



# 2020

## Indiana CCA Virtual Conference

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December 15-16, 2020

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Sponsored by:

Indiana Certified Crop Adviser Program  
& Field Crop Extension Specialists  
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# LIVE PROGRAM – Tuesday, December 15

9:00-9:50am	<b>CROP MANAGEMENT</b>	<b>High Impact Meteorology and Production Agriculture</b>	<b>Eric Snodgrass</b> Nutrien Ag Solutions
<p>The science of weather prediction is rapidly advancing. New computing technologies, high-resolution satellite imagery, and increased weather observations are increasing our ability to manage in-season weather risk. Yet weather prediction has its limits, and as we chase yields and profitability, fluctuations in weather during the growing season force growers to constantly adjust their strategies. In this talk, we will discuss the dominant weather factors that cause yield variance across the cornbelt. We will first focus on low-frequency, high impact events like hail, wind, and tornado damage before discussing broader threats from flood and drought. We will discuss weather patterns that lead to high yields and also discuss the patterns that impact operations and reduce yield. We will discuss long term changes in the length of the growing season, total precipitation, and precipitation intensity. We will discuss the limits of predictability and learn about pre-season indicators of adverse weather conditions. Finally, we will discuss the South American growing season and its potential production over the next decade.</p>			
10:00-10:50am	<b>NUTRIENT MANAGEMENT</b>	<b>Fertilizer Decisions - Agronomic to Economic</b>	<b>Robert Mullen</b> Nutrien
<p>This presentation will cover economic considerations for agronomic decisions. The focus will be on nitrogen, phosphorus, and potassium exclusively.</p>			
11:00-11:50am	<b>PEST MANAGEMENT</b>	<b>Protecting Crop Yield: Weed Control Dos and Don'ts</b>	<b>Christy Sprague</b> Michigan State University
<p>The economic sustainability of any farm is dependent on maximizing crop yield. The number one pest that impacts yield is weeds. Several factors can affect a crops ability to compete with weeds: variety selection, planting date, row width, and plant population. Additionally, weed type, density, and time of weed emergence can influence yield. This session will focus on management strategies that will maximize weed control without impacting yield.</p>			
12:00-12:50pm	<b>BUSINESS MEETING</b>		
1:00-1:50pm	<b>SOIL &amp; WATER MANAGEMENT</b>	<b>Soil Health: Opening the Black Box in Specialty Crop Production Systems</b>	<b>Lori Hoagland</b> Purdue University
<p>Soil health is now widely regarded as the foundation for sustainable production systems. This presentation will provide evidence to support this assertion by summarizing results of recent studies demonstrating clear relationships between soil management practices, soil microbial communities, nutrient cycling and susceptibility of crops to plant and human pathogens. Strategies that growers can use to improve the health of their soils and better support beneficial microbial inoculants will also be covered.</p>			
2:00-2:50pm	<b>SPECIALTY SESSION (CROP MANAGEMENT)</b>	<b>Timeliness of Field Operations: How Planning Crop Rotations with Knowledge is Key</b>	<b>Bryce Irlbeck</b> AgriSecure
<p>Many farmers in the Midwest are looking for ways to increase profits on their family farms. Organic row crop production can be the answer. But take note: realizing financial rewards requires a solid plan and outstanding execution powered by a systems-based approach. In this talk, 5th-generation organic farmer Bryce Irlbeck covers the importance of balancing economics, agronomics, and management. In particular, he demonstrates how agronomics supported by the right crop rotations are the foundation for long-term success with organic farming.</p>			

