CROP TOLERANCE AND WEED MANAGEMENT SYSTEMS UTILIZING ISOXAFLUTOLE IN HPPD TOLERANT COTTON

Delaney C. Foster
Peter A. Dotray
Texas Tech University
Lubbock, TX
Corey Thompson
Frederick T. Moore
BASF
Lubbock, TX
Gregory Baldwin
BASF
Durham, NC

Abstract

The southern US produces 90% of the nation's cotton with the Texas High Plains region being the largest contiguous region. Since 2011, Texas cotton production has been threatened by glyphosate-resistant Palmer amaranth and alternatives to glyphosate-based systems are needed. Integrating soil residual herbicides such as isoxaflutole into a weed management system is an effective strategy to control glyphosate resistant weeds before they emerge. BASF Corporation is developing hydroxyphenylpyruvate dioxygenase (HPPD) tolerant cotton, which will allow growers to utilize isoxaflutole in future weed management systems. In 2019, field experiments were conducted in New Deal, Lubbock, and Halfway, Texas to determine HPPD-tolerant cotton response to isoxaflutole applied preemergence (PRE) or early-postemergence (EPOST) to 2- to 4-leaf cotton as well as to determine the efficacy of isoxaflutole when used as part of a season-long weed management program. A blanket application of 34 fl oz/A Prowl H_2O was applied preplant incorporated approximately one month before trial initiation at the New Deal location and 24 fl oz/A Treflan was applied preplant incorporated at the Lubbock and Halfway locations. Crop response experiments at New Deal and Lubbock included the following treatments: 38.4 fl oz/A Caparol PRE followed by (fb) 43 fl oz/A Liberty + 21.33 fl oz/A Dual Magnum EPOST, 3 fl oz/A isoxaflutole + Caparol PRE fb 16 fl oz/A Outlook + Liberty EPOST, isoxaflutole + 32 fl oz/A Prowl PRE fb Outlook + Liberty EPOST, isoxaflutole + Caparol + Prowl PRE fb Outlook + Liberty EPOST, isoxaflutole + 19.2 fl oz/A (½ rate Caparol) PRE fb Liberty + Dual Magnum EPOST, isoxaflutole + Caparol PRE fb Liberty + Dual Magnum EPOST, isoxaflutole + 32 fl oz/A Cotoran PRE fb Liberty + Dual Magnum EPOST, Caparol PRE fb isoxaflutole + Liberty EPOST, and Caparol PRE fb isoxaflutole + Liberty + 44 fl oz/A Roundup EPOST. A blanket mid-postemergence (MPOST) Roundup + Liberty application was made at first bloom and some treatments received 32 fl oz/A diuron postemergence-directed (PDIR) when cotton was at the bloom stage. Cotton injury was greatest early season but never exceeded 14%. The greatest injury was observed following isoxaflutole + Caparol applied PRE. For all treatments at New Deal and Lubbock, cotton density, plant heights, and lint yield were similar to the nontreated control. In a non-crop weed control study at Halfway, treatments mimicked the cotton response trials with the addition of two treatments: isoxaflutole + Caparol PRE fb Roundup + 12.8 fl oz/A Engenia EPOST and Caparol PRE fb isoxaflutole + Roundup + Engenia EPOST. These two treatments included Roundup + Engenia MPOST. Following the PRE application, all treatments except for isoxaflutole + Prowl controlled Palmer amaranth >90%. When evaluated 21 days after the PRE application, Palmer amaranth density was reduced 82-99% when compared to the nontreated control. Following the EPOST application, all treatments-controlled Palmer amaranth >90%. When evaluated 21 days after diuron PDIR, treatments containing this application-controlled Palmer amaranth up to 20% more than treatments without a PDIR application. When used as part of an overall weed management system, the opportunity to use isoxaflutole in cotton will improve season-long control of Palmer amaranth.