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RESEARCH ARTICLE

Evaluation of promising pre-release inter specific cotton hybrids

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SUMMARY

Field experiment was conducted at Agricultural Research Station, Borwat Farm, Banswara during *Kharif* -2012 to find out the optimum plant geometry and fertility levels for inter specific cotton hybrids. Sowing of RAHB-189 cotton hybrid gave significantly higher seed cotton yield (1798 kg ha^{-1}) over DCH-32. The maximum seed cotton yield (1976 kg ha^{-1}) was observed under plant geometry of 90 x 60 cm than closer plant geometry of 90 x 45 cm and wider plant spacing 90 x 90 cm. Though, yield attributing parameters such as bolls plant^{-1} and boll weight were statically improved in wider as compared to closer spacing it could be increase the seed cotton yield under sowing at 90 x 60 cm plant spacing. Among fertility levels, similar seed cotton yield was recorded with the application of 100 % RDF (1983 kg ha^{-1}) and 125 % RDF (2018 kg ha^{-1}) but both were significantly better than that of 75 % RDF and plant geometry 90 x 60 cm seemed to be ideal for inter specific hybrid cotton for realizing higher productivity under the specific agro climatic zone IV b.

Key Words : Inter specific cotton, Plant geometry, Seed cotton yield, Fertility levels

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Plant geometry having greater importance in cotton cultivation. Bt cotton crop may be producing excessive vegetative growth at wider plant geometry and excessive reproductive growth at close plant geometry. However, numerically lower monopodial with closer plant geometry and lower sympodial with wider plant geometry were observed indicating more period under vegetative growth with wider spacing (Buttar and Singh, 2006). Closer plant geometry also recorded higher seed cotton yields (Sankarnarayanan *et al.*, 2004).

Nutrients are second most important limiting factor of crop production after water. Most often soil in the rainfed regions are not only thirsty but also hungry. It is now well established that for achieving high yields, the nutrient demand of crop should be met cotton crop growth follows a typical sigmoidal pattern. Dry matter accumulation is maximum during the active growth phase

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(40-100 days). Application of nutrients should be done well before the grand growth period between 45-60 days. Nutrient management in cotton is complex due to simultaneous production of vegetative and reproductive structures during the active growth phase. The nutrient supplementation period can be increased, which provides long time from square formation to boll development. Hence, nutrient requirement during critical stages can be better met. Need for major nutrients especially nitrogen and potassium rises dramatically when bolls are set on the plants which are major sinks for potassium and high concentrations of potassium are required to maintain sufficient water pressure (water potential) for fibre elongation. Most of the cotton growing soils are losing their fertility level due to continuous mining of the nutrients from the soil (Blaise and Prasad, 2005). Thus an efficient nutrient management plan is the key in the light of the negative nutrient balances. Nutrient management in Bt-cotton is a better challenge to boost production and productivity.

MATERIAL AND METHODS

An experiment was conducted during *Kharif* 2012 at Agricultural Research Station, Borwat Farm, Banswara. The eighteen treatment combinations comprised of two cotton hybrids (RAHB-189 and DCH-32) in main plot, three plant geometries (90 x 45, 90 x 60 and 90 x 90 cm) in sub plot and three fertility levels (75, 100 and 125 % RDF) in sub-sub plot under split plot design with four replications. Experimental field was well prepared by two ploughing followed by harrowing and cultivator and one planking for uniform levelling were performed for sowing of cotton. The soil was medium in available nitrogen (241 kg/ha), phosphorus (46 kg/ha) and high in available potassium (322 kg/ha) during the crop season. The crop was sown in first week of June by dibbling 2-3 seeds per hills and full dose of phosphorus and potash were applied before sowing, while nitrogen dose was given in two splits *i.e.* first half at the time of thinning and remaining half at flowering stage. All production and protection measures were applied as per package and practices of the zone IV b.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Growth:

Data show that the sowing of inter specific hybrid cotton, among the cotton hybrids the RAHB-189 was proved superior over DCH-32. Cotton hybrid RAHB-189 gave higher plant height (151.55cm), monopodial branches plant^{-1} (1.63), sympodial branches plant^{-1} (18.37) as compared to DCH-32 cotton hybrid plant height (147.17 cm), monopodial branches plant^{-1}(1.49), and

Table 1: Effect of plant geometries and nutrient levels on growth, yield attributes and seed cotton yield of inter specific hybrid cotton

