

Farmer Rancher Grant Program

Final Report

PROJECT IDENTIFICATION

- Name: Theresa Podoll
- Address: 9824 79th ST SE
- City, State, Zipcode: Fullerton, ND 58441
- Phone: 701-883-4416
- E-mail: dtpodoll@drtel.net
- Website: www.prairieroadorganic.co

- Project Title: Screening Open-Pollinated Vegetable Varieties Bred and Released In North Dakota For Suitability to Organic Production Systems and Local Markets
- Project Number: FNC09-754
- Project Duration: March 2010- March 2011
- Date of Report: 3/27/2012

PROJECT BACKGROUND

Prairie Road Organic Farm has been certified organic since 1977. We are located in south-central North Dakota. We produce a variety of small grains and cover crops (rye, oats, millet, triticale, and buckwheat) and vegetable seeds under the name Prairie Road Organic Seed. David, Dan and Theresa Podoll began producing certified organic vegetable seed in 1997.

The family garden and a tradition of selective seedsaving, based on agronomic performance in organic conditions and superb eating qualities, are of focus of their seed production. The Podolls have released seven vegetable varieties bred on their farm. They specialize in tomato seed, squash, popcorn watermelon, and onion. Other seed crops include pumpkin, beet, carrot, leek, cucumber, muskmelon, marigold and bread poppy. The Podolls have taken part numerous organic variety trials of grains and cover crops through the Northern Plains Sustainable Agriculture Society's Farm Breeding Club.

PROJECT DESCRIPTION

GOAL: The goal of this two-year project was to increase the number of varietal choices well suited to organic production systems and local markets in North Dakota.

Objective 1: Screen a minimum of 60 vegetable varieties for agronomic and quality traits of interest to North Dakota market growers (10 per farm per year).

Objective 2: Identify at least twelve North Dakota bred, open-pollinated varieties of vegetable crops with agronomic and quality traits of interest.

Objective 3: Facilitate seed increases of at least nine varieties based on variety trial results and farmer's market taste tests.

PROCESS

A survey was conducted during the North Dakota Farmers Market & Growers Association

(NDFMGA) Annual Meeting (February, 2010) to identify vegetable crops with few varietal choices suited to growers production and market needs. Varietal descriptions of releases from North Dakota State University (1926-1991) and varieties bred and selected for the Oscar H. Will & Co. seed catalog (1896-1969) were researched. Varieties of interest were researched and seed procured through the Germplasm Resource Information Network (GRIN) system, heirloom seed catalogs and seed saving organizations, such as Seed Saver's Exchange, Abundant Life Seed Foundation, and Seeds of Diversity Canada. These seeds were included in variety screening trials held in 2010 and 2011.

Each farmer participant conducted vegetable variety screenings of at least twenty varieties; planting, maintaining, monitoring, and documenting performance and results using photos and variety evaluation forms. A combination of quantitative (eg. height, yield, or fruit size) and qualitative data (eg. seedling vigor, color, flavor, disease and pest resistance, and uniformity) was collected. The farmers took pictures during the growing season. Seed was saved from fourteen varieties; five varieties will undergo continued evaluation and nine varieties will continue to be grown out and selected for variety improvement and seed increase.

PEOPLE

Bryce Farnsworth, NDSU Potato Breeding specialist, *Dr. Harlene Hatterman-Valenti*, NDSU High Value Crop specialist, and *Dr. Larry Robertson*, Vegetable Curator, USDA – ARS Plant Genetic Resources Unit, provided assistance in acquiring seed for these varieties through NDSU and the USDA Germplasm Resource Information Network (GRIN) system.

Steve Zwinger conducted vegetable variety screenings. He is the owner of Prairie Seeds, a certified organic seed operation focused on increasing and developing seed for sustainable and organic farming. He also produces vegetables, marketing at the local farmers market specializing in potatoes, beans, and corn. Steve is a research agronomist at the North Dakota State University (NDSU) Carrington Research Extension Center and has conducted numerous variety trials of grains/alternative crops.

