



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(6): 635-637

© 2020 IJCS

Received: 12-08-2020

Accepted: 30-10-2020

Priyanshu

Department of Horticulture,
R.S.M. (PG) College Dhampur,
M.J.P. Rohilkhand University,
Bareilly, Uttar Pradesh, India

Pal SL

Department of Horticulture,
R.S.M. (PG) College Dhampur,
M.J.P. Rohilkhand University,
Bareilly, Uttar Pradesh, India

Ravi

Department of Soil Science,
R.S.M. (PG) College Dhampur,
M.J.P. Rohilkhand University,
Bareilly, Uttar Pradesh, India

Shoraj Singh

Department of GPB, R.S.M.
(PG) College Dhampur, M.J.P.
Rohilkhand University, Bareilly,
Uttar Pradesh, India

Kumar Vipin

College of Horticulture, Sardar
Vallabhbhai Patel University of
Agriculture & Technology,
Meerut, Uttar Pradesh, India

Corresponding Author:**Priyanshu**

Department of Horticulture,
R.S.M. (PG) College Dhampur,
M.J.P. Rohilkhand University,
Bareilly, Uttar Pradesh, India

Effect of organic manure and inorganic fertilizer on growth yield and yield attributes in onion (*Allium cepa* L.) under Dhampur (Bijnor) condition

Priyanshu, Pal SL, Ravi, Shoraj Singh and Kumar Vipin

DOI: <https://doi.org/10.22271/chemi.2020.v8.i6i.10844>

Abstract

The present investigation on “effect of organic manure and inorganic fertilizer on growth yield, and yield attributes in onion (*Allium cepa* L.) cv Agrifound Light Red”, was conducted at Horticulture Research Farm, Dhampur (Bijnor) during winter season 2019-2020. The experiment was laid out in RBD with 8 treatments of organic manure and inorganic fertilizer viz. Control (T1), 100% N.P.K (T2), 100% F.Y.M (T3), 100% Neem Cake (T4), 50% N.P.K + Neem Cake (T5), 50% F.Y.M. + Neem Cake (T6), 33% N.P.K.+ F.Y.M. + Neem Cake(T7) and 50% N.P.K + F.Y.M (T8). The results showed that the growth attributes were very much fluctuated in different treatments. As far as yield characters are concerned, it was found that the treatment 50% N.P.K + F.Y.M (T8) was found superior over all other treatments studied.

Keywords: Organic manure, inorganic fertilizers, onion, yield

Introduction

Onion (*Allium cepa* L, 2n =16) is one of the most important bulb crop grown all over the world for its nutrients availability like carbohydrates (11gm), protein (1.2gm), calcium (180 mg), phosphorus (50 mg), iron (0.7 mg), nicotinic acid (0.4 mg), riboflavin (0.01 mg) and vitamin C (11 mg) in each 100 gm of edible portion (Bangali *et al.* 2012) [2]. It belongs to the family Alliaceae, and originated in central Asia. It is an indispensable item in every kitchen used as salad, culinary purpose for flavouring as spices in pickles. sauce and vegetable in India. The average productivity of India is 16.3 MT/ha, which is low as compared to other onion producing countries of the world. It is cultivated in an area of 1320.13 Thousand (ha.). It is cultivated in an area of 1320.13 Thousand (ha.) Anonymous (2018) [1]. After the green revolution, production of vegetable has increased to a great extent due to use of chemical fertilizer. But their indiscriminate use led to soil. To overcome the problems of ecological imbalance and increased cost of cultivation due to continuous use of chemical fertilizer, the latest trend of growing vegetable crop by using organic manure, bio fertilizers together with inorganic fertilizer is called as integrated nutrient management (INM).The present investigation entitled “To study about the effect of organic manure and inorganic fertilizer on growth, yield and yield attributes in Rabi Onion (*Allium cepa* L.) Under Dhampur (Bijnor) Condition” of 2019.

