Chapter 5

Peanut Performance and Weed Management in a High-residue Cover Crop System

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Additional information is available at the end of the chapter

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Abstract

Previous research has indicated that conservation tillage is a viable option for successful peanut production; however, interactions between cover crop residues and peanut growth are not fully understood. Additional information is needed about the effects of varying levels of cover crop biomass on peanut growth and development. Level of cover crop residue may also affect the preemergence herbicide activity through interception and efficacy of weed suppression. The objectives of this peanut research were to determine if varying amounts of cover crop biomass would affect peanut growth, herbicide interception, or weed control. This research also aimed to determine if cover crop management practices (rolling or standing cover) would affect herbicide interception rates. The study consisted of a rye (*Secale cereale* L.) cover crop planted at three different dates as well as a fallow treatment at two locations: Dawson, GA, and Headland, AL. Pendimethalin was applied PRE at 1 kg ai/ha across the entire area just prior to planting of the Georgia 03-L peanut variety. Soil samples were collected at three different dates after planting for high-pressure liquid chromatography (HPLC) analysis to determine pendimethalin levels. Peanut yields differed only between location regardless of cover crop residue level with the Headland, Alabama, site averaging 4,272 kg/ha and the Dawson, Georgia, site averaging 2,247 kg/ha. Pendimethalin extraction from soil samples indicated no difference in herbicide recovery between winter fallow systems compared to treatments with cover crops. Weed control ratings taken at 21 and 45 days after planting (DAP) showed greater weed suppression for cover crop systems for an extended period of time when higher levels of cover crop biomass are present. Results of this experiment indicate the inclusion of cover crops in a conservation-tilled peanut system can be a successful alternative to winter fallow systems without reducing peanut yield or herbicide efficacy.

Keywords: Conservation tillage, high-residue cover crops, peanut production

1. Introduction

Peanut offers significant value to agricultural producers in the southeastern United States each year with approximately 530,000 ha harvested in the United States in 2014 [1]. In recent years, time and money savings offered by conservation systems through reduced labor and tillage practices have led to an increase in peanut production under these systems [2–6]. Governmental incentives offered to producers meeting certain criteria pertaining to the practice of conservation tillage have also aided in increasing adoption rates of these practices [7].

In addition to reduced production costs, other benefits of conservation tillage are well recognized throughout agricultural literature, including reduced soil and water loss, increased soil organic matter, improved soil structure, higher-quality stand establishment, and less incidence of disease [8–12]. Cover crop integration into conservation tillage systems further enhances benefits achieved through reduced tillage practices when compared to winter fallow systems [13–16]. Despite the advantages and growing interest, peanut production under conservation tillage systems still lags behind conventional production methods owing to producer concern over yield reduction either through digging losses or through reduced pegging due to cover crop residue impediment [17–19]. Furthermore, the use of cover crops with high biomass may reduce the efficacy of preemergent herbicides and increase producer reliance on postemergent formulations [20–22].

Since the introduction of dinitroaniline herbicides, such as pendimethalin, peanut producers have been integrating this soil-applied, preemergent herbicide into the herbicide regime in order to achieve weed suppression of small seeded annuals [23]. The use of these soil-applied herbicide treatments provides residual activity for several problematic weed species and can reduce the dependency on postemergent herbicide formulations. The growing interest in conservation tillage systems, specifically strip-tillage, in peanut has created an even greater demand for successful herbicide treatment plans due to the loss of weed control from weed seed burial through tillage [24,25].

Pendimethalin is frequently used in reduced-tillage systems due to its high water solubility and low volatility in comparison with other dinitroaniline herbicides [26]. However, there is uncertainty as to whether an acceptable level of weed control can be achieved in peanut systems that include a high level of cover crop biomass due to a physical barrier of residue impeding the movement of the herbicide to the soil surface. Efficacy of pendimethalin, which is tightly sorbed to plant residue, can subsequently be reduced if substantial amounts of the herbicide are intercepted by the cover crop biomass [27,28].

Further questions also remain in regard to cover crop management practices and their role in reducing cover crop interaction with soil-applied herbicides in reduced-till peanut systems. Typical termination practices for cover crops include treating the cover with a nonselective herbicide (glyphosate or paraquat) 2–4 weeks prior to the primary crop plant date and leaving standing residue as a cover [29]. Standing residue will reduce soil and water loss but can hinder planting operations by clogging the planter between the row cover [30]. Mechanically rolling or crimping plant residue, used in conjunction with termination herbicides, is another option

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for effectively managing cover crops prior to planting [29]. This management system, although less frequently used, increases cover crop termination efficacy with the inclusion of an herbicide while effectively creating a dense layer of residue. This layer of cover crop biomass can reduce soil moisture evaporation, subsequently reducing soil strength in comparison with standing residue, and reduce weed seedling emergence [31,32]. While there are many benefits to rolling cover crop residue, concerns exist in regard to increased interception of preemergent herbicides by a dense horizontal layer of plant matter covering the soil surface.

The objectives of this study were to determine the impact of differing levels of biomass residue on peanut production systems in terms of yield and weed control. Moreover, we hope to determine how herbicide interception is affected in different levels of biomass as well as under different termination management strategies to include standing residue and mechanically rolled residue practices.

2. Materials and methods

Field experiments were conducted from the fall of 2006 to the fall of 2008 at the Hooks Hanner Environmental Resource Center in Dawson, GA, and the Alabama Agricultural Experiment Station's Wiregrass Research and Extension Center (WREC) in Headland, AL. Soil types were mostly a Greenville sandy clay loam (fine, kaolinitic, thermic Rhodic Kandiudults) at the Georgia site and a Dothan fine sandy loam (fine-loamy, siliceous, thermic Plinthic Paleudults) at the Alabama site. Experimental layout was a randomized complete block split-plot restriction design with three replications at each site. The main effect of cover crop residue levels (low, medium, high, or fallow) was determined by planting date. Subplots consisted of cover crop termination practice (herbicide and herbicide plus rolling) and herbicide selection (paraquat and glyphosate).

Three fall planting dates of rye (*Secale cereale* L.) spaced approximately 30 days apart were conducted from October through December at each location for both years. Seeding rates were 100 kg/ha at the Headland and Dawson sites. Cover crops were planted using a Great Plains No-Till[1] drill. Termination of rye and fallow plots was conducted in early May, 3 weeks prior to peanut planting (except at the Dawson site where planting was delayed until June for both years) with either glyphosate at 1.7 kg ai/ha or paraquat at 0.84 kg ai/ha. Aboveground ¼ m^2 biomass samples were randomly taken from all plots just before termination and dried at 60°C to determine the dry weight. Cover crop residue was then either left standing or mechanically rolled prior to planting.

