Coffee and Soil Testing

January 19, 2021, 830a-1030a

Attendance:

Matt Adams, Mike Werling, Andrea Bearman, Joelle Neff, Brooke Rudicel, Stephanie McLain, Lindsey Bluhm, Courtney Taylor, Tom Miller, Sharon, Landon, Marissa Renz, Jamie Bultemeier, Julie Good, Greg Giant, Sandy Voglewede, James Wolff, McLaren, Jordan Wall, Greg Lake, Janet McGowan, Matt, Scott Thompson, Wayne Byerly, Nellie Peffley, Kathryn L, Jain Young, Gene Witte

Lindsey Bluhm, ISDA Free Soil Testing Program

* Covering the entire Upper Maumee Watershed and several Adams County watersheds also.

Stephanie McLain, NRCS, Soil Health Specialist

* Soil testing is a snapshot in time, measures nutrients in soil
* Measuring the amount of nutrients in the soil
  + Determining your liming and nutrient needs
  + Protect the environment and your wallet from over fertilizing
* Basic of Soil Sampling
  + Identify sample, collect, and send to the labs
* Where and What are you sampling
  + Useful websites like USDA’s Web Soil Survey can help you understand what soil types you have on your farm
  + **websoilsurvey.nrcs.usda.gov**
    - The goal is to collect a representative soil sample from the field.
    - It shows roughly a snapshot of area soil
* Sample Collection Methods
  + Whole field management \*focus for urban\*
  + Zone-based sampling
  + Grid Sampling
* **Do not use a metal bucket, use a plastic container. The metal bucket can contaminate the soil sample.**
* Off to a lab
  + Make sure that it is an accredited lab
  + Check with local offices for assistance
  + Test for:
    - Organic Matter, soil pH, buffer pH, Phosphorus, potassium, calcium, etc. CEC (and more)
* There is lead and other heavy metals in urban settings
  + Historical use of the land may contribute to high levels of lead
  + Test for lead, check if roads/roads went through there.
* The soil testing-nutrient recommendation system is comprised of four consecutive steps:
  + Collect, Determine, Interpret, Estimate
* Over over-fertilizing, which can cause many other issues like hypoxia, blue green algae, etc.
* What functions would we like our soil to provide?
  + Production of food feed fiber fuel, and medicine
  + Work with the water cycle
  + Cycle nutrients
  + Promote resilience
  + Protect pathogens
  + Detox pollutants
  + Store C and moderate release of gases
  + Resist erosion
* How do we define soil health?
  + Continued capacity of the soil the functions as a vital living ecosystem that sustains everything
* Soil degradation
  + See image
* What are general characteristics of cultivated soil?
  + Less water
  + Less biological activity
  + Less diversity
  + Less nutrient cycling
  + Higher temps
  + More erosion
  + Less aggregation
* 4 Principles that Conserve the soil ecosystem
* Slake Video
* How do you do this in your backyard garden?
  + Add cover crops
    - After crop harvest
    - Between crop rows
    - Between crop cycles
  + Start compost pile and compost to your garden
  + Think about ways to add nutrients and build organic matter
  + Mulch your beds with straw

**Soil aggradation climb**

* Increase biological activity, organic matter turnover, improved nutrient cycling, improved soil structure, improved water availability

James Wolff

* Ag and Natural Resources Educator in Allen County as well as director
* Understanding soil test results
* A&L Labs in Fort Wayne, Indiana
* Organic Matter
  + Plant material and animal residue
  + Darker color is higher in OM (3.5%)
* Phosphorus
  + 2 different methods
    - For P1 20-30ppm is adequate (available to the plants)
    - For P2 40-60ppm is adequate (available plus reserves)
* Potassium
  + 120-170 ppm is considered adequate for most crops
  + Higher values needed for clay soils
* Magnesium and Calcium
  + Closely tied to pH
  + Rarely see deficiencies with correct pH
  + Keep Mg at 50+ ppm
  + Usually corrected with lime
* pH
  + level of acidity
  + most crops prefer 6.0-7.0
  + This range is where most nutrients are available to the plants
* Cation Exchange Capacity (CEC)
  + Measure of how well the soil holds nutrient
  + Tends to be higher with clay soils
* Micronutrients
  + Needed in trace amounts
  + Often not a concern unless deficiencies noted in plants or for specialty crops
  + If testing has not been done for a long time, James recommends doing micronutrients
  + If you are having problems with plants, micronutrients are also recommended
  + Sulfur studies are being done; Sulfur is depleting (it helps balance the nutrients)
* A&L recommends usually\* “high” levels of nutrients, but it can be case dependent.
* Maintenance 15-30ppm
  + Crop nutrient removed X yield potential = application rate
    - Corn
      * .37lb/bu
      * 160 bu/ac
      * .37lb/bu x 160 bu/ac = 60 lbs/ac
* Other options
  + Soil test above 30 ppm
    - Reduce application rates based on soil test (drawdown)
  + Soil test below 15 ppm
    - Increase application rates based on soil test (buildup)
* Maintenance (Depends on CEC)
  + Crop Nutrient Removed x Yield Potential +20 = Application Rate
  + Critical Level based on CEC
    - 10 = 100 ppm
    - 20 = 125 ppm
    - 30 = 150 ppm
* Nitrogen
  + Nitrogen is not included in the test, it does not stay in the soil very well
  + Agronomic optimum rates
    - Rates to produce the highest yield
  + Economic Optimum Rates
    - Rates based on market to enhance profit
* Agronomic Optimum
  + More nitrogen does not mean more yield
* NE Indiana typically needs more nitrogen because of how our soils are in the area
* Take home
  + Start with soil test
  + Do not blindly apply nutrients
  + Adding more nutrients does not mean more yield
  + Applying the correct rate can save money/profit
    - All you apply is used by crop