International Archive of Applied Sciences and Technology
Int. Arch. App. Sci. Technol; Vol 11 [3] September 2020 : 200-203

[ISO9001: 2008 Certified Organization]
www.soeagra.com/iaast.html

IAAST
ONLINE ISSN 2277- 1565
PRINT ISSN 0976 - 4828

CODEN: IAASCA ORIGINAL ARTICLE

DOI: .10.15515/iaast.0976-4828.11.3.200203

Response of FYM and *Azotobacter* on the Vegetative Growth, Yield And Quality of Sugar Beet (*Beta vulgaris* L.) Cv. Crimson Globe

Manvendra Singh Solanki, Brijesh Kumar, Roshan Kushwah, Dalveer Singh, Gautam Singh.
Department of Horticulture, R.B.S. College, Bichpuri, Agra,U.P. (India)

ABSTRACT
The field investigation was conducted during the year 2017-2018 at Raja Balwant singh College, Bichpuri, Agra, U.P. to find out the response of organic and inorganic fertilizer viz. FYM and Azotobacter along with NPK on vegetative growth, yield and quality of sugar beet cv. Crimson Globe. The experiment was laid out in Randomized Block Design (RBD) consisting 8 treatment combinations i.e. T_1 (Control) T_2 (RDF 80:100:80) T_3(50% RDF + FYM) T_4(50% RDF+FYM+Azotobacter) T_5(60% RDF + FYM) T_6 (60% RDF + FYM + Azotobacter) T_7(80% RDF+FYM) and T_8(80%RDF+FYM+Azotobacter) which was replicated thrice. On the basis of results on various aspects of the study envisaged that T_8 (80% RDF + FYM +Azotobacter) was found significantly superior to improved the growth, yield and quality of sugar beet.
KEYWORDS: *FYM, Azotobacter, Nitrogen, Phosphorus, Potassium, Sugar beet, root yield.*

Received 11.06.2019 Revised 20.07.2019 Accepted 14.08.2019

CITATION OF THIS ARTICLE
M S Solanki, B Kumar, R Kushwah, D Singh, G Singh. Response of FYM and *Azotobacter* on the Vegetative Growth, Yield and Quality of Sugar Beet (*Beta vulgaris* L.) Cv. Crimson Globe. Int. Arch. App. Sci. Technol; Vol 11 [3] September 2020: 200-203

INTRODUCTION

Sugar-beet or Beet root (*Beta vulgaris* L.) is a popular root vegetable grown in kitchen gardens as well as market gardens. The sugar beet is cultivated through- out the India. It is mostly cultivated in U.P., Punjab, Rajasthan, Haryana and Tamil Nadu mainly for its fleshy enlarged roots. In world Europe, France, Germany, U.S.A., Iran, Pakistan etc. countries are cultivated beet root. The beet root is a member of chenopodeaceae family and the chromosome no. 2n =18 which is biennial and cross pollinated crop. The most popular potherb or green has or had perhaps as wide spread publicity as any other vegetable. It is mainly grown for its tender, succulent leaves but the tender seed –stalk is also cooked in some parts of the country. *Azotobacter* belongs to family Azotobacteriaceae, chemogeterotropic in nature, free living. It is non-symbiotic in nature and fixes nearly 20 to 40 kg N/ha. IT produces growth promoting substances like vitamins of B group, in dole acetic acid and gibberellic acid. This bio-fertilizer is recommended for all vegetable and other cereal crops**.**

The advantage of combining organic and inorganic sources of nutrients integrated nutrient management has been proved superior to the use of each component separately. Palamiappan and Annadurai 2017 organic manures improve soil physical, chemical and biological properties and this in hence crop. Productivity vis-o-vis maintain soil health. Integrated nutrient management hold a great promise in meeting the growing nutrients almonds of intensive Agriculture.

Keeping these facts in mind the present experiment was conducted at R.B.S.College, Agricultural Research farm, Bichpuri, Agra in rabi season during year 2017-2018 to asses the effect of FYM and Azotobacteron the vegetative growth and quality yield of sugar beet.

