# Physiological seed quality: Impact of drought at flowering and fruiting

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**Rational and Significance of Research.** Peanut is an extremely important crop in Georgia and the ongoing efforts to improve yield and seed quality are an indication of the impact this crop has on the U.S. economy. Growing peanuts is expensive and one of the major production costs is the seed. The quality of a seed lot is represented by a combination of genetic, physical, physiological, and sanitary factors. Environmental stresses during seed development can be detrimental to seed quality. Drought stress during seed development generally reduces growth and yield. Previous results indicated that drought accelerates the germination acquisition during seed development. However, information is lacking on the time, duration, and severity in which plants can undergo without water during seed development in order to improve seed quality without compromising yield. The knowledge on the impact of dry periods at different timings during flowering and pod development on physiological quality of peanut seeds can greatly assist in the efforts to adjust water management in peanut production for greatest seed quality and yield.

**Objective.** The objective is to determine the impact of drought stress at different timings during flowering and pod development on physiological quality of peanut seeds.

**Procedures.** Peanut cultivars Georgia-06G, TifNV-High O/L, and AU-NPL 17 were planted on May 29, 2024 under field conditions at UGA, Tifton Campus. Four water regimes were used, an untreated control, drought stress (DS) from 30 to 50 days after planting (DAP), DS from 51 to 70 DAP, and DS from 71 to 90 DAP. The untreated control received irrigation as needed throughout the season. For the DS treatments, when plants reached the desired developmental stage, water was withheld for 20 days. A rainout shelter was used to cover the stressed plots and prevent rain/irrigation on the plants from these treatments. Other field management practices followed UGA Extension recommendations. At the end of each stress period, number of flowers, pegs, and pods were counted in 10 plants to follow fruit development. Plants were also collected for aboveground biomass and seed physiological quality assessment. Physiological quality was assessed in seeds from each pod maturity class.

**Results.** Overall, mid-season drought stress was the treatment that resulted in lowest pod production for all cultivars. Flower and peg production were more prominently impacted by drought stress at mid and late season. AU-NPL 17 was the least impacted by drought among the three cultivars. Seeds are currently being sorted into the different maturity classes prior to testing them for germination. Full dataset will be further analyzed after germination results are obtained.