

## Manurial Trial on Bellary Onion (*Allium Ceva* L.)

by

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**Introduction:** There was a need to fix up the NPK requirements under particular soil Agro-climatic conditions as no such study has been undertaken so far. Hence this experiment was started with 'Bellary Red' onion cultivar as one of the projects under Five Year Programme of Research by the Agronomy Section during 1967-69 at the Agricultural College and Research Institute, Coimbatore for Coimbatore tract.

The effect of N, P and K on the yield of Bellary Onion have been studied by various workers in the field. Beason quoted by Jordan *et al*, (1958) in U.S.A. calculated the NPK and sulphur requirements at 1.0:0.4:0.6:0.3. Timm and Rickels (1964), Polach and Vleek (1967) found out that 80 lb/ac.  $P_2O_5$  increased the yields and it is greater at increased levels of N. Anon (1966) I.C.A.R. suggested an application of 15-20 tons Farm Yard Manure as a basal dressing along with Super @ 200 lbs/ac. and wood ash 5 cartloads and a top dressing of 400 lb of Ammonium sulphate or 1000 lb/ac. groundnut cake should be applied 20 days to one month after planting. Beaumont *et al*, (1935) said that combined application of NPK increased the yield and recommends that 4-12-8 mixture for the crop to be applied at 2500 lb/ac. Hawthorn (1936) recommends 6-12-0 mixture for effective increase in yield of onion. Radhakrishnan (1953) in Benaras reported that 50 lb. N, 100 lb  $P_2O_5$  and 50 lb  $K_2O$  gave good yields. Madras State Department of Agriculture recommends 500 lb/ac of Nanjanad mixture containing 80:200:100 for Bellary Onion.

**Materials and Methods:** Five levels of P, three levels of N and three levels of K in different combinations in addition to a basal dressing of 5 tons of FYM, were tried in this experiment. The treatments are as follows:

5 levels of  $P_2O_5$  - 0, 30, 60, 90 and 120 kg/ha.

3 levels of N - 0, 30 and 60 kg/ha.

3 levels of K - 0, 30 and 60 kg/ha.

The experiment was laid out in a split plot design in black soil with  $P_2O_5$  in main plots and N & K combinations in sub-plots. There were 5 replications and 9 treatment combinations of N & K as noted below:

$N_0 K_0$ ,  $N_0 K_{30}$ ,  $N_0 K_{60}$ ,  $N_{30} K_0$ ,  $N_{60} K_{30}$ ,  
 $N_{30} K_{60}$ ,  $N_{60} K_0$ ,  $N_{60} K_{30}$ ,  $N_{60} K_{60}$ .

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The gross size of individual plots measured 4.75 metres X 2.5 metres. There were in all 225 plots.

Calculated quantity of NPK were applied on the day of planting and well mixed in the soil.

Onion seedlings (6 weeks old seedlings) were transplanted on 18-5-68 and on 2-5-69 on either side of the ridges with a spacing of 20 cm X 10 cm.

Five plants were selected per plot for recording of observations of plant characters. Weight of bulbs in grams, harvested and cleaned after removal of tops were recorded. Total yields were recorded in kilograms per individual treatments. The data were then classified treatment-wise and replication-wise and statistically evaluated and given in Tables 1 and 2 which brings out the effect of nutrients on the yields singly and in combination together with interactions.

**Discussion:** Application of N alone or K alone singly had no effect greater than the  $N_{60} P_{60} K_{30}$  combination in 'Bellary Red' onion. The combination  $N_{60} P_{60} K_{30}$  significantly increased the yield of bulbs over all other treatments and the significance was at 1% level.

Among the levels of P tried 60 kg/ha, proved to be the best and superior to all other levels. This was followed by  $P_3 P_4 P_1$  and  $P_0$  levels, thereby indicating  $P_2$  was the best level. Other doses had only depressing effect on yield.

TABLE 1.

Treatments	Mean	F	S.E.	C.D. (P=0.05)	Conclusion
1. N					
$N_0$	3.5	**	0.149	0.4	$N_{60} N_{20} N_0$
$N_{20}$	5.6				
$N_{60}$	7.8				
2. P					
$P_0$	4.3	**	0.239	0.7	$P_{60} P_{30} P_{150} P_{20} P_0$
$P_{30}$	5.1				
$P_{60}$	7.5				
$P_{90}$	5.7				
$P_{120}$	5.5				
3. K					
$K_0$	4.9	**	0.149	0.4	$K_{30} K_{60} K_0$
$K_1$	6.4				
$K_3$	5.7				

\*\* Significant at 1%

TABLE 2.