<p>9:00-9:50am</p>	<p><b>CROP MANAGEMENT</b></p>	<p><b>21st Century Climate Change: How Will it Really Impact U.S. Corn Growers?</b></p>	<p><b>Jeffrey Schussler</b> Schussler Ag Research Solutions</p>
<p>Global climate change may impact various environmental factors that influence the yield potential of corn grown in the U.S. While some of these factors may trend negative, others have positively pushed yield trends in corn over the last 50 years. In this presentation, both negative and positive impacts of global climate change on U.S. corn production will be discussed. Strategies to optimize crop production during 21st century climate change through applied research and on-farm management options will be outlined.</p>			
<p>10:00-10:50am</p>	<p><b>NUTRIENT MANAGEMENT</b></p>	<p><b>Nitrogen Fixation: New Opportunities &amp; Potential Contributions to your Cropping System Nitrogen Budget &amp; Fertilizer Needs</b></p>	<p><b>Mike Castellano</b> Iowa State University</p>
<p>Would you like to produce 15% more corn with 30% less nitrogen fertilizer? In the upper Midwest, that is the average difference in grain yield and optimum nitrogen fertilizer rate between corn following corn and corn following soybeans. Where does this yield and nitrogen come from? The soybean nitrogen credit? We will explore the source of the soybean nitrogen credit and opportunities for biological fixation of atmospheric nitrogen to contribute to your nitrogen needs.</p>			
<p>11:00-11:50am</p>	<p><b>PEST MANAGEMENT</b></p>	<p><b>Comparison of Dicamba &amp; 2, 4-D Choline Off-Target Movement and Sensitivity to High-Value Specialty Crops</b></p>	<p><b>Stephen Meyers &amp; Bryan Young</b> Purdue University</p>
<p>Both the Xtend and Enlist soybean systems have key herbicide and trait approvals for the 2021 season. One popular discussion point of these systems continues to be the potential for off-target movement (OTM) of the improved dicamba formulations versus 2,4-D choline. This presentation will share recent research comparing OTM of these herbicides and the sensitivity of high-value specialty crops to dicamba and 2,4-D.</p>			
<p>12:00-12:50pm</p>	<p><b>BUSINESS MEETING</b></p>		
<p>1:00-1:50pm</p>	<p><b>SOIL &amp; WATER MANAGEMENT</b></p>	<p><b>Economics of Cover Crops</b></p>	<p><b>Alan Weber</b> Marc-IV</p>
<p>The reasons producers incorporate cover crops into their rotation is as varied as their responses on how it may impact profits. In this session learn how different cover crop management scenarios may impact farm profitability with specific examples from a Midwest diversified crop and livestock operation.</p>			
<p>2:00-2:50pm</p>	<p><b>SPECIALTY SESSION</b></p>	<p><b>Management of Soil Borne Diseases of Soybean</b></p>	<p><b>Marty Chilvers &amp; Austin McCoy</b> Michigan State University</p>
<p>Soil borne diseases pose a significant threat to stand establishment and can result in yield reducing root rot. We will discuss ROI of seed treatments, and research seeking to better understand the cause of seedling disease and when and where seed treatments pay. With emphasis on research focused on oomycetes (Pythium and Phytophthora) and fungal diseases including Fusarium virguliforme which causes soybean sudden death syndrome.</p>			

# Recorded Presentations

## SOIL & WATER MANAGEMENT

### **Agronomic practices to reduce from ag production fields in the Western Lake Erie Basin**

Session will discuss current findings on linkage of nutrients losses at edge of field to water quality impacts. Results will include discussion of 4R Nutrient Stewardship and other edge of field practices. Participants will have a better understanding of some agronomic and landscape features that impact nutrient losses and potential conservation practices to mitigate these losses.

*Greg LaBarge*  
The Ohio State University

### **The Progression of Next Generation Cover Crop Management to Increase Crop Production and Advance Water Quality**

Cover crop adoption in the Midwest has significantly increased within the last decade. However, critical questions remain that relate to impacts of cover crop management on nitrogen availability, cash crop production, and water quality. Therefore, this presentation will share results of Dr. Armstrong's investigation of next generation cover crop management to increase crop production, while advancing water quality.

*Shalamar Armstrong*  
Purdue University

*Bill Johnson*  
Purdue University

### **Humics, Biologicals, Biochar and Other "Additions" to Soil**

The presentation introduces the use of biological stimulants in soil. Motivation to use the diverse portfolio of products available based on market demand is reviewed and along with a few examples of how these projects are intended to work. Although interest in this field is strong, on farm results are highly variable including negative responses. In addition to the use of biological stimulants, the use of biochar applied to soil is introduced. The properties of biochar are reviewed along with a discussion about when it is appropriate to use biochar as a soil amendment.

