ISOFAST: On-Line Decision Aid Tool Based on Historical On-Farm Trials

Since 2006, ISA has been partnering with farmers to conduct on-farm replicated strip trials to compare products and practices in different soils, weather and under real-world management conditions. These rich and unique data are updated annually with new trial categories, locations and results. Individual trial summary reports are posted online, however, aggregation of these data based on individual reports is not sufficient to make informed decisions. In 2018, the ISA Analytics partnered with Iowa State University (ISU) Agronomy Department to launch the tool Interactive Summaries of On-Farm Strip Trials (ISOFAST). The ISOFAST tool can be accessed on the [ISA website](#).

ISOFAST is a web-based interactive tool to visualize and summarize historical on-farm replicated strip trial data. The tool's capabilities for each study include:

- Identifies on-farm study rationale, specifies trial locations, field management and weather. [Figure 1] & [Figure 2]
- Shows dynamic graphics to better communicate statistical summaries, variability and uncertainty in yield differences within and across trials [Figure 3].
- Provides break-even economic analyses using cost and price inputs provided by users online [Figure 4].
- Summarizes key scouting, soil and tissue observations for tested treatments [Figure 5].
- Provides short summaries for aid in decision making for farmers and agronomists [Figure 6].

While many management aid tools have appeared on the market recently, the new online ISOFAST tool is unique. The tool is based on independent data measuring yield response from on-farm trials and simplifies understanding of agronomic and economic impacts in each study. It also uses observed local variability, management, weather and soils to aid farmers and agronomists in decision-making. The tool also can be used in risk mitigation assessments by farmers, researchers and industry.

The screen shots below provide a quick look at some of ISOFAST's features.

