2025 DAVIS-PURDUE AGRICULTURAL CENTER RESEARCH AND DEMONSTRATION PROJECTS

Jeff Boyer, Superintendent
6230 North State Road 1
Farmland, IN 47340-9340
765-468-7022
jboyer@purdue.edu

Department of Agronomy

Indigenous Soil Potassium (K) Supply, Fertilizer K Use-Efficiency, and K Budgets in Indiana Corn and Soybean Production

Purpose: Evaluate the agronomic efficiency of currently recommended K fertilizer rates; evaluate theoretically improved soil K tests for the ability to predict soil K supply.

Contact: Dan Quinn, Shaun Casteel and Alex Helms, Assistant Director Purdue Ag Centers

Crop Residue Decomposition Study

Purpose: Evaluate products applied in the Fall to break down corn residue.

Contact: Mark Carter, CES and Dan Quinn, Agronomy

Planter Setting Analysis

Purpose: To evaluate automated Precision Planting settings on the corn planter and manual settings.

Contact: Dan Quinn, Agronomy & Alex Helms and Jeff Boyer, Purdue Ag Centers

K Plot Popup Evaluation

Purpose: To evaluate Potash fertilizer broadcast ratees and In Furrow EnZup K rates in corn.

Contact: Dan Quinn, Agronomy, Alex Helms and Jeff Boyer, Purdue Ag Centers

In Furrow K Fertilizer Evaluation in Corn

Purpose: To evaluate In Furrow K fertilizer with Nitrogen fertilizer in a 2x2x2 system.

Contact: Dan Quinn, Agronomy, Alex Helms and Jeff Boyer, Purdue Ag Centers

Corn Seeding Rate Study DIFM

Purpose: Evaluate corn seeding rates with plot design using the DIFM program.

Contact: Dan Quinn, Agronomy

Corn Response to N-Fixing Biological Treatments Across Nitrogen Fertilizer Rates

Purpose: Evaluate Proven 40 OS seed treatment

Contact: Dan Quinn, Agronomy

Department of Agronomy (continued)

Resilient Agriculture Study
Purpose: Deep and shallow soil cores for OM, nutrient, and C analysis
Contact: Yichao Rui, Agronomy

Resilient Agriculture Study
Purpose: Soil microbiome quantification
Contact: Roland Wilhelm, Agronomy

Resilient Agriculture Study
Purpose: Georeferencing fields to map all data collected above onto high resolution grid.
Contact: Sidd Paul, Agronomy

Sulfur by Foliar Protection Study
Purpose: Evaluate potential synergies with sulfur application and in season fungicide and insecticide in soybeans
Contact: Shaun Casteel, Agronomy

Soybean Inoculant After Continuous Corn Study
Purpose: Evaluate Inoculants and AMS in soybeans after continuous corn
Contact: Shaun Casteel, Agronomy

Cereal Rye, Sulfur, Gypsum and Urea Evaluation in Soybeans
Purpose: Evaluate the interaction of sources of Sulfur, Nitrogen and Cereal Rye in soybeans
Contact: Shaun Casteel, Agronomy

Long Term Impact of Cover Crops on Cash Crop Nutrient Uptake, Yield & Nitrogen Application Rate
Purpose: Evaluate barriers in cover crop inclusion; deepen our understanding of cover crop to affect the availability of manure and inorganic Nitrogen to cash crops in multiple cropping systems.
Contact: Shalamar Armstrong, Agronomy

Phosphorus Use Efficiency in Corn
Purpose: Phosphorus use efficiency in corn as impacted by source, timing, and placement. Low P soils require extra fertilizer P in order to "build up" soil P levels to the maintenance range. The objective is to explore the potential for maintaining lower soil test P values and minimizing P application rates without sacrificing yield. This would simultaneously reduce the cost of P applications and risk of causing non-point P losses to surface waters. We are testing different P sources, timing of application, and placements, and evaluating total P uptake and yield, in exploration of the objective. Only the low P areas of the field are being utilized for this experiment.
Contact: Chad Penn, Agronomy

Department of Agronomy (continued)

Purdue Automated Agricultural Weather Station (PAAWS)
Purpose: Automated collection of weather data from this site is sent to the Indiana State Climate Office at Purdue University - data can be observed at: http://climate.agry.purdue.edu
Contacts: Beth Hall, Agronomy

Department of Civil Engineering

Crop Residue Study
Purpose: We will collect traditional crop residue cover percentage measurements using line transect methods and also collect ultra-fine spatial resolution UAS data over the same field. The UAS data will provide means to generate wall-to-wall estimates of crop residue cover percentage of each field, which then can be used to scale the crop residue cover percentage estimation using spaceborne remote sensing technology.
Contact: Jinha Jung and Seth Hackney, School of Civil Engineering

