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# EFFECT OF LEVEL AND TIME OF NITROGEN APPLICATION IN BABY CORN (ZEA MAYS L.)

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## ABSTRACT

The growth parameters like plant height, dry matter yield, leaf area and leaf area index were significantly increased with increase in rates of nitrogen application up to 90 Kg N/ha. The difference between 60 kg N/ha and 40 kg N/ha were also significant. Nitrogen applied in 3 equal splits as 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling Stages of baby corn resulted in significantly highest growth parameters of baby corn. The plant height is maximum at nitrogen level 90 kg/ha i.e., 63.12 cm, 72.34 cm and 167.80 cm at 30 DAS, 45 DAS and 60 DAS respectively. Regarding interaction it is maximum at $S_4$ (1/3 basal+ 1/3 knee height+ 1/3 pre tasseling Stages) and 90 kg N/ha i.e. 184.39 cm. Dry matter yield is maximum at $S_4$ and nitrogen level 90 kg/ha i.e. 6096.07 kg/ha. Leaf area is maximum at nitrogen level 90 kg/ha at 30 DAS, 45 DAS and 60 DAS i.e. 115.32 $cm^2$, 336.12 $cm^2$ and 533.18 $cm^2$ respectively. Similarly, leaf area index is maximum at nitrogen level 90 kg/ha i.e. 0.15, 0.42 and 0.67 at 30 DAS, 45 DAS and 60 DAS respectively.

**KEYWORDS:** Nitrogen, Tassel, Knee Height, Basal

## INTRODUCTION

Baby corn is an extremely easy crop to produce and is grown just like any other corn crop. It is not produced locally because hand labour is required for harvesting and processing, market prices are unknown, and consumers are unfamiliar with it as a fresh crop. However, locally produced fresh baby corn has several advantages such as it is superior in both taste and texture. Fresh baby corn has a crisp texture and a subtle, slightly sweet corn flavour. Although almost all the baby corn found in the United States is pickled or canned and imported from Asia, fresh baby corn is easy to grow in the Indian condition. Baby corn is no longer a delicacy or specialty food reserved for salad bars and Asian restaurants; it is a locally produced delicious treat to eat raw or cooked in many recipes. The tiny ears of baby corn are simply immature ears from regular-sized corn plants. Specialty varieties are available for baby corn production, but baby corn can also be harvested from many common corn varieties.

## MATERIALS METHODS

The field experiment “Effect of level and time of nitrogen application in baby corn (Zea mays L.) was conducted in Uparjhar village of Bolangir district during kharif 2014. The experiment was conducted in Randomised Block Design with three replications. Twelve treatment combinations comprising three nitrogen levels (40, 60 and 90 Kg N/ha) and four schedules of nitrogen application:

$S_1$ ½ basal+ ½ knee height

$S_2$ 1/3 basal+ 2/3 knee height

$S_3$ ½ basal+ ¼ knee height+ ¼ pre tasseling

$S_4$ 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling

Net plot size was 7.5mX4.8m, gross plot size was 8mX5m, seeds sown at a depth of 5 cm with a spacing of 40x20 cm, variety selected was G-5414 $F_1$ hybrid of Syngenta company, seed rate was 25 kg/ha. Phosphorous and potassium was applied @ 60 kg and 40 kg per ha respectively. Gap filling and thinning operations was done at 7 DAS and 12 DAS respectively. Intercultural operations was done at knee height stage (25 DAS) and pre tasseling stage (40 DAS).

## RESULT AND DISCUSSIONS

Effect of N levels and time of its application on growth parameters of baby corn

The plant height of baby corn was higher at 90 kg/ha at all growth stages. This might be due to higher rate of N application that might have increased the availability, uptake and resulted in higher plant height. This is clearly evident from significant corelation between plant height and N uptake. The rest of N levels produced shorter plants. The reason could be lower doses of applied fertilizer which might have released lesser nutrients. Taller plants with higher N levels were also documented by Bar-Zur and Schaffer (2013) in baby corn.

The N applied in 3 equal splits viz., 1/3 basal+ 1/3 knee height+ 1/3 pre tasseling growth stages of baby corn resulted in higher plant height in comparison with all other schedules of N application. This is due to the quicker and increased availability of N with their uptake at the most critical growth stages of baby corn resulted in higher plant height.

