Sugarcane

The Sugarcane Weed Management Guide is prepared by Dr. Matt Foster, Sugarcane Weed Scientist, LSU AgCenter Sugar Research Station, St. Gabriel, Louisiana, and Dr. Ali Wright, USDA-ARS, Sugar Research Unit, Houma, Louisiana.

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.

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:

[band width(in) ÷ row width(in)] x broadcast rate per acre = band rate per acre

At-planting Preemergence 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 1/2 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 can also provide residual control of winter weeds, resulting in cleaner beds in the 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
atrazine @ 2.0-4.0 lb/A	**Atrazine**/others; 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 4L at 2.5 qt/A	Seedling johnsongrass, itchgrass, browntop millet, vaseygrass 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. Poor nutsedge control.
clomazone @ 1.0-1.25 lb/A plus metribuzin @ 0.75 lb/A	**Command 3ME** @ 2.7-3.3 pt/A plus **Metribuzin**/others **75DF @ 1.0 lb/A**	Seedling johnsongrass, itchgrass, browntop millet, vaseygrass 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. Poor nutsedge control.
diuron @ 2.4-3.0 lb/A	**Diuron/Direx**/others; **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.

Active Ingredient and Rate	Formulated Product and Rate	**Weeds Controlled (*See Table 1*)**	Remarks and Precautions
metribuzin @ 1.5-3.0 lb/A	**Metribuzin**/others**; 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 plus mesotrione @ 0.71-0.23 lb/A	**Lumax EZ** 3.7 L @ 2.75-3.75 qt/A	Browntop millet, vaseygrass, 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.
S-metolachlor @ 1.70-2.33 lb/A	**Dual II Magnum/ Dual Magnum**/ others @ 0.89-1.22 qt/A	Browntop millet, vaseygrass, other annual grasses, 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. S-metolachor has no activity on emerged weeds. Poor itchgrass control.
pendimethalin @ 2.0-3.0 lb/A	**Prowl/Prowl H_2O**/others**; 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.
pendimethalin @ 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 grass 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.

Active Ingredient and Rate	Formulated Product and Rate	**Weeds Controlled (*See Table 1)***	Remarks and Precautions
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; 4L @ 1.0-2.0 qt/A	Seedling johnsongrass, itchgrass, browntop millet, vaseygrass 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 should be applied to the soil surface for broadleaf weed control.
flumioxazin @ 0.19-0.25 lb/A	**Valor SX** 51WDG/others @ 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 4L at 2.5 qt/A	Seedling johnsongrass, browntop millet, vaseygrass 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 75DF @ 2.0 lb/A	Seedling johnsongrass, browntop millet, vaseygrass 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 2-3 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 1.5-2 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 Control in Sugarcane Harvest 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 **Dual II Magnum**/**Dual Magnum**/others, **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. Follow herbicide rates specified on the product's label for emerged sugarcane. In most cases, the "At-Planting Weed Control (August/September)" section herbicide rate can be reduced by 25 percent for November applications. Where a follow-up application is being made, selecting a herbicide with a different mode of action 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 2-4 qt/100 gal should be added to the spray solution. **Dual II Magnum**/**Dual Magnum**/others will not provide control to emerged weeds.

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 12-18 inches tall, **Asulox**/**Asulam** 3.3L at 3 qt/A or **Envoke** 75WG at 0.2 oz/A plus **Asulox**/**Asulam** at 2 qt/A plus nonionic surfactant at 1-2 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 4-12 inches in height in early planted sugarcane apply **Permit**/others 75WDG at 1.0-1.33 oz/A with nonionic surfactant at 1-2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water. To control 2-6-inch yellow nutsedge or to suppress 2-4-inch purple nutsedge, apply **Envoke** 75 WG at 0.2 oz/A with nonionic surfactant at 1-2 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. Apply 2-3 qt/A of the 4 lb ai/gallon formulation or equivalent rate based on active ingredient in 5-20 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 1-2 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 0.5-1 qt/A, 2,4-D 3.8L at 0.5-1.5 qt/A, Unison 1.74L at 24-64 oz/A, **Clarity**/**Vision**/others 4L at 0.5-1.0 pt/A when air temperature is above 65 F. *(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. 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 3.8-5.6 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 24-64 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 in Winter (January-March)

- **Broadleaf Weeds:** Apply **Weedmaster**/**Brash**/others 3.8L at 0.5-1.0 qt/A, **2,4-D** 3.8L at 0.5-1.5 qt/A, **Unison** 1.74L at 24-64 oz/A, **Clarity**/**Vision**/others 4L at 0.5-1.0 pt/A after broadleaf weeds have emerged and when air temperature is above 65 F. 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. **Callisto** 4L at 3 oz/A plus **Atrazine**/others, **Diuron**/**Direx**/others, **Velpar**, or **Metribuzin**/others is another option that will provide postemergence weed control and soil residual activity.