Figure 1. General view of the ISOFAST tool, trial location and individual trial identified. An interactive map shows landform regions and trial locations for each study. Clicking on any individual location reveals the year, trial ID, county, and a number of treatment replications. The trial ID can be used to track rainfall, economics and other features for that specific trial relative to all others in the summary.
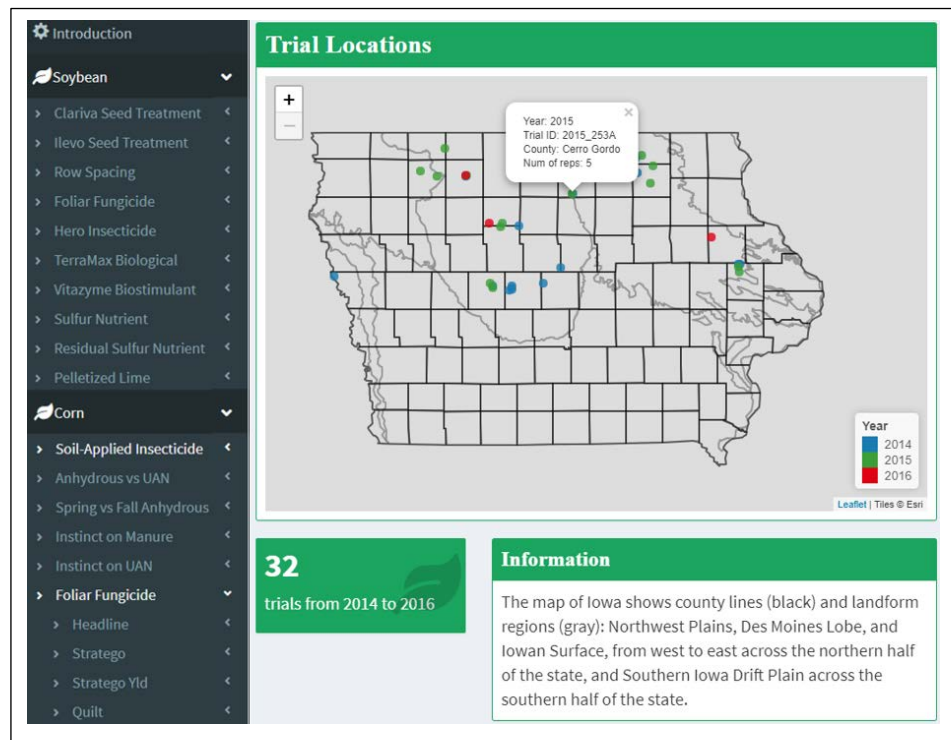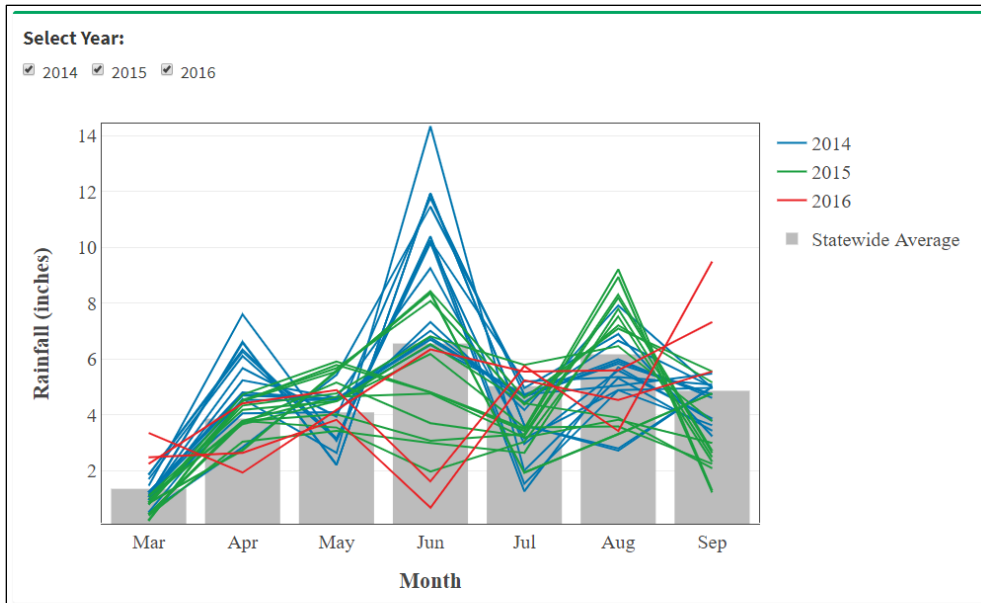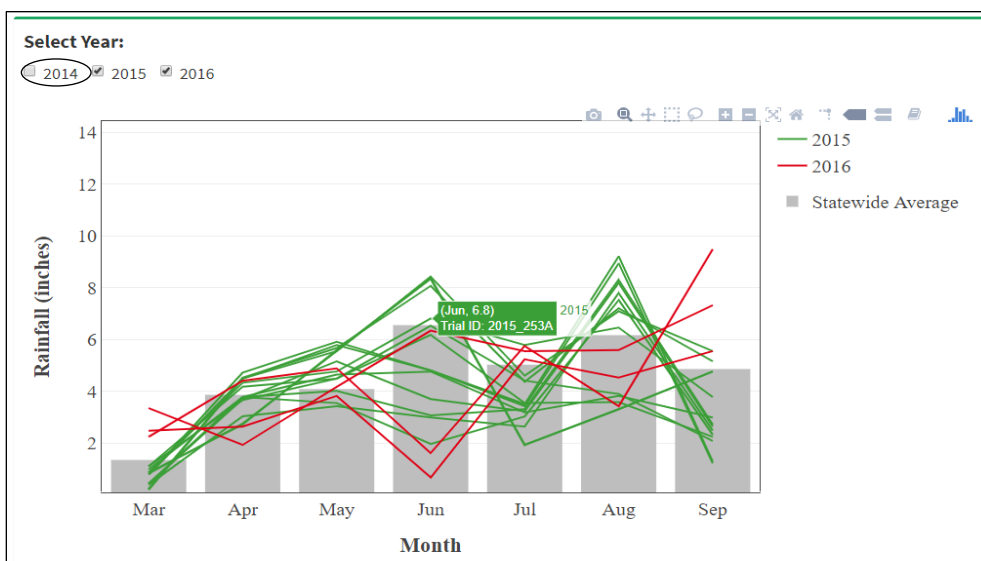
Figure 2. Dynamic monthly rainfall summaries for individual trials. The weather graph (top) illustrates changing rainfall patterns between years by month compared to the