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## Effect of different insecticides against aphids, *Aphis gossypii* and whiteflies, *Bemisia tabaci*

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### Abstract

Investigation on different insecticides against sucking pests of cotton like, aphids and whiteflies were carried out during 2016-17 in farmer field Kommanalu village, Shivamogga. The result revealed that, aphids population was recorded least in dinotefuron 20 SG @ 0.3g/ l (8.69 aphids/ 3 leaves), imidacloprid 17.8 SL @ 0.25 ml/ l (6.99 aphids/ 3 leaves) imidacloprid 70 WG @ 0.25g/ l (2.96 aphids / 3 leaves) and dinotefuron 20 SG @ 0.3g/ l (2.21 aphids/ 3 leaves) were most effective treatments in reducing incidence of aphids on *Bt* cotton as compared to other chemicals. However, the lowest population of whiteflies was recorded least in imidachloprid 17.8 SL @ 0.25 ml/ l (5.71 whiteflies / 3 leaves), thiamethoxam 25 WG @ 0.25g/ l (3.88 whiteflies /3leaves) and imidachloprid 17.8 SL @ 0.25 ml/ l (1.88 whiteflies / 3 leaves). Were effective chemical against cotton whiteflies.

**Keywords:** Aphids, whiteflies, imidachloprid, thiamethoxam, *Bt* cotton

### Introduction

Insects have been dominating as the most successful forms of life on earth surviving extremes of climatic conditions and have challenged man's effort to eradicate them. Insects have great balancing role in the life process of earth and excel all other animals in both diversity and magnitude. Man's desire to shift nature's balance towards his survival has led to efforts, in which pest management is very important. However changes in seasonal dynamics, abundance, diversity and insecticide resistance are invited problems. In India, as many as 162 species of insect-pests are known to attack cotton from sowing to maturity which cause up to 50-60% loss (Agarwal *et al.*, 1984) [1]. Cotton pests can be primarily divided into bollworms and sucking pests. Such phenomenon has been well associated with cotton (*Gossypium* spp.). Existing species associations among insect pests seem to avoid competition among them as well as to match with the phenology of cotton growth. Sucking pests *viz.*, aphids (*Aphis gossypii* Glover), leaf hopper (*Amrasca biguttula biguttula* Ishida), whiteflies (*Bemisia tabaci* Gennadius) and thrips, (*Thrips tabaci* Lindeman) are deleterious to the cotton crop growth and development (Vennila *et al.*, 2000) [5]. The estimated loss due to sucking pest's complex was up to 21.20 per cent (Dhawan *et al.*, 1988) [3]. Now-a-days, numbers of new molecules are introduced in the market and those are not only effective but also cost effective and less toxic to the existing natural enemies of the pests. Therefore, the present investigation was conducted to evaluate the efficacy of different insecticides against sucking insect pests infesting *Bt* cotton

### Material and Methods

This study was carried out at Farmer field, Kommanalu Village, Shivamogga, during *Kharif* 2016 with plot size of 3m x 5m of 300 m<sup>2</sup> areas. The *Bt* hybrid MRC-7918 was sown with a spacing of 90 cm X 60 cm and maintained as per package of practices (spacing, fertilizers, weeding, *etc.*) except plant protection measures. The treatments were imposed when the pest population *viz.*, whiteflies (5-10 whiteflies/ leaf) and aphids 10 per cent affected plant counted randomly crossed ETL and insecticidal spray was taken up. The observations were made on the top, middle and bottom of leaves on 5 randomly selected plants from each plot. The population of the insect pest was recorded at 1 day before and 1, 3, and 7 day after spraying insecticides. The statistical analysis of the data was done using analysis of variance (ANOVA) using Web Agri Stat Package (WASP-2) developed by Indian Council of Agricultural Research, Research Complex, and Goa.

