Original Research Article

Effect of Sulphur and Zinc on growth and yield of Babycorn

ABSTRACT

A field experiment was conducted during *Zaid* season (2023) at Crop Research Farm, Department of Agronomy, SHUATS, Prayagraj (U.P.). The soil of experimental plot was sandy loam in texture, nearly natural in soil reaction (pH -7.6), organic carbon (0.870%), available N (219 kg/ha), available P (41.8 kg/ha) and available K (261.2 kg/ha). The Treatments consisted of 3 levels of Sulphur (15, 30, 45 kg/ha) and zinc (10, 20, 30 kg/ha). The experiment was laid out in Randomized Block Design with 10 treatments and replicated thrice. The results reported that the application of Sulphur 45kg/ha along zinc 30 kg/ha recorded maximum plant height (108.7cm), Maximum plant dry weight (53.21 g/plant), No. of cobs per plant (2.07), cob yield with husk (38.11t/ha), cob yield without husk (13.88), green fodder yield (28.43 t/ha). Maximum gross return (92,087.17 INR/ha), net return (61,352 INR/ha) and B:C ratio (2.00) were recorded in (treatment-9) that is with 45 kg of Sulphur+30 kg Zinc.

Key words: *Sulphur, Zinc, Growth, Yield.*

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Comment [WU2]: along with

INTRODUCTION

Maize is popularly called as “Queen of cereals” as well as “miracle crop” because it has a greater yield potential. Maize is third most important cereal crop, next to rice and wheat. The novelty of maize is cultivating it predominantly for vegetable purpose as “baby corn”. Baby corn is typically a maize ear (Zea mays L.) produced from regular corn plants which is harvested earlier, particularly when the silks have the size of 1-3 cm (Thavaprakash et al., 2005). Baby corn, a novel utilization of maize, is used a vegetable in many Asian countries. It is used as an ingredient in the preparation of

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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 inflorence of maize plant, harvested at silk emergence before fertilization (Kapoor, 2002).

Sulphur nutrition plays an important role in improving the growth and productivity of maize. Sulphur is an essential constituent of amino acids, viz. cysteine which involved in Kreb's cycle, cystine and methionine Used in the formation of Anthocyanin, chlorophyll, lignin and pectin of cell membrane. Sulphur content in plants depends on the growth stage, plant part and crop species. Its concentration is high in grains as higher than in straw at maturity. Plant tissues should have the required concentration of sulphur to produce biomass, carbohydrates, proteins to the full potential. (Text book of plant nutrient management by ISA-Indian Society of Agronomy).

Zinc is one of the essential micronutrient required for optimum plant growth and plays a vital role in metabolism. Zinc plays a role in plant resistance against diseases, photosynthesis, cell membrane integrity, protein synthesis and chlorophyll within the plant tissues. It plays an important role in basic cellular functions in all group of organisms and different enzyme catalyzing many metabolic activities in plants. Zinc is essential for plant functions, production of auxins, an essential growth hormone. It is necessary for starch formation, proper development, cholorophyll and carbohydrates. Plays an important role in stabilization of protein (Komal et al., 2018).

MATERIALS AND METHODS:

The experiment was conducted during *Zaid* season of 2023 at Crop Research Farm, Department of Agronomy, SHUATS, Prayagraj (U.P). The soil of the experimental field was sandy loam in texture, nearly neutral in soil reaction pH (7.6), organic carbon (0.870%), available N (219 kg/ha), available P (41.8 kg/ha) and available K (261.2 kg/ha). The treatment consists of T_1: Sulphur 15 kg/ha + Zinc10 kg/ha, T_2: Sulphur 15 kg/ha + Zinc 20 kg/ha, T_3: Sulphur 15 kg/ha + Zinc 30 kg/ha, T_4: Sulphur 30 kg/ha + Zinc 10 kg/ha, T_5: Sulphur 30 kg/ha + Zinc 20 kg/ha, T_6: Sulphur 30 kg/ha + Zinc 30 kg/ha, T_7: Sulphur 45 kg/ha + Zinc10 kg/ha, T_8: Sulphur 45 kg/ha + Zinc 20 kg/ha, T_9: Sulphur 45 kg/ha + Zinc 30 kg/ha, T_{10}: Control (RDF- N-P-K- 60-60-40 kg/ha).

The experiment was laid out in Randomized Block Design, with 10 treatments replicated thrice. The observations were recorded for plant height, plant dry weight, No. of cobs per plant, Cob yield (t/ha)

a) With husk (t/ha) b) Without husk(t/ha), Green fodder yield (t/ha). The collected data was subjected to statistical analysis by analysis of variance method. Baby corn, variety (G-5414(Syngenta) were selected for sowing. Seeds are sowed of spacing (45x10 cm).

RESULTS AND DISSCUSSION

GROWTH PARAMETERS

Plant height (cm):

The data revealed that significantly higher plant height (108.79 cm) was recorded with application of 45 kg/ha Sulphur along with 30kg/ha Zinc. However, treatment (T8) was found to be statistically at par with highest

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Plant increased height with application of sulphur and zinc it due to the vital role of nutrients in cellular growth, differentiation and metabolism which results in vigorous growth of plants and extensive root system leading to increased growth parameters like plant height Similar results were also reported by **Mohsin (2014)**.

