ABSTRACT

Limited data exists that provides a baseline of what percent of organic matter (OM) makes up Ohio’s soils. This project was initiated with a grant from the Muskingum Watershed Conservation District to identify one county’s OM percentage in row crop soils. Benefits of soil OM include improvement of soil physical condition, water infiltration and aeration, improvement of tile and soil structure, greater water holding capacity, reductions in soil erosion, pH buffering, and energy supplies for microorganisms (IPNI Soil Fertility Manual 2006). Previous research suggests that a soil with one percent OM held 1.9 inches of water per one foot of soil and a soil with three percent OM held 2.9 inches of water per one foot of soil (Hudson 1994). Therefore, if more OM is present in the soil, more water would be held in the soil creating a slower rise of water levels within tributaries of the watershed district. The Muskingum County Extension office provides soil analysis resources to the general public and this grant funded OM analysis that is absent from the standard package. In 129 samples analyzed in this study, 1.2% OM was present in 29% of samples and 2-3% OM was present in 41% of samples. These results provide localized data and context to support the new statewide Fertilizer Applicator Certification Training (FACT) curriculum that is taught annually at the county level by OSU Extension in response to legislation signed into Ohio law in 2014.

INTRODUCTION

The role of nutrient management in agriculture is facing increased scrutiny in Ohio with concerns about recent harmful algal blooms in Lake Erie and the Ohio River. Muskingum County sits wholly in the Muskingum River Watershed (Figure 1), along the Muskingum River, which joins the Ohio River in Marietta, Ohio. The goal of this project is to provide a source of information to help county clientele understand the nature of soils in the county and to highlight the importance of preserving OM as a management goal for row crop producers.

METHODS

Soil samples were collected by individual producers and brought to the county Extension office. Copies of all soil test reports are provided to the Extension office as part of this service by the analyzing laboratory. Results are summarized from these reports.

Educational teaching opportunities are available during the statewide FACT program in the county. Soil nutrient management is highlighted in these programs.

RESULTS

Organic Matter

129 soil samples were included in the data analysis. In addition to % OM, phosphorus, pH, and potassium are included to provide additional context to the information (Table 1). Producers declared on the sample paperwork what the intended next three years of cropping were expected to be and this information was used to break down the samples by rotation (Table 2).

- 54% of samples are in a no-till corn soybean rotation.
- Corn soybean rotations represent 77% of all samples received.
- 61% of the samples in this data set reported %OM between 2-3 % (Figure 2).

Phosphorus (P)

- Reported P levels in this study average 33 ppm (Mohlich 3) with a standard deviation of 38.1 indicating a high degree of variability in the samples.
- Values were reported as low as 2 ppm and as high as 182 ppm.
- Continuous corn rotations show the highest P levels but further investigation is required to determine actual trends.

CONCLUSIONS

There is an opportunity to focus on increasing soil organic matter in Muskingum County and this may be used as a tool to help address regional surface water quality issues. Assuming it takes one year to raise organic matter percent 0.1-0.2%, it would take up to 10 years to increase an average value from 2.3% OM to 3.3% organic matter. This further supports the need for producers to be conscious of soil management to preserve the organic matter that is currently in place. There are increasing opportunities for Extension professionals to focus on topics that support nutrient management and water quality in Ohio.

BIBLIOGRAPHY


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