

Original Research Article

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Effect of Different Levels of Nitrogen and Zinc on Growth and Yield of Baby Corn (*Zea mays* L)

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ABSTRACT

Keywords

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A field experiment was conducted to determine the effect of different levels of Nitrogen and zinc on growth and yield of baby corn (variety G 5414) the experiment was carried out in RBD with 10 treatments in the zaid season 2020 with the different levels of Nitrogen (120, 140, 160 kg /ha) and zinc (15, 20, 25 kg/ha). the finding of the experiment showed that he maximum growth attribute *i.e.* plant height 145.77cm was in Treatment 7(140 kg N/ha +25 kg Zinc/ha) and the Yield attributes was found maximum in treatment 10 (160 kg N/ha +25 kg Zinc/ha) *i.e.* 2.60 No. of cob/plant, 973.33 kg/ha Cob yield, 1633.33 kg/ha Stover yield and the Economic of the experiment *i.e.* Net return (Rs. 178301.5/ha) and B:C (3.74) was also found maximum in Treatment 10 (160kg N/ha +25 kg Zinc/ha).

Introduction

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. Maize 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. Baby corn, a novel utilization of maize, is used as a vegetable in many Asian countries. It is used as an ingredient in the preparation of

many food items. It refers to whole, entirely edible corn of immature cob harvested just before fertilization at the silk emergence stage (Galinat, 1985).

It is dehusked young ear of the female inflorescence of maize plant, harvested at silk emergence before fertilization (Kapoor, 2002). Young cobs are handpicked when the silk length was about 2–4 cm. The criteria for marketable yield were 4.5–10 cm length and 0.7–1.7 cm diameter of dehusked cobs having a regular row arrangement (Bar-Zur and Sadi, 1990).

Thavaprakash *et al.*, (2005) and Das *et al.*, (2008) reported that 100 g of baby corn contained 89.1 g moisture, 0.2 g fat, 1.9 g protein, 8.2 mg carbohydrate, 0.06 g ash, 28.0 mg calcium, 86.0 mg phosphorus, and 11.0 mg of ascorbic acid. Zinc is an essential element for plants, animals and human beings. It is startling to find in the 21st century that an estimated 2 billion people on the planet are zinc deficient.

Zinc deficiency is more prevalent in developing countries of the world. It is required for a number of metabolic processes.

Therefore, Zn deficiency can result in a number of health problems like diarrhoea, low birth weight, and stunted growth in children (Rivera *et al.*, 2003) Recommended intake of dietary Zn ranges from 1.1 to 11.2 mg day⁻¹ in children and 3.0–19.0 mg/day in adults. Recent studies indicated that it is possible to increase Zn concentration in maize grain by either soil Zn application or seed priming with Zn in South Asia.

Maize seed priming with 1% ZnSO₄ not only enhanced plant growth but also increased the final grain yield and seed Zn contents in plants grown on soil with limited Zn availability. In this context, the information is not available

on comparative performance of the zinc levels and method of application of zinc in baby corn for increased crop productivity and zinc use efficiency.

Hence, the present field study was undertaken to identify the most suitable level and method of application of zinc in baby corn during pre-rabi season.

Keeping in view of the above the field and laboratory investigation were conducted with the following objectives: 1. To find out the effect of nutrient on growth and yield of Baby corn and 2. To find out the economics of the Treatments.

Materials and Methods

The experiment was carried out during *Rabi* season of 2019-2020 at Crop Research Farm, Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj (U.P.) which is located at 25° 24' 42" N latitude, 81° 50' 56" E longitude and 98 m altitude above the mean sea level.

The soil of the experimental field was sandy loam in texture having pH 7.4, medium in available NPK but low in organic carbon *i.e.* 0.03%.

The experiment was conducted in Randomized Block Design consisting of 10 treatments combinations with 3 replications and was allocated randomly in each replication. The size of each plot is 3m×3m The experimental crop were raised by using G 5414 which is High yielding variety and recommended for U. P.

Statistical analysis

The experiment data was collected to analyse statistical by Fishers method of Analysis (ANOVA) as outline by Gomen and Gomez

(2010). Critical Difference (CD) value was calculated whenever the F test value was found significant at 5% level.

Results and Discussion

At 60 DAS (Harvesting) the significant variation in plant height (145.77 cm) may be the treatment 7. The increase in plant height may be attributed to better availability of nitrogen at higher levels of its application, resulting in higher plant height, weight/plant and ultimately higher yield Jat *et al.*, (2009) also reported that the plant height of sweet corn was significantly improved with the increase in rate of nitrogen fertilizer.

