

# **Response of Nitrogen and Phosphorus on Growth, Yield and Economics of Fodder Maize (*Zea mays* L.)**

Comment [NSN1]: Corrected

## **ABSTRACT**

Comment [NSN2]: Corrected

The field experiment was conducted during *rabi* season, 2022 at Crop Research Farm, Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P) to study the "Response of Nitrogen and Phosphorus on Growth, Yield and Economics of Fodder Maize (*Zea mays* L.)". The results showed that treatment 9 [Nitrogen (100 kg/ha) + Phosphorus (50 kg/ha)] recorded significantly higher plant height (164.67 cm), maximum number of leaves/plant (15.24), higher plant dry weight (75.81 g), maximum stem girth (3.33 cm), higher green forage yield (47.90 t/ha), maximum moisture content (84.02 %) and maximum crude protein content (7.57 %) compare to other treatment. The maximum gross return (119750.00 INR/ha), maximum net return (83883.77 INR/ha) and highest B:C ratio (2.33) was also recorded in treatment 9 [Nitrogen (100 kg/ha) + Phosphorus (50 kg/ha)] as compared to other treatments.

**Keywords:** Fodder Maize, Nitrogen, Phosphorus, Growth, Yield and Economics.

Comment [NSN3]: Corrected

## **1. INTRODUCTION**

Comment [NSN4]: Corrected

Maize (*Zea mays* L.) is one of the most important fodder crops in the world. It is fondly called as "King of fodder" due to its great importance in animal diet. It is the ideal fodder crop having quick growing habit, high yielding ability, palatability, nutritive value and acceptable to the cattle at any stage of growth. The maize is also most useful crop for making silage. It can be grown within still wider limits and tolerate minimum temperature of about 10 °C and maximum of 45 °C (Patel and Thanki, 2020). Maize is cultivated in diverse production environments ranging from temperate hill zone to the semi-arid region. In terms of world acreage, among the maize growing countries, India rank 4th in area and 7th in production, Maize is an important crop

for billions of people as food, feed, and industrial raw material. The global consumption pattern of maize is feed-61%, food-17% and industry-22%. Currently, nearly 1147.7 million MT of maize is being produced together by over 170 countries from an area of 193.7 million ha with average productivity of 5.75 t/ha (**FAOSTAT 2020**).

In India, maize is principally grown in two seasons, kharif and rabi. Kharif maize represents around 83% of maize area in India, while rabi maize corresponds to 17% maize area. Among Indian states Madhya Pradesh and Karnataka has highest area under maize (15% each) followed by Maharashtra (10%), Rajasthan (9%), Uttar Pradesh (8%) and others. After Karnataka and Madhya Pradesh Bihar is the highest maize producer. Andhra Pradesh is having the highest state productivity (**ICAR 2020**).

Livestock is backbone of Indian economy and its importance in India cannot be overemphasized. India has the largest livestock population of 520 million in the world. It is about 15 % of world's livestock population with only two per cent of world's geographical area. With such a huge population of livestock, the country should have been over flooding with milk. The availability of nutritious feed and fodder are the major limiting factors for increasing livestock products like milk, meat, egg and wool. The supply of nutritious feed and fodder through proper scientific methods are essential for the vast livestock population (**Meena et al. 2022**).

Thus fulfilling the demand for feed and fodder will be major challenge for the livestock sector of the country. Maize is most ideal and suitable crop for fodder as well as silage because of its high yielding ability, excellent nutritional profile, its quick growing nature, succulence, palatability and excellent quality without any anti-nutritional factor, when harvested at any stage of crop growth (**Panwar et al. 2020**). It may not be possible to increase the area under fodder crop because of ever increasing pressure on arable land for grain and commercial crops. So, the only alternative to meet the fodder requirement is to increase the yield of fodder per unit area per unit time. This can be achieved by growing of high yielding varieties and hybrids of cereal fodders.

