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TITLE: Evaluation of Cultural and Pest Management Practices to Optimize Peanut Production

DEPARTMENT: Crop Science

LEADER: David Jordan

Experiments were conducted during 2006 to determine the impact of planting peanut into the desiccated cover crops wheat, oats, annual ryegrass, cereal rye, and triticale compared with planting peanut in stale seedbeds. In these experiments beds were prepared the previous fall with a strip tillage operation performed in the spring prior to planting peanut. As was noted from the experiment during 2005, yellow nutsedge and common ragweed control did not differ among cover crops treatments regardless of herbicide programs. Research was conducted to verify common ragweed resistance to ALS (acetolactate synthase inhibiting)-herbicides. At this location, applying Strongarm at five times the manufacturer's suggested use rate did not kill common ragweed. In previous work, rates as low as 0.25 times the manufacturer's suggested use rate killed common ragweed. This experiment emphasizes the need for growers and their advisors to be diligent in preventing resistance from developing. County agents and other agribusiness personnel toured this field and observed the resistant common ragweed, and during the tour management approaches to minimize development of resistance were discussed. There was no difference in foliar disease development or incidence of tomato spotted wilt regardless of cover crop when compared with incidence in stale seedbed systems. In a different experiment, the interaction of fungicide program (no fungicides, two sprays of fungicide applied early in the season, and season-long bi-weekly applications) and digging dates (three dates spaced approximately 10 days apart) was evaluated at the Upper Coastal Plain and Peanut Belt Research Stations. Additional treatments included a "salvage" treatment applied in late September. In this trial, the highest peanut yield was noted when peanut was dug at optimum maturity (based on pod mesocarp color) and when fungicides were applied bi-weekly). Salvage treatments did not increase yield regardless of the previous fungicide program and the amount of disease incidence and defoliation observed. Additionally, digging peanut prior to optimum maturity (based on healthy peanut receiving bi-weekly applications) to avoid pod shed and theoretically to maintain pod yield did not result in higher yields compared with peanuts remaining in the field exhibiting considerable defoliation. These yield these trials suggest that digging date fungicide programs (and subsequent defoliation and possible pod shed) behave independently. The interaction of weather conditions, field histories, cultivar, and levels of disease pressure contribute to variability and defining a precise percentage of defoliation to initiate digging peanut early. During the 2006, peanut was planted in all plots in five of the long-term rotation trials to compare peanut yield and pest reaction in a variety of cropping systems. Host-plant resistance (varieties Perry or NC 12C versus Gregory), peanut response to inoculants, and peanut response to fumigation were compared within rotation systems. Soil samples were removed from all plots during the fall of 2006 to determine nematode populations in the various cropping systems. Bulk density was determined in the pegging zone within one week prior to digging in the experiments containing rotation and tillage components. Although results were somewhat variable, some general conclusions can be made. Bulk density in the pegging zone did not differ among cropping systems or tillage systems on Goldsboro or Norfolk soil series. This was not unexpected because the reduced tillage system was strip tilled and ripped. Some differences were noted when comparing regions that were not tilled over since inception of the experiment. Peanut yield was similar in conventional, stale seedbed (establishing rows without other tillage practices,) and strip tillage into the previous crop stubble on the Norfolk soil series. In contrast, yield was lower on the Goldsboro series when peanut was strip tilled into residue of the previous crop compared to conventional or stale seedbed systems. No difference in yield was noted when comparing conventional and stale seedbed systems. As expected, peanut yield was higher in a three-or-

more-year rotation (three rotation crops between peanut crops) compared with a one-year rotation. However, no clear trend was noted with respect to peanut response to inoculant. However, in some instances yield increased following inoculant even in a one-year rotation sequence. The cultivar Gregory was much more susceptible to CBR than NC 12C or Perry, and in some instances this was particularly evident when comparing fumigation treatments and rotation sequence. Nematode samples are currently being processed. In the long-term rotation experiments with fescue versus high-residue, reduced tillage cropping, bulk density in the fescue sod was lower than density in the traditional cropping system.

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PROGRESS REPORT
TO
NATIONAL PEANUT BOARD

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DEPARTMENT: Crop Science

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In a different experiment, the interaction of fungicide program (no fungicides, two sprays of fungicide applied early in the season, and season-long bi-weekly applications) and digging dates (three dates spaced approximately 10 days apart) was evaluated at the Upper Coastal Plain and Peanut Belt Research Stations. Additional treatments included a "salvage" treatment applied in late September. In this trial, the highest peanut yield was noted when peanut was dug at optimum maturity (based on pod mesocarp color) and when fungicides were applied bi-weekly). Salvage treatments did not increase yield regardless of the previous fungicide program and the amount of disease incidence and defoliation observed. Additionally, digging peanut prior to optimum maturity (based on healthy peanut receiving bi-weekly applications) to avoid pod shed and theoretically to maintain pod yield did not result in higher yields compared with peanuts

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During the 2006, peanut was planted in all plots in five of the long-term rotation trials to compare peanut yield and pest reaction in a variety of cropping systems. Host-plant resistance (varieties Perry or NC 12C versus Gregory), peanut response to inoculants, and peanut response to fumigation were compared within rotation systems. Soil samples were removed from all plots during the fall of 2006 to determine nematode populations in the various cropping systems. Bulk density was determined in the pegging zone within one week prior to digging in the experiments containing rotation and tillage components. Although results were somewhat variable, some general conclusions can be made. Bulk density in the pegging zone did not differ among cropping systems or tillage systems on Goldsboro or Norfolk soil series. This was not unexpected because the reduced tillage system was strip tilled and ripped. Some differences were noted when comparing regions that were not tilled over since inception of the experiment. Peanut yield was similar in conventional, stale seedbed (establishing rows without other tillage practices,) and strip tillage into the previous crop stubble on the Norfolk soil series. In contrast, yield was lower on the Goldsboro series when peanut was strip tilled into residue of the previous crop compared to conventional or stale seedbed systems. No difference in yield was noted when comparing conventional and stale seedbed systems. As expected, peanut yield was higher in a three-or-more-year rotation (three rotation crops between peanut crops) compared with a one-year rotation. However, no clear trend was noted with respect to peanut response to inoculant. However, in some instances yield increased following inoculant even in a one-year rotation sequence. The cultivar Gregory was much more susceptible to CBR than NC 12C or Perry, and in some instances this was particularly evident when comparing fumigation treatments and rotation sequence. Nematode samples are currently being processed. In the long-term rotation experiments with fescue versus high-residue, reduced tillage cropping, bulk density in the fescue sod was lower than density in the traditional cropping system.

IMPACT STATEMENT:

Results form these experiments will help producers make more informed decisions about cover crop use in reduced tillage systems. Additionally, results suggest that salvage applications of fungicides in late September most likely will not increase yield and that digging prior to optimum maturity will not increase pod yield when defoliation is significant (as high as 70% defoliation). Long-term tillage/rotation trials will further define whether or not fumigation or inoculation are needed in various cropping systems and to what extent host-plant resistance replaces the need for fumigation.