

Farmer Rancher Grant Program

Final Report Form

PROJECT IDENTIFICATION

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- Project Title: Sustainable Sweet Corn Production
- Project Number: FNC12-871
- Project Duration: 15 months
- Date of Report: August 19, 2013

PROJECT BACKGROUND

I am co-owner of Kruthaup Family Farm, LLC, along with my younger brother. We operate our business on our parent's 70 acre farm. This is our fifth year operating a Community Supported Agriculture program. We have a maximum of 200 shares each year, and this year had 170 shareholders. We do not have any livestock. We are licensed by our county board of health to resell items through our market. We have partnerships with several local farmers to provide honey, organic eggs, and fruit to our shareholders.

PREVIOUS SUSTAINABLE AGRICULTURE PRACTICES USED

We do not intervene chemically unless we are in danger of total crop failure. We use products approved for organic production as a first choice for pests, and we have good success with these products. We have traditionally only watered at the base of the plants, both to conserve water and to prevent the spread of plant disease. This year, we installed an irrigation system, which is fed from our pond. This has cut down on our water bills since there is no cost for the spring fed pond. We are also able to continue watering only at the roots of the plants. We manually remove weeds and do not chemically intervene with weed or grass killers, with the exception of corn. We keep records of where we have planted crops, and rotate each year to prevent the emergence of pests and disease. We work with our local agriculture extension office to properly identify any diseases that occur so that we can intervene if necessary for the next year's crops. We plan to seed cover crops on part of our farm this year to naturally nourish the soil and prevent the spread of weeds. We installed two moveable high tunnels this year, and have a plan to keep them in production for two years and then use cover crops for one year uncovered to nourish the soil. We purchase seeds from local seed savers and from organic and heirloom providers.

PROJECT DESCRIPTION

GOALS

I chose to compare the production of sweet corn through two different variables. The first

variable is conventional production vs. organic production. I wanted to measure the labor differences, the insect population, and the overall production of the plants. I also wanted to test the differences in plant health and soil quality at the end of the experiment. The second variable is heirloom vs. hybrid corn seed. For this, I wanted to measure the insect population, and consumer preferences. Consumer preferences include flavor, texture, ear length, sweetness, and overall satisfaction. I had consumers rate the corns using a blind test. I assigned each corn a letter and then used those letters to have consumers rate the corns. This prevented any bias. Not all corns have been tested so far, because they have not all come to full maturation. The following are the corn varieties that I chose:

Heirloom:

- Blue Jade
- Golden Bantam
- Stowell's Evergreen

Hybrid:

- Peaches and Cream
- Bodacious
- Silver Queen

The basic procedures were simple farming techniques. I did these following tasks throughout the season:

- researched and ordered the seeds
- identified the proper areas to plant them based on the type of corn
- prepared the ground; planted the corn
- documented which types of corn were planted in each area
- collected data as the plants came up with respect to population, insect damage and maturation rate
- replanted some patches that had inconsistent population
- kept records of all activities
- fertilized them (used chicken manure on organic patch)
- treated for insects (in the traditional method patch)
- harvested corn when ready
- selected shareholders who were interested in participating in the survey
- created blind evaluation process
- developed survey sheet for data collection by shareholders
- collected data
- hosted open house and farm tour
- developed presentation for Soil and Water Conservation meeting
- prepared for the OEFFA conference

PROCESS

Currently most of the farmers in my area grow hybrid varieties of sweet corn, such as Bodacious,

Incredible, Peaches and Cream, and Silver Queen. Because of multiple pest problems, including the European Corn Borer, Fall Armyworm, Rust, and Stewart's Wilt, farmers usually have to spend a considerable amount of money on insecticides and fungicides.

For this project, I would like to look at two different aspects of growing sweet corn and how viable each option is for farmers in the region. The first aspect I am interested in exploring is the difference in plant susceptibility to insects and disease between hybrid and heirloom varieties of sweet corn. The second aspect I would like to investigate is the difference in production between organically and conventionally produced sweet corn. To do this research, I would have two plots each on the same area of land. One plot would have hybrid and heirloom varieties of sweet corn grown conventionally, and the other plot would have hybrid and heirloom varieties of sweet corn grown organically. Both plots would have the soil tested and then amended to make them equal in starting nutrients and quality.

