

Abscisic Acid on Mitigation of Drought Stress in Groundnut (*Arachis hypogaea* L.)

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Abstract

Drought is one of the most important abiotic stresses which affect the crop growth and yield. Groundnut (*Arachis hypogaea* L.), a major leguminous oil crop cultivated in the world is significantly affected with drought, thus reduces fruit set percentage, filling percentage and pod yield. The occurrence of empty pods, half-filled pods, and wrinkled seeds reduces the seed quality, finally the marketable value of groundnut. Abscisic acid (ABA) plays an important role in abiotic stress including drought. Previous studies has shown that root-originated xylem sap ABA can move to reproductive structures and accumulate there to a high level under drought conditions in wheat crop. This elevated ABA content in the crop reproductive structures had been thought to be involved in controlling kernel pod abortion, presumably via inhibition of cell division in the young ovaries. Thus, a field experiment was conducted to evaluate application of ABA with induced drought stress conditions on the yield responses of groundnut variety, *Thissa*. A two factor factorial experiment with three replicates was designed under induced drought stress conditions in a rainout shelter at the grain legumes and oil crops research and development centre, Angunakolapelassa during 2016/17 *maha* and 2017 *yala*. The experimental site was located in DL_{1b} agroecological region and having reddish brown earth soil. The method of application of ABA *i.e.* application of 0.0001M solution at the onset of flowering (40 days after sowing) and seed priming were evaluated with the control (distilled water application) in different depletion levels (50%, 65% and 85%). Number of seeds, number of pods, seed weight, filled seed weight and shell weight were recorded. ANOVA was performed to evaluate the method of application of ABA by keeping the depletion level fixed using SAS 9.0 software. Filling percentage of groundnut was affected with the increasing depletion levels in all three treatments revealing the fact that filling percentage of groundnut reduces with the increasing water stress conditions. Filling percentage of groundnut was significantly higher in foliar application of ABA compared to seed priming with ABA and control in both seasons. In conclusion, the application of ABA at the onset of flowering can be suggested to mitigate the effect of drought in groundnut.

Keywords: Abscisic acid, Drought, Filling percentage, Ground nut, Seed quality

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