*Cliff Johnston*  
Purdue University

### **In-Field Diagnostic Tools to Assess Soil Function**

As crop consultants, it is important to be able to evaluate not only field crops but also strategically utilize soil diagnostics to evaluate soil function. Proper soil function is essential to water infiltration, nutrient cycling and many other key processes that occur in our soil ecosystem. To fully understand soil function, we need to start with a better understanding of soil health because soil, like humans, cannot function to its fullest potential if it is not healthy. This session will go through key diagnostic tools that can be used in field to assist farmers in better understand what soil functions they are lacking and suggestions to build soil health to improve function.

*Stephanie McLain*  
USDA/NRCS

*Joe Rorick*  
Conservation Cropping Systems Initiative

### **Programs and Payments to Implement Conservation Practices**

Implementation of conservation best management practices can be enhanced by payments from different programs. These unique Partnerships between public and private conservation organizations allows farmers to explore the installation of practices necessary to address items such as soil degradation, water quality, wildlife and to build climate resilience.

*Tony Bailey*  
USDA - NRCS

### **Soil Health: Opening the Black Box in Specialty Crop Production Systems**

Soil health is now widely regarded as the foundation for sustainable production systems. This presentation will provide evidence to support this assertion by summarizing results of recent studies demonstrating clear relationships between soil management practices, soil microbial communities, nutrient cycling and susceptibility of crops to plant and human pathogens. Strategies that growers can use to improve the health of their soils and better support beneficial microbial inoculants will also be covered.

*Lori Hoagland*  
Purdue University

## Economics of Cover Crops

The reasons producers incorporate cover crops into their rotation is as varied as their responses on how it may impact profits. In this session learn how different cover crop management scenarios may impact farm profitability with specific examples from a Midwest diversified crop and livestock operation.

*Alan Weber*  
Marc-IV

## CROP MANAGEMENT

### **Crop Roots & Soil Water Availability**

In the first part of my presentation, I will present experimental results on crop roots from a variety of soils. The data will include a) speed of root growth, b) maximum depth, c) factors affecting root growth, d) root mass and its distribution and how root mass is related to crop yields. In the second part, I will use a well calibrated simulation model (APSIM) and measured soil moisture data to shed light into complex questions regarding a) water availability in soils with and without the influence of shallow water table, b) water uptake by soil layer and c) the relationship between evapotranspiration and yield.

*Sotirios Archontoulis*  
Iowa State University

### **Advancements in Farm Equipment and Ag Tech in Support of Digital Ag**

Digital agriculture continues to rapidly evolve globally. Currently, there are over 150, commercial digital technology offerings in North America with these technologies requiring access to farmer data to provide information and services back to the farm operation. At the same time, agriculture technology is advancing in particular for the application of nutrients and other inputs. This presentation will cover current agriculture technologies and how they provide farmers contemporary approaches for the placement of inputs, in particular nutrients. Further, survey results will be shared on the adoption of digital technologies by US farmers along with challenges they face on creating value back to the farm.

*John Fulton*  
The Ohio State University

## Assessing Soybean Canopy with UAVs

Our research is determining the ability of sUAS to assess soybean stands as it relates to optimal plant population and growth stage. We describe our processes for assessing soybean plant stands with sUAS imagery and vegetative indices with the promising results centered around minimal canopy coverage by growth stage with practical flight patterns. Optimizing corn foliar fungicide applications can be particularly challenging due to field and crop-based limitations that affect coverage and timing with ground and aerial equipment. Drone fungicide application technology will be discussed in this presentation, with a focus on fungicide efficacy of these applications. Benefits and limitations of the technology will be discussed.

*Shaun Casteel*  
Purdue University

*Kiersten Wise*  
University of Kentucky

## Relative Profitability of Conventional and Organic Crop Rotations

This presentation will provide an overview of the National Organic Program, organic transition and certification process, and considerations in transition and organic grain crop rotations. Historical crop yields, gross revenue, total expense, and net returns for conventional and organic crop enterprises will be compared. We will also use recently developed crop budgets to compare the crop breakeven prices and rotation net returns of a conventional and organic corn/soybean/wheat crop rotation.

