

# EFFICACY OF SOME NEW-CHEMISTRY INSECTICIDES FOR CONTROLLING THE SUCKING INSECT PESTS AND MITES ON COTTON

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## ABSTRACT

The efficacy of some new – chemistry insecticides for controlling the sucking insect pests of cotton; jassid, whitefly and thrips and mites was determined. Four insecticides, viz., Novastar 56 EC (bifenthrin + abamectin)@ 500 ml /acre, Deltaphos (deltamethrin + triazophos)@ 600 ml / acre, Confidor 20 SL + Tracer @ 250 + 100 ml /acre and Confidor 20 SL @ 250 ml / acre were sprayed twice at fortnightly intervals in order to ascertain the mortality of the pests on NIAB – 111 variety of cotton sown in 2004 at the Nuclear Institute of Agriculture and Biology, Faisalabad. Against the highest populations of 11.20 jassids, 6.33 whiteflies, 8.37 thrips and 10.64 mites per leaf in the untreated check plots, the lowest populations of 2.54 jassids, 1.79 whiteflies, 4.16 thrips and 7.00 mites per leaf after application of insecticides were shown by Novastar, which was non-significantly different from Confidor. Thus, these two insecticides proved highly effective for the control of sucking insects and mites on cotton.

## INTRODUCTION

Cotton (*Gossypium hirsutum*), popularly known as silver fibre, is the mainstay and backbone of our country. It has multiple uses and contributes up to 63.3 per cent to our foreign exchange earnings (Anonymous, 2003-04). The area under this crop has slightly increased from 2983 million hectares in 1999 – 2000 to 2989 million hectares in 2003 – 2004, but the per acre yield has decreased from 641 kg in the former year to 571 kg in the latter year (Anonymous, 2003 – 2004) This yield is still very low when compared with other cotton growing countries of the world. The low cotton yield has been attributed to many factors, among which insects and mites are the major ones.

As many as 93 insects and mites have been reported to attack the crop in Pakistan (Yunus and Yousuf, 1979) These pests on an average cause 5 – 10 per cent damage to this crop every year. In case of serious attack, however, 30 – 40 per cent of the crop is lost and even total loss may occur in some cases (Huque, 1972)

Of the above pests attacking cotton crop in Pakistan, the sucking insects like whitefly, jassid and thrips and mites are of considerable importance. Their attacks start from the beginning of the crop and continue till its maturity. They play havoc every year by desaping the leaves and reducing the crop vitality, which results in less number of flowers and bolls and reduced yield. About 40 – 50 per cent of the crop is damaged only due to the attacks of sucking insects (Naqvi, 1976). In certain years, their heavy outbreaks due to favourable weather conditions result in total destruction of the crop in parts of the country (Yunus *et al.*, 1980).

The tetranychid mites alone could cause a loss of 21 per cent in cotton yield (Schwartz, 1985). In case of severe mite infestation, the losses could go as high as 35 per cent (Smith Meyer, 1981).

These insects have been mostly controlled with conventional insecticides including either one or only a component of the new – chemistry combination insecticides by Atique and Rashid (1983), Ahmad and Baig (1987), Ahmed and Hasan (1993), Tufail *et al.* (1995), Attique and Ghaffar (1996), Hamed *et al.* (1997), Naimatullah *et al.* (1998), Saleem and Khan (2001), Saleem *et al.* (2001) and Aslam *et al.* (2003) in Pakistan. In the present study, some important new – chemistry insecticides have been used to test their efficacy against the sucking insects of cotton like jassid (*Amrasca biguttula biguttula*), Whitefly (*Bemisia tabaci*) and Thrips (*Thrips tabaci* and *Scirtothrips dorsalis*) and mites (*Tetranychus telarius* and *T. gossypii*).

## MATERIALS AND METHODS

The trial was conducted in the experimental area of the Nuclear Institute of Agriculture and Biology (NIAB), Faisalabad, during the year 2004 on cotton variety NIAB-111 sown in May with a row to row distance of 2.5 ft. All standard agronomic practices were followed. The experiment was laid out in Randomized Complete Block Design (RCBD) with four replications, which were separated from each other by a distance of 6.0 ft. The total experimental area was 130 x 75 ft. with a plot size of 25 x 10 ft. The treatments were separated by a distance of 5.0 ft. The following five treatments including an untreated check were given to the crop.

<b>Treatment</b>	<b>Dose(ml/acre)</b>
Novastar 56 EC (bifenthrin+abamectin)	500
Deltaphos (deltamethrin + triazophos)	600
Confidor 20 SL+ Tracer	250 + 100
Confidor 20 SL	250
Untreated check	-----

The insecticides were sprayed twice on the crop with the help of a knapsack hand - sprayer having a hollow - cone nozzle at fortnightly intervals starting from the time when the population of sucking insects and mites reached the economic threshold level.

The data regarding the adult population of whitefly, jassid, thrips and mites were recorded from each plot 48 and 72 hours and 7 days after each spray from 5 plants taken at random. For this purpose, an upper leaf was taken from the first plant, a middle from the second plant and a lower from the third plant, and so on.

