

Sustaining Cost-Effective Peanut Production in a Long-Term Peanut-Cotton Rotation
Extended Funding Period Ending 2003

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Objectives:

1. Develop a cost-effective peanut production system in a center-pivot irrigated peanut-cotton rotation that is based on the principles of integrated pest management, best crop management practices, and irrigation water stewardship.
2. Develop systems of reduced pesticide use in peanut production in two tillages using expert systems, host-plant resistance to pests, and modified cultural practices.

This research project, conducted at sites in Georgia, Alabama, and Florida, is fully operational and progressing according to plan. All facilities are fully operational. Four years data has been collected from the Georgia site, and three years data from each of the other two sites. Already, these trials are showing interesting trends in pest densities and overall crop management. Through 2002, perennial weeds became the predominant pests in continuous conservation tillage systems in Georgia and Alabama, significantly increasing costs of production and greatly reducing peanut and cotton yield in strip-tillage systems compared to conventional-tillage systems. The perennial weeds of significance were yellow nutsedge and common bermudagrass. In 2002, mid-season yellow nutsedge densities were >100 plants/m² in fields with continuous strip-tillage, compared to yellow nutsedge at 5 plants/m² in plots with conventional tillage. Similar trends were seen with common bermudagrass. In 2002, costs of weed control in strip-tillage systems were more than 5x the costs of weed control in conventional tillage systems. Weed control measures were altered beginning in 2003 and yellow nutsedge and common bermudagrass were effectively and economically controlled in the strip-tillage system. Mid-season weed counts in 2003 showed yellow nutsedge densities < 1 plant/m² in strip-tillage systems. Furthermore, peanut yields were 10% greater in strip-tillage systems than in conventional-tillage systems in 2003. Spotted wilt (average of 12% infection) was less in 2003 than in previous years, yet Georgia Green peanut had more spotted wilt than C99R peanut. In addition, conventional tillage peanut had more spotted wilt than strip-tillage peanut. These results are consistent with previous research and current recommendations to manage the disease. Of interest is the management of late leafspot between the two cultivars. Georgia Green peanut is treated with fungicides (chlorothalonil and Abound®) applied at biweekly intervals, for a total of eight applications per season. In contrast, C99R has resistance to many diseases of peanut and was treated with fungicides only four times per season. Despite receiving fewer fungicide applications, C99R peanut had less leafspot than Georgia Green, resulting in a substantial savings in C99R production.

At the Florida site, systems that depended heavily on glyphosate for weed control (strip-tillage systems and systems in cotton that used glyphosate-resistant cultivars) had a radical weed population shift to the noxious weed tropical spiderwort. This species is very difficult and costly to control in both crops and significantly reduced yield. Paralleling the weed species shift in our

trials, this weed has also quickly emerged to be one of the most troublesome weeds of peanut and cotton in the southeastern U. S. Weed management systems at the Florida site are constantly being modified to find a cost effective means to control tropical spiderwort and reduce overall densities.

In conclusion, these preliminary results show how peanut and cotton production offers unique challenges based on location-specific pests, often related to the tillage system being used. At all three locations, we successfully modified crop and pest management practices according to situations and challenges encountered. Among other specific conclusions, these preliminary data also show the need for peanut and cotton growers to be attentive to pest dynamics and growing conditions, and modify their production systems accordingly.