

Object: To observe the effects of spraying glyphosate onto late-harvested sugarcane.

This crop: Plant Age: 12,2 months (15.11.82-10.11.81)

Location: ZSA Experiment Station, field H2-5.

Soil type: P.E. 1 derived from gneiss.

Design: 3 x 3 factorial with 4 replications.

Spacing: 1,5m between rows.

Irrigation: 1.173mm

Rainfall: 473mm

Treatments: Cultivars

- 1 NCo 376
- 2 CP 61-37
- 3 B 51129

Levels of glyphosate

- 1 Control
- 2 0,60 kg a.i./ha
- 3 1,20 kg a.i./ha

Conduct: Glyphosate was sprayed over the top of the leaf canopy using a carbon dioxide pressurised knapsack sprayer with FS 480 jets on a T-boom.

RESULTS

Relevant data are summarised in Tables 1 and 2.

(a) Cane yields: NCo 376 produced significantly greater cane yields than both CP 61-37 and B 51129. Spraying glyphosate had no effect on cane yields.

(b) ERC % cane: B 51129 produced better quality than both CP 61-37 and NCo 376. The interaction table (2) has shown that glyphosate depressed quality in NCo 376 whereas it improved quality in both CP 61-37 and B 51129.

(c) TERC/ha: Although spraying glyphosate onto NCo 376 depressed quality, NCo 376 produced greater TERC/ha than both B 51129 and CP 61-37.

(d) Stalk lengths: In all cultivars glyphosate depressed stalk elongation by about 7% at harvest.

CONCLUSIONS

It is not clear why glyphosate depressed quality in NCo 376 yet improved quality in both B 51129 and CP 61-37. However it has been observed that spraying glyphosate onto NCo 376 in an early season plant crop (7310/9) had no effect on TERC/ha whereas there was a response in the first ratoon. Nevertheless in both plant crops the NCo 376 controls produced greater TERC/ha than the other cultivars which responded to glyphosate sprays.

RJH/Dec. '82
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7310/10 CHEMICAL RIPENER TRIAL - PLANT DATA

Table 1

Treatments	Cane Yields t/ha	ERC % cane		TERC/ha	TF % cane		TF t/ha	Stalk lengths (m)
		At spraying	At harvest		At spraying	At harvest		
<u>Cultivars</u>								
NCo 376	147,6	12,19	12,83	18,93	13,96	14,81	21,85	2,62
CP 61-37	122,3	13,79	13,39	16,31	15,33	15,34	18,70	2,72
B 51129	118,6	13,80	14,54	17,25	15,59	16,55	19,64	2,76
<u>Glyphosate</u>								
Control	130,9	13,28	13,20	17,24	14,98	15,17	19,82	2,83
0,60 kg a.i./ha	129,2	13,29	13,86	17,82	15,00	15,82	20,37	2,61
1,20 kg a.i./ha	128,5	13,20	13,70	17,42	14,90	15,71	20,01	2,66
L.S.D. P = 0,05	8,3	-	0,55	1,19	-	-	-	-
P = 0,01	11,3	-	0,74	1,61	-	-	-	-
S.E. single plots [±]	9,9	-	0,65	1,41	-	-	-	-
S.E. Means [±]	2,8	-	0,19	0,41	-	-	-	-
C.V. %	7,6	-	4,79	8,08	-	-	-	-
Significant interactions	N.S.	-	CG!*	N.S.	-	-	-	-
Trial means	129,5	13,26	13,59	17,49	14,96	15,57	20,06	2,70

Table 2. ERC % Cane interaction table

Levels of glyphosate	Cultivars			Mean
	NCo 376	CP 61-37	B 51129	
Control	13,07	12,93	13,60	13,20
0,60 kg a.i./ha	12,78	13,80	14,99	13,86
1,20 kg a.i./ha	12,64	13,43	15,02	13,70
Mean	12,83	13,39	14,54	13,59

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

7310/10 CHEMICAL RIPENER TRIAL

TERMINAL REPORT

Cat. No.: 1356
Object: To study the effects of spraying glyphosate onto sugarcane late in the season.

Planted: 10th November, 1981.

Terminated: 12th November, 1984 after the 2nd ratoon crop.

<u>Harvest dates and ages:</u>	<u>Harvest</u>	<u>Age</u>
P	15.11.82	12,2 months
1R	14.11.83	12,0 months
2R	12.11.84	11,9 months

Location: ZSA Experiment Station, Kudu Block H2 to H5.

