

# THE EVALUATION OF NEMATICIDES ON MOUNT ELIAS FARM AT FAWN LEAS

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*Mount Elias, Fawn Leas*

## Abstract

The effects of applying nematicides on plant cane and ratoons are assessed. It is endeavoured to ascertain whether the yields of plant cane can be economically improved on Mount Elias and the rapid deterioration of ratoons can be stemmed.

## Introduction

Mount Elias farm is situated at Fawn Leas in the Natal Midlands. The altitude varies from 884 to 1 036 metres. The soils are Umzinto Midlands derived from TMS with a clay content ranging generally from less than 6% to 17%, although in small areas it rises as high as 30%. The predominant soil forms are Cartref, Fernwood, Glenrosa and Longlands. The land is pockmarked with "isidulis" which are mounds of heavier soil and are typical of the sandy thornveld. Average rainfall is 800 mm per annum, of which less than 100 mm normally falls between May and August.

The north-facing ridge with a slope of approximately 8% has a "spring-line" fairly high up on the slope with about 30 hectares of Cartref Waterridge soils below this line. These have an A horizon with 6-15% clay overlying a severely leached E horizon containing less than 6% clay, and they range in depth from 400 mm to 1 000 mm. In spite of an extensive underground drainage system this remains the most problematical area on the farm.

Mount Elias was acquired in 1971 with 70 hectares of cane growing on the only area of Hutton Msinga soil on the farm and on a Glenrosa Platt. This area was increased

annually until the entire farm was planted by 1978, comprising a total of 314 hectares of sugarcane. Soil samples were taken from each field before planting and after each cutting and the SASA fertilizer recommendations were adhered to stringently. All cane planted was from heat-treated stock. Various samples were analysed but RSD was never found on this farm.

Yields were satisfactorily initially but decreased steadily to 64 tc/ha or 3,0 t cane per ha per month (see Table 1). At this stage the SASA extension officer was called upon for assistance and a group of specialists from the Experiment Station visited the farm. The consensus of opinion was that nematodes were probably the major factor suppressing the yields. A programme was then embarked upon to assess the feasibility of nematicide application.

Nematicide trials on soils containing 30% clay in other parts of this district had shown no response to treatment and since the small area of NCo 376 cane on the Hutton Msinga soil was still yielding 107 tc/ha from a fifth ratoon, it was decided to concentrate on the weaker soils which comprised most of the farm.

A trial on a virgin Glenrosa Oribi soil, which was carried out in a field planted in 1976, had shown no response to nematicide applied in the furrow at the time of planting. In contrast, on a Longlands Vusi soil where Temik had been applied as a top-dressing in two bands on either side of the row three months after cutting a second ratoon, on an area of one hectare, the yield was 53 tc/ha more than the adjoining untreated area (see Table 2).

TABLE 1  
Sugarcane yields on Mount Elias farm from 1974/75 to 1979/80

Season	Total cane area, ha	Area harvested ha	Total crop tons	Average age at harvest months	Yield		Est. rain on crop mm	Percentage of total crop harvested						
					tc/ha	tc/ha/month		P	1R	2R	3R	4R	5R	6R
1974/75	180	75	8 820	22*	119	5,4	1 542	31	50	12	4	3	—	—
1975/76	251	131	10 747	21*	82	3,9	1 531	44	28	20	4	4	—	—
1976/77	269	105	9 809	23*	93	4,0	1 695	20	23	40	17	—	—	—
1977/78	278	133	8 441	21	64	3,0	1 427	26	31	28	10	4	—	—
1978/79	314	155	12 642	20	82	4,1	1 220	26	22	19	31	1	1	—
1979/80	314	152	10 555	22	69	3,1	1 562	30	22	22	8	13	2	3

\* Estimated figures

TABLE 2  
Results from early observation trials

Field No.	Date cut	Age at harvest months	Variety	Plant or ratoon	Soil		Yield, tc/ha		
					Form series	% clay in topsoil	Control	nem-treated	response
T9 . . .	Oct 78	23	805	P	Glenrose Oribi	6	97	97	0
9b . . .	Aug 78	21	382	2R	Longlands Vusi	10	96	149	+ 53

It was therefore assumed that there was probably a build-up of nematode populations on old cane lands. Furthermore these results seemed sufficiently encouraging to warrant the application of nematicides on commercial fields on a limited scale, and this was duly done. In addition to the above, two replicated trials on plant cane were carried out, one on field 29C on a Glenrosa Platt soil and the other on field 31 on a Cartref Waterridge soil.

### Methods and Materials

Fifty hectares of ratoon cane were treated either with 20 kg Temik or 30 kg Curaterr per hectare. The chemicals were applied in bands close to both sides of the cane row, to a depth of 50 mm with the aid of a two-tine applicator.

In order to monitor the effects of the nematicides and to account for seasonal yield fluctuations due to weather conditions, several bands of five untreated rows running the length of the field were left in each block that was treated. At the time of harvest the three centre rows of these bands were cut and windrowed for loading. A similar band of three rows in the adjacent treated portion of the field was cut in the same way. One truck-load was taken from each windrow and weighed, the area required to fill the load was measured, and the yield per hectare calculated from these figures.

