

**COTTON HADSS: HOW WE VALIDATED
THE GEORGIA DATABASE**

**Theodore M. Webster
USDA-ARS
Tifton, GA**

**A. Stanley Culpepper
University of Georgia
Tifton, GA**

**Gregory B. Hardison
Montgomery County Extension
Mt. Vernon, GA
S. Gibbs Wilson Jr.
Irwin County Extension
Ocilla, GA**

Abstract

Selecting an appropriate weed control program can be difficult. Factors such as weed species composition, herbicide effectiveness, cost of control, simplicity of the application, and potential crop rotation restrictions are just a few of the innumerable factors considered by decision makers. In spite of herbicide tolerant crops, there is not a “*one size fits all*” treatment that is applicable to all cropping systems. HADSS is an interactive database, containing weed-crop competition data on 80 weeds in cotton and greater than 50,000 herbicide efficacy values. HADSS incorporates, as much as possible, the knowledge of our weed science expertise. However, HADSS is a decision support system, it cannot replace the decision maker. To validate this database, the most important question to address was “*Can HADSS pick the same treatment as our weed science extension specialists?*”

Various weed density scenarios were posed to Drs. Stanley Culpepper and Steve M. Brown and their recommendations in a Roundup Ready and nontransgenic cotton system were compared to those from HADSS. For the nontransgenic systems, HADSS selected treatments that had a net gain within 10 and 20% of the experts’ recommendations 57 and 79% of the time, respectively. Accuracy in the Roundup Ready system was similar (54 and 65%, respectively). The primary differences between HADSS and the experts with the Roundup Ready system recommendations concerned bermudagrass [*Cynodon dactylon* (L.) Pers.]. The experts recommended glyphosate (various trade names) applied alone to control bermudagrass. However, recent research indicates that tank mixes of glyphosate and fluzifop (trade name: Fusilade DX) are superior to glyphosate alone for controlling/suppressing bermudagrass. Expert recommendations were made in 1999 when the validation began, and with a few exceptions, their recommendations are not expected to have changed much over the years. The HADSS database contains this latest research on bermudagrass efficacy.

Field studies at nine locations between 1999 and 2001 compared costs and yields from HADSS and expert’s recommendations. At each location, HADSS and experts made weed control recommendations based upon the emerged weed population in Roundup Ready and nontransgenic systems. HADSS treatments averaged a cost of \$28/acre (Expert: \$32/acre) and \$59/acre (Expert: \$49/acre) in the Roundup Ready and nontransgenic systems, respectively; with no differences in weed control or crop yields (in 8 of the nine locations) between HADSS and experts. One of the problems observed with HADSS recommendations was the propensity to select glyphosate; glyphosate was the treatment of choice by HADSS even late in the season when the experts would recommend treatments with some degree of residual weed control (i.e. diuron + MSMA or prometryn + MSMA – each of these has various trade names). While some changes have been made in the database, this will continue to be an issue that decision makers will need to consider when making layby applications. Another problem is that HADSS tends to select pyrithiobac (Trade name: Staple) more than the experts. The developers of the HADSS program have addressed this problem. An option to select only Post-Direct applications, and exclude POST treatments, will prevent the erroneous recommendation of pyrithiobac as a late-season application.

While the HADSS database will continue to evolve, we believe that it has been validated for Georgia. HADSS is a valuable resource for decision makers to improve their understanding weed-crop interactions and the biological and economic implications of various weed control programs. In this capacity, HADSS can be used as a real-time interactive model in the field and as an educational tool to help train weed control decision makers.