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Effect of Nutrient Management on Growth, TSS Content, Bulb Yield and Net Realization From Onion Bulb (*Allium cepa*.L)

K.V. Rabari*, M.V. Patel and A.A. Umale

Agricultural Research Station, S.D.A.U., Aseda, India.

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A field experiment was conducted at the Agronomy Farm, Department of Agronomy, B. A. College of Agriculture, Anand Agricultural University, Anand to study the effect of combined application of organic and inorganic fertilizers on growth, yield and quality of onion bulb (*Allium cepa*L.) during the years 2011-12 in rabi season on loamy sand soil. The experiment soil was low in organic carbon (0.21%), total nitrogen (0.022 %), medium in available phosphorus (38.74 kg ha^{-1}) and high in available potash (287.12 kg ha^{-1}). There were twelve treatments of organic and inorganic fertilizers i.e T1 : Absolute control, T2 : RDF @ 100-75-75 NPK kg ha^{-1}(control), T3: NADEP compost @ 7 ha^{-1}, T4 : Vermicompost @ 5 ha^{-1}, T5 : 75 % RDF + NADEP compost @ 1.75 ha^{-1}, T6 : 50 % RDF + NADEP compost @ 3.5 ha^{-1}, T7 : 75 % RDF + Vermicompost @ 1.25 ha^{-1}, T8: 50 % RDF + Vermicompost @ 2.5 ha^{-1}, T9 : 50% RDF + NADEP compost @ 1.75 ha^{-1} + Vermicompost @ 1.25 ha^{-1}, T10 : 50 % RDF + PSB seedling treatment @ 5 ml l^{-1} (root dipping for 15 min), T11: 50 % RDF + *Azospirillum* seedling treatment @ 5 ml l^{-1} (root dipping for 15 min) and T12 : 50 % RDF + PSB seedling treatment @ 5 ml l^{-1} + *Azospirillum* seedling treatment @ 5 ml l^{-1} (root dipping for 15 min) and experiment was laid out in randomized block design with four replications.

* To whom all correspondence should be addressed.
E-mail: kiranrabari26@gmail.com

RESULTS AND DISCUSSION

The result summarized in Table. 1 indicated that an application of nitrogen exerted its significant influence on plant height at 40 and 80 DATP, Though, this treatment was remained statistically at par with treatments T_2 (RDF @ 100-75-75 NPK kg ha^{-1}), T_5 (75 % RDF + NADEP compost @ 1.75 t ha^{-1}), T_6 (50 % RDF + NADEP compost @ 3.5 t ha^{-1}), T_8 (50 % RDF + Vermicompost @ 2.5 t ha^{-1}), T_9 (50% RDF + NADEP compost @ 1.75 t ha^{-1} + Vermicompost @ 1.25 t ha^{-1}) with each others. Higher growth parameter of onion crop recorded with 75 % RDF + Vermicompost @ 1.25 t ha^{-1} might be due to ample supply of nitrogen which encourages the vegetative growth and also led to carbohydrate formation. Nitrogen is also being constituent of chlorophyll, amino acids, proteins and nucleic acid which promotes the cell multiplication and cell elongation, which ultimately accelerate the vegetative growth and vermicompost which contains all essential plant nutrients in appropriate proportions and provides the soil with more stable humus. These findings are in agreement with those of Devi and limi ado (2005), Balemi *et al.* (2007), Mozumder *et al*. (2007) and Adagale *et al*. (2009).

Effect of total soluble salt was found to be non-significant during the investigation, however treatment T7 noted higher total soluble salt (13.38 %) among other treatment.These results are agreement with those of Saimbi and Randhawa (1983), Ethel Ngullies *et al.* (2009), Hari *et al.* (2009).

The bulb yield was significantly higher

under the treatment T7 (75 % RDF + Vermicompost 1.25 ha^{-1}) i.e. 33.33 ha^{-1}, and it was remained at par with treatments T2 (RDF @ 100-75-75 NPK kg ha^{-1}) ,T5 (75 % RDF + NADEP compost @ 1.75 ha^{-1}), T6 (50 % RDF + NADEP compost @ 3.5 ha^{-1}), T8 (50 % RDF + Vermicompost @ 2.5 ha^{-1}) and T9 (50% RDF + NADEP compost @ 1.75 ha^{-1} + Vermicompost @1.25 ha^{-1}) with each others. However, minimum bulb yield was observed under the treatment T1 (Absolute control) i.e. 24.07(ha^{-1}). The increase in bulb yield with the treatment T7 was might be due to increase in weight and volume of bulb observed in present investigations. These are the important yield parameters and their component effects might have result into higher bulb yield. The other probable reason may be due to better root proliferation, more uptakes of nutrient, higher number of leaves, and more photosynthesis and enhances food accumulation which ultimately increase bulb.The increase in bulb yield due to integrated nitrogen levels was also reported by number of workers viz., Kumar *et al*., (2006), Islam *et al*., (2008), Navale *et al*., (2008), Saxena *et al*., (2008), Sharma *et al*., (2009), Abdisa *et al*., (2011), Ethel Ngullie *et al*., (2011), Begali *et al*., (2012).

Table 1. Effect of nutrient management on plant height, total soluble solids and bulb yield of onion

Treatment	Plant height (cm)	TSS(%)	Bulb yield(ha^{-1})
T1	65.08	24.07	11.98
T2	71.14	29.05	12.70
T3	66.15	24.69	12.03
T4	69.91	28.49	12.48
T5	73.50	30.04	12.80
T6	71.94	29.22	12.78
T7	78.80	33.33	13.38
T8	75.00	30.25	12.85
T9	76.60	30.45	13.05
T10	67.06	26.34	12.33
T11	66.75	25.64	12.13
T12	69.45	26.46	12.38
S.Em.±	2.83	1.64	0.37
C.D. at 5 %	8.13	4.74	NS
C.V. %	7.96	11.72	5.91

Table 2. Economics of different treatments

Treatment	Bulb yield (ha^{-1})	Gross realization (Rs. ha^{-1})	Total cost of Cultivation (Rs. ha^{-1})	Net realization (Rs. ha^{-1})	ICBR
T1	24.07	120370	37503	82867	-
T2	29.05	145265	44871	100394	1:2.42
T3	24.69	123455	51503	71952	1:0.18
T4	28.49	143000	57503	85497	1:0.99
T5	30.04	150205	46528	103677	1:2.50
T6	29.22	146090	48187	97903	1:1.89
T7	33.33	166665	48028	118637	1:3.44
T8	30.25	151230	51187	100043	1:1.86
T9	30.45	152260	49687	102573	1:2.11
T10	26.34	131685	41337	90348	1:1.68
T11	25.64	128185	41337	86848	1:1.16
T12	26.46	132300	41487	90813	1:1.73

Economics

The data on economics presented in Table-2 indicated that application of 75 % RDF + Vermicompost @ 1.25 ha^{-1} (T7) registered the highest net realization of 1,18,637 ‘ ha^{-1} with the highest ICBR of 1:3.44 followed by 75 % RDF + NADEP compost @ 1.75 ha^{-1} (T5) with net realization of 1,03,677 ‘ ha^{-1} and ICBR of 1:2.50. Whereas, the treatment T3 (NADEP compost @ 7 ha^{-1}) recorded the lowest net realization of 71,952 ‘ ha^{-1} with the lowest ICBR of 1:0.18.

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