RESEARCH CONFERENCE ABSTRACTS VOLUME 27

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Tuesday, November 28, 2023

MODERATOR: Donna Frizzell
Student Contest Chair: Nick Bateman
Audio-Visual Coordinator: Ben Thrash

MODERATOR: Donna Frizzell

†Denotes General ‡Denotes Poster †Denotes Undergraduate *Denotes M.S. Student **Denotes Ph.D. Student

MODERATOR: Donna Frizzell

5:15 p.m. **End Oral Presentations Day 1/Begin Poster Viewing Session.**

Assessment of *EPSPS* Gene Amplification in Glyphosate-Resistant Ryegrass (*Lolium* spp.) Collected in Eastern Arkansas.
‡F. González-Torralva[1], J.K. Norsworthy[1], L. Adams[1], T. Barber[2].[1]Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR[2]; [4]Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Lonoke, AR

Behavioural and electrophysiological investigations to examine host-herbivore interactions in AR field crops.
‡K. Gandham[1] and R. Kariyat[1]. [1]Department of Entomology and Plant Pathology, University of Arkansas, Fayetteville, AR.

Palmer Amaranth Suppression in Wheat-Soybean Relay Intercropping System: Preliminary Insights.
‡ A.S. Godar[1], J.K. Norsworthy[1], and L.B. Piveta[1]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR.

Cross-Resistance to Florpyrauxifen-benzyl in 2,4-D-Resistant Palmer amaranth (Amaranthus palmeri S. Wats.)
‡J. Hwang[1], J.K. Norsworthy[1], T. Barber[2], T.R. Butts[2]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR; [2]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Lonoke, AR.

Insecticide efficacy on soybean looper
‡L. Amos[1], B.C. Thrash[1], N.R. Bateman[1], W.A. Plummer[1], S.G. Felts[1], T. Harris[1], G. Maris[1]. [1]Department of Entomology and Plant Pathology, University of Arkansas, Fayetteville, AR.

***Bacillus subtilis* as a delivery system for bioactive peptides for nematode control on soybean**
‡Abeer Alnasrawi[1], Payal Sanadhya[1], Lei Zhang[1], Cynthia Gleason[1] and Fiona Goggin[1.]
[1]Department of Entomology and Plant Pathology, University of Arkansas, Fayetteville, AR; [2]Department of Botany & Plant Pathology, Purdue University, Lafayette, IN; [3]Department of Plant Pathology, Washington State University, Pulman, WA.

Wednesday, November 29, 2023

MODERATOR: Lauren Amos

†Denotes General ‡Denotes Poster †Denotes Undergraduate *Denotes M.S. Student **Denotes Ph.D. Student

MODERATOR: Lauren Amos

11:45 a.m. **Awards, Announcements, and Closing Remarks**

12:00 p.m. **Adjourn**

ABSTRACTS

Cotton Tolerance to Herbicides Coated on Fertilizers

S.L Linn[1], J.K. Norsworthy[1], J.T. Smith[1], M.C. Woolard[1], M.C.C.R Souza[1], and L.T. Barber[2]. [1]University of Arkansas System Division of Agriculture, Fayetteville, AR; [2]University of Arkansas System Division of Agriculture, Lonoke, AR.

Utilizing herbicides coated onto granular fertilizers is one method that allows cotton producers to apply nutrients and herbicide simultaneously, resulting in the optimization of time and reduction in production costs. Minimizing crop injury is an important aspect of weed control and can be a deciding factor in using certain herbicides. Therefore, this two-year study was designed to evaluate herbicide injury when coated on granular fertilizer and applied over-the-top of cotton at the 6- to 8-leaf growth stage. The study was conducted in 2022 and 2023 at the Milo J. Shult Agricultural Research and Extension Center in Fayetteville, Arkansas. The fertilizer blend comprised 100 lbs/acre muriate of potash and 175 lbs/acre urea. Herbicide treatments included Zidua SC at 3.5 fl oz/A, Direx at 24 fl oz/A, Loyant at 16 fl oz/A, Cotoran at 24 fl oz/A, Valor EZ at 3 fl oz/A, Brake at 16 fl oz/A, Reflex at 16 fl oz/A, Sharpen at 3 fl oz/A, Dual Magnum at 1.3 pt/A, Fierce EZ at 6 fl oz/A, Verdict at 5 fl oz/A, and a combination of Sharpen at 2 fl oz/A plus Zidua SC at 2.5 fl oz/A. Plots were maintained weed-free, with a nontreated control for comparison. Visible injury was assessed 7 and 28 days after treatment (DAT), and seedcotton yield was recorded at harvest. In both years, Cotoran, Brake, Direx, and Dual Magnum caused less than 10% injury at 7 DAT. At 7 DAT, Fierce, Reflex, Sharpen, Sharpen plus Zidua, and Verdict caused higher injury in 2022 (19-30%) than 2023 (4-12%), potentially due to differences in leaf wetness at application. The injury displayed at the 7 DAT evaluation was transient, with no injury for any treatment exceeding 6% at 28 DAT. In 2022 and 2023, there were no differences in seedcotton yield among the various herbicide treatments. These results highlight the potential of herbicide-coated fertilizers in cotton production, considering crop tolerance.

Spatio-temporal distribution of resistance of *Corynespora cassiicola* in Arkansas to quinone outside inhibitor and succinate dehydrogenase inhibitor fungicides based on frequencies of key target-site alterations

Rafael Zaia[1], Travis R. Faske[2], Alejandro Rojas[4], Jeremy Ross[5], Terry Spurlock[2]. [1]Department of Entomology and Plant Pathology, University of Arkansas, Fayetteville, AR; [2]Department of Entomology and Plant Pathology, University of Arkansas System Division of Agriculture Cooperative Extension Service, Lonoke, AR; [4]Department of Plant, Soil and Microbial Sciences, Michigan State University, East Lansing, MI; [5]Department of Crop Soil and Environmental Sciences, University of Arkansas System Division of Agriculture Cooperative Extension Service, Little Rock, AR.

Quinone outside inhibitors (QoI) and succinate dehydrogenase inhibitors (SDHI) are important fungicide classes used to control foliar diseases on soybean and cotton. Target spot, caused by the fungus Corynespora cassiicola, is an economically important foliar pathogen of both soybean and cotton. PCR assays and sequencing were used to assess the frequency of key target alterations associated with QoI and SDHI in C. cassiicola-infested soybean and cotton fields. Leaf samples were collected in 2022 from 19 Arkansas counties and subject to molecular assays to detect fungicide resistance. This revealed the presence of the most common key alterations conferring resistance to QoI (G143A) and SDHI (C-N75S and B-H278Y) fungicides. The frequency of isolates with the G143A mutation were 68% from Arkansas, Ashley, Chicot, Desha, Drew, Lawrence, Lonoke, Monroe, Poinsett, Prairie, and Woodruff counties. The frequency of isolates with the C-N75S and B-H278Y mutations were 31.4% and 0.06%, respectively, from Arkansas, Ashley, Chicot, Desha, Monroe, Prairie, and Woodruff counties. The frequency of isolates with both mutation G143A and N75S or H278Y were 38.2% and were recovered from Arkansas, Ashley, Chicot, Desha, Monroe, Prairie, and Woodruff counties. Frequent exposure of C. cassiicola to fungicides containing these modes of action have allowed fungal isolates to be selected with these mutations and significant resistance to develop in the fungal populations in these counties. Therefore, QoI and SDHI fungicides will be less effective to control target spot in fields where resistance to both fungicides are present.

