Sugarcane Production Handbook 2014




LSU AgCenter
Research & Extension

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Sugarcane planting recommendations for Louisiana sugarcane producers

The success of a sugarcane farming operation depends on the ability to produce good stands of plant cane and maintain suitable stands for stubble crops. This section provides information to help growers make management decisions about planting practices that should result in excellent plant cane stands.

Keeping good records is an essential part of wise decision making and management of a sugarcane production operation. Growers are encouraged to keep good records of all planting practices as well as pest management practices.

These recommendations are based primarily on research results. Where research results are not available or are inconclusive, current farming practices are considered in making suggestions. The planting information does not include land preparation recommendations. It is essential that proper land preparation is carried out and that rows are built up and ready for furrow opening. Recommendations are made on variety selection, furrow width, planting rate, weed control, soil insect control, depth of cover, depth of planting, dates of planting, succession planting, and use of starter fertilizers.

Healthy seed cane

To maximize yield potential for all sugarcane varieties, it is essential that plantings be made with seed-cane that is free or nearly free of diseases. To accomplish this, healthy seed-cane nurseries should be established with seed-cane of recommended varieties from a heat treatment program or from seed-cane that has been produced by tissue culture to meet the requirements for certification by the Louisiana Department of Agriculture and Forestry. Seed-cane nurseries of all varieties expected to be grown should be planted with cane obtained from one of these sources every year. Special care should then be taken to minimize infection of seed-cane by sugarcane pathogens.

Ratoon stunting disease (RSD) will cause substantial yield losses in all of the varieties recommended for major planting. This disease can be controlled only by the continuous planting of RSD-free seed-cane. In addition, RSD is spread mechanically, so equipment should be carefully cleaned before handling seed-cane. Since RSD has little or no visible symptoms, seed-cane fields should be tested at the LSU AgCenter's Sugarcane Disease Diagnostic Laboratory. Seed-cane should be propagated as few times as is economically feasible. A common mistake made by growers is to assume that cane grown from heat-treated or certified seed-cane that has been cut repeatedly is still disease free.

Cane of any variety containing more than 2% smut-infected shoots should be avoided as a seed-cane source. Where practical, smut-infected plants should be rogued early in the season prior to the emergence of whips (sori). Avoid planting seed-cane nurseries of smut-susceptible

varieties next to smut-infected cane.

Some recommended varieties are susceptible or moderately susceptible to leaf scald. Leaf scald is transmitted through infected seed-cane, mechanically on equipment and, to some extent, in wind-blown rain. Care should be taken to plant healthy seed-cane. The heat treatment used to control RSD does not cure stalks of leaf scald.

Planting healthy seed-cane also means using cane for seed that has low levels of damage caused by the sugarcane borer. Good sugarcane borer control helps to reduce damage by stalk rots following planting and helps to increase stands. Seed-cane nurseries of highly susceptible varieties, such as HoCP 00-950 and L 03-371, should not be planted where insecticides cannot be applied, and cane to be used for seed should be monitored closely for borer presence.

Variety recommendations for planting

Variety recommendations are based on results from research provided by the following organizations: LSU AgCenter; USDA-ARS, Sugarcane Research Unit; and the American Sugar Cane League. Variety development has been a long standing cooperative effort governed by the Three-way Agreement of 2007. Seven varieties, HoCP 96-540, L 99-226, HoCP 00-950, L 01-283, L 01-299, L 03-371, and HoCP 04-838, are recommended for general planting in Louisiana. Other varieties such as LCP 85-384, HoCP 85-845, and CP 89-2143 have been successful in some situations. It must be stressed that growers should plant a variety only if a disease-free seed source is available.

Variety performance

The means of multi-year outfield tests from plant cane through third-stubble crops provide relative yield information about the recommended varieties (Tables 1-4). Actual yields and the relative performance of the varieties on your farm may vary from those reported. Traits other than yield such as harvestability, insect and disease resistance must also be considered in choosing a variety. Table 5 summarizes variety characteristics.

Table 1: Combined means for plant-cane through third stubble crops across outfield locations from 2009 to 2012.

Plant-Cane					
Variety	**Sugar Yield**	**Cane Yield**	**Sugar Content**	**Stalk Weight**	**Population**
	lbs/acre	tons/acre	lbs/ton	lbs	#/acre
HoCP 96-540	9216	33.3	277	2.63	25798
L 99-226	9576	32.7	292	2.90	22905
HoCP 00-950	9639	32.0	301	2.26	28790
L 01-283	9151	31.8	288	2.19	29371
L 01-299	9126	32.9	277	2.27	29725
L 03-371	9969	34.0	294	2.41	28840
HoCP 04-838	9746	35.3	276	2.26	31664
First Stubble					
Variety	**Sugar Yield**	**Cane Yield**	**Sugar Content**	**Stalk Weight**	**Population**
	lbs/acre	tons/acre	lbs/ton	lbs	#/acre
HoCP 96-540	8278	30.1	276	2.23	27495
L 99-226	9330	31.3	297	2.53	25286
HoCP 00-950	8334	27.5	305	1.86	29767
L 01-283	9183	31.5	292	1.91	33571
L 01-299	9750	35.9	276	1.92	37747
L 03-371	8908	30.8	290	2.14	29036
HoCP 04-838	8443	30.6	277	1.96	31679

Second Stubble					
Variety	**Sugar Yield**	**Cane Yield**	**Sugar Content**	**Stalk Weight**	**Population**
	lbs/acre	tons/acre	lbs/ton	lbs	#/acre
HoCP 96-540	6461	25.7	257	1.79	29434
L 99-226	7463	27.1	279	2.11	26195
HoCP 00-950	6795	23.9	288	1.66	29293
L 01-283	8023	29.6	275	1.60	37334
L 01-299	8103	31.2	267	1.61	39004
L 03-371	7449	27.6	273	1.83	30536
HoCP 04-838	6803	26.1	265	1.64	32135
Third Stubble					
Variety	**Sugar Yield**	**Cane Yield**	**Sugar Content**	**Stalk Weight**	**Population**
	lbs/acre	tons/acre	lbs/ton	lbs	#/acre
HoCP 96-540	5311	20.8	254	1.84	22635
L 99-226	6690	24.4	275	2.10	23631
HoCP 00-950	6784	23.5	291	1.60	29962
L 01-283	7662	27.6	279	1.55	36206
L 01-299	7914	29.3	270	1.64	36783
L 03-371	6691	25.1	266	1.81	27896
HoCP 04-838	5427	21.2	256	1.65	26335

Varieties recommended for planting

HoCP 96-540 was selected from a cross of LCP 86-454 x LCP 85-384 and released in 2003. The variety responds extremely well to ripeners and has excellent post-freeze processing qualities. HoCP 96-540 is an erect variety that has withstood hurricane force winds well and is often a choice for planting after such events. It is resistant to smut and leaf scald but is susceptible to RSD and brown rust. Research shows that HoCP 96-540 is moderately resistant to the sugarcane borer. The variety has excellent yield potential and has been the leading sugarcane variety in Louisiana since 2008.

L 99-226 was selected from a cross of HoCP 89-846 x LCP 81-30 and was released in 2006. L 99-226 is a high yielding, excellent stubbling variety. The variety produces a lower population of large diameter stalks and has high sugar per ton of cane. L 99-226 frequently lodges and is difficult to plant. L 99-226 is susceptible to brown rust and is moderately susceptible to smut. The variety deteriorates quickly after being subjected to freezing

temperatures. The variety is moderately resistant to the sugarcane borer and is a good choice in areas where insecticides cannot be applied. L 99-226 responds well to the ripener glyphosate.

HoCP 00-950 was selected from the cross HoCP 93-750 x HoCP 92-676 and was released in 2007. This variety has the highest sugar per ton of any variety released by the Louisiana sugarcane breeding program. HoCP 00-950's sugar per acre yield in plant-cane is very good but there can be a decrease in stubble cane yields that cannot always be offset by high sugar per ton. HoCP 00-950's best fit is on well drained sandier land and is a good choice when growers run out of ripened cane or on rainy days. This variety has a good disease package and has performed well after freezes. The variety can have some top breakage in high winds.

L 01-283 was selected from the cross between L 93-365 x LCP 85-384. When L 01-283 was released in 2008, the new variety held much promise—good sugar per acre, erect, excellent stubbling ability and cold tolerance. However, off-types began appearing in the variety soon after release. Yield trials have determined that high levels of off-types can decrease sugar per acre in L 01-283. The off-types are stress induced and normally begin to appear in July. The variety stubbles extremely well and early spring growth is impressive. At harvest, many fields sugar yields have been good. The variety is susceptible to brown rust and the sugarcane borer. L 01-283 should be planted on your better land to decrease stress induced off-types.

L 01-299 was selected from the cross between L 93-365 x LCP 85-384. This variety has a very erect growth habit and is an extremely good stubbling variety. L 01-299 has excellent sugar yields, especially in older stubble crops. Its sugar per ton levels is similar to HoCP 96-540. The variety is resistant to brown rust, but susceptible to brown stripe disease. L 01-299 is susceptible to smut and has resistance to the sugarcane borer and leaf scald. Because of its stubbling ability, the variety should be a good fit on heavy land.

L 03-371 is an offspring from the cross of CP 83-644 x LCP 82-89. L 03-371 is early an maturing variety with high sugar per ton of cane. The variety is not erect and should be planted early before lodging. It is resistant to smut and leaf scald and moderately susceptible to brown rust. L 03-371 has a poor rating for post-freeze deterioration of the stalk. Research shows that L 03-371 produces good sugar per acre yields, but is susceptible to the sugarcane borer. This variety should not be planted where insecticides cannot be applied.

HoCP 04-838 was selected from the cross HoCP 85-845 and LCP 85-384. This variety was released to growers in 2011. HoCP 04-838 has a very good disease package in addition to good harvesting characteristics. The variety is also rated as resistant to the sugarcane borer, making it a good choice to plant where insecticide applications may be limited. HoCP 04-838 has very good sugar yield potential. This new variety is most impressive in regard to freeze tolerance. Position the variety for late harvest to take advantage of HoCP 04-838's ability to withstand freezing temperatures.

Table 2: Sugarcane variety characteristics

CHARACTERISTICS FOR CURRENT COMMERCIAL SUGARCANE VARIETIES							
Varietal Characteristics	**HoCP 96-540**	**L 99-226**	**HoCP 00-950**	**L 01-283**	**L 01-299**	**L 03-371**	**HoCP 04-838**
Year of Release	**2003**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Sugar per acre	VG	VG	G	VG	VG	VG	G
Sucrose Content (TRS)	M-G	VG	VG	VG	G	VG	M-G
Tonnage	G	VG	G	VG	VG	VG	G
Harvestability	G	P-M	G	G	VG	P-M	G
Maturity	M	M-E	E	E	M	M-E	M
Stubbling	M-G	G	G	VG	VG	G	G
Borer resistance	S	R	S	MR	R	S	R
Rust resistance	S	S	MR	M	R	MS	R
Smut resistance	R	S	R	R	S	R	R
Leaf scald resistance	R	MS	MR	R	R	R	R
Post-freeze deterioration	G	P-M	G	G	G	P	VG
Shading	M	VG	VG	G	M	G	G

E = Early
M = Moderate, Medium
G = Good
VG = Very Good
R = Resistant
MR = Moderately Resistant
MS = Moderately Susceptible
S = Susceptible
P = Poor

New variety release

Ho 05-961 was released in 2012. Because of low levels of sugarcane mosaic disease and newly identified orange rust disease, the new variety was released but not distributed to growers. The disease situation in Ho 05-961 is being closely observed, and the variety is not recommended for further expansion.

Sugarcane variety survey

The annual sugarcane variety census is conducted cooperatively by the Louisiana Cooperative Extension Service and provides acreage data on variety plantings by growers. A better understanding of variety preference by growers can be seen in a comparison of several years of variety surveys. Table 6 shows the 2008-2012 variety survey results as compiled and reported by agricultural agents in the sugarcane-producing parishes of Louisiana.

HoCP 96-540 continues as the most widely grown sugarcane variety in Louisiana, although it decreased in acreage by four percentage points in 2012. The varieties L 99-226, HoCP 00-950, L 01-283, and L 01-299 increased in acreage from the previous year. All other varieties either decreased or remained the same as reported from the previous year. L 99-226 was the second most widely grown variety followed by L 01-283, L 99-233, and L 01-299. All other varieties are grown on only limited acreage.

