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SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

7300/13 DRYING-OFF TRIAL

Catalogue: 1189

Object : To determine the effect on yield and quality of drying off by reducing irrigation frequency in accordance with varying Et/Eo ratios.

This crop : Plant Age: 14,0 months (26.7.78 to 24.9.79)

Location : RSA Experiment Station. Impala Block A5-A11

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

Design : 6 x 6 Latin Square.

Variety/spacing : NCo 376 in 1,5m rows.

Fertiliser (Kg/ha):

N	P2O5	K2O
120	60	60

Rainfall : 707 mm Irrigation : Variable treatments.

Treatments : Nett applications of 50 mm were applied by overhead irrigation with Et/Eo ratio varying from 0,4 at crop emergence to 1,0 at full canopy. The factor of 1,0 was maintained during the full canopy stage until drying-off treatments were commenced 12 weeks before harvest.

The six drying-off treatments comprised five pre-determined class A pan deficits based on declining Et/Eo ratios, and a sixth treatment in which all irrigation was ceased 10 weeks before harvest. The treatments were as follows :

Treatment	Et/Eo ratio	Pan deficit
D1	1,25	40
D2	1,00	50
D3	0,67	75
D4	0,50	100
D5	0,33	150
D6	No further irrigation.	

A net 51 mm was applied when each of the defined deficits had been reached. Rainfall during the drying off period was converted to an effective amount and adjusted by the relevant crop factor for each treatment.

RESULTS

(a) Irrigation data

The routine irrigation schedule described above was used from planting on 26th July, 1978, until 29th June, 1979, when the drying-off treatments were started.

2./ Relevant...

Relevant irrigation data were as follows :

	D1	D2	D3	D4	D5	D6
Pre-drying off period						
No. of irrigations	22	22	22	22	22	22
Amount (mm)	1 071	1 071	1 071	1 071	1 071	1 071
Mean applic. (mm)	49	49	49	49	49	49
Rainfall (mm)	695	695	695	695	695	695
Total (mm)	1 766	1 766	1 766	1 766	1 766	1 766
Drying-off period						
No. of irrigations	7	5	3	2	1	1
Amount (mm)	357	255	153	102	51	51
Mean applic. (mm)	51	51	51	51	51	51
Rainfall (mm)	12	12	12	12	12	12
Total (mm)	369	267	165	114	63	63
Grand Total (mm)	2 135	2 033	1 931	1 880	1 829	1 829
Yields						
TC/ha	154,20	157,52	155,48	153,66	149,27	156,22
TERC/ha	21,57	21,96	21,88	21,85	21,76	22,12
TC/ha/100mm	7,22	7,75	8,05	8,17	8,16	8,54
TERC/ha/100mm	1,01	1,08	1,13	1,16	1,19	1,21

Irrigation intervals varied widely during the drying-off period. Both D5 and D6 received only 1 irrigation during this period, at 5 weeks and 10 weeks before harvest respectively. Rainfall was fortunately low, and did not interfere with the drying-off regimes.

(b) Yield data

Relevant harvest data were as follows :

Treatment	Cane t/ha	ERC % Cane	TERC per ha	Stalks/ha x 10 -3	Lodging - %	Flowers %
D1 : 40 mm deficit	154,20	13,99	21,57	148,8	47,5	46,7
D2 : 50 " "	157,52	13,95	21,96	149,2	47,5	30,8
D3 : 75 " "	155,48	14,08	21,88	147,6	52,5	40,8
D4 : 100 " "	153,66	14,22	21,85	149,0	51,7	33,3
D5 : 150 " "	149,27	14,57	21,76	146,8	32,5	39,2
D6 : 10-week dry-Off	156,22	14,17	22,12	148,0	67,5	25,8
Significance	Nil	Nil	Nil	-	-	-
Trial mean	154,39	14,16	21,86	148,2	49,9	36,1
S.E. plot ±	6,00	0,47	1,02	-	-	-
S.E. mean ±	2,45	0,19	0,41	-	-	-
C.V. %	3,89	3,35	4,64	-	-	-

The different drying-off regimes had no significant effect on cane yields,

3./ ERC % .....

ERC % cane, and TERC/ha. The D6 treatment which was dried-off for 10 weeks before harrest, gave the highest recorded brix values, and slightly lower fibre and purity than the other treatments.

Treatments were applied at too advanced an age to have any effect on stalk populations, but more dodging and less flowering was recorded in the driest treatment (D6).

Because of the lack of yield responses, water use efficiency showed a linear trend to improve as pan deficits were increased during the drying-off period.

KEC/Jan '80.

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

7300/13 DRYING - OFF TRIAL

Catalogue: 1189

Object : To determine the effect on yield and quality of drying off by reducing irrigation frequency in accordance with varying Et/Eo ratios.

