

# THE EFFECTS OF APPLICATION TIMING AND SPRAY ADDITIVES ON GLUFOSINATE PERFORMANCE

T.A. Baughman, P.A. Dotray, K.M. McCormick, J.C. Reed, and J.W. Keeling

Texas A&M Research & Extension Center

Vernon and Lubbock, TX

Texas Tech University

Lubbock, TX

## Abstract

Transgenic cotton that is tolerant to over-the-top applications of glufosinate herbicide will be available to growers in the near future. Research has focused on tolerance of the transgenic cotton cultivars to various application timings and more recently on weed management systems. Research was conducted in the High and Rolling Plains of Texas to investigate the effects of weed size on glufosinate efficacy. Common cocklebur (*Xanthium strumarium*), devil's-claw (*Proboscidea louisianica*), ivyleaf morningglory (*Ipomoea hederacea*), lanceleaf sage (*Salvia reflexa*), and Palmer amaranth (*Amaranthus palmeri*) were treated with 0.42 and 0.52 lb ai/A of glufosinate at 2, 4, 6, 8, 10, and 12-inch growth stages. In addition, research was established to determine the effects of various spray additives on the efficacy of glufosinate 0.42 lb ai/A on carpetweed (*Mollugo verticillata*), Palmer amaranth, and stinkgrass (*Eragrostis cilianensis*). The additives included a non-ionic surfactant, crop oil concentrate, methylated seed oil, organosilicone surfactant, ammonium sulfate, water conditioning agent, and a drift control agent.

Palmer amaranth control 1-week after treatment (WAT) was greater than 90% only when glufosinate applications were made to 2-inch weeds. Application to later growth stages was less than 90%. At 2 WAT, control was less than 90% with all application timings in one study and again was only greater than 90% when applied to 2-inch weeds. Two applications of glufosinate at 0.42 lb ai/A controlled all sizes at least 90%. Increasing the rate of glufosinate from 0.42 to 0.52 lb ai/A did not increase activity. Devil's-claw control was initially greater than 90% with glufosinate at 0.42 lb ai/A applied to 2 or 4-inch weeds and at 0.52 lb ai/A applied to 2 to 6-inch weeds. By 2 WAT, only the 2-inch weeds with both rates of glufosinate and the 4-inch weeds with 0.52 lb ai/A were controlled at least 90%. Burndown of ivyleaf morningglory was at least 90% with plants as large as 12-inches irregardless of herbicide rate. However, by 2 WAT ivyleaf morningglory efficacy of at least 90% was only achieved with plants from 2 to 8-inches with 0.42 lb ai/A. Common cocklebur plants up to 6 inches in size were controlled 90% or greater at both 1 and 2 WAT with both rates of glufosinate. Glufosinate applied at 0.52 lb ai/A controlled 12-inch common cocklebur at least 90% 2 WAT. Initial burndown of lanceleaf sage was 90% when applied at the 2-inch growth stage. Lanceleaf sage control was less than 70% at all weed size 2 WAT.

Glufosinate efficacy was not affected by spray additives when applied to small Palmer amaranth or carpetweed (4-inches or less). Palmer amaranth and stinkgrass control was not lowered when comparing any of the additives to glufosinate applied alone. In one study the addition of any additive except the drift control agent and ammonium sulfate increased Palmer amaranth control when compared to glufosinate applied alone. In the other study, Palmer amaranth control was not affected by any of the additives.

This research indicates that glufosinate should be applied to very small weeds. Increasing the rate of glufosinate may not necessarily increase herbicide efficacy. Coverage appears to be one of the crucial issues with successful use of glufosinate. The additions of various spray additives had little or no effect on glufosinate performance.