For the varieties selected I will use three varieties each of hybrid and heirloom; one white, one yellow and one colored (bi-color, red, blue, etc.). The hybrid varieties I will be using are Bodacious (yellow), Peaches and Cream (bi-color) and Silver Queen (white) because these are the most common varieties currently used in the area. The heirloom varieties I have selected are Golden Bantam (yellow), Morado Purple (purple color), and Stowell's Evergreen (white). Each variety will have a section four rows wide and 150 feet long, for both the organic and conventional plots.

Management will be conducted both organically and conventionally, on their respective plots. For the conventionally grown plot, I will do the same treatment that we currently use on our farm. This will be some herbicides for weeds, and inorganic nitrogen fertilizer. We don't usually have enough insect or disease pressure to spray for those pests. For the organically grown plot, I will use approved natural fertilizers for fertility, Bt for insect control, removal of diseased plants for disease control, and manual cultivation for weed control.

Data collected will include yield data from each of the plots. The yield data will be separated between the organic hybrid, organic heirloom, conventional hybrid, and conventional heirloom plots. I will also keep record of how much input is required for each of the plots and the total cost of those inputs, including labor. Finally, I will spend time scouting for insects and disease and keep integrated pest management records to show the plants' resistance.

PEOPLE

- Ohio Farm Bureau (Steve Berk) – sent out an announcement to their membership about the farm open house
- Soil and Water Conservation District (Jeff Thomas) – invited to attend annual meeting and make a presentation on the project
- Family – all members of my immediate family assisted with the project, including the paperwork, field work, and data collection
- Ohio Ecological Food and Farm Association (OEFFA) – conference organizers assisted me with the registration process and set up during the conference
- Shareholders (30) – participated in the open house and in blind trials

- Clarksville Ag (Jim Parker) – helped with locating and ordering organic seed and organic herbicide
- SARE staff including NCR-SARE Ohio State Co-Coordinator (Alan Sundermeier) helped with reviewing grant application before submission, Joan Benjamin, who supported the completion of the initial and progress reporting paperwork, and Beth Nelson, who I met at the OEFFA conference
- Dr. Krista Jacobson, University of Kentucky professor – assisted with writing the grant
- Our Ohio Cultivator group – helped promote open house by posting on their Facebook page

RESULTS

The results I achieved are documented on the charts in this section. I measured both grower and consumer satisfaction for each variety planted. I kept data on the yield, population planting, ear length and plant height.

The heirloom corns seem to have more insects on them than the hybrid varieties. The Golden Bantam was by far the hardest to plant, and the hardest to determine when it was ready. The seed planter that we used wasn't able to plant the Golden Bantam seed because of the shape and size of the seed. When the Golden Bantam became ready the ears were so small around on the stalk that they appeared to be too small. But when they were picked the kernels were very big. If the ears were picked smaller, the kernels were sporadic on the cob. That kind of corn usually isn't ideal for market sweet corn. The Blue Jade was very low to the ground and therefore was readily torn up by the raccoons. The other heirloom corns didn't seem to be bothered by animals. The Blue Jade and the Stowell's Evergreen were both very easy to pick. The mature ears were easily distinguished from the immature ears.