This Crop : First Ratoon Age : 12,0 months (24:9:79 to 23:9:80)

Location : ZSA Experiment Station, Impala Block A5 - All

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

Design : 6 x 6 Latin Square

Variety/spacing : NCo 376 in 1,5m rows

Fertiliser (kg/ha) :

	N	P_2O_5	K_2O
P	120	60	60
1R	180	100	60

Rainfall : 830mm **Irrigation :** Variable treatments

Treatments : Nett applications of 51mm were applied by overhead irrigation with Et/Eo ratios varying from 0,4 at crop emergence to 1,0 at full canopy. The factor of 1,0 was maintained during the full canopy stage until drying-off treatments were commenced 12 weeks before harvest.

The six drying-off treatments comprised five pre-determined Class A pan deficits based on declining Et/Eo ratios, and a sixth treatment in which all irrigation was ceased 10 weeks before harvest. The treatments were as follows :

Treatment	Et/Eo ratio	Pan deficit
D1	1,25	40
D2	1,00	50
D3	0,67	75
D4	0,50	100
D5	0,33	150
D6	No further irrigation.	

A nett 51mm was applied when each of the defined deficits had been reached. Rainfall during the drying-off period was converted to an effective amount and adjusted by the relevant crop factor for each treatment.

2./ RESULTS .....

RESULTS

(a) Irrigation Data. The routine irrigation schedule described above was used from harvest of the plant crop on 24th September, 1979, until 30th June, 1980, when the drying-off treatments were started.

Relevant irrigation data were as follows :

	D1	D2	D3	D4	D5	D6
Pre-drying off period						
No. of irrigations	18	18	18	18	18	18
Amount (mm)	918	918	918	918	918	918
Mean applic (mm)	51	51	51	51	51	51
Rainfall (mm)	764	764	764	764	764	764
Total (mm)	1 751	1 751	1 751	1 751	1 751	1 751
Drying-off period						
No. of irrigations	8	6	4	2	1	0
Amount (mm)	408	306	204	102	51	0
Mean applic. (mm)	51	51	51	51	51	0
Rainfall (mm)	66	66	66	66	66	66
Total (mm)	474	372	270	168	117	66
Grand Total	2 225	2 123	2 021	1 919	1 868	1 817
Yields						
TC/ha	132,9	140,6	145,7	138,1	138,1	149,1
TERC/ha	18,91	19,92	20,21	19,68	19,91	21,11
TC/ha/100mm	5,97	6,62	7,21	7,20	7,39	8,21
TERC/ha/100mm	0,85	0,94	1,00	1,03	1,07	1,16

Heavy unseasonal rainfall fell from 8th to 10th September, including a storm of 55mm on the 9th, and this may have influenced results to some extent. It was too close to harvest to have had any affect on yields, but would certainly have affected ERC % cane and probably eliminated any quality benefits that may have accrued in the treatments that had been dried-off for long periods.

(b) Yield Data. Relevant harvest data are shown in the attached tables.

The different drying-off regimes had no significant effect on cane yields in the plant crop, but in the first ratoon crop the wet treatment (D1) caused a significant depression in yield, and there was an apparent yield improvement in the D6 treatment which was dried-off for 10 weeks before harvest.

ERC% cane values were unaffected by treatments in both the plant and first ratoon crops, so that TERC/ha responses were the same as for cane yields.

Stalk counts and flowering percentages were unaffected by treatments, as would be expected in view of the fact that treatments were only imposed 10 weeks before harvest. Lodging percentages were erratic in the different replications, but there was nevertheless a trend for reduced lodging in the D5 treatment, and slightly increased lodging in D6.

KEC/Oct.'80.
rw

7300/13 DRYING-OFF TRIAL

HARVEST DATA : PLANT AND FIRST RATOON CROPS

TREATMENTS	CANE t/ha		ERC % CANE		TERC/ha	
	P	1R	P	1R	P	1R
D1 : 40mm deficit	154,20	132,92	13,99	14,24	21,57	18,91
D2 : 50mm "	157,52	140,59	13,95	14,17	21,96	19,92
D3 : 75mm "	155,48	145,70	14,08	13,87	21,88	20,21
D4 : 100mm "	153,66	138,05	14,22	14,26	21,85	19,68
D5 : 150mm "	149,27	138,14	14,57	14,41	21,76	19,91
D6 : 10-week dry off	156,22	149,05	14,17	14,16	22,12	21,11
L.S.D. P=0,05	N.S.	8,17	N.S.	N.S.	N.S.	1,26
P=0,01	N.S.	11,15	N.S.	N.S.	N.S.	N.S.
Trial mean	154,39	140,74	14,16	14,18	21,86	19,96
S.E. Plot ±	6,00	6,79	0,47	0,32	1,02	1,05
S.E. mean ±	2,45	2,77	0,19	0,13	0,41	0,43
C.V. %	3,89	4,82	3,35	2,27	4,64	5,25

TREATMENTS	STALKS/ha x 10^{-3}		LODGING %		FLOWERS %	
	P	1R	P	1R	P	1R
D1 : 40mm deficit	148,8	153,6	47,5	35,2	46,7	35,0
D2 : 50mm "	149,2	156,2	47,5	46,7	30,8	46,7
D3 : 75mm "	147,6	151,9	52,5	45,8	40,8	41,7
D4 : 100mm "	149,0	149,1	51,7	40,8	33,3	50,8
D5 : 150mm "	146,8	151,2	32,5	26,7	39,2	47,5
D6 : 10-week dry-off	148,0	153,9	67,5	58,3	25,8	46,7
Means	148,2	152,6	49,9	42,3	36,1	44,7

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Title: DRYING-OFF TRIAL 7300/13

Cat No.: 1189

Object : To determine the effect on yield and quality of drying-off by reducing the irrigation frequency in accordance with varying Et/Eo ratios.