### Results

The result on the efficacy of different insecticides against aphids and whiteflies after first spray was furnished here in the Table 1. The population of aphids was recorded after spraying the

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insecticides showed significant difference across the treatments although there was no significant difference among the treatments prior to spraying. The lowest population of aphids was recorded after one, three and seven day after treatment when the crop sprayed with imidacloprid 17.8 SL @ 0.25 ml/ l (6.99 aphids/ 3 leaves), imidacloprid 70 WG @ 0.25g/ l (2.96 aphids / 3 leaves) and dinotefuron 20 SG @ 0.3g/ l (2.21 aphids/ 3 leaves) respectively Table.1. Whereas untreated check recording found to be least effective by

registering a highest population of (17.88 aphids/ 3 leaves). Likewise, the lowest population of whiteflies was recorded after one, three and seven day after treatment when crop sprayed with imidachloprid 17.8 SL @ 0.25 ml/ l (5.71 whiteflies / 3 leaves), thiamethoxam 25 WG @ 0.25g/ l (3.88 whiteflies /3leaves) and imidachloprid 17.8 SL @ 0.25 ml/ l (1.88 whiteflies/3leaves) Whereas, significantly higher population (14.92 whiteflies/ 3 leaves) was recorded in untreated check. Table.1

**Table 1:** Effect of different insecticides against aphids, *Aphis gossypii* and whiteflies, *Bemisia tabaci*

Treatments	Dosage	No. of <i>Aphis gossypii</i> / 3 leaves				Post Treatment mean	No. of <i>Bemisia tabaci</i> / 3 leaves				Post Treatment mean	Yield (q/ha)
		1 DBS	1 DAS	3 DAS	7 DAS		1 DBS	1 DAS	3 DAS	7 DAS		
Dinotefuron 20 SG	0.3 g/l	16.21 (4.07)	7.73 (2.87) <sup>b</sup>	4.75 (2.28) <sup>bc</sup>	2.21 (1.64) <sup>c</sup>	7.73 (3.08) <sup>b</sup>	12.15 (3.54)	8.10 (2.93) <sup>b</sup>	7.34 (2.70) <sup>b</sup>	6.60 (1.60) <sup>b</sup>	8.54 (2.99) <sup>b</sup>	15.00 <sup>b</sup>
Thiamethoxam 25 WG	0.25 g/l	16.36 (4.10)	6.52 (2.61) <sup>bc</sup>	3.22 (1.93) <sup>c</sup>	1.77 (1.50) <sup>c</sup>	6.97 (2.89) <sup>bc</sup>	11.70 (3.49)	6.19 (2.55) <sup>bc</sup>	3.71 (1.92) <sup>c</sup>	1.86 (1.16) <sup>c</sup>	5.87 (2.42) <sup>c</sup>	17.20 <sup>a</sup>
Acetamiprid 20 SP	0.25 g/l	16.46 (4.10)	8.67 (3.03) <sup>b</sup>	7.38 (2.8) <sup>c</sup>	6.69 (2.68) <sup>b</sup>	9.80 (3.32) <sup>b</sup>	11.40 (3.45)	7.36 (2.8) <sup>b</sup>	6.49 (2.54) <sup>b</sup>	6.80 (1.61) <sup>b</sup>	8.01 (2.9) <sup>bc</sup>	14.20 <sup>b</sup>
Imidacloprid 70 WG	0.25 g/l	16.87 (4.16)	8.70 (3.03) <sup>b</sup>	2.96 (1.85) <sup>c</sup>	2.43 (1.70) <sup>c</sup>	7.74 (3.02) <sup>b</sup>	11.14 (3.37)	6.23 (2.59) <sup>b</sup>	4.00 (2.00) <sup>c</sup>	2.59 (1.60) <sup>c</sup>	5.99 (2.47) <sup>c</sup>	14.50 <sup>b</sup>
Acephate 75 SP	1.00 g/l	17.34 (4.22)	8.49 (3.02) <sup>b</sup>	5.34 (2.41) <sup>bc</sup>	4.44 (2.10) <sup>b</sup>	8.90 (3.01) <sup>b</sup>	11.63 (3.48)	6.45 (2.64) <sup>b</sup>	5.10 (2.25) <sup>c</sup>	5.32 (2.30) <sup>b</sup>	6.75 (2.64) <sup>bc</sup>	13.50 <sup>b</sup>
Buprofezin 25 SC	2.00 ml/l	16.59 (4.12)	8.84 (3.05) <sup>b</sup>	6.26 (2.59) <sup>bc</sup>	7.13 (2.76) <sup>b</sup>	9.70 (3.26) <sup>b</sup>	12.99 (3.67)	7.87 (2.88) <sup>b</sup>	7.11 (2.66) <sup>b</sup>	6.75 (2.59) <sup>b</sup>	8.68 (3.00) <sup>b</sup>	13.40 <sup>b</sup>
Imidacloprid 17.8SL	0.25 ml/l	16.9 (4.17)	6.99 (2.71) <sup>bc</sup>	3.36 (1.96) <sup>c</sup>	2.40 (1.70) <sup>c</sup>	7.41 (2.96) <sup>bc</sup>	11.55 (3.47)	5.71 (2.49) <sup>c</sup>	3.64 (1.90) <sup>c</sup>	1.88 (1.37) <sup>c</sup>	5.70 (2.39) <sup>c</sup>	16.33 <sup>a</sup>
Untreated check	-	17.82 (4.28)	17.88 (4.26) <sup>a</sup>	19.23 (4.44) <sup>a</sup>	20.06 (4.53) <sup>a</sup>	18.69 (4.33) <sup>a</sup>	12.53 (3.6)	13.37 (3.72) <sup>a</sup>	14.25 (3.77) <sup>a</sup>	14.12 (3.75) <sup>a</sup>	13.57 (3.75) <sup>a</sup>	10.23 <sup>c</sup>
S.E.m±	-	0.17	0.16	0.10	0.10	0.20	0.18	0.14	0.11	0.13	0.16	0.10
CD(0.05)	-	0.52	0.51	0.31	0.30	0.59	0.54	0.45	0.34	0.39	0.48	0.33
CV (%)	-	7.50	10.06	7.85	8.40	12.41	8.89	9.52	8.57	10.47	11.73	8.13

