

## Investigation on Dipel-Organic Insecticide Combinations Against Insect Pests of Brinjal

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### ABSTRACT

Field efficacy of *Bacillus thuringiensis* (Dipel WP) and Dipel in combination with sub-lethal doses of quinalphos, carbaryl, endosulfan and DDT and lethal doses of these insecticides was investigated against the insect pests of brinjal. Among the various combinations, sub-lethal dose of Carbaryl + Dipel was found to be quite promising against most of the insects studied giving maximum fruit yield.

### INTRODUCTION

The enhancement of the action of *Bacillus thuringiensis* by mixing organic pesticides like DDT has been reported by Stokes *et al.* (1962). Godavaribai *et al.* (1962) suggested that such mixtures could be useful for control of several insect species simultaneously. But insecticide dosages must not be so high that the 'no chemical residue' advantage of the pathogen may be nullified (Hall, 1963). Pristavko (1967) indicated that the use of mixtures may be promising if it leads to higher efficiency with reduced dosages. Based on the above indications work was initiated to study the field efficacy of Dipel + sublethal doses of certain well known organic insecticides against the insect pests of brinjal.

### MATERIALS AND METHODS

Field trial was conducted during 1975-76 with the brinjal variety *Anna-*

*malai*. The various treatments included were DDT 0.1, endosulfan 0.03, carbaryl 0.1, quinalphos 0.05 per cent and *B. thuringiensis* (Dipel) WP 1 lb/acre; combinations of sub-lethal doses of insecticides and Dipel like DDT 0.08 + Dipel, carbaryl 0.08 + Dipel, quinalphos 0.04 + Dipel and endosulfan 0.02 + Dipel and alternate day sprayings with the above lethal doses of insecticides and Dipel. The crop received its first round of sprays 15 days after transplanting and subsequent six sprays were given at ten days interval. Weekly observations were recorded on jassids, spotted beetles and leaf rollers on five randomly selected plants in each plot. Observations on the fruit borer were recorded both on shoots and fruits. Finally the yield of fruits was recorded.

### RESULTS AND DISCUSSION

All treatments were significantly superior over control in respect to

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TABLE. Effect of various treatments on the population of various insects and yield of brinjal

Treatments	Jassid <sup>1</sup>		Spotted beetle <sup>1</sup>		Leaf roller <sup>1</sup>	Borer			
	Nymphs	Adults	Grubs	Adults		In shoots <sup>2</sup>	In fruits	No. of fruits per plant	Yield kg/plot
DDT	7.5	1.3	7.4	5.73	1.6	5.2	40.0	18.9	0.96
DDT+Dip	7.8	1.2	7.7	5.6	1.6	5.7	37.7	21.5	1.09
DDT, Dip (alt)	7.4	1.2	7.3	5.5	1.6	5.4	41.9	20.6	1.03
Endo.ulfan	6.6	0.8	5.9	5.2	1.3	2.7	34.4	24.7	1.35
Endo.ulfan+Dip	6.9	0.7	6.2	5.4	1.3	4.0	35.5	29.4	1.58
“ +Dip (alt)	6.6	0.6	5.5	4.9	1.2	4.8	37.0	23.5	1.23
Carbaryl	6.0	0.5	5.4	3.6	1.2	3.1	29.6	25.8	1.47
“ +Dip	5.9	0.5	5.1	3.2	1.1	2.9	28.9	27.7	1.51
“ +Dip (alt)	5.8	0.5	5.3	3.5	1.3	3.4	36.8	23.7	1.22
Quinalphos	6.3	0.6	5.7	3.9	1.3	3.0	32.6	23.7	1.26
“ +Dip	6.5	0.6	5.9	4.1	1.3	3.5	36.5	22.5	1.19
“ +Dip (alt)	6.0	0.6	5.5	3.6	1.2	3.2	31.4	27.5	1.44
Dipel	7.9	1.5	7.4	7.1	1.7	7.2	37.9	20.5	1.03
Control	9.9	2.0	12.0	10.7	2.3	9.5	60.1	15.6	0.75
C. D. at 0.05%	0.4	0.1	0.2	0.2	0.1	0.6	1.9	3.8	0.03

Dip=DIPEL WP; (alt.)=Sprayed on alternate days;

1. Mean of 7 weekly observations

2. Mean of 4 weekly observations

each insect studied (Table). In the case of jassids, the carbaryl - Dipel combination which was sprayed on alternate days showed the minimum number of adults and nymphs. However statistically it was on par with carbaryl + Dipel combination and carbaryl pure spray. It is also evident that Dipel alone could not effectively control the jassids in comparison with other pure insecticidal treatments with the possible exception of DDT. It is also clear that in the case of quinalphos, endosulfan and DDT, there was no significant difference between their pure form of sprays and their combi-

nation treatments with Dipel. A similar trend of results could also be seen with spotted beetles and leaf rollers where minimum population was seen in plots receiving carbaryl + Dipel combination sprays. A similar enhanced action by carbaryl + *Bacillus* preparations has been indicated by Pristovko (1967) against European corn borer. Chen *et al.* (1974) have similarly reported a kind of synergic effect of carbaryl when combined with Bio-trol X K against tobacco bud worm.

Special attention was envisaged on the efficacy of combination sprays

against the lepidopteran *Leucinodes orbonalis*. All the treatments were superior to control in controlling this pest both in the shoot and fruits (Table). Among the various treatments, endosulfan pure spray and carbaryl + Dipel were on par in showing maximum efficacy. In contrast to *Leucinodes* in shoots, there seems to be a clear cut differentiation among various treatments in fruits. The minimum level of mean infestation of 28.9 could be seen in carbaryl + Dipel combination spray closely followed by carbaryl spray. The rest of the treatments were statistically inferior to the above.

Maximum number and weight of fruits were obtained in endosulfan + Dipel combination which were statistically on par with the yields obtained in carbaryl + Dipel plots. However the numerical superiority in fruit yield in the case of endosulfan + Dipel may not possibly be explained with the present data. Thus it appears that the combination of sub-lethal

dose of carbaryl + Dipel could be more effective in the overall control of different insect pests in brinjal to yield more.

## REFERENCES

- CHEN, K. S., B. R. FUNKE, J. T. SCHULZ, R. B. CARLSON and PROSHOLD. 1974. Effect of certain organophosphate and carbamate insecticides on *Bacillus thuringiensis*. *J. econ. Ent.* 67: 471-73.
- GODAVARIBAI, S., K. KRISHNAMOORTHY and S. K. MAJUMDER. 1962. Bacterial spores with malathion for controlling *Ephestia cautella*. *Pest Technol.* 4: 155-58.
- HALL, I. M. 1963. Microbial Control. In *Insect Pathology - an advanced treatise*. Vol. 2 (E. A. Steinhaus ed). Academic Press, New York, London.
- PRISTAVKO, W. P. 1967. On the use of *Bacillus thuringiensis* insecticides combination to control insect pests. In *Insect Pathology and Microbial control*. (P. A. Vans der laan ed). North-Holland Publishing Company, Amsterdam.