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Effect of different levels of nitrogen and phosphorus on growth and yield of baby corn varieties

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Abstract

The present investigation “Effect of different levels of nitrogen and phosphorus on growth and yield of baby corn varieties” was conducted at the Instructional Farm, Jambuvadi, College of Horticulture, Junagadh Agricultural University, Junagadh during the years 2024-25 and 2025-26. The experiment was laid out in RBD with factorial concept consisting two varieties viz., V₁ (GAYMH-3) and V₂ (IMBH-1539), three nitrogen levels i.e. N₁ (100 kg ha⁻¹), N₂ (120 kg ha⁻¹), N₃ (140 kg ha⁻¹) and three phosphorus levels i.e. P₁ (40 kg ha⁻¹), P₂ (60 kg ha⁻¹) and P₃ (80 kg ha⁻¹). The experimental result revealed that the minimum days to 50 % silking were recorded in the treatment N₁ (100 kg ha⁻¹). The maximum chlorophyll content and LAI (Leaf Area Index) were recorded in treatment N₃ (140 kg ha⁻¹) and P₃ (80 kg ha⁻¹). For yield and yield attributing characters the highest average number of cobs plant⁻¹, maximum cob length, cob diameter, cob weight plant⁻¹ with and without husk, cob yield (t ha⁻¹) with and without husk recorded in treatment N₂ (120 kg ha⁻¹) and P₃ (80 kg ha⁻¹).

Keywords: Baby corn, Variety, Nitrogen, Phosphorus, Growth, Yield

1. Introduction

Zea mays L., commonly referred to as baby corn, is a variety of corn cultivated worldwide. As India's population continues to rise, the demand for maize is expected to increase because of its various applications. Amidst climate change, boosting maize production and efficiency in the coming years across India's expanding areas is a critical challenge to meet the anticipated demand for maize.

Any corn variety that produces two or more cobs per plant can be used as baby corn; it is not a separate kind of corn like sweet corn or popcorn. The market prefers baby corn ears with a diameter of 1.0 to 1.5 cm, a length of 10 to 14 cm, and a light yellow colour arranged in uniform rows. India grows baby corn, a multipurpose crop, round the year. Regular maize growing techniques are similar to those used in the production of baby corn. The length of the crop or the harvesting season is the only difference. A conventional maize harvest lasts four months, whereas a baby corn crop takes around two months. Detasseling is one of the main cultural procedures for producing high quality baby corn. Baby corn is consumed as a fresh vegetable in India (Moreira *et al*, 2010) ^[11].

Baby corn has huge potential as a salad and as a cooked vegetable. It is commonly used in Asian cuisine, salads, stir fries and dishes like soup, pasta, chutney, raita, cutlets, pakora and murabba. Baby corn is rich in fiber. This is a low calorie and cholesterol free vegetable. It is nutrient rich and good source of vitamins and minerals having low glycemic index than regular corn. Hence, baby corn is good for controlling blood sugar levels. Baby corn is free from insectpests and diseases and its nutritive value is equivalent with other vegetables available at high price. Baby corn can be compared with the ‘egg’ in terms of nutrients. It is rich in phosphorus content, 86 mg per 100 g in comparison to 21-57 mg per 100 g corn phosphorus content in other common vegetables (Kumar *et al.*, 2006) ^[7].

Maize is a crop that needs all kinds of macro and micronutrients to improve growth and production potential. Since baby corn is a highly nitrogen-sensitive crop, it need a lot of nitrogen to function well and yield more. Because it is a vital component of protoplasm and photosynthesis, nitrogen is linked to the operation of all living cells and is required to increase

crop productivity. Applying nitrogen to baby corn produced a stronger reaction than usual. Nitrogen is essential for encouraging strong vegetative growth, which helps produce young maize plants that are strong and healthy.

Nitrogen is one of the key nutrient additions used to the soil to enhance the growth and yield of numerous crops (Reddy, 2006)^[14]. Nitrogen deficiencies have a significant impact on plant morphology and physiology. Low nitrogen levels cause plants to have shorter lateral branches and a higher root:shoot ratio. Increased NO₃ levels reduce the root:shoot ratio by inhibiting root growth (Scheible *et al.*, 1997; Zhang *et al.*, 1999)^[15, 20].

Phosphorus is another major nutrient after nitrogen for higher crop yield especially for maize, because it is frequently deficient for crop production and is required by crops in quite large amounts. Phosphorus is required for photosynthesis, respiration, cellular activity, gene transfer, and reproduction in plants. It is clear that "without P, there is no cell, plant and grain and without adequate P, there is a lot of hunger" once one understands the vital connection between P and life itself. When it comes to limiting maize performance, phosphorus deficiency is just as significant as nitrogen deficiency (Gul *et al.*, 2015)^[4]. It functions as an activity zone for CO absorption since it is a component of ADP and ATP, which are essential for energy transformation. It also aids in the assimilation of photosynthates into other metabolites. Therefore, a adequate amount of phosphorus promotes a plant's quick growth.

