



News from the High Plains Ag Lab

July 2011



Advisory Board Chairman's Comments:



The cool and wet spring has come to an end, and summer is definitely here. Hopefully, everyone got their share of the rains this spring. Unfortunately, as usually happens,

some hail came with it. The wheat plot tours are over, and the field day at the High Plains Ag Lab is next. It is scheduled for August 4. Registration will begin at 8:30 a.m. The tour starts at 9 a.m. and ends by noon. No meal is planned this year. The agenda is not finalized yet, but it will probably include some results from the wheat variety trials, discussion of the proso millet plots, wheat stem sawfly, fallow management, and grazing studies. Drew would appreciate suggestions if there is something in particular that you would like to see included.

Alton Lerwick

High Plains Ag Lab Farm Manager's Comments:



Well, since it's still too wet to plant the no-till proso millet, I will take a few minutes to write a few lines for the July newsletter. Hopefully, I can finish up this weekend, and put a long and frustrating spring planting season to rest.

I hope most of you missed the hail that came earlier in June, and can continue to dodge it until harvest. We did have some damage here at the High Plains Ag Lab, but not near as much as just a couple of miles south of us. The cool wet weather certainly helped some of the poor stands that we started off with last fall, and I can now hope for a respectable crop instead of one that would have not been very good. When it finally gets here, I hope all of you have a quick, trouble free, and safe harvest with excellent yields.

Just a reminder, don't forget our August 4 field day. Hopefully, the wheat will be in the bin by then, and we can plan on seeing each and everyone of you on the plot tours.

Tom Nightingale

Mark your calendars:

August 4, 2011: Summer field day, 8:30 a.m. - noon. For details watch panhandle.unl.edu/hpal

Contact the High Plains Ag Lab:
Phone: 308-254-3918
On the Web: panhandle.unl.edu/hpal

Inside this Issue:

- Alternative crops research..... 2
- Dryland crops research..... 3
- Field peas in distillers grain cubes..... 4
- Irrigated grass for ethanol production 5



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Spring peas



Safflower



Spring camelina

Alternative crops update at HPAL

Dipak K. Santra and Vernon Florke
Alternative Crops Breeding Program

Winter crops (planted in fall 2010)

Winter wheat: This year wheat is expected to perform well. No serious damage is noticed in both conventional and organic wheat variety trials.

Winter triticale: This trial has been harvested in early June. A normal trial is expected.

Spring and summer crops

Camelina (nicknamed “jet fuel”): My objective is to evaluate camelina germplasm for their ability as spring planted crop. I am testing to identify high-yielding (both seed and oil content) varieties for production in the Nebraska Panhandle. Two variety trials (14 varieties), under both irrigated and dryland, and germplasm evaluation trial (45 lines) under irrigation, have been planted in May to test their potential for commercial production. So far the trial looks good with respect to emergence and plant stand. No disease has been noticed so far.

Fenugreek (human health enhancing legume), also known as Greek hay): This is a brand new crop to the Panhandle. It is an annual legume, can fix nitrogen to the soil and is adapted to a semi-arid climate. Both seed and foliage are rich in various bioactive compounds, which are associated with fighting diabetes, cancer, and cholesterol. The foliage is excellent forage quality, very similar to alfalfa. The crop was planted in June and will be harvested in September-October. We are testing whether varieties can be developed for both seed and forage production in the Panhandle. Two variety trials (10 varieties) under both irrigated and dryland, and germplasm evaluation trial (172 lines) under irrigation, have been planted in May to test their potential for commercial production in western Nebraska. So far the trial looks good with respect to emergence and plant stand. No disease has been noticed so far.

Safflower planting date study: Three commercial saf-

flower varieties were planted at three different planting dates starting the first week of April at 7- to 10-day intervals. The purpose is to evaluate seed yield and oil content variation due to planting at different dates. The early planted trial is expected to perform better since it will be able to utilize available soil moisture during its early seed development and oil-producing development stage. I do not know if this will be manifested this year due to above-normal rainfall in the spring.

Pea: Ten grain pea varieties were planted for their yield potential under dryland in western Nebraska. The stand looks very good.

Proso millet (Bird seed crop): This year I am testing potential varieties, early generation breeding lines and global germplasm (a collection from different countries) for local adaptability, high yield, tolerance to lodging and seed shattering. Two trials were also planted under an organic production system to identify superior and high-yielding varieties for organic proso producers. In 2011 I have planted 31 advanced breeding lines (including standard varieties as checks), 34 advanced breeding lines, about 600 early generation breeding lines, about 100 PI lines and 14 breeding population (F3).

