ESTIMATING SECOND- AND THIRD-YEAR NITROGEN AVAILABILITY FROM DAIRY MANURE

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Brief Summary of the paper:

A field study has been conducted on corn to determine residual availability of N in dairy manure using several methods including the difference, fertilizer equivalence and 15N methods.

Keywords:

- labeled nitrogen
- mineralization
- manure

Abstract:

It is common practice to repeatedly apply dairy manure to the same fields. To accurately assess the total plant availability of manure nutrients, it is necessary to account for the nutrients remaining in soil from previous years applications. A corn (Zea mays) field experiment has continued since 1998 on a Plano silt loam. Residual manure N availability was estimated for two and three years after a single manure application from differences in whole-plant N uptake using 1) fertilizer N equivalence 2) the difference method and 3) 15N labeled manure. Second year availability using the fertilizer equivalence and difference method was estimated to be 7.3 and 2.6% of total manure N applications respectively. Third year availability was estimated to be 7.6 and 3.3%. Estimates of 15N recovery were 5.3 and 2.3% for second and third year availability. respectively. Fertilizer equivalent and difference methods showed great variability making it difficult to accurately estimate residual manure N availability, but was much reduced using the 15N method. However this approach also requires a fertilizer comparison to estimate relative use efficiency and accurately establish an N credit.