Different baby corn cultivars may have different nutrient needs which can greatly influence crop production. A balanced and sustainable approach to cultivation can be ensured by combining the ideal quantities of phosphorus and nitrogen for particular baby corn varieties.

2. Materials and Methods

An investigation on "Effect of different levels of nitrogen and phosphorus on growth, yield and quality of baby corn varieties" was carried out at Instructional Farm, Jambuvadi, College of Horticulture, Junagadh Agricultural University, Junagadh during the year 2024-25 and 2025-26. Junagadh is situated in South-Saurashtra Agro Climatic Zone of Gujarat state. Geographically, it is at 21.5^{mathbf{0}} N latitude and 70.5^{mathbf{0}} E longitudes with an altitude of 60 meters above the mean sea level on the western side at the foothill of mountain Girnar sierra and 82 km away from the Arabic Sea coast under subtropical region. This experiment was laid out in Randomized Block Design with factorial concept and replicated thrice. The plot was thoroughly ploughed and brought to the fine tilth. Harrowing and planking were done before the execution of layout of the experimental field. The required area was marked and 54 plots were prepared according to the layout plan. About two to three seeds were sown at one place then thinning of seedlings was performed

maintaining one plant per stand after germination. The experimental plot was irrigated during the cropping period on need based conditions.

3. Result and Discussion

3.1 Effect on growth parameters

3.1.1 Days to 50 % silking

3.1.1.1 Effect of varieties, nitrogen and phosphorus

The data in Table 1 reveals varieties and different levels of phosphorus on days to 50 % silking was found non-significant during the years 2024-25 and 2025-26 as well as in pooled analysis. The effect of various levels of nitrogen on days to 50 % silking was found significant and minimum days to 50 % silking 55.04, 55.78 and 55.41 days were recorded in the treatment N₁ (100 kg ha⁻¹) during both the years and in pooled data, respectively which was statistically at par with Nu₂ (120 kg ha⁻¹). This underscores that nitrogen deficiency restricts vegetative growth and accelerates the shift from the vegetative to the reproductive phase. Similar findings have been noticed by Madhvi *et al.* (2018) in baby corn.

3.1.2 Interaction effect

The interaction effects of varieties, different levels of nitrogen (N) and phosphorus (P) on days to 50 % silking was found to be non-significant for both years and the pooled results. The only exception was the effect of N and P in year 2024-25.

3.2 Plant height (cm) at last picking

3.2.1 Effect of varieties, nitrogen and phosphorus

The data indicated that effect of varieties and different levels of phosphorus on plant height at last picking was excreted non-significant during the years 2024-25 and 2025-26 as well as in pooled analysis. The effect of various levels of nitrogen on plant height at last picking was found significant in year 2025-26 and in pooled analysis but it found non-significant effect in year 2025-26. Maximum plant height 203.81 cm and 200.87 cm was recorded in the treatment Nu₃ (140 kg ha⁻¹) during year 2025-26 and pooled data, respectively which was at par with treatment Nu₂ (120 kg ha⁻¹). This suggests a trend toward the adequate and higher nitrogen availability stimulates rapid cell division and cell elongation, particularly in stem internodes, resulting in increased plant height. Similar findings were have been found by Jena *et al.* (2013)^[5] in maize, Dar *et al.* (2014)^[2], Raj *et al.* (2021)^[13], Singh *et al.* (2022)^[16] and Srikanth *et al.* (2023)^[18] in baby corn.

3.2.2 Interaction effect

The interaction effects of varieties, different levels of nitrogen (N) and phosphorus (P) on plant height at last picking was found to be non-significant for both years and the pooled results.

Table 1: Effect of different levels of nitrogen and phosphorus on days to 50 % silking and plant height of baby corn varieties

Treatment	Days to 50 % silking			Plant height (cm) at last picking		
	2024-25	2025-26	Pooled	2024-25	2025-26	Pooled
Variety (V)						
V ₁ : GAYMH-3	56.42	57.58	57.00	194.21	193.60	193.91
V ₂ : IMBH-1539	59.43	58.41	58.92	191.82	194.21	193.02
S.Em.+	0.992	0.968	0.693	3.529	3.769	2.582
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Nitrogen (N)						
N ₁ : 100 kg ha ⁻¹	55.04	55.78	55.41	188.09	183.87	185.98
N ₂ : 120 kg ha ⁻¹	58.34	57.82	58.08	193.04	194.03	193.53
N ₃ : 140 kg ha ⁻¹	60.40	60.37	60.39	197.93	203.81	200.87
S.Em.+	1.215	1.185	0.849	4.322	4.616	3.162

