

Assessing impact of cold temperature at growth and pre-flowering in winter maize

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ABSTRACT

Maize is the third most important cereal crop after rice and wheat in India contributing to around 10 percent food grain production in the country. Multiple uses of maize like food, feed, fodder and industrial raw material are the driven forces for increasing its demand globally. Maize is traditionally a *kharif* season crop, but its cultivation is increasing in the rabi and spring season due to higher productivity than the kharif crop. Abiotic stresses like cold, waterlogging, drought and heat cause significant yield losses in maize. Low temperature or cold stress during the growth and pre-flowering stage is one of the major causes of yield reduction in winter maize. In rabi 2017-18 rabi maize crop production suffered from very poor grain setting due to cold stress at pre-flowering and prolong winter. Looking into the above facts the present study was conducted in RBD with two replications using 25 commercial and advanced stage experimental hybrids in 2018-19 and 35 hybrids in 2019-20. The experiment was laid on five sowing dates 25th October, 5th, 15th, 25th November and 25th December in both the year. Observations were recorded on 15 morphological and yield component traits. Based on pooled mean yield performance, the experiment laid on the 5th of November reported the highest mean yield (104. q/h) whereas, the experiment laid on 25th November showed the lowest mean yield (70.7 q/h). The crop laid on 25th November indicating the effect of cold stress at growth stages whereas sowing of the test entries on 25th October showed lower yield (89.6 q/ha) than the crop shown on 5th November indicating the mild effect of cold stress at growth and reproductive stage. The crop sown on 25th December managed to recover well after winter and resulted in an almost comparable yield of crop sown on 25th October. The planting of 5th November taken the maximum number of days to anthesis and maturity leading to the highest yield. The planting of 25th October coincides with the lowest temperature (8.5 °C) during anthesis affecting yield (fig 4). The planting of 15th November and 25th November was affected by cold temperature during growth and developmental stages up to the knee-high stage, although temperature during anthesis was at par for both 5th and 25th November sowings. The study indicated that planting of maize on 5th November resulted in the highest yield and most suitable for the rabi maize planting in Bihar.

Keywords: Cold stress, grain setting, pre-flowering, winter maize