SUGARCANE WEED MANAGEMENT

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Postemergence Efficacy of Experimental Compounds on Italian Ryegrass

Three experimental compounds were evaluated at the Sugar Research Station in Spring 2019 to investigate postemergence Italian ryegrass (*Lolium multiflorum*) control efficacy. Resolve Q® (2.5 oz/a), Capreno® (6 oz/a), and Celsius® (4.9 oz/a), were applied to 8-12 in. tall Italian ryegrass on March 11, 2019. Gramoxone® SL 2.0 (3 pt/a), the industry standard, and an untreated control were also included for comparison. Induce® NIS was added to all herbicide treatments at 0.25% v/v. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft (1 row wide). X 30 ft. in length. Visual control was recorded at 14 and 29 days after application (DAA). The Resolve Q® and Capreno® treatments control 41 and 30% of Italian ryegrass at 14 DAA, and control was increased to 69 and 55% respectively, at 29 DAA (Table 1). Gramoxone® SL 2.0, the sole option for controlling ryegrass following emergence in sugarcane provided 75 and 70% control at 14 and 29 DAA, respectively.

Sugarcane Tolerance and Weed Control Efficacy of Spring Applied Herbicides

A study was conducted in a commercial stubble sugarcane field of L01-299 in Donaldsonville, LA in spring of 2019 to investigate the tolerance of sugarcane to two unlabeled herbicide compounds and several labeled compounds. Herbicide treatments included Lumax EZ® (3.75 qt/a), Tricor® (2.5 lb/a), Tricor® (2.5 lb/a) + Satellite Flex® (3 qt/a), Tricor® (2.5 lb/a) + KFD-308-01 (3 pt/a), Tricor® (2.5 lb/a) + Coyote® (2.8 qt/a), Coyote® (2.8 qt/a), Tripzin® (4 qt/a), Tripzin® (4 qt/a) + Shutdown (10 oz/a)®, and were applied on March 21, 2019. An untreated control was also included for comparison. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row wide) X 40 ft. in length. The Tricor® + KFD-308-01 treatment caused significant sugarcane visual injury (leaf bleaching) at 19 and 32 DAA, and visual injury was 31 and 7%, respectively (Table 2). All other treatments caused < 3% injury at 19 and 32 DAA. All treatments provided > 79% control of timothy-canarygrass (*Phalaris angusta*), crabgrass (*Digitaria sanguinalis*), and broadleaf weeds at 32 DAA, except the Tripzin® + Shutdown® treatment which only provided 65 % control of crabgrass (Table 3).

Postemergence Efficacy of Experimental Compounds on Vaseygrass Control and Sugarcane Tolerance

The experimental herbicides, Resolve Q® (2.5 oz/a), Capreno® (6 oz/a), and Celsius® (4.9 oz/a) were evaluated for postemergence vaseygrass (*Paspalum urvillei*) control and plantcane L01-299 sugarcane tolerance at the Sugar Research Station. Herbicide treatments were applied to 18-30 in. tall vaseygrass on April 9, 2019. Asulam® (4 qt/a) and an untreated control were also included for comparison. Induce® NIS was added to all herbicide treatments at 0.25% v/v. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row wide) X 20 ft. in length. Visual vaseygrass control was recorded at 13 and 27 DAA. The Resolve Q, Capreno®, and Celsius® treatments controlled 32, 31, and 45% of vaseygrass at 13 DAA, respectively and control increased to 64,

66, and 64% at 27 DAA, respectively (Table 4). Asulam®, the industry standard controlled 19 and 53% of vaseygrass at 13 and 27 DAA, respectively. The number of vaseygrass seedheads which developed in each plot were counted at 27 DAA, and the Resolve Q®, Capreno®, and Celsius® treatments averaged 2, 1, and 1 seed head(s) per plot, respectively as compared to 7 for the Asulam treatment and 17 for the untreated control. No sugarcane injury was noted 13 DAA, but by 27 DAA, a 50% reduction in sugarcane shoot height was noted for all experimental herbicide compounds (Table 5). Stalk height was measured 90 DAA, and the untreated check and Asulam® treatments averaged 57 inches in height. Sugarcane height was significantly reduced by the Resolve Q® treatment by 7 in. and the Capreno® and Celsius® treatments also reduced sugarcane height and was 13 and 16 in. less than the control treatment, respectively.

