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EFFECT OF LEVELS AND TIME OF APPLICATION OF POTASH ON GROWTH AND YIELD OF TAPIOCA

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Tapioca is the most important subsidiary food crop of Kerala. It is also gaining importance as an industrial crop as well as a source of cattle feed. This is a crop which requires considerable quantity of K and the response to K is found to vary even among the high yielding varieties. There is some vagueness about the exact time and proportion of split doses of K to be given to the crop. Trials conducted at Trivandrum showed that the crop has responded to split application of K only up to two months after planting (Mandal, 1969 and Mandal and Singh, 1970). However, from a detailed experiment from Nigeria, Obigbesan (1973) reported that the crop can utilise applied K even after nine months of planting. The present study was therefore taken up to investigate the effect of levels and split application of K, in conjunction with Farm Yard Manure.

Materials and Methods

A field experiment was conducted at the College of Agriculture Vellayani with four levels, of K_2O (37. 5, 75, 112.5 and 150 kg/ha), two times of application (1/2 basal + 1/2 two months after planting and 1/3 basal + 1/3 two months after planting + 1/3 three months after planting) and two levels of (0 and 12.5 t/ha) of farm yard manure.

The experiment was laid out in R.B.D. and replicated thrice.

Half the dose of N, P and full dose of farm yard manure as per treatment were given as basal dressing. The remaining quantity of N and P was given two months after planting. The K was given as per the treatments. Mound system of planting was followed with a spacing of 90 x 90 cm. The crop was harvested after ten months. The important growth and yield parameters were recorded. The Utilisation index was worked out (Obigbesan. 1973).

Results and Discussion

Growth characters

The data on the total number of leaves showed that there was no significant difference between levels of K, whereas in the case of height (Table 1) at harvest, it was seen that K application at higher levels had enhanced the same. The top yield presented in Tabie 2 showed that there was a progressive

Table 1

Growth Characters and yield attributes

Levels of K (Kg/ha)	Height of plant at harvest (Cm)	Total number of leaves produced up to hervest	No. of Tubers/plant	Length of tuber (Cm)	Girth of tuber (Cm)	Percentage of edible portion	Utilisation index
37.5	206.6	332.9	10.8	24.3	13.1	84.6	1.79
75.0	220.9	341.5	13.3	26.2	13.7	86.0	1.60
112.5	222.7	339.4	13.2	26.7	14.1	86.1	1.57
150.0	225.1	345.8	12.4	25.5	14.1	86.2	1.46
'F' Test	Sig	N. S.	Sig.	N.S.	Sig.	Sig.	Sig.
C. D. (0.05)	6.9	—	1.8	—	0.7	0.6	1.1

Sig. = Significant N.S. = Not Significant

increase in top yield by K application, even though at 150 kg levels there was a small decrease, which was not significant. The benefical effect of K on the growth characters may be attributed to the indirect effect of K by enhancing the utilisation of N by the plant. (Anderson, 1967 and wilson, 1969)

Yield attributes

From the results presented in Table 1 it can be seen that the number of tubers per plant was not influenced beyond 75 kg/ha of K. In a previous trial Natarajan (1975) got maximum number of tubers in H—165 variety at 50 kg level of K.

Length of tuber was not significantly influenced by K application. With regard to the girth of tuber it was seen that the maximum was observed at 112.5 kg level of K. Similar effects of K application on girth of tuber was recorded by Mohankumar and Hrishi (1973) and Natarajan (1975).

There was a significant increase in percentage of edible portion at 75 kg level of K over the lowest level, beyond which the differences were not significant.

The beneficial effect of K on the yield parameters might be attributed to the role of K in carbohydrate synthesis and its translocation (Black, 1969 and Mayer and Anderson, 1970).

