

## Effect of High Density Planting System (HDPS) and varieties on yield and economics of *desi* cotton

A. S. Karle, Pradeep Kumar, D. N. Gokhale, A.S. Jadhav and Deshraj singh

**ABSTRACT:** A field experiment entitled “Effect of High Density Planting System (HDPS) and varieties on yield and economics of *desi* cotton” was conducted at Cotton Research Scheme, VNMKV, Parbhani during Kharif 2014-15. The soil was clayey in texture with low in available nitrogen, medium in available phosphorus and high in available potassium. The climatic condition during experimental period was favourable. The experiment was laid out in split plot design with four levels of plant densities i.e. 45 x 15 cm, 45 x 22.5 cm, 45 x 30 cm and 60 × 10 cm in main plots and three levels of *desi* cotton varieties i.e. PA 08, PA 528 and PA 255 in sub plots. The sowing of cotton at 45 x 30 cm (74074 plants/ha) recorded significantly higher number of squares, picked bolls per plant and seed cotton yield per plant as compared to 45 x 15 cm, 45 x 22.5 cm, and 60 × 10 cm spacing. The seed cotton yield (Kg/ha) and the maximum gross and net monetary returns and B: C ratio were recorded significantly higher at 45 x 15 cm as compared to other spacings. The *desi* cotton variety PA 528 produced highest seed cotton yield per hectare, the maximum gross and net monetary returns and B: C ratio than both PA 08 and PA 255.

**Key words:** HDPS, *Desi* cotton varieties, Yield, Economics

Cotton (*Gossypium spp.*) also called as “The white gold” is one of the most important fibre and cash crop of global importance and being cultivated in tropical and subtropical regions of almost 80 countries of the world. The top five producers are China, India, USA, Pakistan and Uzbekistan. India occupy first rank in area and constitutes more than 25% of world area under cotton and having second position in production next to China. In India cotton is grown over an area of 115.53 lakh hectares with production of 375.00 lakh bales with productivity of 552 kg lint/ha. (Anonymous, 2014).

In Maharashtra cotton is cultivated over an area of 38.72 lakh hectares with production of 81 lakh bales and having productivity of 356 kg lint/ha. (Anonymous, 2014). Cotton production in India is considered to have a wide reaching impact not only on the livelihood of farmers and economy of the country but also on international trade. Cotton productivity depends on various factors among them selection of potential genotypes along with plant densities play a vital role in increasing the productivity of cotton. The *desi* cotton are known to have survive vagaries of nature for millions of year and thus tolerant and resistant to diseases, pests and

adverse environmental conditions. Now it is an established fact that American cotton varieties are more susceptible to insect pests like jassids, whiteflies, aphids and diseases like bacterial blight, verticillium wilt and leaf curl virus and because of high cost of cultivation they are also considered as major cause of farmer’s suicide. Recently, VNMKV, Parbhani have released new *desi* cotton genotype viz., PA 08, PA 528. The maximum exploitation of these genotypes can be achieved only after determining their optimum planting densities in comparison to recommended cotton varieties. In general it was observed that lower plant densities produces high values of growth and yield attributes per plant, but yield per unit area was higher with higher plant densities. (Namdeo *et al.*, 1991; Dhoble *et al.*, 1992; Sharma *et al.*, 2001). Some time it may happen that moderate increase in plant densities may not increase the yield but decrease due to competition between plants for nutrients, water, space and light. (Nehra and Kumawat, 2003). By keeping in view of above facts, present research work was planned with the objectives to find out the effect of High Density Planting System (HDPS) on yield and economics of *desi* cotton.

