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Performance of Bt and non-Bt cotton genotypes under leaf reddening malady situation*

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Abstract : A field experiment was laid out in a randomized complete block design with three replications on vertisol at Main Agricultural Research Station (MARS), University of Agricultural Sciences (UAS), Dharwad during the rainfed seasons of 2007 and 2008 to assess the performance of Bt and non-Bt cotton genotypes under leaf reddening situation. The experiment consisted of ten treatments (cotton hybrids) *viz.*, T_1-Bunny (BG I) Bt, T_2-Bunny non-Bt, T_3-RCH-368 (BG I) Bt, T_4-RCH-368 non-Bt, T_5-JK Durga (BG I) Bt, T_6-JK Durga non-Bt, T_7-Neeraja (BG II) Bt, T_8-Neeraja non-Bt, T_9-DCH-32 non-Bt hybrid and T_{10}-Sahana non-Bt variety were sown at 90 cm x 60 cm spacing. Results indicated that, Neeraja (BG II) Bt produced significantly higher seed cotton yield (2483 kg/ha) as compared to the other genotypes. The yield levels of Bt and non-Bt cotton genotypes under study were in the range between 2483 kg/ha and 1131 kg/ha. The lowest seed cotton yield was observed in RCH-368 non-Bt (1131 kg/ha). Mean red leaf index at 90 DAS was 1.32 and it increased to 1.77 at 120 DAS among the genotypes. At 120 DAS, check Sahana non-Bt variety recorded significantly higher red leaf index (2.12) and it was at par with RCH-368 (BG I) Bt (1.97) and JK Durga (BG I) Bt (1.92). Between Bt and non-Bt genotypes, Bt genotypes recorded significantly higher red leaf index(1.82) as compared to non-Bt genotypes (1.63). Amongst Bt genotypes, Neeraja (BG II) Bt recorded significantly lower red leaf index(1.58) than others.

Key Words: Bollgard-I, Bollgard-II, Bt cotton, Leaf reddening, Red leaf index

Introduction

In India, cotton is grown under diverse agro-climatic conditions and contributes nearly 65 per cent of total raw material needs of the textile industry. It plays a major role in India's economy, both in terms of providing employment directly or indirectly to about 60 million people and in production of wealth and earning foreign exchange for the country to the tune of ₹ 60,000 crores (Anon.,2011a). It is being cultivated in 70 countries of the world with a total coverage of 32.30 million hectare (Anon., 2011b). Area wise, India ranks first in global scenario (about 33% of the world cotton area). However, in production it ranks second next to China. In India, it was cultivated on an area of 11.16 m ha with a production of 31.20 million bales of seed cotton during 2010-11. Its average productivity in India was 494 kg lint/ha, which was low as compared to world average of 725 kg lint/ha (Anon., 2011a). Maharashtra, Gujarat, Andhra Pradesh, Madhya Pradesh, Punjab, Haryana, Karnataka, Rajasthan and Tamil Nadu are the important cotton growing states in India. In Karnataka, the present cotton growing situation is showing improvement after release of Bt cotton and is grown on an area of 3.95 lakh hectare with a total production of 9.0 lakh bales of seed cotton with a productivity of 387 kg lint/ha. The increase in productivity from 229 kg lint/ha in 1996 to 387 kg lint/ha in 2010 was mainly due to cultivation of Bt cotton (Anon., 2011a). In the recent past, leaf reddening has been a major problem in Bt cotton growing areas of northern Karnataka. Cotton cultivators have been approaching scientists and extension agencies for leaf reddening resistant genotypes. In this context, the present investigation was planned and executed during *kharif* seasons of 2007 and 2008 to evaluate performance of Bt and non-Bt cotton genotypes under leaf reddening malady situation.

Material and methods

The field experiment was laid out in a randomized complete block design with three replications on vertisol with pH 7.31, available N-206:P_2O_5-18.4 and $K_2$0-462 kg ha^{-1} at Main Agricultural Research Station (MARS), University of Agricultural Sciences (UAS), Dharwad during the rainfed seasons of 2007 and 2008. MARS is located in the northern transition zone of Karnataka situated at 15^0 26^i N latitude, 75^0 07 ^{i} E longitudes with an altitude of 678 m above the mean sea level. The experiment consisted of ten treatments (cotton hybrids) *viz.*, T_1-Bunny (BG I) Bt, T_2-Bunny non-Bt, T_3-RCH-368 (BG I) Bt, T_4-RCH-368 non-Bt, T_5-JK Durga (BG I) Bt, T_6-JK Durga non-Bt, T_7-Neeraja (BG II) Bt, T_8-Neeraja non-Bt, T_9-DCH-32 non-Bt hybrid and T_{10}-Sahana non-Bt variety were sown by adopting 90 cm x 60 cm spacing during first rainfed season on 25-07-2007 and for the second rainfed season on 27-07-2008. The mean annual rainfall for the past 56 years at MARS, Dharwad was 759.5 mm and was well distributed from April to November. The maximum rainfall (150.9 mm) was received during the month of July followed by October (129.4 mm). Total rainfall received during the cropping period (1st June to the last week of January) during first season (2007) was 922 mm in 51 rainy days whereas in the second season (2008) it was 730.8 mm in 46 rainy days. The recommended fertilizer dose (120 kg N, 60 kg P_2O_5 and 60 K_2O ha^{-1}) was applied to all the genotypes with entire dose of P_2O_5, K_2O and 50 percent N as basal and the remaining 50 per cent N into three equal splits at 50, 80 and 110 DAS. The timely plant protection measures for sucking pests (leaf hoppers, thrips, aphids and white flies) were adopted. Two hand weedings (at 25 and 45 DAS) and two intercultivations (at 45 and 65 DAS)

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