Title: Lepidopteran insect pest management in soybeans, 01-2012, $69,993

PI: Don Cook (dcook@drec.msstate.edu), Miss. State Univ.

Objectives: Refine/validate current corn earworm thresholds in soybeans; determine residual efficacy of new insecticides for control of soybean looper; maintain and continue testing of labeled insecticides to manage soybean insects.

Duration: Year 2 of 4

Expected Results: Development of data that will be used to update soybean insect control guidelines in the "Insect Control Guide for Agronomic Crops".

Title: Validity of current K recommendations for high yielding soybeans with respect to grain yield and disease control, 3-2012, $30,725

PI: Gabe Sciumbato (Gabe@drec.msstate.edu), Miss. State Univ.

Objectives: Determine soil K level necessary for high-yielding environments and lowest foliar disease levels; determine optimum soil K level to minimize foliar disease occurrence and dependence on late-season foliar fungicide applications.

Duration: Year 2 of 3

Expected Results: Improved recommendations for soil K fertilization that will maximize yield in high-yield environments and improve soybean health and resistance to foliar diseases.

Title: Rapid ID of soybean fungi by spectroscopic techniques, 6-2012, $77,764

PI: Ashli Brown (abrown@pch.msstate.edu), Miss. State Univ.

Objective: Develop spectrometric techniques that can be used to identify specific fungi in field samples.

Duration: Year 2 of 3

Expected Results: Generation of spectral libraries that will allow the rapid identification of a specific fungus specie on soybeans in the field.

Title: Agronomic and economic evaluation of soybean/corn rotation with twin-row production and increased nutrient management, 07-2012, $14,445

PI: M. Wayne Ebelhar (webelhar@drec.msstate.edu), Miss. State Univ.

Objectives: 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 1 of 6

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

Title:	Evaluation of seasonal irrigation requirements and impact on yield and seed quality of soybeans, 08-2012, $13,600
PI:	Daniel K. Fisher (daniel.fisher@ars.usda.gov), USDA-ARS
Objective:	Determine seasonal water requirements for soybeans, and examine impacts of irrigation management on soybean seed yield and quality.
Duration:	1 of 3
Expected Results:	Establish relationships between water use and soybean yield and seed quality, and subsequently establish guidelines for more efficient and economical irrigation of soybeans.

Title:	Improving soybean nutrient management using timely soil testing programs, 9-2012, $15,000
PI:	Larry Oldham (loldham@pss.msstate.edu), Miss. State Univ.
Objectives:	Improve soil sampling management for better utilization of inorganic fertilizer nutrients with variable price points; increase awareness of the importance of soil testing for P and K fertility management in soybean production environments.
Duration:	Year 2 of 3
Expected Results:	New or improved guidelines that will be used to improve fertilizer use efficiency by reducing either over- or under-fertilization of soybeans in varied Mississippi soybean production environments.

Title:	On-farm validation of the Mississippi Irrigation Scheduler Tool (MIST), 10-2012, $77,231
PI:	Amy Schmidt (Aschmidt@abe.msstate.edu), Miss. State Univ.
Objectives:	Develop water release data for typical Mississippi soils and calibrate soil moisture sensors to these values; test and validate MIST for common Mississippi soybean production environments; confirm irrigation application rates recommended by MIST; confirm irrigation application rates recommended by MIST; develop the user interface and integrate research results into the web-based version of MIST.
Duration:	Year 2 of 3
Expected Results:	Development of a validated online irrigation scheduling tool for Mississippi soybean producers.

Title:	Evaluation of commodity programs, crop insurance, and forward pricing alternatives for Mississippi soybean farms, 11-2012, $30,726
PI:	Keith Coble (coble@agecon.msstate.edu)

Objective: Develop data and subsequent simulation models that can be used to quickly evaluate proposed alternative farm policy proposals.

Duration: Year 1 of 1

Expected Results: Production of policy briefs and decision-making tools that producers can use to evaluate farm bill options and how the combination of crop insurance and new commodity programs may affect optimal forward pricing and risk management.

