Missouri Cover Crop Cost Share Program Provides Baseline Soil Health Data for Row-cropped Fields for Much of the State

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Abstract

In July of 2015 the Missouri Department of Natural Resources (MDNR) and the Soil and Water Conservation Districts (SWCD) began providing cost-share monies for farmers establishing cover crops in row-cropped fields. Enrollment in this program required participating farmers to provide soil sample(s) for enrolled fields to the University of Missouri Soil Health Assessment Center (SHAC). The SHAC analyzed the samples for total organic carbon, active carbon, potentially mineralizable nitrogen, water stable aggregates, pH, effective cation exchange capacity, exchangeable cations, bulk density, plant available phosphorus, and exchangeable aluminum (if indicated). Approximately 765 farmers/participants sent in 1,732 samples representing 76 of Missouri’s 114 counties. The program resulted in 83,863 acres planted to cover crops in Missouri in 2015. Results from the analyses were reported to farmers in detailed reports giving information on the tests, their importance, benefits to improving the measured soil properties, comparison to county and state averages, and recommended management options. The results provided averages and references for soil health analyses that were previously unavailable for the Midwest and for Missouri’s varied Major Resource Areas (MLRAs).

Objectives

The objectives of the Cover Crop Program were to provide an incentive to farmers for using cover crops in their cropping systems, to improve soil health in Missouri, and to collect data on soil health measurements in Missouri.

Materials and Methods

Samples were taken with a Humboldt drive tube, 3” (76.2mm) x 2.75” (69.9mm). Four subsamples were taken per field or significant soil series within the field. Samples were sent to the SHAC. A one-page survey form was filled out for each sample submitted.

Results and Discussion

The Cover Crop Program resulted in 83,863 acres of Missouri cropland to be planted in cover crops in 2015. The SHAC analyzed 1,732 samples from 76 of Missouri 114 counties. County and regional averages were obtained for each of the analyses conducted.

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Analyses Conducted

- Simplified Particle Size
- Active Carbon
- Total Organic Carbon
- Mineralizable Nitrogen
- Wet Aggregate Stability
- pH (salt and water)
- Effective Cation Exchange Capacity
- Effective Base Saturation
- Exchangeable Aluminum (if indicated)
- Plant Available Phosphorus
- Bulk Density

Figure 1. Photos of drive tube and bulk density sampling demonstration.

Figure 2. Information sheet filled out for each submitted sample.

Figure 3. Photos of cover crops and statistics from the cover crop program.

Figure 4. Map of Missouri counties indicating the number of cover crop samples receiving by the SHAC from each county in 2015 (2016 Fiscal Year).

Figure 5. Map of Missouri and five regions of the state showing the average total organic carbon (TOC) for the state and each of the regions as determined by the SHAC analyses.

Figure 6. Map of Missouri and five regions of the state showing the average carbon for the state and each of the regions as determined by the SHAC analyses.

Figure 7. Map of Missouri and five regions of the state showing the average percent aggregate stability for the state and each of the regions as determined by the SHAC analyses.

Figure 8. Maps showing the MLRAs in Missouri and the average total organic carbon (TOC) by county to show the influence of the MLRAs on soil TOC.

Conclusions

The Cover-Crop Program has succeeded in persuading Missouri farmers to plant cover crops and in building a soil health database for Missouri soils. The second year of the program will help build upon the data from the first year. Follow-up samples to be taken after five years will help determine change in soil properties effected by planting cover crops.