Material and Methods

The field experiment was conducted Horticulture Research Centre (HRC) at R.S.M (PG) College Dhampur Bijnor Uttar Pradesh India. Geographically it is situated between 29° 17' 27" latitude in the north and 78° 30' 12" longitudes in the eastern elevation of about 235 m above mean sea level. The experiments were laid down in a Randomized Block Design with three replications. Agrifound Light Red variety of onion was taken for the experimentation. Total 8 treatments viz; T1- Control, T2- 100% NPK, T3- 100% FYM, T4- 100% NEEM CAKE, T5-50% NPK + 50% NEEM CAKE, T6- 50% NEEM CAKE + 50% FYM, T7 33% NPK + 33% NEEM CAKE + 33% FYM and T8- 50% NPK +50% FYM was undertaken.

The observations on Plant height(cm), Number of leaves/plant, Height of stem (cm)/plant, Height of stem (cm)/plant, Diameter of stem (mm)/plant, Fresh bulb weight (g)/plant, Dry bulb weight (g)/plant, Fresh bulb weight (g)/plant, Dry bulb weight (g)/plant, Polar Diameter of bulb/plant (cm), Equal Diameter of bulb/plant (cm), Yield (kg)/plot, Yield q/ha, T.S.S. (⁰Brix) and Protein (%). were recorded during the course of experimentation. Average of data from the sampled plant of each treatment was used for statistical analyses in order to draw valid conclusions.

Results and Discussion

Result shown that treatments have wide range of variation in respect of plant height of all treatments. T8-50% FYM+NPK had maximum plant height (42.33cm) followed by 40.70cm in T₇ (33% NPK+NC+FYM), whereas T₁ (control) had minimum plant height (31.00cm) Result shown that treatments have wide range of variation in respect number of leaves/plant for all treatments. Maximum number of leaves/plant (6.07) were found in T8-50% FYM+NPK and T₇ followed by T₅(6.00), whereas T₁ (control) had minimum number of leaves/plant (5.60). A wide range of variation in respect height of leaves/plant for all treatments. T8-50% FYM+NPK maximum number of leaves/plant (45.43 cm) followed by 44.33cm in T₇ (33% NPK+NC+FYM), whereas T₁ (control) had minimum height of leaves/plant (38.00 cm). Height of stem/plant was found maximum in T8-50% FYM+NPK (9.40 cm) followed by 9.33 cm in T₇ (33% NPK+NC+FYM), whereas T₁ (control) had minimum height of stem/plant (8.40 cm). Result shown that treatments have wide range of variation in respect diameter of stem/plant for all treatments. It was observed that T8-50% FYM+NPK had maximum diameter of stem/plant (19.55 cm) followed by 15.59 cm in T₇, whereas T₁ (control) had minimum diameter of stem/plant (12.44 cm). Fresh bulb weight/plant was found maximum in T8-50% FYM+NPK (132.33gm) followed by 110.63gm in T₇ (33% NPK+NC+FYM), whereas T₁ (control) had minimum fresh bulb weight/plant (90gm). The interactive influence of mineral nutrients and FYM on growth characters might be due to improved physico-chemical and biological properties like water holding capacity, hydraulic conductivity, high rate of microbial transformations due to availability of organic carbon in the form of FYM for heterotrophic organisms, buffering effect, improved soil aggregation, aeration, release of organic acid, etc. which might act as stimulant for supply of crop nutrients during the course of decomposition. Results of Patel *et al.* (1986) [7], Meena *et al.* (2015) [5], Singh (2014) [10] and Rabinadra *et al.* (1988) [9] also revealed that there was higher release of nutrient from added sources, it was otherwise not available.

