



## The Yields II Project: Research-Based Management Information

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# What's Stressing Your Soybean Yield? WebGro Estimates Stress Interactions to Improve Management and Profitability

A Web-based soybean decision support system, called WebGro, has been designed to estimate the impact of various stresses and management scenarios on soybean growth and yield. Soybean producers in the midwestern United States may use this computer simulation to better understand how stresses interact and to improve management and profitability of their soybean crop.

**Y**ou thought you'd covered the bases—you planted the “best-yielding” variety, managed your soil, and followed herbicide recommendations. But at the end of the season, the yields were not what you expected. So what went wrong? Was it the weather during the growing season? Was there too much rain or too little? What did the hailstorm in June do to yield? What about the soil analysis that showed the presence of soybean cyst nematode (SCN)? Did the crop fully recover from herbicide injury? It can be difficult for producers to estimate the effect of these multiple stresses on yield. Therefore, we have developed a Web-based soybean decision support system (DSS), called WebGro, to help soybean producers in the midwestern United States decipher and understand how various stresses interact to limit soybean yield.

## What is WebGro?

**I**nformation provided by the WebGro DSS is based on the CROPGRO-Soybean Model (version 3.5) that was modified during the Yields Project to simulate several stresses on soybean growth and yield. Soybean producers enter information for specific fields, such as SCN presence, herbicide injury, Rhizoctonia root rot incidence, and hail damage, and the system provides a yield gap analysis, or an estimate of yield loss due to each stress. WebGro also allows soybean producers to examine different management scenarios, including the effect of different planting dates, row spacings, and maturity groups under specific weather conditions.

## How do I run WebGro?

To use WebGro, a producer must have a computer with access to the Internet through a dial-up Internet service provider or a broadband connection (e.g., cable modem or digital subscriber line) and a Web browser such as Internet Explorer or Netscape. The WebGro program (Figure 1) is located at <http://webgro.ae.iastate.edu/>.

New users must register and choose their own user ID and password. After logging onto the system, you have the option to create a new field or edit an existing field and run WebGro (Figure 2). A 1-page interface was designed to simplify field inputs and make model runs (Figure 3). You can set up a field scenario by defining a field and entering basic information about soil type, maturity group, planting date, row spacing, and population. Next, enter SCN spring egg population density, herbicide injury date and level, hail damage, and Rhizoctonia root rot incidence (Figure 4). Finally, run the scenario with different stresses turned on or off to compute the yield loss due to each stress.

A table is built at the bottom of the screen that displays a summary of each model run and the final yield (Figure 5). You can then analyze the resulting yields and compute the yield loss attributed to each stress.

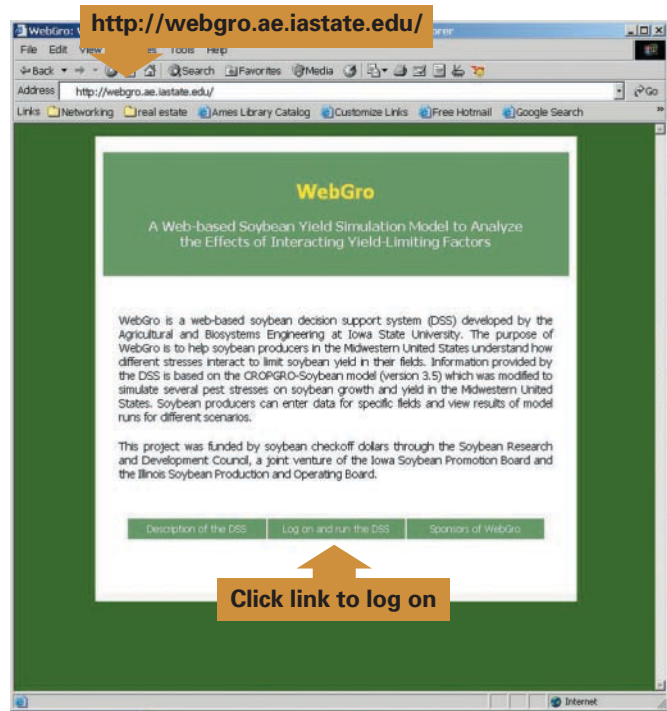


Figure 1. WebGro default page.