MATERIAL AND METHODS

The experiment was conducted at research form of Department of Horticulture, Raja Balwant Singh College, Bichpuri, Agra during 2017-2018. The research farm is situated at latitude of $27^0$2 N and longitude of $77^0$9 E at an elevation of 163.4m above sea level. The Agra tract has a tropical and subtropical climate with hot dry summer and sever winter. Under normal climate condition the area receives about 670 mm. annual rain fall, around 80% of which occurs from July to September. The mean annual maximum and minimum atmospheric temperature are 46^0 and 1-2^0 respectively.

The soil of experimental plot was genetic alluvial with calcareous layer at the depth of about 0-1.5m. It was sandy loam. Fertile,well drained and slightly alkaline in reaction having 7.9pH. The Soil samples were collected from 30 cm. depth just before layout and after analysis. If was found that field was sufficient in potash content but low in available nitrogen and organic carbon and medium in available phosphorus content.

The investigation was laid out under Randomized Block Design having 8 treatment combinations. T_1 (Control) T_2(RDF 80:100:80 kg NPK) T_3(50% RDF + FYM) T_4(50% RDF + FYM +*Azotobacter*) T_5(60% RDF + FYM) T_6 (60% RDF + FYM + *Azotobacter*) T_7(80% RDF+FYM) and T_8(80%RDF+FYM+*Azotobacter*) which were replicated thrice. The seeds of Sugar beet cv. Crimson Globe were sown on the top of ridge on 4.11.2017. The spacing from ridge to ridge was kept 40 cm. and seed to seed 10 cm. Two seeds were sown at each hill at a depth of about 2 cm. depth only bold and apparently healthy seeds were used. Finally maintain the proper plant population by removing the week and unhealthy plant and maintained gapped place.

RESULTS AND DISCUSSION

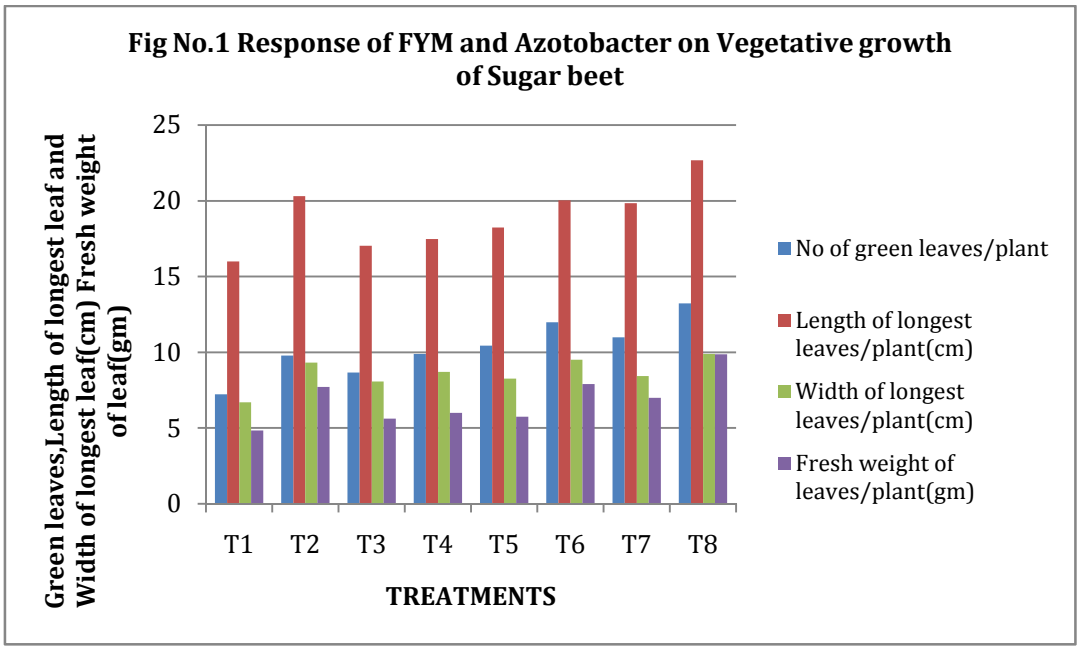
The pooled data regarding vegetative growth, yield and quality of sugar beet were presented in Table-1 and Table-2. It is evident from Table-1 that different treatment combinations showed significant effect on different vegetative observations except fresh weight of leaves per plant (gm) in sugar beet. The significantly maximum number of green leaves (13.22) was counted with T_8 (80% RDF + FYM + *Azotobacter*) followed by T_6,T_7 and T_5 which were found at par to each other. The maximum length of longest leaves (22.68 cm.), width of longest leaves(9.90cm.) and fresh weight of leaves (9.87cm.) were measured with T_8(80% RDF + FYM+ *Azotobacter)* treatment followed by T_6(60%RDF+FYM+*Azotobacter*) which was found at par. Maximum Significantly minimum number of leaves (7.22) length of longest leaf (15.99 cm), width of longest leaf (6.70cm) and fresh weight of leaves per plant (4.83 gm) were recorded with T_1 (control). These findings are in the close proximity to the results reported by Kristaponyte *et al.* [2], Eman l *et al.* [1].