Plant dry weight (g/plant):

Significantly highest plant dry weight (49.08g) was recorded with application of (45kg/ha Sulphur + 30kg/ha Zinc). However, treatment T8 was found to be statistically at par with highest.

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Application of 45 kg/ha Sulphur and 30 kg/ha Zinc had given that higher dry weight this might be due to adequate Sulphur being an energy bond compound and its major role is transformation of energy essential for almost all metabolic processes *viz.*, photosynthesis, respiration, cell elongation and cell division, activation of amino acids

for synthesis of protein and carbohydrate metabolism. Stated by **Kumar *et al.*, (2014)**. The possible reason for this might be due to the fact that the favorable increase in dry weight of Baby corn might be due to Zinc involvement in auxin synthesis which played a major role in photosynthetic activity of the crop (as in other C4 plants) **Amutham *et al.*, (2019)**. The interaction effect between Sulphur and Zinc was found significant in respect of green and dry matter yield.

YIELD PARAMETER:

Number of cobs/plant

Application of (45 Kg/ha Sulphur + 30 kg/ha Zinc) was recorded significantly higher number of corns per plant (2.07) However, treatment T8 was found to be statistically at par with the highest.

Cob yield with husk (t/ha)

Treatment-9 (45Kg/ha Sulphur + 30 kg/ha Zinc) was recorded significantly maximum Corn yield with husk (10.06 t/ha). However, treatment T8 was found to be statistically at par with highest.

Cob yield without husk (t/ha)

Treatment-9 (45Kg/ha Sulphur + 30 kg/ha Zinc) was recorded significantly maximum Corn yield without husk (3.91t/ha) which was superior over all other treatments. However, treatment T8 was found to be statistically at par with highest.

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Increase in corn yield with fertilization might be due to the role of Sulphur and zinc play a vital role in increasing corn yield because Sulphur and zinc takes place in many physiological processes of plant such as chlorophyll formation, stomatal regulation, starch utilization which enhance corn yield. The continuous filling of grains due to sufficient photosynthesis might have resulted in increased length and size of the corn. **Gnanasundari *et al.*, (2018).**

Green Fodder (t/ha)

Treatment-9 (45Kg/ha Sulphur along with 30 kg/ha Zinc) was recorded significantly maximum Green Fodder (28.43 t/ha) which was superior over all other treatments. However, treatments t8 was found to be statistically at par with Treatment-9(45Kg/ha Sulphur + 30 kg/ha Zinc).

Increase in a green fodder yield might be due to the enhanced translocation of Sulphur with applied Zinc, which resulted in a higher production of green fodder in a respective level of nutrient. Similar results of significantly higher fodder yield with Zn application was also reported by **Mehdi *et al.*, 20.**

Table 1. Effect of Sulphur and Zinc on growth attributes of baby corn.

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Sl No.	Treatments	Plant height (cm)	Dry weight (g/plant)
1	Sulphur 15kg/ha + Zinc 10kg/ha	104.46	40.67
2	Sulphur 15kg/ha + Zinc 20kg/ha	104.73	41.25
3	Sulphur 15kg/ha + Zinc 30kg/ha	104.96	42.17
4	Sulphur 30kg/ha + Zinc 10kg/ha	105.47	42.20
5	Sulphur 30kg/ha + Zinc 20kg/ha	106.98	43.94
6	Sulphur 30kg/ha + Zinc 30kg/ha	106.98	44.94
7	Sulphur 45kg/ha + Zinc 10kg/ha	107.15	46.68
8	Sulphur 45kg/ha + Zinc 20kg/ha	107.79	47.32
9	Sulphur 45kg/ha + Zinc 30kg/ha	108.79	49.08
10	Control : (60-60-40 N-P-K kg/ ha)	105.28	41.82

Comment [WU7]: What about the height on harvest

SEm(±)	0.930	1.72
CD (P=0.05)	2.77	5.11

Table 2. Effect of Sulphur and Zinc on yield attributes on Babycorn.

Sl No	Treatments	Number of cobs /plant	Cob yield with husk (t/ha)	Cob yield without husk (t/ha)	Green fodder yield (t/ha)
1	Sulphur 15kg/ha + Zinc 10kg/ha	1.20	7.42	2.16	21.10
2	Sulphur 15kg/ha + Zinc 20kg/ha	1.33	7.66	2.42	21.85
3	Sulphur 15kg/ha + Zinc 30kg/ha	1.40	8.05	2.55	22.83
4	Sulphur 30kg/ha + Zinc 10kg/ha	1.50	8.23	2.73	24.15
5	Sulphur 30kg/ha + Zinc 20kg/ha	1.50	8.24	2.74	24.22
6	Sulphur 30kg/ha + Zinc 30kg/ha	1.56	8.24	2.78	25.12
7	Sulphur 45kg/ha + Zinc 10kg/ha	1.83	9.55	3.34	26.64
8	Sulphur 45kg/ha + Zinc 20kg/ha	2.03	9.79	3.52	27.90
9	Sulphur 45kg/ha + Zinc 30kg/ha	2.06	10.06	3.91	28.43
10	Control : (60-60-40 N-P-K kg/ ha)	1.46	8.12	2.62	23.54

SEm(±)	0.11	0.370	0.420	1.40
CD (P=0.05)	0.32	1.10	-	3.19

CONCLUSION

It can be concluded that application of Sulphur 45 kg/ha along with Zinc 30kg/ha as performed better in growth parameters and yield attributes

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