

Project Report
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Summary

Title: Cropping systems, Organic production, and Rotation Research for Peanuts

Project Leader (Alabama):

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Report: A rotation study was begun in 2003 at the Gulf Coast Research and Extension Center to assess the impact of crop rotation on disease and nematode pests of peanut, cotton, and corn. The study site was previously planted to corn, peanut, and other assorted crops but not to cotton. During the 8 year study period, no foliar diseases were noted in cotton. High numbers of root knot nematode juveniles were occasionally recovered from soil samples collected from plots cropped to cotton, particularly in 2007 (Table 1). Subsequent analysis showed that the southern root knot nematode (*Meloidogyne incognita* Race 1), which is not a parasite on cotton was present, but is of some the weeds found in the study area. In the absence of the cotton root knot or reniform nematodes, cotton cropping frequency had little impact on lint yields. With almost no exceptions, continuous cotton yields did not greatly differ for cotton cropped behind one, two, or three years of either corn or peanut, both of which proved equally valuable cotton rotation partners. In contrast to cotton, cropping frequency had a significant impact on the intensity of leaf spot diseases, pod yield and to a lesser extent stem rot in peanut. Over the study period, leaf spot intensity was higher except in 2005 for continuous peanut compared with peanut cropped after one year of either cotton or corn. Further reductions in leaf spot intensity were noted, particularly in 2009 and 2010, when two and years of cotton and/or corn, respectively, proceeded peanut. When peanut were cropped for two consecutive years in 2007 and 2010, leaf spot intensity levels were similar where peanut followed peanut in 2007 and 2010 and for continuous peanut. In contrast to leaf spot diseases, cropping frequency had very limited impact on stem rot incidence in peanut except in 2010, when higher stem rot incidence was noted in peanut cropped for two or more consecutive years as compared with peanut behind one or two years of cotton or corn. Peanut yield was noticeably influenced by cropping frequency. The value of crop rotation as a tool for enhancing peanut yields was noted as early as the 2nd study year, when higher yields were obtained for peanut cropped behind one year of cotton or corn as compared with two consecutive years of peanut, except for 2006 and 2008, when yields for both cropping patterns were similar. Sizable yield gains were not always noted where peanut followed two or three as compared with only one year of cotton or corn. As was noted on cotton, root knot juveniles were often recovered from the plots cropped to corn but the root knot nematode species was *Meloidogyne incognita* Race 1 (southern root knot). For several years, cropping frequency had no impact on corn yield. Similar yields were seen for corn cropped for two up to five consecutive years as compared with one or more years of cotton or peanut. Later, higher yields were observed for corn following a least one year of cotton or peanut than six or more years of corn monoculture. With the exception of the corn monoculture after 2008, yield for the remaining corn cropping patterns did not greatly differ.

Reports for the rotation studies at GCREC and PBU can be viewed in the AAES Disease Control Field Trial(s) 2010: Standard Fungicide Trials - <http://www.aes.auburn.edu/comm/pubs/entplp/entplp15b.pdf>.

Prepared by Austin Hagan, Professor and Extension Plant Pathologist.