

TOMATO ACRES FINAL PERFORMANCE REPORT

Project Title

Extending the Growing Season for Nebraska Specialty Crop Growers

Project Summary

Nebraska's fertile Typic Argiustolls soils that expand across Nebraska's 77,358 square miles play a large role in the state's agricultural success. It has enabled fruit and vegetable growers with the ability to respond to the rising consumer demand for locally grown produce in recent years. But, despite the state's agricultural success, its growing season has its limitations. Growing days range as long as 165 days in the southeast to 120 days in the northwest with killing frosts ranging from October to April and September to May, respectively. Since Nebraska's humid continental and semi-arid climates do not provide fruit and vegetable growers with the luxury of multiple growing seasons within a single calendar year, growers are constantly exploring new avenues with which to extend their seasons to increase crop productivity.

It's no secret that season extension practices, especially plastic mulches and high tunnels, are becoming extremely popular nationwide as more gardeners see them as essential, practical methods to extending the growing season and increasing crop productivity. These methods produce earlier crops in the spring and maintain consistent production well into the fall, thus, increasing the income and profitability of local gardeners.

In an effort to address this need, the U.S. Department of Agriculture (USDA) provided a grant to the Nebraska Department of Agriculture (NDA) to administer a project that is designed to provide small, competitive grants, in the amounts of up to \$4,600, to a limited number of Nebraska specialty crop growers for the sole purpose of extending the growing season for specialty crops.

Tomato Acres was one of the grant sub-recipient's in 2012 who received Specialty Crop Block Grant Program (SCBGP) funding to construct and implement a season extension practice. They decided to build a shade structure that is designed to increase crop yield, lengthen the growing season for cool season crops (during the spring and fall months), and enable produce to ripen to near perfection. This report is a description of Tomato Acres' season extension unit and how it will extend the season for Nebraska specialty crops. A primary goal of this project was to increase the season extension knowledge base among specialty crop producers and to encourage growers to consider adopting similar production methods into their own operations.

Project Approach and Goals and Outcomes Achieved

Tomato Acres is a small family-owned business which began in 1990. It is located in Elm Creek, Nebraska, which is a small town located in south central Nebraska. Their primary

crop is tomatoes, but also offers a wide variety of garden vegetables. The tomatoes are grown and vine ripened in the soil, many of which are in a greenhouse or high tunnel. Tomato Acres currently has four greenhouses and a large garden area spanning more than three acres. Produce is sold at the Haymarket Farmers' Market in Lincoln on Saturday mornings and at the Kearney Area Farmers' Market on Wednesday afternoons and Saturday mornings.

Topographically, this area of the state is located is near the Platte River, which is Nebraska's most popular and longest river and a tributary of the Missouri River. The region is classified as a "Valley," which consists of flat-lying land, along a major stream. The materials of the valley are made of stream-deposited silt, clay, sand, and gravel.

Tomato Acres applied to utilize funds to erect a shade structure. One of the primary reasons Tomato Acres scored so well on their application is because this type of unit is innovative and is not easily found in Nebraska's produce industry landscape. To NDA's knowledge, it is the first of its kind for a produce grower and appears to be an affordable unit that is easily adaptable to Nebraska's landscape, soil conditions, climate, topography, and production needs. This unit could easily be scaled to fit beginning, intermediate, or advanced growers. Tomato Acres is a veteran grower who made an excellent use of grant funds.

In the beginning, the site was prepared for the construction of the shade structure. In March, flags were placed to where the pipes were to be anchored to the ground. The holes were dug and the perimeter of the unit was string lined during May and June 2012. In late July and early August, the metal brackets to hold the roof support pipes were welded to the support poles previously set. The entire process of setting the initial support poles through the roof supports took approximately 45 days.

The frame was painted to prevent rusting. Once the supports were completed and the frame was painted, 40% black-knitted shade cloth was attached to three sides of the structure in one continuous piece. The shade close for the roof was in two pieces and was attached to the roof supports.

Approximately 176.50 hours of labor were spent constructing the shade structure. The labor was provided by Terry and Kathy Labs, owners, and their two grandsons, Spencer and Brandon Nuhfer.