The examination of data presented in Table-2 revealed that all the treatment have significant effect on fresh weight of root, yield of root, dry matter in root and dry matter content in leaves as compared to control. The non significant response was found in the length of sugar beet where maximum length of root (10.04cm) was measured in T_8 (80% RDF + FYM+*Azotobacter*) and minimum (6.59 cm) was found in control (T_1).

The maximum (364.27 q/ha) root yield was observed from T_8 (80% RDF + FYM+*Azotobacter*) followed by T_6, T_2 and T_4 which were found at par to each other. The maximum fresh weight of root per plant (356gm), dry matter content of root (5.92%) and leaves (11.97%) were recorded with T_8 treatment (80% RDF + FYM +*Azotobacter*) followed by T_6 (60%RDF+FYM+*Azotobacter*) which was statistically at par to each other. The significantly minimum fresh weight of root (165 gm), length of root (2.89 cm), yield of roots (201.66 q/ha), dry matter content in root (3.60%) and leaves (10.43%) were observed in T_1 (control). It may be due to balance application of NPK and organic fertilizer which makes the availability of almost all the major nutrients in available form and improve the physio-chemical properties of soil. The findings are in consonance with the earlier results [1, 2, 6, 7, 3, 4].

Table No. 1- Response of FYM and *Azotobacter* on Vegetative growth of Sugar beet.

Treatment	No. of green leaves per plant	Length of largest leaves per plant (cm)	Width of largest leaves per plant (cm)	Fresh weight of leaves per plant (gm)
T_1	7.22	15.99	6.70	4.83
T_2	9.78	20.30	9.33	7.72
T_3	8.67	17.03	8.07	5.63
T_4	9.89	17.47	8.70	6.00
T_5	10.44	18.23	8.27	5.74
T_6	11.99	20.04	9.50	7.90
T_7	10.99	19.85	8.43	7.00
T_8	13.22	22.68	9.90	9.87
CD at 5% level of probability	**1.49**	**2.05**	**1.63**	**1.20**



