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Yield assessment of sweet corn cv. Sugar-75 in coastal agro-ecosystem of Odisha, India

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ABSTRACT

Front line demonstration of sweet corn cv. Sugar-75 was conducted at Gokarnapur village of Digapahandi block of Ganjam district to assess its productivity in coastal plain zone of Odisha. The study comprised of 10 farmers in cluster approach during *kharif* 2023 and 2024 was undertaken by Krishi Vigyan Kendra, Ganjam-II, Berhampur, Odisha. Observation on growth and yield parameters were recorded, and economic analysis was done. The final seed yield was recorded after harvest, and the gross return was calculated based on the prevailing market price.The results from the study conclusively proved that demonstration of the sweet corn variety Sugar 75 recorded higher green cob yield 144.0 q ha^1 as compared to farmers practice of normal maize 42.5 q ha^{-1}. The enhancement in the demonstration yield over farmer's practices turned into 238%. By conducting front-line demonstrations on sweet corn in large scale in farmers field will increase the income level of farmers and improve the livelihood condition of the farming community.

Key words: Early-maturing, hybrid, resilient, sweet corn

INTRODUCTION

Sweet corn *(Zea mays* var. *saccharata)* is a highly valued crop due to its sweet taste and good source of vitamin C and A. The variety produces uniform, medium-to-large cobs with bright golden-yellow kernels that are tender, sugary, and retain sweetness for a longer duration after harvest. It is suitable for cultivation under diverse agro-climatic conditions, showing good tolerance to major pests and diseases. With a yield potential of 17-20 t ha^{-1}, Sugar-75 has emerged as a profitable crop for farmers, especially in peri-urban and commercial farming systems. Harvested green stalks are highly succulent, palatable and digestible for feeding. Hence, it is called as king of fodder. Its increasing demand in fresh markets, food processing, and export makes Sugar-75 an ideal variety to ensure both nutritional security and enhanced farm income (Singh et al., 2020).

Keeping its popularity, authors studied the performance of high-yielding sweet corn cv. Sugar-75 incomparison to local maize, focusing on yield attributes, profitability and consumer acceptability through front line demonstration in the existing farming situation for substitution of local maize.

MATERIALS AND METHODS

The study was conducted through front line demonstration during the *kharif* seasons of 2023 and 2024 in Gokarnapur village of Digapahandi block of Ganjam district in the east and southeastern coastal plain of Odisha state with an objective to evaluate the performance of the sweetcorn cv. Sugar-75. The experimental site was situated at 19° 37' 15.158" N latitude and 84° 57' 25.234"E longitude, with an average elevation of 26m above sea level. The region experiences a specific climate, with average rainfall of 1276.2 mm during the study period (June

to September). The mean maximum and minimum temperatures observed were 39°C and 18.9°C, respectively. The soil of the experimental site is slightly acidic in reaction (pH: 5.6), sandy loam texture with organic carbon content 0.48%, low in nitrogen 135.5 kg ha^{-1}, low in phosphorus 15.1 kg ha^{-1} and medium in potassium 168.4 kg ha^{-1} contents. The observations were recorded from demonstration plots and farmers' field, covering growth and yield parameters such as plant height, no. of cobs per plant, cob length (cm), green cob yield (q ha^{-1}), and grain yield at maturity stage and the gross returns (Rs ha^{-1}) were calculated based on the prevailing market prices of the produce. Similar methods were also undertaken earlier by Shah et al., 2013 and Bijlwan et al., 2020. Harvest index is the relationship between economic yield and biological yield. It was calculated by using the following formula.

$$\text{Harvest Index}(\%) = \frac{\text{Economic yield}}{\text{Biological yield}} \times 100$$

RESULTS AND DISCUSSION

Front line demonstrations were taken up to assess the yield potential in the farmers' fields. Under the study, both normal maize and Sugar-75 varieties were taken in adjacent plots of the village. Local maize was demonstrated with traditional cultivation practices e.g. more seed rate (15 kg ha^{-1}), no seed treatment, broadcasting, manual weeding at 45 DAS with improper fertilizer application per ha where as in the demonstrated technologies, besides hybrid sweet corn Sugar - 75, other important cultivation practices like proper seed rate, seed treatment with *Trichoderma viride* and *Pseudomonas fluorescens,* line sowing, proper fertilizer and weed managements were taken as indicated in Table 1.

