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Effect of Spacing and Nitrogen on Yield and Economics of Baby Corn (*Zea mays* L.) in Prayagraj Region

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Abstract
A field experiment was conducted during the Rabi season of 2025–26 at the Crop Research Farm, Department of Agronomy, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, to study the effect of spacing and nitrogen levels on the yield, yield attributes and economics of baby corn (Zea mays L.). The experiment was laid out in a Randomized Block Design with ten treatments and three replications, comprising three spacings (30 × 20, 35 × 25 and 40 × 30 cm) and three nitrogen levels (60, 70 and 80 kg N/ha) along with a control. The results revealed that the widest spacing of 40 × 30 cm combined with 80 kg N/ha (T9) recorded the maximum number of cobs per plant (2.63), cob length (12.84 cm), cob weight per plant (32.93 g), cob yield with husk (239.16 g/plant), cob yield without husk (40.58 g/plant), green fodder yield (21.53 t/ha) and biological yield (62.11 t/ha). The same treatment also gave the highest cob yield (102.30 q/ha), gross return (₹ 3,34,850/ha), net profit (₹ 2,47,728/ha) and benefit–cost ratio (2.84), and proved to be the most productive and economically viable treatment for baby corn cultivation under the alluvial soil conditions of the Prayagraj region.

Keywords: Baby corn, spacing, nitrogen, cob yield, harvest index, economics, benefit–cost ratio

Introduction
Baby corn refers to the young, unfertilised ear of maize harvested within 2–3 days of silk emergence, before pollination. Owing to its short duration (45–60 days), tender texture, mild sweetness and rich content of dietary fibre, vitamins and minerals, baby corn has emerged as a high-value vegetable crop with growing demand in hotels, restaurants and food-processing industries. Its short growth cycle allows it to fit well into intensive and multiple cropping systems, while the residual green biomass serves as quality fodder, making it a doubly remunerative crop for small and marginal farmers.

Among the agronomic factors influencing baby corn productivity, plant spacing and nitrogen management are the most critical. Optimum spacing regulates plant population, light interception and competition for moisture and nutrients, whereas adequate nitrogen promotes chlorophyll synthesis, cell elongation and assimilate partitioning towards developing cobs. However, farmers often follow generalised recommendations rather than location-specific practices, which limits yield and profitability. The present study was therefore undertaken to evaluate the influence of different spacings and nitrogen levels on the yield, yield attributes and economics of baby corn under the alluvial soil conditions of the Prayagraj region.

Materials and Methods
The field experiment was carried out during the Rabi season of 2025–26 at the Crop Research Farm, Department of Agronomy, Prof. Rajendra Singh (Rajju Bhaiya) University, Prayagraj, Uttar Pradesh. The region is situated at 24°47′ N latitude and 81°19′ E longitude at an altitude of about 98 m above mean sea level and experiences a tropical, semi-arid climate. The experiment was laid out in a Randomized Block Design (RBD) with ten treatments replicated thrice. The baby corn variety used was Prakash, sown on 12 November 2025. The treatments comprised three spacings (Factor A) and three nitrogen levels (Factor B) along with a control, as detailed below.

Table 1: Treatment combinations

Treatment	Spacing + Nitrogen level
T1	30 × 20 cm + 60 kg N/ha
T2	30 × 20 cm + 70 kg N/ha
T3	30 × 20 cm + 80 kg N/ha
T4	35 × 25 cm + 60 kg N/ha
T5	35 × 25 cm + 70 kg N/ha
T6	35 × 25 cm + 80 kg N/ha
T7	40 × 30 cm + 60 kg N/ha
T8	40 × 30 cm + 70 kg N/ha
T9	40 × 30 cm + 80 kg N/ha
T10	Control (farmer's practice)

Observations on yield attributes (number of cobs per plant, cob length, cob weight per plant), cob yield (with and without husk), green fodder yield, biological yield and harvest index were recorded from five randomly selected plants per plot. The economics of each treatment was worked out in terms of cost of cultivation, gross return, net profit and benefit–cost (B:C) ratio. The data were analysed by analysis of variance (ANOVA) for RBD and treatment means were compared using the critical difference (CD) at the 5% probability level.

