

SUGARCANE RESIDUE MANAGEMENT: INFLUENCE OF A MODIFIED SWEEPER ON YIELDS

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The focus of the study was to provide information on implementation of a modified sweeper which results in equally comparable yields to those of the traditional burn treatment for all stubble years. Equally important is to assess the influence of the sweeper on soil and nutrient losses as when compared to runoff from other traditional management strategies.

Materials and Methods

Two experiments were established near Paincourtville, one at Dugas Farm and one at Gravois Farm. The experiment at Gravois Farm consisted of three large plots of variety HoCP 96-540, 2.5 acres (burn), 2.1 acres (mulch), and 1.2 acres (sweep). The treatments were applied in January 2013 after the plant cane was harvested in December 2012. Stalk counts were collected in August 2013. The 1st stubble cane was harvested on December 13, 2013. The whole plots were loaded on to trucks and weighed at the mill. A ten stalk sample was collected at harvest and processed at the L. S. U. Sugar Station for sucrose analysis. The yield and yield components are reported in Table 1.

The experiment at Dugas Farm consisted of three treatments and two replications of variety L01-299. Each plot consisted of 6 rows 300 feet long. The treatments were applied in January of 2013 after the plant cane was harvested in December of 2012. Stalk counts were collected in August 2013. The 1st stubble cane was harvested on December 17, 2013. The plots were weighed in a weigh wagon. A ten stalk sample was collected at harvest and processed at the L. S. U. Sugar Station for sucrose analysis. The yield and yield components are reported in Table 1.

Two new experiments were initiated in 2015, one in Duson at Rosinski Farm and one in St. Gabriel at the L.S. U. Sugar Station. The experiment at Rosinski Farm consisted of three treatments (burn, mulch, and sweep) and two replications. The plots were 3 rows 480 feet long. Third stubble cane of variety L03-371 was harvested in December of 2014. The treatments were applied in January of 2015. Stalk counts were collected in August of 2015. The 3rd stubble cane was harvested on October 2, 2015. The plots were weighed with a weigh wagon. A ten stalk sample was collected at harvest and processed at the L. S. U. Sugar Station for sucrose analysis. The yield and yield components are reported in Table 3.

The experiment at the L. S. U. Sugar Station consisted of three treatments (burn, mulch, and sweep) and four replications. The plots were 3 rows 450 feet long. Plant cane of variety L 99-226 was harvested in December of 2014. The treatments were applied in January of 2015. Stalk counts were collected in August of 2015. The 1st stubble cane was harvested on November

16, 2015. The plots were weighed with a weigh wagon. A ten stalk sample was collected at harvest and processed at the L. S. U. Sugar Station for sucrose analysis. The yield and yield components are reported in Table 4.

Results

In 2013 and 2014, the burn and sweep treatments were similar in cane and sugar yields. The mulch treatment was lower in cane and sugar yields than both the burn and sweep treatments. In 2015, the burn and sweep treatments were similar in cane and sugar yields. The mulch treatment was higher in cane and sugar yields than both the burn and sweep treatments. A strong draught occurred from June till October in both locations. The mulch helped hold moisture in the soil possibly causing the higher yields. The experiment in St. Gabriel will be continued in 2016. A new experiment will be initiated at Dugas Farm for 2016.

Results from effluent solution of edge field are given in the following figures below for sediment, nitrogen N and phosphorus P. These results are from Gravois site during the 2014 growing season. Several forms of N and P are presented including soluble and total P. Soil and nutrient losses were lowest for the mulch treatment followed by the sweep. These results are consistent with those collected during 2013.

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Table 1. Yield data for sugarcane under different residue management treatments. Harvest was conducted on December 12 and 17, 2013 for the Gravois and Dugas sites, respectively.

TREAT.	REP	STALK		SUCROSE		NORMAL	JUICE	PURITY	SAMPLE	SAMPLE
		POP	WT.	YIELD	BRIX					
		1000/A	LBS.	TONS/A	%	%	%	%	LBS/T	LBS/ACRE
Gravois Farm HoCP 96-540										
BURN	I	32.4	1.78	35.1	17.9	16.8	14.3	85.1	204.6	7181
MULCH	I	30.2	2.06	28.9	18.0	17.0	14.4	84.7	206.3	5962
SWEEP	I	30.2	1.80	34.8	18.7	17.2	15.0	87.2	216.5	7534
Dugas Farm L 01-299										
BURN	I	36.8	2.52	33.5	18.3	17.2	14.6	84.9	209.7	7025
	II	37.2	1.92	34.0	17.6	16.9	14.0	82.8	199.5	6783
	Average	37.0	2.22	33.8	18.0	17.1	14.3	83.9	204.6	6904
MULCH	I	35.4	1.98	33.9	17.4	16.6	13.9	83.7	197.8	6705
	II	35.9	2.21	31.3	18.7	17.5	14.9	85.1	214.8	6723
	Average	35.7	2.10	32.6	18.1	17.1	14.4	84.4	206.3	6714
SWEEP	I	36.3	1.82	34.1	18.2	17.2	14.6	84.9	209.7	7151
	II	36.8	1.66	32.4	18.9	17.7	15.1	85.3	218.2	7070
	Average	36.6	1.74	33.3	18.6	17.5	14.9	85.1	214.0	7111

