RESPONSE OF DIFFICULT-TO-CONTROL PALMER AMARANTH ACCESSIONS TO ELEVEN HERBICIDE GROUPS N. Godara J.K. Norsworthy G.L. Priess L.T. Barber T.R. Butts University of Arkansas System Division of Agriculture, Fayetteville, AR

<u>Abstract</u>

Palmer amaranth is the most troublesome weed of cotton, causing up to 60% yield loss and hindrance of harvesting efficiency. With the evolution of resistance to nine herbicide sites of action (SOAs) in Palmer amaranth, chemical control options are becoming limited. A greenhouse experiment was conducted in the Spring of 2021 at Milo J. Shult Agricultural Research and Extension Center, Favetteville, AR, to evaluate the response of Arkansas Palmer amaranth populations to commonly used row crop herbicides with differing SOAs. Two experimental runs were conducted as a completely randomized design with three spatial replications. Three difficult-to-control accessions (A2019, A2020, and B2020) along with one standard susceptible accession (SS2001) were evaluated to 11 differing herbicide SOAs including pendimethalin and S-metolachlor as preemergence and imazethapyr, 2,4-D, dicamba, atrazine, diuron, glyphosate, glufosinate, fomesafen, paraquat, mesotrione, and tembotrione as postemergence-applied herbicides. All difficult-to-control accessions were observed to have at least 20% points less mortality compared to a susceptible standard to five herbicide SOAs. Mortality of A2019 accession was observed at least 20% points less than susceptible standard to herbicides from nine differing SOAs and likely having resistance to nine herbicide SOAs. Additionally, A2020 and B2020 showed reduced sensitivity and likely having resistance to five herbicide SOAs. Furthermore, atrazine and paraguat provided >86% mortality and are still viable options for controlling the challenging Palmer amaranth populations. Therefore, it is required to identify and incorporate the most effective integrated weed management strategies to mitigate the resistance development.