SOIL FERTILITY RESEARCH IN SUGARCANE IN 2006

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Summary

Seven experiments were conducted in 2006 to test the effects of rates of fertilizers on the yield components of current sugarcane varieties grown on different soil types.

Fall and spring applied NPK fertilizer rates were tested in plant cane on Cancienne silty clay loam soil. In plant cane planted after a fallow year, various starter fertilizer rates increased the average cane yield. A 15-45-45 NPK rate increased yield (6.1%), more than the other rates. A starter fertilizer increased yields more in L 97-128 than Ho 96-988. In second stubble from billet planted LCP 85-384, starter fertilizer did not effect yield. Over the three year cycle, starter fertilizers increased yield over the 0-0-0 NPK starter rate, with the 15-45-45 rate increasing yield the highest (10.1%). Two variety by nitrogen experiments were continued in 2006 on a Commerce silt loam soil. Nitrogen fertilizer rates from 0 to 160 lbs N/acre had a large effect on cane and sugar yield of second stubble crops of three varieties. Nitrogen fertilizer rates from 0 to 120 lbs N/acre had a large effect on the cane and sugar yield of first stubble crops of three varieties. Additional products used in conjunction with normal fertilizer inputs were also studied. In plant cane, application of Trimat increased yields as an average of two varieties. In first and second stubble cane, application of Helena Corporation products in addition to standard practices did not result in significant yield increases.

Objectives

This research was designed to provide information on soil fertility in an effort to help cane growers produce maximum economic yields and increase profitability in sugarcane production. This annual progress report is presented to provide the latest available data on certain practices and not as a final recommendation for growers to use all of these practices. Recommendations are based on several years of research data.

Results

Starter Fertilizers:

An experiment was conducted to test the effects of NPK fertilizer rates applied as a starter fertilizer in fall at planting time. The starter rates were 0-0-0, 15-45-45, and 30-90-90 lbs NPK/acre. The normal spring rate of 120-0-0 was applied over each fall rate. The test was planted with varieties L 97-128 and Ho 96-988, and the starter treatments were applied in the planting furrow in the fall of 2005.

The data in Table 1 show, as an average of two varieties, the highest yield increase was from the 15-45-45 starter rate. Both the 15-45-45 and 30-90-90 starter fertilizer rates significantly increased yields with variety L 97-128. The 15-45-45 starter fertilizer rate slightly increased yields with variety Ho 96-988.

An experiment was initiated in 2003 to test the effects of NPK fertilizer rates applied as a starter fertilizer on the yield of billet planted LCP 85-384. The starter rates were 0-0-0, 15-45-45, 45-0-0, 0-45-45, 45-45-45, 30-45-90, and 90-45-90 lbs NPK/acre.
Spring rates of 120-0-0 and 120-40-80 were applied over each fall rate. The fall treatments were applied in the planting furrow and the spring treatments were applied in the off-bar furrows in 2004, 2005, and 2006. There were no increases in yield from the fall or spring fertilizer treatments in the second stubble cane. Over the three year cycle of the experiment, all of the starter fertilizer treatments increased yield over the 0-0-0 starter rate. The highest yield increase (10.0%) was produced by the 15-45-45 starter fertilizer rate.

Rates of spring applied N fertilizer:

An experiment was continued to test the rates spring applied N fertilizer on the yield of second stubble cane in three varieties on a Commerce silt loam soil. The varieties tested were CP 70-321, LCP 85-384, and HoCP 91-555. Spring applied rates consisting of 0, 40, 80, and 160 lbs/A N were applied in the off-bar furrow each year. The results reported in Table 2 show, as an average over varieties, the highest yields were from the 160 N fertilizer rate. Each increase in N fertilizer significantly increased yield, except the 160 N rate only slightly increased the yield over the 80 N rate. The 160 N rate decreased sugar yield from the 80 N rate in variety LCP 85-384, because of a lower sucrose percentage.

An experiment was continued to test the rates of spring applied N fertilizer on the yield of first stubble cane in three varieties on a Commerce silt loam soil. The varieties tested were LCP 85-384, Ho 95-988, and L 97-128. Spring applied rates consisting of 0, 40, 80, and 120 lb/A N were applied in the off-bar furrow each year. The results reported in Table 3 show, as an average over varieties, the highest yields were from the 80 and 120 fertilizer rates. The 40 N fertilizer rate significantly increased cane and sugar yields over the 0 N fertilizer rate. The 80 and 120 N fertilizer rates significantly increased cane yields over the 0 and 40 N fertilizer rates and slightly increased sugar yields over the 40 N fertilizer rate.