Table 1. Comparison between farmers' practice and demonstrated technologies

Sl. No.	Particulars	Farmers practice	Tested technology
1	Variety	Normal grain maize (starchy, used for grain purpose)	Sweet corn hybrid Sugar-75 (grown for tender, sweet cobs)
2	Seed rate	25 kg ha^{-1}	Recommended (10-12 kg ha^{-1})
3	Seed treatment	No seed treatment	*Trichoderma viride* @ 4 g kg^{-1} seed and *Pseudomonas fluorescens* @ 10 g kg^{-1} seed
4	Method of sowing	No proper spacing	Row-to-row: 60-75 cm, Plant-to-plant: 20-25 cm
5	Fertilizer application	Unbalanced dose of fertilizer	NPK (120: 60: 40 kg ha^{-1}) 0.5 % ZnSO4 sprayed 2-3 times at 15 days interval and 0.2 % Borax solution sprayed at tasselling and silking stage
6	Weed management	Manual weeding at 40- 50 DAS	Pre-emergence application of Atrazine 1.0-1.5 kg a.i. ha^{-1} at 2 DAS and post emergence application of Tembotrione 120 g a. i.ha^{-1} at 20 DAS

The major differences between the demonstrated package and farmers' practice were observed as recommended varieties, seed treatment, soil test-based fertilizer application and weeding. Similar procedures were also followed by Banotra et al., 2017 and Lone et al., 2022. These are the primary cultivation practices for any field crop to get higher yield. Fig.1 indicates the higher yield potential of the demonstrated practice.

Fig. 1. Taking observation on number of grains per cob

Table 2. Effect of different treatments on growth and yield parameters (1st Year)

Treatments	Plant height (cm)	No. of cobs/ plant	No. of grains/ cob	Weight of cob (g)	Green cob yield (q ha^{-1})	Grain yield (q ha^{-1})
Farmer's practice (Common maize)	132.8	1.14	229.5	141.6	40.4	28.5
Improved practice (Sweet corn cv. Sugar 75)	143.4	1.71	424.6	274.3	136.8	44.0

Table 3. Effect of different treatments on growth and yield parameters (2nd Year)

Treatments	Plant height (cm)	No. of cobs/ plant	No. of grains/ cob	Weight of cob (g)	Green cob yield (q ha^{-1})	Grain yield (q ha^{-1})
Farmer's practice (Common maize)	146.8	1.26	253.7	156.6	44.6	31.5
Improved practice (Sweet corn cv. Sugar 75)	158.4	1.89	469.2	303.1	151.2	48.6

Table 4. Effect of different treatments on growth and yield parameters (Pooled data of 2 years)

Treatments	Plant height (cm)	No. of cobs/ plant	No. of grains/ cob	Weight of cob (g)	Green cob yield (q ha^{-1})	Grain yield (q ha^{-1})
Farmer's practice (Common maize)	139.8	1.20	241.6	149.1	42.5	30.0
Improved practice (Sweet corn cv. Sugar 75)	150.9	1.80	446.9	288.7	144.0	46.3

Table 2-4 revealed the differences in growth and yield attributes of maize under different management practices during both years of experimentation. The improved practice (Sweet corn cv. Sugar 75) recorded the highest plant height (150.9 cm), number of cobs per plant (1.80), number of grains per cob (446.9), cob weight (288.7 g), green cob yield (144.0 q ha^{-1}), and grain yield (46.3 q ha^{-1}), which were markedly superior to the farmer's practice (common maize). It corroborates with the findings of Jayesh et al., 2020 and Charan et al., 2010. Fig. 2 shows the higher productivity in the demonstrated variety than the local one.

Fig. 2. Harvesting from the demonstration plot

Table 5. Economics of the assessed varieties (Average pooled data over 2 years)

Treatments	Cost of cultivation (Rs ha^{-1})	Gross return (Rs ha^{-1})	Net return (Rs ha^{-1})	B: C	Harvest index
Farmer's practice (Local maize)	32000	91200	59200	2.8	38.7%
Improved practice (Sweet corn cv. Sugar 75)	52000	175000	123000	3.3	44.5%

Table 5 reveals the economics of both the technologies tested in farmer's field. Sweet corn generated much higher gross returns (Rs 1,75,000 ha^{-1}) than local maize (Rs. 91,200 ha^{-1}) due to higher yield and market price. Sweet corn yielded a net return of Rs. 1,23,000 ha^{-1} nearly double that of local maize (Rs.59,200 ha^{-1}). Similar economic benifits have also been reported by Mahajan et al., 2017 and Khan et al., 2009. The BC ratio in the local cultivation practices was only 2.8. A higher harvest index (44.5%) in sweet corn suggests better partitioning of dry matter into economic yield compared to local maize (38.7%). It corroborates the findings of Bhadu et al., 2017.

CONCLUSION

The demonstration of sweet corn cv. Sugar-75 clearly established its superiority over local maize. While normal maize requires a longer duration, produces mainly starchy grains with low market demand, and gives comparatively low returns, Sugar-75 proved to be an early-maturing (75-80 days), high-yielding (14-15 t ha^{-1}green cobs), and nutritionally superior variety. Its tender, golden-yellow, sugary kernels are highly preferred in urban fresh markets and by food processing industries, fetching a premium price compared to normal maize. Farmers also benefit from higher fodder yield and assured marketability.Thus, the adoption of Sugar-75 not only ensures better profitability and quicker returns but also contributes to nutritional security and diversification of maize-based farming systems.

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