SOUTH AFRICAN SUGAR INDUSTRY
AGRONOMISTS' ASSOCIATION

Code: HW 251
Cat No: 1421

Title: Phytotoxicity of herbicides on weak sands

1. Particulars of project

This crop	:	1st ratoon		
Site	:	Felixton		
Region	:	Zululand		
Soil system	:	Berea/Recent Sands		
Soil form/series	:	Fernwood/Fernwood		
Design	:	Random blocks		
Variety	:	N8		
Fertilizer	:	N	P	K
Top dressing	:	129	-	129

Temik at 20 kg/ha in furrow alongside ratoon cane line

Soil analysis: Date 18. 9. 82

pH	O.M.%	Clay%	Silt%	Sand%
5,96	-	2	6	92

ppm

P	K	Ca	Mg	Zn	Al
>80	66	623	65	>4.0	-

Age: 12,0 months Dates 28.9.82 - 28.9.83

	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Actual	122	75	34	57	70	37	17
L.T.M.	97	104	95	155	176	143	80
% of LTM	126	72	36	37	40	26	21

	May	Jun	Jul	Aug	Sep	Total
Actual	36	29	71			
L.T.M.	109	26	36	53	88	
% of LTM	33	112	197			

2. Objectives

To assess the phytotoxic effects of weed control programmes on N8 in weak sands.

3. Treatments

Chemical treatments used in the programme were:

Chemicals	Rate in kg or ℓ ai or ae/ha
Dual + atrazine	2,0 + 1,0
Dual + ametryne	2,0 + 1,0
Dual + ametryne + paraquat	2,0 + 1,0 + 0,2
Diuron + Actril DS	2,0 + 0,875
Diuron + Sencor	1,6 + 1,4
Lasso + diuron + Actril DS	2,3 + 2,0 + 0,875

4. Experimental

The cane was trashed at harvesting and all trash subsequently removed from all plots. Treatments were applied as directed interrow application using

a lever-operated knapsack sprayer fitted with an Albuz APM Green floodjet. Conditions on each spraying occasion were:

	Date				
	15 Oct	22 Oct	29 Nov	15 Dec	21 Dec
Temperature °C 8 am	23,0	13,8	23,0	22,8	29,8
2 pm	25,6	20,4	23,2	29,2	36,8
Rel. humidity 8 am	59	93	87	65	50
2 pm	66	52	80	47	36
Sunshine hours	9,4	7,3	2,5	11,5	12,4
Rainfall (mm)	0	0	0	0	0
Days to first rain	5	4	7	8	2
Amount of first rain (mm)	13,8	9,2	8,0	5,0	5,0
Total in two weeks (mm)	56,8	117,6	27,4	5,0	24,4
Cane growth stage shoot ht (cm)	3-4	7	15	22	
Canopy ht (cm)	10-15	16	52	69	
Shoot No. (1000/ha)	162	254	8*	*8	

* No of leaves unfurled per shoot

Weed control programmes and treatment sequence are shown in Table 1 (attached)

Crop growth measurements and ratings of weed control during the early part of the crop cycle were recorded regularly. Cane growth stages at each spray date are indicated in the table under conditions at spraying.

Weed infestation at the time of spraying was recorded and ratings taken at subsequent dates. Competitive effects of weeds were considered to be negligible due to repeated weeding as indicated in the programme in all plots with weed growth. However, a certain amount of weed growth did occur later when the crop failed to form a good canopy due to drought conditions. This is considered not to have affected one treatment more than another.

5. Results

Table 2 Weed control ratings (% ground cover of weeds) taken at spraying of the first post-emergence treatments and subsequently. (Assessment dates are indicated)

Programme	Weed control % ground cover							
	C. esculentus			Grasses			Broadleaf	
	22 Oct	29 Nov	15 Dec	22 Oct	29 Nov	15 Dec	22 Oct	29 Nov
1. Control (hand weeded)	7	1	1	15	5	9	7	3
2. Du + At HW Di + Ac	11	5	11	5	3	7	1	0
3. Du + At HW Di + Ac	5	2	1	3	3	1	1	1
4. Du + Am HW Di + Ac	8	6	6	0	3	3	2	1
5. Du + At + par HW	7	3	3	13	2	3	8	1
6. Di + At HW Di + Ac	6	2	4	30	3	5	6	1
7. Di + Sen HW	10	4	5	21	2	2	3	0
8. Lass + Di + par HW	7	3	4	17	2	2	6	0

