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Studies on the Effect of Plant Density and Graded Level of NPK on leaf Yield of Tobacco Variety Vazhaikkappal

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The results from the field experiments conducted at the Agricultural Research Station, Tamil Nadu Agricultural University, Bhavanisagar during Rabi 1980-81 and 81-82 revealed that application of NPK at 200-100-100 Kg/ha and a spacing of 60 x 70 cm were optimum for realising maximum leaf yield in tobacco var. Vazhaikkappal.

In India, tobacco occupies an area of about 4.45 lakh ha. with a production of about 4.0 lakh tonnes. The crop is grown in Tamil Nadu in an area of 16000 ha. of which 12000 ha. is under chewing tobacco. Fertilizer levels and spacing adopted to tobacco crop varies with the type and purpose for which it is grown. Since leaf yield is the important factor in case of chewing tobacco, abundant supply of nutrients with adequate plant population is necessary to get maximum yields.

MATERIAL AND METHODS :

Field experiments were conducted at the Agricultural Research Station, Tamil Nadu Agricultural University, Bhavanisagar during *Rabi* seasons of 1980-81 and 1981-82 to study the effect of plant density and graded levels of NPK on tobacco variety Vazhaikkappal. Split plot design was adopted with three replications. Three spacing viz., 60x75, 75x75 and 90x75cm formed the main plot treatments. The sub plots included four levels of NPK viz., control, 50-25-25, 100-50-50 and 150-75-75 Kg/ha. During Rabi 1981-82 one more fertilizer level (200-100-100 kg/ha) was included in the sub plot treatment. The experimental field was low in available N (135 kg/ha), P (1.8 kg/ha) and K (101 kg/ha). Nitrogen and potassium were applied in two equal on 45th and 60th day after transplanting while phosphorus was applied as basal. Plant protection and other cultural operations recommended by the University for the crops were followed. The crop was harvested at maturity and plant wet weight/ha was recorded. The plants were sun-cured for 15 days and then the leaves were stripped off from the stalk and treatment wise dry leaf-yield per/ha was recorded. Pooled analysis of the two season data and economics of tobacco production were also worked out..

RESULTS AND DISCUSSION

The closer spacing of 60 x 75 cm (22, 222 plants ha) recorded the highest plant wet weight and dry leaf yield in both the years. The plant wet weight and leaf yield obtained by

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adopting 60x75 cm spacing were 8504 kg/ha and 1769 kg/ha during 1980-81 and 11852 kg/ha and 1,731 kg/ha during 1981-82 (Table 1) Walunjkar and Kori (1979) obtained maximum yields in tobacco by adopting a spacing of 80 x 80 cm or 120 x 60 cm in black soils and 100x60 cm in light soils. In another report tobacco cured leaf-yield of 1581 kg/ha was obtained by adopting 90x60 cm as against 782 kg/ha with 90 x 90 cm spacing. (Anonymous, 1958). Carotenuto *et.al.* (1981) reported that topped plants grown with spacing of 60 cm in the row recorded higher yields.

The fertilizer level of 150-75-75 kg NPK/ha registered the highest yield of 9740 kg/ha of plant wet weight and 1790 kg/ha of dry leaf yield during 1980-81. During 1981-82, the plan· wet weight (12181 kg/ha) and dry lea yield (2161 kg/ha) were maximum under 200-100-100 kg NPK/ha. There were several reports on variable fertilizer requirement for different tobacco varieties. Gopalachari *et al.* (1981) reported maximum tobacco yields in varieties I-375, I 64 and HV-67-9 by applying 185 kg Ammonium sulphate and 620 kg super phosphate/ha. By adopting a fertilizer level of 60-25-50 kg NPK/ha. Rao and Patel (1979) reported maximum yield in tobacco var HR 62-7 by applying 40-80-80 kg NPK/ha. Nogueira *et. al.* (1981) recommended 105-80-180 kg NPK/ha for obtaining higher production of tobacco. Pooled analysis of both the season's leaf yield revealed that application of 150-75-75 kg NPK/ha has given the maximum yields (Table 1.) Also, application of 150-75-75 kg NPK/ha registered the maximum net return of Rs. 5827 during Rabi 1980-81 (Table 3) and application of 200-100 100 kg NPK/ha resulted in a maximum net return of Rs. 7191 during Rabi 1981-82. In both the seasons the minimum adopted spacing of 60 x 75 cm recorded maximum net returns.

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Table 1 Effect of plant density and graded level of NPK on tobacco (Vazhaikkappal) (Rabi season)

Treatment	Plant wet weight (Kg/ha)		Leaf yield (Kg/ha)		Pooled anlysis of leaf yield over to seasons (Kg/ha)
	1980-81	1981-82	1980-81	1981-82	
Spacing					
60 x 75 cm	8504	11852	1769	1731	1662
75 x 75 cm	6576	9475	1417	1431	1332
90 x 75 cm	6097	8543	1255	1283	1194
CD (P=0.05)	1339	1492	183	223	123
NPK levels (Kg ha)					
Control	4098	4691	1117	884	1001
50-25-25	6330	6914	1398	1130	1264
100-50-50	8067	9012	1614	1448	1531
150-75-75	9740	11029	1790	1786	1788
200-100-100	Not tested	12181	Not tested	2161	
CD (H=0.05)	763	1926	293	296	216

Table 2. Economics of plant density and graded level of NPK on tobacco (Vazhoaikkappal)

Treatment	1980-81			1681-82		
	Leaf yield (Kg/ha)	Cost of cultivation (Rs./ha)	Net return (Rs./ha)	Leaf yield	Cost of cultivation (Rs./ha)	Net return (Rs./ha)
Spacjug						
60 x 75 cm	1799	2000	6845	1731	2000	6655
75 x 75 cm	1417	2000	5085	1431	2000	5155
60 x 75 cm	1255	2000	4275	1283	2000	4415
NPK levels (Kg/ha)						
Control	1117	1650	3935	884	1650	2770
50-25-25	1398	2141	4849	1130	2141	3509
100-50-50	1614	2632	5438	1448	2632	4608
150-75-75	1790	3124	5827	1786	3123	680y
200-100-100		Not tested		2161	3614	7191

Note : Cost of tobacco Rs. 5.00/Kg
Cost of N Rs. 5.13/Kg
Cost of P_2O_5 Rs. 5.50/Kg
Cost of K_2O Rs. 2.10/Kg