C.D. at 5 %	3.49	3.41	2.39	NS	13.27	8.92
Phosphorus (P)						
P ₁ : 40 kg ha ⁻¹	57.52	58.76	58.14	190.67	190.91	190.79
P ₂ : 60 kg ha ⁻¹	57.77	57.87	57.82	194.57	197.14	195.86
P ₃ : 80 kg ha ⁻¹	58.49	57.35	57.92	193.81	193.66	193.74
S.Em.±	1.215	1.185	0.849	4.322	4.616	3.162
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x N)						
S.Em.±	1.718	1.676	1.200	6.112	6.528	4.471
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x P)						
S.Em.±	1.718	1.676	1.200	6.112	6.528	4.471
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (N x P)						
S.Em.±	2.105	2.053	1.470	7.486	7.995	5.476
C.D. at 5 %	6.05	NS	NS	NS	NS	NS
Interaction (V x N x P)						
S.Em.±	2.976	2.903	2.079	10.587	11.307	7.745
C.D. at 5 %	NS	NS	NS	NS	NS	NS
C.V. %	8.90	8.67	8.79	9.50	10.10	9.81
Interaction with year						
	S.Em.±	C.D. at 5 %	S.Em.±	C.D. at 5 %		
Y x V	0.980	NS	3.651	NS		
Y x N	1.200	NS	4.471	NS		
Y x P	0.840	NS	1.041	NS		
Y x V x N	1.697	NS	6.324	NS		
Y x V x P	1.697	NS	6.324	NS		
Y x N x P	2.079	NS	7.745	NS		
Y x V x N x P	2.940	NS	10.953	NS		

Table 2: Interaction effect of nitrogen and phosphorus on days to 50 % silking of baby corn varieties

Treatment combinations	Days to 50 % silking
	2024-25
N ₁ P ₁	54.64
N ₁ P ₂	55.47
N ₁ P ₃	55.01
N ₂ P ₁	54.84
N ₂ P ₂	56.14
N ₂ P ₃	64.04
N ₃ P ₁	63.09
N ₃ P ₂	61.69
N ₃ P ₃	60.41
S.Em.±	2.053
C.D. at 5 %	6.05

3.3 Chlorophyll content at 45 DAS (SPAD)

3.3.1 Effect of varieties, nitrogen and phosphorus

The data indicated that effect of different varieties on chlorophyll content at 45 DAS was found non-significant during the years 2024-25 and 2025-26 as well as in pooled analysis. The effect of various levels of nitrogen on chlorophyll content was excreted significant and maximum chlorophyll content 45.52, 43.41 and 44.46 SPAD was recorded in the treatment N₃ (140kg ha⁻¹) during both the years 2024-25 and 2025-26 and in the pooled data, respectively. The data indicated that effect of different levels of phosphorus on chlorophyll content was found non-significant during the year 2024-25. The data of the year 2025-26 stated significant difference. Significantly maximum chlorophyll content 41.98 SPAD was observed in treatment P₃ (80kg ha⁻¹) in year 2025- 26 which was at par with bf P₂ (60 kg mathbf h mathbf a-1). In case of pooled data maximum chlorophyll content (42.44 SPAD) recorded in treatment bf P₂ (60 kg ha⁻¹) which was at par with mathbf P₃ (80kg ha⁻¹). Plants supplied with higher nitrogen doses might exhibit darker

green foliage and improved photosynthetic capacity, resulting in maximum chlorophyll content in baby corn plants. Similar findings were found by Jena *et al.* (2013) ^[5] in maize, Dar *et al.* (2014) ^[2], Sreethu and Singh (2020) ^[17] and Belay *et al.* (2023) ^[1] in baby corn.

1.3.2 Interaction effect

The interaction effects of varieties, different levels of nitrogen (N) and phosphorus (P) and varieties on chlorophyll content was found to be non-significant for both years and the pooled results.

3.4 LAI (Leaf Area Index)

3.4.1 Effect of varieties, nitrogen and phosphorus

Varietal effect on LAI (Leaf Area Index) at 45 DAS was found non-significant during both years and pooled analysis. Effect different levels of nitrogen and phosphorus on LAI (Leaf Area Index) had significant variations during the years 2024-25 and 2025-26 as well as in pooled analysis. Maximum LAI (Leaf area index) 5.09, 5.30 and 5.19 during year 2024-25, 2025-26 and in pooled data, respectively were recorded in treatment Nu₃ (140 kg ha⁻¹). While, in phosphorus application treatment mathbf P₃ (80kg ha⁻¹) recorded significantly maximum leaf area index (4.62) in year 2024-25, (4.64) in year 2025-26 and (4.63) in pooled data, which was at par with bf P₂ (60 kg ha⁻¹) in year 2025-26 and pooled data. It is explicit from the result that adequate nitrogen supply might enhances vegetative growth by promoting rapid leaf initiation, expansion and increased leaf size. Higher nitrogen availability also delays leaf senescence and improves photosynthetic efficiency, resulting in the development of more and larger functional leaves per plant. Similar findings were observed by Jena *et al.* (2013) ^[5] in maize, Dar *et al.* (2014) ^[2], Sreethu and Singh (2020) ^[17] and Belay *et al.* (2023) ^[1] in baby corn.

