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The Effect of Drill-Seeded Soybean Population on Palmer Amaranth Emergence With and Without a Residual Pre-Applied Herbicide.

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Palmer amaranth is the most troublesome weed in Arkansas row crops, causing producers to rely heavily on residual herbicides to successfully produce a profitable crop. In 2012, a field experiment was conducted at the University of Arkansas Research and Extension Center in Fayetteville, AR, to determine the effect of drill-seeded soybean population density on Palmer amaranth emergence. This experiment was arranged in a split-plot design replicated four times. The main plot factor was soybean seeding rate. The subplot factor was no preemergence-applied residual herbicide or a preemergence application of Fierce (flumioxazin + pyroxasulfone) at 3.5 oz/A. Palmer amaranth emergence was counted weekly in two half meter quadrants in each plot and Palmer amaranth seedlings were removed after counting. Plots that had no residual herbicide applied were sprayed weekly with Liberty at 29 oz/A. Additionally, soybean groundcover was monitored throughout the season, and daily soil temperature (maximum and minimum) was measured in selected treatments. The application of Fierce helped maintain a season-long Palmer amaranth control, irrespective of soybean population density. In plots that did not receive Fierce, greater Palmer amaranth emergence was observed under low soybean densities and vice versa, suggesting the value of crop canopy in preventing Palmer amaranth emergence in the absence of residual herbicides or when residual herbicides are not activated. Although the residual herbicide was sufficient to achieve effective weed control, exploitation of crop canopy effects can help reduce the selection pressure exerted by residual herbicides. Thus, manipulation of plant densities could be a valuable tool in integrated weed/resistance management.

Palmer Amaranth Control with Brake: A New Herbicide for Cotton and Ditchbanks.

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The evolution of herbicide resistance in Palmer amaranth has had a detrimental effect on Arkansas crops with resistance now confirmed to four mechanisms of action. The discovery and commercialization of a new mechanism of action does not appear imminent; hence, emphasis has been placed on evaluating older herbicide candidates that were never commercialized in crops. In cotton, the current recommendations for Palmer amaranth are the use of seven applications of residual herbicides throughout the growing season. There is no effective over-the-top option for controlling glyphosate- and acetolactate synthase-resistant Palmer amaranth in glyphosate-resistant cotton. The herbicide fluridone (tradename Brake) was discovered in the early 1970's but was never marketed in cotton even though earlier research showed that cotton exhibits a high level of tolerance to preemergence applications. In addition to controlling Palmer amaranth in cotton, this weed must be managed on cotton turnrows and along ditchbanks to prevent weed seed production, reduce dispersal, and diminish the soil seedbank. Two separate experiments were conducted to determine if fluridone would control Palmer amaranth in cotton and on ditchbanks when applied as a preemergence application. Herbicide treatments in cotton included fluridone applied preemergence at five rates from 0.1 to 0.5 lb ai/A, fluometuron and diuron applied preemergence at 0.75 and 1.0 lb ai/A, and fluridone at 0.3 lb/A and fomesafen at 0.25 lb ai/A applied preplant incorporated 14 days prior to planting cotton. The ditchbank trial consisted of two rates of fluridone at 1.0 and 2.0 lb/A, six rates of diuron ranging 2.0 to 12 lb/A, imazapyr at 0.19, 0.38, and 0.63 lb ai/A, aminopyralid at 0.1 lb ae/A, indaziflam at 0.085 lb ai/A, and saflufenacil at 0.14 lb ai/A all applied in late March prior to Palmer amaranth emergence. In cotton, increasing PRE-applied fluridone rates above 0.1 lb/A did not improve Palmer amaranth control nor was effective control achieved at any rate. Generally, Palmer amaranth control with fluridone was comparable to both rates of diuron and fluometuron. In the ditchbank trial, diuron at 12 lb/A provided 92% control of Palmer amaranth at 76 days after application (DAA), while control with all other treatments was no more than 80%. By 128 DAA control with diuron at 12 lb/A had declined to

61% and no herbicide providing effective control. The absence of season-long control in both experiments may be partially a result of the lack of rainfall throughout much of the spring and summer months.

