Manure Application Strategies for Alfalfa & Improved Soil Health

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Alfalfa (*Medicago sativa* L.) is the most widely grown and economically valuable perennial crop in the U.S. The introduction of alfalfa into traditional long-term corn and/or corn-soybean fields has shown to improve soil health and reduce nutrient applications. However, its presence has disrupted the distribution of livestock manure in Minnesota. The majority of dairy farmers' manure production is applied to corn; in many cases, the nutrients produced on large farms meet or exceed the requirements of corn, resulting in elevated nitrate leaching. With a reduced number of corn fields to apply manure, we seek to evaluate the effects of applying manure to alfalfa. Alfalfa contains superior fiber and protein content to that of corn and soybean and has a high demand for nutrients. Manure can act as a complete nutrient source for alfalfa, providing the secondary and micronutrients required that mineral fertilizers fail to adequately supply.

This research aims to evaluate the effectiveness of different application strategies of liquid dairy manure for two varieties of alfalfa: Pioneer 54VR10-RR (High yielding, FD-4) and Ameristand 455TQ-RR (Traffic tolerant, FD-4). Management strategies assessed here included a combination of manure timing (prior to establishment, annually after the last summer cutting, or the combination of the two) and application method (broadcast, banded, or shallow injection) after the alfalfa is established. At two research sites in Minnesota, three years of alfalfa was evaluated for yield, forage quality, stand vigor, and leachate losses each year. These results provide effective manure application plans to yield the highest quality alfalfa in addition to information regarding the impacts of manured alfalfa on soil health and nutrients for the subsequent 2-3 years of corn following alfalfa in the rotation.