~~RESPONSE~~ EFFECTOF NUTRIENT ~~MENAGEMENT~~ MANAGEMENT ON GROWTH, YIELD AND QUALITY OFONION (*Aliumcepa*L.)

ABSTRACT

A field experiment was conducted on the Horticulture Research farm of the RBS College, Bichpuri, Agra during the rabi season of 2016-18.In this experiment eight treatments were applied with three replications and laid out in randomized block design(RBD). Treatments were (T1) ~~Recommended~~ recommended dose of fertilizer (T2) 100% RDF + Azotobacter, (T3) 100% RDF + FYM, (T4) 100% RDF + Azotobacter + FYM, (T5) 80% RDF + Azotobacter + FYM, (T6) 80% RDF + FYM, (T7) 80% RDF + Azotobacter and (T8) control The application of 100%RDF +Azotobacter + FYM (T4) significantly increased in all growth, yield and quality parameters giving the highest bulb yield of 33.95 t/ha.

Key words: ~~Nutrient~~ nutrient management, ~~Azotobacter~~azotobacter, FYM, yield, ~~and~~ quality, onion, ~~(~~*Allium cepa*L.~~).~~

Comment [EC1]: What does this stand for? Please write.

INTRODUCTION

Onion (*Allium cepa*L.) is the most important commercial vegetable and spice crop cultivated extensively in India. The primary center of origin is Central Asia (Vavilov~~e~~ 1951). It belongs to Amaryllidaceae family having 2n = 16 chromosome number, biennial herb type plant with tabular leaves and bulbs are formed by the attachment of swollen leaf bottom to underground part of stem which is small and rudimentary. Its flower type is 'umbel' which have many small flowers. Onion is cross pollinated crop. Onion has many medicinal properties like, anti-flatulence and cure dysentery, reducing cholesterol levels, it may help in reducing high blood pressure and also useful to prevent hair fall. India is second largest producer of the world. The randomly use of chemicals results in bad soil health, erosion loss of organic matter, nitrate pollution and also health hazard from human beings. The bio- fertilizers are alternative source to meet the requirement of crops and to bridge the furthergaps and also get the sustainable production and productivity as well as quality. Azotobacter is an inorganic fertilizer and it is free living, aerobic nitrogen fixing, non-symbiotic bacteria. It fixes about 20 kg/ha atmospheric nitrogen in the roots of the many crops like vegetables, spices and condiments, besides the pulses and enhance the germination. FYM is basically made by decomposition of animal dung, urine other dairy waste, dry leaves and straw waste. Farm yard~~Mnnure~~ manure have all macro

and micro nutrients having 0.5 % N, 0.2% P_2O_5 0.5%K_2O. To ~~reducing uses~~reducing uses of chemical fertilizer in the soil, to save soil health and promote crop quality, longevity of soil, FYM is very affective. FYM less expensive than chemicalfertilizers. Just few researcher namely Banjare*et. al.*, (2015) and TalwarDilpreet*et. al*., (2016) studied in this regard to find out the effect of nutrient management with bio-fertilizers on the onion crop. However, till now no systematic approaches are available so far made to utilize the agro-ecological condition of Gangatic plains of Uttar Pradesh and small information is available about the organic cultivation of this crop in the country.

Therefore, it was considered worthwhile to carry out the present investigation on the growth yield and quality of onion cv. – Agree found light red under Gangatic alluvial soil condition of Uttar Pradesh.

Formatted: Indent: Left: 0", First line: 0"

METHODS ANDMETERIALS

The present investigation was under taken during the rabi season of year 2016-18 for study the response of different combinations of bio- fertilizer , chemical and FYM (Azotobacter + NPK + FYM) on the vegetative growth, and quality character of onion (*Allium cepa*L.).Experiment was conducted at the Agricultural Research farm of Raja Balwant Singh college Bichpuri, Agra (U.P) The soil of the experimental field was Gangatic with calcareous layer at the depth of about 1.0 – 1.5 meters,it was slightly alkaline in reaction pH 7.84 and well drained. Weather conditions of Agra was semi-arid sub-tropical climate with hot dry summer and hardy cold winters. Temperature falls at about 1-2℃ in winter and increased about maximum at 45-47℃.~~In~~insummer. The treatments were (T1)Recommended dose of fertilizer (T2) 100% RDF + Azotobacter (T3) 100% RDF + FYM,(T4)100%RDF+Azotobacter+FYM,(T5)80%RDF+Azotobacter+FYM,