*Michael Langemeier*  
Purdue University

*Michael O'Donnell*  
Purdue University

## Practical On-Farm Research: Why & How

Interest among farmers and their consultants for conducting field scale on-farm research has grown with the availability and adoption of a range of precision agriculture technologies that lessen the logistics of conducting many types of trials. However, conducting sound field research is not just about simpler logistics. It also requires an understanding and appreciation for the statistical and practical details of designing the trial, collecting the data, yield monitor calibration, yield data processing and cleaning, and fundamental statistical analysis.

*Bob Nielsen*  
Purdue University

## High-Throughput Phenotyping Technologies in Crop Improvement

Significant advances have been made in our understanding of the genes that contribute to crop performance; however, more work is needed to determine how phenotypes or traits emerge from the interaction of genome and environment. To address this question, multidisciplinary research teams representing the Colleges of Agriculture and Engineering and the Purdue Polytechnic at Purdue University are developing aerial and ground-based sensor platforms for growth chamber, greenhouse, and field-based studies of the plant phenome. New sensors and sensor platforms, novel georeferencing techniques, and sophisticated image and data analysis methods (e.g., feature extraction, image segmentation) are being developed to quantify variation in plot- and plant-level traits. These measurements provide insights into research plot and field quality, field equipment performance, genotype productivity, physiological plasticity, and spatial variability. Plant breeders are using these and other "omics" tools to address the complex challenges of global food security through collaborative and cross-disciplinary research.

*Mitch Tuinstra*  
Purdue University

## High Impact Meteorology and Production Agriculture

The science of weather prediction is rapidly advancing. New computing technologies, high-resolution satellite imagery, and increased weather observations are increasing our ability to manage in-season weather risk. Yet weather prediction has its limits, and as we chase yields and profitability, fluctuations in weather during the growing season force growers to constantly adjust their strategies. We will discuss the dominant weather factors that cause yield variance across the cornbelt. We will first focus on low-frequency, high impact events like hail, wind, and tornado damage before discussing broader threats from flood and drought. We will discuss weather patterns that lead to high yields and also discuss the patterns that impact operations and reduce yield. We will discuss long term changes in the length of the growing season, total precipitation, and precipitation intensity. We will discuss the limits of predictability and learn about pre-season indicators of adverse weather conditions. Finally, we will discuss the South American growing season and its potential production over the next decade.

*Eric Snodgrass*  
Nutrien Ag Solutions

## 21st Century Climate Change: How Will it Really Impact U.S. Corn Growers?

Global climate change may impact various environmental factors that influence the yield potential of corn grown in the U.S. While some of these factors may trend negative, others have positively pushed yield trends in corn over the last 50 years. In this presentation, both negative and positive impacts of global climate change on U.S. corn production will be discussed. Strategies to optimize crop production during 21st century climate change through applied research and on-farm management options will be outlined.

*Jeffrey Schussler*  
Schussler Ag Research Solutions

## NUTRIENT MANAGEMENT

### K & Soil Clay

North Dakota was primarily a wheat state until the early 1990's. A string of wheat crop failures due to disease and insects, and the simultaneous development of early-maturing corn and soybean varieties, as well as the ease of weed control from their glyphosate-tolerant genetic traits spurred a great increase in corn and soybean acreage, with soybean now the dominant state crop and corn number 3 behind spring wheat/durum. The cropping change resulted in a corresponding decrease in soil K test values, since the previous small grain rotation removed very little K, while corn and especially soybean remove up to 4 times more K per season. A K rate study was conducted from 2014-2016 in fields with K soil tests between ~100-200 ppm. Data were collected from 29 sites. The initial results indicated that the dry K soil test was superior to other extractions, but even the dry test only predicted correct corn response a little over half the time. The clay chemistry was investigated, and the predictability of the K test increased when the ratio of smectite clays to illites was considered. The ratio of 3.5:1 smectite:illite was the ratio above which a 200 ppm critical K soil test level was identified, and below, a 150 ppm critical K soil test value was adequate. A map of clay chemistry in North Dakota was produced from multiple surface soil samples collected in every county to help growers determine their probable clay chemistry ratio.