Table 3: Louisiana sugarcane variety trends by variety and year 2008-2012[1]

Area planted to sugarcane by variety and years (%)						
Variety	**2008**	**2009**	**2010**	**2011**	**2012**	**1 yr. Change**
LCP 85-384	22	6	1	<1	<1	0
HoCP 85-845	1	<1	1	1	1	0
HoCP 96-540	44	50	48	43	39	-4
L 97-128	17	17	11	6	2	-4
L 99-226	5	11	17	19	21	+2
L 99-233	2	6	10	11	9	-2
HoCP 00-950	0	1	2	4	6	+2
L 01-283	0	<1	<1	4	11	+7
L 01-299	0	<1	<1	1	7	+6
L 03-371	0	0	<1	<1	2	+2
HoCP 04-838	0	0	0	<1	1	+1
Others	1	1	2	1	1	0
Totals	100	100	100	100	100	

[1] Based on annual variety surveys by county agents, 2008-2012.

Planting recommendations and suggestions

Selection of seed-cane: Growers should plant seed-cane that is as close to disease free as possible. Cane that is growing well and is free of the sugarcane borer should be selected as seed-cane. Healthy seed-cane will provide the best possible stands if adverse environmental conditions such as drought, water logging or freezes occur. Mechanical planters should be operating so as to minimize stalk damage.

Stalk cold tolerance should be considered when selecting varieties, especially in the northern parishes. HoCP 96-540, L 01-283, L 01-299, and HoCP 04-838 have shown better stalk cold tolerance than other varieties.

Billet planting: Whole stalk planting will continue to be a recommended practice because research has shown that, over time, the highest yields will be obtained with the least risk by planting whole stalks. However, when seed-cane is badly lodged, one option will likely be to cut and plant billets. Current varieties vary in tolerance of billet planting. Stand problems in billet plantings have been encountered most frequently with HoCP 96-540, L 99-226 and L 03-371. Plantings of whole stalks have out-yielded billet plantings in the plant-cane crop and some stubble crops in the majority of experiments.

The impact of stalk rots is greater in billets because of their shorter length and the wounding that occurs during cutting and planting. Billet plantings suffer greater damage if there is any kind of planting problem or environmental stress, and the risk of stand reduction is, therefore, greater. Because of greater stalk rot damage, billets possess less energy reserves than whole stalks by spring, and few buds remain to germinate and replace shoots killed by disease and adverse weather conditions.

If you do choose to plant billets follow these practices:

1. Plant longer (20-24 inch) billets,
2. Remove every other slat in the elevator chain to accommodate longer billets,
3. Run the primary extractor fan but do not run the secondary extractor fan,
4. Use a planting rate averaging at least six billets running in the planting furrow,
5. Use good planting practices (good soil preparation and proper depth of cover), and providing good drainage and careful weed control.

Planting furrow width: Research has shown good yield increases in cane yield and sugar yield when the planted row was widened from the V-furrow to the 18-24 inch furrow. Based on this research, it is suggested that growers use an 18-24 inch furrow for planting. It is also suggested that the furrow opener be constructed to leave a wide bottom with a slight indentation on each side of the furrow and a slight ridge of loose soil in the middle of the furrow bottom to accommodate wider plantings.

Planting rate: Based on research results and field observations, the planting rate recommendation is three to four stalks and a lap of at least two mature joints. Where sufficient seed-cane is not available for optimum planting rates, growers may be able to obtain acceptable stands by planting two stalks and a lap of at least two mature joints. These recommendations are based on using high quality disease-free seed-cane. Additional seed-cane should be used to compensate for poor quality seed-cane. Planted cane stalks should be spread to cover the entire width of the planting furrow.

Date of planting: Planting date trials from early August to mid-October have been conducted across numerous years. Results have shown the greatest advantage of August over mid-October planting; in some trials August planting produced higher sugar yields than mid-September plantings.

Amount of soil cover over seed-cane

Research on depth of soil cover over seed-cane indicates that soil cover in excess of 4 inches can cause yield losses even if the excess is removed in the spring following planting. Although limited in acreages planted, heat-treated cane should be covered with 2 inches of packed soil. After the heat-treated cane is up to a good stand and before freezing weather occurs, add an additional 2 inches of soil to protect from freeze damage. Do not cover heat-treated cane with more than 2 inches of packed soil at planting.

For August, September and October planting, cover with 3 to 4 inches of packed soil at planting time. Farmers in the southern part of the belt can normally get by with 3 inches of packed soil covering. On farms in the northern part of the sugarcane belt, 4 inches of packed soil is recommended for additional freeze protection. Growers should use a fluke on the covering tool to keep from covering with more than 4 inches of packed soil. Growers who cover with much more than 4 inches of packed soil should be prepared to remove the additional soil early in the spring.

Varieties such as L 01-299 and HoCP 96-540 have poor vigor when germinating after planting. Soil cover for these varieties should be no more than 3 inches of packed soil.

Growers should use a covering tool that will cover the cane without pushing the cane closer than the width it was planted. Packing of rows should be done immediately after covering to minimize air pockets. Clean quarter drains before spraying herbicides. Where soil washing occurs in the fall before a hard freeze, it is suggested that the middles be sunk and rows rebuilt for winter protection.

Depth of planting with relation to water furrow

To avoid water damage, seed-cane should be placed at least 3 to 4 inches above the final water furrow or row middle. In soils with poor internal drainage, the seed-cane should be placed even higher above the final water furrow when possible.

Growers should be aware of the need to keep the seed-cane above the area where water levels will hurt cane stands. Low row height at planting time could be a problem, especially with billet planting.

Starter fertilizer application

Recent fertilization trials have shown sporadic yield responses to starter fertilizers applied in the planting furrow for cane planted after a fallow year. Other research has shown better

response to starter fertilizer for succession planted cane. Where yield responses have been obtained, the rate was an application of 15-45-45 lbs/A of N-P_2O_5-K_2O.

Based on these recent findings and high fertilizer prices, it is suggested that growers not apply starter fertilizer at planting. Where sugarcane is succession planted, a starter fertilizer should be applied at a rate of 15-45-45. Applying nitrogen at rates exceeding 15 lbs/A is not recommended.

Rotational soybean crops are becoming more common in fallow fields. Although a nitrogen fertilizer credit has not yet been established, the organic nitrogen from soybeans should be sufficient to get the planted cane off to a good start in the fall. No starter fertilizer application is recommended for cane planted after a soybean crop.

Succession planting sugarcane (cane planted without fallow)

Succession planting is an alternative planting system that has been investigated for several years and is used on a limited basis by some growers. It has the advantages of allowing growers to maintain more of their cane land in production and is beneficial in adjusting the cane rotation for growers who do not have a good balance of their acreage in each year of the crop cycle.

Because of its limitations, succession planting should be considered only on better drained soils that do not have serious infestations of johnsongrass or bermudagrass. Weather often becomes unsuitable for planting during the harvest season, and some varieties are not tolerant of late planting. Observation indicates that varieties that tolerate billet planting tend to perform better when planted in succession. Therefore, L 01-283 and L 01-299 may be good choices for succession planting.

Research has shown that fall fertilization at planting time has increased yields of succession planted cane. In most cases succession planted cane that received 15-45-45 of fall-applied N-P_2O_5-K_2O fertilizer produced yields similar to cane planted conventionally after a fallow period.

Growers who plan to use succession planting should follow the procedure suggested below.

Suggested procedure for succession planting of sugarcane

(Please note: *Growers should select succession planting areas that do not have heavy johnsongrass or bermudagrass infestations.)*

Suggested procedures for succession planting are as follows:

1. Burn any remaining crop residues.
2. Lightly disk row top to break up the cane stubbles into smaller, more manageable pieces.
3. Roto-till rows.
4. Do not subsoil because seed-cane can sink and have too much soil cover.
5. Rebuild rows with disk chopper.
6. Culti-pack and then open planting furrow as recommended.
7. Apply fertilizer in planting furrow at 15-45-45 of N-P_2O_5-K_2O before planting succession cane. (In addition, the normal recommended N-P_2O_5-K_2O rates for plant and stubble cane should be applied in the spring of each crop year, depending on soil type and soil test results.)
8. Plant seed-cane of a variety that tolerates late planting and cover as recommended.
9. Pack rows after planting.
10. Apply pre-emergence herbicides as recommended. Use the higher end of recommended rates.

Sugarcane Diseases

Several diseases can affect sugarcane grown in Louisiana. Knowing what symptoms to look for can lead to early diagnosis and help cut potential losses.

Some common diseases that can affect Louisiana sugarcane are brown rust and smut. These and other diseases Louisiana sugarcane growers should look for in their crops are listed in Table 4. Listed are the disease name, symptoms, sources, and control. For more information, visit www.lsuagcenter.com.

Table 4: Sugarcane diseases

Disease	
Leaf Scald (*Xanthomonas albilineans*)	**Symptoms:** Leaves of young plants may show bleaching or yellowing. The characteristic symptom of leaf scald is the presence of one or more narrow, white "pencil lines" running longitudinally down the full length of the leaf blade into the sheath. Bands of dead tissue may develop along pencil lines starting at the leaf margin and expanding until the entire leaf is dead. Young shoots may be killed. Mature stalks may show leaf symptoms and develop side shoots with symptoms. Under severe disease conditions, entire plants may die. Drought stress may induce severe symptom expression. **Source of Inoculum:** The bacterium that causes leaf scald lives from year to year in infected plants. It is spread by the harvester and possibly by other cultivation practices that cause plant wounding. The disease can be spread aerially in windblown rain. **Control:** Varietal resistance is the best means of control. Only two varieties going out of production, LCP 85-384 and Ho 95-988, are highly resistant. HoCP 96-540 exhibits moderate resistance. The other current varieties exhibit varying degrees of susceptibility with HoCP 00-950 being the most susceptible. Avoid planting seedcane from fields with diseased plants. Regular planting of healthy seedcane produced through tissue culture has kept the incidence of leaf scald low. The heat treatment used to control ratoon stunting disease is not effective against leaf scald.
Mosaic	**Symptoms:** The mosaic pattern of irregular, interspersed, pale green, yellowish (Sorghum mosaic virus and green areas on leaves varies with cane variety, stage of growth, temperature (Sugarcane mosaic virus) and the strain of the virus involved. The mosaic symptom is most evident in the youngest emerging leaves. **Source of Inoculum**: The virus persists from year to year in infected plants. It is spread primarily by migrating aphids and also by planting infected seedcane. **Control:** Mosaic is controlled primarily with host plant resistance. Historically, mosaic was a major disease adversely affecting sugarcane production in Louisiana. Basic breeding and development of sources of resistance have greatly reduced the effects of this disease, however. Currently grown varieties have adequate levels of resistance to mosaic. Planting seedcane produced through tissue culture can help keep disease incidence low in susceptible varieties.

