

**MISSISSIPPI SOYBEAN PROMOTION BOARD  
2016-2017 FUNDED RESEARCH/EXTENSION PROJECTS**

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**Title:** Evaluation of alternative management tactics for early season insect pests of soybeans and impact of seed treatments on stand establishment and replant prevention, 01-2016, \$14,143

**PI:** Don Cook, [dcook@drec.msstate.edu](mailto:dcook@drec.msstate.edu); MSU-DREC

**Objective(s):** Evaluate at-planting insecticides as alternatives to neonicotinoid seed treatments; determine impact of neonicotinoid seed treatments on stand establishment and minimizing risk of replanting

**Duration:** Year 1 of 3

**Expected Results:** Identify alternatives to neonicotinoid seed treatments, and determine the benefit of seed treatments for minimizing failed stands/replanting.

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**Title:** Impact of fruiting structure loss at various growth stages on soybean yield under conditions that may limit yield potential, 03-2016, \$17,950

**PI:** Don Cook, [dcook@drec.msstate.edu](mailto:dcook@drec.msstate.edu); MSU-DREC

**Objective(s):** Determine impact of fruiting structure loss (flowers, pods) at different reproductive stages on soybean yield in low-yield environments (nonirrigated, late-planted)

**Duration:** Year 1 of 3

**Expected Results:** Determination of how fruiting structure loss differentially affects soybean yield in high- and low-yield environments so that economical management guidelines can be tailored for the different production environments.

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**Title:** Effect of spray additives on spray droplet size and crop canopy penetration, 04-2016, \$15,297

**PI:** Darrin Dodds, [dmd76@pss.msstate.edu](mailto:dmd76@pss.msstate.edu), MSU-ES

**Objective(s):** Determine the impact of spray additives on spray droplet size, spray coverage, and crop canopy penetration using common pesticides.

**Duration:** Year 3 of 3

**Expected Results:** Improve application efficiency of new pesticide technologies that have potential for off-target movement that can adversely impact non-target species and crops.

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**Title:** Agronomic and economic evaluation of soybean/corn rotation with twin-row production and increased nutrient management, 07-2016, \$26,338

**PI:** M. Wayne Ebelhar ([webelhar@drec.msstate.edu](mailto:webelhar@drec.msstate.edu)), MSU-DREC

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**Objective(s):** Determine agronomic implications of soybean/corn rotations in twin-row planting systems under standard and high soil fertility with irrigation; evaluate impact of soybean/corn rotation system on whole-farm profitability.

**Duration:** Year 5 of 6

**Expected Results:** Determine the feasibility of a soybean/corn rotation system for increasing yields and profits when used on irrigated soils in Mississippi.

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**Title:** Costs and benefits of on-farm water storage (OFWS) systems, 10-2016, \$73,133

**PI:** Mary Love Tagert, ([MLTagert@abe.msstate.edu](mailto:MLTagert@abe.msstate.edu)), MSU-ABE

**Objective(s):** Quantify and determine the cost-benefit of using OFWS for irrigation water supply, and quantify the nutrient load in recycled water that is used for irrigation.

**Duration:** Year 3 of 3

**Expected Results:** Increase the water supply options for irrigation of Mississippi crops to replace underground water that is being overdrawn.

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**Title:** Practical application of sensor-based irrigation scheduling method in soybean, 11-2016, \$9,990

**PI:** Ruixiu Sui, [ruixiu.sui@ars.usda.gov](mailto:ruixiu.sui@ars.usda.gov); USDA-ARS

**Objective(s):** Develop practical applications for using soil moisture sensors to schedule soybean irrigation; compare soil moisture sensor-based scheduling with Arkansas Irrigation Scheduler

**Duration:** Year 1 of 3

**Expected Results:** Guidelines for using soil moisture sensors to schedule soybean irrigation, to include sensor installation, data collection, and data interpretation so that resulting data can be used to schedule most efficient irrigation.

