SUGARCANE RIPENERS

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Response of HoCP 18-803 to glyphosate and glyphosate in combination with trinexapac-ethyl (Moddus) A study was conducted in 2025 at the Sugar Research Station in St. Gabriel, LA, to evaluate the ripening potential of glyphosate alone and in combination with the ripener trinexapac-ethyl on first-ratoon HoCP 18-803. The experimental design was a randomized complete block with three replications, and plot size was two rows wide (12 ft) by 30 ft in length. Treatments were applied on August 12, 2025, using a tractor-mounted boom sprayer. Treatments included Roundup PowerMax3 at 5 oz/A and Roundup PowerMax3 at 2.5 oz/A + Moddus at 11 oz/A. A hand-cut, 10-stalk sample from each plot was harvested 35 days after treatment (DAT), shredded, and processed at the Sugar Research Station's Sucrose Lab using Spectra Cane NIR to determine theoretical recoverable sugar (TRS, lbs/ton of cane). After sampling was completed, plots were harvested with a sugarcane chopper harvester and loaded into a wagon equipped with load cells, and the weight of each plot was recorded. Sugar yield (lbs/A) was calculated as the product of TRS and cane yield (tons/A). Cane yield was similar for the ripener treatments and the untreated check (Table 1). TRS and sugar yield for both the Roundup PowerMax3 and Roundup PowerMax3 + Moddus treatments were significantly greater than those of the untreated control.

Table 1. First-ratoon HoCP 18-803 response to ripener treatments in St. Gabriel, LA in 2025.

Treatment[1]	Rate/oz A	Cane Yield (tons/A)	TRS (lbs/ton)	Sugar Yield (lbs/A)
RU PowerMax3	5.0	50.4	191 a[2]	9,659 a
RU PowerMax3 + Moddus	2.5 + 11.0	48.6	202 a	9,780 a
Untreated check		49.7	155 b	7,705 b

[1] Treatments applied August 12, 2025, and harvested 35 days after treatment.
[2] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Evaluation of SugarMax (S-abscisic acid) as a ripener. A study was conducted in 2025 at the Sugar Research Station in St. Gabriel, LA, to evaluate the ripening potential of SugarMax (20% S-abscisic acid). The experimental design was a randomized complete block design with six replications, and the plot size was two rows wide (12 ft) × 40 ft in length. Treatments were applied using a tractor-mounted boom sprayer to first-ratoon L 01-299. Treatments evaluated included SugarMax applied at 0.5 oz/A on August 1, 2025, as well as SugarMax applied at 0.5 oz/A on September 2, 2025, and PowerMax3 at 5 oz/A on September 2, 2025. An untreated check was included for comparison. A hand-cut 10-stalk sample from each plot was harvested on September 30, 2025, then shredded and processed at the Sugar Research Station's Sucrose Lab using Spectra Cane NIR to determine theoretical recoverable sugar (TRS, lbs per ton of cane). After sampling was completed on September 30, 2025, plots were harvested with a sugarcane chopper harvester and loaded into a wagon equipped with load cells, and the weight of each plot was recorded. Sugar yield (lbs/A) was calculated as the product of TRS and cane yield (tons/A). Cane yield was statistically similar for all treatments (Table 2). Regardless of application date, SugarMax did not increase TRS or sugar yield compared to the untreated check; however, the Roundup PowerMax3 standard significantly improved TRS compared to all treatments (Table 2).

Table 2. First-ratoon L 01-299 response to SugarMax treatment in St. Gabriel, LA, in 2025*.

Treatment (Application Date)[1]	Rate/oz A	Cane Yield (tons/A)	TRS (lbs/ton)	Sugar Yield (lbs/A)
SugarMax[1] (August 1)	0.5	42.9	197 b[2]	8,478 b
Sugar Max[1] (September 1)	0.5	42.1	203 b	8,540 b
RU PowerMax3 (September 1)	5.0	39.2	247 a	9,675 a
Untreated check		43.4	206 b	8,920 ab