Ratoon Stunt (*Leifsonia xyli* subsp. *xyli*)	**Symptoms:** Ratoon stunting disease has no obvious external symptoms. Infected plants may be shorter but with little or no decrease in diameter of the stalk. Stunting severity is associated with adverse environmental conditions, particulary drought stress, and it is more severe in ratoon crops. Affected plants, when split, may or may not show a pinkish color in the growing point of young shoots and orange to brownish discoloration of vascular bundles at the nodes in the lower portion of mature stalks. **Source of Inoculum:** The bacterium lives from year to year in infected cane. It is spread by the cane harvester and by planting infected seedcane. **Control:** A healthy seedcane program is the primary method for control. Seedcane produced from tissue culture free of the disease is commercially available. Heat treatment of seedcane in hot water at 50 degrees Celsius (122 degrees Fahrenheit) for two hours can provide control of most ratoon stunting disease bacteria. A regular annual heat treatment program can provide good control. Monitoring of infection levels and the success of a healthy seedcane program can be provided by collecting stalk samples and having them tested at the LSU Ag Center's Sugarcane Disease Detection Lab. The level of resistance varies among varieties. High levels of resistance are uncommon, so a healthy seedcane program is essential for successful control.
Red Rot	**Symptoms:** Red rot adversely affects stand establishment by rotting planted (Glomerella tucumanensis) seedcane. Splitting stalks dug up from portions of a row without living plants reveals red discoloration of the internode tissue and rotted nodes. Within the red areas, white spots, usually elongated at right angles to the long axis of the stalk, are indicative of red rot infection. Red rot is more severe when planted stalks are exposed to drought stress or waterlogging. **Source of Inoculum:** The fungal pathogen survives from season to season in infected cane tissue. Fungal inoculum is present on most planted stalks. **Control:** Plant multiple whole stalks and avoid planting heavily bored or physically damaged seedcane. Provide good drainage for planted seedcane. High levels of varietal resistance are uncommon, so cultural practices that minimize stress on planted seedcane are needed to minimize red rot damage.
Rust (Brown) (*Puccinia melanocephala*)	**Symptoms:** Small chlorotic areas appear on the leaves at first as flecks. Later, the flecks elongate and become reddish-brown. The spots continue to enlarge, with a slight yellow halo surrounding the lesion on some varieties. The lesion takes on a pustular appearance on the under-surface of the leaf and pustules erupt, releasing a reddish-brown mass of spores. On susceptible varieties, heavily infected leaves dry out and die prematurely. **Source of Inoculum:** Rust survives the winter in living green leaf tissue – usually in southern areas of the industry. Spores are then produced and aerially dispersed to spread the disease over short and long distances. **Control:** Host plant resistance is the primary control method, but the rust pathogen has the capability to adapt and overcome varietal resistance. Once a variety becomes susceptible, rust can be controlled with the application of fungicide. Clipping or mowing to remove green leaf tissue of susceptible varieties containing rust early in the season may delay the onset of the spring epidemic by a few weeks. Detailed information on varietal resistance ratings, fungicide labels and use recommendations and clipping can be found on the LSU Ag Center website, lsuagcenter.com, in "Best Management Practices for Minimizing the Impact of Brown Rust in Sugarcane."

Smut (Ustilago scitaminea)	**Symptoms:** Smut is characterized by the production of a black, whip-like structure at the apex of stalks with smaller than normal diameter. The whip often elongates to a length of 2-3 feet and curls downward. The whip is covered by a layer of dark-brown fungal spores. Prior to the emergence of whips, smut-infected plants can have a grassy appearance with many small-diameter shoots. **Source of Inoculum:** Tremendous numbers of smut spores are released over time from whips and dispersed in air currents to spread the disease over short and long distances. **Control:** To control smut, grow resistant varieties. Varieties with a high level of resistance to smut include: LCP 85-384, HoCP 85-845, HoCP 96-540, HoCP 00-950, L 01-283, L 03-371 and HoCP 04-838. Varieties with moderate susceptibility include: Ho 95-988, L 97-128, L 99-226, L 99-233 and L 01-299. High rates of disease increase do not occur under Louisiana climatic conditions, so it is possible to grow varieties with moderate smut susceptibility if a rigorous healthy seedcane program is followed. Tissue culture produced seedcane will have little or no smut infection. Roguing smut-infected plants with glyphosate is only feasible in seedcane sources with low levels of infection. Avoid planting seedcane sources of smut-susceptible varieties next to smut infected cane. Do not plant seedcane with more than 2 percent smut infection.
White Stripe (Physiological disorder)	**Symptoms:** Characterized by variable amounts of longitudinal white striping on leaves of some plants, usually occurring during spring. The white stripes extend the full length of the leaf. Striping is not considered infectious but rather is a growth response to environmental conditions. **Control:** None. Plants usually will recover after fertilizer effects are felt in the presence of adequate rainfall.
Yellow Leaf (Sugarcane yellow leaf virus)	**Symptoms:** The underside of the midvein on younger leaves at the apex of mature plants turns bright yellow in infected plants. The yellowing can spread into the leaf blade, and midveins can turn pink in severely infected plants. Due to the short growing season in Louisiana, symptoms are not seen most years because of ripener applications and/or frosts. Despite the lack of visible symptoms, infected plants may exhibit reduced growth and juice quality. **Source of Inoculum:** The sugarcane aphid acquires the virus during feeding on an infected plant. The aphid retains the virus for life and can transmit the disease during feeding on healthy plants within the same field or in other fields. **Control:** Certified seedcane produced through tissue culture is tested for sugarcane yellow leaf virus. Continous planting of seedcane with little or no virus infection will keep the incidence of yellow leaf low. Information is lacking on the disease resistance levels of commercial varieties.

Controlling weeds in sugarcane

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

http://www.lsuagcenter.com/en/communications/publications/management_guides/Louisianas+Suggested+Chemical+Weed+Control+Guide.htm

Rates for herbicides are expressed on a broadcast basis. To calculate band rate, for liquid and dry formulations, use the formula provided below. Band width in inches X Broadcast RATE = Band m RATE Row width in inches per acre 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. Because residual weed control for herbicides applied at planting can be expected for about 60 days, a follow-up application of herbicide may be needed to prevent re-establishment of summer weeds and to control winter weeds. See “At-Planting Pre-emergence Split Application Programs” and “Post-emergence Weed Control (September-November)” sections. Herbicide application also will be needed on fields harvested for seed, especially where Bermuda grass, Johnson grass, and itch grass are a problem.

Table 5: At-Planting Pre-Emergence (August/September)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
atrazine @ 2.0 - 4.0 lb/A	**Atrazine/others** (See Table 2) 4 lb/gallon formulation @ 2 - 4 qt/A **90 DF** formulation @ 2.22- 4.44 lb/A	Annual summer and winter broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ 45 DF** @ 16 - 33 oz/A See Table 6 for equivalent rates of **Spartan 4F** and **Metribuzin 75DF**	Morning glory (tie-vine) and other broadleaf weeds, and nutsedge	Use higher rate on clay soils and soils with organic matter higher than 2%. At the highest rate of 33 oz/A the amount of metribuzin in Authority MTZ is not sufficient to provide grass control.
mesotrione @ 0.19 - 0.24 lb/A	**Callisto 4L** @ 6 - 7.7 oz/A	Annual summer and winter broadleaf weeds	Use higher rate on heavy soils or when sugarcane is planted prior to early September.
clomazone @ 1.0 - 1.25 lb/A	**Command 3ME** @ 2.66 - 3.33 pt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Addition of diuron or metribuzin can provide broadleaf weed control and Bermuda grass suppression. Bleaching can occur where sugarcane has less than two inches of soil cover.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx/others** (See Table 2) 4 lb/gallon formulation @ 2.4 - 3 qt/A	Broadleaf weeds	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
hexazinone plus diuron @ 0.5 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4 60DG** @ 3.75 - 4 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	Can provide Bermuda grass suppression. Can be applied with pendimethalin to improve itch grass control. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A.

Table 5, continued: At-Planting Pre-Emergence (August/September)

pendimethalin @ 2.0 - 3.0 lb/A	**Prowl/Prowl H2O/others** (See Table 2) **3.3EC** formulation @ 2.4 - 3.6 qt/A **3.8CS** @ 2.1 - 3.1 qt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	May be applied to the soil surface or incorporated. Use higher rate on heavy soils. Should be applied with other herbicides for broadleaf weed control.
metribuzin @ 1.5 - 3.0 lb/A	**Metribuzin/Sencor/others** (See Table 2) 75 **DF** formulation @ 2.0 - 4.0 lb/A	Seedling Johnson grass and other annual grass and broadleaf weeds	Safe to sugarcane on all soil types. Use higher rate on heavy soils and when sugarcane is planted prior to early September. Can provide suppression of Bermuda grass at higher rates. Addition of pendimethalin can improve control of browntop panicum and itch grass.
terbacil @ 0.8 - 1.2 lb/A	**Sinbar 80WP** @ 1.0 – 1.5 (1.0 lb/A on very sandy soils)	Seedling Johnson grass and other grass and broadleaf weeds.	Use higher rate on heavy soils and when sugarcane is planted prior to early September. Can provide suppression of Bermuda grass at higher rates. Addition of pendimethalin can improve control of browntop panicum and itch grass.
sulfentrazone @ 0.31 - 0.38 lb/A	**Spartan 4F** @ 10.0 - 12.0 oz/A See Table 6 for equivalent rates of **Spartan 4F** when using **Authority MTZ**	Broadleaf weeds and nutsedge	Use higher rate on heavy soils and when sugarcane is planted prior to early September.
trifluralin @ 2.0 - 4.0 lb/A	**Treflan/Trifluralin/others** (See Table 2) 4 lb/gallon formulation @ 1.0 - 2.0 qt/A (banded)	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Roll or pack rows and incorporate herbicide within 24 hours after application. Avoid incorporation at a depth that will damage seed pieces. Can provide suppression of Bermuda grass at higher rates. Other herbicides should be applied to the soil surface for broadleaf weed control.
flumioxazin @ 0.19 - 0.25 lb/A	**Valor SX** 51WG @ 6.0 - 8.0 oz/A	Annual broadleaf weeds	Use higher rate on heavy soils or when sugarcane is planted prior to early September. Do not apply after sugarcane emergence.

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

SUGARCANE WEED MANAGEMENT

Table 6: Sugarcane weed management

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

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

At-planting pre-emergence split application programs

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

- **Command** at 3.3 pt/A plus **Diuron/Direx 4L**/others at 2.5 lbs/A at planting followed 60 days later by **Metribuzin/Sencor/others** at 1.5 lb/A **Command** at 3.3 pt/A plus **Metribuzin/Sencor/others** at 1.0 lb/A at planting followed 60 days later by **Metribuzin/Sencor/others** at 1.5 lb/A **DuPont K-4** at 4 lb/A at planting followed 60 days later by **Metribuzin/Sencor/others** at 1.5 lb/A.
- **Metribuzin/Sencor/others** at 2 to 3 lb/A at planting followed 60 days later **by Metribuzin/Sencor/others** at 1.5 lb/A

- **Treflan/Trifluralin/others** at 1.5 to 2 qt/A banded (3 to 4 qt/A broadcast) and incorporated at planting followed 60 days later by **Metribuzin/Sencor/others** at 1.5 lb/A

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

Weed control 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, Bermuda grass will rapidly initiate new growth. Any of the herbicide programs listed for use at planting also can be used in fields where sugarcane was harvested for seed or where sugarcane was harvested early and delivered to the mill.

Herbicides listed for use at planting also may be used when sugarcane is succession planted. Rates may be reduced slightly (25 percent) due to the later planting date and to minimize the chance of sugarcane injury.

Residual control of winter weeds (October/November)

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

Post-emergence weed control (September-November)

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

Purple and Yellow Nutsedge (September/October): To control nutsedge 4 to 12 inches in height in early planted sugarcane apply Permit/others (See Table 2 Glossary of Herbicides) at 1.0 to 1.33 oz/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water. To control 2 to 6 inch yellow nutsedge or to suppress 2 to 4 inch purple nutsedge, apply Envoke at 0.2 oz/A with nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water. The higher rate of Permit/others is needed when nutsedge is large and the population is dense. For best results herbicide application should be made before nutsedge is 6 inches tall.

If application is delayed until nutsedge forms a dense mat on the soil surface a sizeable tuber population will have developed underground and control will be reduced. Activity of both Permit/others and Envoke is slow and four weeks may be needed to maximize control. Sugarcane is very tolerant to overtop application of Permit/others. No more than three applications of Permit/others can be made per year and no more than 2.33 oz should be applied per acre per year. Envoke can cause some yellowing and white banding on sugarcane leaves as well as slight stunting but sugarcane growth and emergence in spring has not been affected. Envoke will also provide some residual control of winter weeds. Other herbicides may be applied with Permit/others or Envoke for additional weed control. For additional information on Permit/others and Envoke see the "Post-emergence Weed Control - Purple and Yellow Nutsedge (March/April)" section.

Yukon, a 67.5 percent WG premix of halosulfuron (the active ingredient in Permit/others) and dicamba (the active ingredient in Clarity/Vision), can provide control of both nutsedge and broadleaf weeds. For Yukon, a 4 oz/A rate is equivalent to 0.67 oz/A Permit

and 4.5 oz/A Clarity/Vision; a 6 oz/A rate is equivalent to 1.0 oz/A Permit and 6.6 oz/A Clarity/Vision; and a 8 oz/A rate is equivalent to 1.3 oz/A Permit and 9.0 oz/A Clarity/Vision. Pre-emergence and post-emergence application of Spartan 4F at 8 to 12 oz/A or Authority MTZ at 22 - 33 oz will also control purple and yellow nutsedge as well as many broadleaf weeds. Rates vary with soil type and with nutsedge population and size.

