Effect of Winter Cover Crops on Peanut in Rotation with Cotton

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Winter cover crops can potentially decrease inputs on crop production, improve yield and soil health, reduce soil erosion, conserve moisture, and protect water quality. They can also be harvested to supply biomass used to feed livestock or for bio-based fuels. Row crops such as peanut (*Arachis hypogaea* L.) and cotton (*Gossypium hirsutum* L.) are important summer crops in Georgia, commonly used in rotation with each other in SE, and could benefit from the use of winter cover crops. The objectives of this study are to evaluate three winter crops (lupin (*Lupinus albus L.*.); narrow-leaf lupin (*Lupinus angustifolius L*.); cereal rye (*Secale cereale L*)) and their combination for biomass production and crop quality, and their subsequent effect on the production of peanut in rotation with cotton. The study was conducted at three sites in South Georgia: Tifton, Fort Valley, and Shellman in the years of 2018 and 2019. The experimental design is a split-split-plot, with peanut and cotton as the main plot treatments, cover crop as subplot treatments and winter cover crop termination (harvest, rolled) as sub-sub-plots. Measurements for cover crops included percent ground cover, mid-season biomass and final yield. Measurements for peanuts included final yield, imagery of canopy coverage and final biomass. Results for the year of 2018, first year after the implementation of cover crops did not show a clear relationship between the yield of peanuts with the cover crops and the crop termination system, with yields varying from3554 kg/ha to 5129 kg/ha. Winter cover crops showed significant biomass differences, with lupin and narrow-leaf-lupin having the largest final biomass production, and rye the lowest for the first two years of the study. Yields for peanut were lower during the second year of the rotation due to a hot and dry season, ranging from 2439 kg/ha to 4472 kg/ha. Differences were not observed between treatments for the 2019 year as well. Winter cover crops are beneficial for soil health and consecutively positive effects on the following crop, improvements may be observed after successive cycles of the rotation.