SOUTH AFRICAN SUGAR INDUSTRY AGRONOMISTS' ASSOCIATION

3500/22 SUSCON GREEN TRIAL I (TRIANGLE)

Object: Evaluation of Suscon Green soil insecticide (10% chlorpyrifos granular) for control of *Heteronychus licas* larvae in sugarcane.

Cat. No.: 1798

This crop: Plant **Age:** 11,8 months (26.9.90 - 17.9.91)

Location: Triangle Limited, Section 65, Field 1129.

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

Design: Randomised blocks, 4 replications. Gross plot size: 0,40 ha

Variety/spacing: N14 in 1,5m rows.

Fertiliser: Applied in accordance with normal estate practice, viz. 440 kg/ha ammonium nitrate; 400 kg/ha single super phosphate; 200 kg/ha muriate of potash.

Treatments:

1. Control
2. Dieldrin 50 WP @ 4 kg/ha product (2 kg/ha a.i.)
3. Suscon Green @ 20 kg/ha product (2 kg/ha a.i.)
4. Suscon Green @ 30 kg/ha product (3 kg/ha a.i.)
5. Suscon Green @ 40 kg/ha product (4 kg/ha a.i.)

Conduct:

1. Suscon Green applied by hand over the seedcane after planting and covered immediately to a depth of ±5cm. Covered again after first irrigation to ensure optimum depth of placement.
2. Dieldrin 50 WP applied by knapsack sprayer in a ± 0,5m band across the furrow after planting; covered as above.

RESULTS

Relevant data for the plant crop cycle are presented in the attached tables and figures.

(a) Cane yield: Uniform growth and large plot size accounted for the low variability recorded, and although differences in cane yields between treatments were not great they nevertheless attained significance, with the mean of the Suscon Green treatments outyielded the control (P=0,05).

(b) ERC% cane: There was a trend for the Suscon Green treatments to depress quality, but treatment differences were not significant.

(c) ERC yield: The quality trend counteracted the cane yield benefit in the Suscon Green treatments, and as a result ERC yield differences were not significant.

(d) Stalk characteristics: Measurements of millable stalk populations, stalk lengths, and stalk diameters, did not reveal any significant treatment effects.

(e) Dead heart counts: Counts were made on 10 rows/plot (each 16,5m in length) on three occasions during December and January to determine whether adult beetle activity was affected by the insecticide treatments.

Although there were no significant effects at any of these sample dates, the first two showed lower counts in the Dieldrin treatment and the cumulative effect of this attained significance (P=0,05). There was no evidence of Suscon Green treatment reducing tiller mortality.

(f) Larvae counts: Larvae counts were made from 5 pit samples per plot on two occasions, viz. 23rd May and 23 July, 1991. Samples comprised an area of 0,5m x 0,5m across the cane row and excavated to a depth of ±30cm.

Larvae were separated by size into 1st, 2nd, and 3rd instars but data analysis was confined to totals of 2nd and 3rd instars as it seemed unlikely that the 1st instar larvae present were H.licas (neither adults nor eggs were found at either of the two sampling dates). There were considerably fewer larvae recorded in July than in May, due either to natural mortality and/or to the larvae having moved below the sampling zone.

Larvae populations were relatively low, particularly at the second sampling date, but numbers were still sufficient to reveal highly significant treatment responses (P=0,01).

Larvae counts in the three Suscon Green treatments did not differ significantly, but the average counts in these treatments were significantly lower than those in the Dieldrin treatment and in the Control. These effects are shown in the following table (totals of both sampling dates):

	Mean larvae per sample	Larvae numbers as % of control	% reduction of larvae numbers
Control	7,75	100,0	0,0
Dieldrin	3,80	49,0	51,0
Mean Suscon Green	1,58	20,4	79,6

CONCLUSIONS

High yields were recorded from this trial, which was sited in an area of commercial cane where there had been considerable evidence of beetle activity the previous year, although populations were not as high as at the sites used for trials on Hippo Valley Estates (see 3500/18 and 3500/19 reports). Dead heart counts showed that the crop was not sufficiently damaged by adult beetles during the early growth stages to cause low enough yields to mask treatment effects.

