various @ 16 oz – 32 oz/A Apply with NIS @ 1.0 qt/100 gal	Little barley, ryegrass and annual broadleaf weeds such as buttercup, wild geranium, etc.	Apply during the winter before bermudagrass 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 LEGUME:			
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 (Oct. & Nov.) and during Feb. 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	Cimarron 60 DF, Farmsaver, Patriot, Metsulfuron methyl @ 0.3-0.5 oz.	Pensacola bahiagrass; several broadleaf weeds including spurge. Chinese privet	Apply when weeds are actively growing. For use on common and hybrid

PASTURE and FORAGES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
	Apply with NIS @ 1 qt/100 gal	and briars on fence rows @ 2 oz/100 gallons of water	bermudagrass. Do not use on bahiagrass pastures; no grazing restriction.
PERMANENT PASTURE WITHOUT LEGUME continued:			
sulfosulfuron @ 0.06 to 0.09 lb./A	Outrider at 1.3 to 2.0 oz/A Apply with NIS @ 0.25 % v/v	Johnsongrass; many sedges	Do not exceed 2.66 oz./A per season. Safe for bermudagrass and bahiagrass pastures.
aminopyralid @ 0.06-0.11 lb./A	Milestone @ 4.0-7.0 oz/A	Horsenettle, tropical soda apple, Virginia buttonweed, green briar	Apply when weeds are actively growing. Very effective on buttonweed and horsenettle. Severe legume injury potential.
aminopyralid @ 0.06 to 0.11 lb./A + 2,4-D at 0.5 to 0.9 lb./A	Grazon Next HL @ 1.2 to 2.1 pt/A	Horsenettle, thistles, tropical soda apple, blue vervain, Virginia buttonweed; some other broadleaf weeds	Grazon Next HL will severely injure legumes. Follow label restrictions concerning replanting legumes into treated area. Supplemental label allows treated grasses to be sold for hay in Louisiana.
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 lbs./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 bahiagrass; higher rates on more difficult-to-control weeds. Excellent activity on briars, horsenettle, and spurge.	Apply when weeds are actively growing. For use on bermudagrass. Do not use on bahiagrass, ryegrass or temporary grass pastures. 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 suppression of 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, Hired Hand P+D, Trooper, or Picloram +D @ 2.0-4.0 pt/A	Most annual and perennial broadleaf weeds such as perilla mint, sida, blue vervain, and thistles. Not effective on berry briars.	Apply when weeds are small and actively growing. Good control of hard to kill weeds, especially dogfennel and horsenettle. Good control of Chinese tallow. Do not apply around desirable trees and shrubs.

PASTURE and FORAGES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PERMANENT PASTURE WITHOUT LEGUME continued:			
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, 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 @ 0.28-0.56 lb./A + fluroxpyr @ 0.09-0.18 lb./A	PastureGard HL @ 0.75-1.5 pt/A Apply in 10-20 GPA with NIS @ 1-2 qt/100 gal	Many annual and perennial broadleaf weeds. Effective on dogfennel, briars	Can be used in 2,4-D restricted areas. Do not use on forages grazed or fed to lactating dairy animals. Do not harvest hay for 14 days after application. Not a restricted use herbicide.
imazapic @ 0.0625-0.093 lb./A	Plateau, Panoramic @ 4-6 oz/A	Johnsongrass, annual ryegrass, little barley; suppresses the growth of dallisgrass and vaseygrass	Apply when bermudagrass is dormant or after full green up. DO NOT apply during green up in the spring. Severe stunting and growth reduction likely with this herbicide during the growing season. Add 1-2 pt./A 2,4-D for additional broadleaf control if needed. No grazing restriction, 7 day haying restriction.
tebuthiuron @ 1.0-4.0 lbs./A	Spike 20 P @ 20 lbs./A	Most woody plants	Apply anytime grass is dormant. Can cause temporary damage to grasses. Spot treat where possible. Do not use in vicinity of desirable trees.
triclopyr @ 1.0-1.5 lbs./A	Remedy Ultra and various generic triclopyr options @ 1.0-2.0 qt/A	Most woody brush. Good on dogfennel but usually not as effective as other herbicides on herbaceous plants. Can be mixed with 2,4-D to increase spectrum. 4% solution needed for spot treatment on palmetto.	Apply to brush at full leaf. Good control of Chinese tallow and berry briars. Good fencerow treatment. A 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 @ 0.22 - 0.44 lb./A + fluroxpyr @ 0.18-0.36 lb./A	Surmount @ 1.5-3 pt/A Apply in 10-20 GPA with NIS @ 1-2 qt/100 gal - by ground	Good control of many hard-to-control woody species. Effective on Chinese tallowtree, horsenettle, and dogfennel	Apply when weeds are actively growing. Can be used in 2,4-D-restricted 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 removed for 3 days priors to slaughter.
picloram – see comments	Tordon 22K – see comments	Waxmyrtle, Eastern red cedar, Chinese tallowtree	Apply in spring or fall. Apply as a spot treatment. For cedar, use 3 ml. (cc) of undiluted Tordon 22K per 3 ft. of plant height.

PASTURE and FORAGES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
PERMANENT PASTURE WITHOUT LEGUME continued:			
hexazinone @ 0.75 lb./-1.0 lb./A	Velpar @ 3.0 – 4.0 pt/A	Smutgrass	Apply when smutgrass is actively growing. For use on bermudagrass and bahiagrass pastures. Rainfall needed for activation. No 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 weedssuch as wooly croton, marsh elder, pigweed.	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 @ 0.15-0.23 oz/A	Pastora @ 1.0-1.5 oz/A Add 0.25% v/v nonionic surfactant.	Many annual and perennial grasses and broadleaf weeds including johnsongrass	FOR BERMUDAGRASS ONLY! May be applied in season or as a late winter dormant application. In season application may result in temporary stunting of the bermudagrass. Dormant season application has provided good control of seedling ryegrass and other winter weeds. Add glyphosate for improved control.
quinclorac @ 0.3-0.5 lb./A	Facet L @ 26-43 oz/A OR Quinstar @ 9.6-16 oz/A Add crop oil, methylated seed oil, or nonionic surfactant as per label instructions.	Barnyardgrass, hairy (large) crabgrass, broadleaf signalgrass	FOR BERMUDAGRASS ONLY! Provides both pre- and postemergence control depending on size of grass and rate applied. Follow label for application rates. Do not cut for hay within 7 days of application; no grazing restriction following application. Does not control goosegrass.
halosulfuron @ 0.035-0.062 lb./A	Permit @ 0.75 – 1.3 oz/A Add 0.25% v/v nonionic surfactant	Sedges	Do not apply more than 1.3 oz total per acre per 12 month period. No grazing restriction. Apply at least 37 days before hay harvest.
FORAGE SORGHUM OR SORGHUM SUDAN HYBRIDS:			
atrazine @ 1.6-2.0 lbs./A	AAtrex 4L @ 3.2-4.0 pt/A AAtrex 80W @ 2.0-2.5 lbs./A AAtrex Nine-O @ 1.7-2.2 lbs./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

PASTURE and FORAGES			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
			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
BERMUDAGRASS ESTABLISHMENT (sprigging only):			
diuron @ 0.8-2.4 lbs./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, morningglory species	At sprigging only on sprigs placed at least 2 inches deep. May temporarily burn emerged bermudagrass and can severely injure variety Alicia.
ALFALFA			
benefin @ 1.12 - 1.5 lbs./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 lbs./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.

NONCROPLAND WEED MANAGEMENT

NONCROPLAND		
Formulated Product and Rate	**Weeds Controlled**	**Remarks and Precautions**
BAREGROUND 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 gal. 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 lbs./A	Grasses and broadleaf weeds	Apply in spring and summer in 150-200 gal. of water. Do not use on irrigation ditches or near desirable trees. Apply with surfactant if weeds are present.
Karmex 80% DF @ 20-60 lbs./A	Woody plants	Apply before weed growth begins in 150-200 gal. of water. Use lower rates on lighter soils.
Sahara,Mojave DG @ 13-1 9 lbs./A	Most annual and perennial weeds	Apply at preemergence or early postemergence in 10-20 GPA of water. Always use a non-ionic surfactant or crop oil concentrate for postemergence applications.
Sodium chlorate @ 650-870 lbs./A or 1.5-2 lbs./l00 sq ft (Atlacide)	Johnsongrass, bermudagrass; 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.
Viewpoint @ 13-20 oz/A	Grasses, broadleaf weeds, many woody plants	Apply preemergence or postemergence to weeds. Consult label for proper rate selection.
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 BAREGROUND:		
Arsenal and other imazapyr formulations @ 2.0 - 6.0 pt/A	Annual and perennial grasses and broadleaf weeds; some brush control	Apply at postemergence to weeds. Good residual activity. For non-cropland use only.
Garlon 4 @ 1.0-2.0 pt/A	Many broadleaf weeds; 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	Johnsongrass, vaseygrass, certain broadleaf weeds	Apply in spring and summer in 10-20 gal. of water with 0.5% V/V surfactant. Use at higher rate in spring for bermudagrass 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 lbs./A	Johnsongrass, other grasses, most annual and perennial broadleaf weeds	Apply in late winter or early spring in 100-150 gal. of water. Can be applied to fence rows including pasture fences for season-long weed control.