\* Department of Agronomy, College of Agriculture, VNMKV, Parbhani

## MATERIALS AND METHODS

A field experiment was conducted at Cotton Research Scheme, VNMKV, Parbhani during *Kharif* 2014-15. The topography of experimental field was fairly uniform, leveled and with a good drainage. The soil was clayey in texture with low in available nitrogen (157.51 Kg/ha), medium in available phosphorus (9.68 Kg/ha) and high in available potassium (466.86 Kg/ha). The soil pH, organic carbon and electrical conductivity were 7.86, 0.70% and 0.48 ds/m, respectively. Geographically Parbhani is situated at 19°16' North latitude and 76°47' East longitude and at 409 altitude above sea level in Marathwada division encompassed by 17°35' to 24°40' North latitude and 74°49' to 78°15' East longitude geographical boundaries. Parbhani comes under subtropical climate. It has a mean annual precipitation of 963 mm, distributed in 48 rainy days, mostly during June to October. The mean daily maximum and minimum temperatures varies from 29.16 in December to 41.14 in May and 11.95 in December to 24.95 in May, respectively. Mean relative humidity ranges from 30 to 90 percent. The experiment was laid out in split plot design with four levels of plant densities i.e. 45 x 15 cm, 45 x 22.5 cm, 45 x 30 cm and 60 x 10 cm in main plots and three levels of *desi* cotton varieties i.e. PA 08, PA 528 and PA 255 in sub plots. The crop was sown on 11<sup>th</sup> July 2014 (27<sup>th</sup> MW) by dibbling 2 cotton seeds per hill as per the spacing. The fertilizers were applied as per treatments. Half dose of nitrogen and complete dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O was applied through urea and 10:26:26 fertilizer as basal application. Top

dressing of remaining half dose of nitrogen was given after 30 days after sowing through urea by ring method. The biometric observations were recorded as per the standard procedure.

## RESULT AND DISCUSSION

Data on yield and economics of *desi* cotton as influenced by various treatment are presented in Table 1. The yield attributing characters viz., number of picked bolls per plant, seed cotton yield per plant were considerably higher under wider plant spacing of 45 x 30 cm (S<sub>3</sub>) due to better development of individual plant in wider plant spacing crop. The widely spaced plant received optimum microclimate and the beneficial influence on plant development. The mean boll weight was not significantly influenced by different plant densities, While the seed cotton yield (Kg/ha), the maximum gross and net monetary returns and B: C ratio were highest in 45 x 15 cm plant spacing compared to wider spacing due to more number of plants per unit area. At 60 x 10 cm spacing seed cotton yield/ha was decreased because the reduction in yield per plant due to both inter-plant and intra-plant competition for resources, was more than compensated by increase in the number of plants per unit area. These above results are in accordance with those obtained by Buttar, G.S. and Sudeep Singh (2007), Narayana, E. and Aparna, D. (2011), Sharma *et al.* (2001), Giri and Gore (2006) and Namdev *et al.* (1991). The *desi* cotton variety PA 528 produced significantly more yield per plant, yield per hectare, the gross and net monetary returns and B: C ratio than

**Table 1**  
Seed cotton Yield (Kg/ha) and economics *desi* cotton as influenced by different treatments

Treatments	Seed cotton Yield (Kg/ha)	Cost of cultivation (Rs/ha)	Gross monetary returns (Rs/ha)	Net monetary returns (Rs/ha)	B:C ratio
Plant densities (cm)					
S <sub>1</sub> - 45 x 15 (148148 plants / ha)	2063	37555	87586	50031	2.33
S <sub>2</sub> - 45 x 22.5 (98765 plants / ha)	1807		35776	76032	402552.12
S <sub>3</sub> - 45 x 30 (74074 plants / ha)	1621	34565	67903	33338	1.94
S <sub>4</sub> - 60 x 10 (166666 plants / ha)	1798	36431	77524	41093	2.12
SEm ±	27.46	137	1085	987	0.02
CD at 5%	95.05	475	3754	3418	0.08
Varieties					
V <sub>1</sub> - PA 08	1803	35987	76498	40510	2.11
V <sub>2</sub> - PA 528	2085	37393	88017	50623	2.34
V <sub>3</sub> - PA 255	1579	34865	67269	32404	1.91
SEm ±	18.11	90	705	615	0.01
CD at 5%	54.30	271	2115	1844	0.04
Interaction (S x V)					
SEm ±	72.46	362	2822	2461	0.05
CD at 5%	NS	N.S.	N.S.	N.S.	N.S.
<b>G.mean</b>	<b>1822</b>	<b>36082</b>	<b>77261</b>	<b>41179</b>	<b>2.13</b>

PA 08 and PA 255. However, boll weight was not affected significantly due to different *desi* cotton varieties.

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