

WEED MANAGEMENT SYSTEMS IN GLUFOSINATE TOLERANT COTTON. P. A. Dotray, J. W. Keeling, D. A. Peters, and J. A. Bond. Texas Agricultural Experiment Station, Texas Agricultural Extension Service, and Texas Tech University, Lubbock.

ABSTRACT

In previous research, cotton growth and yield was not affected by glufosinate applications made at different growth stages (cotyledon to 50% open boll), at various rates (0.36 to 2.88 lb ai/A), and in sequential applications (0-1, 3-4, 9-10, and 14-15 mainstem leaves). The objectives of this research were evaluate weed management systems in glufosinate-tolerant cotton, compare the glufosinate-tolerant cotton weed management system to glyphosate- and bromoxynil-tolerant cotton weed management systems, and confirm season-long cotton tolerance to glufosinate. Experiments were conducted in 2000 at the Texas Agricultural Experiment Station located near Lubbock on an Acuff clay loam soil with 0.8% organic matter and pH 7.8. Herbicides were applied using a backpack or tractor-mounted compressed air sprayer that delivered 10 GPA at 3 MPH using 80015 spray tips. In the weed control experiment, cotton was planted on 40-inch rows on May 8. Varieties included glufosinate-tolerant Coker 312, PM2326RR, and BXN47. Treatments with each variety included: trifluralin PPI at 0.75 lb ai/A followed by (fb) prometryn PRE at 1.2 lb ai/A fb cultivation, trifluralin PPI fb a POST herbicide as needed (ASN), prometryn PRE fb a POST herbicide ASN, trifluralin PPI fb prometryn PRE fb a POST herbicide ASN, and a POST herbicide only ASN. The POST herbicides used were glufosinate 0.36 lb ai/A in glufosinate-tolerant cotton, glyphosate at 0.75 lb ae/A in glyphosate-tolerant cotton, and bromoxynil at 0.5 lb ai/A in bromoxynil-tolerant cotton. Control of Palmer amaranth (*Amaranthus palmeri*), devil's-claw (*Proboscidea louisianica*), and silverleaf nightshade (*Solanum elaeagnifolium*) was monitored throughout the growing season and dictated the POST ASN applications. In the tolerance test, trifluralin PPI at 0.75 lb ai/A was applied to control annual grasses and Palmer amaranth. Cotton was planted on 40-inch rows on June 6 and kept weed-free throughout the season. Glufosinate was applied to cotton at three growth stages (1 to 2 leaf, 4 leaf, and peak bloom), at 3 rates (0.36, 0.72, and 1.44 lb ai/A), and in individual or sequential applications.

In the glufosinate-tolerant cotton weed management systems, weed pressure on May 24 dictated a glufosinate application in the prometryn fb POST and POST only treatments. Weed pressure in all treatments dictated glufosinate applications on June 6 and June 21. On July 20 (73 DAP), the glufosinate only treatment controlled Palmer amaranth 79%, whereas all other treatments controlled Palmer amaranth 83 to 89%. At this same rating date, the glufosinate treatments controlled devil's-claw and silverleaf nightshade 81 to 85%, whereas the trifluralin fb prometryn fb cultivation treatment controlled devil's-claw 61% and silverleaf nightshade 75%. The trifluralin fb glufosinate and trifluralin fb prometryn fb glufosinate required 2 in-season applications, whereas the prometryn fb glufosinate and glufosinate only treatments required 3 in-season applications. Similar lint yields were observed from all glufosinate-treated plots. When compared to the POST only treatments in the other weed management systems, glufosinate controlled Palmer amaranth (79%), devil's-claw (81%), and silverleaf nightshade (81%) more effectively than the control achieved from the bromoxynil only treatment (54%, 73%, and 73% control for Palmer amaranth, devil's-claw, and silverleaf nightshade, respectively) and similar to the control achieved from the glyphosate only treatment (85%, 80%, and 80% control for Palmer amaranth, devil's-claw, and silverleaf nightshade, respectively). All POST only herbicide treatments were applied 3 times during the growing season, whereas the trifluralin fb POST ASN treatment required only 2 POST applications. Unlike previous years, slight visual injury (leaf necrosis) was observed 7 days after most glufosinate applications. Yields following all glufosinate applications did not differ from the untreated control.

These studies confirm season-long tolerance of glufosinate tolerant cotton. Control of Palmer amaranth, devil's-claw, and silverleaf nightshade can be achieved using a glufosinate in a glufosinate-tolerant cotton weed management system. Other cotton varieties containing the glufosinate tolerance gene will be tested in 2001 as well as work to further examine the use of glufosinate in a glufosinate-tolerant cotton weed management system.