

## Research Article

# Effect of mulch and irrigation on hydraulic conductivity, infiltration rate, water stable aggregates, water use efficiency and yield of sugarcane

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### Summary

An experiment was conducted in Factorial Randomized Block Design with three replications to evaluate the effect of irrigation and mulch on hydrothermal regime and yield of sugarcane chili intercrop at Water Management Research plot of Rajendra Agricultural University Pusa (Samastipur) Bihar. It was found that mulch and irrigation both maintained higher soil temperature along with better soil physical environment by increasing per cent of macro aggregates hydraulic conductivity and infiltration rates in winter season. The yield performance of mulch and irrigation levels were in the order  $I_2$  (454.19q/ha),  $I_1$  (425.46q/ha) and  $I_0$  (365.08q/ha) where as the yield performance of mulches were in the order  $M_1$  (455.48q/ha) and  $M_0$  (377.09q/ha).

**Key words :** Mulch, Irrigation, Water use efficiency, Yield

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## Introduction

Sugarcane is one of the important cash crops of Bihar, covering about 1.7 lakhs hectare of land. The average production of sugarcane in Bihar is 53.4 tones per hectare. The addition of mulch which is an organic source may create better soil physical environment for supply of water and nutrient to plants enhance the crop production to some extent. Sulphitation press mud a waste product of sugar industry, contain sufficient amount of organic matter and plant nutrients which compares well with other source of organic matter. Annual production of sulphitation press mud in India is more than 28 million tones and is available in North Bihar at a very cheaper rate. The application of irrigation may be helpful in reducing moisture stress. Thermal properties of soil facilitate higher per cent of germination maintaining higher plant population and better crop growth.

## Resources and Research Methods

A field experiment was conducted at the Water

Management Research Farm at Rajendra Agricultural University, Pusa, Samastipur Bihar. The treatment comprised of three levels of irrigation based on IW: CPE ratio (Prihar *et al.*, 1974) of rainfed ( $I_0$ ), 0.5=IW: CPE ( $I_1$ ) and 1.0=IW: CPE ( $I_2$ ), two levels of mulch were unmulch ( $M_0$ ) and SPM (Sulphitation press mud @ 20tonns per hectare)  $M_1$  and two levels of intercrops were pure crop ( $C_1$ ) and sugarcane+chilli intercrop ( $C_2$ ). The experiment was laid out in Factorial Randomized Block Design with three replications. The soil was calcareous alluvial sandy loam and contained 167.1 kg/ha available N, 11.8 kg/ha available Olsen phosphorus and 110 kg/ha available K. The pH of the soil was 8.5 and contained 26.7 per cent free calcium carbonate and organic carbon was 0.41 per cent and electrical conductivity was 0.76dSm<sup>-1</sup>. The physical parameters were sand 46.18 per cent, silt 40.32 per cent and clay 13.50 per cent, bulk density 1.45g/cc, field capacity 22.5 per cent and permanent wilting point 8.2 per cent. Irrigation depth was adopted by Parshall flume having throat width 7.5 cm, installed at the head of experimental plot. The time required to irrigate