Treatments	Plant height (cm)	Monopodial branches plant^{-1}	Sympodial branches plant^{-1}	Bolls plant^{-1}	Boll weight (g)	Seed cotton yield (kg ha^{-1})
Inter specific hybrids						
RAHB-189	151.55	1.63	18.37	34.52	3.88	1798
DCH -32	147.17	1.49	14.56	30.15	3.56	1562
S.E. $\pm$	1.22	0.03	1.02	1.05	0.03	62
C.D. (P=0.05)	3.63	0.08	3.10	3.10	0.09	180
Crop geometry						
90 x 45 cm	149.42	1.54	13.67	24.56	3.48	1602
90 x 60 cm	154.17	1.61	17.24	31.84	3.60	1976
90 x 90 cm	156.48	1.63	19.06	35.72	3.66	1720
S.E. $\pm$	1.35	0.02	0.70	1.60	0.03	84
C.D. (P=0.05)	4.09	0.06	2.19	4.47	0.08	248
Nutrient levels						
75 % RDF	146.13	1.50	14.20	25.22	3.43	1658
100 % RDF	151.24	1.58	18.56	32.28	3.63	1983
125 % RDF	155.71	1.61	20.11	34.50	3.69	2018
S.E. $\pm$	1.57	0.02	0.80	1.60	0.03	76
C.D. (P=0.05)	4.95	0.06	2.19	4.49	0.09	230

sympodial branches plant^{-1} (14.56). The plant spacing 90 x 60 cm gave significantly higher plant height (154.17 cm), monopodial branches plant^{-1} (1.61) and sympodial branches plant^{-1} (17.24) over sowing at 90 x 45 cm plant spacing plant height (149.42 cm), monopodial branches plant^{-1} (1.54) and sympodial branches plant^{-1} (13.67), but it was found at par with sowing at 90 x 90 cm wider plant spacing (Table 1). Significantly increase the growth of cotton with the increasing of fertility levels, application of 100 % RDF and 125 % RDF were found at par with each other. The maximum plant height (151.24 cm), monopodial branches plant^{-1} (1.58) and sympodial branches plant^{-1} (18.56) were observed under application of 100 % RDF over application of 75 % RDF plant height (146.13 cm), monopodial branches plant^{-1}(1.50) and sympodial branches plant^{-1} (14.20). The plant height was more in wider inter row and closer intra row spacing. It might be due to competitions for solar radiation in closer spacing for the process of photosynthesis and thereby plants produced more height in search of light. Bastia (2000), Thokale *et al*. (2004) and Narayana *et al.* (2007) also observed that plant height was highest in closer intra row spacing.

Yield attributes:

Cotton hybrid RAHB-189 gave higher bolls plant^{-1} (34.52), boll weight (3.88) over DCH-32 cotton hybrid bolls plant^{-1} (30.15), boll weight (3.56). The plant spacing 90 x 60 cm gave significantly higher bolls plant^{-1} (31.84), boll weight (3.60) over sowing at 90 x 45 cm closer plant spacing bolls plant^{-1} (24.56), boll weight (3.48), but it was found at par with sowing at 90 x 90 cm wider plant spacing. Application of 100 % RDF and 125 % RDF were found at par with each other. The maximum bolls plant^{-1} (32.28), boll weight (3.63) were observed under application of 100 % RDF over application of 75 % RDF bolls plant^{-1} (25.22), boll weight (3.43). Rekha *et al*. (2008) also recorded significantly more seed cotton yield due to increase in number of sympodial branches /plant under higher fertility levels.

Seed cotton yield:

Data shows that the sowing of cotton hybrids RAHB-189 gave maximum seed cotton yield (1798 kg ha^{-1}) as compared to DCH-32 cotton hybrid seed cotton yield (1562 kg ha^{-1}). Significantly higher seed cotton yield (1976 kg ha^{-1}) was recorded under sowing at 90 x 60 cm plant spacing over sowing at closer plant spacing at 90 x 45 cm and wider plant spacing at 90 x 90 cm seed cotton yield (1602 and 1720 kg ha^{-1}, respectively). Increasing the seed cotton yield with the increasing of fertility levels, application of 100 % RDF and 125 % RDF were found at par with each other. The maximum seed cotton yield (1983 kg ha^{-1}, respectively) was found under application of 100 % RDF over application of 75 % RDF seed cotton yield (1658 kg ha^{-1}). The plant geometry has marked influence on seed cotton yield per plant. The increase in seed cotton yield per plant was observed in plant geometries 90 cm x 60 cm than 90 cm x 45 cm and 90 cm x 90 cm. This might be due to better aeration, adequate interception of light and lesser competition for available nutrient and moisture, which have resulted in synthesis of higher photosynthates and in turn helped to produce higher seed cotton yield per plant under wider intra row spacing. Similar results were reported by Sankaranarayanan *et al*. (2004) and Buttar and Singh (2006).

Conclusion:

Based on the results it was concluded that variety RAHB-189 inter specific hybrid proved superior with 90 x 60 cm plant spacing and 100% RDF over DCH-32 in respect of seed cotton yield.

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