

EVALUATION OF KIH-485 WEED CONTROL PROGRAMS

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Abstract

In 1997, glyphosate was applied to 30% of the cotton acres in Mississippi and by 2005 it was applied to more than 95% of the cotton acres. Consequently, there has been a significant decrease in the use of herbicides historically used for cotton weed control including fluometuron, MSMA, and trifluralin. Lack of residual control from glyphosate has also led to late-season emergence of problematic grass species including large crabgrass (*Digitaria sanguinalis*) and barnyardgrass (*Echinochloa crus-galli*). KIH-485 is a new compound under development from Kumiai Chemical Industry Co. LTD. KIH-485 is thought to be similar in mode-of-action to metolachlor and other chloroacetamides; however, KIH-485 use rates are, potentially, eight- to ten-fold lower than those of metolachlor. Research has been conducted with KIH-485 in the Midwest; however, data regarding weed control in cotton (*Gossypium hirsutum*) in the Midsouth is lacking. Therefore, research was conducted to determine weed control efficacy, crop safety, and seed cotton yields with KIH-485 weed control programs.

Experiments were conducted in 2005 and 2006 and the Black Belt Branch Experiment Station in Brooksville, MS and at the Plant Science Research Center in Starkville, MS. 'DP 444 BR' and 'ST 4554 B2RF' was planted at Brooksville in 2005 and 2006, respectively. 'ST 4892 BR' and 'DP 444 BR' was planted at Starkville in 2005 and 2006, respectively. All locations were planted at 128,000 seeds/ha and aldicarb was applied in-furrow at 0.84 kg ai/ha. Plots consisted of four, 38-inch rows that were 12.2 meters long. The center two rows of each four row plot were treated. Treatments were arranged in a randomized complete block design with four replications. The following treatments were evaluated (grams ai/acre): KIH-485 at 50, 63.5, and 101 preemergence (PRE); s-metolachlor at 433 and 866 PRE; KIH-485 at 50, 63.5, and 101 postemergence over-the-top (POT); KIH-485 plus glyphosate at 40 + 356 POT; KIH-485 plus glyphosate at 50 + 356 POT; s-metolachlor + glyphosate at 575 + 356 POT; metolachlor + glyphosate at 603 + 356 POT; pendimethalin + glyphosate at 340 + 356 POT; and glyphosate as needed at 356 POT. All treatments were applied with a CO₂-pressurized backpack sprayer at 140 L/ha. PRE applications were made the same day as planting and POT applications were generally made when cotton was at the three- to four-leaf stage and weeds were five- to fifteen centimeters in height. Control levels were evaluated as percent control taken visually compared to an untreated check. Seed cotton yields were collected by harvesting the center two rows of each plot with a spindle picker. Data were analyzed using the PROC MIXED procedure and means were separated using Fishers Protected LSD at p=0.05.

Less than 5% cotton injury was observed from any PRE application; however, up to 20% cotton injury was observed from POT applications of KIH-485. Cotton injury from POT applications of KIH-485 alone and tankmixed with glyphosate increased with herbicide application rate. Typical injury included chlorosis followed by necrosis of tissue present at the time of application. KIH-485 PRE at all application rates provided greater than 88% control of barnyardgrass, prickly sida (*Sida spinosa*), broadleaf signalgrass (*Brachiaria platyphylla*), and large crabgrass, eight weeks after application. POT applications of KIH-485 alone provided marginal control of emerged grass species and poor control of emerged broadleaf weed species. Applications of KIH-485, s-metolachlor, metolachlor, and pendimethalin tankmixed with glyphosate provided greater than 90% control of barnyardgrass and prickly sida four weeks after application. Seed cotton yields were >1550 kg/ha when glyphosate was included; all other applications resulted in less than 1350 kg seed cotton yield/ha. Cotton injury from POT application of KIH-485 was transient and did not impact seed cotton yields. These data indicate that KIH-485 provides good PRE control of selected grass and broadleaf weed species. KIH-485 applied POT provided excellent residual control; however, significant cotton injury was observed. Further evaluation of KIH-485 applied POT is needed to determine if it can be safely utilized in cotton weed control programs.