

Control of the Red Hairy Caterpillar, *Amsacta* spp. with Newer Insecticides

by

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Introduction: The red hairy caterpillar, *Amsacta* spp. causes heavy damage to the rainfed groundnut crop not only in its young stage but also in grown up stage by way of migration from field to field. Hence an effective method of control of the pest will help the farmers in getting higher yield from their dry lands. The results of insecticidal trials laid out for the control of the caterpillars in early as well as grown up stages revealed the superiority of the chemical, trichlorphon 0.1% spray (Kuppuswamy *et al* 1965). In the control of the young caterpillars the chemical *viz.*, sprays of parathion 0.025%, dieldrin 0.2% and carbaryl 0.1% and dusts of carbaryl 10%, carbophenothion 2%, imidan 2% and BHC 10% were found effective. But to find out the efficacy of the above chemicals along with some newer chemicals available in controlling the grown up caterpillars of more than 20 days old, three insecticidal trials were laid out during the year 1965 and the results are presented in this paper.

Materials and Methods: (a) *Insecticidal trials on the larvae:* Three randomised, replicated trials were laid out at Ponnaegoundanur in Pollachi taluk (Coimbatore district) during May, 1965 against the grown up caterpillars of *Amsacta* spp. The incidence of the pest was moderate and uniform in the field. Among the chemicals tried, the spray formulations were included in the first and second trial and the dust formulations in the third trial. The bacterial insecticide, thuricide (*Bacillus thuringiensis* Berliner) both in the form of dust and spray was also included in the trials. The net size of the plot was 6 × 5 metres with 3 metres spacing on all sides of the plots in the three trials which were replicated four times. The population of caterpillars in a square metre area at four places selected at random in each plot was recorded before and 24, 48 and 72 hours after treatment to assess the efficacy of the chemicals tried. The interspacing of 3 metres between the plots was sprayed with parathion 0.025% to prevent the migration of caterpillars to a certain extent from one plot to another in all the three trials. The spray fluid used for the trials was at the rate of 900 l/ha and the dust formulations at the rate of 28.0 kg/ha.

The variants included in the first trial were sprays of 1) malathion 0.05%, 2) parathion 0.05%, 3) trichlorphon 0.2%, 4) trichlorphon 0.1%, 5) DDVP 0.1%, 6) thuricide and 7) control (no treatment). In the second trial the chemicals tried were sprays of 1) endrin 0.04%, 2) endrin 0.02%, 3) carbaryl 0.1%, 4) BHC 0.1%, 5) dieldrin 0.2%, 6) isobenzan 0.1% and 7) control (no treatment). Under the third trial, the dust formulations tested were 1) BHC 10%,

2) imidan 2%, 3) carbophenothion 2%, 4) dieldrin 1.5%, 5) carbaryl 10%, 6) thuricide and 7) control (no treatment).

b) *Soil treatment trial with the pupae*: To study the effect of insecticide on the emerging moths of the pest, a laboratory trial was conducted during October, 1964. The trial was replicated four times by having ten pupae per replication in the pots. The chemicals tried were dusts of aldrin 5%, BHC 10%, carbaryl 10%, dieldrin 1.5% and endrin 1% with a control. The pots were sufficiently watered, surface soil raked and the chemicals applied to a depth of 5 cm at 2.26 kg of the actual ingredient per hectare. The pots were covered with cloth pieces and the observations continued daily upto 30 days from treatment to note whether the emerging moths are killed.

Results and Discussion: a) *Insecticidal trials*: The results of the three trials are given in Tables 1, 2 and 3.

i) In case of the first trial DDVP 0.1% spray was found to be significantly superior over treatments viz., parathion 0.05%, malathion 0.05% and thuricide and was on a par with sprays of trichlorphon 0.2% and 0.1% in killing the grown up caterpillars effectively. Heavy mortality of the caterpillars was noticed one hour after treatment in case of DDVP 0.1% and trichlorphon 0.2% while no mortality was observed in the other treatments. No phytotoxicity was observed in the above treatments (Table 1).

