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NATIONAL PEANUT BOARD/SOUTHEAST PEANUT RESEARCH INITIATIVE FINAL REPORT FOR WORK DONE UNDER RESEARCH AGREEMENT	FINAL REPORT March 31, 2010
Institution: University of Georgia	
Project Title: Evaluation of a Web-based Irrigation Scheduler Based on Local Weather Information	
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Introduction

Several irrigation-scheduling methods have been developed during the last few years, including Irrigator Pro. These methods typically attempt to determine irrigation timing and amounts that match crop requirements. However, most of these systems do not integrate current weather information that is available via the internet and, therefore, may not optimize water use efficiency. Through a small grant that was received during the last two years under the auspices of the Southeastern Peanut Research Initiative (SPRI), a web-based interface has been developed for irrigation scheduling that is based on the weather information that is being collected by the Georgia Automated Environmental Monitoring Network (www.Georgiaweather.net).

Objective

The overall goal of this project is to improve irrigation efficiency of peanut production systems using local weather information. Specific objectives include:

- Development of a web-based decision support tool for irrigation scheduling.
- Integration of localized weather and climate information to support peanut irrigation management decisions and irrigation scheduling.
- Evaluation of the irrigation scheduler for practical use by peanut growers.

Results

The irrigation scheduler is a web-based tool that calculates the daily water balance based on a checkbook approach. The system automatically retrieves local weather data from the Georgia Automated Environmental Monitoring Network (AEMN) based on the location of the farmer's field, and uses the data to determine the water requirements of a particular crop.

The system has been designed so that a user does not have to enter field history and irrigation records each time the web-based program is accessed. However, the disadvantage of this approach is that it requires a UserId and Password in order for a user to be able to access this information and for the system to remember all entered data. An Example of the UserId access screen is shown in Figure 1. Once the user enters the system it shows the fields that are being

monitored. In the current example shown in Figure 2 there is only one field, called SIRP (Stripling Irrigation Research Park) that uses the weather station in Camilla. The status shows "red" meaning that a user should irrigate. In Figure 3 further details are shown for the period April 1 through April 7, 2009. The initial water balance on April 1 is 2 inches. With a rain of 0.31 inches on April 1 and water loss of 0.05 inches through evapotranspiration the water balance at the end of the day is 2.26 inches, which is less than the threshold value of 3 inches. However, a rain of 4.23 inches on April 2 results in a water balance of 6.48 inches at the end of the day.

Another example starting on May 1, 2009 is shown in Figure 4. Again, the initial soil moisture is 2 inches, but the threshold value now is 2 inches. For the first two days the color is yellow, which is a recommendation to check if irrigation is required. It changes to red for May 3, recommending irrigation. However, a rain of 2.21 inches on May 5 offsets the water balance threshold, with a value of 3.5 inches at the end of the day.

The design of this system is simple bookkeeping. It includes the initial soil moisture conditions at planting as defined by initial soil moisture. The system then on a daily basis keeps tracks of the water that is lost through evapotranspiration, which include water loss through transpiration and water uptake, and soil evaporation. Especially when there are large rainfall events this system might not always be very accurate, as either runoff or deep drainage could occur, reducing the amount of what is sometimes referred to as "effective" rainfall. However, as an introduction to simple irrigation scheduling based on demand and supply, this web-based irrigation method is a good introductory tool. It can be modified and advanced as needed based on feedback and input from peanut producers.

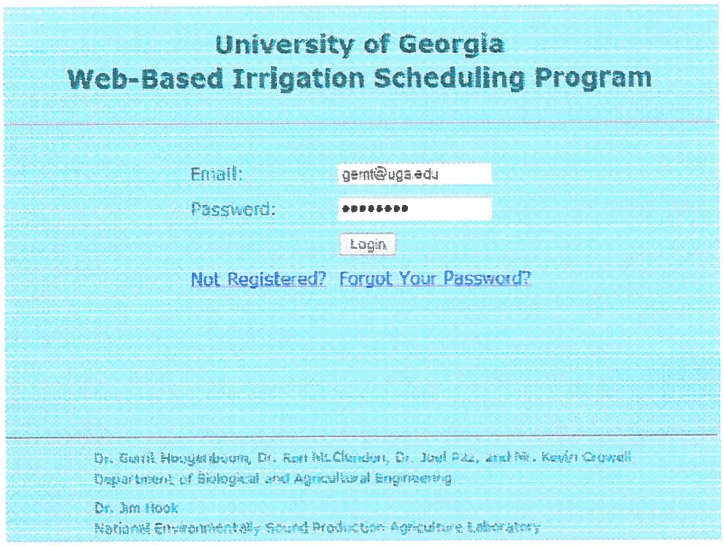

Figure 1. Introductory and login screen for irrigation scheduler.

Figure 2. Overview of defined fields and status of irrigation recommendations.

Figure 3. Example on the status of the system on April 1 through April 7, 2009.

Figure 4. An example on the status of the system on May 1 through May 7, 2009