See "At-Planting Weed Control (August/September)" section for more information. Spartan and Authority MTZ have excellent crop safety when applied pre-emergence but will injure sugarcane when applied post-emergence. See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF.

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

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

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

Winter weed control (January-March)

Broadleaf weeds: Apply Weedmaster/Brash/others at 0.5 to 1.0 qt/A, 2,4-D (3.8L formulation) at 0.5 to 1.5 qt/A, Unison (1.74 L formulation) at 24 to 64 oz/A, or Clarity/Vision/others at 0.5 to 1.0 pt/A after broadleaf weeds have emerged and when air temperature is above 65 ☐ F (See Table 2 G
vetch is present. Information related to these herbicides and 2,4-D formulations is provided in the "After Lay-by Weed Control (July-

Harvest)" section. Atrazine/others, Diuron/Direx/others, DuPont K-4, Metribuzin/Sencor/others, or Valor (prior to sugarcane emergence) may be added to improve post-emergence weed control and to provide soil residual activity.

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

Table 7: Spring Weed Control (February/March)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE (February/March)			
atrazine @ 2.0 - 4.0 lb/A	Atrazine/others (See Table 2) 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
mesotrione @ 0.19 - 0.24 lb/A	Callisto 4L @ 6 - 7.7 oz/A	Seedling broadleaf weeds	Use higher rate on heavy soils.
clomazone @ 1.0 - 1.25 lb/A	Command 3ME @ 2.66 - 3.33 pt/A	Seedling Johnson grass, itch grass, browntop panicum, and other annual grasses	Bleaching/whitening of sugarcane can occur if the crop is emerged at application. Can suppress Bermuda grass at higher rates if applied with diuron or metribuzin
diuron @ 2.4 - 3.0 lb/A	Diruon/Direx/others (See Table 2) 4 lb/gallon formulation @ 2.4 – 3.0 qt/A 80 DF formulation @ 3.0 – 3.76 lb/A	Seedling broadleaf weeds	Use higher rate on heavy soils. Can be applied overtop of sugarcane until daily maximum temperatures for the week preceding application average 80 F or greater.
hexazinone plus diuron @ 0.5 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4.0 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	For Bermuda grass suppression apply at the higher rate. Can be applied with pendimethalin to improve itch grass control. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A. **See precaution above related to diuron application and temperature**

Table 7, cont.

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

Post-Emergence Weed Control (March-April)

Johnson Grass and other grasses (March/April)

Asulox/Asulam can be applied broadcast, banded, or as a spot treatment. Nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 1 gal/100 gal of water should be added to the spray solution. If water pH is above 9.0, addition of a buffer may be beneficial. At application, average air temperature should be at least 60□F. A20-hour rain-free period following Asulox application may be needed to maximize control.

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

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

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

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

Envoke: Envoke 75DF can be applied post-emergence overtop to plant or ratoon cane up to 24 inches tall at 0.3 oz/A broadcast (or the correct proportion if applying on a band) or as a directed application at 0.3 to 0.6 oz/A to sugarcane 18 inches tall at lay-by. Nonionic surfactant at 1 to 2 qt/100 gal of water or crop oil concentrate at 4 qt/100 gal of water should be added to the spray solution. **Envoke** applied overtop of sugarcane can cause some yellowing and white banding on leaves present in the whorl at application as well as slight stunting but recovery is rapid and no negative effect on sugarcane yield has been observed. Envoke at 0.3 oz/A will suppress but will not control rhizome.

Johnson grass or large itch grass. Combinations of **Envoke** with **Asulox/Asulam** provide complementary broadleaf and grass weed control. Envoke at 0.3 oz/A applied with Asulox at 2 qt/A (half rate) plus nonionic surfactant or crop oil concentrate has improved control of large rhizome Johnson grass (more than 18 inches) when compared with Asulox applied alone at 4 qt/A (full rate). Envoke at 0.2 oz/A applied with Asulox at 2 qt/A controlled large itch grass (more than 6 inches) better than Asulox applied alone at 4 qt/A. For ground application use a minimum of 10 gal of water per acre (broadcast basis). Higher spray volume of at least 20 gal per acre should be used for heavy weed infestations to ensure adequate spray coverage. **Envoke cannot be applied aerially**. **For both Asulox/Asulam and Envoke, DO NOT cultivate, fertilize or otherwise disturb the Johnson grass root system 7 days before or after application**.

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

Lay-By Weed Control (May-June)

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

Table 8: Lay-By Weed Control (May/June)

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

			grass control.
diuron @ 2.4 - 3.0 lbs.	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3 qt/A 80 DF formulation @ 3.0 - 3.75 lb/A	Seedling broadleaf weeds	Apply when sugarcane is 30 inches or taller. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.**
hexazinone plus diuron @ 0.27 - 0.4 lb/A + @ 0.94 - 1.4 lb/A	**DuPont K-4** 60DG @ 2 - 3 lb/A	Seedling Johnson grass, browntop panicum, and other annual grass and broadleaf weeds	Apply when sugarcane is 30 inches or taller. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Addition of pendimethalin can improve itch grass control. Velpar 2L at 0.8 qt/A and Direx 4L at 1.4 qt/A can be combined to closely represent the equivalent rate of 3 lb/A of DuPont K4. **If DuPont K-4 was applied in the spring do not apply more than 2 lb/A at lay-by.**

After Lay-By Weed Control (July-Harvest)

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

Table 9: After Lay-By Weed Control (July/Harvest)

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
POST-EMERGENCE After Lay-By (July-Harvest)			
2,4-D @ 0.47 - 1.42 lb/A	**2,4-D** products 3.8L formulation @ 1.0 - 1.5 qt/A (See Table 2) See information below on 2,4-D formulations	Morning glory (tie-vine) and other broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Note: Use of 2,4-D is restricted in some parishes. Check local restrictions before application. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting. See information below on 2,4-D formulations.**
atrazine @ 2.0 - 4.0 lb/A	**Atrazine/others** (See Table 2) 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Morning glory (tie-vine) and other broadleaf weeds	Apply with surfactant overtop or directed before row closure occurs. Use higher rate if vines are climbing sugarcane plants.
sulfentrazone plus metribuzin @ 0.18 - 0.37 lb/A + 0.27 - 0.56 lb/A	**Authority MTZ 45 DF** @ 16 – 33 oz/A See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF	Morning glory (tie-vine) and other broadleaf weeds, and nutsedge	Apply with surfactant as a directed treatment. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** Do not apply more than 33 oz/A in one growing season and within 120 days of harvest.
mesotrione @ 0.09 lb/A	**Callisto** 4L @ 3 oz/A	Morning glory (tie-vine) and other annual broadleaf weeds	Can be applied over the top or as a directed spray. Only one application can be made if Callisto was applied pre-emergence earlier in the season. Do not harvest sugarcane within 114 days following an over the top application and within 100 days following a directed spray.
dicamba @ 0.5 - 0.75 lb/A	**Clarity/Vision/others** (See Table 2) 4L formulation @ 16 - 24 oz/A 3.8L formulation @ 17 to 25 oz/A	Morning glory (tie-vine) and other broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Can be used in areas where 2,4-D is restricted. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting.**
trifloxysulfuron-sodium @ 0.014 - 0.028 lb/A	**Envoke** 75DF @ 0.3 - 0.6 oz/A	Morning glory (tie-vine) and other broadleaf weeds, itch grass and other annual grasses, and purple and yellow nutsedge.	Apply as a directed treatment with nonionic surfactant at 1 qt per 100 gallons. Do not apply within 100 days of harvest. A maximum of 3 applications or 1.5 oz/A may be applied per growing season.

Table 9, cont.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
Post-Emergence After Lay-By (July-Harvest)			
paraquat @ 0.50 - 1.0 lb/A	**Gramoxone Inteon/Paraquat/ others (See Table 2)** 2L formulation @ 2.0 - 4.0 pt/A 3L formulation @ 1.33 - 2.67 pt/A	Small grass and broadleaf weeds, and Bermuda grass suppression	Apply with surfactant as a directed treatment to the row middles in late June to desiccate Bermuda grass. **Herbicide contact to young sugarcane tillers and leaves can cause significant injury.**
halosulfuron @ 0.03 - 0.06 lb/A	**Permit/others (See Table 2)** 75DF formulation @ 0.67 - 1.33 oz/A	Purple and yellow nutsedge	Apply as a directed treatment at 1 to 1.33 oz/A with surfactant to nutsedge growing under the crop canopy
sulfentrazone @ 0.19 - 0.25 lb/A	**Spartan 4F @ 6.0 - 8.0 oz/A** See table included in the "At-Planting Weed Control (August/September)" section for information on the equivalent rates of Spartan 4F when using Authority MTZ 45DF	Morning glory (tie-vine) and other broadleaf weeds and nutsedge	Apply with surfactant as a directed treatment at the higher rate if morning glory is climbing sugarcane plants. **Injury will occur if herbicide contacts newly emerging sugarcane shoots and leaves.** If applied in the spring or at lay-by do not reapply. Do not apply within 120 days of harvest.
flumioxazin @ 0.10 - 0.25 lb/A	**Valor SX** 51WG @ 3.0 - 8.0 oz/A	Morning glory (tie-vine) and other broadleaf weeds and some annual grasses	**Apply as a directed treatment after sugarcane has begun to joint. Spray contact with more than the lower six inches of sugarcane plants will result in severe injury.** Residual red morning glory control can be expected for around 35 days. Valor can be applied at a maximum rate of 12 oz/A per crop year. Do not apply within 90 days of harvest
2,4-D plus dicamba @ 0.36 - 0.72 lb/A + 0.12 - 0.24 lb/A	**Weedmaster/Brash**/others *(See Table 2)* 3.8L formulation @ 0.5 - 1.0 qt/A	Morning glory (tie-vine) and other annual broadleaf weeds	Apply higher rate if vines are climbing sugarcane plants. Surfactant may be added. Note: Use of 2,4-D is restricted in some parishes. Check local restrictions before application. **To avoid potential stand and yield loss in the subsequent plant cane crop, do not apply to seed cane sources later than 7 weeks prior to harvest and planting.**

Table 9, cont.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
Post-Emergence After Lay-By (July-Harvest)			
halosulfuron plus dicamba @ 0.03-0.06 lb/A + 0.14 - 0.28 lb/A	**Yukon** 67.5 WG @ 4 to 8 oz/A	Purple and yellow nutsedge, small morning glory (tie vines), and other broadleaf weeds	Apply as a directed treatment at 1 to 1.33 oz/A with surfactant to nutsedge growing under the crop canopy. A 8 oz/A rate is equivalent to 1.3 oz/A Permit and 9.0 oz/A Clarity/Vision.

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

Fallow weed control

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

Table 10: Pre-Emergence Fallow

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
PRE-EMERGENCE Fallow			
atrazine @ 2 - 4 lb/A	**Atrazine**/others *(See Table 2)* 4 lb/gallon formulation @ 2 - 4 qt/A 90 DF formulation @ 2.22 - 4.44 lb/A	Broadleaf weeds	Use higher rate on heavy soils and when control in excess of 45 days is needed.
diuron @ 2.4 - 3.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 4 lb/gallon formulation @ 2.4 - 3.0 qt/A 80 DF formulation @ 3.0 - 3.75 lb/A	Broadleaf weeds	Use higher rate on heavy soils and when control in excess of 45 days is needed.
hexazinone plus diuron @ 0.50 - 0.53 lb/A + 1.75 - 1.87 lb/A	**DuPont K-4** 60DG @ 3.75 - 4.0 lb/A	Seedling Johnson grass, browntop panicum, doveweed, and other annual grass and broadleaf weeds	Apply to a clean seedbed at least 60 days prior to planting. Can be reapplied at planting but no more than 11.25 lbs can be applied per acre per year. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A.
EPTC @ 3.0 - 6.1 lbs/A	**Eptam 7-E** @ 3.5 - 7 pt/A	Annual grass and broadleaf weeds	Apply to a clean seedbed at least 60 days prior to planting. Can be reapplied at planting but no more than 11.25 lbs can be applied per acre per year. Velpar 2L at 1 qt/A and Direx 4L at 1.8 qt/A can be combined to closely represent the DuPont K4 rate of 4 lb/A.
halosulfuron @ 0.03- 0.06 lb/A	**Permit**/others *(See Table 2)* 75 DF formulation @ 0.67 - 1.33 oz/A	Purple and yellow nutsedge	A rate of 1 to 1.33 oz/A with surfactant is recommended for control of nutsedge. Can be applied with other herbicides. Do not exceed 2.67 oz/A in one growing season.
pendimethalin @ 2.5 lb/A	**Prowl/Prowl H2O**/others 3.3EC formulation @ 3 qt/A 3.8CS @ 2.6 qt/A	Seedling Johnson grass, itch grass, browntop panicum, other annual grasses	Apply to clean seedbed or incorporate 4 inches deep at least 60 days prior to planting.