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

Design: 3 x 3 factorial with 4 replications.

Spacing: 1,5m between rows.

<u>Irrigation & rainfall:</u>	<u>Irrigation(mm)</u>	<u>Rainfall(mm)</u>
P	1 173	473
1R	1 158	355
2R	1 423	446

<u>Fertiliser:</u> (kg/ha)	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
P	140	60	-
1R	180	60	-
2R	180	100	60

Treatments: a) Varieties: 1. NCo 376 (mid-season)
2. CP 61-37 (early-season)
3. B 51129 (late-season)

b) Levels of glyphosate: 1. Nil
2. 0,6kg/ha a.i.
3. 1,2kg/ha a.i.

Conduct: The glyphosate was sprayed over the top of the canopy eight weeks before harvest. A CO₂ pressurised sprayer was used with FS 480 jets on a T-beam applying 80 l/ha of solution.

RESULTS

a) Yield data. Relevant yield data are shown in Table 1. Glyphosate had no effect on cane, ERC or total fermentable (TF) yields in all three crops. Differences in yield between varieties were significant except for the ERC and TF yields in the second ratoon, which were not significant.

b) Quality data. (See Table 2). Glyphosate had no significant effect on ERC % cane in all three crop cycles. Total fermentables (TF% cane) showed a linear response to glyphosate in the plant and first ratoon crops, but response in the second ratoon was nil. These increases in TF% cane with glyphosate were small (approximately 4% in each case).

Purities at the time of glyphosate spraying (8 weeks before harvest) were as follows:-

	<u>Purity %</u>		
	<u>P</u>	<u>1R</u>	<u>2R</u>
NCo 376	89,0	90,8	92,2
CP 61-37	91,4	91,5	93,0
B 51129	89,6	90,6	92,2

The purities in all three seasons were high indicating advanced maturity in all varieties at the time glyphosate was applied. Therefore it is not surprising that there were no marked differences in quality.

c) Quality interactions: ERC % cane and TF% cane showed a significant linear interaction component between glyphosate and varieties in the plant crop and in the second ratoon, (see Table 3). In the plant crop NCo 376 showed a linear decline in both ERC % cane and TF% cane to increasing levels of glyphosate, whereas CP 61-37 showed a quadratic response. In the second ratoon ERC % cane and TF% cane for NCo 376 and CP 61-37 showed a quadratic response to glyphosate, whereas B 51129 showed a linear increase.

There was no significant interaction in the first ratoon crop as the responses to glyphosate in all three varieties were essentially linear.

CONCLUSIONS

No real improvement in quality was obtained by spraying late season cane with glyphosate at 8 weeks before harvest. A better assessment of glyphosate as a late season cane ripener may have been obtained by spraying earlier than eight weeks before harvest, at a much lower percentage purity.

7310/10 CHEMICAL RIPENER TRIAL

PLANT, FIRST AND SECOND RATOON CROPS - TABLE 1: Yield Data

Treatments	CANE YIELD (t/ha)				ERC YIELD (t/ha)				TF YIELD (t/ha)			
	P	1R	2R	Mean	P	1R	2R	Mean	P	1R	2R	Mean
<u>Varieties</u>												
NCc 376	147,63	107,59	114,16	123,13	18,93	14,79	14,54	16,09	21,85	16,88	16,73	18,49
CP 61-37	122,23	89,52	99,59	103,80	16,31	13,20	13,89	14,47	18,70	14,90	15,44	16,35
B 51129	118,59	89,59	104,12	104,10	17,25	13,16	14,37	14,93	19,73	15,11	16,42	17,09
Significance	***	***	*	.	***	**	N.S.	-	***	**	N.S.	-
<u>Glyphosate</u>												
Nil	130,86	95,48	108,88	111,74	17,24	13,58	14,78	15,20	19,82	15,36	16,39	17,19
0,6 kg/ha a.i.	129,15	94,79	103,26	109,07	17,82	13,52	13,73	15,02	20,37	15,53	15,87	17,26
1,2 kg/ha a.i.	128,48	96,44	105,73	110,22	17,42	14,05	14,29	15,25	20,09	16,00	16,33	17,47
Significance	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-
LSD P = 0,05	8,33	8,38	11,06	-	1,19	1,12	-	-	1,40	1,27	-	-
P = 0,01	11,29	11,36	14,98	-	1,61	1,52	-	-	1,89	1,72	-	-
<u>Interactions</u>												
Trial mean	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-
S.E. single plot \pm	129,50	95,57	105,96	110,34	17,49	13,72	14,27	15,16	20,09	15,63	16,19	17,30
S.E. trial mean \pm	9,89	9,94	13,12	-	1,41	1,33	1,84	-	1,66	1,50	1,99	-
C.V.%	2,85	2,87	3,79	-	0,41	0,38	0,53	-	0,48	0,43	0,57	-
	7,64	10,40	12,38	-	8,08	9,70	12,91	-	8,24	9,62	12,29	-