- **Grass and Broadleaf Weeds: Gramoxone SL** 3L or **Paraquat**/others 3L at 2 pt/A plus nonionic surfactant at 1-2 qt/100 gal or crop oil concentrate at 2-4 qt/100 gal can be applied to sugarcane with no more than four 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 with a different mode of action than the one previously applied should be considered to reduce risk of crop injury and development of herbicide-resistant weeds.

- Where paraquat-resistant ryegrass is suspected, apply Envoke at 0.3 - 0.5 oz/A in combination with Asulox 3.3 L at 2 qt/A plus nonionic surfactant or crop oil concentrate to control emerged paraquat-resistant ryegrass.

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 1-2 qt/100 gal or crop oil concentrate at 2-4 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 0.5-1.0 qt/A, **2,4-D** 3.8L at 0.5-1.5 qt/A, **Unison** 1.74L at 24-64 oz/A, or **Clarity**/**Vision**/others 4L at 0.5-1.0 pt/A can be added. The higher rate should be used when broadleaf weeds are large and clover or vetch is present.

Preemergence (February/March):

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
atrazine @ 2.0-4.0 lb/A	**Atrazine**/others; 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.	Good control of fringed redmaids. 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 4L at 2.5 qt/A	Seedling johnsongrass, itchgrass, browntop millet, vaseygrass and other annual grasses; bermudagrass suppression.	Bleaching/whitening of sugarcane will 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; **75DF @ 1.0 lb/A**	Seedling johnsongrass, itchgrass, browntop millet, vaseygrass 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; **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 F or greater.**
S-metolachlor @ 0.93-1.87 lb/A plus atrazine @ 0.35-0.70 lb/A plus mesotrione @ 0.09-0.19 lb/A	**Lumax EZ** 3.7 L @ 1.5-3.0 qt/A	Browntop millet, vaseygrass, 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.
S-metolachlor @ 0.94-1.87 lb/A	**Dual II Magnum/Dual Magnum/** others @ 0.49-0.98 qt/A	Browntop millet, vaseygrass, other annual grasses, 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. Do not apply more than 0.98 qt/A as a postemergence application per year. Do not apply more than 0.49 qt/A as a postemergence application if a preplant or preemergence application was made. Do not apply to sugarcane greater than 60 inches in height or within 100 days of harvest. S-metolachor has no activity on emerged weeds.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
metribuzin @ 1.5-3.0 lb/A	**Metribuzin**/others**; 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**; 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.
pendimethalin @ 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 grass and broadleaf weeds.	Use higher rate on heavy soils.
trifluralin @ 2.0 lb/A	**Treflan/Trifluralin**/ others; 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 6-8 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**; 4L at 2.5 qt/A**	Seedling johnsongrass, browntop millet, vaseygrass 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 75DF @ 2.0 lb/A	Seedling johnsongrass, browntop millet, vaseygrass, 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 1-2 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 15-30 gal of water per acre to actively growing johnsongrass 12-18 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 3-4 qt/A also controls browntop millet, foxtails, goosegrass and barnyardgrass/junglerice when 6-8 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 3-4 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 0.3-0.6 oz/A to sugarcane 18 inches tall at layby. Nonionic surfactant at 1-2 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 seven days before or after application.**

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

- **Bermudagrass (March/April):** Armezon 2.8 SC at 1-2 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 1-2 qt/100 gal or crop oil concentrate at 2-4 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.

Preemergence Layby (May/June):

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
atrazine @ 2.0-4.0 lb/A	**Atrazine**/others; 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 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; 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 plus mesotrione @ 0.09-0.19 lb/A	**Lumax EZ** 3.7 L @ 1.5-3.0 qt/A	Browntop millet, vaseygrass, 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.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
S-metolachlor @ 0.94-1.87 lb/A	**Dual II Magnum/Dual Magnum/** others @ 0.49-0.98 qt/A	Browntop millet, vaseygrass, other annual grasses, 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. Do not apply more than 0.98 qt/A as a postemergence application per year. Do not apply more than 0.49 qt/A of as a postemergence application if a preplant or preemergence application was made. Do not apply to sugarcane greater than 60 inches in height or within 100 days of harvest. S-metolachor has no activity on emerged weeds.
metribuzin @ 1.5-3.0 lb/A	**Metribuzin**/others**; 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; 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 broadleaf weed control, such as morningglory, atrazine, diuron, metribuzin, or Spartan may be applied in combination with pendimethalin. See precautions for diuron and Spartan.
pendimethalin @ 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 grass 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 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 12-month period cannot exceed 12 oz/A.**

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
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 12-month period cannot exceed 15.2 oz/A.**
trifluralin @ 1.5-2.0 lb/A	**Treflan/Trifluralin**/others**; 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/others @ 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/others 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 1-2 qt/100 gal or crop oil concentrate at 2-4 qt/100 gal should be added to the spray solution.

