Eurasian Journal of Analytical Chemistry
ISSN: 1306-3057

Sustaining Productivity of Deshi Cotton Hybrid to Different Plant Spacings And Nitrogen Levels

S. KRISHNAPRABU
Department of Agronomy, Faculty of Agriculture, Annamalai University.

Received 14 June 2015 ▪ Revised 23 August 2015 ▪ Accepted 24 September 2015

Abstract: *A field investigation was conducted on clay soil of Department of Agronomy, experimental farm at Annamalai University during 2014 to study the response of deshi cotton hybrid to different plant densities and nitrogen levels. The nine treatments comprises of three spacings and three nitrogen levels. The experiment was laid out in factorial randomized block design with three replications. On the basis of results obtained from present investigation it was the lowest plant spacing (90 x 60 cm) that gave more seed cotton yield 2670.40 kg/ha over its highest levels of spacing. Application of 80 kg N/ha significantly gave more seed cotton yield 2834.40 kg/ha over 60 kg N/ha and on par with 100 kg N/ha.*

Keywords: *Cotton, nitrogen levels, plant spacing, yield and Boil Water.*

INTRODUCTION

Commercially cotton is best export earning commodity in the country. The area under cotton in India is 91.32 lakh hectares with production of 270 lakh bales and productivity 503 kg lint per hectare (Anonymous, 2006). Productivity of cotton in India is lagging far behind the world average. Gossypium arboreum, species of cotton is most widely distributed in the country. The present arboreum species are mostly indeterminate in habit, their plant phenology make it difficult for management including cotton picking.

The hybrids have higher yield potential and may produce different phenology which permit better management including cotton picking. Recently some private companies have developed arboreum hybrids but its phenological requirement and nutrient particularly nitrogen is the present need to increase productivity and sustainability of cotton. Considering the above points in view experiment was conducted to study the response of deshi cotton hybrid to plant densities and nitrogen levels.

MATERIALS AND METHODS

The experiment was conducted at the Experimental Farm, Annamalai University, Annamalai Nagar. The experiment was laid out in Factorial Randomized Block Design with three replications. There were nine treatment combinations. The combination of three spacings viz., 90 x 60, 90 x 75 and 90 x 90 cm and three nitrogen levels viz., 60, 80 and 100 kg/ha were included. The cotton variety MRDC 227 was used. The crop was sown by dibbling with two cotton seeds per hill. The fertilizers were applied as per treatments. Half dose of nitrogen through urea and complete dose of P2O5 and K2O was applied through 'Suphala' as a basal application by ring method at the time of sowing. Top dressing of remaining half dose of nitrogen was given after 36 days after sowing through urea by ring method. Other cultural practices and plant protection measures was given according to the recommended package of practices. At maturity, the observations on ancillary characters were recorded on five randomly selected plants in each plot. The total yield/ha were recorded on net plot basis.

RESULT AND DISCUSSION

Effect of plant spacing : Various plant spacings influenced the plant height (Table 1). Maximum height (242.89 cm) was found at higher plant population (90 x 60 cm). It is evident from that plant spacing i.e. 90 x 90 cm recorded maximum dry matter accumulation per plant (388.91 g) as against 371 g under plant spacing of 90 x 60 cm. Similar results were reported earlier by Moola Ram and Giri (2006). The sympodial branches per plant (34.24) was found more at higher plant spacing (90 x 90 cm). This is in confirmation of results represented by Bastia (2000). The increase in picked bolls and seed cotton yield per plant was observed with higher plant spacing (90 x 90 cm). Similar results were reported by Katore et at. (2006a) and Nehra and Kumawat(2003). The seed cotton yield at closer spacing was increased may be due to high plant density, which was responsible to harvest more bolls per unit area reflected in increased in yield (Table2). Similar findings were reported earlier by Moola Ram and Giri (2006).

Table 1. Mean height (cm) of cotton as influenced by various treatments at different growth stages

Treatment	Days after sowing						
	30	60	90	120	150	180	At harvest
Spacing (cm)							
S_1 - 90 x 60	18.25	155.74	189.26	212.00	226.06	240.56	242.89
S_2 - 90 x 75	18.67	152.52	188.71	208.88	256.77	237.06	239.71
S_3 - 90 x 90	17.34	149.80	185.76	204.40	220.19	233.00	236.64
SEm +	0.32	1.06	0.70	1.53	1.36	1.07	1.40
CD at 5%	NS	3.19	2.10	4.60	4.10	3.21	4.19
Nitrogen (kg/ha)							
N_1 -60	18.02	145.27	182.77	204.23	221.50	231.21	235.49
N_2-80	18.12	151.53	188.26	209.00	224.84	237.84	239.83
N_3-100	18.94	161.37	194.22	211.44	229.72	241.56	239.68
SEm +	0.32	1.06	0.70	1.53	1.36	1.07	1.40
CD at 5%	NS	3.19	2.10	4.60	4.10	3.21	4.21
Interaction (S x N)							
SE +	0.56	1.84	1.21	2.66	2.37	1.86	2.42
CD at 5%	NS	NS	NS	NS	NS	NS	NS
General mean	18.26	152.69	187.62	208.42	225.35	236.54	238.64

Table 2. Yield contributing characters and yield of cotton (kg/ha) in different treatments

