

**Identification of Disease Resistance (*R*) Genes Associated with Leaf Spot Resistance in Cultivated Peanut and the Conversion of Gene-Expression Markers to DNA Markers for Applications in Marker-Assisted Plant Breeding**

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Early and Late Leaf Spot are fungal diseases in peanuts that can significantly reduce yield and quality without a costly fungicide program. Breeding for resistance in cultivated peanut has been elusive due to both low genetic resistance and strong environmental factors. To identify candidate resistance (*R*) genes involved in leaf spot resistance, 45 advance breeding lines and 3 peanut variety checks were field evaluated for leaf spot diseases. Based on visual disease ratings, 4 susceptible lines, 4 resistant lines and 3 variety checks were utilized in leaf gene-expression studies. Out of a 120 candidate *R*-genes evaluated to associate leaf spot resistance, 24 *R*-genes were significantly associated with resistant peanut lines. All 24 gene-expression patterns were negatively correlated (suppressed) compared to susceptible lines. PCR products of these *R*-genes were cloned and sequenced. Results identified that 4 *R*-genes are different at the nucleotide level between susceptible and resistant lines. These *R*-gene sequence differences will be validated through utilization of single nucleotide polymorphism (SNP) genotyping methods. Results of this research will be incorporated into peanut breeding programs to facilitate development of high yielding and leaf spot resistant peanut varieties