

SOUTH AFRICAN SUGAR INDUSTRY  
AGRONOMISTS' ASSOCIATION

TERMINAL REPORT

Cat. No. : 1472  
Object:

To observe the effects on tillering of a post-emergent spray of Ethrel applied to young cane planted early in the season.

Planted: 4 May, 1984

Terminated: 22 May, 1985 after the plant crop (12.6 months).

Location: ZSA Experiment Station, Field D 7-9

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

Design: 3 x 4 factorial, 3 replications.

Spacing: 1.5m between rows

<u>Fertiliser:</u> KG/HA	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
	80	100	60

(N.B. The nitrogen application was reduced due to residual nitrogen in the field) following a crop of dolichos beans).

Irrigation: 1348 mm      Rainfall: 699 mm

- Treatments:
- a) Varieties
    - 1. NCo 376 (high population)
    - 2. N 14 (medium population)
    - 3. B 51129 (low population)
  - b) Levels of Ethrel
    - 1. Control - no Ethrel
    - 2. 0.5 kg/ha a.i.
    - 3. 1.0 kg/ha a.i.
    - 4. 2.0 kg/ha a.i.

- Conduct:
- 1. The Trial was sprayed on 18 July, 1984 when the mean plant height from ground level to the first visible dewlap was approximately 20 cm.
  - 2. A knapsack sprayer was used, fitted with a "cosmos" lance and nozzle. At a constant pressure of 138 kPa (20 p.s.i.), walking at 4km/h, the nozzle delivered 84.2 l/ha spray solution.
  - 3. Tiller numbers in the two central rows of the net plot were counted before spraying, and at regular intervals after spraying. This exercise was stopped in early December due to lodging.

RESULTS

- a) Tiller Data. At all stages of counting, NCo 376 produced the highest tiller numbers, and B 51129 the lowest. (see Figure 1). Mean tillers/ha at peak tillering for NCo 376, N14, and B 51129 were 615 000, 492 000 and 408 000 respectively. When counts were stopped in early December, these figures had dropped to 329 000, 271 000 and 224 000 respectively.

Figure 2 shows that Ethrel increased the number of tillers from October to early December (when counts were stopped). This response appeared after peak tillering, when tiller numbers were declining due to tiller die-back.

b) Harvest Data.  
(see Table 1)

i) Yield Data. N14 had a significantly higher cane and ERC yield than the two other varieties. Although B 51129 had a significantly higher ERC % cane than NCo 376 and N14, it had the lowest cane and ERC yields.

Cane and ERC yields declined with increasing levels of Ethrel. This decrease was significant at levels of Ethrel of 1.0 and 2.0 kg/ha a.i. ERC % cane was not affected by Ethrel.

ii) Stalk Data. Ethrel significantly increased the number of millable stalks, but reduced the size of each stalk. There was a significant variety x Ethrel interaction for stalk numbers. The two-way interaction table of the means is shown below (stalks/ha x 10<sup>-3</sup>).

VARIETY	LEVEL OF ETHREL kg/ha a.i.				MEAN
	0	0.5	1.0	2.0	
NCo 376	154.0	194.7	203.2	212.8	191.2
N14	130.1	135.2	144.1	157.0	141.6
B 51129	102.2	106.0	100.1	100.3	102.2
MEAN	128.8	145.3	149.1	156.7	145.0

L.S.D. P = 0.05 = 15.8  
P = 0.01 = 21.5

NCo 376 and N14 showed an increase in stalk numbers with increasing levels of Ethrel, while B 51129 did not change.

Lodging was a problem in all treatments. B 51129 did not lodge as much as the other varieties, and Ethrel at 2.0 kg/ha a.i. did not lodge as much as the other Ethrel treatments.

DISCUSSION

The increased tiller production caused by Ethrel lasted until harvest in the case of NCo 376 and N14, as shown by millable stalk populations. However, reduced stalk sizes at the higher levels of Ethrel resulted in depressed cane and sugar yields. Thus, at levels of 1.0 kg/ha a.i. plus, Ethrel adversely affected yields.

The choice of NCo 376, N14 and B 51129 as varieties representative of high, medium and low populations, was a good one. There was no overlap at any stage between tiller

populations of the three varieties.

The excellent performance of N14 against NCo 376 is worth noting from a plant breeding perspective.

CONCLUSIONS

Post - emergent applications of Ethrel increased the number of millable stalks in N14 and NCo 376. Improved stalk populations did not improve yields. On the contrary, Ethrel at levels of 1.0 kg/ha a.i. or more, depressed cane yields due to reduced stalk sizes.

