

The Introduction of Feed Peas and Feed Barley into Whole Farm Planning



Ken talks about his plot trials at his field day

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Project Summary

The purpose of this project was to test alternative crops, feed peas and feed barley, for the ecosystem of the Buffalo Ridge region in southwest Minnesota. The soil types, high altitude, lack of heat units, and wind in this region make growing conditions for corn and soybeans difficult. Cool season crops need to be fit into the rotation to spread out the risk in this harsh environment, spread out the work load, and lower the costs of crop production which come with the blend of warm and cool season, grasses and legumes in a rotation.

Project Description

Our 600 acre farm is located in southwest Minnesota on the Buffalo Ridge. About 300 acres are lighter soils and need more diversity in the system than corn and soybeans. We have a 300 sow feeder pig operation with indoor finishing and a feeder cattle operation. My father has a 100 stock cow operation, which is fed on this farm in the winter. We process all our own feed on the farm. My son and I are in the planning stages for the purchase of my father's stock

cows and developing a pasture rental arrangement for my father's land.

The farm is a family operation with one additional hired laborer for the hog operation. We have four children, three daughters and one son. One daughter is a senior and our son is a sophomore at South Dakota State University. Two daughters are still at home. Our son plans on coming back to the farm after college. My wife works in town as head teller in a bank.

After many years of trying to raise corn and soybeans, I finally realized that the farm is located in a different ecosystem on the Buffalo Ridge than most grain farms are. I now feel a little more comfortable in exploring and developing a new cropping system. The Freedom to Farm program also helped encourage me to look at other crops. Without this program I doubt I would have begun this project. Because my operation is a livestock operation, it made sense to develop a value added system around the livestock.

This project focused on two things that I see will continually evolve. The first is developing a new crop rotation with the introduction of a blend of cool and warm season crops. The second is finding markets for the crops. At this time, I am focusing on two cool season crops, feed peas and feed barley, but I can see benefits to expanding the system to include other crops not normally grown in this area. These cool season alternative crops need to be high yielding and work as a livestock feed.

In 1998, I planted six feed barleys, one feed pea, and one mixture of pea and barley in a test plot. The feed barleys were: Royal, Nebula, Logan, Baroness, Minbrite, and Standuwex. The pea variety was Profi and the pea-barley mix was Profi and Logan. I also planted a plot of spring triticale.

In 1999, I planted four varieties of barley and two varieties of feed peas. The barleys were: Royal, Logan, Standor, and Rhobust, a malting barley. I was not impressed with Baronese, Minbrite, Nebula, and Standuwex in the 1998 plot and with the poor availability of seed, I

did not plant these four varieties in 1999. The pea varieties in 1999 were Integra and Carneval. I did not plant any triticale in the plots in 1999.

Each variety was planted in a one-half acre strip with 90 lb of nitrogen and seven lb of sulfur applied for fertilizer. The previous crop was soybeans. Other nutrients such as phosphorus were not needed.

Results

One of the goals for 1999 was to double-check yields of the selected cool season crops. Some of the varieties come from areas north of us, namely North Dakota and Canada. It was surprising that these crops did so well in this ecosystem of the Buffalo Ridge. I believe the cool nights associated with the altitude, the soil types, and rainfall amounts may be very similar to our neighbors to the north.

Barley

There are some differences in barleys that I did not know existed. The information gained in the first year assisted me in developing a decision-making process to plan for the second year. I was able to gather not only yield information, but also to develop uses for the different varieties in my farming system.

Royal and Logan are two feed barley varieties that stood out in 1998 because of the yield, lack of lodging, and amount of straw produced. I planted these two varieties again in 1999 but the other barleys did not impress me.

The yield for Royal was 100 bu/A in 1998 and 85 bu/A in 1999 (Table 1). This is a semi-dwarf forage barley released by the University of Minnesota that has excellent lodging resistance, a high yield, and can be used as a cover crop when establishing a legume. I planted it thick at 2.25 bu/A to focus on yield.

Overall, I was happy with Royal and will use it for cover cropping. However, Royal is poor for straw production. I tried it as a double-crop after the early barley, but that did not work as the second planting only grew six inches tall. It will fit well in both organic and conventional crop rotations.

Logan also yielded less in 1999 than in 1998 with 72 bu/A and 92 bu/A respectively. The straw production was excellent both years. With the fertilizer that was applied to the plot, I thought lodging would be a big problem but it was not. Logan is known as a forage barley that handles stress well. The high

tonnage of forage produced also enables it to act as a smother crop. I would not use Logan as a cover crop for alfalfa because it is too competitive. It also has potential as a double-crop “barley on barley” because it handles the stress of limited moisture at the second planting. It grows quite tall compared to other varieties. The second planting can then be used as a forage for chopping or grazing.