This crop : Second ratoon **Age :** 11,7 months (23.9.80 to 14.9.81)

Location : ZSA Experiment Station, Impala Block A5 - 10

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

Design : 6 x 6 Latin square

Variety/spacing : NCo 376 in 1,5m rows

Fertiliser (kg/ha) :

	N	P_2O_5	K_2O
P	120	60	60
1R	180	100	60
2R	180	100	60

Rainfall : 853 mm **Irrigation :** Variable

Treatments : Nett applications of 51 mm were applied by overhead irrigation with Et/Eo ratios varying from 0,4 at crop emergence to 1,0 at full canopy. The Et/Eo ratio of 1,0 was maintained during the full canopy stage until drying-off treatments were imposed 12 weeks before harvest.

The six drying-off treatments comprised five pre-determined Class 'A' pan accumulative evaporation deficits based on declining Et/Eo ratios, and a sixth treatment in which irrigation ceased 12 weeks prior to harvest.

The Treatments were as follows :-

Treatment	Et/Eo ratio	Accumulative evaporation deficit
D1	1,25	40 mm
D2	1,00	50 mm
D3	0,67	75 mm
D4	0,50	100 mm
D5	0,33	150 mm
D6	Irrigation ceased 12 weeks before harvest.	

An irrigation of 51 mm nett was applied when each of the specified deficits was reached. Rainfall during the drying off period was deducted from the accumulative deficit.

2./ RESULTS.

RESULTS

(a) Irrigation data. The routine irrigation schedule described above was used from harvest of the first ratoon crop on 23 September 1980, until 18th June, 1981 when the drying-off treatments commenced.

Relevant irrigation data were as follows :-

	D1	D2	D3	D4	D5	D6
Pre-drying-off period						
No. of irrigations	16	16	16	16	16	16
Amount (mm)	816	816	816	816	816	816
Mean application (mm)	51	51	51	51	51	51
Rainfall (mm)	808	808	808	808	808	808
Total (mm)	1 624	1 624	1 624	1 624	1 624	1 624
Drying-off period						
No. of irrigations	6	5	3	2	1	0
Amount (mm)	306	255	153	102	51	0
Mean application (mm)	51	51	51	51	51	0
Rainfall (mm)	45	45	45	45	45	45
Total (mm)	351	300	198	147	96	45
Total precipitation (mm)	1 975	1 924	1 822	1 771	1 720	1 669
Yields						
TC/ha	132,1	137,2	133,5	125,4	130,2	134,0
TERC/ha	17,90	18,19	17,82	17,12	17,81	18,28
TC/ha/100 mm	6,69	7,13	7,33	7,08	7,57	8,03
TERC/ha/100 mm	0,91	0,95	0,98	0,97	1,04	1,10

Moderate rainfall in late August/early September of 28mm and another 16mm just prior to harvest may have influenced results to some extent. It is unlikely that yields were affected by the rainfall as it was close to harvest but ERC% cane values probably were, and quality benefits that may have accrued in the treatments that had been dried-off for long periods may have been eliminated.

Gravimetric sampling was conducted during the drying-off period and this indicated a marked decline in soil moisture % in the most severe drying-off treatments (D6), but the rainfall raised the soil moisture % considerably, at least in the upper 75 cm of the profile.

Observation well data was collected from half the plots in the trial. This showed that the water table level in some plots in early September was as high as 60 cm below the surface although the mean water table level was at 1,25 m. Insufficient data was available to establish any relationship between the water table level and available soil moisture. However the relatively high water table level may be responsible for the negligible response of yield and ERC% cane values to drying-off treatments.

Further evaluation of this aspect will be conducted in the third ratoon crop.

(b) Field data. Relevant harvest data are shown in the attached tables.

In the second ratoon the D4 treatment (drying-off with an Et/Eo ratio of 0,50) resulted in a slightly significant depression in cane yield. However,

3./ no .....

no consistent pattern emerged of yield response to drying-off treatments and this result was possibly fortuitous and should be treated with caution.

Drying-off regimes had no significant effect on cane yields in the plant crop. In the first ratoon crop the wettest treatment (D1) caused a significant depression in yield and there was an apparent yield improvement in the D6 treatment which was dried-off for 12 weeks prior to harvest.

ERC% cane values were unaffected by treatments in the second ratoon crop, as also was the situation for the plant and first ratoon crops. TERC/ha yields were not significantly different in the three crops.

