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Research Communication

Performance of baby corn varieties under varying planting geometry

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ABSTRACT

A field experiment was conducted during the winter seasons of 2014–15 at PJTSAU, Hyderabad to identify a suitable baby corn variety and optimum geometry for Southern Zone of Telangana. Treatments were laid out in randomized block design with factorial concept consisting of three baby corn varieties ('30V92', 'Seed Tech-740' and 'VL-42') along with four planting geometries (45 cm × 15 cm, 45 cm × 20 cm, 60 cm × 10 cm and 60 cm × 15 cm) and replicated thrice. The results of the experiment revealed that baby corn yield was 56% higher in VL-42 with 45 cm x 15 cm over Seed Tech-740 at the same spacing. Contrastingly, cost of cultivation was highest with VL-42 under the planting geometry of 60 cm x 10 cm, whereas net returns and benefit cost ratio were highest in VL-42 with 45 cm x 15 cm. The study showed that VL-42 with a population of 1,48,148 plants /ha is a viable option for growing baby corn on sandy loam soils of Southern Zone of Telangana.

Key words: Baby corn, Cob:corn ratio, Corn yield, Net returns, Plant population, Planting geometry

Among the different forms of corn, baby corn is predominantly grown for vegetable purpose in India and the world. It is a well-known cereal-vegetable in USA, Europe and some Asian countries. In India, maize is grown in 9.4 M ha area with a production and productivity of 24.3 million tonnes and 2,583 kg/ha respectively (Directorate of Economics and Statistics, 2014). Baby corn has medium plant type and provides green ears within 65–75 days after sowing, thereby field duration could be reduced by 45–55 days compared to grain corn (Neginal, 2015). Its earliness facilitates crop diversification, increases overall cropping intensity in a year and fetches higher profitability to the farmers. One can take 3-4 crops in a cropping year under irrigated condition and the quality of its fodder is comparable to maize fodder crop (Pandey *et al.,* 2000). With the growing demand of baby corn in the urban areas, production potential of baby corn shows increase which creates a greater opportunity to augment the income of the farming community dwelling in the outskirts of big cities and metropolis. So, the farmers' preference to baby corn and its increasing cultivation has necessitated the standardization of agro-techniques for higher production and ultimately higher income to the farmers. Since there is limited scope to increase the area under baby corn cultivation due to competition from other cereals and commercial crops, the only alternative to produce more is through enhancement of productivity by various management factors.

A short duration cultivar suitable for Southern region of Telangana with slender and upright architecture, easy to fit in narrow row spacing that yields more number of cobs per plant needs to be identified as most of the existing varieties are introduced from North India. Variations in planting geometry affects the corn yield more than any member of the grass family due to its low tillering ability (Vega *et al*., 2001). Yield maximization can be achieved only when the plant population exercises optimum pressure on the available resources, viz. soil nutrients, moisture and light. Determination of optimum plant density for a given variety not only reduces the cost of production but also enhances the productivity. Though the spacing requirements of grain and fodder corn are well defined, such studies are scanty in baby corn.

Keeping these facts in view, the present investigation was carried out to study the performance of baby corn varieties under varying planting geometry. The soil of the experimental site was sandy loam in texture, low in available nitrogen (257.4 kg/ha), medium in available phosphorus (26.3 kg/ha) and high in available potassium (268.2 kg/ha). The experiment was laid out in a randomized

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block design with factorial concept. Three varieties ('30V92', 'Seed Tech-740' and 'VL-42') along with four planting geometries (45 cm × 15 cm, 45 cm × 20 cm, 60 cm × 10 cm and 60 cm × 15 cm) were accommodated and replicated thrice. 30V92 (single cross hybrid) while Seed Tech-740 (double cross hybrid) were tested against VL-42. The common fertilizer schedule adopted for all the treatments was 180, 60 and 60 kg/ha of N, P_2O_5 and K_2O respectively. Full dose of phosphorus and potassium were applied as basal in the form of DAP and MOP respectively. Nitrogen in the form of urea after calculating the proportion supplied through DAP was applied in three splits as per schedule, i.e. one-third N as basal, one-third N at 30 days after sowing (DAS) and remaining 1/3rd N at 55 DAS. Weeds were controlled through pre-emergence application of atrazine (1.5 kg a.i./ha). Harvesting of cobs was completed within 2–3 days of silking. Harvesting of 30V92 and Seed Tech-740 started at 76 and 75 DAS, respectively, while VL-42, harvesting was done at 55 DAS. The weight of cobs and corns from each net plot (3.6 m x 2.4 m) was recorded in tonnes and expressed in tonnes/ha. After removal of cobs from the plants, the green fodder was harvested and weight was recorded from net plots. The net monetary return was worked out on the basis of cob yield and green biomass yield. The prevailing market price of cob (₹25/kg) and green fodder (₹1.5/kg) were considered. The observations recorded during the course of investigation were tabulated and analysed statistically to draw a valid conclusion. SPSS 17.0 statistical software was used for the standard analysis of variance (ANOVA) test to compare the treatment means. Treatment means were compared at the 5% level of significance ($P < 0.05$) using least significant difference.

Corn yield differed significantly among the three varieties of baby corn (Table 1). Higher yield was observed in VL-42 followed by 30V92 and SeedTech-740. Increase in corn yield in VL-42 over 30V92 and Seed Tech-740 was 36% and 27% respectively. Variation in yield among the varieties was due to significant differences in the number of cobs/plant (data not presented). 'VL-42' had significantly higher number of cobs/plant, resulting in higher yield. Varying planting geometry showed marked differences in yield of baby corn. Planting geometry of 45 cm × 15 cm with 1,48,148 plants/ha resulted significantly higher corn yield followed by 60 cm × 10 cm with 1,66,666 plants/ha. The increase in yield could be due to regulation of the plant population to an optimum level which is essential to exploit the yield potential by allowing inter and intra row spacing competitiveness without any detriment to total output (Meena *et al*., 2017). Normally, the cob yield/plant decreases with increase in plant density but decrease in yield will be compensated by increased plant population and the reverse was true with low plant population. Acute competition for resources with the increase in planting density decreased the cob and corn weight/plant which could not be compensated even through the increase in plant population. However, interaction between varieties and planting geometry was found significant (Table 2). Significantly higher corn yield was observed in VL-42 with a spacing of 45 cm × 15 cm (2.8t/ha).