* Experiment sampled and harvested September 30, 2025.
[1] LI 700 surfactant was added to SugarMax treatment at 0.25% v/v; final mixture pH = 4.3.
[2] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Evaluation of Beyond Xtra (imazamox) as a ripener A study was conducted in 2025 at the Sugar Research Station in St. Gabriel, LA, to evaluate the ripening potential of Beyond Xtra at increased rates compared with previous research conducted in 2022 and 2023. The experimental design was a randomized complete block with three replications, and plots were two rows wide (12 ft) by 50 ft long. Treatments were applied to third-ratoon L 01-299 using a tractor-mounted boom sprayer on August 15, 2025. Treatments included Beyond Xtra at 6, 8, and 10 oz/A, as well as Roundup PowerMax3 at 5 oz/A and an untreated control. Crop oil concentrate (COC) was added to all Beyond Xtra treatments at 1% v/v. A hand-cut, 10-stalk sample from each plot was harvested 35 days after treatment (DAT), shredded, and processed at the Sugar Research Station’s Sucrose Lab using Spectra Cane NIR to determine theoretical recoverable sugar (TRS, lbs/ton of cane). After sampling was completed, plots were harvested with a sugarcane chopper harvester and loaded into a wagon equipped with load cells, and the weight of each plot was recorded. Sugar yield (lbs/A) was calculated as the product of TRS and cane yield (tons/A). Cane yield and sugar yield were similar across all treatments (Table 3). All three rates of Beyond Xtra significantly improved TRS levels above those of the untreated check. TRS was similar for the 8 and 10 oz/A Beyond Xtra treatments as compared to the Roundup PowerMax3 standard (Table 3).

Table 3. Third-ratoon L 01-299 response to increasing rates of Beyond Xtra at the Sugar Research Station, St. Gabriel, LA, in 2025.

Treatment[1]	Rate/oz A	Cane Yield (tons/A)	TRS (lbs/ton)	Sugar Yield (lbs/A)
Beyond Xtra	6.0	37.8	203 c[2]	7,685
Beyond Xtra	8.0	36.4	211 bc	7,687
Beyond Xtra	10.0	33.1	233 a	7,713
RU PowerMax3	5.0	34.5	224 ab	7,733
Untreated check		36.6	182 d	6,678

[1] Treatments applied August 15, 2025, and harvested 35 days after treatment; LI 700 surfactant was added to Beyond Xtra treatments at 1%v/v.

[2] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Evaluating the impact of tank-mixing insecticides with glyphosate ripener A study was conducted in 2025 at the Sugar Research Station in St. Gabriel, LA, to evaluate the impact of tank-mixing insecticides that have been proven to aid in the management of the West Indian cane fly with glyphosate ripener. The experimental design was a randomized complete block design with three replications, and the plot size was two rows wide (12 ft.) × 40 ft. in length. Treatments were applied using a tractor-mounted boom to plant cane L 01-299 on September 10, 2025. Treatments included Savanto + Roundup PowerMax3 (4 oz/A + 5 oz/A), lambda-cyhalothrin (1 lb ai/gal) + Roundup PowerMax3 (4.2 oz/A + 5 oz/A), and Roundup PowerMax3 (5 oz/A). An untreated check was included for comparison. A hand-cut, 10-stalk sample from each plot was harvested at 42 days after treatment (DAT), shredded, and processed at the Sugar Research Station's Sucrose Lab using Spectra Cane NIR to determine theoretical recoverable sugar (TRS, lbs per ton of cane). After sampling was completed, plots were harvested with a sugarcane chopper harvester and loaded into a wagon equipped with load cells, and the weight of each plot was recorded. Sugar yield (lbs/A) was calculated as the product of TRS and cane yield (tons/A). At 42 DAT, sugarcane ripening was not impacted by the insecticidal tank mixes with glyphosate ripener compared to glyphosate alone, and all treatments yielded significantly more TRS than the untreated control (Table 4).

Table 4. Ripening efficacy of Roundup PowerMax3 tank-mixes with two insecticides at the Sugar Research Station, St. Gabriel, LA, in 2025.

Treatment[1]	Rate/oz A	Cane Yield (tons/A)	TRS (lbs/ton)	Sugar Yield (lbs/A)
Savanto + RU PowerMax3	4.0 + 5.0	39.9	260 a[2]	10,341
Lambda Cyhalothrin + RU PowerMax3	4.2 + 5.0	40.4	258 a	10,426
RU PowerMax3	5.0	39.5	262 a	9,551
Untreated check		43.7	204 b	8,943

[1] Treatments were applied to plantcane L 01-299 plots at the LSU AgCenter's Sugar Research Station on September 10, 2025, and harvested 42 days after treatment; Savanto (1.67 lbs/gal), Lambda Cyhalothrin (1 lb/gal).

