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**Dickinson Research Extension Center** 

September 2018



October 19, 2018 Cover Crop Seminar Hettinger Research Extension Center Dickinson Research Extension Center

Hear outstanding presentations at both locations from leading researchers and advisors on how cover crops can be a tool for soil improvement.

The public is welcome. Hettinger program runs from 9-11 a.m. Dickinson program runs from 2:30-4:35 p.m.



Dr. Burton Johnson educates the crowd about industrial hemp production at the DREC Summer Field Day



Golden Valley County producer Rory Farstveet inspects hemp seedlings at the 2018 DREC Summer Field Day.

## **Industrial hemp is crop option** DREC planted demonstration plot; research continues

The Agricultural Act of 2014 (farm bill) allowed research institutions and state departments to grow industrial hemp, if allowed under state law. North Dakota addressed this in March 2015 when House Bill 1436 was signed, creating guidelines for industrial hemp production and reduced federal policies that make industrial hemp production difficult. The North Dakota Department of Agriculture (NDDA) then implemented the industrial hemp pilot program. This allowed NDSU to begin conducting research in 2015 and allowed farmers to apply to be selected to produce industrial hemp under the state and federal guidelines.

In 2018, DREC was able to plant a small demonstration plot of hemp. This is not the first time hemp has been grown at the Dickinson Research Extension Center. After working with Dr. Burton Johnson of NDSU to receive approval to plant the crop, DREC was able to obtain seed and get the crop in the ground on June 20th. In ideal conditions, the hemp would have been planted about a month earlier. Delayed planting generally results in shorter plants.

A major issue with hemp production is the germination rate and seedling mortality. A recommended plant population is 12 plants/square foot. With germination rates generally ranging from 10-70%, seeding rates need to be adjusted accordingly. With the demonstration this year, there were three zones of plant populations consisting of:



This is a file photo of hemp grown at the DREC in the early part of the 20th century.

#### 3, 10, and 12 plants/square foot.

Hemp has been shown in Canadian studies to have a high response to nitrogen fertilizer, with a recommendation for fertilizer similar to that of a high yielding spring wheat. The hemp in the DREC demonstration began to show nitrogen deficiency during the early reproductive (flowering) growth stage.

Most of the research work currently being conducted on hemp in North Dakota is being conducted at the NDSU Langdon Research Extension Center to look at seeding date, seed treatments, and variety trials. The varieties of hemp differ greatly depending on whether the crop will be grown for fiber, grain, or as a dual purpose crop for both fiber and grain. Some varieties of hemp are monoecious and some are dioecious. Monoecious plants have both male and female reproductive parts on the same plant, where dioecious plants have either male or female flowers only. Dioecious plants are generally used for grain production and monoecious plants are either used for their fiber or as a dual purpose crop.

There are many uses for hemp depending on the part of the plant being harvested. Industrial oils, dietary supplements, and animal feed can be produced from the seeds. Paper, textiles, and plastics can be produced



Dr. Burton Johnson directed the hemp study at DREC.

from the long fibers from the outer layers of the stalk and animal bedding, thermal insulation, and construction materials from the woody core of the stalk.

Hemp seed is a source of cannabidiol or (CBD). CBD shows promise as a treatment for epilepsy, along with other therapeutic benefits as well asbeing an anti-inflammatory.

There is currently only one buyer of hemp oilseed within the state of North Dakota, Federal regulations surrounding hemp make marketing the crop challenging.

Growing hemp is smilar to growing canola. Canola, a crop that came from Canada in the late 1970s, is now one of the staple crops of North Dakota. It is clear that hemp has potential to become a viable crop for producers in North Dakota. RR

For more information about hemp production, visit the DREC Agronomy Research page: https://www.ag.ndsu.edu/ dickinsonrec/agronomy

# 2018 Field Day Highlights

Finding and controlling weevils in alfalfa and peas were major topics at the 2018 Dickinson Research Extension Center Summer Field Day. Nearly 100 producers, researchers and agricultural professionals participated in the annual event.

Hector Carcamo from Agriculture and Agri-Food Canada, Lethbridge, Alberta, provided the keynote presentation discussing pea leaf weevil background and management. Pea leaf weevil impacts on crop production can be devastating. He showed a pea plant that had suffered leaf damage from weevils.

