

Introgression of a New Source of Strong Resistance to Root Knot Nematode from the Wild Species *A. stenosperma* into Elite Peanut Lines

PI: David Bertoli, University of Georgia, bertoli@uga.edu

Overview

The research, which begun about nine years ago, has now produced highly performing peanut lines with two new sources of nematode resistance. Root knot nematode (*Meloidogyne arenaria*) resistance has been confirmed in greenhouse and field tests, and field performance has been evaluated in two field seasons. In the 2021 field season, in unsprayed conditions, 9 nematode resistant lineages performed as well, or better, than the cultivar controls, with excellent yield, pod conformation and seed size. **With these results, the initial aim of incorporating two new sources of RKN into elite peanut genetic backgrounds is complete. The project will now advance field selections moving towards germplasm registration and cultivar release and combining the new nematode resistances with strong sources of Late Leaf Spot resistance.**

Results

In 2019, more than 250 third backcrossed plants derived from the elite breeding lines 5-646-10, 13-1014, and a tetraploid hybrid of *A. stenosperma* V10309 and *A. batizocoi* K9484 were generated and genotyped with 48,000 DNA markers distributed over the peanut genome revealing that they harbor genetic contributions from the wild species, varying in proportion from only about 1% to almost 20%. Over the 2020 and 2021 greenhouse and field seasons we have confirmed, and genetically tagged, two sources of nematode resistance in these lines (one from chromosome A02 and one from A09) and selected highly performing lineages. We used both manual field evaluations and the processing of drone images to accompany field trials with very promising results. **In the 2021 field season, in unsprayed conditions, 9 of these nematode resistant lineages performed as well, or better, than the elite cultivar controls, with excellent yield, pod conformation and seed size.** In addition, we took selected BC3 lines to the fourth backcross (considering cultivated peanut as a generic) using elite lineages 13-1125, 5-646-10 and 13-1014.

In the 2022 season we will begin the process of germplasm release; and advance field selections under sprayed and unsprayed conditions, and in fields infected and uninfected with root knot nematodes. We will cross selected lineages with other elite performing lines which have very strong wild species-derived Late Leaf Spot resistance.