Postemergence After Layby (July-Harvest):

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
2,4-D @ 0.47-1.42 lb/A	**2,4-D** 3.8L @ 1.0-1.5 qt/A; 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 within seven weeks of planting. See information below on 2,4-D formulations.**
atrazine @ 2.0 - 4.0 lb/A	**Atrazine**/others; 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 divine 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 divine nightshade.
dicamba @ 0.5 - 0.75 lb/A	**Clarity/Vision**/others**; 4L @ 16-24 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 seed cane sources within seven weeks of planting.**

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
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 three applications or 1.5 oz/A may be applied per growing season. Do not apply aerially.
paraquat @ 0.26 – 0.75 lb/A	**Gramoxone SL/Paraquat**/ others; 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; 75WDG @ 0.67-1.33 oz/A	Purple and yellow nutsedge.	Apply as a directed treatment at 1-1.33 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 12-month period cannot exceed 15.2 oz/A.
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WDG/others @ 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/others can be applied at a maximum rate of 12 oz/A per crop year. Do not apply within 90 days of harvest.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
2,4-D plus dicamba @ 0.36 - 0.72 lb/A + 0.12 - 0.24 lb/A	**Weedmaster/Brash**/others**; 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 cane crop, do not apply to seed cane sources within seven weeks of planting.**
halosulfuron plus dicamba @ 0.03- 0.06 lb/A + 0.14 - 0.28 lb/A	**Yukon** 67.5WDG @ 4-8 oz/A	Purple and yellow nutsedge, small morningglory (tie vines) and other broadleaf weeds.	Apply as a directed treatment at with surfactant to nutsedge growing under the crop canopy.

2,4-D Formulations: Acid, amine salt, and ester formulations of **2,4-D** are available. 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 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.

Preemergence Fallow:

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
atrazine @ 2 lb/A	**Atrazine**/others; 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; 75WDG @ 0.67-1.33 oz/A	Purple and yellow nutsedge.	A rate of 1-1.33 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; 3.3EC @ 3 qt/A; 3.5EW @ 2.25-3.4 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.

- **Glyphosate Formulations:** Postemergence herbicides should be applied to actively growing weeds. Several formulations of **glyphosate** are available. Since only the acid form of glyphosate is active in controlling weeds, glyphosate should be applied based on the amount of ae (acid equivalent) per gallon instead of pound of ai (active ingredient) per gallon, as is the case with most other herbicides. A 32 oz/A rate of a 4L (3 ae) formulation would correspond to 21.3 oz/A of a 5.5L formulation, and 20 oz/A of a 5.88L 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. **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 1-2 qt/A of the 4L glyphosate formulation is sufficient. Do not cultivate for seven 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 1-2 qt/A, **Aim** 2EC at 1-2 oz/A, and **Valor** 51WDG at 3-4 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 two 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 1-2 qt/100 gal or crop oil concentrate at 2-4 qt/100 gal should be added to the spray solution. If applied with glyphosate, surfactant present in the glyphosate formulation may be adequate.

- **Bermudagrass in Fallow:** In fields where bermudagrass population is high, tillage in combination with glyphosate is most effective. Apply 2-3 qt/A of the 4L glyphosate formulation for control of bermudagrass with less than 8-inch runners. Retreatment with 2-3 qt/A may be necessary to maintain control. Do not cultivate for seven 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 1.0-1.33 oz/A, **Yukon** 67.5 WDG at 6-8 oz/A and **Envoke** 75WG at 0.15-0.2 oz/A applied with nonionic surfactant at 1-2 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. 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 seven 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** / **Paraquat**/others 3L at 2 pt/A plus nonionic surfactant at 1-2 qt/100 gal or crop oil concentrate at 2-4 qt/100 gal can be applied one to two 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.

- **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 6-8 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** / **Paraquat**/others 3L at 2 pt/A, **Atrazine**/others 4L at 2 qt/A, or **Metribuzin**/others at 1.5 lb/A applied one to three weeks before planting. Nonionic surfactant at 1-2 qt/100 gal or crop oil concentrate at 2-4 qt/100 gal should be added to the spray solution for postemergence applications. Application of Gramoxone SL /