statewide average. It allows users to deselect data by year to simplify viewing specific information of interest. Each line represents seasonal rainfall for an individual trial. Hovering over a point (bottom) where a line represents rainfall for a month will show the rainfall in inches for that trial that month and the trial ID. Back to top
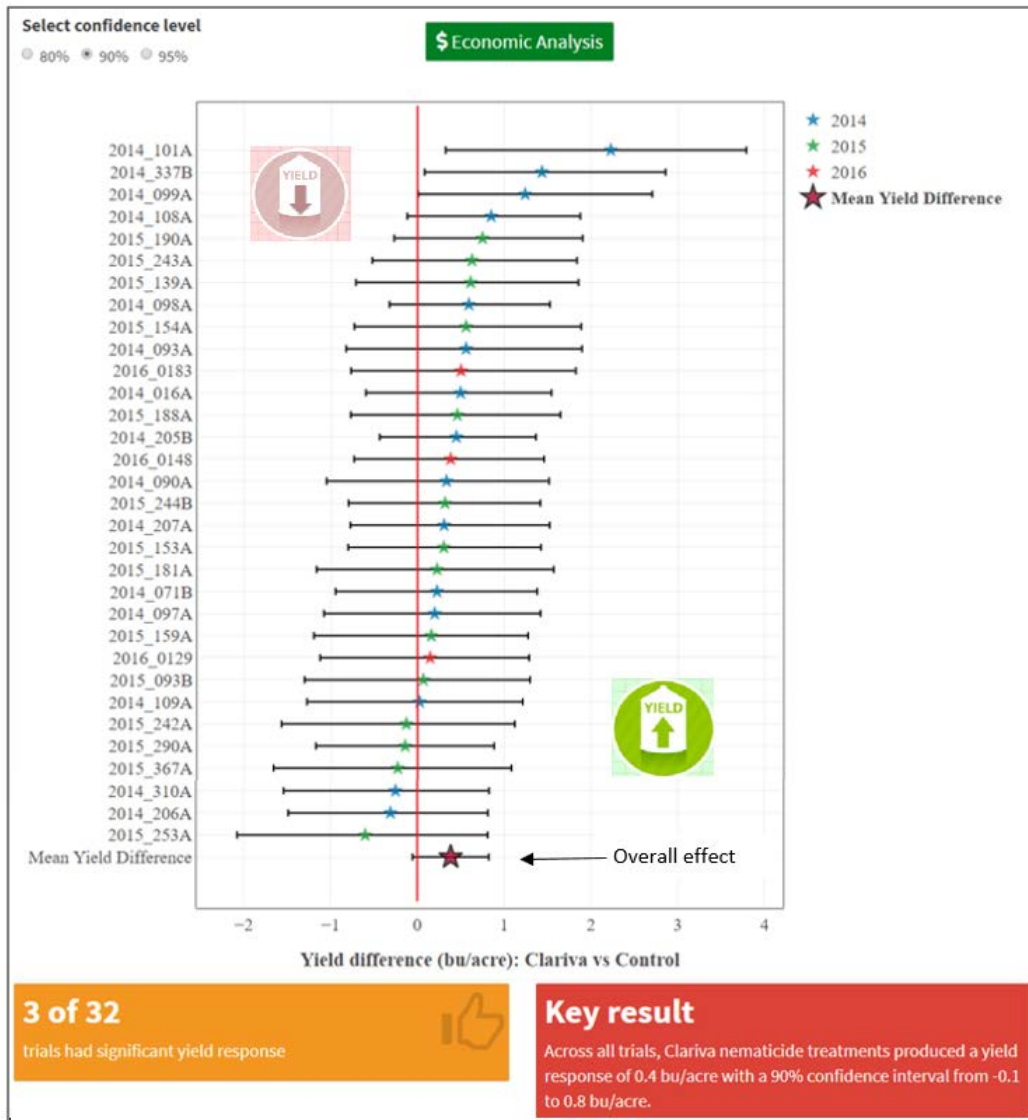
Figure 3. Dynamic individual trial summaries with different confidence interval for treatment yield differences. The "Trial Summaries & Economics" tab shows treatment differences and the uncertainty with each value. Users can select from three different confidence intervals, which are shown by "whiskers" on either side of the trial