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Evaluation of commercially available Bt cotton genotypes for their agronomic performance and economic returns*

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Abstract : A field experiment was carried out at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad, during *Kharif* 2006-07 to assess the agronomic performance of Bt cotton genotypes and their economic returns. The field trial was laid out in randomized complete block design with total of ten cotton genotypes, including eight Bt cotton hybrids *viz*, MRC-6918 Bt, MRC-6322 Bt, MRC-7351 Bt, RCH-2 Bt, JK-Durga Bt, JK-CH 99 Bt, NCS-207 Bt, and NCS-145 Bt and two non-Bt cotton hybrids, *viz*. DHH-11 and DCH-32. Among the tested genotypes (8 Bt and 2 non-Bt genotypes), JK-CH 99 Bt recorded significantly higher yield (3323 kg/ha) which was on par with JK- Durga Bt (3302 kg/ha), MRC-6322 Bt (3230 kg/ha) and NCS-207 Bt (2927 kg/ha). Bt cotton genotypes given higher monitory returns in the form of BC ratio where it was in the range 2.32 - 4.04 rupee per rupee invested for Bt genotypes.

Key words: Bt cotton, economics, leaf area index, seed cotton oil

Introduction

Cotton is one of the most important commercial crops cultivated in 70 countries of the world with a total coverage of 30.61 million ha. Over one quarter of the world cotton area is in India. Bt cotton replacing more and more conventional cotton area and it is estimated that Bt cotton would cover an area of 13.4 million hectares. The most recent study revealed that yield gain of 31%, a significant reduction in the number of pesticide sprays by 39%, and an 88% increase in profit or an increase of $250 per hectare for the 2004 cotton growing season. Transgenic cotton provided a handy tool to reduce the pest menace. The performance of Bt-cotton varied, from region to region with changing agroclimatic conditions, pest pressure and cropping systems thus, it is necessary to test the validity of Bt technology in prevailing field conditions. Bt cotton is becoming popular among the farming community because of its ability to ward-off bollworm menace. This technology is highly beneficial to the growers and to the environment by reducing chemical insecticide treatments for target pests, increasing crop yields and preserving populations of beneficial arthropods. The introduction of transgenic cotton hybrids and their scope for extensive coverage in India in the coming years, there is a need for evaluating yield and yield components of transgenic cotton varieties. Several Bt cotton genotypes have entered the market with GEAC approval but the yield potential of these genotypes were claimed different by different companies. Thus there is need to ascertain the on - farm yield potentials of these Bt cotton genotypes.

Material and methods

The field experiment was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad, Karnataka during *kharif* 2006. The soil of experimental site was medium deep black soil. Chilli crop was taken up during *kharif*-2005, while in *rabi* the land was fallow. The experiment consisted of eight commercially available Bt cotton genotypes (hybrids) and two non-Bt cotton hybrids as treatments viz., MRC-6918 Bt, MRC-6322 Bt, MRC-7351 Bt, RCH-2 Bt, JK-Durga Bt, JKCH-99 Bt, NCS-207 Bt, NCS-145 Bt, DHH-11 and DCH-32 and two conventional non-Bt hybrids like. The field experiment was laid out in a Randomized Complete Block Design, with three replications. The land was ploughed once before commencement of experiment with mould board plough and later harrowed twice to bring the soil to fine tilth. The different cotton genotypes were dibbled at 90 cm apart with intra row spacing of 60 cm on 30th June 2006. Two seeds per hill were dibbled to a depth of 4 cm on flat bed. Gap filling was done 10 days after sowing. The 50 per cent of recommended dose of nitrogen and full dose of Phosphorus and Potassium were applied (100:50:50 N: P: Kg ha^{-1}) at the time of sowing and the remaining 50 per cent of N was applied at 30DAS. Biometric observations were recorded on five tagged plants selected randomly in each plot. The data collected from the experiment at different growth stages were subjected to statistical analysis as described by Gomez and Gomez (1984). The level of significance used in 'F' and't' test was P=0.05. Critical difference (CD) values were calculated wherever the 'F' test was found significant.

Results and Discussion

In the present investigation among different genotypes studied, JK-CH 99 Bt produced significantly higher yield (3323.0 kg/ha) which was on par with JK-Durga Bt (3302.4 kg/ha), MRC-6322 Bt (3230 kg/ha) and NCS-207 Bt (2927 kg/ha). The lowest yield was observed in a non-Bt popular hybrid DCH-32 (2122.0 kg/ha). Higher yield/ha is supported by higher per plant yield which ranged between 179.03 g/plant (JK-CH 99 Bt) to 114.81 g/ plant (DCH-32). Among Bt genotypes, JK-CH 99 Bt produced 53 per cent higher seed cotton yield and also 53 per cent higher per plant yield when compared with the lowest yielding Bt

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