Increased levels of FYM along with combination of chemical fertilizers was found significant for fresh bulb weight, dry bulb weight, polar diameter, equal diameter, yield/plot and yield/hectare. Result shown that treatments have wide range of variation in respect of dry bulb weight/plant all treatments ranged from 64.67 to 110.67gm. T8-50% FYM+NPK had maximum dry bulb weight/plant (110.67gm) followed by 94.33gm in T₇, whereas T₁ (control) had minimum dry bulb weight/plant (64.67gm) at the stage of after harvesting. Result revealed that treatments have wide range of variation in respect of polar diameter/plant for all treatments. T8-50% FYM+NPK had maximum polar diameter/plant (5.65 mm) followed by 5.47 mm in T₇, whereas T₁ (control) had minimum polar diameter/plant (4.59mm). Equal diameter/plant was found maximum (5.89 mm) in T8-50% FYM+NPK followed by 5.77mm in T₇, whereas T₁ (control) had minimum equal diameter/ plant (5.21mm). yield/h for all the treatment was influenced by organic, inorganic and combination of both. T8-50% FYM+NPK had maximum yield/ha (276.67q) followed by 229.33q in T₇ (33% NPK+NC+FYM), whereas T₁ (control) had minimum yield/ha (155.00q). The beneficial response of FYM to yield might also be attributed to the availability of sufficient amount of plant nutrients throughout the growth period of crop resulting, plant vigour and yield (Prabhakaret *al.* 2012) [8]. The importance of FYM in improving the soil fertility and increasing growth and yield of crops have been advocated by Lallan *et al.* (1997) [4] and Gupta *et al.* (1999) [3], Increasing of fertility levels increased protein content and total soluble solids (TSS) in bulb of onion. 50% FYM+NPK was found superior for all the quality parameters. Result revealed that treatments have wide range of variation in respect of TSS for all treatments ranged from 8.00 to 12.67. T₈ had maximum TSS (12.67) followed by 11.00 in T₇, whereas T₁ (control) had TSS (8.00). Protein content was affected by different treatments of organic and inorganic fertilizers. T8-50% FYM+NPK had maximum protein (1.97) followed by 1.80 in T₇, whereas T₁ (control) had protein (1.30). The higher nutrient contents in bulb also seem to be due to higher functional activity of root for longer duration under this treatment. The increase in N, P, K and FYM content in bulb were also observed. TSS content significantly increased with the nitrogen application nitrogen helped in vigorous vegetative growth and imparted deep green colour to the foliage which favoured photosynthetic activity of the plants so there was greater accumulation of food material i.e. carbohydrates in the bulb which synthesized to saccharides and there was increased in TSS content. The similar results have also been reported by Singh *et al.* (2014) [10], Pandey *et al.* (1991) [6], Vachhani and Patel (1993) [12] and Thabet *et al.* (1994) [11].

Table 1: Mean performance of onion (*Allium cepa* L.) cv. Agrifound Light Red by different organic and inorganic treatments

Treatments	Plant Height (cm)	Number of leaves (cm)	Height of leaves (cm)	Height of Stem (cm)	Diameter of stem (cm)	Fresh bulb weight/ plant (gm)	Dry bulb weight/plant (gm)	Polar diameter /plant (mm)	Equal diameter/ Plant (mm)	Yield (q/ha)	T.S.S. (⁰ Brix)	Protein (%)
T1-CONTROL	31.00	5.60	38.00	8.40	12.44	90.00	64.67	4.59	5.21	155.00	8.00	1.30
T2-100% NPK	36.33	5.73	42.67	8.67	14.90	94.33	72.33	5.13	5.43	165.67	8.67	1.30
T3-100% FYM	38.13	5.80	41.67	9.00	15.00	103.83	82.73	4.97	5.39	184.67	9.00	1.47
T4-100% N.C	38.43	5.73	40.37	9.20	14.75	105.67	84.67	4.89	5.41	194.33	9.67	1.60
T5-50% NPK+NC	38.97	6.00	43.17	9.27	14.65	107.83	88.17	5.39	5.46	195.33	10.67	1.67
T6-50% NC+FYM	40.43	5.73	43.67	9.27	15.24	104.60	88.73	5.42	5.56	206.00	10.33	1.80
T7-33% NPK+NC+FYM	40.70	6.07	44.33	9.33	15.59	110.63	94.33	5.47	5.77	229.33	11.00	1.80
T8-50% FYM+NPK	42.33	6.07	45.43	9.40	19.55	132.33	110.67	5.65	5.89	276.67	12.67	1.97
Mean	38.29	5.84	42.41	9.07	15.27	106.15	85.79	5.19	5.51	200.88	10.00	1.61
Minimum	31.00	5.60	38.00	8.40	12.44	90.00	64.67	4.59	5.21	155.00	8.00	1.30
Maximum	42.33	6.07	45.43	9.40	19.55	132.33	110.67	5.65	5.89	276.67	12.67	1.97