(T6) 80% RDF + FYM, (T7) 80% RDF + Azotobacter and (T8) control. The eight treatments were replicated three times in randomized block design in 1.60m x 1.20 size plots. The ~~Recommended~~ recommended dose of ~~Nitrogen~~ ,nitrogen,~~Phosphorus~~ phosphorus and ~~Potash~~ potash were applied at the time of transplanting . The half dose of nitrogen was applied as basal and in two part after 30 day transplanting and 60 day after transplanting. farm yard manure was applied 15 days before transplanting and the bio-fertilizer (Azotobacter) was applied as seedling dipping treatment in Azotobacter and water solution @2kg/ha. All the required cultural operations along with the irrigation was done as per requirement of the crop. The all growth studies recorded at first 15 DAT and all 30 DAT interval. The bulb was harvested at the mature stage.

RESULTS AND DISCUSSION

The pooled(2016-18) data presented in table and figure shows that maximum length of plant (23.59, 39.98, 50.14 and 23.34cm) at 30, 60, 90, DAT and at harvest were found to be significantly higher in T4 (100% RDF + Azotobacter + FYM), which was followed by T3 (100% RDF + FYM) and T5 (80 % RDF + Azotobacter + FYM), the lower height of plant was observed in T8 (control). Present finding is in agreement with the finding of Jawadagi*et. al*. (2012).

Number of green leaves at 30, 60, 90, DAT and at harvest were found to be significantly maximumin T4 (100% RDF + Azotobacter + FYM), which was closely followed by T3 (100% RDF + FYM) and the lowest number of green leaves per plant was observed in T8. The possible reason for increased number of green leaves per plant may be due to the improvement in growth related attributes because of certain promoting substances secreted by bio-fertilizers and better uptake of water.

Leaf length is one of the important characters for determining crop vigour and yield.In the present study all the inorganic + bio-fertilizer + organic manure combination treatments were significantly superior to over in respective to length of longest leaf in this crop season.The maximum length of longest leaf at 30, 60, 90, DAT and at harvest were found to be significantly higher in T4 (100% RDF +Azotobacter + FYM) which was followed by T3. (100% RDF + FYM) and T5 (80% RDF +Azotobacter + FYM) whereas, the lowest length of longest leaf was recorded in control (T8) in this respect. Meena*et. al*. (2015).

The width of longest leaf at 30, 60, 90, DAT and harvest were found to be significantly higher in (T4) 100% recommended dose of fertilizer with the organic manure/ substance and bio-fertilize. Increases in leaf area with optimum level of chemical fertilizer with organic manures could be due to good growth of plant which enhanced by the production of bio active substance having similar effects as that the growth regulator besides nitrogen fixation through bacterial fertilizers. Singh *et. al.*(2015)

Considerable variation in fresh weight of top with T4 (100% RDF +Azotobacter + FYM) might be attributed due to the improvement in overall growth and development of plants by application of 100% RDF + Azotobacter + FYM finely led to higher (45.34gm) fresh weight of top and minimum (38.31gm)fresh weight was also recorded in control (T8). This enabled the plant to draw more nutrients from soil for proper growth and development Talwar*et. al.(*2012).

Significantly higher bulb diameter was recorded under ~~t4~~ T4 (100% RDF + Azotobacter + FYM) and minimum was recorded in control (T8). Brinjh*et. al*. (2014).

Average bulb weight was also recorded maximum in the bulbs receiving 100% RDF +Azotobacter + FYM (T4) which was followed by 100% RDF + FYM (T3). The increases in the bulb weight could be due to the increased uptake of nutrients and buildup of sufficient photosynthesis enabling the increases in size of bulbs ultimately resulting in the increased averaged bulb weight. These results are in confirmation with the finding of Yogita*et. al.* (2012).

The maximum specific gravity of bulb (1.626) was recorded in the treatment T4 (100%RDF + Azotobacter + FYM) followed by T5 (80%RDF + Azotobacter + FYM) (1.107) and minimum (0.89) specific gravity was also recorded in T7(100% RDF +Azotobacter). Bhagwat *et. al*. (2016)

The main and important objective of any production is to have maximum crop yield for better returns. The data regarding bulb yield per plot (kg) and per hectare (q) reveals a significant difference among the different treatments. The maximum bulb yield per net plot

and per hectare (5.17 kg and 339.58q respectively) was recorded in T4 (100% RDF +Azotobacter + FYM) which was statistically at par with T3 and T5 and minimum was noticed inT8.Theseincreases may be due to more number of bulbs per plot, bulb size and average weight of bulb. Use of Azotobacter and FYM, not only makes the atmospheric N respectively to plants, but also enhances the plant growth and bulb yield to release hormones, vitamins and nutrient. Similar findings were also reported by Talwar*et. al.(*2012).

