Cooperation Approach, of Farmer and Chef, to Create a Profitable Niche Market for the Small Farm that Would Increase the Variety and Use of Specialty Potatoes

Final Report for FNC00-317

Project Type: Farmer/Rancher
Funds awarded in 2000: $2,398.00
Projected End Date: 12/31/2002
Matching Non-Federal Funds: $2,378.00
Region: North Central
State: Ohio
Project Coordinator:

Alicia Bongue
Muddy Fork Farm LLC

Project Information

Summary:

PROJECT BACKGROUND
Farmers and gardeners are rediscovering the many kinds of heirlooms, special varieties and unusual shapes and colors of potatoes available to us. Cooks and restaurants are relearning old cooking methods and experimenting with new recipes that go beyond the traditional home fries and mashed and back potatoes. To grow these specialty potatoes in Ohio (or in any particular farm), however, requires some experimentation. This project, funded by the USDA's SARE program during the year 2001, studies the growing, marketing, and cooking qualities of seventeen different potato varieties.

PROJECT DESCRIPTION AND RESULTS
Varieties
The following varieties were chosen for their unusual characteristics in colors and textures and their cooking qualities. Varieties available in the year 2000 that were not available the following year were replaced by another variety with similar characteristics. The variety Tobique, although high yielding, was replaced because the consumers had not accepted it the previous year.

2000 Variety, 2001 Variety, *Season, Color skin/flesh, Texture, Type
All-blue, All-blue, M/L, Blue/blue, moist/firm
Austrian crescent, Austrian crescent, E, yellow/yellow, waxy, fingerling
Bintje, Bintje, L, yellow/yellow, waxy
Blue Mac, Purple Viking, L, blue/white, waxy
Buffalo Ruby Red, Buffalo Ruby Red, E/M, red/white, waxy
Carola, Carola, M/L, yellow/yellow, moist/firm
Desiree, Desiree 1, M, red/yellow, moist/firm
Kerr's Pink, Kerr's Pink, M, pink/yellow, floury
Levitt's Pink, All-red, E, red/pink, moist/firm

Maris Piper, German Butterball, L, C-C, dry/mealy
Penta, Penta, E, yellow/yellow
Princess La Raclette, French Fingerling, E, yellow/yellow, waxy, fingerling
Quaggy Joe, Tobique, L, white/white, waxy
Red gold, red gold, E, red/yellow, waxy
Reddale, Dark red Nordland, E-M, red/white, moist
Rose Finn, Rose Finn, M/L, pink/yellow, waxy, fingerling
Rhine Gold, -, E, yellow/yellow, moist/firm
-, Peanut, L, yellow/yellow, waxy, fingerling

Potato Planting:
Potatoes were planted in the following manner:
Year 2000- seed potato weighing about 4 oz was planted in 12 rows, 100 ft long. The spacing was 12” between seed potatoes and 3 ft between rows. With this spacing 1 pound was planted every 4 ft or 25 pounds/100 feet rows. The seed potato was laid on top of the soil, covered with composted manure and then with 6 to 8 inches of straw. Sixteen varieties of potatoes were planted during the first week of May. Each variety was planted in 3 different locations. The field was divided into three sections of four rows each so that each section included one of each variety. The location of each variety in the trial can be seen in field map 2000.

Year 2001 – potatoes were planted in a different location than in the previous year. The spacing and seed potato size was the same as in the year 2000, however the planting method was different. The seed potato was planted in furrows 4 to 6 inches deep, covered with 2 inches of compost and then soil. The planting date was May 7th for all rows and May 9 for rows 10 and rows 12. The location of each variety in the trail can be seen in field map 2001. The potato plants were hilled three weeks (May 31) and six weeks (June 18) after planting. Potato beetle larvae were removed manually the first and third week of July.

