

SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

3300/48 BAYLETON CONCENTRATIONS AND IMMERSION TIME

Catalogue No.: 1241

Object : To evaluate the optimum concentration of Bayleton (triadimefon) and time of sett immersion for control of smut in sugarcane.

This crop : Plant Age : 12,1 months (4.10.79 to 7.10.80)

Location : ZSA Experiment Station, Sable Block N3

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

Design : Randomised blocks, 4 replications

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

Fertiliser (kg/ha) :

<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
140	100	60

Rainfall : 835mm Irrigation : 735mm

Treatments :

- 0 : Control - no fungicide
- 1 : Recommended concentration (0,025% a.i.)
- 2 : 2 x recommended concentration (0,050% a.i.)
- 3 : 4 x recommended concentration (0,100% a.i.)
- A : Setts dipped only (in cold water)
- B : Setts immersed for 1 minute (in cold water)
- C : Setts immersed for 5 minutes (in cold water)

Conduct :

1. A Bayleton 25% E.C. formulation was used
2. After treatments had been applied to the seedcane, and as soon as the setts had dried out, all seedcane was inoculated by dipping in a fresh smut spore suspension before planting.
3. Clean smut-free seedcane was used.
4. Nett plot size was four rows each of 6m, separated by a single row of N 52/219 to act as a smut-free barrier between plots.
5. Whips were counted and rogued fortnightly from 2 months of age until lodging at 6 months prevented further access to the plots.

2./ RESULTS

RESULTS

Relevant data from the plant crop are presented in the attached table.

- (a) Smut incidence. Cumulative whip counts in the different treatments were as follows.

Treatments	SMUT WHIPS PER HA				Means
	Control	250 ppm	500 ppm	1 000 ppm	
Control - no Bayleton	91 042				91 042
Dipped only		278	139	69	162
Dipped for 1 minute		69	69	0	46
Dipped for 5 minutes		0	0	0	0
Means	91 042	116	69	23	9 167

The overall effect of Bayleton was to reduce smut infection by over 99%, and this was achieved even by instant dipping at the lowest concentration.

Increasing the immersion time had a similar effect to increasing the concentration of the dip, and complete control of smut was attained either by immersing for 5 minutes at low concentration, or by immersing for 1 minute at the highest concentration.

- (b) Yield and quality. Neither the different concentrations of Bayleton nor the immersion times had any significant effects on yields and quality. However, control yields were depressed by almost 15 t/ha as a result of the severe smut levels and the reduced stalk populations.

KEC/Nov '80

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PLANT CROP DATA

Treatments	Cane t/ha	ERC % cane	TERC per ha	Stalks/ha x 10 ⁻³	Smut whips/ha
<u>Concentrations</u>					
0 : Control - no fungicide	121,22	12,98	15,74	112,8	91 042
1 : 0,025% a.i. (250 ppm)	135,81	13,33	18,13	132,7	116
2 : 0,050% a.i. (500 ppm)	134,43	13,26	17,91	131,0	69
3 : 0,100% a.i. (1 000 ppm)	137,22	12,68	17,55	132,4	23
L.S.D. P = 0,05	N.S.	N.S.	N.S.	-	-
P = 0,01	N.S.	N.S.	N.S.	-	-
<u>Immersion time</u>					
A : Dipped only	132,98	12,95	17,33	130,2	162
B : Dipped for 1 minute	136,99	13,26	18,22	131,4	46
C : Dipped for 5 minutes	137,49	13,08	18,04	134,4	0
L.S.D. P = 0,05	N.S.	N.S.	N.S.	-	-
P = 0,01	N.S.	N.S.	N.S.	-	-
<u>Interaction</u>					
Trial mean	134,36	13,08	17,65	130,1	9 167
S.E. mean \pm	4,31	0,28	0,80	-	-
C.V. %	11,11	7,30	15,62	-	-

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Title: BAYLETON CONCENTRATIONS AND IMMERSION TIME 3300/48

TERMINAL REPORT

Cat: 1241

Object : To evaluate the optimum concentration of Bayleton (triadimifon) and time of sett immersion for control of smut in sugarcane.

Planted : 4th October 1979.

Terminated : 30th September 1981, after the first ratoon crop.

<u>Harvest dates and ages :</u>		<u>Harvest</u>	<u>Age</u>
P		7.10.80	12,1 months
1R		30.9.81	11,7 "

Location : ZSA Experiment Station, Sable Ploek N3

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

Design : Randomised blocks, 4 replications.

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

<u>Fertiliser (kg/ha) :</u>		<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
P		140	100	60
1R		180	100	60

<u>Irrigation and Rainfall :</u>		<u>Irrig. (mm)</u>	<u>Rain (mm)</u>
P		735	835
1R		675	847

Treatments :

- 0 : Control - no fungicide
- 1 : recommended concentration (0,025% a.i.)
- 2 : 2 x recommended conc. (0,050% a.i.)
- 3 : 4 x recommended conc. (0,100% a.i.)

A : Setts dipped only
B : Setts immersed for 1 minute.
C : Setts immersed for 5 minutes.

Conduct :

1. A Bayleton 25% E.C. formulation was used.
2. After treatments had been applied to the seedcane, and as soon as the setts had dried out, all seedcane was inoculated by dipping in a fresh smut spore suspension before planting.
3. Clean smut-free seedcane was used.
4. Nett plot size was 4 rows each of 6m, separated by a single row of N 52/219 to act as a smut-free barrier between plots.

