WEED MANAGEMENT IN COTTON WITH "HERBICIDE APPLICATION DECISION SUPPORT SYSTEM (HADSS)" SOFTWARE

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Abstract

The Herbicide Application Decision Support System (HADSS) is a computer program that aids weed management in corn, cotton, peanuts, and soybeans. Inputs required by HADSS include weed counts by species, heights of weeds and cotton, soil moisture status, anticipated yield potential of cotton in the particular field, selling price of cotton, and the cotton variety. HADSS then calculates the expected yield loss based on weed competition and interference research data and provides the user a list of herbicide treatment choices based on the best combination of cost and weed control performances. The objectives of this research were to evaluate weed control, cotton yield, and net returns to land and management systems with traditional management systems.

This research was conducted at Goldsboro, NC in 1998 and 1999, Lewiston, NC in 1998, and Rocky Mount, NC in 1999 on loamy sand soils. The cotton varieties included Stoneville 474 or DeltaPine 51, Stoneville BXN 474, and DeltaPine 5415RR. The tests were scouted four separate times and the results were entered into the HADSS program. The number one recommendation provided by HADSS was then applied on the same day as the scouting. Treatments included a nontreated and weed free check for each variety (nontransgenic, bromoxynil-tolerant (BXN), and glyphosate-tolerant (Roundup Ready)). Herbicide management systems for each variety included 1) Treflan (trifluralin) preplant incorporated (PPI) at 1.0 pint/A followed by (fb) Cotoran (fluometuron) preemergence (PRE) at 2 pints/A fb HADSS recommendation(s), HADSS recommendations without soil-applied herbicides (postemergence treatments only); Treflan PPI fb Cotoran PRE fb Staple (pyrithiobac) early postemergence (EPOST) at 1.2 oz/A fb Caparol (prometryn) at 2.4 pints/A + Bueno 6 (MSMA) at 2.7 pints/A late postemergence-directed (LAYBY) for nontransgenic varieties; Treflan PPI fb Cotoran PRE fb Buctril (bromoxynil) EPOST at 1 pint/A fb Caparol + Bueno 6 LAYBY for the BXN variety; and Treflan PPI fb Cotoran PRE fb Roundup Ultra (glyphosate) at 1.5 pints/A EPOST fb Caparol + Bueno 6 LAYBY.

Roundup Ready systems provided control equivalent to or better than control provided by Buctril or Staple systems for smooth pigweed (*Amaranthus hybridus*), Palmer amaranth (*Amaranthus palmeri*), large crabgrass (*Digitaria sanguinalis*), goosegrass (*Eleusine indica*), ivyleaf morningglory (*Ipomoea hederacea*), and fall panicum (*Panicum dichomiflorum*). Jimsonweed (*Datura stramonium*) was controlled >90% with all systems. Soil applied herbicides fb HADSS recommendations provided equivalent or higher levels of weed control than soil applied herbicides fb Staple, Buctril, or Roundup fb Caparol + Bueno 6. Lint yields of cotton and net returns in the Roundup Ready systems were always equal to or higher than non-transgenic or BXN systems. In 11 of 12 comparisons, the soil-applied herbicides fb HADSS recommendations provided net returns equivalent to the standard system for each respective variety. Net returns were higher for soil applied herbicides fb HADSS recommendations in 8 of 12 comparisions with HADSS POST-only systems. Early-season weed interference reduced cotton lint yields and net returns in the HADSS POST-only systems.

Total seed, herbicide application, and herbicide costs for systems containing HADSS were always greater than the standard POST systems for each variety with few exceptions. Soil-applied herbicides fb HADSS recommendation system application, seed, and herbicide costs were higher in 8 of 12 comparisons. The average cost of the standard POST and soil-applied plus HADSS were $40.49/A and $54.66/A, respectively. However, the net returns for the aforementioned systems were $218/A and $231/A, respectively.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:1489-1489 (2000)
National Cotton Council, Memphis TN