Marvin Baker conducted vegetable variety screenings. He is an experienced horticulturist and the owner of North Star Farms, a produce operation in northwestern North Dakota, growing certified organic crops for local markets. The Bakers helped establish a hometown farmers' market and a network called North Prairie Farmers Markets that has grown from four to 10 markets in three years. Marvin Baker works closely with the Entrepreneurial Center for Horticulture at Minot State University-Bottineau as a resource for growing organic vegetables such as Roma tomatoes and green peppers.

Susan Long is the Administrative Assistant at Northern Plains Sustainable Agriculture Society (NPSAS). NPSAS helped advertise our field days and helped organize the tour at Prairie Road Organic Farm in Fullerton and North Star Farm in Carpio, ND. In addition the project collaborators presented a workshop at the 2012 NPSAS Annual Winter Conference, entitled, "Screening Open-Pollinated Vegetable Varieties."

Annie Carlson is the Executive Director of FARRMS. Prairie Road Organic Farm partnered with FARRMS to host a farm tour June 23, 2010. NPSAS and the North Dakota Farmers Market and Growers Association (NDFMGA) published a press release on the event.

Sue Balcom, Marketing Specialist at North Dakota Department of Agriculture, and *Holly Mawby*, Director of the Entrepreneurial Center for Horticulture at Dakota College at Bottineau, worked with Theresa Podoll to present information on the project and preliminary results during a “Heirloom Seeds” workshop at the Local Foods Conference, February 18 & 19, 2010 at the Doublewood Inn, Bismarck, ND.

Stacy Baldus, Administrative Assistant, Entrepreneurial Center for Horticulture Dakota College at Bottineau, published press releases on all of the garden tours and conference presentations through the NDFMGA Newsletter.

RESULTS

Objective 1: Screen a minimum of 60 vegetable varieties for agronomic and quality traits of interest to North Dakota market growers (10 per farm per year). [See Attachments for detailed results from individual growers.]

- Marvin Baker—screened twenty varieties in 2010-2011 [See Attachment A.]
- Theresa Podoll—screened twenty varieties in 2010-2011 [See Attachment B.]
- Steve Zwinger—screened thirty-one varieties in 2010-2011 [See Attachment C.]

Objective 2: Identify at least twelve North Dakota bred, open-pollinated varieties of vegetable crops with agronomic and quality traits of interest.

Overall, each of us discovered varieties that had traits of interest to our operations. These varieties include: Potatoes—Crystal, Bison, Nordak and Viking; tomatoes-- Cavalier, Cannonball, Sheyenne, Doublerich, Millet’s Dakota, Manitoba, and Orange King; Peas—Homesteader and Alaska; Pinky popcorn; Golden Gem sweet corn; Granite State cantaloupe; Copenhagen cabbage; and Niagara cucumber.

Objective 3: Facilitate seed increases of at least nine varieties based on variety trial results and farmers’ market taste tests.

The potato screenings do not lend themselves to this objective due to state seed laws for potatoes but NDSU has seed available of these varieties. Bryce Farnsworth expressed that he is very pleased that these varieties are being looked at and is happy to share seed tubers. So we will be encouraging farmers’ market growers to consider Crystal, Bison, Nordak and Viking potatoes for their markets. We will emphasize Nordak and Viking for Fall and Winter CSA sales, as they are EXCELLENT keepers.

Steve collected seed of the Alaska pea and Pinky popcorn. Theresa collected seed of the Homesteader pea; Hidatsa Yellow and Mandan Red beans; and Doublerich, Millet’s Dakota, and Orange King tomato varieties. Marvin collected seed of the Niagara cucumber and the Granite State cantaloupe.

The tomato varieties Cavalier, Cannonball, Sheyenne, and Manitoba are of sufficient quality that they could be increased “as is.” The tomato varieties Doublerich, Millet’s Dakota, and Orange King have traits of interest but require selection and improvement work to eliminate cracking and disease issues. All of these tomatoes would benefit from selection work under diseased conditions to increase disease resistance.