Table 1. Weed control treatments

Programme	Treatments/Date of application or hand weeding										
	26 Sept	15 Oct	22 Oct	8 Nov	24 Nov	29 Nov	8 Dec	15 Dec	21 Dec	25 Jan	16 May
1	Harvest	-	-	Handweed	Handweed	-	Rated no weeds	Handweed	-	Handweed	Handweed
2	Harvest	Dual + atraz	-	-	Handweed	-	Rated no weeds	Diur + Ac Handweed	-	Handweed	Handweed
3	Harvest	Dual + atraz	-	-	Handweed	Diur + Ac	Rated no weeds	Handweed	-	Handweed	Handweed
4	Harvest	Dual + amet	-	-	Handweed	Diur + Ac	Rated no weeds	Handweed	-	Handweed	Handweed
5	Harvest	-	Dual + Atraz + par.	-	Handweed	-	Rated no weeds	Handweed	-	Handweed	Handweed
6	Harvest	-	Diur + Act	-	Handweed	-	Rated no weeds	Handweed	Diur + Act	Handweed	Handweed
7	Harvest	-	Diur +Senc	-	Handweed	-	Rated no weeds	Handweed	-	Handweed	Handweed
8	Harvest	-	Lasso + diur + Act	-	Handweed	-	Rated no weeds	Handweed	-	Handweed	Handweed

Table 3 Cane growth stages at spraying

Cane growth	Date		
	22 Oct	29 Nov	15 Dec
Stalk length (cm)	7	15	22
Leaf canopy height (cm)	16	52	69
No leaves unfurled per shoot	1-4	8	8

Table 4 Visual ratings of leaf symptoms taken 7, 14, 38 and 54 days after first treatments

Treatments	Ratings (% leaf scorch)			
	7	14	38	54
1. Control (hand weeded)	2	1	2	4
2. Du + At HW Di + Ac	2	1	2	3
3. Du + At HW Di + Ac	2	1	3	22
4. Du + Am HW Di + Ac	7	2	2	20
5. Du + At + par HW	41	23	5	2
6. Di + Ac HW Di + Ac	14	13	3	3
7. Di + Senc HW	23	19	4	2
8. Lass + di + Ac HW	15	11	4	2

Table 5 Crop measurements taken at 1,5; 4; 4,5; 5,5; and 7,5 months of age

Treatments	Stalk length (cm)					Stalk population (1000/ha)				
	1,5	4	4,5	5,5	7,5	1,5	4	4,5	5,5	7,5
1. Control (hand weeded)	13	38	45	50	58	249	250	223	204	108
2. Du + At HW Di + Ac	12	37	44	49	55	237	241	232	201	109
3. Du + At HW Di + Ac	12	33	42	45	54	260	258	222	183	122
4. Du + Am HW Di + Ac	12	38	45	50	56	236	232	228	199	114
5. Du + At + par HW	10	36	42	48	54	232	263	246	201	117
6. Di + Ac HW Di + Ac	11	38	44	48	57	235	249	214	197	118
7. Di + Senc HW	10	34	43	45	51	231	256	233	204	124
8. Lass + Di + Ac HW	10	34	42	43	51	233	256	236	203	117

Table 6 Field data at harvest

Treatment	Yield			Crop measurements	
	Cane t/ha	Sucrose % cane	Sucrose t/ha	Stalk length (m)	Stalk popln (1000/ha)
1. Control (hand weeded)	17,9	8,92	1,6	0,95	98
2. Du + At HW Di + Ac	16,0	9,29	1,3	0,89	96
3. Du + At HW Di + Ac	19,4	8,13	1,6	0,88	107
4. Du + Am HW Di + Ac	17,6	8,81	1,6	0,92	106
5. Du + At + par HW	18,0	9,36	1,5	0,90	107
6. Di + Ac HW Di + Ac	17,4	8,47	1,5	0,91	101
7. Di + Senc HW	15,7	8,16	1,3	0,89	101
8. Lass + Di + Ac HW	16,4	8,83	1,5	0,84	102
CV%	16,5	7,5	20,5	7,3	12,4
LSD (0,05)	3,709	0,8215	0,3922	0,085	16,40
LSD (0,01)	4,999	1,107	0,5287	0,114	22,10

6. Comments on results

Weed control (Table 2)

1. Some weed growth (very young grasses) were present at application of pre-emergence treatments on 15th October. Ratings on 22 October show that Dual + ametryne controlled grasses very well initially and was better than Dual + atrazine which was itself better than untreated.

2. At the application of post.emergence treatments weeds were present in most plots. Grass infestation averaged about 20%.

3. Post-emergence treatments provided excellent control of grasses (Panicum maximum and some D. sanguinalis and E. indica) and broadleaf weeds (Bidens pilosa and Commelina benghalensis).

4. Most weed control programmes provided adequate weed control and prevented competition until canopy formation.

5. Due to subsequent drought conditions and re-opening of the canopy, further weed growth occurred in the field.

Visual symptoms of cane scorch (Table 4)

1. All post-emergence treatments including diuron + Sencor caused severe leaf scorch symptoms to develop. All of these disappeared in time (± 38 days)

2. Follow-up treatments of diuron + Actril DS also caused severe symptoms in spite of being directed away from the cane foliage.

Crop measurements

1. Post-emergence treatments caused slight stunting of cane initially but variability was subsequently high.

2. Stalk populations were variable and this is not considered to be related to treatment effects.

Yield at harvest

1. No differences in yield or measurements at harvest reached a level of statistical significance. However, stalk lengths of all treated plots were less than unsprayed control and stalk populations (except treatment 2) were slightly higher.

2. The severe drought conditions did not appear to exacerbate or even alter the effects of treatments.

PETT/PMO
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