Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 07, pp.35499-35501, July, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

STUDIES ON THE INFLUENCE OF NITROGEN AND PHOSPHORUS ON CERTAIN GROWTH, PHYSIOLOGICAL AND YIELD ATTRIBUTES OF BABYCORN (*Zea Mays*)

***Sureshkumar, R., Manivannan, K. Sendhilnathan, R. and Rajkumar, M.**

Department of Horticulture, Annamalai University, Annamalai Nagar, Chidambaram, Tamilnadu, India

ARTICLE INFO

Article History:
Received 15th April, 2016
Received in revised form
29th May, 2016
Accepted 17th June, 2016
Published online 26th July, 2016

Key Words:

Babycorn
Nitrogen, Phosphorus
Growth and Yield

ABSTRACT

Growing maize for vegetable purpose is a recent development for which baby maize called "Babycorn" has proved enormously successful as a venture in worldwide. An experiment was conducted at the Department of Horticulture, Annamalai University with Factorial Randomized Block Design(FRBD) which consist of 15 treatments which has different graded levels of Nitrogen at the rate of 100,125,150,175 and 200 kg ha^{-1}along with Phosphorus *viz.*, 40,60 and 80 kg ha^{-1} in addition to a constant dose of Potassium at the rate of 50 kg $ha^{-1}$and the data were recorded for seven characters. Significant effects due to various individual and combined application of nitrogen and phosphorus levels has been observed in different growth, physiological and yield characters like plant height, number of leaves per plant, leaf area index, dry matter production, days to tasselling, chlorophyll content and ear yield. The data collected on different trials were analysed statistically and the range observed in plant height (30.35-60.05cm), number of leaves (6.91-11.35), leaf area index(2.32-3.42) dry matter production(8,112.33-12,422 $kgha^{-1}$), days to tasselling (62.32-68.63) chlorophyll content (2.18-2.71mg g^{-1}), ear weight(17.52-21.07 g) and ear yield (3.07-6.51t ha^{-1}).

Citation: Sureshkumar, R., Manivannan, K. Sendhilnathan, R. and Rajkumar, M. **2016.** "Studies on the influence of nitrogen and phosphorus on certain growth, physiological and yield attributes of babycorn (Zea Mays)", *International Journal of Current Research*, 08, (07), 35499-35501.

INTRODUCTION

Growing maize for vegetable purpose is a recent development, for which baby maize called "Baby corn" has proved enormously successful as a venture in Thailand and Taiwan. For diversification and value addition of maize as well as the growth of the food processing industry, an interesting recent development is of growing maize for vegetable purpose as Babycorn. Attention is not being given to explore its potential in India for foreign exchange and or economic returns to the farmer in worldwide. Babycorn is the ear head of the corn plant. Farmers harvest young finger like green ears, before or just at the time of silk emergence and before fertilization. The young ear, dehusked and desilked is served as a vegetable. Its delicate sweet flavour and crisp nature contribute to its increasing popularity in several countries, as a common ingredient of Manchurian (Chinese) and various fancy dishes.

Recently the farmers of Thailand have developed the little known Babycorn into a multimillion dollar business,with an output of more than 500 times in lesser than two decades. Depending on the agro climatic condition, 3-4 crops of Babycorn can be taken in a year, the fodder yield is also high. In this study, attempts were made to standardise the nitrogen and phosphorus requirement for Babycorn under our conditions.

Corresponding author:* **Sureshkumar, R.,
Department of Horticulture, Annamalai University, Annamalai Nagar, Chidambaram, Tamilnadu, India

MATERIALS AND METHODS

Field investigations were carried out to standardize the nitrogen and phosphorus requirement to maximize the Babycorn yield at the vegetable research area, Department of Horticulture, Annamalai University, Annamalai Nagar, Tamil Nadu.The experiment was conducted in Factorial Randomized Block Design with 3 replications with 15 treatment combinations which comprises of 5 levels of Nitrogen (N_1-100, N_2-125, N_3-150, N_4-175, N_5-200), 3 levels of Phosphorus (P_1-40,P_2-60 and P_3-80 kg ha^{-1}) with constant dose of Potassium at the rate of 50 kg ha^{-1} The experimental field was ploughed, laying out of plots and allocation of treatments were carried out according to the treatment schedule. The plots were individually applied with N and P as per the treatment schedule, the seeds were soaked overnight in cold water and dibbled at the rate of 3 seeds/hole with spacing of 30×15 cm. The gap filling and thinning out operations were also carried out as per the recommendations. The plots were irrigated 8-10 days interval. The most important component in Babycorn production is avoidance of pollination. If the silk is pollinated the kernels and the cob becomes hard. Removal of tassels or detasselling slightly improved the quality of 'n' cob and also improved the yield of marketable ears. Harvesting was done once in 2 days at about 2-3 days after silking. The ears removed one by one as a single plant is capable of yielding upto 3 cobs. The total harvesting duration was 10 days, after