Quantifying the Interference of Palmer Amaranth in Furrow-Irrigated Rice

T.A King[1], J.K. Norsworthy[1], T.H. Avent, S.C. Noe, L.T. Barber[2], and T.R. Butts[2]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR; [2]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Lonoke, AR.

Furrow-irrigated rice acres are increasing in Arkansas, and the absence of a sustained flood creates a conducive environment for Palmer amaranth emergence and development throughout the growing season. Palmer amaranth escaping control in furrow-irrigated rice creates the potential for reduced rice yields and increased in-season herbicide applications. A field trial was conducted at the Milo J. Shult Agricultural Research and Extension Center in Fayetteville, AR, in 2022 and 2023 to evaluate the impact of Palmer amaranth on furrow-irrigated rice yields. Newly emerged Palmer amaranth plants were marked every 7 days, beginning 1 week before rice emergence through 4 weeks after rice emergence. Palmer amaranth biomass and seed production decreased exponentially over time after the initial emergence of the weed. Across all Palmer amaranth emergence timings, only 57% of the maximum yield potential was reached in the 1 ft^2 surrounding the Palmer amaranth plants. Additionally, Palmer amaranth can negatively affect rice yields by 10% up to 2.1 ft away from the plant. All Palmer amaranth plants that emerged within 4 weeks of rice emergence negatively affected the crop, indicating that the need for removal of the weed exceeds four weeks. To preserve rice yields from Palmer amaranth, herbicide applications should be used to delay Palmer amaranth emergence or control the weed shortly after it emerges. The time of emergence of the weed relative to the crop is a critical factor influencing rough rice yields and Palmer amaranth seed and biomass production.

Potassium Availability Effects on Cotton Yield and Plant Nutrition

M. P. R. do Prado[1], G. L. Drescher[1], T. L. Roberts[1], A. D. Smartt[1], G. A. L. Mengez[1], K. S. French[1]. [1]University of Arkansas System Division of Agriculture, Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR.

Potassium is a key nutrient for cotton (*Gossypium hirsutum* L.) production and deficiency symptoms are frequently reported across the U.S. Cotton Belt. We evaluated how K availability influences cotton yield and petiole- and leaf-K concentration throughout the growing season. Fertilizer-K rate (0, 40, 80, 120, 160, and 200 lb K_2O/ac) trials were established in 2023 at the Lon Mann Cotton Research Station (LMCRS), Milo J. Shult Agricultural Research & Extension Center (SAREC), and Rohwer Research Station (RSS) in soils with very low, medium, and optimum soil-test K, respectively. Petioles and leaf samples were collected at first square, first flower, and weekly until boll fill, and analyzed for K concentration. Leaf- and petiole-K concentrations increased with increasing Mehlich-3 K availability at both sampling times, indicating sensibility to diagnose K deficiency. Overall, leaf- and petiole-K concentrations declined about XX and XX% across sampling time, which is related to K remobilization from vegetative to reproductive plant tissues and increased biomass production. Fertilizer-K rate positively impacted tissue-K concentrations at all sampling times and locations, with R^2 values ranging from XX to XX ($P < 0.000$). Preliminary results show XXX tissue-K concentration and XXX yield response to fertilization, additional site-year observations will allow more conclusive information regarding cotton tissue-K and yield response to different K availability. Further data will be included in the abstract.

Comparison of Convintro™ to Current Standards for Residual Palmer Amaranth Control in Soybean

Woolard, M.C[1]., J.K. Norsworthy[1], S.C. Noe[1], M.R. Dodde[1], T.H. Avent[1], and T.R. Butts[2].[1]University of Arkansas System Division of Agriculture, Fayetteville, AR;[2] University of Arkansas System Division of Agriculture, Lonoke, AR.

In Arkansas, soybean was produced on approximately three million acres in 2022. One problem that producers across the state face is control of problematic weeds such as Palmer amaranth. Palmer amaranth has developed resistance to nine modes of action, leaving limited options for control. Bayer CropScience recently announced its intention to launch Convintro™, a premixture including diflufenican (WSSA/HRAC Group 12), metribuzin (WSSA/HRAC Group 5), and flufenacet (WSSA/HRAC Group 15), for use in soybean. Field trials were conducted in 2022 and 2023 at the Northeast Arkansas Research and Extension Center in Keiser, AR, to determine the length of residual control of Palmer amaranth compared to current preemergence herbicides used in soybean. Treatments evaluated included Convintro, Convintro plus Xtendimax with VaporGrip Technology, Tricor, Boundary, Warrant, and Fierce MTZ. In 2022, injury 14 days after treatment (DAT) ranged from 0 to 31%, with the highest injury caused by treatments containing Convintro. In 2023, <5% injury occurred following all treatments, with no difference observed. Additionally, Convintro was superior to Tricor, Boundary, and Warrant but inferior to Fierce MTZ in the reduction of Palmer amaranth emergence 28 DAT in 2022. In 2023, Convintro was comparable to all treatments, except Warrant, which was less effective. By 42 DAT, Fierce MTZ was the only treatment still providing residual control of Palmer amaranth in 2022. In 2023, Warrant was the only treatment to have more than 10 Palmer amaranth plants/10.9 ft^2 at 42 DAT. One possible explanation for the difference in site years was rainfall amounts. Future research with Convintro should include application timing for soybean tolerance and weed control. Overall, Convintro provides a new mode of action for soybean producers to target Palmer amaranth, with control levels comparable to or superior to several herbicides currently being used.

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Nutrient uptake and biomass accumulation of modern rice cultivars in the Arkansas Delta

G. H. Bessa de Lima[1], T.L. Roberts[1], G.L. Drescher[1], J.T. Hardke[1], C.C. Ortel[1], K.A. Hoegenauer[1], A. Smartt[1]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR.

The number of rice (*Oryza sativa L.*) cultivars released in Arkansas in the last two decades has increased tremendously. Understanding nutrient uptake and biomass accumulation among rice varieties can be useful information to growers and aid in fertilizer rate recommendations. However, there is no published literature on the pattern of nutrient uptake and biomass accumulation for the currently planted cultivars. The objective of this research is to evaluate the nutrient uptake, partitioning, and biomass accumulation of Diamond, RT 7521 FP, CLL 16, and Titan rice cultivars under two fertilizer rates. The trials were installed in 2022, at the Rohwer and Pine Tree Research Stations under a RCBD, 4x2 factorial arrangement. For nutrient uptake and biomass accumulation evaluation, samples were taken at taken at V3, V5/6, 2 weeks-post flood, 4 weeks-post flood, 50% heading, and maturity growth stages. Differences ($P < 0.05$) in biomass and nutrient uptake among the treatments were observed due to fertilization rate and cultivar effect, respectively. Our data provides a meaningful insight into how the widely used cultivars are performing and the information can be utilized by farmers to improve their rice crop fertilization practices.

