

RESPONSE OF THREE IOWA WEEDS TO NITROGEN TIMING AND CORN DENSITY. Matthew M. Harbur and Micheal D.K. Owen, Graduate Research Assistant and Professor, Department of Agronomy, Iowa State University, Ames, IA 50011-1010

Weeds may reduce crop yield responses to soil fertilization by immobilizing nutrients or by competing with the crop for other resources. It has been speculated that soil fertilization benefits all weeds, but this generalization ignores differences between weed species in emergence time, relative growth rates, seed reserves, and critical tissue nutrient concentrations, each of which may influence weed responses to nutrient availability in soil. A three-year study in Iowa compared the effect of pre-emergence (PRE N) and post-emergence (POST N) ammonium nitrate applications on the competitive abilities of giant foxtail, velvetleaf, and waterhemp in 'Pioneer 33V08' corn. The N timing effects were studied in corn densities of 5.4 and 7.9 plants per meter in order to understand the influence of other resources, including shading, on N response in weeds.

By late June of each year, PRE N had increased shoot dry weight by over 50% for corn, 100% for velvetleaf, and at over 20% for giant foxtail, compared to POST N. Common waterhemp was unaffected by N timing. Corn density increased corn shoot dry weight by 21 to 32%, but had little effect on weeds. Corn density did not generally affect weed shoot dry weights when evaluated in late June.

Corn grain and weed seed yields were significantly affected by interactions between N timing and weed species. Corn yield was decreased 13 to 20% by velvetleaf for PRE N compared to POST N. Conversely, corn yield was decreased 12 to 15% by POST N compared to PRE N. Similarly, PRE N increased velvetleaf seed weight by 13 to 195% compared with PRE N, but decreased giant foxtail seed weight by 55%. Velvetleaf and giant foxtail seed weights with the greater corn density were decreased by 23 to 56% and 30 to 62%, respectively. Neither N timing or corn density affected corn yield loss or weed seed production in treatments that included common waterhemp.

The results suggested that weed responses to N supply vary widely among species, but that N management can play an important role in reducing early-season weed competitiveness and late-season weed seed production in corn.