Department of Entomology

Resilient Agriculture Study
Purpose: Pest/beneficial insect surveys in corn and soybean, Pollinator (bumblebee) colony health data
Contact: Christian Krupke, Entomology

Soybean Aphid Suction Trap Network
Purpose: Monitor flight of soybean aphids.
Contact: Dave Voegtlin, National Soybean Research Center

Insect Pest Monitoring Network
Purpose: Monitor insect pest levels of corn, soybeans and wheat.
Contact: Christian Krupke, Entomology

Cooperative Ag Pest Survey
Purpose: DPAC is used as a monitoring site for a statewide trap grid for the early detection of exotic, invasive insect pests of soybean and vegetables.
Contact: Christian Krupke, Entomology

Heliothine Research Survey
Purpose: Use DNA samples from Heliothine moths (Corn earworm) collected weekly throughout the United States to determine the phenology and distribution of a group of viruses known to infect those moths and determine how to use those viruses in IPM strategies.
Contact: Paul Baker, Bruce Webb UKY and John Obermeyer, Entomology

Department of Entomology (continued)

Islands in a Sea of Corn: Ants as a Model System for Island Biogeography in Isolated Forest Stands

Purpose: In the 5 decades since the proposal of the Equilibrium Theory of Island Biogeography (ETIB), ecologists have attempted to apply island biogeography principles to isolated habitats other than oceanic islands. One such habitat is isolated forest stands within agricultural fields, which are understudied when it comes to their patterns of biodiversity. We investigated whether the principles of the ETIB apply to these isolated forest stands, using Formicidae as a model system. There were three major objectives in this study: To determine whether Formicidae species richness and abundance in these habitats is affected by habitat area and isolation, whether species assemblages of smaller habitats are nested subsets of larger ones, and how the habitat makeup of the surrounding landscape affects formicidae biodiversity and abundance. In order to characterize the biodiversity of these habitats, and how they are affected by isolation and habitat area, we collected ants at 40 locations within and around Tippecanoe County, IN, while recording relevant geographical and environmental data. Preliminary analysis indicated a positive species-area relationship within forest stands, while increased isolation decreases ant abundance. These results indicate some degree of ecological similarity to oceanic islands, which can have significant effects on land use policy.

Contact: Layton Rosen and Grzegorz Buczkowski, Entomology

Department of Botany and Plant Pathology

Resilient Agriculture Study

Purpose: Pathogen surveys in corn/soybeans

Contact: Darcy Telenko, Botany and Plant Pathology

Field Scale Corn Fungicide Plots – Drone and Ground Sprayer Application

Purpose: Evaluate drone and ground sprayer applications of corn fungicides.

Contact: Darcy Telenko, Botany and Plant Pathology

Field Scale Soybean Fungicide Plots – Drone and Ground Sprayer Application

Purpose: Evaluate drone and ground sprayer applications of soybean fungicides.

Contact: Darcy Telenko, Botany and Plant Pathology

Soybean Sentinel Plots

Purpose: Monitor soybean diseases in soybeans throughout the growing season.

Contact: Darcy Telenko, Botany and Plant Pathology

Corn Sentinel Plots

Purpose: Monitor corn diseases in corn throughout the growing season.

Contact: Darcy Telenko, Botany and Plant Pathology

Department of Botany and Plant Pathology (continued)

Weed Science Herbicide Evaluation

1. Drone efficiency for PRE and POST herbicide applications in soybean
2. Field management for propagation of PPO-resistant waterhemp
3. DPAC-Bayer-Coburn, confidential noncrop trial evaluating experimental herbicides and herbicide combinations for control of PPO-resistant waterhemp
4. DPAC-Chemorse-SA, confidential noncrop trial evaluating the influence of soil applied adjuvants on herbicide efficacy
5. DPAC-Chemorse-Soy, confidential soybean trial evaluating experimental adjuvants with glufosinate
6. DPAC-CHS, confidential noncrop trial evaluating experimental glufosinate formulations for control of PPO-resistant waterhemp
7. DPAC-Chemorse-Meso, confidential corn trial evaluating experimental adjuvants with mesotrione and atrazine
8. DPAC-SIPCAM, corn trial evaluating SIPCAM herbicide concepts on clay soil types
9. Drone efficiency for PRE and POST herbicide applications in corn
10. Field management for propagation of PPO-resistant waterhemp
11. Evaluating the efficacy of drop nozzles for reducing downwind drift in soybean
12. Comparison of droplet size, two drone types, and ground application for control of waterhemp in soybean