Mean data for 3 harvests are presented and indicate that the cane yields from the D2 (normal irrigation), D3 (drying-off with an Et/Eo ratio of 0,67) and D6 (cessation of irrigation 12 weeks before harvest) treatments are marginally higher than the other 3 treatments but the ERC% cane values are lower. Consequently TERC/ha yields are very similar for all treatments.

Reduction in irrigation frequency resulted in an increase in efficiency of water utilisation as measured by TERC/ha/100 mm of applied water. This increased from a value of 0,91 TERC/ha/100 mm for the shortest drying-off treatment to 1,16 TERC/ha/100 mm for the longest drying-off treatment.

Stalk counts and flowering percentages were unaffected by drying-off, expectedly as the treatments were only imposed 12 weeks before harvest. Lodging percentages were erratic in the different replications but nevertheless were lower in the D4 and D5 treatments.

RDE/Oct. '81.
rw.

7300/13 DRYING-OFF TRIAL

HARVEST DATA : PLANT, FIRST AND SECOND RATOON CROPS

TREATMENTS	CANE t/ha				ERC % CANE				TERC/ha			
	P	1R	2R	Means P - 2R	P	1R	2R	Means P - 2R	P	1R	2R	Means P - 2R
D1 : Et/Eo 1,25; 40mm deficit	154,20	132,92	132,08	139,73	13,99	14,24	13,54	13,92	21,57	18,91	17,90	19,46
D2 : " 1,0 ; 50mm "	157,52	140,59	137,22	145,11	13,95	14,17	13,26	13,79	21,96	19,92	18,19	20,02
D3 : " 0,67; 75mm "	155,48	145,70	133,54	144,91	14,08	13,87	13,35	13,77	21,88	20,21	17,82	19,97
D4 : " 0,50; 100mm "	153,66	138,05	125,41	139,04	14,22	14,26	13,64	14,04	21,85	19,68	17,12	19,55
D5 : " 0,33; 150mm "	149,27	138,14	130,24	139,22	14,57	14,41	13,68	14,22	21,76	19,91	17,81	19,83
D6 : 12 week dry-off.	156,22	149,05	133,97	146,41	14,17	14,16	13,65	13,99	22,12	21,11	18,28	20,50
L.S.D. P=0,05	N.S.	8,17	6,41	-	N.S.	N.S.	N.S.	-	N.S.	1,26	N.S.	-
P=0,01	N.S.	11,15	N.S.	-	N.S.	N.S.	N.S.	-	N.S.	N.S.	N.S.	-
Trial mean	154,39	140,74	132,08	142,40	14,16	14,18	13,52	13,96	21,86	19,96	17,85	19,89
S.E. plot ±	6,00	6,79	5,32	-	0,47	0,32	0,37	-	1,02	1,05	0,88	-
S.E. treatment mean ±	2,45	2,77	2,17	-	0,19	0,13	0,15	-	0,41	0,43	0,36	-
C.V.%	3,89	4,82	4,03	-	3,35	2,27	2,76	-	4,64	5,25	4,91	-

7300/13 DRYING-OFF TRIAL

STALK COUNTS, LODGING AND FLOWERING % :
PLANT, FIRST AND SECOND RATOON CROPS

Treatments	Stalks/ha x 10^{-3}			Lodging %			Flowering %		
	P	1R	2R	P	1R	2R	P	1R	2R
D1 : Et/Eo 1,25; 40mm deficit	148,8	153,6	163,4	47,5	35,2	30,8	46,7	35,0	2,5
D2 : " 1,0 ; 50mm "	149,2	156,2	158,6	47,5	46,7	35,8	30,8	46,7	1,7
D3 : " 0,67; 75mm "	147,6	151,9	155,7	52,5	45,8	40,0	40,8	41,7	2,5
D4 : " 0,50; 100mm "	149,0	149,1	155,5	51,7	40,8	13,3	33,3	50,8	5,0
D5 : " 0,33; 150mm "	146,8	151,2	156,4	32,5	26,7	15,8	39,2	47,5	4,2
D6 : 12 week dry-off	148,0	153,9	156,5	67,5	58,3	40,8	25,8	46,7	2,5
Mean	148,2	152,6	157,7	49,9	42,3	29,4	36,1	44,7	3,1

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

7300/13 DRYING-OFF TRIAL

TERMINAL REPORT

Cat. No.:- 1189

Object: To determine the effect of drying-off on yield and quality of sugarcane by reducing the irrigation frequency in accordance with varying Et/Eo ratios.

Planted: 26th July, 1978.

Terminated: 15th September, 1982, after the 3rd ratoon crop.

Harvest dates/ and ages:

Crop	Harvest	Age
P	24.9.79	14,0 months
1R	23.9.80	12,0 months
2R	14.9.81	11,7 months
3R	15.9.82	12,0 months.

Location: ZSA Experiment Station, Impala Block A5-10.

Soil type: Triangle P.E.1 sandy clay loam.

Design: 6 x 6 Latin square.

