Research Report (FY 2025-2026) to
the Georgia Peanut Commission

TITLE: **Development and Evaluation of Cultivars with Disease Resistances to Increase On-Farm Profitability**

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PROGRESS REPORT:

Breeding for Resistance to the Peanut Root-knot Nematode (PRN).

- Continued breeding program to combine resistance to the PRN with high yield and grade, resistance to other pathogens such as leaf spot and white mold, and high oleic acid content. This included continued hybridization and generation advance for breeding populations involving over 50 cross combinations. Material is first advanced to the F_4 generation when seed tissue is sampled for DNA extraction and analysis for marker assisted selection (MAS) for nematode resistance and high oleic fatty acid composition. The use of MAS is greatly speeding the process of developing future resistant varieties. The first product of these efforts was TifNV-High O/L. More recently, we released two additional nematode resistant varieties, TifJumbo (a virginia-type) and TifNV-HG (a runner-type with very good yield and higher grade). We are in the process of releasing 17-2214, a normal oleic, nematode resistant, runner-type.

Breeding for Resistance to Leaf Spot and TSWV.

- Three well-defined segments of the wild *Arachis cardenasii* chromosome confer excellent resistance to late leaf spot. Other genes for resistance to late leaf spot and associated genetic marker were identified in the Peanut Genomics Initiative. We are using MAS to combine these genetics to develop leaf spot resistant cultivars. We have several late generation breeding lines that we are evaluating in fungicide sprayed and non sprayed tests. We anticipate that these efforts will result in the release of leaf spot resistant varieties.
- Continued breeding program to combine resistance to TSWV with acceptable yield and grade. This included continued hybridization and generation advance for breeding populations involving over 100 cross combinations. We have numerous late generation breeding lines that have a higher level of resistance to TSWV in comparison to Georgia-06G. We have also developed and validated genetic markers for resistance to TSWV and are using these in our breeding program.

Breeding for Resistance to White Mold.

- We recently released TifTB. This is a high yielding, high-oleic cultivar with very good grades and excellent resistance to white mold.