Peanut (cv Georgia 03-L) was planted into a strip-tilled system each spring at a rate of 18 seed/m. Strip-tillage, the predominant choice of conservation systems for peanut farmers, was performed using KMC[2] ripper to prepare a 30- cm-wide seedbed area. Plot size was four 10-m rows on a 91-cm spacing for the Headland location and six 10-m rows on a 91-cm spacing for the Dawson site. Pendimethalin was applied as a preemergence treatment across the experiment at a rate of 1 kg ai/ha each year.

Soil samples were collected from each experiment at 7-, 14-, and 21-day increments after pendimethalin application (except at WREC in 2007 due to an oversight). Four random subsamples were collected and combined for each of the sampled plots. Collection of soil was done with a stainless steel flat scoop to include the upper 2 cm of the soil surface. Samples were wrapped in foil before being placed in plastic bags to reduce herbicide adsorption to the plastic and subsequently stored in a cooler for storage until processing. Prior to storage, gravimetric water content of the soil was determined with a 20-g portion of each sample.

Preparation of soil samples for HPLC analysis was conducted based on procedures described by Potter et al. [26]. Samples (50 g each) were processed through a 2-mm sieve and placed in 250-mL glass bottles for extraction with three repetitions using 50 mL of methanol. After extraction, samples were vacuum-filtered and the extract was reduced using a rotary evaporator system to 5 mL. The extract was then reconstituted to a 10-mL volume with 1 g of the extract subsequently being placed into an auto sampler vial along with 10 μg of 0.5-mg/ml 2-chlorolepedine (an internal standard added by the laboratory prior to analysis). In addition, spray targets (70-mm Whatman cellulose filter paper[3]) collected at the time of pendimethalin application were extracted in 25 mL of methanol and then diluted to a 1:10 ratio. A 1-g sample was then prepared for analysis in the same manner as soil sample extracts. High-pressure liquid chromatography (HPLC) was then conducted by the USDA-ARS Southeast Watershed Research Laboratory in Tifton, GA.

In addition, visual weed control ratings on a 0–100% scale with 0 being no control were conducted at 21 and 45 DAP. Peanut yield was calculated with the middle two rows after digging and harvesting at each site. During the experiment, additional management practices (including insect control and nutrient management) followed the respective state's recommendations for peanut growing practices.

Data analysis was conducted using the GLIMMIX procedure in SAS[4] to compare treatment effects on yield as well as weed control rating comparisons at $\alpha = 0.05$. Non-transformed data were used for yield comparison; however, arc sine transformation was used to improve variance in weed control data.

3. Results and discussion

3.1. Yield

Main effect differences were only noted between locations ($P < 0.0001$) with Headland having greater yields in both years of the experiment with 4,432 kg/ha and 4,112 kg/ha for 2007 and 2008 compared with Dawson yield over treatments at 1,775 kg/ha and 2,718 kg/ha (Table 1). Historically, Georgia's average yield is more than the expected yield for Alabama producers with recent 2014 yields for Georgia (4,600 kg/ha) and Alabama (3,600 kg/ha) reflecting this slight difference [1]. The disparity between annual averages and experimental peanut yields could potentially be attributed to the general trend toward irrigation for peanut production in Georgia as opposed to dryland production in Alabama (172,000 ha and 56,000 ha, respectively, in 2014) [1]. For this experiment, neither site was under an irrigation system for the duration of the growing seasons.

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		Yield (kg/ha)				
		Residue Level				Year
		Fallow	Low	Medium	High	Average
Headland[a]	2007	4,441	4,525	4,441	4,319	4,432
	2008	4,268	3,961	3,939	4,279	4,112
	Average	4,355	4,243	4,190	4,299	4,272
Dawson[bc]	2007	1,553	1,587	1,815	2,147	1,775
	2008	2,311	2,401	2,840	3,319	2,718
	Average	1,932	2,733	2,313	1,994	2,243

[a]Yield differences are significant between locations ($P < 0.0001$).

[b]Yield differences are significant between years within location ($P = 0.0143$).

[c]Yield differences are significant between high and fallow residue levels within location for each year ($P = 0.0054$).

Table 1. Yield for 2007 and 2008 for the Headland and Dawson experimental sites.

		Year	
Residue Level	Time (d)	2007	2008
		µg/g	
Fallow	7	——	0.2334[a]
	14	0.1074[A]	0.1089[b]
	21	0.0714[A]	0.1085[b]
Low	7	——	0.3234[c]
	14	0.2398[B]	0.1936[a]
	21	0.0911[A]	0.1333[b]
Medium	7	——	0.2348[a]
	14	0.1371[A]	0.0891[b]
	21	0.0633[A]	0.0944[b]
High	7	——	0.2667[ac]
	14	0.1516[AB]	0.0897[b]
	21	0.1198[A]	0.0546[b]

*Values followed by same letter in same year are not significant at $\alpha = 0.05$.

Table 2. Pendimethalin residue recovered through soil extraction process for Headland. *

		Year	
Residue Level	**Time (d)**	**2007**	**2008**
		———μg/g———	
Fallow	7	0.5471^{A}	0.1809^{a}
	14	0.3280^{C}	0.2166^{a}
	21	0.3150^{CD}	0.1722^{a}
Low	7	0.4576^{B}	0.3600^{b}
	14	0.4453^{B}	0.2976^{b}
	21	0.3645^{BC}	0.1601^{a}
Medium	7	0.4550^{B}	0.3140^{b}
	14	0.4111^{B}	0.1760^{a}
	21	0.2558^{D}	0.1457^{ac}
High	7	0.4075^{B}	0.3201^{b}
	14	0.3983^{B}	0.1332^{ac}
	21	0.2783^{CD}	0.0890^{c}

*Values followed by same letter in same year are not significant at $\alpha = 0.05$.

Table 3. residue recovered through soil extraction process for Dawson. *

The location and year of interaction were significant ($P = 0.0047$) with 2008 yields being higher than 2007 for Dawson and yields for Headland being higher in 2007 (Table 1). With low rainfall amounts in comparison to historical averages (Figure 1), reduced 2007 peanut yield for Dawson would be expected due to inadequate rainfall [31]. In 2008, yearly rainfall surpassed average annual rain totals with substantial rainfall occurring in the summer prior to harvest at the Dawson location. Headland rainfall was below average for both 2007 and 2008 (Figure 2), but monthly rainfall totals during the growing season were sufficient for above-average yield (Table 1). Overall, Headland peanut yield for both years of the study, regardless of rain total amounts, was considerably greater than average peanut yields across Alabama.

Yield comparison between fallow treatments and rye cover crop treatments within each location indicated a difference in yield between high-residue treatments and fallow treatments at the Dawson site with high-residue treatments having increased peanut yield by 260 kg/ha in 2007 and 1,010 kg/ha in 2008 (Table 1). The increase in peanut yield under high-residue treatments occurred at the Dawson site both years, although no significant increase in biomass residue was noted for 2007 (Table 1; Figure 3). Headland did have differences between residue levels for both years (Figure 3), but no yield differences were noted for the Headland site (Table 1).