Fertilizer application is one of the principle factors that directly influence the fodder yield and quality. An adequate supply of nutrients at each growth stage is highly essential for good yield and quality of fodder maize. The essential nutrients such as nitrogen and phosphorus are

important for plant growth, yield and quality. Fertilization is most important agronomic practices and therefore there are several studies conducted with different fertilizer levels suggests that optimum rate of fertilizer for forage maize cultivation depends on many variable factors such as environmental factors, management systems, soil fertility and, management factors including plant density. Higher plant density may require more fertilizer. Nitrogen and Phosphorus fertilization of maize influences dry matter yield by influencing leaf area index, leaf area duration and photosynthetic efficiency. Some other researchers also reported that there were positive effects of nitrogen on dry matter yield and forage yield (Subrahmanya *et al.* 2019).

Among different nutrients, nitrogen is the most commonly deficient nutrient in the soil and gives considerable response in forage maize crop. It has the quickest and most pronounced effect on plant growth and development, and ultimately on forage yields. The adequate supply of this element is associated with vigorous vegetative growth and deep green color of the foliage. Nitrogen and phosphorus application increases the green fodder yield of maize. Phosphorus application enhances the crop to reach 50% tasseling and silking earlier. It also enhances the leaves protein content of forage maize. Crude fiber content of maize is also significantly influenced by the application of nitrogen and phosphorus (Ayub *et al.* 2002).

In plants, phosphorus is a common component of organic compounds. Phosphorus deficiency, however, significantly reduces plant growth. Phosphorus application increased green forage and dry matter yield of the crop. It also affects plant height, stem thickness and leaf: stem ratio of fodder maize and quality characters like crude protein content (Eltelib *et al.* 2006). Keeping in view the above fact, the experiment was conducted to find out "Response of Nitrogen and Phosphorus on Growth, Yield and Economics of Fodder Maize (*Zea mays* L.)".

## 2. MATERIALS AND METHODS

This experiment was laid out during the *rabhi* season of 2022 at Crop Research Farm, Department of Agronomy, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.). The soil of the field constituting a part of central gang etic alluvium is neutral and deep. The soil of the experimental field was sandy loam in texture, nearly neutral in soil reaction (pH 8.0), low level of organic carbon (0.62%), available N (225 kg/ha), P (38.2 kg/ha) and K (240.7 kg/ha). The treatment consist of 3 different levels of Nitrogen (60, 80 and 100 kg/ha) with combination of 3 different levels of Phosphorus (30, 40 and 50 kg/ha). The experiment was laid out in RBD with 9 treatment each replicated thrice. The treatment combination are T<sub>1</sub> – [Nitrogen (60 kg/ha) + Phosphorus (30 kg/ha)], T<sub>2</sub> – [Nitrogen (60 kg/ha)

Comment [NSN5]: Corrected

Comment [NSN6]: Corrected

+ Phosphorus (40 kg/ha)], T<sub>3</sub>– [Nitrogen (60 kg/ha) + Phosphorus (50 kg/ha)], T<sub>4</sub>–[Nitrogen (80 kg/ha) + Phosphorus (30 kg/ha)], T<sub>5</sub>–[Nitrogen (80 kg/ha) + Phosphorus (40 kg/ha)], T<sub>6</sub>– [Nitrogen (80 kg/ha) + Phosphorus (50 kg/ha)], T<sub>7</sub>–[Nitrogen (100 kg/ha) + Phosphorus (30 kg/ha)], T<sub>8</sub>–[Nitrogen (100 kg/ha) + Phosphorus (40 kg/ha)], T<sub>9</sub>–[Nitrogen (100 kg/ha) + Phosphorus (50 kg/ha)]. The Data recorded on different aspects of crop, viz., growth parameters, yield attributes were subjected to statistically analysis by analysis of variance method. (Gomez and Gomez, 1976)