Soil insecticides applied at planting depth are aimed at control of larvae, not only to reduce damage to the standing crop, but also in an attempt to reduce overall pest populations. The results obtained from larvae counts in this trial showed that all of the three Suscon Green treatments gave good control of larvae, and that although Dieldrin was still proving useful for larvae control, it was considerably less effective than Suscon Green. The significant reaction to Dieldrin treatment indicated that the local H.licas population at the Triangle site was less resistant to the chemical than the population at the HVE trial sites, where no response to Dieldrin treatment was recorded.

The effect of the Suscon Green treatments in providing ±80% control of larvae was reflected in a small but significant gain in cane yield. There were no significant differences between the three Suscon Green treatments in either larvae counts or cane yields, but differences can be expected to show up in the ratoons because the higher rates should provide longer residual activity and more lasting control.

Suscon Green is now used successfully in Australia to control a range of white grub species in sugarcane, and it has also proved successful in other parts of the world in controlling soil-dwelling larvae of various beetle species. The product has been designed to remain insecticidally active in the soil for a three-year period, the release of the active ingredient (chlorpyrifos) involving a leaching process in moist soil. It is encouraging to note that it is also effective against H.licas larvae, and as a result of these and other results this product has now been temporarily registered for use on sugarcane in Zimbabwe.

The product has certain limitations, apart from its high cost, the most important being that it will only be effective if applied below the sett at planting and adequately covered to a depth of about 10cm. It is unsuitable for ratoon applications because of the problem of applying it at depth (see 3500/19 results), so that its use is likely to be restricted to new plantings only.

KEC/Nov'91
vdr

3500/22: PLANT CROP HARVEST DATA 1991

TREATMENT MEANS

TREATMENTS	Cane t/ha	ERC % cane	ERC t/ha	Stalks/ ha/1000	Stalk lgth (m)	Stalk diam(cm)
Control	134,90	13,15	17,74	120,56	2,55	2,50
Dieldrin 4 kg/ha	136,02	13,33	18,12	118,53	2,74	2,53
Suscon Green 2 kg/ha	142,47	12,88	18,35	118,01	2,51	2,53
Suscon Green 3 kg/ha	137,77	12,86	17,72	117,85	2,49	2,55
Suscon Green 4 kg/ha	143,32	13,03	18,67	120,06	2,59	2,55
Trial mean	138,89	13,05	18,12	119,00	2,57	2,53
Significance	*	-	-	-	-	-
L.S.D. (P = 0,05)	5,67	-	-	-	-	-
S.E.plot ±	3,67	0,36	0,59	5,45	0,15	0,13
S.E.treat mean ±	1,84	0,18	0,29	2,72	0,08	0,07
C.V.%	2,64	2,75	3,25	4,58	6,05	5,22

3500/22: DEAD HEART COUNTS (PLANT CROP)

TREATMENT MEANS (x = dead hearts/10 rows x 16,5m)

TREATMENT	ACTUAL COUNTS						CUMULATIVE COUNTS			
	11.12.90		28.12.90		14.01.91		to 28.12.90		to 14.01.91	
	x	log x	x	log x	x	log x	x	log x	x	log x
Control	453,00	2,65	311,00	2,50	160,00	2,20	764,00	2,88	924,00	2,97
Dieldrin 4 kg/ha	356,50	2,53	266,25	2,42	181,00	2,25	622,75	2,78	803,75	2,90
Suscon Green 2 kg/ha	446,75	2,64	307,25	2,49	163,50	2,21	754,00	2,88	917,50	2,96
Suscon Green 3 kg/ha	439,00	2,64	320,75	2,51	176,75	2,24	759,75	2,88	936,50	2,97
Suscon Green 4 kg/ha	498,00	2,69	311,75	2,49	178,25	2,24	809,75	2,91	988,00	2,99
Trial mean	438,65	2,63	303,40	2,48	171,90	2,23	742,05	2,87	913,95	2,96
Significance	-	-	-	-	-	-	*	*	-	-
L.S.D. (P = 0,05)	-	-	-	-	-	-	116,90	0,06	-	-
S.E. Plot ±	70,07	0,08	30,28	0,04	39,70	0,10	75,86	0,04	93,94	0,04
S.E. Mean ±	35,04	0,04	15,14	0,02	19,85	0,05	37,93	0,02	46,97	0,02
C.V. %	15,97	2,98	9,98	1,85	23,09	4,43	10,22	1,61	10,28	1,49

