

Farmer Rancher Grant Program

Final Report

I. *Project Identification*

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- Phone: 605-594-6287
- Project Title: **Effects of Eastern South Dakota Soils and Climate on Sustainable Production of Cold Hardy Grape Varieties**
- Project Number FNC07-666
- Project Duration: March 24, 2008 – December 31, 2009
- Date of Report: April 29, 2010

II. *Project Background*

Tucker's Walk Vineyard is now a 12+ acre field that is fenced with 8-foot tall game fence, and contains approximately 4.5 acres of grapes with approximately 2400 plants. The vineyard is surrounded by 54 acres that we also own, including 30+ acres in corn, soybeans rotation, and much of the balance in pasture and homesite. For the corn and soybeans area, we have switched from a cash rent contract to 60/40 shares. We rent some of the pasture land as well. We have tried to use sustainable practices, including the use of fertilizer during the 2009 soybeans rotation to help build up the nutrient in the soils.



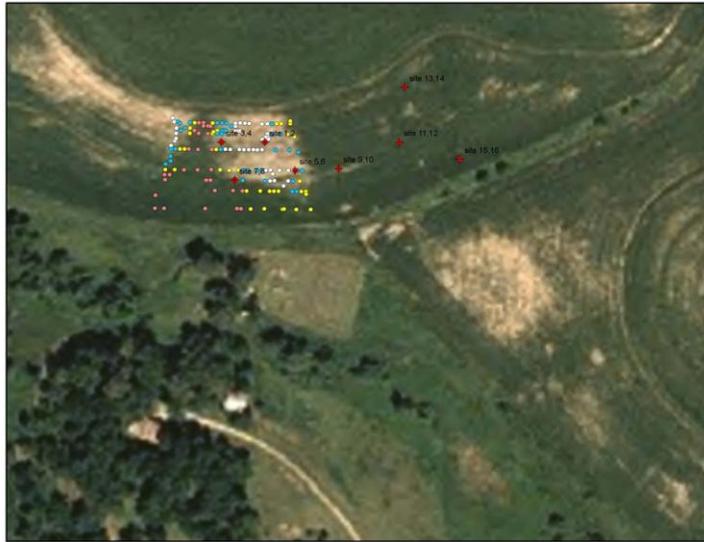
The big project for the last several years has been the gradual planting of our vineyard. We planted buffalo grass, blue gramma, and side oats between the rows and in the aisles of the vineyard. We are using a device (herbaflex) that helps us keep weeds down in the rows, using a spinning device that slings (rather than sprays) droplets of glyphosate. The device has a shield that protects the young grapes from any spray or overspray.

III. *Project Description and Results*

By way of introduction, it should be noted that our study area is just to the south of the Prairie Coteau landform/ecoregion that was rearranged during the last glacial period (Wisconsinan), but itself has older soil development that is referred to as the Loess Prairies. In short, our vineyard is on the very west edge of the rich corn belt that extends east and south into Iowa, and includes a diverse range of soil type and agricultural capability.

The goal of our project was to learn more about the affect of soil and climate conditions on newly developed cold hardy grape varieties that we have planted in the last several years. We especially wanted to document the soil and climate conditions that the newest of these grape varieties, Marquette (nee MN 1211 until being named and patented by the University of Minnesota in 2006) that we began planting in 2008. We chose to focus on Marquette because so little is known about its ability to grow in our soils and survive our cold winters.

