Dec 3rd, 12:00 AM

Continuous improvement in the areas of crop, nutrient, pest and soil and water management

Patrick Reeg
Iowa Soybean Association

Peter Kyveryga
Iowa Soybean Association

Tristan Mueller
Iowa Soybean Association

Follow this and additional works at: https://lib.dr.iastate.edu/icm

Part of the Agriculture Commons, and the Agronomy and Crop Sciences Commons

Reeg, Patrick; Kyveryga, Peter; and Mueller, Tristan, "Continuous improvement in the areas of crop, nutrient, pest and soil and water management" (2014). Proceedings of the Integrated Crop Management Conference. 10.
https://lib.dr.iastate.edu/icm/2014/proceedings/10

This Event is brought to you for free and open access by the Conferences and Symposia at Iowa State University Digital Repository. It has been accepted for inclusion in Proceedings of the Integrated Crop Management Conference by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
Continuous improvement in the areas of crop, nutrient, pest and soil and water management
Patrick Reeg, Director of On-Farm Network, Iowa Soybean Association; Peter Kyveryga, Operations Manager-Analytics, Iowa Soybean Association; Tristan Mueller, Operations Manager-Agronomic Research, Iowa Soybean Association

Introduction
During the last 15 years, the Iowa Soybean Association On-Farm Network® has developed and adopted a variety of tools to conduct on-farm studies to improve efficiency and profitability in crop production by engaging farmers in participatory learning. The information collected enables farmers to make informed decisions by examining results of on-farm studies evaluating different products and management practices.

Figure 1. The locations of On-Farm Network studies conducted from 2005 through 2014 across Iowa.

Research topics and methodologies
Participants of on-farm studies test a variety of products and management practices in replicated strip trials. Some of the most common research topics are below:
• Crop management - seeding rates, row widths, planting date, plant growth regulators and plant stimulants.
• Nutrient management - rate, form, time, placement and stabilizers.
• Pest management - fungicides, insecticides, herbicides and nematicides.
• Soil and water management - cover crops, soil amendments and tillage types.
• Technology evaluation-crop canopy sensors, planter systems, tillage and fertilizer equipment and data transfer (industry telematics).
Precision agriculture tools and technologies allow growers to turn their farms into research plots. Strip trials compare alternating treatments across farmers’ fields replicated a minimum of three times. The simplicity of the design allows farmers to use their own equipment to complete a trial. Treatments are set up to align with the width of the combine header and span the field length. Treatment locations and crop yields are recorded using monitors equipped with GPS.

Analyses are done to identify whether topography, soil drainage, organic matter, soil conductivity and other factors affect yield differences within and across fields.

**Tools and technologies**

In addition to precision agriculture monitors equipped with GPS, a geographic information system (GIS) is used to process, analyze and summarize data as well as execute trials. For example, a plot planner tool is used to help in treatment design and treatment layout and ensures that farmers follow trial protocols (Fig. 2). These plans can also be used to prescribe treatments automatically by changing fertilizer or seed rates as farmers conduct field operations.

![Figure 2. An example of using the plot planner tool to design a strip trial plan.](image)

**Data quality control and summary**

A variety of quality control procedures are used to ensure the reliability of trial results. Spatial attributes such as harvest date, grain moisture, combine speed and swath width help eliminate errors and remove areas affected by flood or other problems. Spatial data from precision agriculture monitors are also utilized when assigning treatments to yield observations in GIS.

Late-season aerial imagery of crop canopy is used to identify equipment application errors, changes in crop varieties or hybrids within fields or to verify the treatment effect.
Figure 3. The treatments, 15 inch vs 30 inch row spacing in soybeans, are visible on the aerial imagery collected on September 14, 2014. The imagery helped to remove the flooded areas from the yield data.

Figure 4. A screen capture of the On-Farm Network database of replicated strip trials. Results can be queried by a variety of factors.
Summary of individual trials are posted online at www.isafarmnet.com/onlinedb/index.php. Farmers’ name and locations remain anonymous, but users can query, sort by research topic, geographic area or year.

In addition to the summaries of individual trials, the online database can be used to calculate a return on investment for products and practices based on the aggregated results. These summaries are useful for making data driven decisions.

Acknowledgements

The Iowa Soybean Association On-Farm Network is funded in part by the soybean checkoff. We would like to thank our network of partners and participants who have contributed.