### 3. RESULTS AND DISCUSSION

#### 3.1 Growth parameters

##### 3.1.1 Plant height (cm)

The data revealed that a significantly higher plant height (164.67 cm) was recorded in treatment 9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) as compared to rest of the treatments. However, the treatment-4 (Nitrogen 80 kg/ha + phosphorus 30 kg/ha) treatment-5 (Nitrogen 80 kg/ha + phosphorus 40 kg/ha), treatment -6 (Nitrogen 80 kg/ha + phosphorus 50 kg/ha), treatment-7 (Nitrogen 100 kg/ha + phosphorus 30 kg/ha) and treatment -8 (Nitrogen 100 kg/ha + phosphorus 40 kg/ha) was found to be statistically at par with treatment 9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) in (Table 1). Significant and higher plant height was recorded with application of nitrogen (100 kg/ha) might be due to supply of proper amount of nitrogen at different stages of maize. The nitrogen promotes plant growth, increased number of internodes, increased cell division, cell elongation, nucleus formation as well as green foliage, which may have direct impacts on growth and development of plants. Similar results were also reported by Kuldeep *et al.* (2022). Further, significant and higher plant height was with application of phosphorus (50 kg/ha) fertilizer may be due to appropriate nutrient availability, which in turn helps in robust vegetative growth of plants and subsequently increases the plant through cell elongation, cell division, photosynthesis and turbidity of plant cell which leads to vegetative growth of crop, particularly plant height Similar results was also reported by (Kumar *et al.* 2021).

##### 3.1.2 Number of leaves/plants

The data revealed that significantly maximum number of leaves/plant (15.24) was recorded in treatment-9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) as compared to rest of the treatments. However, the treatment-4 (Nitrogen 80 kg/ha + phosphorus 30 kg/ha), treatment-5 (Nitrogen 80 kg/ha + phosphorus 40 kg/ha), treatment-6 (Nitrogen 80 kg/ha + phosphorus 50 kg/ha), treatment-7 (Nitrogen 100 kg/ha + phosphorus 30 kg/ha) and treatment-8 (Nitrogen 100 kg/ha +

Comment [NSN7]: Corrected

Comment [NSN8]: Added subsection number

Comment [NSN9]: Added subsection number

Comment [NSN10]: Corrected

Comment [NSN11]: Corrected

Comment [NSN12]: Added subsection number

phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha +phosphorus 50 kg/ha)in (Table 1).Significant and maximum number of leaves/plant was recorded with application of nitrogen (100kg/ha) might be due to nitrogen application increased plant growth and development, particularly more nodes and inter nodes, which may have results in production of more leaves /plant. Similar results were also reported by (Amin, 2011). Further, Significant and maximum number of leaves/plants was recorded with application of phosphorus (60 kg/ha) might be due to formation of new cells, promote plant vigorously and fastens leaf development, which help in harvesting more solar energy and better utilization of nitrogen, which help toward higher growth attributes. Similar result was also reported by (Sankadiya *et al.* 2021).

Comment [NSN13]: Corrected

Comment [NSN14]: Corrected

Comment [NSN15]: Corrected

### 3.1.3 Plant dry weight

The data revealed that significantly higher plant dry weight (75.81 g)was recorded in treatment-9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) as compared to rest of the treatments. However, the treatment-4 (Nitrogen 80 kg/ha + phosphorus 30 kg/ha), treatment-5 (Nitrogen 80 kg/ha + phosphorus 40 kg/ha), treatment-6 (Nitrogen 80 kg/ha + phosphorus 50 kg/ha), treatment-7 (Nitrogen 100 kg/ha + phosphorus 30 kg/ha) and treatment-8 (Nitrogen 100 kg/ha + phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) in (Table 1). Significant and higher plant dry weight was recorded with application of nitrogen (100kg/ha) might be due to adequate availability of nitrogen leads to better nutritional environment at root zone and also increases auxins supply to plants, which results in better vegetative growth and more dry matter accumulation in plants. Similar result was also reported by (Palet *al.* 2017). Further, significant and higher plant dry weight was recorded with application of phosphorus (60 kg/ha) might be due to phosphorus increases plant height, no. of leaves/plant and vegetative growth which results in more dry matter accumulation, Similar result was also reported by (Khanet *al.* 2014).