*David Franzen*  
North Dakota State University

## **Practical Approaches to 4R Certification: What Should I Expect? How Do I Get Ready?**

This presentation will give detailed guidance on what a 4R certification audit looks like and how to prepare for this voluntary process. The 15 core requirements that are common to any geography will be covered, with special attention paid to requirements that are unique to Indiana and/or Ohio. The emphasis will be on practical tips and ideas that have proven useful for current 4R certified participants. In addition, a “big-picture” outlook will be laid out, to help with the many gray areas that can occur during an audit.

*Mark Fritz*  
Ohio AgriBusiness Association

## **Strategies to Address Variability in Nitrogen Management**

Corn nitrogen requirement varies in both space and time. We should understand the components of nitrogen fertilizer requirement, soil nitrogen processes, and nitrogen fertilizer response to develop a strategy that addresses the variability in requirement. This presentation will discuss strategies and tools currently available and ongoing research.

*Josh McGrath*  
University of Kentucky

## **Legacy Effects of Nitrogen Inputs on Crop Productivity and Fertilizer Nitrogen Use Efficiency**

Nitrogen fertilization is critical to maximize corn productivity and replace nitrogen removed during harvest. Because nitrogen fertilizer inputs increase corn growth and residue return to the soil, agronomic optimum nitrogen fertilizer inputs help to sustain or increase soil organic matter over time, which may improve soil functioning. In this session, we will discuss how nitrogen fertilizer inputs affect soil organic matter levels, soil productivity, and fertilizer N recovery in continuous corn and corn-soybean systems.

*Hanna Poffenbarger*  
University of Kentucky

## **Managing Manure Nutrients**

Best management practices for the use of manure nutrients from an economic and environmental standpoint are discussed with emphasis on nitrogen and phosphorus. Changes to the Tri-State Fertilizer recommendations that will impact manure P management will be presented. Adjustments for the pre-sidedress nitrate test will be shown to adapt it to the current experiment-based nitrogen recommendation system. The meaning of different levels of the late-season stalk nitrate test will also be discussed.

*Jim Camberato*  
Purdue University

## **Hybrid Differences in Nutrient Uptake**

Corn hybrids change rapidly and most Corn Belt hybrids have a 2-3 year commercial lifespan. Seed company claims often suggest, based on their internal research or grower field experiences, that certain hybrids respond more to higher rates of fertilizers than others. There are also known hybrid differences in grain nutrient concentrations, and therefore in actual crop removal at particular yield levels. In this talk I will review preliminary evidence for possible hybrid differences in total nutrients taken up and in how the nutrients are allocated within corn plants at maturity. I will also briefly look at plant population impacts on nutrient uptake and nutrient partitioning during the growing season. Hybrid differences, if they are substantial, could have implications for optimum management assumptions for fertilizer applications. Public sector research on these hybrid by fertilizer management questions is very limited, but our recent preliminary investigations may provide some helpful clues to 4R nutrient recommendations for corn.

*Tony Vyn*  
Purdue University

## **Fertilizer Decisions – Agronomic to Economic**

This presentation will cover economic considerations for agronomic decisions. The focus will be on nitrogen, phosphorus, and potassium exclusively.

*Robert Mullen*  
Nutrien

## **Nitrogen Fixation: New Opportunities & Potential Contributions to your Cropping System Nitrogen Budget & Fertilizer Needs**

Would you like to produce 15% more corn with 30% less nitrogen fertilizer? In the upper Midwest, that is the average difference in grain yield and optimum nitrogen fertilizer rate between corn following corn and corn following soybeans. Where does this yield and nitrogen come from? The soybean nitrogen credit? We will explore the source of the soybean nitrogen credit and opportunities for biological fixation of atmospheric nitrogen to contribute to your nitrogen needs.