7310/10 CHEMICAL RIPENER TRIAL

TABLE 2: QUALITY DATA - PLANT, FIRST AND SECOND RATOON

a) ERC % CANE

Treatments	ERC % cane at spraying			ERC % cane at harvest			
	P	1R	2R	P	1R	2R	Mean
<u>Varieties</u>							
NCo 376 12,19	12,19	12,94	12,85	12,83	13,76	12,84	13,14
CP 61-37	13,79	14,48	14,30	13,39	14,76	13,61	13,92
B 51129	13,80	13,76	14,10	14,54	14,68	13,79	14,34
Significance		***	***	***	**	***	-
<u>Glyphosate</u>							
N11		13,86	13,71	13,20	14,28	13,32	13,60
0,6 kg/ha a.i.		13,58	13,73	13,86	14,28	13,33	13,82
1,2 kg/ha a.i.		13,74	13,82	13,70	14,65	13,59	13,98
Significance		N.S.	N.S.	N.S.	N.S.	N.S.	-
L.S.D. P = 0,05		0,36	0,38	0,55	0,50	0,47	-
P = 0,01		0,49	0,51	0,74	0,68	0,63	-
<u>Interactions</u>							
Trial mean	13,26	13,73	13,75	13,58	14,40	13,41	13,80
S.E. single plot ±		0,43	0,45	0,65	0,60	0,55	-
S.E. treatment mean ±		0,12	0,13	0,19	0,17	0,16	-
C.V.%		3,14	3,24	4,79	4,14	4,12	-

b) TF% CANE

Treatments	TF % cane at spraying			TF % cane at harvest			
	P	1R	2R	P	1R	2R	Mean
<u>Varieties</u>							
NCo 376	13,96	14,74	14,44	14,81	15,71	14,65	15,06
CP 61-37	15,33	16,17	15,83	15,34	16,67	15,49	15,83
B 51129	15,59	15,57	15,78	16,56	16,74	16,01	16,44
Significance		***	***	***	***	***	-
<u>Glyphosate</u>							
N11		15,60	15,27	15,17	16,15	15,28	15,53
0,6 kg/ha a.i.		15,38	15,31	15,82	16,30	15,37	15,83
1,2 kg/ha a.i.		15,50	15,46	15,72	16,66	15,50	15,96
Significance		N.S.	N.S.	G'*	G'*	N.S.	-
L.S.D. P = 0,05		0,34	0,36	0,52	0,48	0,35	-
P = 0,01		0,46	0,49	0,70	0,66	0,48	-
<u>Interactions</u>							
Trial mean	14,96	15,49	15,35	15,57	16,37	15,38	15,77
S.E. single plot ±		0,40	0,43	0,61	0,58	0,42	-
S.E. treat. plot ±		0,12	0,12	0,18	0,17	0,12	-
C.V.%		2,58	2,80	3,94	3,51	2,73	-

7310/10 CHEMICAL RIPENER TRIAL

PLANT, FIRST AND SECOND RATOON CROPS

TABLE 3: INTERACTION EFFECTS

ERC % CANE AT HARVEST

VARIETIES (V)	LEVELS OF GLYPHOSATE IN KG/HA											
	PLANT CROP				FIRST RATOON				SECOND RATOON			
	0	0,6	1,2	Mean	0	0,6	1,2	Mean	0	0,6	1,2	Mean
NCo 376	13,07	12,78	12,64	12,83	13,59	13,77	13,93	13,76	12,90	12,99	12,64	12,84
CP 61-37	12,93	13,80	13,43	13,39	14,69	14,48	15,13	14,76	13,65	13,68	13,51	13,61
B 51129	13,60	14,99	15,02	14,54	14,56	14,59	14,89	14,68	13,42	13,33	14,62	13,79
Means	13,20	13,86	13,70	13,58	14,28	14,28	14,65	14,40	13,32	13,33	13,59	13,41
Significant interactions	VG'*				None				VG'*			
L.S.D. body of table	0,95 (P=0,05)				-				0,81 (P=0,05)			