3.4.2 Interaction effect

The interaction effects of varieties and different levels of

nitrogen (N) and phosphorus (P) on leaf area index was excreted non-significant for both years and the pooled results.

Table 3: Effect of different levels of nitrogen and phosphorus on chlorophyll content at 45 DAS and LAI (Leaf Area Index) of baby corn varieties

Treatment	Chlorophyll content at 45 DAS (SPAD)			LAI (Leaf Area Index)		
	2024-25	2025-26	Pooled	2024-25	2025-26	Pooled
Variety (V)						
V ₁ : GAYMH-3	42.30	41.44	41.87	4.45	4.42	4.43
V ₂ : IMBH-1539	41.75	41.41	41.58	4.41	4.60	4.51
S.Em.±	0.596	0.309	0.336	0.079	0.065	0.051
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Nitrogen (N)						
N ₁ : 100 kg ha ⁻¹	39.28	39.21	39.24	3.77	3.64	3.71
N ₂ : 120 kg ha ⁻¹	41.27	41.66	41.46	4.43	4.59	4.51
N ₃ : 140 kg ha ⁻¹	45.52	43.41	44.46	5.09	5.30	5.19
S.Em.±	0.729	0.379	0.411	0.097	0.080	0.063
C.D. at 5 %	2.10	1.09	1.16	0.28	0.23	0.18
Phosphorus (P)						
P ₁ : 40 kg ha ⁻¹	40.70	40.36	40.54	4.09	4.27	4.18
P ₂ : 60 kg ha ⁻¹	42.98	41.91	42.44	4.58	4.61	4.59
P ₃ : 80 kg ha ⁻¹	42.40	41.98	42.19	4.62	4.64	4.63
S.Em.±	0.729	0.379	0.411	0.097	0.080	0.063
C.D. at 5 %	NS	1.09	1.16	0.28	0.23	0.18
Interaction (V x N)						
S.Em.±	1.031	0.536	0.581	0.137	0.113	0.089
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x P)						
S.Em.±	1.031	0.536	0.581	0.137	0.113	0.089
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (N x P)						
S.Em.±	1.263	0.656	0.712	0.168	0.138	0.109
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x N x P)						
S.Em.±	1.787	0.928	1.007	0.237	0.196	0.154
C.D. at 5 %	NS	NS	NS	NS	NS	NS
C.V. %	7.36	3.88	5.91	9.27	7.52	8.42
Interaction with year						
	S.Em.±	C.D. at 5 %		S.Em.±	C.D. at 5 %	
Y x V	0.475	NS		0.072	NS	
Y x N	0.581	NS		0.089	NS	
Y x P	0.286	NS		0.062	NS	
Y x V x N	0.822	NS		0.125	NS	
Y x V x P	0.822	NS		0.125	NS	
Y x N x P	1.007	NS		0.154	NS	
Y x V x N x P	1.424	NS		0.217	NS	

4. Effect on yield parameters

4.1 Number of cobs plant-1

4.1.1 Effect of varieties, nitrogen and phosphorus

The data in Table 4 indicated that varying varieties effect on number of cobs plant-1 found non-significant during the years 2024-25, 2025-26 and in pooled data. Notably, treatment N₂ (120 kg ha⁻¹) yielded the highest average number of cobs plant-1, with impressive figures of 3.97, 4.12 and 4.04 in the years 2024-25, 2025-26 and pooled data, respectively. Which was at par with Nu3 (140 kg ha⁻¹) in year 2024-25 and in pooled data. In case of phosphorus application treatment bf P₃ (80 kg ha⁻¹) produced the highest average number of cobs plant-1, with (4.09) in year 2024-25, (4.15)

in year 2025-26 and an overall average of (4.12) when the data from both years were combined. Nitrogen enhances vegetative growth, leaf area expansion and chlorophyll synthesis, leading to higher photosynthetic activity and greater production of assimilates. Phosphorus promotes root development, energy

transfer (ATP synthesis), early crop establishment and timely differentiation of reproductive organs. The combined application of nitrogen and phosphorus improves nutrient uptake efficiency, strengthens the source-sink relationship and ensures adequate supply of carbohydrates and energy to developing ear primordia. This reduces floral abortion, enhances ear initiation and retention and supports the development of secondary cobs, ultimately resulting in an increased number of cobs plant-1. Similar results were noticed by Das *et al.* (2009) ^[3], Lone *et al.* (2013) ^[8], Sreethu and Singh (2020) ^[17] and Raj *et al.* (2021) ^[13] in baby corn.

4.1.2 Interaction effect

The interaction effects of varieties, different levels of nitrogen (N) and phosphorus (P) on number of cobs plant-1 was found non-significant for first year and the pooled results. The only exception was the effect of N and P in year 2025-26.

