

**2016 CROP PEST MANAGEMENT SHORT COURSE PROGRAM**

# Abstracts

**TUESDAY, DECEMBER 6, 2016**

**MCPR PLENARY SESSION – ROOM 102DEF**

**1:00 – 3:00 Earning consumer trust – What matters most to consumers and you**

*Donna Moenning, Center for Food Integrity*

It's time to talk differently about food and agriculture. The public is skeptical about how food is produced and they crave transparency. What do they want, where do they want it, and most importantly, why is it needed? The Center for Food Integrity's annual consumer trust research provides direction. In this presentation, CFI's Donna Moenning will navigate through the insight underscoring what matters most to your business. Anchored with a farm background and thirty years of experience in the consumer marketplace, Moenning's engaging delivery will equip and empower attendees with the knowledge they need to earn trust in the dynamic food system in which we function.

**What is society now demanding from crop production retailers and our suppliers and customers?**

*Dean Lemke, Iowa Agribusiness Association*

The Keynote Address on is entitled "Know GMO". The speaker is receiving rave reviews from agriculture all over North America as he reviews the shocking facts about agriculture's mighty battle with the opponents of GMO's in our food. Don't miss this electrifying presentation. In addition to being CEO of The Agri-Trend® Group of Companies, Robert is a Professional Agrologist and a Certified Agricultural Consultant.

## WEDNESDAY, DECEMBER 7, 2016

### GENERAL SESSION – ROOM 102DEF

#### 8:00 **Think differently about pesticide resistance - the role of biology in crop production**

*Dr. Jeffrey Gunsolus, University of Minnesota*

Dr. Jeffrey Gunsolus, Professor, University of Minnesota will draw on his 30 plus years as a Weed Scientist working in the areas of applied research and Extension education to assess how the complicated interactions between agricultural policy, pesticide manufactures, marketing and retail sectors, farmers and University researchers and educators have influenced pesticide resistance. Dr. Gunsolus will propose that we have placed greater emphasis on products to manage pests with less regard to pest biology and pest/crop interactions. In addition, there is a need to expand our discussion about pesticide resistance beyond the causes of pesticide resistance and increase our focus on how the entire agribusiness sector should respond and adapt to the changing conditions and risks posed by the increasing presence of pesticide resistance. Dr. Gunsolus will challenge the audience to “Think Differently about Pesticide Resistance - the Role of Biology in Crop Production”.

#### 9:00 **Battle scarred experience from the North American beachhead on neonic bans**

*Dr. Art Schaafsma, University of Guelph, Ontario*

Because of a recent Executive Order in Minnesota, the Minnesota Department of Agriculture has proposed action steps regarding the use of neonicotinoids to minimize the impact of neonicotinoids on pollinators. Corn and soybean producers in Ontario are already dealing with restrictions involving neonicotinoid-treated corn and soybean seed. A very timely Keynote Address entitled “Battle scarred experience from the North American beachhead on neonic bans” will be presented by Ontario crop farmer and Field Crop IPM scientist, Dr. Art Schaafsma. Dr. Art Schaafsma, Professor in Field Crop Pest Management at the University of Guelph, Ontario, Canada’s premier agricultural university, and has been intimately involved in the neonic debate in Ontario informing policy, conducting research, serving as a critic to protect the voice of science and to be the voice of practical reason. Dr. Schaafsma and his research team began studying neonic drift in 2013. Most recently they have studied the neonic issue as it relates to vacuum-style planters used for planting corn and soybeans as well as the use of newer seed coatings. Dr. Schaafsma will provide an overview of the forces at play in Ontario, the powers they wield, and the lessons to be learned for Minnesota corn and soybean crop production.

#### 10:00 **Strategies to win with young farmers**

*Jan Johnson, Millennium Research Inc.*

Young farmers are a small portion of today’s growers and producers, yet are already taking over most of the management decisions on Minnesota farms. They don’t act like other millennials

and generation Y, and they don't act like their fathers either. What do retailers need to do differently to reach this highly important generation? What sets them apart from older farmers? How do they think differently and how can you as retailer meet their needs and win their business? This highly engaging presentation highlights findings from an extensive survey of young farmers conducted by Millennium Research and Lessing-Flynn, Des Moines, IA, and most importantly, makes suggestions for action that work in the real world.

