Harney Silt Loam - Kansas State Soil

By A. Tyler Labenz, Resource Soil Scientist Hutchinson, Kansas

Kansas, along with all the states, has adopted official state symbols that represent its unique natural history, heritage, and culture. Most people are familiar with the Kansas symbols including the buffalo, cottonwood tree, western meadow lark, and sunflower. However, few people know that Kansas also recognizes an official state soil, the Harney Silt Loam.

A state soil is a soil that has special significance to a particular state. Soil is Kansas' most valuable resource. Combined with the state's climate and water supply, soil supports the state's top industry, agriculture. Agriculture accounts for nearly $6 billion each year to the Kansas economy. Harney silt loam was adopted as the Kansas State Soil on April 12, 1990, when Governor Mike Hayden signed Senate Bill 96 into law. Each state in the United States has selected a state soil, but only twenty have been legislatively established.

Harney Silt Loam is a very deep, nearly level to moderately sloping, well-drained soil on flat ridgetops and side slopes. This soil typically has a dark grayish brown silt loam surface layer about 12 inches deep. Below this lies the subsoil which is about 23 inches deep. The upper part of this layer is grayish brown silty clay loam and the lower part is brown calcareous silty clay loam. The parent material layer goes from a depth of 35 to 70 inches and is calcareous silt loam.

Harney silt loam formed under prairie grasslands and over thousands of years developed a deep organic topsoil. Harney silt loam covers almost four million acres covering 26 west central Kansas counties. A variety of cash crops, irrigated and dryland, are raised on Harney Silt Loam. Livestock including cattle, sheep, and hogs get their food directly from this soil.

The name "Harney," meaning people, is adopted from "harahey," an ancient Wichita Indian term for "Pawnee Indian" stemming from when Coronado journeyed across Kansas.[1]

Kansas has over 300 different soil types across its 52 million-acre surface area. Crop acres account for 56 percent, or just over 29 million acres, while range and pasture lands account for over 19 million acres, or 37 percent. Nearly 25 million of the 52 million total acres (48 percent) are considered prime farmland. Prime farmland has the best combination of physical and chemical soil characteristics for producing food and fiber.

For more information about Kansas soils or soils in your county, please contact your Natural Resources Conservation Service (NRCS) office or conservation district office located at your local county U.S. Department of Agriculture (USDA) Service Center (listed in the telephone book under United States Government or on the internet at offices.usda.gov) for assistance. More information is also available on the Kansas Web site at www.ks.nrcs.usda.gov. Follow us on Twitter @NRCS_Kansas. USDA is an equal opportunity provider and employer.

[1]Dr. Patricia J. O'Brien, professor of social anthropology and social work, Kansas State University, Manhattan

'Are you Ready for Rain?'

By Toni M. Flax, NRCS Rangeland Management Specialist Hill City, Kansas

During a recent conversation with a colleague, he told me the story about two farmers from a recent soil health field day. One neighbor asked the other "Are you ready for spring?" The guy thought about it, looked at his neighbor and said, "You know, I'm not sure if I am or not?" The neighbor had asked a small talk question, but he unknowingly got my colleague and me to thinking-spring means rain and are we REALLY ready for rain?

Kansas has faced several years of continual drought and most conversations start with someone asking "Are you ready for rain?" How are we sure if we are ready for rain? Is our ground ready to take up and effectively use the next rain Mother Nature gives us or will it just run off and do no good?

This topic not only pertains to cropland, but also greatly impacts rangeland. Here are three concepts to for you to think over the next time you are asked "are you ready for the rain?"

First, what does the above ground plant cover look like? A single rain drop falls to the earth with great force and can cause an erosion event to occur on bare ground. Using the old rule of thumb "take half, leave half," we can slow down the velocity of the rain drops when they hit the plants' leaves and make their way to the ground below and soak in. Also, leaves and other biomass provide insulation for the ground, causing less water evaporation and keeping the soils at a temperature that allows for healthy soil microbial activity to take place.

Second, when it comes to a plant's biomass, two-thirds is below ground. Having leafy material above ground leads to having a healthy root system and a healthy root system is what keeps the plants going and in place during an erosion event. Think of it like this, the roots are a factory, they take up the water and nutrients to grow more leaves and root material, and the leaves are the solar panels that, in turn, soak up the sunlight and carbon dioxide needed to drive the growth. When the animal grazes off the leaves the plant has to put its resources to growing more leaves. If the leaves keep getting grazed off, then the plant replaces them making no effort to grow roots which stores the carbohydrates for the winter. This causes the roots to "die off" and makes the plant weak and not able to take up the moisture and use it the next spring. Some root "die off" is to be expected, this helps form "water highways" to help the water infiltration further down into the soil profile.

Third is the concept of plant diversity. Many people believe that grass is the only type of plant to have on rangeland and that any forbs or legumes are bad. This is not the case. Even if livestock do not eat forbs or legumes, they provide a great benefit to the system. They provide

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Soil Sampling for Soil Health Across Kansas

By Karri Honaker, NRCS, Resource Conservationist Hays, Kansas

The 68th session of the United Nations announced 2015 to be the "International Year of Soils." The topic of soil importance has been gaining momentum for several years now and it doesn't look like it will be slowing down anytime soon. So why all the fuss? Everyone eats don't they? Take a moment to contemplate how agriculture touches your life. Without the soil, there would be no agriculture and that means, no you! It doesn't take long to figure out that soil is the basis of everything we do, especially here in Kansas with agriculture being one of the top industries in the state. Now that everyone is becoming more familiar with soils and why they are so important, the Natural Resources Conservation Service (NRCS) would like to focus more specifically on soil health.