Post-emergence fallow

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

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

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

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

application.

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

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

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

Sencor/others at 1 lb/A with **Weedmaster/Brash**/others at 1.5 pt/A were effective when planting was delayed beyond 3 weeks after application.

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

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

Ditchbank weed control

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

Table 11: Ditchbank Weed Control

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL			
2,4-D plus triclopyr @ 2 lb/A + 1 lb/A	Crossbow 3L @ 4.0 qt/A	Poppingweed, briars, and woody species	Best control obtained when applied to young poppingweed, less than 2 years old. For control of briars and smaller diameter woody species, apply at 1.0 to 1.5 gal/100 gal of water and add nonionic surfactant at 1 qt/100 gal of water. Apply in a spray volume of 40 to 60 gal per acre to thoroughly soak all stems and plant crowns at the soil line. **This product contains 2,4-D and use may be restricted in some areas of the state.**
diuron @ 2.0 - 15.0 lb/A	**Diuron/Direx**/others *(See Table 2)* 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.

Table 11, cont.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL			
triclopyr @ 2.0 - 3.0 lb/A	**Garlon**/others *(See Table 2)* 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.
MSMA @ 4.0 lb/A	**MSMA/others *(See Table 2)*** 6L @ 2.7 qt/A	Johnsongrass and itchgrass	Apply and repeat as necessary. Add nonionic surfactant at 1 qt/100 gal of water if not present in the formulation. Apply MSMA alone if the goal is to encourage bermudagrass growth for ditchbank stabilization. Mixing can be a problem when MSMA is applied with some broadleaf herbicides. **Note:** MSMA can no longer be purchased. If a sugarcane grower has MSMA in inventory it can be used on roadsides and ditchbanks. **After December 31, 2013, use of MSMA-containing products for all labeled uses, except cotton, is prohibited.**
pendimethalin @ 2.5 - 3.3 lb/A	**Prowl/Prowl H2O/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 3)*** **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 and Diuron/Direx/others 4L at 1.8 qt/A can increase initial control and provide extended control of many annual weeds. Do not allow herbicide to contact foliage of desirable plants.**

Table 11, cont.

Active Ingredient and Rate	Formulated Product and Rate	Weeds Controlled	Remarks and Precautions
DITCHBANK WEED CONTROL			
hexazinone plus diuron @ 0.5 + 1.8 lb/A	**Velpar** 2L at 1 qt/A and **Diuron/Direx**/others 4L at 1.8 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.
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.**

Table 12: Effectiveness of Selected Sugarcane Herbicides Applied Pre-Emergence and Post-Emergence In-Crop and In-Fallow

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

Table 13: Pre-emergence application

	Seedling Johnson grass	Rhizome Johnson grass	Itch grass (Raoulgrass)	Bermuda grass[1]	Browntop Panicum	Annual Grasses	Morning glory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
Pre-emergence Application:												
Atrazine/others	2	0	2	0	4	5	**8**	**9**	2	5	**8**	**9**
Authority MTZ	5	0	2	1	5	5	**9**	**8**	7	-	5	**8**
Callisto	2	0	0	0	5	5	76	**8**	2	**8**	3	**7**
Command plus Direx	**9**	2	**8**	**8**	**9**	**9**	6	**8**	2	-	7	**8**
Diuron/Direx/others	7	0	5	1	6	6	6	**8**	2	3	7	**8**
DuPont K-4	**8**	2	7	7	**8**	**9**	7	**8**	5	**9**	**8**	**8**
Eptam[4]	**8**	6	-	6	-	-	7	6	5	-	2	2
Prowl/others	**8**	2	**8**	2	**8**	**9**	2	2	3	0	6	2
Prowl plus DuPont K-4	**8**	2	**8**	5	**9**	**9**	7	**8**	3	-	7	**8**
Prowl plus Metribuzin/Sencor/others	**9**	2	**8**	5	**9**	**9**	**8**	**9**	4	-	**8**	**8**
Metribuzin/Sencor/others	**9**	0	2	6	6	**9**	**8**	**9**	5	-	**8**	**8**
Sinbar	**9**	0	2	**8**	3	**9**	7	7	5	-	6	5
Spartan	4	0	2	0	3	4	**9**	**8**	7	-	4	**8**
Treflan/Trifluralin/others[4]	**9**	6	**9**	7	**9**	**9**	2	2	5	-	**8**	2
Valor	3	0	2	0	3	4	**8**	**9**	2	-	**8**	**9**
Aim	0	0	0	0	0	0	**9**	**8**	0	0	-	-
Asulox/Asulam[5]	**8**	7	7	2	**8**	**9**	0	0	0	-	-	-

Table 13, cont.

	Seedling Johnson grass	Rhizome Johnson grass	Itch grass (Raoulgrass)	Bermuda grass[1]	Browntop Panicum	Annual Grasses	Morning glory (Tie-vines)	Other Broadleaf Weeds	Nutsedges	Doveweed	Winter Grasses[2]	Winter Broadleaf Weeds[3]
Atrazine/others	2	0	2	0	2	6	**9**	**9**	2	7	4	7
Callisto	0	0	1	0	4	4	**7**[6,7]	**8**	2	6	0	8
Clarity/Vision/others	0	0	0	0	0	0	**9**	**9**	3	6	0	**9**
Diuron/Direx/others	6	2	5	0	5	**8**	7	**8**	2	-	6	6
Envoke[5]	7	4	**8**	1	7	**9**	6	**8**	7	2	-	-
Envoke + Asulox/Asulam[5]	**8**	7	**9**	2	**8**	**9**	6	**8**	7	2	7	7
Glyphosate herbicides	**9**	**9**	**9**	**8**	**9**	**9**	6	7	6	4	**8**	**8**
Gramoxone Intion/	**8**	**2**	**8**	**4**	**8**	**9**	8	8	2	8[6]	**8**	**8**
Paraquat/others												
Permit/others	1	0	0	0	0	1	4	4	**8**	0	0	0
Spartan	2	0	2	0	2	4	**9**	**8**	7	-	3	**8**
Valor	2	0	2	0	3	4	**9**	**8**	2	5	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.
5Requires 28 to 35 days to reach maximum control.
[6] Addition of atrazine improves control.
[7]For best results, apply before morning glory exceed 5 inches in height.

Table 14: Glossary of Herbicides Registered for Use in Sugarcane in Louisiana[1]

Common chemical name	Company	Trade name and formulation
asulam	Bayer CropScience	Asulox XP - 3.12 lb/gal; Asulox - 3.34 lb/gal
	Helena Chemical	Asulam - 3.34 lb/gal
	United Phosphorus	Asulox - 3.34 lb/gal; Asulox XP - 3.12 lb/gal
	AgriSolutions (Agriliance)	Asulam 3.3 - 3.3 lb/gal liquid
atrazine	Drexel Chemical	Atra-5 - 5 lb/gal; Atrazine 4L - 4 lb/gal; Atrazine 90DF — 90% DF
	Helena Chemical	Atrazine 4L - 4 lb/gal; Atrazine 4F - 4 lb/gal; Atrazine 90-DG
	Loveland Products	Atrazine 4L - 4 lb/gal; Atrazine 90 WDG - 90% WDG
	Makhteshim Agan of N.A.	Atrazine 4L - 4 lb/gal; Atrazine 90DF 90% dry flowable
	Sipcam	Atrazine 4L - 4 lb/gal liquid; Atrazine 90DF - 90% dry flowable
	Southern States Cooperative	Atrazine 4L - 4 lb/gal
	Syngenta Crop Protection	AAtrex 4L - 4 lb/gal; AAtrex Nine - 85.5% WDG
	Tenkoz	Atrazine 4L- 4 lb/gal; Atrazine 4F - 4 lb/gal; Atrazine 90DF - 90% dry flowable
	Universal Crop Protection Alliance	Atrazine 4L - 4 lb/gal liquid; Atrazine 90 - 90% dry flowable
	AgriSolutions (Agriliance)	Atrazine 4L - 4 lb/gal liquid; Atrazine 90DF - 90% dry flowable
carfentrazone-ethyl	FMC	Aim EW - 1.9 lb/gal; Rage D-Tech - 0.13 lb/gal carfentrazone and 2,4-D ester
	Helena	Shutout - 0.05 lb/gal carfentrazone + mecoprop-p acid + 2,4-D ester
clomazone	FMC	Command 3ME - 3 lb/gal
	Helena Chemical	Command 3 ME - 3 lb/gal
2,4-D amine	Alligare	2,4-D Amine - 3.8 lb/gal
	Albaugh/AgriStar	2,4-D Amine 4 - 3.8 lb/gal
	Dow Agro Sciences	Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Helena Chemical	2,4-D Amine 4 - 3.8 lb/gal liquid; Sinker Ball - 1.74 lb/gal; Opti-Amine; 2,4-D Amine - 3.8 lb/gal liquid; Unison - 1.74 lb/gal; Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Loveland Products	Amine 4 - 3.74 lb/gal; Saber - 3.8 lb/gal; Crossbow - 3 lb/gal (2,4-D 2 lb/gal and triclopyr 1 lb/gal)
	Nufarm	UAP Timberland Platoon - 3.8 lb/gal; Weedar 64 - 3.8 lb/gal
	Tenkoz	Amine 4 - 3.8 lb/gal
2,4-D (ester)	AgriSolutions (Winfield Solutions)	2,4-D LV6 - 5.6 lb/gal
	Albaugh/AgriStar	2,4-D LV4 - 3.8 lb/gal; 2,4-D LV6 - 5.5 lb/gal
	Helena Chemical	2,4-D LV4 - 3.8 lb/gal; Barrage HF - 4.7 lb/gal
	Loveland Products	Low Vol 4 - 3.8 lb/gal; Low Vol 6 - 5.6 lb/gal; Salvo - 5 lb/gal; Whiteout - 3.7 lb/gal
	Nufarm	Weedone LV4 EC - 3.8 lb/gal
	Tenkoz	Lo-Vol 4 2,4-D Low Volatile - 3.8 lb/gal; Lo-Vol 6 2,4-D Low Volatile - 5.5
	Universal Crop Protection Alliance	2,4-D Lo-V Ester Weed Killer - 3.76 lb/gal liquid

Table 14, cont.

dicamba	**AgriSolutions (Agriliance)**	**Sterling - 4 lb/gal**
	Albaugh/AgriStar	Vision - 3.8 lb/gal
	Alligare	Cruise Control - 4 lb/gal
	Arysta LifeScience	Banvel - 4 lb/gal
	AXSS USA	Dicamba 4 DMA - 4 lb/gal
	BASF	Clarity - 4 lb/gal
	Gharda USA	Oracle Dicamba Ag. - 4 lb/gal liquid
	Loveland	Rifle - 4 lb/gal
	Nufarm	Diablo - 4 lb/gal
	Trace Mountain	Dicamba 4 - 4 lb/gal
	Universal Crop Protection Alliance	Dicamba - 4 lb/gal
dicamba + 2,4-D	AgriSolutions (Winfield Solutions)	Brash - 4 lb/gal
	Albaugh/AgriStar	Range Star - 4 lb/gal
	Arysta LifeScience North America	Banvel + 2,4-D - 3.8 lb/gal
	BASF	Weedmaster - 3.8 lb/gal
	Loveland	Rifle-D - 3.8 lb/gal
	Nufarm	Weedmaster - 3.8 lb/gal; Kambamaster - 3.8 lb/gal
diuron	AgriSolutions (Agriliance)	Diuron 4L - 4 lb/gal
	AgriSolutions (Winfield)	Diuron 80DF - 80% DF
	Alligare	Diuron 80DF - 80% DF
	Drexel Chemical	Diuron 4L - 4 lb/gal; Diuron 80W - 80 WP
	DuPont	Direx 4L - 4 lb/gal; Karmex XP - 80% DF
	Griffin	Direx 4L; Direx 80DF - 80% DF; Karmex DF - 80%; Karmex XP - 80% DF
	Loveland	Diuron 4L Herbicide - 4 lb/gal; Diuron 80WDG Weed Killer - 80% DG
	Makhteshim Agan of N.A.	Diuron 80DF - 80% DF; Diuron 4L - 4 lb/gal
EPTC	Gowan	Eptam 7E - 7 lb/gal
flumioxazin	Valent USA	Valor SX - 51.0% WDG
glyphosate	See Table 3	See Table 3
halosulfuron	Aceto Agricultural Chemicals Corp.	Halomax - 75 DF
	Gowan	Permit - 75% WDG; Yukon - 67.5% WDG (12.5% halosulfuron and 55.0% dicamba)
hexazinone	DuPont	Velpar L - 2 lb/gal; Velpar DF - 75% DG; Velpar K-4 Max - 78.8 DG (17.3% hexazinone and 61.5% diuron)
mesotrione	Syngenta Crop Protection	Callisto - 4 lb/gal; Callisto Xtra - 3.7 lb/gal (0.5 lb/gal mesotrione and 3.2 lb/gal atrazine)

Table 14, cont.

