

COMMON LAMBSQUARTERS RESPONSE TO GLYPHOSATE APPLIED AT THREE DIFFERENT GROWTH STAGES. Christopher L. Schuster, Douglas E. Shoup, and Kassim Al-Khatib, Graduate Research Assistant, Graduate Research Assistant, and Professor. Department of Agronomy, Kansas State University, Manhattan, KS 66506.

Common lambsquarters is becoming a problematic weed in glyphosate-resistant cropping systems. Our first objective was to determine the efficacy of glyphosate on common lambsquarters from five regions around the United States at the 2.5, 7.5, and 15-cm growth stage. In addition, glyphosate absorption and translocation were determined at the same three growth stages. Common lambsquarters populations from Kansas, Nebraska, North Dakota, Ohio, and Washington were treated with glyphosate at 0, 0.125, 0.25, 0.5, 1, 2, 4, and 8 times the use rate at three growth stages. Glyphosate use rate was 1060 g ha^{-1} . Visible injury ratings and plant dry weights were determined at 14 days after treatment (DAT). Data were analyzed using nonlinear regression analysis. Herbicide rate required to inhibit plant dry weight by 40% (GR_{40}) were calculated for each growth stage of the five common lambsquarters populations. The greatest GR_{40} value at the 2.5-cm growth stage was with the Ohio population at 0.27 times the use rate whereas the least value was with the Nebraska population at 0.18 times the use rate. The greatest GR_{40} value at the 7.5-cm growth stage was with the Washington population at 0.96 times the use rate whereas the least value was with the Kansas population at 0.49 times the use rate. The greatest GR_{40} value at the 15-cm growth stage was with the Ohio population at 3.97 times the use rate whereas the least value was with the Kansas population at 0.71 times the use rate. The second objective was to determine glyphosate absorption and translocation in the Nebraska population. The second mature leaf from the top of common lambsquarters at the three growth stages were treated with ^{14}C -glyphosate. Plants were harvested 1, 3, and 7 DAT and divided into treated leaf, foliage above treated leaf, foliage below treated leaf, and roots. Plant parts were oxidized and $^{14}\text{CO}_2$ was captured and quantified using liquid scintillation spectrometry. Data were analyzed using analysis of variance. There were no differences in absorption or translocation between growth stages. At 7 DAT, common lambsquarters at the 2.5, 7.5, and 15-cm growth stage absorbed 60, 68, and 61% of the radioactivity applied, respectively. The 2.5, 7.5, and 15-cm common lambsquarters retained 89, 83, and 76% of radioactivity in the treated leaf at 7 DAT. In general, remaining radioactivity translocated equally to the foliage above treated leaf, foliage below treated leaf, and roots.