

SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code No : R14 ETv1/90/R3
Cat No : 1761

Title : Ripeners - Early season.

1. Particulars of the crop

This crop : Third ratoon	<u>Spray method</u> : CO ₂ operated knapsack with two TK 1,0 floodjets
Site : Mhlati (TSB) Block 2	<u>Pressure</u> : 220 kPa
Region : Northern area	<u>Volume/ha</u> : 6l
Soil system : Komatipoort	<u>Weather at spraying</u> : Cloudy and warm
Soil form/series: Shortlands - Shallow phase	<u>Condition of cane at spraying</u> : 10 - 13 green leaves; about 70% stalks with flower initials
Design : Randomised blocks	<u>Sampling technique</u> : Four stalks taken at 4 predetermined points in each plot, cleaned and topped at NBP.
Plot size : 6 rows x 1,5m x 9m	For sectioning 24 marked stalks taken from plots in treatments 1 and 2 (see note on sectioning).
Variety : N14	
Date and age at spraying: 27/4/90 - 10,1 months	
Date and age at harvest: 4/7/90 - 12,3 months	
Sampling dates : 25/4, 28/5. 18/6, 3/7	
Partitioning : 25/6 only	
Irrigation : 836 mm (by centre pivot)	
Rainfall (mm): Feb Mar Apr May June 28 95 43 0 2	

2. Objectives

- 2.1 To continue determining the optimum interval between spraying and harvesting Fusilade Super treated cane.
- 2.2 To assess the effects that Fusilade Super has on:
 - (a) green leaf numbers
 - (b) growth, mass and sucrose content of various sections of stalk
 - (c) leaf water potential (✓)

2.3 To assess the potential of Focus as a ripener of sugarcane.

3.1 Treatments

1. Control unsprayed.
2. Fusilade Super at 400 ml/ha (50 g a.i./ha).
3. Focus at 500 ml/ha (50 g a.i./ha).
4. Focus at 750 ml/ha (75 g a.i./ha).

3.2 Notes on partitioning

On 30 April the sheath length of the upper most leaf with a visible collar was determined ($a = 285$ mm) and the distance between the stalk apex and the point at which this leaf was attached to the stalk was measured ($b = 26$ mm). 75 stalks were marked at a point 859 mm below the top most visible collar (i.e. $(a - b) + 600 = 859$ mm) in plots of treatments 1 and 2. Twenty-four marked stalks were taken from each plot in treatments 1 and 2 on 25 June, cleaned of trash and leaves; broken tops were retained. The stalks were sectioned in the following manner:

Section 3 : first 20 cm from mark upwards

Section 2 : second 20 cm from mark upwards

Section 1 : remaining top most section of the stalk

Section 5 : 1 m from base upwards

Section 4 : centre section of stalk of variable length

All sections were weighed immediately; sections 4 and 5 were analysed in the Central Board laboratories at Malelane and the remaining sections were frozen and later analysed in the Experiment Station millroom at Mount Edgecombe.

3.3 Crop measurements

- PER ° Plant extension rate (P.E.R.) of 15 stalks was measured prior to spraying. After spraying measurements were done on 7 stalks in each of a Control and treated plot (Fusilade Super).
- ° Leaf water potential (Ψ_l) were measured on 2 March (mechanical failure of the pressure bomb prevented further measurements).
 - ° flower counts were done on 30 May and green leaves were counted on 27 June.
 - ° One row in each plot from which no stalks were taken for samples was harvested and weighed on 4 July - 68 days after applying the ripener treatments.

4. Results

4.1 Sample data

Treatments	mass g/stalk				ers % C				ers g/stalk			
	0	32	52	68	0	32	52	68	0	32	52	68
Control	1331	1389	1311	1564	7,6	11,1	11,6	12,7	101	154	151	199
Fus S	1353	1451	1364	1658	6,7	11,5	12,0	12,1	91	166	164	200
Focus 500	1309	1447	1346	1427	6,9	11,6	12,3	12,6	91	167	165	178
Focus 750	1285	1301	1289	1652	6,5	11,2	11,8	12,0	83	146	152	197
Mean	1320	1397	1327	1575	6,9	11,3	11,9	12,3	92	158	158	194
CV %	8,2	7,4	6,5	13,7	11,8	6,9	4,0	6,5	15,1	8,4	6,3	11,5
SED ±	62,7	59,6	50,2	124	0,47	0,45	0,27	0,46	7,9	7,6	5,8	12,8
LSD 05	133,7	127	107	265	1,0	0,96	0,58	0,98	17,0	16,3	12,3	27,3

4.2 Responses to ripeners at intervals after spraying

Ripener	ers % C			ers g/stalk		
	32d	52d	68d	32d	52d	68d
Fus S	+ 0,4	+ 0,4	- 0,6	+ 12	+ 13	+ 1
Focus 500	+ 0,5	+ 0,7	- 0,1	+ 13	+ 14	- 21
Focus 750	+ 0,1	+ 0,2	- 0,7	- 8	+ 1	- 2

