

8000/2 GIBBERELIC ACID TRIAL

TERMINAL REPORT

Cat.: 1309

Object: To determine the effect of spraying gibberellic acid (GA<sub>3</sub>) onto approximately 5½-month old sugarcane varieties in May, for late-season harvest.

Planted: 2nd December, 1980.

Terminated: 29th November, 1982.

<u>Harvest dates and ages:</u>	<u>Harvest</u>	<u>Age</u>
P	2.12.81	12.0 months
1R	29.11.82	11,9 "

Location: ZSA Experiment Station, Sable Block N1.

Soil type: PE.1 sandy clay loam derived from gneiss.

Design: Randomised blocks, 5 replications.

Spacing: 1,5m between rows.

<u>Fertiliser:</u>	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
P	140	60	-
1R	180	60	-

<u>Irrigation and rainfall:</u>	<u>Irrig. (mm)</u>	<u>Rain (mm)</u>
P	690	896
1R	1 179	395

Treatments: Varieties 1. NCo 376 (mid-season).  
2. B 51129 (late-season).

Time of GA<sub>3</sub> application

1. Control - no GA<sub>3</sub>.
2. Single application in mid-May.
3. Second application 4 weeks later.
4. Three applications at 4-week intervals.

Conduct:

1. GA<sub>3</sub> applied at the rate of 100g/ha a.i. using a CO<sub>2</sub> pressurised knapsack with F5 jets on a T-boom to give uniform coverage over the top of the leaf canopy.
2. Stalk lengths measured at the time of GA<sub>3</sub> application in May; 14 weeks later in August; and again at the time of harvest (approx. 28 weeks after spraying).

## RESULTS

Relevant yield data for the plant and first ratoon crops are presented in the attached table.

Varietal differences were as expected, but the GA<sub>3</sub> treatments did not produce any yield or quality responses, and there were no significant interactions. Treatments also had no effect on millable stalk populations, stalk lengths, or stalk diameters at the time of harvest of either of the two crops.

Stalk length measurements conducted at the end of winter in mid-August showed that the GA<sub>3</sub> treatments had failed to enhance stalk elongation during the cold season, and no meaningful treatment differences were evident in either the plant or the first ratoon crop.

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## CONCLUSIONS

Earlier exploratory work with gibberellic acid showed a marked response in stalk elongation of up to 0,6m during the winter months, although unsprayed controls subsequently grew more rapidly to produce similar stalk lengths at the time of harvest.

The lack of any similar response in this experiment over two consecutive seasons may be attributed to the greater age of the cane at the onset of winter, other recorded responses having been observed in young cane harvested in autumn.

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KEC/Aug'83

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GIBBERELIC ACID TRIALYIELD DATA - PLANT AND FIRST RATOON CROPS

Treatments	CANE YIELD t/ha			ERC % CANE			TERC/ha		
	P	1R	Mean	P	1R	Mean	P	1R	Mean
<u>Varieties</u>									
NCo 376	118,0	125,7	121,9	12,47	11,02	11,75	14,71	13,78	14,25
B 51129	100,3	108,9	104,6	13,34	13,11	13,23	13,37	14,24	13,81
L.S.D. P = 0,05	6,3	7,3	-	0,42	0,89	-	0,90	N.S.	-
P = 0,01	8,5	9,9	-	0,57	1,20	-	1,22	N.S.	-
<u>GA<sub>3</sub> applications</u>									
Control	109,3	120,9	115,1	13,02	11,93	12,48	14,18	14,26	14,22
Single application	106,1	109,5	107,8	13,09	12,73	12,91	13,81	13,82	13,82
Two applications	110,8	121,3	116,1	13,08	12,15	12,62	14,46	14,67	14,57
Three applications	110,2	117,4	113,8	12,44	11,45	11,95	13,72	13,30	13,51
<u>Significance</u>	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-
<u>Interaction</u>	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-
Trial mean	109,1	117,3	113,2	12,91	12,06	12,49	14,04	14,01	14,03
S.E. single plot	9,8	11,3	-	0,65	1,37	-	1,40	1,91	-
S.E. var. mean <sup>+</sup>	2,2	2,5	-	0,14	0,31	-	0,31	0,43	-
S.E. GA <sub>3</sub> mean <sup>+</sup>	3,1	3,6	-	0,20	0,43	-	0,44	0,60	-
C.V. %	8,9	9,6	-	5,01	11,39	-	9,94	13,60	-

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Title GIBBERELIC ACID TRIAL 8000/2

Cat No: 1309

Object : To determine the effects of spraying gibberellic acid (GA<sub>3</sub>) onto approximately 5,5 month old non-flowered sugarcane cultivars during winter for late season harvest.