NONCROPLAND		
Formulated Product and Rate	**Weeds Controlled**	**Remarks and Precautions**
ABATEMENT - NOT BAREGROUND continued:		
Karmex 80 DF @ 3.0 lbs./A + MSMA @ 3.0 lbs./A Hyvar X 80WP @ 1.5 lbs./A + MSMA @ 3.0 lbs./A	Johnsongrass, 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 bermudagrass sod is desired. Dry ditches, turn rows and fences except around pastures. Do not apply products containing arsenic along pasture fences. Add 0.50% non-ionic surfactant.
Esplanade 200 SC @ 3.5 – 7.0 fl. oz/A	Annual grasses and certain broadleaf weeds	Apply prior to weed germination. Excellent long-term annual grass and small-seeded broadleaf control. Apply with postemergence herbicide such as glyphosate.
Outrider @ 1.3 oz/A	Johnsongrass and sedges	Apply at early postemergence. For bermudagrass and bahiagrass, release on road sides and other non-crop areas. Apply with 0.5% surfactant.
Overdrive @ 4.0 - 8.0 oz/A	Many broadleaf weeds.	Apply in spring and summer in 10-20 GPA.
Plateau @ 7 - 10 oz/A	Johnsongrass, vaseygrass; certain broadleaf weeds	Apply at early postemergence for bermudagrass release on roadsides and other noncrop areas. Apply with 0.5% surfactant.
Roundup Ultra/Pro OR other glyphosate formulations (4 lbs./gal) @ 1 - 5 qt/A	Annual and perennial broadleaf weeds and grasses	Apply to actively growing weeds. Use 1-1.5 pt./A for bermudagrass release. High rates give nonselective 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 bermudagrass release in non-crop areas.
Milestone @ 4.0 – 7.0 oz./A	Many broadleaf weeds	Very effective on broadleaf weeds such as clovers, Virginia buttonweed, thistle and horsenettle.
Spike 80WP @ 5-20 lbs./A	Annual and perennial broadleaf grasses and woody plants	Apply in winter and early spring in 100-200 gal. of water. Use high rates for perennial grasses and woody plants. Don't use on fence rows.
Ureabor @ 1-3 lbs./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.
Streamline @ 1.7-9.5 oz/A	Most broadleaf weeds and bahiagrass	Apply at full-leaf, avoid drift to desirable plants. Can be used in certain unimproved turf and roadside applications. Consult label for proper rate and weed selection. Apply when weeds are actively growing. Add 0.25 % v/v non-ionic surfactant.
VEGETATION CONTROL UNDER ASPHALT PAVEMENT: CAUTION – Vegetation such as trees and shrubs may be damaged or even killed		

NONCROPLAND WEED MANAGEMENT

NONCROPLAND		
Formulated Product and Rate	**Weeds Controlled**	**Remarks and Precautions**
if their roots grow into the herbicide-treated soil.		
CBM (Sodium chlorate + sodium metaborate) @ 240 gal/A	All weeds controlled	Apply just ahead of prime coat at 200 GPA. Weeds from adjacent areas may grow under edge of pavement.
Hyvar XL @ 12 gal/A or Hyvar X @ 30 lbs./A	All grasses, sedges, 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 lbs./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 lbs./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 lbs. active ingredient @ 5 qt/A	Broadleaf weeds and grasses	Apply in 10-40 gal. of water. Use 2 oz./ gal. of water per 1,000 sq ft. to control annual grasses. Bermudagrass, nutsedge, other perennial weeds, use 3 oz. per gallon of water per 1,000 sq. ft.). For torpedograss infestations, use 5 oz per gallon of water per 1,000 sq. ft.
Other treatments listed for soil sterilization also can 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 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 at 30-50 GPA. Good residual activity.
Finale @ 3.0 - 6.0 qt/A	Annual and perennial grasses and broadleaf weeds	Apply at 20 GPA. No residual activity. Fast acting.
Herbicidal Naphtha	Annual grasses and broadleaf weeds; top kill of perennial weeds	Apply at 50-100 GPA. Regrowth will occur from roots; other annual weeds will probably appear. Repeat as needed.
Roundup Ultra/Pro, others @ (4 lbs./gal) 2 - 5 qt/A	Annual and perennial weeds	Apply in 10-40 GPA. Apply 1% solution to annual weeds and johnsongrass (1.25 oz. Roundup/gal). Apply 2% solution to bermudagrass and nutsedge (2 .5-3 oz. Roundup/gal).

WOODY PLANTS WEED MANAGEMENT

WOODY PLANTS AND FORESTRY			
Active Ingredient and Rate	**Formulated Product and Rate**	**Weeds Controlled**	**Remarks and Precautions**
TREE INJECTOR:			
2,4-D amine	Various products ((4 lbs./gal) @ 1.0-2.0 ml (cc) in spring and early summer at 1-2 inch intervals	Most oaks, hickory, pecan, hawthorn, elm, waterlocust. 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 lbs./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 lbs./gal	glyphosate @ 1 ml per 2-3" DBH	Oaks, sweetgum, poplar, 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 lbs./A	Spike 20P @ 5 - 20 lbs./A Spike 80WP @ 1.25 - 6.0 lbs./A	Most woody brush and trees	Apply anytime the ground is not frozen. Distribute pellets uniformly. Caution: Off target movement potential.
imazapyr @ 0.5 to 1.0 lb./A	Chopper or Chopper Gen 2 at 1.0 to 2.0 qt/A	Weeds, vines, 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 lbs./A	Most species	Apply year-round. Some legumes are resistant.
hexazinone @ 3.6-6.3 lbs./A	Velpar 90SP @ 4-8 lbs./A Velpar L @ @ 1.8- 3.6 gal WK or Pronone 10G @ 5 -30 lbs/A	Willow, oak, gum; other trees and brushes	Apply between later winter and early summer. Apply Velpar in 50-200 gal. of water, plus surfactant with handgun as individual stem treatments or as narrow bands 4-6 feet apart. Follow instructions on label. Apply Pronone 10G by hand or with spreader.
hexazinone @ 3.6-6.3 lbs./A	Velpar L undiluted @ 4-8 ml per 2" stem diameter.	Willow, oak, maple, tallow, other trees and brush	Apply between late 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 lbs./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 briar 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 lbs./gal	Garlon 4 @ 25 oz/gal + diesel @ 90 oz/gal + Cide Kick or Penetrator @ 12 oz/gal; makes 1 gal finished pray	Most hardwoods up to 4 inches DBH; better on thin-bark species	Apply year-round by hand with backpack sprayer as a narrow band or mist to lower 12 inches of stem. Also may be applied with a spot gun set to deliver 3-5 ml./sec as a solid stream. Vegetable-based basal oil may be used instead of diesel.

Triclopyr	Pathfinder II RTU	Woody plants in forests, in rangeland and permanent pastures, and in noncrop area, commercial and residential landscapes	Ready to use product. Cut stump or basal bark treatment.
2,4DP + 2,4D	Weedone CB @ 5 gal/A	Most Southern hardwoods up to 4 inches DBH	Apply spring through fall. Apply with hand pump sprayer to lower 18-36 inches of stem.
FOLIAGE SPRAY:			
imazapyr @ 0.5-.5 lbs/A	Arsenal 2 EC, Arsenal Powerline @ 2.0 - 6.0 pt/A	Most woody plants, grasses, 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 surfactant	Effective on Chinese tallowtree and black willow; fair on sweetgum.	Only moderate injury on red oaks and hickory when applied at lower rate. Do not use non-selectively if injury to oaks, hickory and other hardwoods can't be tolerated.
dicamba @ 0.5-1 lb./A + 2,4-D @ 2.0-6 lbs./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 lbs./A + butoxyethyl 2,4-D @ 2.0 -3.0 lbs./A	Crossbow @ 1.0-1.5 gal/100 gal water	Most woody plants; especially good on briars, willow, 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 lbs./A	Escort XP and generics @ 1 - 4 oz/A	Oaks, ash, elm, other woody species; kudzu, black locust, sericea lespedeza, privet	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 lbs./A	Garlon 4 @ 1.0-2.0 qt/A	Most woody plants and poison ivy	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.
FOLIAGE SPRAY continued:			
glyphosate @ 2-5 lbs./A	glyphosate @ 2-5 qt/A or 1.0-2.0% solution	Many trees, brush, herbaceous weeds	Apply at later summer and fall while plants are actively growing. May be aerially applied in 5-15 GPA of water. Use 10-40 GPA water for ground rig. For percent solution, spray to wet.
fosamine @ 6-12 lbs./A	Krenite @ 1 1/2-3 gal in 50 - 300 gal of water plus surfactant	Willow, kudzu and certain hardwoods	Apply in the 2-month period prior to fall leaf coloration. Ground application only on ditch banks. Read label for specific instructions.
sulfometuron methyl @ 0.09-0.36 lb./A	Oust XP and generics @ 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 @ + 0.24-0.29 metsulfuron-methyl @ 0.08-0.09 lb./A	Streamline @ 9.5-11.5 oz/A	Most woody plants; especially good on Chinese tallow, vines, briars	Apply at full-leaf, avoid drift to desirable plants. Not for use overtop of pines for hardwood control. Can be used in 2,4-D restricted areas.
aminocyclopyrachlor @ 0.23-0.29 + metsulfuron-methyl @ 0.07-0.09 + imazapyr @ 0.32-0.40 lb./A	Viewpoint @ 16-20 oz/A	Most woody plants; also controls herbaceous weeds and grasses	Apply at full-leaf, avoid drift to desirable plants. Not for use overtop of pines for hardwood control. Can be used in 2,4-D-restricted areas.

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.
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.

FLOATING WEED (unattached, leaves/stems above water):		
Formulated Product and Rate Types of Aquatic Weed or Site		**Remarks and Precautions**
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. Also, can 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, common salvinia, and frog'sbit	Can be used to control water hyacinth in 2,4-D-restricted areas.
2,4-D amine (several products) @ 64 oz/A in 100-gal water	Floating mats of alligatorweed, water hyacinth	Apply on foliage when weeds are actively growing. Spray to uniformly wet foliage. Add .25% approved non-ionic surfactant. Repeat in 4-6 weeks. Avoid use in waters used for irrigation.
Diquat/Reward/Tribune (others) @ up to 1.0 gal/A + 1.0 qt of surfactant/100 gallons of water during growing season and winter	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, Polaris, Arsenal, or Imazapyr 4SL @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, Refuge, Roundup Custom, AquaPro, AquaNeat, Glyphosate 5.4, or others @ 4.0-6.0 pt/A + surfactant	Giant salvinia, common salvinia, and water hyacinth	Add 0.5% approved surfactant.
Diquat/Reward/Tribune (others) @ 1.0 gal/A during the winter	Common or giant salvinia	Apply 1.0 gal./A as a low or high-volume spray plus 0.5% approved surfactant.
Clipper WDG/Clipper SC/FlumiGard/Semera @ 6.0-12.0 oz/A + 0.25% v/v approved surfactant	Common or giant salvinia, water lettuce, watermeal	For use on water bodies with limited or no outflow. Contact herbicide, coverage important. Very fast acting. May be tank-mixed with glyphosate, 2,4-D, or imazapyr to increase weed control spectrum. If tank-mixed, use 1 to 4 oz/A.
Tradewind @ 1-2 oz/A + 0.25% nonionic surfactant	Alligatorweed, duckweed, water hyacinth, and water lettuce	Can be used to control floating weeds in 2,4-D-restricted areas. Apply to actively growing weeds.
Stingray @ 3.4-13.5 oz/A + 0.25% nonionic surfactant	Common or giant salvinia, water lettuce	Fast acting. Contact herbicide, coverage important. May be tank-mixed with glyphosate, imazapyr, penoxsulam, or imazamox to increase weed control spectrum. If tank mixed, use 2 to 4 oz/A.
ProcellaCOR SC @ 1.0 to 2.0 PDU + 1% v/v methylated seed oil (MSO) per 100 gallons of water; 1 PDU = 1.35 fluid oz.	Water hyacinth and mosquito fern	Apply to the foliage of actively growing plants. Follow water use restrictions. DO not apply directly to, or otherwise permit ProcellaCOR SC to come in contact during an application, with soybeans, vegetable crops, flowers, ornamental shrubs, or trees, or other desirable broadleaf plants, as serious injury may occur. Please see the label for additional instructions related to drift management.
Renovate 3, Garlon 3A, Triclopyr 3, Trycera @ 32 to 64 oz/A + 0.25% surfactant	Water hyacinth	Apply to the foliage of actively growing plants.
Sonar AS/Genesis @ 10-20 ppb	Giant/common salvinia, watermeal, and duckweeds	Slow acting, systemic activity will require at least 7 days for noticeable injury. Product half-life is 30 to 90 days; therefore, do not use treated water for irrigation of turf, forage or food crops for 30 days or until herbicide concentration is <5 ppb or FasTEST has been performed.

