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A trial on chemical control of mango leaf hoppers (*Idiocerus atkinsoni* L. and *I. clypealis* L.)

by

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Introduction : Different workers from time to time advocated different formulations of insecticides against mango leaf hoppers. An attempt was made to evaluate the efficacy of various insecticides against this pest. The authors have tried in their control experiments for two seasons (1958–'59 ; 1959–'60) four insecticides; viz., DDT 50% W. P., BHC 50% W. P., Parathion (Ekatox 20% W. P.) and Endrin 20% E. The general belief of the workers in the use of Parathion is not favourable because it being a phosphatic compound is toxic to the operators and the workers engaged in the orchards. However, this fear seems to be baseless as the concentrations used are very light. What is required is a little care while spraying. It was successfully sprayed on the orchards without any adverse effects on the persons concerned. The purpose of using Endrin for jassids was simply to assess its efficacy as it is usually considered to be a good insecticide for controlling immature stages of insects. BHC also was tried for comparing its efficacy with the other insecticides mentioned in the above para.

Review of Literature : For the control of mango hoppers various insecticides have been advocated from time to time. Ballard (1915) used crude oil emulsion for jassids. Hussian and Pruthi (1921) recommended rosins and crude oil emulsions. Fletcher (1914) and Clouston (1928) successfully applied fish oil rosin soaps against mango leaf hoppers. Subramaniam (1932), Basin (1926) and Rahman (1939) used kerosene oil emulsion and rosin wash. Ramachandran (1924) recommended fish oil rosin soap at the strength of one pound to 10 gallons of water as the best insecticide to tackle the nymphs.

Subramaniam *(loc. cit.)* reported that Hongay *(Pongamia glabra)* oil rosin soap was as effective as fish oil rosin soap. A 0.066% suspension of powdered roots of *Derris elliptica* was found to give 80% mortality by Bhatta and Narayanan (1958).

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In Philippines, nicotine sulphate (40%) diluted at the rate of 1:500 was initially recommended (Merinio, 1929), but later, Palo and Garcia (1935) found that 0.38% solution mixed with 0.12% nicotine sulphate was very effective against mango hoppers.

Kunhikannan (1929) found that Pyrethrum dust either alone or mixed with Calcium cyanide had also given good results. Later on sulphur dust though recognised to be a weak insecticide, attained considerable popularity for mango hopper control. It was found to be effective by Wagle (1930) and Subramaniam (1932). Uppal and Wagle (1944) found sulphur dusting to be most effective in controlling mango hoppers in Konkan.

Sen and Prasad (1954) of Bihar tried DDT and other new orgnic insecticides like Chlordane, Dieldrin, Aldrin, Folidol E 605 and Pyrethrum. DDT (0.125%) proved to be the most effective insecticide in the control of mango hoppers. De and Dutta (1955) have tried a systemic insecticide octamethylpyro-phosphoramide (Schradan) (trade name Pestox III) for controlling the *Idiocerus atkinsoni* Letta. A concentration of 0.4% was found to be the most effective.

Methods : The experiments for the control of mango hoppers were undertaken in the mango orchards of the Horticultural Section on the College Farm and were continued for two years viz., 1958–'59 and 1959–'60. It was started in a compact area of about 3/4 acres. The infestation was found to be uniformly high in both the years. In all twenty trees of uniform height in full blossom stage were selected and the area was divided into five blocks. Counting was taken on ten branches from each tree (the branches were numbered for this purpose) at random before spraying. The insecticides used were DDT. 0.156% (W. P.), BHC. 0.15% (W. P.), Endrin 0.041% and Parathion 0·0087% (W. P.). There were four treatments and one control with four replications. The spraying operations were carried from 10 A. M. to 4 P. M.

The efficacy of these insecticides was judged by taking counts immediately within 48 hours and the data statistically analysed which showed the reduction in populations of hoppers subsequently to various degrees. The counting of hoppers was undertaken from 8 A. M. to 10 A. M. during which the largest number of hoppers were found seated on trees. On an average $7\frac{1}{2}$ gallons of spray was required for spraying a single tree of average height by sparton power sprayer.

Data and Discussion : The authors have observed two species of mango hoppers i. e., *Idiocerus atkinsoni* L, and *I. clypealis* L. on the Agricultural College Farm, Osmania University. The percentage of mortality was calculated and presented in Tables 1 and 3 for the two seasons respectively. Then the values were transformed into degrees for statistical analysis as given in Tables 2 and 4

TABLE 1.

Percent mortality of *Idiocerus spp.* after treatment with different insecticides, *(15—1—1959 to 8—2—1959)*.