Figure 1 - Shade Structure

Tomato Acres' shade unit consists of a metal pipe frame structure. A removable netted cloth is suspended over the 7 foot high pipes allowing for a flat roof and side walls that are perpendicular to the ground (Figures 1 & 2). The cloth is tied down by straps anchored to ground posts. The cloth is black, thus, blocking out some of the sun's rays, but allows for adequate airflow. The advantage of a shade structure is multifaceted. It increases yield,

lengthens the growing season for cool season crops (during the spring and fall months), protects crops from wind and hail, and allows produce to ripen near to perfection. It enables growers to charge premium prices because of produce quality and the limited number of cool season crops grown in Nebraska. The sunlight under the unit is diminished and is cooler than its surroundings and is an ideal environment when starting new plants. It provides enough light to maintain plant growth and production. Crops grown under the structure generally require less fertilizer and water. More importantly, the netting decreases the kinetic energy of rain drops hitting the soil, thus decreasing water splash and the spread of disease. In terms of convenience, the shade netting can be easily installed and removed in a matter of minutes. The netting is gradually installed, in sections, at the onset of summer but then gradually removed at the onset of fall. Tomato Acres' particular unit is 90 feet long and 36 feet wide, but could easily be scaled to fit any beginning, intermediate, or advanced operation, regardless of their size.



Figure 2 - Shade Structure

Location often dictates when crops are to be planted. The number of days crops need to mature are closely related to their Growing Degree Day (GDD) requirements. For example, specialty crops planted on April 25 in east central Nebraska normally would take longer to mature than if planted on May 20 when the temperature is warmer. However, the disadvantage is that planting crops during warmer temperatures shortens the maturity dates and limits the number of cool season crops that can be grown. The season temperature of a region must be able to meet the GDD requirements of a crop or it will not

be adapted. The GDD available for a crop decreases as the time of planting is delayed; therefore, the adaptability of different crops changes from the beginning to the end of the season. Since the amount of GDD and the dates of killing frosts varies from year to year, planting dates have different freeze risks. Tomato Acres is located in Buffalo County, Nebraska, which averages 2,900 GDD. This equates to a 150-day freeze-free season with the first autumn freeze around October 8th. On October 1, 2012, the night temperature hit 28 degrees, but the crops beneath the shade cloth were protected and were not harmed. The killing frost came a week later when the night temperature hit 17 degrees. Tomato Acres is currently using this shade structure to grow cool season crops during the spring and fall seasons.

The Tomato Acres Farm Tour was held in Elm Creek, Nebraska, on June 9, 2013. NDA worked with Tomato Acres to publicize this event. Announcement of this tour made to the Nebraska delegation who attended the Great Plains Growers Conference in St. Joseph, Missouri, on January 11th, and to growers who attended the Lincoln Farmers Market Meeting in Lincoln, Nebraska on February 9th. Approximately 30 and 70 people attended each event, respectively. In May, NDA sent out 167 postcards to specialty crop growers who lived near Elm Creek encouraging them to attend. Additional postcards were sent to Tomato Acres for additional publication in an effort to better canvas this area, and NDA sent individual announcements to non-profit organizations and University personnel who might

have a potential interest in the tour. The announcement was also posted on the *Nebraska Our Best to You website*. Growers were asked to RSVP to NDA by May 31st. A total of 67 people made RSVP reservations, of which 29 attended.

Lessons Learned

Following the conclusion of the tour, the UNL professor sent out an electronic survey to the attendees to measure the success of this tour. The results were extremely positive. Although not all attendees completed the electronic survey, 100% of the survey respondents stated that they have a better understanding of how a shade unit can be used and it was valuable to conduct a farm visit to see this shade unit in use. The survey showed that 13% of the respondents are planning to develop a structure/system of their own and 75% are somewhat likely to build one, but are not sure when. Overall, 63% of the respondents found the tour to be very informative.

The only delay encountered during the construction of the project was the individual hired to do the welding did not show up to do the work. The problem was solved by renting a welding machine, and Terry Labs did the welding. It probably took a little longer, but the task was accomplished. This part of the construction was done during the time of year when temperatures hit over 100 degrees. This slowed the process down due to the danger of fire.

The shade cloth was reinstalled as early as possible in an effort to obtain two crop seasons during 2013. The structure should help protect the early crops from the usual late frost received early in the spring. The farm tour taught Nebraska specialty crop farmers how they implemented their season extension practice. It provided interested growers with first-hand knowledge as to how the season techniques were incorporated into Tomato Acres' farming operation. Grower education addressed the challenges, obstacles, and opportunities they encountered and how they could have been circumvented. The benefits and results were provided to demonstrate the affordability and practicality of the selected methods.

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Additional Information

The total amount expended for the construction of the shade structure totaled \$4,735.37. In addition, it is estimated that the labor provided by the owners and their helpers amounted to \$2,007.65.