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Uptake of nitrogen, phosphorus and potassium levels on baby corn

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Abstract
An experiment entitled "Effect of nitrogen and phosphorus levels on yield and quality of baby corn" was carried out in *kharif* season of 2014-15 at the Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.).The experiment was laid out in Factorial Randomized Block Design with three replications and twelve treatment combinations with factor A *viz*. nitrogen(N) i.e. 150 kg ha^{-1} (N_1), 175 kg ha^{-1} (N_2), 200 kg ha^{-1} (N_3) and 225 kg ha^{-1} (N_4) factor B phosphorus (P) i.e. 50 kg ha^{-1} (P_1), 75 kg ha^{-1} (P_2) and 100 kg ha^{-1} (P_3). Uptake of nitrogen was significantly affected with different nitrogen and phosphorus combinations the highest (195.53). Amount N uptake was recorded with treatment N_4P_1 (225kg +50 kg N: P_2O_5 ha^{-1}).Uptake of phosphorus was significantly affected with different nitrogen and phosphorus levels the highest (21.26) amount P uptake was recorded with treatment combination N_4P_3 (225kg +100 kg N: P_2O_5 ha^{-1}). Uptake of potassium was significantly affected with different nitrogen and phosphorus combinations the highest (129.76) amount K uptake was recorded with treatment N_4P_3 (225kg +100 kg N: P_2O_5 ha^{-1}).

Keywords: Babycorn, cultivar, nitrogen, phosphorus, potassium

1. Introduction
Vegetables are rich sources of vitamins, mineral and dietary fiber essential for functioning of human body and very common in human diet that a meal without vegetable is supposed to be incomplete in any part of the world. Maize (*Zea mays* L.) also known as "Queen of Cereals" belongs to family Graminae and is the third most important cereal crop next to rice and wheat and having highest production potential among the cereals. For diversification and value addition of maize as well as growth of food processing industries. Young cob corn has a short growth thus a farmer can grow four or more crop cycles per year. It has a wide range of adaptation and does not need intensive cultivation. Considering these factors, young cob corn has good potential. Baby corn production, being a recent development has proved an enormously successful venture in countries like Thailand and Taiwan. Attention is now being paid to explore its potential in India, for earning foreign exchange besides higher economic returns to the farmers. Baby corn production being a recent development has proved an enormously successful venture in countries like Thailand and Taiwan.

Composition of baby corn (per 100g of edible portion)

Moisture	90.03%	Total Soluble Sugar	23.43g
Protein	17.96%	Lignin	5.41g
Cellulose	8.1	Ascorbic acid	5.43mg
Fat	2.13	Carotene	670µg
Carbohydrate	1.49	Calcium	95.00 mg
Crude fiber	5.89	Magnesium	345.00 mg
Ash	5.30	Phosphorus	898.62mg

2. Material and Methods
1. Experimental Site
The experiment entitled, "Effect of nitrogen and phosphorus levels on yield and quality of baby corn" was carried out at Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during *kharif* season of 2015.

Akola is situated in subtropical region between 22.42°N latitude and 77.02° E longitude at an altitude of 307.42 m above the mean sea level. The climate of Akola is semi-arid and characterized by three distinct seasons i.e. hot and dry summer from March to May, warm humid and rainy monsoon from June to October and mild cold winter from November to February. The meteorological data in respect of rainfall, humidity, maximum and minimum temperature for the period of experimentation recorded at Meteorological section Department of Agronomy, Dr. Panjabrao Krishi Vidyapeeth, Akola in 2015. Fairly leveled land was selected for conducting the experiment. The experimental plot was with very loose soil having uniform texture and structure with good drainage.

2. Methodology

The experiment was laid out in factorial randomized block design with three replications and treatments were consisting of twelve combinations of four levels of nitrogen four nitrogen levels viz.150 kg N ¯1, 175 kg N ha-1, 200 kg N ha-1,225 kg N ha-1 and three levels of phosphorus viz. 50 kg P ha-1, 75kgP ha-1,100 kg P ha-1. The crop was baby corn with variety G-5414 and number of plot thirty six. Statistical analysis of the data was carried out using standard analysis of variance.

