Screening of Different Bt and Non Bt Cotton Hybrids against Aphids *Aphis gossypii*, and Whiteflies *Bemisia tabaci* on Bt Cotton

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**ABSTRACT**

The field experiment was carried out at Agricultural and Horticultural Research Station, Honnavile farm Shivamogga during Kharif 2016-17. Totally 15 Bt cotton hybrids and their counter non Bt cotton hybrids were screened against sucking pests of cotton like aphids and whiteflies under unprotected conditions. Lowest population of aphids were recorded in DCH-32 (13.04 aphids/3 leaves) followed by Ankur HB-2110 non Bt, MRC-7351 non Bt, SP904BG-II chamundi BG-II and chamundi BG-II non Bt, Minerva BG-I non Bt, MRC-7351, Minerva BG-I MRC-7918 non Bt and Ankur HB-2110 the highest population of aphids were recorded in double Bt (19.08 aphids/3 leaves) and MRC-7918 (18.54 aphids/3 leaves). However lowest population of whiteflies were recorded in DCH-32 (0.96 whiteflies/3 leaves) while the highest population of whiteflies were recorded in double Bt non Bt (4.54 whiteflies/3 leaves).

**Keywords**

Bt cotton, Aphids, Whiteflies, DCH-32

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**Introduction**

Cotton is the most important cash crop of monsoon season in India and popularly known as “white gold”. India has a unique distinction of being the only country in the world to cultivate all four cultivable *Gossypium* species. *Gossypium hirsutum* represents 99.9 per cent of the hybrid cotton in India and all the current Bt cotton hybrids are either *G. hirsutum* or inter-specific hybrids with *G. barbadense*. In India, cotton is grown under 40 per cent irrigated and 60 per cent rainfed. American cotton is highly susceptible to sucking insect pests and of which jassid, *A. biguttula biguttula* also referred, as leafhopper is important sucking pest. Although introduction of Bt cotton could reduce the bollworm incidence, number of other pests *viz.*, leafhopper, mirid bugs, aphids and thrips are assuming potential threats (Kranthi et al., 2011). At present many sucking pests of cotton have assumed potential threats and causing significant economic yield losses in cotton. The reduction of pyrethroid and other conventional insecticides on Bt cotton is presumed to have enhanced infestation of sucking pests (Kranthi et al., 2009). Keeping in this point view the present investigation is conducted to study the reaction of Bt cotton hybrids against aphids and whiteflies of cotton.
Materials and Methods

The field experiment was carried out at Agricultural and Horticultural Research Station (AHRS), Honnavile farm Shivamogga during Kharif 2016-17 for screening of Bt cotton hybrids for their reaction to sucking pest. Totally 15 Bt cotton hybrids and their counter non Bt cotton hybrids were screened against sucking pests under unprotected conditions. The hybrids were sown in two rows of 15 m length with a spacing of 90 cm x 60 cm with two replications. The crop was raised following all the recommended agronomic practice except the plant protection measures. Observations on sucking pests viz., aphids and whiteflies were recorded at monthly intervals starting from 15 days after the sowing continued throughout the crop growth on ten randomly selected plants avoiding the border rows. Sucking pests were recorded on three leaves per plant by selecting top, middle and bottom leaves. The data collected on the population of sucking pests were subjected to ANOVA test by following with $x + 0.5$ transformations.

Results and Discussion

The results on incidence of aphids on different Bt cotton hybrids were furnished in the Table 1. The mean population of aphids across the different Bt and non Bt cotton hybrids during the cropping period was ranged between 13.04 to 19.08 aphids per three leaves, which revealed that lowest population of whiteflies were recorded in DCH-32 (13.04 aphids/ 3 leaves) followed by Ankur HB-2110 non Bt (14.27 aphids/ 3 leaves), MRC-7351 non Bt (14.42 aphids/ 3 leaves), SP904BG-II (14.48 aphids/ 3 leaves) chamundi BG-II (15.01 aphids/ 3 leaves) and chamundi BG-II non Bt (15.52 aphids/ 3 leaves), where all these Bt cotton hybrids were statistically on par with each other.