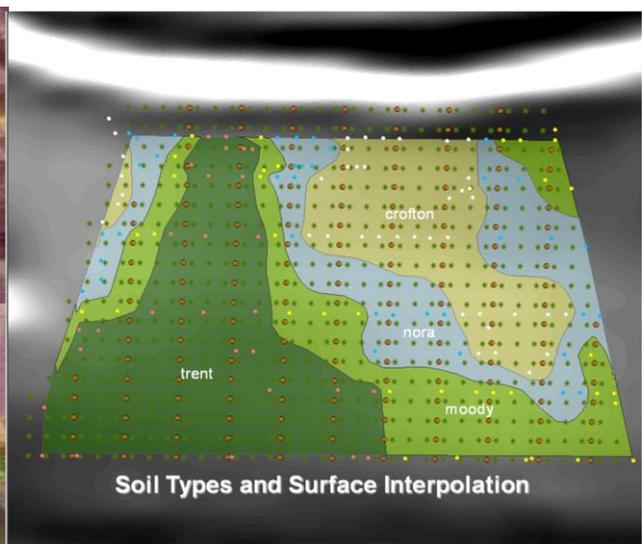
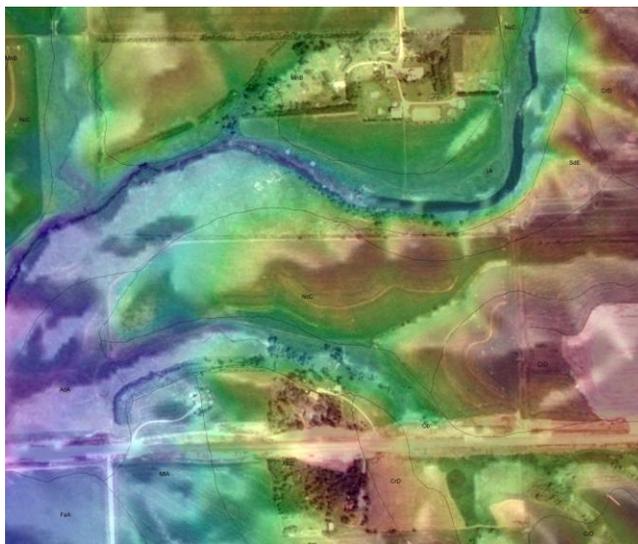
Although we began with a 1:24,000 scale SSURGO soil map from the USDA-NRCS we decided to conduct site specific soil testing and a more detailed mapping of the soils in a 1-acre area planted in 2007. With the help of Bruce Kunze, a professional soil scientist from NRCS, we took over 200 soil samples in the 1 acre plot, and a few in the plot planned for next year, and sent 16 to the SDSU soil lab for more chemical analysis.



Because of our relationship with the South Dakota Specialty Producers Association, and specifically with Dr. Rhoda Burrows and Dr. Anne Fennell, we were able to join up with another research project being conducted at South Dakota State University. This allowed us to instrument our vineyard with temperature sensors mounted on the trellis at a height of 3 feet and 6 feet. The collaborative research project we joined will hopefully lead to the identification of traits and genes involved in acclimation and cold hardiness, and is being conducted at South Dakota State University in cooperation with the University of Minnesota and USDA-ARS Grape Genetic Unit, Geneva, NY. We very much appreciate the help of Dr. Rhoda Burrows (SD Extension Horticulturist), Dr. Anne Fennell (Fruit Crops Research), and Dr. Dennis Todey (SD State Climatologist) in getting our vineyard “wired”. The SDSU devices also measure soil moisture at a depth of 2” and 8”.

Results

The SSURGO map of our vineyard initially showed the soil type as Nora-Crofton Complex, 6 to 9 percent slope. The waterway below the vineyard is shown in class Obert Silty Clay Loam, 0 to 1 percent slope. Bruce Kunze, a professional soil scientist with NRCS, pulled hundreds of soil samples and essentially allows us to map the area at 1:1 scale. While the Nora-Crofton might be a reasonable single class assignment for our 1 acre plot, in reality there are 3 more soil types present. They range from Trent to Moody to Nora to Crofton. The represents a range from some of the best soils in this part of South Dakota to some rather marginal soils.



Even before we studied the response of our Marquette grapes to the soil, we observed differences in the soybeans just outside the vineyard plantings that correspond to the soils. In particular, on the west side of the vineyard plantings, there is a progression from north to south, from the top of the hill to the bottom, from the marginal soils (Crofton) to the best soils (Trent). It is easy to see that the soybeans respond better (are larger and more vigorous) to the heavier soils at the lower section.