[2] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

EFFECTS OF RIPENER ACTIVITY AND EFFECTIVENESS FROM DIFFERENT SPRAY DRONES AND APPLICATION SYSTEMS

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Sprayer drones with different application systems, rates, and droplet sizes were used to apply ripener to sugarcane to test for ripener efficiency and efficacy. The first two drones were 16L quad copters (34-inch props). One drone had a centrifugal/rotary disk nozzle system with nozzles mounted under the rear motors with 4-inch standoffs and a 3-inch offset (out from the drone). These nozzles were calibrated to output a uniform spray pattern at 2 GPA when operated at 11.1 MPH with 300 um droplet size and 14 ft swath width. The other matching drone was outfitted with a standard fixed orifice hydraulic nozzle system with four AIXR11002 nozzles mounted under the motors (1 nozzle per motor) with an 8-inch stand-off pipe and a 5-inch offset. When operated at 40 psi and the same parameters as the first drone (11.1 MPH, etc.) this drone produced a similar spray pattern to the first drone at 2 GPA, but with 400 um droplets. The swath width of both drones was 14 ft. A third drone was included in the test and was a large 100 liter 8-rotor Hylio 272 (Oct-8) and also used a standard hydraulic fixed orifice nozzle system, but could be setup to output multiple flowrates (2, 3, or 6 GPA) using multiple types of nozzles. For this test, either 8 or 16 FF8003 or 8 FF110015 flat fan tips (operated at 20 or 40 psi) were used to create 350, 400, and 550 um droplets sizes. These nozzles were also mounted under-the-motor with a 6-inch two nozzle drop bar.

Tests were performed at three different fields located in Meeker, Cheneyville, and Evergreen, LA. Ripener was applied to each field (and treatment) at a standard rate of 5 ounces per acre of RoundUp Power Max herbicide (LSU recommended rate). Applications were performed in 500 ft. long, 4-row strip plots to save space. Each test was replicated 2 to 3 times in each field, but applications were performed in a round-robin block type design. Effectiveness of the ripener application was measured by sampling 10 stalks per plot and analyzed them at the LSU AgCenter Sugarcane Research Station (St. Gabriel, LA) for TRS (total recoverable sugar). All fields were sampled 33 to 38 days after the ripener applications.

Reduction in vegetative state was also measured during the ripening period using a visible wavelength (RGB) remote sensing drone. Vegetative reduction was measured by averaging the green and red pixels of the two inner rows of each plot (excluding edge effects) and calculating the green minus red (GR) index for each plot/ Note that the green minus red index is very similar to the VARI index (Variable Atmospheric Resistant Index) where the VARI value simulates the NDVI (normalized difference vegetative index) used with multispectral imagery. Sugarcane varieties tested were Ho 13-739 (in early season cane) and the L 01-299 and L 15-306 in middle and late season ripened cane.

Results for the treatments are show in Figures 3 through 6 and indicate that in early season treated cane (Figure 3) the centrifugal/rotary nozzles with low application rates (2 GPA) and smaller droplets (300 um) returned the highest TRS values, while standard fixed orifice nozzles with higher application rates (6 GPA) with larger droplet (550 um) sizes returned the lowest levels. This effect is also seen in the vegetative reduction data (Figures 1 through 3) that show in general that larger vegetative reductions occurred in treatments that also had higher final TRS levels. Still, the centrifugal/rotary nozzles did not always give the highest TRS level in all fields and treatments, and other nozzles-types and systems did well in some fields (such as the AIXR11002 in field 2 [Figure 5 - Cheneyville, LA] and the Oct-8 in field 3 [Figure 6 - Evergreen, LA]).

In conclusion, the centrifugal/rotary nozzles have always shown improved TRS levels over other systems, but those tests were conducted on sugarcane in good growing conditions (i.e. - high temps, plenty of water, sunlight, etc.). In stress crops (Cheneyville, LA, and Evergreen, LA) other nozzles systems (AIXR11002 and Oct 8 at 3 GPA) provided the highest TRS levels in those fields. More testing is needed to better define the results and better determine the effect of different fields and environmental conditions on TRS value and the application systems.

