SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code No : R103/91/R
Cat No : 1777

Title: Ripeners - early season

1. Particulars of project

This crop : Ratoon
Site : Pongola Field Station Block 1106
Region : Northern area
Soil system : Komatipoort
Soil form/series: Hutton/Shorrocks
Design : Randomised blocks
Plot size : 16 m x 4 rows x 1,4 m
Variety : NCo376
Date and age at spraying : 19.3.91 - 8,3 months
Date and age at harvest : 6.6.91 - 12,0 months
Sampling dates : 21/3; 17/4; 2/5; 14/5 29/5; 6/6
Irrigation : Upto 2 weeks before harvesting.

Spray method: CO_2 operated knapsack with two TK 1,0 floodjets on overhead boom.

Condition of cane at spraying:

66% purity (Ethrel spraying)

Sampling technique:

4 stalks taken from 4 predetermined points in 2 net rows. Stalks taken from harvested cane in each plot on 6 June.

Particulars of spraying

Date	Treatment/rate	Volume/ha	Pressure (kPa)	Purity %	
19 Mar	2. Ethrel(11w) 1,51 l/ha	62 l	200	66	
				Cont.	Ethrel
11 Apr	3. Fus.S.(8w) 330 ml/ha	75 l	200	75	78
2 May	4. Fus.S.(6w) 293 ml/ha	67 l	200	80	83
16 May	5. Fus.S.(4w) 293 ml/ha	67 l	200	80	83

Note on treatment

Treatment 6 was not applied and the plots provided further data for treatment 1 (control).

2. Objectives

- To measure the responses from Ethrel and Fusilade Super individually and in combination.
- To determine whether the response to the combination treatment is affected by the interval between application of the two ripeners.

3. Treatments

1. Control - unsprayed
2. Ethrel 1,5 l/ha - 12 weeks before harvest (21 March)
3. Ethrel 1,5 l/ha (21 March) + Fus.S. 300 ml/ha - 8 weeks before harvest
4. Ethrel 1,5 l/ha (21 March) + Fus.S. 300 ml/ha - 6 weeks before harvest
5. Ethrel 1,5 l/ha (21 March) + Fus.S. 300 ml/ha - 4 weeks before harvest

*6. Fusilade Super 300 ml/ha - 6 weeks before harvest.

* Not applied.

4. Results

4.1 Changes in cane quality (ers % c)

Treatments \ Dates	21/3	17/4	2/5	14/5	29/5	6/6*
1. Control	3,4	6,5	8,4	9,1	9,8	9,6
2. Ethrel 1,5 l	3,6	7,3	10,2	10,9	11,4	11,9
3. Eth.+F.S. 8 weeks	3,9	7,8	10,0	11,6	12,3	12,3
4. Eth.+F.S. 6 weeks	3,9			10,7	11,6	11,7
5. Eth.+F.S. 4 weeks	3,9				12,1	11,7
MEAN	3,6	7,1	9,6	10,3	11,2	11,1
No. of Ethrel plots		18	18	12	6	6
C.V. %	18,3	17,6	9,0	9,7	10,1	7,9
SED ±	0,38	0,73	0,5	0,58	0,65	0,51

* Samples taken from harvested bundles.

4.2 Changes in stalk mass (fresh mass g/stalk)

Treatments \ Dates	21/3	17/4	2/5	14/5	29/5	6/6*		6/6 with tops	
1. Control	703	803	720	782	886	846	% of control	1005	% of control
2. Ethrel 1,5 l	680	776	683	749	866	805	95	969	96
3. Eth.+F.S. 8 wks	696	819	674	724	800	774	91	898	89
4. Eth.+F.S. 6 wks	689			702	770	711	84	841	84
5. Eth.+F.S. 4 wks	628				806	749	89	891	89
MEAN	675	792	694	748	836	789		921	
No. of Ethrel plots		18	18	12	6	6			
C.V. %	10,0	30,0	13,7	13,9	11,4	11,0			
SED ±	39	137	55	60	55	50			

