MISSISSIPPI SOYBEAN PROMOTION BOARD
2015-2016 FUNDED RESEARCH/EXTENSION PROJECTS

Title: Evaluation of soybean plant response to tillage system, 02-2015, $12,000

PI: Ernie Flint, ernestf@ext.msstate.edu, MCES

Objective(s): Determine economic feasibility of adopting a no-till system for soybean production, and evaluate soybean performance and soil parameters when a no-till system is converted to a till system of production.

Duration: Year 3 of 3

Expected Results: Provide definitive expectations that will be realized from converting a till system for soybean production to a no-till system, and vice versa.

Title: Effect of spray additives on spray droplet size, coverage, and efficacy, 04-2015, $15,110

PI: Darrin Dodds, dmd76@pss.msstate.edu, MCES

Objective(s): Determine the impact of spray additives on spray droplet size, spray coverage, and efficacy of common pesticides.

Duration: Year 2 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.

Title: Support of Delta Agriculture, Delta Council, 05-2015, $15,000

Title: Agronomic and economic evaluation of soybean/corn rotation with twin-row production and increased nutrient management, 07-2015, $22,678

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

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 4 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.

Title: Costs and benefits of on-farm water storage (OFWS) systems, 10-2015, $85,360

PI: Mary Love Tagert, (MLTagert@abe.msstate.edu), Miss. State Univ.

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 2 of 3

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

Title: Soybean storage profitability and marketing strategies for Mississippi soybean growers, 11-2015, $32,518

PI: Brian Williams, (williams@agecon.msstate.edu), Miss. State Univ.

Objective(s): Determine the advantages of and estimate the costs associated with storing and drying soybeans in on-farm facilities.

Duration: Year 2 of 2

Expected Results: Determination of optimal storage capacity and development and explanation of marketing strategies for producers who use on-farm storage facilities.

Title: Nematode management investigations in Mississippi soybean production systems, 12-2015, $38,967

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

Objective(s): Determine impact of 1) Telone II and seed-applied nematicides on soybean production in nematode-infested fields, 2) variety selection for root knot nematode-infested fields, and 3) winter cover crops for managing sites with high nematode pressure.

Duration: Year 3 of 3

Expected Results: Specific management guidelines for growing soybeans on soils that are infested with nematode species that limit soybean production.

Title: Influence of cover crops on early season insect pest dynamics in Mississippi soybeans, 13-2015, $49,835

PI: Angus Catchot, (acatchot@ext.msstate.edu), Miss. State Univ./MCES

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 1 of 3

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, 14-2015, $89,428

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

Title: Soybean disease monitoring for Mississippi soybean producers ,15-2015, $44,000

PI: Tom Allen (tallen@drec.msstate.edu), Miss. State Univ./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 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: Evaluation of soybean varieties for resistance to Cercospora blight, frogeye leaf spot, and stem canker, 19-2015, $37,370

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

Objective(s): Evaluate Miss. OVT entries for resistance to Cercospora blight and frogeye leaf spot (natural infestations), and stem canker (inoculated trials); 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 resistance and/or susceptibility so that disease-tolerant/resistant varieties can be selected to avoid yield losses associated with the above pathogens.

Title: Weed management programs for Mississippi soybean production, 20-2015, $116,994

PI: Jason Bond (jbond@drec.msstate.edu), Miss. State Univ./DREC

Objective(s): Evaluate new and/or currently registered herbicides and herbicide-resistant (HR) technologies for use in Mississippi soybean weed management programs; determine Palmer amaranth response to foliar fungicides that are applied to soybeans; determine utility of PPO herbicides applied to soybeans for the control of glyphosate-resistant (GR) Palmer amaranth in Roundup Ready soybean.

Duration: Year 1 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 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.

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, 21-2015, $57,624

PI: Mark Shankle (shankle@ra.msstate.edu), Miss. State Univ., 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 3 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.

Title: Correlation of soil test K and P indices with plant tissue concentrations and soybean yield, 22-2015, $34,414

PI: Bobby Golden (bgolden@drec.msstate.edu), Miss. State Univ./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).

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Duration: 4 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, 23-2015, $30,000

PI: Brad Burgess, bburgess@pss.msstate.edu, MSU/MAFES

Objective(s): 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: Corn and soybean crop residue management impact on soil quality, yield, and returns, 25-2015, $32,714

PI: Normie Buehring (buehring@ra.msstate.edu), Miss. State Univ./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 5 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: Soybean response to N addition in high yield environments, 27-2015, $32,068

PI: Bobby Golden (bgolden@drec.msstate.edu), Miss. State Univ./DREC

Objective(s): Determine critical application time for and form of N fertilizer that will minimize detriment to N_2 fixation and potentially increase soybean seed yield.