	Treatments	F	S.E.	C.D. (P=0.05)
1.	N × P	**	0.9	0.511
2.	N × K	**	0.26	0.70
3.	P × K	**	0.90	1.00
4.	N × P × K	**	0.577	1.60

\*\* Significant at 1%

*Conclusion:*

1.  $N \times P$

$P_0 - N_{60} N_{30} N_0$

$N_0 - \overline{P_{60} P_{30} P_{120} P_{50} P_0}$

$P_1 - N_{60} N_{30} N_0$

$N_{30} - \overline{P_{60} P_{30} P_{120} P_{30} P_0}$

$P_2 - N_{60} N_{30} N_0$

$N_{60} - \overline{P_{60} P_{120} P_{30} P_{20} P_0}$

$P_3 - N_{60} N_{30} N_0$

$P_4 - N_{60} N_{30} N_0$

2.  $N \times K$

$N_0 - \overline{K_{30} K_{60} K_0}$

$K_0 - N_{60} N_{30} N_0$

$N_{30} - \overline{K_{20} K_{60} K_0}$

$K_{60} - N_{60} N_{30} N_0$

$N_{60} - \overline{K_{30} K_{60} K_0}$

$K_{30} - N_{60} N_{30} N_0$

3.  $P \times K$

$P_0 - \overline{K_{60} K_{30} K_0}$

$K_0 - \overline{P_{60} P_{30} P_{70} P_{120} P_0}$

$P_{30} - \overline{K_{30} K_0 K_{60}}$

$K_{30} - \overline{P_{60} P_{30} P_{120} P_{60} P_0}$

$P_{60} - \overline{K_{30} K_{60} K_0}$

$K_{60} - \overline{P_{60} P_{120} P_{30} P_{50} P_0}$

$P_{90} - \overline{K_{60} K_{30} K_0}$

$P_{120} - \overline{K_{30} K_{60} K_0}$

4.  $N \times P \times K$

$N_{60} P_{60} K_{30}$

Similarly, among the 3 levels of N tried 60 kg N/ha, gave the significantly highest yields followed by  $N_{30}$  and  $N_0$  levels tried. Hence,  $N_{60}$  was superior to all other levels.

Among the 3 levels of Potash tried  $K_{30}$  significantly proved to be the best level over the other two levels namely,  $K_0$  and  $K_{60}$ . Higher doses of K had only the depressing effect on yields.

*Interaction:* The interaction of N and K combinations had shown that  $N_{60} K_{30}$  had given significantly the highest yields as could be seen in Table 2 followed by  $N_{30} K_{30}$ ,  $N_{30} K_{60}$  and  $N_{30} K_0$ .  $N_{30} K_{30}$ ,  $N_{30} K_{60}$ ,  $N_{30} K_0$  were all on par. Thus,  $N_{60} K_{30}$  significantly proved to be the best level.

The interaction between P and N revealed that  $P_{60} N_{60}$  had significantly increased the yield followed by  $P_{120} N_{60}$ . This was closely followed by  $P_{60} N_{30}$  level.  $P_0 N_0$  was the lowest. Thus,  $P_{60} N_{60}$  was the best combination.  $P_{120} N_{60}$ ,  $P_{60} N_{60}$ ,  $P_{60} N_{30}$  were on par as could be seen in Table 2.

The interaction between P and K indicated that  $P_{60} K_{30}$  was significantly superior to other combinations. This was followed by  $P_{60} K_{60}$ ,  $P_{90} K_{30}$  levels.  $P_0 K_0$  was the lowest. Higher levels of this combination over and above  $P_{60} K_{30}$  had only depressing effects on the yield. The data is presented in Table 2.

In the combinations of various NPK levels tried the highest yield was obtained at  $N_{60} P_{60} K_{60}$  level in both the years. This was followed by  $N_{60} P_{60} K_{30}$  and  $N_{30} P_{60} K_{30}$ . Thus,  $N_{60} P_{60} K_{30}$  was the best combination and the significance was at 1% level.

**Conclusion:** The nutrients N, P and K singly had no effect in increasing the yields in Bellary Onion. Among the 5 levels of P tried  $P_{60}$  was the most superior to all other levels. Among 3 levels of N and K tried  $N_{60}$  and  $K_{30}$  were found to be significantly superior. Though  $K_{30}$  and  $K_{60}$  were on par  $K_{30}$  being the lowest and economical, this level was taken to be the best.

A combination of 60 kg/ha N, 60 kg/ha  $P_2O_5$  and 30 kg/ha  $K_2O$  of fertilisers is therefore, recommended besides 5 tonnes of FYM for application to the Cultivar 'Bellary Red' onion with a view to obtaining the maximum yield in Coimbatore tract.

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