Carcamo told the audience crop diversity was a good way to prevent pea leaf weevil infestions. Carcamo's presentation followed a presentation by NDSU Extension entomologist Janet Knodel, who discussed alfalfa weevils and demonstrated how to use a sweep net to check a field for weevils.



Weevil control was discussed among Hector Carcamo, Janet Knodel, Greg Lardy, Rory Farstveet and Kevin Kessel. An alfalfa weevil larva at right.

> NDSU plant sciences department professor Burton Johnson provided a presentation on hemp as an alternative crop.

Jon Stika offered insights into soil health; demonstrating the importance of water infiltration into the soil.

Dickinson Farm Management Instructor Levi Helmuth offered producers tips on financial management. "One thing I can't drive home enough is that you can't manage what we don't measure," he said.

Field day attendees met interim NDSU Extension director, Greg Lardy, a native of Sentinel Butte, ND. He assumed the position July 1, 2018.

"I'm really here as a servant leader for this organization to see it through. Clearly, we are focused on the legislative session," Lardy said. "We want to make sure we do a good job of

working with our decision makers and working with the governor's officeto ensure our budgets our intact. That is really our number one priority." **RR** 

# Crested wheatgrass: a staple for livestock

The autecology of Crested wheatgrass, *Agropyron cristatum*, is one of the prairie plant species included in a study conducted at the NDSU Dickinson Research Extension Center during 67 growing seasons from 1946 to 2012. The study describes the changes in growth, development and abundance through time as affected by management treatments.

Crested wheatgrass is a long-lived perennial, cool-season, mid-grass, that is highly drought tolerant and winter hardy. Crested wheatgrass was introduced into the United States in 1906, and into Canada in 1915, from Eurasia and has become naturalized in the Northern Plains. Numerous accessions of plant material originating from Turkey, Iran, Kazakhstan, central Asia, western and southwestern Siberia, and the steppe region of European Russia have been brought to North America.

The extensive root system of Crested Wheatgrass has tough main roots growing vertically down, forming a dense mass in the top three feet of soil with several

long main roots descending to depths of eight feet. Regeneration is primarily by crown and rhizome tiller buds. Viable seed production is high and seedlings are vigorous, however, seedlings are successful only when competition from established plants is nonexistent. The numerous flower stalks are erect,slender, and hairless with a flattened dense spike that hasclosely spaced overlapping spikelets in two opposite rows. Flower period is from late-May to mid-June. Leaves and stems are palatable and nutritious to livestock during May.

Early growth consists of basal leaves from crown and rhizome tiller buds. The rhizomes are short and the plants are typically described as a bunch-type grass, however, the number

# Crop aftermath can provide feed needs

Early fall is a good time to take advantage of crop aftermath grazing. Crop aftermath grazing gives producers an opportunity to position cows for calving and rebreeding next year.

If bulls are turned out June 1, the second trimester of the cows' pregnancy starts in early to mid-September and the third trimester starts in mid-December. Thus, the last week in September presents an excellent opportunity to increase cow body condition by grazing crop aftermath.

This is also a good time to evaluate plans for winter. Feed inventory, cattle inventory, pasture usage and prepping calves for weaning are all on the table. September starts a window of nutritional change for cow herds that had an early June bull turnout. Weight gain is difficult for a cow once she enters the last third of gestation, when the ever-growing calf and cold winter nights can take a toll.

We want the cows to be in good condition at calving next spring and even better condition at breeding next summer. So when do we put weight on the cow? Well, the middle three months of gestation, or pregnancy, would work. Cow milk



Crested wheatgrass is a cool season grass in the Northern Plains. The grass was introduced to the United States in the early 20th century.

and length of the rhizomes and the relative quantities of crown and rhizome tillers is determined by the timing of grazing and the amount of leaf area remaining at end of the grazing period.