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**Title:** Influence of cover crops on early season insect pest dynamics in Mississippi soybeans, 13-2016, \$50,338

**PI:** Angus Catchot, [acatchot@ext.msstate.edu](mailto:acatchot@ext.msstate.edu); MSU-ES

**Objective(s):** Determine 1) influence of cover crops on early-season insect pest dynamics, 2) how cover crops affect efficacy of foliar spray programs for control of early-season insect pests, and 3) effect of cover crops on growth and yield of soybeans in conjunction with IPM insect control programs.

**Duration:** Year 2 of 3

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**Expected Results:** Information on the effect (risks or benefits) of cover crops use on early-season insect management strategies in soybean production systems, and guidelines to manage risks if they occur.

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**Title:** Determining environmental management schemes to influence the development of high seed quality in MG IV and MG V soybean, 14-2016, \$89,516

**PI:** Tom Allen, [tallen@drec.msstate.edu](mailto:tallen@drec.msstate.edu), MSU-DREC

**Objective(s):** Create environments (controlled and natural settings) conducive to the development of seed rot, and determine their impact on seed quality; determine specific pathogenic organisms that infect soybean plant parts in the different environments, and their pathogenicity; and determine nutrition status of seed and plant tissue and its possible correlation with seed rot.

**Duration:** Year 2 of 6

**Expected Results:** Determination of the fungal complex responsible for and its association with seed rot in conducive environments; determination of specific environmental conditions and associated pathogens that promote seed rot in soybeans; development of strategies involving fungicide/insecticide applications and application timing that can be used to reduce the impact of seed rot on harvest seed quality of soybeans when conducive environmental conditions are anticipated.

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**Title:** Soybean disease monitoring for Mississippi soybean producers ,15-2016, \$43,000

**PI:** Tom Allen, [tallen@drec.msstate.edu](mailto:tallen@drec.msstate.edu), MSU-DREC

**Objective(s):** Monitor occurrence and geographic location of foliar diseases, including rust, and provide producers with up-to-date information that can be used to make timely treatment decisions; determine environmental conditions that promote soybean rust and other foliar diseases of soybean, and determine effective fungicide management schemes for treatment of foliar diseases when they occur.

**Duration:** Continuous

**Expected Results:** Notification to producers through media outlets within hours of detection of significant outbreaks of yield-limiting diseases so that recommendations for product choices and timely treatment decisions can be made.

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**Title:** Kudzu bug management in soybeans, 17-2016, \$47,301

**PI:** Fred Musser, [fm61@msstate.edu](mailto:fm61@msstate.edu), MSU

**Objective(s):** Develop action thresholds for treatment during vegetative growth stage and evaluate existing action thresholds for treatment during reproductive stages; determine seed treatment efficacy against early-season infestations; and evaluate foliar insecticide efficacy against kudzu bug infestation.

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**Duration:** Year 1 of 3

**Expected Results:** Development of economic control/management strategies for kudzu bug in Midsouth soybean systems.

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**Title:** 2,4-D and dicamba resistant soybeans: stewardship and testing, 18-2016, \$39,898

**PI:** Ashli Brown, [abrown@msstate.edu](mailto:abrown@msstate.edu), MSU

**Objective(s):** Determine best sampling procedure for detection of auxin herbicide injury on soybeans; develop and validate testing methods to differentiate 2,4-D and dicamba herbicide formulations; design off-target field sampling program to determine best practices and participate in grower education program to promote stewardship of auxin herbicide use.

**Duration:** Year 1 of 3

**Expected Results:** Development of methodologies for identifying low-volatility 2,4-D and dicamba formulations, and design and implementation of a stewardship program for effective weed management with auxin herbicides.