TF % CANE AT HARVEST

VARIETIES (V)	LEVELS OF GLYPHOSATE KG, HA a. i.											
	PLANT CROP				FIRST RATOON				SECOND RATOON			
	0	0,6	1,2	Mean	0	0,6	1,2	Mean	0	0,6	1,2	Mean
NCo 376	15,00	14,82	14,62	14,81	15,44	15,78	15,91	15,71	14,71	14,73	14,52	14,65
CP 61-37	14,89	15,62	15,50	15,34	16,51	16,45	17,04	16,67	15,47	15,59	15,40	15,49
B 51129	15,63	17,02	17,03	16,56	16,50	16,68	17,04	16,74	15,67	15,70	16,59	16,01
Means	15,17	15,82	15,72	15,57	16,15	16,30	16,66	16,37	15,20	15,37	15,50	15,38
Significant Interactions	VG'*				None				VG'*			
L.S.D. body of table	0,89 (P=0,05)				-				0,61 (P=0,05)			

7310/10 CHEMICAL RIPENER TRIAL

Cat.: 1356

Object: To study the effects of spraying glyphosate onto sugarcane late in the season.

This crop: First ratoon Age: 12,0 months (15.11.82 to 14.11.83)

Location: ZSA Experiment Station, Kudu Block H2 to H5.

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

Design: 3 x 3 factorial with 4 replications.

Spacing: 1,5m between rows.

Irrigation & rainfall:

	<u>Irrig. (mm)</u>	<u>Rain (mm)</u>
P	1 173	473
1R	1 158	355

<u>Fertiliser:</u> (kg/ha)		<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
P	140	60	-	-
1R	180	60	-	-

Treatments: Varieties : 1. NCo 376 (mid-season)
2. CP 61-37 (early-season)
3. B 51129 (late-season)

Levels of glyphosate: 1. Nil
2. 0,6 kg/ha a.i.
3. 1,2 kg/ha a.i.

Conduct: The glyphosate was sprayed over the top of the canopy eight weeks before harvest. A CO₂ pressurised sprayer was used with FS 480 jets on a T-boom, applying 80 litres/ha of solution.

RESULTS

Relevant data from the plant and first ratoon crops are presented in the attached tables.

a) Quality effects: Glyphosate had no significant effect on ERC % cane in either of the two crops, but total fermentables (TF % cane) responded linearly (P=0,05) in both crop cycles. However, the increases in TF % cane caused by glyphosate application were very small at approximately 4% in each case.

2/Purities at....

Purities at the time of glyphosate spraying (8 weeks before harvest) were as follows

	<u>Purity %</u>	
	<u>P</u>	<u>1R</u>
NCo 376	89,0	90,8
CP 61-37	91,4	91,5
B 51129	89,6	90,6

The high purities indicate advanced maturity of all three varieties at the time the ripener was applied, and it is therefore not surprising that no marked quality responses were recorded.

b) Quality interactions: In the plant crop the linear interaction component between glyphosate and varieties was significant ($P=0,05$) in the case of both ERC % cane and TF % cane. A study of the interaction tables (attached) shows that the three varieties responded quite differently to ripener application. Increasing levels of glyphosate caused a linear increase in B 51129, and a quadratic response from CP 61-37.

In the first ratoon crop responses were essentially linear in all three varieties, and hence the interaction was not significant.

c) Yield effects: The application of glyphosate did not produce any responses in cane, ERC, or TF yield in either of the two crops. There was a trend towards linear responses in the case of ERC and TF yields, but differences were too small to attain significance.

CONCLUSIONS

Results to date indicate that no real improvement in quality is likely following application of glyphosate as a ripener on late-season cane. The trial will be continued for one more season.

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7310/10 CHEMICAL RIPENER TRIAL