Exploring New Scouting Methods for Rice Water Weevils and the Efficacy of Control Strategies

P.G. Maris[1], N. R, Bateman[3], B.C. Thrash[2], J.T. Hardke3, R. Kariyat[1], W.A. Plummer[2], S.G. Felts[2], T. Harris[2].
[1]Dept. of Entomology and Plant Pathology, University of Arkansas, Fayetteville, AR. [2]Dept. of Entomology and Plant Pathology, University of Arkansas, Lonoke, AR. [3]Dept. of Entomology and Plant Pathology, University of Arkansas, Stuttgart, AR.

Rice water weevil (*Lissorhoptrus oryzophilus*) is the most economically important insect pest for flooded rice production in the southern US. Current scouting methods for rice water weevils (RWW) is based on the presence of leaf scarring on new leaves caused by adult RWW feeding. Traditionally, foliar insecticide applications are recommended when 50-60% of new leaves have scarring present or when 5 or more larvae are present in a four cubic inch soil core. These sampling methods are cumbersome and inefficient and can lead to lower efficacy of treatments due to poor population density estimates. Sweep nets are used to scout for insect pests in many row crops, therefore utilizing them to scout for RWW would streamline the process and make scouting more similar to the techniques that producers and consultants are already accustomed to. A study was conducted in 2023 at two locations in Arkansas to determine the relationship of adult RWW caught in a sweep net to plant tissue scarring, larval densities, and yield. Preliminary results suggest that there is a relationship between adult populations, larval numbers, and yield, however continued research is required to establish a sweep net threshold for RWW adults. Another study was conducted evaluating the efficacy of seed treatments, seed treatment combinations, and combinations of seed treatments and foliar insecticides to determine the most cost-effective control option for RWW. Overall, both CruiserMaxx and Dermacor seed treatments as well as foliar insecticide applications reduced the number of larvae found in a soil cores. In conventional rice, seed treatments and foliar insecticide applications improved yield when compared to the untreated check. In hybrid rice, no differences were observed among treatments with respect to yield.

Crop Management Practices Impact on Carbon-based Soil Health Indexes

K. S. French[1], G. L. Drescher[1], T. L. Roberts[1], T. McLain, G. H. Bessa De Lima[1], G. A. L. Mengez[1], M. P. R. do Prado[1].
University of Arkansas System Division of Agriculture. Department of Crop, Soil, and Environmental Sciences.

Soil health refers to the soil's ability to complete ecosystem functions in biological, chemical, and physical cycles. The collection of measurements that a soil test report contains can be unclear and sometimes not useful for end users. Reliable, location-specific, and efficient interpretations of soil test reports could be highly useful to producers and scientists. We are investigating how biological, carbon-based soil health indexes change in eastern Arkansas row-crop production systems due to short- and long-term varying levels of crop rotation, crop cover, degree of tillage, and nutrient rate. Four studies with an experimental factor of nutrient rates (phosphorus and potassium) and cover crop rotation with reduced tillage near Rohwer, AR and Marianna, AR were established in 2017, while cover crops were planted in 2018. Soil samples from these four studies were collected during Spring 2023 at the 0-15 cm depth, homogenized, and submitted for analysis of soil organic matter (LOI %), carbon dioxide respiration (ppm C), active carbon (ppm C), β-glucosidase activity levels (mg p-NP/kg soil h) and CASH Cornell Soil Health scores. Preliminary data show differences in results between locations due to inherent soil characteristic differences. Preliminary data also show no significant sensitivity of any biological and carbon-based indicator values like carbon dioxide respiration or active carbon in either location. In summary, these preliminary results suggest that no indicator values are sensitive to changes in management across a 5-year period.

Influence of Soybean Production Systems on Palmer amaranth (*Amaranthus palmeri* S. Wats.) Emergence and Yield Potential

J.S. Smith[1], J.K. Norsworthy[1], M.R. Dodde[1], S.L. Linn[1], T. Barber[2]. [1]University of Arkansas System Division of Agriculture, Fayetteville, AR;[2]University of Arkansas System Division of Agriculture, Lonoke, AR.

Palmer amaranth remains one of the most troublesome weeds for Arkansas soybean growers. For years, herbicides have been the premier option for controlling this weed, but this has led to the evolution of herbicide resistance and decreased efficacy of herbicide applications. Going forward, an integrated weed management approach will be needed to adequately control Palmer amaranth. This research aims to evaluate the use of winter wheat to suppress the emergence of Palmer amaranth in soybean production systems with different row widths. In the fall of 2022, a field trial was initiated at the Milo J. Shult Agricultural Research and Extension Center in Fayetteville, AR. This experiment consisted of four treatments: drill-seeded soybean as a single crop, drill-seeded soybean relay cropped with winter wheat, 36-inch row soybean as a single crop, and 36-inch row soybean relay intercropped with winter wheat. Additional wheat was planted next to the trial and was harvested as a check for wheat yield. Wheat yields between the two soybean spacings did not differ; however, intercropped wheat yielded 55% less on average than the check. Drill-seeded soybean yielded 38% higher than in the 36-inch row treatments, but there was no difference between single and intercropped yields. Both intercropped treatments gave a land equivalent ratio (LER) greater than the single crop treatments, and the drilled intercrop gave a greater LER than the 36-inch intercrop. The drilled single crop had the most Palmer amaranth emergence throughout the season. Compared to the drilled single crop, the 36-inch single crop had 58% less Palmer amaranth emerge, and the intercrop had 94% less Palmer amaranth emerge on average. The greater Palmer amaranth emergence in the drilled single crop is attributed to increased soil disturbance at planting. These results suggest that relay intercropping winter wheat and soybean could be part of an integrated approach to control Palmer amaranth in the face of increasing herbicide resistance.

Amicarbazone-Containing Herbicide Programs as a Replacement for Atrazine in Grain Sorghum.

M.R. Dodde[1], J.K. Norsworthy[1], M.C. Woolard[1], A.S. Godar[1], L.T. Barber[2], and R.S. Henry[3]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR; [2]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Lonoke, AR; UPL, [3]King of Prussia, PA.

Atrazine is one of the most used herbicides in grain sorghum for preemergence (PRE) and postemergence control of grass and broadleaf weeds. Due to environmental concerns, the Environmental Protection Agency (EPA) has proposed to reduce the rate of atrazine to only 0.5 lb/A/year. Therefore, research was conducted in 2023 at the Milo J. Shult Agricultural Research and Extension Center in Fayetteville, AR, to determine if amicarbazone-containing PRE herbicide programs offer similar weed control without injuring grain sorghum. A randomized complete block design experiment was established with four replications. Treatments were all applied PRE and included amicarbazone, metribuzin, and atrazine alone and in combination with S-metolachlor plus mesotrione. Injury and weed control data for multiple weed species were collected for 5 weeks after grain sorghum emerged. Amicarbazone (0.4 lb/A) plus *S*-metolachlor (1.6 lb/A) plus mesotrione (0.6 lb/A) controlled Palmer amaranth (*Amaranthus palmeri*) (>95%) and broadleaf signalgrass (*Urochloa platyphylla*) (>97%) 5 weeks after treatment (WAT). This level of control was comparable to atrazine (0.5 lb/A) plus *S*-metolachlor (1.6 lb/A) plus mesotrione (0.6 lb/A). Both treatments never caused more than 6% injury to grain sorghum, and no differences between these treatments occurred. When comparing atrazine alone to amicarbazone alone, weed control was often comparable for the two treatments. Based on these results, amicarbazone should be further evaluated and shows promise as a replacement for atrazine in grain sorghum.

