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Yield performance and economic evaluation of sweet corn (*Zea mays* L. Saccharata) cultivars under different sowing dates

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Abstract
A field experiment was conducted to study the "Yield Performance and Economic Evaluation of Sweet Corn (*Zea mays* L. Saccharata) Cultivars under Different Sowing Dates" at the farm of the National Agriculture Research Project, Chh. Sambhajinagar during the *kharif* season of 2024. The site had medium black, deep clayey soil with high moisture retention and received 598.93 mm of monsoon rainfall, providing favourable conditions for sweet corn. The experiment was laid out in a split plot design with four sowing dates (1st June, 15th June, 1st July and 15th July) and three cultivars (Phule Madhu, Sugar 75 and Mithas) replicated thrice, with a gross plot size of 4.5 m × 4 m. Results revealed that early sowing on 1st June recorded the highest fresh cob yield (20.78 t ha^{-1}), which translated into the maximum gross monetary return (₹ 2,44,909 ha^{-1}), net monetary return (₹ 1,55,564 ha^{-1}) and B:C ratio (2.95). Among cultivars, Phule Madhu produced the highest fresh cob yield (17.06 t ha^{-1}) with an average net return of ₹ 1,00,010 ha^{-1}. Delayed sowing beyond mid-June led to significant reductions in yield and profitability. Thus, sowing on 1st June with cultivar Phule Madhu emerged as the most productive and economically viable option under the agro-climatic conditions of Chh. Sambhajinagar.

Keywords: Sweet corn, sowing dates, cultivars, yield, economics, profitability

Introduction
Sweet corn (*Zea mays* L. Saccharata) is a short duration, high value maize variant widely cultivated for its rich nutritional composition and versatile applications in the food industry. Unlike field corn, it is harvested at the milk stage when sugar content peaks, providing a valuable source of carbohydrates, fibers, vitamins (A, B1, B9, C) and essential minerals such as magnesium and potassium. Global production has reached 28.5 million metric tons (FAO, 2022) [2], with the United States, China, Brazil and India as leading producers. In India, sweet corn is cultivated on approximately 40,000-45,000 ha, achieving yield of 10-12 t ha^{-1} under optimal conditions, primarily in Karnataka, Maharashtra, Tamil Nadu and Punjab (AgriXchange, 2023; APEDA, 2024) [4, 1]. Its high market demand, short crop cycle (60-70 days) and profitability make it significant for nutritional security and rural livelihoods.

Sowing date and cultivar choice play a decisive role in determining sweet corn yield and quality. Key post-harvest characteristics such as sweetness, tenderness and shelf life depend heavily on genotype environment interactions and untimely sowing can hasten the conversion of sugars to starch, diminishing taste and consumer acceptability. Properly timed sowing synchronizes crop growth with favourable climatic conditions, reducing susceptibility to biotic and abiotic stresses (Sharma *et al.*, 2021) [9]. Research indicates that early sowing can increase yield by 15-20% compared with delayed planting (Verma *et al.*, 2020; Smith & Anderson, 2022) [12, 10]. Similarly, selecting cultivars suited to regional agro-climatic conditions, with attributes like disease resistance and climate resilience, enhances performance and yield stability under changing environments (Rathore *et al.*, 2023) [8].

In this context, the present investigation, titled the "Yield Performance and Economic Evaluation of Sweet Corn (*Zea mays* L. Saccharata) Cultivars under Different Sowing Dates" was undertaken during the *kharif* season of 2024 at the National Agriculture Research Project, Chhatrapati Sambhajinagar. The objective was to identify suitable cultivars and sowing windows that optimize yield, preserve grain quality and ensure economic viability in the Marathwada region.

The findings are expected to assist farmers, policymakers and extension agencies in adopting improved agronomic practices that enhance productivity, nutritional security and profitability under the challenges of climate variability (IIMR, 2023; FAOSTAT, 2024) [5, 3].

Materials and Methods

The field experiment was conducted during the *kharif* season of 2024 at the farm section of the National Agricultural Research Project (NARP), Chh. Sambhajinagar (19°54′ N, 75°21′ E; 568 m above MSL). The site has a flat topography, semi-arid climate and adequate moisture conditions during the cropping period. The soil is clayey, moderately rich in organic carbon (0.63%), low in available nitrogen (157 kg ha^{-1}), moderate in phosphorus (20.11 kg ha^{-1}) and very high in potassium (395 kg ha^{-1}), with an alkaline pH (8.59).