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**Title:** Evaluation of soybean varieties for resistance to Cercospora blight, frogeye leaf spot, stem canker, and root-knot nematode, 19-2016, \$37,371

**PI:** Tom Allen, [tallen@drec.msstate.edu](mailto:tallen@drec.msstate.edu), MSU-DREC

**Objective(s):** Evaluate Miss. OVT entries for resistance to Cercospora blight and frogeye leaf spot (natural infestations), stem canker (inoculated trials), and root-knot nematode (naturally infested field); and collect and maintain stem canker isolates from infestations (when they occur) throughout Mississippi.

**Duration:** Continuous

**Expected Results:** Data that will provide producers information about the level of varieties' disease/nematode resistance and/or susceptibility so that tolerant/resistant varieties can be selected to avoid yield losses associated with the above pathogens.

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**Title:** Weed management programs for Mississippi soybean production, 20-2016, \$105,022

**PI:** Jason Bond ([jbond@drec.msstate.edu](mailto:jbond@drec.msstate.edu)), MSU-DREC

**Objective(s):** Evaluate new and/or currently registered herbicides and herbicide-resistant (HR) technologies for use in Mississippi soybean weed management programs; characterize synergism or antagonism between glyphosate and PPO herbicides; and conduct studies to refine Mississippi recommendations for use of PPO herbicides to manage glyphosate-resistant (GR) Palmer amaranth in GR soybeans.

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**Duration:** Year 2 of 3

**Expected Results:** Identification/development of cost effective control strategies for the various weed control problems that occur in soybeans, to include control options for GR/HR weeds, management options to prevent or delay development of HR weeds, and assessment of new herbicide technologies and traits that provide new weed management options.

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**Title:** Response and net profit of genetically enhanced and conventional soybean varieties to fertilizer recommendations on low nutrient soils in rainfed and irrigated production systems, 21-2016, \$57,631

**PI:** Mark Shankle, [shankle@ra.msstate.edu](mailto:shankle@ra.msstate.edu), MSU-PRFBES

**Objective(s):** Compare/validate fertility recommendations for soybeans from different soil testing facilities; identify optimum K fertilizer rate for new compared to old soybean varieties grown on soils low in K; determine the economic benefits of K fertility recommendations from different testing labs.

**Duration:** Year 4 of 4

**Expected Results:** Determination of the economic K fertility rate for soybean varieties grown in rainfed and irrigated environments in Mississippi, and determination of the correct K fertilizer rate based on recommendations from different soil testing labs.

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**Title:** Correlation of soil test K and P indices with plant tissue concentrations and soybean yield, 22-2016, \$34,420

**PI:** Bobby Golden, [bgolden@drec.msstate.edu](mailto:bgolden@drec.msstate.edu), MSU-DREC

**Objective(s):** Evaluate soybean yield response to P and K fertilization rate; correlate Lancaster and Mehlich-3 soil test P and K with plant indices (tissue concentration and seed yield).

**Duration:** 5 of 5

**Expected Results:** Provide a set of soil test recommendations that can be applied to soil test data from laboratories that use the Mehlich-3 extractant; update current P and K fertility recommendations for soybean that are based on the Lancaster extraction method; develop prescription fertilizer application guidelines for variable rate equipment.

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**Title:** Enhancement of Mississippi Soybean Variety Trials through entry standardization, 23-2016, \$30,000

**PI:** Brad Burgess, [bburgess@pss.msstate.edu](mailto:bburgess@pss.msstate.edu), MSU-MAFES

**Objective(s):** Conduct standardized soybean variety trials at multiple Mississippi locations.

**Duration:** Continuous

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**Expected Results:** Published yield results that can be used by producers to select varieties for individual production environments throughout Mississippi.

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**Title:** Corn and soybean crop residue management impact on soil quality, yield, and returns, 25-2016, \$36,714

**PI:** Normie Buehring, [buehring@ra.msstate.edu](mailto:buehring@ra.msstate.edu), MSU-NMREC

**Objective(s):** Determine how tillage and management of residue in a corn/soybean rotation affect soil quality, crop yields, and economic returns.