Table 2

Tuber yield and top yield

K levels (Kg/ha)	Tuber Yield (Tonne/ha)					Top Yield (Tonne/ha)				
	Time of application of K		Farmyard manure (t/ha)		Mean	Time of application of K		Farmyard manure (t/ha)		Mean
	T_1	T_2	0	12.5		T_1	T_2	0	12.5	
[illegible]7.5	23.97	25.93	25.33	24.57	24.95	13.54	15.00	14.08	14.47	14.27
75.0	28.25	32.27	29.85	30.86	30.26	18.23	19.46	18.61	19.08	18.85
112.5	30.10	29.62	30.47	30.25	34.36	20.74	23.52	20.75	23.51	22.13
150.0	31.15	28.92	28.60	31.84	30.22	29.92	21.42	21.40	21.22	21.31
Mean	30.62	29.20	28.51	31.37		18.35	19.52	18.71	19.57	

C D (0.05) For K levels = 1.37

C D (0.05) For time and farmyard manure = 0.97

C D (0.05) For combinations = 1.37

C D. (0.05) For K levels = 1.55

C D. (0.05) For time = 1.10

T_1 = ½ basal + ½ two months after planting T_2 = ⅓ basal + ⅓ two months after planting + ⅓ three months after planting

Yield

The tuber yield data presented in Table 2 shows that there was a progressive increase in tuber yield upto 112.5 kg level beyond which there was a significant reduction. The absorption of K by a crop is dependent on the K ion concentration in the soil (Russel, 1973) and it is possible that maximum absorption of K has taken place at 112.5 kg level. However, when the K concentration is increased as in 150 kg level, some imbalances in the uptake of other nutrients might have set in (Anderson, 1973) which have resulted in a significant depression in yield. Similar results are reported from Colombia also (Anon. 1975).

Two split application of 75 kg/ha of K had given the highest tuber yield (39.1 t/ha) followed by three split application of 75 kg/ha (32.27 t./ha). Three split application had given better response at lower levels of K than two split application. However, at higher levels of K three split application had given a decreased yield. This difference in yield suggests that the K. given in three split doses at higher levels might have resulted in greater availability than in two split doses and a consequent imbalance in the nutrition. The tuber yield at three split application might have been reduced especially in the absence of the corresponding application of N with K.

Farm yard manure application had given a better response to K fertilization at higher levels of 112.5 and 150 kg/ha. This shows that for better utilisation of K at higher levels, application of farm yard manure is necessary probably because of the improved physical conditions and the presence of N in farm yard manure.

Utilisation index

There was not much difference in the Utilisation index up to 75 kg level of K (Table 1) beyond that a significant reduction was noticed. A reference to the top yield (Table 2) showed that there was no significant reduction in yield at the highest level of K, when compared to tuber yield (Table 2). The reduction in the Utilisation index at the higher levels of K might be attributed to the increase in top yieid, with a consequent decrease in tuber yield. This is presumably due to the reason that, as the level of K is increased, more quantity of K might have been utilised for vegetative growth rather than for tuber production.

Summary

A field experiment was conducted to study the effect of different levels and time of application of K in conjuction with farm yard manure in tapioca variety H—97. The results indicated that maximum tuber yield was obtained at 112.5 kg level of K. Three split application had given better

response at lower levels of K. Farm yard manure application had given a better response at higher levels of K. Utilisation index showed a decrease after 75 kg level of K.

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സംഗ്രഹം

4.97 മരച്ചീനിക്ക വേണ്ടുന്ന പൊട്ടാഷ് വളത്തിന്റെയും കാലിവളത്തിന്റെയും അളവു കണ്ടുപിടിക്കുന്ന പരീക്ഷണങ്ങളിൽ നിന്നു താഴെ പറയുന്ന ഫലങ്ങൾ ലഭിച്ചിരിക്കുന്നു.

1. ഏറ്റവും കൂടുതൽ വിളവു കിട്ടുവാൻ ഹെക്ടറിനു 112.5 കിലോഗ്രാം എന്ന തോതിൽ പൊട്ടാഷ് വളം നൽകണം.

2. ചുരുങ്ങിയ അളവിൽ പൊട്ടാഷ് കൊടുക്കുമ്പോൾ മുന്നു ഗഡുക്കളായി കൊടുക്കുന്നതാണു കൂടുതൽ ഫലപ്രദമെന്നു തെളിഞ്ഞിട്ടുണ്ടു.

3. കാലി വളത്തിൽ നിന്നും മികച്ച ഫലം ലഭിക്കുവാൻ ഉയർന്ന അളവിൽ പൊട്ടാഷ് കൊടുക്കണമെന്നു കാണപ്പെട്ടു.

4. ഹെക്ടറിനു 75 കിലോഗ്രാമിനു മുകളിൽ പൊട്ടാഷ് കൊടുത്തപ്പോൾ ഉപയോഗ സൂചിക കുറഞ്ഞതായി കണ്ടു.

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