*Mike Castellano*  
Iowa State University

## **PEST MANAGEMENT**

### **Principles of Fungicide Resistance in Field Crops**

Fungicides are an important tool for managing the threat of losses due to plant diseases. Unfortunately, the use of fungicides can lead to the selection of strains of plant pathogenic fungi that are resistant or less sensitive to the fungicides. This presentation will focus on the basic principles of fungicide resistance and will provide a case example of the frogeye leaf spot pathogen of soybean and its resistance to fungicides. Best management practices for delaying or slowing the selection of fungicide-resistant plant pathogenic fungi also will be discussed.

*Carl Bradley*  
University of Kentucky

### **Soybean Gall Midge: Understanding a New & Emerging Pest of Soybean in the Midwest**

This presentation will focus on the geographic distribution of soybean gall midge, its impact on soybean, scouting tips, and management challenges. As a new pest of soybean, the lack of knowledge on its biology, ecology and environmental interactions makes it difficult to define solid strategies for mitigating injury. Although soybean gall midge has not yet been detected in Indiana, it is critical to be aware of the insect's symptoms and distribution of injury in the field.

*Justin McMechan*  
University of Nebraska - Lincoln

## **Insect Management in Rye Cover Crops**

Rye cover crop adoption has increased in recent years as a mechanism to reduce erosion, improve soil health, and mitigate nutrient losses. This talk will focus on the insect management implications of rye adoption (specifically winter or cereal rye), including impacts on pests and beneficial arthropods. Preliminary results will be presented from a series of field studies conducted in Illinois to survey cover crop fields for insect damage, pest species, and beneficials. In addition, the implications of practices such as spring termination timing will be discussed, as well as management recommendations for specific pests.

*Nick Seiter*  
University of Illinois

## **Update on Weed Suppression with Cover Crops**

Farmers in the eastern cornbelt are faced with the increasing challenge of controlling weeds that are resistant to more than one herbicide side of action. Over the next 5 years, I believe we will need to incorporate more mechanical cultural and weed control tactics into our currently used herbicide programs. In this presentation I will share results from our research program on the incorporation of cover crops with traditional weed control tactics.

*Bill Johnson*  
Purdue University

## **Tar spot of corn: An update on research in Indiana**

Tar spot of corn, caused by *Phyllachora maydis*, is a newly established disease in Indiana corn. It has had significant yield impacts on corn production in Indiana. The 2018 tar spot epidemic was the first time yield losses were documented in the U.S. Prior to this epidemic; no field research had been done in North American for tar spot. A summary of our experiences in Indiana will be presented, including an update on 2020 research, as we continue to improve our understanding of this new disease in corn.

*Darcy Telenko*  
Purdue University

## **Protecting Crop Yield: Weed Control Dos and Don'ts**

The economic sustainability of any farm is dependent on maximizing crop yield. The number one pest that impacts yield is weeds. Several factors can affect a crops ability to compete with weeds: variety selection, planting date, row width, and plant population. Additionally, weed type, density, and time of weed emergence can influence yield. This session will focus on management strategies that will maximize weed control without impacting yield.

*Christy Sprague*  
Michigan State University

## **Comparison of Dicamba & 2, 4-D Choline Off-Target Movement and Sensitivity to High-Value Specialty Crops**

Both the Xtend and Enlist soybean systems have key herbicide and trait approvals for the 2021 season. One popular discussion point of these systems continues to be the potential for off-target movement (OTM) of the improved dicamba formulations versus 2,4-D choline. This presentation will share recent research comparing OTM of these herbicides and the sensitivity of high-value specialty crops to dicamba and 2,4-D.

*Stephen Meyers*  
Purdue University

*Bryan Young*  
Purdue University

## **SPECIALTY SESSION**

### **Cropping Systems Strategies for Success in Organics**

This presentation will explore how cropping system strategies can solve and prevent problems in organic grain production systems. A major focus will be overcoming bottlenecks such as inadequate N availability, high weed pressure and tight windows of opportunity for field work that frequently impede success in organics. Novel cropping systems such as solar corridors, intercropping and cover crop based rotational no-till will be explored as well as more traditional practices.