**Duration:** Year 6 of 6

**Expected Results:** Information that can be used by producers to make informed decisions (based on soil quality and economic returns) regarding tillage-crop residue management practices in a corn/soybean rotation production system.

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**Title:** Delta agricultural weather project, 29-2016, \$24,932

**PI:** Mark Silva, [marks@ext.msstate.edu](mailto:marks@ext.msstate.edu), MSU-DREC

**Objective(s):** Continue data collection and dissemination of pertinent agricultural weather data and products required by Delta researchers and producers.

**Duration:** Continuous

**Expected Results:** Collection of weather data for Delta Counties that will be assimilated into the DREC weather website archive to be available as a historical weather source for researchers, producers, and consultants.

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**Title:** Screening of pigweeds for resistance to PPO-inhibiting herbicides and evaluation of factors affecting PPO herbicide efficacy, 30-2016, \$20,000

**PI:** Vijay Nandula, [vijay.nandula@ars.usda.gov](mailto:vijay.nandula@ars.usda.gov), USDA-ARS

**Objective(s):** Screen pigweed populations from Delta locations for resistance to PPO-inhibiting herbicides, and evaluate factors affecting efficacy of these herbicides

**Duration:** Year 1 of 1

**Expected Results:** Up-to-date information on distribution of pigweed populations resistant to PPO-inhibiting herbicides, and determination of how treatment conditions such as additives, water quality, nozzle type, and product formulation affect performance of these herbicides.

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**Title:** Evaluation of soybean breeding lines for resistance to Phomopsis seed decay (PSD) and for high seed germinability, 31-2016, \$45,856

**PI:** Shuxian Li, ([shuxian.li@ars.usda.gov](mailto:shuxian.li@ars.usda.gov)), USDA-ARS

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**Objective(s):** Evaluate/test soybean breeding lines for resistance to PSD under field-inoculated conditions, and identify agronomically acceptable PSD-resistant lines that can be used in developing PSD-resistant varieties

**Duration:** Year 1 of 3

**Expected Results:** Identification of soybean breeding lines with resistance to PSD and having high seed quality that can be used in the development of high-yielding varieties with PSD resistance.

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**Title:** Phenotyping F<sub>2</sub> populations segregating for frogeye leaf spot (FLS) resistance, 32-2016 NCE

**PI:** Jeff Ray, [jeff.ray@ars.usda.gov](mailto:jeff.ray@ars.usda.gov), USDA-ARS

**Objective(s):** Apply molecular markers to F<sub>2</sub> DNA from previous F<sub>2</sub> phenotype screening, phenotype a confirming F<sub>2</sub> population segregating for *C. sojae* resistance, collect tissue and isolate DNA from the confirming population, and advance appropriate F<sub>2</sub> lines in a breeding program

**Duration:** Year 4

**Expected Results:** Molecular data that will be used in future studies to map FLS-resistant genes that will ultimately be used to identify race-specific FLS-resistant soybean germplasm that can be used to develop FLS-resistant varieties, which ultimately may be the only effective control measure for FLS

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**Title:** Post-infection development of reniform nematode on resistant soybean lines from JTN-5203, PI 404166, and 02011-1-1-1-5-1-1, 33-2016, \$20,960

**PI:** Salliana Stetina, [Sally.Stetina@ars.usda.gov](mailto:Sally.Stetina@ars.usda.gov), USDA-ARS

**Objective(s):** Characterization of post-infection development and fecundity of reniform nematode on resistant soybean lines; and evaluation and advancement of lines developed from crosses to resistant accessions

**Duration:** Year 1 of 1

**Expected Results:** Development of soybean germplasm lines with resistance to reniform nematode and that are adapted to Mississippi.

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**Title:** Mechanism of soybean root infection by *Macrophomina phaseolina*, 34-2016, \$48,000

**PI:** Hamed Abbas, [hamed.abbas@ars.usda.gov](mailto:hamed.abbas@ars.usda.gov), USDA-ARS

**Objective(s):** Examine the mechanism by which the charcoal rot (CR) fungus locates and enters soybean roots in the soil, and screen for substances that are involved in root infection by the CR fungus.