Proper grazing prior to flowering stimulates the number and length of the rhizomes of Crested Wheatgrass and increases the quantity of rhizome tillers; while grazing or haying after flowering inhibits rhizome development and decreases the quantity of rhizome tillers. In this way, grazing crested wheatgrass between the time that three and one half new leaves develop in the spring, but before flowering occurs, is best for long term forage production.**RR** 



Corn stover is crop aftermath that meets cow needs.

production is decreasing at that time, weather is favorable and fall feed-stuffs generally are readily available. Crop aftermath is bountiful across the country. After weaning, a cow will eat above her requirements while grazing crop aftermath and gain weight. In this case, replacing the weight she lost raising her calf, along with adding more body condition (commonly called fat) in preparation for winter.

Yes, fall grazing can make a real difference in the productivity level of the herd. The challenge for many producers is the business of getting ready for winter. The fall weeks slip by, and all of sudden the cows third trimester is here and we still are catching up. Take the time to fix some fence, visit with the neighbors and seek some crop aftermath for your cows to graze to get them ready for winter. **R**B

## **Retained ownership profit opportunities** Yearlings grazing on diverse crop rotation can provide options

Cattlemen in ND typically produce 500-900 pound calves destined for backgrounding and finishing in feedlots. Cow-calf producers who retain ownership of their calves through finishing and slaughter do so as a high risk, low profit margin business with potential for catastrophic loss. For this reason, retaining ownership is often avoided.

However, what if retained ownership could be consistently profitable?

Dating back to 2011, researchers at the Dickinson Research Extension Center started looking into the profit potential from extended grazing and delayed feedlot entry. This is being accomplished by integrating yearling steer grazing into



Yearling steers grown on corn can be a profitable retained ownership venture.

a five-year multi-crop rotation of spring wheat, cover crop, corn, field pea-forage barley, and sunflower. Income from the system is derived from sales of spring wheat and sunflowers along with finished yearling steers that grazed the other crops as forage in the crop rotation.

For the first study, steers were weaned in early November and grown at 1.0 pound per day until the first week of May and then divided into three groups. One group was shipped directly to the University of Wyoming, Sustainable Agricultural Research and Education Center (SAREC) for traditional growing, finishing,and slaughter (FLT). The two remaining groups were assigned to either graze crested wheatgrass and



### Continuing Our Commitment

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

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	FLT - Control	PST	ANN
Grazing:			
Days Grazed	-	181	181
Grazing ADG, lb	-	1.7	2.22
Grazing Cost/Steer, \$	-	\$157.31	\$238.46
Grazing Cost/lb of Gain, \$	-	\$0.51	\$0.59
Ribeye Muscle Area (cm <sup>2</sup> )	-	55.9	70.1
% Intramuscular Fat (Marbling) (%)	-	3.22	4.13
Finishing:			
Days on Feed	142	91	66
Harvest Age, Months	18.1	22.1	21.4
Starting Weight, Ib	809	1074	1188
End Weight, Ib	1349	1488	1479
Gain, Ib	540	414	291
ADG, lb	3.8	4.55	4.41
Feed/lb of Gain, lb	1.07	0.92	0.95
Economics:			
Carcass Value, \$	\$1,497.41	\$1,718.41	\$1,738.93
Total Grazing & Feedlot Expenses, \$	\$1,795.46	\$1,748.51	\$1,729.84
System Net Return	-\$298.05	-\$30.10	\$9.08

TABLE 1 -- Research at the DREC shows retained ownership options available to producers.

native range for the entire grazing period from May to November (PST), or to graze crested wheatgrass and native range until August and then graze field pea-barley and unharvested corn in the cropping system until November (ANN). Then at the end of the 181-day grazing period, the grazing steers were shipped to the SAREC feedlot for a short finishing period.

Results from the research are summarized in Table 1. After two years, the steers that grazed grass and crops gained weight better than the steers that grazed grass alone (2.22 vs. 1.70 lb/day). After accounting for gross carcass return less grazing, feedlot finishing, transportation to

the feedlot and packing plant, brand inspection, and health costs each system's net return was: \$9.09 per steer for the steers that grazed grass and crops, -\$30.10 for the steers that grazed grass alone, and -\$298.05 for the steers fed on the feedlot alone. The bottom line: grazing perennial and annual forages and delayed feedlot entry showed the greatest potential for profitability.

A future article will summarize performance, net return, and profitability among steers of two frame-score sizes grown and finished in a 211-day extended annual forage grazing period followed by an abbreviated feedlot-finishing period. **RR**