

Research Article

Growth and Yield Response of Baby Corn (*Zea Mays* L.) To Sowing Time and Crop Geometry

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Abstract

An experiment entitled “Growth and yield response of baby corn (*Zea mays* L.) to sowing periods and crop geometry” was carried out during the year 2013-14 and 2014-15 at Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.). The experiment was laid out in factorial randomized block design with three replications and twenty treatment combinations with main factor A i.e. four levels of sowing periods (i.e. Last week of Aug., Sept., Oct. and Nov.) and sub-factor B i.e. five different crop geometry (30cm × 30cm, 45cm × 15cm, 45cm × 30cm, 60cm × 15cm and 60cm × 30cm). Among the treatment combinations, it was observed that P₂S₃ (last week Sept. + 45 × 30 cm) exhibited highest number of leaves plant⁻¹ (13.63), leaf area (512.62 cm²) and LAI (3.62). Whereas the treatment combination P₂S₂ (last week Sept. + 45 × 15 cm) gives highest plant height (205.47 cm). The yield and yield attributing characters such as, number of cobs plant⁻¹ (3.43), cob weight (9.87 g) cob yield plant⁻¹ (31.64 g) were found highest in P₂S₅ (last week Sept. + 60 × 30 cm). However, P₂S₂ (last week Sept. + 45 × 15 cm) exhibited highest yield hectare⁻¹ (81.10 q).

Keywords: sowing time, crop geometry, baby corn

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Introduction

Baby corn cultivation promises to have an important role in the future of crop production due to its fresh and safe product. Cultivation of baby corn to diversify cropping patterns and to increase productivity of the cropping systems has been considered important for improving the livelihood of resource poor farmers in South Asia. This approach can fetch very high income within a quite short period i.e., 3-4 crops can be raised in year giving good profit per unit area per unit time and at the same time can generate rural employment for the rural poor. The other advantage of growing baby corn is its remaining biomass after harvesting which can be used as feed for animal and aquaculture raising [5].

Sowing time is an important factor influencing the performances of the crop since it is important for better utilization of available moisture and nutrients supplied to the crop. Maximum yield can be expected only when plant geometry allows individual plant to achieve their maximum inherent potential. In recent year baby corn has been gaining popularity among growers in India because of its several uses and advantages. However the location specific technologies are not available. Therefore agro-techniques to achieve higher production are the need of the day.

Materials and Methods

The experiment was conducted at Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.) during the year 2013-14 and 2014-15. The experiment was laid out in factorial randomized block design with three replications and twenty treatment combinations with main factor A i.e. four levels of sowing dates (last week of August, September, October and November) and sub-factor B i.e. five different spacing (30cm × 30cm, 45cm × 15cm, 45cm × 30cm, 60cm × 15cm and 60cm × 30cm). The experimental field was prepared by ploughing, removing weeds, roots, stubbles etc. and 2-3 cross harrowing. FYM @ 10 t/ha was incorporated in the soil at the time of last harrowing. Fertilizer NPK was applied @ 150:60:60 Kg ha⁻¹ in the form of urea, SSP, and MOP. Other intercultural operations like weeding, earthing up, control of pests and diseases were carried out as and when required. For recording observations, five plants were selected randomly from each plot.

Results and Discussion

Growth parameters

The different sowing periods with different crop geometry have been found to exert a significant increase on growth parameters. The treatment combination, P₂S₃ (last week Sept. + 45 × 30 cm) exhibited the highest values for almost all the growth parameters; number of leaves plant⁻¹ (13.63), leaf area (512.62 cm²) and LAI (3.62), which might be due to optimum growing period [8], better availability and utilization of resources by the plants. The number of leaves was higher at wider spacing [1, 2, 5, 7] and also the leaf area as well as LAI was reported highest under wider spacing [1, 9, 10]. Whereas the treatment combination P₂S₂ (last week Sept. + 45 × 15 cm) gives highest plant height i.e. 205.47 cm (**Table 1**). Colder soil results in slow germination and growth of the plants and delay of sowing caused decline in plant height [4] while, the tallest plant was observed at closer spacing [6]. The higher plant density at closer crop geometry leading to more severe competition for light and higher intra and inter-row competition for nutrients and water by the plants [3, 4] which coupled with the optimum sowing time, suitable growth period and favorable climatic conditions especially temperature might have resulted in maximum plant height.

Table 1 Effect of sowing time and crop geometry on growth parameters of baby corn (*Zea mays* L.)