Results and Discussion

Objective 2: Effect of spacing and nitrogen on yield and yield attributes

Yield attributes: The yield attributes of baby corn were significantly influenced by spacing and nitrogen levels (Table 2, Fig. 1). The maximum number of cobs per plant (2.63), cob length (12.84 cm) and cob weight per plant (32.93 g) were recorded under T9 (40 × 30 cm + 80 kg N/ha), which was superior to all other treatments. These values declined progressively with narrower spacing and lower nitrogen, the minimum being recorded under the control (T10) with 1.20 cobs per plant, 8.34 cm cob length and 16.72 g cob weight. Wider spacing reduced inter-plant competition and, combined with adequate nitrogen, enhanced photosynthetic activity and assimilate supply to developing cobs, resulting in longer and heavier cobs.

Table 2: Effect of spacing and nitrogen on yield attributes of baby corn

Treatment	No. of cobs/plant	Cob length (cm)	Cob weight/plant (g)
T1	1.34	8.55	18.66
T2	1.37	9.06	20.44
T3	1.33	9.67	22.44
T4	1.40	10.15	23.96
T5	1.47	10.63	25.84
T6	1.60	11.27	25.54
T7	1.80	11.78	29.33
T8	2.17	12.26	31.13
T9	2.63	12.84	32.93
T10	1.20	8.34	16.72
F-test	NS	S	S
S.Ed. (±)	0.003	0.001	0.002
C.D. at 5%	–	0.002	0.006

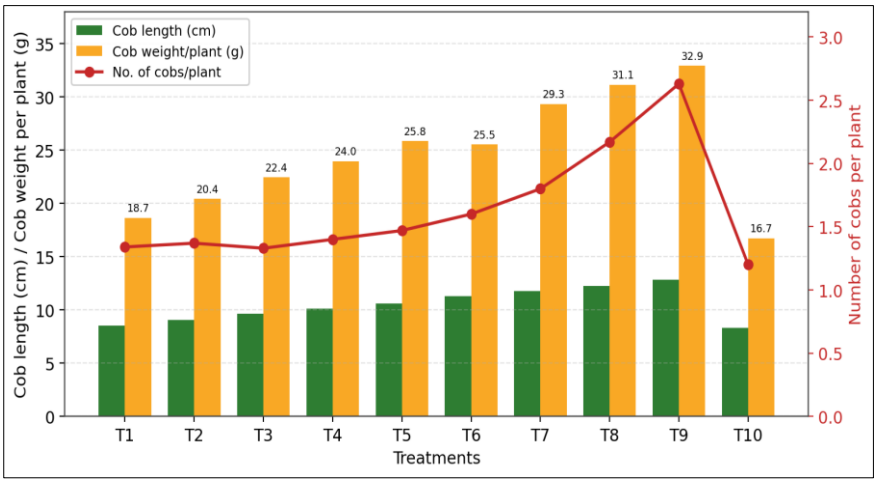

Fig 1: Effect of spacing and nitrogen on yield attributes of baby corn

Cob yield

Cob yield with husk and without husk per plant differed significantly among treatments (Table 3, Fig. 2). The highest cob yield with husk (239.16 g/plant) and without husk (40.58 g/plant) was obtained under T9 (40 × 30 cm + 80 kg N/ha), followed by T8 (198.38 and 38.05 g/plant) and T7 (169.37 and 36.47 g/plant). The lowest values were recorded under the control (T10) with 125.74 g/plant (with husk) and 30.59 g/plant (without husk). The superior cob yield under wider spacing with higher nitrogen reflects greater dry-matter accumulation and efficient translocation of photosynthates towards the developing sink.

