631.92 : 632.111/.112

HEAT UNIT REQUIREMENTS OF *RAYA*

Temperature influences the growth of plants in many ways like root growth, nutrient uptake and water absorption, photosynthesis, respiration and translocation of photosynthetes. It also influences morphology, development, production and occurrence of phenological phases. The concept of growing degree days has been used in scheduling planting and prediction of different phenophases (Nield 1977). The present investigation was undertaken to study the growth, development and phenological behaviour and thermal requirement of *raya* at the research farm of the Department of Agril. Meteorology, Haryana Agril. University, Hisar (29°10′ N, 75°46′ E) during *rabi* 1986. *Raya* (Var. RH-30) was sown in randomized block design under six planting systems, *viz*., normal sowing in flat beds (S_1, row to row spacing 45 cm), paired row sowing in flat beds (S_2 row to row spacing 30 cm and pair to pair spacing 60 cm), ridge furrow sowing with one row in each furrow (S_3, furrow to furrow distance 90 cm), ridge furrow sowing with two rows in each furrow (S_4), normal sowing in flat beds with every 4th row skipped off (S_5), normal sowing in flat beds with every 6th row skipped off (S_6). Five plants were selected at random for observation on leaf emergence, branch emergence (primary, secondary and tertiary), plant height and phenological stages. Plant samples were taken at 15 days interval for dry matter production and leaf area. Leaf area was measured with leaf area meter and leaf area index was calculated as the ratio of total leaf area to the ground area covered by the foliage. Heat units under different planting systems were computed using threshold temperature of 5°C (Bishnoi *et al.* 1989). Linear regression was used to study the relationship between accumulated heat units and growth development parameters. It was observed that phenophase occurrence was not affected by different planting systems. The accumulated heat units required for maturity of *raya* crop were 1628.8 $\pm$ 38.9 day °C. Linear relationships exist between emergence of leaves and accumulated growing degree days (GDD) with mean threshold value of 248 $\pm$ 9.6 day °C Emergence of primary, secondary and tertiary branches was observed to have strong linear dependence of accumulated GDD with mean threshold values of 220.2 $\pm$ 31.3, 533.1 $\pm$ 30.1 and 665.5 $\pm$ 43.4 day °C respectively. Baker *et al.* (1986) also reported similar type of results in spring and winter wheat cultivars The mean threshold heat units above which plant height had showed linear response was 18.8 $\pm$ 2.5 day °C. The leaf area index and dry matter production were also positively related with cumulative development of heat units above mean threshold values 289.1 $\pm$ 19.1 and 437.5 $\pm$ 15.9 day °C, respectively. Similar type of linear relationships between cumulative development of heat units and biomass production were reported by Chakravarty and Sastry (1983) in moong and wheat crops. These results can be fruitfully utilized in the prediction of occurrence of different phenophases.

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