

SOUTH AFRICAN SUGAR INDUSTRY  
 AGRONOMISTS' ASSOCIATION  
FURROW IRRIGATION TRIAL (4200/2)

Cat No. : 31  
This crop : 2nd Ratoon  
Site : H.V. Settler Farm 16 (R. Yeatman)  
Altitude : 1300'  
Soil : P.E. 1. Sandy clay loam  
Design : 6 x 2 Factorial in 4 randomized blocks  
Variety : N:Co.310  
Fertilizer : 140 lb. N/acre (carrier urea)  
Rainfall on crop: (Hippo Valley) 12.05 in. Age: 12.9 months (20/8/67-17/9/68).

Object: To determine the effects of varying systems of furrow irrigation on water use, cane yield and sucrose content.

Treatments: The following six systems were compared on a grade of 1 : 200, with furrow lengths of 290 ft.

- R H Irrigated in cane row: standard Hippo Valley practice.
- R R Irrigated in cane row with the inter-row ridged up to give a wide furrow with some root pruning.
- R C Irrigated in cane row: Hippo Valley practice with checkdams.
- I T Irrigated in alternate inter-row a broad flat furrow with trash piled on alternate inter-row; standard Triangle practice.
- I B Irrigated in alternate inter-rows. Trash burnt, tops re-burnt.
- I N Irrigated every inter-row with narrow V-shaped furrows and ridges.

Ripping was compared with non-ripping for each of the systems mentioned.

Results:

Treatment	Tons Cane per acre	Sucrose % Cane	Tons Sucrose per acre	Irrigation (in.) Water	Tons Cane /in. Water Applied	Tons Cane /in. Total Water	Mean Water Application in./irrig.
R H	58.4	10.0	10.53	79.4	0.78	0.64	6.0
R R	58.3	18.2	10.59	74.4	0.82	0.67	5.7
R C	55.5	18.4	10.23	106.7	0.56	0.47	8.0
I T	51.5	18.3	9.40	30.1	1.74	1.23	1.5
I B	55.3	18.1	9.97	33.2	1.71	1.22	1.6
I N	52.4	18.2	9.50	32.0	1.66	1.19	1.7
Mean R	57.4	18.2	10.45	86.8	0.72	0.59	6.5
Mean I	53.1	18.2	9.62	31.8	1.71	1.21	1.6
L.s.d. 5%	3.1	0.7	0.66	17.5	0.26	-	1.9
1%	4.1	0.9	0.89	23.6	0.35	-	2.6
Ripping	54.5	18.3	9.95	55.5	0.98	0.81	3.7
No Ripping	55.9	18.1	10.12	63.1	0.89	0.74	4.4
	N S	N S	N S	N S	N S	-	N S
C.V. %	5.5	3.7	6.5	29.1	21.2	-	47.2

## Conclusions

### a) Furrow systems

There was a very large difference between the three treatments where water was applied in the row (R) and those where the water was applied in the inter-row. (I). The mean application per irrigation in the former case was 4 times that in the latter. The total water applied over the year was as high as 106 in. in the (R C) treatment. This is clearly an excessively high figure. On the other hand, water application was too low in the inter-row treatments.

Yields of cane were higher in the (R) treatments (average 57.4 tons/acre) than the (I) treatments (average 53.1 tons/acre) due to the fact that the (I) treatments received inadequate water and were stressed on a few occasions over the hot period December-January. However, examination of the water efficiency figures (tons cane/inch water applied) shows that the efficiency of water use was  $2\frac{1}{2}$  times better in the inter-row irrigation than in the row irrigation treatments. This large saving of water is very pertinent in the Lowveld since water rather than land is the limiting factor. Tons cane/inch water is probably more important than tons cane/acre.

No difference between the sucrose content of the (R) and (I) treatments could be detected (means of both were 18.3%), consequently yields of sucrose/acre showed exactly the same trends as those of cane yield.

Comparing the individual treatments:

Row Irrigation No measurable differences could be detected in the cane yield or water use between the standard practice (R H) and the inter-row ridged treatment (R R). However, the use of checkdams (R C) on this field resulted in a much greater usage of water, a slightly lower yield (perhaps due to waterlogging) and a much poorer efficiency of water-use (0.56 tons cane/inch water compared with 0.8 for the other two (R) treatments).

Inter-row Irrigation The narrow V-shaped furrow in the (I N) treatment resulted in too low mean application of water (1.7 in.). Around  $2\frac{1}{2}$ -3 in. would be considered optimum on this soil. The treatments irrigated in alternate inter-rows (I T & I B) also gave too low application rates (1.5 in.) but these would have been approximately correct (3.0 in.) if irrigation had been carried out on each row, as advocated where cane is burnt at harvest, instead of on alternate rows.

### b) Ripping

No advantage could be found for ripping under the particular conditions of this experiment. Cane yields were almost identical with both treatments; and no significant differences in water application could be measured.