

Understanding Variation in Oleic Acid Content of High-Oleic Virginia-type Peanut

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Bailey II is a high-oleic (HO) version of the commercially successful cultivar Bailey. In recent tests, the oleic acid content of Bailey II averaged 74%, barely meeting the requirements of a high oleic cultivar. Furthermore, this is below that of other HO Virginia-type peanut cultivars and breeding lines within the NC State program that typically measure 79-81%. We posit three possible explanations exist for this discrepancy: 1) differences in days required to achieve optimum maturity 2) seed contamination via either seed mixing or inadvertent cross-pollination, or 3) differences in genes with minor effects on oleic acid content.

To investigate, four cultivars and four breeding lines were grown in 2019 and 2020 at the Peanut Belt Research Station in Lewiston, NC. Two plots per entry were dug at three different digging dates: very early (131 days after planting (DAP), optimum (145 DAP), and very late (159 DAP). Ninety-six seeds from each plot were run on a Brimrose Luminar 3076 Seedmeister to determine oleic acid content. In order to assess genetic purity, all 96 seeds per plot were genotyped for the *FAD2B* causal mutation.

Genotyping revealed extensive contamination of Bailey II at the *FAD2B* allele, however contamination was not exclusive to Bailey II. This indicates that more rigorous standards should be employed for seed increases in order to ensure purity at the *FAD2B* locus in our program. However, pure lots of Bailey II should not differ in oleic acid content from other cultivars. To this end, higher oleic acid thresholds will be adopted for screening with the Seedmeister and the purchase of a Qualysense QSorter Explorer should enable more efficient screening of large seed lots.