DEVELOPMENT OF SEED-APPLIED AND IN FURROW TREATMENTS TO INSURE THE ESTABLISHMENT OF PEANUT STANDS IN GEORGIA

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Strong, healthy plant stands are important for establishing the yield potential of a peanut crop. Our industry generally produces good quality seed which is the foundation for those stands. However, many factors can act to impact the quality and performance of seed. One of the most important factors is seed and seedling diseases, which can be caused by a wide range of organisms. Seed treatments are often overlooked, but in reality are one of the most important components of an integrated production systems. We were reminded of this in 2020 when peanut seed in Georgia was heavily contaminated with *Aspergillus flavus* as a result of the hot, dry conditions in 2019. The past few planting seasons have ben more wet and cool, and other pathogens like *Rhizopus* have ben more of an issue. Rhizopus seed and seedling rot is a destructive peanut disease associated with rotted, ungerminated seeds wherever peanuts are grown. It's reported to completely rot seeds in 36-96 hours and cause up to 60% stand losses. But surprisingly, it's often not recognized in the major seed and seedling disease complex, because traces of the rotted seed rapidly degrade and makes in-field diagnosis unreliable. There is almost no current research on Rhizopus seed rot, but our recent surveys of commercial seed in Georgia show it to be present in seed at a high frequency, especially in somewhat compromised seed lots. Our research has five objectives:

1. Document relative seed vigor of 13 commercial peanut cultivars
2. Determine the susceptibility of these cultivars to Rhizopus seed rot
3. Identify *Rhizopus* species from multiple seed lots in Georgia
4. Determine the temperature optima of three Rhizopus species and the pathogenicity to commercial peanut seeds at five temperatures
5. Determine the sensitivity of these samples to seed treatment and in-furrow fungicides

For objective 1, seed of 13 commercial cultivars was collected from Tifton, GA. To reduce the presence of harmful micro-organisms, the cultivars were all planted in a field tarped and fumigated with 300lb/A of chloropicrin before planting. To quantify seed vigor, the radicle protrusion of each cultivar was measured, and the final germination was above 90% for all cultivars, and all were similar at the 1-3 day interval critical for *Rhizopus*. To determine cultivar susceptibility to *Rhizopus*, an in vitro assay was developed. Seeds from each cultivar were exposed to an active colony of *Rhizopus*, and by Day 12 virtually all seed of all cultivars were rotten. All 13 cultivars were highly susceptible. To identify *Rhizopus* species in Georgia, samples were sourced from five commercial seed lots. So far 30 isolates have been identified. The results show that *R. delemar, R. arrhizus,* and *R. stolonifer* were identified in nineteen, nine, and two samples, respectively.

The last two objectives are still in progress. The biological characteristics of these different species are currently being evaluated, including their relative pathogenicity, temperature optima for growth and disease development, as well as their sensitivity to various fungicides used either as a seed treatment or an in furrow spray. This information will be critical to insure that our future control measures will be effective on this too often forgotten peanut pathogen.