

Cover Crop Response to Residual Herbicides in Peanut-Cotton Rotation

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Cover crops can provide many benefits to peanut and cotton rotation in terms of suppressing weeds, conserving soil moisture for planting, increasing soil organic matter, and reducing soil erosion. However, in fields where residual herbicides were used during the growing season, establishment of cover crops can be negatively affected by the herbicide residues. The objective of this study was to investigate the responses of six cover crops (daikon radish, cereal rye, cocker oats, crimson clover, winter wheat, and common vetch) to twelve common soil herbicides used in peanut and cotton. A multi-year (2016-2018), multi-location study was conducted in Macon and Henry County in Alabama. At 50 and 150 days after planting (DAP), plant heights and stand counts were evaluated as well as wet biomass at 150 DAP. Herbicide treatments were applied at 10% of labelled rate at planting. Treatments included S-metolachlor, acetochlor, pyroxasulfone, diclosulam, imazapic, chlorimuron ethyl, bentazon plus acifluorfen, pyriithiobac sodium, trifloxysulfuron sodium, diuron, prometryn, flumioxazin, and a non-treated check (NTC). In 2016, significant stand reductions ($p \leq 0.05$) of 30-52% in rye and 28-75% were observed in wheat 50 DAP for S-metolachlor, acetochlor, pyroxasulfone, diclosulam, imazapic, chlorimuron ethyl, and bentazon plus acifluorfen treatments over both locations. Vetch had significant stand reductions for all twelve treatments at 50 DAP ranging from 12.53% to 80.21% over both locations. S-metolachlor, pyroxasulfone and acetochlor had the largest impacts on stand counts for rye, wheat and vetch. Daikon radish only had significant height reductions of 9, 15, 31% at 50 DAP for diuron, chlorimuron ethyl, and imazapic, respectively, in Macon County. At 145-149 DAP, all affected cover crops had recovered from herbicide damage and did not show any significant treatment differences in any of the growth parameters evaluated in 2016. In 2017, wheat had a significant stand reduction of 24% for flumioxazin at 42-45 DAP over both locations. No other cover crop evaluated in 2017 had a significant stand or height reduction for any treatments at 42-45 DAP. Oats showed the most tolerance with no treatments significantly reducing stands or plant heights in 2016 and 2017. Overall, the type of cover crop planted should be based on the residual herbicides applied to row crops the previous season as well as the biomass and nutrient needs of the field. Although initial injury and stunting may occur, biomass of those cover crops may not be affected by herbicide residues.