Title: Managing transgenic crops as weeds in soybean production systems, 13-2012, $35,003

PI: Dan Reynolds (dreynolds@pss.msstate.edu), Miss. State Univ.

Objectives: Develop weed management programs that will control volunteer corn, cotton, and soybean growing as weeds in fields of Roundup Ready, Liberty Link, and conventional soybean varieties; determine effect of volunteer corn, cotton, and soybean on soybean growth and yield, develop herbicide programs to control failed stands of and volunteer crop species in herbicide-resistant soybean.

Duration: Year 3 of 3

Expected Results: Determination of level of effect of volunteer crop plants on soybean growth and yield, and development of management strategies that can be used to control volunteer plants of herbicide-resistant crop species that act as weeds in soybean production fields.

Title: Determining environmental management schemes to influence the development of poor seed quality in MG IV and MG V soybean, 14-2012, $268,506

PI: Tom Allen (tallen@drec.msstate.edu), Miss. State Univ.

Objectives: Create environments (controlled and natural settings) conducive to the development of seed rot; determine specific pathogenic organisms that infect soybean plants in the different environments, and their pathogenicity; determine if plant nutrition status is correlated with seed rot.

Duration: Year 1 of 6

Expected Results: Determination of the fungal complex responsible for and its association with seed rot in high moisture environments; determination of specific environmental conditions 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.

Title: Soybean disease monitoring for Mississippi soybean producers ,15-2012, $56,500

PI: Tom Allen (tallen@drec.msstate.edu), Miss. State Univ.

Objectives: Monitor occurrence and geographic location of foliar diseases, including rust, to provide producers with up-to-date information that can be used to make timely treatment decisions; determine environmental conditions that promote soybean rust, and effective fungicide management schemes for rust treatment in locations where it occurs.

Duration: Continuous

Expected Results: Notification of producers through media outlets within hours of detection of significant outbreaks of yield-limiting diseases so that timely treatment decisions can be made.

Title: Irrigation use and efficiency in soybean production systems in Mississippi, 16-2012, $48,375

PI: Tom Eubank (teubank@drec.msstate.edu), Miss. State Univ.

Objectives: Evaluate and validate conservation irrigation practices such as Phaucet; assess varietal tolerance to flooded/wet soil.

Duration: Year 3 of 3

Expected Results: Identification of (a) conservation measures to use to reduce total amount of irrigation water applied to soybeans in the Delta in order to halt drawdown of the alluvial aquifer and also lower irrigation costs and associated energy usage, and (b) identify soybean varieties best suited for flood-irrigated environments.

Title: Threecornered alfalfa hopper (TCAH) management in soybeans, 17-2012, $9,455

PI: Fred Musser (fm61@msstate.edu), Miss. State Univ.

Objectives: Refine current TCAH thresholds in soybeans; estimate sweep net sampling efficiency for TCAH in soybeans.

Duration: Year 1 of 3

Expected Results: Refined thresholds to enable consultants and growers to apply insecticides when economically justified, and the ability to translate sweep net catches of TCAH into reliable threshold estimates.

Title: Development of a rapid genetic field race test for SCN and generation of SCN resistance through gene inactivation,18-2012, $97,124

PI: Vincent Klink (vklink@biology@msstate.edu), Miss. State Univ.

Objective: Develop a rapid genetic field race test that can be used for on-site testing of soil samples, and that may reduce the time required for determining the presence and infestation level SCN and other nematodes.

Duration: Year 3 of 3

Expected Results:	Provide a molecular diagnostic tool that can rapidly and accurately detect SCN presence, race, and infestation level in soil samples, as well as determine the presence of other nematode species.

Title:	Evaluation of private and public soybean varieties and breeding lines for resistance to stem canker, forgeye leaf spot, purple leaf and pod stain, black root rot, and rust, 19-2012, $49,093
PI:	Gabe Sciumbato (Gabe@drec.msstate.edu), Miss. State Univ.
Objectives:	Evaluate entries (>200) in the Mississippi Soybean Variety Trials (MSVT) for resistance/reaction to stem canker, frogeye leaf spot, purple leaf and pod stain, and black root rot; evaluate MSVT entries for resistance to soybean rust.
Duration:	Continuous
Expected Results:	Development of data that will be published in the annual MSVT publication to provide producers information about varieties' disease susceptibility, which can be used as an additional aid in selecting varieties.

