

**Northeast Sustainable Agriculture Research and Education Program
Farmer/Grower Grant Report FNE03-488
KJ Farm**

1. Project Name and Contact Information

“A Study of More Cost Effective Ways of Crop Production”

Jason Pontius
R.R. #1 Box 670
Richfield, PA 17086
717-694-3405
kpontius@pa.net

2. Goals

The goal of “A Study of More Cost Effective Ways of Crop Production” was to determine the feasibility of using non-traditional crops for grain farming in the Northeast United States.

3. Farm Profile

For the past twelve years, I have been a full-time farmer. Over the years, I have experimented with crops to determine what is the best crop rotation for the type of soil where I farm. I currently own 70 tillable acres and rent an additional 530 acres to make my total farming operation 600 acres. The crops produced during the 2004-growing season were corn, soft red wheat, hard red wheat, buckwheat, sorghum, oats, alfalfa and barley. In addition to my cropland, I work in partnership with my father on a 40-cow dairy operation.

4. Participants

Throughout this project, Greg Hostetter, Juniata County Extension Agent, has served as the primary consultant. Mr. Hostetter has assisted me in designing the research plots, keeping accurate records along the way and making proper use of the steps of the scientific method while harvesting the crops. In addition, Mr. Hostetter made arrangements for my field day and was present to help me field questions from local, interested farmers. In addition, Krista Pontius, FFA Advisor at Greenwood High School,

provided support by arranging for students to be available during harvest of the test plots.

This proved valuable for both parties. I was able to acquire some much needed assistance harvesting and the students had the opportunity to work directly with a research project.

5. Project Activities

Corn- Grain Sorghum

Question: Is there an economic advantage of raising grain sorghum rather than corn?

Project Methods: Using a four acre plot, we will plant a 24 foot wide strip of grain sorghum and a 24 foot wide strip of corn, the test will be replicated four times.

Oat-Clover

Question: Does underseeding oats with clover produce an adequate amount of Nitrogen to successful grow crops?

Project Methods: Using a three acre plot of oats, we will underseed clover into a 30 foot strip and use another 30 foot strip as a control. This test will be replicated four times within the plot. (The original grant proposal was to overseed wheat with clover but this was not possible during the last growing season because of the amount of snow cover.) The second year, we planted corn in the plots to determine which would result the best yield.

Buckwheat

Question: Is buckwheat a feasible fruit to use in crop rotations in the Northeast?

Project Methods: Using the recommended application rate (50 lb./acre) we will create several plots of buckwheat, using two acre strips, focusing on planting date and tillage methods. The plots will consist of: a no-till plot planted on July 26, a minimum-till (chisel plow) plot planted on August 2, a no-till plot planted on July 30, a minimum-till plot planted on July 30, a no-till plot planted on August 9, and a minimum-till plot planted on August 9. We will also

plant one strip of full season buckwheat to use as a control. The dates could vary slightly depending on maturity of wheat and weather conditions.

Barley-Grain Sorghum

Question: Is it an economically sound practice to use grain sorghum as a double crop after barley?

Project Methods: After the barley is harvested, we will use the two three acre strips to plant grain sorghum. We will plant a strip of no-till. (Minimum-till was originally proposed, but it was unable to occur because of the excessive amounts of rain received during the summer months.)

6. Results

Corn-Grain Sorghum

Crop	Date Harvested	Number of Rows	Length of Rows	Number of Plots	Plot Size	% Moisture	Yield (lbs)
Grain Sorghum	12/31/04	5	530 ft	4	.77 acre	13	719
Corn	11/15/04	4	531 ft	4	.62 acre	15.5	1934

Oat-Clover

Crop	Date Harvested	Number of Rows	Length of Rows	Number of Plots	% Moisture	Yield (bu/acre)
Clover	12/31/04	32	530 ft	4	15.5	68.7
No Clover	12/31/04	32	530 ft	4	15.5	75.7

Buckwheat

Tillage Practice	July 26	August 2	August 9	Harvest Date	% Moisture
Full Tillage	4.37 cwt/acre	4.72 cwt/acre	2.94 cwt/acre	10/30	15

No-till	0	0	0	N/A	N/A
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Barley-Grain Sorghum

Barley-Sorghum	Harvest Date	Plot size	Yield (LBS/ACRE)	% Moisture
Plot #1	.12/17/04	.569 acre	512	13
Plot #2	12/17/04	1.34 acre	440	13

7. Conditions

The intention of the SARE grant was to provide farmers with options for growing crops under dryer conditions. Unfortunately, the research was performed under two of the wettest years on record in Central Pennsylvania. The excessive amounts of moisture effected the test results. We are certain that the test weight of the buckwheat was much lower than normal, because of these conditions. It is also suspected that the outcome of the grain sorghum tests drastically declined because of the weather conditions.

