

# SOUTHEAST PURDUE AGRICULTURAL CENTER RESEARCH AND DEMONSTRATION PROJECTS 2020

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## **Soil Drainage and Water Quality**

Long-term project to determine:

- 1) The effect of tile drain spacing on corn and soybean yields on a Clermont soil
  - 2) The movement of nitrates into drainage water under typical management practices
- Eileen Kladviko, Agronomy

## **CSCAP Cover Crop effects on corn and soybean production**

Measurement of cereal rye crop growth and subsequent effects on corn and soybean growth and yield. Determine if a historical cereal rye growth can provide nitrogen credit to corn crop.

Eileen Kladviko, Daniel Welage, Bob Nielsen, Jim Camberato, Agronomy

## **Long-term drainage and soil structure development**

Measure soil structural differences at different distances from tile drains to determine genesis of flow paths and changes in structure resulting from drainage system maturation over thirty- five years

Eileen Kladviko, Jason Adams, Daniel Welage, Kevin Mitchell, Agronomy  
Daniel Hirmas University of California Riverside  
Dena Anderson, NRCS

## **Assess the nitrogen contributing capabilities of various leguminous cover crops to subsequent corn crop**

Early season establishment of a variety of cover crop species followed by corn crop with various levels of synthetic nitrogen treatments

Shalamar Armstrong, Agronomy  
SEPAC staff

## **Effectiveness of Annual Ryegrass to mitigate negative effects of fragipan soils**

Establishment of annual ryegrass on fragipan soils and measure yield differences in corn and soybean with no ryegrass. Measure fragipan depths overtime.

Lloyd Murdock, University of Kentucky  
Dena Anderson, NRCS  
SEPAC staff

## **Corn Response to Starter & Sidedress Applications of Sulfur Fertilization**

Evaluate corn response to sulfur fertilization.

Bob Nielsen and Jim Camberato, Agronomy

## **Corn Responses to Applied Boron**

Evaluating corn responses to sidedress-applied boron fertilizer

Bob Nielsen and Jim Camberato, Agronomy

**Comparison of In-Furrow and 2X2 Starter Fertilizers on the Growth, Development, and Yield of Continuous Corn**

Evaluate corn response to various starter placements, rates and products in a continuous corn environment

Bob Nielsen, Jim Camberato, Agronomy

**Indigenous Soil Potassium Supply, Fertilizer Potassium Use Efficiency, and Potassium Budgets in Indiana Corn and Soybean Production**

Evaluate the agronomic efficiency of currently recommended potassium fertilizer rates

Alex Helms SEPAC, Jim Camberato, Agronomy

**Collection of hyperspectral imagery by multiple methods of plants with various nutrient deficiencies**

Develop and catalog images of various images of plants with known nutrient deficiencies.

Evaluation differences between image data collection methods.

Meng-Yan Lin, Agronomy

**Corn Response to combinations of Zn, P, S in starter fertilizer**

Evaluate corn response to various starter fertilizer combinations

Jim Camberato, Agronomy

SEPAC staff

**Soybean Response to combinations of sulfur and nitrogen fertilizer x planting date**

Evaluate soybean response to nitrogen and sulfur fertilization in combination with two planting dates.

Shaun Casteel, Agronomy

**UAV plant stand assessments of Soybean Seeding Rate Trial Crossed by Plant Type**

Evaluate and fine tune soybean planting rate recommendation

Develop UAV scouting protocols.

Shaun Casteel, Richard Smith, Agronomy

**Soybean management systems**

Evaluate seed treatments and foliar treatments of fungicide and insecticide.

Robert Waller, Purdue Agricultural and Natural Resources

SEPAC staff

**Industrial Hemp production in no-till and tillage systems**

Evaluate and document stand establishment and yield of hemp in conventional and no-till methods

Marguerite Bolt, Agronomy

SEPAC staff

**Nitrogen Rates for Industrial Hemp**

Evaluate various nitrogen rates influence on grain yield in conventional and no-till systems

Marguerite Bolt, Agronomy

SEPAC staff

**Field Scale Fungicide Timing in Corn**

Fungicide applications at different timings and observe crop diseases throughout the growing season. Evaluate corn response to treatments.

Darcy Telenko, Jefferey Ravellette, Botany and Plant Pathology

**Field Scale Fungicide Timing in Soybean**

Fungicide applications at different timings and observe crop diseases throughout the growing season. Evaluate soybean response to treatments.

