

## **Original Research Article**

### **Growth and yield performance of baby corn (*Zea mays* L.) as influenced by row spacing and phosphorus application in black cotton soils of Krishan zone of Andhra Pradesh**

#### **ABSTRACT**

Baby corn having high remunerative value, Provides opportunities for crop diversification value addition and revenue regeneration. So, there is a need to standardize the agro techniques for its cultivation. Hence, a field experiment was conducted during the rabi season in black clayey soils at Fodder Production Farm of Livestock Research Station, Sri Venkateswara veterinary University, Lam Farm, Guntur-522034, Andhra Pradesh, India to find out the Influence of different levels of phosphorus (40, 50, 60 kg/ha) and various row spacings (40 x 15 cm, 45 x 15 cm, 50 x 15 cm) on growth and yield of baby corn. The experiment was laid out in Randomised Block Design with nine treatments each replicated thrice. It is observed that crop established with 50 x 15 cm spacing along with application of 50 kg/ha Phosphorus produced Maximum growth attributes viz. Plant height (161.10 cm), No. of leaves (12.47), Plant dry weight (90.21 g/plant) and yield attributes viz. No. of cobs/ plant (4.03), Length of cob (24.34 cm), Length of corn (9.47 cm), Cob weight (56.38 g), corn weight (11.61 g), Cob yield (35696.67 kg/ha), Corn yield (7560 kg/ha).

*Key words: Baby corn, Growth , Phosphorus, Row Spacing, , Yield*

## **INTRODUCTION:**

Maize (*Zea mays L.*) is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions. With the rise in Living standard of people and shift in food item from non-vegetarian to vegetarian in the world evolved several vegetables, one such vegetable is called baby corn. The small sized fresh green cobs of maize, when picked within 36 hours of silk emergence, popularly known as baby corn. Baby corn production provides opportunities for crop diversification, value addition and revenue generation and is becoming increasingly popular among farmers due to its high remunerative value. (Pandey *et al* 2002).

One Baby corn can be compared with an 'egg' in terms of minerals. It is a low calorie vegetable having higher fibre content without cholesterol (Kumar *et al.*, 2006). Besides nutritive advantage, it is also free from residual effect of pesticides as it is harvested within a week of tassel emergence. Baby corn has a prime place as a safe and quality vegetable. With the increasing concern for health, people are looking for quality food in place of bulky items. So, Baby corn has prime place as a safe and quality vegetable.

To commercialize this new crop, there is an urgent need to find out suitable agro-techniques for higher production and ultimately higher income to the farmers.

Maintenance of optimum crop geometry is essential to harvest maximum solar radiation and to utilize the soil resources effectively in addition wider spacing provided uniform spread of plants because of less crowding which resulted into healthy cobs. Maize being exhaustive crop requires high quantity of nutrients for its growth and development. Judicious use of fertilizer is a key for profitable Baby corn crop production as they alone contribute 40-60 per cent of the crop yield. Phosphorus plays a vital role besides nitrogen in plant nutrient that influences well developed roots, that are able to penetrate the ground and gather all the nutrients required by the plant for development. It helps to strengthen the skeletal structure of the plant there by preventing lodging (Rangothama, 1999) and hence improves the root growth, vigour of the plant and quality of baby corn yield.

#### **MATERIALS AND METHODS:**

A field experiment was conducted during *Rabi* season of 2020 in field No.6B/FPF at Fodder Production Farm, of Livestock Research Station, Sri Venkateswara Veterinary University, Lam Farm, Guntur-522034, Andhra Pradesh, India. Guntur Andhra Pradesh, India, which is having Sub tropical climate with maximum and minimum temperatures of 31.37 and 15.82 °C, respectively. The soil of experimental field was black clay in nature with pH 8.5 and EC 0.45 dms<sup>-1</sup> low in Organic carbon (0.42 %) medium in available N (288 kg/ ha<sup>1</sup>), high in both available P<sub>2</sub>O<sub>5</sub> (174 kg / ha<sup>1</sup>) and K<sub>2</sub>O (418 kg / ha).

A combination of nine treatments were replicated thrice and laid out in a randomized block design. Treatments comprised of T<sub>1</sub>:40 x 15 cm Row spacing + 40 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>2</sub>:40 x 15 cm Row spacing + 50 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>3</sub>:40 x 15 cm Row spacing + 60 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>4</sub>:45 x 15 cm Row spacing + 40 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>5</sub>:45 x 15 cm Row spacing + 50 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>6</sub>:45 x 15 cm Row spacing + 60 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>7</sub>:50 x 15 cm Row spacing + 40 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>8</sub>:50 x 15 cm

Row spacing + 50 kg P<sub>2</sub>O<sub>5</sub>/ha, T<sub>9</sub>: 50 x 15 cm Row spacing + 60 kg P<sub>2</sub>O<sub>5</sub>/ha. Fertilizers were applied according to the treatment description at the time of sowing. Healthy Seeds of Baby corn variety G-5414 of Syngenta Pvt. Ltd., were sown on 23<sup>rd</sup> November 2020 by dibbling two seeds manually per hill. The first harvesting of baby cobs was carried out 58 days after sowing (20.01.2021) and subsequently green cobs harvested in 2 pickings. The cobs were harvested from an area of one meter square, treatment wise and weighed with and without husk, then the obtained values were converted to per hectare and recorded as kg/ha.