Postemergence Control of Bushkiller Vine with Auxin Herbicides

A study was conducted in a commercial sugarcane field in White Castle, LA in spring of 2019 to investigate the effectiveness of auxin herbicides to control bushkiller vine (*Cayratia japonica*). Treatments were applied on May 23, 2019 and included 2,4-D® (2 qt/a), Brash® (1 qt/a), Clarity® (1 qt/a), and Trycera® (1.4 qt/a) and (2.1 qt/a). A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row) X 40 ft. in length. All treatments provided >95% control of bushkiller vine 15 DAA (Table 6). On June 19, 2019, and July 2, 2019, reemergence counts were recorded. At both evaluations, the Clarity® treatment had the fewest reemerged bushkiller vine plants per plot and averaged 1 and 4 reemerged plants for the June and July evaluations, respectively. Bushkiller vine reemergence for both Trycera® treatments were similar to the Clarity® treatment and averaged 3 and 2 plants per plot respectively for the June evaluation, and increased to 11 and 10 plants for the July evaluation. The 2,4-D treatment had the highest level of bushkiller vine reemergence and averaged 17 and 31 for the June and July evaluations, respectively.

Postemergence Efficacy of Vandal (Sulfentrazone) and Combinations on Annual Grasses and Purple Nutsedge at Layby

A study was conducted in a commercial stubble sugarcane field of L01-299 in Cheneyville, LA in 2019 to investigate the efficacy of Vandal herbicide alone and in combination to control emerged annual grasses (1 to 3 inches) (crabgrass, goosegrass (*Eleusine indica*), and barnyard grass (*Echinochloa crus-galli*) and purple nutsedge (*Cyperus rotundus*). Herbicide treatments included Vandal® (10 oz/a), Tricor® (2 lb/a), Vandal® (8 oz/a) + Tricor® (2 lb/a), Vandal® (8 oz/a) + Satellite Flex® (3.4 qt/a), Vandal® (8 oz/a) + Tripzin® (4 qt/a), Vandal® (8 oz/a) + Callisto® (3 oz/a), Vandal® (8 oz/a) + Direx® (3 qt/a), and Vandal® (8 oz/a) + Atrazine® (3 qt/a), and were applied as a post-directed layby treatment on June 11, 2019. An untreated control was also included for comparison. Induce® NIS was added to all herbicide treatments at 0.25% v/v. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row) X 40 ft. in length. Visual weed control was recorded at 6 and 14 DAA. The Vandal® treatment poorly controlled annual grasses at 6 and 14 DAA; however, control was improved with the addition of residual herbicide combinations to Vandal® (Table 7). Vandal® controlled 51 and 43% of purple nutsedge at 6 and 14 DAA, respectively; however, control was not improved with the addition of residual herbicide combinations.

Postemergence Control of Least Snout Bean

A study was conducted in a commercial sugarcane field in Loreauville, LA in Summer of 2019 to investigate the effectiveness of herbicides to control least snout bean (*Rhynchosia minima*). Treatments were applied on June 14, 2019 and included 2,4-D® (1 qt/a), Brash® (1 qt/a), Clarity® (1 qt/a), Trycera® (1.4 qt/a), Callisto® + Atrazine® (3 oz + 2 qt/a), and Vandal® + 2,4-D® (8 oz + 1 qt). Induce® NIS was added to all herbicide treatments at 0.25% v/v. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row) X 20 ft. in length. Clarity® and Trycera® treatments controlled at least 99% of least snout bean at 27 DAT, whereas the Brash® treatment provided 80% control (Table 8). 2,4-D® provided 11% control at 27 DAT. The Callisto® + Atrazine® and Vandal® + 2,4-D® treatments provided poor control of least snout bean as well.

Preemergence Efficacy of Vandal (Sulfentrazone) and Combinations on Itchgrass At Planting