**11:00 Millennial Farmer Panel**

*Zach Johnson and Adam Hislop*

**CONCURRENT SESSIONS I & II – ROOMS 103ABC & 211AB**

*(Session I jointly offered with Applicator Recertification)*

**1:00 & 4:10 Worker Protection Standard Update**

*Betsy Buffington, Iowa State University*

The Worker Protection Standard was updated in November 2015. Major revisions to the federal regulation affecting crop consultants, for hire commercial applicators, agricultural retailers, and co-ops will be discussed. These include: annual mandatory training; expanded training for both workers and pesticide handlers; minimum age requirements; mandatory recordkeeping; new no-entry application-exclusion zones up to 100 feet surrounding pesticide application equipment; respiratory requirements, decontamination requirements, additional ways for workers to gain access to pesticide application information and safety data sheets; expanded definition of immediate family; and exemptions for certified crop advisors.

**1:00 & 4:10 What can pulse-width modulation sprayer systems do for you?**

*Thomas R. Butts, University of Nebraska-Lincoln*

Pesticide applications are complex processes with many factors influencing the fate of each pesticide droplet and the resulting biological effect. Adjuvants, pesticide active ingredient, formulation, nozzle type, orifice size, application pressure, and carrier volume have all been shown to influence droplet size characteristics. However, if we standardize these factors, we can better understand the influence of droplet size on efficacy. Pulse-width modulation (PWM) spray application systems allow for numerous factors to be standardized while variably controlling flow. More precise and efficient pesticide applications are necessary to meet regulatory demands and reduce input costs for farmers. Interest from industry professionals and regulators has been placed on increasing droplet size to minimize the drift potential of pesticide applications. However, little research has been conducted to determine the effect of increasing droplet size on efficacy of pesticide technologies. The precise applications of new pesticide technologies will allow growers and applicators to more effectively utilize application technologies, increase crop yield potential, and control pesticide-resistant species.

In this session, we will review the applied research on how both the Pulse-width modulation (PWM) and conventional nozzle application systems along with other application parameters

influence pesticide drift potential, spray droplet size, and efficacy. There will also be a discussion relating these characteristics to new herbicide labels and best management practices for PWM systems.

**1:55 & 3:15 Changing role of insecticides in managing crop insects with a special focus on neonics**

*Dr. Kenneth Ostlie, University of Minnesota*

Lower grain prices demands increasing scrutiny of crop budgets by farmers and crop advisors. What role should insecticides play in crop production, especially in view of reduced use of transgenic traits, insect resistance to traits, and developing resistance to some insecticides. Adding a further wrinkle is increased scrutiny of neonicotinoid insecticides in their effects of pollinators and what that means for seed treatments and foliar applications of this group of insecticides. In this presentation, we'll review insecticides, their performance, and their effective use amid these changing factors while pointing how to make effective decisions on their role in managing crop insects.

**1:55 & 3:15 Invasive pests and pesticide regulation: implications for soybean insect pest management**

*Dr. Robert Koch, University of Minnesota*

Invasive pests and insecticide regulations may force growers and their advisors to think differently about insect pest management in soybean. The presentation will provide updates on these two issues and recommendations for 2017. First, two invasive pests, the brown marmorated stink bug and Japanese beetle, are emerging as new threats to soybean production. This presentation will review the biology, impacts and management of these pests. Second, several insecticides used in soybean pest management have been or could soon be affected by regulatory action. This presentation will review circumstances and potential short- and long-term consequences of the Governor's executive order on neonicotinoid insecticides and pollinator protection.

**CONCURRENT SESSIONS III & IV – ROOMS 102DEF & 208CD**

**1:00 & 3:15 Nitrogen loss inhibitors and extenders**

*Dr. Dave Franzen, North Dakota State University*

The chemistry of proven nitrification and urease inhibitors will be explained and their modes of action. Also, the factors to consider when deciding what soils or fields are in need of these inhibitors and their benefits if conditions are favorable for N loss. Polycoated urea will also be explored and considerations for use will also be covered. Products or chemistries claiming to be nitrification inhibitors, urease inhibitors or N use enhancers will also be touched on.

