

## PRODUCTION TECHNOLOGY FOR ORGANIC ARBOREUM COTTON

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**Abstract:** A field experiment was undertaken at Regional Agriculture Research Station, Nandyal, Andhra Pradesh during *kharif* 2015-16 on vertisols to find out production technology for organic arboreum cotton in scarce rainfall zone of Andhra Pradesh. The experiment was laid out in randomized block design with eight treatments and replicated thrice. Significantly higher seed cotton yield ( $1768 \text{ kg ha}^{-1}$ ) number of bolls  $\text{m}^{-2}$  (139.1) were recorded with recommended dosage (RD) of nutrient through organic based on P equivalent basis + green manuring with *sesbania* @ 50 kg seed  $\text{ha}^{-1}$  and incorporated at 30-45 days after sowing (DAS).

**Keywords:** Arboreum cotton, green manuring, seed cotton yield.

### Introduction

India is the second largest producer (after China) of cotton lint worldwide (FAO, 2013). Organic cotton production systems - holding a minor percentage of the cotton growing area in India - are often neglected and little information exists on the productivity and profitability of organic farming in India (Charyulu and Biswas, 2010). Fertility levels of soils should be improved through organic means before opting for this kind of cultivation. Just after the cotton season is over, the land may be ploughed in late February or early March to allow solarisation of soil in hot summer months. This enables the exposure of life stages of pests and diseases such as pupae of bollworms or disease causing organisms. However, organic cotton production is slowly gaining momentum in the global cotton market (Bachmann, 2012). GM cultivars are not compatible with the guidelines of organic agriculture (IFOAM, 2012). CICR recommends varieties which are hardy and jassid-tolerant and early maturing as hybrids may not always be suitable. In India, a number of local 'desi' varieties of *G. herbaceum* and *G. arboreum* are grown besides the 'American hybrids'. They are usually more resistant to pests and to drought. 'Desi' varieties (hardy, drought resistant) could be of great interest, especially for organic farmers with less irrigation. The main aim of the trial is to assess the agronomic performance of arboretum cotton under organic

management in scarce rainfall zone of Andhra Pradesh for maximizing the productivity under rainfed condition.

### Material and Methods

A field experiment was conducted at Regional Agriculture Research Station, Nandyal, Andhra Pradesh during *kharif* 2011-16 on vertisols to optimize organic nutrient management for arboretum cotton in scarce rainfall zone of Andhra Pradesh for maximizing the productivity under rainfed condition. The soil was deep black, moderately alkaline with a pH 8.2, low in available nitrogen ( $195 \text{ kg ha}^{-1}$ ), high in available phosphorous ( $74 \text{ kg ha}^{-1}$ ) and potassium ( $425 \text{ kg ha}^{-1}$ ). The experiment was laid out in randomized block design with eight treatments and replicated thrice. The treatments comprised of 5 t /ha FYM + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_1$ ); 2.5 t /ha vermicompost + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_2$ ); 10 t /ha FYM /compost + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_3$ ); 5 t /ha vermicompost + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_4$ ); *In situ* green manuring of *sesbania* + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_5$ ); Castor cake @ 500 kg /ha + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_6$ ); RD (20-20 NP kg  $\text{ha}^{-1}$ ) of nutrient through organic based on P equivalent basis + green manuring with *sesbania* 50 kg seed /ha and incorporated at 30-45 DAS ( $T_7$ ) and control ( $T_8$ ). Sowing of arboreum variety Yaganti was done at plant geometry of 60 cm x 30 cm on 5.4 x 4.5 m plots by dibbling of seeds. Fertilizers were applied as per the protocol. The observations on Plant height, number of monopods and sympods  $\text{plant}^{-1}$ , number of bolls  $\text{m}^{-2}$ , boll weight and seed cotton yield were recorded. The data were subjected to statistical analysis as outlined by Gomez and Gomez (2010).

### Results and Discussion

Growth parameters i.e. plant height and number of monopodia  $\text{plant}^{-1}$  did not differ significantly among treatments. Higher number of monopodia  $\text{plant}^{-1}$  (16.4) was recorded with 5 t /ha vermicompost + seed treatment with azotobacter + PSB @ 25g each /kg of seed ( $T_4$ ) and at par with all other treatments except  $T_6$  and  $T_8$ . Significantly higher number of bolls  $\text{m}^{-2}$  (139.1) were observed with RD of nutrient through organic based on P equivalent basis + green manuring with *sesbania* 50 kg seed  $\text{ha}^{-1}$  and incorporated at 30-45 DAS ( $T_7$ ) and at par with  $T_4$  (133.8),  $T_3$  (130.3),  $T_2$  (124.6) and  $T_1$  (105.3). The results of present investigation on number of bolls per plant are in conformity with the findings by Awasya *et al.* (2006) and Bhalerao *et al.* (2007). Boll weight did not differ significantly due to different

treatments. Application of RD of nutrient through organic based on P equivalent basis + green manuring with *sesbania* 50 kg seed /ha and incorporated at 30-45 DAS ( $T_7$ ) recorded higher seed cotton yield ( $1768 \text{ kg ha}^{-1}$ ) and at par with  $T_4$  ( $1659 \text{ kg ha}^{-1}$ ),  $T_3$  ( $1554 \text{ kg ha}^{-1}$ ),  $T_2$  ( $1502 \text{ kg ha}^{-1}$ ) and  $T_1$  ( $1463 \text{ kg ha}^{-1}$ ). All the growth and yield parameters were significantly lower in control ( $T_1$ ). This could be ascribed to the effect of mineralization of organic sources or through solubilization of the nutrients from the native sources during the process of decomposition. This also might be ascribed to the improvement in the soil physical, chemical and biological properties due to the incorporation of green manure which might have hastened the nutrient availability as well as better soil condition for root penetration. The results are in close agreement with the findings reported by Subramanian *et al.* (2000). Higher seed cotton yield might be due more number of bolls per unit area (Shukla *et al.*, 2013).

