Mastering agronomic decisions through on-line summaries of on-farm replicated strip trials

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“I don’t have 50 years of experience. I have one year of experience 50 times” – A farmer

Source: Pat Swanson (ISA board)
Successful crop:
genetics x management x environment
How do we learn form the past?

• What patterns emerge from the on-farm research network?
Learning from the past

• How would you feel about a particular practice if it worked on your farm (one year)?

• How would you feel about the same practice if it did NOT work on anyone else’s farm?
Learning from the past

• Finding consistent patterns among messy data is not simple
• But this is the goal of our project
• We have developed an online tool to visualize and analyze data from the ISA on-farm research network
General Information about the tool

This on-line interactive tool is designed to provide individual and across field summaries of on-farm trials conducted by farmers working with the Iowa Soybean Association. On-farm trials include replicated treatments or strips that test different products, practices or technologies in Iowa cropping systems. Farmers apply treatments and collect yield observations using yield monitoring equipment and GPS. All the trials used have two treatments: treated and control.

Process

Yield and as applied spatial data of the studied fields were cleaned of errors and outliers guided by aerial imagery and information from farmer equipment such as combine speed, grain moisture, harvest date and field scouting. Treatment averages were combined with weather observations from the Iowa Environmental Mesonet, field management, digital soil information, and scouting data.

Data analyses

The effect of treatments is shown as average yield differences (bu/acre) or yield change (%) for individual trials and across trials in different years. Uncertainty in averages is shown by 80, 90 and 95% confidence intervals. The treatment effects are meaningful if the confidence intervals for the averages do not cross the zero-yield response line. Yield differences are correlated with observed rainfall, growing degree days and yield level of the control or control strips.

How to use the tool

Navigate through Tabs on the left to select a crop and trial category of interest. Read the trial description, check trial locations, observed weather and view results. You can select or deselect years by checking boxes on the legend. You can hover to see data values on the plot. Scroll under each graph to view more information or explanation. General conclusions for each trial type follow the graphic information.
On-farm network

Replicate 1
Strip 1 Treatment
Strip 2 Control

Replicate 2
Strip 3 Treatment
Strip 4 Control

Replicate 3
Strip 5 Treatment
Strip 6 Control

Iowa
How is the tool organized?
How is the tool organized?

ISA On-Farm Trial Summarization Tool

- Introduction
- Soybean
- Corn

ISA On-Farm Trial Summarization Tool

- Introduction
- Soybean
  - Clariva Seed Treatment
  - Row Spacing
  - Foliar Fungicide
- Corn
How is the tool organized?
The map of Iowa shows county lines (black) and landform regions (gray): Northwest Plains, Des Moines Lobe, and Iowan Surface, from west to east across the northern half of the state, and Southern Iowa Drift Plain across the southern half of the state.
Conclusions

1. Across three years, Clariva nematocide treatments increased yield on average by 0.4 bu/acre, ranging from -0.1 to 0.7 bu/acre with 90% confidence.

2. Of the 32 trials, only 4 trials had significant yield responses of 0.8, 1.2, 1.4 and 2.2 bu/acre.

3. The effects of Clariva seed treatments compared with control were variable across years and locations.
Benefits of narrow row spacing

- Faster light interception
- Better weed competition
- Less competition (crowding)
- In principle, as plant pop go up the benefit of narrow row spacing might increase

More info: http://www.aganytime.com/corn/Pages/default.aspx
Disadvantage of narrow row spacing

- Restricted air flow
- Ground and lower canopy stay wet
- Favorable conditions for white mold (present at flowering stage in July)

Figure 7. Across- and within-row spacing (in inches) in various row configurations at 36,000 plants/acre.

More info: http://www.aganytime.com/corn/Pages/default.aspx
Row Spacing locations
Beware of spurious associations!
Yield loss for narrow spacing was observed under wet conditions due to the white mold at flowering stage.
Successful crop: genetics x management x environment
Hail!
3 of 18 trials had significant yield response

Key results

Across all trials compared with 30” row spacing, 15” row spacing treatments produced a yield response of 0.7 bu/acre with a 90% Confidence Interval of from -0.6 to 1.9 bu/acre.
Foliar fungicide: Headline® locations (206 trials)
Select type of comparison

- Yield Difference (bu/acre)
- Yield Change (%)

Graph showing yield difference vs untreated yield against cumulative GDD. The graph includes data points for various years (2006-2015) with different colors, a smoothing line, and a 90% confidence interval.
160 of 206 trials had significant yield response

Key result

More than 70% of the trials had significant positive yield responses to foliar fungicide. Across all trials, Headline treatments produced a yield response of 2.5 bu/acre with a 90% Confidence Interval ranging from 2.2 to 2.7 bu/acre.
Industry on-farm research

Figure 2. Average soybean yield response to foliar fungicide (top) and fungicide + insecticide (bottom) across DuPont Pioneer on-farm trials.

Soil applied insecticide on corn locations
• Major insect pest in corn field
• A soil applied insecticide might be needed to manage corn rootworm
• Roots are much more critical in dry years, than in wet years, However…

Larva feeding on corn root

Source: Purdue University
• Rain is needed for successful functioning of the active ingredient but too much rain reduce the effectiveness

Source: Purdue University

Larva feeding on corn root
2012 was dry
A low untreated yield might be explained by pest pressure. Advantage of using the soil-applied insecticide was observed.
13 of 36 trials had significant yield response

Key Results

Across all trials, treatments with Soil-Applied Insecticide (SAI) produced a yield response of 2.5 bu/acre with a 90% Confidence Interval ranging from 1.2 to 3.7 bu/acre
Successful crop: genetics x management x environment
Questions?

Temporary link: 
iasoybeans.com:3838/On_Line_Strip_Trial_Tool