The maximum No. of cob/plant (2.6 cob/plant) was found in treatment 10 (160 kg N/ha +25 kg Zinc /ha) which is followed by treatment 7 (2.53 cob/plant)

The increase in cob yield attributes due to application of zinc was caused by higher chlorophyll contents, and this had apparently a positive effect on photosynthetic activity, synthesis of metabolites and growth-regulating substances, oxidation and metabolic activities and ultimately better growth and development of crop, which led to increase in yield attributes of baby corn. The results were in conformity with Thavaprakash *et al.*, (2008) and Hooda *et al.*, 2013

The significant and maximum Cob yield (973.33 kg/ha) was found in treatment 10 (160 kg N/ha +25 kg Zinc /ha) However Treatment 3 (120 kg N/ha +20kg Zinc /ha), 4 (120 kg N/ha +25 kg Zinc /ha), 7 (140 kg N/ha +25 kg Zinc /ha) and 9(160 kg N/ha +20kg Zinc /ha) was found to be at par with treatment 10.

Yield is an ultimate end product of many yield contributing components, physiological and morphological processes taking place in plants during growth and development (Mona,

due to the effect of dose of nutrients and the significant and maximum plant height was found in treatment 7 (140 kg N/ha +25 kg Zinc /ha).

However treatment 10 (160 kg N/ha +25 kg Zinc/ha)and treatment 4((120 kg N/ha +25 kg Zinc /ha) was found to be at par with 2015).

The increase in yield attributes due to application of zinc was caused by higher chlorophyll contents, and this had apparently a positive effect on photosynthetic activity, synthesis of metabolites and growth-regulating substances, oxidation and metabolic activities and ultimately better growth and development of crop, which led to increase in yield attributes of baby corn. The results were in conformity with Thavaprakash *et al.*, (2008) and Jat *et al.*, (2009)

The Stover yield was found significant and maximum (1633.33 kg/ha) in treatment 10 (160 kg N/ha +25 kg Zinc /ha) However Treatment 4 (120 kg N/ha +25 kg Zinc/ha), 7 (140 kg N/ha +25 kg Zinc/ha) and 9(160 kg N/ha +20kg Zinc /ha) was found to be at par with treatment 10.

Increase in green fodder yield might be due to the enhanced translocation of photosynthates with applied zinc, which resulted in higher production of green fodder in the respective levels of nutrient.

Similar results of significantly higher fodder yield with Zn application was also reported by Thavaprakash *et al.*, (2008) and Bunker *et al.*, (2013)

The Maximum Net return Rs.178301.5/ha was recorded in treatment 10 (160 kg N/ha +25 kg Zinc /ha) while The Maximum B:C 3.74 was recorded in treatment 10 (160 kg N/ha +25 kg Zinc /ha) (Table 1).

Table.1 Effect of different levels of nitrogen and zinc on growth and yield of baby corn (*zea mays* L)

Treatment Details		Plant height At 60 DAS	No. of cob/plant	Cob yield (kg/ha)	Stover yield (kg/ha)	Net return (Rs./ha)	B:C
1.	Control (RDF)	121.427	2.00	803.333	1,166.667	137692.8	3.18
2.	120 kg N/ha + 15 kg Zinc/ha	128.907	2.26	820.000	1,300.000	141232.4	3.21
3.	120 kg N/ha +20kg Zinc /ha	132.887	2.40	893.333	1,233.333	159215.7	3.48
4.	120 kg N/ha +25 kg Zinc /ha	142.073	2.46	943.333	1,500.000	171365.7	3.65
5.	140 kg N/ha +15 kg Zinc /ha	130.007	2.33	853.333	1,200.000	149283.6	3.33
6.	140 kg N/ha+20kg Zinc /ha	133.407	2.40	840.000	1,266.66	145600.3	3.26
7.	140 kg N/ha +25 kg Zinc /ha	145.777	2.53	950.000	1,533.33	172750.3	3.66
8.	160 kg N/ha +15 kg Zinc /ha	128.187	2.46	816.667	1,266.66	139834.9	3.17
9.	160 kg N/ha +20kg Zinc /ha	131.310	2.46	936.667	1,436.66	169484.9	3.62
10.	160 kg N/ha +25 kg Zinc /ha	140.477	2.60	973.33	1,633.33	178301.5	3.74
F-test		S	NS	S	S	-	-
SEm (±)		2.414	0.13	37.497	98.136	-	-
CD (5%)		7.227	-	112.273	293.837	-	-

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