TABLE 1. *Insecticidal trial against Amsacta spp on groundnut*

Treatments (Sprays)	Initial population of caterpillars (Total in 4 replications)	Population of caterpillars after				Mean population of live caterpillars
		24 hours	48 hours	72 hours	Percentage of reduction	
Malathion 0.05%	124	61	67	51	58.87	14.92
Parathion 0.05%	109	53	47	51	53.21	12.59
Trichlorphon 0.1%	130	33	27	37	71.54	8.08
Trichlorphon 0.2%	136	29	24	31	77.94	7.00
DDVP 0.1%	124	15	21	26	79.03	5.17
Thuricide	103	89	81	83	19.42	21.08
Control	112	98	103	96	14.29	24.75

S.E.=0.904

C.D.=2.56

P=0.01

ii) The analysis of the data collected in the second trial revealed that isobenzan 0.1% spray was superior over other treatments viz., endrin 0.02%, carbaryl 0.1%, BHC 0.1% and dieldrin 0.2% and on a par with endrin 0.04% in controlling the pest. An appreciable number of dead caterpillars was noticed in the treatments isobenzan 0.1%, endrin 0.04% and 0.02% one hour after treatment. No phytotoxicity was observed in the above treatments (Table 2).

TABLE 2. Insecticidal trial against *Amsacta spp* on groundnut

Treatments (Sprays)	Initial population of caterpillars (Total in 4 replications)	Population of caterpillars after				Percentage of reduction	Mean population of live caterpillars
		24 hours	48 hours	72 hours			
Endrin 0.02%	121	56	43	54	55.37	12.75	
Endrin 0.04%	127	47	40	48	62.20	11.25	
Carbaryl 0.1%	102	59	53	56	45.09	14.00	
BHC 0.1%	95	63	60	64	32.63	15.68	
Dieldrin 0.2%	107	72	56	64	40.19	16.00	
Isobenzan 0.1%	115	41	34	38	66.96	9.42	
Control	94	86	82	91	3.09	21.58	

S.E.=0.82

C.D.=2.32

P=0.01

iii) Among the dust formulations tried in the third trial, carbaryl 10% was found to be significantly superior over all other treatments viz., carbophenothion 2%, imidan 2%, dieldrin 1.5%, BHC 10% and thuricide in controlling the pest. Carbophenothion 2% was found to be on a par following carbaryl 10% (Table 3).

TABLE 3. Insecticidal trial against *Amsacta spp* on groundnut

Treatments (Sprays)	Initial population of caterpillars (Total in 4 replications)	Population of caterpillars after				Percentage of reduction	Mean population of live caterpillars
		24 hours	48 hours	72 hours			
BHC 10%	117	83	76	83	29.05	20.17	
Imidan 2%	110	72	64	67	39.09	17.00	
Carbophenothion 2%	112	69	64	66	41.07	16.58	
Dieldrin 1.5%	117	79	73	79	32.47	17.58	
Carbaryl 10%	108	56	48	53	50.91	13.08	
Thuricide	100	91	79	85	15.00	21.26	
Control	139	128	144	125	10.07	33.08	

