OPTIMUM SPACING OF GROUNDNUT AS INTERCROP IN TAPIOCA

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Tapioca, *Man/hot esculenta* Crantz, is an important subsidiary food crop of Kerala. It is grown not only as a sole crop but also as a mixed crop with groundnut, cowpea, yam, sweet potato, green gram etc. Intercropping tapioca with seasonal crops has been proved to be the most effective method for increasing the net income by the use of available light and nutrients more efficiently (Suryatna and Hardwood, 1976). However, the information on spacing of intercrop is not available with respect to different intercrops. Hence the present study was undertaken with a view to find out the optimum spacing of groundnut as an intercrop in tapioca.

Materials and Methods

The investigations were carried out during three consecutive years, 1977-78, 1979-80 and 1980–81 at the Research Station and Instructional Farm, Mannuthy. The soil type is of deep well drained sandy loam with pH of 5.1.

The design of experiment was randomised block replicated three times with ten treatments including the control as follows:

T_1 Tapioca alone
T_2 Tapioca + one row of groundnut 20 cm apart
T_3 — Tapioca + one row of groundnut 30 cm apart
T_4 Tapioca + one row of groundnut 40 cm apart
T_5 Tapioca + two rows of groundnut 20 cm apart
T_6 Tapioca + two rows of groundnut 30 cm apart
T_7 Tapioca + two rows of groundnut 40 cm apart
T_8 Tapioca + three rows of groundnut 20 cm apart
T_9 Tapioca + three rows of groundnut 30 cm apart
T_{10} Tapioca + three rows of groundnut 40 cm apart

The varieties used were M 4 tapioca and TMV 2 groundnut. The tapioca was planted by level method at a spacing of 75 cm x 75 cm in the plot of size of 40 sqm. Both the crops were planted simultaneously. Farm yard manure was applied at the rate of 12.5 tonnes per ha at the time of land preparation. Complete dose of phosphorus (125 kg P_2O_5/ha) was applied along with half dose of nitrogen (30 kg/ha) and potassium (62.5 kg/ha) as basal application. Remaining half dose of nitrogen (30 kg/ha) and potassium (92.5 kg K_2O/ha) were applied 60th day after planting. Lime at the rate of one tonne per ha was applied for groundnut 45 days after sowing. yield data of tapioca tubers and groundnut pods were recorded plotwise from 1977 to 1981 and statistically analysed.

Table 1

Mean yield of tapioca and groundnut in different spacing of groundnut (q/ha)

Treatments	Mean yield of tapioca			Overall mean	Mean yield of groundnut			Overall mean
	1977-78	1979-80	1980–81		1977-78	1979–80	1980-81	
T,	104.40	113.32	98.25	105 32	—	—	—	—
T₂	100.40	99.82	85.58	95.26	1.75	3.50	4.25	3.17
T₃	109.17	107.92	102.75	106.62	3,50	1.90	4.45	3.28
T₄	81.50	87.50	74.00	81.00	3.07	2.95	1.75	2.59
T₅	70.82	109.17	59.50	79,83	3,52	6.17	5.83	5.17
T₆	91.42	86.67	88.16	88.75	3.42	3.10	4.20	3.57
T₇	93,07	92.07	78.16	87.77	3.32	4.12	3.75	3.73
T₈	56.25	58.42	46.91	53.86	3.50	5.12	5.70	4.77
T₉	60.82	64.57	51.16	58.85	3.25	6.62	5.87	5.25
T₁₀	45.82	54,57	41.83	47.41	2.50	4.62	4.58	3.90
C D (0.05)				5.72**				NS