This crop : Plant Age : 12,0 months (2.12.80 to 2.12.81)

Location : ZSA Experiment Station, Field N1

Soil type : PE.1 sandy clay loam derived from gneiss

Design : 2. x 4 factorial, replicated 5 times

Spacing : Rows 1,5 m apart

Fertiliser : Nitrogen Phosphate  
140 kg N/ha 60 kg P<sub>2</sub>O<sub>5</sub>/ha

Rainfall : 896 mm Irrigation : 690 mm

Treatments : Cultivars  
1. NCo 376 (Mid-season cultivar)  
2. B 51129 (Late-season cultivar)

Times of GA<sub>3</sub> application  
1. Control  
2. Single spray (75g a.i. GA<sub>3</sub>/ha) in mid-May  
3. As for 2 and sprayed again four weeks later  
4. As for 3 and sprayed again four weeks later.

Conduct : The gibberellic acid solutions were sprayed over the top of the leaf canopy using a carbon dioxide pressurised knapsack sprayer with FS jets on a T-boom.

RESULTS

Cane yields. NCo 376 produced significantly greater cane yields than B 51129. These differences were largely accountable to greater stalk populations in NCo 376 than in B 51129, although their stalk lengths and diameters were smaller than those from B 51129. Spraying GA<sub>3</sub> during winter onto these 5,5 month old cultivars had no effect on stalk lengths.

ERC % cane. B 51129 produced significantly greater ERC % cane than NCo 376, whereas spraying GA<sub>3</sub> had no effect on quality.

TERC/ha. NCo 376 produced significantly greater TERC/ha than B 51129. This was largely due to the greater effect of cane yields on TERC/ha than quality. Spraying GA<sub>3</sub> onto these cultivars had no effect on TERC/ha.

RS% cane, TF% cane and TF t/ha. Spraying GA<sub>3</sub> had no effect on reducing sugars and total fermentables, whereas there were marked differences between cultivars i.e. NCo 376 produced greater RS% cane and TF t/ha and less TF% cane than B 51129.

CONCLUSIONS

Although it is known that spraying gibberellic acid (GA<sub>3</sub>) onto leaf canopies can increase stalk lengths during cool winter temperatures, GA<sub>3</sub> had no effect on stalk lengths in this experiment. Also it has been observed

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in the Zimbabwe Lowveld that young tillers sprayed with GA<sub>3</sub> initially elongated rapidly. However, about four weeks after the last GA<sub>3</sub> spraying, stalk elongation declined before resuming normally. This setback allowed the control to produce the same stalk length as the sprayed stalks. These results suggest more information is required to determine the reasons for the decline in rates of stalk elongation after the cessation of GA<sub>3</sub> spraying and how it can be overcome.

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RJH/Jan. '82  
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8000/2 GIBBERELIC ACID TRIAL - PLANT DATA

Table 1.

Treatments	Cane yields t/ha	ERC % cane	TERC/ha	RS % cane	TF % cane	TF t/ha	Stalk counts x 10 <sup>-3</sup>	Stalk lengths (m)	Stalk diameter (cm)
<u>Cultivars</u>									
1. NCo 376	118,0	12,47	14,71	0,71	14,83	17,50	149,1	2,23	2,0
2. B 51129	100,3	13,34	13,37	0,63	15,54	15,59	87,0	2,30	2,4
L.S.D. P = 0,05	6,3	0,42	0,90	-	-	-	-	-	-
P = 0,01	8,5	0,57	1,22	-	-	-	-	-	-
<u>GA<sub>3</sub> applications</u>									
1. Control	109,3	13,02	14,18	0,66	15,32	16,74	118,9	2,26	2,2
2. Single spray, mid-May	106,1	13,09	13,81	0,68	15,40	16,31	118,3	2,20	2,0
3. As for 2 and sprayed again four weeks later	110,8	13,08	14,46	0,64	15,27	16,91	116,4	2,35	2,3
4. As for 3 and sprayed again four weeks later	110,2	12,44	13,72	0,69	14,74	16,24	118,6	2,25	2,2
L.S.D. P = 0,05	N.S.	N.S.	N.S.	-	-	-	-	-	-
<u>Interactions</u>									
Trial mean	109,11	12,91	14,04	0,67	15,18	16,54	118,0	2,26	2,2
S.E. single plot ±	9,8	0,65	1,40	-	-	-	-	-	-
S.E. cultivars ±	2,2	0,14	0,31	-	-	-	-	-	-
S.E. GA <sub>3</sub> ±	3,1	0,20	0,44	-	-	-	-	-	-
C.V.%	8,9	5,01	9,94	-	-	-	-	-	-