CONCLUSION part was missing!

REFFERENCES

Brinjh S, Kumar S.Kumar D and Kumar M.(2014)Effect of integrated nutrient management on the growth , yield and quality in onion cv. PusaMadhavi.
*Plant Archives***14** (**1**):557-59

Bhagwat KP; shinde KG; Bhalekar MN and Yadav DB (2016)Effect of Organic Manure, Inorganic Fertilizers and Biofertilezers on Growth and Yield Attributes in Onion (*Allium cepa. L)* **13(1)**13-15.

Banjare, C., Shukla, N., Sharma,P.K., Patanwar, M, and Chandravanshi, D. (2015). Effect of organic substances on yield and quality of onion (*Allium cepa*L.). *International Journal of Farm Sciences*, **5(1):**30-35.

DilpreetTalwar(2016)Influence of biofertilizers on growth, yield, quality and nutrient uptake in onion(Alliuncepa L.) *Indian Journal of Ecology***43(1):**124-27.

Meena A K; Paliwal R and Meena K K**.** (2015).Effect of organic manures and bio-fertilizersongrowthandqualityattributesofkharifonion(*Alliumcepa*L.)insemi-aridregion. *Indian Research Journal of Genetics and Biotechnology* 7(1): 73-76.

Jawadagi RS., Basavaraj N., Patil BN and HemltaNaik B (2012) Effect of different sources of nurtients on growth, yield and quality of onion (*Allium cepa*L) Cv. Bellary red. *Karnataka Journal of Agricultural Science.* July **25(2)**

Singh, A., Ram, R.B. and Meena, M.L**.** (2015).Efficacy of different sources of nutrients and bio-fertilizers on growth yield and quality of onion. *International Research Journal of Natural and Applied Sciences*.**2(10)**:64-70.

Talwar, P; Gupta, N.K. and Dubey, S.(2012). Effect of organic, inorganic and biofertilizers on the growth and productivity of garlic (*Allium sativium*L) cv. G-323. *Crop Research*, **43 (1,2& 3)**:89-97.

Vavilov N I. (1951). *Origin, variation, immunity and breeding of cultivated plants. Journal of Chronical Botany* **13** (**1/6**):1-364.

Yogita and Ram RB (2012) Effect of Chemical and Bio-fertilizers on Quality of onion. (*Allium sativium*L). *HortFlora Research Spectrum*, **1(4)**: 367-70

Table 1: Effect of Nutrient Management on the vegetative growth of Onion (*Allium cepa*L.)

Treatment	Plant height (cm)	No. of leaves /plant	Length Of leaf	Width of leaf (cm)	Diameter of pseudo-stem(cm) (cm)	Weight. of tops (gm)
T_1	43.53	6.55	38.23	1.51	1.43	41.73
T_2	44.31	6.66	39.66	1.65	1.30	41.85
T_3	47.85	7.66	42.46	1.88	1.53	43.65
T_4	50.14	8.65	45.53	2.00	1.76	45.34
T_5	46.25	7.55	41.10	1.82	1.33	42.56
T_6	44.53	7.22	40.36	1.73	1.30	42.18
T_7	41.3	6.11	37.25	1.44	1.30	41.34
T_8	39.52	5.88	33.96	1.28	1.20	38.31
S.Em±	0.656	0.193	0.330	0.051	0.708	0.714
CD(P=0.05)	5.97	0.588	1.00	0.155	0.214	2.16

Table 2: Effect of Nutrient Management on the growth and quality of Onion (*Allium cepa*L.)