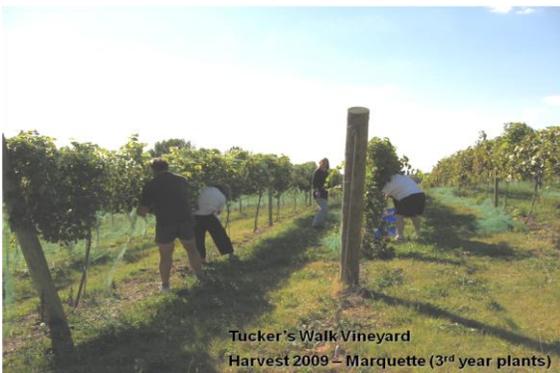


Mid-August soybeans in Crofton soil



Mid-August soybeans in Trent - Moody soil

On the other hand, in the 3 growing seasons since we planted the grapes, we have not observed noticeable differences in the plant vigor. Dr. Fennell predicted that if we were to see differences, it might not be until we had harvested a crop (or even several crops) from the vines. Since last year was our first crop, it may still be too early to measure differences that we can attribute to soil type. Our plan is to continue to monitor the Marquette grapes over time, even to the point of recording the harvest parameters separately (including weight) for each of the soil types.



Tucker's Walk Vineyard
Harvest 2009 - Marquette (3rd year plants)



Tucker's Walk Vineyard - 2009
• Marquette (MN1211)
• 1900 lbs. from ~1/2 acre - Block B
• harvest parameters pH = 3.1, brix = 23.9
• finished wine = 14.88% alcohol, pH 3.4

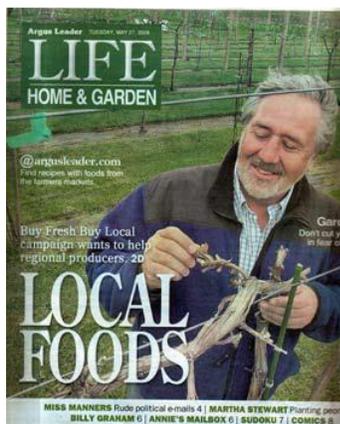
Appendix A is a set of powerpoint slides used to give a briefing to Professional Soil Scientists Association of South Dakota. There was considerable interest in the presentation, and I think we will be working with scientists from the NRCS (Eugene Preston) in future collaborations.

IV. *Project Impacts*

It is much too early to measure the total impact of planting our vineyard and beginning to make wine from our cold hardy grapes. We have told our friends, and even the SD Treasurer's office, that we are looking forward to paying lots of taxes, assuming we have lots of grapes, lots of wine, and lots of customers!

V. Outreach

We have not had to work very hard to communicate the progress on our vineyard project. We live within view of a well traveled highway, and many people see our vines every day as they drive by. The local folks have shown considerable interest in our progress, and if we happen to be out where people can see us in the vineyard, some even stop and visit with us. It has helped considerably that there was an article in the local newspaper (Garretson Weekly) that described our project, and that the Argus Leader (newspaper in nearby Sioux Falls) ran an article that showed pictures of our grapes and a discussion of our participation in the Buy Fresh, Buy Local campaign. This year, we joined the Garretson Chamber of Commerce, and hosted an evening in the vineyard with local business people that was attended by about 20 people. We have hosted



pruning clinics for the South Dakota Specialty Producers Association, and last year, we were honored to have Dr. Paul Reed come up from the University of Nebraska to show us pruning methods for Vertical Shoot Positioning (VSP), our chosen vine training protocol. We have recently gotten bonded, and have applied for a Federal permit for our winery. By next year, we intend to be selling wine and actively advertising our products.



VI. Program Evaluation

N/A – Everything has worked well for us, and we are happy to have been able to participate.

VII. Budget Summary

Soil Testing		237.44
Petiole analysis		66.56
Bird netting		996.10
Post pounder rental	312 + 477 =	789.00
Trellis posts	50% x 950 + 1600 =	1275.00
Earth anchors	50% x 376 =	188.00
Trellis wire	50% x 900 =	450.00
Grape plants	50% x 2025 (2009) + 1966 (2008) =	1995.50
Total:		\$5997.60

Total expenses submitted to SARE: **\$5990**