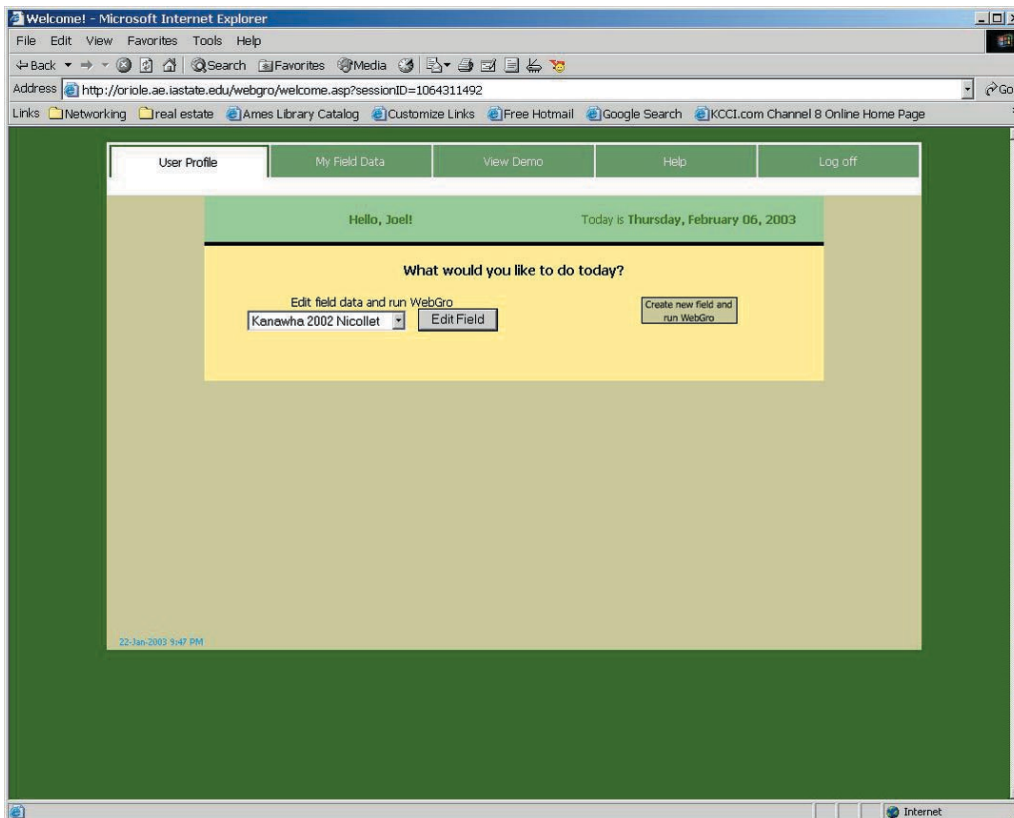


Figure 2. Welcome page. User has the option to create a new field or edit existing field data and run WebGro.

