Georgia Peanut Board

Report Feb 2019

I. Identification

Title: Identification of new sources of resistance to TSWV in wild tetraploid Arachis for peanut improvement

Funding year: 2018 – July 1 2018 – June 30 2019.

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Amount approved: $ 30,000.00

Location of research: UGA Athens and UGA Griffin

Spotted wilt caused by tomato spotted wilt virus (TSWV) is one of the major peanut diseases in the southeastern United States. Peanut lacks strong sources of resistance. Previous work suggests that some wild species possess strong mechanisms of resistance to TSWV. Here we proposed to screen a panel of wild species and their derived tetraploid hybrids. The main objective is to identify strong sources of resistance to white mold and stem rot in wild germplasm. Because canopy architecture of wilds and cultivated are so distinct, greenhouse evaluation with controlled conditions is required.

Methodology

Wild Arachis species, and induced (synthetic) allotetraploids have dormancy that needs to be broken for germination. Seeds were germinated in the Athens Campus Plant Pathology Greenhouse. In two-week intervals, 10 replicates of three wild-derived allotetraploids plus a susceptible control were germinated. Well stablished plantlets, at around four-week old, were and sent to Griffin so they could be challenged with TSWV-infected thrips (*Frankliniella fusca*).

Potentially viruliferous thrips were collected in the field at the end of peanut season and multiplied in greenhouse.

Three-week old wild-derived allotetraploids

List of genotypes screened/to be screened

Genotype	Accession	Status
BatDur1	9484 x 14167	tested
GregSten1	6389 x 10309	tested
BatSten1	9484 x 10309	tested
MagDur1	30097 x 14167	tested
BatDur2	K9484 x 2848	tested
IpaDur1	30076 x 14167	germinated
IpaVillo1	30076 x 12812	germinated
ValSten	468154 x 10309	germinated
IpaCor1	30076 x 9548	germinated
IpaCor2	30076 x 9530	germinated
IpaDur3	30076 x 30060	germinated
BatDio (diploid)	K9484 X 10602	Cuttings made
MagDio (diploid)	30092 X 10602	Cuttings made
MagCor (diploid)	30097 X 10017	Cuttings made
IpaDio (diploid)	30076 x 10602	Cuttings made

Experiment set up:

10 potentially viruliferous thrips collected in a 1.5 microcentrifuge tube.

Plants are placed in a cylinder cage. Thrips are released at the bottom of the stem.

Plants are kept in thrips-proof cages in a greenhouse. ELISA tests are carried out 3-4 weeks after inoculation.

Two sets of plants were evaluated in Nov 2018.

Genotype	ELISA		Total plant #	Infection rate
	+	-		
GA-Green	0	8	8	0
BatDur1	1	8	9	0.11
GregSten1	1	10	11	0.09

There was a very low infection rate, and the susceptible control did not show symptoms, or positive ELISA results. This was attributed to the poor quality of infected leaves collected in the field, especially after hurricane Michael.
All allotraploids were multiplied in the greenhouse in the 2018 season, so there is enough seed for another round of experiments (wild seed number is a constant limitation). In the 2019 growing season, thrips will be collected again from the field near Griffin and Tifton, and new attempt to establish a viable of viruliferous thrips will be done. We hope to be able to then have a satisfactory screening experiment and identify wild sources of resistance.