

Horticulture Research Reports – 2016

TITLE:

Fertility program impacts on yield on Concord grape production in Central Michigan. Experiment 16 – P104

Experiment Information:

Planted: 5/29/2010

Harvested: 9/28/16 thru 10/3/16

Yield Goal: 8 tons/acre

Target Fertilizer: Match Yield Goal

Variety: Concord Grapes

Population: 545 vines/acre

Row Width: 10'

Plot Size: 4 Vines (8' between vines)

Replications: 3

Rootstock: Concord

Soil Test Values:

pH: 7.3

CEC: 8.6

%OM: 1.3

Bray P1: 211

Bicarb P: ---

K: 124 ppm

S: 2 ppm

%K: 3.7

%Mg: 21.6

%Ca: 74.4

Zn: 13 ppm

Mn: 5 ppm

B: 0.8 ppm

Objective:

Compare different fertility programs impact on the yield of Concord grape vines in Central Michigan.

Materials & Methods:

In the spring of 2010, this research vineyard was established with two rows of concord grapes. The rows were spaced ten feet apart and the in-row spacing for the vines was eight feet. Each plot contained four vines (4 vines x 8 ft.). These vines were established and trained to a High Wire Cordon System. The 2013 season was the first cropping year for this block of grapes. During spring, the vines were all pruned to a proper cropload level based on the 30+10 pruning formula. This pruning formula states that for the first pound of one year old growth material that 30 buds will be left on the vine and that for each additional pound of material that an additional 10 buds are left after prune is finished. For example a vine that produced 2 pounds of pruned material will have 40 buds left on the vine. A vine with 4 pounds will have 60 buds left after pruning. Pesticide applications to provide disease and insect control were applied uniformly across all plots as necessary during the growing season. Spring fertilizer applications were directed at the base of the vines at the time of bud-break. Foliar fertilizer applications were applied to selected plots at full bloom, bunch closure and Veraison utilizing a backpack sprayer. At maturity, all clusters were harvested and weighed for all four vines within each plot.

Treatments:

The treatments used in the vineyard were developed to match the nutrient demand of the vineyard based off of the tonnage demand for the vineyard and as the available nutrients in the soil. Below is a table used to calculate the demand of nutrients for the plots in this experiment, this data provided in this table is compiled from various industry, academic, and private institutions.

Grapes Nutrition Requirements*											
	Nitrogen (N)	Phosphorus (P)	Potassium (K)	Calcium (Ca)	Magnesium (Mg)	Manganese (Mn)	Copper (Cu)	Sulfur (S)	Zinc (Zn)	Boron (B)	Iron (Fe)
Removal (lbs./ Tons of Fruit Produced)	2.92	0.56	4.94	1.00	3.2 oz.	-	0.02 oz.	0.08 oz	0.01 oz.	0.02 oz.	0.17 oz.

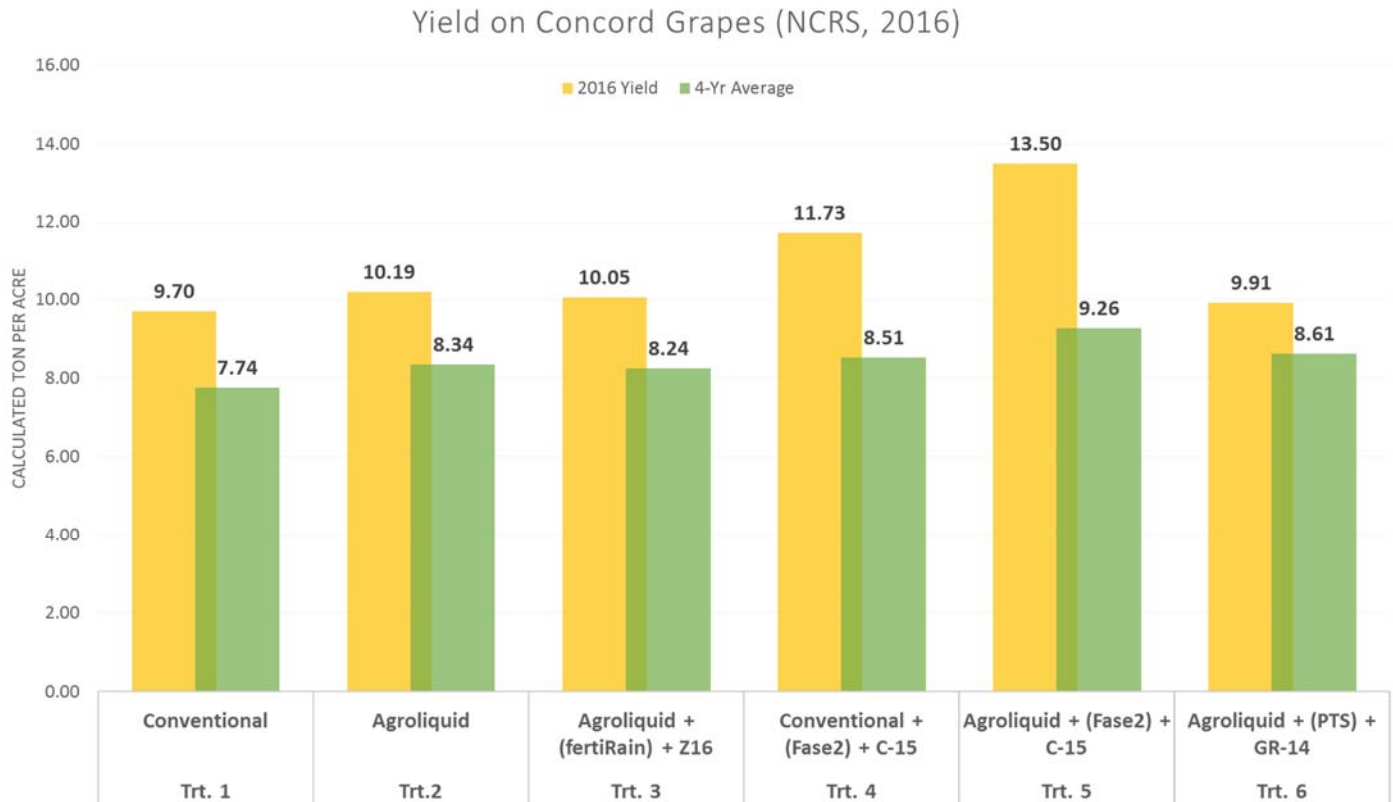
**Data from IPNI, Washington State University, Michigan State University, Internal Data*

