

Evaluating Soil Health

Summary: Soil health can be measured, monitored and managed to increase sustainability and productivity.

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BOZEMAN – Experts with Montana State University and MSU Extension have recommendations for growers on evaluating soil quality and health.

The concept may seem subjective, but there are ways to measure and improve soil health. It takes time to measure, monitor and manage to improve soil health, but it can be worth the effort for potential benefit in sustainability and productivity.

“With ‘soil health’ now being a frequently heard term, we want agricultural producers to be aware of what factors contribute to soil health and how they can be reliably measured,” said Clain Jones, Extension soil fertility specialist at MSU.

Soil productivity is influenced by its chemical characteristics, physical structure and biological activity. Measurements of these properties provide an estimate of the soil’s ability to produce crops. Indicators of soil productivity can be tracked over time, compared in side-by-side fields, or compared to a reference soil and are useful to assess the effect of management or evaluate problem areas.

Chemical soil characteristics, including pH, soil organic matter, nutrient levels and cation exchange capacity are often part of routine soil analyses done by analytical labs. The physical properties such as available water holding capacity (also called plant available water), bulk density, porosity and aggregate stability, are also most reliable if measured by an accredited lab, yet not all labs perform these measurements. Field tests are available for many of these soil properties but they often rely on subjective interpretation of potentially imprecise measurements. Microbial activity is also important, yet has the least defined set of measureable factors by which it can be quantified.

For a quick assessment of soil health, get out a shovel and dig. Compare a cropped soil with undisturbed fence-line soil. How deep do roots go? Does it break apart easily? Does it smell earthy? Is there evidence of worms? Darker color indicates more soil organic matter or soil carbon.

“The shovel test can give the grower an idea of their soil quality and identify what problems they might be facing,” said Jones.

Major steps towards increasing soil health are to reduce tillage, increase crop diversity and reduce fallow time by including alternative crops or cover crops into the rotations.

For more detailed information on soil health indicators and measurements, see Jones' The Soil Scoop on his website <http://landresources.montana.edu/soilfertility>, or contact Clain Jones at clainj@montana.edu or 406-994-6076.

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