

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

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### Overview

The research, which begun about eight years ago, has now produced highly performing peanut lines with two new sources of nematode resistance. In the 2020 field season, these lines grown in Midville and Tifton had very good yield, pod conformation and seed size. In the 2020/21 winter season, greenhouse tests on selected plants confirmed resistance to root knot nematode (*Meloidogyne arenaria*). **With these results, the initial aim of incorporating two new sources of RKN into elite peanut genetic background is essentially complete. The project will now advance field selections moving towards germplasm registration and cultivar release.**

### Results

More than 300 putative third backcrossed plants derived from the elite breeding lines 5-646-10, 3-1014 from the Holbrook breeding program and a tetraploid hybrid of *A. stenosperma* V10309 and *A. batizocoi* K9484 were genotyped with 48,000 DNA markers distributed over the peanut genome. Analysis of the results confirmed that more than 250 of the plants did indeed harbor genetic contributions from the wild species, varying from only about 1% to almost 20%. Of these, 154 had the nematode resistance from chromosome A02 of *A. stenosperma*, and 69 had the nematode resistance from chromosome A09. Four progeny of each of these plants were grown at Midville, and two of each family were grown at Tifton, for single plant selection (1,338 plants in total). Of these, 190 plants had good architecture and overall strong disease resistance, and yielded in the range of the parental controls. The yield of 13 of these plants exceeded the best of the elite peanut parental controls (eg. Fig. 1). Pod and seed conformation were generally very good, with only a few plants producing more deeply constricted pods than the elite peanut parental controls. Progeny from 5 of the best lines were tested for nematode resistance in greenhouse assays in the winter season. Resistance for both the A02 and A09 chromosome sources was confirmed.



**Figure 1**

Left: 2019, field trials at Midville, GA. Selections were made on individual plants growing in a checkerboard design delineated by tractor tire tracks. The right hand line of individual plants are elite line controls, the other plants are backcrossed plants with two new sources of root-knot nematode resistance from the wild species *Arachis stenosperma*. Right: Pods harvested from a single plant harboring one of the new sources of root-knot nematode resistance (on A02). Note the quantity and conformation of pods.