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

Table 14. cont.		
trifluralin	AgriSolutions (Winfield Solutions)	Trust - 4 lb/gal
	Albaugh/AgriStar	Trifluralin 4EC - 4 lb/gal
	Dow AgroSciences	Treflan HFP - 4 lb/gal
	Helena Chemical	Treflan 4EC - 4 lb/gal
	Loveland Products	Treflan 4L - 4 lb/gal; Trifluralin 4HF - 4 lb/gal
	Makhteshim Agan of N.A.	Triflurex HFP - 4 lb/gal
	Tenkoz	Trifluralin 4 EC - 4 lb/gal
	TriCorp	Trilin - 4 lb/gal
	Universal Crop Protection Alliance	Trifluralin 4EC - 4 lb/gal

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

Table 15: Glyposate Products Registered for Use in Louisiana with Surfactant Recommendations

		Glyhosate concentration[2]		Rate equivalent based on 4 lb ai/gal product			
Product	**Manufacturer or Distributor**	**Acid equivalent (a.e)**	**Active ingredient (a.i.)**	**Need for non-ionic 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

Table 15, cont.

		Glyhosate concentration[2]		Rate equivalent based on 4 lb ai/gal product			
Product	**Manufacturer or Distributor**	**Acid equivalent (a.e)**	**Active ingredient (a.i.)**	**Need for non-ionic surfactant[3]**	**1.0 qt**	**1.5 qt**	**2.0 qt**
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
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

Table 15, cont.

		Glyhosate concentration[2]		Rate equivalent based on 4 lb ai/gal product			
Product	**Manufacturer or Distributor**	**Acid equivalent (a.e)**	**Active ingredient (a.i.)**	**Need for non-ionic surfactant[3]**	**1.0 qt**	**1.5 qt**	**2.0 qt**
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 Pckg & 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 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	Agriliance	3	4	May be added***	1.0	1.5	2.0
Reserve 41 Plus	Ntl Ag Chem Assoc.	3	4	No	1.0	1.5	2.0

Roughneck	Nufarm	3	4	No	1.0	1.5	2.0
Roundup Original	Monsanto	3	4	May be added***	1.0	1.5	2.0
Roundup OriginalMax	Monsanto	4.5	5.	May be added*****	0.75	1.1	1.5
Roundup PowerMax	Monsanto	4.5	5.	May be added*****	0.75	1.1	1.5
Roundup WeatherMax	Monsanto	4.5	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.	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 web site. This list does not include all available glyphosate products. See herbicide label for specific crops and uses. The LSU AgCenter does not recommend or endorse specific herbicide brands.

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

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

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

Sugarcane fertilization

Sugarcane production is important to the Louisiana rural economy. Fertilizer and lime costs are two of the largest direct costs incurred in producing sugarcane. To maximize the return on fertilizer investment and insure minimal environmental damage, it is necessary to follow sound, research-based guidelines. For best results, apply fertilizer according to soil test recommendations.

To maximize returns from your fertilizer dollar, consider these four points: (1) What nutrients are needed? (2) How much of each nutrient is needed? (3) What source of fertilizer should be used? (4) How and when should they be applied?

Soil testing

The best way to determine lime, phosphorus and potassium requirements is with a reliable soil test. The soil sample must be collected properly for the test to be valid. Large fields should be broken up into smaller units for sampling purposes, and the smaller fields intensively sampled, because nutrient and pH levels often vary greatly within fields. Thorough sampling is the only way to detect these variations and adjust fertilizer and lime rates accordingly.

Soil samples may be collected at any time before fertilizing or liming, but soon after harvest is recommended, if possible. You will get your test results in time to plan a fertilizer program tailored to each individual field. Also, if lime is recommended, it is best applied in the fall or early winter since it takes several months for lime to react fully with the soil to neutralize excess acidity.

An investment in a good soil testing program is one of the most effective programs you can use to increase profits. More information on soil sampling, soil sample collection boxes and information forms can be obtained from your county agent.

Lime

Correcting soil pH is the single most important aspect of a soil fertility program. Availability of most plant nutrients is usually best in a soil with a pH of 5.8-7.0. Yield decreases can occur when the pH falls below 5.5 on silt loam and sandy loam soils, and below 5.2 on clay loams and clays. Soil solution levels of aluminum and manganese increase sharply when the soil pH falls below 5.0. Root growth slows rapidly when soil solution levels of aluminum or manganese become toxic. Other benefits of liming include enhancing the activity of soil microorganisms and improving the activity of soil applied herbicides.

When the soil pH drops below 5.5 on sandy loam or silt loam soils, or below 5.2 on clay loam or clay soils, lime is recommended to reduce soil acidity. Lime rates should always be based on soil test results. Different soils have different buffering capacities. For example, an equal amount of lime may raise the soil pH one full unit on a sandy soil, and possibly only two-

tenths of a unit on a clay loam soil. A soil test is necessary to determine the correct amount of lime to apply since excessive rates of lime may cause problems, including deficiencies of some nutrient elements. For best results, apply lime in the fallow year and incorporate, or apply in the fall or winter. Lime takes several months to reach its maximum effectiveness.

There are two basic types of lime, calcitic and dolomitic. Calcitic lime contains primarily calcium carbonate. Dolomitic lime contains both calcium carbonate and magnesium carbonate. If soil test levels of magnesium are very low, low or medium, use dolomitic lime if lime is needed. If soil test magnesium levels are high or very high, either source may be used. In this case, base your choice of lime on price and availability.

Nitrogen

Nitrogen rates: Nitrogen is an important plant nutrient and used in fairly large amounts by sugarcane. Nitrogen is supplied to the plant by fertilizers, residual nitrogen in the soil, decomposition of organic matter and atmospheric sources of nitrogen. Nitrogen rates in sugarcane are based on soil type (whether the soil is light or heavy) and crop (plant cane vs. stubble cane). Table 2 shows the recommendations for nitrogen rates on sugarcane in Louisiana.

Table 16: Recommended Nitrogen Rates for Sugarcane in Louisiana

Crop	Soil Type	Nitrogen Rate (lbs. N/acre)
Plant-cane	Light	60 – 80
Plant-cane	Heavy	80 – 100
Stubble	Light	80 – 100
Stubble	Heavy	100 - 120

Nitrogen placement: Nitrogen fertilizer is best applied as a banded application to row side, either off bar or knifed in.

Nitrogen timing: The recommended time for nitrogen application is April 1 -April 30 – earlier if the crop is more advanced and later if the crop is less advanced. Early applications of nitrogen have the potential to be lost to leaching and denitrification and can stimulate early weed growth.

Split applications of nitrogen: Split applications of nitrogen may be beneficial under certain rare situations. These include high tonnage cane free of weeds and with weather conditions which lead to nitrogen loss, such as excessive rainfall. If nitrogen is to be split, apply two-thirds of the recommended rate in early April and the remainder at lay-by. Nitrogen is important for good tillering (suckering) and should not be limited during this important growth stage of sugarcane.

Sources of nitrogen: If correctly applied, all sources of nitrogen are equal in their ability to increase the yield of cane and sugar per acre. Base your decision(s) on nitrogen sources on price, service, convenience and personal preference.

Phosphorus and potassium

Phosphorus (P) and potassium (K) are important plant nutrients for sugarcane and used in fairly large quantities. Phosphorus is expressed in fertilizer analyses phosphate (P_2O_5) equivalent; potassium is expressed as the potash (K_2O) equivalent.

Phosphorus (P): Phosphorus is critical in the early stages of sugarcane growth. It stimulates root growth. It is essential in the storage and transfer of energy, and is an important component of several biochemicals that control plant growth and development. If all other factors are equal, sugarcane grown on clay soils generally responds to phosphorus fertilizer applications better than does cane grown on sandy soils. This is because of poor root penetration and a small root feeding volume in clay soils.

Phosphate (P_2O_5) is used by sugarcane at a rate of approximately 1.7 lbs per ton of cane. Of this, about half is in the millable stalk and is removed from the field, and about half is in the tops, trash, stubble and roots and returned to the soil during decomposition.

Phosphate fertilizer rates should be derived from soil test results. Phosphate is recommended according to soil test levels of P and age of cane stand. Table 3 shows the phosphate fertilizer recommendations for sugarcane.

Table 17: Recommended Phosphate Rates for Sugarcane in Louisiana

Soil Test	Plant Cane	Stubble Cane
	lbs P_2O_5 per acre	
Very Low	50	60
Low	45	50
Medium	40	40
High	0	0
Very High	0	0

Phosphorus availability in the soil is largely controlled by soil pH. When the soil pH is highly acidic (pH < 5.5), phosphorus becomes tied up in insoluble compounds with iron and aluminum. When the soil pH is alkaline (pH > 7.0), phosphorus becomes tied up in insoluble compounds with calcium. Phosphorus is most available to plants when the soil pH is 6.0-7.0.

Phosphorus fertilizers attach strongly to the soil particles. In Louisiana soils, phosphorus losses to leaching are almost non-existent. The major means of phosphorus losses from the soil are crop removal and soil erosion.

Application methods for phosphate fertilizers depend on the soil pH and soil test P level. Do not broadcast phosphate if the soil pH is below 5.0 or above 7.5. If soil test levels of P are low or very low, band applications should be made to increase the efficiency of the phosphate fertilizer. On soils with a pH of 6.0-7.0 and testing medium in P, broadcast application of phosphorus can be as effective as band applications. When using broadcast applications of phosphate, the fertilizer can be applied after the cane has been off-barred and before rebuilding the row. This will result in a semi-banding of the fertilizer.

Potassium (K): Potassium is indirectly related to many plant cell functions in sugarcane. Some 60 enzymes require the presence of K. Potassium deficiency inhibits the ability of the plant to use available water and makes them more susceptible to drought stress. Potassium deficient plants are more prone to certain diseases and more likely to lodge than plants containing adequate potassium.

Sugarcane is a heavy feeder of potassium. The plants require about 6.7 lbs. of potash (K_2O) per ton of cane produced. Of this amount, about 2.9 lbs. are contained in the millable stalk and removed from the field. The remaining 3.8 lbs. of potash are contained in the tops, trash, stubble and roots and are returned to the soil during decomposition.

Potash fertilizer rates should be based on soil test results. Potash is recommended according to soil test levels of K and age of cane stand. These recommendations are based on research conducted by LSU AgCenter scientists. Table 4 shows the potash fertilizer recommendations for sugarcane from the Louisiana Cooperative Extension Service. Although a suggested rate is

shown for situations when soil tests are not available, soil testing is strongly encouraged. Using a general recommendation instead of one based on soil tests can waste money or reduce yields.

Table 18: Recommended Potash Rates for Sugarcane in Louisiana

Soil Test	Plant Cane	Stubble Cane
	lbs K_2O per acre	
Very Low	120	140
Low	110	120
Medium	80	80
High	0	0
Very High	0	0

The higher rates at the low and very low soil test levels are to replace what the cane crop removes and perhaps give a small build-up amount. This can prevent mining of potassium from the soil at these low soil test levels.

