Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(6): 1135-1137
Received: 04-08-2020
Accepted: 21-10-2020

SP Umbarkar
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

AP Wagh
Professor of Horticulture, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

PS Umbarkar
Senior Research Assistant, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

NV Mane
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

SP Deokar
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

Corresponding Author:
SP Umbarkar
M.Sc. Student, Department of Vegetable Science, Faculty of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

Effect of different levels of nitrogen and potassium on soil and plant nutrient analysis of sweet corn

SP Umbarkar, AP Wagh, PS Umbarkar, NV Mane and SP Deokar

Abstract
A field investigation on "Effect of different levels of nitrogen and potassium on available nutrients, nutrient contents, dry matter per plant and nutrient uptake of sweet corn (*Zea mays* (L).var.*Saccharata*)" was carried out at Instructional Farm, Department of Vegetable Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS) during summer season of year 2018-19. The experiment was laid out in Factorial Randomized Block Design having fifteen (15) treatment combinations and three (3) replications. Among the two factors studied, the factor A *i.e.* nitrogen (N) was applied in five different levels *i.e.* N_1 (150 kg ha^{-1}), N_2 (175 kg ha^{-1}), N_3 (200 kg ha^{-1}), N_4 (225 kg ha^{-1}) and N_5 (250 kg ha^{-1}). While, another factor B *i.e.* potassium (K) was applied in 3 different levels such as K_1 (60 kg ha^{-1}), K_2 (80 kg ha^{-1}), K_3 (100 kg ha^{-1}). Available nutrients (NPK), plant nutrient content (NPK), dry matter per plant and also plant nutrient uptake (NPK) were found maximum at nitrogen level N_5 (250 kg ha^{-1}), potassium level K_3 (100 kg ha^{-1}) and treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}).

Keywords: Nitrogen, Potassium, Sweet corn, Nutrients, Dry matter, Nutrient uptake

Introduction
Sweet corn is one of the most popular cultivars of maize. It is not considered as a staple food rather than it is consumed as a fresh vegetable. Out of the various cultivars of maize, sweet corn has very big market potential and has a great genetic variability and has a wide scope to improve its nutritive value. In many parts of the world corn is the most important food source and one of the most efficient field crops. Sweet corn is a warm season vegetable crop that can be grown in all seasons in Maharashtra and in any garden with sufficient light. It is photo insensitive crop and it is monoecious in nature, *i.e* staminate and pistillate flowers are born on separate inflorescence on the same plant. It comes in three colours via. Yellow, white and bicolour. Cross pollination of yellow kernel with white kernel results in production of bicolour corn. According to genetic background it is divided into 3 distinct types: Natural Sugary, Sugary Enhance, Super Sweet corn. The grains of sweet corn have a sugary rather than starchy endosperm and has creamy texture. Its cannot be regarded as a staple food but it is consumed fresh as a confection. Mainly sweet corn is grown for the processing purpose, for preparing products such as canned kernels, frozen cobetts and frozen kernels. Compared to the global growth in the production and consumption of corn, the production of corn is not registering adequate growth in India (Venkatraman 2007) [4]. As compared to USA and China the yield per hectare of corn in India is much lower, so as a result of these the price of corn in India is increasing. It is very essential to cultivate sweet corn with good improved fertilizer doses for getting good yield and eventually good returns. It is not only a single purpose crop, rather it is a dual-purpose crop *i.e*. corns are used as vegetables and leaves stems and other plant parts is used as best fodder for animals. So, improving corn yields as well as fodder yield by improved nitrogen and potassium doses is of vital importance in India.

Material and methods
Experimental Site
The present investigation of field experiment was laid out during summer season of year 2018-19 at the Instructional Farm, Department of Vegetable Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (MS).

Climate and Weather Conditions
Akola is situated in sub-tropical region between 22.20^0 N latitude and 77.02^0E longitudes. The altitude of place is 307.2m above mean sea level.

The climate of Akola is semi-arid and characterized by three distinct seasons, i.e. warm humid and rainy monsoon from June to October, mild cold winter from November to February and hot dry summer from March to May.