that the cob detoriated. The ears were stored under low temperature immediately after harvest to prevent deterioration in quality. In each plot 5 plants randomly choose and tagged. The data obtaining to growth and yield parameters were recorded in plant height, number of leaves, leaf area index, dry matter production, days to tasselling, chlorophyll content, ear yield and harvest index.

RESULTS AND DISCUSSION

The plant height and the number of leaves have been greatly influenced by the individual applications of N, P and their interactions. They enhanced with increased levels of N and P. The maximum plant height and number of leaves were observed at N_5 (200 kg ha^{-1}). Similar results were observed by Selvaraju and Irudhayaraj (1993) and in maize. And also the same observations were recorded with increased levels of P, the maximum values were observed with P_3 (80 kg ha^{-1}). This was in line with the results of Narang *et al.,* (1989) who found the maximum plant height and number of leaves with the application of P at the rate of 90 kg ha^{-1}. Increasing trend in the leaf area index, dry matter production, chlorophyll content with the increasing levels of N and P was found in the investigation. Application of N at the rate of 200 kg ha^{-1} envisaged maximum leaf area index, dry matter production, chlorophyll content. It was inconsonance with the findings of Hills *et al.,* (1983) who reported that corn with a short growing season had been the largest biomass mobilizes which required 8-10 kg N per ton of dry matter. The interaction of N and P had significantly influenced the above characters. It was maximum when applied N and P at the rate of 200 and 80 kg/ha respectively. It was reported with the findings of Banga *et al.,* (1994) who reported that the dry matter accumulation increased significantly with increased levels of N and P application. The maximum numbers of ears per plant and ear yield per hectare were recorded in the combination of N and P at the rate of 200 and 80 kg ha^{-1} respectively which was closely followed by 175 kg/ha and 80 kg ha^{-1} respectively. The corroborative results were put forth by Castho and Lasztaty (1995) who recorded the maximum yield with the application of 200 kg of N and 100 kg of P in maize. It would be meaningful to evaluate the treatment combination of N and P rather than on their *perC* effect.

Table 1. Influence of Nitrogen, Phosphorus and their interactions on the plant height (cm) in Babycorn

Treatments	Plant height(cm)			
	P_1	P_2	P_3	N mean
N_1	75.56	80.06	84.56	80.06
N_2	85.82	90.32	94.81	90.31
N_3	96.01	100.62	105.13	100.51
N_4	106.29	110.79	115.28	110.78
N_5	116.44	121.04	125.68	121.05
P mean	96.02	100.56	105.09	
	Factor=N×P	SEd= 2.56	CD(5%)=5.11	

Table 2. Influence of Nitrogen, Phosphorus and their interactions on the number of leaves in Babycorn

Treatments	Number of leaves			
	P_1	P_2	P_3	N mean
N_1	6.91	7.33	7.74	7.32
N_2	7.82	8.22	8.61	8.22
N_3	8.71	9.14	9.55	9.13
N_4	9.62	10.04	10.45	10.04
N_5	10.51	10.93	11.35	10.94
P mean	8.71	9.13	9.54	
	Factor=N×P	SEd= 0.37	CD(5%)=0.76	

Table 3. Influence of Nitrogen, Phosphorus and their interactions on the leaf area index in Babycorn

Treatments	leaf area index			
	P_1	P_2	P_3	N mean
N_1	2.31	2.41	2.52	2.42
N_2	2.54	2.63	2.74	2.64
N_3	2.76	2.85	2.96	2.86
N_4	2.98	3.09	3.17	3.08
N_5	3.19	3.30	3.41	3.30
P mean	2.76	2.86	2.96	
	Factor=N×P	SEd= 0.09	CD(5%)=0.18	

Table 4. Influence of Nitrogen, Phosphorus and their interactions on the dry matter production (kg ha^{-1}) in Babycorn

