

# Effect of Bt Hybrids On Growth, Yield Attributes, And Seed Cotton Yield In *Hirsutum* Cotton

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## Abstract

A field experiment was conducted during the Kharif season of 2016 at an oil seed research farm, C.S. Azad University of Agriculture and Technology, Kanpur, to see different cotton Bt hybrids and non-Bt varieties on growth, yield attributes and seed cotton yield in *hirsutum* cotton. Data indicated that all the yield attributing characters viz number of bolls per plant and boll wt (g) were improved significantly with Bt hybrids than non-Bt varieties. Bt hybrid 6588 BG II produced significantly higher seed cotton yield (3427 kg/ha) and lint yield (1232 kg/ha) than 6488 BGII, and this yield was at par with Bio -100 (3301 and 1201 kg/ha), Bio-105 (3382 and 1212 kg/ha) and Yuva plus (3249 and 1197 kg/ha) seed cotton yield and lint yield, respectively and gave 22.6% more seed cotton yield and 22.1 % more lint yield than 6488 BGII (2795 and 1009 kg/ha), respectively. Variety F-1861 was found significantly superior in seed index (8.40 g) and lint index (4.36) compared to the rest of Bt hybrids and non-Bt varieties. Significantly higher GOT% (35.9%) was obtained with the Bt hybrid (6588 BGII) compared to the non-Bt varieties and 6488 BGII. However, the highest 2.5 span length (30.9 mm) with Yuva plus BGII followed by Bio -105 BGII (30.4 mm) was noted compared to the non-Bt varieties and Bt hybrids.

**Keywords** - bt cotton, fiber quality, ginning outturn, hybrids, lint yield, and seed cotton yield.

## INTRODUCTION

Cotton is an important commercial fiber crop of India and plays a significant role in the Indian economy by providing 30 percent of total export earnings. In India, it was grown in an area of about 12.23 mha with the production of 361 lakh bales and productivity of 501 kg/ha during 2018-19. India has the 1st rank in the area and production of cotton in the world (Anonymous, 2018). UP has quite a low cotton area, about 14000 ha, due to not adapting to Bt cotton cultivation by cotton farmers whenever another cotton-growing state in the north zone like Haryana, Punjab, and Rajasthan has about 85-90 % area under Bt cotton cultivation. The introduction of Bt cotton in Indian agriculture has resulted in an immense increase in seed cotton yield. The economically viable technology of Bt cotton has helped significantly in increasing the net income of cotton farmers. (Mehta et al., 2012). So, there is utmost need to grow the Bt cotton in UP for increasing the production of cotton.

Keeping the above view in mind, the experiment was

carried out to see Bt cotton's effect on growth, yield attributes, and seed cotton yield in *hirsutum* cotton.

## Materials and methods

The field experiment was conducted during the Kharif season of 2016 at Oilseed Research Farm, Kalyanpur, C.S. Azad University of Agriculture and Technology, Kanpur, to study different Bt non-Bt cotton varieties on growth, yield attributes, and seed cotton yield in *hirsutum* cotton. In all 9 cotton Bt and non-Bt varieties viz V1- 6588 BG II, V2- Bio-100 BGII, V3- Bio-105 BGII, V4-Yuva Plus BGII, V5-Vikas (Non-Bt), V6- F-1861 (Non-Bt), V7-H-1300 (Non-Bt, V8 - F-2164 (Non-Bt) and V9-6488 BG II were tested in randomized block design with three replications. The soil of the experimental field was sandy loam in texture having a pH of 7.8, low in available OC% (0.31), medium in available P<sub>2</sub>O<sub>5</sub> (16 kg/ha), and high in available K<sub>2</sub>O (272 kg/ha). Cotton planting was done at a spacing of 67.5 X 60 cm on 02.06.16. Recommended fertilizer dose was applied for hybrid (90:60:20kg NPK/ha) and variety (60:30:20 Kg NPK/ha). Picking of the crop was done from 20-11-16 to 23-11-16 during the study.