**DBS:** Day before spray; **DAS:** Days after spray; Values in the parentheses are  $\sqrt{x + 1}$  transformed value; Means followed by same letters do not differ significantly by DMRT (P=0.05)

## Discussion

The mean aphids population after spraying the insecticides, across the treatments indicated that, least population of aphids were recorded in thiamethoxam 25 WG @ 0.25g/ l, followed by imidacloprid 17.8 SL @ 0.25 ml/ l, Dinotefuron 20 SG @ 0.3g/ l, imidacloprid 70 WG @ 0.25g/l, acephate 75 SP @ 1g/ l, buprofezin 25 SC @ 2ml/ l and acetamiprid 20 SP @ 1g/ l which were on par with each other.

The present findings are in associated with Patil *et al.* (2009), Neelima *et al.* (2011) [8] and Prasada *et al.* (2011) [8-9] who reported that the thiamethoxam 25 WG @ 0.3 g/ l and imidacloprid 17.8 SL @ 0.5 ml/ l was found to be superior by recording least number of aphids, thrips and leafhoppers.

However, the whiteflies population after spraying the insecticides, across the treatments indicated that, least population of whiteflies were recorded in imidacloprid 17.8 SL @ 0.25 ml/ l followed by thiamethoxam 25 WG @ 0.25g/ l and imidacloprid 70 WG @ 0.25g/ l The next best treatment in order of control of whiteflies population were acephate 75 SP @ 1g/ l followed by acetamiprid 20 SP @ 0.25 g/ l, dinotefuron 20 SG @ 0.3g/ l and buprofezin 25 SC @ 2ml/ l (8.68 whiteflies/3 leaves).

The present findings are in agreement with Raghuraman and Gupta (2005) who reported that acetamiprid @ 40 g a.i/ ha and imidacloprid @ 100 g a.i/ ha were found to be the most effective treatments against whitefly on cotton.

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