4.3 Changes in mass recoverable sugar (ers g/stalk)

Treatment \ Dates	21/3	17/4	2/5	14/5	29/5	6/6
1. Control	22,7	54,5	60,3	71,2	87,1	81,8
2. Ethrel 1,5 l	24,4	55,5	69,1	80,0	98,6	95,5
3. Eth.+F.S. 8 weeks	27,0	66,4	67,6	84,9	98,7	95,5
4. Eth.+F.S. 6 weeks	26,8			75,7	88,9	83,8
5. Eth.+F.S. 4 weeks	19,3				97,4	87,8
MEAN	24,0	57,0	65,9	77,2	93,0	87,7
No. of Ethrel plots		18	18	12	6	6
C.V. %	18,8	37,2	14,5	19,2	16,0	15,7
SED ±	2,6	12,2	5,5	8,5	8,6	7,9

4.4 Harvest data

Treatments	t cane/ha	ers % c	t ers/ha		Mass of tops (g/stalk)	Estimated * cane yields with tops
Control	103,7	9,57	9,9	response	159	125,0
Ethrel 1,5 l	107,7	11,87	12,8	+2,9	164	129,7
Eth.+F.S. 8 weeks	100,1	12,32	12,4	+2,5	124	116,7
Eth.+F.S. 6 weeks	95,7	11,74	11,2	+1,3	130	113,1
Eth.+F.S. 4 weeks	107,1	11,68	12,5	+2,6	142	126,1
MEAN	103,0	11,13	11,5		146	122,1
C.V. %	9,3	7,9	13,3		17,4	
SED ±	5,6	0,51	0,88		14,6	
LSD 05	11,5	1,0	1,8		30	

* Based on mean stalk population of 134000/ha and the combined mass of final samples + tops.

5. Comments

5.1 Quality

The application of Fusilade Super (23 days after spraying Ethrel [treatment 3]) raised the cane quality by 0,7 ± 0,58 units within 28 days of applying Fusilade Super. This difference was 0,9 ±0,65 units 43 days after spraying Fusilade Super. The response of the combination treatment above from Ethrel (treatment 2) was smaller at the time of harvesting (0,4 ±0,51 units) which was 51 days after spraying Fusilade Super. Neither of the other two combination treatments provided better responses than that from treatment 3 (Ethrel + Fus.S. 8 weeks).

5.2 **Mass - recoverable sucrose**

The benefits from the combination treatments in terms of quality were negated by the small (ns) but consistently lower stalk mass of these treatments. Sucrose yields from Ethrel applied on its own were increased by 2,9 ± 0,88 t ers/ha and there is no evidence of Fusilade Super providing an added response in this experiment.

General

Similar responses from Fusilade Super in terms of cane quality were evident in samples taken: 33 and 48 days after spraying Fusilade Super onto cane which had been sprayed with Ethrel 18 days earlier (treatment 3) and in samples taken 13 days after spraying Fusilade Super onto cane sprayed with Ethrel 53 days prior to spraying Fusilade Super (treatment 5).

Note: The average rate of Fusilade Super applied in treatment 3 was 330 ml/ha while those applied in treatments 4 and 5 were 293 ml/ha.