The data obtained were tested by the analysis of variance technique. When a significant F-ratio was obtained from treatment effects, Duncan's Multiple Range Test at 5 per cent probability was applied to the treatment means (Steel and Torrie, 1960).

**RESULTS**

Out of different insecticides applied in order to see their efficacy against the sucking insects and mites of cotton, the lowest population of 2.54 jassids per leaf (Table 1) was shown by Novastar, which was statistically not different from Confidor having a population of 2.75 jassids per leaf. The maximum population of 11.20 jassids per leaf was found in the untreated check.

Table 2 reveals that after application of insecticides, the lowest population of 1.79 whiteflies per leaf was given by Confidor, which was on the same level of significance as

Novastar. Here again the highest population of 6.33 whiteflies per leaf was seen in the check, which was significantly different from all other treatments.

As shown by Table 3, the lowest population of 4.16 thrips per leaf was found in Novastar, which was significantly not different from Confidor having a population of 4.99 thrips per leaf. The highest population of 8.37 thrips per leaf was revealed by the untreated plots.

The perusal of Table 4 shows that the lowest population of 7.00 mites per leaf was recorded in the Novastar and Confidor treated plots, but they were significantly not different from the remaining treatments except the check, which had the highest population of 10.64 mites per leaf.

**DISCUSSION**

Out of different insecticides applied twice in order to see their efficacy against the sucking insect pests and mites of cotton at different time intervals, Novastar 56 EC (bifenthrin + abamectin) @ 500 ml /acre proved to be the most effective as it reduced the maximum population of jassid, whitefly and thrips. These findings are in complete conformity with those of Tufail *et al.* (1995), Naimatullah *et al.* (1998) and Saleem and Khan (2001), who reported good control of sucking insects with this insecticide. Confidor 20 SL (imidacloprid) @ 250 ml/acre was almost equally effective against the sucking insects like jassid, whitefly and thrips. These results agree with those of Mullins and Christie (1995), Tufail *et al.* (1995), Attique and Ghaffar (1996), Hamed *et al.* (1997), Saleem and Khan (2001) and Saleem *et al.* (2001), who found this insecticide very effective against the sucking insects of cotton. These two insecticides were equally and fairly effective against the mites, but no relevant literature is available for comparison.

**Table 1: Population ( mean ) of cotton jassid , *Amrasca biguttula biguttula* , on NIAB - III Cotton after application of insecticides in Faisalabad**

Treatment	48 Hrs	72 Hrs	7 Days	Total	Mean
Novastar	1.75	2.05	3.80	7.62	2.54 <sup>d</sup>
Deltaphos	3.80	5.87	5.97	15.64	5.21 <sup>b</sup>
Confidor+Tracer	2.65	5.55	5.50	13.70	4.56 <sup>bc</sup>
Confidor	2.35	2.10	3.82	8.27	2.75 <sup>cd</sup>
Check	11.95	10.90	10.77	33.62	11.20 <sup>a</sup>

**Table 2: Population ( mean ) of cotton whitefly , *Bemisia tabaci* , on NIAB - III Cotton after application of insecticides in Faisalabad**

Treatment	48 Hrs	72 Hrs	7 Days	Total	Mean
Novastar	1.77	2.52	2.0	6.29	2.09 <sup>bc</sup>
Deltaphos	1.67	3.20	3.07	7.94	2.64 <sup>b</sup>
Confidor+Tracer	1.82	3.38	3.22	8.42	2.80 <sup>b</sup>
Confidor	1.45	2.07	1.85	5.37	1.79 <sup>c</sup>
Check	6.27	6.77	5.95	18.99	6.33 <sup>a</sup>

**Table 3: Population ( mean ) of cotton Thrips , *Thrips tabaci* and *Scirtothrips dorsalis*, on NIAB - III Cotton after application of insecticides in Faisalabad**

Treatment	48 Hrs	72 Hrs	7 Days	Total	Mean
Novastar	3.37	3.77	5.35	12.49	4.16 <sup>c</sup>
Deltaphos	6.05	6.30	7.35	19.70	6.56 <sup>ab</sup>
Confidor+Tracer	5.47	6.12	7.17	18.76	6.25 <sup>b</sup>
Confidor	3.50	5.92	5.55	14.97	4.99 <sup>bc</sup>
Check	9.17	6.18	9.77	25.12	8.37 <sup>a</sup>

**Table 4: Population ( mean ) of cotton Mites *Tetranychus talarius* and *t. gossypii* on NIAB - III Cotton after application of insecticides in Faisalabad**

Treatment	48 Hrs	72 Hrs	7 Days	Total	Mean
Novastar	6.92	6.60	7.50	21.02	7.00 <sup>b</sup>
Deltaphos	8.50	8.05	8.22	24.77	8.25 <sup>b</sup>
Confidor+Tracer	7.72	7.80	9.42	24.95	8.31 <sup>b</sup>
Confidor	5.92	7.22	7.87	24.01	7.00 <sup>b</sup>
Check	10.67	10.87	10.40	31.94	10.64 <sup>a</sup>

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