S. No.	Treatments	Replications			
		I	II	II	IV
1.	DDT. 0·156%	83·33	88·79	96·30	90·00
2.	BHC. 0·156%	21·81	33·93	31·43	11·25
3.	Parathion 0·00876%	92·85	98·33	100·00	97·56
4.	Endrin 0·041%	66·66	88·88	100·00	94·97
5.	Control	17·24	12·50	...	...

TABLE 2.

Transformed values from Table 1. (in degrees) for statistical interpretation.

S. No.	Treatments	Replications				Total	Means
		I	II	III	IV		
1.	DDT. 0·156%	65·6	70·6	78·5	71·6	286·3	71·57
2.	BHC. 0·156%	28·0	35·7	33·8	19·4	116·9	29·22
3.	Parathion 0·00876%	74·7	81·9	90·0	81·9	328·5	82·12
4.	Endrin 0·041%	54·9	70·6	90·0	77·1	292·6	73·15
5.	Control	24·4	20·3	...	...	44·7	11·17
	Total	247·6	279·1	292·3	250·0	1069·0	...

F Test Table value at 1% level is 5·41 and at 5% level 3·26 with calculated value as 38·5.

As the calculated value is much greater than the table value the treatment differences are highly significant.

As the difference between the means in case of DDT, Parathion and Endrin is less than 15·36, so all the three insecticides are superior to BHC. and control.

The data for the next season are given as below :

TABLE 3.

Percent mortality of *Idiocerus spp.* after treatment with different insecticides *(8—1—1960 to 3—2—1960)*.

S. No.	Treatments	Replications			
		I	II	III	IV
1.	DDT. 0·156%	100	84·90	98·00	80·23
2.	BHC. 0·156%	44·60	18·64	...	32·14
3.	Parathion 0·00876%	91·14	91·66	90·00	91·30
4.	Endrin 0·041%	88·48	86·85	88·88	83;60
5.	Control	18·18	4·71	11·11	15·73

TABLE 4.

Transformed values from Table 3 (in degrees) for statistical interpretation.

S. No.	Treatment	Replications				Total	Mean
		I	II	III	IV		
1.	DDT. 0·156%	90·0	67·2	81·9	63·4	302·5	73·63
2.	BHC. 0·156%	41·1	25·8	...	34·4	102·3	25·58
3.	Parathion 0·00876%	72·5	73·6	71·6	72·5	290·2	72·55
4.	Endrin 0·041%	69·7	68·9	70·6	66·4	275·6	68·90
5.	Control	25·1	12·9	19·4	23·6	81·0	20·25
	Total	299·4	284·4	243·5	260·3	1051·6	...

So the F test value at 5% level is 3·49 with calculated value as 30·01.

As the calculated value is much greater than the table value the treatment differences are highly significant.

The mean mortality was 82·12 for Parathion during the 1st trials in January, February 1959 (Table 2). The same value is slightly lesser i. e., 72·55 during the next season i. e., January,

February 1960 (Table 4). So Parathion appears to be the best insecticide for the control of mango leaf hoppers on the basis of the average mean figure from two seasons which comes to 77·33. This insecticide is hazardous to use, particularly if used carelessly. However, the cultivators or the orchardists can use it safely if trained properly.

DDT may be regarded less toxic than Parathion in its effect on mango leaf-hoppers as per the average mean figure obtained for this insecticide for the two seasons which comes to 73.55. The means for each season were 71.57 and 75.63 respectively. It may, however, be pointed out that the mean mortality obtained for DDT in the second season was 75.63% compared with 72.55% for Parathion. In other words, DDT can be better than the Parathion in its effectiveness or on par with it. Therefore, further trials are necessary in order to prove the relative efficacy of these two insecticides. Endrin proved to be next to DDT and Parathion in its toxicity to the mango leaf hoppers on the basis of the data obtained. The average mean for Endrin for the two seasons works out to be 71.02%. However, in the 1st season the figure is slightly higher than the same for DDT. Therefore, Endrin can be regarded as one of the effective insecticides in the control of mango leaf hoppers. BHC proved to be the poorest of all the four insecticides tried in the present study. The average mean mortality (Table 2 and 4) obtained for it for the two seasons was 27.48%. Therefore, it cannot be regarded as one of the effective insecticides against mango leaf hoppers.

The control figures for mortality for the two seasons were 11.17 and 20.25 respectively.

As the difference between means in case of DDT, Parathion and Endrin is less than 15.38, so all the three insecticides are superior to BHC and control.

Summary : On the basis of trials made against the mango leaf hoppers for two seasons it was found out that DDT, Parathion and Endrin are more or less similar in toxicity, giving effective control. BHC proved to be quite ineffective.

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