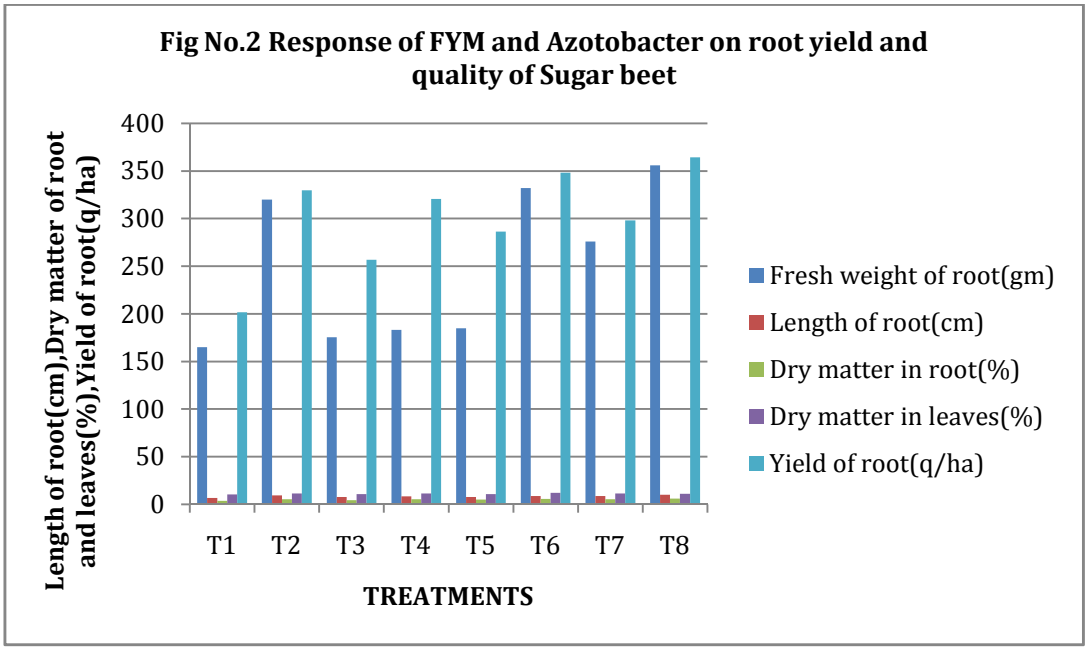


Table No. 2- Response of FYM and *Azotobacter* on root yield and quality of Sugar beet

Treatment	Fresh weight of root (gm)	Length of root (cm)	Dry matter content in root (%)	Dry matter content in leaves (%)	Yield of roots (q/ha)
T_1	165.00	6.59	3.60	10.43	201.66
T_2	320.00	9.47	5.53	11.47	329.89
T_3	175.33	7.88	4.47	10.70	256.76
T_4	183.33	8.44	5.47	11.27	320.51
T_5	185.00	7.64	5.19	10.83	286.24
T_6	332.00	8.77	5.80	11.97	348.22
T_7	276.66	8.79	5.32	11.27	298.01
T_8	356.00	10.04	5.92	10.98	364.27
CD at 5%	**47.11**	**1.13**	**068**	**094**	**8.02**

REFERENCES

1. Eman I., EI-Sarag and Sameh,H.,Moselhy (2013). Response of sugar beet quantity and quality to nitrogen and potassium fertilization under sandy soils conditions. Asian journal of crop science, 5,295-303
2. Kristaponyte, I.(2003).The influence of organic and mineral fertilizers on sugar beet productivity. Zemdirbyste, Mokslo Darbar, 2003 81:64-7
3. Shani Kumar; Sanjay Kumar; Sutana Maji and Pandey V.K, (2017). Effect of inorganic fertilizers and bio-fertilizers on growth, yield and quality of radish (Raphanus sativus L.), Environment and Ecology, 35(1): 25-28
4. T.A., Mehdi, M.A.,Siddique and Sonia B.,Shahid (2012) .Effect ofurea and cowdung on the growth and yield of carrot (Daucus carrot L.) J. Bangladesh Agril. Univ., 10 (I):9-13.2012
5. Sentiyangla; Kanaujia, S. P.; Singh, V. B.; Singh, A. K.(2010) ;INM for quality production of radish (*Raphanus sativus* L.) in acid alfisol. Association of Soils and Crops Research Scientists , Nagpur , India , Journal of Soils and Crops , Vol. 20 , No. 1 , pp. 1-9
6. Sarkar, A; mandal, A.R., Prasad, P.H. and Maity, T.K. 2010. Influence of nitrogen and bio fertilizer on growth and yield of sugar beet. Journal of crop and Weed 6 (2):76-77.
7. Balakrishnan, A.; Selvakumar, T.; Springer SBM , Dordrecht ,Netherlands, (2008) Integrated nitrogen management for tropical sugar beet hybrids. Vol. 10, No. 2,pp. 177-180