

## Identification and utilization of new sources of resistance to White Mold in wild tetraploid *Arachis* for peanut improvement

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### Overview

Peanut lacks strong sources of resistance against important diseases, and therefore is one of the most expensive crops for farmers to grow. Wild relatives of peanut, on the other hand, have strong resistances to several fungal and viral diseases, and nematodes. Wild-derived tetraploids are promising sources of resistance to white mold, but because their architecture is so different from cultivated peanuts, methods that gave meaningful comparisons needed to be developed. With the support of the GPC and other funders, our group has devised two methods: a greenhouse bioassay method and a field method both of which can be used to test wild-derived ‘hybrid peanuts’ with diverse growth habits against white mold. We have also produced tetraploid hybrids with several combinations of wild species and identified some white mold resistant genotypes. We have now begun to use them for breeding and identification of genome regions that confer resistance. The production of peanut varieties with increased resistance to white mold will reduce the need for application of fungicides and increase productivity.

### Results

We have developed two methods to evaluate white mold resistance suitable for wild peanut hybrids with diverse growth habits, one using cuttings in a greenhouse, and one in the field. The greenhouse method was developed by testing and progressively modifying several *in vitro*. The most successful of these methods used a greenhouse incubator: stem cuttings from greenhouse grown plants are transplanted into a cup filled with potting mix and inoculated with active white mold mycelial plugs. This was written as a scientific publication to allow other researchers and breeders to use it, and has been accepted for publication in “Phytofrontiers”.

Using these methods we have identified the hybrid ValSten as the most promising of wild tetraploid hybrids for white mold resistance. Furthermore we have identified two F4 progeny of ValSten with TifNV as having good resistance (F4.424.45 and F4.396-7). These two F4 progeny were hybridized to GA-12Y and York to begin the production and selection of white mold resistant elite performing peanut lineages.

In order to map the regions that confer this resistance, we created a F2 population using TifGP-2 x allotetraploid ValSten1. The population (325 individuals) was evaluated for white mold at the Blackshank Farm in Tifton, Georgia (as shown below). It was also genotyped using the ThermoFisher Axiom v02. Results are being currently analysed.

