# Linking Soil Quality, Plant Health and Animal Nutrition on Dairy Farms Through Energy and Nitrogen Balance. (A08-bedet173551-Poster)

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## Abstract:

Dairy farms rely on microbes to recycle nutrients. In both the soil and rumen, nutrients are released from plant material by microbial action. This organic matter can be managed for nutrient content to promote microbial efficiency. In a 2001 study of 22 grazing and confinement dairy farms in Northeast Ohio, we investigated carbon and nitrogen balance in the soil, plant and animal. Soil microbial nitrogen increased with soil organic matter content ($R^2 = 33\%$, $P < 0.001$), indicating a positive microbial response to augmented food source. In June 2001, soil NO3-N was higher in cornfields receiving inorganic-N, relative to those receiving no synthetic fertilizer (120 vs. 56 kg/ha); but subsequent grain yields were not higher. Hay and pasture quality was variable in crude protein (11-31%) and acid detergent fiber (14-53%). Among herds grazing legume-rich (> 30%) pasture, those fed little supplemental energy (< 3 kg grain/day and no straw) tended to have elevated levels of milk urea nitrogen (> 18 mg/dl) during peak pasture growth, indicating inefficient use of N by ruminal bacteria. Average milk production was 34 and 27 kg/d for confinement and organically managed grazing dairies, respectively.

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## Presentation Information:

Presentation Date: Monday, November 11, 2002
Presentation Time: 2:00-4:00 pm
Poster Board Number: 535

**Keywords:**
soil quality, nutrient cycling, nitrogen management