RAD/1b
3 September 1991

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Cat.No. : 1777
Code No. : R103/91/R4

Title : Ripeners - early season

1. Particulars of project:

This crop	: 4th ratoon	Spray method	: CO_2 operated knapsack
Site	: Pongola Fld St Blk1106	Pressure	: 1.5kPa
Region	: Northern area	Volume	: 8.3 ml nozzle/s
Soil System	: Komatipoort	Weather at spraying	: Good on all occasions
Soil form/ series	: Hutton/Stella	Conditon of cane	: Purity 60% on 10/3
Design	: Random block (6 reps)	Sampling method	: 4 stalks at 4 points
Variety	: NCo376		
Date and age at spraying	: 10/3 (Eth), 9.1 months 29/4 (FS), 10.7 months 14/5 (FS), 11.3 months 04/6 (FS), 11.9 months		
Sampling dates:	10/3, 7/4, 27/4, 11/5, 2/6, 24/6		
Cycle	: 6/6/91-1/7/92 (12,8m)		

Irrigation, Rainfall & Et (mm)

	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
R	50	12	2	23	25	96	98	100	87	15	16	0	10
I	61	61	61	0	61	0	61	61	61	61	122	61	61
Et	67	95	120	139	175	176	197	206	182	187	145	124	100

Totals: R = 534
I = 732
Et = 1913
R + I - Et = -647

2. Objectives

2.1 To measure the responses from Ethrel and Fusilade Super individually and in combination.

2.2 To determine whether the response to the combination treatment is affected by the interval between application of the two ripeners.

3. Treatments

Control - unsprayed
Ethrel 1.5l/ha - 112d (10Mar) before harvesting
Ethrel 1.5l/ha 112d* + FS 300ml/ha 62d
Ethrel 1.5l/ha 112d + FS 300ml/ha 47d
Ethrel 1.5l/ha 112d + FS 300ml/ha 26d
Fusilade S 300ml/ha 47d
*days before harvesting

4. Results

4.1 Gains in stalk wet (WM) and dry (DM) mass (g) of untreated cane after 10 March and gain during sampling period as % of final stalk mass

Date	10/3	7/4	27/4	11/5	2/6	24/6	%
WM	690	+58	+70	+58	+130	+261	38
DM	141	+32	+35	+48	+73	+119	84

4.2 Stalk mass (g/stalk) on various sampling occasions

Dates	10/3	7/4	27/4	11/5	2/6	24/6
Con	690	720	741	744	820	951
Eth		746	702	764	771	942
E+FS(62d)			708	727	853	999
E+FS(47d)				775	727	779
E+FS(26d)					817	847
FS(47d)						908
MEAN	690	733	717	756	793	891
No. of Eth. plots		24	18	12	12	6
CV%	9.6	10.8	14.5	17.9	10.3	11.7
SED±		46	60	78	47	60

4.3 Sucrose content at various sampling occasions (ers%cane)

Dates	10/3	7/4	27/4	11/5	2/6	24/6
Con	3.6	5.9	8.3	10.5	11.1	11.9
Eth		6.9	10.2	11.5	12.9	12.8
E+FS(62d)				11.9	12.4	13.3
E+FS(47d)				11.5	12.6	12.2
E+FS(26d)					11.1	12.4
FS(47d)						12.5
MEAN	3.6	6.5	9.6	11.5	12.2	12.5
No. of Eth. plots		24	18	12	12	6
CV%	21	11.3	10.3	8.3	6.1	10.5
SED±		0.4	0.6	0.6	0.4	0.8

4.4 Sucrose mass on various sampling dates (ers g/stalk)

Dates	10/3	7/4	27/4	11/5	2/6	24/6
Con	25.3	42.2	62.1	77.7	91.0	112.4
Eth		51.3	71.6	88.0	99.4	119.7
E+FS(62d)				86.3	106.0	121.5
E+FS(47d)				90.4	91.5	94.8
E+FS(26d)					90.6	105.0
FS(47d)						113.5
MEAN	25.0	48.2	68.3	87.3	96.3	111.2
No.of Eth. plots		24	18	12	12	6
CV%	24	14.0	19.1	21.1	12.5	13.3
SED±		3.9	7.5	10.6	7.0	8.5

4.5 Yields and responses at harvesting

Treatment	t cane/ha	ers%cane	t ers/ha	Response
Control	112	11.9	13.3	
Ethrel(112d)	110	12.8	14.0	+ 0.7
Eth+Fus(62d)	107	13.2	14.2	+ 0.9
Eth+Fus(47d)	98	12.2	11.9	- 1.4
Eth+Fus(26d)	104	12.4	12.9	- 0.4
Fus(47d)	108	12.5	13.9	+ 0.6
MEAN	106	12.5	13.3	
CV%	8.7	10.5	14.4	
LSD(05)	10.9	4.8	2.3	

Comments

Evaporative demand exceeded moisture from rainfall and irrigation by 647 mm so that soil moisture was being slowly depleted.

