

Insecticidal Trials for the Control of the Sweet Potato Weevil

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Introduction: Since the sweet potato weevil, *Cylas formicarius* Fb. is the most destructive pest of the sweet potato crop, trials for the control of the insect have been in progress in the Agricultural College and Research Institute, Coimbatore, from 1952 onwards with the synthetic insecticides now available in the market. Experiments conducted up to 1956 had shown that six foliar applications of Aldrin, Dieldrin or Endrin at fortnightly intervals during the growth period of the crop, kept down the infestation and increased the yield (Anantanarayanan and Subramanian 1958). Aldrin and Dieldrin proved better than Endrin in these trials. Further trials were continued in the 1956—'57 and 1957—'58 seasons on the same lines for confirming the results. Trials were also laid out with different types of treatments like treatment of the slips before planting, and treating soil before and after planting with the object of reducing the cost of the treatment. The results obtained are given below.

Material and methods: Six sets of experiments were laid out with the various types of treatments given under each experiment. In each case it was laid out in half-cent plots in randomised blocks with four replications. Variety V 8 was used for the foliar application trials and V 6 for the others.

DETAILS OF EXPERIMENTS.

I. Foliar application of insecticides.

(a) *Treatments given throughout the crop period:* Aldrin 2.5% dust, 0.1% spray; Dieldrin 1.5% dust, 0.1% spray; and Endrin 1.0% dust, 0.02% spray were applied to the crop six times as in the former years at fortnightly intervals from the sixth week of planting. The experiment was conducted in 1956—'57 and 1957—'58 for the third and fourth years. The experiment conducted in 1957—'58 failed due to adverse seasonal conditions. The results of the 1956—'57 trial are given in Table 1.

During the 1956—57 season a high percentage of the incidence of the weevil was recorded. All the insecticidal treatments had given significantly lower infestation and higher yield. Of these Dieldrin proved to be the best with Endrin coming next.

(b) *Treatments given at the time of the tuber formation only*

This is a new experiment in which the chemicals were applied as foliar sprays about two months after planting at the time of the formation of tubers. DDT, Lindane, Dieldrin and Endrin at 0.1% level and Parathion (Folidol) at 0.05% were tested. Three rounds of treatments were given at fortnightly intervals. The results are given in Table 2.

The results were not significant. It however showed that there was reduction in the treated plots and higher yields than in the control.

II. Dipping slips in insecticides before planting.

This is another new experiment in which the slips of sweet potato were dipped for five minutes in the chemical and planted. Aldrin, Dieldrin and DDT at 0.1%, Endrin at 0.05%, Parathion (Folidol) 0.025%, and Systox 0.1% were tried. The results are given in Table 3.

In this experiment there was no difference in the intensity of infestation in the plots at the time of harvest. The yield was however significantly higher in Dieldrin, DDT and Parathion treatments.

III. Application of the chemical to the soil before planting.

This experiment was designed to control the weevil when it tries to infest the tuber in the soil. Two pounds of the actual chemicals per acre were incorporated into the soil before planting the slips and no further treatment was given. The results are given in Table 4.

There was no marked reduction in the incidence of the weevil due to the treatments. Aldrin recorded 19.0% against 32.1 in the control. The yield was increased in Endrin and Toxaphene treatments.

IV. Chemicals applied to the soil at the time of tuber formation.

In this experiment 2 lb. of actual chemicals per acre were incorporated into the soil at the time of formation of tubers 2½ months after planting. Dust formulations of DDT, Toxaphene, Heptachlor and Chlordane were tried. The experiment was conducted in two series with the chemicals applied (a) once and (b) twice to the soil.

(a) *Treatments given once*: The results obtained are given in Table 5. Though there was slight reduction in infestation in all treatments, it was not significant. The yield was significantly higher in DDT treatment.

b) *Treatments given twice*: In this case the same insecticides were applied at the same rate $2\frac{1}{2}$ months after planting and again after another month. The results obtained are given in Table 6. The infestation was considerably reduced in all the treatments and was significant statistically. The yield was higher in DDT and Heptachlor treatments but was not significant.

Discussion: The six experiments laid out during the year have shown wide range of infestation by the weevil in the control plots. However it is possible to compare the merits of the various treatments given in these experiments. In spite of six fortnightly applications of insecticides to the crop during the growth period, the reduction of the infestation has not been appreciable. The infestation ranged from 58.2 to 87.7% and 43.7 to 69.6% against 95.0 and 71.2% in the control plots of the two experiments. The application of the insecticides to the soil after the tubers have begun to ripen seems to be more advantageous as indicated by the 6th experiment. The range of infestation was 7.8 to 12.5% in the treated plots as against 35.8% in the control.