Fertilizer	Nutrient (%)
Urea	46% N
Single super phosphate (SSP)	16% P_2O_5
Murate of potash (MOP)	60% k_2O

3. Result and Discussion

1. Available N

The initial available N before sowing of baby corn was found 169.3 kg ha^{-1}. The data regarding effect of nitrogen and phosphorus levels on available nitrogen (kg ha^{-1}) in soil after harvest is presented in Table 1.

1.1 Effect of nitrogen

The data revealed that the available nitrogen content increase with increasing fertilizer doses and it varies from 163.98 to 176.80 kg ha^{-1}. Highest value of available nitrogen 176.80 kg N ha^{-1} was observed in treatment N_4 (225 kg N ha^{-1}) followed by treatment N_3 and the lowest value of nitrogen was found in N_1 (150 kg N ha^{-1}).The significant increase in available N in soil with application of different levels of N fertilizer were also reported by Tarfa *et al*. (2001) [4], Muthukumar *et al.* (2005) [3].

1.2. Effect of phosphorus

Soil nutrient status after harvest was significantly influenced by phosphorus level. Available N was significantly higher (177.55 kg $ha^{-1)}$ at P_2 (75kg P_2O_5 ha^{-1}). Whereas, minimum available N (164.49 kg $ha^{-1)}$ was recorded at P_1 (50 kg P_2O_5 ha^{-1}).

1.3. Interaction effect

The data regarding interaction effect is presented in Table 2.Maximum available N (186.86 kg ha^{-1}) was recorded in treatment combination N_3P_2 (200 kg +75 kg N: P_2O_5 ha^{-1}) and minimum (160.00 kg $ha^{-1)}$ was recorded with treatment combination N_1P_1, (150 kg +50 kg N: P_2O_5 ha^{-1}). The similar finding has also been reported by Bharud *et al*. (2012) [1] regarding baby corn.

2. Available Phosphorus

Available P_2O_5 before sowing of baby corn was found 16.4 kg ha^{-1} and the data regarding effect of nitrogen and phosphorus levels on available phosphorus (kg ha^{-1}) in soil after harvest is presented in Table 1. And fig. 1

2.1. Effect of Nitrogen

Soil nutrient status after harvest, available phosphorus was significantly higher (24.29 kg ha^{-1}) at N_1 level (150kgNha^{-1}), whereas, minimum available Phosphorus (19.94 kg $ha^{-1)}$ was recorded at N_4 level (225kg N ha^{-1}).

The results of present investigation are in similar line as finding obtained by the results of present investigation are in similar line as finding obtained by Keerthi *et al*. (2013) [2]

2.2. Effect of Phosphorus

Soil nutrient status after harvest was significantly influenced by phosphorus levels. Available P was significantly higher (22.83 kg $ha^{-1)}$ at P_1 (50kg$P_2O_5$$ha^{-1}$). Whereas, minimum available level (20.70 kg ha^{-1}) was recorded at P_3 (100kg $P_2O_5$$ha^{-1}$).

The above findings were in close agreement with in baby corn. The results of present investigation are in similar line as finding obtained by Keerthi *et al*. (2013) [2].

2.3. Interaction Effect

The data regarding interaction effects is presented in Table 2. And fig. 2 Maximum available P (24.63 kg $ha^{-1)}$ was recorded in treatment combination N_2P_1 (200 kg +50 kg N: P_2O_5 ha^{-1}), which was at par with N_1P_2, N_1P_3, N_3P_3 (24.60, 24.16, 23.40 kg ha^{-1}respectively) and minimum was recorded (16.36 kg ha^{-1}) with treatment combination N_2P_3. (200 kg +100 kg N: P_2O_5 ha^{-1}).

3. Available K

Available K before sowing of baby corn was found 269 kg ha^{-1} and the data regarding effect of nitrogen and phosphorus levels on available potassium (kg ha^{-1}) in soil after harvest is presented in Table 1.

3.1. Effect of nitrogen

Soil nutrient status after harvest, available K was significantly higher (127.18 kg ha^{-1}) at N_4 (225 kgNha^{-1}), whereas, minimum available K (125.21 kg $ha^{-1)}$ was recorded at N_2 (200 kgNha^{-1}).

3.2. Effect of phosphorus

Soil nutrient status after harvest was significantly influenced by phosphorus levels. Available K was significantly higher (126.28 kg ha^{-1}) at P_2 which was at par with (126.24 kg ha^{-1}) P_3.Whereas, minimum available K (125.73 kg ha^{-1}) was recorded at P_1 (50 kg P_2O_5 ha^{-1}).