Contact: Bryan Young and Tommy Butts, Botany and Plant Pathology

FMC Agricultural Solutions

1. 200 Preemergence Mixtures for annual weed control in field corn in high OM soils – 16 treatments x 3 Reps
2. 201 Preemergence compounds for annual weed control in corn and soybeans – 11 treatments x 3 reps
3. 204 Preemergence Mixtures for annual weed control in field corn in high OM soils – 14 treatments x 3 Reps
4. 206 Preemergence Mixtures for annual weed control in field soybeans in high OM soils – 11 treatments x 3 Reps
5. 242 Experimental compound premixes for weed control and crop safety in soybeans – 14 treatments x 3 reps
6. 248 Preemergence formulation testing on experimental compounds – 8 treatments x 3 reps
7. 249 Post emergence formulation testing on experimental compounds – 14 treatments x 3 reps

   Purpose: Evaluate Crop Response of Corn/Soy, overall efficacy of all weed species present (% control), and stalk or root lodging (corn only). In soybean trials, stand counts were evaluated to characterize the treatment effect of heavy rains after chemical application. Notes were taken on symptomology on both the crop and weed species. Soil samples were taken in order to compare results at DPAC with trials implemented at other sites around the Midwest with similar soil properties.

   Contact: Nick Hustedde, FMC Agricultural Solutions

Forestry and Natural Resources

UAS Wildlife Inventory Method Testing

Purpose: Monitor activity of Northern Long-eared bats through various collection methods.

Contact: Tina Jackson, Dr. Patrick Zollner, Forest and Natural Resources

Understanding Habitat Needs of Northern Long-Eared Bats

Purpose: Monitor activity of Northern Long-eared bats through various collection methods.

Contact: Cheyenne Gerdes, Dr. Patrick Zollner, Forest and Natural Resources

Long Term Continuous Forest Inventory

Purpose: Permanent Forest inventory plots have been established and maintained on most of the woodlands at Davis PAC to monitor changes in species abundance, growth, survival, and timber quality over time. Comp 1 is periodically 100% inventoried (but not this year). Compartments 2-4 are managed under different parameters to be an overall demo.

1. Old growth- no mgt
2. No cutting for long time then increased harvest impact (-50% regenerated).
3. -20 year harvest cycles followed by TSI. Manage for health of forest for production and income generation.
4. ~20 year harvest cycle. Managed for short term income generation. No investment back in TSI. (High graded)

Contact: Mike Jenkins and Don Carlson, Forestry and Natural Resources

Mixed Hardwood/Deer Pressure Tree Planting

Purpose: Still being used toward the long term effects of deer control. (Biggest impact was the presence of the fence and how it altered MY random 1-2 hr mgt episodes over the last 15 years. Significantly more entries outside the fence. Neglected inside until it was mostly too late.)

Contact: Mike Jenkins and Don Carlson, Forestry and Natural Resources

Wildlife Shrub/Deer Pressure Plantings

Purpose: Surrounding the pond area are mature and wonderful examples of a mix of wildlife, windbreak, or aesthetic plantings. The wildlife shrub plantings (50% fenced) are still there for future data collection and physical demonstration of deer pressure in wildlife planting.

Contact: Mike Jenkins and Don Carlson, Forestry and Natural Resources

Forestry and Natural Resources (continued)

Forest Regeneration Methods
Purpose: Evaluate how a forest regenerates following the removal of the woody material. Supplemental tree planting of both standard and select nursery stock occurred on the sites along with fencing of half of the site to exclude impacts of deer on regeneration.
Contact: Don Carlson, Forestry and Natural Resources

80+ years of Central Hardwood Forest Dynamics
Contacts: Mike Jenkins and Robert Morrissey, Hardwood Tree Improvement and Regeneration Center, Department of Forestry and Natural Resources

Collaborations and Extension Demonstrations

Controlled Drainage for Improvement of Water Quality
Purpose: Quantify environmental benefits of managed drainage and use of soil amendments under standard crop production.
Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

Interaction of Management Practices on Soil Health and Water Quality
Purpose: Develop management techniques using cover crops and gypsum to increase soybean yield while maintaining soil health.
Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

Cover Crops, Phosphorus and Sulfur Management on Soil Quality and Grain Yield
Purpose: Evaluate the effects of cover crops on soil phosphorus, sulfur and soil quality and grain yield
Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

Legacy of Phosphorus
Purpose: Evaluate soil phosphorus drawdown rates, plant phosphorus uptake, and potential changes in corn and soybean yield with elimination of phosphorus fertilizer to long- term Fertility research plots.
Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab

Collaborations and Extension Demonstrations (continued)

Influence of the Rate and Frequency of FGD Gypsum Applications and Cover Crops on Soil Health and Water Quality

Purpose: Determine the effects of gypsum on grain yield and soil and water quality.

Contact: Brenda Hofmann, Biological Science Technician and Javier Gonzalez, Soil Scientist with USDA-ARS National Soil Erosion Research Lab Research Lab

National Weather Service Weather Station (NWS)

Purpose: Record weather data on a daily basis and maintain weather record data base.

Contact: Brad Herald, National Weather Service