Sunflower (edible oil but can be used as biodiesel): My goal is to test commercial sunflower hybrids (oil and confection types) for adaptability, high seed and oil yield in Nebraska Panhandle under irrigated and dryland (HPAL) conditions. We have planted 18 and 23 oil type varieties under irrigation and dryland, respectively, and 17 confection type hybrids under irrigation.

Tef (Gluten-FREE, high Fe and Ca content cereal. Also nick named “lost crop of Africa”): This crop originated in Ethiopia. Its seed is fine like sand but highly useful as food for people with gluten intolerance (Celiac patients). The whole plant also can be used as forage. In 2011, I have planted 14 varieties under irrigation for early maturing varieties with high yield.

Dryland cropping systems activities

Drew Lyon, Dryland Cropping Systems Specialist
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I would like to share with you my current research activities at the High Plains Ag Lab. I do not have much in the way of final results to share with you at this time, but I thought you might be interested in the scope of the work I am currently conducting. Please feel free to contact me about any of these projects if they are of interest to you.

Flexible Fallow

This study was designed to collect field data on crop growth and water use to be used to calibrate and validate a crop simulation model. The model will be used to compare two fixed crop rotations (winter wheatBcornBfallow and winter wheatBcornBspring triticale forage) with a flexible fallow rotation. The field portion of the study will be completed with the 2011 harvest of spring triticale and winter wheat.

Juan Miceli-Garcia, the M.S. graduate student working on this project, is working closely with Dr. David Nielsen with the USDA-ARS at Akron, CO to calibrate and validate the simulation model AquaCrop. Once this is done to everyone's satisfaction, historical weather data will be used to see if a flexible fallow system, where spring triticale for forage is substituted for summer fallow when soil water content in the spring is at or above a threshold level, performs better than always planting triticale or never planting triticale as a summer fallow replacement.

Long-Term Tillage Plots

The second of two blocks in the long-term tillage study, which was initiated by Charlie Fenster and Gary Peterson in 1970, were sampled and a new tillage regimen was initiated this spring (see History of Sidney long-term tillage plots in the October 2010 issue of the HPAL newsletter). Drs. Maysoon Mikha, Joeseeph Benjamin, and Francisco Calderon, all with the USDA-ARS at Akron, CO, have sampled the plots prior to initiating the new tillage regime. Soil sample analysis will occur in the coming year and we hope to be able to share the data with you in 2012. Going forward, all of the fallow plots will be maintained without tillage until the spring of 2016 when the second round of intermittent tillage is scheduled to be performed.

Organic Wheat Fertility

This study was initiated in 2008 and will be completed following the 2011 winter wheat harvest. The study is investigating the use of green manure (dry pea), composted cattle

manure, and spring-applied organic liquid fertilizer to improve yield and grain protein in organic winter wheat. Low grain protein can be a problem in many organic production systems. Previous results have shown a consistent reduction in wheat yield following green manure as a result of reduced soil water at planting compared to treatments without green manure.

Weed Control with Tillage and Flaming in Organic Sunflower

We are repeating this study in 2011 on weed control in organic sunflower. Treatments will involve various combinations of in-row cultivation and/or flaming. We are adding a treatment timing at the cotyledon stage this year. Last



Flexible fallow field study on June 22, 2010, at Sidney.

year, treatments involving inter-row cultivation and intra-row hooded flaming at V-6 or V-6 and V-12 provided good pigweed control and less crop injury and greater seed yield than flaming alone.

Annual Forages/Cover Crops for Partial Summer Fallow Replacement

We seeded winter wheat into the various cover crop residues from the 2010 cover crop study (see Annual forage/cover crop study update in the October 2010 issue of the HPAL newsletter). That study included eight different annual forage treatments that were no-till drilled into standing proso millet stubble in our no-till continuous crop winter wheat-sunflower-proso millet-annual forage rotation. These eight treatments were forage pea, oat/pea, four different forage cocktail mixes, fenugreek, and triticale.