Table 1: Effect of nitrogen and phosphorus levels on soil nutrient status after harvest of baby corn

Treatments	Soil nutrient status after harvest (kg ha^{-1})		
	Total N	Total P	Total K
A. Nitrogen (kg ha^{-1})			
N_1-150	163.98	24.29	126.39
N_2-175	169.59	20.71	125.21
N_3-200	173.96	22.02	125.56
N_4-225	176.80	19.94	127.18
F Test	Sig.	Sig.	Sig.
SE(m)±	1.60	0.30	0.04
CD at 5%	4.69	0.88	0.11
B. Phosphorus(kg ha^{-1})			
P_1-50	164.49	22.83	125.73
P_2-75	177.55	21.69	126.28
P_3-100	171.20	20.70	126.24
F Test	Sig.	Sig.	Sig.
SE(m)±	1.39	0.26	0.03
CD at 5%	4.07	0.77	0.10

Table 2: Interaction effect of nitrogen and phosphorus levels on soil nutrient status after harvest of baby corn

Treatments Combination	Available N	Available P	Available K
N1 x P1	160.00	24.10	126.33
N1 x P2	167.03	24.60	126.33
N1 x P3	164.90	24.16	126.50
N2 x P1	163.13	24.63	125.43
N2 x P2	178.33	21.11	125.70
N2 x P3	167.30	16.36	124.50
N3 x P1	167.36	20.35	124.56
N3 x P2	186.86	22.29	125.56
N3 x P3	167.65	23.40	126.53
N4 x P1	167.46	22.22	126.60
N4 x P2	177.96	18.73	127.50
N4 x P3	184.96	18.86	127.43
F test	Sig.	Sig.	Sig.
SE(m)±	2.77	0.52	0.07
CD at 5%	8.13	1.58	0.20

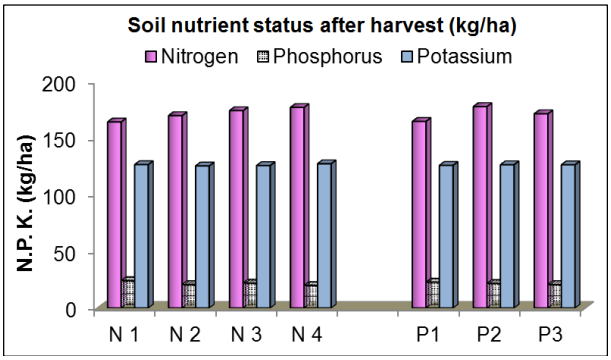

Fig 1: Effect of nitrogen and phosphorus levels on soil nutrient status after harvest (kg/ha) of baby corn

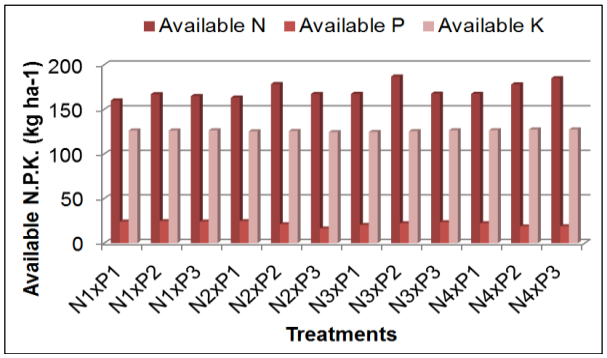

Fig 2: Interaction effect of nitrogen and phosphrus levels on soil nutrient status after harvest (kg/ha) of baby corn

4. Conclusion

Amount N uptake was recorded with treatment N_4 P_1 (225kg + 50 kg N: P_2O_5 ha $^{-1}$).Uptake of phosphorus was significantly affected with different nitrogen and phosphorus levels the highest (21.26) amount P uptake was recorded with treatment combination N_4P_3 (225kg +100 kg N: P_2O_5ha^{-1})· Uptake of potassium was significantly affected with different nitrogen and phosphorus combinations the highest (129.76) amount K uptake was recorded with treatment N_4P_3 (225kg +100 kg N: P_2O_5 ha $^{-1}$).

5. References

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