

Evaluation of agronomic management practices for yield enhancement in summer irrigated cotton

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Abstract: Choice of suitable cultivar and nutrient management practices are foremost important to tap the yield potential of summer irrigated cotton which shows upward trend in the Southern districts of Tamil Nadu, India. Studies conducted at Agricultural Research station, Paramakudi for two years (summer 2001 and 2002) indicated that among the varieties tested (MCU 7, SVPR 2 and SVPR 3), SVPR 2 was found to give higher kapas yield (12.6 and 8.1 Q / ha). Recommended NPK + foliar spray of DAP 2% and KCl 1% on 60 and 75 days after sowing enhanced the yield to the tune of 32% and 13% as compared to recommended dose of NPK alone (60: 30: 30 kg ha⁻¹). Treatment combination of SVPR 2 with recommended NPK and foliar nutrition gave higher net return and benefit: cost ratio.

Key words: Summer irrigated cotton, Foliar nutrition

Introduction

In the Southern districts of Tamil Nadu, India, cotton is cultivated during summer season (March - June). Area under summer irrigated cotton is slowly picking up in this region. Cultivating improved varieties with high yield potential may promote the cotton yield. It is also important to adopt appropriate nutrient management technique to increase the yield. Foliar N fertilization of cotton is a widely used production practice to augment soil - applied N fertilization programmes. When soil N and foliar N treatments significantly interacted under irrigated conditions, yields increased with each increment of soil - applied N until a maximum was reached. Foliar N tended to increase yields more on cotton grown with lower soil - applied N rates (Mc Connell, *et al.* 1998). Foliar sprays with 2 per cent DAP on 75 and 90 days after sowing (DAS) improved the flower number and resulted in higher seed set (Sastri *et al.* 2001). Application of recommended N and P (40: 20 kg / ha) along with 1% Mg 864 foliar spray at 45,

60 DAS recorded significantly highest seed cotton yield of MCU 10 (Kannaiyan *et al.* 2001). Foliar application of KCl, DAP, urea and KNO₃ increased the seed cotton yield due to more number of bolls per plant. (Brar and Brar, 2002). Field experiments were planned to find out suitable cotton cultivar and to test appropriate nutrient management on growth and yield of summer cotton.

Materials and methods

Field experiments were conducted at Agricultural Research Station (TNAU), Paramakudi, Tamil Nadu during summer, 2001 and 2002. The experiments were planned in a split plot design with three replications. Main plots included cotton varieties: MCU 7 (V₁), SVPR 2 (V₂), SVPR 3 (V₃). In the sub plots, nutrient management practices were followed: T₁ - recommended NPK (60 : 30 : 30 kg ha⁻¹), T₁ + DAP 2% spray (T₂), T₁ + KCl 1% spray (T₃), T₁ + DAP 2% + KCl 1% (T₄), DAP 2% + KCl 1% spray alone (T₅). Sowing was taken up with a spacing of 75

Table 1. Effect of varieties and foliar spray on growth and yield parameters of summer irrigated cotton 2001 and 2002.

Treatment	Summer 2001					Summer 2002						
	Plant height	No. of sympodial branches	No. of bolls per plant	Boll weight (g)	Plant height	No. of sympodial branches	No. of bolls per plant	Boll weight (g)	Plant height	No. of sympodial branches	No. of bolls per plant	Boll weight (g)
V1	71.8	8.9	10.7	2.80	61.4	8.2	10.0	2.32				
V2	76.3	11.5	11.2	2.48	71.0	13.6	13.7	2.45				
V3	74.8	11.2	14.8	2.26	64.9	11.5	11.7	2.28				
CD(P=0.05)	0.5	0.2	0.5	0.04	1.5	1.0	0.4	0.11				
T1	73.4	10.7	12.4	2.28	64.9	10.7	11.6	2.37				
T2	75.7	11.2	13.2	2.88	68.0	12.0	13.0	2.48				
T3	73.7	10.5	12.8	2.35	67.6	11.9	12.2	2.40				
T4	78.3	11.7	15.8	2.50	71.8	14.2	15.4	2.69				
T5	70.5	8.8	7.0	2.20	56.6	6.7	6.9	2.14				
CD(P=0.05)	0.7	0.3	0.5	0.04	1.3	0.6	0.6	0.06				

x 30 cm on 07.03.2001 and 06.03.2002. Full dose of P & K and 50% N were applied on 20-25 DAS at the time of hoeing. Remaining 50% N was applied on 40-45 DAS during formation of ridges and furrows. Foliar nutrient sprays were given as per the treatments on 60 and 75 DAS. Harvest was completed on 07.08.2001 and 05.06.2002. Plant height, number of sympodial branches per plant, bolls / plant, boll weight and kapas yield were recorded and statistically analyzed. Economics viz. net return and benefit - cost ratio were worked out at the prevailing market rate.