A study was conducted in a newly planted sugarcane field in Cade, LA in 2019 to investigate the efficacy of Vandal® herbicide alone and in combination to control itchgrass (*Rottboellia chochinchinensis*). Herbicide treatments included Vandal® (12 oz/a), Vandal® (12 oz/a) + Tricor® (2.1 lb/a), Vandal® (12 oz/a) + Satellite Flex® (2.9 qt/a), Vandal® (12 oz/a) + Velpar® (1 qt/a), Vandal® (12 oz/a) + Lumax EZ® (3 qt/a), Vandal® (12 oz/a) + Command® (3 pt/a), Vandal® (6 oz/a) + Command® (3 pt/a) + Satellite Flex®, Satellite Flex® (2.9 qt/a) + Velpar® (1 qt/a), and Command® (3 oz/a) + Tricor® (1 lb/a), and were applied September 9, 2019, two days after the field was planted. An untreated control was also included for comparison. A randomized complete block experimental design was used for the study, treatments were replicated 3 times, and the plot size was 6 ft. (1 row) X 40 ft. in length. Emerged itchgrass plants were counted in the entire plot at 18, 24, and 32 DAA. The Vandal® treatment averaged 87, 222, and 264 itchgrass plants at 18, 24, and 32 DAA, respectively, and was similar to the number of itchgrass plants in the untreated control at each respective evaluation (Table 9). Treatments which contained Satellite Flex® had the lowest number of itchgrass plants as opposed to the Vandal® + Lumax EZ® which contained the highest number of itchgrass plants, regardless of evaluation date.

Preemergence Control of Itchgrass At Planting

A study was conducted in a newly planted sugarcane field in Cade, LA in 2019 to investigate the efficacy of an experimental herbicide and two new pendimethalin formulations to control itchgrass. Herbicide treatments included H1168aa (14.3 oz/a), Tripzin® (4 qt/a), and Satellite Flex®, and were applied September 9, 2019, two days after the field was planted. An untreated control was also included for comparison. A randomized complete block experimental design was used for the study, treatments were replicated 4 times, and the plot size was 6 ft. (1 row) X 40 ft. in length. Emerged itchgrass plants were counted from the entire plot at 18 DAA. The H1168aa treatment averaged 141 itchgrass plants, as compared to 2 and 4 itchgrass plants for the Tripzin® and Satellite Flex® treatments (Table 10). The untreated check averaged 49 itchgrass plants, and was statistically similar to the H1168aa treatment.

Table 1. Mean percentage POST control of 8 to 12 inch Italian ryegrass in St. Gabriel, LA in 2019 with three experimental compounds

Treatment[1]	Rate/a	% Ryegrass Control 14 DAA[2]	% Ryegrass Control 29 DAA
Resolve Q ®*	2.5 oz	41 b[3]	69 a
Capreno ®*	6 oz	30 bc	55 a
Celsius ®*	4.9 oz	24 c	49 a
Gramoxone SL 2.0®	3 pt	75 a	70 a
Check		0 d	0 b

[1] Treatments applied 3/11/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

Table 2. Mean sugarcane visual injury following spring herbicide treatment of stubble L 01-299 in Donaldsonville, LA in 2019

Treatment[1]	Rate/a	% Sugarcane Injury 19 DAA[2]	% Sugarcane Injury 32 DAA
Lumax EZ®	3.75 qt	3 b[3]	2 b
Tricor®	2.5 lb	2 b	0 c
Tricor® + Satellite Flex®	2.5 lb + 3 qt	2 b	0 c
Tricor® + KFD-308-01*	2.5 lb + 3 pt	31 a	7 a
Tricor® + Coyote®*	2.5 lb + 2.8 qt	2 b	0 c
Coyote®*	2.8 qt	3 b	2 b
Tripzin®	4 qt	2 b	0 c
Tripzin® + Shutdown®	4 qt + 10 oz	3 b	1 bc
Check		0 b	0 c

[1] Treatments applied 3/21/2019.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

Table 3. Mean percentage control of timothy-canarygrass, crabgrass and broadleaf weeds in Donaldsonville, LA in 2019

Treatment[1]	Rate/a	% Timothy-Canarygrass Control 32 DAA[2]	% Crabgrass Control 32 DAA	% Broadleaf Weeds Control 32 DAA
Lumax EZ®	3.75 qt	79 a[3]	100 a	99 a
Tricor®	2.5 lb	83 a	92 a	99 a
Tricor® + Satellite Flex®	2.5 lb + 3 qt	98 a	96 a	100 a
Tricor® + KFD-308-01*	2.5 lb + 3 pt	100 a	100 a	100 a
Tricor® + Coyote®*	2.5 lb + 2.8 qt	99 a	100 a	100 a
Coyote*	2.8 qt	81 a	100 a	99 a
Tripzin®	4 qt	83 a	99 a	85 a
Tripzin® + Shutdown®	4 qt + 10 oz	84 a	65 b	96 a
Check		0 b	0 c	0 b

