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FLORIDA AGRICULTURAL EXPERIMENT STATION
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

Final
Check-OFF Funds – Report- Peanuts
Summary

UNIT: University of Florida, IFAS
North Florida Research and Education Center
155 Research Road
Quincy, FL

DATE: 2-5-2010

TITLE: Eliminating TSW as a Production Factor in Peanut in the SE
ii) Investigators:

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iii) Objectives: 1) To assess the impact of bahiagrass, winter cover crops, fallow and turned bahia on tomato spotted wilt on the following peanut crop.
2) To determine the impact of planting date (mid April and mid May) on TSW on two peanut cultivars, GA Green and Florida 07 when planted in the different cropping systems.
3) To determine economics of the system with bahiagrass vs. conventional cropping systems

METHODS: The experiment was conducted in 2009 at Quincy (North Florida Research and Education Center, University of Florida). Soil type of the experimental field is Dothan sandy loam (fine-loamy, kaolinitic, thermic Plinthic Kandiudult). The experiment included two cropping sequences as main plots bahia-cotton-oat-peanut (BCOP), and bahiagrass-bahiagrass-peanut (BBP) with either winter fallow or an oat cover crop. Winter oat cover crop was killed by spraying glyphosate at heading. An additional conventional tilled plot had oat that was killed at hard dough stage. The early planting dates were 15 April 2009, and the normal planting date of 15 May 2009. Georgia Green (GA Green) was used as test variety. Bahiagrass was killed in the fall with 3 qts. Roundup Weather Max per acre, and rows strip tilled using a Brown Ro-Till implement (Brown Manufacturing Co., Ozark, AL) in early April, prior to peanut planting. Peanut was seeded with a Monosem planter with a row space of 3 feet and six seeds per foot row and at both planting dates. There were 8 rows in each plot with a plot length of 40 feet. No insecticides were applied throughout the course of the experiment. Foliar and stem rot diseases were controlled using proprietary fungicides and irrigation was scheduled as and when needed based on peanut production practices in the region.
Four center rows of plots were assessed for symptoms of spotted wilt on monthly basis and the number of plants exhibiting spotted wilt symptoms recorded. Peanut yields were estimated based on pod dry weight in the middle four rows form where spotted wilt assessments were conducted. Market pod grading characteristics, including percentages of sound mature kernels (SMK), sound split kernels (SSK), other kernels (OK), hulls, and tomato spot wilt virus (TSWV)

infection, were determined in a commercial peanut quality laboratory.

The experiments were a split-split plot design with four replications. The rotation (cropping sequence) was main plot, with planting date sub-plot. Statistical analysis was performed using SAS procedures of GLM to determine the main and interactive effects of rotation and planting date.

RESULTS AND CONCLUSIONS:

Highest yield from planting date 1 (mid April) was obtained when area under disease progress curve (AUDPC) was the smallest indicating the least amount of disease. Peanuts planted after bahiagrass had higher yields than that planted after cotton which had been planted after bahiagrass the year before. Peanuts planted after a cover crop had higher yields than that planted after winter fallow even when it followed bahiagrass. Conventional tillage reduced yield as compared to the same treatment with strip tillage and had higher AUDPC with tillage. As shown in figure 1 below where BBopStrip=2yr bahia, oat, peanut striptilled; BBxPStrip=2yr bahia, fallow, peanut striptilled; BBopConv= 2yr bahia, oat, peanut planted after plowing; BCoPStrip= 1year bahia, cotton, oat, peanut striptilled.

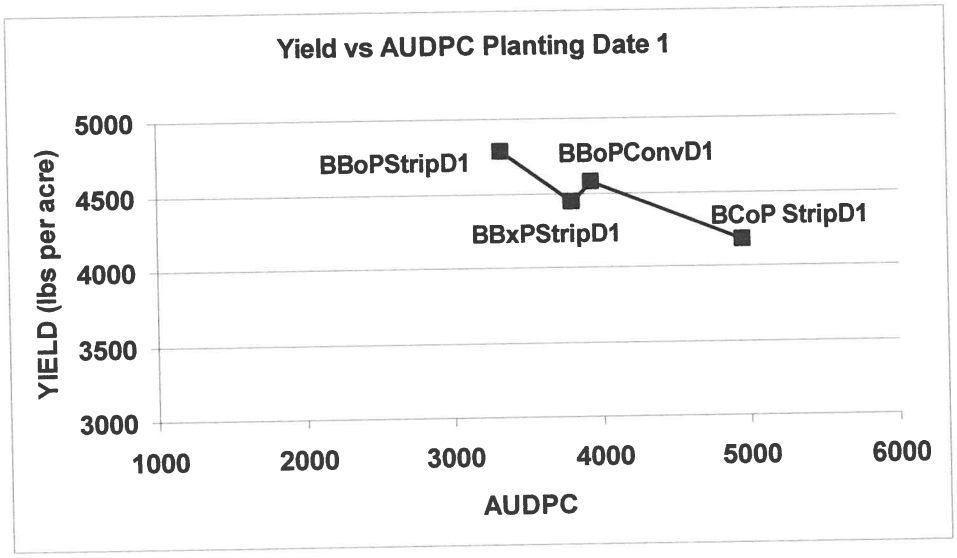

Fig. 1. Relationship between disease and yield of peanut with different tillage methods after Bahiagrass when planting in mid April.

Highest yield from planting date 2 (mid May) was obtained when AUDPC was the smallest except when peanut was planted after cotton and had the most disease but yield was not different from highest yield after bahia. However, yields were lower in the second planting date due to deer damage than in the first planting date since deer foraged on the younger peanuts.

