

***IN VITRO* ASSAY FOR ASSESSMENT OF GLYPHOSATE RESPONSE USING A LEAF DISK SYSTEM.** Renae R. Robertson, Burkhard Schulz, and Stephen C. Weller, Graduate Research Assistant, Assistant Professor, Professor, Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN 47907.

In recent years glyphosate use has increased significantly due to the widespread culture of glyphosate resistant agronomic crops. Increased glyphosate use has resulted in selection of 16 glyphosate resistant weed biotypes worldwide. This study was designed to determine the optimal conditions for developing a non-destructive bioassay for identifying glyphosate resistance in weeds. Giant ragweed (*Ambrosia trifida* L.) was used in this *in vitro* assay which was performed by floating leaf disks from sensitive (S) and resistant (R) populations in 24-well plates on a table shaker. Each plate was placed under either dark, low light, or high light intensities to evaluate an ideal light condition to observe an effect. Leaf disks (13 mm) from either young or mature leaves were evaluated for response. Disks were floated in four water solution treatments: 0, 4, and 8% sucrose and a combination of aromatic amino acids (phenylalanine, tyrosine, and tryptophan) with and without glyphosate. After 48 hours of exposure to the various solutions, leaf disks were weighed and chlorophyll extracted. Total chlorophyll content after treatment, was the best indication of differences in response between resistant and sensitive populations. Tissue from mature leaves floated in 0% solution under high light conditions in the presence of glyphosate resulted in the best glyphosate response. Our results show that a non-destructive *in vitro* leaf disk assay is an effective technique to determine differences in plant response to glyphosate between R and S populations of giant ragweed.