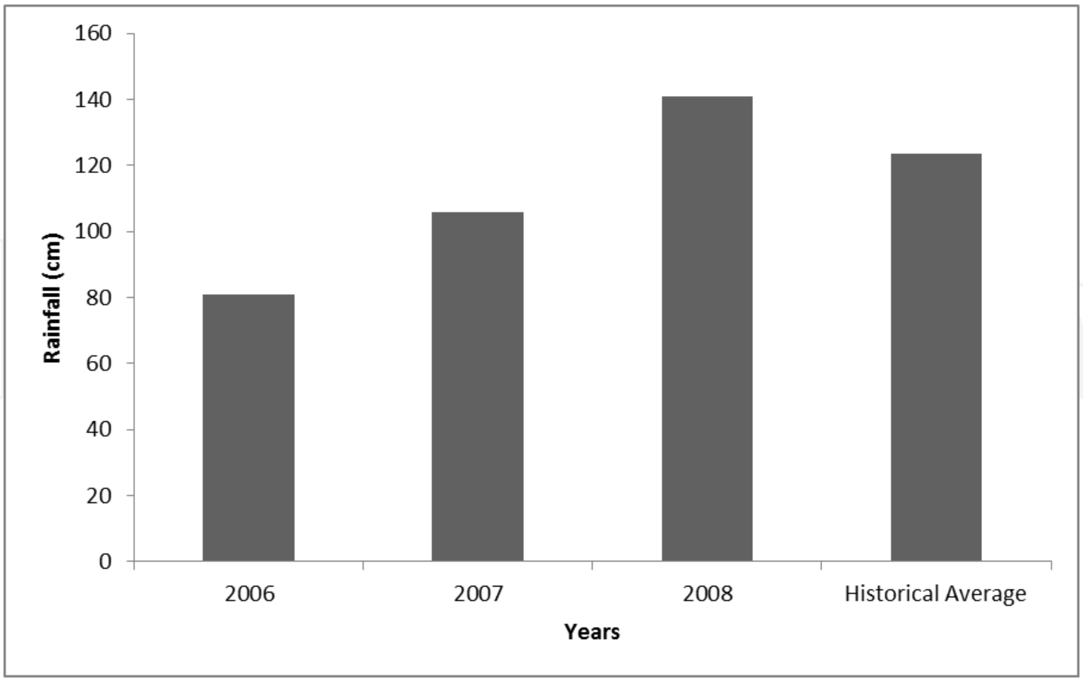

Figure 1. Annual rainfall totals for 2006, 2007, and 2008 along with an historical average over the past 30 years for Dawson, GA.

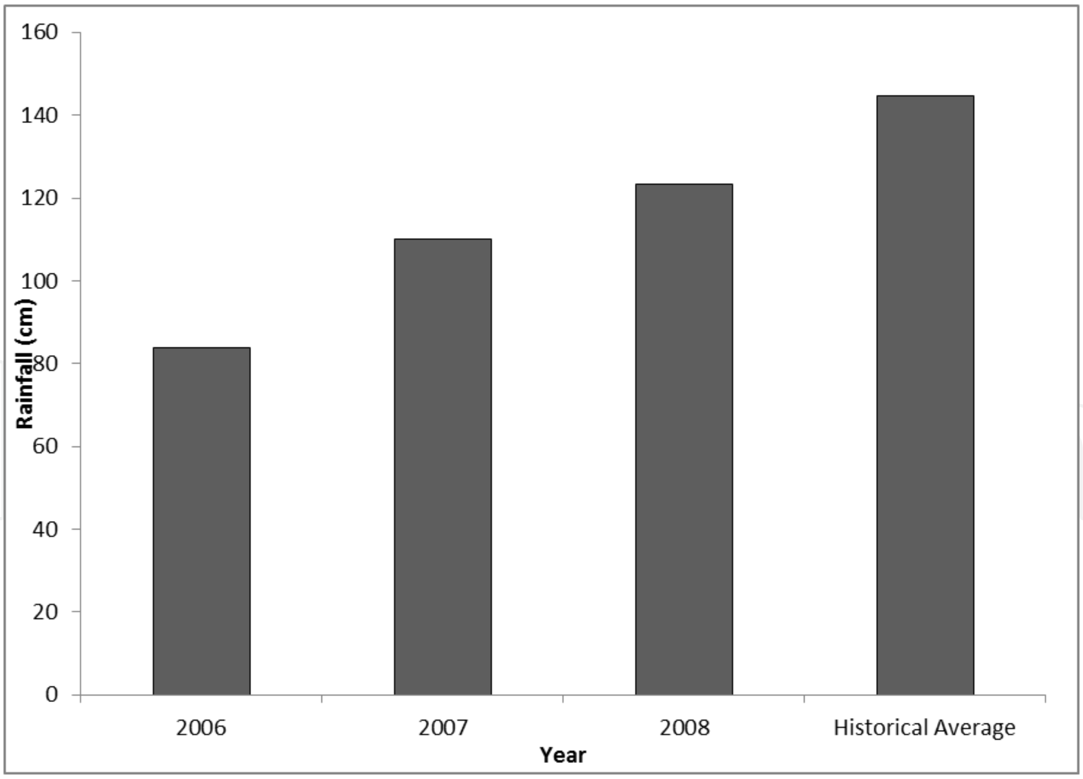

Figure 2. Annual rainfall totals for 2006, 2007, and 2008 along with an historical average over the past 30 years for Headland, AL.

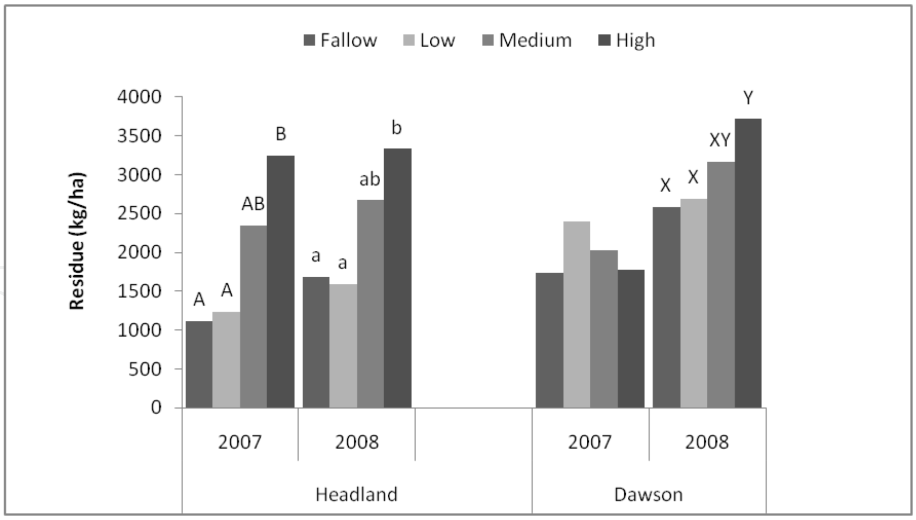

Figure 3. Biomass yield in kg/ha for 2007 and 2008 for the Headland and Dawson experimental sites. Values followed by same letter in same sampling time are not significant at $\alpha = 0.05$.