Title:	Addressing critical weed control issues in soybean, 20-2012, $79,345
PI:	Tom Eubank (teubank@drec.msstate.edu), Miss. State Univ.
Objectives:	Develop strategies for management of glyphosate-resistant (GR) weeds; assess burndown options for management of early-season weeds; determine utility of Liberty Link soybeans in the management of GR weeds; evaluate emerging weed control products and technologies for soybeans.
Duration:	Year 3 of 3
Expected Results:	Identification/development of cost effective control strategies for the various weed control problems that occur in soybeans, to include burndown options to control problem weeds, alternative control options for GR weeds, management options to prevent or delay development of herbicide-resistant weeds, and assessment of new herbicide technologies and traits that provide new weed management options.

Title:	Managing soybean production on low nutrient status soils in Mississippi, 21-2012, $48,210
PI:	Mark Shankle (shankle@ra.msstate.edu), Miss. State Univ.
Objectives:	Compare/validate fertility recommendations resulting from soil tests conducted at different soil testing facilities; identify optimum K fertilizer rate for soybeans grown on soils low in K; determine the economic benefits of K fertility recommendations from the different labs.
Duration:	Year 3 of 3

Expected Results:	Determination of the economic K fertility rate for low-K soils, and determination of the correct K fertilizer rate based on recommendations from different soil testing labs.

Title:	Correlation of soil test K and P indices with plant tissue concentrations and soybean yield, 22-2012, $33,977
PI:	Bobby Golden (bgolden@drec.msstate.edu), Miss. State Univ.
Objectives:	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:	1 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.

Title:	Enhancement of Mississippi soybean variety trials through entry standardization, 23-2012, $36,125
PI:	Brad Burgess (bburgess@pss.msstate.edu), Miss. State Univ.
Objective:	Conduct standardized soybean variety trials at multiple Mississippi locations.
Duration:	Continuous
Expected Results:	Published yield results that can be used by producers to select varieties for individual production environments throughout Mississippi.

Title:	Evaluation of effects of residual glyphosate and its soil metabolites on growth and development of soybeans, 24-2012, $15,000
PI:	Ernie Flint (ernestf@ext.msstate.edu), Miss. State Univ.
Objectives:	Assess effects of long-term glyphosate use on soybeans; identity soil amendments that may alleviate these possible effects.
Duration:	Year 2 of 3
Expected Results:	Determination of soil amendments for and their effectiveness in improving soybean health and yield following long-term glyphosate use.

Title:	Corn and soybean crop residue management impact on soil quality, yield, and returns, 25-2012, $28,285
PI:	Normie Buehring (buehring@ra.msstate.edu), Miss. State Univ.

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

Duration: Year 2 of 5

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.

Title: Developmentof Phomopsis seed decay-resistant soybean from new sources of resistance, 28-2012, $15,500

PI: Anne Gillen (Anne.Gillen@ars.usda.gov), USDA-ARS

Objective: Develop high-yielding soybean lines with resistance to *Phomopsis* seed decay (PSD).

Duration: Year 2 of 2

Expected Results: Germplasm with resistance to PSD that can used in a breeding program to develop resistant varieties.

Title: Delta agricultural weather project, 29-2012, $22,955

PI: Steve Martin (smartin@ext.msstate.edu), Miss. State Univ.

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

Duration: Year 1 of 3

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

Title: Identification of soybean varieties with resistance to *Phomopsis* seed decay (PSD) to enhance soybean seed quality, 30-2012, $33,428

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

Objective: Identify available soybean varieties that have resistance to PSD and concurrent high seed quality when inoculated with the disease pathogen.

Duration: Year 2 of 2

Expected Results: Varieties with PSD resistance will be identified, and this information will be made available to producers and the seed industry.

