

SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

7310/19(a) CHEMICAL RIPENER TRIAL

Cat No.: 1738  
Object: To monitor the development and change in yield and quality of early season cane sprayed with three chemical ripeners, Ethrel, Roundup and Fusilade Super.  
This crop: First Ratoon Age: 12,0 months (27.4.89 to 26.6.90)  
Location: ZSA Experiment Station, Field J2.  
Soil type: PE. 1 sandy clay loam derived from gneiss.  
Design: Randomised blocks with 5 replications.  
Variety/Spacing: NCo376, 1,5m between rows.

<u>Fertilizer:</u> (kg/ha)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
P	100	100	60
1R	160	60	60

<u>Irrigation/ Rainfall(mm)</u>	<u>Irrigation</u>	<u>Rainfall</u>
P	1 431,0	605,8
1R	1 216,0	529,9

- Treatments:
1. Control - no chemical ripener.
  2. Control - no chemical ripener.
  3. Ethrel applied at 0,72 kg/ha a.i. (1,5 l/ha product)!
  4. Roundup applied at 0,25 kg/ha a.i. (0,6 l/ha product)
  5. Fusilade Super applied at 0,041 kg/ha a.i. (0,33 l/ha product).

N.B. The term Fusilade Super will from this point be referred to as Fusilade.

- Conduct:
1. Maturity test samples of 24 stalks per plot were taken from guard rows before spraying and from net plots after spraying
  2. Ethrel was sprayed when the cane had juice purity of 71,0% and both Roundup and Fusilade were sprayed later when purities had risen to 78,7%. Times, dates, purity at spraying and weather conditions were as follows:

	<u>Ethrel</u>	<u>Roundup</u>	<u>Fusilade</u>
Date applied	21.12.89	17.1.90	17.1.90
Weeks before harvest	18	14	14
Purity at spraying	71,0%	78,7%	78,7%
Time of day (pm)	4:15-5:40	4:50-6:45	4:50-6:45
Relative humidity @ 2.00 pm	48,4	59,2	59,2
Mean maximum temp. °C	34,8	29,4	29,4
Mean minimum temp. °C	23,1	20,2	20,2
General weather conditions	Calm with gust of wind	Calm	Calm

3. Samples for yield monitoring were taken at two weeks intervals from 12 weeks before harvest until harvest. One row of net plot was cut, stalks counted and weighed at each sampling date.
4. Standard sampling and recording was done from the remaining net-plot at harvest.

Spraying details:

Chemical ripeners were sprayed over the top of the canopy using a carbon dioxide pressurised knapsack sprayer with a T-boom. The T-boom had three TK 1,5 nozzles spaced 1,0m apart spraying down from a height of approximately 50 cm above the canopy. The solution was delivered at 102,1 l/ha by maintaining a pressure of 220 kPa and a walking speed of 1,25 m/s.

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RESULTS

Relevant harvest data for the first ratoon crop are presented in the attached tables.

- a) Quality effects: Figure 1 shows changes in ERC% cane with time after Ethrel application. There were steady ERC% cane increases from 15 weeks before harvest and at 10 weeks the increases were more marked. Higher ERC% cane values over the control were maintained until harvest.

Changes in ERC% cane for Roundup and Fusilade applications are shown in Figures 2 and 3 respectively. Roundup caused steady ERC% cane increases from about 2 weeks after spraying with the highest values being recorded at 2 weeks before harvest (12 weeks after spraying). ERC% cane increases after Fusilade application were rapid from 2 weeks up until 8 weeks after spraying. Increases were steady thereafter until harvest (see Figure 3).

Figure 4 shows that all ripening treatments gave greater ERC% cane responses than the control and Fusilade gave the best responses. ERF% cane responses were compared only at harvest (Table 1) and responses were similar to those of ERC% cane.

- b) Yield effects: Table 1 shows that desiccant treatments caused a cane yield decline with Fusilade giving significantly lower yield at harvest. Differences between Ethrel and Control treatments were small and non-significant.