On other hand the next best Bt cotton hybrids in the order of superiority were Minerva BG-I non Bt (16.35 aphids/ 3 leaves) followed by MRC-7351 (16.94 aphids/ 3 leaves), Minerva BG-I (17.00 aphids/ 3 leaves) MRC-7918 non Bt (17.14 aphids/ 3 leaves) and Ankur HB-2110(17.18 aphids/ 3 leaves), where all this hybrids were statistically on par with each other, the highest population of aphids were recorded in double Bt (19.08 aphids/ 3 leaves) followed by double Bt non Bt (18.74 aphids/ 3 leaves) and MRC-7918 (18.54 aphids/ 3 leaves) respectively and were statistically on par with each other. However the results on incidence of whiteflies on different Bt cotton hybrids were furnished in the Table 1. revealed that lowest population of whiteflies were recorded in DCH-32 (0.96 whiteflies/ 3 leaves) and Ankur HB-2110 non Bt (0.96 whiteflies/ 3 leaves) followed by Chamundi BG-II non Bt Minerva BG-I (1.00 whiteflies/ 3 leaves), Ankur HB-2110 (1.11 whiteflies/ 3 leaves) MRC-7351 (1.15 whiteflies/ 3 leaves), MRC-7351 non Bt (1.23 whiteflies/ 3 leaves), double Bt (1.43 whiteflies/ 3 leaves) and MRC-7918 (1.85 whiteflies/ 3 leaves), where all these hybrids were on par with each other. However the highest population of whiteflies was recorded on Chamundi BG-II (2.57whiteflies/ 3 leaves) followed by Minerva BG-II non Bt (3.28 whiteflies /3 leaves) and double Bt non Bt (4.54 whiteflies/ 3 leaves) and were statistically on par with each other.

The results on incidence of aphids on different Bt cotton hybrids were furnished in the Table 1. which revealed that lowest population of whiteflies were recorded in DCH-32 (13.04 aphids/ 3 leaves) followed by Ankur HB-2110 non Bt, MRC-7351 non Bt, SP904BG-II chamundi BG-II and chamundi BG-II non Bt, where all these Bt cotton hybrids were statistically on par with each other.
### Table 1. Screening of different Bt and non Bt cotton hybrids against aphids, *Aphis gossypii* and whiteflies, *Bemisia tabaci*

