XTENDFLEX AND ENLIST COTTON TOLERANCE TO GLUFOSINATE WHEN MIXED WITH GLUTATHIONE S-TRANSFERASE INHIBITORS AND SAFLUFENACIL

P Carvalho-Moore JK Norsworthy ML Zaccaro-Gruener GL Priess MC Castner LB Piveta University of Arkansas Fayetteville, AR

<u>Abstract</u>

Palmer amaranth [Amaranthus palmeri (S.) Watson] is one of the main weeds in cotton production systems. Glufosinate is an option in Palmer amaranth control in glufosinate-resistant cotton. It is recommended that this herbicide be sprayed between dawn and 2 h prior sunset due to the negative impact caused by reduced light intensity. Several approaches have been pursued to overcome the inconsistency in glufosinate performance, including the addition of glutathione S-transferase (GST) inhibitors and enhancers of reactive oxygen species, such as saflufenacil. The aim of this study was to evaluate the injury response in XtendFlex and Enlist cotton following the addition of glutathione S-transferase inhibitors or saflufenacil to glufosinate. The experiment was conducted at the Milo J. Shult Agricultural Research & Extension Center, Fayetteville, AR in 2021. The experimental design consisted of a twofactor factorial with four replications. The factor A consisted of glufosinate with or without GST-inhibitors (ellagic acid, baicalin, caffeic acid, and quercetin) or saflufenacil. Factor B consisted of applications at 10 a.m. or 10 p.m. Glufosinate was sprayed at 0.58 lb ai A⁻¹. GST-inhibitors and saflufenacil were added at 0.03 and 0.001 lb ai A⁻¹. respectively. Visual injury (reduction in growth and groundcover) to XtendFlex and Enlist cotton was evaluated at 21 days after treatment. The addition of GST-inhibitors to glufosinate did not cause more than 5% injury to glufosinateresistant cotton at any application time. The addition of saflufenacil applied at dusk did not increase injury. However, when applied at 10 a.m., glufosinate plus saflufenacil caused significant injury to XtendFlex (56%) and Enlist (40%) cotton. Previous studies had shown that the addition of GST-inhibitors to glufosinate improved weed control. Therefore, the addition of metabolic inhibitors to glufosinate is a viable approach to reduce the inconsistency in performance with guaranteed crop safety.