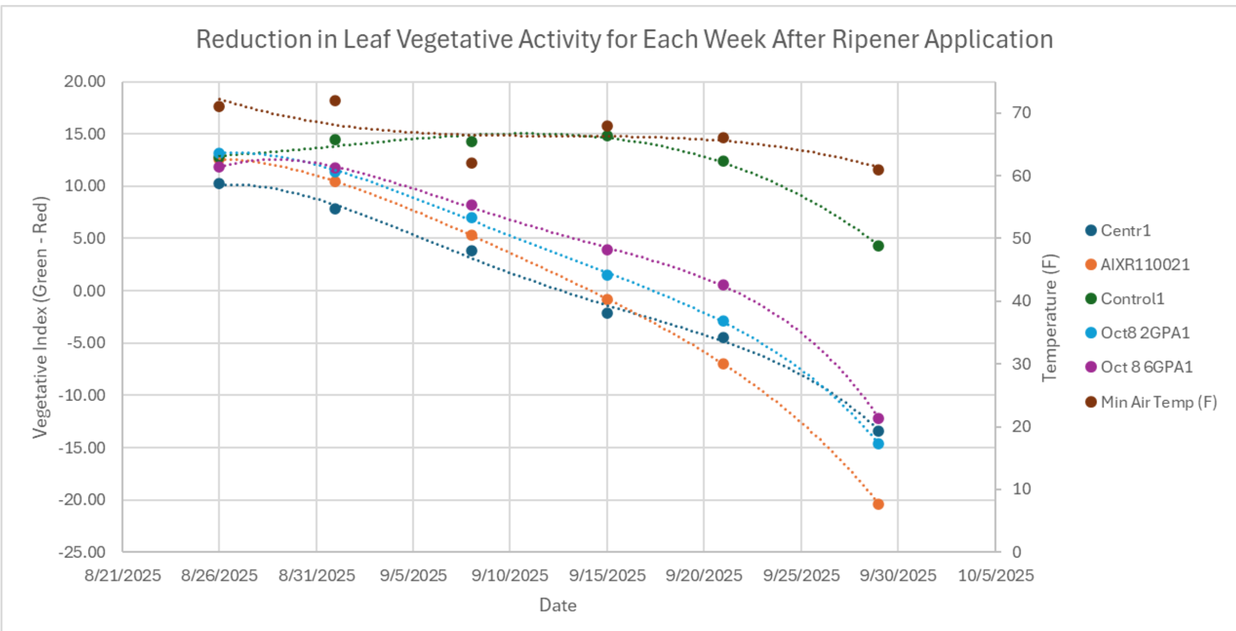

Figure 1. Vegetative reduction from ripener application in Meeker, LA, field (Variety Ho 13-739)

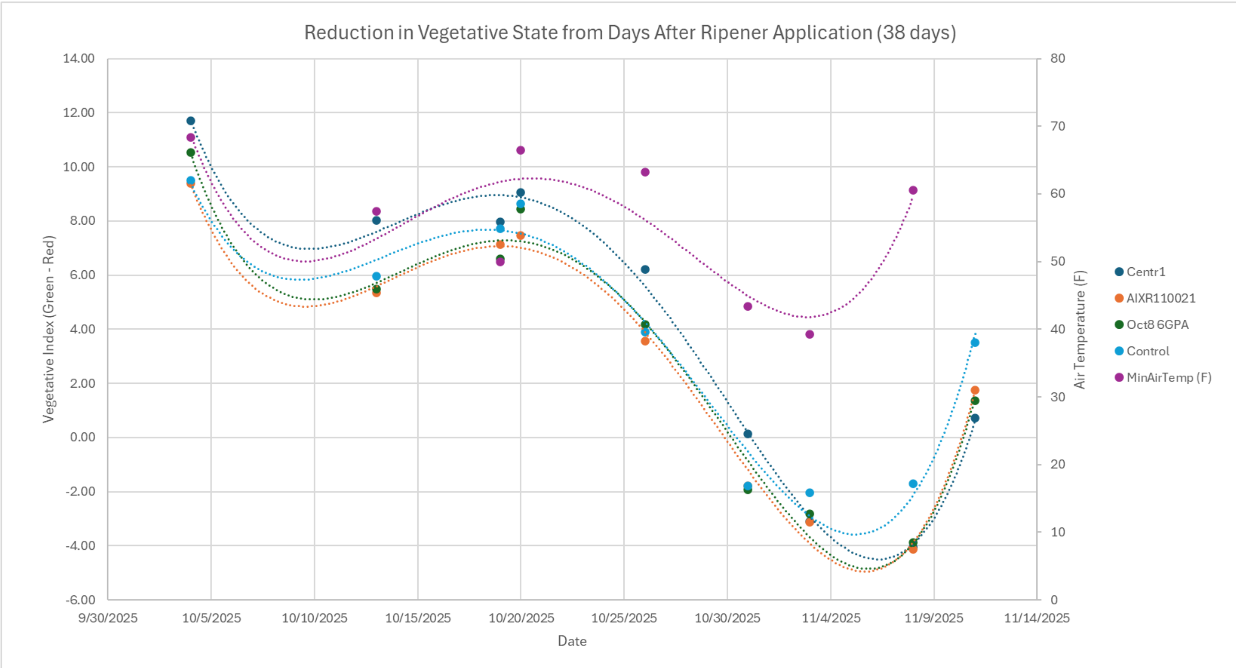

Figure 2. Vegetative reduction from ripener application in Cheneyville, LA, field (Variety L 01-299).

