



Intercropping can increase production

Improves microbial population, diversity and nutrient cycling

By JON STIKA
DREC Webmaster

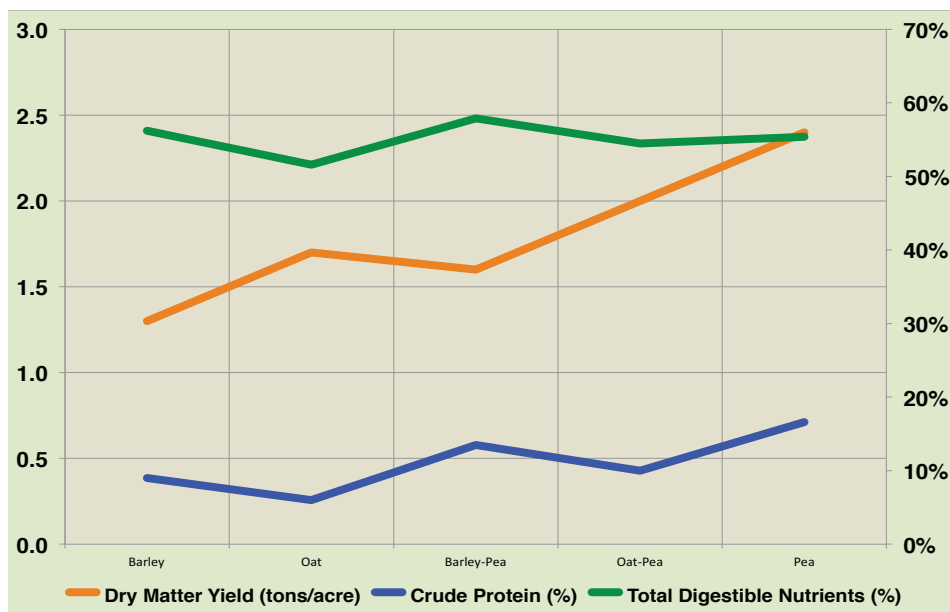
Intercropping, growing two or more species of crop at the same time, has the potential to increase tonnage and crude protein. The study conducted at the Dickinson Research Extension Center showed forage crops like peas and oats or peas and barley together outperforms growing pea, oat, or barley in a single-species stand.¹

Intercropping for forage production at DREC is practiced routinely with combinations of winter triticale-hairy vetch harvested for hay, and corn-soybean-rape harvested by grazing steers.

Graph 1 shows basic results from the DREC study where crops were grown without additional nitrogen fertilizer on soils that had less than 14 pounds of nitrogen per acre in the upper 24 inches of soil.

Additionally, there is a symbiotic relationship that occurs when planting multiple species together. There are increases in the overall diversity of the crop rotation and increases in the diversity of microbial populations in the soil. This diversity contributes improved crop nutrient cycling and soil health.

¹2003 DREC Annual Report. Barley, Oat, And Cereal-Pea Mixtures As Dryland Forages In The Northern Great Plains. P. M. Carr, R. D. Horsley, and W. W. Poland



Graph 1: Intercropping can produce many positives for producers.

Continuing our Commitment

to serve the people of North Dakota with meaningful research work and protecting our natural resources.

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Do your livestock like their table?

Grazing systems mix resources of sun, soil, air, water and plants

By JON STIKA
DREC Webmaster

What do livestock think of their meal table?

Livestock are at the mercy of the producers and the grazing systems.

Grazing systems are an intricate web of many resources in balance with each other. Sun, soil, air, water, plants, and animals all play a part in how forage is produced and harvested, and how well soil, plants, and animals, are maintained.

The main players, livestock, plants and soil, work together to maintain a balance, each caring for itself and providing for their partner-players. This partner relationship is critical so all will be able to continue functioning together into the future.

How does a cow view a grazing system? As cattle move around a grazing paddock they use their many senses to determine what parts of which plants they wish to graze.

Livestock graze to meet their nutritional needs for energy and protein, drink water and rest to ruminate, all in a day's existence. When there is a wide variety of plants and sufficient growth available, a cow, for example, selects the portion of particular plants to meet her needs.

If there is insufficient plant growth, particularly if most of the plants are the same species, livestock will be less selective and probably spend more time grazing to meet their needs. Ultimately, a cow sets out each day to meet her nutritional needs

from what is available within the paddock to which she is confined.

The affect on the plants and soil within a paddock depends upon where and how long the livestock graze. Livestock left to graze too long in a paddock will re-bite plants as soon as they grow enough to be attractive again.

This often results in degradation of plants: some from over grazing and some from not being grazed at all. This often occurs to plants that are side by side in the paddock resulting in a patchwork of spot grazing.

Livestock left in a given paddock for an extended period of time may overgraze all of the plants in an attempt to meet their nutritional needs. Ideally, all plants in the paddock would be stimulated by grazing so they remain leafy and can grow unmolested until they have produced enough growth, and gathered enough energy to maintain themselves, before being grazed again.