Conventional tillage reduced yield as compared to the same treatment with strip tillage and had higher AUDPC with tillage. This verifies previous research that tillage increases TSWV and can result in decreased yields as shown in figure 2 below where BBopStrip=2yr bahia, oat, peanut striptilled; BBxPStrip=2yr bahia, fallow, peanut striptilled; BBopConv= 2yr bahia, oat, peanut planted after plowing; BCoPStrip= 1year bahia, cotton, oat, peanut striptilled.

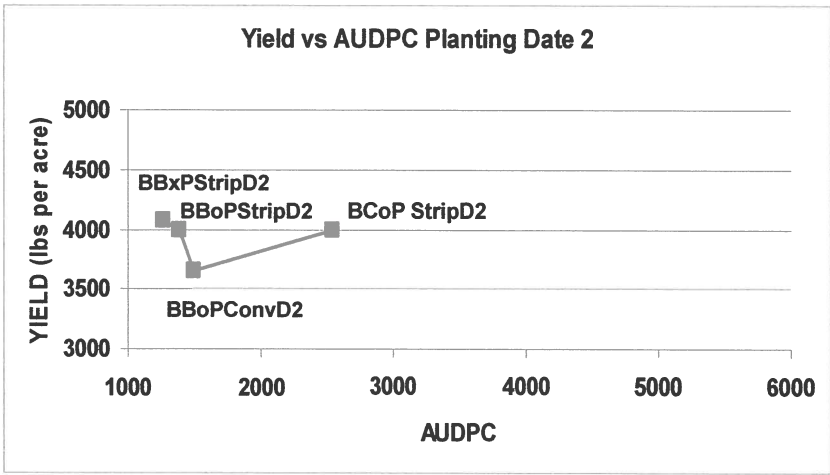

Fig. 2. Relationship between disease and yield of peanut with different tillage methods after Bahiagrass when planting in mid May.

Table 1. Yield and grades of peanuts with different planting dates, rotations and tillage, 2009.

Treatment	Yield	smk	ok	tswv
BBoP ConvD1	4572	68	4.13	0.56
BBoP ConvD2	3658	67	4.38	0.65
BBoP StripD1	4778	67	4.75	0.61
BBoP StripD2	3988	67	3.88	0.43
BBxP StripD1	4444	67	4.38	0.58
BBxP StripD2	4069	68	5.13	0.63
BCoP StripD1	4175	68	4.38	0.68
BCoP StripD2	3986	67	4.25	0.78

BBopStrip=2yr bahia, oat, peanut striptilled; BBxPStrip=2yr bahia, fallow, peanut striptilled; BBopConv= 2yr bahia, oat, peanut planted after plowing; BCoPStrip= 1year bahia, cotton, oat, peanut striptilled. Smk =sound mature kernels, ok= other kernels, tswv=tomato spotted wilt average ratings over the season.

Figure 3 below shows the tomato spotted wilt ratings over time with BBopStrip=2yr bahia, oat, peanut striptilled; BBxPStrip=2yr bahia, fallow, peanut striptilled; BBopConv= 2yr bahia, oat, peanut planted after plowing; BCoPStrip= 1year bahia, cotton, oat, peanut striptilled and D1= mid April planting and D2= mid May planting.
Lowest tswv ratings came from the second planting date which is why we have recommended later planting since this disease has become prevalent. Intermediate levels of tswv were noted when peanuts were planted after cotton even at the later date and was not different in the latter readings from early planted peanuts following oats after bahia was fall killed. This indicates that if farmers needed to plant early that tswv would do less damage after bahiagrass than other cropping systems. The higheset amount of tswv at the end of the last rating came from cotton planted early after cotton.

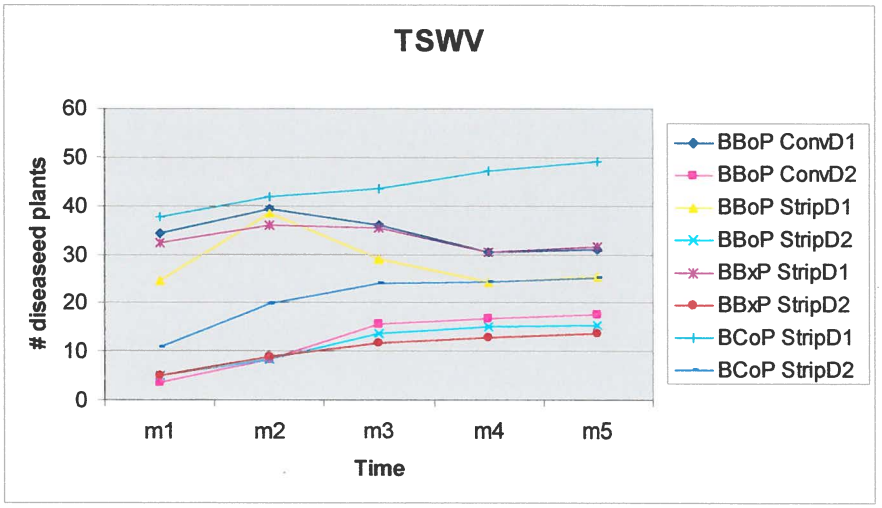

Fig. 3. Tomato spot wilt virus ratings over time with different planting dates, rotation, and tillage.

Conclusions:

Peanuts planted after bahiagrass have less tswv than peanuts planted after cotton even though that is a standard recommendation. Mid April planting in 2009 resulted in higher yields even with higher tswv than mid May planting, however, we think some of this was due to deer damage noted on the younger peanut plants. In 2008, peanuts planted after bahiagrass were higher yielding and indicated that higher yields could be obtained even from early planting. More research I needed to confirm these observations since early planted peanuts did better in 2009.

Expenditures:
Funding was used for labor for running studies and for seed, fertilizer and chemicals. Peanut grading is paid for from this funding.