

Studies on performance of Bt cotton genotypes under rainfed situation through farmers participatory approach*

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Abstract: The performance of different Bt cotton hybrids were compared in mother and baby trial design to assess the potentiality under researcher managed (mother) Vs farmers growing practices (baby trial) in black soil under rainfed situation. The field experiment was conducted at Govankoppa village of Bailhongal taluk for two years (2008-09 and 2009-10). The results indicated that Bunny BG-II Bt recorded significantly higher seed cotton yield (2385 kg/ha) than JK-99 Bt (1920 kg/ha), Brahma Bt (1770 kg/ha) and DHH-11 Bt (1615 kg/ha). RCH - 708 Bt (37.05 mm) recorded significantly higher 2.5% span length (mm) compared to all other cotton genotypes except MRC - 6918 Bt (35.90mm). Bundle strength did not differ significantly with the cotton genotypes. In baby trial, the seed cotton yield of RCH-708 Bt, RCH-2 Bt, JK-99 Bt and Brahma Bt could not vary significantly between mother and baby trial. Hence, in the present investigation it can be concluded that RCH-708 Bt, RCH-2 Bt, JK-99 Bt and Brahma Bt genotypes have recorded the maximum potential in both researcher managed (mother) and farmers practice (baby trial).

Keywords : Genotypes, Bt cotton, fibre quality, seed cotton yield

Introduction

The development of Bt cotton containing a genetically introgressed endotoxin gene from the gram negative soil bacteria (*Bacillus thuringiensis* Hubner) represents a significant technological land mark in the global cotton research. India adopted this technology in 2002-03.

Cotton is a major cash crop of India and accounts for 75 per cent of the fiber used in the textile industry, which has 1063 spinning mills and accounts for 4 per cent gross domestic product. India is the only country to grow all four species of cultivated cotton. *Gossypium hirsutum* represents more than 90 per cent of the hybrid cotton production in India and all the current Bt cotton hybrids are *G. hirsutum* grown in an area of 87 per cent or 8.4 m. ha, a remarkably high proportion in a fairly short period of eight years equivalent to an unprecedented 168 fold increase from 2002 to 2009. In 2009, the multiple gene Bt cotton hybrids were planted for the first time in more area (57%) than single gene Bt cotton hybrids occupied 4.82 m. ha as compared to 3.58 m. ha (43%) by single gene Bt cotton hybrids. Farmers prefer multiple genes over a single gene Bt cotton hybrids because multiple gene Bt cotton hybrids provide additional protection, increases efficacy of protection and higher profit through savings with fewer sprays, which inturn increased the yield by 8 to 10 per cent over single gene Bt hybrids. Therefore, to realize the utility of BG-II for enhanced yield in comparison with BG-I and non-Bt in black soil with a agronomic performance, the present study was undertaken on farmers field in participatory mode of research with mother and baby trial design at Govankoppa village of Bailhongal taluk.

Material and methods

Field experiment was conducted for two years (2008-09 and 2009-10) in farmer field of Govankoppa village of Bailhongal

taluk. Soil of the site was clay texture and neutral in its pH (7.2), available N, P₂O₅ and K₂O were in the class of low (265 kg/ha), medium (32.4 kg/ha) and high (420 kg/ha), respectively. Experiment was laid out in randomized complete block design with three replications. Gross plot size was 10.8 m x 7.8 m. The treatments consisted of RCH-2 Bt, RCH-2 BG II Bt, Bunny Bt BG II Bt, JK-99 Bt, Mallika Bt, MRC-6918 Bt, Brahma Bt, RCH-708 Bt, Bunny Bt and DHH-11 grown under rainfed condition. Recommended dose of fertilizers were applied (100:50:50 N:P₂O₅:K₂O kg/ha). The 50 per cent of recommended dose of nitrogen and full dose of P₂O₅ and K₂O were applied at the time of sowing and the remaining 50 per cent of N was applied at 30 DAS. Sowing was done in fourth week of June in both the years. Sowing of seed was done by hand dibbling with 90 x 60 cm spacing at 4 to 5 cm soil depth. Growth observations were recorded at 60, 90, 120 DAS and at harvest. Yield and yield parameters were recorded at harvest during both the years. The yield was recorded at harvest in farmers field (baby trial) with the genotypes in both the years. Similar to the genotypes grown in mother trial (RCH-2 Bt, RCH-2 BG II Bt, Bunny Bt BG II Bt, JK-99 Bt, Mallika Bt, MRC-6918 Bt, Brahma Bt, RCH-708 Bt, Bunny Bt and DHH-11). Quality parameters of cotton fibre viz., 2.5% span length, fibre fineness, fibre maturity and bundle strength were assessed as per Sundaram (1979) using HVI machine at regional centre, CIRCOT, Dharwad.

Results and discussion

Among different genotypes in pooled data, Bunny BG II Bt recorded significantly higher seed cotton yield (2385 kg/ha) and was on par with RCH-2 BG II Bt, MRC-6918 and RCH-708 Bt. The yield was significantly lower with DHH-11 (1615 kg/ha) compared to all other cotton genotypes (Table 2). The results indicated the superiority of Bt cotton hybrids with respect to seed cotton yield over that of non-Bt hybrid. The results obtained

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