Conclusions: From the results of the trials of different types for the control of the sweet potato weevil conducted during 1956—'57, the following conclusions may be drawn.

1. The use of chlorinated hydrocarbons or organophosphorus insecticides for dipping slips alone, periodical foliar applications or soil treatment have generally given increased yields.

2. The number of applications of the chemicals can be restricted to the period of tuber formation since no marked reduction in infestation or increase in yield has been obtained by more treatments.

3. Soil or foliage application of insecticides have the same effect in reducing the infestation and increasing the yield. Of these soil application during the ripening period of the tubers seems to be more useful.

4. Among the insecticides tested Dieldrin and DDT have shown promise of greatly reducing the insects and giving higher yields.

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REFERENCES

- Anantanarayanan, K. P. and Subramanian, T. R. 1958 Control of the sweet potato weevil. *Madras Agric. J.* 45 (2): 74.

TABLE 1

Foliar application of insecticides throughout growth period

	Aldrin		Dieldrin		Endrin		No treatment	Significant.
	2.5% dust	0.1% spray	1.5% dust	0.1% spray	1.0% dust	0.02% spray		
	1	2	3	4	5	6	7	8
% infestation	62.3	87.7	58.2	58.5	63.5	60.1	95.0	yes
	S. E. 6.26		C. D. 18.00		7, 2, 5, 4, 6, 1, 3			
Healthy tubers per acre	2850	1200	3900	3950	2850	3600	400	yes
	S. E. 3.89		C. D. 11.29		4, 3, 6, 1, 5, 2, 7			
Total yield/acre	7550	8100	8900	9525	8800	9025	8025	No

TABLE 2

Foliar application at the time of tuber formation

	DDT 0.1%	Lindane 0.1%	Dieldrin 0.1%	Endrin 0.1%	Folidol 0.05%	No treatment	Significant
% infestation	54.0	57.0	43.7	68.6	54.8	71.2	No
Healthy tubers/acre	3300	3150	5750	2650	3650	2300	No
Total yield/acre	7425	7325	10225	8425	8075	8000	No

TABLE

Dipping slips in insecticides before planting

	Aldrin 0.1%	Dieldrin 0.1%	DDT 0.1%	Folidol 0.025%	Endrin 0.05%	Systox 0.1%	No treatment	Significant
	1	2	3	4	5	6	7	8
% infestation	41.9	10.5	29.1	29.4	38.1	41.5	39.7	No
Healthy tubers/ac.	11100	15500	14800	14950	11750	12600	12700	Yes
	S. E. 3.86,		C. D. 11.47		5, 6, 1, 7, 4, 3, 2			
Total yield/ac.	19100	19250	20875	21150	19000	21550	21050	No

TABLE 4
Chemicals applied to the soil before planting

	Aldrin	Chlordano	DDT	Dieldrin	Endrin	Toxapheno	No Treat- ment	Significant
% infestation	19.0	26.3	25.4	22.1	35.0	26.7	52.1	No
Healthy tubers per acre	12975	13055	13200	13300	13000	14450	10700	No
Yield per acre	16025	17750	17700	17075	19100	19725	15750	No

TABLE 5
Chemicals applied once to the soil at the time of tuber formation.

	Toxapheno	Heptachlor	Chlordano	DDT	No Treat- ment	Significant
	1	2	3	4	5	
% infestation	56.0	50.0	58.9	54.7	68.5	No
Healthy tubers per acre	900	1350	575	4050	575	Yes
	S. E. 3.81 C. D. 11.74			4, 1, 2, 3, 5		
Total yield per acre	2050	2700	1500	8050	1825	Yes
	S. E. 6.7 C. D. 20.64			4, 2, 1, 5, 3		

TABLE 6
Chemicals applied twice to the soil at the time of tuber formation

	Toxapheno	Heptachlor	Chlordano	DDT	No Treat- ment	Significant
% infestation	12.0	7.8	12.5	8.5	35.8	Yes
	S. E. 2.39, C. D. 7.36			5, 3, 1, 4, 2		
Healthy tubers per acre	12000	15725	10738	17600	14450	No
Total yield per acre	13638	17050	12350	10238	10725	No

Note: In the case of the percentage of infestation the inverse sign proportion has been applied.