[1] Treatments applied 3/21/2019.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

Table 4. Mean percentage POST control of 18 to 30 inch vaseygrass in St.Gabriel, LA in 2019 with three experimental compounds

Treatment[1]	Rate/a	% Vaseygrass Control 13 DAA[2]	% Vaseygrass Control 27 DAA	Vaseygrass Height (in.) 27 DAA	# of Vaseygrass Seedheads/Plant 27 DAA
Resolve Q ®*	2.5 oz	32 ab[3]	64 a	24.9 bc	2 bc
Capreno ®*	6 oz	31 ab	66 a	22.8 c	1 c
Celsius ®*	4.9 oz	45 a	64 a	24.4 bc	1 c
Asulam®	4 qt	19 b	53 b	30.7 b	7 b
Check		0 c	0 c	44.4 a	17 a

[1] Treatments applied 4/9/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

Table 5. Mean sugarcane injury and height following treatment with three experimental compounds in St.Gabriel, LA in 2019

Treatment[1]	Rate/a	% Sugarcane Injury 27 DAA[2]	Sugarcane Height (in.) 90 DAA
Resolve Q ®*	2.5 oz	50 a[3]	50.5 b
Capreno ®*	6 oz	50 a	44.1 b
Celsius ®*	4.9 oz	50 a	41.3 c
Asulam®	4 qt	0 b	58.1 a
Check		0 b	57.4 a

[1] Treatments applied 4/9/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

Table 6. Mean bushkiller vine POST control and reemergence following auxin herbicide treatment in White Castle, LA in 2019

Treatment[1]	Rate/a	% Bushkiller Vine Control 15 DAA[2]	Bushkiller Vine Reemergence (#/plot) 23 DAA	Bushkiller Vine Reemergence (#/plot) 36 DAA
2,4-D ®	2 qt	95 a[3]	17 a	31 a
Brash ®	1 qt	95 a	8 ab	11 b
Clarity ®	1 qt	98 a	1 b	4 b
Trycera®	1.4 qt	98 a	3 b	11 b
Trycera®	2.1 qt	98 a	2 b	10 b

[1] Treatments applied 5/23/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Table 7. Mean percentage POST control of annual grasses and purple nutsedge at layby in Cheneyville, LA in 2019

Treatment[1]	Rate/a	% Emerged Annual Grass Control 6 DAA[2]	% Emerged Purple Nutsedge Control 6 DAA	% Emerged Annual Grass Control 14 DAA	% Emerged Purple Nutsedge Control 14 DAA
Vandal®	10 oz	11 c[3]	51 a	10 c	43 ab
Tricor®	2 lb	69 ab	47 a	85 ab	35 ab
Vandal® + Tricor®	8 oz + 2 lb	86 a	64 a	95 a	50 a
Vandal® + Satellite Flex®	8 oz + 3.4 qt	68 ab	66 a	83 ab	49 a
Vandal® + Tripzin®	8 oz + 4 qt	70 ab	62 a	84 ab	66 a
Vandal® + Callisto®	8 oz + 3 oz	69 ab	57 a	66 ab	63 a
Vandal® + Direx®	8 oz + 3 qt	75 ab	66 a	83 ab	39 ab
Vandal® + Atrazine®	8 oz + 3 qt	48 b	49 a	53 b	35 ab
Check		0 c	0 b	0 c	0 b

[1] Treatments applied 6/11/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Table 8. Mean least snout bean POST control following herbicide treatment in Loreauville, LA in 2019

Treatment[1]	Rate/a	% Least Snout Bean Control 11 DAA[2]	% Least Snout Bean Control 27 DAA
2,4-D ®	1 qt	11 c[3]	11 d
Brash ®	1 qt	63 b	80 b
Clarity ®	1 qt	91 a	99 a
Trycera®	1.4 qt	99 a	100 a
Callisto® + Atrazine®	3 oz + 2 qt	15 c	50 c
Vandal® + 2,4-D®	8 oz + 1 qt	13 c	7 d

[1] Treatments applied 6/14/2019. Induce® non-ionic surfactant at 0.25% v/v added to all treatments.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Table 9. Itchgrass emergence following application of several PRE herbicide treatments at-planting in Cade, LA in 2019