3.2. HPLC analysis

Analysis of soil extraction samples detected both pendimethalin and its metabolite, pendimethalin alcohol, 4-[(1-ethylpropyl)amino]-2-methyl-3,5-dinitrobenyzl alcohol. The metabolite data are not presented in this study due to trace amounts detected uniformly throughout the samples (<0.05 μg/mL). Recovered pendimethalin is presented by location and year (Figure 4) due to differences detected between these main effects. The general trend in recovery rate indicated the Dawson site, regardless of year, had higher pendimethalin recovery throughout the 21-day sampling period (Figure 4). No difference in pendimethalin recovery was noted between standing and rolled cover crop treatments.

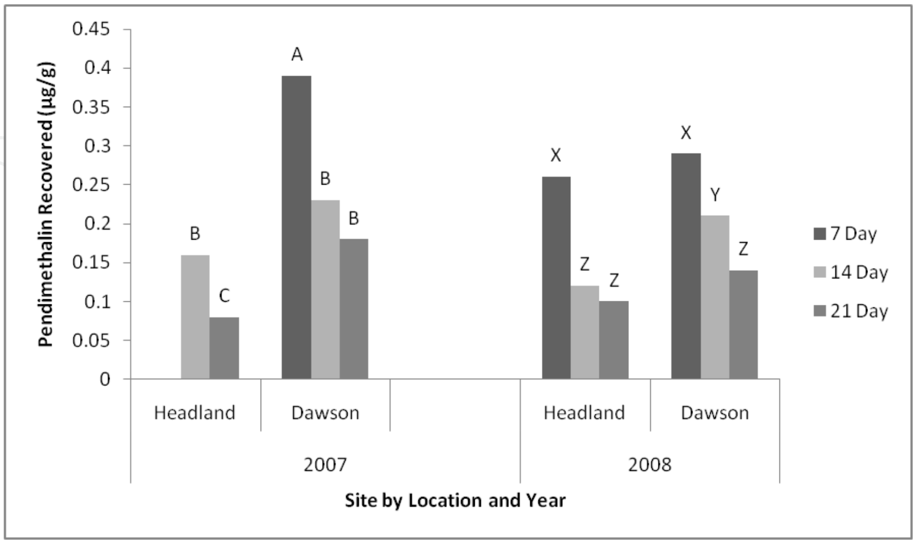

Figure 4. Average pendimethalin residue recovered through soil extraction process by year and location. Values followed by same letter in same sampling time are not significant at $\alpha = 0.05$.

Within location and year, pendimethalin recovery was generally higher for 7-day samples than later sampling dates from expected rapid initial dissipation due to volatilization, photodegradation, microbial metabolism enhanced by warm soil temperatures and soil moisture, and chemical decomposition [21,27,33]. Increases in pendimethalin recovery amount were noted for winter fallow treatments in comparison to cover crop treatments for only the Dawson site in 2007 (Tables 2 and 3). Previous research has reported increased dissipation of preemergence-applied herbicides in cover cropping systems compared to systems with no cover crop [21,34]. In our study, only one site had increased biomass yield for cover crop treatments in comparison to fallow treatments (Figure 5); the limited differences between biomass residues in this study at the Dawson site could potentially mask any effect increased cover crop residue may have on herbicide movement to the soil; however, pendimethalin recovery was not greater for fallow treatments at the Headland site where biomass yields were higher in heavy-residue treatments.

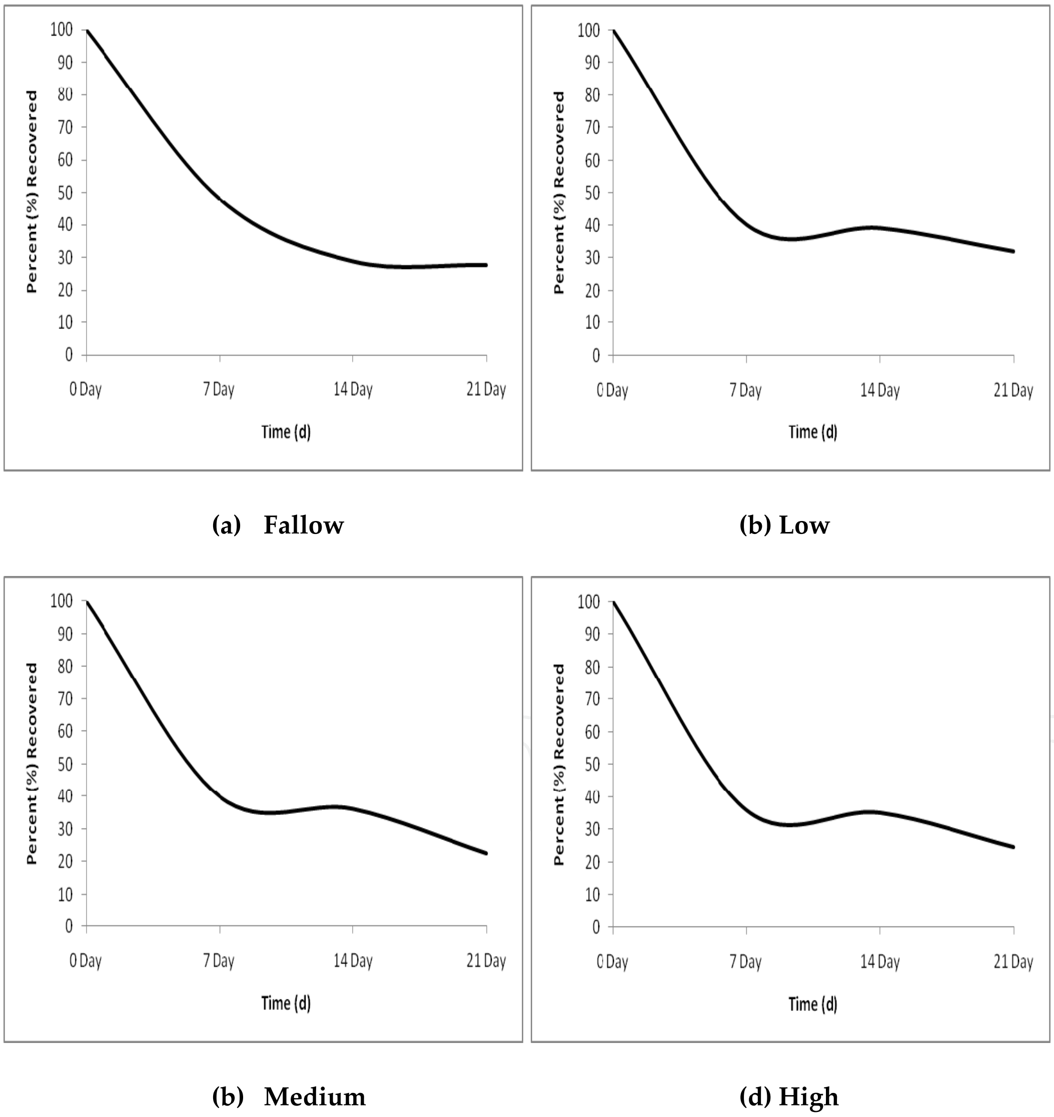

Figure 5. Percent pendimethalin recovered from Dawson during the 2007 growing season at three collection times during a 21-day period after herbicide application.

