Cover Crop Response to Residual Herbicides in Peanut-Cotton Rotation

Steve Li. Extension Specialist, Assistant Professor. Auburn University

Introduction

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, reducing soil erosion, etc. However, in fields where residual herbicides were used during the previous crop, establishment of cover crops could be negatively affected by the herbicide residues. The use of residual herbicides has increased especially in areas with herbicide resistant weeds. While herbicide labels list rotation intervals for common row crops, they often do not address cover crops. Herbicide carryover can reduce the efficacy of a cover crop, wasting time and money for producers. Limited rainfall, high organic matter content, repeated usage and late applications can increase risk of herbicide carryover which can vary from year to year due to rainfall, temperature, application timing, and rates. If herbicide carryover is a concern, a resilient cover crop should be selected for that field. As the usage of cover crops increases throughout the southeast, more research needs to be done to evaluate different cover crop responses to residual herbicides. The objective of this study was to investigate the responses of 6 common cover crops (daikon radish, cereal rye, cocker oats, crimson clover, winter wheat, and common vetch) to 12 common soil herbicides used in peanut-cotton rotation.

Methods

Herbicides effects on plant height, stand count, and percent coverage of each crop cover were evaluated at 50 and 145 days after planting (DAP), as well as biomass at project termination. Herbicide treatments (Table 1) were applied at the day of planting. Each herbicide was sprayed at 10% of label rate to simulate herbicide carryover from cotton and peanut production. All treatments were irrigated into the field within 3 days of application. This study was conducted at two locations Wiregrass Research Extension Center in Headland, AL and E.V. Smith Research and Extension Center in Tallassee, AL.

Results

Overall, vetch was the most sensitive cover crop with all 12 herbicides significantly reduced its stand count 50 days after planting. Initially Dual Magnum, Warrant, Zidua, Strongarm, Cadre, Classic, and Storm treatments reduced stand counts for rye (30%-50% reduction) and wheat (30%-75% reduction). Dual Magnum, Zidua and Warrant had the largest impacts on stand counts for vetch, rye and wheat (Table 1). Radish showed significant reduction plant heights 50 DAP at Tallassee for Direx, Cadre, and Classic but not at Headland. The cause of the radish only being sensitive at one location is likely due to soil pH differences. However, by the end of the season, all four cover crops (vetch, rye, wheat and radish) had outgrown initial stunting. Caporal significantly reduced ground cover for clover at the end of the season. Biomass data from non-treated plots showed the top three highest residue-producing cover crops were, clover (averaged 13,631 lbs/A), oats (averaged 12,308 lbs/A) and vetch (averaged 10,910 lbs/A). Oats showed the most tolerance with no herbicides effecting any growth parameter evaluated throughout this study and it had the most consistent biomass for each herbicide treatment.

Figure 1: At 50 days after application, vetch stand treated with Cadre at 0.4 oz/a (left photo) was significantly different from the non-treated check (right photo).

Chemical	Rate	Vetch	Rye	Wheat	Radish	Clover	Oats
Dual Magnum	0.13 pt/a	**3**	**3**	**3**	1	1	1
Warrant	0.3 pt/a	**3**	**3**	**3**	1	1	1
Zidua	0.3 oz/a	**3**	**3**	**3**	1	1	1
Strongarm	0.045 oz/a	2	1	1	1	1	1
Cadre	0.4 oz/a	2	1	1	2	1	1
Classic	0.05 oz/a	2	1	1	2	1	1
Storm	0.15 pt/a	2	1	1	1	1	1
Staple LX	0.38 oz/a	2	1	1	1	1	1
Envoke	0.045 oz/a	2	1	1	1	1	1
Direx	2.4 oz/a	2	1	1	2	1	1
Caparol	0.4 pt/a	2	1	1	1	2	1
Valor	0.3 oz/a	2	1	1	1	1	1

Table 1: Injury Potential: 1= Low risk of injury, 2 = Some risk depending upon herbicide rate, application timing and environmental conditions. 3= High risk of injury affecting cover crop establishment

Summary

When selecting cover crop, producers need to take into account any residual herbicide use and the goal of the cover crop (i.e. weed suppression, erosion control, building N and C in soil, high residue, etc.). In this study, vetch is the most sensitive crop cover to herbicides while radish, rye and wheat showed sensitivity to three herbicides tested. We recommend producers utilize oats as cover crop when there is a concern for residual herbicide injury, especially if Dual Magnum, Zidua or Warrant residues are present in soil. Clover also showed decent tolerance to most of the herbicides evaluated in this study. If high residue is the goal and herbicide carryover is not a concern then clover, oats or vetch can all be good options. **This study will be repeated in the fall of 2017 and more results will be available in 2018.**

Questions? Please contact:

Dr. Steve Li,

Extension Weed Scientist, Assistant Professor

Department of Crop, Soil and Environmental Sciences

Auburn University

334-707-7370; steveli@auburn.edu