

EFFECT OF PIT AND FLAT PLANTING SYSTEMS ON THE YIELD OF AUTUMN SUGARCANE

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Studies pertaining to the effect of pit and flat planting systems on the yield and quality of autumn sugarcane were conducted at the Postgraduate Agricultural Research Station (PARS), University of Agriculture, Faisalabad. The different planting treatments comprised 60 cm apart single rows, 90 cm apart double row strips, 90 cm apart tripple row strips, 90 cm apart four row strips, 120 cm apart four row strips and 100 cm apart 100 x 100 cm block pits. The experiment was laid out in a randomised complete block design with four replications. The variety used was COJ-64. The crop was planted on October 7, 1988 and harvested on December 2, 1989. The highest number of millable cane/m² (12.77) was recorded in case of 100 cm apart 100 x 100 cm pit planting system as compared to the lowest of 9.34 for 90 cm apart double row strip planting system.

INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is an important sugar crop grown in Pakistan. It plays a vital role in speedy development and industrialisation of our country. It provides basic material for sugar industry which is second to textile. In Pakistan, it is grown on an area of 8200 thousand hectares with total annual production of 35 million tonnes of cane giving an average of 42,250 kg ha⁻¹ (FAO, 1990) which is below the yield potential of our existing varieties of sugarcane.

To enhance yield ha⁻¹, an appropriate planting technology has been evolved which has displayed a great promise towards increasing sugarcane yield to its maximum as compared to its conventional method of planting. The present study was therefore, planned to test and compare the pit planting technology with the flat planting system under irrigated conditions at Faisalabad.

MATERIALS AND METHODS

Studies pertaining to the effect of pit and flat planting systems on the yield of autumn sown sugarcane were carried out at the Agronomic Research Area (PARS), University of Agriculture, Faisalabad during the year, 1988-89. The experiment was laid out in randomized complete block design with four replications using a normal plot size. The sugarcane variety COJ-64 was used as a test crop and treatments included in the experiment were as under:

- T1 = 60 cm apart single rows
- T2 = 90 cm apart double row strips
- T3 = 90 cm apart tripple row strips
- T4 = 90 cm apart four row strips
- T5 = 120 cm apart four row strips
- T6 = 100 cm apart 100 x 100 cm pits

Pits were dug to a depth of 60 cm and then again filled up to the level of 45 cm with the same soil alongwith 4-5 kg of

well-rotten farm yard manure per pit well-mixed with the soil. The irrigation water was applied to the pit through basin irrigation system, while to the flat planted plots by flood irrigation. Pits were dug at zero tillage and no hoeing and earthing up was done to the pit planted sugarcane, while flat planted crop was given normal tillage operations including hoeing and earthing up. The crop was sown on October 7, 1988 and harvested on December 2, 1989.

A basal dose of 150-100-100 kg NPK ha⁻¹ was applied in the form of urea, S.S.P. and S.O.P., respectively. Full dose of phosphatic and potash fertilisers alongwith half of the nitrogen were applied at sowing, while the remaining half of the nitrogen was top-dressed at the completion of tillering before earthing up and 20 irrigations were given in all to meet the water requirements of the crop. The yield components studied were such as number of millable canes/m², cane length (m), cane diameter (cm), weight/cane (kg) and stripped cane yield/plot/ha (t).

dom from each plot. Cane diameter was measured with the help of Vernier calliper from bottom, mid and top portion of individual cane and then the average was calculated, while cane length was measured with the help of a meter rod. The data collected were analysed statistically by using Fisher's analysis of variance technique and the difference among the treatment means was compared by LSD at 0.05 probability level (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The final yield of sugarcane crop was mainly determined by the final cane density per unit area. The results given in Table 1 revealed highly significant difference among various planting systems under study. The highest number of millable canes (12.77 m⁻²) was recorded in 100 cm apart 100 x 100 cm pits which was statistically equal to 90 cm apart row strip planting system (11.74 m⁻²). The differences among rest of the planting treatments were, however, found to be non-

Table 1. Analysis of variance

Treatments	Individual comparison of treatment means				
T ₁ = 60 cm apart single rows	9.71 b	2.30 a	2.34	1.01 ab	98.52 b
T ₂ = 90 cm apart double row strips	9.34 b	2.43 a	2.38	1.10 a	102.48
T ₃ = 90 cm apart tripple-row strips	9.95 b	2.31 ab	2.26	0.99 b	98.44 b
T ₄ = 90 cm apart four row strips	11.74 a	2.17 b	2.17	0.82 c	95.55 b
T ₅ = 120 cm apart four strips	9.98 a	2.35 a	2.26	0.97 b	96.73 b
T ₆ = 100 cm apart 100 x 100 cm pits	12.77 a	2.40 a	2.22	0.94 b	120.26 a

Any two means not sharing a letter differ significantly at 5% level of probability.

For recording the individual observations on cane length, cane diameter and weight/cane, ten canes were selected at ran-

dom from each plot. These findings were quite similar to those reported by Fasihi *et al.* (1974).

The length of a cane contributes ma-

terially towards the final cane yield ha^{-1} . There were significant differences among the different planting systems in respect of cane length. Sugarcane planted in the pattern of 90 cm apart four row strips produced significantly smaller canes (2.17 cm) than all the rest of the planting treatments which were similar to one another and produced cane with an average length of 2.31 to 2.43 m. These findings are in agreement with those reported by Faqeer (1986).

Cane diameter as affected by significant planting systems did not show significant differences. The average cane diameter, however, ranged between 2.17 and 2.38 cm. It could be attributed to almost uniform growth pattern of the plants under various planting systems. Results reported by Kanwar and Sharma (1974) supported these findings.

Weight cane $^{-1}$ has a direct bearing on the final cane yield ha^{-1} and is a function of its length and thickness. Significant differences among various planting treatments with regard to weight cane $^{-1}$ were observed. Sugarcane planted in 90 cm apart double row strips gave significantly higher weight cane $^{-1}$ (14.10 kg) than with rest of the treatments but was on par with the treatment of 60 cm apart single rows (1.01 kg). The differences among the treatments of 90 cm apart three row strips, 120 cm apart four row strips and 100 cm apart 100 x 100 cm on pits were non-significant. However, the lowest weight cane $^{-1}$ (0.82 kg) was recorded in case of sugarcane planted in 90 cm apart four row strips which gave relatively poor growth in case of canes growing in the central two rows of the strips. Similar results were also reported by Urgal (1966).

The final cane yield ha^{-1} is a function of integrated interplay of the genetic and the environmental factors. The data showed that there were highly significant differences among various planting treatments. sugar-

cane planted in 100 cm apart 100 x 100 cm pits on account of greater number of millable canes per unit area gave significantly higher cane yield of 120.26 tonnes ha^{-1} than all the rest of the treatments which on an average yielded 95.55 to 102.48 tonnes of cane ha^{-1} . From the above mentioned results it is concluded that the highest number (12.77) of millable cane/ m^2 was recorded in case of 100 cm apart 100 x 100 cm pit planting system as compared to the lowest of 9.34 for 90 cm apart double row strips planting system.

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