Soil Quality reflects the capacity of soil to function over extended periods relative to the goals of its users – sustained crop yield in the case of agricultural producers (Snapp and Morrone, 2008). Among the most important soil quality indicators are the amount and availability of soil organic matter. From 2009 through 2012 soil samples were collected across Kentucky by producers participating in individual environmental grants sponsored by the Kentucky Division of Conservation and designed by the USDA-NRCS. As part of those grants, cropping systems were designed to maintain and improve the soil’s physical, biological, and chemical properties to maximize the natural benefits received from them.

Base components of all designed cropping systems were: no tillage, organic matter. From 2009 through 2012 soil samples were collected across Kentucky by producers participating in individual environmental grants sponsored by the Kentucky Division of Conservation and designed by the USDA-NRCS. As part of those grants, cropping systems were designed to maintain and improve the soil’s physical, biological, and chemical properties to maximize the natural benefits received from them.

One measurement used to determine the success of that effort may be incremental increases in available soil N. We analyzed samples over a four-year period for rapidly mineralizable soil N by anaerobic incubation, and for total mineralizable N in 2011 by long-term aerobic incubation.

**RESULTS – ANAEROBIC MINERALIZATION (2009-12)**

Between 2009 and 2012 there was a 320% increase in anaerobically mineralizable N from 20 to 84 mg kg⁻¹ N during the 7-day incubation period (Fig. 2). For the period 2010-2012, when a larger set of samples was included, the increase was 115%, suggesting diminishing returns from the management change with time.

**RESULTS – AEROBIC MINERALIZATION (2011)**

Aerobic mineralization ranged from 30-230 mg kg⁻¹ N in a two-week period and had a good linear relationship to anaerobically mineralized N recovered in a one week period (Fig. 3).

**RESULTS – RELATION TO SOIL PROPERTIES**

The relationship between anaerobically mineralizable N or aerobically mineralized N and either total N or total C was best fit to a polynomial function (Fig. 6).

**CONCLUSIONS**

- For cropping systems sampled each year, % total N and % total C increased 26 and 28%, respectively between 2009 and 2011.
- Anaerobically mineralized N increased in one year and increased over 320% from 2009-2012. These good linear relationships between rapidly mineralizable N and 2-week total aerobically mineralizable N.
- No good relationships existed between anaerobically mineralizable N and basic soil nutrients such as Ca, Mg, and P.
- Overall, the practices employed in this program appear to be successfully increasing mineralizable N soil with time.

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