

Georgia Peanut Commission Research Report Day

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Dr. Timothy Grey

Nick Hurdle- PhD. Student

Can Plant Growth Regulators Enhance Peanut Seed Germination and Stand Establishment?

Should seed quality and vigor be less than optimal, one potential option to remedy this by utilizing plant growth regulators (PGR's). These naturally occurring plant hormones can be applied to peanut seed via the synthetic analogs. PGR's such as gibberellins, auxins, and cytokinins assist in induction of germination, root initiation, and cell division, respectively. An experiment was performed to investigate the response of peanut seed to PGR's applications for vigor, stand establishment, and agronomic characteristics along with interactions with flumioxazin herbicide applications. The experiment was conducted in Plains and Ty Ty, GA in mid-late May of 2021. Six peanut cultivars: TifNV-HO, GA-142728(GA20-VHO), GA-14N, GA-06G, GA-16HO, GA-18RU were treated one day before planting with indole-3-butyric acid + cytokinins, gibberellic acid, or remained non-PGR treated. An additional treatment included an application or non-application of flumioxazin resulting in 36 plots per replication, totaling 144 plots per test due four replications. During the crop season, measurements such as plant density, height, and width were taken, along with utilizing a LI-COR 6800 (LI-COR Inc., Lincoln, NE) to observe physiological parameters at the beginning of the season.

In general, no differences regarding the photosynthesis rate or germination rate were observed. Peanut in Plains noted a difference in stand counts that was cultivar related. However, plants treated with indole-3-butyric acid + cytokinins resulted wider plants. The overall widths for GA-16HO were lower compared to the other cultivars. Yield differences were only cultivar related.

Peanut in Ty Ty noted multiple PGR interactions across all cultivars. Seed of GA-06G were subject to early season diseases exacerbating the interactions. GA-16HO treated with gibberellins noted greater plant widths compared to the non-PGR treated plants. Cultivars treated with indole-3-butyric acid + cytokinins did not show any improvement during the first days/weeks after germination. Flumioxazin injury was not significant in either year.

Differences in yield were noted in Ty Ty but were the result of cultivars and not influenced by PGR's. Differences in Plains could be explained by PGR's in which GA-14N treated with indole-3-butyric acid + cytokinins resulted in the greatest yield increase.

Overall, the use of PGR's in peanut production did not improve the parameters investigated. One method that could be improved is the mode in which the PGR's are applied. In this study, the PGR's were applied one day prior to planting. One suggestion would be to soak the seed in a PGR solution to prime the seed prior to planting.