Table 2. Yield data for sugarcane variety HoCP96-540 under different residue management treatments. Harvest was conducted on December 2, 2014 for the Gravois site.

TREAT.	REP	POP	STALK	YIELD	SUCROSE	CRS	SUGAR
		1000/A	WT.	TONS/A	%	LBS/T	LBS/A
			LBS.				
BURN	I	33.3	2.01	28.7	13.3	215.0	6172
MULCH	I	29.9	1.86	26.5	13.3	207.3	5492
SWEEP	I	33.1	2.01	28.0	13.6	219.9	6157

Table 3. Yield data for sugarcane variety L03-371 under different residue management treatments at Duson site. Harvest was conducted on October 2, 2015.

Treatment		STALK							
	REP	POP	WT.	YIELD	BRIX	SUCROSE	CRS	PURITY	SUGAR
		1000/A	LBS.	TONS/A	%	%	LBS/TON	%	LBS/A
BURN	I	29.5	1.22	13.4	22.6	22.3	317.1	84.3	4249
	II	33.7	1.06	16.8	22.2	22.1	315.9	85.2	5307
	X	31.6	1.14	15.1	22.4	22.2	316.5	84.8	4778
MULCH	I	31.1	1.31	17.6	20.5	20.3	289.1	84.5	5088
	II	38.9	1.16	17.1	20.4	19.9	281.8	83.6	4819
	X	35.0	1.24	17.4	20.5	20.1	285.5	84.1	4954
SWEEP	I	31.8	0.96	15.3	22.5	22.5	322.7	85.7	4937
	II	37.8	0.90	14.8	21.5	21.3	303.7	84.7	4495
	X	34.8	0.93	15.1	22.0	21.9	313.2	85.2	4716
LSD .05		NS	NS	NS		NS	NS		NS

The plots consisted of 3 rows 480 feet long. The test was harvested October 2, 2015. The variety was L03-371.

A drought occurred from the middle of June until harvest. Only three measurable rainfall events with less than 2 inches occurred from early June to October 2.

Table 4. Yield data for sugarcane variety L99-226 under different residue management treatments at St Gabriel site. Harvest was conducted on November 19, 2015.

Treatment		STALK							
	REP	POP	WT.	YIELD	BRIX	SUCROSE	CRS	PURITY	SUGAR
		1000/A	LBS.	TONS/A	%	%	LBS/TON	%	LBS/A
BURN 2	I	42.1	1.70	27.2	17.3	17.3	247.7	85.4	6737
	II	42.7	1.75	27.9	17.0	17.3	250.2	87.2	6981
	III	38.5	1.39	40.2	16.6	16.5	235.5	84.9	9467
	IV	38.6	1.82	27.9	17.0	16.6	235.2	83.7	6562
	X	40.5	1.67	30.8	17.0	16.9	242.2	85.3	7437
MULCH 1	I	45.4	1.56	30.8	17.0	17.2	248.1	86.7	7641
	II	44.1	1.35	30.5	16.6	16.6	237.7	85.4	7250
	III	45.2	2.07	32.9	17.2	17.3	249.0	86.3	8192
	IV	46.6	2.13	33.6	17.0	17.0	243.8	85.7	8192
	X	45.3	1.78	32.0	17.0	17.0	244.7	86.0	7819
SWEEP 3	I	37.6	1.69	33.1	17.2	17.5	253.3	87.3	8384
	II	48.6	1.83	30.8	17.3	17.4	249.9	85.9	7697
	III	41.8	1.50	24.3	16.4	16.6	239.5	86.8	5820
	IV	47.0	1.67	35.5	16.7	17.2	249.9	88.0	8871
	X	43.8	1.67	30.9	16.9	17.2	248.2	87.0	7693
LSD .05		NS	NS	NS		NS	NS		NS