3500/22: LARVAE COUNTS FROM SOIL SAMPLES

TOTALS OF 2nd and 3rd INSTAR LARVAE 1st Sampling 23.05.91
2nd Sampling 23.07.91

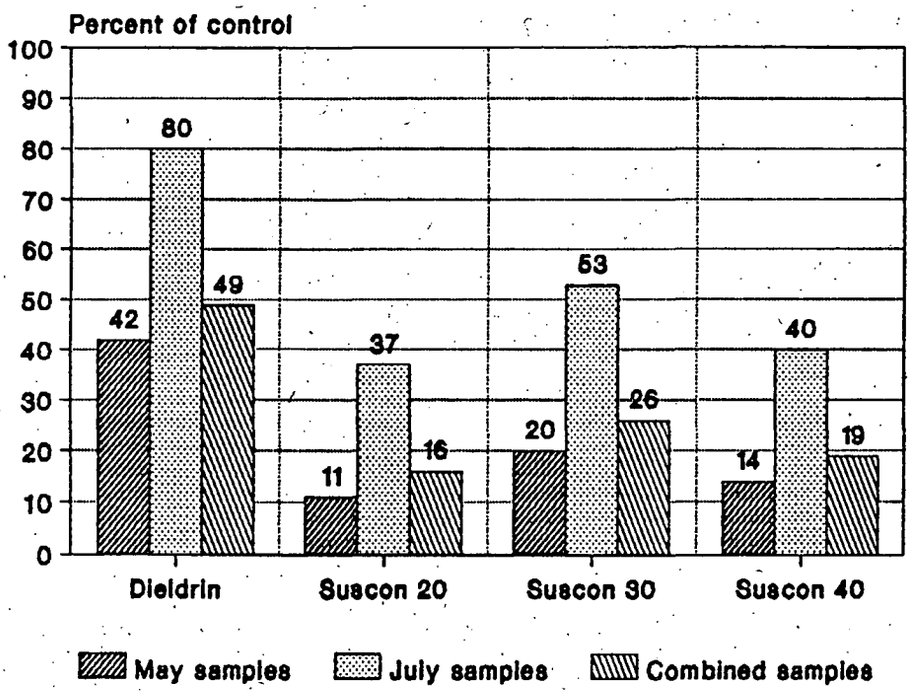
TREATMENT	MEAN LARVAE PER SAMPLE (X			TRANSFORMED SQ.RT.(X+1)		
	1st Samples	2nd Samples	Both Samples	1st Samples	2nd Samples	Both Samples
Control	6,25	1,50	7,75	2,69	1,57	3,96
Dieldrin @ 2kg/ha	2,60	1,20	3,80	1,90	1,48	3,38
Suscon @ 20 kg/ha	0,70	0,55	1,25	1,28	1,24	2,53
Suscon @ 30 kg/ha	1,25	0,80	2,05	1,46	1,34	2,80
Suscon @ 40 kg/ha	0,85	0,60	1,45	1,34	1,26	2,61
L.S.D. P = 0,05	0,92	0,52	1,17	0,31	0,18	0,71
P = 0,01	1,30	0,73	1,64	0,43	0,26	0,99
Trial mean	2,33	0,93	3,26	1,73	1,38	3,05
S.E. Plot ±	0,60	0,33	0,76	0,20	0,12	0,46
S.E. Mean ±	0,30	0,17	0,38	0,20	0,06	0,23
C.V. %	25,74	35,77	23,23	11,44	8,48	14,96

LARVAE NUMBERS EXPRESSED AS PERCENTAGES OF CONTROL VALUES

TREATMENT	LARVAE AS % OF CONTROL			% REDUCTION OF LARVAE		
	1st Samples	2nd Samples	Both Samples	1st Samples	2nd Samples	Both Samples
Control	100,00	100,00	100,00	0,00	0,00	0,00
Dieldrin @ 2kg/ha	41,60	80,00	49,03	58,40	20,00	50,97
Suscon @ 20 kg/ha	11,20	36,67	16,13	88,80	63,33	83,87
Suscon @ 30 kg/ha	20,00	53,33	26,45	80,00	46,67	73,55
Suscon @ 40 kg/ha	13,60	40,00	18,71	86,40	60,00	81,29

3500-22: SUSCON GREEN TRIAL I (TRIANGLE)

2nd & 3rd INSTAR LARVAE AS % OF CONTROL



PERCENT REDUCTION OF LARVAE POPULATIONS