Exploring the potential of cold plasma as a pest management strategy in field crops.
D. Dilip[1], M. Rahman[2], R. Kariyat[1]. [1]Department of Entomology and Plant Pathology, University of Arkansas, [2]Department of Food Science, University of Arkansas.

Insect pest management is a critical component of agriculture and alternate as well as environment friendly methods are being explored to mitigate the deleterious effects from overuse of chemical insecticides. Recently, cold plasma has been used in agriculture for decontaminating seeds before sowing or storage, increasing seed germination as well as growth, soil remediation and production of Nitrogen based fertilizers like nitrites and nitrates. Even though cold plasma is capable of releasing nitrogenous radicals with possible implications for the activation of plant defense traits, this area has been unexplored. As a proof of the concept, we exposed rice seeds of commonly grown Arkansas varieties to cold plasma for 10 minutes and tested its effectiveness against Fall Armyworm (*Spodoptera frugiperda;* FAW), an insect pest in rice. Although it is considered as a minor pest in Arkansas; having high fecundity and voracious feeding habit makes FAW a possible threat in coming years. Our preliminary results show that cold plasma treated seeds exhibited faster germination as well as better vegetative growth in early stages, and FAW caterpillars caused lower feeding damage as well as feeding rejections on seedlings from treated seeds. Further experiments are underway to examine these effects in detail at different phenological stages of rice and expand to other field crops.

Effects of Fast and Slow Wilting Soybean Genotypes on Fall Armyworm *(Spodoptera frugiperda)* growth and development
Jessica Ayala[1], Alejandro Vasquez[1], Devi Balakrishnan[1], and Rupesh Kariyat[1]. [1]University of Arkansas, Fayetteville, AR, Department of Entomology & Plant Pathology.

Soybean (*Glycine max*) is the most important source of plant protein in the world for both humans and animals. In Arkansas, soybean reigns supreme as the largest row crop with more acres than all others combined. Fall Armyworm (FAW) (*Spodoptera frugipera*) is a pest of increasing concern across the globe due to its polyphagous nature and gluttonous feeding behavior. As global temperatures rise, and droughts become more prevalent as a result of climate change- researchers are turning their attention to developing soybean accessions that demonstrate better water use efficiency (WUE) traits to maintain their production. However, there is little research on how increasing WUE traits impacts the accessions' ability to respond to insect herbivory and specifically FAW herbivory, especially at different life stages. The aim of this study is to explore the impact of FAW feeding on soybean accessions with various WUE traits to determine which accessions are best suited for growers in the future. Through exposing FAW larvae to soybeans at different life stages we were able to ascertain that FAW were differentially impacted by different soybean growth stages. Furthermore, we can clearly see that the impacts of soybean defense mechanisms can impact FAW at different life stages as well depending on the age of the soybean they were exposed to. Looking through the lens of WUE and more specifically canopy wiltiing speed, we can also see that FAW experience higher mortality rates on slower wilting soybean accessions than on faster wilting accessions with less WUE traits. Ultimately we aim to gain a better understanding on the relationship between WUE traits and insect resistant traits and how they alter both FAW and soybean growth and development to give more clarity to growers.

Effects of Cover Crops on an Arkansas Rice Production System

H.E Vickmark[1], T.L Roberts[1], K.R Brye[1], G.L Drescher[1], J.T Hardke[2], & K.A. Hoegenauer[1]. [1]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR. [2]Dept. of Crop, Soil, and Environmental Sciences, University of Arkansas, Stuttgart, AR.

Carbon dioxide accounts for 79% of the world's greenhouse gases. With the threat of climate change and land-use practices being one of the main drivers, researchers have turned their attention to agronomic management practices that reduce emissions by sequestering carbon in the soil. Research was developed to investigate the effects of various cover crop treatments on nutrient availability and rough rice *(Oryza sativa* L.) yield in a direct-seeded, delayed-flood rice production system. Four cover crop treatments were drill-seeded in the fall of 2022 and included winter fallow, Austrian winter pea (*Pisum sativum*), Black-seeded oats (*Avena sativa*), and a 50:50 blend of the Austrian winter pea and black-seeded oats at rates of 45, 50, and 50 lb seed acre^{-1}, respectively. Cover crop samples were collected from a 3.9 ft^2 area immediately prior to rice planting and analyzed for total aboveground biomass and nutrient content. Prior to cover-crop termination, rice cultivar RT7521 FP was no-till drill-seeded into the existing cover-crop at a rate of 35 lb seed acre^{-1}. Rice samples were collected from a length of 3 ft and analyzed for aboveground biomass and nutrient content at 50% heading and at maturity. There were no significant differences observed between treatments in rice biomass or rough rice yield. However, average rice yield was numerically higher in a legume-only cover crop treatment (220 bu acre^{-1}) compared to the no cover crop rice control treatment (230 bu acre^{-1}) and may be attributed to the increase N accumulation and availability within this management practice. Additional years of data will allow for understanding of long-term treatment effects on rough rice yield and soil carbon sequestration by comparison of initial soil sampling. Future research may be conducted to investigate total emissions reductions of regenerative management practices, as well as the socio-economic effects on agricultural producers.

Evaluating Broad Mite (*Polyphagotarsonemus latus*) (Acari: Tarsonemidae) Sampling Techniques in Blackberry.

J.B. Linn[1], A.J. Cato[2], and R.F. Keiffer[2]. [1]Department of Horticulture, University of Arkansas, Fayetteville, AR. [2]Department of Horticulture, University of Arkansas, Little Rock, AR.

Broad mites (*Polyphagotarsonemus latus* Banks) (Acari: Tarsonemidae) are an emerging pest of blackberry across the world that can severely limit yield. Although current thresholds for broad mite recommend sampling 10 terminal primocane blackberry leaflets per field, the optimal method of estimating broad mite density across a field is still unclear. Additionally, the link between mite density and visual injury has not been investigated and could prove to be a highly adopted sampling technique. The objective of this study is to determine an effective leaflet sample size for estimating broad mite population densities in blackberry, investigate the relationship between broad mite population density and the severity of visible primocane injury, and determine an accurate and efficient sampling strategy for broad mite. Broad mite sampling strategies were evaluated by comparing three sample sizes (5, 10, and 15 leaflets) on 12 commercial fields and visual injury was rated on a descriptive scale (1-5) in 33 commercial blackberry fields. The number of broad mites and associated visual injury in each transect were compared using regression analysis. The optimum sample size for leaflet samples and for visual injury assessments was determined using Taylors coefficients. Little difference was observed when comparing different blackberry leaflet sample sizes. When using 10-leaflet samples, an optimum sample size at 70% accuracy would necessitate 16 different samples across each field, much higher than the single 10-leaflet sample currently recommended, whereas only six 10-cane visual injury samples would be necessary. A positive linear relationship was observed between broad mite density and visual injury. When visual injury averaged a rating of two, 72% of samples were observed to be above threshold. These results indicate that visual injury can effectively estimate broad mite populations and should be used to promote grower adoption of broad mite scouting.