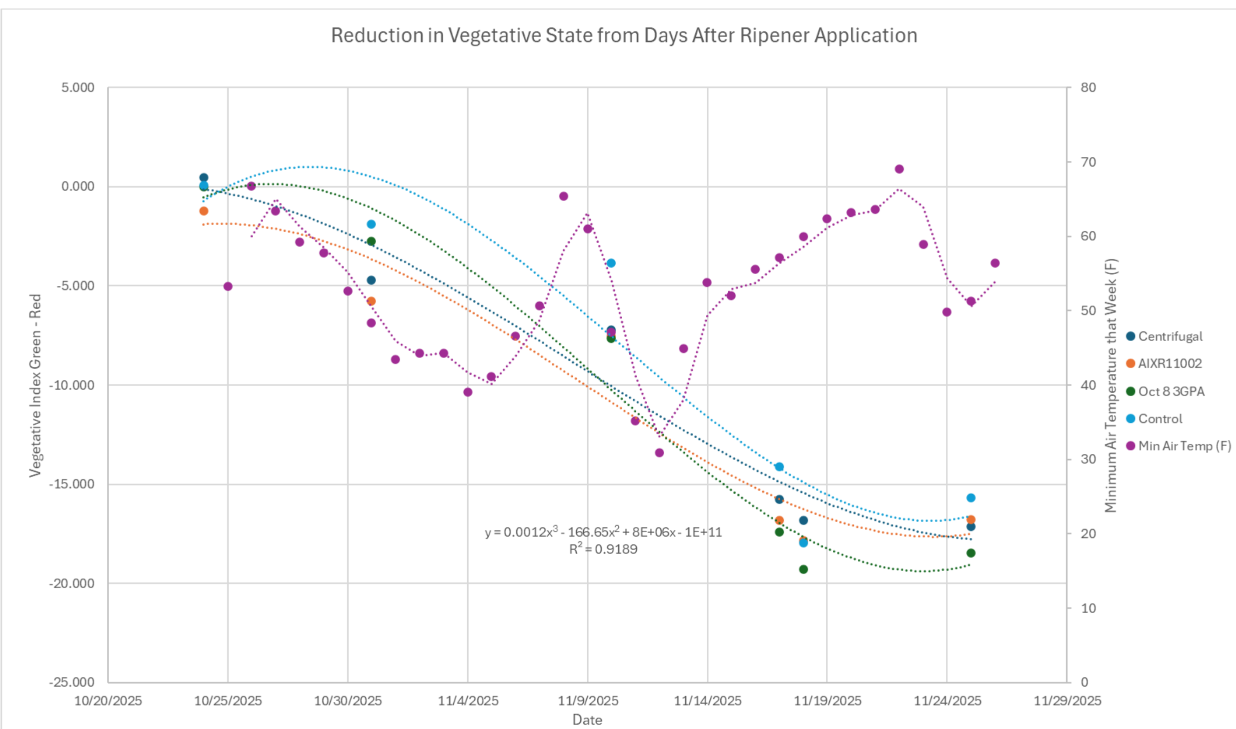

Figure 3. Vegetative reduction from ripener application in Evergreen, LA, field (Variety L 15-306).

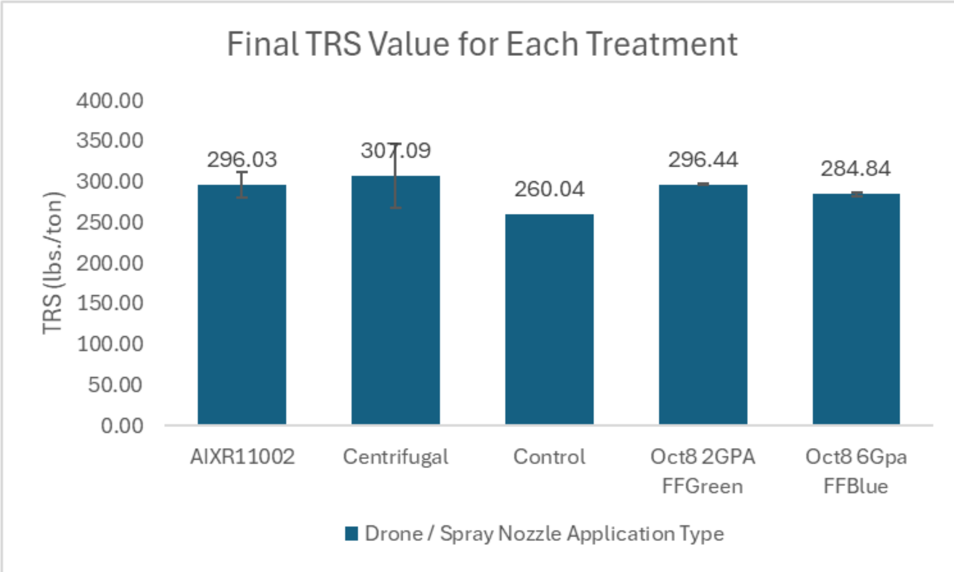

Figure 4. Final TRS values for field at Meeker, LA.

