SOUTHEAST PURDUE AGRICULTURAL CENTER
RESEARCH AND DEMONSTRATION PROJECTS
2024

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Department of Agronomy

Soil Drainage and Water Quality
Long-term project to determine:
1) The effect of tile drain spacing on corn and soybean yields on a Cobbsfork soil
2) Evaluate cover crop biomass across various tile drainage spacings
Eileen Kladivko, 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 Kladivko, Bob Nielsen, Jim Camberato, Agronomy

IRA-GHG-Soil Carbon Monitoring Network Site
SE Illinoisan Till Plain site for NRCS long term soil carbon monitoring.
Eileen Kladivko, Agronomy Dena Anderson, NRCS

Cover crop species x seeding method x nitrogen rate – influence on corn yield and nitrogen cycling
Conventional and precision seeded cereal rye and balansa clover with various nitrogen rates ahead of corn and soybean.
Shalamar Armstrong, SEND LAB team, Agronomy

Feasibility of Winter Hardy Legumes in the North Central Region 1
sUAS broadcast seeding of red, crimson and Balansa clovers across four seeding dates followed by corn at different nitrogen rates. Determine nitrogen credits that influence synthetic nitrogen fertilizer rates, corn yield, farmer economics and nitrogen fate.
Shalamar Armstrong, SEND LAB team, Agronomy

Feasibility of Winter Hardy Legumes in the North Central Region 2
Inclusion of wheat in corn and soybean rotation, followed by interseeding of cover crops into established double crop soybeans. Quantify above ground biomass, nitrogen uptake and total carbon in root and shoot portions of the cover crop prior to corn planting.
Shalamar Armstrong, SEND LAB team, Agronomy

Utilizing UAS imagery to document spatial variability of cover crop biomass and nutrient content
Utilize sUAS to sense and model cover crop biomass and nutrient uptake spatially across a landscape
Dan Quinn, Sergio Sosa, Agronomy

Department of Agronomy (continued)

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.

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

Xyway LFR delivery and timing in corn production

Evaluate Xyway timing (planting, sidedress, Y drop) – quantify leaf disease and evaluate yield

Dan Quinn, Agronomy

Seeding and Nitrogen Rate Trial for popcorn and yellow #2 corn

Reevaluate seed and nitrogen rate recommendations for popcorn.

Dan Quinn, Agronomy

Data-Intensive Farm Management Project (DFIM)

Utilize and evaluate open-source cloud-based software for intensive trial designs

Dan Quinn, Agronomy & University of Illinois

Evaluation of short stature and standard stature corn hybrids

Evaluate nitrogen, population and harvestability of short and standard stature hybrids

Dan Quinn, Erick Oliva, Agronomy

Intensive Corn Management Study

Evaluate corn yield response to a variety of management practices including fungicides, population late season nitrogen, micronutrients and sulfur fertilization.

Dan Quinn, Malena Bartaburu Silva, Agronomy

Evaluation of commercially available biological products to supplement corn nitrogen needs

Evaluate various biological products across multiple synthetic nitrogen rates to quantify possible nitrogen contribution of biological product

Dan Quinn, Agronomy

Development of tool to design research trials based upon historical spatial variability

Utilize historical data to account for spatial variability and assist in trial design

Dan Quinn, Agronomy

Sneha Ja, Engineering

2024-2025 FiberX Corn ICMC

Assess the impact of corn stover removal percentages following grain harvest on nutrient removal rates and soil nutrient level changes across different hybrids and grain yield levels.

Dan Quinn, Agronomy

Bruno Paulus Scheffer Sr, Agronomy

Department of Agronomy (continued)

Data Development and Modeling

Utilize and explore SEPAC's archived GIS data to develop data flows and initiate and integrate modeling

Pratishtha Poudel, Agronomy; Adewumi Adeayo, Agriculture and Biological Engineering; Gustavo Zapata, Ag Data Services

Evaluating nitrogen fertilization impacts on the below-ground root system, CO2 emission flux and soil carbon pool of short stature corn hybrids

Yichao Rui & Binod Joshi, Agronomy

Long-term impact of cereal rye cover crops on biological soil health in a corn-soybean rotation in southeastern Indiana

Yichao Rui & Anshu Siwach, 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 PAC administration, Jim Camberato, Agronomy

Soybean Spatial Variability of Soybean Quality

Map spatial variability of soybean quality, protein, oil, fatty acids, etc. and predict it prior to harvest with remote sensing

Shaun Casteel, Agronomy & Kansas State University

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

Soybean Inoculant x sulfur study

Evaluate soybean response to various levels of inoculant with and without sulfur following a fourteen-year continuous corn field

Shaun Casteel, Agronomy
Dan Quinn, Agronomy

Intensive Soybean Management

Evaluate soybean yield response to a variety of management practices such as seed treatment, micronutrients, sulfur, urea, fungicides, insecticides

Shaun Casteel, Agronomy

Soybean Response to cover crop, sulfur and nitrogen fertilization

Evaluate soybean response to interactions of cereal rye, sulfur and nitrogen combinations

Shaun Casteel, Agronomy

USDA-ARS Northern Soybean Uniform Test

Evaluate USDA_ARS Northern Uniform Soybean Test strains grouped by maturity for comparison and seed increases