In most instances, broadcast potash fertilizers are equal to banded applications. The fertilizer can be applied after the cane has been off-barred and before rebuilding the row. This will result in a semi-banding effect. Since potash fertilizers do not tie up chemically with the soil, they can be applied anytime between harvest and the time the cane begins spring growth, except in extremely sandy soils. In extremely sandy soils, potash can leach and should be applied near the time of spring growth.

Sulphur (S): Sulfur is essential in several key plant functions including synthesis of chlorophyll and photosynthesis. It is a constituent of several enzymes, amino acids and biochemicals which regulate plant growth.

Yield increases to applied sulfur fertilizers on sugarcane have been observed in Louisiana under certain situations. Yield increase due to sulfur fertilizer may be expected include: (1) stubble cane is more likely to respond to S fertilization than plant cane and (2) sugarcane grown on fine-textured soils (clays) is more likely to respond to S fertilization than sugarcane grown on coarse-textured soils (sandy loams and silt loams). Table 5 provides soil test recommendations for sulphur in sugarcane.

Table 19: Recommended Soil Levels for Sulphur in Sugarcane.

Soil test category	Plant-cane	Stubble-cane
	----------lbs/acre----------	
Low	24	24
High	0	0

If an economical source can be obtained, gypsum (calcium sulfate) can be substituted for sulfur fertilizer in areas where sulfur responses are expected. Applying 1 ton of gypsum in the fallow year can provide adequate sulphur for the crop cycle. Base your choice of sulphur or gypsum on price, availability and convenience.

Micronutrients

Generally speaking, micronutrient deficiencies are not common on sugarcane in Louisiana. Research by sugarcane soil scientists has failed to establish yield increases caused by general applications of zinc, copper, boron or other micronutrients. In specific situations, where a micronutrient deficiency is known to exist, specific micronutrient applications may increase yields. However, we do not recommend applications of micronutrients unless a deficiency of a particular micronutrient has been confirmed by soil or tissue analysis (Table 6).

Table 20: Sugarcane Recommendation for the Application of Zinc in Louisiana

Soil test category	Application Rate
	-------lbs/acre----------
Very low (<1 ppm)	6
Low (< 2.25 ppm)	3

Fertilization at planting

Succession planted cane: Fall fertilization at planting time has been shown to increase yield of succession planted cane. In most tests, succession planted cane with fall-applied NPK fertilizer produced yields similar to conventionally planted cane after a fallow year.

Research results indicate that 15-45-45 lbs/A of N-P_2O_5-K_2O should be applied in the planting furrow before planting succession cane. In addition, the normal recommended N, P_2O_5 and K_2O rates for stubble cane should be applied in the spring of each crop year, depending on soil type and soil test results.

Conventionally planted cane: Only a few positive yield responses have been noted in both plant and stubble cane crops from a one-time in-furrow fertilizer application at planting. With increasing costs of fertilizer, it is not recommended to make an at-planting fertilizer application following a conventional fallow program or following a soybean crop.

Filter press mud: Soil application of filter press mud, a byproduct of raw sugar factories, has generally resulted in yield increases in sugarcane and improvement of soil fertility. The total

nitrogen, phosphorous, potassium, calcium (Ca), and magnesium (Mg) found in filter press mud were high compared to soil contents of these elements. Although extractable Ca and Mg were relatively high in filter press mud, addition of filter press mud to soils resulted in only small changes to soil pH.

Caution: Direct treatment with filter press mud fresh from the factory at harvest has occasionally caused "burning" of cane when very low rainfall occurred the following spring.

Summary

A complete soil fertility program is essential for maximum sugarcane yields and profits. Use soil tests properly. Know the lime and fertilizer requirements for each field on which you grow sugarcane, and apply the plant nutrients according to the recommendations and soil test results. Avoid unproven and untested products. You'll harvest better yields and make more profit if you do.

Sugarcane ripener recommendations

Glyphosate program

In 2013, the following glyphosate formulations are available as chemical ripeners: Touchdown Total®, Roundup WeatherMAX®, and Roundup PowerMAX®. **Note: these products are labeled for use in stubble sugarcane crops only and not in plant cane.** When used according to the label and the following recommendations, these products should increase recoverable sugar per ton of cane, while minimizing decreases in tons of cane per acre. Sugarcane's response to ripener application may be lessened when conditions favor good natural ripening or when conditions are not conducive to glyphosate absorption. Ripener application will reduce vegetative growth and may reduce cane yields. However, cane yield losses are generally offset by increases in recoverable sugar per ton of cane, resulting in equal or greater yields of sugar per acre when harvested during the recommended treatment-to-harvest interval.

Table 21. Glyphosate ripener rates for available formulations.

Glyphosate Formulation	Recommended	Label Rate Range
	---------- Ounces per acre ----------	
Touchdown Total®	5.7	4.3 – 13.4
Roundup WeatherMAX®	5.3	4.0 – 12.0
Roundup PowerMAX®	5.3	4.0 – 12.0

[1] **DO NOT** round off rates as shown in the table.

Rates, drift, and surfactants: Application rates for glyphosate products vary depending on concentration of active ingredient (Table 1). Use of higher than the recommended rates should only be used on the final stubble crop as the risk of injury increases.

Glyphosate can cause serious damage when drifted onto non-target sites (newly planted cane, other crops, or residential landscapes). Drift-control agents may be added to reduce drifting potential. However, ripener should only be applied when wind speeds are between 3 and 10 mph and should not be applied when there is a surface temperature inversion. A surface inversion occurs when temperature at the surface is cooler than air above the surface; usually in the evening or early morning. Surface inversions restrict vertical air mixing and cause spray droplets to remain suspended where they can move laterally reducing effectiveness of application and potentially causing damage to non-target sites. Also, wind direction should be taken into account when applying glyphosate ripener to avoid drifting onto sensitive non-target sites.

All recommended glyphosate formulations contain surfactants, so under normal conditions, no additional surfactant is needed. Research has shown that rainfall less than 6 hours after

application may reduce sugarcane's response to glyphosate. The low use rate of glyphosate, when applied as a sugarcane ripener, results in a lower than ideal concentration of surfactant in the spray solution. This lower amount of surfactant may not provide the rain-fastening properties obtained when these formulations are applied at much higher herbicidal rates. Therefore, do not apply glyphosate ripener if rainfall is likely within 6 hours of application.

Variety response: Some sugarcane varieties are less responsive to glyphosate than others. Higher rates of glyphosate may be needed to obtain the desired increase in the recoverable sugar per ton of cane (TRS) in varieties that are less responsive (Table 2). Caution should be used when applying higher rates in order to increase response in poor responding varieties as this may also increase injury to the following year's stubble crop.

Table 22. Response of Louisiana sugarcane varieties to glyphosate ripener application

Highly Responsive	Moderately Responsive
LCP 85-384	HoCP 85-845
HoCP 96-540	L 97-128
L 99-226	L 99-233
L 01-299	HoCP 00-950
L 03-371	L 01-283
HoCP 04-838	

Treatment to harvest intervals: A 28 to 49 day treatment to harvest interval is recommended following glyphosate ripener application. Research has shown that the percent increase in TRS is similar during this time frame. Harvesting prior to 28 days is not recommended because this will not maximize TRS for ripener applications. Delaying harvest beyond 49 days not only reduces yield potential in the current crop but increases risk of injury and further yield loss in next year's crop.

Application schedule: When glyphosate ripener is applied in late August and early September for harvest in late-September or early-October, sugarcane will still be actively growing. Therefore, it is recommended that the first applications be scheduled no earlier than 4 weeks before mill opening to minimize reductions in cane tonnage. This will also allow for delays in factory openings without greatly impacting the current and future stubble crops.

The following schedule is recommended to maximize the response to application of these ripeners. **For harvest dates of September 15 to October 15, consider a treatment-to-harvest interval of 28 to 35 days; from October 15 to November 15, 28 to 42 days; and from November 15 to December 1, 35 to 49 days.** Treatment-to-harvest intervals beyond 49 days are not recommended, especially if additional stubble crops are planned. Sugarcane scheduled for harvest after December 1 should not be treated with a ripener as sugarcane will have matured naturally and little to no increase in recoverable sugar should be expected.

Response to glyphosate is based on sugar levels at the time of ripener application; therefore, it is recommended that a hand refractometer be used to test for Brix as an indicator of the cane's sucrose content prior to application. Fields with the highest Brix should be treated first and fields with the highest Brix at the recommended treatment-to-harvest interval should be harvested first. Please refer to *Brixing to Improve Sugarcane Quality*, online Publication No. 2888.

Regrowth: Research has shown that glyphosate ripener applications may delay spring shoot emergence and, in some cases, harvestable stalk populations in subsequent stubble crops. In some years and in some varieties, spring shoots will appear bleached and stunted. Sugarcane will typically outgrow this injury with warmer weather. Yield reductions are infrequent, occurring primarily when higher than recommended rates of glyphosate are applied, and/or recommended treatment-to-harvest intervals are exceeded, and/or harvest residue is not removed on a timely basis following harvest. Leaving mulch on ripener-treated sugarcane can reduce sugar yields by as much as 30% the following year. In fields where mulch cannot be removed, a ripener should only be applied to the last stubble crop.

Points to consider when applying a glyphosate-based ripener:

1. Follow product labels and rate recommendations.
2. Do not apply to seed-cane or plant-cane.
3. Apply the higher recommended rates only to the last stubble crop.
4. Do not exceed the maximum recommended treatment-to-harvest intervals (49 days).
5. Do not apply glyphosate ripeners to sugarcane after the third full week of October.
6. For best results, apply glyphosate to erect cane. If recently lodged, allow sufficient time (7-10 days) for the cane to erect itself.
7. Do not apply ripeners when rainfall is imminent.
8. Use a drift control agent to reduce chances of injuring crops in nearby fields.
9. Use a hand refractometer to measure Brix to optimize ripener scheduling.

Moddus™ program

The plant growth regulator Moddus™ was recently labeled for use as a ripener for sugarcane in Louisiana. Limited quantities will be made available for the 2013 sugarcane harvest. Moddus™ can be applied to all crops in the sugarcane crop cycle. The recommended rate for Moddus™ for ripening sugarcane in Louisiana is 16 – 19 oz./acre. The label states that Moddus™ can be applied 28 – 60 days prior to sugarcane harvest; higher theoretical sugar per ton of cane (TRS) response was achieved in the 50 – 60 day range.

Table 23. Moddus ripener rates for sugarcane grown in Louisiana

Trinexapac-ethyl Formulation	Recommended	Label Rate Range
	---------- Ounces per acre ----------	
Moddus™	16 – 19	11 – 19

Research experience

- Moddus™ did not increase theoretical recoverable sugar as effectively as glyphosate. The average TRS increase was 5 percent above non-treated sugarcane; whereas, the increase for glyphosate was 10 – 20 percent.
- Moddus™ response among Louisiana varieties was more variable. Varieties such as L 99-226, L 99-233, and HoCP 00-950 exhibited negligible to low TRS increases due to Moddus application; varieties such as HoCP 96-540 and HoCP 04-838 exhibited greater TRS increases.
- Moddus™ reduces sugarcane growth which can reduce cane yields (tons/acre) when compared to non-treated sugarcane, but reductions in yield were generally less than when compared with glyphosate applications. Reductions in cane yield as a result of ripener application, glyphosate or Moddus, depend on rate of growth at time of application, treatment to harvest interval, and sugarcane variety.

