Central Grasslands Forum



NDSU Central Grasslands Research Extension Center Streeter, ND 58483 701-<u>424-3606</u>

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Soil Health: Principle One of Five - Soil Armor

Jay Fuhrer, Soil Health Specialist, Natural Resources Conservation Service, Bismarck

The foundation of soil health consists of five principles, which are: soil armor, minimizing soil disturbance, plant diversity, continual live plant/root and diversity with livestock integration. Today we will discuss the first principle, soil armor.

This is the first of five articles on building soil health.

Armor, or soil cover, provides numerous benefits for cropland, rangeland, hayland, gardens, orchards, road ditches and more. Let's take a closer look at the benefits of soil armor or cover:

Controlling wind and water erosion – Armor protects soil from wind and/or water as it moves across the soil surface. It holds the soil, along with valuable soil organic matter and nutrients, in place.

Evaporation rates - Armor reduces the soil evaporation rates, keeping more moisture available for plant use.

Soil temperatures - Armor helps soils maintain a more moderate range of temperatures, keeping soil warmer in cold weather and cooler in hot weather. Like us, the soil food web functions best when soil temperatures are moderate.

Compaction - Rainfall on bare soils is one cause of soil compaction. When rainfall hits the armor instead of bare soil, much of the raindrop energy is dissipated.

Suppresses weed growth - Limits the amount of sunlight available to weed seedlings.

Habitat - Provides a protective habitat for the surface dwellers in the soil's food web.

The photo below shows the residual armor after corn planting was completed last spring at the Menoken Farm. At a minimum, the armor should last until the new crop is fully canopied.

How quickly this residue decomposes depends on the carbon-tonitrogen ratio of the residue. High -carbon residue (for example, wheat at a ratio of 80-to-1)



decomposes much slower than low carbon residue (for example, pea at a ratio of 29-to-1). When we supply the soil surface with a diversity of residues from one year to the next, we can achieve the benefits of soil armor and still maintain a fully functioning nutrient cycle.



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The Grazing Stick: A Tool for Monitoring Pastures and Rangelands

Miranda Meehan, Extension Livestock Environmental Stewardship Specialist, NDSU

Monitoring your grazing resources can help you determine when to remove livestock from a pasture and prevent overgrazing.

Forage utilization is a measure of the percent of the plant that has been consumed and/or destroyed by grazing animals. Utilization should be monitored throughout the grazing period to ensure you achieve proper utilization, maintain plant health and prevent overuse of key species.

As a general rule of thumb, proper utilization is achieved when 50 percent of the total plant weight (not height) of key species has been utilized. To determine utilization, you must take measurements during the grazing period and within three days of the removal of livestock to make sure target grazing goals have been met.

To obtain the most accurate

measurement of utilization, measurements should be taken from grazed and ungrazed plants of the same species on the same date, so measurements are taken from plants at the same stage of growth.



Example: If your plant has been grazed down to 3 inches from a standing 12 inches, your calculation will be: [1 – (3 inches ÷ 12 inches)] x 100 = 75% 75 percent of the plant has been removed

NDSU Extension has developed a grazing monitoring stick (GMS) as a tool for measuring and monitoring the utilization of pastureland and rangelands. The GMS is a modified yardstick with information on it related to grazing management. Using the GMS, utilization can be calculated in a few simple steps:

- Measure the grazed and ungrazed height of the key forage species. Take a minimum of 30 measurements for each key species.
- 2) Calculate the plant height removed by dividing the average grazed height of the plant by the average ungrazed height. Subtract this amount from 1.
- Multiply this amount by 100 to determine the percent of height removed.
- Use the Height to Weight Conversion chart below to estimate the percent of weight removed.

Monitoring utilization of range and pasture lands
using the GMS provides a way to assess how
much forage livestock have used, helping to
determine when livestock should be removed
from a pasture. The GMS can assist North Dakota
livestock producers and other land managers in
monitoring forage for long-term grass
production.

For more information on ordering and using the GMS, check out the links below or contact your local county Extension office.

"The North Dakota Grazing Monitoring Stick: A Way to Measure Range and Pasture Utilization" (Publication R1780) - <u>http://tinyurl.com/GrazingStick</u>

Wooden Grazing Monitoring Stick - order from the NDSU Distribution Center at http://tinyurl.com/WoodenGrazingStick

Percent Height to Percent Weight Conversion Chart ¹								
	Percent of height removed							
Plant Community Type	65	70	75	80	85	90		
Western wheatgrass	44	50 ²	58	66	74	82	ed	
Intermediate wheatgrass / smooth brome	37	45	52	58	63	82	remov	
Tall, warm-season grasses: big bluestem, switchgrass	41	46	54	62	71	79	veight	
Kentucky bluegrass	26	34	40	47	57	71	t of \	
Green needle /crested wheat / little bluestem	35	38	45	53	61	70	Percen	
Blue grama / needle-and-thread	19	24	29	36	44	54		

¹Adapted from Natural Resources Conservation Services Field Office Technical Guide, May 2010.

² The **50 percent level** (by weight) is considered the optimal utilization level.

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County Corner: Extension Study on Bale Grazing

Penny Nester, Kidder County Extension Agent, Agriculture and Natural Resources

Beef producers are exploring alternative, low-input winter feeding systems for the benefits of increased soil health, nutrient management, and reducing labor and cost inputs.

While some outreach and education has been done in the area of winter grazing, little research has been conducted in North Dakota on bale grazing. Producers who implement bale grazing have noticed a visual difference in biomass production, plant populations and forage quality.

NDSU Extension personnel, with the help of four producers in Burleigh, Kidder, Logan and Morton counties, are seeking to bridge the information gap on this topic through an applied research project. This project also has received support and funding through the North Dakota Grazing Lands Coalition.

This local bale grazing project will examine differences in soil nutrient content and forage production during a



two-year period, and also will look at animal condition pre- and post-bale grazing.

Soil, hay and supplemental feed samples were taken in the fall of 2015, along with cow body condition scores that were recorded at turnout and again when bale grazing was

completed for the season. Soil and forage samples will be taken in the summer of 2016 and again the following summer.

Conventional soil sampling methods are being used, along with a newer soil health test called the Haney test. This test is designed to mimic nature's approach to soil nutrient availability in a lab setting.

Contact our office to learn

more about the results of this initial project as our year progresses. The Extension staff hopes to expand our knowledge on these farm-applied winter feeding systems in the future.

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Animal Science Technician Joins CGREC

Stephanie Gross has joined the **Central Grasslands Research** Extension Center as an animal science research technician, assisting animal scientist Michael Undi. She works with beef cattle and is involved with data collection and entry.

Gross grew up in Napoleon, N.D. and graduated from NDSU with a B.S. degree in animal science.



Gross is passionate about the agriculture industry and enjoys anything related to that topic, especially beef cattle. In her spare time, she enjoys spending time with her family, camping, reading and horseback riding.





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Central Grasslands REC 35th Annual Field Day

Monday, July 11

Tour the center, learn about current projects, meet with others interested in agriculture and natural resources. (Lunch is provided.)

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Photos by Rick Bohn, CGREC

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