Adam Brock, USDA-ARS

Department of Botany & Plant Pathology

Field Scale Fungicide applications methods to soybean

Evaluation of R3 and R5 fungicide applications via drone and ground rig at various carrier volumes

Darcy Telenko, Monica Mizuno, Ivis Miranda Botany and Plant Pathology

Field scale fungicide application methods to corn

Evaluation of R1 fungicide applications via drone and ground rig at various carrier volumes

Darcy Telenko, Monica Mizuno, Ivis Miranda 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, Botany and Plant Pathology

Water hemp sampling network

Collection site of water hemp to sample various biotypes and resistance levels across the Midwest region under various cropping management systems. Evaluate genetic diversity and the expanse of herbicide resistance.

Julia Kreiner, University of Chicago, Department of Ecology and Evolution

USB Early Planted Soybean Trial

Evaluation of soybeans planting dates and various herbicide management programs

Bill Johnson, Estevan Carson, Botany and Plant Pathology

Early Planted Soybean Weed, Insect and Disease Management Strategies
Weed science Trials and Seed Treatment Trials

Evaluation of soybean planting date interactions with herbicide programs and seed treatment efficacy.

Darcy Telenko, Monica Mizuno, Ivis Miranda, Botany and Plant Pathology
Christian Krupke, Sadhana Chhetri ,Entomology

Comparison of pigmentation present on rust spores and Mycodiplosis

Sampling of Mycodiplosis (midges that eat rust spores) and compare pigmentation of midges and larva to that of various rust species

Terry Cruz, Catherine Aime, Botany and Plant Pathology

Department of Entomology

Enhance Pollination and Pest Regulation Services in watermelon

Evaluation of a variety of flowering cover crop species and impact of subsequent watermelon pollinator population

Ian Kaplan, Zeus Mateos Fierro, Entomology

Spider mite outbreak study in watermelon

Evaluation of insecticide programs for spider mite control in watermelons with control and cover crop conditions

Ian Kaplan, Zeus Mateos Fierro, Entomology

Resilient Ag Project

Long-term evaluation and monitoring of plant, soil and insects in a conventional management system versus a reduced input management system.

Christian Krupke, Entomology
Siddhartho Paul, Geospatial Science
Eileen Kladivko, Shalamar Armstrong, Agronomy
Bill Johnson, Botany and Plant Pathology

Cooperative Ag 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

Alicia Kelley, CAPS Indiana State Coordinator

Corn Earworm Pheromone Trapping

To monitor the presence of corn earworm moths.

Laura Ingwell, 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 and other aphid species.

Dave Voegtlin, National Soybean Research Center

Spotted Lanternfly Trapping

Installation and monitoring of traps

John Couture, Entomology

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

Department of Forestry and Natural Resources

MOTUS Wildlife Tracking System

An international collaborative research network that uses coordinated automated radio telemetry to facilitate research and education on the ecology and conservation of migratory animals.

John Dunning, Kaitlyn Young, Brian Beheler, Don Carlson, FNR
SEPAC Staff

Soundscape ecology monitoring of solar eclipse

Utilize advanced acoustic sensors and recorders to capture wildlife responses to solar eclipse event

Bryan Pijanowski, FNR - Director, Center for Global Soundscapes

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

Field Edge Management Techniques and Demonstrations

Implementation of various field edge techniques to improve profitability and wildlife habitat

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

Controlled Burn Management for Oak Regeneration

Evaluate the of 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

Indiana Bat Survey Network

Part of a network surveying bat communities across the state of Indiana to evaluate maps predicting the current distribution of bats based on huge population declines

Scott Bergeson, Biological Sciences, Purdue Fort Wayne
Pat Zollner, 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

Department of Forestry and Natural Resources (continued)

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 Coulture 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

Department of Forestry and Natural Resources (continued)

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

Department of Forestry and Natural Resources (continued)

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 Woester, 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

White Oak Regeneration Study – Started 2023

Evaluation of techniques to encourage white oak reestablishment in forested ecosystems

Mike Saunders, Don Carlson, Forestry and Natural Resources

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 asses 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

Department of Forestry and Natural Resources (continued)

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 barbary, wintercreeper, privit, perrywinkle, burning bush, Johnson grass.
Development of boundary identification and GIS mapping of infestations.

Don Carlson, Forestry and Natural Resources

SEPAC STAFF

Mechanical termination of Balansa clover with and without pivot bio-40

Demonstration of management techniques to provide nitrogen to corn crop

SEPAC staff

Two pass foliar fungicide evaluation

Evaluate fungicide application at VT/R1 with and without secondary application 21 days post 1st application

SEPAC staff

Corn Management System Demonstration

Plant multiple hybrids under low and high management programs and evaluate yield

SEPAC staff

Corn Fungicide Product Evaluation

Evaluation of various corn fungicide products applied with sUAS at VT/R1 growth stage

SEPAC Staff

Evaluation and Implementation of 3D Land forming utilizing advanced software and GPS technologies

Utilize commercially available software platforms: OptiSurface and Trimble WM Form on southeastern Indiana soils with significant surface drainage problems to determine if the technology can improve surface drainage