average. A 90 percent confidence level is used in the example. Results of trials are significant if whiskers of the confidence interval of do not cross the 0 bu/acre yield difference line. The number of trials with significant response is updated for each confidence interval selected. Back to top
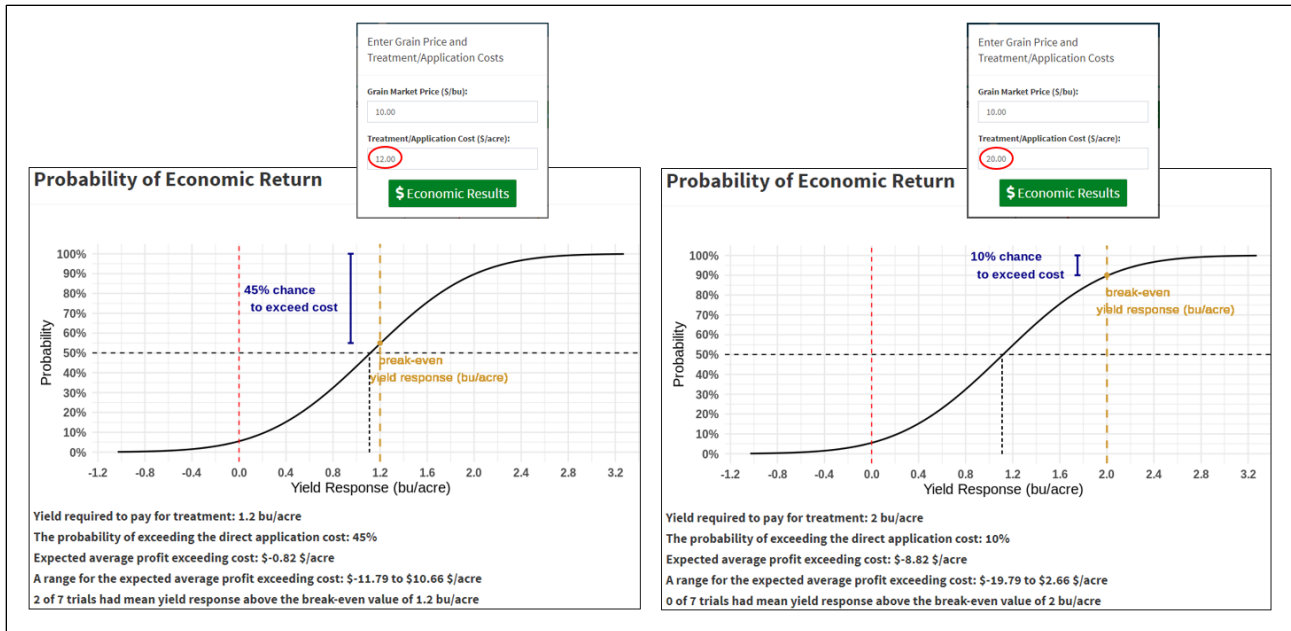
Figure 4. Dynamic break-even economic analyses comparing two different grain price and input cost values. The Economic Analysis feature allows users to enter different grain price and product/practice application cost values to calculate a break-even yield response and probability that the treatment application value will exceed the cost of the treatment. Back to top