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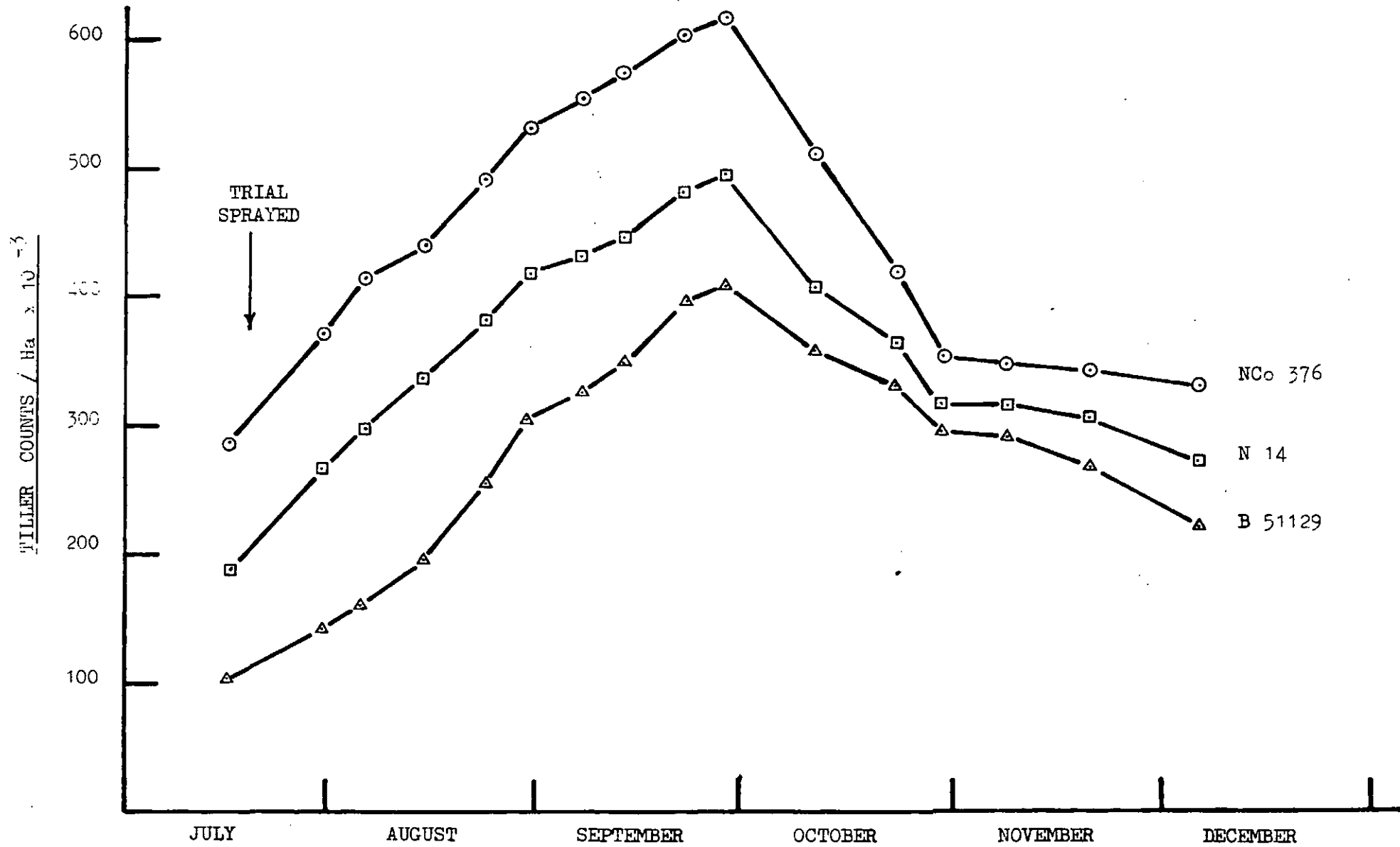