Results and discussion

Growth and yield parameters

Among the varieties tested, SVPR 2 recorded higher plant height, sympodial branches, boll number and boll weight. Foliar spray of DAP 2% + KCI 1% produced significantly taller plants with more number of sympodial branches, more number of bolls with higher weight. Interaction effect was found significant for all the characters in both the years except boll weight during 2001. Cotton variety, SVPR 2 receiving DAP 2% + KCI 1% as foliar spray on 60 and 75 DAS performed better due to continuous supply of nutrients through foliar spray. The results are in confirmation with the earlier findings of Brar and Brar (2002) (Table 1).

Kapas yield and economics

Among the varieties, SVPR 2 recorded higher seed cotton yield of 1262 and 811 kg ha⁻¹ during 2001 and 2002 respectively. Adopting the nutrient management practice of DAP 2% + KCI 1% foliar spray recorded higher kapas yield during both years (1390 and 830 kg ha⁻¹ respectively). Interaction effect was also found to be significant. Cotton

Table 2. Effect of varieties and foliar spray on Kapas yield and economics of summer irrigated cotton, 2001 and 2002.

	Kapas yield (kg ha ⁻¹)						Economics (Mean of 2 years)								
	Summer, 2001			Summer, 2002			Net return (Rs/ha)			B: C ratio					
	VI	VZ	V3	Mean	VI	VZ	V3	Mean	VI	VZ	V3	Mean	VI	VZ	V3
T1	928	1175	1049	1051	595	867	684	715	2268	6160	3840	715	1.29	1.76	1.47
T2	1047	1333	1145	1175	601	947	779	776	2915	7655	4985	776	1.32	1.89	1.58
T3	1102	1287	1153	1181	559	895	731	728	3053	6960	4733	728	1.32	1.81	1.54
T4	1247	1575	1346	1390	651	990	850	830	4540	9543	7105	830	1.46	2.03	1.76
T5	655	940	88 ³	826	243	357	338	313	1245	1748	743	313	0.80	1.16	1.04
Mean	996	1262	1116		530	811	677								

CD (P=0.05)

V	41	45
T	49	30
VI	83	64
TV	84	53

variety, SVPR 2 with recommended NPK and foliar spray of DAP 2% + KCl 1% recorded higher seed cotton yield (1575 kg ha⁻¹ and 990 kg / ha respectively) in both the years. Me Connell *et al.* (1998) reported that foliar N treatments significantly increased lint yields of cotton. Increase in yield due to DAP application might be due to increase in flower number, ovule number, pollen number, weight and viability as was reported by Sasthri *et al.* 2001 .

In both the years, cotton variety, SVPR 2 under various nutrient treatments gave higher net return (Rs. 7158 ha⁻¹ and Rs. 7229 ha⁻¹) and B : C ratio (1:1.6 and 1:1.85) as compared to MCU 7 and SVPR 3. Among the nutrient management, recommended NPK and foliar spray of DAP 2% + KCl 1% recorded higher net return (Rs. 8582 ha⁻¹ and Rs. 5543 ha⁻¹) and B : C ratio (1:1.6 and 1:1.80). Application of DAP 2% and KCl 1% alone was not economically viable. On an average, cultivation of cotton variety, SVPR 2 and adoption of recommended NPK with foliar spray of DAP 2% + KCl 1 % recorded higher net return (Rs. 9543 ha⁻¹) and B : C ratio (1:2.03) in both the years (Table 2).

To conclude, it can be recommended that SVPR 2 cotton is best suited for summer irrigated situation. Foliar nutrient spray of DAP 2% + KCl 1% on 60 and 75 DAS along with recommended NPK (60:30:30kg/ha) improved the kapas yield and gave higher economic returns.