## RESULTS AND DISCUSSION

Data indicated (table 1) that all the yield attributing characters viz number of bolls per plant and boll wt (g) were improved significantly with Bt hybrid than non-Bt varieties. Significantly higher plant height was recorded with the Bt hybrid Bio -105 (192.3 cm) followed by Yuva Plus, 6488, and H-1300 compared to the rest of Bt hybrids and non-Bt Varieties. The number of bolls per plant did not show any difference among the Bt hybrids and non-Bt varieties. The highest boll wt (4.3 g) was recorded with the Bt hybrid of Yuva plus BG II, followed by 6588 BG II (4.1 g) than the rest of Bt hybrids non-Bt varieties. These results conform with the finding of Nehra *et al.* (2004), Alse and Jadhav (2011), and Kumar *et al.* (2010). Bt hybrid 6588 BG II produced significantly higher seed cotton yield (3427 kg/ha) and lint yield (1232 kg/ha) as compared to the non-Bt varieties and Bt hybrid (6488), and this yield was at par with Bio-100 BG II (3301 and 1201 kg/ha), Bio-105 BG II (3382 and 1212 kg/ha) and Yuva plus B GII (3249 and 1197 kg/ha) seed cotton yield and lint yield, respectively and gave 22.6% more seed cotton yield and 22.1 % more lint yield than 6488 BGII (2795 and 1009



kg/ha), respectively. The increase in seed cotton yield with Bt hybrids might be due to increased boll/plant and boll wt (g). These results are in agreement with the finding of Nehra et al. (2004), Kote et al. (2005), Butter et al. (2010), Kumar et al. (2010), Rekha and Durua (2010), Butter et al. (2010), Sarang et al. (2010), Kumar et al. (2011), Kulvir et al. (2011), Singh et al. (2011). Significantly higher GOT % was obtained with (36.3 %) Bio-100 BGII and Yuva Plus BG II than the rest non-Bt varieties and Bt hybrids. Variety F 1861 was found significantly superior in seed index (8.40) than the rest of Bt hybrids and non-Bt varieties. A higher value of lint index (4.99 g) was observed with Bio-100 BG II than all the rest of the Bt hybrids and Non-Bt varieties. However, the highest 2.5 span length (30.9) mm was noted with Yuva plus BG II followed by Bio -105 BG II (30.4) compared to the rest non-Bt varieties and Bt hybrids. The highest fiber strength (28.1) was recorded with Bio-100 BGII than the rest of the Bt and Non-Bt varieties. These results are in agreement with the finding of Sarang et al. (2011). A higher micron is the value (5.0) obtained with Vikas (Non-Bt) compared to Bt hybrids and non-Bt varieties.

### Conclusions

Based on the above results, it may be concluded that the Bt hybrids, namely 6588 BG II, Bio-100 BGII, Bio-105 BGII, and Yuva Plus BGII, were found best hybrids to produce higher seed cotton yield in *hirsutum* cotton.

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**Table I**Effect of Bt cotton on growth, yield attributes and seed cotton yield and fibre quality in *hirsutum* cotton.

SN	Hybrid/ Varieties	Plant height (cm)	No of boll/plant	Boll wt(g)	Seed cotton yield (kg/ha)	GO T (%)	Lint yield (kg/ha)	Seed Index (g)	Lint Index (g)	Span length (mm)	Strength (g/tex)	Micronaire
1	V <sub>1</sub> -6588 BGII	179.6	40.6	4.1	3427	35.9	1232	7.16	4.07	29.6	26.8	4.7
2	V <sub>2</sub> -Bio-100 BGII	177.6	39.6	3.8	3301	36.3	1201	8.73	4.99	30.1	28.1	4.7
3	V <sub>3</sub> -Bio-105 BGII	192.3	49.6	3.8	3382	35.8	1212	6.86	3.82	30.4	27.3	4.7
4	V <sub>4</sub> -Yuva plus BGII	187.6	49.6	4.3	3249	36.3	1197	8.33	4.76	30.9	27.1	4.3
5	V <sub>5</sub> -Vikas	180.6	32.6	2.9	2416	34.1	823	7.53	3.91	28.2	26.3	5.0
6	V <sub>6</sub> -F-1861	172.0	39.0	3.4	2407	34.2	823	8.40	4.36	29.5	26.6	4.5
7	V <sub>7</sub> -H-1300	182.6	32.0	3.6	2481	34.0	844	7.83	4.04	28.1	27.3	4.8
8	V <sub>8</sub> -F-2164	181.3	33.6	3.8	2502	35.0	874	7.45	4.00	28.1	27.1	4.9
9	V <sub>9</sub> -6488 BGII	185.3	42.0	3.9	2795	34.9	1009	6.96	3.73	29.8	26.8	4.7
CD at 5 %		10.53	NS	0.275	443.92	0.658	155.12	0.275	0.225	-	-	-