Comment [NSN16]: Added subsection number

### 3.1.4 Crop growth rate (g/m<sup>2</sup>/day)

The data revealed that significantly higher crop growth rare (86.74 g/m<sup>2</sup>/day)was recorded in treatment-9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) as compared to rest of the treatments. However, the treatment-1 (Nitrogen 60 kg/ha + phosphorus 30 kg/ha), treatment-2 (Nitrogen 60 kg/ha + phosphorus 40 kg/ha), treatment-3 (Nitrogen 60 kg/ha + phosphorus 50 kg/ha), treatment-4 (Nitrogen 80 kg/ha + phosphorus 30 kg/ha), treatment-5 (Nitrogen 80 kg/ha + phosphorus 40 kg/ha), treatment-6 (Nitrogen 80 kg/ha + phosphorus 50 kg/ha), treatment-7

Comment [NSN17]: Added subsection number

(Nitrogen 100 kg/ha + phosphorus 30 kg/ha) and treatment-8 (Nitrogen 100 kg/ha + phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + phosphorus 50 kg/ha) in (Table 1). Significant and higher crop growth rate was recorded with application of nitrogen (100kg/ha) with phosphorus (50kg/ha) might be due to supply of nutrient with higher availability of nitrogen and phosphorus which might have promoted development of morphological structure by virtue of multiplication of cell division which is well reflected through increased crop growth rate. Similar result was also reported by (Khan *et al.* 2017).

### 3.2 Yield attributes

#### 3.2.1 Stem girth (cm)

The data revealed that Significant and maximum stem girth (3.33 cm) was recorded with Treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) which was superior over all other treatment. However, the treatment -8(Nitrogen 100 kg/ha + Phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) in (Table 2). Significant and maximum stem girth was recorded with application of nitrogen (100 kg/ha) might be due to increasing supply of nitrogen concentration might trigger cell division, cell elongation which attributed to expansion of stem diameter. Similar results were also reported by Ali *et al.* (2017).

#### 3.2.2 Green forage yield (t/ha)

The data revealed that Significant and higher green forage yield (47.90 t/ha) was recorded with Treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) which was superior over all other treatment. However, the treatment -7 (Nitrogen 100 kg/ha + Phosphorus 30 kg/ha), treatment -8(Nitrogen 100 kg/ha + Phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) in (Table 2). Significant and higher green forage yield was recorded with application of nitrogen (100kg/ha) might be due to nitrogen plays an important role in the synthesis of proteins, carbohydrates, which increased in yield with increased in nitrogen level was mainly due to associated with increased plant height, leaves/plant, stem diameter, dry matter production resulted higher forage yield. Similar results were also reported by Ali *et al.* (2012). Further, significant and higher forage yield was with application of phosphorus (50 kg/ha) might be due to phosphorus enhances nutrient uptake by the crop, better translocation of photosynthesis form source to sink, which results in increased plant growth and forage yield. Similar results were also reported by Jena *et al.* (2014).

#### 3.2.3 Moisture content (%)

Comment [NSN18]: Added subsection number

Comment [NSN19]: Added subsection number

Comment [NSN20]: Added subsection number

Comment [NSN21]: Corrected

Comment [NSN22]: Corrected

Comment [NSN23]: Corrected

The data revealed Significant and maximum moisture content (84.02 %) was recorded with Treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) which was superior over all other treatment. However, the treatment-4 (Nitrogen 80 kg/ha + phosphorus 30 kg/ha), treatment-5 (Nitrogen 80 kg/ha + phosphorus 40 kg/ha), treatment-6 (Nitrogen 80 kg/ha + phosphorus 50 kg/ha), treatment-7 (Nitrogen 100 kg/ha + phosphorus 30 kg/ha), treatment -8 (Nitrogen 100 kg/ha + Phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) in (Table 2). Significant and maximum moisture content was recorded with application of nitrogen (100kg/ha) might be due to increases the protein formation from manufactured carbohydrates. Where, less carbohydrate is deposited in vegetative cell and more the protoplasm will be formed. As protoplasm is highly hydrated which lead to more succulence in the plant, which results in increasing level of nitrogen increased moisture content in fodder maize. Similar results were also reported by **Karla et al. (2015)**.

