Smallflower Umbrella Sedge Cross-Resistance to ALS Inhibitors in the California Rice Growing Region. Alex Ceseski*, Katie Driver, Amar Singh Godar, Kassim Al-Khatib. University of California, Davis, CA, USA. *Corresponding author: arceseski@ucdavis.edu

Control of smallflower umbrella sedge (*Cyperus difformis* L.) in California rice has relied heavily on acetolactase synthase (ALS) inhibiting herbicides for more than two decades. As a result, smallflower populations resistant to ALS inhibitors are found throughout California's rice growing region. The present study illustrates the current extent of smallflower resistance to ALS herbicides in California rice. Sixty-two grower-submitted smallflower samples collected in 2015 and 2016 were screened for resistance to four ALS herbicides: bensulfuron-methyl (Londax), halosulfuron-methyl (Halomax 75), bispyribac-sodium (Regiment CA), and penoxsulam (Granite SC). Plants were grown in a greenhouse at the Rice Experiment Station in Biggs, California and sprayed with each herbicide at two rates: labeled field rate (1x) and 3x the field rate. Only one population was susceptible (S) to all treatments; in the remaining 61 populations six major resistance (R) patterns emerged. All of the 61 R populations exhibited some resistance to bensulfuron, with 58 showing significantly reduced mortality at the higher rate. Resistance to more than one herbicide was apparent in 59 populations, confirming that smallflower cross-resistance to ALS herbicides is widespread in the region. Of note, 18 populations were R to bensulfuron but S to halosulfuron, both of which are sulfonylurea-based herbicides. This may not be fully explained by a change to the ALS enzyme target site; a combination of enzyme insensitivity and enhanced herbicide metabolism may be present in these populations. Furthermore, one population was strongly resistant to all treatments, suggesting that a substitution for tryptophan at residue 574 of the ALS enzyme may be the mechanism of resistance for that biotype, as that particular mutation is known to confer resistance to all ALS herbicides.