

## **Effect of sowing date, irrigation and mulch on thermal time requirement and heat use efficiency of maize (*Zea mays* L.)**

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### **ABSTRACT**

The field experiments was carried out for three years (2015 to 2017) at the Research Farm, Department of Climate Change and Agricultural Meteorology, Punjab Agricultural University, Ludhiana with maize variety PMH-1 sown on three dates ( $D_1$ -Third week of May,  $D_2$ -Second week of June and  $D_3$ -First week of July) under two irrigation regimes ( $I_1 = IW:CPE 1.0$  and  $I_2 IW:CPE 0.75$ ) and mulch application ( $M_1$ : straw mulch @  $5 \text{ tha}^{-1}$  and  $M_2$ : without mulch) in a split plot design. Results revealed that the early sown crop (third week of May) took higher number of days and heat units to attain various phenophases. Maize variety PMH-1 consumed maximum heat units of  $1952^\circ\text{C days}$  for maturity under early sown condition. The heat use efficiency was highest ( $3.04 \text{ kg ha}^{-1}\text{Cday}^{-1}$ ) for the crop sown during June. Among irrigation regimes, the HUE was higher ( $2.89 \text{ kg ha}^{-1}\text{C day}^{-1}$ ) in  $IW: CPE = 0.75$  level of irrigation as compared to  $IW: CPE = 1.00$  ( $2.81 \text{ kg ha}^{-1}\text{Cday}^{-1}$ ) and higher HUE was obtained with mulch application ( $M_1$ ) ( $2.92 \text{ kg ha}^{-1}\text{Cday}^{-1}$ ) as compared to without mulch ( $M_2$ ) ( $2.76 \text{ kg ha}^{-1}\text{Cday}^{-1}$ ). The sowing of maize crop during second week of June with irrigation of  $IW: CPE 0.75$  under mulch application have been found to be the most efficient for heat utilisation.

**Key words:** Maize, phenology, heat units, heat use efficiency, maize, mulch, irrigation