Table 1. Corn yield, cob: corn ratio, green fodder yield and economics of baby corn varieties as influenced by varying planting geometry

Treatment	Corn yield (t/ha)	Cob: corn ratio	Green fodder yield (t/ha)	Cost of cultivation (× 10^3 ₹/ha)	Net return (× 10^3 ₹ /ha)	Benefit: cost
Variety						
30V92	1.8	2.43	35.7	43.6	69.5	2.58
Seed Tech-740	1.6	2.51	28.5	38.3	68.7	2.78
VL-42	2.4	2.48	27.6	46.0	108.0	3.34
SEm±	0.3	0.01	0.5	-	0.9	-
CD (P=0.05)	0.8	0.03	1.4	-	2.8	-
Planting geometry						
45 cm × 15 cm	2.2	2.41	35.5	43.2	94.4	3.17
45 cm × 20 cm	1.8	2.50	24.7	42.1	74.0	2.75
60 cm × 10 cm	1.9	2.55	39.8	43.4	87.7	3.01
60 cm × 15 cm	1.8	2.49	22.4	42.1	71.9	2.69
SEm±	0.3	0.02	0.6	-	0.9	-
CD (P=0.05)	0.9	0.04	1.6	-	2.8	-
V × S Interaction						
SEm±	0.6	0.04	1.0	-	1.9	-
CD (P=0.05)	1.6	NS	2.8	-	5.6	-

NS, non-significant

Among the yield parameters, cob:corn ratio was observed to be higher in ‘Seed Tech 740’ (Table 1). Higher vegetative growth and less vigorous reproductive growth led to increased husk production leading to significantly higher cob:corn ratio in ‘Seed Tech 740’ (Pandey *et al*., 2002). Significantly higher cob:corn ratio was observed with the spacing of 60 cm × 10 cm. Aravinth *et al*. (2011) also reported decrease in cob:corn ratio with the increase in plant population. Significantly higher green fodder yield was recorded in ‘30V92’. Taller plants coupled with more number of leaves (14.09) at harvest, higher leaf area index (5.27) and dry matter production (9.2 t/ha) resulted in significantly higher green fodder yield in ‘30V92’ (Pandey *et al*., 2002). Significantly higher green fodder yield was obtained from the planting geometry of 60 cm × 10 cm. Higher green fodder yield with narrow planting geometry of 60 cm × 10 cm was due to higher number of plants/ha (1,66,666/ha). Similar finding was reported by Sobhana *et al*. (2012). 30V92 with planting geometry of 60 cm × 10 cm resulted significantly higher green fodder yield over VL 42 with the planting geometry of 60 cm × 15 cm (Table 2).

Cost of cultivation was highest for ‘VL-42’ followed by ‘30V92’. Gross returns, net returns and benefit: cost ratio were higher in ‘VL-42’. Significantly higher cob yields led to higher net returns in ‘VL-42’ (Sobhana *et al*., 2012). Among the planting geometries cost of cultivation was highest for the spacing of 60 cm × 10 cm because of higher plant population and in turn higher seed rate. Net returns differed significantly among the varying planting geometry. Net returns and benefit : cost ratio were higher with the planting geometry 45 cm × 15 cm whereas 60 cm × 15 cm gave lower net returns. Significantly higher net returns and benefit–cost ratio was reported by Golada *et al*., 2013 with the planting geometry of 45 cm × 15 cm due to higher cob yield than other planting geometries. Net returns were higher in VL-42 (45 cm × 15 cm) whereas lower net return was noticed in Seed Tech 740 (60 cm × 15 cm) (Table 2).

On the basis of present study, it can be concluded that higher baby corn yield with higher net returns and benefit: cost ratio can be obtained from ‘VL-42’ with a spacing of 45 cm × 15 cm.

Table 2. Interaction effect of varieties and planting geometry on corn yield, green fodder yield and net returns of baby corn

Treatment	Corn yield (t/ha)					Green fodder yield (t/ha)					Net returns (×10^3 ₹/ha)				
	45 cm × 15 cm	45 cm × 20 cm	60 cm × 10 cm	60 cm × 15 cm	Mean	45 cm × 15 cm	45 cm × 20 cm	60 cm × 10 cm	60 cm × 15 cm	Mean	45 cm × 15 cm	45 cm × 20 cm	60 cm × 10 cm	60 cm × 15 cm	Mean
30V92	2.0	1.7	1.8	1.7	1.8	41.1	28.4	48.2	25.3	35.7	78.1	63.8	74.7	61.1	69.5
Seed Tech-740	1.8	1.5	1.6	1.5	1.6	34.1	24.3	33..2	22.1	28.5	70.1	61.2	75.4	58.9	68.7
VL-42	2.8	2.2	2.6	2.1	2.4	27.6	20.8	38.5	19.8	27.6	125.9	97.0	113.1	95.8	108.0
Mean	2.2	1.8	2.0	1.8		35.5	24.7	39.8	22.4		94.4	74.0	87.7	71.9	
	SEm±		CD (P=0.05)			SEm±		CD (P=0.05)			SEm±		CD (P=0.05)		
V × S	0.61		1.6			1.0		2.9			1.9		5.6		

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