In Figure 4, the example shows where costs were adjusted. In the first scenario, the probability of exceeding the $12.00/acre application cost with $10.00 soybeans is 45 percent. In the second scenario, the probability of exceeding a $20.00/acre application cost with $10.00 soybeans is 10 percent. A 45 percent chance of exceeding the cost is not bad, but the average expected profit for this scenario is still slightly negative (-$2/acre). Both the probability of exceeding the cost and the average profit enable users to better evaluate economic decisions for future uncertainty.
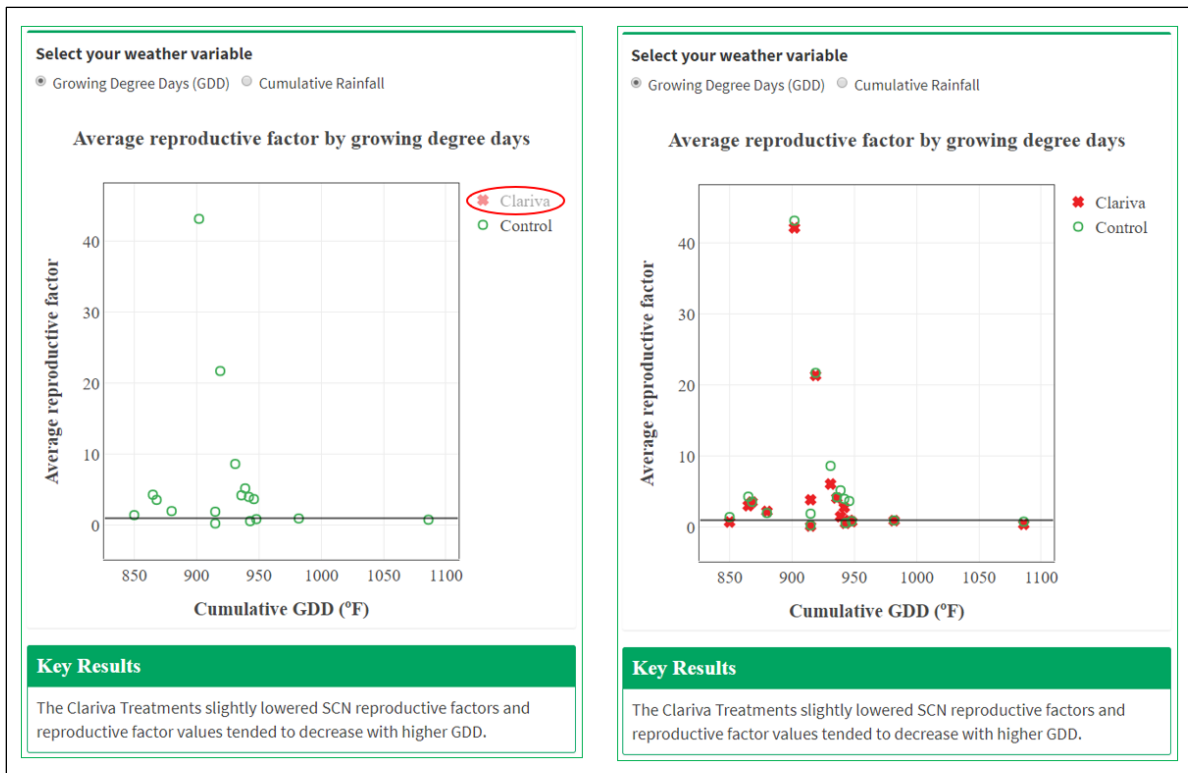

