Title:	Evaluating the impact of different thermal growing conditions and ozone on PBW550 wheat (Triticum Aestivum) cultivar
Authors:	Meena, Aakanksha
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Abstract:	In this study we have explored the phenology of the PWD-550 cultivars of triticum aestivum during wheat growing season from November 2018 to April 2019. Seeds of the cultivar PWD-550 were acquired from breeders. To study our objective, wheat was grown in three different plots with variations in growth conditions and time periods. Sowing was done on November 1 st for plot 1, November 15th and December 1 st for plot 2 and 3 respectively. Different parameters such as grain yield per plant, 1000 grain weight, number of effective tillers, head length, number of shrivelled grains, temperature, plant phenology, and time period taken for reaching specific growth stages were analysed triticum aestivum cultivar PBW550. These analyses were performed to observe their effects on the yield of wheat cultivars. The PBW550 cultivars show a similar thermal sum to reach flag leaf stage for plot 1 and plot 2 but a significantly lower thermal sum for plot 3. This is despite the fact that the temperature at which the thermal sum is conventionally capped was not reached before this growth stage. Plants on plot 3 did not reach tillering growth stage before temperatures, dropped as winter started early. We observe, that there is decrease in active number of tiller in plot 3 in compare to plot-1 and plot-2. The decrease in the number of active tillers correlates strongest (R=0.99) with the number of days with optimum temperatures for photosynthesis before the plant reaches the flag leaf stage. Plot 3 also shows shorter heads compared to plot-1 and plot-2. This head length correlates best with the first day of heat stress experience by the plant expressed in days after sowing (R=1) and the number of days with optimum temperatures for photosynthesis before the plant reaches the flag leaf stage (r=0.99). Head length is strongly anti-correlated with heat stress between anthesis and maturity (R=-0.98) and the ozone exposure (M7) from anthesis to maturity (R=-0.99). Anti-correlation means the stronger the stressor the shorter head length. The number of normalized to the head length is perfectly anticorrelated with the ozone exposure from flag leaf stage to anthesis (R=-1) indicating that ozone exposure just before the anthlers become visibly could most significantly reduce grain number. The 1000 grain weight is weakly correlated with the number of days with optimum temperatures for photosynthesis before the plant reaches the flag leaf stage (R=0.67). This data seems to suggest that ozone exposure and heat stress after anthesis were not the main drivers of yield loss in late sown wheat.
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