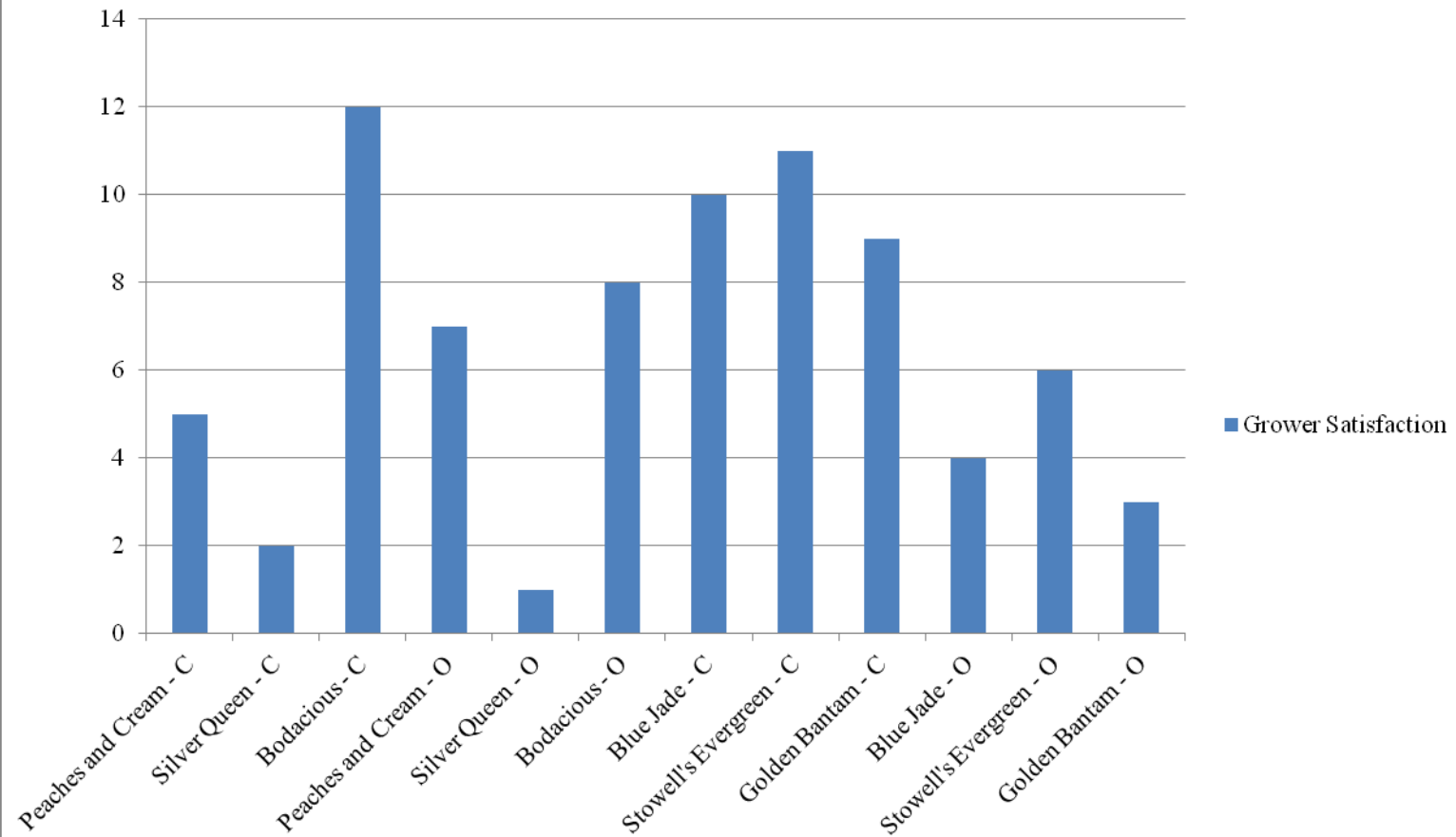
The hybrid varieties were more uniform in the stalk size and the ear length. Most of these varieties also had uniform maturation. For example, the Bodacious sweet corn ears matured all at the same time and the whole patch picked one time through. The Silver Queen did not mature all at the same time and had to be picked several times to get at least one ear per stalk. This is also the pattern for the Golden Bantam and the Stowell's Evergreen. The Peaches and Cream and the Blue Jade are more like the Bodacious corn.

The differences between the organic and the conventional corn have been less noticeable. I thought that the organic corn would be more labor intensive and it wasn't that much different. We definitely had to spend more time in that patch, but it wasn't an unreasonable amount of time. That patch had to be rototilled twice more than the conventional patch and had to be hoed once. The conventional patch had to be rototilled once, and some of it twice, and also sprayed with Volley herbicide.

