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Effect of plant growth regulators on yield and yield contributing character of Bt cotton (*Gossypium hirsutum* L) hybrid

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Abstract

Plant growth regulators are used for cotton (*Gossypium hirsutum* L.) canopy manipulation to avoid excess growth and yield losses. Application of Mepiquat chloride @ 15ml and 10ml/10 lit of water at square and flowering stage was found significantly superior through out all growth stages which is resulted in alteration of cotton plant growth and development like reduction in plant height, internode length, reduction in leaf area and monopodial branches. It also responsible for increase in sympodial branches, relative water content, chlorophyll content, yield and yield parameters in Bt cotton hybrid. Application of mepiquat chloride (mc) at square and flower formation stage was found effective in reducing plant height, internode length, sympodia, increase in RWC, chlorophyll content and yield attributes as well as GMR, NMR and B:C ratio of Bt cotton.

Keywords: Regulators, contributing, *Gossypium hirsutum*

Introduction

Cotton (*Gossypium hirsutum*. L) is one of the most important commercial cash crops, important fibre crop of global significance and cultivated in more than seventy countries. It is an important raw material of economy in terms of both employment generation and foreign exchange and hence it is known as: 'White gold' or 'friendly fibre and king of fibre'. The cotton plant belongs to the genus *Gossypium* of the family Malvaceae. Cotton is one of the principle crops of India and plays a vital role in the country's economic growth by providing substantial employment and making significant contributions to export earnings. Plant growth regulators are substances, when added in small amounts modify the growth of plant usually by stimulating or inhibiting part of the natural growth regulation. Plant growth regulators are known to modify the source to sink relationship and increase the translocation and photosynthetic efficiency resulting in increased square and boll retention and boll set percent. MC is also known to modify source-sink relationship and stimulate translocation of photo-assimilates towards effective flower, fruit and seed development and ultimately enhanced crop productivity. It only affects new plant growth as effect of mepiquat chloride is function of plant size and concentration of the product applied.

Material and Method

The field experiment was conducted during *Kharif* season of 2017 at the experimental farm, Department of Agril. Botany, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani Experiment was laid out in randomized block design as per the plan after preparatory cultivation. The layout consisted of thirty experimental plots in three replications. Data on growth and yield attributes were recorded from five randomly selected plants in each treatment plot. The experiment comprising Bt cotton hybrid Ajeet-155 and using PGRs to study effect of spraying on plant growth and yield of cotton. By using PGRs with different proportion such as Ethrel 100 ppm at 45 DAS+ 80 DAS, MH 750 ppm at 45 DAS+ 80 DAS, MH 1000 ppm at 45 DAS+80 DAS, Ethrel 100 ppm at 45 DAS+MH750 ppm at 80 DAS, Ethrel 100 ppm at 45 DAS+ MH 1000 ppm at 80 DAS, Cycocel 100 ppm at 45 DAS +80 DAS, Cycocel 150 ppm at 45 DAS+80 DAS, Mepiquat Chloride 10ml/10 lit at 45 DAS+80 DAS, Mepiquat Chloride 15ml/10 lit at 45 DAS+ 80 DAS.

Statistical analysis and interpretation of data

The data recorded on various variables were statistically analyzed by using technique of analysis of variance and significance was determined as given by Panse and Sukhatme (1967). Whenever differences were significant, C.D. values were indicated for comparison otherwise only the values of SE \pm were indicated. Graphical illustrations of data have been given at appropriate places. The critical difference was worked out whenever the treatment effects were statistically significant

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Results**Yield and Yield Contributing Characters**