Treatment	Bulb Diameter (cm)	Weight of bulb (gm)	Bulb yield qt/ha	Specific gravity
T_1	4.05	68.32	222.67	1.08
T_2	4.21	71.57	250.93	1.04
T_3	4.93	82.05	301.48	1.05
T_4	5.21	84.32	339.58	1.62
T_5	4.96	80.13	282.43	1.10
T_6	4.47	77.13	268.64	1.04
T_7	4.60	66.68	218.72	0.89
T_8	4.04	63.40	193.13	0.919
S.Em±	0.246	1.27	30.85	0.105
CD(=0.50)	0.747	3.88	93.59	0.319

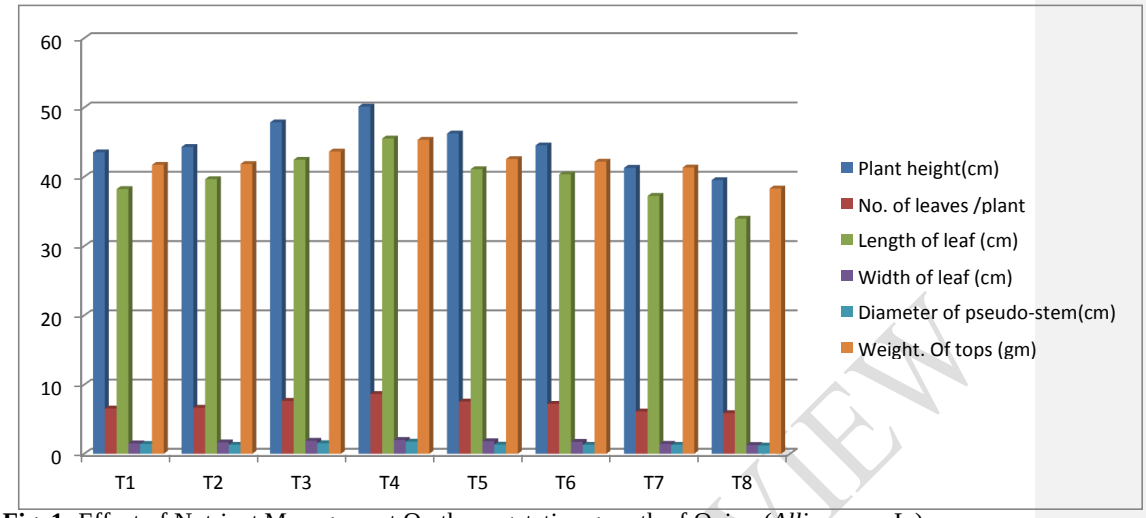

Fig. 1: Effect of Nutrient Management On the vegetative growth of Onion (*Allium cepa*L.)

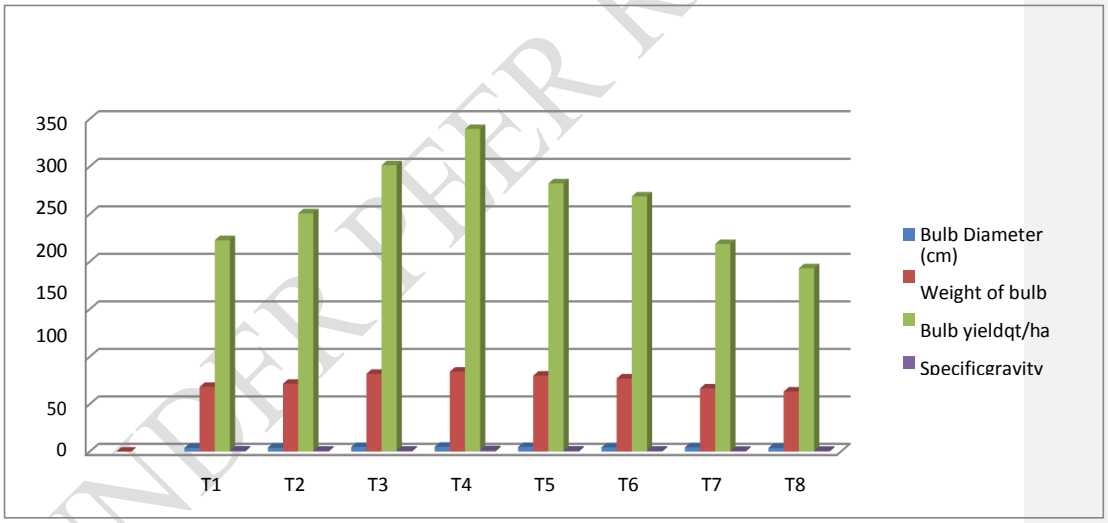

Fig. 2: Effect of Nutrient Management On the growth and quality of Onion (*Allium cepa*L.)