**1:00 & 3:15 Current trends in public and private soybean variety development**

*Dr. Aaron Lorenz*

The development of higher yielding, pest resistant crop varieties has contributed immensely to the agricultural economy. However, challenges still remain for Minnesota soybean producers in

the areas of SCN, Soybean Aphid resistance and IDC tolerance, for example. The improvement of plants through artificial selection dates back to the dawn of agriculture. Modern soybean plant breeders have a vast array of powerful tools at their disposal, including genome sequencing, genome editing (CRISPR technology), transgenic modification, and high-throughput phenotyping. This session will provide an overview of soybean variety development and discuss cutting-edge technologies applied to plant breeding programs to deliver better varieties to farmers more quickly.

**1:55 & 4:10 Think differently: An evolutionary perspective is the key to managing herbicide resistance**

*Dr. Patrick Tranel, University of Illinois*

Farmers increasingly are encountering weed populations that are not being controlled by herbicides that previously were effective. The appearance of these herbicide-resistant weed populations is neither magical nor surprising; it is the expected outcome of evolution in action. Unfortunately, there are not likely to be novel herbicide chemistries in the foreseeable future to replace our current options, so effective chemical weed control will depend on how well we sustain the effectiveness of our current herbicides. Because herbicide resistance in weeds is the product of evolution, strategies to successfully mitigate herbicide resistance must play by the same evolutionary rules. This presentation will discuss herbicide resistance within an evolutionary framework. When herbicide resistance is understood from such a framework, strategies to mitigate it become self-evident. For example, herbicide rotation is often touted as an effective strategy to prevent herbicide resistance. Closer inspection of this strategy from an evolutionary perspective, however, reveals why its effectiveness at mitigating most cases of herbicide resistance is quite limited.

**1:55 & 4:10 Managing weather risk: Tools of the trade**

*Eric Snodgrass, University of Illinois*

Weather is a major source of risk in agricultural production. Managing this risk involves accurate prediction and strategy. This presentation will focus on the modern technologies that are used to monitor and predict weather. We will discuss how to consume weather data and produce forecasts. We will learn how to forecast and observe severe weather events (i.e., floods, drought, hail and severe winds) using the latest online resources. This presentation will then focus on long term weather variability and look at the forecast for winter 2016-17 as well as spring and summer 2017 for corn and soybean yields. We will also learn how weather can dominate commodity markets during certain times of the year and learn how to anticipate fluctuations in the market when weather is the dominant factor.

**THURSDAY, DECEMBER 8, 2016**

**CONCURRENT SESSION I – ROOM 103ABC**

**8:00 & 11:10**

**The what, when, and why of new corn fertilizer guidelines**

*Dr. Daniel Kaiser, University of Minnesota*

The corn fertilizer guidelines are based on current research focused on the efficient management of nutrients. As new research is available the guidelines are changed to reflect current technology, hybrids, and weather conditions. Updates were recently made to the corn guidelines in Minnesota. Modifications to suggested nitrogen rates and sulfur application for corn were made during the update. This presentation will outline some of these changes, why they occurred, and possible changes for the future. For nitrogen, the primary changes were made to suggested rates as new data was added to the corn N rate database from the past five growing seasons. Suggestions for corn following soybean did not change appreciably but there was a major increase in suggested rates for corn following corn which will be a discussion point. For sulfur, current data has pinpointed where the greatest return on investment. However, additional data is being conducted on high pH soils where current research has demonstrated a response to S for soils considered to be of high mineralization potential. Major changes to the P and K guidelines were not made during this update. The reason for the lack of changes will be an additional discussion point.

**8:55 & 12:30**

**A 4R evaluation of fall urea application in Minnesota**

*Jeffrey Vetsch, University of Minnesota*

Fall is a desirable time for suppliers and producers in Minnesota to apply fertilizer nitrogen (N) for the next year's crop. Historically, anhydrous ammonia was the primary N source in south-central MN and ammonia and urea in the drier areas of the state (southwest and western MN). Recently, fall application of urea impregnated with the nitrification inhibitor Instinct has been common in south-central MN. This presentation will highlight recent research on the agronomics and environmental consequences of fall-applied urea in Minnesota. The 4R's of fall urea application will also be discussed. Where in Minnesota is fall-applied urea an acceptable practice? Does placement and rate of application have an effect?