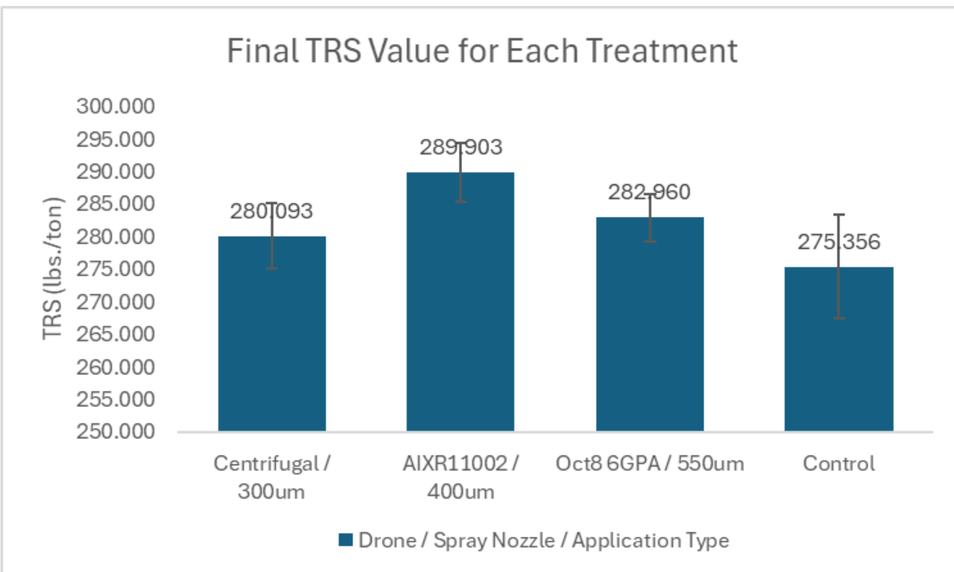

Figure 5. Final TRS values for field at Cheneyville, LA.

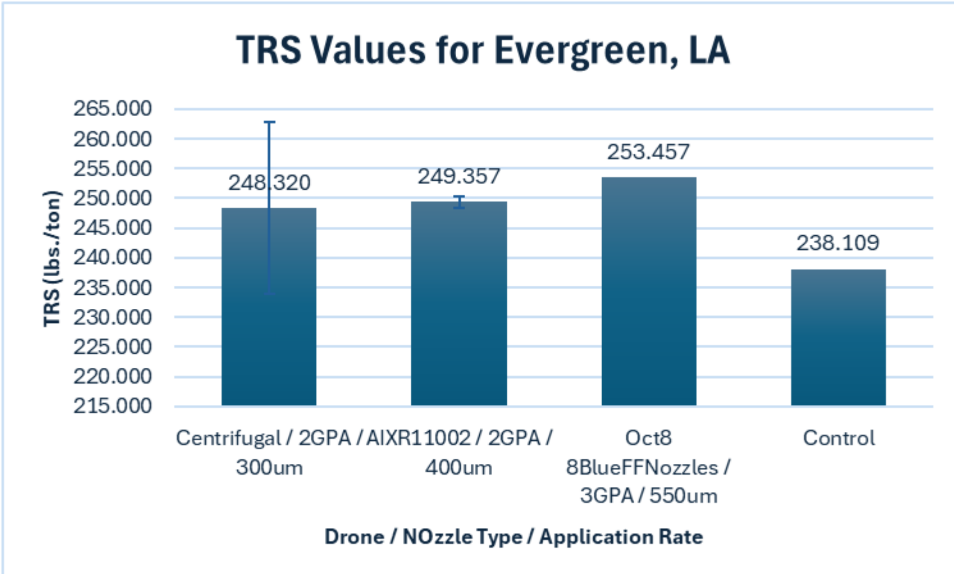

Figure 6: Final TRS values for field at Evergreen, LA.

EVALUATING NEW RIPENER ALTERNATIVES ON SUGARCANE

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Introduction

There is a need for ripening sugarcane in Louisiana due to the short growing season. The LSU AgCenter sugarcane ripening recommendation is the use of a sub-lethal dose of glyphosate (5 oz A^{-1}) (https://www.lsuagcenter.com/articles/page1595613262956). Using this strategy, an increase in the sucrose content in the stalk has been seen, mainly early in the harvesting season. However, glyphosate is an herbicide that might negatively affect ratooning ability due to plant stress. To bypass plant stress, an alternative is the foliar application of plant nutrients involved in sucrose metabolism, for example, potassium (K) and boron (B). These nutrients are known to increase the load of sucrose into the phloem and the transport of sucrose to the stalk, but there is a lack of knowledge on their use in Louisiana for ripening sugarcane.