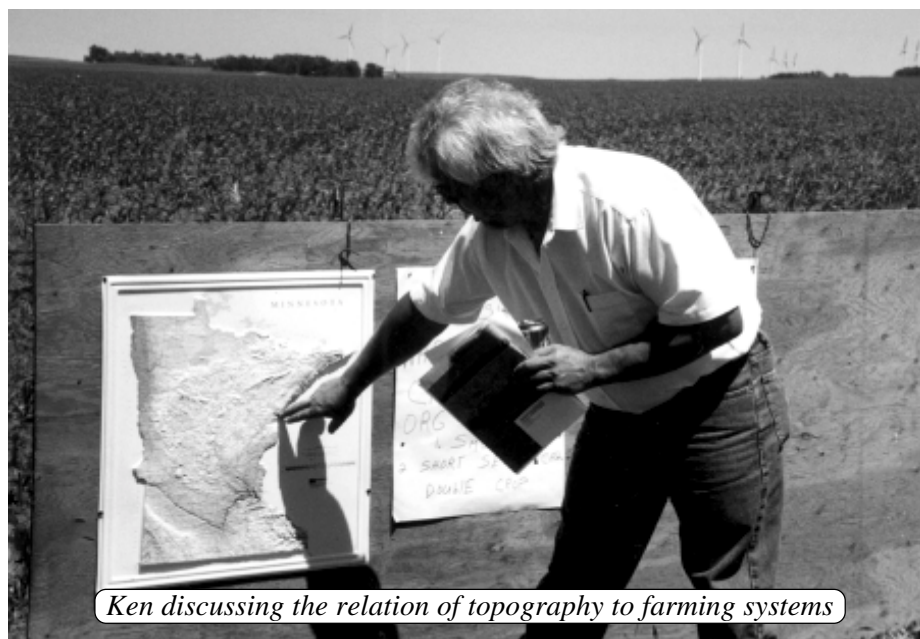
When I started the project, I did not think too much about the value of straw. We do not use much straw in our operation. After seeing the amount of straw that Logan produces I am changing my mind. The straw yield was 100 small bales/A. Straw has good value whether you use it for bedding, stock cow feed, or sell it.

I tested the variety, Standor, for the first time in 1999. The name Standor means it stands well. It had good lodging resistance and had a very good yield of 85 bu/A. The focus on this barley should be grain yield. It is not a malting barley or good as a forage. It definitely has a place on a livestock farm because of its resistance to lodging and high grain yield. I did not try it as a double-crop.

I am also exploring the potential for growing barley for the malting barley market. I tried the variety, Rhobust, in 1999. I planted the test plot too late and it did not meet the requirements for the malting barley market. However, the yield was decent at 67 bu/A. Several farmers in the area did meet malting barley standards with Rhobust and had yields between 65 and 85 bu/A. The Buffalo Ridge ecosystem appears to be suitable to growing malting barley.

Peas

Peas are a good cool season crop that I started trying to fit into my cropping system in 1997. I try to plant peas on lighter ground, which is high in phosphorus and potassium. Peas are a good crop to follow corn. They improve soil tilth and put nitrogen back into the soil at a rate of 1.25 to 1.5 lb/bu of peas



Ken discussing the relation of topography to farming systems



Ken discusses field pea varieties at his field

harvested. Peas are an excellent crop for early planting on soils that lack water-holding capacity. They grow early when it is cool and are harvested before the hot and dry weather takes too much soil moisture away.

In the 1998 plot, the feed pea variety, Profi, did really well yielding 52 bu/A (Table 1). In 1999, Carneval, a semi-leafless variety, and Integra, an open-topped variety that pods high and gets fairly tall, yielded 47 bu/A and Integra yielded 45 bu/A respectively. The spring

of 1999 was wet and led to white mold and pea aphid problems, which resulted in less yield. I sprayed Diamethlayte to control the aphids and it provided excellent control.

Peas are a good protein source for swine rations. We fed peas to our growing-finishing pigs and the results were favorable. We needed to use an additional bin and auger to handle the pea meal. The peas also need to be processed to the proper micron size of 700 to 800µ. We do need to add soybean

meal and methionine to balance the ration. As the pigs got bigger, pea meal levels were increased and soybean meal levels decreased. At this time, there is not enough research completed on how to balance rations with peas for sow diets.

We are also feeding peas to newly weaned beef calves and the calves are doing great. We are tracking the pea-fed beef calf research from the Carrington Research Station in North Dakota. The researchers are very impressed with the performance of pea-fed beef calves on their station. We recently purchased a mixer-wagon with a scale which is assisting us in feeding properly balanced rations and helps in calculating feed conversions. We are using available feedstuffs on our farm such as chopped hay, corn silage, and ground barley to formulate rations.

