Regenerative RANCHING

NOBLE RESEARCH INSTITUTE

by Jim Johnson

Evaluate Soil Health

All you need is a shovel and your senses to get an idea of your soil's health.

For any cattle producer or landowner, the first step to being a good land steward is taking stock of the current health of the soil beneath your grasslands. You can look for the following indicators of soil health on any farm or ranch with just a shovel, your eyes and your nose.

You will want to complete the following steps at least twice: once in the pasture and once in a nearby fence row. Compare the soil in these two places. Typically, soil in the fence row has not been as disturbed by grazing, machinery or prior tillage, and will show signs of greater health. This is why it makes a good benchmark to give you an idea of what your working soil could look like.

All you need is a shovel. While any shovel will do, I prefer one that is completely made from steel. That's because digging in the field tends to break shovel handles. If you have a lot of difficulty digging, that may be your first sign of a compaction (and soil health) problem.

Before you dig, look straight down at the soil surface and note if it is bare or covered. One of the important indicators of soil health is soil cover. If soil is bare in an area, it tells you the ecosystem processes are not working well. The soil won't be healthy, and it's vulnerable to erosion.

Digging for soil health indicators

With shovel in hand, follow these six steps to check the soil health.

Step 1: Push the shovel into the ground at your evaluation site. As you do, feel for resistance. While resistance could be caused by roots or rock, it is often a sign of compaction. The shovel should go into the ground easily.

Step 2: Turn the shovel full of soil out and look at the color, an indication of soil organic matter. In general, the darker the soil, the better the soil health.

Step 3: While looking at the color, do a further check for compacted layers — layers of resistance that limit root penetration and water infiltration. One way to notice compaction is to look at the plant roots. Are they growing sideways, or in a "J" formation — in which they grow down to the resistance layer then turn 90 degrees because they can't penetrate it? You want the roots to grow downward, deep into the ground.

Step 4: Look for biological activity. Are there lots of living roots or channels where roots have grown? Are there earthworms and other forms of life, like dung beetles, or evidence of them, like earthworm castings or dung-beetle balls buried in the soil? These are all signs that your soil is alive and healthy.

Step 5: Smell the soil. It should have a good earthy smell, like a freshly tilled garden. That comes from active bacteria in healthy soils that are cycling organic matter. It should not smell like vinegar, a swamp, a rock from the creek or rotten eggs. Smell can be difficult to gauge at first but remember to compare the soil in your field to the soil in the fence row. No smell equals no life.

Step 6: Look at the soil's structure. Healthy soil should crumble easily, like a perfectly done, moist chocolate cake. Your soil should include both big clumps and small clumps. If your soil is a singular clump, you probably have a compaction issue. Alternatively, if your soil sifts through your fingers like flour, you are missing the biological soil activity that provides the soil its healthy structure.

Lastly, remember it doesn't matter how healthy the soil is if it erodes away. Likewise, it is impossible to build healthy soil while it is being eroded away by wind or water. Walk your pastures looking for not only obvious signs such as gullies, but also signs on the soil surface. They will show up as soil deposited behind plants and rocks by wind erosion, or small dams of soil and litter where water has run downhill. While wind and soil erosion are natural processes, the management choices we make around grazing or keeping the soil covered with living plants can increase or decrease the speed and intensity of soil loss.

Beyond these valuable observations in the pasture, the next step is taking samples to send off for Haney soil health tests and other laboratory analysis to add benchmark data to your soil health journey. **BA**

Editor's Note: Jim Johnson is a senior regenerative ranching advisor at Noble Research Institute, where he focuses on helping ranchers use soil health principles and ecosystem processes to improve their land.

Photo courtesy of Rob Mattson/Noble Research Institute

Dung-beetle balls and eggs (pictured), earthworms and other forms of life in soil samples are indicators of soil health.