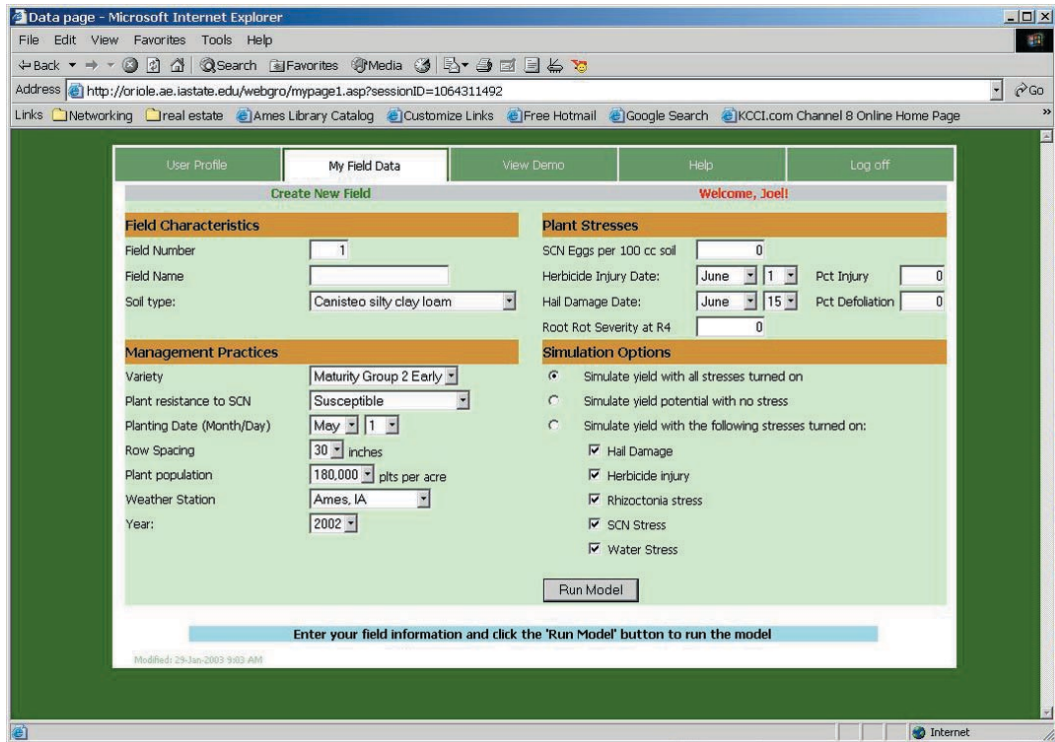


Figure 3. Input page.