Table 4: Effect of different levels of nitrogen and phosphorus on number of cobs plant⁻¹ in baby corn varieties

Treatment	Number of cobs plant ⁻¹		
	2024-25	2025-26	Pooled
Variety (V)			
V ₁ : GAYMH-3	3.61	3.60	3.60
V ₂ : IMBH-1539	3.74	3.84	3.79
S.E.m. _±	0.085	0.083	0.059
C.D. at 5 %	NS	NS	NS
Nitrogen			
N ₁ : 100 kg ha ⁻¹	3.17	3.22	3.20
N ₂ : 120 kg ha ⁻¹	3.97	4.12	4.04
N ₃ : 140 kg ha ⁻¹	3.89	3.82	3.85
S.E.m. _±	0.104	0.102	0.073
C.D. at 5 %	0.30	0.29	0.21
Phosphorus			
P ₁ : 40 kg ha ⁻¹	3.22	3.32	3.27
P ₂ : 60 kg ha ⁻¹	3.71	3.69	3.70
P ₃ : 80 kg ha ⁻¹	4.09	4.15	4.12
S.E.m. _±	0.104	0.102	0.073
C.D. at 5 %	0.30	0.29	0.21
Interaction (V x N)			
S.E.m. _±	0.147	0.144	0.103
C.D. at 5 %	NS	NS	NS
Interaction (V x P)			
S.E.m. _±	0.147	0.144	0.103
C.D. at 5 %	NS	NS	NS
Interaction (N x P)			
S.E.m. _±	0.180	0.176	0.126
C.D. at 5 %	NS	0.51	NS
Interaction (V x N x P)			
S.E.m. _±	0.255	0.249	0.178
C.D. at 5 %	NS	NS	NS
C.V. %	12.00	11.60	11.80
Interaction with year			
	S.E.m. _±	C.D. at 5 %	
Y x V	0.084	NS	
Y x N	0.103	NS	
Y x P	0.039	NS	
Y x V x N	0.145	NS	
Y x V x P	0.145	NS	
Y x N x P	0.178	NS	
Y x V x N x P	0.252	NS	

Table 5: Interaction effect of different levels of nitrogen and phosphorus on number of cobs plant⁻¹ in baby corn varieties

Treatment combinations	Number of cobs plant ⁻¹
	2025-26
N ₁ P ₁	3.01
N ₁ P ₂	2.97
N ₁ P ₃	3.70
N ₂ P ₁	3.51
N ₂ P ₂	4.55
N ₂ P ₃	4.29
N ₃ P ₁	3.43
N ₃ P ₂	3.56
N ₃ P ₃	4.47
S.E.m. _±	0.176
C.D. at 5 %	0.51

4.2 Cob length (cm)

4.2.1 Effect of varieties, nitrogen and phosphorus

The data indicated that varieties significantly affect the cob length over the year 2024-25 and 2025-26 as well as in pooled analysis. Significantly, the highest cob length (14.47 cm) in first year, (14.25 cm) in second year and (14.36 cm) in combined year observed in V₁ (GAYMH-3). Significantly, maximum cob

length (14.63 cm) in year 2024-25, (14.43 cm) in year 2025-26 and (14.53 cm) in pooled year observed in treatment Nu₂ (120 kg ha⁻¹). The data depicted in Table 4 excreted that phosphorus levels had non-significant effect on cob length in both the years. The longer cobs were observed in V₁ (GAYMH-3) might be due to the varietal characteristics because GAYMH-3 variety produce slightly longer cobs compare to IMBH-1539 variety. Similar findings noticed by Medhi and Dutta (2019) ^[10] and Yesmin *et al.* (2019) ^[19] in baby corn.

4.2.2 Interaction effect

The cob length was found non-significant influenced by the various levels of nitrogen and phosphorus with baby corn varieties in both the years and as well as in pooled analysis.

4.3 Cob diameter

4.3.1 Effect of varieties, nitrogen and phosphorus

The data indicated that effect of different varieties on cob diameter was found nonsignificant during the years 2024-25 and 2025-26 as well as in pooled analysis. Nitrogen had significant impact on cob diameter in both the years and as well as in pooled year. Significantly, maximum cob diameter (1.92, 1.86

and 1.89 cm) in year 2024-25, 2025-26 and in pooled year observed in treatment N2 (120 kg ha⁻¹). The diameter of cob significantly influenced by the varying levels of phosphorus. The maximum cob diameter (1.85 cm) in year 2024-25, (1.81 cm) in year 2025-26 and (1.83 cm) in pooled year found in treatment bf P3 (80 kg ha⁻¹) which was at par with treatment bf

P2 (60 kg ha⁻¹) in both the years as well as in pooled data.

4.3.2 Interaction effect

The interaction effects of varieties, different levels of nitrogen (N) and phosphorus (P) on cob diameter was excreted non-significant for both years and the pooled results.