A trial to determine the optimum time and method of nematicide application, using the same procedure, was carried out on a Glenrosa Trevanian soil in field No. 9a as follows :

Treatment 1 — Nematicide in furrow at plant in May 1977.

Treatment 2 — Nematicide side-dressed in the following spring September 1977.

### Results and Discussion

#### Plant Cane

Good results were obtained from nematicide applications in the furrow at planting. Even on a Cartref Waterridge soil with 4% clay, there was a yield increase of 42 tc/ha (see Table 3, field No. 31). On field 29c with Glenrosa Platt soil the increase was 53 tc/ha. On field 9a with a similar soil, treatment 1, even though it was applied in late autumn, was superior to treatment 2 applied in spring. The first commercial application of nematicide on plant cane crops was made on field 36 in January 1978. The response to treatment was 41 tc/ha in comparison with previous crops, also on a Cartref Waterridge soil.

#### Ratoons

On the ratoons (see Table 4) moderate responses were obtained on Fields 8, 30 and 10, ranging from 6 tc/ha to 15 tc/ha. The cane stools were too severely stunted on these Cartref Waterridge soils to be revived by nematicides. The crops have now been ploughed out and replaced with the varieties N6 and N8 on fields 30 and 10, and further nematicide trials will be conducted with these varieties.

The Glenrosa soils (Fields 21 and E) as well as the Fernwood soils (Fields C and 6a) have given excellent responses to treatment with nematicide. Yield increases were between 18 tc/ha and 43 tc/ha on 1st and 2nd ratoons on these trials. The average estimated response to nematicides on the entire 50 ha area of ratoon cane was 23 tc/ha, but the true benefit of the nematicide could have been more than this. The crops on these fields had an excellent growing season during the initial 17 months of growth (from August 1977 to December 1978 they received 1 263 mm of rain), resulting in a high population and vigorous growth. During the following nine months, however, (in the case of fields C and E) it was extremely dry. From January 1979 to cutting in September 1979 only 454 mm of rain fell. Of this 203 mm fell in one intense downpour. Assuming that three quarters of this downpour was lost through run-off, then the crop received only 310 mm of usable rain over this period. Unfortunately the crop could only be cut when it was 26 months old. The result of this was that on fields C and E, 20% of the stick was completely dry and had to be discarded. On field 21 the percentage was 15%). The crop was desiccated and very light. This was clearly illustrated by the results obtained from one contour of 1,1 ha in field 21. It was situated on a slightly weaker part of the field, and was cut at 22 months of age, before the dry winter to provide a fire-break. It yielded 108 tons or 98 tc/ha, compared with 78 tc/ha for the whole field cut at 27 months of age in October.

In the light of this experience it will be necessary to shorten the cutting cycle and to cut the mature crops before winter in order to obtain the full benefit of nematicide treatments.

### Conclusion

The cost of nematicides used was as follows :

Temik, 20 kg per hectare — R107,74/ha.

Curaterr, 30 kg per hectare — R89,40/ha.

At a cane price of R14 per ton, less say R2 for cutting and transporting costs, an increment of 7,5 tons per hectare must be achieved to break even, using the less expensive product.

TABLE 3  
Results of trials in plant cane

Field No.	Date cut	Age of harvest months	Variety	Soil		Yield, tc/ha		
				Form series	% clay in topsoil	Control	Nematicide treated	Response
31	Sept 79	21,6	376	Cartref Waterridge	4	54	96	+ 42
29c	Aug 79	21,5	376	Westleigh Kosi . .	< 6	85	133	+ 53
9a	Nov 78	18	376	Glenrosa Platt . .	15	85	110*	+ 25
							98**	+ 13

\* nematicide in furrow, May 1977

\*\* nematicide side-dressed, September 1977.

TABLE 4  
Results of trials on ratoon crops (side-dressed)

Field No.	Date cut	Age at harvest months	Variety	Plant or ratoon	Soil		Yield, tc/ha		
					Form series	% clay in topsoil	Control		response
8	Aug 79	26	293/376	1R	Cartref Waterridge	< 6	76	91	+ 15
30	Dec 79	23	376	1R	Cartref Waterridge	< 6	77	83	+ 6
10	May 79	22	216	2R	Cartref Waterridge	< 6	61	72	+ 11
21	Oct 79	27	376	1R	Glenrosa Platt	10-15	80	106	+ 26
E	Nov 79	24	293	2R	Glenrosa Glenrosa	6-10	70	112	+ 43
C	Oct 79	26	293	2R	Fernwood Fernwood	6-10	77	95	+ 18
6a	May 79	22	293	2R	Fernwood Fernwood	< 6	43	84	+ 41
Average		24,3				< 8	69	92	+ 23

The application of nematicides in the furrow at planting has given large responses, eg 53 tc/ha on a Westleigh Kosi soil and 42 tc/ha on a Cartref Waterridge soil in the controlled experiments. On a commercial field basis the average response to nematicide from all ratoon fields was 23 tc/ha.

Results when a nematicide was used as a side-dressing on ratoons on Cartref Waterridge soils were not economic, whereas on the Glenrosa, Longlands and Fernwood soils they were well worthwhile.