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Evaluation of Various Methods of Fertilizer Application in Potato (*Solanum tuberosum*)

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Abstract: The field experiment was conducted to compare the banding method of fertilizer application with the broadcast at Vegetable Research Station, SHRI Mirpurkhas, Pakistan. The recommended 250-125-125 NPK kg ha^{-1} were applied in the form of Urea, DAP and SOP. The application of NPK through banding showed better results for more number of plants and stems. The maximum soil coverage percentage, tuber number and weight of marketable tubers increased significantly than broadcast fertilizer method of application.

Key word: Potato, banding, broadcasting, N.P.K, tubers

INTRODUCTION

Potato *Solanum tuberosum* L. is the fourth most important crop by volume of production. It is high yielding having high nutritional value. The area under production increased to 101.5 thousand hectors and production 1666.1 thousand tons (Pakistan Statistical Year Book[1]). Mostly the potato growers apply fertilizer through broadcast method. It is assumed that by this method fertilizer is not properly used by potato crop and some wastage takes place. For getting maximum utility of applied materials it is essential that fertilizers should be placed in the vicinity of root zone. This does not mean that it should be placed just near the seed tubers to affect the emergence. The method of fertilizer application should be better that it dose not cause any damage to growth of sprouts of tubers but same time it must have high fertilizer use efficiency. Amin *et al.*[2] reported that nitrogen, phosphorous, potassium, magnesium and zinc when applied in combination and banded gave highly positive response on the potato yield. The application of fertilizer through banding, exhibited maximum emergence, soil coverage, number of tubers, tuber size, tuber weight and tuber yield per hectare[3]. Looking the economic importance of the potato and fertilizers the research was conducted to explore the appropriate method of fertilizer placement for growth and yield of potato.

MATERIALS AND METHODS

An experiment was conducted at Experimental area of Vegetable Research Station, SHRI, Mirpurkhas, Sindh, Pakistan during autumn 2002-03. Tubers of diamond variety were sown on the ridge with 25 cm plant to plant and 75 cm row to row distance. The recommended 250-125-125 NPK kg ha^{-1} were split applied in the form of Urea, DAP and SOP through broadcast and banding methods. The plots in broadcast methods directly received the fertilizers, however, in banding the fertilizers were placed 6 cm apart and 6 cm deep. Proper irrigation and agronomic practices were adopted according to the requirement of crop.

Table 1: Agronomic traits of potato as affected by banding and broadcasting methods of fertilizer application

Observation	T_1	T_2	Cd-I	Cd-II
Emergence data at 45 days	57.0	79.0	15.50	N.S
No of plants at 60 days	74.0	82.0	N.S	N.S
Total No. of stems at 60 days (in 3 rows 5 m long)	224.0	253.0	4.29	9.91
% soil coverage at 45 days in cm	17.7	30.0	11.46	N.S
% soil coverage at 60 days in cm	25.0	36.7	11.19	N.S
% soil coverage at 75 days in cm	33.0	44.7	11.19	N.S
% soil coverage at 90 days in cm	30.7	37.7	N.S	N.S
Total No. of tubers in (3 rows of 5 m long)	219.3	270.3	7.44	17.18
Total weight of tubers in kg in (3 rows of 5 m long)	5.3	6.8	N.S	N.S
Marketable tubers bigger than 30mm (3 rows of 5 m long)	121.0	153.3	6.24	14.39
Weight of marketable tubers (3 rows of 5 m long)	4.3	5.7	N.S	N.S
No. of marketable tubers less than 30 mm	98.3	117.0	13.66	N.S
Weight of non-marketable tubers less than 30 mm	0.9	1.0	0.07	N.S

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RESULTS AND DISCUSSION

The results obtained showed the superiority of banding for recording maximum number of plants, number of stems, soil coverage percentage, total number of tubers and weight of marketable tubers as compared to fertilizers applied through broadcast (Table 1)

Banded fertilizer stimulated plant growth early in the growing season with increased plant N and P concentration and content[4]. Malhi and Nyborg[5] observed that the method of placement have significant effect on the efficiency of nitrogen fertilizer by increasing the yield.

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