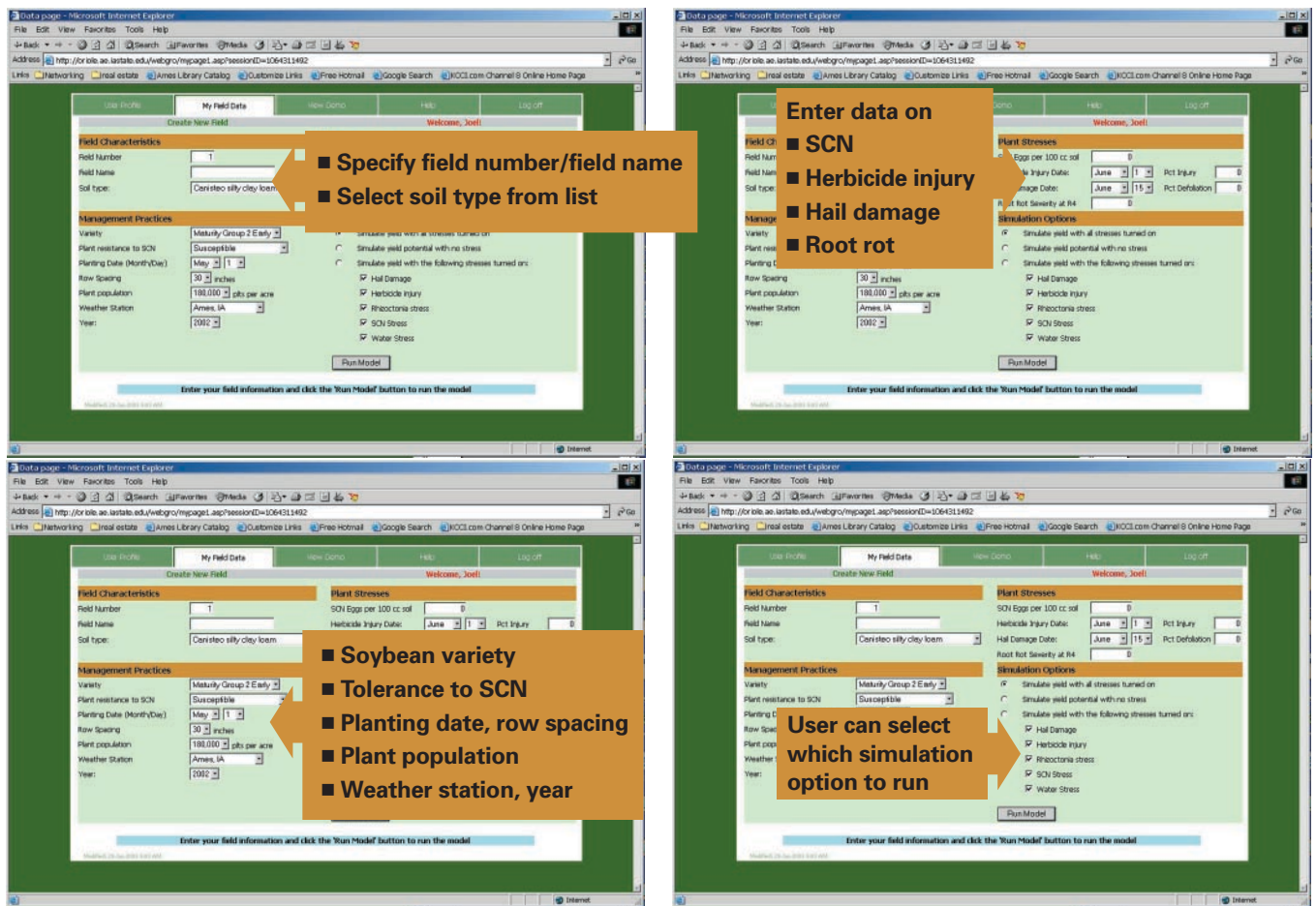
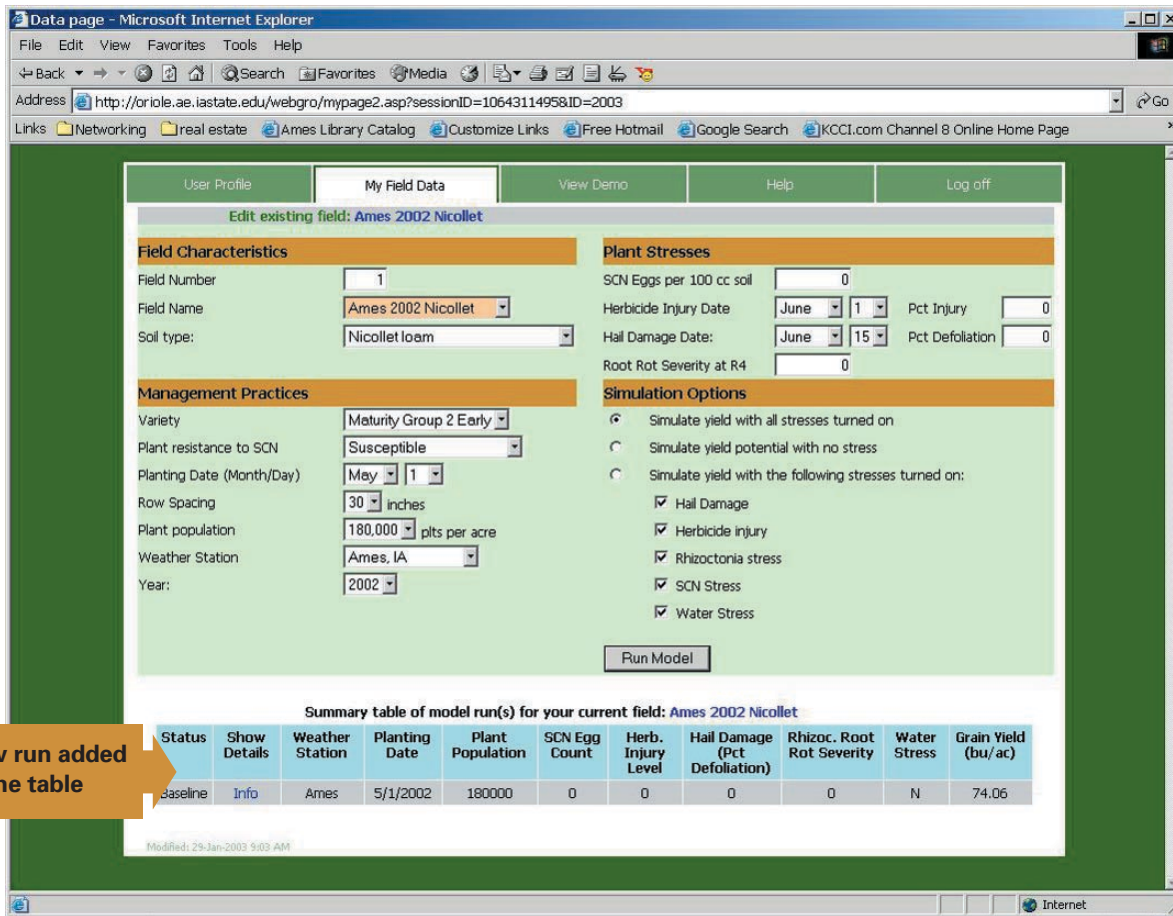


Figure 4. Inputs required to run WebGro.



**Figure 5. Model output based on information supplied by a user (top). Each succeeding model run is added to the output table (bottom).**

### Who funded WebGro?

WebGro is the culmination of 6 years of research on the Yields Project, a multistate project funded by soybean checkoff dollars through the Soybean Research and Development Council. During the Yields Project, WebGro was

designed and simulations were run using extensive data collected in Iowa, Illinois, Wisconsin, and Missouri. These relationships were incorporated into the CROPGRO-Soybean Model, which is the foundation of WebGro.

Page 1 photos courtesy of the USDA Natural Resources Conservation Service (NRCS).

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