Field Map 2000
Replicate 1
Row 1, red gold, penta, Austrian crescent, rhine gold, princess
Feet, 25, (25) 50, (25) 75, (16) 91, (9) 100
Row 2, rose finn, reddale, ruby red, levitts pink, princess
Feet, 27, (27) 54, (27) 81, (27) 95, 5 (100)
Row 3, kerrs pink, desiree, all blue, carola
Feet, 27, (27) 54, (27) 81, (19) 100
Row 4, carola, bintje, blue mac, maris piper, quaggy joe
Feet, 8, (26) 34, (25) 59, (25) 84, (16) 100

Replicate 2
Row 5, penta, Austrian crescent, rhine gold, princess, red gold
Feet, (25) 2, (25) 50, (16) 66, (9) 75, (25) 100
Row 6, reddale, ruby red, levitts pink, princess, rose finn
Feet, 27, (27) 54, 14 (68), 5 (72), (27) 100
Row 7, desiree, all blue, carola, kerrs pink
Feet, (27) 27, (27) 54, (19) 73, 27
Row 8, bintje, blue mac, maris piper, quaggy joe, carola
Feet, 26, (25) 51, (25) 76, (16) 92, 8

Replicate 3
Row 9, Austrian crescent, rhine gold, princess, red gold, penta
Feet, (25) 25, (16) 41, (9) 50, (25) 75, (25) 100
Row 10, ruby red, levitts pink, princess, rose finn, reddale
Feet, 27, (14) 41, (5) 46, (27) 73, (27) 100
Row 11, all blue, carola, kerrs pink, desiree

Feet, 27, (19) 46, (27) 73, (27) 100
Row 12, blue mac, maris piper, quaggy joe, carola, bintje
Feet, 25, (25) 50, (16) 66, (8) 74, (26) 100

Field map 2001
Replicate 1
Row 1, kerrs pink, desiree, all blue, carola
Feet, 25, 25, 25, 25
Row 2, rose finn, dark red, buffalo ruby red, all red
Feet, 25, 25, 25, 25
Row 3, peanut, penta, Austrian crescent, red gold, French fingerling
Feet, 15, 25, 15, 25, 15 rose finn 5
Row 4, tobique, bintje, purple Viking, german butterball
Feet, 25, 25, 25, 25

Replicate 2
Row 5, French fingerling, Austrian crescent, tobique, peanut, rose finn
Feet, 15, 15, 25, 15, 30
Row 6, carola, all red, german butterball, penta
Feet, 25, 25, 25, 25
Row 7, purple Viking, all blue, bintje, kerrs pink
Feet, 25, 25, 25, 25
Row 8, dark red, buffalo ruby red, desiree, red gold
Feet, 25, 25, 25, 25

Replicate 3
Row 9, purple Viking, german butterball, tobique, kerrs pink
Feet, 25, 25, 25, 25
Row 10, all red, buffalo ruby red, peanut, dark red, rose finn
Feet, 25, 25, 15, 25, 10
Row 11, all blue, carola, bintje, desiree
Feet, 25, 25, 25, 25
Row 12, Austrian crescent, French fingerling, rose finn, red gold, penta
Feet, 15, 15, 20, 25, 25

Diseases and Stresses:
Year 2000 – there was moderate weed pressure from mostly Canada thistle, redroot pigweed, and lamb’s quarters. The major insect problems were Colorado potato beetles, Japanese beetle and flea beetle. All 3 sections of the field were scored in mid-July for total damage to foliage. A score of 0 = no damage, 1 = 10% damage to foliage and 100% = all foliage showing damage. Damage was any discoloration, perforation or drying of tissue.

Year 2001 – there was minimal weed pressure on the planting. The major insect problems were Colorado potato beetles, Japanese beetle and flea beetles. Growth and insect damage were measured three times during the growing season. There was a drought period during the month of July.

Supplies:
For the project, irrigation and packaging supplies were purchased.

Labor, year 2001:
The field was prepared by tilling cover crops with a tractor and equipment belonging to Muddy Fork Farm. Planning the field planting and purchasing of seed and supplies was done by Monica Bongue. Planting, weeding, hand picking insets, and harvesting was done manually with hoes and shovels. Field work and collecting and analyzing data was done by Monica Bongue and Matt Mariola. Matt was paid $10.00/hour.

Results:

Over all, yields were low for both years. Yield per pound planted was measured as pounds harvested/pound planted.

2000 – The plants were grown under heavy straw mulch. This led to a very easy harvest, howver it also contributed to greening of the tubers and considerable rodent damage. This factor reduced the number of marketable tubers. Perhaps a combination of very shallow planting, compost mulch and then straw mulch will provide better outcome for the harvest. Yields varied from 1 pound to 12 pounds/per pound planted. Table 1 shows the differences in yield between varieties.