Monitoring Insect Pest Populations Across Soil EC Based Management Zones in Midsouth Cotton With and Without Wheat Cover Crop.

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Cotton producers in NE Arkansas typically plant cereal winter cover crops such as wheat or oats to protect cotton seedlings from damage due to blowing sand. Additional benefits from use of cereal cover crops in these cotton ecosystems can include improvements in weed suppression, run-off water quality and pest management. One objective of this 2012 field study was to contrast infestation levels of cotton insect pests. Across spatially variable fields of cotton grown with a winter weed fallow field and wheat winter cover crop. Paired commercial fields on three NE Arkansas farms were separated into four management zones based on soil electrical conductivity (EC) properties classified from measurements using a dual depth Veris 3150 Soil Surveyor. In each management zone, thrips infestations were monitored by collecting 10 plants per site; there were three sites per zone. Plants were cut at ground level, placed in plastic bags, and taken to the laboratory where the thrips were washed onto filter paper and counted under magnification. After the crop began to produce squares, insect pest sampling was expanded to include weekly counts of tarnished plant bug (*Lygus lineolaris* Palisot de Beauvouis) using drop cloth sampling. Crop maturity measures using the COTMAN crop monitoring system were used to document date of physiological cutout (flowering date of the last effective boll population). Thrips infestations (primarily tobacco thrips (*Frankliniella fusca* (Hinds)) and western flower thrips (*Frankliniella occidentalis* (Pergande)) were detected in the first two to three weeks following crop emergence. High thrips numbers (exceeding UA Extension action levels) were observed on only one of three farms. At that location, significantly fewer thrips were associated with cotton grown with a wheat cover crop (20 thrips/sample) compared to cotton without wheat (109 thrips/sample). There was no apparent spatial component associated with thrips distribution in the six fields with no differences in thrips numbers observed among soil EC based management zones. Plant bug numbers did not exceed the Arkansas action threshold prior to cutout (3 bugs per 5 row feet(h))) Late season numbers were higher in management zones where plants continued to produce squares in late season. Early maturing plants had fewest plant bugs. The late season plant bugs numbers had no significant impact on yield.

Weed Control Programs for Edamame Soybean.

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Edamame is a food soybean harvested when the seeds are at the immature R6 stage. Few herbicides are registered for use on edamame, which constrains expanded commercial production in the US. A field study was conducted in the summer 2012 at Fayetteville and Newport, AR to evaluate the effectiveness of different herbicide programs and the tolerance of edamame to different herbicides. The experimental design was a randomized complete block with nine treatments and four replications. Treatments were: 1) Dual Magnum (*S*-metolachlor), 1 lb ai, preemergence (PRE) followed by (fb) Flexstar (fomesafen), 0.29 lb ai, postemergence (POST); 2) Dual Magnum, 1 lb ai + Sencor (metribuzin), 0.38 lb ai/A PRE fb Flexstar, 0.29 lb ai/A POST; 3) Linex (linuron), 1 lb ai/A PRE fb Flexstar, 0.29 lb ai/A POST; 4) Dual Magnum, 1 lb ai/A PRE fb Blazer (acifluorfen) at 0.25 lb ai/A + Basagran (bentazon) at 0.5 lb ai/A POST; 5) Linex, 1 lb ai/A PRE fb Blazer, 0.25 lb ai/A + Basagran, 0.5 lb ai/A POST; 6) Linex, 1 lb ai/A PRE fb Prefix (fomesafen, 0.24 lb ai/A + *S*-metolachlor, 1.08 lb ai/A) POST; 7) Linex, 1 lb ai/A + Sencor, 0.38 lb ai/A PRE fb Prefix (fomesafen, 0.24 lb ai/A + *S*-metolachlor, 1.08 lb ai/A) POST; 8) Linex, 1 lb ai/A + Dual Magnum, 1 lb ai/A PRE fb Blazer, 0.25 lb ai/A + Basagran, 0.5 lb ai/A POST; and 9) weedy check. Herbicide treatments were applied with a CO_2-