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## Determination of Effective and Economic Dose of Two Carbamate Insecticides Against Cotton Whitefly *Bemisia tabaci* (Genn.) on Niab Karisham Cotton at Faisalabad (Pakistan)

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**Abstract:** Comparative efficacy of 3 different doses of two carbonates viz., Lannate 40SP (methomyl) at 400, 500 and 600 gm/acre and Larvin 80 DF (thiodicarb) at 200, 300 and 400 gm/acre was sorted out against cotton whitefly *Bemisia tabaci* (Genn) on NIAB. Karishma cotton at Faisalabad. All the doses of both insecticides failed to keep the population of the pest below economic threshold level (4-5/leaf). Population of the whitefly after 3 sprays due to different doses of Lannate 40SP and Larrin 80F was 6.77, 6.04, 4.98 and 7.87 and 7.87, 8.13, 6.07 per leaf respectively as compared with control (10.51 per leaf). Lannate 40SP provided better control of whitefly, maximum population decrease was observed due to highest dose (600 gm/acre). However, population reduction due to both of the insecticides did not differ significantly.

**Key words:** Cotton, *Bemisia tabaci*, carbamates doses

### Introduction

Cotton whitefly *Bemisia tabaci* (Genn.) has gained the status of serious pest. Beside cotton it has been recorded feeding upon about 540 plant species over the world (Yousuf, 1995). The direct damage to cotton crop includes the sucking of cell sap, secretion of honey dew upon which sooty mould grows which lowers the photosynthetic activity of the crop and indirectly by transmitting Gemini virus also, known as cotton leaf curl virus (CLCuV) (Hashmi *et al.*, 1993). Due to continuous use of various insecticides with different insecticidal chemistry it has developed resistance to commonly used insecticides and needs over dosage (Ahmad, 1999, Yousuf, 1996, Mallah and Attique, 1995). Keeping in view present research was planned for determining the effective and economic dose of two carbamate insecticides viz; Lannate 40 SP (methomyl) and Larvin 80 DF (thiodicarb). Various research workers of the world in other geographical regions like Sudan (Gameel, 1974) and India (Borle *et al.*, 1980; Sidhu and Dhawan, 1981) have tested various carbamic insecticides on sucking insect pests of cotton and found them effective than insecticides of the other groups. Most of the workers from Pakistan have investigated the efficacy of insecticides other than cabamates. (Ahmad, 1996, Ahmad *et al.*, 1995). Their results revealed methamidophos with emulsifier Neem oil and IGRs (at higher dose rate) proved to be effective than other insecticides under trial.

### Materials and Methods

The trial for present research investigations were laid-out at the Ayub Agricultural Research Institute, Faisalabad, following randomized complete block design. Three doses of each insecticide Lannate 40 SP (methomyl, 400, 500, 600 gm/acre) and Larvin 80 DF (thiodicarb, 200, 300, 400 gm/acre) including control were the treatments. The experiment was repeated thrice. The plot size for individual treatment was 30 × 12.5 ft. The spray materials were prepared on weight/vol. basis and sprayed over to the NIAB-Karishma cotton by means of solo-knapsack sprayer in 3 installments at fortnight interval starting from early

August, 1997.

The data regarding the whitefly population was recorded 24, 48, 72 and 168 hours after spray. For this purpose, 9 plants were selected at random from each treatment. Population density was recorded on per leaf basis, observing upper leaf of the first plant, middle leaf of the second plant, lower leaf of third plant and so on. The data were presented in form of mean values for each treatment. The significance of the difference in the mean population of pest was however sorted out through Duncan's Multiple Range Test after analysis of variance (Steel and Torrie, 1980). The comparative effectiveness of different doses of insecticides under trial was considered to be an indirect reflection on their population.

### Results and Discussion

Data regarding the whitefly population after 3 sprays of different doses of Lannate and Larvin is presented through Fig. 1. From the figure it is clear that different doses of insecticides were significantly different in their killing potential. Lannate at 600 gm/acre and Larvin at 400 gm/acre gave maximum control of the pest under trial. All the doses provided less than 50% control when compared with untreated check. Mean population of cotton whitefly (24, 48, 72 and 168 hours after treatment) for individual 3 sprays has been displayed through Table 1. From the table it is clear that no general trend was found towards killing potential of different doses of insecticides. However, after second spray all the doses except control were found to be statistically at par.

These results do not agree with other workers like Gameel (1974), Borle *et al.* (1980), Siddhu and Dhawan (1981) as their studies proved carbamates effective in reducing population of sucking insect pests than insecticides of other groups. It is also interesting to note that all the doses of insecticides have been failed to keep population below economic threshold level (4-5 nymphs/leaf) (Ahmad, 1999). This might be due to the development of insecticidal resistance in whitefly. As high levels of resistance have been reported to 2 organophosphate insecticides, moderate

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Table 1: The multiple comparison of the mean values for the population of cotton whitefly under different treatments, after individual spray

Treatments	Insecticides	Dose (gm/acre)	Mean population spray		
			Spray		
			1st	2nd	3rd
T0	Control	000	10.42a	10.95a	10.16a
T1	Lannate 40SP	400	6.28bc	7.17b	6.86abc
T2	Lannate 40SP	500	6.32bc	6.19b	5.63abc
T3	Lannate 40SP	600	5.23c	5.08b	4.63c
T4	Larvin 80DF	200	6.74bc	7.33b	9.54a
T5	Larvin 80DF	300	7.98b	7.32	9.10ab
T6	Larvin 80DF	400	6.01bc	5.42b	6.79abc

(Significant at 1 % level)

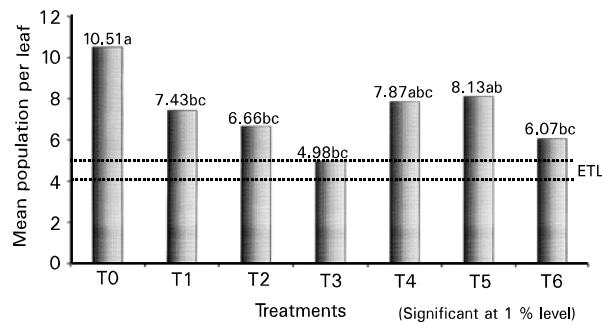


Fig. 1: Mean population (per leaf) of cotton whitefly after application of 3 sprays on NIAB Karishma cotton

resistance levels to 3 pyrethroids and low levels to cyhalothrin and fenprothrin). But no resistance was reported to endosulfan and profenophos (Ahmad, 1999). No carbamic insecticides were included in resistance studies. The failure to keep the population even less than 50% may be due to the resistance to carbamates. These studies strongly support the suggestions of Yousuf, (1996), to use carbamates in combination with other insecticides or chemicals with new pesticidal chemistry, to control cotton whitefly.

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