The experiment evaluated three sweet corn (*Zea mays* L. saccharata) genotypes; Phule Madhu, Sugar 75 and Mithas under a spacing of 75 × 20 cm using the dibbling method. These varieties were chosen for their variability in earliness, sweetness and yield potential under different sowing conditions. Regular intercultural operations and recommended agronomic practices were followed to ensure uniform crop growth.

The trial was laid out in a split-plot design with twelve treatment combinations and three replications. The main plots consisted of four dates of sowing (D_1: 1st June, D_2: 15th June, D_3: 1st July, D_4: 15th July), while the sub-plots comprised three genotypes (V_1: Phule Madhu, V_2: Sugar 75, V_3: Mithas). Each gross plot measured 4.5 × 4.0 m^2, and the recommended dose of fertilizer 120:60:60 N:P:K kg ha^{-1} was applied.

Results and Discussion

Effect of different treatment on yield

A) Effect of Sowing Dates

Data presented in Table 1 revealed that both fresh cob and fodder yields of sweet corn were significantly affected by sowing dates. The highest fresh cob and fodder yield were obtained with 1st June sowing (20.78 13 t ha^{-1} and 37.13 t ha^{-1} respectively), which declined progressively with delayed sowing, reaching the lowest values on 15th July (12.31 t ha^{-1} and 22.30 t ha^{-1} respectively). The reduction in yield under later sowings was mainly attributed to a shortened growth duration and less favourable climatic conditions that restricted biomass accumulation and cob development. Early sowing provided a longer vegetative phase and better synchronization with climatic conditions, leading to higher productivity, as also supported by Vafa *et al*., (2013) [11].

B) Effect of Cultivars

Variations among cultivars for fresh cob and fodder yields were statistically non-significant, indicating a minimal genotypic effect under the experimental conditions. Among the cultivars, Phule Madhu produced the highest fresh cob and fodder yield (17.06 t ha^{-1} and 30.21 t ha^{-1}), followed by Sugar 75 (16.64 t ha^{-1} and 29.91 t ha^{-1}) and Mithas (15.13 t ha^{-1} and 29.46 t ha^{-1}). The narrow range of yield differences suggests that sowing time had a more prominent influence on productivity than cultivar differences.

C) Interaction effect

The interaction effects between sowing dates and cultivars on both fresh cob and fodder yields were non-significant, indicating that all cultivars exhibited similar performance trends across different sowing dates.

Table 1: Yield influnced by different treatments

Treatments	Fresh cob yield (t ha^{-1})	Fodder yield (t ha^{-1})
Times of Sowing		
1st June	20.78	37.13
15th June	17.07	32.15
1st July	14.96	27.87
15th July	12.31	22.30
S.Em.±	0.85	0.81
CD(P=0.05)	2.94	2.78
Cultivars		
Phule Madhu	17.06	30.21
Sugar 75	16.64	29.91
Mithas	15.13	29.46
S.Em.±	1.92	0.59
CD(P=0.05)	NS	NS
Interaction		
S.Em.±	3.84	1.17
CD(P=0.05)	NS	NS
G.M	16.28	29.86

Effect of different treatment on economics (GMR, NMR and B:C ratio)

A) Effect of Sowing Dates

Significant influence of sowing dates was observed on economic returns of sweet corn. Table 2 revealed that gross monetary returns, net returns, and B:C ratio were highest under 1st June sowing (244,908 ₹ ha^{-1}, 1,55,564 ₹ ha^{-1}, 2.95). Compared to this, 15th June showed reductions of 17.2%, 27.01%, and 21.7% in Gross, Net and B:C values, while 1st July recorded declines of 27.5%, 43.35%, and 28.5% and 15th July the largest at 40.6%, 63.95%, and 42.4% respectively. These declines were primarily due to reduced green cob and biological yield in later sowings, while uniform cultivation costs made early sowing more profitable. Early planting ensured efficient resource use, prolonged growth and maximum economic returns, supporting the findings of Oktem *et al.*, (2004) [7] and Mashreghi *et al.*, (2014) [6].