5. Whips were counted and rogued fortnightly from approximately 2 months of age until lodging at 6 months prevented further access to the plots.

RESULTS

(a) Smut incidence. Cumulative whip counts in the different treatments were as follows:-

Treatments	Smut whips/ha	
	P	1R
<u>Concentrations</u>		
0 : Control - no fungicide	91 042	188 321
1 : Bayleton @ 250 ppm a.i.	116	17 337
2 : " @ 500 ppm a.i.	69	9 861
3 : " @ 1 000 ppm a.i.	23	5 393
<u>Immersion time</u>		
A. Dipped only	162	12 823
B. Dipped for 1 minute	46	11 435
C. Dipped for 5 minutes	0	8 333

In the plant crop the overall effect of Bayleton was to reduce smut infection by over 99%, and this was achieved even by instant dipping at the lowest concentration. Increasing the immersion time had a similar effect to increasing the concentration of the dip, and complete control of smut was attained either by immersing for 5 minutes at low concentration, or by immersing for 1 minute at the highest concentration.

Smut incidence increased considerably in the first ratoon, particularly in the plots which had been treated with fungicide. The effects of increased concentrations of Bayleton and of longer immersion times were still evident, and it was apparent that concentrations had a more pronounced residual effect than immersion times. Whereas Bayleton (average of all treatments) reduced smut incidence by over 99% in the plant crop, it still accounted for 94% reduction in the first ratoon.

(b) Yield and quality effects. Relevant data for the plant and first ratoon crops are shown in the attached table.

The Bayleton treatments had no effect on cane yields, ERC% cane, or TERC/ha in either the plant or first ratoon crops, in spite of differing levels of smut incidence. However, Bayleton had a pronounced effect on both yield and quality when compared with the untreated controls.

3./

High smut levels in the control caused only a marginal depression in quality in the plant crop, but a highly significant depression in the ratoon when ERC% cane was reduced from 13,14 to 12,03. Similarly the effect on yield was more marked in the ratoon than in the plant crop. Bayleton treatment increased TERC/ha by 13,5% in the plant crop, and by 126% in the ratoon when high smut levels caused a severe collapse in yield in the untreated controls.

(e) Stalk counts. Millable stalk counts recorded at the two harvests were as follows:-

Treatments	Stalks/ha x 10 ⁻³	
	P	1R
Control - no fungicide	112,8	57,2
Bayleton treated	132,0	137,8
Means	130,1	129,7

High smut levels in the plant crop caused a $\pm 15\%$ reduction in stalk populations, but the effect was far more pronounced in the ratoon when $\pm 60\%$ reduction was recorded. It was apparent that this was the main reason for yield loss, as there was a strong relationship between yield and millable stalk count.

CONCLUSIONS

The inoculation of seedcane was done to simulate conditions of severe soil infection, and plant crop results showed that a short-duration cold-water Bayleton dip was successful in reducing smut incidence under such conditions, even at low fungicide concentrations.

Although varying Bayleton concentrations and sett immersion times has an effect on smut incidence, even in the ratoon crop, differences were not great enough to induce significant treatment effects on yield.

The reduction in yield associated with high levels of smut incidence in the untreated controls was directly associated with reduced millable stalk populations.

3300/48 BAYLETON CONCENTRATIONS AND IMMERSION TIME

HARVEST DATA - PLANT AND FIRST RATOON CROPS

Treatments	CANE YIELD t/ha			ERC % CANE			TERC/ha			WHIPS/ha	
	P	1R	Mean	P	1R	Mean	P	1R	Mean	P	1R
Control - no fungicide	121,22	62,97	92,10	12,98	12,03	12,51	15,74	7,56	11,65	91 042	188 321
Bayleton treated	135,82	130,22	133,02	13,09	13,14	13,12	17,86	17,11	17,49	69	10 864
Significance	N.S.	***	-	N.S.	***	-	N.S.	***	-	-	-
<u>Concentrations</u>											
0,025% a.i. (250 ppm)	135,81	132,95	134,38	13,33	13,00	13,17	18,13	17,17	17,65	111	17 337
0,050% a.i. (500 ppm)	134,43	126,74	130,59	13,26	13,28	13,27	17,91	16,84	17,33	65	9 861
0,100% a.i. (1 000 ppm)	137,22	131,38	134,35	12,60	13,15	12,92	17,55	17,33	17,44	82	5 393
Significance	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-	-	-
<u>Immersion time</u>											
Dipped only	132,98	132,66	132,82	12,93	13,05	12,99	17,33	17,32	17,33	162	12 823
Dipped for 1 minute	136,99	125,71	131,35	13,26	13,33	13,30	18,22	16,76	17,49	40	11 435
Dipped for 5 minutes	137,49	132,30	134,90	13,08	13,06	13,07	18,04	17,26	17,65	0	8 333
Significance	N.S.	N.S.	-	N.S.	N.S.	-	N.S.	N.S.	-	-	-
<u>Interaction</u>											
Trial mean	134,36	123,50	128,93	13,08	13,04	13,06	17,65	16,16	16,91	9 167	28 609
S.E. mean ±	4,31	2,71	-	0,28	0,12	-	0,80	0,38	-	-	-
C.V.%	11,11	7,60	-	7,30	3,12	-	15,62	8,09	-	-	-