NOTE: A ft. (acre foot) = volume of water in an area having 1 acre of surface and a depth of 1 foot.

EMERGENT AND MARGINAL WEEDS (rooted under water, tops above water or growing on wet soil):		
Formulated Product and Rate	**Types of Aquatic Weed or Site**	**Remarks and Precautions**
Galleon @ 2 to 5.6 fl oz/A + 0.25% nonionic surfactant.	Alligatorweed, parrotfeather, other weeds	Can be used in 2,4-D-restricted areas.
Clearcast @ 16 to 64 oz/A + surfactant	Alligatorweed, parrotfeather, sedges, and primrose species	Can be used in 2,4-D-restricted areas.
2,4-D low volatile ester (LVE) @ 4.0 lbs/A in 100-gal water	Broadleaf species (arrowhead, lotus, smart-weed, spatterdock, spikerush, water primrose, white waterlily, yellow waterlily), Cuban bulrush	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 1 application may be required for control of some species. Avoid use in waters for crop irrigation.
Habitat, Polaris, Arsenal, or Imazapyr 4SL @ 1-6 pts/A plus 0.25% nonionic surfactant	Many grasses, rushes, sedges, cattail, 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. May be tank-mixed with glyphosate and/or Clipper. Late summer and fall applications may work better than early season applications on emergent weeds.
Rodeo, Roundup Custom, Refuge, AquaNeat, Glyphosate 5.4, or others @ 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 mile upstream of potable water intakes or in tidewater areas. May be tank-mixed with Habita/Polaris/Arsenal/etc., Clipper or Stingray. Late summer and fall applications may work better than early season applications on immersed weeds.
Sonar (Genesis/AS) subsurface (in-water) @10-40 ppb	Crested floating heart	Slow acting, systemic activity will require at least 7 days for noticeable injury. Product half-life is 30 to 90 days; therefore, do not use treated water for irrigation of turf, forage or food crops for 30 days or until herbicide concentration is <5 ppb or FasTEST has been performed.
Renovate 3, Trycera, Triclopyr 3, Garlon 3A, or others @ 2-8 qt/A in 20-200-gal water	Broadleaf weeds, brush and trees	Apply to alligatorweed, water primrose, broadleaf, and several 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%.

AQUATIC WEED MANAGEMENT

SUBMERSED WEEDS (majority of plant grows under water, usually rooted or anchored):		
Formulated Product and Rate Types of Aquatic Weed or Site		**Remarks and Precautions**
Copper sulfate @ 2.0 -3.0 lbs/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.
Aquathol K (liquid) @ 1.0 - 2.0 gal/A Aquathol Super K (Granular) @ 125 lb–250 lbs/A (water 4-6 ft)	Coontail, fanwort, hydrilla, milfoil species, pondweeds, naiad, water stargrass	Apply at active growth stage. Can be injected into the upper end of the pond or sprayed over surface of pond. If entire waterbody is treated at one time or dissolved oxygen level is low, decaying weeds can remove enough oxygen and may result in fish suffocation. Therefore, limit treatment to half the waterbody. Repeat treatments should be delayed by 7 to 14 days.. Can be used for other uses within 7 days after treatment. **Read the label.**
Copper Chelates (Cutrine-Plus, Captain, Captain XTR, Argos) @ 0.2 to 1.0 ppm (see individual labels for gallons per acre foot)	Algae (scums and mosses)	Apply at bloom. Apply as a surface spray or injection. Toxicity to fish depends 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. If entire waterbody is treated at one time or dissolved oxygen level is low, decaying weeds can remove enough oxygen and may result in fish suffocation. Therefore, limit treatment to half the waterbody. Repeat treatments should be delayed by 7 to 14 days. Follow label instructions concerning fish toxicity.
Sonar Genesis/AS @ 10-20 ppb	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, Reward, Tribune, others @ 1.0 - 2.0 gal/surface-acre	Coontail, naiad, and milfoil species	Apply at active growth stage. If entire waterbody is treated at one time or dissolved oxygen level is low, decaying weeds can remove enough oxygen and may result in fish suffocation. Therefore, limit treatment to half the waterbody. Repeat treatments should be delayed by 7 to 14 days. Apply as a direct-pour or subsurface injection. Short residual. Water may be used for irrigation 5 days after treatment. Can be tank-mixed with copper, Aquathol K, or Clipper for hydrilla control.
Aqua-Kleen granules @ 100-200 lbs/A	Coontail, naiads, milfoil	Apply after weeds begin to grow in spring. Granular 2,4-D. **Do not apply to water used for agricultural**

SUBMERSED WEEDS (majority of plant grows under water, usually rooted or anchored):		
Formulated Product and Rate Types of Aquatic Weed or Site		**Remarks and Precautions**
		use or potable water supplies. Excellent for treating around docks, landings, etc.
Galleon @ 25-75 ppb as a total water treatment	Hydrilla and naiads	A 60-day contact time required. Do not use in moving water or where rapid dilution is expected.
Tradewind @ 20-45 ppb	Hydrilla	Must maintain desired concentration for minimum of 60 days. Not for use in moving water.
Clipper @ 100-400 ppb as a total water treatment	Hydrilla, naiad, pondweeds, milfoils, coontail	For use in water bodies with limited or no outflow. Fast acting. Follow instructions on timing of application and possible oxygen depletion following application. Herbicide efficacy/activity will decrease as water pH increases to 8 and higher. Can be tank-mixed with other herbicides to increase control.

AQUATIC WEED MANAGEMENT

USE RESTRICTIONS for TREATED WATER (number of days)									
Herbicide	**Human Drinking**	**Human Swimming**	**Human Fish consumption**		**Animal Drinking**		**Turf Irrigation**	**Forage Irrigation**	**Food Crop Irrigation**
2,4-D	21[e]	0	0		21[e]		21[e]	21	21[e,f]
Aquathol Granular	7	I	0		7		0	7	7
Aquathol K	7-25	I	0		7-25		0	7-25	7-25
Clearcast	0[i]	0	0		0		K	K	K
Clipper	0	0	0		0		5	5	5
Chelated Copper	0	0	0		0		0	0	0
Copper sulfate	0	0	0		0		0	0	0
Diquat/Reward/Tribune	2	0	0		I		2	5	5
Galleon	0	0	0		0		H	0	I
Habitat/Polaris/Imazapyr 2SL	2	0	0		0		120[g]	120[g]	120[g]
Hydrothol	7-25	I	0		7-25		7-25	7-25	7-25
ProcellaCOR SC	0[l]	0	0		0		0	[m]	[m]
Rodeo/Glypro/AquaPro/Glypro/Roundup Custom	0	0	0		0		0	0	0
Sonar	-	0	0		0		30[d]	30[d]	30[d]
Tradewind	0	0	0		0[g]		0	0	0
Stingray	K	0	0		K		k	k	k

[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.
[l] Concentration = 1 ppb, except rice = 30 ppb.
[j] Concentration < 50 ppb within 0.25 miles of water intake.
[k] See label.
[m] See label for specific label irrigation restrictions.

RECROP INTERVALS

RECROP INTERVALS FOR VARIOUS HERBICIDES USED IN LOUISIANA

In the "Rotation Interval" 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 crop rotation interval for the following crop was stated on the label.
C. Following spring is self-explanatory.

Table 1. Rotational crop restrictions for herbicides labeled for use in corn.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
Accent Q	None	10m	10-18m (see label)	10-18m (see label)	15d	4m
Anthem ATZ	None	following year	18m	18-24m (see label)	following year	18m
Anthem/Anthem Maxx	None	4m	6-12m (see label)	10-24m (see label)	0-4m (see label)	1-6m (see label
Armezon/Impact	None	9m	9m	3m	9m	3m
Atrazine	None	following spring	None	2yr	following spring	1yr
Callisto	None	10m	None	10m	10m	4m
Capreno	None	10m	10-18m (see label)	18m	18m	4m
Corvus	None	10m	17-24m (see label)	10m	9m	4m
Dicamba	None	21d	15d	15d	15-28d	15d
Halex GT	None	10m	None	18m	10m	4.5m
Harness Xtra	None	following spring	None	15m	following spring	2yr
Instigate	None	10m (see label)	10m (see label)	10m	10m	4m
Keystone NXT	None	following spring	None	15m	following spring	2yr
Laudis	None	10m	10m	4m	8m	4m
Lexar EZ	None	following year	following year	18m	following year	following year
Metolachor/S-metolachlor	1yr (see label)	1yr (see label)	1yr (see label)	1yr (see label)	1yr (see label)	4.5m
Outlook	None	4m	4m	6-9m	None	4m
Pendimethalin	None	None	10-12m	None	None	4m
Permit/Halomax	1m	4m	2m	None	9m	2m
Realm Q	None	10m (see label)	10m (see label)	18m	10m	9m
Resolve Q	None	1m	1m	10m	1m	3m
Sharpen	None	1.5-9m (see label)	0-1m (see label)	0-4m (see label)	0-6m (see label)	0-3m (see label)
Status	7d	30d	30d	3m	30d	30d
Steadfast Q	None	10m	10-18m (see label)	15d	15d	4m

RECROP INTERVALS

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
Verdict	None	6-9m (see label)	0-1m (see label)	4m	4-6m (see label)	4m
Zidua WG/Zidua SC	None	1-4m (see label)	6-12m (see label)	10-24m (see label)	0-4m (see label)	1-6m (see label)

