

FACTORS AFFECTING COMMON LAMBSQUARTERS CONTROL WITH GLYPHOSATE. Dana B. Harder, Christy L. Sprague, Karen A. Renner, and Christina D. DiFonzo, Graduate Research Assistant, Assistant Professor, and Professor, Department of Crop and Soil Sciences, and Associate Professor, Department of Entomology, Agriculture, and Natural Resources, Michigan State University, East Lansing, MI 48824.

Common lambsquarters control with glyphosate in Michigan has been variable. In 2003, beet petiole borers (*Cosmobaris americana*) were found tunneling throughout the vascular tissue of common lambsquarters plants that survived glyphosate application. Field and greenhouse studies were established to: 1) evaluate the effect of glyphosate rate, application timing, and insect larval tunneling on common lambsquarters control, and 2) determine if there were differences in susceptibility of seven different common lambsquarters populations collected in Michigan to glyphosate. Field studies were established on May 6 and June 4 in 2004 and May 4 in 2005. In 2004, the experiment was a 3x4 factorial; the first factor was application timing (10-, 25-, and 46-cm tall common lambsquarters), and the second factor was glyphosate rate (0, 0.63, 0.84, and 1.7 kg ae/ha). In 2005, an additional factor consisting of no insecticide compared to bi-weekly applications of the insecticide lambda-cyhalothrin was added to comprise a 3x4x2 factorial arrangement. Common lambsquarters plants were examined for insect tunneling prior to each glyphosate application and visual control was recorded 28 DAT. In 2004, there was no insect tunneling present in common lambsquarters prior to the 10- or 25- cm application timings in the May planting. However, insect larval tunneling was present in 40% of common lambsquarters plants prior to the 46-cm application timing. Common lambsquarters control was significantly less at this application timing compared with the other two application timings. Insect tunneling was present in 40 to 70% of common lambsquarters plants prior to glyphosate applications for the June planting; however, common lambsquarters control was greater than 83% and was similar between the medium and high glyphosate rates across application timing. In 2005, insect larval tunneling was present prior to the 25- and 46-cm application timings. The insect identified tunneling in common lambsquarters was a fly larva, order Diptera, family Agromyzidae. Bi-weekly applications of lambda-cyhalothrin significantly reduced the number of plants infested with insect larvae prior to glyphosate application. However, there were no differences in common lambsquarters control between plants treated or not treated with the insecticide. Common lambsquarters control was greater than 92% for all treatment timings with all rates of glyphosate. In greenhouse studies, common lambsquarters biotypes from Eaton, Gratiot, Ingham, Montcalm, Saginaw, and Shiawassee Counties and a control population from F&J Seeds were treated with glyphosate at rates of 0, 0.21, 0.42, 0.84, 1.7, 3.4, and 6.7 kg ae/ha when plants were 8- to 10-cm tall. Three of the seven populations had significantly higher GR₅₀ values compared with the F&J biotype. However, there was no difference in GR₇₅ values among the biotypes. In conclusion, insect larval tunneling had no effect on common lambsquarters control. Glyphosate rate and application timing had the greatest effect on control. Furthermore, common lambsquarters populations can vary in tolerance to glyphosate, particularly at reduced rates.