Although no difference between pendimethalin recovery amounts under different cover treatments was indicated by the results, the amount of pendimethalin extracted from the soil, when viewed as percentages recovered (Figures 5–8), was never greater than 50% of total herbicide applied at the 7-day sampling date. Previous publications investigating pendimethalin dissipation under varied environments have reported half-lives from 10 to 30 days or longer [21,33,36]. These low recovery percentages would suggest herbicide interception, to a degree, in all cover treatments. However, without a comparative pendimethalin dissipation rate under no residue with similar environmental conditions, it is difficult to determine between what proportion of unrecovered pendimethalin was intercepted and sorbed to plant residue and how much was lost through dissipation and degradation.

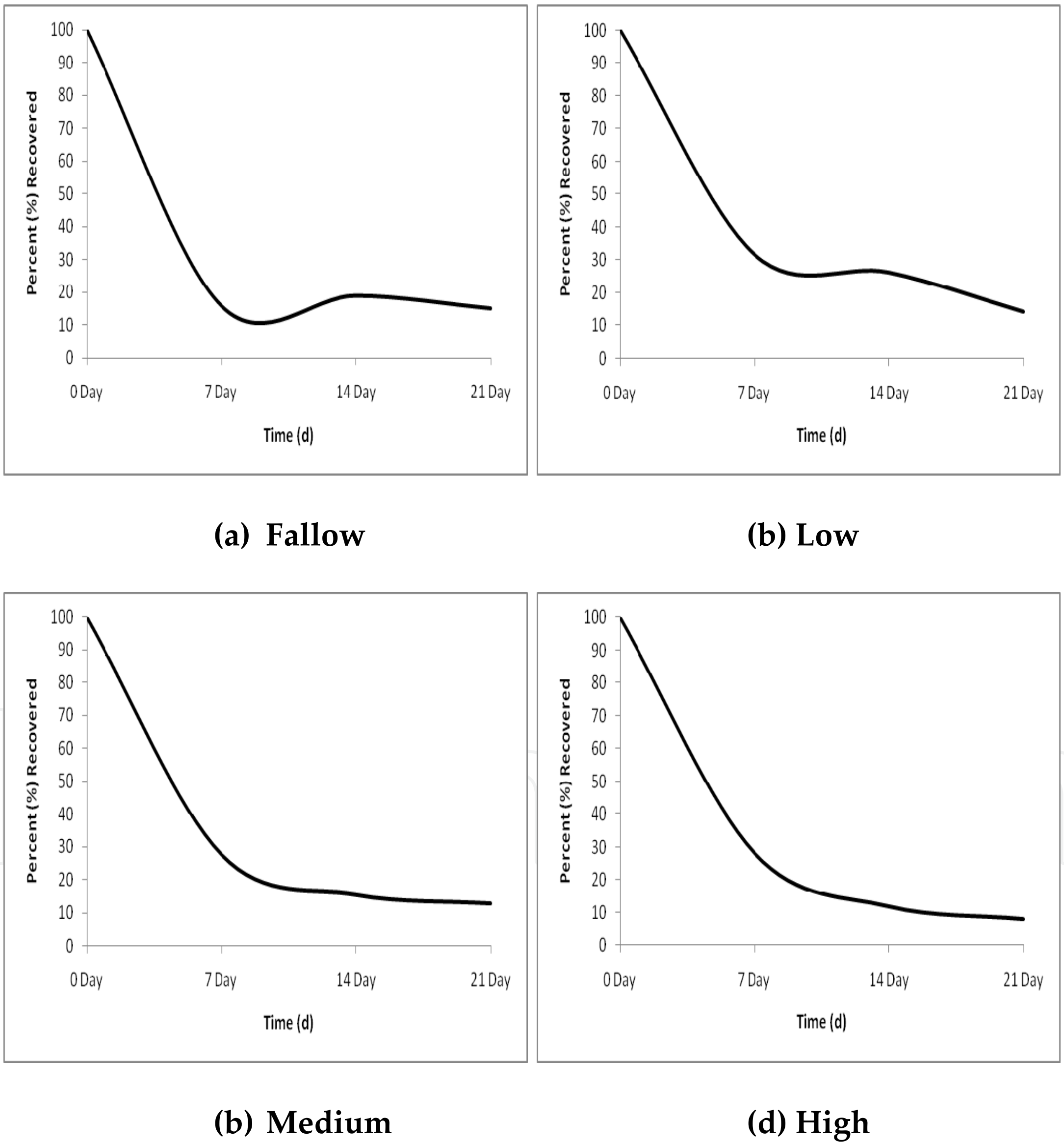

Figure 6. Percent pendimethalin recovered from Dawson during the 2008 growing season at three collection times during a 21-day period after herbicide application.