Duration: Year 3 of 3

Expected Results: Recommendations and guidelines for applying N fertilizer to soybeans that may have insufficient N in high-yield environments.

Title: Delta agricultural weather project, 29-2015, $23,889

PI: Mark Silva, marks@ext.msstate.edu, Miss. State Univ./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.

Title: Effect of new multiple herbicide-resistant (HR) soybean technologies on control of HR weeds and soil microbial parameters, 30-2015, $20,000

PI: Vijay Nandula, vijay.nandula@ars.usda.gov, USDA-ARS

Objective(s): Determine 1) efficacy of new 2,4-D and dicamba formulations alone and in combination with other herbicide modes-af-action on HR weeds; and 2) impact of dicamba and 2,4-D alone and in combination with glyphosate on soil microbial populations involved in nutrient cycling.

Duration: Year 1 of 1

Expected Results: Knowledge about the effect of new herbicide technologies on HR weeds, and how these new technologies will affect the soil microbial population that is an integral and invaluable component of soil-plant interactions.

Title: Evaluation of the inheritance of resistance to Phomopsis seed decay (PSD) in PI 458130 populations, 31-2015, $43,303

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

Objective(s): Phenotype F_2 population derived from PSD-resistant PI 458130, extract DNA from F_2 populations, and apply molecular markers for mapping of the PSD-resistant gene in PI 458130

Duration: Year 2 of 2

Expected Results: Identify new sources/genes of resistance to PSD that can be used in the development of high-yielding varieties and agronomically competitive breeding lines with PSD resistance.

Title: Phenotyping F_2 populations segregating for frogeye leaf spot (FLS) resistance, 32-2015, $24,500

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

Objective(s): Apply molecular markers to F2 DNA from previous F2 phenotype screening, phenotype a confirming F2 population segregating for *C. sojina* resistance, collect tissue and isolate DNA from the confirming population, and advance appropriate F2 lines in a breeding program.

Duration: Year 3 of 3

Expected Results: Molecular data that will be used in future studies to map FLS-resistance 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.

Title: Development of reniform nematode resistant soybean lines from JTN-5203, PI 404166, and 02011-126-1-1-5-1-1 soybean, 33-2015, $23,400

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

Objective(s): Develop improved breeding lines with resistance to reniform nematode derived from crosses between the above lines and soybean lines that are agronomically adapted for Mississippi, develop and evaluate progeny from these populations for determining the inheritance of resistance to reniform namatode, and identify molecular markers for resistance.

Duration: Year 3 of 3

Expected Results: Development of soybean germplasm with resistance to reniform nematode that can be used to develop resistant varieties for Mississippi soybean production systems.

Title: Mechanism of soybean root infection by *Macrophomina phaseolina*, 34-2015, $48,000

PI: Hamed Abbas, 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 1 of 1

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.

Title: Provide in-field soybean diagnostic service for Mississippi soybean producers and researchers, 35-2015, $10,000

PI: Billy Moore (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), 36-2015, $125,930

PI: Trent Irby, tirby@pss.msstate.edu, Miss. State Univ./MCES

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.

Title: Characterization of the resistance potential for the diamide insecticides Belt and Prevathon, 37-2015, $38,912.

PI: Jeffrey Gore, (jgore@drec.msstate.edu), Miss. State Univ./DREC

Duration: Year 3 of 3

Objective(s): Quantify the variation in response of bollworm to diamide insecticides; determine influence of selection pressure with the diamide class of insecticides on resistance development in bollworm, soybean looper, and beet armyworm; correlate field control with this insecticide class against resistant and susceptible insect populations; characterize residual and systemic activity of diamide insecticides against caterpillar pests; and determine heritability and mechanisms of resistance in these insects.

Expected Results: Management strategies for the use of diamide insecticides in soybeans that will mitigate resistance development and thus prolong/preserve their effectiveness.

Title: Yield and economic responses of soybean to irrigation initiation in Mississippi, 40-2015, $25,344

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

Duration: Year 4 of 4

Objective(s): Determine the relationship of irrigation initiation timing to yield and economic return from soybean grown on Mississippi Delta soils.

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

Title: Video support for Mississippi soybean producers, 41-2015, $16,229

PI: Leighton Spann, leightons@ext.msstate.edu, Miss. State Univ.

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)

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

Title: Mitigating herbicide spray drift under field conditions, 44-2015, $38,086

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

Duration: Year 4 of 4

Objective(s) 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 herbicide efficacy and avoid off-target deposition when applying herbicides that can be used with new transgenic herbicide traits in soybean.

Title: Large-scale drift assessment with aerial imagery and ground-based spectral reflectance, 45-2015, $39,608

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

Duration: Year 3 of 3

Objective(s): Evaluate effect of drift reduction technologies on off-target soybean injury with dicamba; assess use of aerial imagery and ground-based spectral reflectance methods for mapping drift injury on large landscapes; and develop a pictorial guide for rating dicamba injury.

