

INFLUENCE OF SHADING, SEED SIZE AND GROWTH RATE ON CROP AND WEED RESPONSES TO NITROGEN. Matthew M. Harbur and Micheal D.K. Owen, Graduate Research Assistant and Professor, Department of Crop, Soil and Atmospheric Sciences, Iowa State Univ. Ames, IA 50011.

The incorporation of soil nitrogen manipulation into integrated weed management has been largely unsuccessful, in part, due to the failure to identify factors that potentially explain differences in nitrogen response between species. Corn, soybean and six weed species were grown in sand culture in order to determine the effect of shading, seed size and growth rate on nitrogen response. Plants were grown with and without shade, and fertilized daily with a complete nutrient solution that contained either 7.5 or 0.2 mM nitrogen. Dry weight and leaf area at 18 days after emergence decreased sharply in response to shade and low nitrogen availability. Dry weight and leaf area responses to shading and nitrogen availability were greater under high nitrogen and unshaded conditions, respectively. Proportional decreases in dry weight and leaf area were weakly correlated with seed weight, but were strongly correlated with relative growth rates, calculated from dry weight and leaf area, under optimal conditions. The absolute and proportional decreases in relative leaf growth rate were also strongly correlated with relative leaf growth rate under optimal conditions. Recognition of the role of shading and relative growth rate in N response may improve the prediction of the effect of nitrogen management on particular crop-weed competitions.