**Duration:** Year 2 of 2

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**Expected Results:** Defining how the CR fungus infects soybean roots, which should enable the development of alternative management strategies for soybean production in the Midsouth so that the incidence of CR will be reduced. Also, this research could lead to new strategies for the development of CR-resistant soybean lines and/or the control of CR by using endophyte-free seed.

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**Title:** Provide in-field soybean diagnostic service for Mississippi soybean producers and researchers, 35-2016, \$10,000

**PI:** Billy Moore, [wfm1888@aol.com](mailto:wfm1888@aol.com), Private Consultant

**Objective(s):** To provide soybean disease diagnostic assistance to soybean producers and leaders of MSPB-funded projects.

**Duration:** Continuous

**Expected Results:** Disease problems that occur in producer and MSPB-funded project fields will be evaluated to provide disease management assistance to MSU researchers and extension personnel.

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**Title:** Soybean management by application of research and technology (SMART), 36-2016, \$126,618

**PI:** Trent Irby, [tirby@pss.msstate.edu](mailto:tirby@pss.msstate.edu), MSU-ES

**Objective(s):** Identify and apply key management practices that increase soybean production profitability, provide a hands-on educational opportunity to assess profitable best management practices (BMP's), collect long-term data for determining specific BMP's that consistently increase yields and profits, and promote BMP's that are proven to sustain profitable Mississippi soybean production.

**Duration:** Continuous

**Expected Results:** Demonstrating and showcasing BMP's that are proven to consistently and sustainably improve soybean production in all Mississippi regions, and disseminating this information to producers, extension personnel, and consultants.

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**Title:** Video support for Mississippi soybean producers, 41-2016, \$16,233

**PI:** Leighton Spann, [leightons@ext.msstate.edu](mailto:leightons@ext.msstate.edu), MSU

**Duration:** Continuous

**Objective(s)** Identify important soybean production topics and produce video segments that will provide producers with current, timely information needed to address issues related to those topics; video presentations of results from MSPB-funded research projects that will be posted on the MSPB website ([www.mssoy.org](http://www.mssoy.org))

**Expected Results:** Video segments featuring projects and presentations of results from MSPB-funded projects posted on the MSPB website.

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**Title:** Use of Bolt soybean to mitigate off-target deposition of Grasp and Regiment applications to rice, 45-2016, \$19,543

**PI:** Dan Reynolds, [dreynolds@pss.msstate.edu](mailto:dreynolds@pss.msstate.edu), MSU

**Duration:** Year 1 of 1

**Objective(s):** Determine level of tolerance of Bolt soybean varieties to titrated rates of Grasp and Regiment herbicides; evaluate Bolt soybean varieties for differential tolerance to Grasp and Regiment (ALS-inhibiting herbicides) that are applied to rice.

**Expected Results:** Determination of ability of available soybean varieties to withstand low to moderate levels of ALS-inhibiting herbicides that will 1) allow rice producers more flexibility in selection of postemergence weed control options, and 2) provide soybean producers a level of protection against off-target deposition of these herbicides when soybean are grown in close proximity to rice fields.

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**Title:** Web-based interface for atmospheric stability and spray timing recommendations, 47-2016, \$12,200

**PI:** Yanbo Huang, [yanbo.huang@ars.usda.gov](mailto:yanbo.huang@ars.usda.gov), USDA-ARS

**Duration:** Year 2 of 2

**Objective(s):** Build prototype web-based system that can be used by pilots and farm managers to provide indications of whether or not conditions are suitable for spraying, and expand the system to include recommendations based on temperature fluctuations.

**Expected Results:** An accessible web-based interface that obtains real-time data that can be configured for specific field situations so that pilots and farm managers can avoid spraying under stable atmospheric conditions that result in temperature inversions.