Procedure

Field trials were set up at Dean Lee Research and Extension Center (DLREC), at Iberia Research Station (IRS), and at Evergreen with sugarcane variety L01-299; a fourth trial was set up at Evergreen with L15-306. All fields were plant-cane in 2025, and the experimental design adopted was a completely randomized block design with four repetitions. Treatments consisted of i. Control (no ripener, nor nutrients), ii. Glyphosate (RoundUp PowerMax 3®; 5 oz A^{-1}), iii. Trinexapac-ethyl (Mazata®; 11 oz A^{-1}), iv. Nutrients (Smart KB®, 0.281 gl A^{-1}, plus Bio-Master®, 0.16 gl A^{-1}), v. Glyphosate split application (2.5 + 2.5 oz A^{-1}), vi. Glyphosate + Trinexapac-ethyl (2.5 + 11 oz A^{-1}), vii. Nutrients applied twice, and viii. Nutrients + Trinexapac-ethyl. The application was done with a drone (flow rate 2.5 GPA) at 45 days before harvesting (DBH), except nutrients applied twice and glyphosate split application, which were applied 70 and 45 DBH. The first application was done on 09/19 in both fields at Evergreen, on 10/03 at DLREC, and on 10/07 at IRS. Surfactant was added to the solutions (Torpedo Plus®, 5 fl oz A^{-1}). The theoretical recoverable sugar (TRS) was determined over the ripening season. Trials will be carried out over at least three subsequent years to investigate field longevity as a function of the ripener strategy adopted.

Results

The TRS increased from 70 DBH to harvesting by 18.3, 59.1, 56.8, and 35.3 lbs ton^{-1} on average at DLREC, IRS, Evergreen 299, and Evergreen 306, respectively (Figure 1). At harvesting, treatments differed on TRS at IRS and at Evergreen 306, considering 5% significance level (Table 1). The highest TRS was obtained with glyphosate split application and glyphosate applied at45 DBH at IRS and Evergreen 306, respectively. Nutrients applied at 45 DBH showed the lowest TRS, similar to the control, in both fields. No statistical difference was observed on TRS at DLREC, and at Evergreen 299 at harvesting. Considering all trials in a multivariate analysis, it shows that the parameters evaluated explain almost 80% of the result (Figure 2). The new ripener strategies that have been investigated in this research, that is, glyphosate split application and nutrients applied twice, are in the direction of the TRS and in the same quadrant, showing that these treatments are more prone to increase TRS compared to the other treatments. However, it is important to highlight that this data reflects only the first year of the trials which will be carried out over at least 3 years.