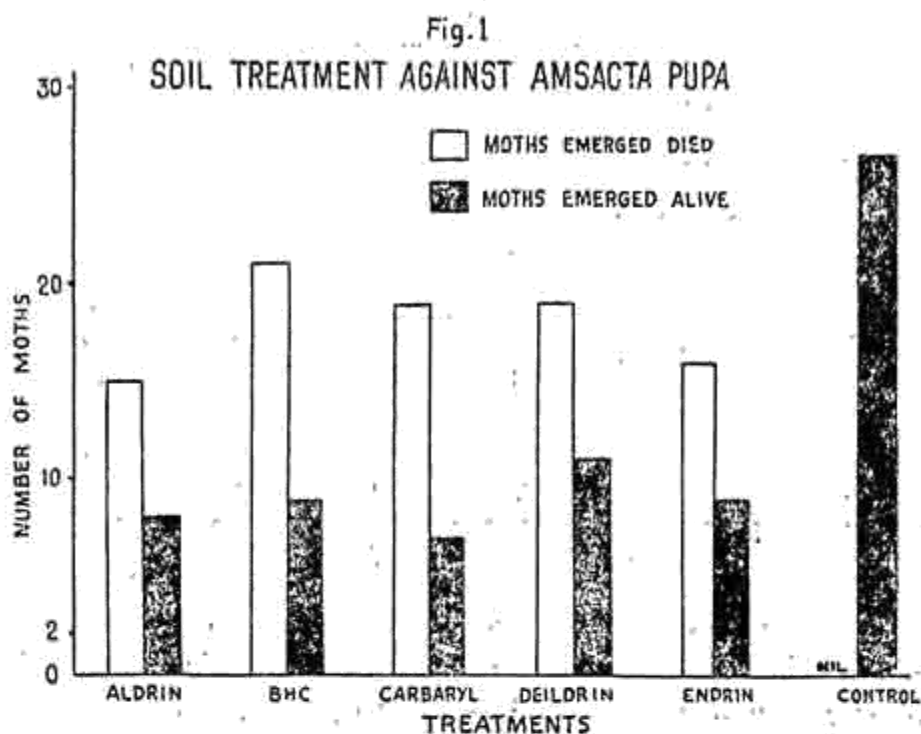
S.E.=1.303

C.D.=3.685

P=0.01

b) *Soil treatment with pupae*: It was observed that in all the treatments except control, complete mortality of the moths was noticed 12 days after treatment, the moths that emerged 14 days after treatment were found to be alive and active. They were found to copulate and lay fertilized eggs. This may be due to the depletion of the chemical effect in the soil (Figure 1).

In general, for controlling the grown up caterpillars of more than 20 days old, spraying was found to be more effective than dusting since the percentage of reduction of caterpillars was more in case of spray formulations than the dust formulations. Eventhough the cost of treatment and application



is higher in case of spray formulations, to get the best control of the pest the spray formulations has to be sought for.

The poor performance of the bacterial insecticide, *Bacillus thuringiensis* Berliner on the caterpillars both in the form of dust and spray may be due to less feeding of the leaves by the grown up caterpillars which were in the prepupal stage. Since this bacteria affect only the intestinal portion of the larvae after getting into the stomach, without feeding the treated leaves no mortality could be seen visibly.

Cost of treatments: The cost of the chemical required to spray or dust one hectare of the crop was worked out and are furnished below :

Sprays :	Rupees per hectare
1. DDVP 0.1%	96.65
2. Trichlorphon 0.2%	59.37
3. Trichlorphon 0.1%	29.68
4. Isobenzan 0.1%	105.90
5. Endrin 0.04%	32.14
6. Endrin 0.02%	16.07
7. Parathion 0.05%	36.70
8. Malathion 0.05%	10.53
9. BHC 0.1%	26.20
10. Dieldrin 0.2%	79.20
11. Carbaryl 0.1%	21.60
12. Thuricide	N. A.

Dusts :

13. Carbaryl 10%	89.28
14. Carbophenothion 2%	22.32
15. Imidan 2%	22.32
16. BHC 10%	11.90
17. Dieldrin 1.5%	34.72
18. Thuricide	N. A.

Conclusion: Sprays of DDVP (nuvan) 0.1% or trichlorphon 0.2% and 0.1% or isobenzan 0.1% or endrin 0.04% and 0.02% can be recommended for the effective control of grown up caterpillars. Since the cost of the chemicals DDVP 0.1%, isobenzan 0.1% and trichlorphon 0.2% is very high it is necessary to go in for other alternative. Considering the efficacy of the chemicals, trichlorphon 0.2% and 0.1% and endrin 0.04% and 0.02% there is no significant difference in the percentage of reduction of caterpillars between the higher and lower concentrations. Hence sprays of trichlorphon 0.1% or endrin 0.02% can be economically recommended for the effective control of the grown up caterpillars. From the results of the exploratory soil treatment trial, it can be concluded that eventhough this method of approach is a tedious one it can also be tried as one of the methods, if timely measures of control have not been taken up during the larval period of the pest.

Summary: Three trials on insecticidal effect on *Amsacta spp.* caterpillars of groundnut were conducted at Ponnaegoundanur of Pollachi tract with newer chemicals along with that already being used. The population of caterpillars was recorded before 24, 48 and 72 hours after treatment to assess the efficacy of the chemicals tried. In general, for controlling the grown up caterpillars of more than 20 days old spraying was found to be effective than dusting since the percentage of reduction of caterpillars was more in case of spray formulations than in dust treatments. The quick knock down effect was noticed in case of the treatments viz., sprays of DDVP 0.1%, trichlorphon 0.2%, isobenzan 0.1% and endrin 0.04% one hour after treatment. Considering the economics and effectiveness of the chemicals tried, it was concluded that sprays of trichlorphon 0.1% or endrin 0.02% can be recommended for the control of the grown up caterpillars.

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