Grazing animals do not begin their day thinking about degrading the plants in a paddock. Livestock utilize what has been provided to them to meet their daily nutritional needs.

If plants in a grazed paddock are



This calf is well hidden among some old structure and new growth forage.

degraded and become less productive, it is not through the fault of livestock, plants, or soil. Livestock are the tools used to harvest forage and turn that forage into something of value (beef, milk, lamb, wool, etc.) in the marketplace. A well-designed and executed grazing system will maintain (or perhaps improve) the soil and plants and produce saleable commodities.

Biologically effective management of grazing lands is an important facet of the research and education taking place at the Dickinson Research and Extension center. To learn more about this important topic please visit the DREC website at: <https://www.ag.ndsu.edu/dickinsonrec>.

The next installment will cover a plant's view of a grazing system.



Set the table: good pasture management for livestock is a positive mixture of sun, soil, air, water and plants.

Cows eat less, gain more and save grass

Early wean advantages

- Cow gain increase near .5 lbs/day
- Cow intake decreased 18.9 lbs/day
- Cow body condition score increased .58
- 36% more forage left

By DOUG LANDBLOM
DREC Animal Scientist

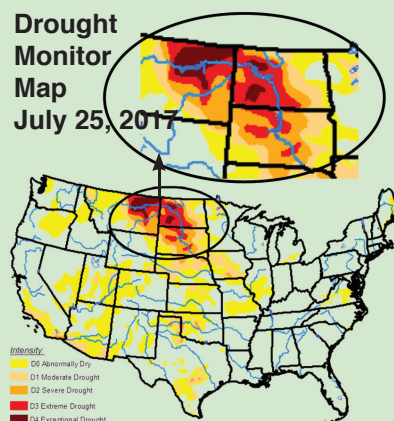
Early weaning of calves can improve pasture forage and increase cow weight gain. Research data shows 36% more forage left in native pastures, cows consumed 18.9 pounds less forage per day, gained 45 pounds, nearly a half a pound per day, and increased body condition score .58.

This research was especially appropriate after the drought in the Dakotas and Montana in 2017 with large portions of the states in the extreme and exceptional drought categories. (See map.) Thousands of cattle were sold or moved to rented pastures in unaffected neighboring states.

The same fears exist going into the 2018 grazing season. Subsoil moisture is inadequate but snowfall and timely spring rains can change that outlook.

Next month, a discussion on annual-forage grazing options to feed early weaning calves.

Drought Monitor Map
July 25, 2017



Much of the Dakotas and Montana experienced severe drought in 2017.

Autecology of Purple prairie clover

By JON STIKA
DREC Webmaster

How well do you know your plants?

The Purple prairie clover, *Dalea purpurea*, is one prairie plant species that has been studied for 67 growing seasons (1942 to 2012) at the Dickinson Research Extension Center. The current autecology study is coordinated by DREC Range Scientist Dr. Llewellyn Manske.

Autecology: what is it?

Autecology is the study of the interactions of an individual organism or a single species with the living and nonliving factors of its environment. Autecology is primarily experimental and deals with easily measured variables such as light, humidity, and available nutrients in an effort to understand the needs, life history, and behaviour of the organism or species.

www.britannica.com/science/autecology

Manske's research reviews the presence of the Purple prairie clover since the first record of the plant in 1891 by J.I. Bolley. Manske's research describes the changes in growth and development and the changes in abundance through time as affected by various pasture treatments: non-grazed; season long and twice-over rotation.

Purple prairie clover is a member of the legume (bean, pea) family. Purple prairie clover is a native, perennial warm season herb that is moderately drought tolerant, and fairly shade tolerant.

The plant can have several stems 8 to 24 inches tall with compound leaves 0.4 to 1.6 in long with a woody taproot that may go 6 to 8 feet deep into the soil. Survival is highly dependent upon mycorrhizal fungi for uptake and transport of soil nutrients.

The flowers are tiny, pea shaped with five purple to rose colored petals. Blooms start at a bottom row and progressively move upward during late June to early August. Pollination is by bumblebees, beetles, and other insects. Fruits are a one seeded legume pod.

Above ground parts of the plant are eaten by livestock. Purple prairie clover had a greater presence and stem density in native range pastures where twice-over grazing was practiced than those pastures that were not grazed or grazed all season long.

The twice-over treatment was the only management treatment that Purple prairie clover was present during the drought stricken growing season of 1988.

The thick, woody caudex with several lateral branches, the deep woody taproot, and the coarse deep lateral roots help Purple prairie clover persist through the harsh conditions on the Northern Mixed Grass Prairie.

The full report is available on the web: <https://www.ag.ndsu.edu/DickinsonREC/annual-reports-1/2017-annual-report/2017-annual-report-drec-1137.pdf>



Prairie purple clover is a native legume on the prairies of the region.

BeefTalk: Helping beef producers

Beef production is an economic force, providing production techniques, management protocols and evaluation metrics to all phases of the industry throughout the world.