DISCUSSION

There is definite value in exploring older germplasm that was originally bred within the region. The USDA Germplasm Resources Information Network is a valuable resource for researching historic varieties and obtaining seed for research. We were able to identify varieties that have traits of interest and have historically significant stories that can be told. Regionally significant varieties with specific adaptation traits have dropped out of the seed trade. This presents a significant loss to regional gardeners and market growers and an opportunity for differentiating our farming and marketing enterprises. This may be a significant advantage for those willing to conduct variety screenings and subsequent variety trials. The disadvantage is the time and effort it takes to screen through the less desirable varieties to find the varieties that have value to your operation. Some of the varieties we sought from GRIN was either no longer available OR had not been grown out for some time. These had very poor germination or did not germinate at all. Once you find varieties of interest, implementing sound seed production and maintaining trueness to type may be a challenge, depending on whether the crop is primarily self-pollinated or cross-pollinated. Seed saving is an art and requires some knowledge and skills. Crop specific seed saving resources are available for free download through the Organic Seed Alliance website; Susan Ashworth’s book, “Seed to Seed” is a comprehensive and valuable guide.

OUTREACH

- Prairie Seed Farm markets at the Carrington Farmers Market and conducted consumer taste tests of the tomato, potato and sweet corn varieties that it screened in 2010-2011. (See Attachment C. for the results of the taste testings Steve conducted.)
- Prairie Road Organic Farm partnered with FARRMS to host a farm tour June 23, 2010. <http://www.farrms.org/cgi-bin/farrms.org/farrmsnews/fnews.pl?record=23> NPSAS and NDFMGA published a press release on the event.
- North Star Farms did not host a farm tour in 2010 due to the limited number of varieties they screened in the first year of this project.
- Theresa Podoll presented information on the project and preliminary results during a “Heirloom Seeds” workshop at the Local Foods Conference, February 18 & 19 at the Doublewood Inn, Bismarck, ND. <http://www.agdepartment.com/Forms/WebLocalFoodsRegistration.pdf>
- Garden tours were conducted in 2011 in cooperation with NDFMGA, FARRMs, NPSAS and the “Going Local North Dakota” program. The tours had a designated photographer. Press releases were distributed through the NDFMGA, NPSAS, FARRMs, and the North Dakota Department of Agriculture’s “Going Local North Dakota” newsletters and websites.
 - Prairie Road Organic Farm held a farm tour on Thursday, August 25, 2011. The tour was attended by over 50 participants.

- North Star Farms held a farm tour on Wednesday, August 31, 2011. The tour was attended by over 35 participants.
- Project results were presented at the 2012 NPSAS Annual Winter Conference, which was attended by 40+ participants. The evaluation forms indicated a score of 4.5/5.0; Feedback: "great information; interesting; informative; fabulous."
- Variety screening results will be sent to the NOVIC project for posting on the website.
- A final project report and press release will be sent to E-Organic with links to web postings, including pictures.

Attachment A. North Star Farms, Marvin Baker March 27, 2011
Screening open-pollinated vegetables bred and released in North Dakota for suitability to organic production systems and local markets.

1.) Manitoba Tomato

This tomato was developed at the Manitoba Agriculture and Agrifood Research Center in Morden.

It is a 66-day determinant slicer and or canner. It is a bush-type tomato that will tolerate heat or cold and was not affected by overnight lows in the upper 30s as many other tomato plants were.

This tomato is slow to emerge and slow to grow, but toward the end of the season, appears to have a spurt that produces most of the fruit. In addition, the fruit takes longer than other slicers to ripen.

Most of the fruits are 4 and 5 inches, but the taste is superior.

In 2011, we grew 48 plants that yielded 142.5 pounds of fruit.

2.) Copenhagen Cabbage

Seeds were planted in May, they sprouted and the seedlings didn't do much of anything but absorb water. Fourteen plants survived 136 degrees in the greenhouse but were stunted from the intense heat.

On Sept. 30, still immature seedlings, they were transplanted into larger pots to see if they would grow. They grew in the greenhouse until 15 December, when they appeared to go dormant because of the lack of light. On Dec. 30, there was movement once again.

These cabbage plants survived through the winter and withstood temperatures of 16 degrees twice, 18 degrees and 22 degrees. On those coldest nights, they were covered with burlap bags and appeared frozen solid the following mornings.