Crop Response to Zinc Fertilization

T. McLain[1] and T. L. Roberts[1]. [1]Department of Crop, Soil, and Environmental Sciences, Fayetteville, AR.

Zinc (Zn) is the most widespread micronutrient deficiency found in rice (Oryza sativa L.) production and deemed the third most important factor limiting rice yields. Zinc fertilization techniques have been introduced and promoted for rice management, but there is limited research confirming their effectiveness. A study was developed to compare different Zn management strategies to the standard practice of applying 11.2 kg Zn ha^{-1} as granular zinc sulfate (ZnSO4) preplant incorporated. Comparisons of the treatments focus on the effects on tissue-Zn concentration, grain yields, and soil-test Zn levels over time. To achieve the objective, the following Zn treatments were implemented: i) no Zn, ii) granular ZnSO4 applied at 3.36 kg Zn ha^{-1}, iii) granular ZnSO4 applied at 11.2 kg Zn ha^{-1}, iv) Zn EDTA applied at 1.12 kg Zn ha^{-1}, v) F-420G applied at 11.2 kg Zn ha^{-1}, vi) F-420G Exp applied at 11.2 kg Zn ha^{-1}, vii) MicroEssential's (MESZ) applied at 1.12 kg Zn ha^{-1}, viii) MESZ applied at 1.12 kg Zn ha^{-1} in combination with ZnSO4 applied at 2.24 kg Zn ha^{-1}, ix) Muriate of potash (MOP) applied at 101 kg ha^{-1} coated with Wolf Trax Zn DDP at 1.23 kg Zn ha^{-1}, and x) MOP applied at 101 kg ai ha^{-1} coated with Yaravita Procote Zn at 1.23 kg Zn ha^{-1}. All Zn treatments were applied prior to planting and incorporated, except for Zn-EDTA which was applied as a foliar spray at the V2 growth stage. Results indicate that there were significant differences in rice tissue-Zn concentration and grain yield.

Tolerance of Rice Cultivars to 3-leaf Application of Fluridone

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The spread of herbicide-resistant weeds in rice has led to a challenging weed management scenario. To address this issue, new approaches, such as adding new modes of action, must be explored. Fluridone was first labeled in rice in 2023, offering a new site of action to control weeds in the crop. However, additional research is necessary to assess rice tolerance to this herbicide. This study aimed to evaluate the tolerance of twelve rice cultivars to fluridone applied at the 3-leaf growth stage – a labeled application. The experiment was conducted in 2022 and 2023 at the Pine Tree Research Station near Colt, Arkansas, and it was organized as a randomized complete block design with 2 factors and four replications. Factor A was cultivars, and the following cultivars were tested: CLL15, CLL16 (Clearfield®), RT7321 FP, RT7521 FP (FullPage®), PVL02 (Provisia®), RTv7231 MA (Max-Ace®), DG263L, Diamond, Titan, Jupiter, XP753, and Lynx (conventional). The cultivar Lynx was tested just in 2022. Factor B was fluridone rates. The herbicide was applied at 0 (nontreated check), 0.15, and 0.3 lbs ai/A when the rice achieved the 3-leaf growth stage. Injury ratings were collected 1 and 4 weeks after treatment (WAT), and rough rice grain yield was determined at harvest. In 2022, minimal injury was observed at both ratings, with the highest level displayed by the cultivar Lynx (5%) at 4 WAT when sprayed with the highest rate. It was equivalent to the cultivars XP753, Jupiter, Diamond, Titan, DG263L, and RT7521 FP at the same rate and Lynx at the lower rate. In 2023, only the cultivar effect was significant at 1 WAT, and the cultivar PVL02 displayed the greatest injury (9%), which was comparable to the cultivars DG263L, Jupiter, RTv7231MA, and XP753. In 2023, at 4 WAT, the injury ranged from 4 to 38%, and the cultivars DG263L and PVL02 displayed the highest injury levels (38% and 36%, respectively) when treated with the highest rate. The increase in crop injury compared to the evaluation at 1 WAT in the same year is potentially attributed to herbicide reactivation due to flood establishment, which occurred 14 days before the last evaluation. Additionally, the differences in overall injury between the two years can be partially ascribed to the lower temperatures and increased rainfall in 2023, contributing to higher injury levels. In 2022, there was no yield difference between the treatments. Conversely, in 2023, the high injury levels led to a yield penalty to the cultivar DG263L at both rates. In contrast, only the highest rate decreased yield to the cultivar RTv7231 MA. The same year, fluridone rates did not decrease yield for the other cultivars compared to the nontreated checks. These results indicate that rice tolerance varies among cultivars depending on environmental conditions, and rice injury may translate into yield loss for some cultivars. Further studies are needed to assess rice tolerance to fluridone across various environmental conditions and its efficacy in weed control.

Two-years Comparing a Broadcast Program to See & Spray™ Premium in Soybean

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With the commercial introduction of See & Spray™ Ultimate in 2022, producers need additional insight into the future effects this technology may have on production systems. The Ultimate platform comes equipped with different sensitivity levels, which can affect weed detection, and a dual tank/boom system allows simultaneous targeted and broadcast pesticide applications. Additionally, John Deere introduced See & Spray™ Premium in March 2023, retrofitting new generation machines with See & Spray functionality without the dual boom/tank setup. In this situation, producers may apply residual herbicides through targeted applications rather than broadcasting, which poses additional risks from the lack of broadcast-applied residual. This research aimed to determine the long-term impact of utilizing single tank See & Spray Ultimate or See & Spray Premium programs compared to a broadcast. The experiment was designed as a randomized complete block with 3 treatments and 6 replications. All treatments received a broadcast preemergence application. At early-postemergence (EPOST) and mid-postemergence (MPOST), all plots were treated with the same herbicides and rates but differed by application method: 1) broadcast, 2) See & Spray high sensitivity, or 3) See & Spray low sensitivity. In the first year, See & Spray provided herbicide savings from 20% to 81% depending upon application timing and sensitivity level, but some escapes were observed at the end of the year. Again, in 2023, savings ranged from 42% to 83%, and more weeds were observed at the time of application for treatments that received low sensitivity level applications the previous year compared to the broadcast and high sensitivity level. The higher number of weeds in the second year indicates that the low sensitivity level either missed weeds or provided inadequate weed control, allowing escapes to produce seed for the second growing season. While the high sensitivity level had a similar number of weeds compared to the broadcast, producers should be cautious about utilizing single-tank programs that apply residual herbicides as targeted applications. The highest sensitivity level should be used to reduce the risk of increasing the number of weeds in future production seasons.

Development of Effective Herbicide Programs to Control Glufosinate-Resistant Palmer amaranth in Soybean Fields.

