Asian Journal of Soil Science and Plant Nutrition

Volume 10, Issue 2, Page 455-459, 2024; Article no.AJSSPN.116196
ISSN: 2456-9682

Effect of Different Nutrient Combinations on Quality of Sweet Corn (*Zea mays* L. Var. Saccharata.)

Parne Shyam Sundar Reddy [a*], Kolse R. H [a], Ugale N. S [b] and Shelke S. R [b]

[a] Department Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth Rahuri, Ahemednagar, Maharashtra, 413722, India.
[b] Department of Statistics, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth Rahuri, Ahemednagar, Maharashtra, 413722, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/ajsspn/2024/v10i2302

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/116196

Original Research Article

Received: 04/03/2024
Accepted: 10/05/2024
Published: 14/05/2024

ABSTRACT

A field experiment was conducted at Post Graduate Instructional Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri, India, during Rabi season 2020. The trial was laid out in Randomised Block Design with nine treatments replicated thrice. The soil of the experimental plot was clay loamy, medium in available nitrogen, medium in available phosphorus, and high in available potassium. The sowing was done on 24 November 2020. The general recommended dose of fertiliser applied was 120:60:40 N: P2O5: K2O kg ha-1+ 10 t FYM ha-1. Application of 125% general recommended dose of fertiliser along with a foliar spray of 2% 19:19:19 NPK at 30 and 45 DAS recorded significantly higher crude protein content in cob and stover (11.12%, 5.18%), Protein Yield (1878 kg ha-1).

**Corresponding author: Email: srreddy5273606@gmail.com;*

***Cite as:** Reddy, P. S. S., Kolse R. H, Ugale N. S, & Shelke S. R. (2024). Effect of Different Nutrient Combinations on Quality of Sweet Corn (Zea mays L. Var. Saccharata.). Asian Journal of Soil Science and Plant Nutrition, 10(2), 455–459. https://doi.org/10.9734/ajsspn/2024/v10i2302*

Keywords: Sweet corn; foliar spray; season; fertiliser.

1. INTRODUCTION

One of the most often used varieties of maize is sweet corn. The first hybrid was created by breeder and seed producer Noyes Darling of New Haven, Connecticut. Widespread production of sweet corn did not begin until the turn of the 20th century. The plant was recognised for quite some time in Europe, but its commercial significance didn't really take off until after World War II. There is a huge market for sweet corn, popcorn, baby corn, high oil corn, and other specialty corn in India and abroad. These specialist corns have a high market value, which makes them perfect for para-urban agriculture. Among the several types of maize, sweet corn has a considerable commercial potential. Popcorn, baby corn, high oil corn, sweet corn and other. These specialist corns have a high market value, which makes them perfect for para-urban agriculture. Among the several types of maize, sweet corn has a considerable commercial potential [1,2,3]. Modern agriculture must minimise soil and water damage while supplying crops with enough nutrients at every stage of the development cycle. This can be achieved by applying precise and up-to-date nutrient management techniques, especially water-soluble fertilisers that have a low salt index and a high quantity of primary nutrients. Water-soluble fertilisers allow for the application of fertiliser foliarly as well as crop fertigation [4].

The production of maize is heavily dependent on the nutrient management system because it is a demanding crop that needs a lot of nutrients. Soil and environmental variables have a significant influence on the comparatively low nutrient usage efficiency (NUE) of fertilisers delivered through soil [5,6]. Apart from enhancing the dietary needs of crops, prompt administration of vital nutrients via foliar sprays in combination with nutrient treatments applied to the soil provides several benefits, such as prompt and effective crop response. One popular method of adding extra nourishment to plants is through foliar spraying water-soluble fertiliser. Because foliage absorbs nutrients far more quickly than roots do, foliar nutrition is very effective [7,8-11].

The amount and quality of agricultural production will be greatly increased by using a balanced fertiliser during the key growth phases. More than 90% of fertiliser applied to leaves is utilised by the plant [12-15]. However, only 10% of the fertiliser is used when the same amount is applied to the soil. When foliar nutrients are applied in conjunction with soil application, there are several benefits to augmenting crop nutritional needs. These benefits include quicker and more effective plant response, reduced fertiliser consumption, preservation of soil health, and resolution of nutrient fixation and immobilisation issues. Considering the nutrient requirement and nutrient use efficiency of foliar application of nutrients, the present investigation was carried out [16].

2. MATERIALS AND METHODS

The study was conducted during Rabi season of 2020 at the PGI Farm, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, and District, Ahmednagar. The soil texture of the experimental field was clay loam, medium in available nitrogen (298.18 kg ha-1), medium in available phosphorus (27 kg ha-1), and very high in available potassium (412 kg ha-1). In reaction, the soil in the experimental field was mildly alkaline (pH 8.46) with 0.34 % organic carbon, soil electrical conductivity was 0.52 dSm-1.