Title: Characterization of frog eye leaf spot (FLS) isolates and identification of soybean resistance genes, 32-2012, $24,428

PI: Jeff Ray (Jeff.Ray@ars.usda.gov), USDA-ARS

Objectives: Characterize the pathogenicity of FLS isolates; develop genetic markers that can be used to differentiate among the isolates; identify race-specific sources of resistance to FLS that can be used in a breeding program; and initiate crosses to create race-specific populations for mapping; and identify markers in parental lines of crosses.

Duration: Year 2 of 3

Expected Results: The planned characterization of FLS isolates is a necessary first step and lays the foundation for the development of FLS-resistant germplasm that can be used to develop FLS-resistant varieties. Development of FLS-resistant germplasm/varieties may be the only effective alternative to managing this pathogen in the face of developing resistance to fungicides.

Title: Development of reniform nematode resistant soybean adapted for Mississippi and the Midsouth, 33-2012, $24,500

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

Objectives: Transfer reniform nematode resistance from resistant lines to lines that are agronomically adapted to Mississippi; determine genomic location of resistance genes; and identify molecular markers that can be used in marker-assisted selection.

Duration: Year 2 of 3

Expected Results: Development of tools/materials that can be used to develop resistant germplasm that in turn can be used to develop soybean varieties that have resistance to the reniform nematode.

Title: Provide in-field soybean diagnostic service for Mississippi soybean producers, 34-2012, $10,000

PI: Billy Moore (wfm1888@aol.com), Private Consultant

Objective: To provide soybean disease diagnostic assistance to soybean producers and leaders of MSPB-funded projects

Duration: Year 2 of Continuous

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

Title: Soybean management by application of research and technology (SMART): Support of on-farm soybean verification programs and other extension activities, 36-2012, $139,319

PI: Trent Irby (tirby@ext.msstate.edu), Miss. State Univ.

Duration: Year 1 of 4

Objectives: Identify and apply key management practices that will increase profitability of Mississippi soybean production; collect long-term data that can be used to identify sustainable management practices that can be applied to producer fields to enhance profitable soybean production.

Expected Results: Continual updating of recommendations for practices that will enhance profitable and sustainable soybean production in Mississippi.

Title: Yield and economic responses of soybean to irrigation initiation on clay soil in Mississippi, 40-2012, $25,322

PI: H.C. (Lyle) Pringle (lpringle@dres.msstate.edu), Miss. State Univ.

Duration: Year 1 of 4

Objective: Determine the relationship of irrigation initiation timing to yield and economic return from soybean grown on clay.

Expected Results: Irrigation initiation timing recommendations that will lead to maximum economic yields and conservation of irrigation water (increased irrigation efficiency) for producers growing early-planted MG 4 soybean varieties.

Title: Video support for Mississippi soybean producers, 41-2012, $15,430

PI: Bob Ratliff (bobr@ext.msstate.edu), Miss. State Univ.

Duration: Year 1 of Continuous

Objectives: Identify important soybean production topics and produce video segments that will provide producers with current, timely information 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)

Expected Results: Production of approximately 35 video segments for posting on the MSPB website.

Title: Determining the effect of low concentrations of dicamba and 2,4-D on soybean growth and yield, 42-2012, $36,975.

PI: Dan Reynolds (dreynolds@pss.msstate.edu), Miss. State Univ.

Duration: Year 1 of 3

Objectives: Determine effect of simulated drift and volatility of dicamba and 2,4-D on soybean growth and yield, and the most sensitive soybean growth stage to these herbicides; compare the effectiveness of various clean-out procedures for sprayers that have been used to apply these herbicides.

Expected Results:	With the advent of new transgenic herbicide technologies, results from this research will demonstrate to producers the importance of good stewardship in the application of auxin herbicides, as well as the importance of and methodology for cleaning spray equipment used in their application.

Title:	Development of agricultural applications for use on Apple iPhone and iPad, 43-2012, $10,000
PI:	Dan Reynolds (dreynolds@pss.msstate.edu), Miss. State Univ.
Duration:	Year 1 of 3
Objective:	Research and secure mechanism for offering MSU-developed agricultural applications (apps) on the iTunes store; develop two prototype apps to demonstrate the usefulness of this technology, and to increase awareness of its application.
Expected Results:	Development of two successful apps as well as the infrastructure necessary for development of additional agricultural apps.

