

levels, groundnut + black gram-rice-sesamum due to the inclusion of two oilseed crops (groundnut and sesamum) produced higher fat output.

Protein output

It was higher in sorghum + vegetable cowpea-rice-soybean. It was mainly due to the inclusion of protein rich soybean. Cropping of sorghum + vegetable cowpea-rice-soybean was followed by groundnut + black gram-rice-sesamum due to comparatively higher protein content of groundnut, black gram and sesamum. Protein output was higher in recommended level of irrigation, which was due to higher protein content and moderate yield of soybean. Cropping of rice-rice- green gram, sorghum + vegetable cowpea-rice-soy bean, maize + soybean-rice-vegetable cowpea, and groundnut + black

gram-rice- sesamum produced more protein output under recommended level of irrigation, which was due to adequate moisture supply through the crop growth stages of *kharif* and summer crops leading to higher yield and ultimately protein output. At both the irrigation levels, the cropping of sorghum + vegetable cowpea-rice-soybean could produce higher protein output as a result of higher protein content in both soybean and vegetable cowpea.

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SPACING AND FERTILIZER REQUIREMENT OF NEW VARIETIES OF COTTON

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ABSTRACT

Field experiments conducted at Coimbatore revealed that the new cotton varieties viz., TCH.959, 77/10, ACP 27-1/1 and TCH.1002 recorded higher seed cotton with a spacing of 50 x 20cm and with a fertilizer level of 80:40:40 kg NPK ha⁻¹.

To obtain the maximum yield of cotton it is obligatory to find out the optimum combination of nutrients and spacing in relation to the varieties. The chief objective of manuring is to make up the deficiency of certain nutrients in the soil and to neutralise others that are in excess, thereby providing with all essential elements in the right proportion needed for growth. Yield from an area depends on the plant population though the yield of seed cotton per plant may be adjusted by the number of bolls per plant (Asana, 1975). Hence, an experiment was conducted to study the effect of plant population (spacings) and fertilizer levels on some new varieties of cotton.

MATERIALS AND METHODS

Field experiments were conducted at Coimbatore during the winter seasons of 1987-88, 1988-89 and 1989-90 under All India Coordinated Cotton Improvement Project to find out the spacing

and fertilizer requirement of new varieties of cotton under irrigated conditions. The treatments comprise of three varieties during 1987-88 (TCH.959, 77/10 and ACP.27-1/1, three varieties during 1988-89 (77/10, ACP.27-1/1 and TCH.1002) and two varieties during 1989-90 (77/10 and TCH.1002) with two spacings (75 x 30 cm. and 50 x 20cm.) and with three fertilizer levels viz., 80:40:40, 120:60:60 and 160:80:80 kg NPK ha⁻¹. The experiment was laid out in a split plot design with varieties and spacings in main plot and fertilizer levels in the sub plot with three replications. The soil type was clay loam with low (182 kg ha⁻¹), medium (18 kg ha⁻¹) and high (640 kg ha⁻¹) in available N, P₂O₅ and K₂O respectively. The crop was sown on 26.8.87, 21.8.88 and 2.9.89 during the respective years. Half of N was applied as basal at the time of sowing and remaining half was applied at 45 days after sowing as per the treatment schedule. Full dose of P₂O₅ and K₂O were applied

Table 1. Effect of Fertilizer levels and spacings on seed cotton yield (kg ha⁻¹)

Variety (V)	1987-88						1988-89						1989-90						
	Spacing (S)		Fertilizer (F)			Mean	Spacing (S)		Fertilizer (F)			Mean	Spacing (S)		Fertilizer (F)			Mean	
	S1	S2	F1	F2	F3		S1	S2	F1	F2	F3		S1	S2	F1	F2	F3		
TCH. 959	1127	1369	1415	732	1010	952	-	-	-	-	-	-	-	-	-	-	-	-	-
77/10	868	1074	1404	1072	965	1147	2094	2148	2102	2234	2027	2121	2299	2388	2369	2295	2368	2344	-
ACP 27-1/1	862	1225	1227	1106	1157	1163	2027	2332	2072	2258	2211	2180	-	-	-	-	-	-	-
TCH. 1002	-	-	-	-	-	-	1739	2329	2026	2040	2037	2034	2326	2407	2337	2406	2357	2366	-
Mean	952	1233	1248	970	1044	-	1954	2270	2067	2177	2091	-	2313	2398	2353	2350	2363	-	-
S1 - 75 x 30 cm, S2 - 50 x 20 cm, F1 - 80:40:40, F2 - 120:60:60, F3 - 160:80:80 kg. NPK ha ⁻¹																			
CD (P=0.05)	V		NS			-	V		NS			-	V		NS			-	-
	S		181			-	S		219			-	S		NS			-	-
	F		121			-	F		NS			-	F		NS			-	-
	V at S		NS			-	V at S		NS			-	V at S		NS			-	-
	V at F		193			-	S at N		NS			-	S at F		NS			-	-
	S at F		NS			-	V at F		NS			-	V at F		NS			-	-
	VXSXF		NS			-	VXSXF		NS			-	VXSXF		NS			-	-

as basal at the time of sowing as per the treatment. Necessary irrigation and need based plant protection were given to the crop. The results of the experiment are presented in Table-1.

RESULTS AND DISCUSSION

All the varieties tested in the experiment were equally productive and they are on par with respect to seed cotton yield (Table-1). The variety ACP.27-1/1 better during 1987-88 and 1988-89 and TCH.1002 recorded appreciable yield during 1989-90. Among the spacings, 50x20cm. recorded significantly higher yields compared to 75x30cm. during the first two years. This would have been due to the higher plant density of (1,00,000 plants ha⁻¹). The plant density effect was not significant during the third year. Similarly increased yields due to closer spacing also reported by Brar *et al.* (1990).

Among the fertilizer levels tried, 80:40:40 kg NPK ha⁻¹ significantly recorded higher seed cotton yield during 1987-88 and there was no significant increase in yield due to fertilizer application even at 120:60:60 and 160:80:80 kg. NPK ha⁻¹ during 1988-89 and 1989-90. This suggest that the varieties tested under the experiment needs only the

recommended level of NPK (80:40:40 kg ha⁻¹) and increased levels of fertilizer is not necessary.

The interaction effect of varieties and fertilizer levels was significant only during 1987-88. Under 80:40:40 and 120:60:60 kg NPK ha⁻¹ fertilizer levels, yields of varieties 77/10 and ACP 27-1/1 were on par and with higher fertilizer level (160:80:80 kg NPK ha⁻¹), the yield of all the varieties were on par. This indicates that the varieties 77/10 and ACP 27-1/1 responds to fertilizer application upto 120:60:60 kg NPK ha⁻¹ and none of the varieties responded at higher levels (160:80:80 kg ha⁻¹). Under the variety ACP.27-1/1 all the fertilizer levels were on par indicating that this variety lacks response to fertilizer application.

It can be concluded that varieties 77/10, ACP 27-1/1 TCH.1002 and TCH.952 can be sown at a closer spacing (50x20cm) and applied fertilizer at 80:40:40 kg NPK ha⁻¹ during the winter season for better productivity.

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