Methodology

The experiment was laid out in Factorial Randomized Block Design having fifteen (15) treatment combinations and three (3) replications. Among the two factors studied, the factor A *i.e*. nitrogen (N) was applied in five different levels *i.e*. N_1 (150 kg N ha^{-1}), N_2 (175 kg N ha^{-1}), N_3 (200 kg N ha^{-1}), N_4 (225 kg N ha^{-1}) and N_5 (250 kg Nha^{-1}). While, another factor B *i.e*. potassium (K) was applied in 3 different levels such as K_1 (60 kg K_2O ha^{-1}), K_2 (80 kg K_2O ha^{-1}), K_3 (100 kg K_2O ha^{-1}).

Results and discussion

Available nutrients, plant nutrient content and dry matter per plant

Available nitrogen, available phosphorus and available potassium were observed significantly maximum at level N_5 (250 kg ha^{-1}), level K_3 (100 kg ha^{-1}) and treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}). Plant nitrogen content, plant phosphorus content and plant potassium content were also observed significantly maximum at level N_5 (250 kg ha^{-1}), level K_3 (100 kg ha^{-1}) and treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}). Dry matter per plant was observed significantly maximum at level N_5 (250 kg ha^{-1}), level K_3 (100 kg ha^{-1}) and treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}). Available NPK after harvesting in soil was built up due to the increase in nitrogen and potassium levels. Such kind of similar findings were also reported by Gosavi (2006) [2] and Bharud *et al*. (2012) [1].

Plant Nutrient Uptake

Nitrogen uptake, phosphorus uptake and potassium uptake were found significantly maximum at level N_5 (250 kg ha^{-1}), level K_3 (100 kg ha^{-1}) and treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}). This might be due to significant improvement in most of the growth and yield contributing characters resulted in higher green cob and green fodder yield and thus higher nitrogen, phosphorus and potassium uptake. The findings gained in this research work were in range of those given by Gosavi (2006) [2] and Bharud *et al*. (2012) [1], Rehman *et al*. (2011) [3] in maize and Zende (2006) [5] in sweet corn.

Table 1: Effect of N and K levels on Available nutrients, Plant nutrient content and Dry matter per plant of sweet corn

Treatments	Available Nutrients (kg ha^{-1})			Nutrient Content in plants (%)			Dry Matter $plant^{-1}$ (g)
	N	P	K	N	P	K	
N_1	183.13	17.69	372.97	2.14	0.15	0.47	173.22
N_2	188.54	18.81	382.22	2.30	0.18	0.54	177.43
N_3	194.22	20.29	392.32	2.48	0.20	0.59	180.87
N_4	201.73	21.30	399.07	2.68	0.22	0.62	185.19
N_5	208.72	22.64	407.52	2.92	0.24	0.64	190.18
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	0.89	0.33	0.76	0.01	0.01	0.01	0.79
CD at 5%	2.58	0.96	2.19	0.03	0.02	0.02	2.30
K_1	193.09	19.71	387.84	2.44	0.19	0.56	180.02
K_2	195.33	20.09	390.54	2.51	0.19	0.57	181.21
K_3	197.37	20.64	394.08	2.57	0.21	0.59	182.21
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	0.69	0.26	0.59	0.01	0.01	0.01	0.62
CD at 5%	2.00	0.74	1.70	0.02	0.02	0.02	1.78
Interaction							
N_1 K_1	180.30	17.37	370.50	2.09	0.15	0.45	171.71
N_1 K_2	183.37	17.72	372.48	2.13	0.15	0.47	173.27
N_1 K_3	185.72	17.97	375.94	2.19	0.16	0.49	174.69
N_2 K_1	187.86	18.47	377.42	2.24	0.17	0.52	176.67
N_2 K_2	188.47	18.55	382.48	2.31	0.17	0.54	177.24
N_2 K_3	189.24	19.42	386.78	2.36	0.18	0.57	178.39
N_3 K_1	192.72	19.85	388.96	2.43	0.19	0.58	179.68
N_3 K_2	194.45	20.36	392.03	2.48	0.20	0.59	180.79
N_3 K_3	195.48	20.67	395.95	2.52	0.21	0.60	182.13
N_4 K_1	198.59	20.97	397.10	2.62	0.21	0.61	183.92
N_4 K_2	202.33	21.32	398.48	2.69	0.22	0.62	184.79
N_4 K_3	204.26	21.61	401.63	2.74	0.22	0.63	186.86
N_5 K_1	206.00	21.87	405.20	2.83	0.23	0.63	188.11
N_5 K_2	208.04	22.48	407.26	2.93	0.24	0.64	189.97
N_5 K_3	212.12	23.55	410.10	3.02	0.25	0.65	192.47
'F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)±	1.54	0.57	1.31	0.02	0.01	0.01	1.38
CD at 5%	4.46	1.66	3.79	0.04	0.04	0.04	3.98