Fertiliser: (kg/ha)

	N	P	K
P	120	60	60
1R	180	100	60
2R	180	100	60
3R	180	100	60

Treatments: During the pre-drying-off period nett applications of 51mm were applied by overhead irrigation with Et/Eo ratios increasing from 0,4 at crop emergence to 1,0 at full canopy, which was maintained until drying-off treatments were imposed 12 weeks prior to harvest. (10 weeks for the plant crop).

The six drying-off treatments comprised five pre-determined Class 'A' open pan accumulative evaporation deficits based on declining Et/Eo ratios, and a sixth treatment in which irrigation ceased 12 weeks before harvest. The treatments were as follows:-

Treatment	Et/Eo ratio	Accumulative evaporation deficit
D1	1,25	40mm
D2	1,00	50mm
D3	0,67	75mm
D4	0,50	100mm
D5	0,33	150mm
D6	Irrigation ceased 12 weeks before harvest	

An irrigation of 51mm nett was applied when each of the specified deficits was reached. Rainfall during the drying-off period was deducted from the accumulated deficit.

2/RESULTS.....

RESULTS

(a) Irrigation data. Irrigation and rainfall data for the four crops are presented in Table 1.

Rainfall was above average for the first three crops of the trial and this was reflected in the second ratoon when piezometer readings indicated a relatively high water table. In the third ratoon rainfall was below average which resulted in lowered water table levels.

Rainfall during the drying-off phase may have influenced treatment effects when 66mm and 45mm rainfall occurred on the first and second ratoon crops respectively. There was negligible rainfall interference during drying-off in the plant and third ratoon crops.

Soil moisture status at or just prior to harvest was determined in the plant, second and third ratoon crops (Table 2). This data indicated a general decline in available soil moisture with increasing severity of drying-off regimes. For the D5 and D6 treatments, where the open pan deficits at harvest were greater than total available moisture, there was no available soil moisture in the upper 90cm of soil in the plant and third ratoon crops. However, in the second ratoon a significant amount of available moisture was present at harvest, reflecting the rainfall that occurred during drying-off and the raised water table resulting fron the high rainfall experienced that season.

The mean water table depth at harvest in the second ratoon was 1,25m and for the third ratoon 1,44m.

(b) Yield data. The harvest data for the four crops of this trial are presented in Tables 1-5.

(1) Cane yield: Drying-off regimes had no significant effect on cane yield in theplant and third ratoon crops. In the first ratoon crop the wettest treatment (D1) caused a significant depression in yield and there was an apparent yield improvement with the D6 treatment, dried-off for 12 weeks before harvest. In the second ratoon, the D4 treatment (drying-off with an Et/Eo ratio of 0,5) resulted in a slightly significant depression in cane yield.

There was no obvious trend of yield response to drying-off regimes when these were meaned for the four crops. There was only a variation of 6,7 TC/ha between the mean yield of the the highest and lowest yielding treatments.

(2) ERC % cane: ERC % cane values were not significantly affected by the drying-off regimes in any of the crops. There was, however, a tendency for them to increase with increase in severity of drying-off, particularly in the plant crop and third ratoon when negligible rainfall occurred during the drying-off phase. In the third ratoon the response of ERC % cane values to drying-off was markedly linear. In this particular crop Pol % and Brix % values were significantly increased with longer drying-off periods.

Mean values for the four crops indicated small increase in ERC % cane with increased severity of drying-off.

3/TERC.....

(3) TERC/ha yields: These generally followed a similar pattern to those of cane yields but they were slightly modified by the higher ERC % cane values of the severer drying-off treatments. A significant difference was only recorded in the first ratoon when crystal yields were depressed by the wettest treatment and increased by the driest treatment.

Mean values for the four crops showed that the highest yields were obtained from the longest drying-off period (12 weeks) and the lowest from the shortest drying-off period (40 mm pan deficit). No consistent pattern emerged from the intermediate drying-off regimes.

Efficiency of use of applied water. (Table 6).

The efficiency of use of applied water was expressed in terms of TC or TERC/ha/100mm applied water. Both of these parameters increased approximately linearly with increasing severity of drying-off from 0,97 TERC/ha/100mm (7,00 TC/ha/100mm) for the D1 treatment to 1,23 TERC/ha/100mm (8,69 TC/ha/100mm) for the D6 treatment. This represented a 27% and 24% increase for the respective parameters. Yields per unit of applied water were highest for all treatments in the driest season (3rd ratoon).

The mean difference in total applied water between the least (D6) and most (D1) frequently irrigated treatments was 331mm, which resulted in a TERC/ha yield improvement by the former of 1,15 t/ha.

Other harvest data

Mean stalk counts were slightly reduced with drying-off schedules more severe than 50mm pan deficits, but this had no apparent yield effects (Table 7). Stalk lengths and diameters were not affected by treatments.

Lodging and flowering percentages were not affected by the drying-off regimes (Table 8).

CONCLUSIONS

There was no consistent response of cane yield to increasing the length of the drying-off period. Particularly satisfying was that there was no evidence of a reduction in yield due to a prolonged (12 week) period without irrigation.