Table 2. Rotational crop restrictions for herbicides labeled for use in cotton.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
2,4-D	14d	30d (see label & herbicide technology)	29d	30d	15d (see label & herbicide technology)	7d
Assure II	4m	None	4m	4m	None	4m
Clethodim	1m	None	1m	1m	None	1m
Command	9m	see label	9m	0-9m (see label)	None	12m
Dicamba	None	21d (see label & herbicide technology)	15d	15d	15-28d (see label & herbicide technology)	15d
Diuron	4m-1yr (see label)	4m-1yr (see label)	4m-1yr (see label)	4m-1yr (see label)	4m-1yr (see label)	4m-1yr (see label)
Envoke	7m	7m	7m	7m	7m	3m
Flumioxazin	7d-9m (see label)	14d-9m (see label)	30d (see label)	30d-9m (see label)	0-9m (see label)	30d-9m (see label)
Fluometuron	8m	None	9m	9m	9m	3m
Fomesafen	10m	See label	18m	10m	None	18m
Fusilade DX	2m	None	2m	2m	None	2m
Goal 2XL	10m	None	10m	10m	None	10m
Metolachor/S-metolachlor	1yr (see label)	1yr (see label)	1yr (see label)	1yr (see label)	1yr (see label)	4.5m
Pendimethalin	None	None	10-12m	None	None	4m
Prometryn	5m	5m	12m	12m	12m	12m
Sequence	None	None	None	9m	None	4.5m
Solicam DF	2yr	30d	2yr	2yr	1.5m	2yr
Staple LX	9-10m (see label)	None	following year	9m	10m	4m
Suprend	next yr	None	next yr	next yr	next yr	next yr
Trifluralin	None	None	None	9m	None	None

RECROP INTERVALS

Table 3. Rotational crop restrictions for herbicides labeled for use in rice.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
2,4-D	14d	30d	29d	30d	15d	7d
Aim	None	None	None	None	None	None
Basagran	None	None	None	None	None	None
Beyond	8.5m	9m	9m	9m	9m	3m
Bolero	6m	6m	6m	None	6m	6m
Broadhead	12m	12m	12m	None	12m	12m
Clearpath	10m	18m	18m	None	10m	10m
Clincher	3m	3m	3m	None	3m	3m
Command	9m	see label	9m	0-9m (see label)	None	12m
Facet L	10m	10m	None	None	10m	None
Grandstand R	4m	4m	4m	None	4m	4m
Grasp	3m	3m	3m	None	3m	3m
GraspExtra	3m	3m	3m	None	3m	3m
League	12m	8m	12m	None	12m	12m
Londax	4m	4m	4m	None	4m	4m
NewPath	8.5m	18m	18m	None	None	4m
Obey	309d	309d	309d	None	309d	309d
Pendimethalin	None	None	10-12m	None	None	4m
Permit Plus	1m	4m	2m	None	soil dependent,	2m
Permit/Halomax	1m	4m	2m	None	9m	2m
Propanil	2m	2m	2m	None	2m	2m
RebelEx	3m	3m	3m	None	3m	3m
Regiment	None	None	None	None	None	None
RiceBeaux	2m	2m	2m	None	2m	2m
Ricestar HT	None	None	None	None	9m	None
Sharpen	None	1.5-9m (see label)	0-1m (see label)	0-4m (see label)	0-6m (see label)	0-3m (see label)
Strada	3m	6m	12m	None	6m	3m
StradaPro	3m	6m	36m	None	9m	3m
StradaXT	309d	309d	309d	None	309d	309d

RECROP INTERVALS

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
Ultra Blazer	100d	100d	100d	None	None	3m

Table 4. Rotational crop restrictions for herbicides labeled for use in soybean.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
2,4-D	14d	30d (see label & herbicide technology)	29d	30d	15d (see label & herbicide technology)	7d
Anthem/Anthem Maxx	None	4m	6-12m (see label)	10-24m (see label)	0-4m (see label)	1-6m (see label
Authority Elite/BroadAxe	10m	12-18m (see label)	10m	10m	None	4.5m
Authority First/Sonic	10-18m (see label)	12-18m (see label)	12m	10m	None	4m
Authority MTZ	10m	18m	18m	10m	None	4m
Authority XL	10-18m (see label)	12m	10-18m (see label)	10-18m (see label)	None	4m
Basagran	None	None	None	None	None	None
Boundary	4m	1yr	1yr	8m	None	4.5m
Canopy DF	10-18m (see label)	10-18m (see label)	10-18m (see label)	10-18m (see label)	None	4m
Canopy EX	7m	10m	12m	10m	None	4m
Classic	7m	8m	9m	9m	None	3m
Clethodim	1m	None	1m	1m	None	1m
Cobra	None	None	None	None	None	None
Command	9m	see label	9m	0-9m (see label)	None	12m
Dicamba	None	21d (see label & herbicide technology)	15d	15d	15-28d (see label & herbicide technology)	15d
Enlite	9m	9m	9m	9m	None	3m
Envive	10-18m (see label)	10m-30m (see label)	12-18m (see label)	10-18m (see label)	None	4m
Fierce	30d (see label)	2m	12m	12m	None	2m
Fierce XLT	18m	15-30m (see label)	18m	18m	None	10-18m (see label)
FirstRate	9m	9m	9m	9m	None	4m
Flexstar GT 3.5	10m	None	18m	10m	10m	4m
Flumioxazin	7d-9m (see label)	14d-9m (see label)	30d (see label)	30d-9m (see label)	0-9m (see label)	30d-9m (see label)
Fomesafen	10m	See label	18m	10m	None	18m
FrontRow	9m	9m	9m	see label	None	4.5m
Fusilade DX	2m	None	2m	2m	None	2m

RECROP INTERVALS

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
Intimidator	10m	12m	18m	10m	None	4.5m
Marvel	10m	None	10m	10m	None	4m
metribuzin	4m	18m	18m	12m	4m	4m
Pendimethalin	None	None	10-12m	None	None	4m
Prefix	10m	1m	10m	10m	None	4.5m
Pursuit 2EC	8.5m	18m	18m	See label	None	4m
Python	None	18m	12m	6m	None	4m
Scepter	9.5m	18m	11m	following year	None	4m
Sequence	None	None	None	9m	None	4.5m
Sharpen	None	1.5-9m (see label)	0-1m (see label)	0-4m (see label)	0-6m (see label)	0-3m (see label)
Storm	100d	100d	100d	None	None	40d
Synchrony XP	7m	8-10m (see label)	9-15m (see label)	9-18m (see label)	None	3-4m (see label)
Ultra Blazer	100d	100d	100d	None	None	3m
Valor XLT	10-18m (see label)	10-30m (see label)	10-18m (see label)	9-18m (see label)	None	4m
Verdict	None	6-9m (see label)	0-1m (see label)	4m	4-6m (see label)	4m
Zidua WG/Zidua SC	None	1-4m (see label)	6-12m (see label)	10-24m (see label)	0-4m (see label)	1-6m (see label)

Table 5. Rotational crop restrictions for herbicides labeled for use in wheat.[1]

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
2,4-D	14d	30d (see label & herbicide technology)	29d	30d	15d (see label & herbicide technology)	7d
Anthem Flex	None	1-4m	6-10m	10-24m	0-4m	1-6m (see label)
Axial XL	3m	3m	3m	3m	3m	None
Dicamba	None	21d (see label & herbicide technology)	15d	15d	15-28d (see label & herbicide technology)	15d
Finesse Cereal & Fallow	18m	18m	4m	18m	18m	4m
Harmony Extra	14d	14d	14d	None	7d	2m
Huskie						
metribuzin	4m	18m	18m	12m	4m	4m
Osprey	3m	3m	3m	3m	3m	7d
PowerFlex HL	10m	10m	10m	12m	12m	1m

RECROP INTERVALS

	Corn	Cotton	Grain Sorghum	Rice	Soybean	Wheat
Sharpen	None	1.5-9m (see label)	0-1m (see label)	0-4m (see label)	0-6m (see label)	0-3m (see label)
Zidua WG/Zidua SC	None	1-4m (see label)	6-12m (see label)	10-24m (see label)	0-4m (see label)	1-6m (see label)

[1] When herbicides are applied (alone, as a tank-mix or in a sequential program), follow the recrop 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 temperatures and/or rainfall after herbicide application, in addition to other factors, may affect the recrop interval and may increase the potential for injury. Environmental conditions, such as temperature and rainfall after application, may affect the recrop interval. These listings are minimum intervals between herbicide application and recropping, 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 recrop intervals.**

CALIBRATION PROCEDURES

SPRAYER CALIBRATION

Sprayer calibration is the process of determining the correct vehicle speed, orifice size and pressure to create a desired application rate (usually in gallons per acre, or GPA) and droplet size. Most manufacturers have tables to help you determine these values. Still, differences can occur between your spray vehicle and the manufacturer's rates because of tip wear, inaccurate pressure gauges, flow meters, varying liquid viscosities (created by different chemical mixtures) and pressure losses in hoses. To properly calibrate a sprayer you should select the correct tip size, pressure, speed to obtain the desired GPA rate, and then use a sprayer calibration "jug" to make sure that your sprayer is applying this rate (note that most famers can quickly determine correct flow rate in the field from liquid usage in the tank, but this type of monitoring does not indicate plugged or non-uniformity nozzle flow). A spray tip calibrator, such as the SpotOn individual tip calibrator, works well for this purpose and will greatly speed up testing or checking. When selecting a nozzle orifice size, keep in mind that slower speeds (5 to 12 mph) typically require less pressure to achieve a chosen flowrate. In addition, sprayer calibration can be achieved using the following steps:

1) Measuring the flow rate of individual tips: Measuring the flow rate (GPM) from individual tips to determine when tips need to be changed or a problem is occurring in a boom section. Individual nozzle tests are performed by either using a calibration container (Tee Jet, etc.) or a spray tip calibrator, such as the SpotOn calibrator made by Innoquest (http://www.innoquestinc.com/). Spray tip calibrators can greatly reduce your time in performing this operation and make the test less labor and time-consuming. To check nozzles, place the calibrator under the tip of the nozzle for the set time period and read the amount of GPM for that nozzle (note: you may have to set the flow controller to a "test" mode to operate the spray system while the machine is not moving). When in the field, always perform a visual check to make sure that all nozzles are operating correctly and evenly (misting typically indicates a severe problem). The GPM of each nozzle should be within 10% of the target GPM. For that pressure If any tip varies by more than 10%, filters should be checked, and a new tip installed if necessary. If the average GPM of all nozzles is above or below the target rate, slight adjustments in the pressure, speed or even recalibration (of the flowrate sensor) may be necessary. Check the manufacturer's manual on how to clean or recalibrate the flow sensor. Flow rate tests should be performed on nozzles at least once a year. The general equation for calculating individual nozzle flow rate is given by:

$$GPM = \frac{GPA * MPH * W}{5940}$$

GPM is the gallons per minute of liquid used per application width
GPA is the gallons per acre
MPH is the average speed of the vehicle through the field
W is the nozzle application width in inches (typically the distance between the nozzles for broadcast sprayers or banding width for banding sprayers)