Darcy Telenko, Jefferey Ravellette, Botany and Plant Pathology

**Corn and Soybean Sentinel Plots**

Establishment of susceptible hybrids for observation of various disease presence and severity throughout the growing season

Darcy Telenko, Jefferey Ravellette, Botany and Plant Pathology

**20-SEPAC-Corn-01 Herbicide Trial**

Evaluation of preemergent herbicide premixes for control of summer annual weeds in corn

Bryan Young, Jesse Haarmann Botany & Plant Pathology

**20-SEPAC-Soy-01 Herbicide Trial**

Use of fall burndown programs for control of winter annual weeds and summer annual weeds the following soybean season

Bryan Young, Jesse Haarmann, Botany & Plant Pathology

**Cooperative Aq Pest Survey (CAPS) for exotic insect pests of soybean corn and oak**

Installation and monitoring of a trap array for exotic insect pests as part of a statewide survey network

Larry Bledsoe, Entomology

**Corn Earworm Pheromone Trapping**

To monitor the presence of corn earworm moths.

John Obermeyer, Entomology

**Black Cutworm Pheromone Trapping**

To monitor the presence of black cutworm moths.

John Obermeyer, Entomology

**Armyworm Pheromone Trapping**

To monitor the presence of armyworm moths.

John Obermeyer, Entomology

**Soybean Aphid Suction Trap**

To monitor the presence of soybean aphid.

Dave Voegtlin, National Soybean Research Center

**Specialty Crop Research Initiative (SCRI) Impact of neonicotinoid insecticides on honey bee pollinators of melons**

The within and surrounding field impacts of neonicotinoid insecticides on honey bees.

Laura Ingwell, Ian Kaplan, Christian Krupke, Jacob Pecenka, Entomology

**Specialty Crop Research Initiative (SCRI) Impact of neonicotinoid insecticides on cucumber beetle natural enemy communities**

Effect within and surrounding field impacts of neonicotinoid insecticides on cucumber beetle natural enemy populations

Steve Yaninek, Amanda Skidmore, Ivan Grijalva and Louisa Panado, Entomology

**Role of symbiotic microbes in the transmission of insect-vector plant pathogens**

Investigate potential of bacterial communities associated with aphids and influence of Barley yellow dwarf virus

Laramy Enders, Laura Ingwell and Brandon Schemerhorn, Entomology

**Evaluating vacuum stream treatment as an alternative to methyl bromide for killing the oak wilt fungus in logs from wilted red and white oak trees**

Evaluate vacuum steam treatment as a viable alternative to methyl bromide

Ron Mack USDA, Mark White Virginia Tech University, Zhangjing Chen Virginia Tech University, Anna Yang University of Minnesota, Jenny Juzwick US Forest Service, Paul Castillo US Forest Service, Phil Marshall Indiana DNR, Don Carlson, Forestry & Natural Resources

**Forest Insect Pest Monitoring**

Establish annual insect sampling sites to monitor the spread of new and ongoing forest insects involved in the establishment and spread of forest pests and diseases

Phil Marshall, Indiana DNR

**Bacterial Leaf Scorch Disease monitoring**

Monitor the spread and impacts of bacterial leaf scorch disease in a red oak provenance planting. Evaluate disease compared to red oak genetics from all regions of its native range.

Phil Marshall, Indiana DNR, Jenny Juzwic, US Forest Service, Matt Ginzel, Matt Ginzel, Jim McKenna, Hardwood Tree Improvement & Regeneration Center

**Edge Feathering**

Implementation of edge feathering management practices around wooded field borders for increased wildlife habitat and evaluation of crop yield response to the practice

Jarred Brooke, Don Carlson Forestry & Natural Resources – SEPAC staff

**Controlled Burn Management for Oak Regeneration**

Evaluate the effectiveness of utilizing controlled burn as a management strategy to increase oak species competitiveness in a regeneration site

Jarred Brooke, Don Carlson Forestry and Natural Resources

**Warm Season Grass Plantings**

Establishment of warm season grasses and forbs for demonstrating various management techniques and plant identification education

Jarred Brooke, Forestry and Natural Resources

**Wildlife Food Plots**

Demonstration of seeding techniques, establishment, and management of various beneficial plant species for wildlife