There were no significant differences in soil water con-

Continued on page 6

Field peas as a binder in distiller's grain cubes

By **Karla Jenkins**

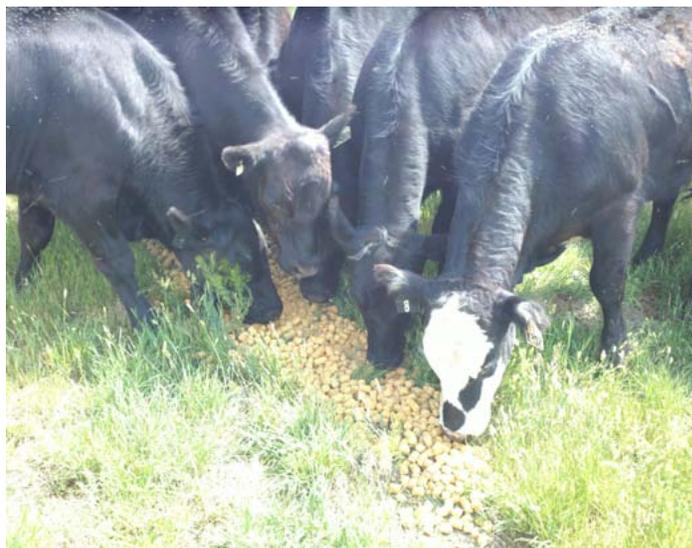
Cow-calf/range management specialist

Farmers in the Nebraska Panhandle are becoming more interested in the value of raising field peas as an alternative to fallow in dryland wheat rotations. The availability of this commodity has sparked interest in its value as a feed for beef cattle. Research studies have indicated that field peas are palatable, result in no reduction in animal performance, and enhance carcass tenderness.

Dried distiller's grains are a good protein supplement for grazing cattle, but when fed loose can result in substantial waste. Field peas are a good binder when making range cubes and supply degradable intake protein (DIP) to complement the undegradable intake protein (UIP) supplied by the distiller's grains. Feeding supplement on the ground as opposed to in bunks allows producers to move cattle around in the pasture to encourage more uniform grazing. Currently, a 25 percent field pea- 75 percent distiller's grain cube is being evaluated at the High Plains Ag Lab.

In the summer of 2010, 108 heifers (744 lb) grazed crested wheatgrass from June through September and were supplemented with either dried distillers grains on the ground, dried distillers grains in a bunk or the 25 percent field pea-75 percent distillers grain cube fed on the ground (3 pastures/treatment). The heifers receiving the pea cube on the ground and the heifers receiving loose distillers in a bunk gained at a similar rate and significantly ($P < 0.01$) more than the heifers supplemented loose distillers grains on the ground (Table 1). Currently, (summer 2011) the study is being repeated with yearling steers for increased statistical power.

The initial results of this study indicate that peas make a nice binder in a distillers grains based cube, reducing waste when fed on the ground.



	Distillers grains on the ground	Distillers grains in a bunk	Pea/Distillers cube on the ground
Initial Weight (lbs.)	744	748	739
Final Weight (lbs.)	863 ^a	894 ^b	892 ^b
Daily Gain (lbs.)	1.15 ^a	1.40 ^b	1.47 ^b
Supplement Intake lb/hd/d	2.3	2.3	3.5

^{a,b}Values with different superscripts differ ($P < 0.01$), supplement was fed to provide 0.6 lb protein/hd/d

NU Foundation to help raise pledges for new lab building

Harvest is here! Thanks to a year of excellent moisture and hard work, the undamaged wheat crop is looking good! This work isn't just the tasks achieved on your farm, but others are also working hard for your crop. The High Plains Ag Lab crew is among the other help which is used on your farm. We have gained many ideas and insights from the their work, which has received national recognition.

The University of Nebraska Foundation has taken up the challenge of helping us work towards a new lab building this year. The lab building need is the current weak point in a tremendous effort accomplished during the last 40 years of agricultural research. Your help and investment into this

building program is needed to keep this research productive into the future of Panhandle agricultural profitability.

The Foundation has received some initial pledges, but a major effort is needed to make this dream into a reality. PLEASE SEND NAMES FOR POTENTIAL DONORS, ESPECIALLY POTENTIALLY LARGE DONORS, TO ME, ALTON LERWICK OR DREW LYON. Your ideas and help are appreciated!

*Keith Rexroth, Chairman
High Plains Ag Lab Building Project*

Irrigated grass for ethanol production studied

**Gary W. Hergert, Drew Lyon,
Alexander Pavlista and Dean Yonts**

The Energy Independence and Security Act (EISA) passed in 2007 mandated that U.S. ethanol production beyond 15 million gallons would be from cellulosic materials and advanced biofuels.