Comment [NSN24]: Corrected

Comment [NSN25]: Corrected

#### 3.2.4 Crude protein content (%)

Comment [NSN26]: Corrected

The data revealed Significant and maximum crude protein content (7.52 %) was recorded with Treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) which was superior over all other treatment. However, the treatment -8 (Nitrogen 100 kg/ha + Phosphorus 40 kg/ha) was found to be statistically at par with treatment-9 (Nitrogen 100 kg/ha + Phosphorus 50 kg/ha) in (Table 2). Significant and maximum crude protein was recorded with application of nitrogen (100kg/ha) might be due to nitrogen is an active ingredient of protein molecule and a building block of amino acid results in linear increase in crude protein with increased nitrogen levels. Similar results was also reported by **Sewhag et al. (2021)**

#### 3.2.5 Economy

Comment [NSN27]: Added subsection number

The result showed that, maximum Gross return (119750.00 INR/ha), maximum net return (83883.77 INR/ha) and highest B:C ratio (2.33) was recorded maximum in treatment 9 [Nitrogen (100 kg/ha) + Phosphorus (50 kg/ha)] in (Table 3). Maximum economic was recorded with application of Nitrogen (100 kg/ha) might be due to sufficient availability and split application of nitrogen minimize nitrogen utilization which helps to get better vegetative growth that leads to higher fodder yield. Similar result was also reported by **Meena et al. (2022)**.

## 4. CONCLUSION

Comment [NSN28]: Added subsection number

Based on the above findings it is concluded that fodder maize with the application of Nitrogen (100kg/ha) along with Phosphorus (50 kg/ha) was observed higher green yield and benefit- cost ratio.

#### **COMPETING INTERESTS**

Comment [NSN29]: Added subsection

Authors have declared that no competing interests exist

UNDER PEER REVIEW

## REFERENCES

1. Ali, N., & Anjum, M. M. (2017). Effect of different nitrogen rates on growth, yield and quality of maize. *Middle East J. Agric. Res.*, *6*(1), 107-112.
2. Ali, S., Sahiba, Malik, M. A., Hassan, F. & Ansar, M. (2012). Growth of rainfed fodder maize under different levels of nitrogen and phosphorus. *Pakistan Journal of Agricultural Research*, *25*(3).
3. Amin, M. E. M. H. (2011). Effect of different nitrogen sources on growth, yield and quality of fodder maize (*Zea mays* L.). *Journal of the Saudi Society of Agricultural Sciences*, *10*(1), 17-23.
4. Gomez, K.A and Gomez, A.A. (1976). Three more factor experiment in: Statistical procedure for agricultural Research 2<sup>nd</sup> edition.P.139-141.
5. Jena, N., Vani, K. P., Rao, V. P., & Sankar, A. S. (2015). Effect of nitrogen and phosphorus fertilizers on growth and yield of quality protein maize (QPM). *International Journal of Science and Research (IJSR)*, *4*(12), 197-199.
6. Kalra, V. P., & Sharma, P. K. (2015). Quality of fodder maize in relation to farmyard manure and nitrogen levels. *Forage Research*, *41*(1), 63-67.
7. Khan, A., Munsif, F., Akhtar, K., Afridi, M. Z., Ahmad, Z., Fahad, S., & Din, M. (2014). Response of fodder maize to various levels of nitrogen and phosphorus. *American Journal of Plant Sciences*, *5*, 2323-2329.
8. Khan, W., Singh, V., Sagar, A., & Singh, S. N. (2017). Response of phosphorus application on growth and yield attributes of sweet corn (*Zea mays* L. Saccharata) varieties. *Journal of Pharmacognosy and Phytochemistry*, *6*(5), 2144-2146.
9. Kumar, T., Thomas, N. S. T., Barthwal, A., Khatana, R. N. S., & Monahar, D. V. (2021). Effect of Varying Nitrogen and Phosphorus Levels on Growth and Yield of Maize (*Zea mays* L.) Cv. K-64. *Biological Form- An International Journal*, *13*(4): 60-65.
10. Meena, A., Solanki, R. M., Parmar, P. M., & Chaudhari, S. (2022). Effect of spacing and nitrogen fertilization on growth, yield and economics of fodder maize (*Zea mays* L.). *The Pharma Innovation Journal*, *11*(4): 1732-1735.
11. Nagar, K., Patel, H.K., Raval, C.H., Badi, A.R., Chaudhary, L & N. (2022). Response of FYM and split application of Nitrogen on growth and green yield of fodder maize (*Zea mays* L.) *Internation Journal of Plant & Soil Science*, *34*(23):245-253.