Experiment data collected was subjected to statistical analysis by adopting Fisher's method of Analysis of variance (ANOVA) as outline by **Gomez and Gomez (1984)**. Critical Difference (CD) values were calculated the 'F' test was found significant at 5% level.

## **RESULTS AND DISCUSSION:**

### **Growth attributes**

Influence of different levels of Phosphorus with row spacings have been found to exert a significant increase on growth parameters at Harvest stage. The treatment T<sub>8</sub> (50 kg/ha Phosphorus + 50 x 15 cm Row Spacing) exhibited the highest values for almost all the growth parameters *i.e.* Plant height (161.10 cm), Number of leaves/plant (12.47) and Dry weight/plant (90.21 g), which might be due to wider space availability between the rows and closer intra- rows helped for increase of root spread which eventually utilized the resources such as water, nutrient, space, sunlight very effectively. P, a component of fertility management, on crop growth seem to be due to maintaining congenial nutritional environment of plant system on account of their greater availability from soil media, which might have resulted in greater synthesis of amino acids, proteins and growth promoting substances, which seems to have enhanced the meristematic activity and increased cell division and their elongation which ultimately enhanced the growth in terms of Plant height,

no. of leaves and finally accumulation of dry matter, these results were stated in conformity with **Mathukia et al.,(2015),Singh et al., (2015).**

### **Yield attributes and yield**

The yield parameters; Length of the Cob (24.34 cm), Length of the corn (9.47 cm), Cob weight (56.38 g), Corn weight (9.47 g) were found highest in T<sub>8</sub> (50 kg/ha Phosphorus + 50 x15 cm Row Spacing). Regarding yield of baby corn, the treatment T<sub>8</sub> (50 kg/ha Phosphorus + 50 x15 cm Row Spacing) exhibited the highest cob yield (35696.67 kg/ha) and corn yield (7560 kg/ha). This might be due to increase in Phosphorus levels with wider row spacing levels led to better interception, absorption and utilization of available nutrients and soil moisture which empowered the plant to manufacture more quantities of photosynthates and accumulating enhanced sink capacity and maximum nutrient uptake by the crop. Besides, positive response of yield attributing characters such as length of cob, length of corn, cob weight and corn weight at higher levels of fertilizer dose of Phosphorus and wide spacing levels attributed to higher cob and corn yields, these results were stated in conformity with **Medhi Dhabanita and Dutta Rinjumoni (2019).**

### **CONCLUSION:**

On the basis of one season experimentation it is found that application crop established with row spacing of 50 x 15 cm along with application of Phosphorus 50 kg/ha found more productive (35696.67 kg/ha) for baby corn production at black clayey soils of Sub-tropical climate.

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**Table. 1 Influence of different levels of Phosphorus and Row Spacing on growth attributes of Baby corn**

Tr. No	Treatment Combination	Plant height	Number of Cobs	Plant dry weight
		(cm) At Harvest	(No) At Harvest	(g/plant) At Harvest
T <sub>1</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	134.92	10.20	83.65
T <sub>2</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	137.73	10.27	84.70
T <sub>3</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	154.72	11.40	88.69
T <sub>4</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	138.00	10.47	85.51
T <sub>5</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	148.00	10.53	86.79
T <sub>6</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	158.07	12.33	89.46
T <sub>7</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	153.27	11.07	87.07
T <sub>8</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	161.10	12.47	90.21
T <sub>9</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	152.66	11.20	88.20
	<i>S. Em</i> (±)	2.15	0.07	0.75
	<i>CD</i> ( <i>P</i> =0.05)	6.45	0.21	2.27

**Table. 2 Influence of different levels of Phosphorus and Row Spacing on yield attributes of Baby corn**

Tr. No	Treatment Combination	Cob length (cm)	Corn length (cm)	Cob weight (g)	Corn weight (g)	Cob yield (kg/ha)	Corn Yield (kg/ha)
T <sub>1</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	19.32	8.02	48.49	9.53	28456.67	4533.33
T <sub>2</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	20.20	8.24	49.58	9.79	29276.67	5736.67
T <sub>3</sub>	40 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	23.14	8.73	54.73	11.14	35133.33	7250.00
T <sub>4</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	20.68	8.28	50.44	10.12	29573.33	6330.00
T <sub>5</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	21.37	8.43	51.42	10.53	31633.33	6436.67
T <sub>6</sub>	45 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	24.19	9.32	55.27	11.33	35436.67	7396.67
T <sub>7</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 40 kg/ha	22.26	8.46	52.36	10.33	32453.33	6843.33
T <sub>8</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 50 kg/ha	24.34	9.47	56.38	11.61	35696.67	7560.00
T <sub>9</sub>	50 x 15 cm Row spacing + P <sub>2</sub> O <sub>5</sub> 60 kg/ha	22.73	8.53	53.62	10.73	34196.67	7126.67
	<i>S.Em</i> (±)	0.14	0.05	0.36	0.16	501.82	55.66
	C.D (P = 0.05)	0.44	0.16	1.08	0.47	1504.54	165.88