INTERACTION OF MESOTRIONE WITH PHOTOSYNTHETIC INHIBITORS. Julie A. Abendroth, Alex R. Martin, and Fred W. Roeth, Graduate Research Assistant, Professor, and Professor, Department of Agronomy and Horticulture, University of Nebraska-Lincoln, Lincoln, NE 68583-0915.

After preliminary research, a study was conducted in Clay Center, NE, to further investigate the interaction that occurs from the combination of mesotrione with photosynthetic inhibitors, specifically photosystem II inhibitors (PS II). Mesotrione was tested at five different rates: 0.0078, 0.016, 0.031, 0.063, and 0.094 lb ai/A. The PS II herbicides tested were atrazine, at rates of 0.125, 0.25, 0.50 lb ai/A, metribuzin at 0.75 and 1.5 oz ai/A, and bromoxynil, at 0.0625 and 0.125 lb ai/A. Treatments consisted of either mesotrione alone, a PS II alone, or a combination of the two. Percent necrosis at 6 days after treatment (DAT) and percent control at 12 DAT were recorded on velvetleaf, sunflower, and palmer amaranth. The expected treatment means were found by subjecting the observed treatment means to a multiplicative survival method, as described by Colby in 1967. Differences between observed and expected values were compared using an lsd at $\alpha = 0.05$.

Synergism occurs when the observed response from two herbicide's joint application is greater than the expected response. Synergistic activity occurred between mesotrione and PS II inhibitors with all three weed species, excluding the combination of mesotrione and metribuzin on velvetleaf. With this and some other mesotrione + PSII combinations, the rates of herbicides used were too high to differentiate between additive and synergistic behavior, at one or both of the rating times. Overall, synergism was observed for velvetleaf and sunflower only in regards to the time of death. Death was quickened by the combination of mesotrione with a PS II; however, none of the observed responses for the combinations proved to have greater significant efficacy than the expected responses at 12 DAT. With respect to palmer amaranth, rates appear to be in the appropriate range for determining synergism, which occurred at both 6 DAT and 12 DAT. At 12 DAT, the expected response for mesotrione (0.016 lb ai/acre) and bromoxynil (0.0625 lb ai/acre) is 56%; however, the observed percent control was 95%.