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Glufosinate is a commonly used postemergence option to control herbicide-resistant Palmer amaranth in row crops. The confirmation of glufosinate-resistant Palmer amaranth populations in Arkansas, Missouri, and North Carolina is of high concern, and effective control programs are sought. This study aimed to evaluate different herbicide programs in soybean to control glufosinate-resistant Palmer amaranth. Field trials were conducted in 2022 and 2023 at the Milo J. Shult Agricultural Research & Extension, Fayetteville, AR. The experiments were conducted in an area geographically isolated from agricultural lands, previously infested with seeds of a highly glufosinate-resistant accession. The postemergence treatments were: 1) sequential glufosinate applications, 2) sequential 2,4-D applications, 3) sequential 2,4-D plus glyphosate applications, 4) sequential 2,4-D plus glufosinate applications, and 5) sequential dicamba applications. All postemergence treatments were combined with the presence or absence of residuals (*S*-metolachlor plus metribuzin at preemergence and *S*-metolachlor at early postemergence). Treatments were sprayed preemergence (PRE), early postemergence at 4 weeks after PRE (EPOST), and late postemergence at 6 weeks after PRE (LPOST). Nontreated controls were included for comparison. Palmer amaranth control was assessed 2 weeks after LPOST. The lowest control levels (under 55%) were observed whenever sequential glufosinate applications were used, independently of adding residuals. The highest control was obtained when residuals were combined with sequential applications of 2,4-D plus glyphosate. Except with sequential spraying of glufosinate, all the treatments, including residuals, obtained control levels above 90%. Adding additional postemergence chemistry using residuals was an effective approach to control glufosinate-resistant Palmer amaranth.

Effects of seed treatment and varietal differences on growth and development of Fall armyworm in AR rice

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Fall armyworm, (*Spodoptera frugiperda* (J.E. Smith) is one of the most destructive polyphagous pests, feeding more than 350 host plants belonging to 76 plant families. Rice is one among the host plants and FAW damage in rice can cause approximately 15% yield loss annually. Rice is one of the most important crops grown in the state of Arkansas and the state ranks first in production and is also the leading exporter of rice in the United States. Considering the insect infestations in AR-grown rice, FAW is considered as a minor pest that is usually seen during the panicle initiation to grain filling stage. However, due to changes in the climatic conditions and the high usage of agrochemicals in the field, there is a high probability of changing the pest status to a major, which can result in high economic loss. To test whether the FAW damage is dependent of variety as well as on phenological stages, we used seed-treated as well as untreated, commonly grown Arkansas rice varieties and infested them with the FAW larvae at three life stages of rice. We then collected data on mass gain and developmental traits of FAW, along with the damage, mortality, and defense traits of the rice varieties. Our preliminary results show that the FAW damage differed with the rice varieties, and the defense traits in plants vary with their phenological stages. More detailed exploration of varieties with respect to growth stages and seed treatment using other physical and chemical defenses and the response of FAW growth and development studies are in progress.

Water Regime and Fertilizer-phosphorus Source Effects on Greenhouse Gas Emissions from Rice in the Greenhouse.

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Greenhouse gas (GHG) emissions from rice (*Oryza sativa*) systems have been correlated to water soil moisture status and water management practice, but, to date, no study has directly evaluated the three main GHGs [i.e., methane (CH4), nitrous oxide (N2O), and carbon dioxide (CO2)] under flood- and furrow-irrigated conditions at the same time as affected by various fertilizer-P sources, in particular the reportedly slow-release struvite-P source. Therefore, the objective of this study was to evaluate the effect of water regime (flooded and furrow-irrigated) and fertilizer-P source [diammonium phosphate (DAP), chemically precipitated struvite (CPST), electrochemically precipitated struvite (ECST), triple superphosphate (TSP), and an unamended control (CT)] on GHG emissions and global warming potential (GWP) in the greenhouse. Mean methane emissions were 10 times greater ($P < 0.05$) under flooded (29.4 kg CH4 ha-1 season-1) than under furrow-irrigated conditions (2.9 kg CH4 ha-1 season-1), and four times lower ($P < 0.05$) with ECST (3.4 kg CH4 ha-1 season-1) than other fertilizer-P sources, while mean CO2 emissions were three times greater ($P < 0.05$) under furrow-irrigated (23428 kg CO2 ha-1 season-1) than under flooded (8290 kg CO2 ha-1 season-1) conditions. Mean global warming potential under furrow-irrigated conditions was almost 40% lower ($P < 0.05$) than under flooded conditions. Though N2O emissions were unaffected by fertilizer-P source, the mean N2O contribution to GWP was more than 80% under furrow-irrigated conditions. Divergent water regimes require a diversified approaches in GHG mitigation practices, where best managements for ECST needs to be fully evaluated.

Cascading effects of drought and herbivory on growth and development of host and herbivores in AR soybean

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Soybean, one of the most prominent field crops in Arkansas and the United States, is highly susceptible to drought and insect pest attacks. The planted acreage of soybean has been reduced by 10% in 2023 from 2018 with increasing dryness while insects and pests such as corn ear worm, soybean looper, stink bug are always abundant during dry years. Clearly, limited water availability and herbivory poses serious challenges to soybean production in Arkansas. Consequently, there is a pressing need to expand the studies on understanding the underlying mechanisms of drought X herbivory interactions and their impacts on functional traits of soybeans. To address this, we imposed partial drought and herbivory (soybean looper caterpillar) on 3 soybean genotypes that vary in their drought tolerance, with respective controls in University of Arkansas, Division of Agriculture greenhouse with ~600 plants. Soybean physiological traits were measured using LI-COR 6400/XT while soybean looper performance on soybean plants was also constantly monitored. We found that chlorophyll content and net photosynthesis was lower for stressed soybean plants immediately after drought, but net photosynthesis was significantly higher when attacked by soybean loopers after recovering from drought. Similarly, the soybean looper survival and larval mass gain was significantly lower in drought stressed soybeans as compared to well-watered ones. Current findings suggest that drought stressed soybeans after recovery and exposure to herbivory, become more vigorous which makes it difficult for the loopers to perform well when compared to non-stressed soybeans. We believe that our study will unravel the drought X herbivory interaction and their impact on soybeans and our findings will contribute to the development of strategies aimed at enhancing crop resilience of soybean and other economically important field crops in Arkansas.

Sweetpotato variety performance in spring cover crops

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Research was conducted at the Vegetable Research Station, Kibler, Arkansas in 2023, to evaluate the performance of sweetpotato [*Ipomoea batatas* (L.) Lam.] varieties under spring-planted cover crops. This is a split-split plot experiment with three factors- weeding (main plot), cover crop (subplot), and cultivar (sub-subplot). Weeding treatment were hand-weeded and not-weeded; cover crops were cereal rye + clover, cereal rye + vetch, cereal rye + winter pea, and fallow, and sweet potatoes varieties were 'Heartogold,' 'Morado,' 'Centennial,' and 'Beauregard14'. Data calculated included vine length and yield of sweetpotato varieties. The vine length of sweetpotato was longest when planted in cereal rye + vetch cover crop averaged across varieties, regardless of weeding treatment. Comparing varieties averaged across cover crops and weeding treatments, Centennial had the longest vine which was similar to Morado, while, Heartogold the had shortest vine at four weeks after transplanting. Eight weeks after transplanting Morado had the longest vine length under cereal rye + vetch cover crop in both weeding treatments. Total marketable yield was calculated as the sum of jumbo, no.1, and canner roots. Hand-weeding increased yield by 127.8% relative to the not-weeded treatment. Among cover crops, cereal rye + vetch with handweeding and cereal rye + winter pea without handweeding resulted in the highest marketable yield of sweetpotato. Sweetpotato roots were significantly smaller in non-weeded plots compared to handweeded plots, regardless of cover crop and variety. Therefore, jumbo roots were rare in non-weeded plots. Whether handweeded or not, Centennial produced the highest yield, averaged across cover crops. Beauregard14 produced the lowest yield under handweeded treatment and Heartogold yielded the least without handweeding. Sweetpotato yield was positively correlated with vinelength (r=0.503).