2) Ensure that the sprayer speed is correct: Speeds must be correctly reported to the rate controller to obtain the correct GPA rates, and this value should not vary more than 1 to 2 mph when travelling through the field. On newer sprayers, speed is typically input with a GPS sensor directly into the flow rate controller and no calibration is required. Older machines may use radar (or GPS units that outputs a radar type reading) that are based on pulsed frequencies and need calibration to indicate the correct speed. Typically this procedure is performed by travelling a prescribed distance with the rate controller set in a speed calibration mode. Consult the manufacturer's manual for this procedure and the travel distance needed for calibration. Calibration of the speed sensor should be performed at least once a year Check that the radar unit is securely affixed to the vehicle frame and that the correct angle between the unit and the ground. Consult the manufacturer's manual for the correct orientation as some radar units contain an angled emitter that allows the unit to be mounted horizontally. Wheel speed sensors should not be used for general row crop purposes but may be acceptable in pasture and other situations where terrain conditions are more consistent, or if no other option is available. To check the travelling distance versus speed for this type of system, use the equation below with at least a 500 feet or larger travel distance to ensure 0.5 mph or better accuracy.

$$MPH = \frac{360 * Distance\ Travelled\ in\ Feet}{528 * Time\ Needed\ to\ Travel\ that\ Distance\ in\ \text{Seconds}}$$

Conversion Factors

Weights	Temperature
1 U.S. ton = 2,000 lb = 0.97 metric ton	Celsius = 5/9*(F-32)
1 pound = 16 ounces = 453.4 grams = 0.4534 kilogram	Fahrenheit = (9/5*C) + 32
1 ounce = 20.35 grams	Kelvin = Celsius + 273.16;

Speed	Length
1 miles/hour = 5,280 feet/hour = 88 feet/minute = 1.467 feet/second	1 mile = 5,280 feet = 1.61 kilometers
1 meter/second = 196.85 feet/minute = 2.24 miles/hour	1 yard = 3 feet = 36 inches = 91.44 centimeters = 0.9144 meters
1 meter/second = 1.942 knots	1 foot = 12 inches = 30.48 centimeters = 0.3048 meters

Area	Liquid Measure
1 square mile = 640 acres	1 tablespoon = 3 teaspoons = 0.5 fluid ounces
1 acre = 43,560 square feet	1 fluid ounce = 2 tablespoons
1 acre = 0.405 hectare	1 cup = ½ pint = 8 fluid ounces = 16 tablespoons
1 hectare = 2.471 acres	1 pint = 2 cups = 32 tablespoons
1 hectare = 10,000 square meters	1 gallon = 4 quarts = 8 pints = 16 cups = 8.4 pounds of water = 231 cubic inches
1 square yard = 9 square feet = 0.836 square meters	1 gallon = 128 fluid ounces=3.785 liters = 3,785 milliliters = 3,785 cubic centimeters
1 square foot = 144 square inches = 0.09 square meters	1 quart = 2 pints = 4 cups = 32 fluid ounces = 0.946 liters = 946 milliliters
1 square centimeter = 0.155 square inch	1 pint = 2 cups = 16 fluid ounces = 0.473 liters = 473 milliliters
Number of acres = [(Length in feet)*(Width in feet)]/43,560	1 cup = 8 fluid ounces = 0.24 liters = 240 milliliters
1 acre = 13,068 feet of 40-inch rows	1 tablespoon = 0.166 ounces = 4.92 milliliters
1 acre = 13,754 feet of 38-inch rows	1 milliliter = 0.0338 fluid ounces
1 acre = 14,520 feet of 36-inch rows	
1 acre = 17,424 feet of 30-inch rows	
1 acre = 34,848 feet of 15-inch rows	
1 acre = 69,696 feet of 7.5-inch rows	

NOZZLE TYPE AND DRIFT REDUCTION

Drift reduction is the practice of reducing the "driftable fines" in a spray system which are the droplets less than 150 micrometers (um) and can become easily buoyant and travel great distances from the sprayer. These driftable fines are controlled as follows:

Nozzle Selection:

Nozzle type selection is one of the best ways to reduce driftable fines in the spray pattern. Figure 1 shows the different type of nozzles and the percentage of drift produced by each type. Air induction (A.I.) nozzles scored the best in drift reduction and are recommended for most spraying operations except for AIM command sprayers (which use a larger orifice flat fan nozzle). A.I. turbo tees had the best drift reduction qualities, but also produce a very courses droplets which maybe too course for some spraying operations (note that some pesticide labels require these types of nozzle for use with that chemical), A.I. flat fans are a good choice for many spraying operations as they can have a smaller droplet spectrum (medium with appropriate choice in orifice size and pressure), while still maintaining better drift reduction qualities. XR and Cone Jets produce the most driftable fines but still may be useful in some applications such as fungicide and insecticides applications, where contact is a premium. All other types of nozzles - Turbo Tees, 80-degree Flat Fans, D.G. [drift guard] Flat Fans, and Turbo Tee Twin, etc. - fell in-between these two nozzles types for drift reduction.

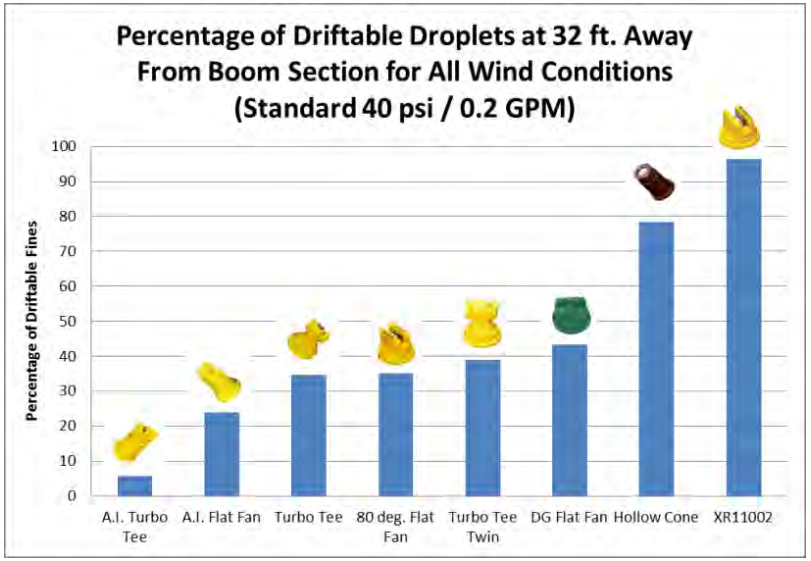

Figure 1: Percentage drift associated with each nozzle type operated in similar conditions.

Equipment Settings:

Equipment settings can greatly affect the driftable fines in a spray system and the following guidelines are given to help create a "safer" drift resistant system:

1) Lower Boom Pressure: Lowering the boom pressure and/or using a slightly larger nozzle orifice size can greatly help reduce the number of driftable fines in a spray system. In one case, research showed that a large XR flat fan nozzle combined with lower boom pressures had nearly the same effect on drift reduction as an A.I. Flat Fan (note though that A.I. flat fans still have a better pressure and flowrate changing qualities than a standard flat fan and maybe preferred for this reason). Sizing nozzles for drift reduction should include using slightly larger nozzle size with lower boom pressures in some cases.

2) Travel speed: Research has shown (Figure 2) that increasing travel and/or wind speeds across a boom can greatly increase the number of driftable fines in a spray system. In XR and Cone Jets, the driftable fines emitted into the open air increased by 6.5 times for each additional 1 mph of extra wind or travel speed across the boom. A.I. type nozzles had a much lower increase in driftable fines of only 0.8. For this reason, lower travel speeds are always recommended over faster speeds for reducing drift.
3) Boom height: Keep boom heights as low as possible. Typically, 18 to 20 inches above crop surface is the appropriate height for most nozzles. Overly high booms conditions allow more time for wind to affect the spray pattern and cause more inconsistent spray patterns.
4) Sprayer shields: Spray shields can greatly decrease the number of driftable fines emitted into the open environment from a spray system. These shields block the wind and allow smaller droplets to either impact the crop or collect on the hood surface. Remember to keep sprayer shields tight on the crop surface or high-speed winds can move through the opening and increasing drift (flexible skirts can help prevent this).

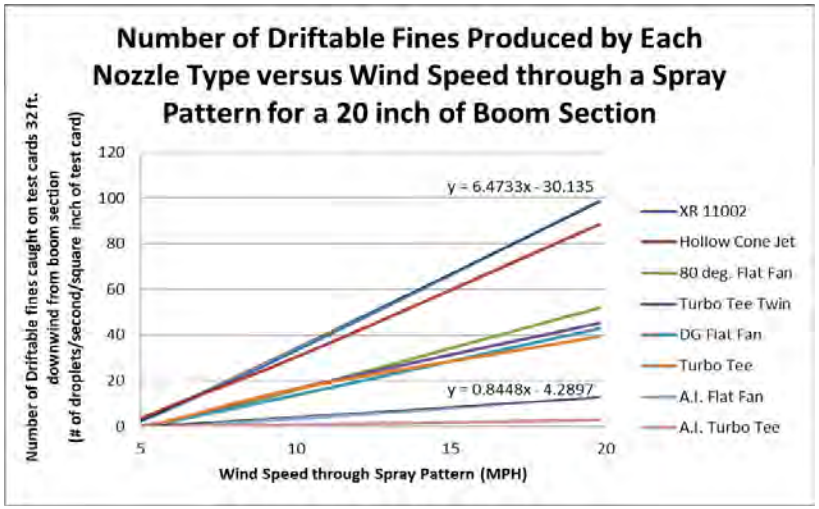

Figure 2: Chart of wind speed on a spray boom versus on the amount of "driftable fines" released into the atmosphere (3 to 5 MPH) for different nozzle types.