SE(m)	0.63	0.23	0.80	0.73	0.37	3.47	2.82	0.12	0.21	4.79	0.31	0.08
C.D. at 5%	1.94	NS	2.43	NS	1.13	10.62	8.63	0.36	NS	14.67	0.96	0.23
C.V. (%)	2.86	6.86	3.25	13.88	4.17	5.66	5.69	3.92	6.65	4.13	5.4	8.16

Conclusion

On the basis of results emanated from the present investigation that application of 50% N.P.K + 50% F.Y. Mproved best in respect of better growth and yield as well as for quality parameters. It is also reveal that about 25% nutrient required by onion crop could be supplemented by making effective combination of chemical fertilizer with FYM. The treatment 50% N.P.K + 50% F.Y.M were found better than the rest of the treatments for yield and most of the yield attributing characters. This treatment may be considered as guidelines for further enhancement of growth, yield and quality parameters in onion.

References

1. Anonymous. National Horticulture Board Database, Gurgaon, 2018. <http://www.nhb.gov.in>.
2. Bangali AN, Patil HB, Chimmed VP, Patil RV. effect of inorganic and organics on growth and yield on onion (*Allium cepa*.L) Karnataka Journal Environment Science and Natural Resources. 2012; 6(1):159-162.
3. Gupta RP, Sharma VP, Singh DK, Shrivastava KJ. Effect of organic manures and inorganic fertilizers on growth, yield and quality of onion var. Agri Found Dark Red. Newsletter, Nat. Horti. Res. and Devet. Foundation. 1999; 19(2-3):15-18.
4. Lallan S, Bhonde SR, Mishra VK. Effect of different organic manures and inorganic fertilizers on yield and quality of Rabi onion. New latter, Net. Horti. Res. Devt. Foundation. 1997; 17:1-3.
5. Meena AK, Palwal R, Meena KK. Effect of organic manures and bio- fertilizers on growth and quality attributes of kharifonion (*Allium cepa* L.) in semi-arid region. Indian research journal Genetics and Biotech. 2015; 7(1):73-76.
6. Pandey UB, Singh Lallan, Singh Raj, Kumar Raj, Singh L, Kumar R *et al.* Response of different levels of N, P and K on the yield and quality of kharif onion. Recent advances in medicinal aromatic and spice crops. Vol. 1 International conference held on 28-31 Jan. 1989 at New Delhi, 1991, 231-234.
7. Patel MS, Sutaria GS, Patel AG. Effect of rock phosphate in combination with FYM, S.S.P. and pyrite on P and S availability in calcareous soil. In: Rockphosphate in Agriculture (Eds. Kothandaraman, G.V.; Manickram, T.S. and Natarajan, K.) Tamil Nadu Agricultural University, Coimbatore, 1986, pp 137-142.
8. Prabhakar M, Hebbar SS, Nair AK. Effect of organic farming practices on growth yield and quality of rose onion (*Allium cepa* L.). Indian journal of agricultural science. 2012; 82(6):50-53.
9. Rabinadra B, Naidu BS, Swamygowda SN, Geethadevi T. Rock phosphate as a source of P for rice in neutral soil. In: Proc: seminar on use of rock phosphate in neutral soils. Tamil Nadu Agricultural University, Coimbatore, 1988, pp. 143-148.
10. Singh BV. Influence of organic and inorganic sources of nutrients on growth yield and quality of onion (*Allium cepa* L.) Thesis submitted at Rajmata Vijayara Scindia Krishi Vishwa Vidyalaya, Gwalior, 2014.
11. Thabet EMA, Abdallah AAG, Mohamed ARAG. Productivity of onion grown in reclaimed sandy soil

using tafla as affected by water regimes and nitrogen levels. Ann. Agric. Sci. Cairo. 1994; 39:337-344.

12. Vachhani MU, Patel ZG. Effect of nitrogen, phosphorus and potash on bulb yield and quality of onion (*Allium cepa*). Indian J Agronomy. 1993; 38(2):333-334.