COTTON HERB- A NEW DECISION MAKING TOOL FOR WEED MANAGEMENT IN COTTON

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Abstract

COTTON HERB is a computer program that aids weed management decision making in cotton. Inputs required by COTTON HERB include weed counts by species, heights of weeds and cotton, soil moisture status, anticipated yield potential of cotton in this field, selling price of cotton, and the cotton variety. COTTON HERB then calculates the expected yield loss based on weed competition research conducted in cotton and provides the user a list of herbicide choices based on the best combination of cost and weed control performances. COTTON HERB relies on accurate weed identification and timely scouting and herbicide application to ensure success. The objectives of this research are to evaluate weed control, cotton yield, and net returns to land and management systems with traditional management systems versus COTTON HERB in nontransgenic and transgenic cotton. The nontransgenic varieties were Stoneville 474 at Lewiston, NC and Deltapine 51 at Goldsboro, NC. Transgenic varieties at both locations included Stoneville BXN47 and Deltapine 5415RR (Roundup Ready). The tests were scouted four separate times and the results entered into the Cotton HERB program. The number one recommendation provided by Cotton HERB was then applied. Treatments included: nontreated for each variety , Treflan PPI at 1 pint/A followed (fb) by Cotoran PRE at 2 pints/A fb COTTON HERB recommendations for each variety, COTTON HERB recommendations only without soil applied treatments for each variety and, a weedfree plot for each variety, Treflan fb Cotoran fb Staple EPOST at 1.2 oz/A fb Caparol at 2.4 pints/A + Bueno 6 at 2.7 pints/A late postemergence directed (LAYBY) for Deltapine 51 or Stoneville 474, Treflan fb Cotoran fb Buctril EPOST at 1 pint/A fb Caparol plus Bueno 6 LAYBY for BXN 47, and Treflan fb Cotoran fb Roundup Ultra EPOST at 1.5 pints/A fb Caparol plus Bueno 6 LAYBY for Deltapine 5415RR.

Weed control was estimated visually six weeks after the LAYBY applications for entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula),* large crabgrass (*Digitaria sanguinalis*), sicklepod (*Senna obtusifolia*), smooth pigweed (*Amaranthus hybridus*), fall panicum (*Panicum dichotomiflorum*), goosegrass (*Eleusine indica*), yellow nutsedge (*Cyperus esculentus*), common lambsquarter (*Chenopodium album*), and prickly sida (*Sida spinosa*).

All weed management systems controlled all weeds at least 90% with the exception of sicklepod and common lambsquarter in nontransgenic cotton. Common lambsquarter was controlled less than 40% in nontransgenic cotton when no soil applied herbicide was used. This lack of control illustrates the lack of Staple postemergence activity on common lambsquarter. A total postemergence system in nontransgenic cotton which included, Staple EPOST fb Cobra plus Bueno 6 PDS fb Caparol plus Bueno 6 LAYBY, controlled sicklepod 80% which was less than all other systems which controlled sicklepod at least 90%. In Goldsboro, only three different herbicide applications were made with the exception of the Round Ready systems, where COTTON HERB recommended a fourth herbicide application. The commercial standard treatments which used soil applied, POST, and LAYBY herbicides had less herbicide cost than any of the HERB treatments. The Roundup Ready system provided the most economical herbicide cost. Soil applied herbicides plus postemergence recommendations by COTTON HERB yielded equivalent to the weedfree check in all varieties. Systems which used only postemergence herbicides yielded less than the weedfree check and systems which use soil applied herbicides plus postemergence COTTON HERB recommendations. This reduced yield from postemergence herbicide systems may reflect early season competition. Total POST systems may be of limited utility in fields with heavy weed infestations. Early season weed interference appears to reduce cotton yield potential- regardless if late season weed control is excellent. This early season interference influenced both transgenic and non-transgenic cotton.

Cotton HERB can be a valuable resource and provide additional information for herbicide selection. The Cotton HERB recommendations provided excellent control of the weeds infesting the test areas. Cotton HERB accounts for the multiple populations of weeds found in most fields, and provides a grower with the economically best control option. Cotton HERB helps to relieve some of the uncertainty associated with deciding what combinations of herbicides are most effective. The COTTON HERB herbicide efficacy data base is compiled from a number of extension publications from across the Cotton Belt. It is the most extensive data base available in one source. Additionally, it accounts for differences in weed control based on weed sizes and drought stress. Finally, it provides the user an evaluation of potential economic losses based on the weed population present in that field. The user can then use this information for herbicide selection. It allows a producer to more accurately assess cost/benefit ratios and determine the amount of risk their enterprise is willing to assume. Modifications are currently being made to improve cotton HERB which should be available for testing on a limited basis in the year 2000 growing season.

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