Jarred Brooke, Forestry and Natural Resources

**Deer Population Density Study**

Estimating deer population by amount of browse in a controlled coppicing and exclusion enclosures area of hardwood species

Jarred Brooke, Forestry and Natural Resources

**Biomass Harvest Site Demonstration Tree Planting**

Four, two-acre planting sites with four treatments and half of the acreage fenced.  
Don Carlson, Forestry & Natural Resources

**Woody Biomass Removal Study -2012**

Harvest a woody biomass to document the economic returns and ecological impacts from varying woody biomass retention levels. Maintained as a demonstration and extension education site

Mike Saunders and John Dunning, Forestry & Natural Resources  
Don Carlson, Forestry and Natural Resource

**Characterizing abiotic and biotic tree stress using hyperspectral information - Started 2019**

Incorporating digital approaches into forest monitoring and management to potentially mediate the negative impact of stressors on forests.

John Couture Entomology, Doug Jacobs, Forestry and Natural Resources

**Soil Suitability Studies – Started in 2019**

Evaluate the framework of Wallace & Young (NRCS) black walnut suitability index by intensively sampling soils at black walnut sites. Further, analyses of soils data in conjunction with planted black walnut family genotype data will be used to look for trends in soil characteristics or survival of families on a particular site.

Shaneka Lawson, US Forest Service, Forestry and Natural Resources

**Screening Butternut for Resistance to Butternut Canker Disease - Started 2011**

To evaluate butternut canker disease.

Jim McKenna and Brian Beheler, Hardwood Tree Improvement & Regeneration Center

**Ecological Fitness and Comparison of Pure and Hybrid Butternut - Started 2011**

Evaluate butternut from all over the native range as well as hybrids and pure lines from the SEPAC orchard.

Jim McKenna and Brian Beheler, Hardwood Tree Improvement & Regeneration Center

**Pure Butternut Seed Orchard of New Clones Resistant to Butternut Canker – Started 2011**

Orchard seed production.

Jim McKenna and Brian Beheler, Hardwood Tree Improvement & Regeneration Center

**Butternut Test - Started 2010**

Evaluate butternut from all over the native range as well as hybrids and pure lines from the SEPAC orchard.

Jim McKenna and Brian Beheler, Hardwood Tree Improvement & Regeneration Center

**Limited Range Provenance Test of Black Cherry – Started 2006**

First year test in Southern Indiana of a limited range provenance (common garden) test to evaluate black cherry seedlings collected from the Allegheny National forest in Northwestern Pennsylvania in comparison to northern and southern Indiana sources along with seedlings from selections in an IDNR seed orchard with other plots in Central Indiana and Southern Michigan 50 miles north of the Indiana border.

Phil O'Connor, Indiana Department of Natural Resources; Jim McKenna, Keith Woeste, Hardwood Tree Improvement & Regeneration Center

**Mass Selection of Butternut for Resistance to Butternut Canker from a Range-Wide Collection – Started 2005**

Evaluation of Butternut seedlings collected throughout the native range of butternut from resistant individuals for future breeding and development of Butternut Canker resistant germplasm.

Jim McKenna, Keith Woeste, Hardwood Tree Improvement and Regeneration Center

**Mass Selection of Butternut for Resistance to Butternut Canker from a Wisconsin Forest – Started 2004**

Evaluation of Butternut seedlings from a wood lot in Wisconsin where a large population of Butternut trees with resistance to the butternut canker fungus are growing.

Jim McKenna and Keith Woeste, Hardwood Tree Improvement & Regeneration Center

**Butternut Resistance Test – Started 2004**

A test of susceptible, moderately resistant and resistant butternut seedling families for resistance to butternut canker disease.

Jim McKenna and Keith Woeste, Hardwood Tree Improvement & Regeneration

**Butternut Resistance Seed Orchard – Started 2001**

Grafted butternuts from resistant selections from Southern Illinois University (Carbondale) to be used for future breeding of resistant butternut along with own-rooted cuttings from butternut seedlings.

Keith Woeste, Paula Pijut, and Jim McKenna, Hardwood Tree Improvement and Regeneration Center; Mike Ostry USDA-Forest Service -Northern Research Station; John Seifert, Indiana Department of Natural Resources

**Progeny Test of Black Walnut Families for Timber Production via Sprouted Seed - Started 2004**

Evaluation of select black walnut families for vigor and timber quality using sprouted seed as a means of better controlling variables such as initial seedling size and to make grid-planting easier and more economical

Jim McKenna and Keith Woeste, Hardwood Tree Improvement & Regeneration Center

**Effect of Genotype and Seedling Size on Early Walnut Plantation Performance**

Test walnut seedlings from 9 diverse mother trees grown at 3 different planting densities in the IDNR State Forestry Nursery for out-planting survival and growth.

