EFFECT OF DIFFERENT DOSES OF N.P.K. FERTILIZERS ON THE YIELD OF ONION CV. RED BALL

Ch. Muhammad Ayyub, M.N. Malik and Waqar Ahmed
Department of Horticulture,
University of Agriculture, Faisalabad

A field experiment was conducted to see the effect of seven different combinations of N, P_2O_5 and K_2O on "Red Ball" onion variety. All the combinations gave significantly higher yield compared to the control. Although maximum yield was obtained with the application of N, P_2O_5 and K_2O @ 175, 100 and 300 kg ha^{-1}, respectively but it was statistically at par with all the other combinations. The application of N, P_2O_5 and K_2O @ 85.5, 50 and 150 kg ha^{-1} (half dose) gave yield very close to above treatment. However, very little or no response was observed with varying doses of potash beyond 150 kg ha^{-1}.

INTRODUCTION

Onion belongs to the family Amaryllidaceae and is being cultivated over an area of 58.6 thousand hectares with a total annual production of 712.9 thousand tonnes in Pakistan (Anonymous, 1990). It is extensively used as a condiment in the preparation of many kinds of foods like curry, chutney and pickles etc. All over the world, it is an indespensible part of the human diet as it is a rich source of several minerals and vitamins. Onion is used in large quantities by the rich as well as poor in all the spheres of life.

Commercial fertilizers have attained an important position in vegetable production and their use is thus increasing every year, which may be attributed to the scarcity of animal manures. Increased knowledge regarding importance of the value of commercial fertilizers, in enhancing yield of various crops manifolds, is playing an important role in their popularity.

Keeping in view the importance of the crop in the economy of Pakistan as a basic component of daily diet, this study was undertaken to see the effect of different doses of N, P_2O_5 and K_2O on the production of onion variety "Red Ball".

MATERIALS AND METHODS

The experiment was laid out according to randomised complete block design (RCBD) in the Experimental Vegetable Garden, University of Agriculture, Faisalabad. Nursery of onion variety "Red Ball" raised during the month of October, was transplanted in the first week of January. Net plot size measured 6 x 4 m. Following treatments were applied in four replications:

Treatment	N (kg ha^{-1})	P_2O_5 (kg ha^{-1})	K_2O (kg ha^{-1})
T_0	0	0	0
T_1	175	100	300
T_2	125	100	300
T_3	87.5	50	300
T_4	175	100	150
T_5	125	100	150
T_6	87.5	50	150

Table 1. Effect of different doses of NPK fertilizers on the yield of onion (kg ha^{-1}) Cv. Red Ball

Treatment	Yield	Increase over control (%)
T_0	5417.7 b	-
T_1	9692.7 a	78.9
T_2	8726.3 a	61.1
T_3	9415.6 a	73.8
T_4	9619.8 a	77.6
T_5	8818.8 a	62.8
T_6	9570.8 a	76.7

Urea and DAP was the main source of nitrogen, while DAP and potassium sulphate were the source of P_2O_5 and K_2O, respectively. Total fertilizers of each treatment were mixed by hand and broadcasted in respective treatment during the last week of February when bulb formation started. Harvesting was done during first week of May, when the bulbs were fully matured and about 75% tops of the bulbs were dried. Bulbs were pulled out by hand and weight was recorded separately in each sub-plot.

RESULTS AND DISCUSSION

The data show statistically higher onion yield with fertilizer application compared to control (Table 1). Although, all the treatments differed non-significantly when compared with one another, yet the treatment T_1 (where N, P_2O_5 and K_2O were applied @ 175, 100 and 300 kg ha^{-1}, respectively) gave the maximum yield which was almost twice that of the control (T_0). The treatment T_1 and T_4, where amount of nitrogen and phosphorus applied was same but potash varied from 300 to 150 kg ha^{-1}, gave comparatively similar yield.

The treatment T_3 (87.5-50-300 kg ha^{-1}) gave 9415.5 kg ha^{-1} but showed 9.1 kg of onion yield per kg of nutrient application (Table 2). In this treatment half of nitrogen T_1 was applied. This shows otherwise effect of higher dose of nitrogen application and no effect of potash application. Results are in accordance with those of Robert and College (1947), who reported that major response of onion yield to fertilizers and none to potash. The results obtained also emphasized the application of 87.5 kg N ha^{-1}

Table 2. Effect of nutrient application on onion yield Cv. Red Ball

Treatment	Nutrients applied			Total amount of nutrients applied	Yield of onion	Onion yield due to nutrient	Yield to nutrient ratio application
	N	P_2O_5	K_2O				
		(kg ha^{-1})		(kg ha^{-1})	(kg ha^{-1})	(kg ha^{-1})	
T_0	0	0	0	0	5417.7	-	-
T_1	175	100	300	575.0	9692.7	4275.0	7.4
T_2	125	100	300	525.0	8726.3	3308.6	6.3
T_3	87.5	50	300	437.5	9415.6	3997.9	9.1
T_4	175	100	150	425.0	9619.8	4202.1	9.9
T_5	125	100	150	375.0	8188.7	3401.0	9.1
T_6	87.5	50	150	287.5	9570.8	4153.1	14.4

than 125 and 175 kg N ha^{-1}. Since the application of 87.5-50-150 kg ha^{-1} of NPK produced onion yield of 9570.8 kg ha^{-1} more close to T_1 and T_4 might be considered as optimum and economical dose as this treatment had produced 14.4 kg onion yield kg^{-1} of nutrient application (Table 2). Srivastava *et al.* (1965) found that application of 40 kg N $acre^{-1}$ was most effective dose for "Matele Large" variety of onion. He also observed that application of 10 kg of phosphorus $acre^{-1}$ gave higher yield than 20 kg $acre^{-1}$ of phosphorus, while potash application resulted in lower yield.

Application of 150 kg K_2O ha^{-1} produced more onion yield (Table 2) than that with 300 kg ha^{-1}. Also, the application of potash @ 150 kg ha^{-1} in combination with nitrogen and phosphorus gave higher yield to nutrient ratio compared to 300 kg ha^{-1} in similar combinations. However, the ratio was increased with a decrease in nitrogen and phosphorus doses. Maximum ratio (14.4) was obtained with application of 87.5-50-150 kg ha^{-1}. This combination had proved optimum and economical dose compared to all other combinations.

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