Evaluation of Swine Effluent as a Plant Nutrient Source for Sprinkler Irrigated Corn

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The expansion of large swine-production facilities in northeastern Colorado prompted a need to evaluate the use of swine effluent as a nutrient source for irrigated corn. The objectives of this study were to compare the impact of swine effluent to similar rates of commercial-N fertilizer on corn performance and N buildup in the soil profile. The 3-year study began in 1995 on a 36-acre sprinkler irrigated site, consisting of sandy to loamy sand soil and planted to field corn (*Zea Mays L.*). The total available nitrogen rate for swine effluent and commercial-N fertilizer treatments are 0, 130, 185, and 235 pounds (lb) N/acre. The fertilizer treatments were replicated three times in a completely randomized design. Ninety percent of the total nitrogen was present as ammonium-N in the effluent of a two-stage lagoon, where the total dry matter content was only 0.1-0.2% by volume. The feed ration and age of pigs grown significantly impacted the effluent content. Corn yield increased an average of 24% under swine effluent as compared to commercial-N fertilizer, resulting in significant soil-N buildup at the 4 to 8-foot depths under the commercial-N fertilizer. This buildup is most likely due to enhanced crop production in response to other nutrients found in the effluent. The total N and P plant uptake was 24% and 55%, respectively, greater under the swine-effluent treatments than under the commercial-N fertilizer treatments. As the swine-effluent-application rate increased, the plant N and P uptake and recovery rate increased.

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