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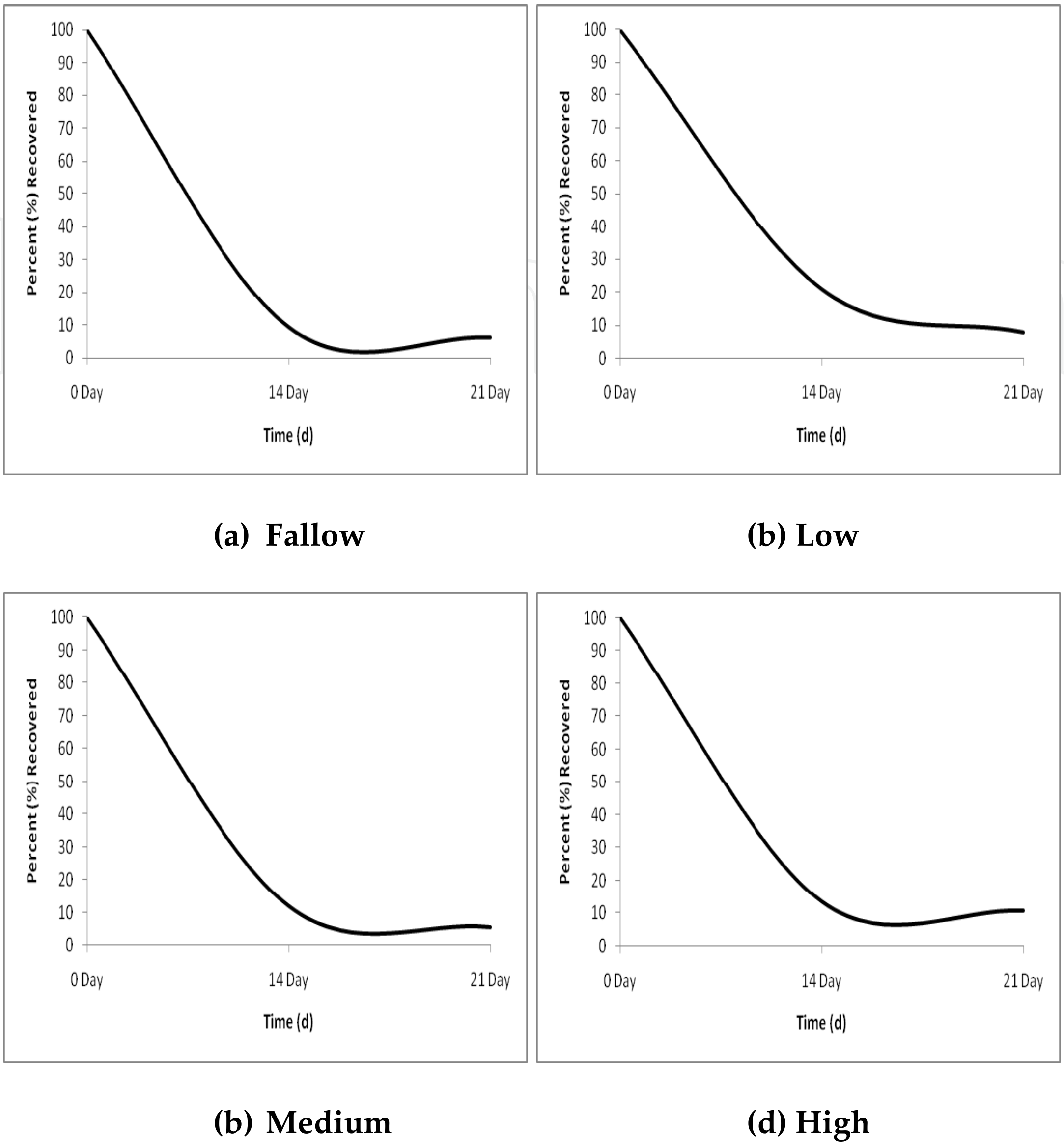
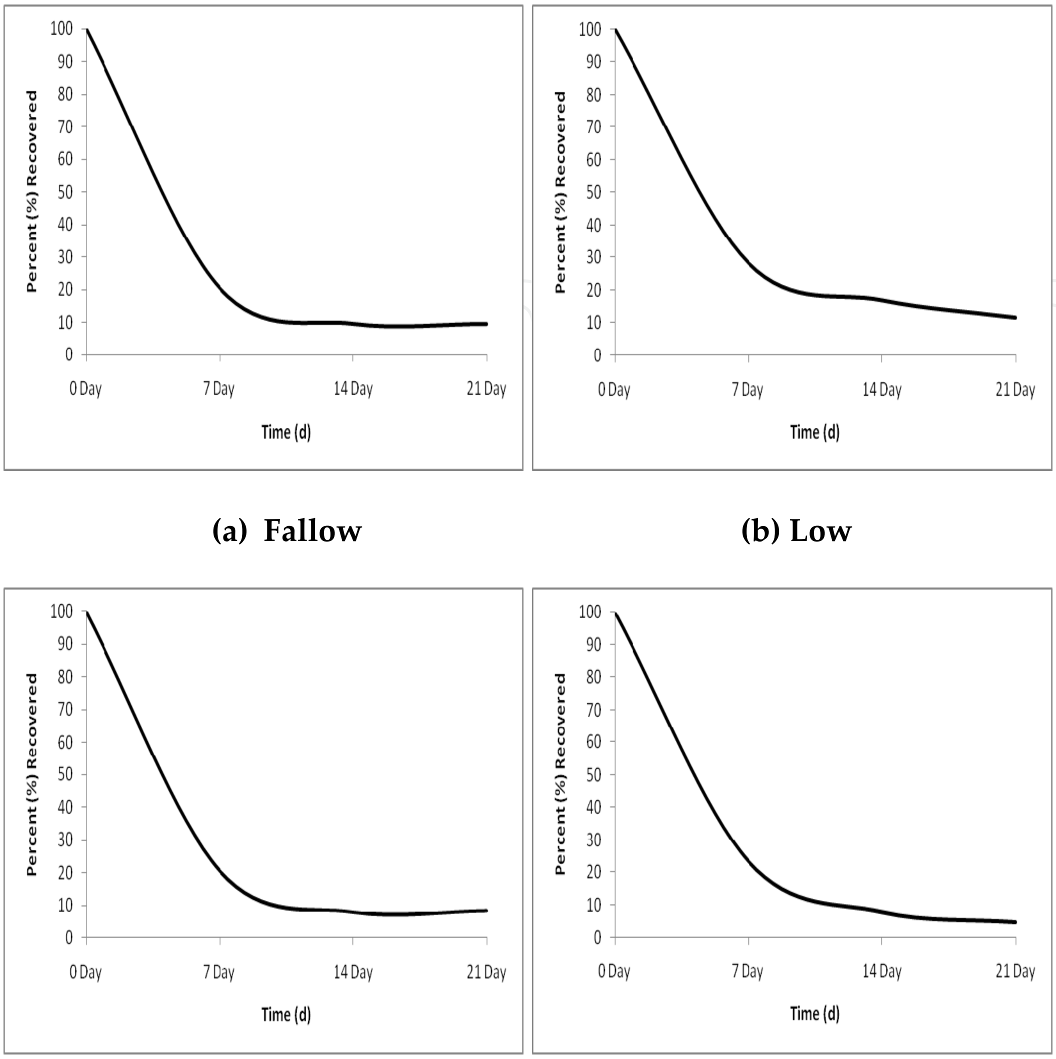


Figure 7. Percent pendimethalin recovered from Headland during the 2007 growing season at two collection times during a 21-day period after herbicide application.

3.3. Weed control

Dominant weed species at the Headland experiment site were nutsedge (*Cyperus* sp.) and smallflower morning glory [*Jaquemontia tamnifolia* (L.) Griseb.]. Weed species present at the Dawson site included Palmer amaranth (*Amaranthus palmeri* S. Watson) and smallflower morning glory. Weed analysis is presented by species at 21 and 45 days after planting (DAP) and averaged over the duration of the experiment due to no difference between years. Residue level was a significant main effect; however, cover crop termination method had no effect on weed control. No interactions were significant for either time period of weed ratings. At 21 DAP, control of smallflower morning glory in Headland was 90% or greater for all residue levels; however, medium- and high-residue treatments had slightly better control at 94%



(a) Fallow (b) Low

(b) Medium (d) High

Figure 8. Percent pendimethalin recovered from Headland during the 2008 growing season at three collection times during a 21-day period after herbicide application.