Environmental Conditions:

Environmental factors can play a large role in driftable fines and the following parameters are given to help prevent drift:

1) Inversion layers: Inversion layers trap driftable fines emitted from the sprayer and concentrate them in a layer in the atmosphere. This layer then moves off the field and deposits somewhere else in a thick chemical laden cloud (sometimes 10 to 50 miles away). Surface inversion layers most often occur when air temperatures is warmer above the ground than on the ground surface, but can also exist in low-wind and humid conditions. To prevent thermal layers from occurring, spraying should not be done too early in the morning, nor too late at night. Many states recommend waiting until the morning temperature rises 3 degrees above the morning low to spray, and then recommend ceasing spraying operations when the air temperatures fall more than 3 degrees from the daily high. Spraying when the winds are greater than 2 mph will help ensure that inversion layers do not exist.
2) Wind conditions: Spray when winds are between 2 and 10 MPH.
3) Relative humidity: Spraying in lower humidity (R.H.) situations can greatly reduce the number of driftable fines as some research has shown that driftable fines can greatly increase in higher humidity conditions.

Additives:

Additives are a good way to reduce drift (over bare water). I most cases, additives (Figure 3) reduced the driftable fines in all nozzles by up 60 percent over pure water. The biggest reduction in driftable fines was seen in nozzles that created the most driftable fines (such as XR and Cone Jets). No negative effects were seen in additives except in very cold or low humidity conditions (where small droplet did not evaporate as well).

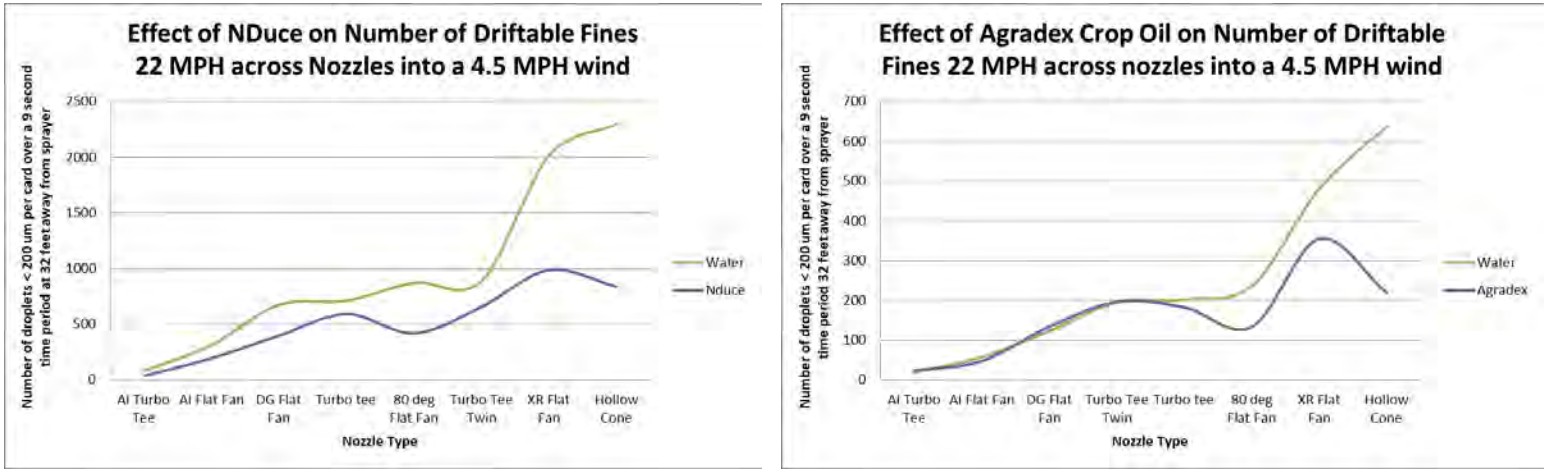

Figure 3: Graphs of several additives on spray drift for different nozzles types. Most other additives had similar responses.

NOZZLE TYPE AND DRIFT REDUCTION

Table 1 lists the recommended tips for different spraying operations.

Table 1: Pesticide Mode of Action and Recommend Nozzle or Sprayer Tip Selection

Pesticide and Mode of Action	Tip or Nozzle Selection	Recommended Practices
Most Herbicides with Systemic Type Attributes – Coarse to Medium Droplets	A.I. (Air Induction) Flat Fans	- Use higher flow rates to ensure good coverage (although higher flow rates are not always necessary to attain good results). o Spray when environmental conditions are optimum. o Make sure a low-level inversion layer is not present (fog, heavy air, etc.). o Make sure winds are between 2 and 10 mph (some winds are needed to insure a stable, non-inversion layer environment). - Monitor back of sprayer and droplet evaporation. o If you see a large amount misting behind sprayer, check system for over-pressurization or wrong tip selection and flow rate. - Keep boom height at recommended distance from canopy (typically 18-20 inches from canopy surface). - Use hooded sprayers to further aid in drift reduction. o Make sure to run hood on the surface of the crop canopy.
Herbicides and Pesticides with Contact and/or Partially Systemic Attributes – Medium Droplet Size	Turbo Tee, DR and DG (Drift Reduction and Drift Guard), 80-degree Flat Fans	
Fungicides – Medium to Fine Droplet Sizes Insecticides – Fine Droplet Size	Fungicide and Insecticides – DR/DG (Drift Reduction/Guard) and Hollow Cones or Equivalent	

GLOSSARY OF HERBICIDES

HERBICIDE TRADE NAME, COMMON NAME, FORMULATION AND MANUFACTURER[1]

Trade Name	Common Name	Formulation	Manufacturer
2,4-D amine or ester	2,4-D	several	several
2,4-DB	2,4-DB	several	several
Aatrex and others	atrazine	4L, 90 DF	several
Accent Q	nicosulfuron	54.5 WDG	Corteva Agriscience
Acclaim	fenoxaprop	1 EC	Bayer CropScience
Acclaim Extra	fenoxaprop	0.57 E	Bayer CropScience
Aim	carfentrazone	40 DG; 2 EC; 1.9 EW	FMC
Alanap	naptalam	2 L	Crompton Uniroyal
Ally XP	metsulfuron	60 DF	Corteva Agriscience
Anthem	pyroxasulfone + fluthiacet-methyl	2.15 SE (2.087 + 0.063 lb/gal)	FMC
Anthem ATZ	pyroxasulfone + fluthiacet-methyl + atrazine	4.505 SE (0.485 + 0.014 + 4.006 lb/gal)	FMC
Anthem Flex	pyroxasulfone + carfentrazone	4 SE (3.733 + 0.267 lb/gal)	FMC
Anthem Maxx	pyroxasulfone + fluthiacet-methyl	4.3 SC (4.174 + 0.126 lb/gal)	FMC
Armezon	topramezone	2.8 L	BASF
Arsenal A.C.	imazapyr	4 AC	BASF
Assure II	quizalofop	0.88 EC	Corteva Agriscience
Asulox	asulam	3.3 EC	UPI
Authority	sulfentrazone	75 DF	FMC
Authority Elite/BroadAxe	sulfentrazone + *S*-metolachlor	7.0 SL (0.7 + 6.3 lb/gal)	FMC/Syngenta Crop Protection
Authority First/Sonic	sulfentrazone + choransulam	0.7 DF (0.62 + 0.08 lb/gal)	FMC/Corteva Agriscience
Authority MTZ	sulfentrazone + metribuzin	45 DG (18 + 27%)	FMC
Authority XL	sulfentrazone + chlorimuron	70 DG (62.22 + 7.78%)	FMC
Avast! SC	fluridone	4 SC	SePro
Axial XL	penoxaden	0.83 EC	Syngenta Crop Protection
Balan	benefin	60 DF; 2.5G	Corteva Agriscience
Balance Flexx	isoxaflutole	2.05 L	Bayer CropScience
Banvel	dicamba	4 SL	Microflo
Barrage HF	2,4-D ester	4.7 EC	Helena
Barricade	prodiamine	65 WG	Syngenta Crop Protection

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Basagran	bentazon	5 SL	AgriSolutions
Basagran T/O	bentazon	4 L	AgriSolutions
Basamid G	dazomet	99 G	Certis USA
Betasan; Bensumec	bensulide	4 E	PBI Gordon
Beyond	imazamox	1 S	BASF
Bicep II Magnum	S-metolachlor + atrazine	5.5 L (3.1 + 2.4 lb/gal)	Syngenta Crop Protection
Bolero	thiobencarb	8 EC	Valent
Boundary	S-metolachlor + metribuzin	6.5 EC (5.25 + 1.25 lb/gal)	Syngenta Crop Protection
Brake FX	fluridone + fluometuron	3.6 L (0.6 + 3.0 lb/gal)	SePro
Brake F16	fluridone + fomesafen	2.7 L (1.2 + 1.5 lb/gal)	SePro
Broadhead	carfentrazone + quinclorac	7 L (0.027 + 0.46 lb/gal)	FMC
Broadstar	flumioxazin	0.25 G	Valent
Buctril	bromoxynil	4 EC; 2 EC	Bayer CropScience
Butoxone 200	2,4-DB	2 SL	Cedar Chemical
Butyrac 200	2,4-DB	2 SL	Albaugh
Cadet	fluthiacet methyl	0.91 EC	FMC
Cadre	imazapic	2 AS	BASF
Callisto	mesotrione	4 L	Syngenta Crop Protection
Canopy DF	metribuzin + chlorimuron	75 DF (64.3 + 10.7%)	Corteva Agriscience
Canopy EX	chlorimuron + tribenuron	29.5% WDG (22.7% + 6.8%)	Corteva Agriscience
Caparol	prometryn	80 DF; 4 L	Syngenta Crop Protection
Capreno	thiencarbazone-methyl + tembotrione	3.45 L (0.57 + 2.88 lb/gal	Bayer CropScience
Casoron	dichlobenil	2 G; 4 G	Crompton
Celsius	iodosulfuron + thiencarbazone-methyl + dicamba	68 WG (1.9 + 8.7 + 57.4%)	Bayer CropScience
Certainty	sulfosulfuron	75 DF	Bayer CropScience
Chaser	2,4-D + triclopyr	3 S (2 + 1 lb/gal)	Verdicon
Chateau	flumioxazin	51 SW; 51 WDG	Valent
Chopper	imazapyr	2 S	BASF
Cimarron Max	metsulfuron + 2,4-D + dicamba	60 DF and 1.87 + 1 lb/gal	Bayer CropScience
Cimarron Plus	metsulfuron + chlorsulfuron	63 DF (48 + 15%)	Bayer CropScience