** Significant at 5% level,   NS - not significant

Table 2

Economics of intercropping groundnut with tapioca

Treatments	Mean yield of tapioca (q/ha)	Income obtained @ Rs. 70/q (Rs/ha)	Mean yield of ground-nut (q/ha)	Income obtained @ Rs 400/q (Rs/ha)	Total income (Rs/ha)	Cost of Cultiva-tion (Rs/ha)	Profit (Rs/ha)	Percentage gain over control
T_1	105.32	7372.40	—	—	7372.40	2500	4872.40	—
T_2	95.26	6668.20	3.17	1268	7936.20	2770	5166.20	+ 6.03
T_3	106.62	7463.40	3.28	1312	8775.40	2680	6095.40	+ 25.10
T_4	81.00	5670.00	2.59	1036	6706.00	2635	4071.00	-16.45
T_5	79.83	5588.10	5.17	2068	7656.00	3040	4616.00	—55.26
T_6	88.75	6212.50	3.57	1428	7640.50	2860	4780.50	— 1.89
T_7	87.77	6143.90	3.73	1492	7635.90	2770	4865.90	—0.13
T_8	53.86	3770.20	4,77	1908	5678.20	3310	2368.20	-51.40
T_9	58.85	4119.50	5.25	2100	6219.50	3040	3179.50	-34.75
T_{10}	47.41	3318.70	3.90	1560	4878.70	2905	1973.70	-59.49

Results and Discussion

The data on the yield of tapioca tubers and groundnut pods with different spacing of groundnut are presented in Table 1. The result indicated that there is significant difference in the yield of tapioca.

The mean yield of tubers was the highest when tapioca was grown with one row of groundnut at 30 cm spacing. This was significantly superior to all other treatments except tapioca alone, which was on par in terms of tuber yield. The groundnut yield, however, did not reach the level of significance despite the variation in the number of rows of groundnut ranging from 1 to 3 and spacing from 20 cm to 40 cm. In addition to this, interplanting of more than one row of groundnut between two rows of tapioca also resulted in a severe reduction in tuber yield of the crop as evident from Table 1. The mean tuber yield of tapioca in intercropping with one row of groundnut with 30 cm spacing was 106.62 q/ha-The same trend was reported by Potti and Thomas (1978) and Thomas and Nair (1979).

The economics of intercropping groundnut with tapioca is presented in Table 2. The total income increases with the increase in the rows of groundnut, except in T_8, T_9 and T_{10}, the cost of cultivation also was found to be increased. It is seen that tapioca + one row of groundnut with spacing of 30 cm apart was found to accrue a 25.10% increase in profit over the sole crop whereas, tapioca + one row of groundnut with 20 cm apart recorded only a margin of 6.03% profit over the sole crop of tapioca.

There was no significant difference in the groundnut yield in different treatments indicating that though the population intensity of groundnut influences the yield of tapioca it did not influence the yield of groundnut in this inter-cropping system.

Summary

The results from the studies conducted at the Research Station and Instructional Farm, Mannuthy from 1977 to 1981 indicated that among different treatments, growing one row of groundnut at 30 cm apart may be optimum for intercropping with tapioca as compared to the sole crop of tapioca. In addition, it is possible to get an increase in income of Rs. 1,223 per ha than growing tapioca alone,

സംഗ്രഹം

മരച്ചീനിയ്ക്കിടയിൽ നിലക്കടല ഇടവിളയായി നടുമ്പോഴം സ്വീകരിക്കേണ്ട അക ലം. നിർണ്ണയിക്കാനായി ഒരു പഠനം. കേരള കാർഷിക സർവകലാശാലയുടെ കീഴിലുള്ള മണ്ണുത്തി ഇൻസ്ട്രക്ഷണൽ ഫാമിൽ 1977 മുതൽ 1981 വരെ നടത്തുകയുണ്ടായി. പഠന വിധേയമായ വിവിധ അകലങ്ങളിൽ, ഓരോ വരി നിലക്കടല 30 സെ. മീ. raw കലത്തിൽ മര ച്ചീനിയ്ക്കിടയിൽ കൃഷി ചെയ്തപ്പോഴം അധിക വരുമാനം ലഭ്യമാക്കാമെന്നു തെളിഞ്ഞി രിക്കുന്നു.

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