## FIELD EVALUATIONS OF HPPD-INHIBITOR TOLERANT COTTON IN WESTERN TEXAS Peter A. Dotray Texas Tech University, Texas A&M AgriLife Research, Texas A&M AgriLife Extension Service Lubbock, TX Frederick T. Moore Corey N. Thompson Bayer Crop Science

Lubbock, TX

## <u>Abstract</u>

Glyphosate-resistant Palmer amaranth (Amaranthus palmeri) was first identified in 2011 in Terry County, Texas and has quickly spread across the region. Overlaying soil residual herbicides is part of an effective strategy to control these weeds but growers are looking for new options to assist in their weed management efforts. Auxin-tolerant cotton was introduced in 2016 and these new technologies will assist in the management of glyphosate-resistant Palmer amaranth and other difficult-to-control broadleaf weeds. Cotton tolerant to 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors, such as isoxaflutole (IFT), is under development by Bayer CropScience. This novel mode of action for cotton will provide growers a new option to control grass and broadleaf weeds. The objective of this research was to evaluate HPPD-inhibitor tolerant cotton to IFT applied alone or in sequential or tank-mix combination with glyphosate (RUPM) or Liberty. HPPD-inhibitor tolerant cotton was planted at 60,000 seeds/A at four locations in western Texas in 2016 and 2017. Field trials were conducted at Lubbock (Amarillo fine sandy loam with overhead irrigation), New Deal (Pullman clay loam with subsurface drip irrigation), Plainview (Pullman clay loam with overhead irrigation), and San Angelo (Tobosa clay with furrow irrigation). Isoxaflutole was applied preemergence (PRE) or early-postemergence (EPOST) at the 2- to 4-leaf stage with and without RUPM or Liberty. Additional mid-postemergence (MPOST) applications of RUPM or Liberty at squaring and late-postemergence (LPOST) applications of RUPM at full bloom was included in some treatments. All herbicide treatments were applied at 2X the maximum labeled rate in a carrier volume of 15 GPA. The IFT EPOST treatments included crop oil concentrate and ammonium sulfate (AMS) and all solo RUPM and Liberty applications included AMS. Plots were maintained weed-free. Cotton stand, phytotoxicity, plant height, and crop maturity were evaluated after treatment and yield and fiber quality were determined at the end of the growing season. No adverse effects were observed on cotton stand. Mean visual phytotoxicity (leaf chlorosis) did not exceed 3% following IFT PRE applications. Isoxaflutole PRE followed by (fb) RUPM EPOST, MPOST, and LPOST or Liberty EPOST and MPOST did not result in mean phytotoxicity that exceeded 6%. Isoxaflutole applied EPOST alone or in tank mix combination with RUPM or Liberty did not impart mean phytotoxicity that exceeded 10%. All phytotoxicity diminished throughout the remainder of the growing seasons and injury did not exceed 1% at the final end-of-season rating. Mean plot yield ranged from 1480 to 1656 lb/A. No yield differences were observed when comparing any IFT treatment to the nontreated control. In summary, exceptional cotton tolerance was observed following IFT applied PRE across all soil types and irrigation regimes. Isoxaflutole applied PRE fb sequential postemergence applications of RUPM or Liberty induced chlorosis or spotty necrosis, which dissipated throughout the remainder of the growing season. Visual symptomology observed following IFT applied EPOST alone or in tank mix with RUPM or Liberty (<10%) did not adversely affect plant growth or development. No difference in plant height, maturity, lint yield, or HVI fiber quality was observed following any IFT treatment when compared to the nontreated control. Future research will include testing elite germplasm containing HPPD tolerance in additional environments.