Changes in Cane and ERC yield after ripener application are shown in Table 2. Cane yields of Ethrel and Control treatments were comparable but high ERC% cane responses from Ethrel accounted for higher ERC yield benefits.

ERC yield gain from Fusilade application reached 22% over the control within 4 weeks after application but dropped by 11% between 4 and 8 weeks and at harvest ERC values were the same as those of the control. Roundup however, although caused cane yield to drop maintained higher ERC yield values than the control from 4 weeks after spraying until harvest when 10% ERC yield gain was recorded. ERC yield drop for Roundup was 4% from 10 weeks after spraying to harvest (see Table 2).

- c) Stalk data: Relevant stalk data are presented in Table 3. Differences in stalk numbers were too small to show any significant treatment responses. Fusilade and Roundup treatments reduced stalk lengths but increased diameters. At harvest stalks were erect in all plots and had no flowers.
- d) Visual symptoms: Characteristic Roundup and Fusilade symptoms were observed. Ethrel symptoms were not marked at any stage of ripening.
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## DISCUSSION

Results show that all ripening treatments increased quality and that increases lasted until harvest. Fusilade gave higher ERC% cane responses than other treatments.

Fusilade and Roundup applications restricted plant growth and the check on growth caused cane yield losses. These were greater with Fusilade than with Roundup, and Roundup gave 10% more ERC yield gain at harvest. Ethrel had no significant effect on cane and ERC yields.

Desiccant treatments increased quality but cane yield losses offset the quality gains. Delaying harvest for more than 8 weeks after desiccant application reduced the ripening responses.

## CONCLUSIONS

Preliminary results show that Fusilade sprayed cane should be harvested within 8 weeks and Roundup within 10 weeks after spraying.

These results agree well with earlier observations in showing that ripener responses will be reduced if harvesting of desiccant sprayed cane is delayed for more than about 12 weeks after spraying. Further observations are however needed before firm conclusions are made.

The trial continues into the second ratoon crop.

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CN/Sept '90

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Table 1. Yield and Quality data at harvest

TREATMENTS	CANE YIELD t/ha	ERC% CANE	ERC YIELD t/ha	ERF% CANE	ERF YIELD t/ha
Control	115,52	13,03	15,04	14,27	16,47
Ethrel	118,09	13,73	16,19	14,83	17,49
Roundup	107,09	14,44	15,48	15,33	16,44
Fusilade	94,36	15,06	14,21	15,88	14,99
Significance	***	***	N.S.	***	*
L.S.D. 5%	10,98	0,47	-	0,46	1,75
1%	15,39	0,66	-	0,64	2,46
Trial mean	108,76	14,06	15,23	15,07	16,35
S.E. single plot ±	7,97	0,34	1,20	0,33	1,27
S.E. treatment means ±	5,56	0,15	0,54	0,15	0,57
C.V. %	7,32	2,41	7,87	2,21	7,78

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Table 2. Cane and ERC yield responses

WEEKS BEFORE HARVEST	WEEKS AFTER DESICCANT APPLICATION	PERCENTAGES OF CONTROL VALUES		
		ETHREL	ROUNDUP	FUSILADE
<u>Cane yield</u>				
-12	2	97	99	109
-10	4	105	108	102
- 8	6	105	93	91
- 6	8	105	95	88
- 2	12	110	96	85
0	14	102	99	86
<u>ERC yield</u>				
-12	2	100	105	106
-10	4	108	112	122
- 8	6	111	113	112
- 6	8	116	114	111
- 2	12	114	107	93
0	14	107	110	100

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Table 3. Stalk data

T R E A T M E N T S	STALK NUMBERS x 1000/ha	STALK LENGTHS (m)	STALK DIAMETERS (cm)
Control	132,1	2,40	2,23
Ethrel	127,8	2,42	2,20
Roundup	136,0	2,17	2,34
Fusilade	133,8	1,67	2,38
Significance	N.S.	***	***
L.S.D. 5%	-	0,17	0,07
1%	-	0,24	0,10
Trial mean	132,4	2,16	2,30
S.E. single plot ±	5,05	0,12	0,05
S.E. Treatment mean ±	2,26	0,05	0,02
C.V. %	3,81	5,67	2,33

