

Comparison of Germination Rates of Seed from High Oleic and Non High Oleic Near-Isogenic Peanut Lines

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Oxidative stability is an important factor considered by those in the peanut manufacturing industry. Product stability has been shown to increase up to 10-fold when high-oleic peanuts are used. The percentage of U.S. crop that is high-oleic continues to increase, but many producers are resistant to grow high-oleic cultivars due to the uncertainty of the high-oleic effect on agronomic traits, such as seed germination, yield and grade. Experiments were designed and conducted from 2017 to 2019 to examine the effect of the high oleic trait on peanut seed germination in field plots and in the laboratory on a thermal gradient table. Genotypes used in these experiments included cultivars or breeding lines from each peanut market-type along with their near-isogenic, high oleic counterparts. Seed germination was tested in the field in 4 geographically different regions, as well as in the laboratory on a thermal gradient table, eliminating environmental effects and allowing testing for the effect of temperature on germination of all seed-types. Near-isogenic line pairs were planted in field plots (CRB, 3 replications) in the following locations: OAES Caddo Research Station, Ft. Cobb, OK; NCDA Peanut Belt Research Station, Lewiston-Woodville, NC; Lingo, New Mexico; and Tifton, GA. Stand counts were taken on a weekly basis for 4 weeks after planting and averaged over replications. Thermal gradient table experiments on seed germination were conducted on the original seed sources and then on seed post-harvest collected from each location. Original seed and post-harvest seed were tested for oil composition to ensure purity. Results indicated a lag in germination in for high oleic genotypes when compared to their normal oleic counterparts. Thermal gradient table experimental results demonstrated a lag in germination in high oleic genotypes compared to normal oleic counterparts in all market-types, but the effect was lowest in the runner-type pair. Results from these experiments will increase the understanding of the agronomic properties of high-oleic peanut cultivars and could be used to create new standard protocols used by State agencies to test high-oleic peanut germination for registered and certified seed quality labeling.