ERC % cane values tended to increase with severity of drying-off regimes, a trend observed in previous experiments.

A considerable improvement in efficiency of water use was possible with increasingly severe drying-off regimes.

Some reduction in high water table levels is also possible by extending drying-off.

It is clear that prolonged periods of drying-off during the winter months when daily evaporation rates are low are advantageous, particularly on relatively deep soils. On shallower soils, those of lower available moisture capacity and during periods of high evaporation, drying-off treatments may require modification, but the advantages of drying-off clearly demand that this practice should be routine.

RDE/Jan'83
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7300/13 DRY-ING OFF TRIAL — PLANT TO THIRD RATOON

TABLE 1 : IRRIGATION AND RAINFALL DATA

TREATMENT	CROP	PRE-DRYING-OFF PHASE				DRYING-OFF PHASE				TOTAL APPLICATION			
		No. of Irrig-ations	Irrig-ation applied mm	Rain-fall mm	Total water mm	No. of Irrig-ations	Irrig-ation applied mm	Rain-fall mm	Total water mm	No. of Irrig-ations	Irrig-ation applied mm	Rain fall mm	Total water mm
D1 Dry-off at Et/Eo ratio of 1,25; 40mm pan deficit	P	22	1 071	695	1 766	7	357	12	369	29	1 428	707	2 135
	1R	18	918	764	1 682	8	408	66	474	26	1 326	830	2 156
	2R	16	816	808	1 624	6	306	45	351	22	1 122	853	1 975
	3R	22	1 064	398	1 462	6	306	6	312	28	1 370	404	1 774
	Mean	20	967	666	1 634	7	344	32	376	26	1 311	699	2 010
D2 Dry-off at Et/Eo ratio of 1,0; 50mm pan deficit	P	22	1 071	695	1 766	5	255	12	267	27	1 326	707	2 033
	1R	18	918	764	1 682	6	306	66	372	24	1 224	830	2 054
	2R	16	816	808	1 624	5	255	45	300	21	1 071	853	1 924
	3R	22	1 064	398	1 462	5	255	6	261	27	1 319	404	1 723
	Mean	20	967	666	1 634	5	268	32	300	25	1 235	699	1 934
D3 Dry-off at Et/Eo ratio of 0,67; 75mm pan deficit	P	22	1 071	695	1 766	3	153	12	165	25	1 224	707	1 931
	1R	18	918	764	1 682	4	204	66	270	22	1 122	830	1 952
	2R	16	816	808	1 624	3	153	45	198	19	969	853	1 822
	3R	22	1 064	398	1 462	3	153	6	159	25	1 217	404	1 621
	Mean	20	967	666	1 634	3	166	32	198	23	1 133	699	1 832
D4 Dry-off at Et/Eo ratio of 0,50; 100mm pan deficit	P	22	1 071	695	1 766	2	102	12	114	24	1 173	707	1 880
	1R	18	918	764	1 682	2	102	66	168	20	1 020	830	1 850
	2R	16	816	808	1 624	2	102	45	147	18	918	853	1 771
	3R	22	1 064	398	1 462	2	102	6	108	24	1 166	404	1 570
	Mean	20	967	666	1 634	2	102	32	134	22	1 069	699	1 768
D5 Dry-off at Et/Eo ratio of 0,33; 150mm pan deficit.	P	22	1 071	695	1 766	1	51	12	63	23	1 122	707	1 829
	1R	18	918	764	1 682	1	51	66	117	19	969	830	1 799
	2R	16	816	808	1 624	1	51	45	96	17	867	853	1 720
	3R	22	1 064	398	1 462	1	51	6	57	23	1 115	404	1 519
	Mean	20	967	666	1 634	1	51	32	83	21	1 018	699	1 717
D6 Dry-off by cessation of irrigation 12 weeks before harvest.	P	22	1 071	695	1 766	1	51	12	63	23	1 122	707	1 829
	1R	18	918	764	1 682	0	0	66	66	18	918	830	1 748
	2R	16	816	808	1 624	0	0	45	45	16	816	857	1 673
	3R	22	1 064	398	1 462	0	0	6	6	22	1 064	404	1 468
	Mean	20	967	666	1 634	0	13	32	45	20	980	699	1 679

7300/13 DRYING-OFF TRIAL PLANT, SECOND AND THIRD RATOON CROP

TABLE 2 : SOIL MOISTURE STATUS PRIOR TO HARVEST

TREATMENT	CROP	Accumulated Pan Deficit mm	Available Moisture at Harvest mm/ 90cm 1	Available Moisture at Harvest as % total available moisture 2
D1 Dry-off at Et/Eo ratio of 1,25; 40 mm pan deficit.	P	35,2	68,1	60%
	2R	40,9	67,1	59%
	3R	61,9	51,9	46%
D2 Dry-off at Et/Eo ratio of 1,0; 50 mm pan deficit	P	58,3	0	0
	2R	33,7	78,0	69%
	3R	34,1	75,6	67%
D3 Dry-off at Et/Eo ratio of 0,67;75 mm pan deficit	P	77,2	23,1	20%
	2R	50,9	79,2	70%
	3R	68,3	51,9	46%
D4 Dry-off at Et/Eo ratio of 0,5;100 mm pan deficit	P	116,1	0	0
	2R	71,7	52,8	47%
	3R	76,9	16,2	14%
D5 Dry-off at Et/Eo ratio of 0,33;150 mm pan deficit	P	149,7	0	0
	2R	120,2	45,0	40%
	3R	135,1	0	0
D6 Dry-off by cessation of irrigation 12 weeks before harvest.	P	303,8	0	0
	2R	272,8	30,0	27%
	3R	288,2	1,5	1%