### CHANGES IN ERC % CANE IN NCo376

Fig.1: CONTROL vs ETHREL

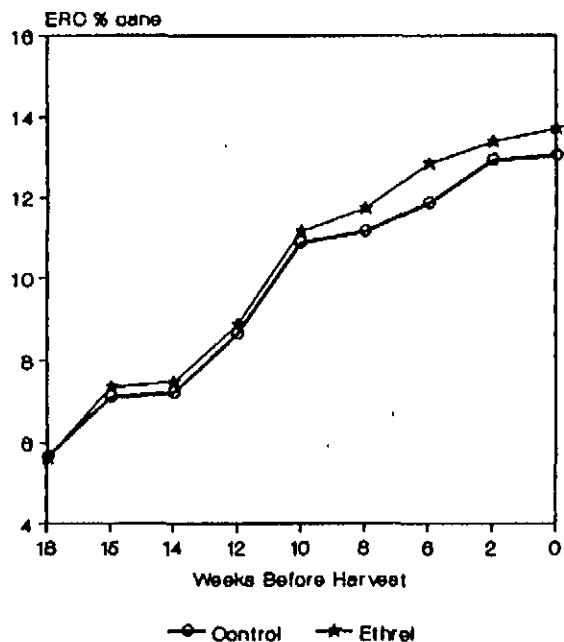


Fig.2: CONTROL vs ROUNDUP

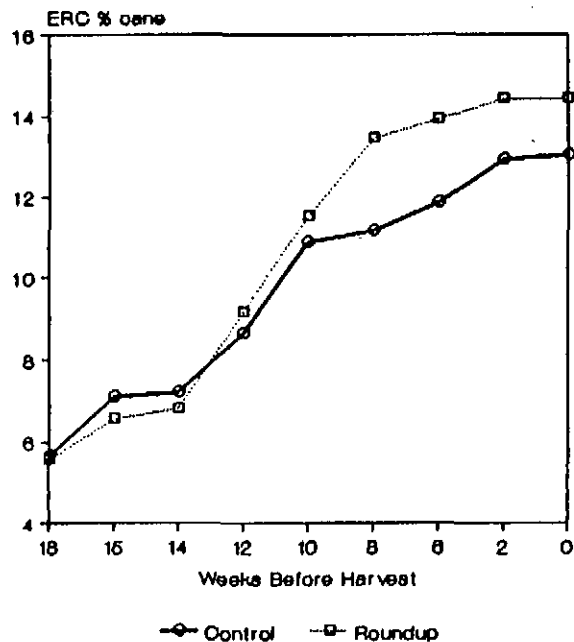


Fig.3: CONTROL vs FUSILADE

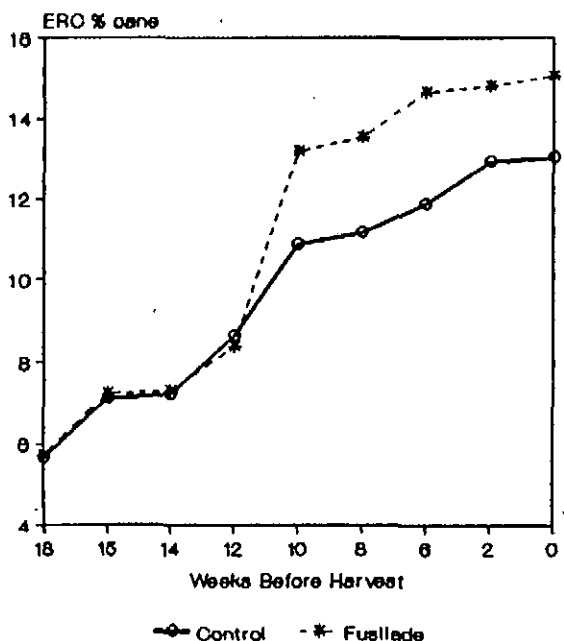


Fig.4: CONTROL vs ALL TREATMENTS

