

EFFECT OF PLOUGHING DEPTH UNDER VARYING IRRIGATION REGIMES ON SPRING PLANTED SUGARCANE

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Abstract

An experiment to evaluate the performance of sugarcane under varying ploughing depth and irrigation coefficients was conducted at Farm area, Sugarcane Research Institute, Faisalabad during 2011-12. The trial was laid out in randomized complete block design with split plot arrangement keeping irrigation coefficients (1.0, 0.8 and 0.6) in main plots and ploughing depths (6, 12, 18 and 24 inches) in sub plots with net plot size of 7.2 m × 7 m. All other agronomic practices were kept unchanged. Irrigations were applied according to the treatments after formative stage of crop on the basis of cumulative pan evaporation. It was observed that as the water stress was imposed, the cane count, cane yield and sugar yields were reduced accordingly. Ploughing depth of 24 inches has significantly excelled in tillers plant⁻¹, cane count, cane and sugar yield over the rest.

Introduction

- ▶ Sugarcane
 - the 2nd important cash crop of Pakistan
 - area of 1.07 million hectares
- ▶ Pakistan ranks
 - 5th in area and sugarcane production
 - 8th in sugar production.
- ▶ The average yield and recovery?
- ▶ The major reasons of this low yield are
 - less plant population
 - conventional planting techniques
 - poor land preparation

- planting of unapproved varieties and
- scarcity of irrigation water etc.
- ▶ Most of our farmers prepare the land up to the depth of 6 " with cultivator
- ▶ Sugarcane is a deep rooted crop which requires land preparation to a depth of 18-24"
- ▶ Deep ploughing increases
 - The penetration of the root into the soil and
 - the root surface area
- ▶ Resultantly
 - saving of water in deep layers of soil
 - improves tolerance against lodging and drought
 - improves the growth of crop by increasing cane length, cane girth and finally the yield of the crop.

Keeping this in view, the present study was conducted with the objective to find out the most suitable ploughing depth that combats the ill effects of drought on growth, yield and recovery of sugarcane.

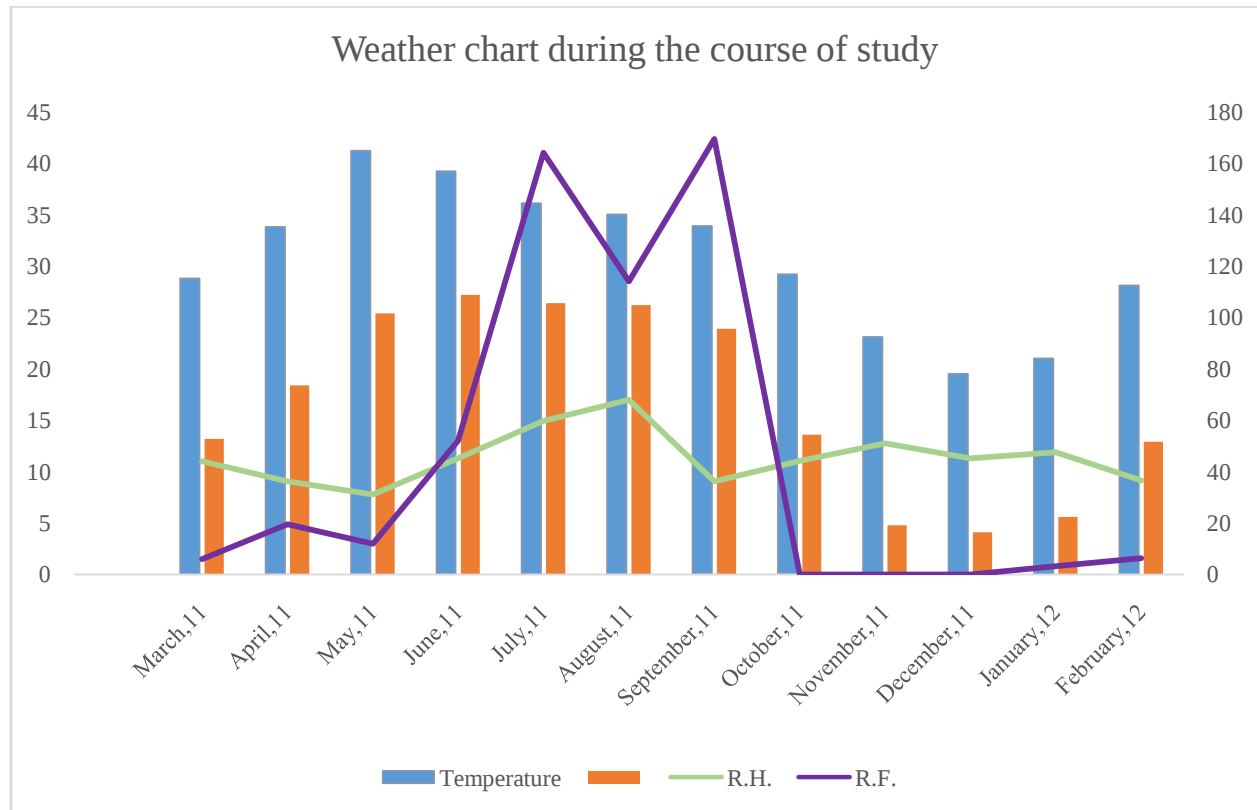
Materials and methods:

