SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

Code: HW 211/80

Cat No: 1291

Title: Phytotoxicity of herbicides to ratoon cane sprayed post-emergence

1. Particulars of the project

This crop	: 1st ratoon
Site	: Shakaskraal Field Stn
Region	: N. Coast Coastal
Soil system	: Umzinto
Soil form/series	: Longlands/ Waldene
Design	: Randomised blocks
Variety	: NCo 376
Fertilizer/ kg/ha t/dressing	: N P K : 115 - -
Spray date	: 20.2.81
Conditions at spray :	
Rainfall (mm) Date of spray	:0
Within 2 weeks	:4,7
Days to first rain	:1
Amount of first rain	:0,2
Sunshine hours	: 8,5

Soil analysis: Date: 15.6.81

pH	CEC	O.M.%	Silt%	Clay %
6,0	10,0	1,8	13	20

Fine sand %	Med	Coarse
62	1	4

ppm

P	K	Ca	Mg	Zn	Al
26	76	671	148		

Age: 16,3 months Dates 8.1.81-18.5.82

Rainfall: 1 464 mm L.T.M. 1 508 mm

Irrigation: 203,2 mm

Temperature °C	8 am	: 24,2
	2 pm	: 27,9
Rel. humidity %	8 am	: 92
	2 pm	: 70

Wind : Mild
General : Clear
Soil : Moist

2. Objectives:

To assess the phytotoxic effects of herbicides on cane growing in a medium soil when applied over the cane crop.

3. Treatments

See results

4. Experimental

Plots consisted of 5 rows x 8 m x 1,4 m in size and there were 6 replications.

Treatments were applied directly over the sugarcane foliage by means of a lever-operated knapsack sprayer fitted with a Spraying Systems TK5 floodjet. Output was 313 ℓ/ha. The cane growth stage at the time of spraying was ± 670 mm in leaf canopy height with 6-8 leaves unfurled per shoot.

Results:

1. Visual ratings of leaf scorch and stunting taken 17 and 28 days after spraying are presented in Table I.

2. Crop growth measurements taken 5 days and 1, 6,5 and 11 months after spraying are presented in Table II.

3. Crop characteristics and yield data at harvest are presented in Table III.

Table I: Visual ratings of stunting and leaf scorch taken 17 and 28 days after spraying.

Treatments	Rate in kg or ℓ ai or ae/ha	Phytotoxicity *1		Stunting *2	
		17	28	17	28
Control (unsprayed)	-	1	1	5	5
Diuron + 2,4-D + S	4,0 + 2,88	1,8	2,7	3,2	2,7
Bimate + paraquat	6,0 + 0,4	6,8	3,8	2,6	2,9
Diuron + Actril DS + TCA	4,0 + 1,75 + 4,75	4,3	3,9	3,3	2,8
Diuron + Sencor + TCA	3,2 + 2,8 + 4,75	3,7	2	3,8	4,3
Bimate + 2,4-D + S	6,0 + 2,88	2,5	3,8	3	2,3
MSMA + diuron	4,32 + 4,8	4,7	3	3,8	3,9
MSMA	8,64	4,7	3,3	3,8	4
Ametryne + Velpar	3,0 + 1,35	4,6	3,1	3,3	3,4

*1 Ratings based on a 1-9 scale where 1 = no effect 9 = dead

*2 Ratings based on a 1-5 scale where 1 = very poor 5 = equal to control

Table II: Crop measurements taken 5 days and 1, 6,5 and 11 months after spraying

Treatments	Rate in kg or ℓ ai or ae/ha	Stalk heights (m)				Stalk populations ($x10^{-3}$/ha)			
		5D	1	6,5	11	5D	1	6,5	11
Control (unsprayed)	-	0,29	0,8	1,31	2,04	290	226	163	200
Diuron + 2.4-D + S	4,0+2,88	0,27	0,57	0,92	1,77	281	239	160	174
Bimate + paraquat	6,0+0,4	0,26	0,59	1,01	1,80	232	256	162	167
Diuron + Actril DS + TCA	4,0+1,75+4,75	0,26	0,58	0,97	1,75	256	255	167	183
Diuron + Sencor + TCA	3,2+2,8+4,75	0,26	0,70	1,20	1,92	264	240	164	179
Bimate + 2,4-D + S	6,0+2,88	0,26	0,54	0,84	1,67	265	255	170	174
MSMA + diuron	4,32+4,8	0,27	0,67	1,15	1,89	256	233	156	193
MSMA	8,64	0,29	0,74	1,18	1,92	265	227	174	202
Ametryne + Velpar	3,0+1,35	0,27	0,65	1,13	1,89	264	245	157	186

Table III: Crop characteristics and yield date at harvest

Treatment	Rate in kg or ℓ ai or ae/ha	Yield					
		Cane t/ha	ers % cane	ers t/ha	Sucrose t/ha	Stalk ht. (m)	Stalk pop^{n} x10^{-3}/ha
Control (unsprayed)	-	124	12,9	16,0	17,8	2,40	159
Diuron + 2,4-D + S	4,0 + 2,88	111*	13,1	14,4*	16,0*	2,16**	152
Bimate + paraquat	6,0 + 0,4	104**	12,6	13,1**	14,6**	2,12**	161
Diuron + Actril DS + TCA	4,0 + 1,75 + 4,75	116	12,2	14,3*	16,1	2,12**	164
Diuron + Sencor + TCA	3,2 + 2,8 + 4,75	116	13,1	15,2	16,8	2,25*	163
Bimate + 2,4-D + S	6,0 + 2,88	107**	13,0	13,8**	15,3**	2,07**	149*
MSMA + diuron	4,32 + 4,8	118	13,3	15,6	17,2	2,27*	162
MSMA	8,64	116	13,2	15,3	16,9	2,31	167
Ametryne + Velpar	3,0 + 1,35	118	12,9	15,2	16,9	2,28*	162
C.V. %		8,6	6,2	9,1	8,9	4,6	5,3
L.S.D. (0,05)		11,46	0,9348	1,568	1,706	0,1180	9,838
L.S.D. (0,01)		15,34	1,251	2,099	2,284	0,1580	13,17

Comments

Leaf scorch and stunting

1. Extremely severe leaf scorch symptoms were caused by most treatments. Least effect was produced from diuron + 2,4-D + S, diuron + Sencor + TCA and Bimate + 2,4-D + S. Symptoms disappeared in time.

2. Cane was visibly stunted in all treated plots at an early age. Worst treatments were diuron + 2,4-D + S, both Bimate treatments and diuron + Actril DS + TCA.

Crop measurements

1. Stalk heights were severely affected by most treatments. Treatments with hormones (2,4-D or Actril DS) and paraquat were the worst.

2. Stalk populations were relatively unaffected.

3. This severe stunting of cane could be expected at this time of the year when growth is rapid (sprayed 20th February).

Yield data

1. Statistically significant reductions were produced in terms of cane t/ha, ers t/ha and sucrose t/ha.

2. MSMA treatments were less severe than paraquat with Bimate.

3. Treatments containing 2,4-D or paraquat were the most severe.

4. No treatments were markedly worse than the standard diuron + 2,4-D (ie. differences were not statistically significant).

Conclusion

All treatments included in this experiment would be acceptable for use on ratoon cane under these conditions. Care should be exercised with the use of 2,4-D or paraquat at a late stage of cane growth.

PETT/PMO
16.7.82