4.3 Analysis of stalk sections 60 days after spraying

Segment length (mm)	Fusilade Super						Control					
	Mass (g)		ers % C		mass ers (g)		mass (g)		ers % C		mass ers (g)	
	Act*	Cum**	Act	Cum	Act	Cum	Act	Cum	Act	Cum	Act	Cum
1 200+	36	1391	3,4	12,37	1,2	172,1	41	1258	1,0	11,29	0,4	142,0
2 200	41	1355	5,6	12,61	2,3	170,9	41	1217	4,1	11,64	1,7	141,6
3 200	50	1314	6,3	12,83	3,1	168,6	49	1176	5,6	11,90	2,8	139,9
4 Variable	584	1264	11,1	13,09	65,2	165,5	509	1127	10,3	12,17	52,1	137,1
5 1000	680	680	14,8	14,75	100,3	100,3	618	618	13,7	13,75	85,0	85,0

* = actual ** = cumulative

4.4 Flower counts per row (30/5/90)

Treatments	Flowered	Non-flowered	Total	Dead spindles
Control	46	84	130	14
Fus S	29	107	136	54
Focus 500 ml	36	89	127	33
Focus 750 ml	38	91	129	38

4.5 Leaf numbers per leaf position of 30 stalks on 27/6

Leaf position on stalks	D	C	B	A	1	2*	3	4	5	6	7	8	9	10
Control	5	18	30	30	30	30	30	30	30	29	25	23	17	7
Fus Super	0	4	26	28	30	30	30	30	30	27	22	12	3	0

* TVD leaf at spraying; leaves A to D emerged after spraying

4.6 Leaf water potentials on 2 March

Time :	11.30 - 12.00	12.00 - 12.30	12.30 - 1.00	
$\bar{X} - \psi$ (MPa)	- 0,34	- 0,26	- 0,25	$\bar{X} = - 0,278$
No readings	7	8	10	

4.7 Stalk heights and populations

Treatment	Heights (cm)		Population x1000 ha ⁻¹		
	Date	24/4 (at spraying)	24/4	15/5 (31 DAT)	30/5 (46 DAT)
Control		292	113	109	108
Fus. S		309	118	119	114
Focus 500		297	96	109	105
Focus 750		295	110	117	107
Mean		298	109	114	109
CV %		3,3	-	8,7	9,2
SED ±		5,6	-	5,7	5,8
LSD 05		11,3	-	12,1	12,4

4.8 Harvest data (4 July - 68 DAT)

Treatment	t cane ha ⁻¹	ers % C	t ers ha ⁻¹	Purity %
Control	140	12,7	17,8	88,4
Fus S	154	12,1	18,6	86,0
Focus 500	149	12,6	18,8	88,2
Focus 750	136	12,0	16,3	87,2
Mean	145	12,4	17,9	87,5
CV %	15,4	6,5	16,2	2,6
SED ±	12,8	0,46	1,67	1,31
LSD 05	27,4	0,98	3,6	2,79

5. General comments

5.1 Condition of cane before and after spraying

- ° The early indications were that about 70% of the stalks had produced flower initials. In samples taken on 30 May (33 days after spraying) only 46% of the stalks had initiated flowers of which 7% had aborted (see 4.4).
- ° Plant extension rates ranged between 2,14 mm/hr and 1,62 mm/hr while the soil moisture was high and temperatures favoured rapid growth, but declined to 0,29 mm/hr at the end of May (see Figure 1).
- ° Irrigation was suspended from the first week in March and resumed in the third week of April. It was then withdrawn again during the first week of May.
- ° \sqrt{L} on 2 March indicated that the crop was not suffering from stress.
- ° On average 2,77 new leaves per stalk emerged from the spindle in untreated stalks between date of spraying, 27 April and 27 June, while Fusilade Super treated stalks produced 2,1 leaves per stalk. This effect of Fusilade Super on the top leaves would probably be more severe in a crop which has not flowered.
- ° Senescence of older leaves appears to have been more rapid in Fusilade Super treated cane.

5.2 Sample data

The improvements in sucrose content (ers % c) from ripeners were relatively small but evident between 32 and 52 days after spraying. The greater stalk mass of sprayed cane which is unlikely to be a treatment effect, contributed to the gains of about $13 \pm 5,8$ g ers/stalk (see 4.1 and 4.2). Focus applied at 500 ml ha^{-1} was as effective as Fusilade Super.

5.3 Sectioning data

- ° The samples were taken from non-flowered stalks and there may have been a bias in selection of heavier stalks in Fusilade Super treated plots. The data however indicate that Fusilade Super had little effect on the mass of the upper stalk sections; that the top 600 mm + additional growth of sixty days after spraying produced 6,6 g ers/stalk in Fusilade Super treated stalks and 4,9 g ers per stalk in untreated stalks (see 4.3).
- ° The small responses reflected in data from the normal sampling method may be due to the inclusion of flowered stalks in the samples.

5.4 Stalk heights and populations

- ° Height measurements done three days before spraying indicate longer stalks on average in plots designated for Fusilade Super treatment (see 4.7).

5.5 Harvest data

- ° CVs were as high as would be expected in commercial plantings and no effects of the chemicals on cane yields could be discerned. The yield differences between treatments at harvest (see 4.8) are therefore not real.
- ° The mean Purity rose from 74% on 26 April to 88% when the trial was harvested on 4 July. There was no additional ripening effect from the chemicals 68 days after application.

Conclusion

The interpretation of the data from this trial has been complicated by flowering, the interruptions in irrigation and the variable growth.