Treatment[1]	Rate/a	# of Itchgrass Plants/ plot 18 DAA[2]	# of Itchgrass Plants/ plot 24 DAA	# of Itchgrass Plants/ plot 32 DAA
Vandal®	12 oz	87 ab[3]	222 ab	264 ab
Vandal® + Tricor®	12 oz + 2.1 lb	91 ab	178 ab	201 ab
Vandal® + Satellite Flex®	12 oz + 2.9 qt	22 ab	44 b	54 b
Vandal® + Velpar®	12 oz + 1 qt	161 ab	268 ab	284 ab
Vandal® + Lumax EZ®	12 oz + 3 qt	227 a	440 a	476 a
Vandal® + Command®	12 oz + 3 pt	54 ab	125 ab	140 ab
Command® + Satellite Flex® + Vandal®	3 pt + 2.9 qt + 6 oz	16 b	42 b	48 b
Satellite Flex® + Velpar®	2.9 qt + 1 qt	24 ab	30 b	36 b
Command® + Tricor®	3 pt + 1 lb	70 ab	115 ab	139 ab
Check		153 ab	260 ab	283 ab

[1] Treatments applied 9/9/2019.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.

Table 10. Itchgrass emergence following application of one experimental and two labeled sugarcane PRE herbicide treatments at-planting in Cade, LA in 2019

Treatment[1]	Rate/a	# of Itchgrass Plants/plot 18 DAA[2]
H1168aa*	14.3 oz	141 a[3]
Tripzin®	4 qt	2 b
Satellite Flex®	2.9 qt	4 b
Check		49 a

[1] Treatments applied 9/9/2019.
[2] DAA = Days after application.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.
* Experimental compound not labeled for use in sugarcane.

USING COVER CROPS TO PROMOTE SUSTAINABLE SUGARCANE PRODUCTION

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A cover crop is a crop grown for the protection and improvement of the soil. Cover crops can help prevent erosion, cycle nutrients, and improve soil organic matter after long-term use. For a perennial crop like sugarcane, cover crops can be used in the fallow year prior to replanting or on the row hips and in the wheel furrows following planting.

Effect of Cover Crop Termination Timing on Plant Cane Yield Parameters

On August 24, 2018, L 01-299 was planted into a fallow sugarcane field at the Sugar Research Station in St. Gabriel, LA. Austrian winter pea and hairy vetch were drill planted on the row shoulders using a single-row John Deere 7100 plate-planter at 7 and 3 lbs/a, respectively, on October 12, 2018. Cover crop biomass was chemically terminated with a mixture of TriCor® (2 lb/a) (metribuzin) and Brash® (1 qt/a) (2,4-D + dicamba) using a hand spray-boom sprayer. Termination treatments were applied on January 28, 2019, February 18, 2019, and March 11, 2019. A non-planted "No Cover Crop" treatment was also included for comparison. The experimental design was a randomized complete block design with four replications, and plot size was 6 ft X 40 ft. A 10-stalk sample from each plot was hand-harvested on October 16, 2019. Stalks were topped at the growing point and stripped of leaves and weighed. Stalk samples were shredded, and sucrose content (lbs/ton of cane) was determined by near-infrared reflectance spectroscopy. Plots were harvested with a sugarcane chopper harvester, and the harvested sugarcane was loaded into a wagon equipped with load cells, and the weight of each plot was recorded. The sum of the plot weights and sample weights was used to calculate cane yield (tons/acre). Sugar yield (lbs/acre) was calculated as the product of sucrose content and cane yield. Sucrose content, cane yield, and sugar yield were not affected by cover crop termination timing in 2019 (Table 1).

Table 1. Sugarcane yield parameters for three cover crop[1] termination timings at Sugar Research in St. Gabriel, LA in 2019

Cover Crop Termination[2] (Date)	Sucrose content (lbs/ton cane)	Cane Yield (tons/acre)	Sugar Yield (lbs/acre)
January 28, 2019	175 a[2]	56.3 a	9696 a
February 18, 2019	171 a	53.4 a	9136 a
March 11, 2019	170 a	52.8 a	8928 a
No Cover Crop	162 a	52.3 a	8493 a

[1] Austrian winter pea (7 lbs/a) and hairy vetch (3 lbs/a) planted onto row hips on 10/12/2018.
[2] TriCor® (2 lb/a) (metribuzin) and Brash® (1 qt/a) (2,4-D + dicamba) were broadcast applied to terminate cover crop growth.
[3] Means within a column followed by the same lowercase letter are not significantly different at P=0.05.