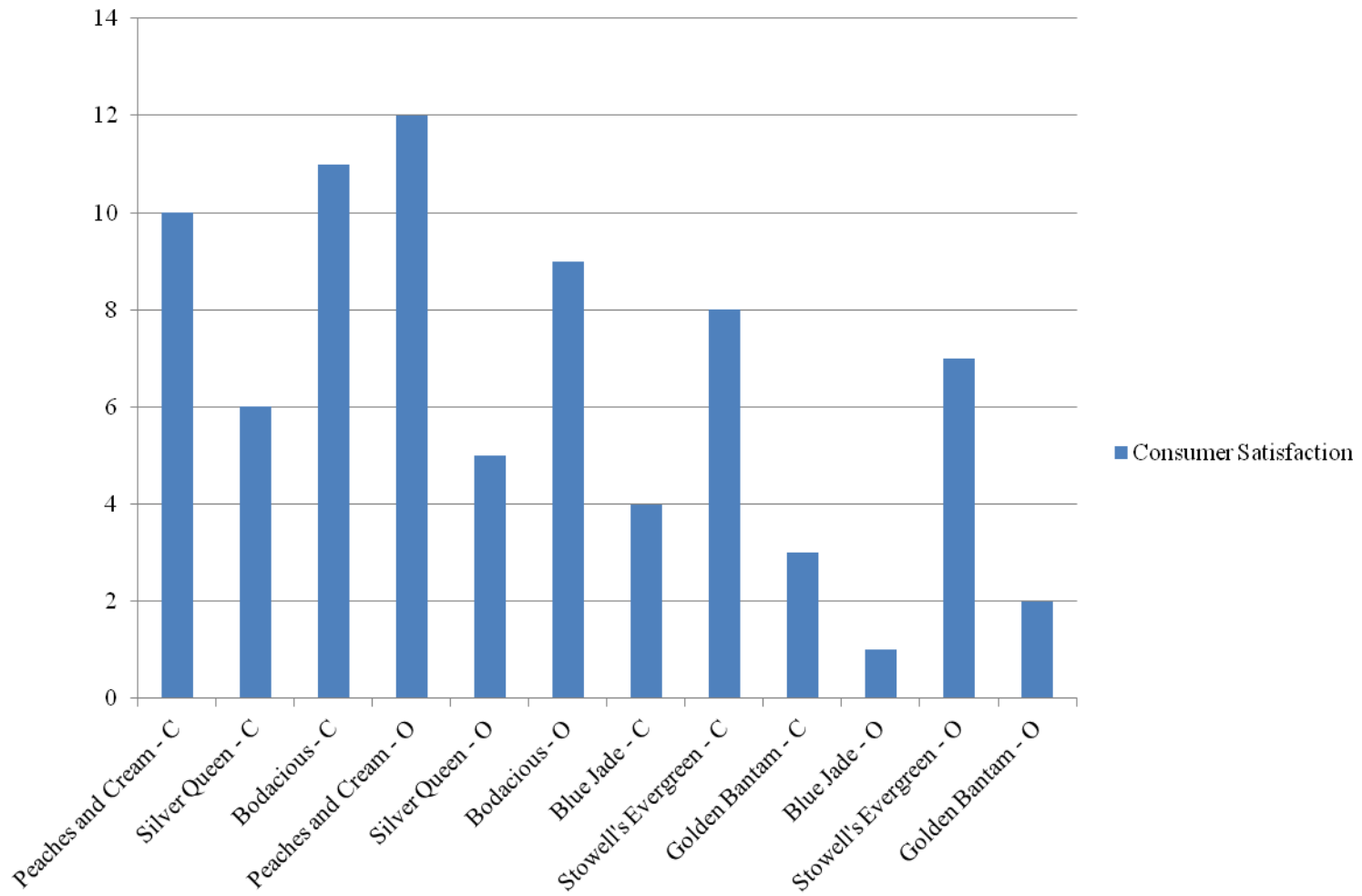
The overall cost for the organic corn was higher than the overall cost of the conventional corn. But again, there was not as much of a difference as I would have thought. The most expensive combination was the heirloom organic corn.