Expected Results: An objective(s) tool for recognizing and assessing drift injury from auxin herbicides at the field or landscape level.

Title: Web-based interface for atmospheric stability and spray timing recommendations, 47-2015, $9,600

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

Duration: Year 1 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.

Title: Farm Families of Mississippi, MFBF, 50-2014, $15,000

Title: Cover crop and tillage effects on irrigation application efficiency, irrigation scheduling, soil physical properties, runoff, soybean yield, and economic return, 52-2015, $89,592

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

Duration: Year 1 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.

Title: Developing strategies for improving furrow irrigation efficiency, 54-2015, $76,100

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

Duration: Year 3 of 3

Objective(s): Determine utility of surge irrigation and surge irrigation + Pipe Planner for increasing surface irrigation efficiency while simultaneously maintaining or improving irrigated soybean yields and profits.

Expected Results: Identification of a furrow irrigation system that can be used by Mississippi soybean farmers to realize the most efficient use of surface-applied irrigation water for soybeans.

Title: Row crop irrigation science extension and research (RISER) program, 55-2015, $138,866

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

Duration: Year 3 of 3

Objective(s): Develop and validate irrigation best management practices, and utilize onsite farm application and training programs to facilitate wide-spread adoption of these practices and complementary water conservation tools by producers who irrigate soybeans in Mississippi

Expected Results: Identification and validation of irrigation best management practices, and facilitating the adoption of these practices by disseminating this information to Mississippi soybean producers in training venues offered via new and existing extension programs.

Title: Impact of planting date and maturity group on management strategies for insect pests in soybean, 58-2015, $48,901

PI: Angus Catchot, (acatchot@ext.msstate.edu), Miss. State Univ./MCES

Duration: Year 3 of 4.5

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.

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.

Title: Investigations into strobilurin fungicide resistance of soybean pathogens in Mississippi, 61-2015, $57,178

PI: Maria Tomaso-Peterson, (mariat@pss.msstate.edu), Miss. State Univ.

Duration: Year 3 of 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.

Title: Determine irrigation rate and timing, and water availability for optimum yield, water use efficiency, and profitability of soybean in Mississippi Blackland Prairie region, 62-2015, $39,106

PI: Gary Feng, gary.feng@ars.usda.gov, USDA-ARS

Duration: Year 2 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.

Title: Detection of glyphosate-resistant (GR) and susceptible (GS) Italian ryegrass using plant hyperspectral reflectance imagery in soybean fields, 68-2015, $13,220

PI: Yanbo Huang, yanbo.huang@ars.usda.gov, USDA-ARS

Duration: Year 1 of 1

Objective(s): Characterize hyperspectral reflectance properties of GR and GS Italian ryegrass plants, and assess the classification accuracy against a known set of GR and GS plants in order to optimize results

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

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Title: Blaine Fellowship–Managing charcoal rot using soil incorporated nutrients, 72-2015, $71,268

PI: Tessie Wilkerson, recipient, twilkerson@drec.msstate.edu, Miss. State Univ.

Duration: Year 3 of 3 (starts Aug. 2015)

Objective(s): Determine the role of nutrition and soil-applied nutrients in reducing infection by charcoal rot, and determine pathogenicity differences among isolates of the pathogen that originate from other hosts in addition to soybeans.

Expected Results: Provide management options and specific methods to alleviate stress and delay disease symptom expression resulting from charcoal rot infestation.

Title: Effect of silicon on growth and yield of soybean grown on dryland or nonirrigated sites, 73-2015, $33,379

PI: Jiaxu Li, JL305@bch.msstate.edu, Miss. State Univ.

Duration: Year 1 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:	Billy Moore Soybean Doctoral Fellowship, 74-2015, $71,478
PI:	TBD
Duration:	Year 1 of 3 (starts Aug. 15, 2015)
Objective(s):	TBD
Expected Results:	TBD

Title:	Soybean physiological maturity: documentation and developing a tool for management, 75-2014, $100,893
PI:	K. Raja Reddy, krreddy@pss.msstate.edu, Miss. State Univ.
Duration:	Year 2 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.

Title:	Hester Fellowship–Effect of incremental sub-threshold levels of insect defoliation on yield of soybeans in Mississippi, 77-2015, $71,363
PI:	Benjamin Thrash, recipient, bct157@msstate.edu, Miss. State Univ.
Duration:	Year 2 of 3 (starts Aug. 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 that 1) 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) are based on dryland vs. irrigated production systems

Compiled by Larry G. Heatherly, Feb. 2015, larryheatherly@bellsouth.net