

Transcriptional responses in wild peanut genotypes in comparison with GA-06G following thrips-mediated TSWV transmission

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Despite using TSWV resistant cultivars for the past two decades and genomics' advancements, the genetics of TSWV resistance in peanut is not completely understood. Also, the resistance to TSWV in currently used cultivars seems to be limited. This limitation could be due to the narrow genetic base for TSWV resistance that is available. Resistance against TSWV in the wild species of peanut might assist in overcoming the current limitation. In collaboration with Dr. Bertioli, wild diploid species and their hybrids are being screened for TSWV and/or thrips resistance at UGA, Griffin, by doctoral student, Ms. Yi-Ju Chen. Screening over the past two years has helped identify potential sources of resistance. Currently, samples from two diploid species and their hybrid are being sequenced using an Illumina platform. Recently we developed and examined peanut transcriptomes following thrips (*F. fusca*)-mediated TSWV inoculation and peanut genome guided assembly. Results of the study were published in 2021 (Catto et al.

Viruses 2021). These results shed more light on the TSWV resistance mechanism.

Transcriptomes of TSWV-infected and non-infected resistant cultivar (Tifguard) and the susceptible cultivar (SunOleic 97R) were compared. As expected, the differential gene expression was greater in SunOleic97R (~4500) than in Tifguard (~2500). Despite that, an increased proportion of defense genes was upregulated in Tifguard than in Sunoleic97R. These results indicated that the defense responses in the TSWV-resistant cultivar (Tifguard) were more robust than in the case of the susceptible cultivar (Sunoleic 97R). The defense-related genes upregulated include LRRs, resistance (R) proteins, dicer, and stilbene synthase. Further analysis suggested that defense genes and genes associated with photosynthesis were downregulated in the case of TSWV-susceptible Sunoleic97R. Overall, results suggested that defense response was robust in Tifguard and physiological functions were less affected following TSWV infection than in the susceptible cultivar, Sunoleic 97R. It would be interesting to assess if the defense response to TSWV in wild species and their hybrid vary from that of the resistant cultivar, Tifguard. More details can be found by accessing the manuscript listed below.

Citation:

Catto, M.A.; Shrestha, A.; Abney, M.R.; Champagne, D.E.; Culbreath, A.K.; Leal-Bertioli, S.C.M.; Hunt, B.G.; Srinivasan, R. Defense-Related Gene Expression Following an Orthospovirus Infection Is Influenced by Host Resistance in *Arachis hypogaea*. *Viruses* **2021**, *13*,1303. <https://doi.org/10.3390/v13071303>