8. Economics

Because of the current value of Nitrogen, fertilizer costs nearly doubled from the grant budget.

Corn- Grain Sorghum

Sorghum requires only 2/3 the cost of corn of initial investment.

	<u>Corn (Cost/Acre)</u>	<u>Sorghum (Cost/Acre)</u>
Seed	\$26 (26,000 seeds)	\$9.65 (110,000 seeds)

Fertilizer	\$41.50 (150 lbs starter, 75 units N)	\$31.30 (150 lbs starter, 45N)
Spray	\$24 (Roundup, Steadfast, Atrazine)	\$15 (Atrazine, 2-4D, Roundup)
<i>Total Costs</i>	<i>\$91.50</i>	<i>\$55.95</i>

Oat-Clover

Despite the fact that the clover yielded less than the non-clover, because of the high cost of nitrogen, it is still more economically feasible to underseed oats (or wheat) with clover. Eight dollars and thirty-eight cents was gained per acre by underseeding oats with clover. However, the most valuable benefit of this trial was the building of soil structure because clover adds organic matter to the soil.

	<u>Oat-Clover</u>	<u>Oat</u>
Nitrogen Costs/Acre	\$0.00	\$25.50 (75 units @ \$.33/unit)
Seed Costs/Acre	\$6.72 (8 lbs/acre).	\$0.00
Application Cost (N)	\$0.00	\$5.00
Gross \$/Acre (\$2.20/bu)	\$151.14	\$161.54
<i>Net Profit/Acre</i>	<i>\$144.42</i>	<i>\$136.04</i>

Buckwheat

The project triggered additional net farm income particularly through the buckwheat tests. Despite the weather conditions, resulting in lower test weights, the buckwheat plot proved successful and netted additional income. In addition, it was discovered that buckwheat creates a nice seedbed for planting the next year's crop.

Barley-Grain Sorghum

This test seems to not be economically feasible because of the short growing season in Pennsylvania. However, under normal weather conditions, this may be successful.

9. Assessment

Corn- Grain Sorghum

Unfortunately, because of the weather condition under which the research was conducted, the results are inconclusive. Despite the unsuccessful results, these tests will be run again on our own, because we feel this is a option for growing.

Oat-Clover

Through this research, we will continue to underseed wheat and oats to provide Nitrogen in the soil.

Buckwheat

This research proved successful. We've learned to avoid no-tilling buckwheat, since both years' yields were so poor that they were deemed not worth harvesting. However, buckwheat is a viable and feasible double crop to grow in Central Pennsylvania. As a single crop, buckwheat does not provide enough income per acre to justify growing.

Barley-Grain Sorghum

Unfortunately, because of the weather condition under which the research was conducted, the results are inconclusive. However, through these studies, we've concluded that this is not a viable option because of the growing season in Central Pennsylvania.

10. Adoption

Corn- Grain Sorghum

This segment of the test will continue in our farming operation. Central Pennsylvania has an excellent market for grain sorghum, which is used in birdseed. We will continue to grow grain sorghum because it seems as if it is a good hedge against dry weather.

Oat-Clover

This segment of our test will continue in our farming operation. Using this test as a regular practice will assist us in defraying some of the costs of fertilizer, which is continually rising. In addition, the fringe benefits are provided to the soil by building up the soil composition through additional organic matter.

Buckwheat

This segment of our test will continue in our farming operation. Buckwheat is the first crop that we've found successful as a double crop. Hopefully the use of double crops will help justify rising land rents. In addition, buckwheat seems to loosen the soil and frees phosphorus, which works to promote soil health.

Barley-Grain Sorghum

Even though this test may work under perfect conditions, this is not feasible for our farming operation, because of the length of growing season.

11. Outreach

In October, in cooperation with Juniata County Extension, we held a field day to inspect the plots and field questions from interested producers in our area about the SARE grant research project. At the field day, we provided handouts about the field trials.

12. Report Summary

The purpose of the project was to prove that there are some non-traditional, more cost-effective ways of grain farming. Four separate test plots were performed: A cost-analysis comparison of growing corn to grain sorghum, the effectiveness of underseeding oats with clover as a source of Nitrogen, the most practical way of producing buckwheat as a double crop and the productiveness of doubling cropping grain sorghum after barley. Because of the wet growing conditions of the past two years, some of the results were inconclusive. However, the buckwheat trials were the most successful of the entire test. Buckwheat is most definitely a feasible option as a doublecrop. Underseeding oats (or wheat) with

alfalfa proved successful in two ways. The excess Nitrogen lowered input costs and the soil will find great benefits from the additional organic matter. The tests proved that growing grain sorghum after barley is not practical because of the length of growing season. Several of these practices will be incorporated into the regular farming operation of our farm because of the benefits to the soil, the lower input costs, and the marketability of the crops.

Jason Pontius
March 15, 2005