*Indian J. Appl. Ent.* **33**(1) : 35–37 (2019)

# EFFICACY OF DIFFERENT INSECTICIDE AGAINST LEAFHOPPER AND WHITEFLY IN *BT* COTTON

**KRISHNA ROLANIA, S S YADAV AND BALBIR SINGH**

Department of Entomology, CCS Haryana Agricultural University, Hisar, Haryana (India) 125 004
Email: krish81rolania@rediffmail.com

## ABSTRACT

Six insecticides *viz*. acephate 75SP, acetamiprid 20SP, buprofezin 25SC, imidacloprid 17.8SL, thiamethoxam 25WG and fipronil 5SC were evaluated against cotton leafhopper, *Amrasca biguttula biguttula* (Ishida) and whitefly, *Bemisia tabaci* (Gennadius) on Bt cotton hybrid RCH 134 BG II at Cotton Research Area, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar during *kharif*, 2012. Most effective insecticide against leafhopper was found thiamethoxam 25WG (at 25 & 50 g a.i./ha) with 67.21 and 81.03% mortality up to seven days after spray. Against whiteflies the most effective insecticides were observed fipronil (46.60%) followed by thiamethoxam (39.82% at 50 g a.i./ha) and acetamiprid (32.80% and 25.83%).

**Key words:** *Bt* cotton, insecticidal selectivity, sucking insect-pests

## INTRODUCTION

Cotton is the backbone of the textile industry as it employs vast majority of population directly or indirectly and earns the foreign exchange too. Also as a commodity it has been playing an important role in economic and social development of India. India is an important grower of cotton on a global scale. It ranks second in global cotton production after China. India accounts approximately 122.35 lakh hectares area and 377 lakh bales production. However, average lint yield of cotton in India is 524 kg per ha. In Haryana, cotton is cultivated on 6.56 lakh hectares with production of 25.00 lakh bales with productivity of 648 kg /ha (Anon., 2018). The insect pests spectrum of cotton is quite complex and as many as 1326 species of insect pests have been listed on this crop throughout the world. However, main losses in cotton production are due to its susceptibility to about 162 species of insect pests (Manjunath, 2004). Among these, the bollworms *viz*., American bollworm, *Helicoverpa armigera*, (Hubner), spotted bollworm, *Earias vittella* (Fabricius), spiny bollworm, *Earias insulana* (Biosdual), pink bollworm, *Pectinophora gossypiella* (Saunders), pose greater threat to cotton production. Besides these, a complex of sucking pests *viz*., green leaf hopper, *Amrasca biguttula biguttula* (Ishida), thrips, *Thrips tabaci* (Linnman), aphids, *Aphis gossypii* (Glover), whitefly, *Bemisia tabaci* (Gennadius), red cotton bug, *Dysdercus koenigii* (Fabricius) and dusky cotton bug, *Oxycaranus hayalinipennis* (Costa) occupy major pest status and contribute to lower yields (Ghosh, 2001). Among the sucking pests attacking cotton crop, whiteflies and leafhoppers are of the important sap feeders. Both nymphs as well as adults suck the sap from the under surface of the leaves. Severe infestation leads to drying of leaves with curling symptoms and affecting the growth and reduction in square numbers and ultimately it become one of the most limiting factor in the crop productivity. In the present study, effectiveness of different insecticides was evaluated for the control of sucking insect pests like whiteflies and leafhoppers on cotton during 2012.

## MATERIALS AND METHODS

A field experiment was laid out at Cotton Research Area, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar during 2012. There were three replications of each treatment using randomized block design. All agronomic practices were carried out to raise the healthy crop. The prescribed quantity of the insecticide was dissolved in water and sprayed evenly on the crop using knapsack sprayer fitted with cone nozzle. The observations on whitefly (adult) and leafhopper (nymphs & adults) were recorded from randomly selected plants per treatment on three leaves representing the top, middle and bottom canopy. Before spray of the insecticides, pre-treatment

**Table 1. Efficacy of different insecticides against leafhopper and whitefly on cotton during *kharif*, 2012**

| S. No | Treatments | Dose (g a.i./ha) | Leafhopper/3 leaves | | Before spray Mortality (%) | |
|---|---|---|---|---|---|---|
| | | | Before spray | Mortality (%) 7 DAS | Before spray | Mortality (%) 7 DAS |
| 1. | Acephate 75% SP | 292 | 2.45 | 24.07 (29.30) | 4.89 | 17.39 (24.51) |
| 2. | Acetamiprid 20% SP | 10 | 2.44 | 33.62 (35.35) | 5.33 | 22.60 (28.34) |
| 3. | Acetamiprid 20% SP | 20 | 2.91 | 57.29 (49.19) | 4.86 | 32.80 (34.92) |
| 4. | Buprofezin (IGR) 25% SC | 250 | 2.87 | 38.32 (38.23) | 5.08 | 16.43 (23.90) |
| 5. | Imidacloprid 17.8% SL | 22.5 | 3.03 | 66.59 (54.73) | 5.24 | 10.40 (18.76) |
| 6. | Thiamethoxam 25% WG | 25 | 2.93 | 67.21 (55.16) | 5.47 | 18.41 (25.32) |
| 7. | Thiamethoxam 25% WG | 50 | 2.71 | 81.03 (64.19) | 4.78 | 39.82 (39.12) |
| 8. | Fipronil 5% SC | 87.5 | 2.77 | 48.04 (43.86) | 4.74 | 46.60 (43.03) |
| 9. | Control | | 2.92 | - | 5.00 | - |
| | C.D. (P=0.05) | | NS | 5.28 | NS | 3.73 |