**10:15 & 1:25**

**In-season fertilization of corn: The potential for sensor-based management**

*Dr. Richard Ferguson, University of Nebraska-Lincoln*

Crop producers have significantly increased the efficiency with which they use nitrogen (N) fertilizer over the past 30 years. Today, they are faced with increasing economic and environmental concerns that require continued increases in N use efficiency. In-season fertilization is one way to increase efficiency. This presentation will discuss the use of crop canopy sensors as a tool to manage in-season N fertilization, and will share results from on-farm research experiences in Nebraska of producers using canopy sensing technology.

## CONCURRENT SESSION II – ROOM 102DEF

8:00 & 1:25

### **Impact of Agricultural Drainage on Water Movement**

*Dr. Bruce Wilson, University of Minnesota*

There are approximately 21,000 miles of drainage ditches in Minnesota and many more miles of subsurface drainage tiles. These drainage practices have changed the natural pathway of water movement. These changes are important for crop production but can also have undesirable impacts on the environment. Understanding the impact of agricultural drainage on water movement requires separate consideration of surface ditches and subsurface tile drains. Physical representation of these processes is possible at relatively small scales corresponding to public drainage ditches. However, the analysis becomes very complex for the large scales corresponding to major rivers and streams.

8:55 & 11:10

### **Thinking differently about *Amaranthus* – Experiences from Illinois**

*Dr. Aaron Hager, University of Illinois*

*Amaranthus* species are among the most troublesome weed species in agronomic production systems. These species are considered troublesome in corn and soybean because of their ability to cause crop yield loss and propensity to evolve resistance to various herbicides. Several *Amaranthus* species are regarded as weedy pests across the Midwest, including the monoecious (male and female flowers on the same plant) species redroot pigweed (*A. retroflexus*), smooth pigweed (*A. hybridus*), Powell amaranth (*A. powellii*), tumble pigweed (*A. albus*), prostrate pigweed (*A. blitoides*), and spiny amaranth (*A. spinosus*), and the dioecious (separate male and female plants) species common waterhemp (*A. tuberculatus*) and Palmer amaranth (*A. palmeri*). Among these, the dioecious species waterhemp and Palmer amaranth have become increasingly widespread across the Midwest. The evolution of herbicide resistance coupled with the ability of these species to adapt to contemporary agronomic production practices ensures farmers will contend with these species well into the future. In this conversation, we will share our experiences with waterhemp and Palmer amaranth in Illinois. Our single objective is to assist Minnesota weed management practitioners with the management of these species.

10:15 & 12:30

### **Soybean seed, seedling, and root rots: Is management a prescription or a package?**

*Dr. James Kurle, University of Minnesota*

Seed, seedling, and root rots of soybean are a costly challenge to Minnesota soybean growers. Minimizing stand losses to Fusarium, Pythium, Phytophthora, and Rhizoctonia root rots is essential for profitable soybean production since seed is the single costliest input in soybean production. Current seed protection practices emphasize application of

seed treatment fungicides or planting of resistant varieties. Seed treatments are effective against either filamentous fungi, *Fusarium* spp. and *Rhizoctonia*, or oomycetes, *Pythium* spp. and *Phytophthora sojae*. This specificity can be advantageous for a single pathogen but may be problematic when multiple pathogens sensitive to different fungicide modes of action are present. Similarly, single gene resistance can be highly effective if the pathotype infesting a field is correctly identified. Unfortunately, the number of *P. sojae* pathotypes has increased steadily since the first *P. sojae* resistant varieties were released. In both cases, selection of fungicide and selection of resistance source, the protection option is often chosen as “insurance” without identifying pathogen species or pathotype. Rather than relying on only seed treatments or cultivar resistance control of root rots requires a package of management practices including *P. sojae* tolerant soybean varieties, selection of the most effective seed treatment fungicides, and tillage and drainage practices that counteract the effect of cold saturated soils at planting.

### **CONCURRENT SESSION III – ROOM 211AB**

**8:00 & 1:25**

#### **Are you getting the most out of your beans? A maturity group update.**

*Dr. Seth Naeve, University of Minnesota*

The current maturity group system for soybean was developed 45 years ago. While photoperiod has not changed over this time, climate conditions and cultural practices have. Farmers in the upper Midwest have been planting longer season varieties than in years gone by, but what is really adapted to a specific location? And, what does 'adapted' really mean, anyway? In this session we will review results from two recently completed studies that will help clarify what maturities will provide the greatest yield potentials based on specific location and logistics.

