Towards Reliable Greenhouse Methods for Phenotyping Peanut Susceptibility to Stem Rot (White Mold)

Y-C. TSAI*, Department of Plant Pathology, University of Georgia, Athens, GA 30605; C. C. HOLBROOK, USDA-ARS, Tifton, GA 31793; T. BRENNEMAN, Department of Plant Pathology, University of Georgia, Tifton, GA 31793; and S. LEAL-BERTIOLI**,** Department of Plant Pathology, University of Georgia, Athens, GA 30605.

Peanut stem rot (white mold), caused by the fungus *Sclerotium rolfsii*, is one of the most severe soil borne pathogens for U.S. peanut production. Only moderate to low levels of resistance are shown in cultivated peanuts, hence, it is essential to breed for white mold resistance. So far, field evaluation is the main approach for assessing plant resistance. Reliable methods for in-vitro or greenhouse evaluations are needed since field evaluation is costly and labor intensive. We devised a method to reliably assess resistance to stem rot on greenhouse cuttings. Sixty-day old stem cuttings treated with rooting gel were transplanted into a cup filled with potting mix. Cuttings were inoculated with active *S. rolfsii* mycelial plugs (0.7-cm-diameter) at the base with mycelium directly contacting the stem. Inoculated cuttings were put in a large storage box to keep humidity high. Each genotype had 4-7 replications. Length of lesion on stems was measured at 3, 5, 7, and 9 days after inoculation (DAI). Experiments were conducted twice in 2019 and 2020 in the greenhouse. Twelve recombinant inbred lines with different levels of field resistance and Georgia-12Y were evaluated using this method, and the results were compared with a 4-year field evaluation conducted in 2013-2015 and 2018. Results were subjected to analysis of correlation by using cor function in R, and Fisher z-transformation was used to test significance. Average lesion lengths in two experiments measured at 3, 5, 7 and 9 DAI were significantly correlated with 2 set of field evaluations at α=0.05. Correlation coefficients ranged from 0.63-0.88. Lesions measured at DAI7 were most highly correlated with field results. Overall, this greenhouse method is reliable and correlates well with field evaluation. It will greatly facilitate white mold resistance assessment among wild, induced allotetraploid, and cultivated peanuts.