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**Title:** Farm Families of Mississippi, MFBF, 50-2016, \$15,000

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**Title:** Cover crop and tillage effects on irrigation application efficiency, irrigation scheduling, soil physical properties, runoff, soybean yield, and economic return, 52-2016, \$70,772

**PI:** Jason Krutz, [jkrutz@drec.msstate.edu](mailto:jkrutz@drec.msstate.edu), MSU-DREC

**Duration:** Year 2 of 3

**Objective(s):** Determine the effect of cover crops combined with tillage system on irrigation efficiency, soil properties, runoff, and soybean yield and economic return.

**Expected Results:** Development of BMP's for using a combination of cover crops and tillage system in irrigated soybean production systems.

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**Title:** Row crop irrigation science extension and research (RISER) program, 55-2016, \$193,331

**PI:** Jason Krutz, [jkrutz@drec.msstate.edu](mailto:jkrutz@drec.msstate.edu), MSU-DREC

**Duration:** Year 1 of 3

**Objective(s):** Develop and validate irrigation best management practices (BMP's) for soybean, and utilize onsite farm application and training programs to transfer and facilitate wide-spread adoption of these BMP's and complementary water conservation tools to and by producers who irrigate soybeans in Mississippi; determine effect of different agronomic practices on water use efficiency and irrigation economics for soybean

**Expected Results:** Identification and validation of irrigation BMP's; facilitating the adoption of BMP's by disseminating this information to Mississippi soybean producers in training venues offered via new and existing extension programs; and determination of best agronomic practices to use for irrigated soybean.

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**Title:** Evaluation of multiple agronomic considerations with harvest aid use in Mississippi soybean production, 57-2016, \$58,167

**PI:** John Orlowski, [john.orlowski@msstate.edu](mailto:john.orlowski@msstate.edu), MSU-DREC

**Duration:** Year 1 of 2

**Objective(s):** Investigate the effects of 1) adjuvants and spray volume on efficacy of harvest aids applied to soybean, 2) harvest interval after harvest aid application on yield, seed moisture, and shattering, and 3) various rates of paraquat applied to soybean at multiple growth stages to simulate spray tank contamination and drift;

**Expected Results:** Recommendations for proper spray volumes and adjuvants to use to minimize costs and maximize efficacy of harvest aids, and provide producers yield loss estimates associated with delayed harvest that may result from harvest aid use.

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**Title:** Impact of planting date and maturity group on management strategies for insect pests in soybean, 58-2016, \$49,406

**PI:** Angus Catchot, [acatchot@ext.msstate.edu](mailto:acatchot@ext.msstate.edu), MSU-ES

**Duration:** Year 4 of 5

**Objective(s):** In ESPS and conventional soybean plantings of MG IV and V varieties, determine insect pest complex densities and evaluate benefits of season-long control of caterpillars by treating and monitoring experimental units in producer fields throughout Mississippi in order to validate small-plot findings from previous work.

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**Expected Results:** Risk models to use for determining control protocol for major caterpillar pests, identification of periods of greatest benefit for using high-value insecticides, and documentation of potential benefit from using *Bt* soybean in ESPS and conventional soybean plantings.

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**Title:** Investigations into strobilurin fungicide resistance of soybean pathogens in Mississippi, 61-2016 NCE

**PI:** Maria Tomaso-Peterson, ([mariat@pss.msstate.edu](mailto:mariat@pss.msstate.edu)), MSU

**Duration:** Year 4

**Objective(s):** Monitor soybean fields and sentinel plots for strobilurin (Qo1) resistance in selected diseases, ID mechanisms of resistance, and determine potential fitness costs associated with Qo1 resistant soybean pathogens.

**Expected Results:** New information and awareness concerning fungicide resistance, the extent of that resistance, the potential threat of that resistance to profitable soybean production, and a determination of the long-term effects of disease resistance to this class of fungicides so that effective disease management strategies can be developed.