Figure 5. Dynamic summaries of scouting observations of soybean cyst nematode (SCN) egg counts in Clariva™ seed trials. The tool also summarizes scouting observations if they are available. In the example with a Clariva soybean seed treatment, average reproductive SCN values (a ratio of a number of SCN eggs in the beginning to the number of eggs in the end of the growing season) are shown for different weather conditions. The seed treatment has a significant effect when the red cross symbols of Clariva treatment fall below the green circles of the control treatment. Back to top
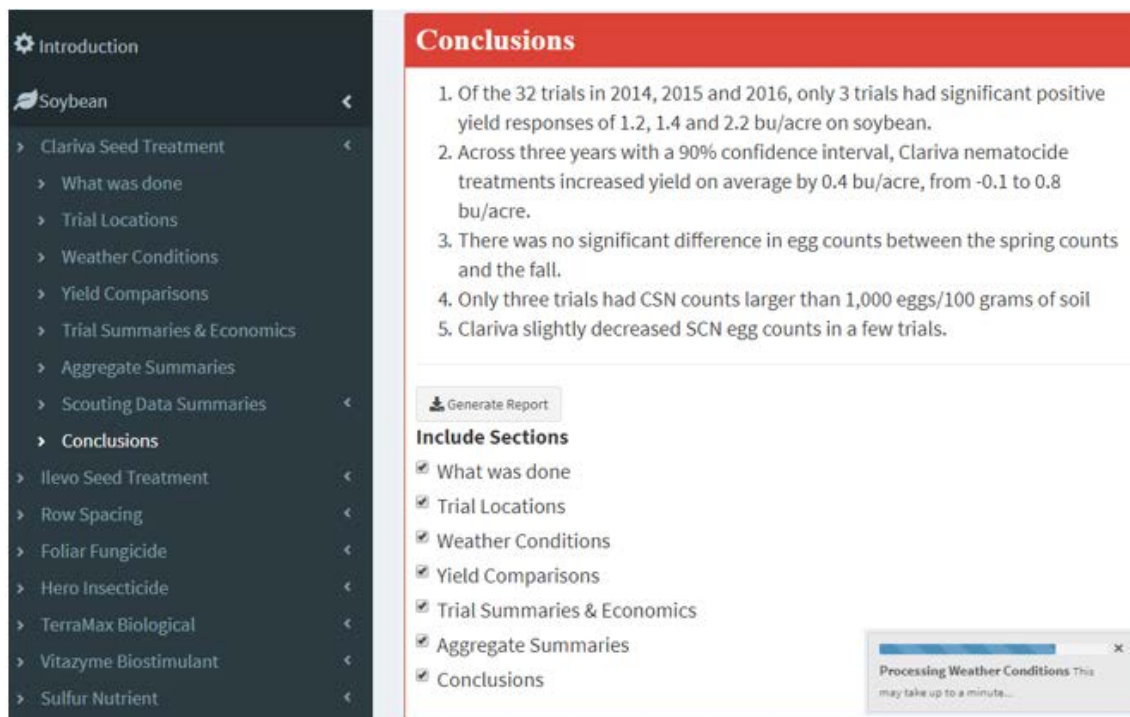
Figure 6. From the Conclusions page of each study, users may generate a complete or partial interactive PDF report of that study. Check boxes allow users to select different sections to include in the report. Converting web pages to an interactive PDF format takes a minute, so a progress bar will appear in the lower left-hand corner to keep you apprised. The application is still fully functional and interactive while a report is being generated. Once the report is complete, clicking on an item in the table of contents will take the user directly to that page. Back to top

Clariva Nematicide Treatments Analysis

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ISA Analytics leverages funding sources for technical support and to summarize corn trials. The ISU Soybean Research Center supports an ISU graduate student who codes graphical information and conducts statistical analyses.

Additional technical information for the ISOFAST tool was recently published in the online research update, "Dynamic tool empowers farmers with interactive visual summaries of on-farm replicated strip trials."

A scientific manuscript is being finalized for submission to "On-Farm Research," a special issue in the Agronomy Journal.

Analytics