*Joel Gruver*  
Western Illinois University

## **No-till Planting Organic Soybean and Wheat into Rolled-Crimped Cover Crops**

No-till planting soybean into rolled-crimped cover crops can be an effective strategy for improving soil health and reducing labor and fuel requirements, but it is important to use a systems approach and adaptive management. Participants will learn about cultural management practices and new tools that can be used to optimize production. New research on no-till planting winter wheat into rolled cover crops and the possibility of extended sequences of no-till crops will also be discussed.

*Matthew Ryan*  
Cornell University

## **Intensifying the Use of Cover Crops in Organic Grain Systems in the Midwest**

Cover cropping can positively impact several aspects of a healthy agricultural system, including reducing soil erosion, improving water quality, facilitating weed management, and providing habitat for beneficials and pollinators. However, in the upper Midwest, with its short growing season and unpredictable weather, intensifying cover crops across the rotation can be challenging. In this session, we will discuss some of the strategies we've researched at UW-Madison and how farmers have integrated these practices into their rotations, including interseeding into corn and cereal grains, managing...

*Léa Vereecke*  
University of Wisconsin Madison

## **Seed Treatment Equipment**

Seed treating equipment began with the never ending demand for higher yields. Some of the first seed treating equipment were designed by farmers in a barn and now have the capabilities to be run remotely from a phone. Learn about the types of seed treating equipment available today and how it effects the seed industry.

*Travis Anderson*  
Direct Enterprises

*Ryan Pottinger*  
Direct Enterprises

### **Biologicals – Opportunities in an Emerging Market**

Biologicals products are inputs derived from naturally occurring substances and is a rapidly expanding market. This presentation will provide an overview of the category and illustrate examples of commercial biological products and how they work. Implementing biological products into existing production systems and an overview of techniques to evaluate product performance will be highlighted.

*Marcus Jones*  
WinField United

### **Insecticide Seed Treatments: Efficacy, Mode of Action & Stewardship**

Neonicotinoid seed treatments have been a part of US field crops production for almost 20 years. This presentation will highlight research into what we know about the pro's and con's of this approach, including how/where seed treatments are most efficacious in preserving yield and whether concerns of non-target impacts are relevant.

*Christian Krupke*  
Purdue University

### **Timeliness of Field Operations: How Planning Crop Rotations with Knowledge is Key**

Many farmers in the Midwest are looking for ways to increase profits on their family farms. Organic row crop production can be the answer. But take note: realizing financial rewards requires a solid plan and outstanding execution powered by a systems-based approach. In this talk, 5th-generation organic farmer Bryce Irlbeck covers the importance of balancing economics, agronomics, and management. In particular, he demonstrates how agronomics supported by the right crop rotations are the foundation for long-term success with organic farming.

*Bryce Irlbeck*  
AgriSecure

### **Management of Soil Borne Diseases of Soybean**

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*Marty Chilvers*  
Michigan State University

*Austin McCoy*  
Michigan State University

## **Speaker List**

Travis Anderson	Joel Gruver	Justin McMechan	Christy Sprague
Sotirios Archontoulis	Lori Hoagland	Stephen Meyers	Darcy Telenko
Shalamar Armstrong	Bryce Irlbeck	Robert Mullen	Mitch Tuinstra
Tony Bailey	Bill Johnson	Bob Nielsen	Léa Vereecke
Carl Bradley	Cliff Johnston	Michael O'Donnell	Tony Vyn
James Camberato	Marcus Jones	Hanna Poffenbarger	Alan Weber
Shaun Casteel	Christian Krupke	Ryan Pottinger	Kiersten Wise
Mike Castellano	Greg LaBarge	Joseph Rorick	Bryan Young
Marty Chilvers	Michael Langemeier	Matthew Ryan	
David Franzen	Austin McCoy	Jeffrey Schussler	
Mark Fritz	Joshua McGrath	Nick Seiter	
John Fulton	Stephanie McLain	Eric Snodgrass	