The data pertaining to the yield and yield contributing

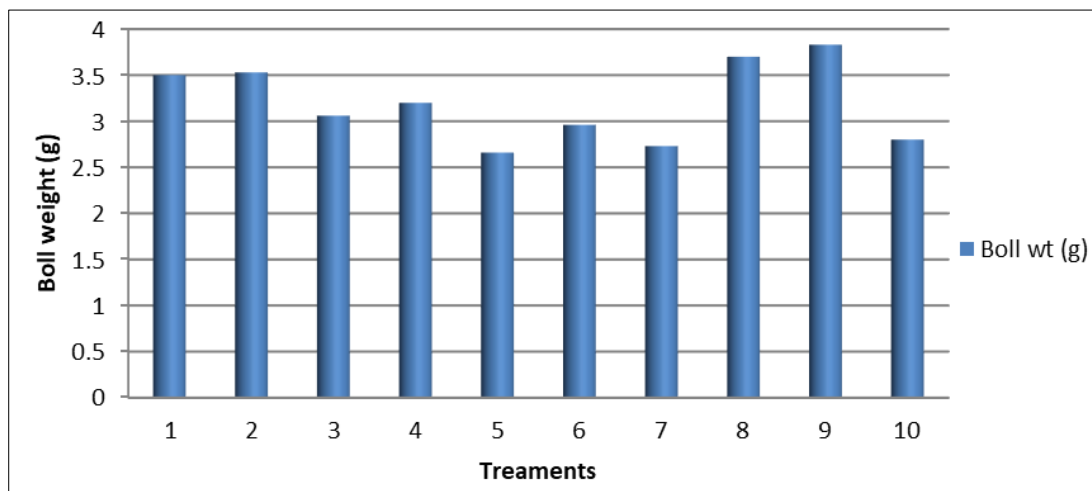
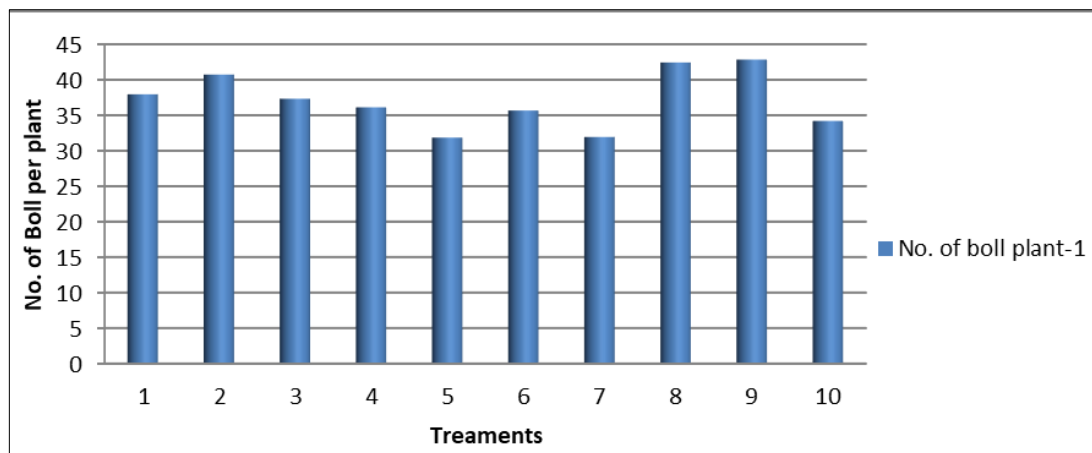
characters of Bt cotton viz., yield kg ha⁻¹, no. of bolls plant⁻¹, weight of boll⁻¹ (g boll⁻¹), cotton yield per plant (g plant⁻¹), yield per plot and harvest index (%) are presented in Table 1.

Table 1: Yield and yield contributing characters

S. No	Treatments	Yield kg ha ⁻¹	No. of boll plant ⁻¹	Boll wt (g)	Yield Plant ⁻¹ (g)
T ₁	Ethrel 100 ppm at 45 DAS+ 80 DAS	1690	37.96	3.20	119.8
T ₂	MH 750 ppm at 45 DAS+ 80 DAS	1875	40.73	3.53	130.5
T ₃	MH 1000 ppm at 45 DAS+80 DAS	1705	37.33	3.06	114.7
T ₄	Ethrel 100 ppm at 45 DAS+MH750 ppm at 80 DAS	1680	36.13	3.20	114.1
T ₅	Ethrel 100 ppm at 45 DAS+ MH 1000 ppm at 80 DAS	1402	31.86	2.66	88.43
T ₆	Cycoceal 100 ppm at 45 DAS +80 DAS	1805	35.66	2.96	109.4
T ₇	Cycoceal 150 ppm at 45 DAS+80 DAS	1393	31.93	2.73	108.64
T ₈	Mepiquat Chloride 10ml/10 lit at 45 DAS+80 DAS	1888	42.43	3.70	133.5
T ₉	Mepiquat Chloride 15ml/10 lit at 45 DAS+ 80 DAS	1935	42.86	3.83	137.1
T ₁₀	Control	1583	34.20	2.80	107.0
	SE ±	74.91	1.56	0.1	4.7
	CD at 5%	219.7	4.6	0.3	14.2
	CV	7.4	7.3	8.5	7.27
	GM	1696	36.90	3.17	113.9