(Table 4). Weed control 2 weeks later indicated suppression of smallflower morning glory by greater than 70% for all treatments, but all cover crop treatments had greater suppression regardless of residue level (Table 4). Nutsedge, like smallflower morning glory, was controlled by 90% or greater at 21 DAP in all residue treatments at Headland, but all cover crop treatments had slightly greater control than fallow treatments (Table 5). At 45 DAP, control of nutsedge was similar to that of smallflower morning glory in that suppression was greater than 70% for all treatments, but greatest weed control was achieved in medium- and high-residue treatments (Table 5).

At the Dawson site, Palmer amaranth control at 21 DAP was greater in all cover crop treatments compared to fallow treatments (Table 6). Control ratings 2 weeks later indicated greater control of this species by high-residue treatments only (Table 6). Smallflower morning glory followed

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	21 DAP			45 DAP		
Treatment	**Mean**	***P-value***	**95% CI**	**Mean**	***P-value***	**95% CI**
Fallow	91	———	(90,93)	74	———	(72,77)
Low	93	0.2520	(92,95)	80	0.0052	(78,83)
Medium	94	0.0205	(93,96)	86	<0.0001	(84,90)
High	94	0.0202	(93,95)	83	<0.0001	(81,86)

Table 4. Weed control in Headland of smallflower morning glory by residue treatment in comparison with fallow treatment 21 and 45 days after planting (DAP).

	21 DAP			45 DAP		
Treatment	**Mean**	***P-value***	**95% CI**	**Mean**	***P-value***	**95% CI**
Fallow	90	———	(89,91)	74	———	(72,77)
Low	94	0.0002	(92,96)	78	0.0814	(76,80)
Medium	95	<0.0001	(94,97)	82	<0.0001	(82,87)
High	95	<0.0001	(94,96)	81	<0.0001	(81,86)

Table 5. Weed control in Headland of nutsedge by residue treatment in comparison with fallow treatment at 21 and 45 days after planting (DAP).

a similar trend for both the 21 and 45 DAP control ratings as Palmer amaranth. The first rating revealed greater suppression by all cover crop treatments and the subsequent control rating indicated higher suppression for medium- and high-level cover crop systems (Table 7).

	21 DAP			45 DAP		
Treatment	**Mean**	***P-value***	**95% CI**	**Mean**	***P-value***	**95% CI**
Fallow	51	———	(46,57)	62	———	(55,69)
Low	93	<0.0001	(88,98)	60	0.9499	(52,67)
Medium	94	<0.0001	(89,99)	72	0.1424	(65,79)
High	94	<0.0001	(89,99)	60	0.0061	(71,86)

Table 6. Weed control in Dawson of Palmer amaranth by residue treatment in comparison with fallow treatment at 21 and 45 days after planting (DAP).

	21 DAP			45 DAP		
Treatment	**Mean**	***P-value***	**95% CI**	**Mean**	***P-value***	**95% CI**
Fallow	54	———	(48,61)	63	———	(56,70)
Low	95	<0.0001	(90,99)	84	0.2143	(62,75)
Medium	95	<0.0001	(89,99)	76	0.0093	(69,82)
High	96	<0.0001	(89,99)	69	<0.0001	(77,90)

Table 7. Weed control in Dawson of smallflower morning glory by residue treatment in comparison with fallow treatment at 21 and 45 days after planting (DAP).

Previous research has suggested that the use of cover residue could potentially decrease the efficacy of preemergent herbicides and, subsequently, reduce crop yield under high-residue cover cropping systems [21,27]; while other researches have indicated that cover crops used in conjunction with PRE herbicide applications achieve similar weed control as peanut systems that utilize both PRE and POST herbicides [37]. The results of this experiment suggest that the use of cover crops, at any level of residue, can be viewed as a feasible alternative to fallow systems without increased herbicide sorption or reduced peanut yield. Moreover, the use of these cover crops when higher levels of residue are achieved may even offer greater weed suppression for a longer period of the growing season, providing producers with a cost-effective means to combat weed infestations without an overdependence on early postemergent herbicide applications.

4. Sources of materials

[1] Great Plains No-Till drill, Great Plains Mfg., Inc., 1525 East North Street, Salina, KS 67401.

[2] KMC ripper, Kelly Manufacturing Company, 80 Vernon Drive, Tifton, GA 31793.

[3] Whatman cellulose filter paper, Whatman Inc., 800 Centennial Avenue, Piscataway, NJ 08854.

[4]SAS software, version 9.1, 2002–2003, Statistical Analysis Systems Institute Inc. Cary, NC 27513.

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References

[1] United States Department of Agriculture (USDA), National Agricultural Statistics Service. 2015. Website: http://www.nass.usda.gov/Statistics_by_Subject/result.php?

A74ABF45-F909-3BBE-94CF- E3BBB9E8FD28&sector=CROPS&group=FIELD %20CROPS&comm=PEANUTS. Accessed 16 February, 2015.

[2] Jordan, D.L., J.S. Barnes, C.R. Bogle, G.C. Naderman, G.T. Roberson, and P.D. Johnson. 2001. Peanut response to tillage and fertilization. Agronomy Journal 93: 1125–1130.

[3] Johnson, W.C. III, T.B. Brenneman, S.H. Baker, A.W. Johnson, D.R. Sumner, and B.G. Mullinix, Jr. 2001. Tillage and pest management considerations in a peanut-cotton rotation in the Southeastern coastal plain. Agronomy Journal 93: 570–576.

[4] Jordan, D.L., J.S. Barnes, T. Corbett, C.R. Bogle, P.D. Johnson, B.B. Shew, S.R. Koenning, W. Ye, and R.L. Brandenburg. 2008. Crop response to rotation and tillage in peanut-based cropping systems. Agronomy Journal 100: 1580–1586.

[5] Faircloth, W.H., D.L. Rowland, M.C. Lamb, and K.S. Balkcom. 2011. Interaction of tillage system and irrigation Amount on peanut performance in the southeastern U.S. Peanut Science 39: 105–112.

[6] Godsey, C.B., J. Vitale, P.G. Mulder, J.Q. Armstrong, J.P. Damicone, K. Jackson, and K. Suehs. 2011. Reduced tillage practices for the southwestern US peanut production region. Peanut Science 38: 41–47.

[7] Tubbs, R.S. and R.N. Gallaher. 2005. Conservation tillage and herbicide management for two peanut cultivars. Agronomy Journal 97: 500–504.

[8] Steiner, J.L., H.H. Schomberg, P.W. Unger, and J. Cresap. 2000. Biomass and residue cover relationships of fresh and decomposing small grain residue. Soil Science Society of America Journal 64: 2109–2114.