Days to Harvest for POLADO Application

September Harvest

Table 24: Days to Harvest fo POLADO Application (September Harvest)

Date of Harvest: September																	
Date of Application		15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Aug.	4	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
	5	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	6	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
	7	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	8	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
	9	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	10	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	11	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	12	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
	13	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	14	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	15	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
	16	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	17	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
	18	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	19	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	20	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
	21	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	22	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	23	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
	24	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
	25	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	26	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	27	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	28	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	29	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	30	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	31	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Sep.	1	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	3	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	4	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

	5	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	6	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	8	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	9	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	10	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	11	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	12	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	13	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	14	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	15		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	16			1	2	3	4	5	6	7	8	9	10	11	12	13	14
	17				1	2	3	4	5	6	7	8	9	10	11	12	13
	18					1	2	3	4	5	6	7	8	9	10	11	12
	19						1	2	3	4	5	6	7	8	9	10	11
	20							1	2	3	4	5	6	7	8	9	10
	21								1	2	3	4	5	6	7	8	9
	22									1	2	3	4	5	6	7	8
	23										1	2	3	4	5	6	7
	24											1	2	3	4	5	6
	25												1	2	3	4	5

Days to Harvest for POLADO Application October Harvest

Table 25: Days to Harvest for POLADO Application (October Harvest)

Days to Harvest: October																																
Date of Application		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Aug	14	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
	15	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
	16	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
	17	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
	18	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
	19	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
	20	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	21	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	22	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	23	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
	24	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
	2	3	3	3	4	4	4	4	4	4	4	47	4	4	5	5	5	5	5	5	5	5	5	5	60	6	6	6	6	6	66	67

	5	7	8	9	0	1	2	3	4	5	6		8	9	0	1	2	3	4	5	6	7	8	9		1	2	3	4	5		
	26	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
	27	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
	28	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
	29	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
	30	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
	31	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
Sep	1	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	2	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
	3	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
	4	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
	5	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	6	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
	7	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	8	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53

	9	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	10	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	11	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	12	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49

Days to Harvest: October																																	
Date of Application	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
	13	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
	14	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	
	16	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
	17	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
	18	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	
	19	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
	20	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
	21	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	

	22	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
	23	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
	24	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
	25	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
	26	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
	27	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
	28	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
	29	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Oct.	1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	2			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
	3				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
	4					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
	5						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
	6							1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	

	7								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	8									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	9										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	10											1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	11												1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	12													1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Days to Harvest for POLADO Application November Harvest

Table 26: Days to Harvest for POLADO Application (November Harvest)

		Days to Harvest: November																														
Date of Application		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Sep.	20	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	
	21	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	
	22	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	
	23	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	
	24	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	
	25	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	
	26	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	
	27	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	
	28	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	
	29	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	
	30	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	
Oct	1	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	

.		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
	2	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
	3	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
	4	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
	5	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	6	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
	7	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	8	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
	9	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	10	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	11	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	12	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
	13	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	14	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	15	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46

	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	17	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
	18	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
	19	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
	20	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
	21	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	22	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	23	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
	24	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
	25	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	26	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	27	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	28	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	29	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

	30	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Nov.	1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	2			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	3				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	4					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
	5						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	6							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	7								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	8									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	9										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	10											1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	11												1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	12													1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	1														1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1

	3																					0	1	2	3	4	5	6	7
	14														1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Sugarcane harvesting recommendations including

Post-freeze resistance of varieties

To maximize the yield of sugar per acre, always strive to deliver clean, fresh cane to the mill for processing. The use of glyphosate is recommended at the proper rate range to increase the yield of recoverable sugar per ton. Further, it is recommended that all stubble cane be harvested prior to harvesting plant-cane because stubble cane generally matures earlier than plant-cane. Also, the growth rate in the stubble crop during the harvest is generally less than the growth rate in the plant-cane crop. Delaying the harvest of the plant-cane crop will generally mean an increase in cane yield during the harvest season.

Maturity classification

Maturity studies designed to measure relative changes in juice quality of commercial varieties are conducted at the USDA-ARS Sugarcane Research Unit on a continuing basis in the first-stubble and plant-cane crops. Within each stubble group, varieties should be harvested according to the following maturity classes:

- **Very early –** varieties with an acceptable yield of commercially recoverable sugar per ton of cane on or before October 1 (HoCP 00-950, L 01-283);
- **Early –** varieties with acceptable yield of commercially recoverable sugar per ton of cane on or about October 15 (HoCP 96-540, L 99-226, L 01-299, L 03-371, HoCP 04-838); and,
- **Mid-season –** varieties with acceptable commercially recoverable sugar on or about November 1 (L 99-233).

Glyphosate is an effective management tool to advance the maturity curve of all varieties listed above in the stubble crop; however, the rate of increase is dependent upon the variety selected as well as the condition of the cane and the weather at the time of application. The increase in commercially recoverable sugar per ton of cane, as an average of all varieties when using glyphosate at the recommended rate and proper treatment-harvest interval, is 21%. Growers are suggested to follow the recommendations for the use of glyphosate in the publication “Sugarcane Ripener Recommendations” (See Section V of this handbook).

Post-freeze classification

Varieties harvested after December 1 are generally vulnerable to a damaging freeze (25°F) with freezing temperatures lasting for 6-10 hours or more. However, regardless of the crop year, all varieties should be harvested after a freeze of this magnitude according to stalk cold tolerance or resistance to deterioration following a killing freeze. Varieties are classified according to the following post-freeze resistance groups:

- **Resistant –** varieties with generally acceptable levels of sucrose, purity, TRS, pH, titratable acidity and dextran for four weeks following a freeze of the above magnitude (HoCP 96-540, L 01-283, L 01-299, HoCP 04-838);
- **Intermediate –** varieties with generally acceptable levels of sucrose, purity, TRS, pH, titratable acidity and dextran for two to four weeks following a freeze of the above magnitude (Ho 95-988, L 97-128, HoCP 00-950); and,
- **Susceptible –** varieties with generally unacceptable levels of sucrose, purity, TRS, pH, titratable acidity and dextran within two weeks following a freeze of the above magnitude (L 99-226, L 99-233, L 03-371).

Insect guide: commercial sugarcane

The sugarcane borer is the most destructive insect attacking the Louisiana sugarcane crop. Wireworms, the sugarcane aphid, sugarcane beetle, sugarcane mealybug, root stock weevils, West Indian canefly, and springtails are minor pests for which no controls or spot controls are consistently recommended. The Mexican rice borer, which was first discovered in Calcasieu Parish in 2008, is also a pest of potential concern. Populations of the Mexican rice borer are present in low numbers across the western sugarcane region including Calcasieu, Cameron, and Jefferson Davis Parishes.

Table 28: Sugarcane borer

Sugarcane Borer	
Cultural Practices	1. The following farming practices can reduce sugarcane borer infestations and damage. 2. Plant non-infested seed cane to improve crop stands. Sugarcane borer larvae in seed cane can destroy 20% or more of the vegetative buds (eyes), and contribute substantially to overwintering populations. 3. Plant corn as far as possible from sugarcane to reduce mid-summer moth migration from senescing cornfields to sugarcane. 4. Plow stubble soon after final harvest to reduce the number of overwintering larvae. 5. Leave crop residues such as cane tops, pieces of broken stalks, or old stubs exposed on the soil surface throughout winter to obtain maximum kill of larvae by low temperature.
Varietal Resistance	Some varieties withstand sugarcane borer attack better than others. The following commercial sugarcane varieties are ranked in order of their response to attack. Within resistance groups those varieties that grow more quickly early in the season are more likely to have early heavy infestations. In addition, because of fewer fire ants and other arthropod predators, plant cane fields often have earlier treatable infestations. With the development of combine harvester operations and increased use of reduced risk insecticides enhancing beneficial organisms, substantial reductions in sugarcane borer populations are occurring.
Relative Susceptibility to Borer Injury*	**Rating** / **Available Varieties** Resistant: **HoCP 85-845, **HoCP 04-838 Moderate: L 99-226, L 01-283, L 01-299 Susceptible: HoCP 96-540, Ho 95-988, L 97-128, L 99-233, HoCP 00-950, L 03-371 * Based on injury in replicated on-farm varietal trials. ** Standards for Mexican rice borer varietal evaluations are HoCP 85-845 (resistant) and HoCP 04-838 (susceptible). Plant each variety in as large an area as possible. This practice facilitates the scouting program and reduces the treatment of resistant varieties when mixed with susceptible varieties. Plant resistant varieties wherever appropriate as this will greatly reduce the number of insecticide applications needed for control of damaging infestations. Use of resistant varieties supplies about 25% of the suppressive effect annually to control the sugarcane borer.

Table 29: Insecticides to use against sugarcane borers and Mexican rice borers

Insecticide	IRAC Mode of Action	Dosage Pounds A.I./Acre	Dosage Fluid Ounce/Acre	Last Application to Harvest**
Sugarcane borer				
Karate Z	Pyrethroid (3A)	0.033	2.0	21 days
Asana XL	Pyrethroid (3A)	0.033-0.05	5.5-9.8	21 days
Baythroid XL	Pyrethroid (3A)	0.033	2.1	15 days
Mustang Max	Pyrethroid (3A)	0.01875-0.025	3.0-4.0	21 days
Proaxis	Pyrethroid (3A)	0.0125-0.02	3.2-5.12	21 days
Voliam Xpress, Besiege	Diamide (28) + Pyrethroid (3A)	0.078-0.098	8.0-10.0	14 days
Reduced Risk Chemistry				
Confirm 2F	Diacylhydrazine [IGR] (18)	0.09-0.12	6.0-8.0	14 days
Diamond 0.83EC	Benzoylurea [IGR] (15)	0.052-0.078	8.0-12.0	14 days
Coragen	Diamide (28)	0.045-0.065	3.5-5.0	14 days
Prevathon	Diamide (28)	0.047-0.067	14.0-20.0	14 days
Belt SC	Diamide (28)	0.094-0.125	3.0-4.0	14 days
Mexican Rice Borer				
Diamond 0.83 EC	Benzoylurea [IGR] (18)	0.052-0.078	12.0	14 days
Confirm 2F	Diacylhydrazine [IGR] (15)	0.25	16.0	14 days
Baythroid XL	Pyrethroid (3A)	0.022	2.8	15 days
*Insecticide Resistance Action Committee Mode of Action Classification				
** Minimum number of days from last application until harvest				

Note: During those instances that treatable sugarcane borer and morningglory (tie vine) infestations occur in the same fields during late summer, a co-application of insecticide and 2-4-D can be used [minimum five (5) gallons water/acre] unless otherwise stated on the label. For most labeled products, effectiveness is not reduced when insecticides and 2-4-D are co-applied and there are no additional drift hazards associated with the combination than with each chemical applied independently. This saves the cost of an additional application.

Warning: Re-entry times for workers entering groves and/or treated fields should be strictly observed. Be sure to check the label for this information.

Timing application: It is important that fields be checked at weekly intervals from mid-June through Sept. 15, that insecticides are applied only when economically injurious borer infestations exist, at an action threshold of 5% stalks infested with live larvae in leaf sheaths.

No Application Should Be Made During Rain. Applications may be made after Sept. 15 when borer populations could damage late harvested sugarcane as long as the PHI is considered. Insecticide applications should be made only after joints have begun to form and when economic infestations are detected. The need for thorough and competent checking of fields to determine where and when to use insecticides is most acute.

Field checking permits the use of insecticides in a way that will:

1. Prevent the unnecessary destruction of natural enemies of the sugarcane borer.
2. Eliminate the unnecessary expense of applying insecticides where they are not needed.
3. Reduce fish kills and adverse effects of insecticides on other wildlife.
4. Prolong the useful life of new insecticides by delaying the development of resistance.
5. Reduce hazards of insecticide contamination of drinking water.
6. Reduce amount of insecticide accumulating in the soil that could cause excess residues in future crops.

Wireworms

Soil treatment is recommended to control wireworms where sod land is planted to cane or where wireworms are a problem. Wireworm damage generally occurs in spots and is usually confined to sandy loam soils. Apply granular insecticide over seed pieces in the open furrow in a band 12-16 inches wide so that all the seed pieces have contact. The application should be made just before the seed pieces are covered with soil.

Formulation	**Dosage**	**Application**
Thimet 20G	1.0-1.5 pounds/A.I./acre 5.0-7.5 pounds/acre	Apply in furrow directly around planted cane in a 12-inch band and cover with soil.
Mocap 20G	1.0-1.5 pounds/A.I./acre 5.0-7.5 pounds/acre	Apply in furrow directly around planted cane in a 12-inch band and cover with soil.

Sampling: No treatments should be made without sampling to determine if an infestation of wireworms exists. Wireworms can be sampled by setting up 1-2 bait stations per acre 1-4 weeks before planting. For each bait station, bury a handful of fermented corn seeds 2-4 inches deep (corn seeds must not be coated with a seed treatment). Cover with a small mound of soil and mark location with a flag. Remove the soil and count the number of wireworms attracted to each bait station at least a week after set up. Wireworms are hard, elongated, wire-like larvae. An average of one wireworm per bait station would justify insecticidal control.

Note: Liquid formulations are not recommended for wireworm control because their persistence is limited and these formulations are extremely hazardous to the applicator.

Aphids

Foliar applications of labeled pyrethroids are not recommended because of inadequate control of the yellow sugarcane aphid and sugarcane aphid.

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Pub. 2859 (2.5M) 12/13 Rev.