Table 3: Effect of spacing and nitrogen on cob yield of baby corn

Treatment	Cob yield with husk (g/plant)	Cob yield without husk (g/plant)
T1	132.35	31.55
T2	137.04	32.06
T3	140.03	32.55
T4	148.16	33.23
T5	152.35	33.57
T6	158.23	34.98
T7	169.37	36.47
T8	198.38	38.05

T9	239.16	40.58
T10	125.74	30.59
F-test	S	S
S.Ed. (±)	0.61	0.006
C.D. at 5%	1.81	0.017

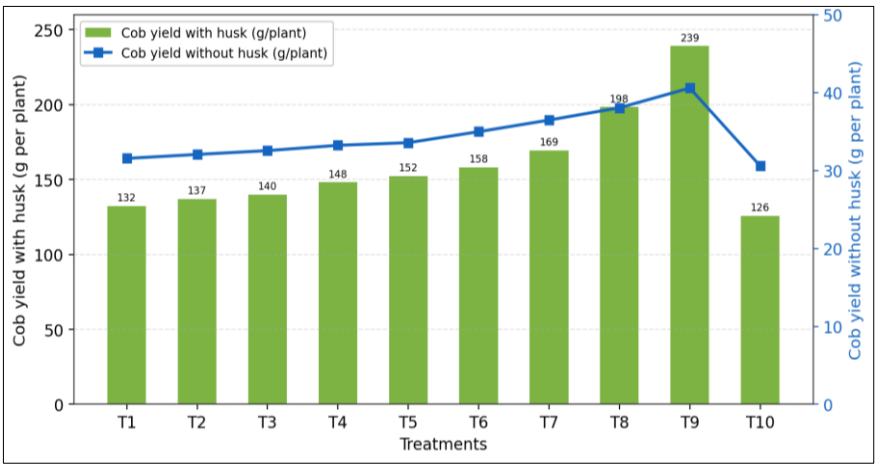

Fig 2: Effect of spacing and nitrogen on cob yield of baby corn

Green fodder yield, biological yield and harvest index

Green fodder yield and biological yield increased significantly with wider spacing and higher nitrogen levels (Table 4, Fig. 3). The maximum green fodder yield (21.53 t/ha) and biological yield (62.11 t/ha) were recorded under T9 (40 × 30 cm + 80 kg N/ha), while the minimum values were observed under the control (12.57 and 43.16 t/ha, respectively). Harvest index, however, did not vary significantly and ranged from 64.69% (T8) to 70.88% (T10); the slightly higher harvest index of lower-yielding treatments reflects their lower total biomass rather than superior partitioning. Overall, the combination of wider spacing and higher nitrogen enhanced total biomass production while maintaining a favourable harvest index.

Table 4. Effect of spacing and nitrogen on green fodder yield, biological yield and harvest index

Treatment	Green fodder yield (t/ha)	Biological yield (t/ha)	Harvest index (%)
T1	13.70	45.25	69.72
T2	14.00	46.06	69.60
T3	15.13	47.68	68.27
T4	16.27	49.50	67.13
T5	17.13	50.70	66.21
T6	18.77	53.75	65.08
T7	19.63	56.10	65.01
T8	20.77	58.82	64.69
T9	21.53	62.11	65.34
T10	12.57	43.16	70.88
F-test	S	S	NS
S.Ed. (±)	0.28	1.58	0.18
C.D. at 5%	0.84	4.64	–

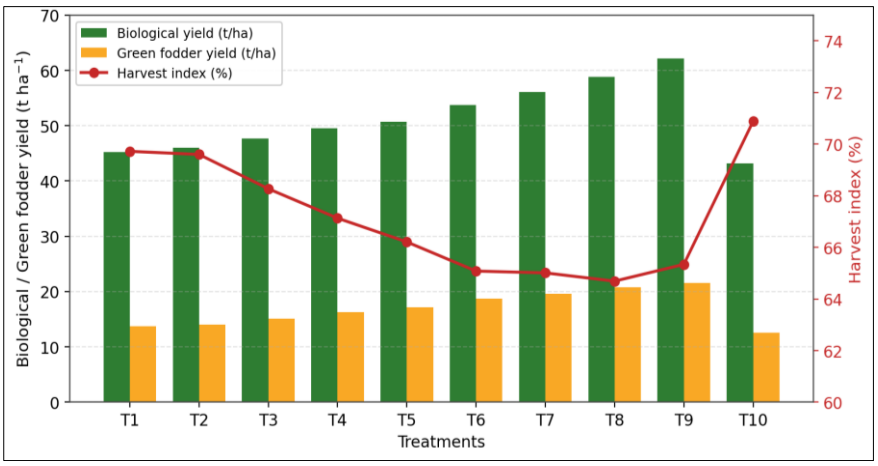

Fig 3: Effect of spacing and nitrogen on green fodder yield, biological yield and harvest index