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 three 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). 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
2,4-D plus triclopyr @ 2.0 + 1.0 lb/A	**Crossbow** 3L @ 4.0 qt/A	Poppingweed, briars and woody species.	Best control obtained when applied to young poppingweed, less than 2 years old. For control of briars and smaller diameter woody species, apply at 1.0 to 1.5 gal/100 gal of water and add nonionic surfactant at 1 qt/100 gal of water. Apply in a spray volume of 40 to 60 gal per acre to thoroughly soak all stems and plant crowns at the soil line. **This product contains 2,4-D and use may be restricted in some areas of the state.**
diuron @ 2.0-15.0 lb/A	**Diuron/Direx**/others; 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 1-2 qt/100 gal of water or crop oil concentrate at 2-4 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; 4L @ 2.0-3.0 qt/A; 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 1-2 qt/100 gal of water. Apply in a spray volume of 40-60 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 + **Roundup/others**	Poppingweed and other ditchbank weeds.	For a 100-gallon total spray mix, include 5 qt of Garlon 4, Triquad 4L, or other triclopyr product with a 4L concentration and 4 qt of a Roundup/glyphosate product with a 5.5L concentration or 5.5 quarts of a 4L glyphosate product. If the glyphosate formulation does not contain surfactant, add nonionic surfactant at 2 quarts per 100 gallons of water. Because herbicide rates are not specified in product per acre, spray volume (gallons per acre) will affect herbicide rate per unit area treated, number of acres of ditchbank treated and cost per acre. In general, spray volume should be in the range of 20-40 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.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
pendimethalin @ 2.5-3.3 lb/A	**Prowl/Prowl H_2O**/others**; 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; 4L @ 1.0-5.0 qt/A; 5.5L @ 0.7-3.6 qt/A	Johnsongrass, itchgrass and other weeds.	Johnsongrass, itchgrass and most other weeds are controlled at 1-2 qt/A of the 4L glyphosate formulation. Apply 2-3 qt/A for control of bermudagrass with less than 8-inch runners. Retreatment with 2-3 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**; 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 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.
2,4-D plus dicamba @ 0.36-2.15 lb/A + 0.12-0.75 lb/A	**Weedmaster/Brash**/others**; 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.**

Table 1a. Effectiveness of selected sugarcane herbicides applied preemergence.

Weed control estimates represent 28 to 35 days after application of preemergence herbicides at the high end of the rate range.

A value of 0 = no control.
A value of 10 = 100% control.

	Seedling Johnsongrass	Rhizome Johnsongrass	Itchgrass (Raoulgrass)	Bermudagrass[1]	Browntop Millet	Annual Grasses	Vaseygrass	Morningglory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
Atrazine/others	2	0	2	0	4	5	**0**	**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**	**9**	3	3	2	-	7	2
Command plus Diuron/Direx/others or Metribuzin/others	**9**	2	**8**	**8**	**9**	**9**	**9**	6	8	2	-	7	**8**
Diuron/Direx/others	7	0	5	1	6	6	**9**	6	8	2	3	7	**8**
Eptam[4]	**8**	6	-	6	-	-	-	7	6	5	-	2	2
Prowl/others	**8**	2	**8**	2	**8**	**9**	4	2	2	3	0	6	2
Prowl plus Velpar/Velossa + Diuron/Direx/others	**8**	2	**8**	5	**9**	**9**	**9**	7	8	3	**9**	7	**8**
Prowl plus Metribuzin/others	**9**	2	**8**	5	**9**	**9**	5	**8**	9	4	**9**	**8**	**8**
Lumax EZ	7	0	2	0	**9**	**9**	**9**	**8**	9	7	**8**	**9**	**9**
Metribuzin/others	**9**	0	2	6	6	**9**	2	**8**	9	5	**9**	**8**	**8**
Sinbar	**9**	0	2	**8**	3	**9**	1	7	7	5	-	6	5
Spartan	4	0	2	0	3	4	6	**9**	8	7	-	4	**8**
Spartan Charge	4	0	2	0	3	4	6	**9**	8	7	-	4	**8**
Dual II Magnum/ Dual Magnum/others	7	0	1	0	7	**9**	**9**	1	5	7	-	**9**	7
Treflan/Trifluralin/others[4]	**9**	6	**9**	7	**9**	**9**	**8**	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**	**9**	7	8	5	**9**	**8**	**8**

Notes:

[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 28-35 days to reach maximum control.

[6] Addition of atrazine improves control.

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

Table 1b. Effectiveness of selected sugarcane herbicides applied postemergence in-crop and in fallow.

Weed control estimates represent 14 to 21 days after application of postemergence herbicides at the high end of the rate range.

A value of 0 = no control.
A value of 10 = 100% control.

	Seedling Johnsongrass	Rhizome Johnsongrass	Itchgrass (Raoulgrass)	Bermudagrass[1]	Browntop Millet	Annual Grasses	Vaseygrass	Morningglory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
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**	7	6	**8**	7	2	7	7
Glyphosate herbicides	**9**	**9**	**9**	**8**	**9**	**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**

Notes:

[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 28-35 days to reach maximum control.

[6] Addition of atrazine improves control.

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