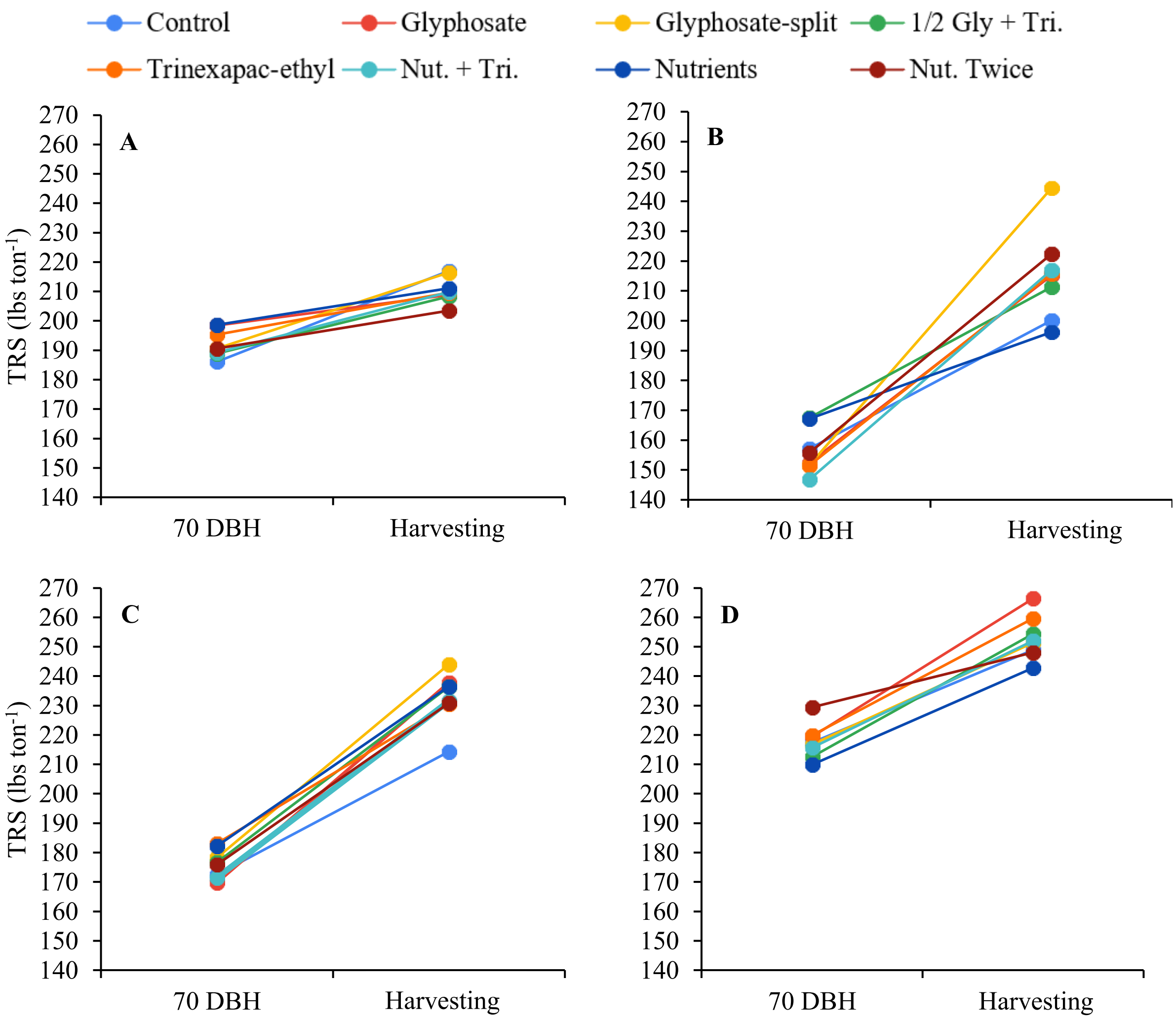

Figure 1. Theoretical recoverable sugar (TRS) at 70 days before harvesting (DBH), when first treatments were applied, and at harvesting, 0 DBH, at DLREC (A), IRS (B), Evergreen 299 (C), and Evergreen 306 (D).

Table 1. Theoretical recoverable sugar (TRS, lbs ton^{-1}) obtained at harvesting in all fields.

	Treatment	DLREC		IRS		Evergreen 299		Evergreen 306	
T1	Control	216.95	a	200.07	b	214.30	a	248.91	ab
T2	Glyphosate	208.86	a	215.22	ab	237.84	a	266.46	a
T3	Trinexapac-ethyl	209.60	a	215.78	ab	230.50	a	259.63	ab
T4	Nutrients	211.06	a	196.18	b	236.49	a	242.81	b
T5	Glyphosate-split	216.43	a	244.49	a	244.05	a	251.38	ab
T6	1/2 Gly + Tri.	208.32	a	211.25	ab	236.36	a	254.45	ab
T7	Nut. Twice	203.50	a	222.42	ab	230.78	a	248.09	ab
T8	Nut. + Tri.	209.77	a	217.00	ab	231.57	a	252.10	ab
	Average	210.56		215.30		232.74		252.98	
	p-value	0.92		0.05		0.50		0.04	

The data represents the average of four independent biological replicates. Lowercase letters indicate differences among the treatments according to Tukey post-hoc test ($p < 0.05$).

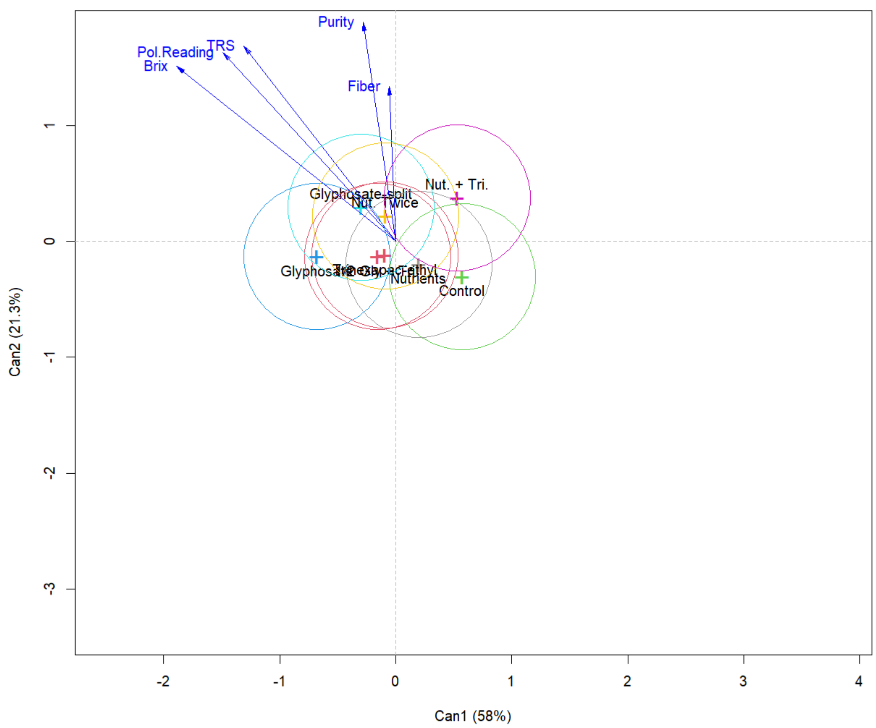

Figure 2. Canonical discriminant analysis, that is, multivariate analysis, performed with the TRS obtained at harvesting of all field trials and considering all treatments.

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