Table 2: Effect of N and K levels on Plant nutrient uptake of sweet corn

Treatments	Plant Nutrient Uptake (kg ha^{-1})		
	N	P	K
N_1	274.34	19.24	60.04
N_2	302.76	23.06	71.28
N_3	331.69	26.96	79.34
N_4	368.12	29.74	85.20
N_5	412.09	33.97	89.84
'F' test	Sig.	Sig.	Sig.
SE(m)±	1.96	0.99	0.98
CD at 5%	5.68	2.87	2.83
K_1	326.74	25.55	74.50
K_2	337.57	26.27	76.94
K_3	349.09	27.97	79.98
'F' test	Sig.	Sig.	Sig.
SE(m)±	1.52	0.77	0.76
CD at 5%	4.40	2.22	2.19
Interaction			
N_1 K_1	265.84	18.63	56.83
N_1 K_2	273.36	18.81	59.90
N_1 K_3	283.83	20.28	63.41
N_2 K_1	293.18	22.65	67.63
N_2 K_2	303.29	22.31	70.46
N_2 K_3	311.82	24.22	75.74
N_3 K_1	322.97	24.86	77.20
N_3 K_2	331.65	27.22	79.46
N_3 K_3	340.46	28.80	81.37
N_4 K_1	357.38	29.09	83.55
N_4 K_2	367.72	29.67	84.85
N_4 K_3	379.26	30.47	87.20
N_5 K_1	394.35	32.49	87.31
N_5 K_2	411.82	33.31	90.03
N_5 K_3	430.10	36.09	92.18
'F' test	Sig.	Sig.	Sig.
SE(m)±	3.39	1.71	1.69
CD at 5%	9.83	4.97	4.90

Conclusion

From the above results it can be concluded that nitrogen and potassium levels recorded positive effects on all the aspects given above. All the parameters such as available nutrients (NPK), plant nutrient content (NPK), dry matter per plant and also plant nutrient uptake (NPK) were found maximum at treatment combination N_5K_3 (250 kg N + 100 kg K_2O ha^{-1}).

References

1. Bharud SR, Bharud RW, Mokate AS. Effect of planting geometry and different fertilizer levels on growth and yield of sweet corn. J Agric Res Technol 2012;37(3):411-414
2. Gosavi. Effect of mulches, fertilizer and levels of organic manure on the performance of rabi sweet corn (*Zea mays var. saccharata*). M.Sc. (Agri.) thesis (unpublished) submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri (M.S.) 2006.
3. Rehman A, Saleem, Safdar ME, Akhtar N. Grain quality, nutrient use efficiency and bioeconomics of maize under different sowing methods and NPK levels. Chilean J Agric Res 2011;71(4).
4. Venkatraman NS. Need for corn revolution in India. Kisan world 2007, 22-23.
5. Zende NB. Effect of integrated nutrient management on the performance of sweet corn (*Zea mays* var. *saccharata*). Ph. D. (Agri.) thesis (unpublished) submitted to Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dist. Ratnagiri (M.S.) 2006.