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**Title:** Determine irrigation rate and timing, and water availability for optimum yield, water use efficiency, and profitability of soybean in Mississippi Blackland Prairie region, 62-2016, \$39,106

**PI:** Gary Feng, [gary.feng@ars.usda.gov](mailto:gary.feng@ars.usda.gov), USDA-ARS

**Duration:** Year 3 of 3

**Objective(s):** Determine irrigation triggering criteria to maximize yield and water use efficiency (WUE) for soybean, develop a model that can be used as a tool to guide soybean producers who use on-farm stored water for irrigation, and compare economics of using surface vs. groundwater for irrigation.

**Expected Results:** A management tool for predicting the amount of stored/impounded water available/needed for soybean irrigation, and how best to schedule soybean irrigation from impounded water.

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**Title:** On-farm, interactive soybean Management Verification Program (MVP), 63-2016, \$55,707

**PI:** John Orłowski, [john.orłowski@msstate.edu](mailto:john.orłowski@msstate.edu), MSU-DREC

**Duration:** Continuous

**Objective(s):** Work with growers to increase adoption of MSU-ES recommendations by soybean producers in Mississippi to increase profitability and efficiency of soybean production on individual farms

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**Expected Results:** Adoption of MSU-ES best management practices by multiple grower participants, which will eventually lead to widespread adoption of these practices

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**Title:** Mississippi Soybean Promotion Board Professional and Operational Development (POD) Program, 64-2016, \$15,000

**PI:** John Orłowski, [john.orłowski@msstate.edu](mailto:john.orłowski@msstate.edu), MSU-DREC

**Duration:** Continuous

**Objective(s):** Create a program for soybean producers who are exposed to multiple production and leadership viewpoints in order to increase production and leadership skills

**Expected Results:** Increased interaction among soybean producers and with MSU researchers and extension personnel to stimulate exchange of production ideas in order to increase adoption of soybean best management practices that will increase yields and profits from soybean production in the state

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**Title:** Maximization of yield and economic returns from nonirrigated soybean production in Mississippi, 65-2016, \$42,564

**PI:** John Orłowski, [john.orłowski@msstate.edu](mailto:john.orłowski@msstate.edu), MSU-DREC

**Duration:** Year 1 of 3

**Objective(s):** Determine best agronomic practices (beds vs. flat planting, row spacing, MG, and planting date) to use for profit maximization from dryland soybean production

**Expected Results:** Determination of production systems that consistently produce profitable soybean yields under dryland conditions

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**Title:** On-farm, field-scale evaluation of soybean row spacing and seeding rates, 66-2016, \$56,206

**PI:** John Orłowski, [john.orłowski@msstate.edu](mailto:john.orłowski@msstate.edu), MSU-DREC

**Duration:** Year 1 of 2

**Objective(s):** Determine interaction of row spacing/seeding rate (using precision planting) combinations on yield from soybean, and quantify effects on physiological characteristics, plant water status, and water use efficiency in various production systems

**Expected Results:** Define appropriate seeding rates for varying row spacings used in soybean production

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**Title:** Agronomic evaluation of USDA heat-tolerant MG III soybean germplasm for use in the Early Soybean Production System (ESPS), 67-2016, \$22,889

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**PI:** John Orłowski, [john.orłowski@msstate.edu](mailto:john.orłowski@msstate.edu), MSU-DREC

**Duration:** Year 1 of 2

**Objective(s):** Compare productivity and seed quality of newly-developed late MG III soybean lines to traditional MG III soybean varieties, and compare the economics of narrow- and twin-row soybean production for traditional and heat-tolerant MG III genotypes

**Expected Results:** Identify early-maturing heat-tolerant soybean lines that can be used to develop varieties that will produce acceptable yields of seed with higher quality from dryland production systems

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**Title:** Detection of glyphosate-resistant (GR) and susceptible (GS) weeds through hyperspectral plant sensing in soybean fields, 68-2016, \$13,220