Table 6: Effect of different levels of nitrogen and phosphorus on cob length and cob diameter of baby corn varieties

Treatment	Cob length (cm)			Cob diameter (cm)		
	2024-25	2025-26	Pooled	2024-25	2025-26	Pooled
Variety (V)						
V ₁ : GAYMH-3	14.47	14.25	14.36	1.70	1.65	1.68
V ₂ : IMBH-1539	13.36	13.21	13.28	1.72	1.71	1.71
S.E.m. _±	0.214	0.225	0.16	0.035	0.039	0.026
C.D. at 5 %	0.61	0.65	0.44	NS	NS	NS
Nitrogen (N)						
N ₁ : 100 kg ha ⁻¹	13.34	13.27	13.30	1.55	1.48	1.52
N ₂ : 120 kg ha ⁻¹	14.63	14.43	14.53	1.92	1.86	1.89
N ₃ : 140 kg ha ⁻¹	13.77	13.50	13.63	1.66	1.70	1.68
S.E.m. _±	0.262	0.275	0.190	0.042	0.048	0.032
C.D. at 5 %	0.75	0.79	0.54	0.12	0.14	0.09
Phosphorus (P)						
P ₁ : 40 kg ha ⁻¹	13.42	13.27	13.34	1.55	1.52	1.54
P ₂ : 60 kg ha ⁻¹	13.98	13.83	13.91	1.73	1.71	1.72
P ₃ : 80 kg ha ⁻¹	14.35	14.09	14.21	1.85	1.81	1.83
S.E.m. _±	0.262	0.275	0.190	0.042	0.048	0.032
C.D. at 5 %	NS	NS	0.54	0.12	0.14	0.09
Interaction (V x N)						
S.E.m. _±	0.370	0.389	0.268	0.060	0.068	0.045
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x P)						
S.E.m. _±	0.370	0.389	0.268	0.060	0.068	0.045
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (N x P)						
S.E.m. _±	0.453	0.477	0.329	0.073	0.083	0.055
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x N x P)						
S.E.m. _±	0.641	0.674	0.465	0.104	0.117	0.078
C.D. at 5 %	NS	NS	NS	NS	NS	NS
C.V. %	7.98	8.50	8.24	10.49	12.07	11.29
Interaction with year						
	S.E.m. _±	C.D. at 5 %		S.E.m. _±	C.D. at 5 %	
Y x V	0.219	NS		0.037	NS	
Y x N	0.268	NS		0.045	NS	
Y x P	0.048	NS		0.008	NS	
Y x V x N	0.380	NS		0.064	NS	
Y x V x P	0.380	NS		0.064	NS	
Y x N x P	0.465	NS		0.078	NS	
Y x V x N x P	0.658	NS		0.111	NS	

4.4 Cob weight plant-1 (g) with husk

4.4.1 Effect of varieties, nitrogen and phosphorus

The data indicated that varieties found non-significant effect on cob weight plant-1 with husk during the years 2024-25 and 2025-26 as well as in pooled analysis. The data pertaining reflected that maximum cob weight plant-1 with husk (146.56 g) in year 2024-25, (143.06 g) in year 2025-26 and (144.81 g) in pooled year found in treatment Nu2 (120 kg ha⁻¹) which was at par with treatment N3 (140kg ha⁻¹) in year 2025-26. The data depicted in Table 5 revealed that maximum cob weight plant-1 with husk (143.58 g) in year 2024-25, (144.84 g) in year 2025-26 and (144.21 g) in combined year recorded in treatment maths P3 (80kg ha⁻¹). Moreover, it was statistically at par with treatment P2 (60kg ha⁻¹) in year 2025-26. Nitrogen promotes vigorous vegetative growth, better sink-source relationship and improved husk development, thereby increasing overall cob

weight with husk. Similarly, phosphorus plays a vital role in energy transfer (ATP), root development, and metabolic processes. Adequate phosphorus availability enhances early root growth and nutrient uptake, ensuring efficient utilization of nitrogen. It accelerates reproductive development, improves cell division and enlargement in cob tissues and enhances assimilate translocation to the developing cobs. As a result, cob size, husk development and cob weight per plant increase. Similar results were recorded by Sreethu and Singh (2020) ^[17], Patel *et al.* (2021) ^[12], Kumar *et al.* (2022) ^[6] and Srikanth *et al.* (2023) ^[18] in baby corn.

4.4.2 Interaction effect: The interaction effects of different levels of nitrogen (N), phosphorus (P) and varieties (V) on cob weight plant-1 with husk was recorded non-significant for both years and the pooled results.

4.5 Cob weight plant-1 (g) without husk

4.5.1 Effect of varieties, nitrogen and phosphorus

The data depicted in Table 6 revealed that varieties found non-significant effect on cob weight plant-1 without husk during the years 2024-25 and 2025-26 as well as in pooled analysis. The maximum cob weight plant-1 without husk (43.38, 40.94 and 42.16 g) recorded in treatment Nu2 (120 kg ha⁻¹) during 2024-25, 2025-26 and pooled year, respectively. Which was at par with treatment Nu3 (140 kg ha⁻¹) during year 2025-26. The data pertaining reflected that maximum cob weight plant-1 without husk (41.10 g) reported in treatment bf P2 (60 kg ha⁻¹) in 2024-

25 and which was at par with treatment bf P3 (80 kg ha⁻¹). However, maximum cob weight plant-1 without husk (41.13 g) in 2025-26 and (40.42 g) in pooled year observed in treatment bf P3 (80 kg ha⁻¹) Moreover, it was statistically at par with treatment bf P2 (60 kg ha⁻¹) in combined year.