### **Conclusion**

Arboreum cotton can be grown with application of recommended dose of nutrient (20-20 NP  $\text{kg ha}^{-1}$ ) through organics based on P equivalent basis + green manuring with *sesbania* @ 50 kg seed  $\text{ha}^{-1}$  and incorporated at 30-45 days after sowing (DAS) for getting higher yields in the scarce rain fall zone of Andhra Pradesh.

### **Acknowledgement**

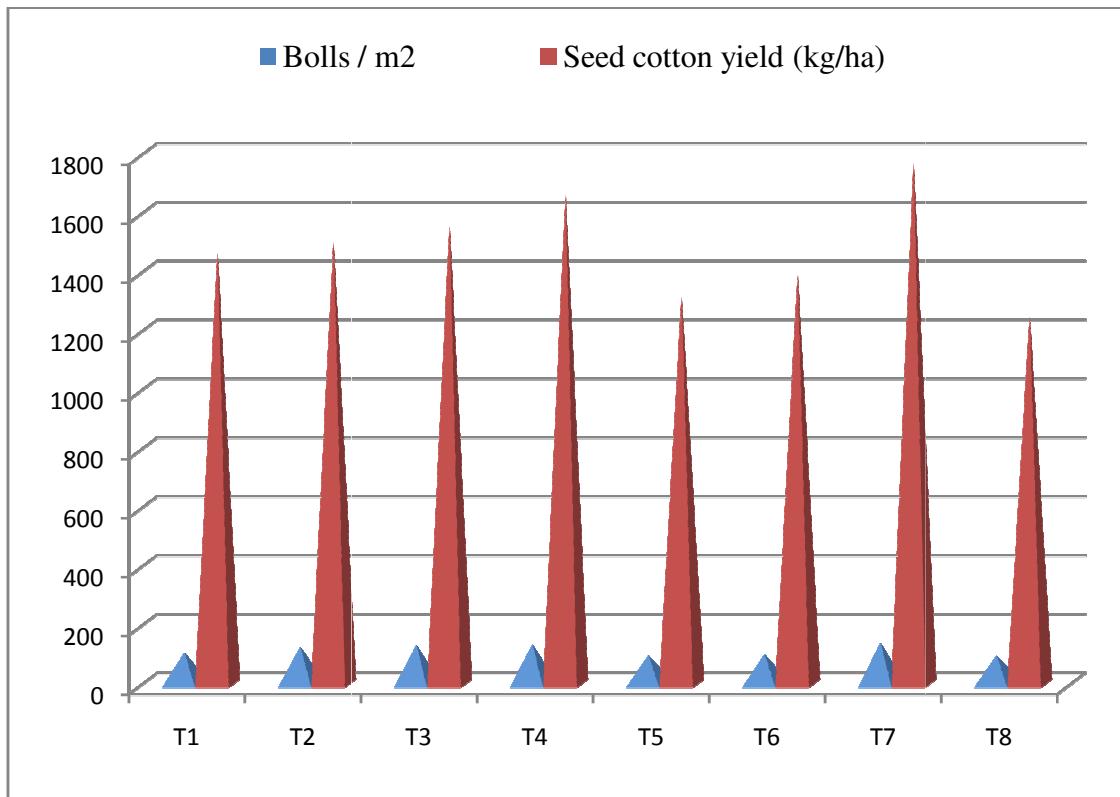
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**Fig 1.** Yield parameters of *arboreum* cotton due to different organic treatments



Treatments	Plant height (cm)	No. of monopodia Plant <sup>-1</sup>	No. of sympodia Plant <sup>-1</sup>	No. of bolls m <sup>-2</sup>	Boll weight (g)	Seed cotton yield (Kg ha <sup>-1</sup> )
T <sub>1</sub> - 5 t /ha FYM + seed treatment with azotobacter + PSB @ 25g each /kg of seed	136.8	1.9	15.1	105.3	2.93	1463
T <sub>2</sub> - 2.5 t /ha vermicompost + seed treatment with azotobacter + PSB @ 25g each /kg of seed	132.6	1.6	14.3	124.6	2.86	1502
T <sub>3</sub> - 10 t /ha FYM /compost + seed treatment with azotobacter + PSB @ 25g each /kg of seed	133.0	1.6	13.5	130.3	2.80	1554
T <sub>4</sub> - 5 t /ha vermicompost + seed treatment with azotobacter + PSB @ 25g each /kg of seed.	130.9	1.5	16.4	133.8	2.86	1659
T <sub>5</sub> - <i>In situ</i> green manuring of <i>sesbania</i> + seed treatment with azotobactor + PSB @ 25g each /kg of seed	125.8	1.6	14.5	96.2	2.73	1313
T <sub>6</sub> - Castor cake @ 500 kg /ha + seed treatment with azotobacter + PSB @ 25g each /kg of seed	125.2	1.9	12.1	99.5	3.06	1389
T <sub>7</sub> - RD of nutrient through organic based on P equivalent basis + green manuring with <i>sesbania</i> 50 kg seed /ha and incorporated at 30-45 DAS	129.1	1.3	14.3	139.1	2.73	1768
T <sub>8</sub> - Control	128.1	1.46	12.4	95.5	2.93	1245
S.E. m ±	5.41	0.2	1.3	12.8	0.19	124
CD (P= 0.05)	NS	NS	3.8	38.4	NS	376
CV (%)	7.2	19.7	15.5	16.0	11.5	14.4

**Table 1. Growth and yield parameters of arboreum cotton as influenced by different organic treatments**