B) Effect of cultivars

The differences among cultivars for gross monetary return, net monetary return and B:C ratio were found to be non-significant. Numerically, Phule Madhu recorded the highest gross return (200855.00 ₹ ha^{-1}), followed by Sugar 75 (196337.50 ₹ ha^{-1}) and Mithas (180819.17 ₹ ha^{-1}). Net returns were slightly higher in Sugar 75 (105293 ₹ ha^{-1}), closely followed by Mithas (104674 ₹ ha^{-1}) and Phule Madhu (100010 ₹ ha^{-1}). Similarly, Sugar 75 recorded the highest B:C ratio (2.44), followed by Mithas (2.38) and Phule Madhu (1.99), indicating no statistically significant economic differences among the cultivars under uniform management and agro-climatic conditions.

C) Interaction effect

The interaction effects between sowing dates and cultivars on gross monetary return, net monetary return, and B:C ratio were all found to be non-significant, indicating a consistent economic response across all tested genotypes under varying sowing windows. This suggests that the advantages of early sowing and profitability trends were similarly reflected across cultivars, with no specific genotype showing a differential economic advantage for any particular planting window.

Table 2: Gross Monetary Return (Rs ha^{-1}), Net Monetary Return (Rs ha^{-1}) and B: C ratio of sweet corn as influenced by various treatments.

Treatments	Gross Monetary Return (Rs ha^{-1})	Net Monetary Return (Rs ha^{-1})	B:C ratio
Times of Sowing			
1st June	244909	155564	2.95
15th June	202883	113538	2.31
1st July	177469	88124	2.11
15th July	145421	56076	1.70
S.Em.±	9062.13	9062.13	0.11
CD(P=0.05)	31360.23	31360.23	0.38
Cultivars			
Phule Madhu	200855	100010	1.99
Sugar 75	196338	105293	2.44
Mithas	180819	104674	2.38
S.Em.±	18985.42	18985.42	0.22
CD(P=0.05)	NS	NS	NS
Interaction			
S.Em.±	37970.84	36619.27	0.43
CD(P=0.05)	NS	NS	NS
G.M	192670.56	103325.56	2.27

Conclusion

Sowing sweet corn on 1st June provided the highest yield (20.78 t ha^{-1}) and maximum economic returns with a Gross Monetary Return of ₹ 2,44,909 ha^{-1}, Net Monetary Return of ₹ 1,55,564 ha^{-1}, and B:C ratio of 2.95, outperforming later sowing dates by 17-41% in GMR and 19-59% in NMR. Uniform cultivation costs and better synchronization with favourable climatic conditions made early sowing the most profitable. Cultivar differences were statistically non-significant, though Phule Madhu had the highest cob yield. Hence, 1st June is the most suitable sowing date for sweet corn, as it ensures prolonged growth duration, better resource utilization, and maximum profitability.

Reference

1. APEDA. Export statistics of frozen sweet corn. New Delhi: Agricultural and Processed Food Products Export Development Authority; 2024.
2. FAO. Food and Agriculture Organization of the United Nations-Statistics on sweet corn production. Rome: FAO; 2022.
3. FAOSTAT. Crop production statistics: Maize global data. Rome: Food and Agriculture Organization; 2024.
4. ICAR AgriXchange. Sweet corn cultivation and marketing trends in India. New Delhi: Indian Council of Agricultural Research; 2023.
5. IIMR. Annual report 2022-23. Ludhiana: Indian Institute of Maize Research; 2023.
6. Mashreghi M, Saeed KK, Darban ARS. Effect of different planting method and plant density on yield and morphological traits of fodder maize in two planting dates. Life Science Journal. 2014;11(3):207-213.
7. Oktem A, Eulumoketem A, Coskun Y. Determination of sowing dates of sweet corn under Sanliurfa condition. Turkish Journal of Agriculture. 2004;28:83-91.
8. Rathore S, Kulkarni M, Tiwari H. Climate-resilient sweet corn cultivars for Indian conditions. Environmental and Agricultural Studies. 2023;51(4):367-375.
9. Sharma R, Singh K, Yadav M. Effect of sowing date on yield and quality of sweet corn. Journal of Agronomic Research. 2021;45(3):210-215.
10. Smith J, Anderson P. Yield response of sweet corn to sowing dates under varying rainfall conditions. American Journal of Crop Science. 2022;37(2):145-153.
11. Vafa P, Barari M, Darkhal H. Interaction of grain corn hybrids in various planting dates. International Journal of Agronomy and Plant Production. 2013;4(8):2018-2023.
12. Verma A, Deshmukh R, Kale P. Influence of sowing time on performance of sweet corn in western India. Indian Journal of Agricultural Sciences. 2020;90(6):1123-1127.