1. Estimated from gravimetric sampling assuming (a) a mean bulk density of 1,6gm/cc (b) estimated wilting point derived by pressure membrane determinations of samples from adjacent site of similar soils.

2. Total available moisture in upper 90cm of soil estimated to be 113mm.

7300/13 DRYING-OFF TRIAL

HARVEST DATA : PLANT, FIRST, SECOND AND THIRD RATOON CROPS

TABLE 3 : CANE YIELD

TREATMENT	CANE t/ha				
	P	1R	2R	3R	Mean P-3R
D1 Et/Eo 1,25; 40mm deficit	154,20	132,92	132,08	143,65	140,71
D2 Et/Eo 1,0; 50mm deficit	157,52	140,59	137,22	146,94	145,57
D3 Et/Eo 0,67; 75mm deficit	155,48	145,70	133,54	141,68	144,10
D4 Et/Eo 0,50; 100mm deficit	153,66	138,05	125,41	141,93	139,76
D5 Et/Eo 0,33; 150mm deficit	149,27	138,14	130,24	143,42	140,27
D6 12 week drying-off period	156,22	149,05	133,97	146,77	146,50
L.S.D. P = 0,05	N.S.	8,17	6,41	N.S.	-
P = 0,01	N.S.	11,15	N.S.	N.S.	-
Trial mean	154,39	140,74	132,08	144,06	142,82
S.E. single plot ±	6,00	6,79	5,32	7,73	-
S.E. treatment mean ±	2,45	2,77	2,17	3,15	-
C.V. %	3,89	4,82	4,03	5,36	-

TABLE 4 : ERC % CANE

TREATMENT	ERC % CANE				
	P	1R	2R	3R	Mean P-3R
D1 Et/Eo 1,25; 40mm deficit	13,99	14,24	13,54	13,65	13,86
D2 Et/Eo 1,0; 50mm deficit	13,95	14,17	13,26	13,68	13,77
D3 Et/Eo 0,67; 75mm deficit	14,08	13,87	13,35	13,84	13,79
D4 Et/Eo 0,50; 100mm deficit	14,22	14,26	13,64	13,97	14,02
D5 Et/Eo 0,33; 150mm deficit	14,57	14,41	13,68	14,08	14,19
D6 12 week dry-off	14,17	14,16	13,65	14,36	14,09
L.S.D. P = 0,05	N.S.	N.S.	N.S.	N.S.	-
P = 0,01	N.S.	N.S.	N.S.	N.S.	-
Trial mean	14,16	14,18	13,52	13,93	13,95
S.E. sample plot ±	0,47	0,32	0,37	0,42	-
S.E. treatment mean ±	0,19	0,13	0,15	0,17	-
C.V.%	3,35	2,27	2,76	3,00	-

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HARVEST DATA : PLANT, FIRST, SECOND AND THIRD RATOON CROPS

TABLE 5 : TERC YIELD

TREATMENT	TERC/ha				
	P	1R	2R	3R	Mean P-3R
D1 Et/Eo 1,25; 40mm deficit	21,57	18,91	17,90	19,61	19,50
D2 Et/Eo 1,0 ; 50mm deficit	21,96	19,92	18,19	20,08	20,04
D3 Et/Eo 0,67; 75mm deficit	21,88	20,21	17,82	19,60	19,88
D4 Et/Eo 0,50;100mm deficit	21,85	19,68	17,12	19,84	19,62
D5 Et/Eo 0,33;150mm deficit	21,76	19,91	17,81	20,19	19,92
D6 12 week dry-off	22,12	21,11	18,28	21,08	20,65
L.S.D. P = 0,05	N.S.	1,26	N.S.	N.S.	-
P = 0,01	N.S.	N.S.	N.S.	N.S.	-
Trial mean	21,86	19,96	17,85	20,06	19,94
S.E. single plot ±	1,02	1,05	0,88	1,08	-
S.E. treatment mean ±	0,41	0,43	0,36	0,44	-
C.V. %	4,64	5,25	4,91	5,39	-