Title:	Mitigating herbicide spray drift under field conditions, 44-2012, $37,179
PI:	Dan Reynolds (dreynolds@pss.msstate.edu), Miss. State Univ.
Duration:	Year 1 of 3
Objectives:	Compare effect of various spray tips on herbicide drift, and the efficacy of these spray tips when used with contact, auxin, and systemic herbicides; compare efficacy of light and non-light activated herbicides when applied during both daytime and nighttime hours.
Expected Results:	Recommendations to optimize efficacy and avoid off-target deposition when applying herbicides that can be used with new transgenic herbicide traits.

Title:	Estimation of deer damage to soybean production in Mississippi: a spatial and temporal context, 48-2012, $68,186
PI:	Bronson Strickland (bstrickland@cfr.msstate.edu), Miss. State Univ.
Duration:	Year 1 of 3
Objectives:	Quantify deer abundance and utilization of soybean fields during browsing, and estimate/quantify subsequent loss of soybean yield ; characterize deer habitat surrounding soybean fields to establish relationship with soybean damage; and test various deer-damage mitigation techniques for potential economic benefit.
Expected Results:	A reliable estimate of the impact of deer depredation on soybean fields that will be used to develop cost-effective management practices, and information for producers to use for accurately targeting areas for damage mitigation.

Title: Optimal timing of aerial spray application to avoid inversion-induced far-field movement of spray, 49-2012, $13,224

PI: Steve Thomson (steve.thomson@ars.usda.gov), USDA-ARS

Duration: Year 1 of 2

Objective: Obtain and apply data to track atmospheric stability during a cropping season, and translate results into meaningful guidelines for agricultural pilots and producers to use to avoid spraying in conditions that will result in inversion-induced movement of spray.

Expected Results: Pinpoint times of day and weather trends that can be used to spray in "safe" conditions, or conditions unfavorable for temperature inversions.

Title: Farm Families of Mississippi, 50-2012, $15,000

Title: Bufkin Fellowship–Effect of fall-seeded cereal cover crops when used in soybeans for control of Palmer amaranth in Mississippi soybeans, 51-2012, $65,806

PI: Ryan Edwards, recipient (re219@pss.msstate.edu), Miss. State Univ.

Duration: Year 1 of 3

Objective: Determine effectiveness of cover crops for controlling underlying weed populations in conjunction with PRE residual herbicide applications in soybeans

Expected Results: Determine if cover crops can be used as a viable weed management component for Mississippi soybeans, and determine which cover crop species may provide the most benefit if this option is viable.

Title: Developing scientific irrigation scheduling methods for Mississippi soybean production systems, 52-2012, $34,977

PI: Jason Krutz (jkrutz@drec.msstate.edu), Miss. State Univ.

Duration: Year 1 of 3

Objective: Evaluate existing and new irrigation scheduling tools for improving soybean yield, seed quality, and irrigation water use efficiency under Midsouth growing conditions.

Expected Results: Identification of best method(s) that can be used by soybean producers to schedule soybean irrigation for optimum yield and returns, and water conservation.

Title: Developing profitable deficit irrigation guidelines for Mississippi soybean production systems, 53-2012, $52,301

PI: Jason Krutz (jkrutz@drec.msstate.edu), Miss. State Univ.

Duration: Year 1 of 3

Objectives: Increase soybean yield potential and profitability by developing production systems that require up to 25% less irrigation water through 1) determining optimum physiological period for initiating irrigation, 2) determining critical physiological period for terminating irrigation, and 3) determining growth stage(s) when deficit irrigation adversely affects yield and profitability.

Expected Results: Identification of those periods of soybean development when irrigation water can be withheld or curtailed in order to reduce seasonal irrigation application amounts.

Updated by Larry G. Heatherly, June 2012, larryheatherly@bellsouth.net