## CHEMICAL GAMETOCIDES CAN SUPPRESS REPRODUCTION IN LATE-SEASON PALMER AMARANTH (AMARANTHUS PALMERI) ESCAPES Sarah E. Kezar Nithya Subramanian Texas A&M University College Station, TX Gaylon Morgan Cotton Incorporated Cary, NC Muthukumar V Bagavathiannan Texas A&M University College Station, TX

## Abstract

Gametocide applications are historically made in hybrid seed production to induce male sterility. However, gametocide potential for control of late-season Palmer amaranth (Amaranthus palmeri) escapes has yet to be explored. The objective of this study is not to kill the Palmer amaranth with a sublethal gametocide dose, but to understand the potential impact on suppressive reproductive capabilities. Gametocides have been shown to physiologically stunt and suppress reproduction which could be an important tool for reducing late-season contributions to the seedbank. Seeds of the next generation could also express lower vigor and altered dormancy which could shift seedbank dynamics. This study was conducted in a greenhouse setting at the Borlaug Center for Southern Crop Improvement Greenhouse Complex. Because of the variation of stages this species may be at in a late-season field setting, these 21 gametocide treatments will be applied at three levels; peak vegetative stage, seedhead initiation to seedhead development, and early to late flowering. An automated research track sprayer with a boom mounted with two flat-fan 800067 nozzles (TeeJet Technologies) was utilized to apply treatments at a 30 ml carrier volume. We found that both male and female Palmer amaranth reproduction was impacted by chemical gametocide application, implying that this can be a new integrated weed management tool to reduce seedbank contributions. Gametocides such as MES, RH, TFMSA, were proven to be effective over a wide growth window from peak vegetative to seedhead development when pollen viability was reduced by 90% compared to the NTC. Reduction in seed viability was more dependent on the stage of application for select gametocides. For example, we found that females sprayed at seedhead development with Gibberellic Acid and females sprayed at peak flowering with Estrone producing seed with a 35% and 25% reduction in viability, respectively. Beyond this, thousand seed weight was significantly reduced in comparison with NTC with several gametocides applied across all application timings, indicating that the progeny could be less vigorous. Select gametocidal applications can effectively disrupt weed seedbank contributions by reproductive suppression of Palmer amaranth escapes.