count of insects was taken so that the uniformity in pest population distribution may be ensured. The population of test insects (whitefly and leafhopper) was counted after seven days of spray. The data were tabulated and subjected to the analysis of variance. The differences were compared using critical difference (CD) at p=0.05 level of significance.

## RESULTS AND DISCUSSION

The data presented in Table revealed that before spray the population of leafhopper was uniform and had non significant difference among the treatments with a range of 2.44 to 3.03 per three leaves. The per cent mortality of leafhopper was significantly higher (81.03% and 67.21%) in plots treated with thiamethoxam at 25 & 50 g a.i./ha, respectively after seven days of spray followed by imidacloprid (66.59% mortality) which was at par with thiamethoxam (67.21%) at 25 a.i./ha. However, Acetamiprid 20% SP at 20 g a.i./ha (57.29% mortality) had significant difference with thiamethoxam but superior over fipronil 5% SC for management of leafhopper in cotton.

Whitefly population was below economic threshold level (ETL) even before treatments and reduced further in all plots except control (untreated check) after application of insecticides. Population of whitefly (4.74 to 5.47) in different treatments had non significant difference before imposition of treatments. Seven day after the spray, maximum decrease in whitefly population was observed in plots treated with fipronil 5% SC (46.60% mortality) followed by 39.82% mortality in thiamethoxam 25% WG at 50 g a.i./ha and 25.83% and 32.80% mortality in acetamiprid 20% SP at 10 and 20 g a.i./ha, respectively. Among all the treatments imidacloprid 17.8 % SL was found least effective in reducing the whitefly population.

Efficacy of thiomethoxam against sucking pest has been reported by Prasanna (2000) where the chemical was effective against leafhoppers and thrips. Similar reports were also made by Vastard (2003) and Dhawan and Simwat (2002). Jadhav et al. (2017) who found highest population reduction of leafhopper in imidacloprid 70WG at 35g a.i./ha treatment followed by thiamethoxam 25WG at 100 g a.i./ha. The present investigation also confirmed the fact that thiamethoxam is highly effective and specific in their action against sucking pests (Patil *et al*., 2004). Sachin and Kumari

(2018) recorded 100 per cent mortality in fipronil 80% WG treatment at five days after treatment against whitefly, *Trialeurodes vaporariorum* in potted condition. Kumar *et al.* (2017) revealed that thiamethoxam 25 WG @ 100g/ha was most effective insecticide in reducing the population of whitefly.

## REFERENCES


Anonymous, 2018. Annual report. *All India Coordinated Cotton Improvement Project.* Cotton Section, CCS Haryana Agricultural University, Hisar

Dhawan, A. K. and Simwat, G.S. 2002. Field evaluation of thiomethoxam for control of cotton jassid Amrasca biguttula bigutula (Ishida) on upland cotton. *Pestology*, **26**:15-19

Ghosh, S. K. 2001. G.M. Crops: Rationally irresistible, *Current Science*., **84**: 655-660.

Jadhav, Y.T., Zanwar, P.R. and Shinde, D.S. 2017. Evaluation of Newer Pesticides against Leafhopper Population and its Effect on Summer Okra Yield. *International Journal of Current Microbiology and Applied Sciences,* **6** : 2520-2526.

Kumar, Awaneesh, Sachan, S.K., Sudhir Kumar and Kumar Promish. 2017. Efficacy of some novel insecticides against white fly (*Bemisia tabaci* Gennadius) in brinjal. *Journal of Entomology and Zoology Studies,* **5**(3): 424-427.

Manjunath, T. M. 2004. *Bt* cotton in India: The technology wins as the controversy wanes. http://www.Monsanto.co.uk/news/ukshowlib.html wid8478.

Patil, S.B., Udikari, S.S. and Khadi, B.M. 2004. Thiamethoxam 35FS-A new seed dresser formulation for sucking pest control in cotton crop. *Pestology,* **28:** 34-37.

Prasanna, A. R., 2000, Bioefficacy of thiamethoxam as seed treatment and foliar spray against early sucking pests of hybrid cotton. M. Sc. (Agri.) Thesis, University of Agricultural Sciences Dharwad (India).

Sachin, U.S. and Kumari, S. 2018. Relative toxicity of selected insecticides against adult whitefly, *T. vaporariorum* in potted condition. *Journal of Entomology and Zoology Studies*, **6**(1): 116-120.

Vastrad, A.S. 2003. Neonicotinoids current success and future outlook. *Pestology*, **27**:60-63.


Received: 16.03.2019 Accepted: 24.05.2019