2001 – The yield of tubers was overall low. The yields on replicates 1 and 2 were 2.4 x higher than in replicate 3. The lower yields in replicate 3 were probably a result of lesser fertility in the soil and more clay and compaction. Soil tests were done for soil 1 (rep1 and 2) and soil 2 (rep 3). The soil analysis is included in this report. Although the soil fertility was very good for soil 1, it still did not result in a very productive crop. It is possible that foliage growth and not tuber formation was encouraged under these conditions. Furthermore, during the month of July drought conditions could have affected tuber production at a critical step of formation. The water source is the well, which supplies the house, and irrigation was minimal to conserve water for family use. Table 1 shows each variety's yield.

Table 1
Differences in yield (pounds harvested/pounds planted) between potato varieties.

2000
Variety, average, Standard deviation
All-blue, 2.90, 0.71
Austrian Crescent, 3.43, 1.32
Bintje, 4.11, 2.40
Blue Mac, 2.80, 0.48
Buffalo Ruby Red, 2.15, 0.28
Carola, 3.01, 1.22
Desiree, 5.02, 2.24
Kerr's Pink, 4.27, 2.15
Levitts pink, 5.75, 1.48
Maris Piper, 4.30, 1.59
Penta, 2.89, 0.24
Princess, 8.08, 1.05
Quaggy Joe, 12.32, 0.32
Red Gold, 3.67, 1.18
Reddale, 5.36, 3.17
Rose Finn Apple, 2.55, 0.43
Rhine Gold, 1.90, 0.81

2001
Variety, average, Standard deviation
All blue, 4.04, 0.44
Austrian Crescent, 5.96, 1.79
Bintje, 5.73, 0.12
Purple Viking, 4.13, 0.26
Buffalo Ruby Red, 4.78, 2.77
Carola, 3.12, 0.37
Desiree 1, 3.86, 1.47
Kerr's Pink, 4.55, 0.44
All red, 5.42, 0.26
German Butterball, 3.33, 0.22
Penta, 2.25, 0.44

French Fingerling, 1.54, 1.92
Tobique, 5.50, 1.15
Red Gold, 4.74, 0.62
Dark Red, 3.98, 0.15
Rose Finn, 2.20, 0.33
Peanut, 1.30, 1.20

Diseases/Stresses

The relationship between yield and stresses of potato was studied during the two year period. During the year 2000 stress (or disease) was measured as percent of leaf tissue damaged. A score of 0 = no damage and 10 = 100% leaf loss. During 2000, average yield of each variety was compared to its average disease score. The results are listed on Table 2. From this table, it is clear that a low disease score led to higher yields in most cases.

Table 2
Comparison of average yield to average disease score, year 2000
Variety, year 2000 potato yield, average disease score
Buffalo Ruby Red, 2.20, 2.67
Rose Finn, 2.60, 3.33
Blue Mac, 2.80, 4.67
All Blue, 2.90, 1.67
Penta, 2.90, 3.67
Austrian Crescent, 3.40, 3.33
Red Gold, 3.70, 6.67
Carola, 4.00, 1.00
Kerr’s Pink, 4.30, 3.67
Maris Piper, 4.30, 2.00
Bintje, 4.40, 3.00
Desiree, 5.00, 2.67
Levitts pink, 5.70, 0.00
Rhine Gold, 6.30, 3.67
Princess, 8.10, 2.83
Quaggy Joe, 12.30, 2.00

Table 3 shows a comparison of yield, growth and insect damage. Growth was scored as 3 (vigorous) for most varieties with the exception of Penta and Peanut. Those two varieties also showed the lowest yields. There were differences in yield between varieties with an average growth value between 2.7 and 3. A high score for insect damage, as in Austrian Crescent, did not lead to low yield (relative to other varieties) nor did a low score necessarily lead to a high yield as in the All-blue, Rose Finn or Purple Viking varieties.

Table 3 Yield, Growth and Insect Damage in 2001
Variety, yield #s harvest/#s planted, relative growth May 31, 2001, average insect damage
Peanut, 1.3, 2.0, 0.33
French Fingerling, 1.5, 3.0, 0.67
Penta, 1.7, 0.8, 0
Rose Finn, 1.8, 2.7, 0
Carola, 2.8, 2.5, 0.33
German Butterball, 2.9, 3.0, 1.33
Kerr’s Pink, 3.0, 3.0, 1.67
All blue, 3.1, 3.0, 0
Purple Viking, 3.2, 2.7, 0.33
Desiree1, 3.3, 3.0, 1

Dark red, 3.5, 2.7, 0.33
Tobique, 3.7, 3.0, 0.33
Red Gold, 4.0, 2.7, 0.33
Austrian Crescent, 4.3, 3.0, 2
Bintje, 4.5, 2.7, 1
All red, 4.7, 2.7, 0.33
Buffalo Ruby Red, 4.8, 2.7, 0.33

Marketing of Potatoes
Sales:
During the year 2001, 849 pounds of potatoes were sold at the North Union's Farmer's Market in Shaker Square, Cleveland and to restaurants in Cleveland Ohio. The price/pound of specialty potato was $2.00. Total sales were $1700. The previous year 1173 pounds were harvested and sold for $2.00/pound for a sales total of $2350.