After calculating the amount of nutrients need to produce the crop several experimental treatments were developed for this experiment. Dry fertilizer products were applied to the soil surface under the vines in the spring by hand to allow for equal amount of material spread. Conventional liquid fertilizer was mixed and applied using a rate controlled sprayer that allowed the material to be banded under the vines next to the drip irrigation system. The Agroliquid products were applied in the similar way using the same sprayer. All foliar treatments were applied at three times during the growing season (Fruit set, Bunch closure, and Veraison). This application was made using a backpack air blast sprayer to allow for controlled coverage of specific plots.

TREATMENT NUMBER	PRODUCT NAME	PRODUCT PER ACRE	HOW MATERIAL APPLIED AND TIME
1	28% UAN	12.0 gallons	Banded under the vines in the spring
	10-34-0	12.9 gallons	Banded under the vines in the spring
	Sulfate of Potash (SOP)	100 pounds	Spread under the vines in the spring
	Micro-nutrient Mix	0.1 pound	Spread under the vines in the spring
2	High NRG-N	11 gallons	All products banded under the vines in the spring
	Pro-Germinator	4.2 gallons	
	Sure-K	4.2 gallons	
	Micro-500	1 gallon	
	Microlink Manganese	0.125 gallon	
3	High NRG-N	11 gallons	All products banded under the vines in the spring
	Pro-Germinator	4.2 gallons	
	Sure-K	4.2 gallons	
	Micro-500	1 gallon	
	Microlink Manganese	0.125 gallon	
	Z-16 (EXPERIMENTAL)	0.5 gallon	
4	28% UAN	12.0 gallons	Banded under the vines in the spring
	10-34-0	12.9 gallons	Banded under the vines in the spring
	C-15 (EXPERIMENTAL)	0.5 gallon	Banded under the vines in the spring
	Sulfate of Potash (SOP)	100 pounds	Spread under the vines in the spring
	Micro-nutrient Mix	0.1 pound	Spread under the vines in the spring
5	High NRG-N	11 gallons	All products banded under the vines in the spring
	Pro-Germinator	4.2 gallons	
	Sure-K	4.2 gallons	
	Micro-500	1 gallon	
	Microlink Manganese	0.125 gallon	
	C-15 (EXPERIMENTAL)	0.5 gallon	
6	High NRG-N	11 gallons	All products banded under the vines in the spring
	Pro-Germinator	4.2 gallons	
	Sure-K	4.2 gallons	
	Micro-500	1 gallon	
	Microlink Manganese	0.125 gallon	
	GR-14 (EXPERIMENTAL)	0.25 gallon	

*See Text for timing descriptions.

Results:



Conclusions:

- The vineyard has matured (4th year of fruit production) and the yearly production is starting to stabilize based on the various fertility of each plot. The data collected shows that a sustainable level of production can be accomplished using a total AgroLiquid program compared to using conventional fertilizer.
- Again in 2016, we see an increase in tonnage produced by the vineyard when a foliar program is added to the cultural management practices of the vineyard. This holds true for adding the additional spray to either the conventional soil applied program or the Agroliquid soil applied program.
- After several years of continued success in the vineyard several treatments were changed to help determine the impacts of newly developed experimental products. These new products were used in the 2016 season and the effects of switching to these products will not be fully determined until the 2017 season. First impressions are showing great improvements for these new products to be used in commercial grape production.
- The products shown in the chart within the parentheses were the various products uses in the previous growing season. Due to the fact that grape bud formation is created during the growing season prior to the year the fruit is produced it is not possible to conclude that the results seen in 2016 are a results of the products applied in 2016. The results in 2017 will be able to conclude if the products applied in 2016 caused the observed effects.

Additional Information:

Field Data for this project can be found at [2016 data\Field data 2016.xlsx](#)

Look under the Grape tabs.

Plot Plans and protocols can be found at [2016 data\Grapes.xlsx](#)

Look under the Concord tabs.