Objective 3: Economics of treatment combinations

Economics of baby corn cultivation

The economic analysis revealed considerable variation in gross return, net profit and benefit–cost ratio among the treatments (Table 5, Fig. 4). The treatment T9 (40 × 30 cm + 80 kg N/ha) recorded the highest cob yield (102.30 q/ha) and consequently the maximum gross return (₹ 3,34,850/ha) and net profit (₹ 2,47,728/ha) with the highest benefit–cost ratio of 2.84. The next best treatments were T8 (₹ 2,40,012/ha net profit; B:C 2.77) and T7 (₹ 2,36,540/ha; B:C 2.74). Although the cost of cultivation increased marginally with higher nitrogen, this was more than compensated by the increase in yield and returns. The lowest economic returns were recorded under the control (T10) with a net profit of ₹ 1,61,730/ha and a B:C ratio of 2.07, mainly due to its lower yield. The progressive improvement in net profit and B:C ratio with wider spacing and higher nitrogen clearly indicates that T9 is the most profitable treatment for baby corn cultivation under the experimental conditions.

Table 5. Economic analysis of baby corn as influenced by spacing and nitrogen

Trt.	Yield (q/ha)	Rate (₹/q)	Gross return (₹/ha)	Cost (₹/ha)	Net profit (₹/ha)	B:C
T1	85.20	2400	2,89,420	83,210	2,06,210	2.48
T2	87.10	2400	2,89,895	83,558	2,06,337	2.47
T3	89.00	2400	2,86,590	83,882	2,02,708	2.42
T4	91.10	2400	2,95,435	84,830	2,10,605	2.48
T5	93.20	2400	2,97,055	85,178	2,11,877	2.49
T6	95.40	2400	3,15,645	85,502	2,30,143	2.69
T7	97.60	2400	3,22,990	86,450	2,36,540	2.74
T8	99.90	2400	3,26,810	86,798	2,40,012	2.77
T9	102.30	2400	3,34,850	87,122	2,47,728	2.84
T10	82.60	2400	2,39,780	78,050	1,61,730	2.07

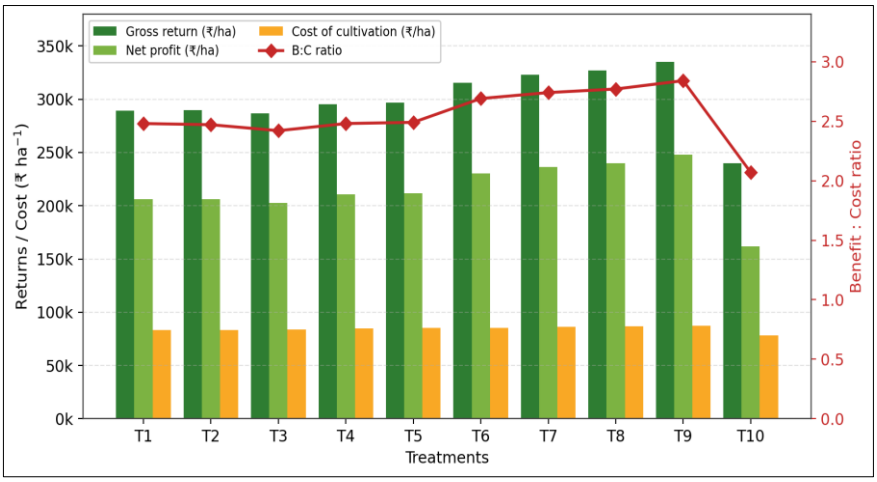

Fig 4: Economics of baby corn cultivation as influenced by spacing and nitrogen.

Conclusion

On the basis of one season of field experimentation, it may be concluded that sowing baby corn at a wider spacing of 40 × 30 cm with the application of 80 kg N/ha (treatment T9) produced the highest yield attributes, cob yield, green fodder yield and biological yield, together with the maximum gross return (₹ 3,34,850/ha), net profit (₹ 2,47,728/ha) and benefit–cost ratio (2.84). This treatment is therefore recommended as the most productive and economically viable practice for baby corn cultivation under the alluvial soil conditions of the Prayagraj region. Confirmation through further multi-season trials is suggested.

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