Treatments	Number of picked bolls per plant	Yield per plant	Boll weight (g)	Yield (kg/ha)
Spacing (cm)				
S_1 - 90 x 60	32.35	149.59	4.58	2669.29
S_2 - 90 x 75	38.56	182.02	4.59	2622.40
S_3 - 90 x 90	44.92	213.07	4.59	2569.05
SEm +	1.40	6.49	0.0081	99.03
CD at 5%	4.20	19.44	NS	NS
Nitrogen (kg/ha)				
N_1 -60	36.65	162.43	4.29	2409.90
N_2 - 80	41.29	195.04	4.61	2836.12
N_3-100	37.73	182.60	4.71	2609.39
SEm +	1.40	6.49	0.0081	99.03
CD at 5%	NS	19.41	0.024	297.12
Interaction (S x N)				
SE +	2.43	11.25	0.014	171.53
CD at 5%	NS	NS	NS	NS
General mean	38.48	181.52	4.59	2620.46

Effect of nitrogen : Plant height was profoundly influenced by every increase in level of nitrogen (Table 1). The maximum height of 244 cm was obtained at 100 kg N/ha while it was low (235.4 cm) at lower level of nitrogen. The number of functional leaves per plant increased as fertility level increased. This could be due to particularly more number of branches per plant as observed under higher fertilizer level attributed to more number of internodes as reflected from more height and so more number of functional leaves per plant. Total dry matter production was increased with increase in nitrogen doses and maximum was achieved at 100 kg N/ha. Similar results were reported by Katkar et at. (2000). The monopodia and sympodia increased with highest levels of nitrogen. Similar results were obtained by Thirumurugan etal. (1984). The increase in number of picked bolls per plant, yield per plant boll weight and yield (kg/ha) were observed higher upto 80 kg N/ha and decrease further at 100 kg N/ha (Table 2). Similar results were reported by Sharma etal. (2001). Saleem et al 2010, Clawson et al 2006, Sawan et al 2006, Prasad 2006.

REFERENCES

[1]. Anonymous. 2006. All India Cotton Seed Crushers Association. : 1-3.

[2]. Bastia, D.K. 2000. Response of cotton hybrid Savita to spacing and NPK treatments under rainfed conditions of Orissa. Indian J. Agric. Sci. 70 (8): 541-542.

[3]. Katkar, R.N., Turkhede, A.B., Wankhede, S.T. and Solanke, V.M. 2000. Studies on the agronomic requirement of promising cotton hybrids Crop. Res. Hisar, 19 (3): 525-526.

[4]. Katore, J.R., Wankhade, S.T., Chavan, A.K., Sajid, M. and Tiwari, V.A. 2006. Effect of spacing and fertilizer levels on soil moisture studies and economics in Hirsutum cotton hybrids. Crop Prot. Prod. 3(1): 26-28.

[5]. Mooia Ram and Giri, A.N. 2006. Response of newly released cotton (Gossypium hirsutum) varieties to plant densities and fertilizer levels. J. Cotton Res. Dev. 20 (1): 85-86.

[6]. Nehra, P.L. and Kumawat, P.D. 2003. Response of hirsutum cotton varieties to spacings and nitrogen levels. J. Cotton Res. Dev. 17(1): 41-42.

[7]. Sharma, J.K., Upadhyay, A., Khamparia, S.K., Mishra, U.S. and Mandloi, K.C. 2001. Effect of spacing and fertility levels on growth and yield of hirsutum genotypes. J. Cotton. Res. Dev. 15(2): 151-153.

[8]. Thirumurugan, V., Kolandaiswamy, S. and Muthukrishnan, P. 1984. Studies on the response of hybrid cotton C 135-156 to varied spacings and graded levels of nitrogen. Madras Agric. J. 71 (3): 195-197.

[9]. Zhao W, Wang Y. Zhouz, meng Y, Chen B, Oosterhuis DM. 2012. Effect of Nitrogen rates and flowering dates of fibre quality of Cotton (Gossypium hirsutum L.) Am. J. Exp. Agri, 2 : 133-159.

[10]. Siebert JD,m Stewart Am, Leonard BR. Comparative growth and yield of cotton planted at various densitiers and configurations. Agron J. 2006; 98: 562-568.

[11]. Siddiqui mH, oad Fc, Burriro VA. Plant spacing effects on growth and lint of cotton. Asian J. Pl. Sci. 2007; 2: 415-418.

[12]. Reddy Kr, Kotis, Davidonis GH, Reddy VR. Interactive Effects of Carbon dioxide and Nitrogen nutrition on Cotton growth, development, yield and fiber quality, Agron J. 2004: 96: 1148-1157.

[13]. Saleem MF, Bilal MF, Aqwais M, Shahid MQ, Arjum SA. Effect of Nitrogen on Seed cotton yield and Fibre qualities of cotton Cultivars J. Anim SPI. Sci 2010: 20 : 23-27.

[14]. Clawson EL, Cothren JT, Blouri DC. Nitrogen Fertilization and yield of cotton in Ultra – narrow and Conventional row spacings. Agron. J. 2006: 98: 72-79.

[15]. Jawan ZM, Mahmod MH, El-GuibaliAH. Response of Yield, yield components and the fibre properties of egyptian cotton to nitrogen fertilization and foliar applied potassium and mepiqueat chloride J. Cotton Sci, 2006; 10: 224-234.

[16]. Prasad, M. Siddiquw .MRB, 2004 Effect of Nitrogen and mepiquat chloride on yield and quality of upland cotton(Gossypium hitrdutum). Indian J. Agric. Sci. 2004. 74: 560-562.