The experiments was laid out in randomised complete block design and comprised of nine treatments replicated thrice and the treatments are:

T_1: Control
T2: 125% GRDF + 1% 19:19:19 NPK
T3: 100% GRDF +1% 19:19:19 NPK
T_4: 75% GRDF + 1% 19:19:19 NPK
T5: 50% GRDF + 1% 19:19:19 NPK
T6: 125% GRDF+ 2% 19:19:19 NPK
T_7: 100% GRDF + 2% 19:19:19 NPK
T8: 75% GRDF + 2% 19:19:19 NPK
T9: 50%GRDF + 2% 19:19:19 NPK

The foliar spray of 1% and 2% 19:19:19 NPK are applied at 30 and 45 DAS. The GRDF of Sweet corn is 120:60:40 N: P2O5: K2O kg ha-1+ 10 t FYM. The climatic conditions were favourable for sweet corn growth and development, according to the meteorological data. During the investigation of Rabi sweet corn in 2020, the following meteorological data were observed, relative humidity during morning hour (92.1–70.7%), evening hour (47.4– 19.7 %). The rainfall distribution received during crop growth was uniform. In general, the weather conditions were found favourable for normal crop growth and development. The general recommended dose of fertiliser (GRDF) was applied in each plot to treatments in the form of FYM, urea, single super phosphate, and muriate of potash, respectively. Sowing was done on 24 November, 2020, with the sweet corn seed variety Sugar -75; the crop duration was 80-90 days.

There was a total of 27 experimental plots in three replications in the layout. Nine experimental units were separated into each replication. Each experimental unit had a gross plot size of 6.0 x 5.0 m2 and the net plot size was 4.8 x4.6 m2. Sowing was done by dibbling two seeds at each hill at the recommended spacing of 60 cm x 20 cm. The other practices of growing sweet corn were adequately taken for the management of experimental plots throughout the cropping season. Five plants from the net plot area were randomly selected at harvest and used for analysis of protein content and protein yield in cob and stover

3. RESULTS AND DISCUSSION

Data regarding crude protein content in cob and Stover of sweet corn at harvest as influenced by different nutrient combinations is presented in Table 1. The mean crude protein content in cob and fodder is 9.71 and 3.98 %. The mean protein yield was 1236 kg ha^{-1}. All the treatments recorded increase in crude protein content than control.Crude protein content and protein yield was significantly influenced by different combinations of nutrient management practices. Significantly maximum crude protein content in cob and stover was noted in T_6 (11.12%, 5.18%) i.e., 125% GRDF+2%19:19:19. However T_2 (10.35%, 4.50%) i.e., 125% GRDF+1%19:19:19 NPK was at par with T_6 i.e., 125% GRDF+2%19:19:19. The lowest crude protein content percentage was observed in T_1 control (7.35%, 2.62%).

Data regarding crude protein yield in cob and stover of sweet corn at harvest was influenced by different nutrient combinations are presented in Table 1. Significantly highest protein yield was obtained in T_6 (1878 kg ha^{-1}) i.e., 125% GRDF+2%19:19:19 NPK. However T_2 (1639 kg ha^{-1}) i.e., 125% GRDF+1%19:19:19 NPK was at par with T_6 i.e., 125% GRDF+2%19:19:19 NPK. Lowest protein yield was observed in T_1 control (614 kg ha^{-1}). The results are in agreement with the Khan et al. (2006) and Drocelle et al. (2006).

Table 1. Crude protein content in cob and stover and protein yield as influenced by different nutrient combinations

Tr.No.	Treatment Details	Crude protein in Cob (%)	Crude protein in Stover (%)	Protein yield (kg ha^{-1})
T_1	Control	7.35	2.62	614
T_2	125% GRDF + 1% 19:19:19 NPK	10.35	4.50	1639
T_3	100% GRDF+ 1% 19:19:19 NPK	9.56	4.06	1333
T_4	75% GRDF+ 1% 19:19:19 NPK	8.79	3.93	1114
T_5	50% GRDF+ 1% 19:19:19 NPK	8.04	3.50	848
T_6	125% GRDF+2%19:19:19 NPK	11.12	5.18	1878
T_7	100% GRDF+2%19:19:19 NPK	9.62	4.18	1377
T_8	75% GRDF+ 2%19:19:19 NPK	9.39	3.97	1362
T_9	50% GRDF+2%19:19:19 NPK	8.35	3.89	961
	SE (m) ±	0.45	0.32	78.79
	C.D.at 5%	1.37	0.98	238.45
	General Mean	9.17	3.98	1236