But sunny days in February brought them back. They sprouted new leaves and have really taken off in March and should mature by the end of April. Thus, this 65 day cabbage has taken nearly 10 months and has gone through intense heat and killing frost to a plant and

have survived.

This is an incredibly durable plant and I will continue to use it indefinitely.

3.) Arikara Squash

This is a very rare heirloom variety that is unlike a normal winter squash. The fruit is yellow, is oblong and has fewer seeds than other varieties.

In 2011, this plant demonstrated incredible vigor and the fruit grew rapidly despite being flooded several weeks after being planted. We harvested a total of 103 pounds with most of the fruits weighing 8-11 pounds.

Arikara is a very good storage squash and is said to be excellent for soup.

4.) Banquet squash

I wasn't happy with this squash because the fruits were very inconsistent. We harvested 136 pounds with most of them being 1 pound. One of the fruits, however, weighed 38 pounds... Consumers demand more consistency in the size and shape.

It is considered an extremely rare variety as it was developed by Oscar Will in the 1930s. It is a cross between Gilmore and Buttercup. The fruit is generally orange in color with a cup at the bottom as in Buttercup.

5.) Clemson Spineless Okra

This is another variety trial I wasn't happy with. Much like the Copenhagen cabbage, the okra stagnated after the seedlings emerged. But unlike the cabbage, many of the plants perished in the intense, summer greenhouse heat.

We grew 24 plants and harvested only three pods. Some of the other plants produced pods but they fell off the lanky plants before becoming mature. By the end of September all the plants had died.

Still, this is considered the most popular open-pollinated variety of okra. It was developed at Clemson University in 1939. I believe it is a poor variety for North Dakota, although I will be growing it again in 2012.

6.) Granite State Cantaloupe

I wanted to test this cantaloupe as it is the parent of Sweet Granite, a cantaloupe we have been growing for six years.

Fruits are generally 4 pounds, are oblong and slightly lighter in color than Sweet Granite. In fact, the color of the rind is almost gray. The flavor is actually a bit bland and the flesh is a light orange in color.

This 83-day fruit (Sweet Granite is 66 day) is mildew resistant and produced 79 pounds of

fruit for North Star Farms. It is a cross between Honey Rock and Mennonite melons that were developed at Winkler, Manitoba.

If provided the seeds, I would certainly grow this cantaloupe again.

7.) Nueta – Mandan corn

James Holding Eagle, from the Fort Berthold Indian Reservation, presented Nueta to Oscar Will in 1907.

It has short, frail stalks and there are usually 2 ears per plant. It is a tasty, yellow variety that didn't grow well at all in 2011, but had full ears of the plants that did develop.

8.) Evergreen corn

Weak stalks; only 5 pounds of yield from 24 plants. Pale green in color, I'm not sure what this corn would be good for. The ears produced spotty kernels.

9.) Golden Self Blanching Celery

A total failure. Only 20 percent of the seed emerged and all died by the time they reached the 2 and 3 leaf stage. Introduced to the United States from Kenya in 1886.

10.) Niagara Cucumber

This was my shining star in 2011. Little was found on this impressive fruit that is resistant to the cucumber mosaic virus and the spotted cucumber beetle.

It is tasty but seedy and is a great producer. Of eight varieties at North Star Farms in 2011, Niagara had the fourth highest yield and followed Mideast Prolific, Sumter and Marketmore. We harvested 112.5 pounds of fruit.

The plant produces a dark green rind on 8-10 inch fruits. This is a great slicer and the only flaw I could find was that 10 percent of the fruits are curved, some as much as 90 percent.

Unfortunately, this variety isn't commercially available. If it were, I would use it annually. I can't pin it down, but believe Niagara was released in 1932.

11.) Improved Guernsey Parsnip

A total failure. Zero emergence in 2010 and in 2011.

12.) Additional varieties not rated in 2010 or 2011

Homesteader pea

Alaska pea

Improved Gradus pea

Klondike watermelon

Imperator carrot

Sunshine corn

Cavalier tomato

Mandan tomato



MANITOBA
tomato

Manitoba tomato



Copenhagen cabbage



Arikara squash



Clemson Spineless okra



Granite Slate cantaloupe



Niagara cucumber