Fertilizer Adjuvants:

An experiment was initiated to test Amino Grow products Trimat, PGR, and foliar NPK on the plant cane yield of two varieties on a Cancienne silty clay loam soil. The varieties tested were Ho 95-988 and L 97-128. The fall treatments consisted of control (no application), Trimat (1 quart/A), and Trimat with PGR (1 pint/A). The treatments were applied in the planting furrow in the fall of 2005. The spring treatments consisted of control, Trimat, and PGR with foliar NPK (2 quarts/A). The spring Trimat was applied with normal spring N fertilizer in April 2006. The PGR and foliar NPK was applied to the leaves in April and June of 2006. The results reported in Table 4 show, as an average of varieties, the fall Trimat treatment produced the highest yield. The treatment with fall Trimat and PGR and spring Trimat and PGR with foliar NPK significantly increased yield over the control. All combinations of treatments increased yield

over the control in variety L 97-128. The fall Trimat application increased yield over the control in variety Ho 95-988.

Two experiments were continued with Helena Chemical products in addition to standard fertility practices. An experiment was continued to test Helena products on the second stubble yield of HoCP 91-555. The results reported in Table 5 show none of the treatments increased yield over the standard fertilizer practice. Another experiment was continued to test Helena products on the first stubble yield of L 97-128. The results reported in Table 6 show the addition of Helena product HM9827 to standard fertilizer slightly increased yield over the standard fertilizer treatment.

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Table 1. Effects of starter fertilizer on the plant cane yield of two varieties on a Cancienne silty clay loam soil on the Sugar Research Station, 2006.

		Plant cane – 2006					
Cane Variety	Starter Fert. N-P-K	Cane Yield	----- Stalk ----- No.	Wt.	--- Normal Juice --- Brix	Sucrose	Sugar Yield
	Lbs./A	T/A	1000/A	Lbs.	%	%	Lbs./A
Ho 95-988	0-0-0	32.9	31.2	2.29	18.4	15.6	7471
	15-45-45	34.2	31.6	2.33	18.4	15.7	7819
	30-90-90	33.9	31.3	2.30	17.9	15.1	7406
L 97-128	0-0-0	35.9	32.7	2.36	17.2	14.3	7336
	15-45-45	38.5	33.2	2.56	17.5	14.5	8007
	30-90-90	38.6	32.2	2.57	17.5	14.6	8102
LSD .05		1.3	NS	0.23	0.5	0.5	571
		Mean effects					
	0-0-0	34.4	32.0	2.32	17.8	15.0	7404
	15-45-45	36.3	32.4	2.45	17.9	15.1	7913
	30-90-90	36.2	31.7	2.43	17.7	14.9	7754
LSD .05		1.6	NS	NS	NS	NS	404

The starter fertilizer was applied in the planting furrow in 2005, and normal fertilizer practice was followed in the spring of 2006.

Table 2. Effects of spring nitrogen rates on the second stubble yield of three cane varieties on Commerce soil on the Sugar Research Station, 2006.

Variety Of Cane	Spring Fert. N	Second stubble – 2006 Cane Yield	----- Stalk ----- No.	Wt.	--- Normal Juice --- Brix	Sucrose	Sugar Yield
	Lbs./A	T/A	1000/A	Lbs.	%	%	Lbs./A
CP 70-321	0	12.6	15.2	1.39	15.5	12.9	2262
	40	21.2	25.2	1.89	16.1	13.4	3984
	80	28.0	26.6	2.25	16.3	13.3	5248
	160	30.8	31.3	2.50	16.6	13.6	5962
LCP 85-384	0	16.2	25.7	1.10	16.8	14.4	3319
	40	23.4	33.5	1.50	17.4	14.8	4992
	80	28.6	39.4	1.65	17.2	14.6	5966
	160	29.1	41.1	1.67	16.1	13.3	5423
HoCP 91-555	0	13.0	18.9	1.12	17.1	14.6	2712
	40	22.3	35.3	1.41	17.4	14.9	4788
	80	27.4	37.5	1.48	17.2	14.3	5607
	160	30.1	39.7	1.53	17.5	14.6	6274
LSD .05		4.2	5.4	0.35	0.6	0.7	892
			Mean effects				
	0	13.9	19.9	1.20	16.4	13.9	2764
	40	22.3	31.3	1.60	16.9	14.3	4588
	80	28.0	34.5	1.79	16.9	14.1	5607
	160	30.0	37.3	1.90	16.7	13.8	5886
LSD .05		2.4	3.1	0.20	0.3	0.4	515

The nitrogen fertilizer was applied in the off-bar furrow in the spring of each year.

Table 3. Effects of spring nitrogen rates on the first stubble yield of three cane varieties on Commerce soil on the Sugar Research Station, 2006.