4. CONCLUSION

The production of maize is heavily dependent on the nutrient management system because it is a demanding crop that needs a lot of nutrients. Soil and environmental variables have a significant influence on the comparatively low nutrient usage efficiency (NUE) of fertilisers delivered through soil. The amount and quality of agricultural production will be greatly increased by using a balanced fertiliser during the key growth phases. More than 90% of fertiliser applied to leaves is utilised by the plant.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Kumar P, Halepyati AS, Pujari BT, Desai BK. Effect of integrated nutrient management on productivity, nutrient uptake and economics of maize (*Zea mays* L.) under rainfed condition. Karnataka Journal of Agricultural Science. 2007;20(3):462-465.
2. Abdi M, Mohamadi GN, Golchin A. The influence of foliar nutrition of urea and potassium chloride on grain yield, grain protein content, yield components and leaf relative water content of sardari wheat under rainfed condition. Journal of Agricultural Science. 2002; 8(2):29-38.
3. Amanullah, Khair MK, Azam K, Imran K, Zahir S, Zahid H. Growth and yield response of maize (*Zea mays* L.) to foliar NPK-fertilizers under moisture stress condition. Soil Environment. 2014;33(2): 116-123.
4. Dalvi SD. Effect of various spacing and nitrogen levels on growth, yield and quality of two varieties of maize (*Zea mays*) under konkan conditions. Journal of Agricultural Biological science. 1984;32(3): 16-17.
5. Silva, Paulo Sérgio L, Araújo Júnior BB, Oliveira VR, Pontes FS, Oliveira OF. Effects of nitrogen application on corn yield after harvesting the apical ear as baby corn. Horticultura Brasileira. 2013;31(3):419–425.
6. Zhang Y, Li C, Wang Y, Hu Y, Christie P, Zhang J, Li X. Maize yield and soil fertility with combined use of compost and inorganic fertilizers on a calcareous soil on the North China Plain. Soil and Tillage Research. 2016;155:85–94.
7. Jayant KP, Sanjay K, Dwivedi, Harishankar. Effect of integrated nutrient management on productivity and profitability of sweet corn (*Zea mays* L. saccharata). International Journal of Current Microbiology and Applied Sciences. 2018;6(5):2762-2769.
8. Zende NB. Effect of integrated nutrient management on the performance of sweet corn (*Zea mays* L. saccharata). Thesis submitted for Ph.D. (Agri.) Thesis to Konka Krishi Vidyapeeth, Dapoli; 2006.
9. Ayoola OT, Makinde E. Maize growth, yield and soil nutrient changes with N-enriched organic fertilizers. African Journal of Food, Agriculture, Nutrition and Development. 2009;9(1): 580–592.
10. Bekele A, Kibret K, Bedadi B, Balemi T, Yli- Halla M. Effects of lime, vermicompost and chemical P fertilizer on yield of maize in Ebantu District, Western highlands of Ethiopia. African Journal of Agricultural Research. 2018;13(10):477–489.
11. Canatoy RC. Effects of vermicompost onthe growth and yield of sweet corn in Bukidnon, Philippines. Asian Journal of Pangaribuan DH, Hendarto K. The effect of organic fertilizer and urea fertilizer on growth, yield and quality of sweet corn and soil health. Asian Journal of Agriculture and Biology. 2018;6(3):335–344.
12. Sofyan ET, Sara DS, Machfud Y. The effect of organic and inorganic fertilizer applications on N, P-uptake, K-uptake and yield of sweet corn (*Zea mays* saccharata Sturt). IOP Conference Series: Earth and Environmental Science. 2019;393(1): 012021.
13. Gardner J, Hoffmann MP, Pitcher SA, Harper JK. Integrating insecticides and trichogramma ostriniae to control European corn borer in sweet corn: Economic analysis. Biological Control. 2011;56(1):9–1.
14. Kumar R, Bohra JS, Singh AK, Kumawat N. Productivity, profitability and nutrient-use efficiency of baby corn (*Zea mays*) as influenced by varying fertility levels. Indian Journal of Agronomy. 2015; 60(2):285–290.
15. Marlina N, Amir N, Aminah RIS, Nasser GA, Purwanti Y, Nisfuriah L. Organic and inorganic fertilizers application on npk uptake and production of sweet corn in inceptisol soil of lowland swamp area. MATEC Web of Conferences, 97,

01106.il Science and Plant Nutrition. 2017; 1–8.

16. Akgüngör S, Miran B, Abay C. Consumer willingness to pay for organic food in urban Turkey. Journal of International Food & Agribusiness Marketing. 2010;22(3–4):299–313.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/116196