Since 2001, NDSU Extension Beef Specialist Dr. Kris Ringwall has authored a weekly column mixing statistical analysis, livestock trends, and production opportunities for all elements of the beef production chain. Woven into this storyline is relevancy with non-beef production events.

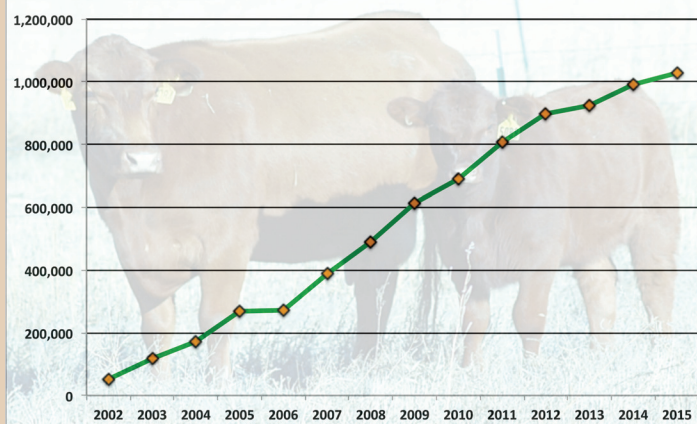
The BeefTalk column is provided world-wide in two languages (English and Spanish). Over 1,000,000 internet views of the column occurred in 2015. The internet audience continues to grow.

Additionally, thousands of beef producers regularly read the column in weekly and daily newspapers, livestock journals, agricultural publications and periodicals, and classrooms.

In addition to the publication and internet reads, there is great acceptance on the international stage for the wit, humor, philosophy and dedication to provide producers with meaningful information based on scientifically collected and analyzed data.

The science supporting the BeefTalk column is the Cow Herd Appraisal Performance Software, a major tool which offers producers an opportunity to analyze herd performance and animal production. Since the introduction of the CHAPS program, over 1,000,000 cattle records have been processed, providing producers with benchmarks in signifi-

BeefTalk Web Views



cantly important production and economic traits for the beef industry.

The BeefTalk column is also a strong proponent of practicing stewardship, preserving resources and preparing youth to be future leaders. There is a graphic associated with each BeefTalk column.

Access the BeefTalk columns on the web at www.ag.ndsu.edu/news/columns/beefstalk/ or www.ag.ndsu.edu/DickinsonREC/beefstalk-articles-1.

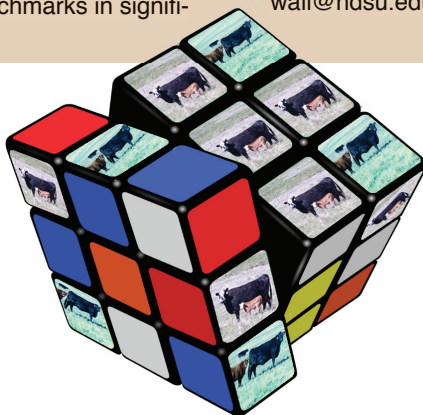
For information, contact Ringwall by email at kris.ringwall@ndsu.edu or by phone at 701-456-1103.

Cropland Soil Health Project

The Dickinson Research Extension Center hosted the Southwest North Dakota Soil Health Demonstration Project from 2008 – 2016. The project was a cooperative venture with North Dakota State University, Stark-Billings Soil Conservation District, the Dunn County Soil Conservation District and the USDA Natural Resources Conservation Service.

Soil health was looked at closely and improvements noted. Areas of research investigated included but were not limited to feeding soil organisms, preventing erosion and fostering water and nutrient savings.

One major improvement was the water infiltration rate of over 680% in eight growing seasons.



Plant and Animal Genomic Research

There are billions of possibilities present within plant and animal biology. The Dickinson Research Extension Center continues to use scientific methods to find sustainable, sensible solutions.

Areas of DREC plant and animal genomic research include the following:

- Evaluating population diversity
- Exploring heterozygosity
- Using sound stewardship

Contact the DREC via the internet at www.ag.ndsu.edu/dickinsonrec or call 701-456-1100 for more information.

Crop Rotations and Beef Cattle Grazing

S. Senturklu, D. Landblom, L. Cihacek, E. Brevik

Research has been ongoing at the Dickinson Research Extension Center regarding various ways to improve soil health and provide opportunities for livestock.

During the process of seeking various options for soil management, a variety of outcomes were discovered. A synopsis is as follows:

Yield increase: Wheat yield increased on diverse crop rotation while continuous wheat yield declined

\$ return: Average annual return of diverse crop rotation is \$85/ac. vs. continuous wheat \$70/ac.

Increased beef gain: Currently, 105 days of 2.1 lbs/day beef gain when grazing annual crops

For more information on this research project, contact DREC Animal Scientist Doug Landblom, 701-465-1109 or email him at doug.landblom@ndsu.edu

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