Treatment combinations	Pooled mean			
	Plant height (cm) at harvest	No. of leaves plant ⁻¹ at harvest	Leaf area (cm) ²	Leaf area index
P ₁ S ₁	195.95	12.47	507.27	3.35
P ₁ S ₂	197.83	12.20	505.33	3.27
P ₁ S ₃	193.43	12.87	511.05	3.53
P ₁ S ₄	195.88	12.40	508.67	3.31
P ₁ S ₅	193.57	12.97	511.65	3.51
P ₂ S ₁	198.62	12.70	507.68	3.47
P ₂ S ₂	205.47	12.57	505.57	3.34
P ₂ S ₃	196.55	13.63	512.62	3.62
P ₂ S ₄	198.78	12.70	508.75	3.44
P ₂ S ₅	194.25	13.20	511.77	3.61
P ₃ S ₁	197.50	12.57	507.50	3.43
P ₃ S ₂	198.85	12.33	505.47	3.30
P ₃ S ₃	194.12	12.97	511.80	3.58
P ₃ S ₄	195.02	12.50	508.50	3.41
P ₃ S ₅	191.97	12.90	511.72	3.56
P ₄ S ₁	193.52	12.30	507.40	3.37
P ₄ S ₂	195.60	12.00	505.57	3.29
P ₄ S ₃	190.52	12.70	511.58	3.53
P ₄ S ₄	192.53	12.27	508.62	3.32
P ₄ S ₅	189.85	12.67	511.52	3.52
F test	Sig.	Sig.	Sig.	Sig.
SE(m) _±	0.812	0.092	0.125	0.007
CD at 5%	2.324	0.263	0.358	0.021

Yield parameters and yield

The yield parameters; number of cobs plant⁻¹ (3.43) and cob weight with husk (53.34 g) were found highest in P₂S₅ (last week Sept. + 60 × 30 cm). While the treatment combination P₂S₃ (last week Sept. + 45 × 30 cm) recorded maximum cob weight without husk (9.87 g). Regarding yield of baby corn, the treatment combination P₂S₅ (last week Sept. + 60 × 30 cm) exhibited the highest cob yield plant⁻¹ with husk (186.53 g) and without husk (31.64 g). However, on account of higher plant population under the closer crop geometry, the treatment P₂S₂ (last week Sept. + 45 × 15 cm) recorded the highest yield hectare⁻¹ with husk (445.01 q ha⁻¹) and without husk 81.10 q ha⁻¹ (**Table 2**). The higher yield under closer crop geometry was also reported by [2].

Table 2 Effect of sowing time and crop geometry on yield parameters and yield of baby corn (*Zea mays* L.)

Treatment combinations	Pooled mean						
	No. of cobs plant ⁻¹	Cob wt. (g)		Yield plant ⁻¹ (g)		Yield ha ⁻¹ (q)	
		with husk	without husk	with husk	without husk	with husk	without husk
P ₁ S ₁	2.50	46.61	8.62	116.42	21.53	362.21	66.98
P ₁ S ₂	2.43	46.38	8.30	112.77	20.19	417.67	74.77
P ₁ S ₃	2.70	51.26	8.96	138.33	24.20	307.39	53.78
P ₁ S ₄	2.57	46.50	8.11	119.31	20.81	353.50	61.66
P ₁ S ₅	2.83	52.22	8.89	147.85	25.15	262.84	44.71
P ₂ S ₁	2.73	47.28	8.76	129.17	23.93	401.87	74.46
P ₂ S ₂	2.57	46.86	8.53	120.15	21.90	445.01	81.10
P ₂ S ₃	3.17	53.41	9.87	169.14	31.27	375.87	69.49
P ₂ S ₄	2.77	46.90	8.46	129.72	23.40	384.37	69.35
P ₂ S ₅	3.43	54.34	9.22	186.53	31.64	331.62	56.24
P ₃ S ₁	2.67	46.95	8.68	125.15	23.14	389.34	72.01
P ₃ S ₂	2.50	46.86	8.43	117.09	21.08	433.66	78.06
P ₃ S ₃	2.90	52.88	9.17	153.29	26.59	340.64	59.08
P ₃ S ₄	2.73	46.96	7.88	128.32	21.56	380.20	63.87
P ₃ S ₅	3.00	51.56	8.99	154.65	26.96	274.93	47.94
P ₄ S ₁	2.63	45.09	8.11	118.70	21.36	369.28	66.44
P ₄ S ₂	2.47	43.22	7.80	106.55	19.24	394.62	71.25
P ₄ S ₃	2.83	45.75	8.66	129.58	24.54	287.95	54.53
P ₄ S ₄	2.70	43.64	8.02	117.77	21.64	348.96	64.11
P ₄ S ₅	2.90	45.36	8.66	131.47	25.09	233.73	44.61
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m) _±	0.046	0.454	0.093	1.657	0.274	4.250	0.798
CD at 5%	0.133	1.300	0.266	4.744	0.786	12.167	2.285

Conclusion

From the results it may be concluded that, sowing of baby corn at last week of September with crop geometry 45 × 30 cm increase almost all the growth and yield parameters, while the crop geometry 45 × 15 cm results highest yield of baby corn under Akola condition. However further studies are needed to optimize the specific time of sowing and crop geometry.

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