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Cinch	S-metolachlor	7.64 EC	Corteva Agriscience
Cinch ATZ	S-metolachlor + atrazine	5.5 F (3.1 + 2.4 lb/gal)	Corteva Agriscience
Clarity	dicamba	4 S	BASF
Classic	chlorimuron	25 DF	Corteva Agriscience
Clearcast	imazamox	1 SC	BASF
Clearpath	imazethapyr + quinclorac	75 DF	BASF
Clincher SF	cyhalofop	2.38 L	Corteva Agriscience
Clipper	flumioxazin	51% WDG	Valent
Clipper SC	flumioxazin	4 SC	Nufarm
Cobra	lactofen	2 EC	Valent
Command	clomazone	3 ME	FMC
Confront	triclopyr + clopyralid	3 L (2.25 + 0.75 lb/gal)	Corteva Agriscience
Corsair	chlorsulfuron	75 WDG	Nufarm
Corvus	thiencarbazone-methyl + isoxaflutole	2.63 SC (0.75 + 1.88)	Bayer CropScience
Costarr	glyphosate + dicamba	2.1 EC (1.5 + 0.6 lb/gal)	Albaugh
Cotoran	fluometuron	4 L; 80 DF	MANA
Cotton-Pro	prometryn	4 L	Corteva Agriscience
Crossbow	2,4-D + triclopyr	3 S (2 + 1 lb/gal)	Corteva Agriscience
Curbit	ethalfluralin	3 EC	Platte Chemical
Dacthal; DCPA	DCPA	75 WP; 6 L; 5 G	Amvac Chemical
Degree	acetochlor	3.8 SL	Bayer CropScience
Delta Goal	oxyfluorfen	4 EC	Corteva Agriscience
Devrinol	napropamide	2 G; 2 EC	United Phosphorus
Dimension	dithiopyr	2 EC; 1 EC	Corteva Agriscience
Direx	diuron	4 L	MANA
Dismiss	sulfentrazone	4L	FMC
Drive	quinclorac	75 DF	BASF
DSMA Plus	DSMA	3.8 SL	UAP-Loveland
Dual II Magnum	S-metolachlor	7.64 EC	Syngenta Crop Protection
Dual Magnum	S-metolachlor	7.62 EC	Syngenta Crop Protection

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Duet	propanil + bensulfuron	60 DF (60 + 0.46%)	RiceCo
Corteva Agriscience K-4	diuron + hexazinone	60 DG (46.8 + 13.2%)	Bayer CropScience
Dyclomec	dichlobenil	4 G	PBI Gordon
Echelon	sulfentrazone + prodiamine	4 SC (13.6 + 27.3%)	FMC
Elevore	halauxifen	0.572 L	Corteva Agriscience
Endurance	prodiamine	65 WDG	Syngenta Crop Protection
Engenia	dicamba	5 S	BASF
Enlite	chlorimuron + flumioxazin + thifensulfuron	47.9 WDG (2.85 + 36.21 + 8.8%)	Corteva Agriscience
Envive	chlorimuron + flumioxazin + thifensulfuron	41.3 WDG (9.2 + 29.2 + 0.9%)	Corteva Agriscience
Envoke	trifloxysulfuron	75 DG	Syngenta Crop Protection
Envoy	clethodim	0.94 EC	Valent
Eptam	EPTC	7 EC	Syngenta Crop Protection
Escort	metsulfuron	60 DF	Bayer CropScience
ET	pyraflufen ethyl	0.208 EC	Nichino
Exceed	primisulfuron + prosulfuron	57 DF (28.5 + 28.5%)	Syngenta Crop Protection
Express	tribenuron	75 DF	Corteva Agriscience
Facet	quinclorac	75 DF	BASF
Factor	prodiamine	65 WSG	Syngenta Crop Protection
Fierce	flumioxazin + pyroxasulfone	76 WDG (33.5 + 42.5%)	Valent
Finale	glufosinate	1 SL	Bayer CropScience
Finesse	chlorsulfuron + metsulfuron	75 DF (62.5 + 12.5%)	Corteva Agriscience
FirstRate	cloransulam	84 DF	Corteva Agriscience
FirstShot SG	thifensulfuron + tribenuron	50% SG (25% + 25%)	Corteva Agriscience
Flexstar GT 3.5	fomesafen + glyphosate	2.82 L (0.56 + 2.66 lb/gal)	Syngenta Crop Protection
Flexstar, Rhythm	fomesafen	1.88 ME	Syngenta Crop Protection; Cheminova
Forestry Garlon 4	triclopyr	4 SL	Corteva Agriscience
FreeHand	dimethenamid-P + pendimethalin	1.75 G (0.375 + 0.5 lb/gal)	BASF
Frontrow	cloransulam + flumetsulam	co-pack 84% + 80%	Corteva Agriscience
Fusilade DX	fluazifop	2 EC	Syngenta Crop Protection

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Fusion	fluazifop + fenoxaprop	2.56 EC (2 + 0.56 lb/gal)	Syngenta Crop Protection
Galigan	oxyfluorfen	2 E	MANA
Galleon	penoxsulam	2 SC	SePRO
Gallery	isoxaben	75 DF	Corteva Agriscience
Gambit	halosulfuron + prosulfuron	79 DF (50 + 29%)	Gowan
Garlon	triclopyr	4 L	Corteva Agriscience
Glory; Metribuzin 75 DF	metribuzin	75 DG	various
glyphosate formulations[2]	glyphosate	various	various
Goal 2XL; Goal T/O	oxyfluorfen	2 EC; 1.6 EC	Corteva Agriscience
Goosegrass/Crabgrass Control	oxadiazon + bensulide	6.56 G (1.31 + 5.25%)	Scotts
Gramoxone, Parazone, Quik-Quat	paraquat	2 SL	Syngenta Crop Protection; Drexel; MANA
Grandstand R	triclopyr	3 SL	Corteva Agriscience
Grasp	penoxsulam	2 EC	Corteva Agriscience
Grasp Xtra	penoxasulam + triclopyr	2.31 EC (0.25 + 2.06 lb/gal)	Corteva Agriscience
Grazon P + D	picloram + 2,4-D	2.54 L (0.54 + 2 lb/gal)	Corteva Agriscience
GrazonNext	aminopyralid + 2,4-D	3 lb/gal (0.33 + 2.67 lb/gal)	Corteva Agriscience
Habitat	imazapyr	2.0 lb/gal	BASF
Halex GT	mesotrione + S-metolachlor + glyphosate	4.4 L (0.209 + 2.09 + 2.09)	Syngenta Crop Protection
Halo Max 75	halosulfuron	75 WG	Aceto
Harmony Extra	thifensulfuron + tribenuron	75 DF (50 + 25%)	Corteva Agriscience
Harness Extra	acetochlor + atrazine	5.6 L (3.1 + 2.5 lb/gal); 6 L (4.3 + 1.7 lb/gal)	Bayer CropScience
Harness, Warrant	acetochlor	7 EC	Bayer CropScience
Hoelon	diclofop	3 EC	Bayer CropScience
Hyvar X	bromacil	80 WP	Bayer CropScience
Ignite	glufosinate	2.38 SL	Bayer CropScience
Illoxan	diclofop	3 EC	Bayer CropScience
Image	imazaquin	1.5 EC; 70 DG	BASF
Impact	topramezone	2.8 L	AMVAC
Instigate	rimsulfuron + mesotrione	45.84 DG (4.17 + 41.67%)	Corteva Agriscience

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Integrity	saflufenacil + dimethenamid	5.5 L	BASF
Intrro	alachlor	4.51 EC	Bayer CropScience
Journey	glyphosate + imazapic	1.5 + 0.75 SL	BASF
Karmex	diuron	4 L; 80 DF	MANA
Katana	flazasulfuron	25 DF	PBI Gordon
Kerb	pronamide	50 WSP	Corteva Agriscience
Kerb SC	pronamide	3.3 SC	Corteva Agriscience
Keystone NXT	acetochlor + atrazine	5.6 L (3.1 + 2.5 lb/gal)	Corteva Agriscience
Krenite S	fosamine	4 S	Bayer CropScience
Krovar	bromacil + diuron	80 DF (40 + 40%)	Bayer CropScience
Lasso	alachlor	4 F	Bayer CropScience
Laudis	tembotrione	3.5 L	Bayer CropScience
LeadOff	rimsulfuron + thifensulfuron	33.4 WG (16.7 + 16.7%)	Corteva Agriscience
League	imazosulfuron	75 WG	Valent
Lesco PRE-M	pendimethalin	50 WP (others)	Lesco
Lescosan	bensulide	4 L (others)	Lesco
Lexar EZ	atrazine + S-metolachlor + mesotrione	3.67 L (1.74 + 1.74 + 0.224 lb/gal)	Syngenta Crop Protection
Liberty 280	glufosinate	2.34 SL	Bayer CropScience
Linex/Lorox	linuron	4 L	NovaSource
Londax	bensulfuron	60 DF	Corteva Agriscience
Lontrel	clopyralid	3 L	Corteva Agriscience
Loyant	florpyrauxifen	0.21 L	Corteva Agriscience
Manor, Blade, Mansion, MSM	metsulfuron	60 WDG	Nufarm; Riverdale
Marksman	dicamba + atrazine	3.2 L (1.1 + 2.1 lb/gal)	BASF
Matrix	rimsulfuron	25 DF	Corteva Agriscience
MCP amine	MCPA	4 SL	Loveland; Platte
MCPP	MCPP	4 L	Verdicon
Mecomec	mecoprop	2.5 L	PBI Gordon
Micro-Tech	alachlor	4 ME	Bayer CropScience
Milestone	aminopyralid	2 lb/gal	Corteva Agriscience