Irrigated grasses gain popularity when livestock prices are high or when forage supplies are low. Once a good stand of grass is established and it is not profitable for livestock, could it have other uses? There is limited information for different irrigation levels, especially warm-season (WS) perennial grasses under different irrigation levels in this area.

Warm-season species are more water-use efficient than cool-season species and may have excellent potential under limited irrigation. There is also limited information on the potential of grass mixtures versus monoculture or grasses that fit drier areas. Switchgrass is a good alternative for eastern Nebraska, but it may not be the best choice for western Nebraska. (Ken Vogel, personal communication).

The goal of a study undertaken at High Plains Ag Lab and the Panhandle Research and Extension Center

is to determine the production of perennial cool- and warm-season forages (monoculture vs mixes) under dryland to fully irrigated conditions.

Two locations were selected for the research: an area under the linear move at HPAL at Sidney and an area under the linear move at PHREC at Scottsbluff. This report will only discuss the HPAL data. The cool season (CS) grasses included:

1. A pure stand of orchardgrass
2. A wheatgrass mixture including western, intermediate and pubescent
3. A brome mix including meadow and smooth brome, creeping foxtail and orchardgrass

The warm season (WS) grasses included:

1. Switchgrass (cv. Trailblazer)
2. Big bluestem plus Indiangrass
3. A mixture of switch, big bluestem and Indiangrass

Cool-season grasses were planted the fall of 2008 at HPAL, but did not survive the winter so were replanted early May 2009 as well as warm-season grasses. Irrigation levels during 2009 and 2010 were 5, 10,

Continued on Page 6

Yield of warm-season grasses harvested 10/28/10 at Sidney, NE.

	Switchgrass	Big Blue/Indian Mix	Sw + Big Blue + Indian
	----- tons of dry matter per acre-----		
5 inches	2.20	1.73	2.00
10 inches	1.81	1.66	2.30
15 inches	2.11	2.44	2.38
20 inches	2.07	1.79	2.21

*Average Percent of Moisture= 32 %

2010 Total Yield of cool-season grasses (6/24 and 9/2 harvests)

	Brome Mix	Orchardgrass	Wheatgrass Mix
	----- tons of dry matter per acre-----		
5 inches	4.86	3.90	4.82
10 inches	5.03	3.78	4.81
15 inches	6.01	4.71	5.84
20 inches	5.11	4.36	5.54

Irrigated grass for ethanol production

Continued from page 5

15, or 20 inches for the growing season but these were modified for 2011.

Establishing a good stand of grass from seed can take awhile. Seed was purchased from Arrow Seed in Broken Bow, which notes on their web site: “The first year it sleeps, the second year it creeps, and the third year it leaps.” Growing grass as a crop is like growing any other crop: it requires patience and good management for weed control, fertilization and irrigation.

Due to weed control efforts, there was no grass harvest at HPAL during 2009. Weed control was still an issue in 2010. Warm season grasses were sprayed with either atrazine or Prowl to control early season weeds and rogue cool season grasses in plots. Cool season grasses were sprayed with 2,4-D to control weedy

broadleaf weeds in May. Once CS grasses began to grow rapidly, they competed well with weeds.

During 2010, there were 2 harvests of CS grasses at HPAL and 1 harvest of the WS grasses in late October. Data for different treatments and cuttings are shown in tables below.

The highlights of the first year of production show that the cool season grasses get off to a much faster start than the warm seasons regardless of soil type (sandy loam at SB vs. silt loam at Sidney) or irrigation level. The bulk of the production of the CS grasses was at the June harvest, but with adequate water and N, there was good production from the September cutting. The lower irrigation level was not harvested as CS grasses at the 5” irrigation level went dormant in July due to lack of water (rainfall and irrigation), but they recovered nicely with the irrigation applied in September 2010.

Dryland cropping systems research

Continued from page 3

tent between forage treatments. There was a slight difference in soil water content between the June 1 and July 2 harvest dates. There was about one-half inch more water in the soil profile following the June 1 harvest date than following the July 2 harvest date. We will see if the 2011 winter wheat crop responds to these differences in soil water at planting or to the differences in standing crop residue levels.

Herbicide Screening Trials

We are conducting various herbicide screening trials in 2011. They include two trials on downy brome control in winter wheat, a trial on feral rye and downy brome control in 2-gene Clearfield winter wheat, a trial on weed control in no-till sunflower, and a trial in weed control in no-till proso millet.



Feral rye and downy brome control in 2-gene Clearfield wheat in Banner County.