4.5.2 Interaction effect

The interaction effects of varieties (V), different levels of nitrogen (N) and phosphorus (P) found non-significant for both years and pooled results. The only exception was the effect of N and P on cob weight plant-1 without husk (g).

Table 7: Effect of different levels of nitrogen and phosphorus on cob weight plant-1 with and without husk of baby corn varieties

Treatment	Cob weight plant ⁻¹ with husk (g)			Cob weight plant ⁻¹ without husk (g)		
	2024-25	2025-26	Pooled	2024-25	2025-26	Pooled
Variety (V)						
V ₁ : GAYMH-3	136.90	137.60	137.25	39.04	37.70	38.37
V ₂ : IMBH-1539	137.18	136.35	136.76	39.95	38.62	39.28
S.E.m. _±	1.897	2.220	1.460	0.742	0.888	0.578
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Nitrogen (N)						
N ₁ : 100 kg ha ⁻¹	132.02	130.60	131.31	36.94	35.59	36.26
N ₂ : 120 kg ha ⁻¹	146.56	143.06	144.81	43.38	40.94	42.16
N ₃ : 140 kg ha ⁻¹	132.53	137.26	134.89	38.16	37.95	38.05
S.E.m. _±	2.323	2.718	1.788	0.908	1.088	0.708
C.D. at 5 %	6.68	7.81	5.05	2.61	3.13	2.00
Phosphorus (P)						
P ₁ : 40 kg ha ⁻¹	127.63	129.92	128.78	37.66	35.71	36.69
P ₂ : 60 kg ha ⁻¹	139.90	136.15	138.03	41.10	37.63	39.37
P ₃ : 80 kg ha ⁻¹	143.58	144.84	144.21	39.72	41.13	40.42
S.E.m. _±	2.323	2.718	1.788	0.908	1.088	0.708
C.D. at 5 %	6.68	7.81	5.05	2.61	3.13	2.00
Interaction (V x N)						
S.E.m. _±	3.286	3.844	2.529	1.284	1.538	1.002
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x P)						
S.E.m. _±	3.286	3.844	2.529	1.284	1.538	1.002
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (N x P)						
S.E.m. _±	4.024	4.708	3.097	1.573	1.884	1.227
C.D. at 5 %	NS	NS	NS	4.52	5.41	3.46
Interaction (V x N x P)						
S.E.m. _±	5.691	6.659	4.380	2.225	2.664	1.735
C.D. at 5 %	NS	NS	NS	NS	NS	NS
C.V. %	7.19	8.42	7.83	9.76	12.09	10.95
Interaction with year						
	S.E.m. _±	C.D. at 5 %		S.E.m. _±	C.D. at 5 %	
Y x V	2.065	NS		0.818	NS	
Y x N	2.529	NS		1.002	NS	
Y x P	2.284	NS		1.767	NS	
Y x V x N	3.576	NS		1.417	NS	
Y x V x P	3.576	NS		1.417	NS	
Y x N x P	4.380	NS		1.735	NS	
Y x V x N x P	6.194	NS		2.454	NS	

Table 8 Interaction effect of different levels of nitrogen and phosphorus on cob weight plant-1 without husk of baby corn varieties

Treatment combinations	Cob weight plant ⁻¹ without husk (g)	
	2025-26	Pooled
N ₁ P ₁	34.02	35.00
N ₁ P ₂	37.05	38.16
N ₁ P ₃	42.16	40.99
N ₂ P ₁	42.16	41.74
N ₂ P ₂	42.77	43.15
N ₂ P ₃	43.41	41.59
N ₃ P ₁	30.46	31.90
N ₃ P ₂	34.24	38.21
N ₃ P ₃	38.72	38.69
S.E.m. _±	1.884	1.227
C.D. at 5 %	5.41	3.46

4.6 Cob yield (t ha⁻¹) with husk

4.6.1 Effect of varieties, nitrogen and phosphorus

The data indicated that effect of different varieties on cob yield (t ha⁻¹) with husk was found non-significant during the years 2024-25 and 2025-26 as well as in pooled analysis. The data indicated that significant differences in cob yield (t ha⁻¹) with husk was observed because of different levels of nitrogen during both the years and in pooled analysis also. Significantly maximum cob yield (t ha⁻¹) with husk (10.02, 10.25 and 10.14 t) was recorded in the treatment Nu2 (120kg ha⁻¹) during 2024-25, 2025-26 and pooled data, respectively. The data revealed that effect of different levels of phosphorus on cob yield (th a-1) with husk was found significant in both the years as well as in pooled analysis. Significantly maximum cob yield (th mathsf a-1) with husk (9.75, 9.73 and 9.74 t) was recorded in the treatment bf P3 (80 kg ha⁻¹) during 2024-25, 2025-26 and in pooled data, respectively.