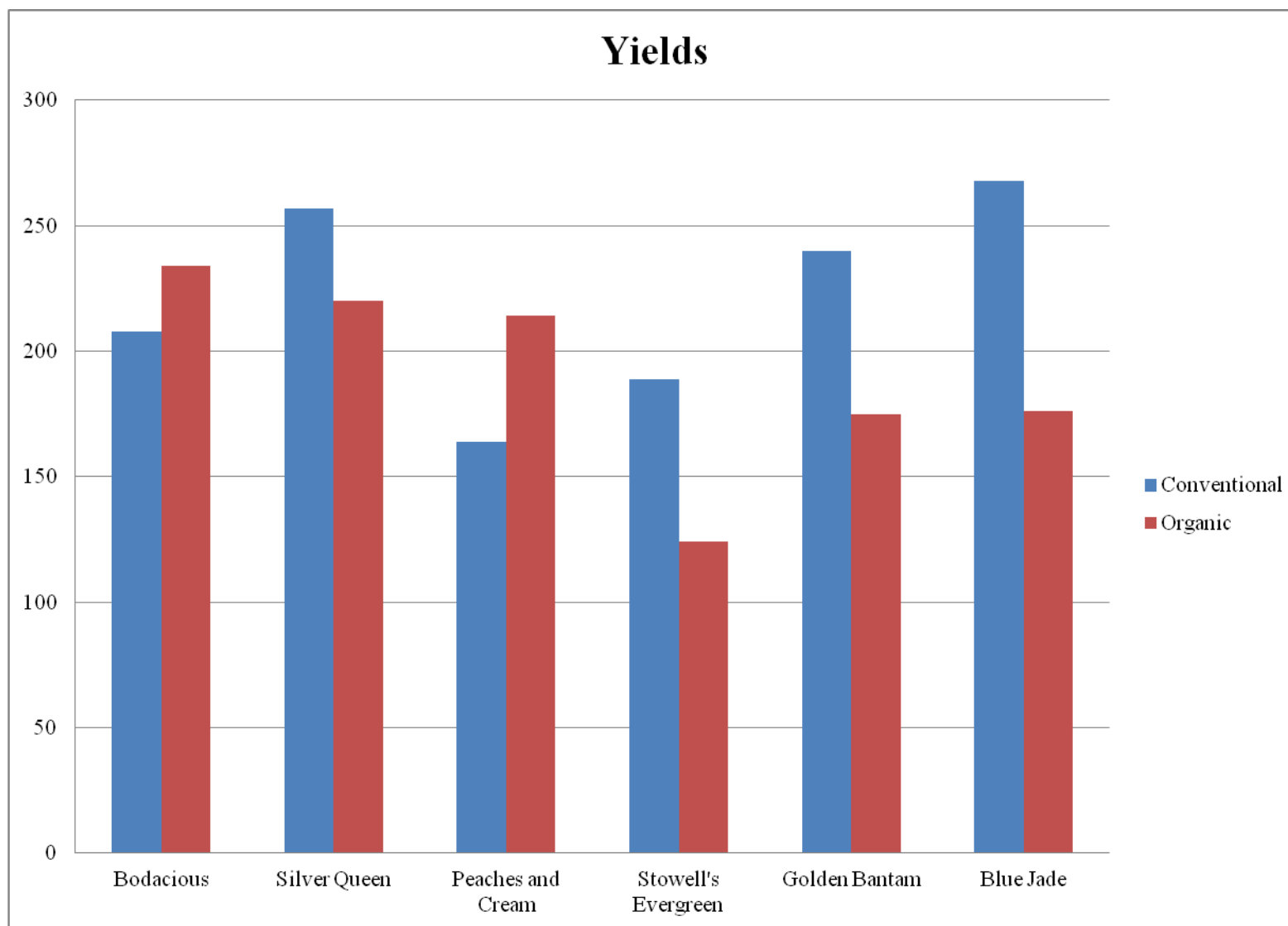
I gauged end consumer satisfaction through the use of a double blind survey.

