

Evaluation of Grain Filling Rate and Duration in Bread and Durum Wheat, under Heat Stress after Anthesis

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Abstract

Bread and durum wheat genotypes were submitted to heat stress during the grain filling period, and relationships between grain weight and accumulated time from anthesis until maturity, using days after anthesis and growing degree days, were described by cubic polynomials. Maximum grain weight and the duration and rate of grain filling were estimated from the fitted curves. It was found that bread and durum wheat exposure to high temperatures significantly decreased grain weight and hastens physiological maturity (shortening the grain filling period). High temperatures significantly affected the rate (on a growing degree day basis) and duration (on Julian day units) of grain filling. The grain filling rate, on a thermal time basis, was positively associated with the final grain weight and the estimated maximum grain weight. The duration of grain filling does not appear to be a limiting factor for genotype grain weight stability, being mainly fixed by temperature. Grain weight of the controlled plants was positively correlated with the final and maximum grain weight of heat stressed plants. It was concluded that a high grain filling rate and a high potential grain weight are major traits that can be useful to improve heat tolerance of *Triticum* under Mediterranean environments.