- | | |
|----------------------------|--|
| ▶ Site: | Farm area, Sugarcane Research Institute, Faisalabad |
| ▶ Lay out : | RCBD with split plot arrangement |
| ▶ Plot size: | 8m × 7.2m |
| ▶ Seed rate: | 50,000 TBS ha⁻¹ |
| ▶ Fertilizer rate: | 168-112-112 NPK Kg ha⁻¹ |
| ▶ Date of planting: | 07-03-2011 |
| ▶ Test Variety: | CPF 246 |

Treatments:

- ▶ **Main Plot: Irrigation**
 - ▶ **I₁: 1.0 Coefficient (irrigation after 4 inches of cumulative pan evaporation)**
 - ▶ **I₂: 0.8 Coefficient (irrigation after 5 inches of cumulative pan evaporation)**
 - ▶ **I₃: 0.6 Coefficient (irrigation after 6.67 inches of cumulative pan evaporation)**
- ▶ **Sub Plot: Ploughing Depth**
 - ▶ **P.D.₁: 6 inches (Cultivator)**
 - ▶ **P.D.₂: 12 inches (Chisel plough)**
 - ▶ **P.D.₃: 18 inches (Subsoiler)**

► **P.D.₄: 24 inches (Subsoiler)**



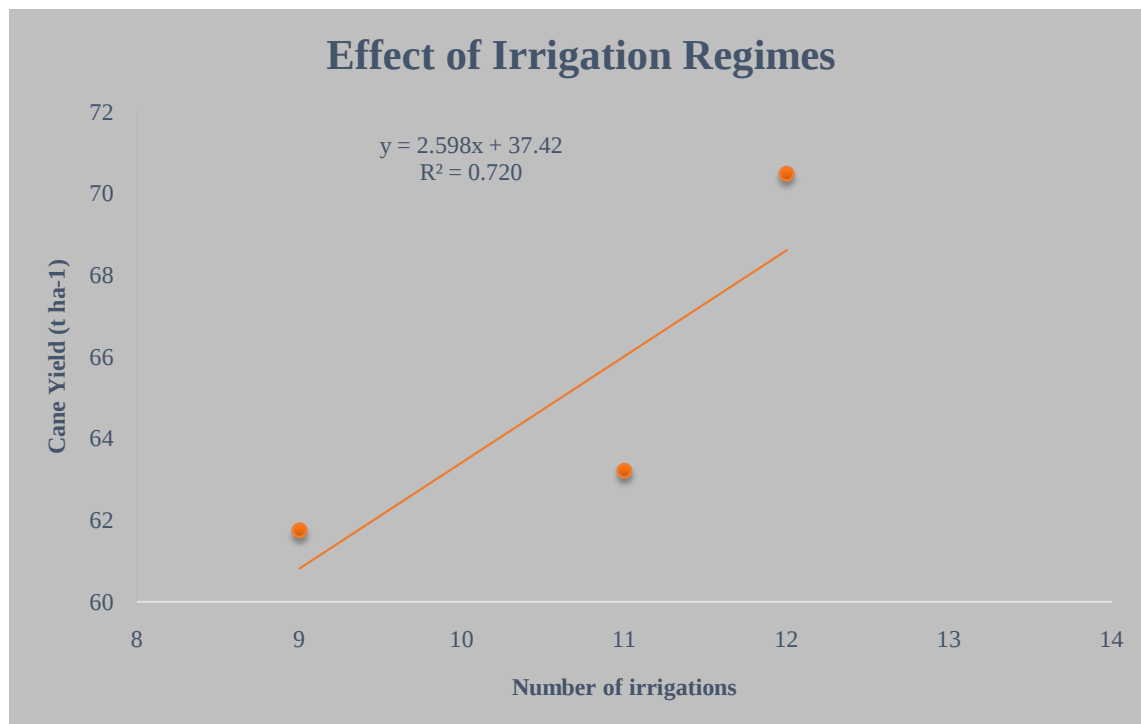
Number of irrigations and rain fall

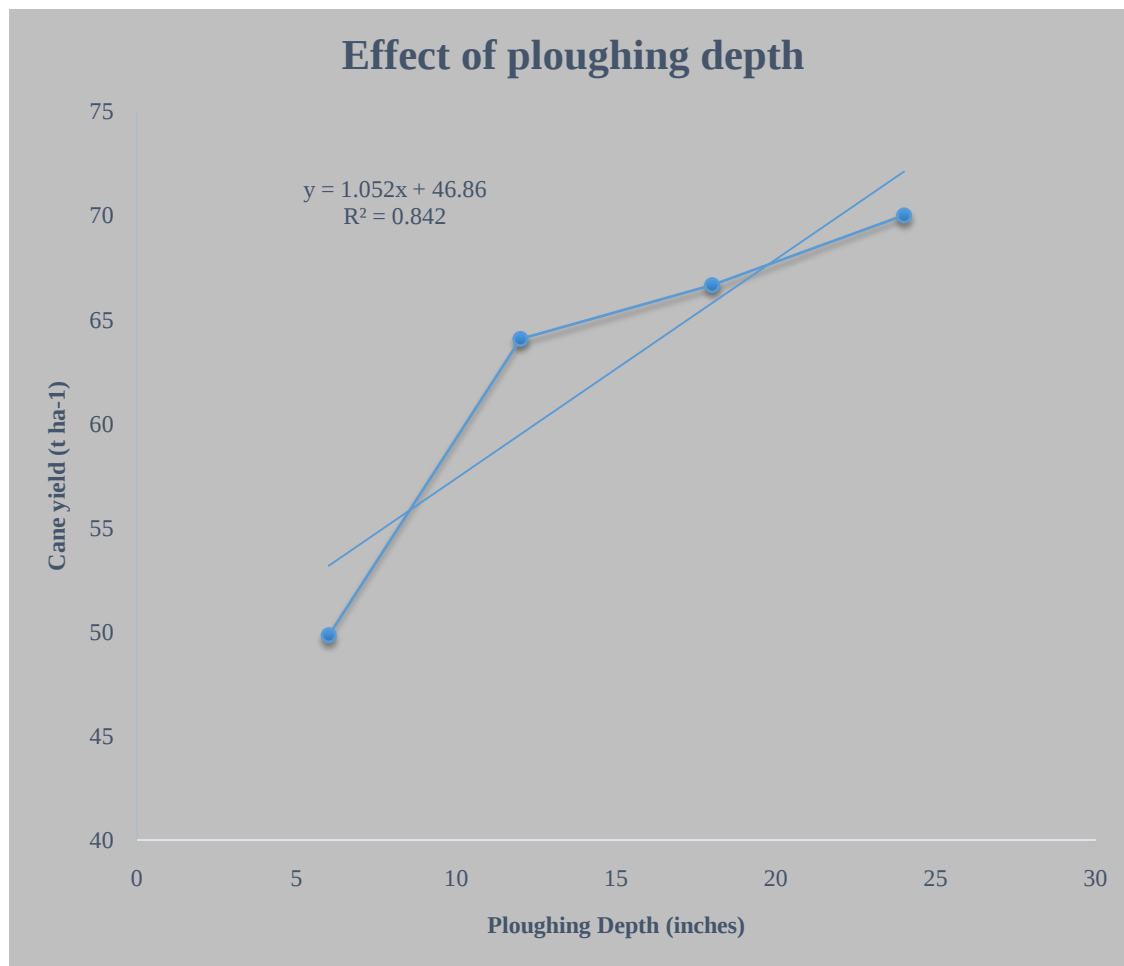
	I₁ = 1.0 pan coefficient	I₂ = 0.8 pan coefficient	I₃ = 0.6 pan coefficient	Rain fall (mm)