Grower Satisfaction



Consumer Satisfaction





Ear Length

	Conventional	Organic
Bodacious	10.5"	11.5"
Silver Queen	11"	11.5"
Peaches and Cream	10"	11.5"
Stowell's Evergreen	13.5"	12.5"
Golden Bantam	9.5"	10"
Blue Jade	6"	5.5"

POPULATION PER PLANTING

	Conventional	Organic
Bodacious	324	378
Silver Queen	395	238
Peaches and Cream	234	307
Stowell's Evergreen	424	178
Golden Bantam	413	189
Blue Jade	544	245

PLANT HEIGHT

	Conventional	Organic
Bodacious	72"	80"
Silver Queen	87"	92.5"
Peaches and Cream	80.5"	83.5"
Stowell's Evergreen	114"	117"
Golden Bantam	84"	88"
Blue Jade	36"	37.5"

DISCUSSION

I learned what the benefits would be to the farmer and consumer to growing organic sweet corn and what the challenges are, too. I learned that the consumer cannot tell the difference in the taste of the traditionally grown sweet corn and the organically grown sweet corn. Based on the results of this study, we have switched from growing the conventional Silver Queen corn to the heirloom Stowell's Evergreen white corn. Consumer preferences and grower preferences were the basis for this switch. Consumers preferred the taste over that of Silver Queen, and it ranked higher on some of the measured variables. Silver Queen, in our area, has quite a bit of smut, so much so that there is a significant amount of yield loss. This was not true with the Stowell's Evergreen.

One of the advantages of this project was that our shareholders got to try a variety of sweet corn varieties during the season, many that we never would have chosen. One of the disadvantages for our shareholders was that when one of the varieties failed to produce, or did produce but did not have a good response from the end consumer, we did not have another variety to substitute for that week's offering for corn. We used the corn in the research plots in our count for what we needed for the season. Many of the shareholders enjoyed participating in the project and the collection of research data. However, those that did not were disappointed that they did not get the sweet yellow varieties that they are accustomed to in the summer.

The strongest recommendation that I would have for other local farmers would be to evaluate the use of other varieties of sweet corn for their summer production, especially when considering Silver Queen as their only white corn selection. There are many other varieties that will produce just as well, or better, in our local environment. Financially, this will make sense for them because they will have to spend less money intervening to keep the yields high. It could also create a niche market for them if they are the only one in the area growing a well received variety of corn.

OUTREACH

On August 18, 2012, I hosted an open house here at our farm to share the results of my work with the other farms in the community and with our shareholders. To let people know about it, I posted the information on our farm website, I sent an email to all of our current shareholders, and I talked to other farmers in our community. There was also an article in the local paper about the SARE grant and what I would be doing with it, and the open house component was mentioned in that article. I didn't know the exact date then, but I did have several people contact me and ask to be put on the invitation list. I had 14 people attend. They all stayed for quite a while, and seemed very interested in both the project and the outcome.

I also spoke at length with one of the local farmers in our area who was interested in the research. He grows many acres of sweet corn on his farm in Morrow, Ohio, and also purchases hundreds of dozens of corn from other farmers for sale in his market each summer.

One of our shareholders works for the Warren County, Ohio, Soil and Water Conservation District. He participated in the data collection for my project. He asked me to be one of the keynote speakers at their annual meeting, and present the results of my project. I developed a

power point presentation to use with the delivery of my information. I would estimate that about 125 people attended that meeting. A few of them stopped by to see me and told me that they came specifically to hear my research. Our shareholder said that they had twice the number of participants that they usually do at that event, so there may have been more that were interested in the research.

I participated as an exhibitor in the Ohio Ecological Food and Farm Association's annual conference in Granville, Ohio, February 16-17, 2013. I have been invited back to the 2014 conference as a session presenter to discuss the SARE grant process, and my specific project and outcomes.