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Monument	trifloxysulfuron	75 WG	Syngenta Crop Protection
MSMA (others)	MSMA	6 SL; 6.6 SL	several
Newpath	imazethapyr	2 AS	BASF
Obey	clomazone + quinclorac	2.5 L (1.25 + 1.25 lb/gal)	FMC
OH II	oxyfluorfen + pendimethalin	3 G (2% + 1%)	Scotts
Osprey	mesosulfuron	4.5 DF	Bayer CropScience
Oust	sulfometuron	75 WDG	Bayer CropScience
Outlook	dimethenamid-p	6 EC	BASF
Outrider	sulfosulfuron	75 WP	Bayer CropScience
Overdrive	dicamba + diflufenzopyr	0.7 L (0.5 + 0.2 lb/gal)	BASF
Parrlay	metolachlor	8 EC	Bayer CropScience
Pastora	nicosulfuron + metsulfuron-methyl	71.2 DF (56.2 + 15%)	Bayer CropScience
PastureGard	triclopyr + fluroxypyr	1.5 + 0.5	Corteva Agriscience
Peak	prosulfuron	57 DG	Syngenta Crop Protection
Pendimax	pendimethalin	3.3 EC	Corteva Agriscience
Pendulum	pendimethalin	3.3 EC; 2 G; 60 WDG	BASF
Pendulum AquaCap	pendimethalin	3.8 lb/gal	BASF
Pennant Magnum	S-metolachlor	7.62 EC	Syngenta Crop Protection
Permit	halosulfuron	75 DG	Gowan
Phytar 560	cacodylic acid	2.48 EC	Drexel
Plateau	imazapic	70 DG	BASF
Poast	sethoxydim	1.5 EC	Microflo
Poast Plus	sethoxydim	1 EC	Microflo
Power Zone	carfentrazone + MCPA + mecoprop + dicamba	2.9 EC (0.04 + 2.21 + 0.44 + 0.22 lb/gal)	PBI Gordon
Powerflex HL	pyroxsulam	0.13 WG	Corteva Agriscience
Pramitol	prometon	25 E (25% active liquid)	Agriliance
Predict	norflurazon	80 DF	Syngenta Crop Protection
Prefar	bensulide	4 E	Gowan
Prefix	S-metolachlor + fomesafen	Co-Pak (7.62 EC/2 LC)	Syngenta Crop Protection
Pre-san	bensulide	7 G	PBI Gordon

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Princep; Simazine; Caliper	simazine	4 L; 90 DG	Syngenta Crop Protection
Prograss	ethofumesate	1.5 EC	Bayer CropScience
Prompt	bentazon + atrazine	5 L (2.5 + 2.5 lb/gal)	Microflo
Pronone	hexazinone	10 G; 2.5 G	Proserve
Provisia	quizalfop	0.88 EC	BASF
Prowl	pendimethalin	3.3 EC	BASF
Prowl H_2O	pendimethalin	3.8 CS	BASF
Pursuit	imazethapyr	2 AS; 70 DG	BASF
Pyramin	pyrazon	65 DF	Microflo
Python	flumetsulam	80 WDG	Corteva Agriscience
Q4 Plus	quinclorac + sulfentrazone + dicamba + 2,4-D	22.4 L (8.43 + 0.69 + 11.81 + 1.49%)	PBI Gordon
Quicksilver	carfentrazone	1.9 L	FMC
Rage D-Tech	carfentrazone + 2,4-D LVE	67 EC (1.44 + 65.52%)	FMC
Rage G	carfentrazone + glyphosate	5.04 SL (0.04 + 5 lb/gal)	FMC
Raptor	imazamox	1 AS	BASF
Realm Q	rimsulfuron + mesotrione	38.75 DG (7.5 + 31.25%)	Corteva Agriscience
RebelEX	penoxulam + cyhalofop	2.03 L (0.25 + 1.78)	Corteva Agriscience
Reflex, Dawn	fomesafen	2 LC	Syngenta Crop Protection; Cheminova
Regalkade	prodiamine	65 WG	Regal
Regiment	bispyribac	80 DF	Valent
Remedy	triclopyr	4 SL	Corteva Agriscience
Renovate	triclopyr	3.0 lb/gal	SePro
Resolve Q	rimsulfuron + thifensulfuron	22.4 DF (18.4 + 4%)	Corteva Agriscience
Resource	flumiclorac	0.86 EC	Valent
Revolver	foramsulfuron	0.19 L	Bayer CropScience
Reward	diquat	2 SL	Syngenta Crop Protection
RiceBeaux	propanil + thiobencarb	6 SL (35% + 31%)	RiceCo
RiceOne	clomazone + pendimethalin	3.63 SC (1.07 + 2.56 lb/gal)	RiceCo
Ricestar HT	fenoxaprop	0.58 EW	Bayer CropScience

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Ronstar	oxadiazon	50 SP; 2 G	Bayer CropScience
Roundup formulations	glyphosate	various	Bayer CropScience
Rout	oxyfluorfen + oryzalin	2 G (2% + 1%)	Scotts
Rubigan	fenarimol	50 WSP	Gowan
Sahara DG	imazapyr + diuron	70 DG (7.78 + 62.22%)	BASF
Sandea	halosulfuron	75 DF	Gowan
Sedgehammer	halosulfuron	75 DF	Gowan
Segment	sethoxydim	1 EC	BASF
Select and others	clethodim	1, 2, or 3 EC	various
Select Max	clethodim	0.97 EC	Valent
Sempra	halosulfuron	75 DF	Nufarm
Sencor and others	metribuzin	4 L; 75 DF	various
Sequence	glyphosate + S-metolachlor	5.25 F (2.25 + 3 lb/gal)	Syngenta Crop Protection
Shapshot	trifluralin + isoxaben	2.5 TG (2% + 0.5%)	Corteva Agriscience
Sharpen	saflufenacil	2.85 SC	BASF
Showcase	isoxaben + oxyfluorfen + trifluralin	1.25 G (0.25 + 0.25 + 2%)	Corteva Agriscience
Sinbar	terbacil	80 WP	Corteva Agriscience
Solicam	norflurazon	78.6 DF	Syngenta Crop Protection
Sonalan HFP	ethalfluralin	3 EC	Corteva Agriscience
Sonar A.S.	fluridone	4 L	SePro
Spartan	sulfentrazone	4 F; 75 DF	FMC
Specticle	indaziflam	20 WSP	Bayer CropScience
Speed Zone South	carfentrazone + mecoprop + 2,4-D + dicamba	2.2 EC (0.05 +1.53 + 0.48 + 0.14 lb/gal)	PBI Gordon
Spike	tebuthiuron	80 DF; 20 P	Corteva Agriscience
Stam M4	propanil	4 L; 80 DF	Corteva Agriscience
Staple LX	pyrithiobac	3.2 SL	Corteva Agriscience
Status	dicamba + diflufenzopyr	61.1 WG (44 + 17.1%)	BASF
Steadfast Q	nicosulfuron + rimsulfuron	37.7 WDG (25.2 + 12.1)	Corteva Agriscience
Stinger	clopyralid	3 SL	Corteva Agriscience
Stingray	carfentrazone	1.9 L	SePro

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Storm	bentazon + acifluorfen	4 SL (2.67 + 1.33 lb/gal)	UPI
Strada	orthosulfamuron	50 WG	Isagro-USA
Strada Pro	orthosulfamuron + halosulfuron	54 WG (42.05 + 11.92%)	Isagro-USA
Strada XT	orthosulfamuron + quinclorac	70 WG (10 + 60%)	Isagro-USA
Strategy	ethalfluralin + clomazone	2.1 L (1.6 + 0.5 lb/gal)	Loveland
Strongarm	diclosulam	0.84 L	Corteva Agriscience
Super Wham	propanil	4 EC	RiceCo
Suprend	prometryn + trifloxysulfuron	80 WG (79.3 + 0.7%)	Syngenta Crop Protection
Sureguard	flumioxazin	51 WG	Valent
Surflan	oryzalin	4 EC; 4 AS	Corteva Agriscience
Surge	2,4-D + MCPP + dicamba + sulfentrazone	0.06 + 1.4 + 0.5 + 0.22	PBI Gordon
Surmount	picloram + fluroxypyr	1.19 + 0.96	Corteva Agriscience
Surpass	alachlor	6.4 EC	Corteva Agriscience
Synchrony XP	chlorimuron + thifensulfuron	28.4 XP (21.5 + 6.9%)	Corteva Agriscience
Telar	chlorsulfuron	75 DF	Bayer CropScience
Tordon 22K	picloram	2 SL	Corteva Agriscience
Tordon K	picloram	2 SL	Corteva Agriscience
Tower	dimethamid-P	6 EC	BASF
Tradewind	bispyribac	80 SP	Valent
Transline	clopyralid	3 L	Corteva Agriscience
TranXit GTA	rimsulfuron	25 DF	Corteva Agriscience
Treflan	trifluralin	10 G	Corteva Agriscience
Treflan HFP	trifluralin	4 EC	Corteva Agriscience
Tribute Total	thiencarbazone-methyl + foramsulfuron + halosulfuron	60.5 WDG (9.9 + 19.8 + 30.8%)	Bayer CropScience
Trimec Classic	2,4-D + MCPP + dicamba	2.7 EC (1.98 + 0.53 + 0.21 lb/gal)	PBI Gordon
Trimec Southern	2,4-D + MCPP + dicamba	3 EC (1.44 + 1.32 + 0.3 lb/gal)	PBI Gordon
Trivence	chlorimuron + flumioxazin + metribuzin	61.3 DG (3.8 + 12.8 + 44.6%)	Corteva Agriscience
Trycera	triclopyr	2.87 SL	Helena
Tupersan	siduron	50 WP	PBI Gordon; Gowan
Turflon Ester	triclopyr	4 L	Corteva Agriscience

GLOSSARY OF HERBICIDES

Trade Name	Common Name	Formulation	Manufacturer
Ultra Blazer	acifluorfen	2 SL	UPI
Valor	flumioxazin	51 WDG	Valent
Valor XLT	flumioxazin + chlorimuron	40.3 WDG (30% + 10.3%)	Valent
Vanquish	dicamba	4 SL	Syngenta Crop Protection
Vantage	sethoxydim	1 EC	BASF; Microflo
Velpar	hexazinone	75 DF; 2 L	Corteva Agriscience/Bayer CropScience
Verdict	saflufenacil + dimethamid-P	5.57 EC (0.57 + 5 lb/gal)	BASF
Vista	fluroxypyr	1.5 EC	Corteva Agriscience
Weedmaster	dicamba + 2,4-D	3.87 SL (1 + 2.87 lb/gal)	BASF
XL	benefin + oryzalin	2 G (1 + 1%)	Setre
Yukon	halosulfuron + dicamba	67.5 WSG (12.5 + 55%)	Gowan
Zidua	pyroxasulfone	85 WG	BASF

[1] Liquid formulations include AC, applicator's concentration; CS, aqueous capsule suspension; E, EC or EW, emulsifiable concentration; F, flowable; L. liquid, ME, micro-encapsulated; SL, soluble liquid; S, suspension. Dry formulations include DF, dry flowable, DG, dispersible granules; G, granules, SE, suspoemulsion; SP, soluble powder, W, WG and WDG, wettable dispersible granules, WP, wettable powder, WSG, wettable soluble granule.

[2] For list of glyphosate products, please see Appendix A "Glyphosate Products, Formulations and Surfactant Suggestions."

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Pub. 1565 **01/20 Rev.**