

## Nitrogen Assimilation of Weed Species as Influenced by Application Rate and Weed Removal Timing

Laura Bast, Wesley Everman, and Darryl Warnke

Timely weed control and adequate nitrogen supply are both necessary to maximize corn grain yield and economic return. A field study was established in 2009 and 2010 at the Michigan State Agronomy Farm in East Lansing, to investigate nitrogen assimilation of common lambsquarters (*Chenopodium album*), common ragweed (*Ambrosia artemisiifolia*), giant foxtail (*Setaria faberi*), and corn (*Zea mays*). A split-plot, randomized complete block design consisted of four nitrogen preplant application rates (0, 67, 134, and 202 kg N ha<sup>-1</sup>) as main plots and 6 weed removal timings as subplots. Weed removal timings were defined by weed canopy height to include control when weeds were 5, 10, 15, and 20 cm tall. Plots were maintained weed free after each weed removal timing. Two additional treatments included weed free and weedy (no weed removal) plots. At each weed removal timing, biomass samples were collected by species and fresh and dry weights recorded. Shoot and root portions were analyzed separately for total nitrogen content. Grain yield was determined at harvest. In 2009, nitrogen assimilation of giant foxtail increased with nitrogen application rate. Nitrogen assimilation of common ragweed was only different between the 0 nitrogen rate and 67, 134, and 202 kg N ha<sup>-1</sup> application rates. Nitrogen application rate had no effect on nitrogen assimilation of common lambsquarters. Corn nitrogen assimilation increased with nitrogen application rate from 0 to 134 kg N ha<sup>-1</sup>. There was no difference in nitrogen assimilation at 134 and 202 kg N ha<sup>-1</sup> application rates. Corn grain yield was greatest when weeds were controlled between 0-5 cm, except when 202 kg N ha<sup>-1</sup> was applied. At 202 kg N ha<sup>-1</sup>, grain yield was the same among all weed removal timings, indicating that grain yield loss due to delayed weed removal can be minimized with nitrogen application.

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