| Treatment detail | No. of *Bemisia tabaci* / 3 leaves | Mean | No. of *Aphis gossypii* / 3 leaves | Mean |
|------------------|-----------------------------------|------|----------------------------------|------|
|                  | September  | October | November | December | August  | September | October | November | December |
| T1 MRC-7918      | 3.00       | 3.00    | 1.01     | 0.37     | 1.85    | 10.30     | 7.90     | 16.00    | 27.1     |
| T2 MRC-7918, non Bt | 5.15       | 0.15    | 0.35     | 0.82     | 1.62    | 5.80      | 5.55     | 21.05    | 25.65    |
| T3 MRC-7351      | 1.75       | 2.35    | 0.25     | 0.24     | 1.15    | 8.64      | 12.5     | 17.00    | 24.00    |
| T4 MRC-7351, non Bt | 1.90       | 2.15    | 0.28     | 0.58     | 1.23    | 4.90      | 4.00     | 20.60    | 17.80    |
| T5 Ankur-HB 2110 | 2.00       | 2.00    | 0.28     | 0.15     | 1.11    | 10.05     | 10.75    | 16.25    | 21.70    |
| T6 Ankur-HB 2110, non Bt | 1.70       | 1.70    | 0.38     | 0.07     | 0.96    | 5.00      | 5.75     | 13.10    | 22.50    |
| T7 Minerva BG-I | 1.65       | 1.65    | 0.47     | 0.29     | 1.00    | 9.65      | 11.30    | 18.15    | 16.75    |
| T8 Minerva BG-1, non Bt | 7.55       | 5.25    | 0.33     | 0.00     | 3.28    | 8.32      | 8.15     | 19.95    | 19.20    |
| T9 Double Bt    | 2.50       | 2.50    | 0.41     | 0.29     | 1.43    | 12.30     | 13.35    | 15.75    | 25.25    |
| T10 Double Bt, non Bt | 8.80       | 8.80    | 0.26     | 0.29     | 4.54    | 8.75      | 8.15     | 22.00    | 28.50    |
| T11 SP 904BG-II | 5.40       | 5.40    | 1.12     | 0.00     | 3.05    | 6.55      | 5.95     | 17.25    | 14.85    |
| T12 SP 904BG-II, non Bt | 3.25       | 3.25    | 0.20     | 0.00     | 2.50    | 5.50      | 5.15     | 18.25    | 20.50    |
| T13 Chamundi BG-II | 4.75       | 4.85    | 0.51     | 0.15     | 2.57    | 3.35      | 7.00     | 16.25    | 24.35    |
| T14 Chamundi BG-II, non Bt | 2.85       | 2.65    | 0.20     | 0.00     | 1.38    | 5.50      | 3.70     | 19.75    | 23.35    |
| T15 DCH-32      | 1.70       | 1.70    | 0.45     | 0.00     | 0.96    | 7.75      | 5.40     | 18.70    | 18.30    |

*SEM± 0.49, 0.17, 0.15, 0.15, 0.11, 0.14, 0.21, 0.17, 0.12*

*CD @ P= 0.05 1.40, 0.50, 0.44, 0.44, 0.54, 0.33, 0.43, 0.42, 0.63, 0.54, 0.38*

*CV % 13.26, 9.07, 9.20, 9.94, 13.48, 11.19, 12.23, 12.34, 16.86, 14.19, 13.34*

Figures in parenthesis are □ x + 0.5 transformed value Means in the columns followed by the same alphabet do not differ significantly by DMRT (P=0.05)
On other hand the next best Bt cotton hybrids in the order of superiority were Minerva BG-I non Bt followed by MRC-7351, Minerva BG-I, MRC-7918 non Bt and Ankur HB-2110, where all this hybrids were statistically on par with each other, the highest population of aphids were recorded in double Bt followed by double Bt non Bt and MRC-7918 respectively and were statistically on par with each other.

The results are in line with many findings, Udikeri et al., (2012) who observed that the impact of Bt transgenic cotton on dynamics of aphid in RCH 2 Bt and non-Bt cotton hybrids. In RCH 2 Bt the population of aphid ranged between 8.58/ leaf (34th SMW) and 42.15/ leaf (50th SMW) with a mean incidence of aphid (23.82/ leaf) whereas in RCH 2 non-Bt cotton, the aphid population ranged from 6.22 to 37.08/ leaf (46th SMW) with a mean incidence of 21.37/ leaf. However the results on incidence of whiteflies on different Bt cotton hybrids were furnished in the Table 1. revealed that lowest population of whiteflies were recorded in DCH-32 and Ankur HB-2110 non Bt followed by Chamundi BG-II non Bt Minerva BG-I, Ankur HB-2110 MRC-7351, MRC-7351 non Bt, double Bt and MRC-7918, where all these hybrids were on par with each other. However the highest population of whiteflies were recorded on Chamundi BG-II followed by Minerva BG-II non Bt and double Bt non Bt (4.54 whiteflies/3 leaves) and were statistically on par with each other. The present findings are in agreement with Rohith et al., (2014) recorded the Bt genotypes MRC-7918 and cheeranjivi show resistant and moderately resistant respectively to aphid, thrips and white flies. No genotype show resistant to mirid bug but cheeranjivi and MRC-7351 show moderately resistant DCH-32 is highly susceptible to all the sucking pest.

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