Among the treatments the highest cotton yield kg per hectares was recorded in treatment T₉ (Mepiquat Chloride 15ml/10 lit at 45 DAS+ 80 DAS)(1935kg/ha) followed by T₈ (Mepiquat Chloride 10ml/10 lit at 45 DAS+80 DAS)(1888 kg/ha) and T₂ (MH 750 ppm at 45 DAS+ 80 DAS)(1875kg/ha) over all treatments and control. The mean number of bolls per plant

was 36.90 however the significantly higher bolls per plant, The mean boll wt (g) per plant was 3.21. The mean yield plant⁻¹ (g) was 113.9 however the significantly higher yield per plant, The mean yield per plot (kg) was 3.21 however the significantly higher yield per plant.



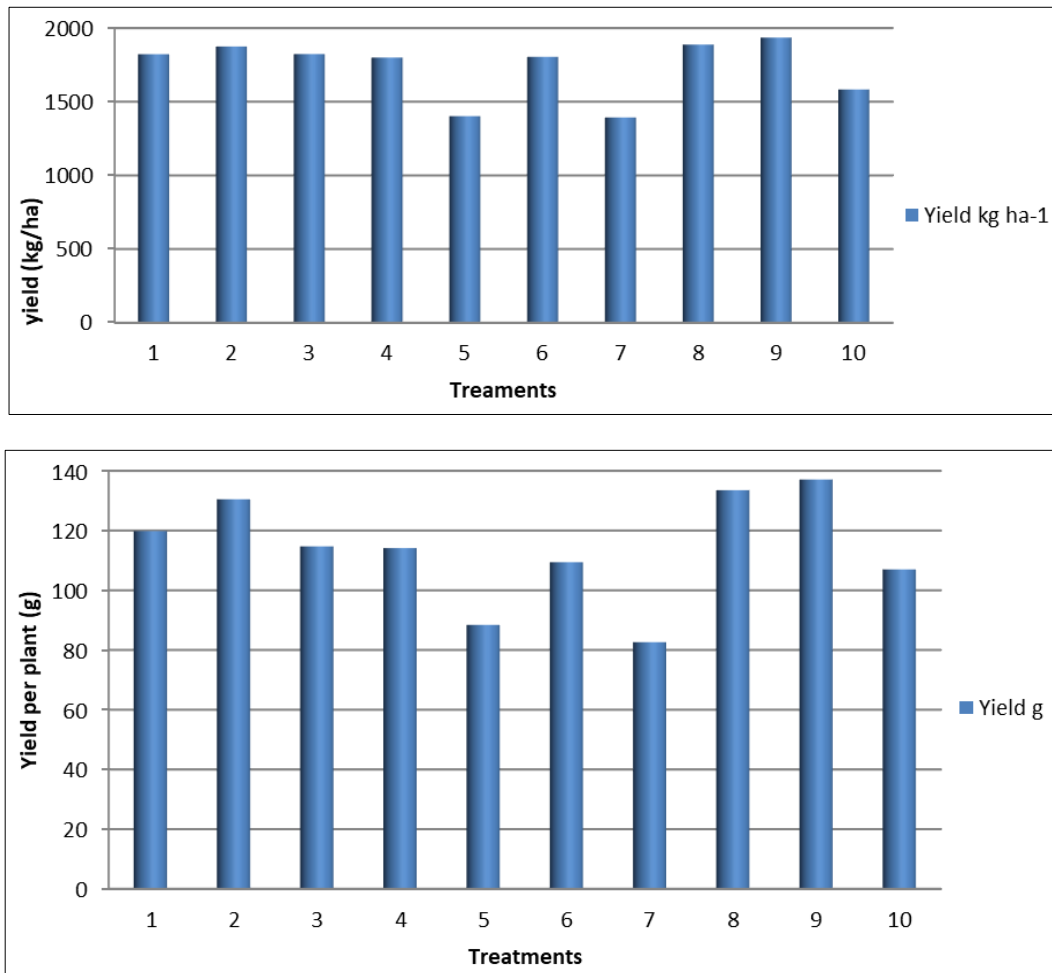


Fig 11: Yield and yield contributing characters (no. of bolls plant⁻¹, weight of boll⁻¹ (g boll⁻¹), cotton yield per plant (g plant⁻¹) Yield per kg ha⁻¹).

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