Comment [NSN30]: Corrected

Comment [NSN31]: Corrected

Comment [NSN32]: Corrected

Comment [NSN33]: Corrected

Comment [NSN34]: Corrected

Comment [NSN35]: Corrected

Comment [NSN36]: Corrected

Comment [NSN37]: Corrected

Comment [NSN38]: Corrected

Comment [NSN39]: Corrected

Comment [NSN40]: Corrected

Comment [NSN41]: Corrected

Comment [NSN42]: Corrected

Comment [NSN43]: Corrected

Comment [NSN44]: Corrected

Comment [NSN45]: Corrected

Comment [NSN46]: Corrected

Comment [NSN47]: Corrected

Comment [NSN48]: Corrected

Comment [NSN49]: Corrected

12. **Pal, B., Hirpara, D. S., Vora, V. D., Vekaria, P. D., Sutaria, G. S., Akbari, K. N., & Verma, H. P. (2017).** Effect of nitrogen and phosphorus on yield and yield attributes of maize in South Saurashtra, India. *International Journal of Current Microbiology and Applied Sciences*, **6**(3), 1945-1949.
13. **Panwar D., Chouhan D., Singh D., Singh R. P., & Nepalia V., (2020).** Performance of Fodder Maize (*Zea mays* L.) Under Varying Plant Densities and Fertility Levels. *International Journal of Current Microbiology and Applied Sciences*- **11**:255-260.
14. **Patel, H.A. and Thanki, J.D. (2020).** Growth, Yield and Nutrient Status in Soil of Summer Fodder Maize (*Zea mays* L.) as Influenced by Residual Effect of INM and Direct Application of Varying Fertility Levels. *International Journal of Current Microbiology and Applied Sciences*. **9**(11):3186-3194.
15. **Sabu, A., Dawson, J., & Thomas, T. (2021).** Effect of phosphorus and potassium levels on growth and yield of baby corn (*Zea mays* L.). *The Pharma Innovation*, **10**(10), 1959-1963.
16. **Sankadiya, S., & Sanodiya, L. (2021).** Effect of phosphorus and potassium levels on growth and yield of maize (*Zea mays* L.). *Pharma Innov. J*, **10**(10), 1347-1350.
17. **Sewhag, M., Shweta, Kumar, S., Kumar, r., Tokas, J., Neelam, Devi, U. & S.(2021).** Response of spring planted fodder maize to nitrogen and phosphorus levels. *Forage Res.*, **46**(4): pp. 363-367.
18. **Shivprasad, M., & Singh, R. (2017).** Effect of planting geometry and different levels of nitrogen on growth, yield and quality of multicut fodder sorghum (*Sorghum bicolor* (L.) Monech). *Journal of Pharmacognosy and Phytochemistry*, **6**(4), 896-899.
19. **Subrahmanya, D.J., Kumar, R., Pyati, P.S., Hardev, R., Meena, R.K., Tamta, A. (2019).** Growth, Yield & Economics of Fodder Maize (*Zea Mays*) As Influenced By Plant Density and Fertility Levels. *Forage Res.*, **45** (2): pp. 127-131.
20. **Tsen, C.C. and Martin, E.E. (1971).** A note on determining protein in various wheat flours and flour stream by kjeldahl activation methods. *American Association of Cereal Chemists, Inc.*, **48**: 721-726.