**PI:** Yanbo Huang, [yanbo.huang@ars.usda.gov](mailto:yanbo.huang@ars.usda.gov), USDA-ARS

**Duration:** Year 2 of 2

**Objective(s):** Characterize hyperspectral reflectance properties of GR and GS weeds, and assess the classification accuracy against a known set of GR and GS plants in order to optimize results and determine principal wave bands

**Expected Results:** A method to rapidly and consistently differentiate GR and GS susceptible weed plants so that site-specific weed management strategies can be planned for soybean production systems

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**Title:** Effect of silicon on growth and yield of soybean grown on dryland or nonirrigated sites, 73-2016, \$32,991

**PI:** Jiaxu Li, [JL305@bch.msstate.edu](mailto:JL305@bch.msstate.edu), MSU

**Duration:** Year 2ds of 2

**Objective(s):** Evaluate effects of silicon application on growth and yield of soybean grown on nonirrigated sites

**Expected Results:** Development of guidelines for root zone application of silicon to soybean as a potential strategy for improvement of soybean yield from nonirrigated sites

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**Title:** Maximizing soybean yield in Mississippi: Influence of plant populations, seed treatment, and stand loss on overall profitability, 74-2016 (Moore Fellowship), \$71,478

**PI:** Angus Catchot, [acatchot@ext.msstate.edu](mailto:acatchot@ext.msstate.edu), MSU-ES

**Duration:** Year 1 of 3

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**Objective(s):** Effect of plant population (with precision planting), seed treatments, and planting date on soybean yield; identification of alternatives to neonicotinoid seed treatments; and effect of stand loss (often caused by insects) and timing of stand loss in different plant populations on soybean yield

**Expected Results:** Identify plant populations that will maximize soybean yield potential from differing soybean production systems, provide information on potential replacement products or practices for neonicotinoid seed treatments, and provide information that can be used to make replant decisions that are specific to specific plant populations

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**Title:** Soybean physiological maturity: documentation and developing a tool for management, 75-2016, \$99,791

**PI:** K. Raja Reddy, [krreddy@pss.msstate.edu](mailto:krreddy@pss.msstate.edu), MSU

**Duration:** Year 3 of 3

**Objective(s):** Precisely identify reproductive stages of soybean and soybean physiological maturity as a defined period from flowering in MG IV and V varieties.

**Expected Results:** Development of a tool that can be used to precisely identify critical soybean reproductive stages that are used as triggers for management inputs.

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**Title:** Effect of incremental sub-threshold levels of insect defoliation on yield of soybeans in Mississippi, 77-2015 (Hester Fellowship), \$71,451

**PI:** Benjamin Thrash, recipient, [bct157@msstate.edu](mailto:bct157@msstate.edu), Miss. State Univ.

**Duration:** Year 2 of 3 (started Aug. 15, 2015)

**Objective(s):** Evaluate effect on yield reduction in soybeans resulting from incremental insect defoliation during vegetative and reproductive development, and determine influence of irrigation on soybean yield loss from insect defoliation

**Expected Results:** Refinement of treatment thresholds 1) that take into account the incremental foliage losses in soybean that result from multiple defoliation events caused by multiple insect pests during the growing season, and 2) that are based on dryland vs. irrigated production systems

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**Title:** Characterization of soybean taproot decline; a new disease in Mississippi soybean production fields, 78-2016, \$32,079

**PI:** Maria Tomaso-Peterson, [mariat@pss.msstate.edu](mailto:mariat@pss.msstate.edu), MSU

**Duration:** Year 1 of 3

**Objective(s):** Confirm *Xylaria* sp. as the causal pathogen of taproot decline, and characterize its life cycle and the disease cycle of taproot decline; complete a phylogenetic analysis of *Xylaria* sp. collected from Mississippi soybean fields that exhibit the disease

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**Expected** Confirmed identification of the taproot decline pathogen so that best

**Results:** management practices/remedial measures can be developed to minimize yield loss from taproot decline

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