THE UNIVERSITY OF ARIZONA COTTON MONITORING SYSTEM

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Cotton production in the desert Southwest is commonly characterized by a high input system oriented toward high yields. Water is commonly the first, most limiting factor in desert cotton production systems. Other important inputs include pest control, fertilizer nitrogen (N), and plant growth regulators. Since cotton is very responsive to crop inputs, such as water and fertilizer N, management of these factors is critical to achieve not only maximum agronomic, but also economic yield. Efficient management of all inputs is extremely important for crop management and realizing a profit. Producers need to critically manage crop inputs and have a relatively good assurance that any specific input actually has a high probability of having a positive effect on the crop.

One method that has been proposed which can lead to a more efficient management of inputs is the use of a 'feedback' approach to input management. This is contrasted by a 'scheduled' approach, which commonly involves the scheduling of inputs based upon a calendar or days after planting. The 'feedback' approach to input management can employ crop monitoring techniques in order to ascertain the past and current status of the crop. The resultant information can then be used to make informed management decisions.

There are three important aspects that need to be addressed in order to use crop monitoring in an efficient manner. The first is the collection of data. Data collection must be made in a uniform and consistent manner across all management units and across years if the objective is to develop long-term trends for a given farm. The second aspect is the management of collected data. Collection of crop monitoring data or plant mapping data is of little value if it cannot be summarized into a form that is useful and relatively easy to interpret. The third (and probably the most important of the three) involves the interpretation of the data and then utilizing the information in management decisions. The overall objective would be, to increase the efficiency of the production system.

In an effort to address point number two, management and summary of collected cotton crop monitoring data, a simple software program has been developed that can be used to manage and summarize data collected from a cotton crop. The software was developed using Microsoft Excel. This program does not provide any recommendations regarding management. All information is summarized on one 8.5"x11" sheet from the data that is entered into the system.

The system consists of several pages, each of which allows for the input of different crop monitoring/input data. These pages include:

- General information page: This page allows for the input of field identifiers, variety, planting date, plant population, and acres.

- Plant mapping data entry page: Accommodates the input of plant mapping data collected for a given date. This page has the capacity for the entry of 15 individual dates of sampling over the season. In order to calculate percent fruit estimates and height to node ratios all plant mapping data must be entered. This data includes plant height, first fruiting branch, number of mainstem nodes, number of aborted or missing sites for first positions (pre-bloom), and first two positions (post first-bloom), and nodes above top white flower.

- Irrigation information page: Provides for the input of irrigation event information including; start date, stop date, and total amount of water applied to the field (acre-ft.). Amount of water applied (acre-in.) per acre is calculated. This page has the capacity for 15 irrigation events across the season.

- Fertilizer N information page: For the input of fertilizer N information including; date of event, form of fertilizer used, rate of fertilizer used, and rate of N applied to field.

- Petiole NO_3^--N analysis information page: Allows for the input of petiole analysis (ppm NO_3–N) information for 15 dates of sampling across the season.

- PIX/PGR information page: Provides for the input of information regarding PIX or other PGR applications including application date, products used, and rate applied.

All of the information from the preceding pages is then summarized on the summary sheet, which can be printed out. All plant mapping information i.e., fruit retention estimates (FR), height to node ratios (HNR), petiole NO_3^--N values, and nodes above white flower (NAWF) estimates are calculated and plotted on graphs that contain long-term baselines developed for Arizona cotton. All of the plant mapping data is plotted as a function of heat units (86/55°F thresholds) accumulated after planting (HUAP). All other information i.e., irrigation events, fertilizer N events, PIX/PGR events are tabulated on the summary sheet with running totals. Irrigation, fertilization, and PIX/PGR events are identified on the FR and HNR graphs with markers so as to track these events along with plant mapping trends.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:103-103 (1998)
National Cotton Council, Memphis TN

Basic requirements to operate this software include; a computer (at least a 486, preferably Pentium based) that is capable of operating Microsoft Excel 7.0 (version of Excel included in Office 95) or greater. The software (University of Cotton Monitoring System, UA-CMS) will be available through the University of Arizona Cooperative Extension for the 1998 growing season.