Lodging progressed after May until the time of harvesting when most plots were severely lodged and is the probable reason for the increased variability. Samples from which sucrose contents were determined were taken one week before harvesting.

Untreated cane gained little wet mass between 10 March and 11 May after which growth increased rapidly until harvesting. Similar trends are evident in dry mass data. The dry mass was accumulated at a substantially greater rate than wet mass during the period of the trial, which suggests that the crop was ripening rapidly.

Sample and harvest data

The responses from Ethrel were variable ranging from 1.0 to 1.9 units of ers % cane. The combination treatments generally did not improve the responses from Ethrel and at harvesting sucrose yields from Ethrel, Fusilade Super and the combination treatment in which Fusilade Super was applied 62 days before harvesting were very similar and not statistically significant. Cane yields of the combination treatment with Fusilade Super applied 47 days before harvesting, however, were significantly lower ($P=0.05$) than untreated cane yields. The application of Ethrel and Fusilade Super applied alone did not have the same negative effects on cane yields.

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code : R103/91/R5
Cat No.: 1777

Title: Ripeners - early season

1. Particulars of the project

This crop	:	5th ratoon	Condition of cane	:	Purity 59% on 1/3/93
Site	:	Pongola Fld. St. Blk1106	Sampling method	:	4 stalks at 4 points
			Design	:	Random block (6 reps)
Region	:	Northern area	Plot size	:	12 m x 6 rows x 1.4 m
Soil system	:	Komatipoort	Variety	:	NCo376
Form/family	:	Hutton/Stella	Date and age		
Spray method	:	CO_2 operated knapsack	at spraying	:	9/3 (Eth),8.3 months 30/3 (FS), 9.0 months
Pressure	:	1.75 kPa			14/4 (FS), 9.3 months
Volume	:	9.3 ml/nozzle/s			29/4 (FS), 9.7 months
Weather at spraying	:	Good on all occasions	Sampling dates	:	1/3,31/3,13/4,27/4,3/6
			Cycle	:	1/7/92 - 3/6/93 (11,1 m)

Irrigation, Rainfall & Et (mm)

	Jl	A	S	O	N	D	J	F	M	A	M	J
R	0	0	4	37	85	93	60	97	166	13	14	9
I	61	61	0	61	0	61	122	61	61	61	61	61
Et	105	135	154	195	194	198	233	171	177	162	107	128

Totals: R = 578 I = 671 Et = 1959 R + I = -710

2. **Objectives:**

1. To measure the responses from Ethrel and Fusilade Super individually and in combination.

2. To determine whether the response to the combination treatment is affected by the interval between application of the two ripeners.

3. **Treatments:**

Control - unsprayed

Ethrel 1.5ℓ/ha - 86d (9Mar) before harvesting
Ethrel 1.5ℓ/ha 86d* + FS 300mℓ/ha 65d
Ethrel 1.5ℓ/ha 86d + FS 300mℓ/ha 50d
Ethrel 1.5ℓ/ha 86d + FS 300mℓ/ha 35d
Fusilade S 300mℓ/ha 50d
*days before harvesting

4. Results:

4.1 Gains in stalk wet (WM) and dry (DM) mass (g) of untreated cane after 1 March and gain during sampling period as % of final stalk mass

Date	1/3	31/3	13/4	27/4	3/6	%
WM	440	+137	+191	+235	+272	38
DM	78	+35	+61	+74	+103	57