Evaluation of Brown Mid Rib Sorghum Varieties Against Fall Army Worm

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Insect herbivory in agroecosystems has driven the development of integrated pest management strategies that reduce pest incidence, and to keep them under economic thresholds. Arkansas sorghum, primarily grown in eastern Arkansas, faces attack from a major Lepidopteran pest, *Spodoptera frugiperda*, Fall Army Worm (FAW), a polyphagous, voracious feeder responsible for immense sorghum yield loss for growers as they feed on whorls and heads. While a similar Lepidopteran sorghum pest, *Helicoverpa* zea, corn earworm has 10 recommended insecticides, FAW only has 4 and therefore is a need to develop new methods of management. Seed treatments are amongst the most widely used chemical forms of pest management because of their relatively inexpensive treatment and application methods. Alongside seed treatments, in grains and millets, Brown Mid Rib (BMR) is a trait with implications for plant defense against insect herbivores. BMR plants have lower amounts of lignin, which produces a less fibrous, more digestible crop, but have been found to be susceptible to herbivores. Using FAW, we tested whether in sorghum, *Sorghum drummondii*, BMR x Seed treatment x Age interactions affected FAW growth, development, and plant defense responses. Our results show that seed treatment did not affect growth or development or herbivory, and neither did BMR; however, BMR reduced both pupal and adult mass. We also found that age was a major factor as FAW gained less mass, pupated slower, and had lower pupal mass on 60Day old plants compared to younger stages. Ultimately, FAW has proven as a resilient pest of Arkansas sorghum that requires control via improved chemical methods alongside developing varieties with better resistant traits.

Tetflupyrolimet: A Novel Herbicide for Barnyardgrass Management in Midsouth Rice

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Herbicide-resistant (HR) barnyardgrass [*Echinochloa crus-galli* (L.) P. Beauv] has evolved into an increasingly difficult challenge to manage for rice producers in the Midsouth. Currently in development by FMC Corporation, tetflupyrolimet (Dodhylex™) is the first conventional herbicide in multiple decades with a novel mode of action for preemergence (PRE) control of HR barnyardgrass populations. Prior to commercialization of Dodhylex, experiments were conducted to ensure a high level of performance on barnyardgrass without compromising crop safety. Barnyardgrass control with Dodhylex was evaluated on a silt-loam and clay soil in 2021 and 2022 at the Rice Research and Extension Center and Northeast Research and Extension Center, near Stuttgart and Keiser, AR, respectively. At each location, Dodhylex was applied in mixture with Command® 3ME (Command) PRE followed by (fb) a Dodhylex plus Command mixture applied POST in combination with a graminicide product (RebelEX®, Stam® M4, or Ricestar® HT) at 3-to 4-lf rice and compared to commercial standards with the same application timings. At 14 DAPRE and 56 DAPOST, barnyardgrass control with a PRE fb POST Dodhylex and Command mixture plus a POST grass product was comparable to the standard PRE fb 3- to 4-lf herbicide programs evaluated at both locations. Rice tolerance to Dodhylex was evaluated with 12 commonly planted rice cultivars in 2021, 2022, and 2023 at the Pine Tree Research Station, near Colt, AR. Dodhylex was applied preemergence and early postemergence at a low and high rate of the herbicide. Visible injury was recorded weekly until 28 days after treatment and grain yield was collected at harvest. Response variables were compared to the nontreated control within each cultivar. For each evaluated cultivar, no visible injury or a reduction in relative grain yield was observed from Dodhylex regardless of rate or application timing. The integration of Dodhylex as a conventional residual herbicide for Midsouth rice production will provide growers with an effective and safe new mode of action for control of HR barnyardgrass using any rice technology of choice.

Evaluation of Seed Treatments on Rice as Safeners for Bleaching Herbicides

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Chemical weed control in rice (Oryza sativa L.) has become increasingly hindered by the increasing occurrence of resistance to the primary herbicide modes of action (MOAs) labeled for use in the crop. Therefore, it is imperative that new MOAs be utilized for weed control in rice production systems. In the fall of 2023, a two-factor factorial experiment was conducted in the greenhouse in the Altheimer Laboratory in Fayetteville, AR, to evaluate the effectiveness of three undisclosed safeners applied as a seed treatment to Diamond cultivar. Rice was treated with one of three safeners and compared to a non-treated seed treatment. Three herbicides, which included topramezone, tembotrione, and mesotrione, were evaluated in a preemergence application timing to determine if any of the seed treatments could provide adequate tolerance to rice. Each of these herbicides inhibits 4-hydroxyphenylpyruvate dioxygenase (HPPD), a site of action for which there are no registered preemergence herbicides in Arkansas rice production. A second experiment was conducted to evaluate the effectiveness of a lone herbicide safener as a seed treatment in response to several rates of topramezone-applied preemergence. Significant bleaching injury to rice is typical of HPPD-inhibiting herbicides. Injury was assessed at 7, 14, and 21 days after treatment (DAT), and crop density assessments were taken at 7 and 21 DAT. When averaged over herbicides at 14 DAT, all three seed safeners differed in their ability to protect rice from injury relative to rice without seed treatment. Likewise, the extent of injury to rice differed among herbicides, with tembotrione generally causing the least amount of crop injury (<10%). These results indicate there may be some potential for using certain seed treatments to safen rice to preemergence-applied HPPD-inhibiting herbicides, but further research will be needed under a range of environmental conditions including field application of the herbicides.

Evaluation of Rice Tolerance to Clomazone when Treated with Fenclorim

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Current research at the University of Arkansas involves exploring new methods of managing weeds in rice production. Chloroacetamide herbicides are not labeled in U.S. rice production. Still, studies conducted by our research group have demonstrated the efficacy and safety of a fenclorim seed treatment in conjunction with these herbicides. Most recently, clomazone, a group 13 herbicide (diterpene synthesis inhibitor), applied to the soil after planting fenclorim-treated rice seed resulted in less injury to the crop than the safener's absence. To gauge the extent of rice safening to clomazone by a fenclorim seed treatment, a greenhouse experiment was conducted in Fayetteville, AR, during the fall of 2022. The experiment compared fenclorim-treated rice with non-treated rice while applying clomazone at seven rates (0x, 0.5x, 1x, 1.5x, 2x, 3x, and 4x times the recommended field rate of 336 g ai/ha) to a silt loam soil. As the clomazone rate increased, the percentage of injury to rice in the form of bleaching increased, but more so when rice was not treated with fenclorim. At the 4X clomazone rate, all emerging rice plants had total mortality. In contrast, fenclorim-treated rice at the same clomazone rate had only 40% mortality relative to non-treated plots. Rice aboveground biomass and groundcover, based on green pixels determined from Turf Analyzer software, followed similar trends to observed rice injury, indicating a strong safening of rice to clomazone from fenclorim. This study provides evidence that fenclorim-treated rice has the potential to mitigate the bleaching effects of clomazone applications and should be further evaluated in the field over a range of soils and environmental conditions.

