COMPARATIVE BIOLOGY OF GLYPHOSATE-RESISTANT AND GLYPHOSATE-SUSCEPTIBLE COMMON RAGWEED. Brent A. Sellers, Justin M. Pollard, and Reid J. Smeda, Post-Doctoral Fellow, Graduate Research Assistant, and Associate Professor, Department of Agronomy, University of Missouri, Columbia, MO 65211.

A population (JRW) of common ragweed was confirmed resistant to glyphosate and the I_{50} value was approximately 10-fold greater than the glyphosate-susceptible population (BRAD). Under field and greenhouse conditions, the JRW population appeared to grow slower than the BRAD population, with JRW plants exhibiting shortened internodes, reduced stature and an overall 'bushy' appearance. Plants with differing morphology may intercept spray particles differently, thus impacting plant response to postemergence herbicides. An experiment was established to compare growth parameters of JRW and BRAD common ragweed populations, and to determine if these potential differences impact spray interception. Seeds of both populations were planted in pots under natural conditions 1 June 2004. All pots were thinned to one ragweed plant at the cotyledon growth stage (time zero). Destructive harvests were performed weekly for six weeks beginning two weeks after cotyledon expansion. At each harvest time, plant height, node and branch number were recorded; plants were then treated with 2 M KNO_3 to measure spray interception. After spraying, KNO_3 was rinsed from plant tissues and nitrate levels were measure spectrophotometrically. Leaves were then separated from stems and leaf area was measured. Leaf, stem and root dry weights were also recorded. The experiment was conducted as a completely randomized design with 7 replications. At each harvest time, three additional plants were treated with 0.84 kg ae/ha glyphosate (Roundup WeatherMax™). Plant dry weights were recorded four weeks after glyphosate treatment. The JRW population was 1.6- to 2-fold shorter than the BRAD biotype at all harvest times, but stem weight was similar between the two biotypes until five weeks after cotyledon expansion. Node number was 1.2-fold higher for the BRAD biotype versus the JRW biotype at two, three and four weeks, but was similar among the two biotypes at five and six weeks after cotyledon expansion. Except at four weeks after cotyledon expansion, leaf area and leaf dry weight were not different at any harvest time. Although the JRW biotype grows differently than the BRAD biotype, net assimilation rate and relative growth rate did not differ throughout the experiment. Though leaf area was similar among the two biotypes, the BRAD biotype intercepted 1.9-fold more spray than the JRW biotype two weeks after cotyledon expansion. At three and four weeks after cotyledon expansion, spray interception was similar among the two biotypes, but the BRAD biotype intercepted 1.5-fold more spray at five and six weeks after cotyledon expansion. The BRAD biotype was controlled (based on dry weight accumulation) with glyphosate at two, three and four, but not at five and six weeks after cotyledon expansion. The JRW biotype was not controlled at any harvest interval, but control was greatest (24% of the untreated control dry weight) at three weeks after cotyledon expansion. Variability in plant morphology contributes to differences in interception, but this does not fully account for the reduction in glyphosate activity in the JRW population.

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