

PERFORMANCE OF SWEET POTATO VARIETIES UNDER VARYING LEVELS OF NITROGEN AND TIME OF ITS APPLICATION IN RED LOAM SOILS OF VELLAYANI*

G. Muralidharan Nair and N. Sadanandan

Agricultural College, Vellayani, Kerala

Sweet potato is an important tuber crop of Kerala State. The short duration of the crop with its ability to perform well under lowland and upland conditions facilitates its inclusion in the multiple cropping programme of the state. Response of sweet potato to nitrogen has been well established (Mac Donald, 1963; Paterson and Speights, 1964; Thomas, 1965 and Mandal *et al.*, 1971). Yuan *et al.* (1964) and Morita (1967) found split application of nitrogen more beneficial than single application. The present experiment was conducted to study the performance of three sweet potato varieties under Vellayani conditions and to ascertain the correct dose of nitrogen and its time of application.

Materials and Methods

The experiment was conducted at the Agricultural College farm, Vellayani during October 1971 to February 1972, the soil of the experimental area was red loam having 0.046 percent total nitrogen, 0.002 percent available P_2O_5 , 0.0012 percent available K_2O and a pH of 5.4. Three levels of nitrogen (50, 75 and 100 kg Per hectare) with three timings of application (single basal, 2/3 basal + 1/3 one month after planting, and 1/3 basal + 1/3 one month after planting + 1/3 two months after planting) and three varieties i.e. J 13, J 14 and Kottaranchola (local) were included in the experiment. Uniform doses of superphosphate (50 kg P_2O_5 per hectare) and muriate of potash (75 kg K_2O per hectare) were applied at the time of planting. The experiment was laid out in a 3^3 factorial design and was repeated twice.

Results and Discussion

The data presented in Table I indicate that varieties had a significant influence on tuber as well as vine yield. The variety J 14 produced significantly higher tuber yield than the local variety. There was significant difference in the number of tubers per plant in different varieties.

Part of a thesis submitted by the first author for M. Sc. (Ag) Degree of the University of Kerala.

The variety J 14 produced the maximum number of tubers per plant followed by the variety J 13, whereas the local variety produced the lowest number. The factor, i.e. number of tubers per plant enabled the variety J 14 to produce the maximum tuber yield among the varieties tested. But the local variety produced the highest vine yield at all levels of nitrogen. This clearly indicates the wasteful use of photosynthates produced for increasing aerial vegetative parts by the local variety. On the contrary, the variety J 14 produced the lowest amount of vegetative growth and the highest yield of tubers, thus showing its varietal superiority.

Table I. Effect of levels and timings of nitrogen application on the yield of vines, tuber and tuber number of sweet potato varieties.

Treatment	Yield of vines in tons/ha	Yield of tuber in tons/ha	Number of tubers per plant
1. Varieties			
J 13	10.86	13.01	2.36
J 14	9.30	14.30	3.70
Kottaranchola	12.98	11.53	2.10
'F' test	Sig.	Sig.	Sig.
S.Em.+	0.59	0.63	0.23
C. D.	1.73	1.85	0.67
2. Levels of Nitrogen			
50kg/ha	9.79	13.21	2.56
75 „	11.20	12.59	2.62
100„	12.16	13.04	2.95
'F' test	Sig.	N.S	N.S
S.Em. +	0.59	0.63	0.23
C. D.	1.73		
3. Time of Nitrogen application			
S0	11.34	13.57	2.71
S 1	11.27	12.72	2.70
S2	10.53	12.55	2.73.
'F' test	N.S	N.S	N.S
S.Em. †	0.59	0.63	0.23

Sig.- Significant

N. S. Not significant

S0. Single basal

S1. 2/3 basal † 1/3 one month after planting

S2. 1/3 basal + 1/3 one month after planting † 1/3 two months after planting.

The different levels of nitrogen had no effect on tuber yield whereas there was significant increase in vine yield with increasing levels of nitrogen. The highest yield of vine was obtained by the application of 100 kg. nitrogen per hectare. This shows that the nitrogen requirement for high vine production is at a higher level, while that for tuber production is at or lower than the lowest level tried, viz: 50 kg nitrogen per hectare. The timings of application also had no significant effect on the number of tubers per plant. Dean (1971) found that it is the supply of potassium rather than the supply of nitrogen that favours the production of sweet potato tubers. In the present investigation, the basal dose of potassium given, at the rate of 75 kg per hectare, was probably adequate for the crop and the absence of response to variation in nitrogen supply might be attributed to the non-interference of potassium deficiency on the expression of tuber characteristics. Lack of significant response in tuber number due to timings of nitrogen supply may also be attributed to the above reasons.

Summary

Investigations were carried out at the Agricultural College, Vellayani during October 1971 to February 1972 to study the performance of three sweet potato varieties under different levels and timings of nitrogen application. It was found that the variety J 14 recorded the highest yield of tubers and lowest yield of vines, whereas the local variety Kottaranchola produced the lowest yield of tubers and highest yield of vines. Application of nitrogen beyond 50 kg per hectare was found to improve the yield of vines, but not that of tubers. Split application of nitrogen had no effect on the yield of tubers as well as vines.

REFERENCES

- Dean, E.K. 1971. The influence of nitrogen and potassium nutrition on vine and root development of 'All gold' sweet potato at early stage of storage root enlargement. *J. Amer. Soc. Hort. Sci.* 96 (6) 718-720.
- Mac Donald, A. S. 1963. Sweet potatoes with particular reference to the tropics. *Field Crop Abs.* 16 (4) 219-225.
- Mandal, R.C., Singh, K. D., Maine, S. B. and Magoon, M. L. 1971. Response of sweet potato to plant spacing and nitrogen fertilization. *Indian J. Agron* 16 (1) 85-87.
- Morita T. J. 1967. Effect of application time of nitrogenous fertilizers on top growth, tuber formation and its development in sweet potatoes. *J. Jap. Sci.* 84: 431-435.
- Paterson, D.R. and Speights, D.E. 1964. Influence of crop rotation, fertilizer and variety on yields and variety on yields and cracking of sweet potato roots. *Proc. Amer. Soc. Hort. Sci.* 84: 431-435.
- Thomas, C.V. 1965. Studies on the response of certain varieties of sweet potato to fertilizer application. M. Sc. (Ag) Thesis, Kerala University.
- Yuan, P.C., Lu, H.P., Chih, Y. F. and Tang, A. J. 1964. The physiological basis and fertilizer practice on sweet potato for high yield production. *Crop Sci. Peking.* 3 (4): 33-48.
- (M. S. received. 26-3-1973)