Profitability
The cost of the seed potato was between $500 and $600 for both years. Additionally there was the cost of labor. Between Matt Mariola and me, 70 hours were spent to plant, weed, water and hand harvest the crop. At $10.00/hour, this labor adds $700 to the cost of the crop for a total of $1300. Assuming the above costs plus $100 for marketing expenses there was a profit of $950 in 2000 and $300 in the year 2001. this profit is good considering the crop only yielded ½ of its potential. With specialty potatoes once can expect 10 pounds of potato harvested/pound planted. During both years, my yields have been 4 to 5 fold. A normal yield would have given a profit closer to $3000 in the year 2000 and $1800 in the year 2001.

I believe that with some small scale mechanization such as a potato harvester and cultivating attachments to the tractor one can reduce the cost of labor and increase the profitability of the crop. Some mechanization will also allow an increase in scale and thus a reduction in seed cost. With those two considerations and an average 10 fold yield, the potato crop will be very profitable.

In my opinion, the market demand and the type of market that is targeted are very important to obtain the high price of the specialty potato. This price ($2.00/pound) is a retail price and supermarkets and wholesalers will not pay that. Furthermore the customer that will pay this price and appreciate the product is generally educated, rich and a gourmet. One must reach this customer directly and provide him/her with ideas and recipes for the potatoes. The market for this type of product may not be large enough for a large scale production. A large scale production would also take the specialty out of specialty potatoes and thus lose profitability.

Information to Consumers and Surveys
During the sales season at the North Union Farmer's Market the different varieties were displayed in rolled down burlap sacks with information on each variety. A blackboard with information and jokes regarding potatoes was also displayed. An example of this would be "Pink and red potatoes tend to be low in starch, sometimes called waxy. They will hold their shape in potato salads". Customers were also provided with recipes and ideas on using the potatoes. Customers were very appreciative of the information and the recipes and kept coming back for discussion on potatoes.

I conducted an informal oral survey with my customers. I asked them the following questions:
1) Why did you choose to buy that variety?
2) What did you think about the potatoes that you bought last week?
3) How did you prepare them?

From my survey with the customers, I got the following comments.
1) The main reason for purchasing a particular variety was to try something new. The special qualities and novelty was important. However, another important reason to buy a particular variety was that the customer had tried to previously and liked it. Once the novelty wore off people kept purchasing a variety they liked. There were other responses such as nobody else has potatoes today and there were people who did not find the novelty worth the price.
2) Most people who purchased a variety were pleased. For the all blue variety of potato, there was some surprise and disappointment as well as excitement. With this variety, the consumer has to be warned that used in soup it will turn the soup gray and the cooking method is important, as they tend to burst. Other people found it fun to have blue mashed potatoes. There was more acceptance of the pink fleshed variety than the blue fleshed. The fingerling variety was by far the most popular, probably due to the publicity it has recently received in cooking magazines and newspapers.
3) The preferred method for preparing the fingerling potatoes was roasting. About half my respondents prepared the non-fingerling potatoes by steaming or boiling; the other half of cooks prepared a potato salad. Our recipes were often used. In general, cooks wanted to do something simple and fast. One variety, purple Viking was used and loved for mashed potatoes.

OUTREACH
This SARE funded project and the potato varieties were publicized in several newspaper articles. In December 2000 the Farm and Dairy weekly newspaper of Wayne County, Ohio announced the granting of the funding for the potato project. A series of articles featuring cuisine in Ohio appeared in four different papers during the summer of 2001. The newspapers were the Charlotte Observer, (Charlotte, North Carolina), the Kansas City Star, the Akron Beacon Journal (Akron, Ohio) and the Contra Costa Times. Additionally an article in the Cleveland Plain Dealer features the farmer’s market at Shaker Square and includes an excerpt that highlights the SARE funding with the potato project.

Research

Participation Summary