**8:55 & 11:10**

#### **Developing management zones in precision farming**

*Dr. David Clay, SDSU*

Site specific fertilizer recommendations can be developed based on management zones or grid soil sampling. However, in many fields grid sampling can be cost prohibitive. An alternative approach is to define individual habitats, or management zones that are structurally similar. Research has shown that the different data collection techniques have unique strengths and weaknesses. For example, collecting grid soil samples requires little statistical training, whereas collecting soil samples from management zones requires a highly skilled practitioner. The overall goal of the management zone approach is to improve management efficiency by matching treatments to locations and problems. This paper will discuss the concept behind management zones and how different data layers can be used to identify zone boundaries.



**10:15 & 12:30**

**Corn seed treatments: Is there a difference between products?**

*Dr. Joe Lauer, University of Wisconsin*

The number of commercial corn seed treatments available to farmers has increased dramatically over the past decade. Implementing traditional IPM practices concerning seed treatment use (especially for ones containing fungicide and insecticide) is difficult because producers make a whole-field decision to use a seed treatment before planting with limited predictive knowledge of pest/disease pressure and spring weather conditions. The objectives of this study were to (i) quantify the effects of various corn seed treatments on plant stand and (ii) assess the importance of individual seed treatment pesticide components (fungicide, insecticide, and/or nematicide) across diverse and challenging environments. Trials were conducted on two hybrids at 7 Wisconsin locations during the 2013 to 2015 growing seasons. Results suggest that though fungicide + insecticide and fungicide + insecticide + nematicide seed treatments consistently increased plant stand, yield increases were variable and contingent on unpredictable factors. Ultimately, producers and crop consultants seek seed treatments that can provide consistent increases in plant stand and yield across a range of environments (i.e., location × years) to minimize their risk. Producers need to weigh potential yield gains with biological (resistance management) and economic (ROI and risk mitigation) concerns before implementing seed treatment practices at the whole farm level.

**CONCURRENT SESSION IV – ROOM 208CD**

**8:00 & 11:10**

**New developments to understand and manage soybean SDS disease**

*Dr. Dean Malvick, University of Minnesota*

Soybean sudden death syndrome (SDS) continues to be an important, yield-reducing disease in Minnesota and other Midwestern States. This disease is favored by summers with plentiful rainfall and is likely spreading to new fields and areas. SDS has been and continues to be studied intensively. The studies are resulting in important new findings that range from basic biology to disease resistance and improved disease management strategies. This presentation will address what is new with SDS based on research done in Minnesota and other areas that is leading to improved understanding and management of this disease.

**8:55 & 12:30**

**Status of Palmer Amaranth eradication efforts in Minnesota**

*Anthony Cortilet, Minnesota Department of Agriculture*

Palmer amaranth was recently documented in western Minnesota on conservation lands located in Lyon and Yellow Medicine Counties. Currently, MDA is investigating a potential source of seed contamination that is believed to be responsible for these recent infestations. This presentation will summarize the current status of Palmer amaranth in the state and the course of action that MDA is developing in an effort to eradicate it.

## **Minnesota Buffer Law Update**

*Tom Gile, Minnesota Board of Water and Soil Resources*

A brief overview of the State Buffer Law time lines and requirements. The Minnesota buffer law designates an estimated 110,000 acres of land for water quality buffer strips statewide. The law establishes new perennial vegetation buffers of up to 50 feet along rivers, streams, and ditches that will help filter out phosphorus, nitrogen, and sediment. This session will also review some of the key requirements of the buffer law of interest to ag professionals such as plant species selection, planting and management of the buffers.

**10:15 & 1:25**

## **Filling the void: Cover crop based strategies for increasing soil productivity**

*Dr. Scotty Wells, University of Minnesota*

Cover crops have potential to improve economic outcomes for farmers while supporting ecosystem function in Minnesota's agricultural landscape. However, use of cover crops remains low with less than 2% of the land in MN occupied with cover crops. To facilitate cover crop adoption, it is necessary to develop region specific best management practices that overcome many of the hurdles facing adoption. These practices include the continued agronomic utilization of our classical cover crops (e.g. cereal rye, red clover, etc) while developing new cover crop systems to include species that increase soil productivity while providing economic opportunities. This session will define the void and current consequences of corn and soybean production in MN while building the case for the necessity of cover crops as a strategy for improved soil and water quality.