7300/13 DRYING-OFF TRIAL PLANT TO THIRD RATOON CROP

TABLE 6 : EFFICIENCY OF USE OF APPLIED WATER

DRYING-OFF TREATMENT	CROP	Total applied water	Cane yield t/ha	TERC/ha yield	TC/ha per 100mm applied water	TERC/ha per 100mm applied water
D1 Dry-off at Et/Eo ratio of 1,25; 40mm pan deficit	P	2 135	154,20	21,57	7,22	1,01
	1R	2 225	132,92	18,91	5,97	0,85
	2R	1 975	132,08	17,90	6,69	0,91
	3R	1 774	143,65	19,61	8,10	1,11
	Mean	2 027	140,71	19,50	7,00	0,97
D2 Dry-off at Et/Eo ratio of 1,0; 50mm pan deficit	P	2 033	157,52	21,96	7,75	1,08
	1R	2 123	140,59	19,92	6,62	0,94
	2R	1 924	137,22	18,19	7,13	0,95
	3R	1 723	146,94	20,08	8,53	1,17
	Mean	1 951	145,57	20,04	7,51	1,04
D3 Dry-off at Et/Eo ratio of 0,67; 75mm pan deficit	P	1 931	155,48	21,88	8,05	1,13
	1R	2 021	145,70	20,21	7,21	1,00
	2R	1 822	133,54	17,82	7,33	0,98
	3R	1 621	141,68	19,60	8,74	1,21
	Mean	1 849	144,10	19,88	7,83	1,08
D4 Dry-off at Et/Eo ratio of 0,50; 100mm pan deficit	P	1 880	153,66	21,85	8,17	1,16
	1R	1 919	138,05	19,68	7,19	1,03
	2R	1 771	125,41	17,12	7,08	0,97
	3R	1 570	141,93	19,84	9,04	1,26
	Mean	1 785	139,76	19,62	7,87	1,11
D5 Dry-off at Et/Eo ratio of 0,33; 150mm pan deficit	P	1 829	149,27	21,76	8,16	1,19
	1R	1 868	138,14	19,91	7,40	1,07
	2R	1 720	130,24	17,81	7,57	1,04
	3R	1 519	143,42	20,19	9,44	1,33
	Mean	1 734	140,27	19,92	8,14	1,16
D6 Dry-off by cessation of irrigation 12 weeks before harvest	P	1 829	156,22	22,12	8,54	1,21
	1R	1 817	149,05	21,11	8,20	1,16
	2R	1 669	133,97	18,28	8,03	1,10
	3R	1 468	146,77	21,08	10,00	1,44
	Mean	1 696	146,50	20,65	8,69	1,23
Overall Mean		1 840	142,82	19,94	7,84	1,10

7300/13 DRYING-OFF TRIAL PLANT, FIRST, SECOND AND THIRD RATOON CROPS

TABLE 7 : STALK COUNTS, STALK LENGTHS AND STALK DIAMETERS

TREATMENT	STALK COUNTS/ha x 10^{-3}					STALK LENGTHS m					STALK DIAMETER cm				
	P	1R	2R	3R	Mean P-3R	P	1R	2R	3R	Mean P-3R	P	1R	2R	3R	Mean P-3R
D1:40mm deficit	148,8	153,6	163,4	174,4	160,1	2,77	2,38	2,61	2,64	2,60	2,2	1,9	1,9	2,0	2,0
D2:50mm deficit	149,2	156,2	158,6	173,2	159,3	2,88	2,63	2,70	2,68	2,72	2,2	1,8	1,9	2,1	2,0
D3:75mm deficit	147,6	151,9	155,7	171,9	156,8	2,73	2,55	2,66	2,67	2,65	2,2	1,8	1,8	2,0	2,0
D4:100mm deficit	149,0	149,1	155,5	171,0	156,2	2,81	2,56	2,60	2,73	2,68	2,2	1,8	1,8	2,0	2,0
D5:150mm deficit	146,8	151,2	156,4	171,9	156,6	2,82	2,59	2,66	2,70	2,68	2,2	1,8	1,8	1,9	1,9
D6:12 week dry-off	148,0	153,9	156,5	166,9	156,3	2,87	2,56	2,64	2,66	2,68	2,1	1,8	1,9	2,0	2,0
Mean	148,2	152,6	157,7	171,5	157,6	2,81	2,55	2,65	2,68	2,67	2,2	1,8	1,9	2,0	2,0

TABLE 8 : LODGING AND FLOWERING PERCENTAGES

	LODGING %					FLOWERING %				
	P	1R	2R	3R	Mean P-3R	P	1R	2R	3R	Mean P-3R
D1 Et/E 1,25; 40mm deficit	48	35	31	20	34	47	35	3	1	22
D2 Et/Eo 1,0 ; 50mm deficit	48	47	36	22	38	31	47	2	2	21
D3 Et/Eo 0,67; 75mm deficit	53	46	40	20	40	41	42	3	0	22
D4 Et/Eo 0,50;100mm deficit	52	41	13	15	30	33	51	5	1	23
D5 Et/Eo 0,33;150mm deficit	33	27	16	20	24	39	48	4	1	23
D6 12 week dry-off	68	58	41	8	44	26	47	3	1	19
Mean	50	42	30	18	35	36	45	3	1	22