**Table 1. Response of different levels of nitrogen and phosphorus on growth attributes of Fodder maize**

Comment [NSN50]: Corrected

At 80 DAS						
S.No.	Treatment combinations	Plant height (cm)	Number of leaves/plant	Dry weight (g/plant)	CGR (60-80) DAS	RGR (60-80) DAS
1.	Nitrogen 60 kg/ha + Phosphorus 30 kg/ha.	143.20	12.15	64.12	78.57	0.066
2.	Nitrogen 60 kg/ha + Phosphorus 40 kg/ha.	144.13	12.98	67.31	82.92	0.067
3.	Nitrogen 60 kg/ha + Phosphorus 50 kg/ha.	146.13	13.15	65.92	80.38	0.066
4.	Nitrogen 80 kg/ha + Phosphorus 30 kg/ha.	151.97	13.48	68.90	83.88	0.066
5.	Nitrogen 80 kg/ha + Phosphorus 40 kg/ha.	154.63	13.89	70.52	84.25	0.063
6.	Nitrogen 80 kg/ha + Phosphorus 50 kg/ha.	158.17	14.37	71.96	83.54	0.060
7.	Nitrogen 100 kg/ha + Phosphorus 30 kg/ha.	164.10	14.51	72.72	82.83	0.058
8.	Nitrogen 100 kg/ha + Phosphorus 40 kg/ha.	163.23	14.83	74.96	86.29	0.059
9.	Nitrogen 100 kg/ha + Phosphorus 50 kg/ha.	164.67	15.24	75.81	86.74	0.058
	F test	S	S	S	S	NS
	SEm(±)	4.71	0.61	2.49	4.36	0.003
	CD (p=0.05)	14.11	1.83	7.47	13.06	-

**Table 2. Response of different levels of nitrogen and phosphorus on yield attributes and yield of Fodder maize**

Comment [NSN51]: Corrected

**Yield attributes and yield**

S.No.	Treatment combination	Stem girth	Green forage	Moisture content	Crude protein
		(cm)	yield(t/ha)	(%)	content (%)
1.	Nitrogen 60 kg/ha + Phosphorus 30 kg/ha.	1.34	36.97	73.99	5.04
2.	Nitrogen 60 kg/ha + Phosphorus 40 kg/ha.	1.57	38.07	77.66	5.47
3.	Nitrogen 60 kg/ha + Phosphorus 50 kg/ha.	1.92	38.87	78.74	5.82
4.	Nitrogen 80 kg/ha + Phosphorus 30 kg/ha.	2.07	39.80	80.74	5.97
5.	Nitrogen 80 kg/ha + Phosphorus 40 kg/ha.	2.22	41.37	82.23	6.12
6.	Nitrogen 80 kg/ha + Phosphorus 50 kg/ha.	2.44	42.87	82.83	6.34
7.	Nitrogen 100 kg/ha + Phosphorus 30 kg/ha.	2.77	45.27	83.10	6.67
8.	Nitrogen 100 kg/ha + Phosphorus 40 kg/ha.	3.10	46.50	83.54	7.00
9.	Nitrogen 100 kg/ha + Phosphorus 50 kg/ha.	3.33	47.90	84.02	7.57
	F-test	S	S	S	S
	S Em ( $\pm$ )	0.11	15.55	1.98	0.21
	CD(p=0.05)	0.33	46.62	5.92	0.62

**Table 3. Response of different levels of nitrogen and phosphorus application on economics in Fodder maize**

Economics					
S.No.	Treatment combination	Cost of cultivation (INR/ha)	Gross return (INR/ha)	Net return (INR/ha)	B:C
1.	Nitrogen 60 kg/ha + Phosphorus 30 kg/ha.	34132.51	92425.00	58292.49	1.70
2.	Nitrogen 60 kg/ha + Phosphorus 40 kg/ha.	34395.01	95175.00	60779.99	1.76
3.	Nitrogen 60 kg/ha + Phosphorus 50 kg/ha.	35257.51	97175.00	61917.49	1.75
4.	Nitrogen 80 kg/ha + Phosphorus 30 kg/ha.	34436.87	99500.00	65063.13	1.88
5.	Nitrogen 80 kg/ha + Phosphorus 40 kg/ha.	34999.37	103425.00	68425.63	1.95
6.	Nitrogen 80 kg/ha + Phosphorus 50 kg/ha.	35561.87	107175.00	71613.13	2.01
7.	Nitrogen 100 kg/ha + Phosphorus 30 kg/ha.	34741.23	113175.00	78433.77	2.25
8.	Nitrogen 100 kg/ha + Phosphorus 40 kg/ha.	35303.73	116250.00	80946.27	2.29
9.	Nitrogen 100 kg/ha + Phosphorus 50 kg/ha.	35866.23	119750.00	83883.77	2.33

Comment [NSN52]: Corrected

UNDER PEER REVIEW

