

COMMON WATERHEMP INTERFERENCE IN CORN. Joseph C. Cordes and William G. Johnson, Graduate Research Assistant and Assistant Professor, Department of Agronomy, University of Missouri, Columbia, MO 65211.

Field studies were conducted at Columbia, Novelty, and Albany, MO in 2001 on a Mexico silt loam, Putnam silt loam, and a Grundy silt loam respectively, to determine the effects of common waterhemp interference on corn growth, biomass, nitrogen accumulation, and yield. Ammonium nitrate (NH_4NO_3) fertilizer (180 kg ha^{-1}) was surface applied prior to planting. An EPOST (7-cm weeds) application of imazethapyr + imazapyr and bromoxynil was applied to control annual weeds except for waterhemp. Waterhemp was allowed to infest the experiment and treated at heights of 8, 15, 23, 31, 38 or 46 cm with dicamba + diflufenzopyr followed by hand hoeing 7 days after the herbicide treatment. These treatments were kept weed free after waterhemp removal. Corn and weed biomass, heights, fresh weights, and dry weights were collected at each waterhemp removal timing and at corn harvest from the Columbia site. The other two sites were utilized for yield data at different weed removal timings. Corn and waterhemp plant samples were analyzed for total nitrogen content. Corn leaf color was recorded with a SPAD[™] meter and soil water content measured with a portable time domain reflectometry probe (TDR) from the weed-free and weedy treatments at each removal timing. Corn yield responded differently to environments and waterhemp populations. Corn yield was not affected by waterhemp removal timing at Novelty, due to the low waterhemp populations ($108/\text{m}^2$). However, at Columbia corn yielded less than weed free checks when waterhemp was allowed to reach 31 cm or taller before removal ($1065/\text{m}^2$). The Albany site received excessive precipitation and waterhemp densities ($115/\text{m}^2$) were low thus competition for water and nitrogen was minimal and yield was not affected by removal timings. At the Columbia site waterhemp biomass contained 3.8% N when it was 8 cm tall, but only 2.0% N when it was 38 cm tall. Corn biomass contained 2.0% N and 1.3% N at these removal timings, respectively. On a per hectare basis, waterhemp accumulated 12.35 Kg of N by the time it was 8 cm tall and 44.46 Kg N by the time it was 38 cm tall. Corn biomass accumulated 38 and 93 Kg N at these waterhemp heights, respectively. This indicates that waterhemp is capable of accumulating N at a very rapid rate early in the growing season. Soil moisture was greater in the weed free plots compared to the weedy plots at Columbia when the waterhemp was 15, 23, 31, and 38 cm. Soil moisture at Novelty and Albany was not limiting throughout the season and differences between weedy and weed free treatments were only noticed at the 31-cm waterhemp removal timings. Corn leaf color as measured by the SPAD[™] meter indicated that corn leaves in weedy plots contained less N compared to weed free treatments at the 38 and 46-cm removal timings at Columbia and Albany and the 23 and 31-cm removal timings at Novelty.