Application of 90 kg N/ha resulted in marked increase in dry matter yield of baby corn. The results of leaf area and leaf area index followed the same trend as that of plant height. The increased leaf area index under 90 kg/ha increased the net assimilation rate and resulted in increased dry matter accumulation. Significant improvement in growth parameters resulting in better plant height, leaf area index leading to higher photosynthetic rate with more accumulation of dry matter reflected into better source sink relationship which in turn enhanced the yield attributes of baby corn. This is in confirmation with Chutkaew and Paroda (2014) and Galinat et al (2014).

**Interaction Effect between Nitrogen Level and Time of its Split Application**

Interaction effect between nitrogen level and time of its split application revealed significant response in increasing plant height at 30 DAS, dry matter yield at 45 and 60 DAS, leaf area and leaf area index at 30 DAS. Similar findings were also reported by Jackson et al (2013) and Kotchetal (2011) in sweet corn and baby corn respectively.

## CONCLUSIONS

Based on the above discussion, it can be concluded that for higher plant height, dry matter content, leaf area and leaf area index, may be applied @ 90kg/ha in 3 equal split would be most viable practice.

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## APPENDIES

**Table 1: Effect of Level and Time of Nitrogen Application on Plant Height (cm) of Baby Corn at Different Growth Stages**

| Treatment | Plant Height | | |
|---|---|---|---|
| | 30 DAS | 45 DAS | 60 DAS |
| **Nitrogen Level (kg/ha)** | | | |
| **40** | 34.97 | 48.32 | 84.20 |
| **60** | 43.99 | 55.68 | 131.32 |
| **90** | 63.12 | 72.34 | 167.80 |
| **SEM(±)** | 1.61 | 1.72 | 2.48 |
| **CD(P=0.05)** | 4.67 | 3.99 | 7.36 |
| **Time of N Application** | | | |
| **$S_1$** | 43.89 | 55.38 | 112.90 |
| **$S_2$** | 46.27 | 57.09 | 120.03 |
| **$S_3$** | 47.03 | 58.13 | 133.98 |
| **$S_4$** | 53.75 | 63.12 | 148.06 |
| **SEM(±)** | 1.85 | 1.99 | 2.86 |
| **CD(P=0.05)** | 5.40 | 5.78 | 8.39 |

**Table 2: Interaction Effect between Level and Time of N Application on Plant Height of Baby Corn at 60 DAS**

| N Level(kg/ha) / Time of N Application | 40 | 60 | 90 |
|---|---|---|---|
| **$S_1$** | 61.133 | 127.01 | 151.21 |
| **$S_2$** | 70.73 | 128.99 | 163.73 |
| **$S_3$** | 90.03 | 137.41 | 175.04 |
| **$S_4$** | 119.44 | 140.19 | 184.39 |
| **SEM(±)** | 4.97 | | |
| **CD(P=0.05)** | 14.51 | | |

**Table 3: Effect of Level and Time of Nitrogen Application on Dry Matter Yield (kg/ha) of Baby Corn at Different Growth Stages**

| Treatment | Dry Matter Yield | | |
|---|---|---|---|
| | 30 DAS | 45 DAS | 60 DAS |
| **Nitrogen Level (kg/ha)** | | | |
| **40** | 810.10 | 951.32 | 1718.76 |
| **60** | 1274.39 | 1932.05 | 3332.84 |
| **90** | 1750.23 | 4621.15 | 7509.21 |
| **SEM(±)** | 30.67 | 74.78 | 96.12 |
| **CD(P=0.05)** | 89.62 | 218.12 | 280.56 |
| **Time of N Application** | | | |
| **$S_1$** | 1108.38 | 2007.14 | 3223.45 |
| **$S_2$** | 1219.63 | 2234.19 | 3986.34 |
| **$S_3$** | 1290.43 | 2557.18 | 4425.89 |
| **$S_4$** | 1496.37 | 3192.08 | 5115.84 |
| **SEM (±)** | 35.47 | 86.31 | 111.01 |
| **CD(P=0.05)** | 103.51 | 251.86 | 323.97 |

**Table 4: Interaction Effect between Level and Time of N Application on Dry Matter Yield (kg/ha) of Baby Corn at 45 DAS**

| N Level(kg/ha) / Time of N Application | 40 | 60 | 90 |
|---|---|---|---|
| **$S_1$** | 829.93 | 1501.31 | 3687.40 |
| **$S_2$** | 899.77 | 1861.26 | 3939.01 |
| **$S_3$** | 1005.47 | 1943.56 | 4727.63 |
| **$S_4$** | 1072.73 | 2480.83 | 6096.07 |
| **SEM (±)** | 149.96 | | |
| **CD(P=0.05)** | 435.17 | | |