QUALITY DATA - PLANT AND 1ST. RATOON CROPS

Treatments	ERC % CANE AT SPRAYING		ERC % CANE AT HARVEST			TF % CANE AT SPRAYING		TF % CANE AT HARVEST		
	P	1R	P	1R	Mean	P	1R	P	1R	Mean
<u>Varieties (V)</u>										
NCo 376	12,19	12,94	12,83	13,76	13,30	13,96	14,74	14,81	15,71	15,26
CP 61-37	13,79	14,48	13,39	14,76	14,08	15,33	16,17	15,34	16,67	16,01
B 51129	13,80	13,76	14,54	14,68	14,61	15,59	15,57	16,56	16,74	16,65
Significance		***	***	**	-		***	***	**	-
<u>Glyphosate (G)</u>										
Nil		13,86	13,20	14,28	13,74		15,60	15,17	16,15	15,66
0,6 kg/ha a.i.		13,58	13,86	14,28	14,07		15,38	15,82	16,30	16,06
1,2 kg/ha a.i.		13,74	13,70	14,65	14,18		15,50	15,72	16,66	16,19
Significance		N.S.	N.S.	N.S.	-		N.S.	G' *	G' *	-
L.S.D. P=0,05		0,36	0,55	0,50	-		0,34	0,52	0,48	-
P=0,01		0,49	0,74	0,68	-		0,46	0,70	0,66	-
<u>Interactions</u>										
Trial mean	13,26	N.S.	VG' *	N.S.	-	14,96	N.S.	VG' *	N.S.	-
S.E.single plot ±		13,73	13,58	14,40	13,99		15,49	15,57	16,37	15,97
S.E.treat.mean ±		0,43	0,65	0,60	-		0,40	0,61	0,58	-
C.V.%		0,12	0,19	0,17	-		0,12	0,18	0,17	-
		3,14	4,79	4,14	-		2,58	3,94	3,51	-

7310/10 CHEMICAL RIPENER TRIAL

INTERACTION EFFECTS

ERC % CANE AT HARVEST

VARIETIES	PLANT CROP				1ST RATOON			
	Nil	0,6 kg/ha	1,2 kg/ha	Means	Nil	0,6 kg/ha	1,2 kg/ha	Means
NCo 375	13,07	12,78	12,64	12,83	13,59	13,77	13,93	13,76
CP 61-37	12,93	13,80	13,43	13,39	14,69	14,48	15,13	14,76
B 51129	13,60	14,99	15,02	14,54	14,56	14,59	14,89	14,68
Means	13,20	13,86	13,70	13,58	14,28	14,28	14,65	14,40

L.S.D. body of table = 0,95 (P=0,05)

1R Interaction non-significant

TF % CANE AT HARVEST

VARIETY	PLANT CROP				1ST RATOON			
	Nil	0,6 kg/ha	1,2 kg/ha	Means	Nil	0,6 kg/ha	1,2 kg/ha	Means
NCo 376	15,00	14,82	14,62	14,81	15,44	15,78	15,91	15,71
CP 61-37	14,89	15,62	15,50	15,34	16,51	16,45	17,04	16,67
B 51129	15,63	17,02	17,03	16,56	16,50	16,68	17,04	16,74
Means	15,17	15,82	15,72	15,57	16,15	16,30	16,66	16,37

L.S.D. body of table = 0,89 (P=0,05)

1R Interaction non-significant

7310/10

CHEMICAL RIPENER TRIALYIELD DATA - PLANT AND 1ST RATOON CROPS

Treatments	CANE YIELD (t/ha)			ERC YIELD (t/ha)			TF YIELD (t/ha)		
	P	1R	Mean	P	1R	Mean	P	1R	Mean
<u>Varieties</u>									
NCo 376	147,63	107,59	127,61	18,93	14,79	16,86	21,85	16,88	19,37
CP 61-37	122,28	89,52	105,90	16,31	13,20	14,76	18,70	14,90	16,80
B 51129	118,59	89,59	104,09	17,25	13,16	15,21	19,73	15,11	17,42
Significance	***	***	-	***	**	-	***	**	-
<u>Glyphosate</u>									
Nil	130,86	95,48	113,17	17,24	13,58	15,41	19,82	15,36	17,59
0,6 kg/ha a.i.	129,15	94,79	111,97	17,82	13,52	15,67	20,37	15,53	17,95
1,2 kg/ha a.i.	128,48	96,44	112,46	17,42	14,05	15,74	20,09	16,00	18,05
Significance	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-
L.S.D. P=0,05	8,33	8,38	-	1,19	1,12	-	1,40	1,27	-
P=0,01	11,29	11,36	-	1,61	1,52	-	1,89	1,72	-
<u>Interactions</u>	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-
Trial mean	129,50	95,57	112,54	17,49	13,72	15,61	20,09	15,63	17,86
S.E.single plot±	9,89	9,94	-	1,41	1,33	-	1,66	1,50	-
S.E.treat.mean ±	2,85	2,87	-	0,41	0,38	-	0,48	0,43	-
C.V.%	7,64	10,40	-	8,08	9,70	-	8,24	9,62	-