4.6.2 Interaction effect

The interaction effects of varieties, varying levels of nitrogen and phosphorus on cob yield (t ha⁻¹) with husk was found non-

significant during both years and in the pooled results.

4.7 Cob yield (t ha⁻¹) without husk

4.7.1 Effect of varieties, nitrogen and phosphorus

The data indicated that effect of different varieties on cob yield (th a-1) without husk was found non-significant during the years 2024-25 and 2025-26 as well as in pooled analysis. The data revealed that significant differences in cob yield mathbf (th a-1) without husk was observed because of different levels of nitrogen during both the years and in pooled analysis also. Significantly maximum cob yield (t ha⁻¹) without husk (3.18, 3.58 and 3.35 t) was recorded in the treatment Nu2 (120 kg ha⁻¹) during 2024-25, 2025-26 and in pooled year. The analysis of data on effect of different levels of phosphorus on cob yield (t ha⁻¹) without husk was found significant in both the years as well as in pooled analysis. Significantly maximum cob yield mathbf (th a-1) without husk (3.10 t) was recorded in P2 (60 kg ha⁻¹) during 2024-25 which was at par with bf P3 (80 kg ha⁻¹). Whereas, during 2025-26 and pooled reported maximum cob yield (t ha⁻¹) without husk (3.40 and 3.23 t) in treatment P3 (80th a-1).

Table 9: Effect of different levels of nitrogen and phosphorus on cob yield with and without husk of baby corn varieties

Treatment	Cob yield (t ha ⁻¹) with husk			Cob yield (t ha ⁻¹) without husk		
	2024-25	2025-26	Pooled	2024-25	2025-26	Pooled
Variety (V)						
V ₁ : GAYMH-3	9.41	9.17	9.29	3.02	3.14	3.08
V ₂ : IMBH-1539	9.36	8.96	9.16	2.98	3.09	3.05
S.Em. _±	0.154	0.171	0.115	0.052	0.078	0.047
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Nitrogen (N)						
N ₁ : 100 kg ha ⁻¹	8.91	8.24	8.57	2.89	2.85	2.84
N ₂ : 120 kg ha ⁻¹	10.02	10.25	10.14	3.18	3.58	3.35
N ₃ : 140 kg ha ⁻¹	9.22	8.71	8.97	2.93	2.96	2.94
S.Em. _±	0.188	0.210	0.140	0.063	0.096	0.057
C.D. at 5 %	0.54	0.62	0.41	0.18	0.27	0.16
Phosphorus (P)						
P ₁ : 40 kg ha ⁻¹	9.06	8.42	8.74	2.84	2.82	2.83
P ₂ : 60 kg ha ⁻¹	9.35	9.04	9.20	3.10	3.12	3.10
P ₃ : 80 kg ha ⁻¹	9.75	9.73	9.74	3.06	3.40	3.23
S.Em. _±	0.188	0.210	0.140	0.063	0.096	0.057
C.D. at 5 %	0.54	0.62	0.41	0.18	0.27	0.16
Interaction (V x N)						
S.Em. _±	0.266	0.297	0.199	0.089	0.135	0.081
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x P)						
S.Em. _±	0.266	0.297	0.199	0.089	0.135	0.081
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (N x P)						
S.Em. _±	0.326	0.364	0.244	0.110	0.166	0.099
C.D. at 5 %	NS	NS	NS	NS	NS	NS
Interaction (V x N x P)						
S.Em. _±	0.461	0.514	0.345	0.155	0.234	0.140
C.D. at 5 %	NS	NS	NS	NS	NS	NS
C.V. %	8.50	10.16	9.34	9.65	9.35	9.50
Interaction with year						
	S.Em. _±	C.D. at 5 %		S.Em. _±	C.D. at 5 %	
Y x V	0.163	NS		0.066	NS	
Y x N	0.199	NS		0.081	NS	
Y x P	0.422	NS		0.138	NS	
Y x V x N	0.282	NS		0.115	NS	
Y x V x P	0.282	NS		0.115	NS	
Y x N x P	0.345	NS		0.140	NS	
Y x V x N x P	0.488	NS		0.198	NS	

Conclusion

On the basis of experimental results, it infer that there were differences in the outcomes of various levels of nitrogen and phosphorus on baby corn varieties for growth and yield parameters in baby corn. An application of 100 kg ha⁻¹ N recorded minimum days to 50 % silking. Application of 140 kg ha⁻¹ N recorded better growth parameters. Application of 120 kg ha⁻¹ N resulted better for yield and yield attributing parameters. While, phosphorus application of 80 kg ha⁻¹ P recorded better for yield and yield attributing parameters. Hence, for getting better growth and higher yield GAYMH-3 variety of baby corn should be applied 120 kg ha⁻¹ N (in two equal splits) and 80 kg ha⁻¹ P for its individual effect.

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