4.2 Stalk mass (g/stalk) on various sampling occasions

Dates	1/3	31/3	13/4	27/4	3/6
Con	440	551	587	674	712
Eth		507	534	633	692
E+FS(65d)			592	626	620
E+FS(50d)				605	571
E+FS(35d)					703
FS(50d)				674	801
MEAN	440	538	561	640	683
No. of Eth plots	0	24	18	12	6
CV %	14.3	15.7	19.3	10.4	17.4
SED ±		49	63	39	69

4.3 Sucrose content at various sampling occasions (ers % cane)

Dates	1/3	31/4	13/4	27/4	3/6
Con	3.0	5.0	7.4	6.8	9.0
Eth		6.1	8.4	10.0	10.1
E+FS(65d)			9.9	11.0	12.6
E+FS(50d)				10.0	11.9
E+FS(35d)					11.4
FS(50d)				7.3	10.0
MEAN	3.0	5.8	8.3	9.2	10.8
No.of Eth plots		24	18	12	6
CV %	36	12.0	21.0	15.1	8.1
SED ±		0.4	1.0	0.8	0.5

4.4 Sucrose mass on various sampling dates (ers g/stalk)

Dates	1/3	31/3	13/4	27/4	3/6
Con	13.2	29.4	41.9	45.8	64.6
Eth		31.6	44.9	63.2	69.9
E+FS(65d)			58.4	69.5	77.9
E+FS(50d)				59.3	67.8
E+FS(35d)					80.1
FS(50d)				49.1	80.2
MEAN	13.2	30.9	46.2	58.4	73.4
No.of Eth plots		24	18	12	6
CV %	42	17.3	25.7	19.4	20.3
SED ±		3.1	6.9	6.5	8.6

4.5 Yields and responses at harvesting

Treatment	cane t/ha	ers % cane	ers t/ha	Response
Control	109	9.0	9.9	
Ethrel(86d)	99	10.1	10.0	+ 0.1
Eth+Fus(65d)	93	12.6	11.6	+ 1.7
Eth+Fus(50d)	88	11.9	10.5	+ 0.6
Eth+Fus(35d)	87	11.4	9.9	0
Fus(50d)	108	10.0	10.7	+ 0.8
MEAN	97	10.8	10.4	
CV %	8.8	8.1	11.7	
LSD (05)	10.2	1.0	1.4	

Comments:

As in the previous crop, evaporative demand exceeded moisture from rainfall and irrigation (by 710 mm). The profile had probably been depleted of plant available moisture by the end of the previous crop and untreated cane yielded 8.7 tons cane per 100 mm of moisture received in this crop.

Nearly 40% of wet mass and 60% of dry mass was accumulated in stalks between 1 March and 3 June (i.e. during the last three months of an eleven month old crop).

Sample data:

At the time of spraying stalks weighed substantially less, in all treatments, compared with those taken from control plots. The stalk mass differences, particularly of the Eth + Fus S (50d) treatment, persisted throughout the sampling period and are reflected in the significantly lower cane yields. It is therefore not clear whether cane yield differences are due to treatments applied in this crop.

With the exception of the Fusilade S applied alone, responses in terms of cane quality were greatest in all treatments on 27 April. By 3 June responses (ers % cane) were reduced in Ethrel (alone) treated cane but were maintained in the combination treatments.

Sample data suggest that benefit in terms of sucrose yield from the treatments would have been greatest from Eth + Fus (65d) harvested on 27 April, i.e. about 30 days after applying Fusilade Super.

Harvest data:

Cane yields from Ethrel - and particularly of the combination treatments - were significantly less than untreated and Fusilade Super treated cane. The best sucrose yields were from Eth + Fus (65d) which were significant ($P = 0.05$) and twice that of the next best treatment, which was from Fusilade Super applied alone.

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2 August 1993