EVALUATION OF WEED CONTROL AND CROP TOLERANCE WITH POSTEMERGENCE HERBICIDES IN SETHOXYDIM-TOLERANT CORN

by

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Plant Pathology, Physiology and Weed Science

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April 27, 1998
Blacksburg, Virginia

Key Words: Bermudagrass (Cynodon dactylon L.), corn (Zea mays)
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(ABSTRACT)

Field experiments were conducted in 1995, 1996, and 1997 at six locations to evaluate strategies for the use of sethoxydim-tolerant hybrids in Virginia corn production. The specific objectives of this research were to evaluate the effect of graminicides including clethodim, fluazifop-P, quizalofop-P, and sethoxydim, and method of application, on crop tolerance and bermudagrass (*Cynodon dactylon* L.) control; to evaluate the effect of sethoxydim in combination with broadleaf herbicides on crop tolerance and bermudagrass control; to evaluate sethoxydim-based herbicide programs for annual grass and broadleaf weed control; and to determine the response of sethoxydim-tolerant corn hybrids to these graminicides in the absence of the competitive effects of weeds. All experiments were conducted using a randomized complete block design with four replications. Individual plots consisted of 4 corn rows 7.6 meters in length in which the two inner rows received treatment and the two outer rows served as borders. All applications were made with a CO$_2$-pressurized backpack sprayer delivering 210 L/ha of
water at 220 kPa using flat fan spray tips. The dependent variables evaluated included crop response to herbicide treatments, weed control by species, and corn yield. All data were subjected to analysis of variance and appropriate mean separation techniques at the 0.05 significance level. Excellent bermudagrass control was obtained from postemergence broadcast or postemergence directed applications of sethoxydim, fluazifop-P, quizalofop-P, clethodim, and fluazifop-P plus fenoxaprop. Broadcast applications of fluazifop-P and both broadcast and directed applications of clethodim caused significant crop injury, however. Combinations of sethoxydim with bentazon, bentazon plus atrazine, flumiclorac, and halosulfuron resulted in reduced bermudagrass control relative to that control afforded by sethoxydim alone. In experiments to evaluate control of annual species including smooth pigweed (*Amaranthus hybridus* L.), common lambsquarters (*Chenopodium album* L.), giant foxtail (*Setaria faberi* Herrm.), ivyleaf morningglory (*Ipomoea hederaceae* L. Jacq.), jimsonweed (*Datura stramonium* L.), large crabgrass (*Digitaria sanguinalis* L. Scop.), and a perennial, yellow nutsedge (*Cyperus esculentus* L.), excellent broad spectrum control was achieved with sethoxydim in combination with bentazon, bentazon plus atrazine, nicosulfuron, or primisulfuron. Crop tolerance to these treatments was excellent. In experiments to evaluate sethoxydim-tolerant hybrids and susceptibility to graminicides, no rate of sethoxydim caused significant injury to any hybrid tested. Tolerance of these hybrids to a 1X rate of quizalofop-P was also demonstrated, although 4X and 8X rates of fluazifop-P and quizalofop-P caused significant injury. Clethodim at all rates of application caused significant crop injury. Differential responses to graminicides among hybrids were noted.
For James III, Jake and Elizabeth