[9] Yu, B., S. Sombatpanit, C.W. Rose, C.A. Ciesiolka, and K.J. Coughlan. 2000. Characteristics and modeling of runoff hydrographs for different tillage treatments. Soil Science Society of America Journal 64: 1763–1770.

[10] Campbell, H.L., J.R. Weeks, A.K. Hagan, and B. Gamble. 2002. Impact of strip-till planting using various cover crops on insect pests and diseases of peanuts. In: E. van Santen (ed.) Making Conservation Tillage Conventional: Building a Future on 25 Years of Research. Proceedings of 25th Annual Southern Conservation Tillage Conference for Sustainable Agriculture. Auburn, AL 24–26 June. Special Report No. 1. Alabama Agric. Exp. Stn. and Auburn University, AL 36849.

[11] Durham, S. 2003. Drought survival with conservation tillage. Agricultural Research 51: 22.

[12] Robinson, B.L., S.B. Clewis, and J.W. Wilcut. 2006. Weed management with flumioxazin in strip-tillage peanut (*Arachis hypogaea*). Peanut Science 33: 41–46.

[13] Hall, J.C., L.L. Van Eerd, S.D. Miller, M.D.K. Owen, T.S. Prather, D.L. Shaner, M. Singh, K.C. Vaughn, and S.C. Weller. 2000. Future research directions for Weed Science. Weed Technology 14: 647–658.

[14] Schwab, E.B., D.W. Reeves, C.H. Burmester, and R.L. Raper. 2002. Conservation tillage systems for cotton in the Tennessee Valley. Soil Science Society of America Journal 66: 569–577.

[15] Price, A.J., M.E. Stoll, J.S. Bergtold, F.J. Arriaga, K.S. Balkcom, T.S. Kornecki, and R.L. Raper. 2008. Effect of cover crop extracts on cotton and radish radicle elongation. Communications in Biometry and Crop Science 3: 60– 66.

[16] Veenstra, J.J., W.R. Horwath, and J.P. Mitchell. 2007. Tillage and cover cropping effects on aggregate-protected carbon in cotton and tomato. Soil Science Society of America Journal 71: 362–371.

[17] Williams, E.J., S. Wilton, M.C. Lamb, and J.I. Davidson. 1998. Effects of selected practices for reduced tillage peanut yield, disease, grade, and net revenue. Proceedings of the American Peanut Research Education Society 30: 49.

[18] Monfort, W.S., A.K. Culbreath, K.L. Stevenson, T.B. Brenneman, D.W. Gorbet, and S.C. Phatak. 2004. Effects of reduced tillage, resistant cultivars, and reduced fungicide inputs on progress of early leaf spot of peanut (*Arachis hypogaea*). Plant Disease 88: 858–864.

[19] Rowland, D.L., W.H. Faircloth, and C.L. Butts. 2007. Effects of irrigation method and tillage regime on peanut (*Arachis hypogaea* L.) reproductive processes. Peanut Science 34: 85–95.

[20] Teasdale, J.R., D.R. Shelton, A.M. Sadeghi, and A.R. Isensee. 2003. Influence of hairy vetch residue on atrazine and metolachlor soil solution concentration and weed emergence. Weed Science 51: 628–634.

[21] Locke, M.A., R.M. Zablotowicz, P.J. Bauer, R.W. Steinriede, and L.A. Gaston. 2005. Conservation cotton production in the southern United States: herbicide dissipation in soil and cover crops. Weed Science 53: 717–727.

[22] Blackshaw, R.E. and L.J. Molnar. 2008. Integration of conservation tillage and herbicides for sustainable dry bean production. Weed Technology 22: 168–176.

[23] Grey, T.L., and G.R. Wehtje. 2005. Residual herbicide weed control systems in peanut. Weed Technology 19: 560– 567.

[24] Lègére, A. and N. Samson. 2004. Tillage and weed management effects on weeds in barley-red clover cropping systems. Weed Science 52: 881–885.

[25] Shaw, D.R., W.A. Givens, L.A. Farno, P.D. Gerard, D. Jordan, W.G. Johnson, S.C. Weller, B.G. Young, R.G. Wilson, and M.D.K. Owen. 2009. Using a grower survey to

assess the benefits and challenges of glyphosate- resistant cropping systems for weed management in U.S. corn, cotton, and soybean. Weed Technology. 23: 134–149.

[26] Grey, T.L., T.M. Webster, and A.S. Culpepper. 2008. Weed control as affected by pendimethalin timing and application method in conservation tillage cotton (*Gossypium hirsutum* L.). Journal of Cotton Science 12: 318– 324.

[27] Gaston, L.A., D.J. Boquet, and M.A. Bosch. 2003. Pendimethalin wash-off from cover crop residues and degradation in a Loessial soil. Communications in Soil Science and Plant Analysis 34: 2515–2527.

[28] Potter, T.L., C.C. Truman, T.C. Strickland, D.D. Bosch, and T.M. Webster. 2008. Herbicide incorporation by irrigation and tillage impact on runoff loss. Journal of Environmental Quality 37: 839–847.

[29] Reeves, W., A.J. Price, and M.G. Patterson. 2005. Evaluation of three cereals for weed control in conservation- tillage nontransgenic cotton. Weed Technology 19: 731–736.

[30] Torbert, H.A., J.T. Ingram, and S.A. Prior. 2007. Planter aid for heavy residue conservation tillage systems. Agronomy Journal 99: 478–480.

[31] Ashford, D.L. and D.W. Reeves. 2003. Use of a mechanical roller-crimper as an alternative kill method for cover crops. American Journal of Alternative Agriculture 18: 37–45.

[32] Kornecki, T., A. Price, R. Raper, F. Arriaga, E. Schwab. 2009. Effects of multiple rolling cover crops on their termination, soil water and soil strength. Proceedings of the 18th Triennial International Soil Tillage Research Organization (ISTRO). Izmir, Turkey; June 15–19.

[33] Beasley, J.P. 2006. Irrigation strategies. In: 2006 Peanut update, The University of Georgia, Cooperative Extension, CAES, p. 6–7.

[34] Barrett, M.R. and T.L. Lavy. 1983. Effects of soil water content on pendimethalin dissipation. Journal of Environmental Quality 12: 504–508.

[35] Zablotowicz, R.M., M.A. Locke, L.A. Gaston, and C.T. Bryson. 2000. Interactions of tillage and soil depth on fluometuron degradation in a Dundee silt loam soil. Soil and Tillage Research 57: 61–68.

[36] Alister, C., P. Gomez, S. Rojas, M. Kogan. 2009. Pendimethalin and oxyfluorfen degradation under two irrigation conditions over four years application. Journal of Environmental Science and Health 44: 337–343.

[37] Price, A.J., D.W. Reeves, M.G. Patterson, B.E. Gamble, K.S. Balkcom, F.J. Arriaga, and C.D. Monks. 2007. Weed control in peanut grown in a high-residue conservation-tillage system. Peanut Science 34: 59–64.

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