**Project Report - 2019**

**Identification of resistance to white mold (stem rot) and Rhizoctonia limb rot in *Arachis* wild germplasm**

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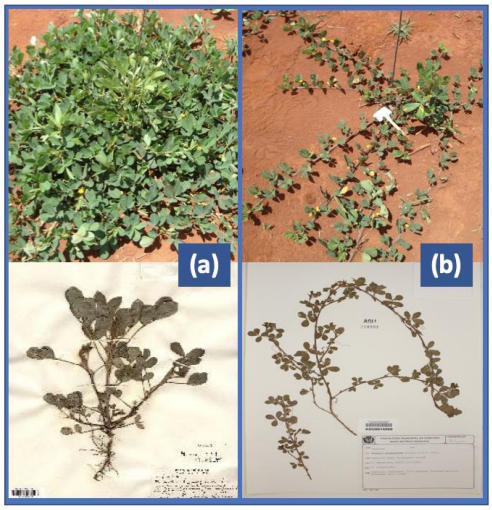
## Background

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, present strong resistances to several fungal and viral diseases, and nematodes. Field observations strongly suggest that wild species are likely to have resistance to soil borne pathogens. Here we propose to screen a panel of wild species and their derived tetraploid hybrids. Because the canopy architecture of wilds and cultivated are so distinct, greenhouse evaluation with controlled conditions is likely to be a very useful screening tool. The identification of resistant wild hybrids will allow for their use in breeding programs for the development of cultivars with superior disease resistance, making cultivation of peanuts more economically and environmentally favorable for the U.S. farmer. The purposes of this project were: (1) to design an in vitro method for stem rot evaluation (2) to identify strong sources of resistance to peanut soil borne pathogens in wild germplasm.

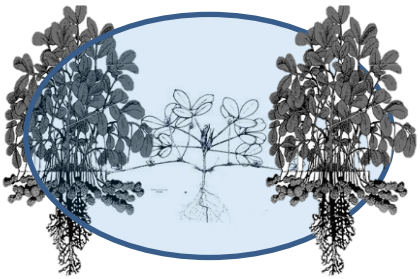



*Need for greenhouse screening methods*

Establishment and development of disease is the consequence of the dynamic interaction between the plant and the pathogen under the influence of the environment, which includes microenvironment, determined largely by canopy architecture (Tivoli et al., 2013). When canopy architecture does not favor fungal infection or development, disease escape or avoidance can be confused with resistance. Field evaluation is, to date, the most reliable way to screen for resistance to soil borne diseases in peanut, since cultivated genotypes used in the Southeast have similar canopy architecture, but *Arachis* wild species are very distinct (Fig1). To tease out the effects of microenvironment due to architecture from real resistance components, we propose to perform evaluations with cuttings at early developmental stages, with similar phenology to cultivated checks, in controlled environment.

***Results in 2019***

***Several methods were tried and the one that best resembled field results was inoculating established cuttings on soil, and inoculating with a mycelial plug. Evaluation 9DAI provided the best correlation with the field.***



***New method devised by the group of Dr. Brenneman for field evaluation is effective for comparing wilds x cultivated peanut. In summary, it comprises of interplanting rows of wild species/allotetraploids with susceptible cultivated lines. The cultivated plants provide the microclimate for even pathogen infection. This method provided very promising and some wild-derived allotetraploid showed superior resistance. Experiments and will be repeated this year to confirm results.***