Financially, feeding peas does work. At \$3.50/bu for peas times the yield of 52 bu/A we grossed \$182.00/A. This is equivalent to \$180.00/ton of soybean meal. Protein costs for swine rations are important. If protein costs are high, peas are an excellent crop to raise to place as a hedge against those costs.

The peas in the pea-barley mix plot I tried in 1998 were smothered out by the Logan barley. Logan is such a tall and thick stooled barley that it overwhelms companion crops such as peas. I think a companion planting of barley and peas with a semi-dwarf barley variety such as Royal should be used.

Triticale

I was impressed with the growth rate of the 1998 planted spring triticale, but I planted it too thin to get a good idea as to yield and smother crop capabilities. I am thinking that winter triticale may fit better into our crop rotation because it could be double-cropped with soybeans.

The biggest stumbling block I have encountered is the lack of information on alternative crops. It is hard to fit these crops with different agronomic

Table 1. 1998 and 1999 Feed Barley and Feed Peas Plot Results

	<u>1998 Yield</u> (bu/A)	<u>1999 Yield</u> (bu/A)	<u>Lodging</u> <u>Resistance</u>
<u>Barley</u>			
Royal	100	85	excellent
Nebula	82		poor
Logan	92	72	good
Baroness	88		poor
Minbrite	92		poor
Standuwex	no results		poor
Standor		85	good
Rhobust (malting)		67	poor
<u>Peas</u>			
Profi	52		good
Carneval		47	good
Integra		45	good
<u>Peas & Barley Mix</u>			
Profi & Logan	no results		poor

characteristics into a rotation with the specific climate and ecology of the Buffalo Ridge. There has not been much research done in our area. I have found that the Buffalo Ridge area resembles North Dakota more than southwest Minnesota. Also, finding possible markets for alternative crops is difficult.

What started as the introduction of barley and peas to the crop rotation has evolved into a cropping system of mixing warm and cool season grasses and legumes. The cool season crops can be used as both grain and forage. This has created additional opportunities for livestock feed and lowers feed costs.

Part of my information on alternative crops has come from Denmark. In 1997, I had the opportunity to go to Denmark and tour their hog industry. The farmers there raise mainly cool season crops to feed livestock. Danish farmers are also involved in their own seed production. In Denmark, the consolidation of the seed and chemical companies had taken place years ago, not unlike what is happening now in the United States. Some of these consolidations were not viewed as positive for the seed industry. Many cooperatives representing the farmers felt it wise that farmers raise some of their own seed under strict production and handling guidelines, similar to the guidelines of the Minnesota Crop Improvement Association. Farmers in Denmark are adding value to their crops by controlling seed costs and by selling seed.

Summary Notes

Having both warm and cool season crops to plant on the soils that lack water-holding capacity appears to be an excellent way to manage risk in this unpredictable ecosystem. The barley and peas are also environmentally friendly and assist in controlling soil erosion.

These solid-seeded cool season crops definitely have a place in organic or low-input crop rotations. They are seeded before the warm season weeds get going

and act as a smother crop. Peas are not as effective as a smother crop as barley is, but I do believe peas can withstand a light tillage such as rotary hoe to take care of the first flush of weeds. After the first flush of weeds, peas make an excellent smother crop.

As changes in agricultural technologies advance, different ecosystems may require fine tuning of the crops planted. The large seed companies may not want to service a small market such as the ecosystem on the Buffalo Ridge. This creates opportunities for the farmer or a group of farmers to add value to their products. This can also mean, in order to survive, the farmer may have to do his or her own research and revamp the entire cropping system for the farm as part of doing whole farm planning. I am also taking a serious look at seed production as a way to diversify my farm operation and add value to the crops I am raising.

Management Tips

1. It is good to look at alternative crops if corn and soybeans have trouble maturing or yielding well in your area.
2. A blend of cool season and warm season crops spreads the labor and risk as well as adds diversity to the system.
3. Do your own research in test plots and study research from other states before you change your whole crop rotation. You need to gain some experience with alternative crops.
4. If planting barley as a cover crop or companion crop use a semi-dwarf variety such as Royal.
5. Barley straw is an excellent food for stock cows.
6. Barley will lodge if it has too much nitrogen.
7. Feed peas are an excellent source for protein for swine rations. Add methionine to balance the ration.

8. Peas provide a tremendous amount of mulch, which adds nutrients to the soil.

9. Peas like well-drained soils. Peas can be planted early on ground that dries out fast. This helps insure that you will get a crop off of the lighter and dryer soils.

10. Attend field days and visiting with researchers is a great way to gain knowledge.

Project Location

From Woodstock, take Cty Rd 18 north for 3 miles. Go 1 mile west then 1/4 mile north.

Other Resources

Carrington Research Center, North Dakota State University, P.O. Box 219, Carrington, ND 58421, 701-652-2055. Conducts research on cropping systems and the development of alternative crops for the northern plains.