**Table 5: Interaction Effect between Level and Time of N Application on Dry Matter Yield (kg/ha) of Baby Corn at 60 DAS**

| N Level(kg/ha) / Time of N Application | 40 | 60 | 90 |
|---|---|---|---|
| **$S_1$** | 1577.41 | 2152.61 | 5936.95 |
| **$S_2$** | 1645.97 | 3205.09 | 7110.97 |
| **$S_3$** | 1767.47 | 3476.91 | 8035.23 |
| **$S_4$** | 1887.89 | 4505.87 | 8954.61 |
| **SEM (±)** | 193.16 | | |
| **CD(P=0.05)** | 562.34 | | |

**Table 6: Effect of Level and Time of Nitrogen Application on Leaf Area ($cm^2$) at Different Growth Stages of Baby Corn**

| Treatment | Leaf area | | |
|---|---|---|---|
| | 30 DAS | 45 DAS | 60 DAS |
| **Nitrogen Level (kg/ha)** | | | |
| **40** | 54.45 | 245.32 | 415.21 |
| **60** | 81.03 | 291.04 | 465.57 |
| **90** | 115.32 | 336.12 | 533.18 |
| **SEM (±)** | 2.53 | 6.04 | 6.43 |
| **CD(P=0.05)** | 7.41 | 17.67 | 18.45 |
| **Time of N application** | | | |
| **$S_1$** | 71.14 | 269.14 | 452.43 |
| **$S_2$** | 78.58 | 274.15 | 467.16 |

| | | | |
|---|---|---|---|
| **$S_3$** | 87.98 | 295.57 | 472.79 |
| **$S_4$** | 99.16 | 325.19 | 494.15 |
| **SEM (±)** | 2.98 | 6.67 | 7.32 |
| **CD(P=0.05)** | 8.52 | 20.54 | 21.34 |

**Table 7: Interaction Effect between Level and Time of N Application on Leaf Area ($cm^2$) of Baby Corn at 30 DAS**

| N Level(kg/ha) / Time of N Application | 40 | 60 | 90 |
|---|---|---|---|
| **$S_1$** | 47.52 | 72.39 | 92.09 |
| **$S_2$** | 54.61 | 82.73 | 99.86 |
| **$S_3$** | 56.33 | 84.03 | 123.03 |
| **$S_4$** | 63.51 | 86.71 | 148.87 |
| **SEM(±)** | 5.07 | | |
| **CD(P=0.05)** | 15.01 | | |

**Table 8: Effect of Levels and Time of Nitrogen Application on Leaf Area Index of Different Growth Stages of Baby Corn**

| Treatment | Leaf Area Index | | |
|---|---|---|---|
| | 30 DAS | 45 DAS | 60 DAS |
| **Nitrogen Level (kg/ha)** | | | |
| **40** | 0.07 | 0.31 | 0.52 |
| **60** | 0.10 | 0.36 | 0.58 |
| **90** | 0.15 | 0.42 | 0.67 |
| **SEM(±)** | 0.003 | 0.008 | 0.008 |
| **CD(P=0.05)** | 0.011 | 0.024 | 0.024 |
| **Time of N Application** | | | |
| **$S_1$** | 0.09 | 0.34 | 0.56 |
| **$S_2$** | 0.09 | 0.34 | 0.58 |
| **$S_3$** | 0.11 | 0.37 | 0.59 |
| **$S_4$** | 0.12 | 0.41 | 0.62 |
| **SEM(±)** | 0.004 | 0.009 | 0.009 |
| **CD(P=0.05)** | 0.012 | 0.028 | 0.028 |

**Table 9: Interaction Effect between Level and Time of N Application on Leaf Area Index of Baby Corn at 30 DAS**

| N level(kg/ha) / Time of N Application | 40 | 60 | 90 |
|---|---|---|---|
| **$S_1$** | 0.06 | 0.09 | 0.12 |
| **$S_2$** | 0.07 | 0.10 | 0.12 |
| **$S_3$** | 0.07 | 0.10 | 0.15 |
| **$S_4$** | 0.08 | 0.11 | 0.19 |
| **SEM(±)** | 0.006 | | |
| **CD(P=0.05)** | 0.021 | | |