Variety Of Cane	Spring Fert. N	First stubble – 2006					
			----- Stalk -----		--- Normal Juice ---		
		Cane Yield	No.	Wt.	Brix	Sucrose	Sugar Yield
	Lbs./a	T/A	1000/A	Lbs.	%	%	Lbs./A
LCP 85-384	0	29.1	37.0	1.71	17.5	14.9	6261
	40	35.4	37.4	2.07	17.7	15.1	7678
	80	35.6	40.4	1.86	17.0	14.4	7354
	120	34.7	42.3	1.82	17.2	14.7	7310
Ho 95-988	0	35.2	29.9	2.44	17.1	14.4	7255
	40	41.7	33.5	2.77	17.7	14.9	8948
	80	42.0	36.1	2.32	17.9	15.3	9320
	120	42.1	33.4	2.46	18.3	15.7	9620
L 97-128	0	27.0	27.8	2.34	17.8	15.2	5961
	40	35.3	31.9	2.60	17.8	15.0	7670
	80	40.7	32.9	2.48	17.2	14.4	8392
	120	41.5	34.0	2.47	16.9	14.0	8254
LSD .05		3.2	4.0	0.31	0.5	0.5	778
		Mean effect					
	0	30.5	31.6	2.16	17.5	14.9	6492
	40	37.5	34.2	2.48	17.7	15.0	8099
	80	39.5	36.5	2.22	17.4	14.7	8355
	120	39.4	36.6	2.25	17.5	14.8	8395
LSD .05		1.7	2.8	0.19	NS	NS	457

The nitrogen fertilizer was applied in the off-bar furrow in the spring of each year.

Table 4. Effects of Aminogrow products on the plant cane yield of two cane varieties on Cancienne silty clay loam on the Sugar Research Station, 2006.

Variety Of Cane	Fall Treat.	Spring Treat.	Plant cane – 2006 Cane Yield	Stalk No.	Stalk Wt.	Normal Sucrose	Sugar Yield
			T/A	1000/A	Lbs.	%	Lbs./A
Ho 95-988	Control	Control	27.9	34.6	2.00	14.9	5971
	T & PGR	T,PGR,F	31.7	36.4	1.98	14.2	6434
	T	T,PGR,F	29.4	34.4	2.09	14.4	6049
	T	Control	32.4	35.5	2.08	14.8	6922
L 97-128	Control	Control	29.6	30.2	2.40	15.0	6387
	T & PGR	T,PGR,F	33.3	31.7	2.39	14.7	7055
	T	T,PGR,F	34.9	32.7	2.28	15.0	7505
	T	Control	33.2	31.8	2.32	14.9	7147
LSD .05			3.5	3.1	0.34	NS	710
			Mean effect				
	Control	Control	28.7	32.4	2.20	14.9	6179
	T & PGR	T,PGR,F	32.5	34.1	2.18	14.5	6744
	T	T,PGR,F	32.2	33.6	2.19	14.7	6777
	T	Control	32.8	33.7	2.20	14.9	7034
LSD .05			2.4	NS	NS	NS	502

T=Trimat PGR=growth regulator F=foliar NPK.

Table 5. Effects of Helena Chemical products on the second stubble yield of variety HoCP 91-555 on Commerce soil on the Sugar Research Station, 2006.

		Second stubble cane – 2006					
			----- Stalk -----		--- Normal Juice ---		
Fert. NPK	Helena Product	Cane Yield	No.	Wt.	Brix	Sucrose	Sugar Yield
Lbs./A		T/A	1000/A	Lbs.	%	%	Lbs./A
80-0-80	Control	27.4	38.2	1.55	17.5	14.6	5726
80-0-80	Asset	28.5	40.2	1.79	17.6	14.7	5995
80-0-80	Hydrahume	26.6	36.8	1.32	17.3	14.4	5498
80-0-80	Asset+Hydr	26.5	38.3	1.60	17.5	14.6	5557
80-0-80	HM9310	28.4	37.3	1.62	17.6	14.8	6028
80-0-80	HM9827	28.1	39.8	1.58	17.5	14.6	5899
LSD .05		NS	NS	0.39	NS	NS	NS

Asset, Hydrahume, Asset+Hyrahume, HM9310, and HM9827 were soil applied in April.
Asset = 8 oz/A
Hydrahume = 1:20 gpa

Table 6. Effects of Helena Chemical products on the first stubble yield of variety L 97-128 on Commerce soil on the Sugar Research Station, 2006.

		First stubble – 2006					
			----- Stalk -----		-- Normal Juice --		
Fert. NPK	Helena Product	Cane Yield	No.	Wt.	Brix	Sucrose	Sugar Yield
Lbs/A		T/A	1000/A	Lbs.	%	%	Lbs./A
80-0-80	Control	41.0	33.8	2.00	16.8	13.7	7968
80-0-80	Asset	39.7	34.0	1.91	16.8	13.7	7708
80-0-80	Hydrahume	38.8	33.6	2.09	16.6	13.8	7617
80-0-80	Asset+Hydr	40.6	36.2	1.97	17.0	14.2	8205
80-0-80	HM9310	41.6	35.5	2.01	16.4	13.5	7975
80-0-80	HM9827	41.1	35.6	2.10	17.3	14.5	8550
80-0-80	HM0523	40.0	34.6	1.91	15.9	13.0	7239
80-0-80	A,H,HM0523	40.2	37.3	1.98	16.1	13.3	7490
LSD .05		2.3	2.2	NS	0.7	0.9	733

All Helena products were soil applied in the spring.