FIGURE 1: VARIETAL INFLUENCE ON TILLERING

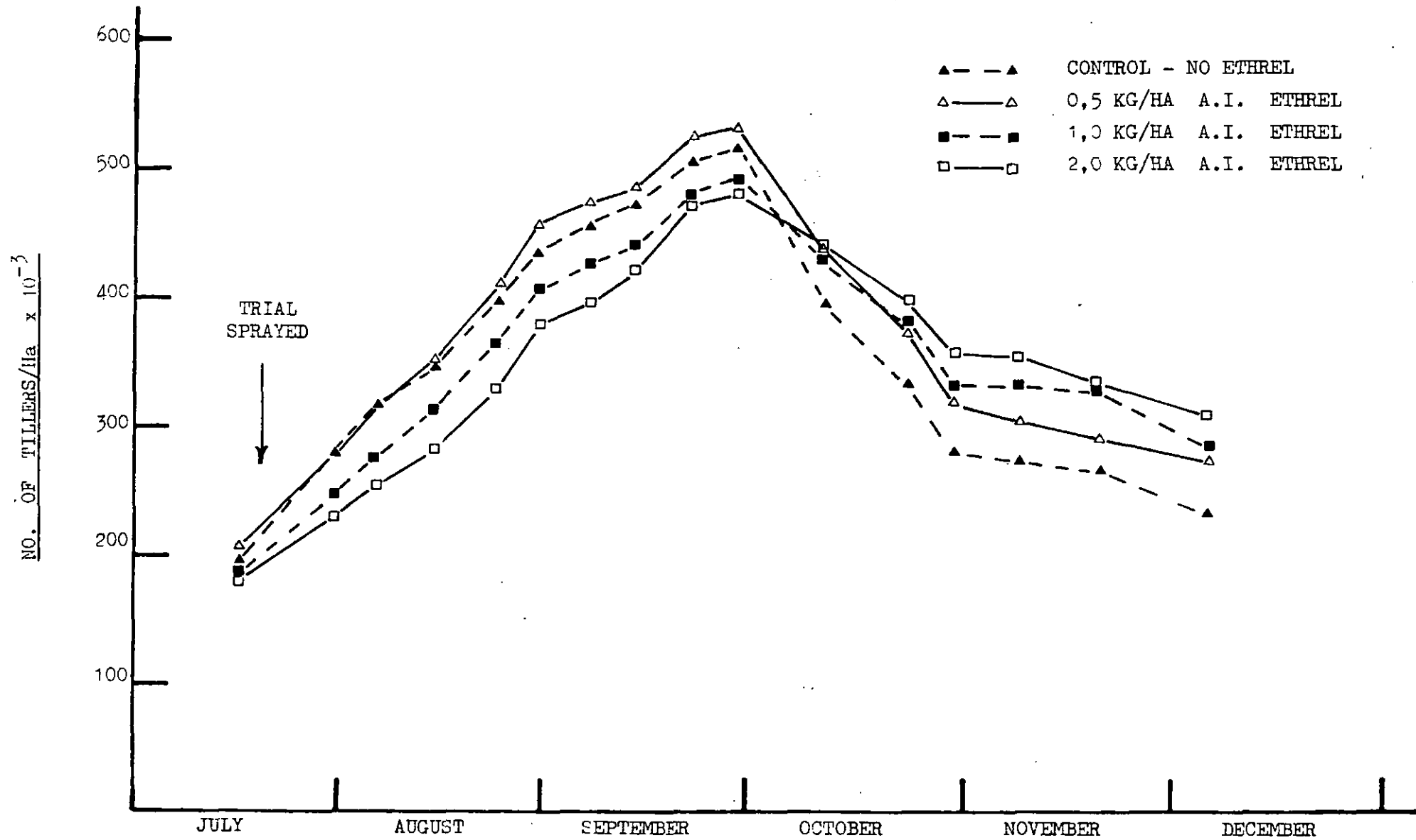


FIGURE 2 : EFFECT OF ETHREL ON TILLERING

8800/2a POST - EMERGENT TREATMENT WITH ETHREL

TABLE 1: HARVEST DATA

TREATMENTS	CANE YIELD t/ha	ERC% CANE	ERC YIELD t/ha	STALKS/ ha $\times 10^{-3}$	STALK LENGTH □	CANE DIAMETER cm	LODGING %
<u>Varieties</u>							
1. NCo 376	156.12	11.90	18.58	191.2	2.92	2.1	74
2. N14	174.25	11.93	20.80	141.6	3.03	2.4	80
3. B 51129	137.55	12.57	17.27	102.2	2.93	2.5	33
<u>Significance</u>							
L.S.D. 5%	8.83	0.56	1.32	7.9			
1%	12.00	0.76	1.79	10.7			
S.E. Variety mean $\pm$	3.01	0.19	0.45	2.7			
<u>Levels of Ethrel kg/ha a.i.</u>							
1. Control - no Ethrel	168.98	12.07	20.33	128.8	3.11	2.5	66
2. 0.5	163.85	12.21	19.98	145.3	2.93	2.3	74
3. 1.0	149.28	12.21	18.16	149.1	2.96	2.3	63
4. 2.0	141.77	12.05	17.05	156.7	2.84	2.3	47
<u>Significance</u>							
L.S.D. 5%	10.19	N.S.	1.52	9.1			
1%	13.85	-	2.07	12.4			
S.E. Ethrel Mean	3.47	0.22	0.52	3.1			
<u>Variety x Ethrel Interaction</u>							
	N.S.	N.S.	N.S.	***			
<u>Trial Mean</u>							
S.E. single plot $\pm$	155.97	12.13	18.88	145.0	2.96	2.4	62
C.V. %	10.42	0.66	1.56	9.3			
	6.68	5.42	8.25	6.4			