Jim McKenna and Doug Jacobs, Hardwood Tree Improvement & Regeneration Center

**Limited Range Black Cherry Provenance Test – Started 2007**

Second year test in Southern Indiana of a limited range provenance (common garden) test to evaluate Black Cherry seedlings collected from the Allegheny National forest in north western Pennsylvania in comparison to northern and southern Indiana sources along with seedlings from selections in an IDNR seed orchard. Other plots are in Central Indiana and Southern Michigan 50 miles north of the Indiana border.

Jim McKenna, Keith Woeste, Forestry & Natural Resources; USDA Forest Service, National Forest - Region 9; Phil O'Connor, Indiana Department of Natural Resources

**Red Oak Progeny Test – Started 2008**

The beginning of a northern red oak improvement program using genetic testing of select northern red oak seed trees.

Keith Woeste, Keith Woeste and Jim McKenna, Forestry & Natural Resources; Phil O'Connor, Indiana Department of Natural Resources

**Black Walnut Progeny Test – Started 2008**

Ongoing genetic improvement of select black walnut seed trees to develop improved walnut seed sources for Indiana and the Midwest.

Keith Woeste, and Jim McKenna, Forestry & Natural Resources

**Deer Fencing, Select Genetics, & Slow-Release Fertilizer Mixed Hardwood Plantation – Started 2008**

Demonstration of research results that have shown improvement in tree growth and form utilizing deer fencing, select genetic stock, and fertilizing with slow-release fertilizer at the time of planting with each main factor being tested in large blocks to demonstrate their applied application with species including northern red oak, white oak, black walnut & cherry.

Don Carlson, Jim McKenna, Lenny Farlee, Mike Saunders, Doug Jacobs, and Keith Woeste, Forestry & Natural Resources; Phil O'Connor and Bob Hawkins, Indiana Department of Natural Resources

**Red Oak Progeny Test – Started 2009**

Ongoing genetic improvement of select black walnut seed trees to develop improved northern red oak seed sources for Indiana and the Midwest.

Keith Woeste, and Jim McKenna, Forestry & Natural Resources; Phil O'Connor, Indiana Department of Natural Resources

**Black Walnut & Northern Red Oak Container-grown vs. Bare-Root Nursery Grown Stock – Started 2009**

Assess the performance of containerized grown tree seedling to determine uniformity, year-to-year consistency and lower cost of planting of red oak and black walnut.

Lenny Farlee, Keith Woeste, Don Carlson, and Jim McKenna, Forestry & Natural Resources; Anthony Davis, University of Idaho

**Purdue Continuous Forestry Inventory Plots**

Maintain forestry inventory data from all forested compartments

Don Carlson, Forestry & Natural Resources

**Oak Wilt Management**

Monitoring of forested compartments to detect and assess oak wilt outbreaks in red oak stands. Confirmed infected stands will be salvaged at the appropriate times to contain or eradicate the disease.

Don Carlson, Forestry and Natural Resources

**Timber Stand Improvement**

Conducted as necessary on forested compartments and tree plantings to maximize forest productivity and maintain forest health.

Don Carlson, Forestry and Natural Resources

**Timber Sales and Harvesting**

Management of timber resources in conjunction with forest management plans and FNR policies. Standing timber is marked, advertised and sold via sealed bid sales. FNR and SEPAC staff do conduct some timber harvesting to address salvage, research, extension or other unique situations presented.

Don Carlson, Forestry and Natural Resources & SEPAC Staff

### **Invasive Plant Control**

Control of non-native invasive plants (IPs) in forested areas. Controlled IPs include: Asian bush honeysuckle, multi-flower rose, autumn olive, Japanese honeysuckle, Tree of Heaven (ailanthus), Japanese stilt grass, common buckthorn, reed canary grass, Japanese barberry, wintercreeper, privet, periwinkle, burning bush, Johnson grass.

Development of boundary identification and GIS mapping of infestations.

Don Carlson, Forestry and Natural Resources