No. of irrigations	12	11	09	547

Results

Treatments	Germination (%)	Tillers plant ⁻¹	Cane Count (000 ha ⁻¹)	Cane Yield (t ha ⁻¹)	Sugar Yield (t ha ⁻¹)
A. <u>Irrigation</u>					
I₁= 1.0 Coefficient	46.01	0.84	78.29 a	70.48 a	9.93 a
I₂= 0.8 Coefficient	43.88	0.91	73.62 b	63.21 b	8.80 b
I₃= 0.6 Coefficient	44.40	0.82	67.31 c	61.75 b	8.69 b
LSD at 0.05	N.S.	N.S.	2974	3.929	0.554
B. <u>Ploughing Depths</u>					
P.D₁= 6"	48.19 a	0.76 b	68.38 c	49.83 d	8.40 c
P.D₂= 12"	45.18 ab	0.78 b	69.41 c	64.07 c	9.03 b
P.D₃= 18"	44.18 ab	0.83 b	74.27 b	66.66 b	9.34 b
P.D₄= 24"	41.52 b	1.04 a	80.24 a	70.01 a	9.80 a
LSD at 0.05	4.130	0.886	4.734	2.195	0.313

Quantification of results





Conclusion

- ▶ From the present study, it may be concluded that:
 - ▶ Preparation of land upto a depth of 24 inches gave 29% higher yield than the farmer's conventional land preparation upto 6 inches.
 - ▶ 12 Irrigations gave 14 & 11% higher cane yield than 9 & 11 irrigations, respectively.