Value of Insecticide Applications for Tobacco Thrips in Cotton

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Tobacco thrips are an increasingly problematic pest in Arkansas cotton due to widespread resistance to neonicotinoid and organophosphate insecticides. Thrips can delay maturity and decrease yield in years with heavy pressure. Many cotton fields are being treated multiple times in order to reduce these negative effects. The objective of this study was to determine the value of insecticide seed treatments (IST), in-furrow insecticide applications (IF), and 1, 2 or 3 foliar applications of Intrepid Edge for control of tobacco thrips. Untreated, IST, and IST + IF plots without a foliar application and untreated and IST plots with a single foliar application had delays in maturity compared to all other plots. Yield results will be discussed.

Evaluation of ILEVO to Manage the Southern Root-knot Nematode in Different Soil Texture

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The southern root-knot nematode (*Meloidogyne incognita*) is one of the most important yield- limiting plant-parasitic nematode that affects soybeans (*Glycine max*) in Arkansas. One of the tactics used by farmers to manage nematodes are seed applied-nematicides such as fluopyram. Seed-applied fluopyram is marketed as ILEVO, but little is known about nematode control across different soil texture classes. The objective of this study was to evaluate the effectiveness of ILEVO to manage the southern root-knot nematode in three different soil texture classes in the greenhouse. The soils were sampled from row crop fields near Kerr, Leachville, and Tuckerman Arkansas. ILEVO treated seed were sown in size 262 cm^3 Deepots in each soil texture and subsequently with approximately 1,310 eggs in three 1-inch deep holes around each seed. Non-treated seed and sand used in greenhouse experiments were used as controls. Treatments were arranged in a randomize complete block design. Soybean roots were sampled at 45 days after planting and eggs extracted from each root system. Data were similar between experiments. ILEVO suppressed nematode reproduction across all soil texture classes compared to the non-treated control. Of the soil texture classes, nematode reproduction was greater in soil sampled near Leachville than Kerr, Tuckerman, or standard greenhouse sand. These results conclude that ILEVO was effective across three soil texture classes in suppressing southern root-knot nematode reproduction.

Evaluation of Rinde for Improved Barnyardgrass Control in Rice

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Arkansas has historically been the leading rice-producing state, accounting for almost 50% of total rice production in the United States. Weed control in rice has been difficult, with the most difficult-to-control weed being barnyardgrass (Echinochloa crus-galli). Herbicide resistance has contributed heavily to the difficulty in controlling barnyardgrass, resulting in the need for new herbicide products. Rinde is a mixture of quinclorac and bispyribac sodium, two herbicides commonly used in rice to control barnyardgrass. The objective of this experiment was to determine the effectiveness of Rinde in a herbicide program for drill-seeded rice production and evaluate selected populations of barnyardgrass for sensitivity to quinclorac, bispyribac sodium, and a combination of the herbicides (Rinde). For all the Rinde-containing treatments evaluated, at no point in the growing season was >8% injury. All Rinde-containing treatments provided at least 98% barnyardgrass control at the final evaluation. Findings from the screening of populations to the herbicides will be presented, but results were not complete at submission of this abstract.

Brake, Valor, and Their Tank-Mixture Combinations with Residual Herbicides for Broad- Spectrum Weed Management Programs in Mississippi Peanut

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Crop losses from weed interference have a significant effect on net returns. Weed control is one of the most limiting factors facing peanut (*Arachis hypogaea*) producers in Mississippi. Early season weed management is most important which means weed control later in the season should be easier. A field study was conducted in 2022 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate Brake, Valor, and their tank-mixture combinations with residual herbicides for broad- spectrum weed management programs in Mississippi peanut. Peanut (Georgia-06G) was planted at a seeding rate of eight seeds ft^{-1} on May 24, 2022 and emerged on May 30. Plot size was 13 ft wide by 20 ft long. The plot area contained Palmer amaranth (*Amaranthus palmeri*), entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula*), prickly sida (*Sida spinosa*), broadleaf signalgrass (*Urochloa platyphylla*), and hemp sesbania (*Sesbania herbacea*). The study was designed as a randomized complete block with 18 treatments and four replications. Herbicide treatments were as follows (rate in oz/a): 1) Brake at 16; 2) Brake at 32; 3) Valor (flumioxazin) at 1.5; 4) Valor at 3; 5) Brake at 16 + Valor at 1.5; 6) Brake at 16 + Valor at 3; 7) Brake at 32 + Valor at 1.5; 8) Brake at 32 + Valor at 3; 9) Valor at 3 + Dual Magnum (*S*-metolachlor) at 32; 10) Strongarm (diclosulam) at 0.45 + Dual Magnum; 11) Brake at 16 + Dual Magnum; 12) Valor at 3 + Brake at 16 + Dual Magnum; 13) Valor at 3 + Dual Magnum + Strongarm; 14) Valor at 3 + Dual Magnum + Strongarm + Brake at 16; 15) Brake at 16 + Strongarm + Dual Magnum; 16) Brake at 16 + Warrant (acetochlor) at 48; 17) Brake at 16 + Warrant + Valor at 1.5: and 18) nontreated check. All treatments were applied preemergence (PRE).

There was no peanut injury from the application of tank-mixture combination of Brake with Valor + Dual Magnum + Strongarm (Trt. 14). Peanut injury was 11 and 2; 23 and 13; 4 and 1; 10 and 5; 6 and 3; 11 and 9; 7 and 3; 8 and 5; 11 and 11; 0 and 3; 10 and 2; 1 and 1; 0 and 0; 0 and 0; 2 and 0; 2 and 0; 0 and 0 from treatment 1 through 17 at 1- and 2- weeks after emergence (WAE), respectively. There was no peanut injury after 4 WAE. Palmer amaranth control was > 95% for treatment 3, 4, 6, 9, 12, and 15 at 6 WAE. Entireleaf morningglory control was 95, 99, 95, 100, 100, and 100% from treatment 5, 9, 10, 13, 14, and 15 at 6 WAE, respectively. The application of treatment 16 and 17 provided only 68 and 74% entireleaf morningglory control, respectively. All herbicide treatments provided 95 to 100% control of prickly sida and hemp sesbania. Broadleaf signalgrass was a difficult weed to control. Treatment 1 through 17 provided 49, 66, 64, 67, 81, 84, 91, 85, 98, 95, 91, 95, 100, 100, 100, 64, and 69% control of broadleaf signalgrass at 6 WAE, respectively. Based on this study, treatments 13 (Valor at 3 + Dual Magnum + Strongarm) and 14 (Valor at 3 + Dual Magnum + Strongarm + Brake at 16) were the best applications in terms of longer residual activity and broad-spectrum weed control.