

MINNESOTA - Site-Specific Nitrogen Management for Second-Year Corn Following Alfalfa***Jeff Coulter, University of Minnesota***

Alfalfa is the fourth largest crop in the United States in terms of area. Two years of corn follow alfalfa on one-half of terminated Midwest alfalfa acres. When included in rotations, alfalfa enhances yield and reduces the nitrogen (N) fertilizer requirement of the following corn crop, usually for two years. Nitrogen fertilizer requirements are often eliminated for first-year corn following alfalfa and reduced by one-half or more for second-year corn following alfalfa. An analysis of more than 250 N rate trials in first-year corn following alfalfa found grain yield response to N fertilizer was associated with soil texture, terminated alfalfa age, alfalfa termination timing, and weather conditions from fall of the alfalfa year through spring of first-year corn. Updated N management guidelines for corn following alfalfa (z.umn.edu/fertilizingcorn) take these factors into account and no longer assign N credits to corn based on alfalfa stand density. Second-year corn following alfalfa has wide variation in yield response to N. Grain yield of second-year corn was not increased with N fertilizer in more than one-half of nearly 80 trials from the northern United States and the economically optimum N rate in the responsive trials ranged 30-180 lb N/ac. Current research, from Minnesota, Wisconsin, Iowa, and beyond, is focused on identifying site-specific factors that accurately predict sites where second-year corn following alfalfa will not respond to N fertilizer and the economically optimum N rate at N-responsive sites. These will be used to further refine N management guidelines to help farmers improve economic net return and reduce risk of N losses.