The Kansas NRCS has launched a soil health campaign to bring this message home. In order to fully support the soil health campaign, NRCS employees throughout Kansas have jumped on board and have carried out several soil health strategies to enhance the soil health message. One of those strategies is looking at soil health indicators in soil tests. The four soil health tests include aggregate stability, active carbon, CO2 burst method, and the solvita SLAN (Soil Labile Amino Nitrogen) tests. The aggregate stability test runs the soil through a series of tests that will determine the extent to which soil aggregates resist falling apart when moistened. Active carbon tests determine what fraction of the soil organic matter is readily available as an energy source. Microbial activity in the soil gives off carbon dioxide which is measured after drying and rewetting the soil in the CO2 burst method test. The SLAN test measures the available organic nitrogen. Sample depths range from 0-2 inches and 2-6 inches and are a composite of 5-15 sub samples per acre. In order to completely interpret the tests, information such as cropping history for the previous two years is needed, along with soil maps of the property and global positioning system (GPS) points of where the samples were taken. These specific tests will allow us to gain knowledge on just how healthy the soils in Kansas are and what we can do to continue to improve soil health throughout the state.

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Wonderful 'Weeds'

By Doug Spencer, Rangeland Management Specialist, Marion, Kansas

Start a discussion about "weeds" and you're likely to get several participants involved in a hurry. Questions such as "What does it look like?", "Do livestock eat it?", and the more popular one, "What do you spray it with?" I'm amazed at how passionately some producers are about killing "weeds". Passion is a great thing when targeted towards a true "weed" that is invasive to an ecosystem, but I often see plants that are native to the system be wrongfully targeted. These targeted native plants that so many call a "weed" might be wonderful! I know you're thinking, "Did he just say weeds are wonderful?" Yes, and I'll tell you why.

In a grazing land setting with cattle as the grazer, if it isn't grass, a lot of producers will call it a weed, even if it is native. "What do cows eat?" is a question I ask grade school students at field events and the resounding answer is, "grass!" Yes, but cows are picky as to what types of grass they'll graze and actually consume a fair amount of "weeds" or "forbs" (native broadleaf plants) as the grazing season progresses. In Chautauqua County, a study on the subject of grazing cows on native grassland done by Preedy et al. (2013) had some interesting findings. The cow's diet in June when the grass is lush consisted of approximately 85 percent grass and 15 percent forbs. By October, when the grass was more mature, the cow's diet shifted to approximately 75 percent grass and 25 percent forbs. Some key native forbs selected were heath aster (*Symphyotrichum ericoides*), dotted gayfeather (*Liatris punctata*), and purple prairie-clover (*Dalea purpurea*). That begs the question, "Who would purposely spend money to remove 25 percent of their livestock's preferred diet?" The forbs we sometimes call a "weed" are actually feed.

Soil health is the talk in many agriculture publications. One of the key principles discussed is plant diversity. Several cover crop trials have been completed where plants were grown as a monoculture and then as a mixture of those same plants. Often the mixture outcompetes the monoculture plots in production. Diversity in our rangeland and pastures is just as important. In some instances, there are times that cows don't eat a particular forb species, but a look below the soil surface tells the whole story. Grass and forb roots are different in their root structure, rooting depth, the root exudates, and the symbiotic relationships with microbes they make. Studies have shown nutrient transfer in plants being facilitated by a mycorrhizal mycelial network. Research by Wilson, Hartnett, & Rice (2006) specifically looked at tracing phosphorus in Indiangrass (*Sorghastrum nutans*) and Lousiana sagewort (*Artemisia ludoviciana*). It was found that when either plant was the donor, phosphorus showed up in the receiver plant. It was also noted that Indiangrass was the stronger competitor for the phosphorus. If this network below ground facilitates the transfer of nutrients that are taken up from a forb (that many would call a "weed") and it shares with a grass that cattle readily graze, why would it be removed from the system? It's interesting to read publications that discuss how diverse mixes should be used in cover crop plantings and in the same publication advise how to kill your cover crop, now called weeds, in the native rangeland so we can have just grass. The forbs we sometimes call a "weed" allows the plant community to succeed.

We've discussed cattle but what about bees and butterflies? According to recent work by Shelly Wiggam, a Popenoe Fellow and PhD student at Kansas State University majoring in Entomology, some species of native bumblebee queens in the Flint Hills show a very specific preference for the forbs blue wild indigo (*Baptisia australis*), cream wild indigo (*Baptisia braceata*), and prairie penstemon (or cobaea beardtongue-*Penstemon cobaea*). These plants are their sole source of pollen on which they lay their eggs and the larvae feed on to develop into bumblebee workers. Additionally, green antelopehorn (*Asclepias viridis*) and antelopehorn (*Asclepias asperula*) have been documented as the sole source of nectar for these same bumblebee queens, their sole source of energy while creating and maintaining a functional bumblebee nest for the entire growing season.

In addition to bees, the monarch butterfly is gaining more and more recognition as a pollinator species of conservation concern due to rapidly declining over-wintering population numbers. Milkweeds are in the spotlight because they are the only larval food source for the monarch butterfly. Butterfly milkweed (*Asclepias tuberosa*) and green antelopehorn (*Asclepias viridis*) are two of several beneficial plants for the monarch and can often be found in Kansas rangeland and some pastures.

There is a vast number of additional pollinators that use specific flowering forbs at various times of year. It's easy to focus on specific parts of the ecosystem without seeing how decisions impact the whole ecosystem. These native forbs are part of the system for a reason and are

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