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Grant Report *Sinal + Summary*
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Title: Cropping systems, Organic production, and Rotation Research for Peanuts

Project Leader (Alabama):

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Influence of crop rotation on disease and nematode activity as well as yield response of a peanut root knot (*Meloidogyne arenaria* race 2) resistant and susceptible peanut cultivar was assessed in a rotation study established at the Wiregrass Research and Extension Center in 1988. While 35 different rotation patterns were included, notable cropping patterns include peanut monoculture, one year of peanut cropped after one year of pearl millet, grain sorghum, soybean, or summer fallow (SF); one, two or three years of corn or cotton; one year of each of the former crops; and one, two, three, four, or five years of bahiagrass (B). Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The study was irrigated as needed. Beginning in 2009, a split plot design with rotation pattern as the whole plot and peanut cultivar as sub-plots was used. Whole plots, which consisted to twelve 50 foot rows spaced 3-feet apart, were randomized in four complete blocks. In each study year, the peanut root knot resistant cultivar Tifguard was planted on six randomly selected rows, while the peanut root knot susceptible cultivar Florida 07, which was planted in 2009 and 2010, or Georgia-06G, which was planted in 2011, was sown on the remaining six rows of each whole plot cropped to peanut. All plots received seven applications of Bravo Weather Stik 6F at 1.5 pt/A at 2-week intervals for leaf spot control. While TSWV incidence and leaf spot severity was assessed just prior to plot inversion, stem rot incidence was determined immediately after plot inversion. Soil samples for a nematode soil assay, which were collected prior to inversion, were processed using the sugar flotation method. Since there was no rotation x cultivar interaction for any variable, data were pooled across peanut cultivar and rotation sequence. While TSWV and stem rot incidence as well as leaf spot severity and root knot juvenile counts were higher for Florida 07 than Tifguard in 2009, yield was significantly higher for the former cultivar. While root knot juvenile counts were higher in 2010 for Florida 07 and Tifguard, stem rot indices as well as yield for both cultivars did not significantly differ. In 2011, similar leaf spot severity, stem rot indices, and yield were noted for Tifguard and Georgia-06G. Peanut cropping frequency often had a significant impact on leaf spot severity, stem rot incidence, root knot juvenile counts, and yield of peanut. Leaf spot severity was higher in 2009 for continuous peanuts when compared with the one, two, and three year out rotations. While stem rot incidence was consistently lower for the two and three year out rotations when compared with continuous peanuts, lower stem rot counts were recorded for the one year out rotation pattern in two of three years. Higher root knot juvenile counts were recorded for continuous peanuts than the 3 year but not 1 and 2 year out rotation patterns. In all study years, yields were significantly higher for the 1, 2, and 3 year out rotation patterns than continuous peanuts. In two of three years, higher yields were recorded for the 2 and 3 year compared with the 1 year out rotation patterns. Summary of the above data was presented at the 2012 APRES Annual Meeting and Wiregrass Research and Extension Center Field Day on August 23, 2012.

The above study is being repeated in ²⁰¹³ ~~2012~~. While TSWV incidence on both Tifguard and Georgia-06G is low, considerable rotation influenced differences in leaf spot intensity and stem rot incidence, as well as root and pod damage attributed to the peanut root knot nematode. Mean values for the above variables as well as yields and grades will be available at a later date as will the yields for the other rotation partners.

Publication:

Hagan, A. K., H. C. Campbell, K. L. Bowen, and L. Wells. 2012. Disease, nematode activity and yield response of a peanut root knot and susceptible peanut cultivar as influenced by crop rotation. *Am. Pnut. Res. Ed. Soc.* 44 (in press).