Effect of elevated growth temperature on acclimation capacity to water deficit stress.

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We have observed acclimation responses to elevated temperature and to water-deficit stress in diverse peanut genotypes. The acclimation response has been observed under field conditions of scheduled water-deficit stress as a means of early season savings on irrigation and the induction of late-season tolerance to water deficit stress. This acclimation in the field was correlated with an increase in root mass and rooting depth and could be measured on a physiological level as maintenance of photosynthesis under progressive soil drying that occurred during the irrigation interval. Subsequently, we showed genotypic differences in acclimation to short-term, acute, high temperature stress in genotypes from the U.S. peanut mini-core collection.

Here, we tested whether growth under elevated temperature affects the acclimation to water deficit stress in two selected genotypes for short- and long-season production. We hypothesize that growth under moderately elevated temperatures, similar to those predicted for near future environments, will dampen the acclimation response, but that genotypic diversity for this response may be present in the germplasm. We will present our findings on the physiological and growth responses to elevated temperature and its effect on acclimation capacity in these two genotypes.