Treatments	Dry matter production (kg ha^{-1})			
	P_1	P_2	P_3	N mean
N_1	8112.33	8737.33	9347.67	8732.44
N_2	9423.33	10024.00	10628.00	10025.11
N_3	10720.00	11345.00	11943.00	11336.00
N_4	12035.67	12642.00	13261.00	12646.22
N_5	13357.45	13984.33	14422.33	13921.44
P mean	10729.80	11346.53	11920.40	
	Factor=N×P	SEd= 215.50	CD(5%)=431.20	

Table 5. Influence of Nitrogen, Phosphorus and their interactions on the days to tasselling in Babycorn

Treatments	Days to tasselling			
	P_1	P_2	P_3	N mean
N_1	68.63	67.83	67.24	67.90
N_2	66.77	66.45	65.75	66.32
N_3	65.55	64.91	64.22	64.89
N_4	63.84	63.11	62.32	63.09
N_5	62.52	62.41	62.35	62.43
P mean	65.46	64.94	64.38	
	Factor=N×P	SEd= 1.07	CD(5%)=2.11	

Table 6. Influence of Nitrogen, Phosphorus and their interactions on the chlorophyll content (mg g^{-1}) in Babycorn

Treatments	Chlorophyll content (mg g^{-1})			
	P_1	P_2	P_3	N mean
N_1	2.15	2.18	2.23	2.19
N_2	2.31	2.30	2.33	2.31
N_3	2.45	2.43	2.46	2.45
N_4	2.57	2.59	2.56	2.57
N_5	2.69	2.67	2.68	2.68
P mean	2.43	2.43	2.45	
	Factor=N×P	SEd= 0.03	CD(5%)=NS	

Table 8. Influence of Nitrogen, Phosphorus and their interactions on the ear yield (t ha^{-1}) in Babycorn

Treatments	Ear yield (t ha^{-1})			
	P_1	P_2	P_3	N mean
N_1	3.07	3.45	3.83	3.45
N_2	3.90	4.26	4.62	4.26
N_3	4.68	5.04	5.41	5.04
N_4	5.44	5.85	6.94	6.07
N_5	5.80	6.21	6.51	6.19
P mean	4.58	4.96	5.47	
	Factor=N×P	SEd= 2.56	CD(5%)=5.11	

The yield is the prime factor that governs the economic importance to the crop. So this was used to choose the best treatment combinations. Among the combinations of N and P, 200 kg and 80, 175 kg with 80 kg/ha showed the maximum yield in Babycorn. The similar trend was observed in findings of Sekhon *et al.,* (1996).Based on the growth, yield and economics, it was concluded that the application of 175 kg of

Nitrogen and 80 kg of Phosphorus along with 50 kg of K ha^{-1} was found to be the superior to the other combinations.

REFERENCES

Astho, P. and Lasztity, B. 1995.The effect of long-term P application on the yield of maize *(Zea mays* L.) on the calcareous chernozem soil. *Acta Agronomica Hungarica*, 43(3/4): 297-304.

Banga, R.S., Tejsingh and Yadav, S.K. 1997.Comparative performance of wheat and winter maize at various levels of fertigation and fertility. *Haryana J. Agron*. 13(2): 71-75.

Hills, F.J., Broadbent, F.E. and Lorenz, O.A. 1983.Fertilizer nitrogen utilization by corn, tomato and sugarbeet. *Agron. J.,* 75: 423-426.

Mangatram, Tejinder Singh, HariOrn, IshwarS.ingh and Dhiman, S.D. 1995.Studies on N management in Tall scented rice (*Oryzasativa). Haryana J. Agron.,* 11(1): 23-26.

Narang, R.S., Nathu Singh and Saudagar Singh. 1989. Response of winter maize (*Zea mays* L.) to different soil moisture regimes and P levels. *Indian J. Agron.,* 34(4): 402-405.

Sekhon, G.S., Kanwar, J.S. and Garg, A.C. 1996. Response of wheat and maize crops to nitrogenous and phosphatic fertilizers application in Rajpura tehsil. *J. Res. Punjab Agric. Univ.,* 3: 105-107.

Selvaraju, R. and Iruthayaraj, M.R. 1993. Effect of irrigation scheduling, methods of irrigation and N levels on growth analysis parameters of maize. *Madras Agric. J.,* 80(10): 562-565.

****