Nitrogen Mass Budget of a Silage Corn Field at the University of Florida's Dairy Research Unit in Hague, FL

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The Florida Department of Environmental Protection requires most dairy farms in Florida to have a comprehensive Nutrient Management Plan to help manage nutrients on the farm. These plans manage not only the manure collection and storage, but also the application of manure to fields and its potential impact on ground water and surface water that could be nearby. These plans often include assumptions about certain nitrogen sources and fates on the farm. The objective of this research is to quantify certain N sources in the Nutrient Management Plan for a silage corn field at the Dairy Research Unit at the University of Florida in Gainesville, FL. The inputs of the nitrogen budget are residual nitrogen in the soil, nitrogen in the irrigation water, manure effluent applied through a center pivot irrigation system, inorganic nitrogen fertilizer, and atmospheric deposition. The outputs of the nitrogen budget are the final residual nitrogen in the soil, crop uptake, leaching, runoff, and gaseous losses. Residual nitrogen, crop uptake, and leaching will be directly measured by the nitrogen content of the soil cores, plant samples, and leachate collected in drainage lysimeters under the crop, respectively. Runoff is assumed to be negligible because the field is very level. Amounts of manure effluent and inorganic fertilizer will be obtained from farm records. Atmospheric deposition will be estimated from the National Atmospheric Deposition Program. Gaseous N losses (volatilization plus denitrification) will be estimated from the difference in inputs and outputs. The nitrogen mass budget will be measured over one year including two silage corn growing seasons and a winter rye grass cover crop. It is hoped the results of this study will draw attention to the important sources of N and their management in silage production in Florida and provide information to improve silage corn yield.