

Title of Project: Planting and Establishment of Wine Grape Variety Trials for Long-Term Benefit to the Georgia and Southeastern US Wine Industry

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Objective:

The main objective of this proposal is to establish trials of major and new hybrid wine grape varieties, in addition to native varieties, at the University of Georgia Griffin Campus. The goal of this planting is to provide the Georgia wine growers and industry with up-to-date horticultural trait and fruit quality information on varieties that may be grown in the up and coming wine growing regions within Georgia and surrounding areas.

Description and Justification:***Georgia Wine Potential***

In the early eighteenth century, European wine grapes (*Vitis vinifera*) and mulberry trees were first planted in Georgia to promote the trade of wine and silk. Years passed without significant amounts of success for both crops' production. This changed in the mid-nineteenth century when Charles Axt began selling the idea of growing native American grape vines (*Vitis labrusca*, cv. 'Catawba', and *Vitis aestivalis*, cvs. 'Herbemont' and 'Lenoir') to farmers throughout Georgia. Charles Axt became known as the "itinerant Grape Missionary." By the early 1900's, approximately, 20,000 acres were planted to wine grapes in the northeastern portion of Alabama and northwestern Georgia (Pinney, 1989). Georgia became ranked number six in the US for wine production (Winegrowers Association of Georgia, 2012). Unfortunately, with the onset of prohibition, Georgia was the first state to go dry in 1907, 12 years before national amendment passed in 1919 (Pinney, 1989).

Georgia's wine industry began again in the early part of the 1980's with an increase of vineyards and wineries. Just in the last ten years, 12 new vineyards have opened in North Georgia, with more wineries being scheduled to open in the upcoming years (Winegrowers Association of Georgia, 2012). The wine industry in western Georgia is growing as well. The association for the area began in 2009, and as of 2013 has members currently growing or planning to grow wine grapes in 32 counties. To date, collectively there are 36 vineyards and wineries throughout the state of Georgia (Madlom, 2013).

The state wine economic impact has been calculated including for many southern states including Georgia (Wolfe, et al., 2013) Texas (Frank, Rimerman + Co. LLP., 2013), Missouri (Stonebridge Research, 2010), North Carolina (Frank, Rimerman + Co. LLP., 2011), Tennessee (Lockwood, D. 2014, pers. comm.), and Virginia (Frank, Rimerman + Co. LLP., 2012). Wine production is an important component of the states' economies and ranges in economic impact from the millions to the billions of dollars. States with total economic impact in the millions of dollars include Georgia (\$81.6 million), Virginia (\$747 million), and Tennessee (\$880 million). States totaling over \$1 billion dollars of economic impact include North Carolina (\$1.28 billion), Missouri (\$1.6 billion), and Texas (\$1.83 billion).

Justification and Significance

The current and potential growth of the wine industry in the southeastern US creates a unique opportunity for the evaluation of varieties for their suitability to this region of the country. Georgia's historical success and present expansion and growth of the wine industry highlights the importance of variety trial establishment and continued evaluations. Currently, there are some efforts at other institutions that are supporting the

wine industry within their respective states and areas. It is important for an evaluation effort to be established which would provide support for area growers and the expanding industry presence. The potential benefit to establishing a variety evaluation program is to examine the effect of environmental factors present within the area on overall plant performance and fruit quality.

Methodologies:

The University of Georgia Griffin Campus is found approx. 40 miles to the south of Atlanta. Due to the major problem within this region of the country being Pierce’s Disease (Anas et al., 2008) varieties known to be resistant or tolerant to the disease pressure will be selected. Major French American hybrid and American hybrid varieties that are of interest to the area, with their major desirable traits are listed in Table 1. Selected varieties will be grown in a randomized complete block design for variety testing. Plants will be planted with 12 foot between row spacing, and eight foot in row spacing, and will be trained on a single wire bicurtain trellis. Plants will be purchased at US nurseries and the varieties selected to be purchased and grown will depend upon availability and pricing. Current industry standard management practices will be used to establish and grow the plants.

Table 1. French American hybrid and American hybrid varieties of interest to establish variety trial testing at the University of Georgia Griffin Campus.

Cultivar Name (Wine type)	Major Desirable Traits for Area
‘Blanc du Bois’ (White)	Pierce’s Disease ¹ (PD) tolerance (Kamas et al.)
‘Villard Blanc’ (White)	PD tolerance (Kamas et al.) Moderate resistance to downy mildew ² and bunch rot ³ (Robinson et al., 2012)
‘Lenoir’ / ‘Black Spanish’ (Red)	PD tolerance (Texas Wine & Grape Growers Association)
‘Cynthiana’ / ‘Norton’ (Red)	Resistance to powdery and downy mildew (Firstenfeld, 2010)
‘Champanel’ (Red)	PD tolerance (Hu et al., 2012), Anthracnose resistance (Mortensen, 1981)
‘Seyval Blanc’ (White)	Moderately susceptible to powdery mildew and black rot ⁴ , Slightly susceptible to anthracnose ⁵ (Smiley, 2008)
‘Stover’ (White)	PD tolerance (Mortensen, 1968)
‘Lake Emerald’ (White)	PD tolerance (Hu et al., 2012), Black rot tolerance, Downy mildew tolerance (Stover, 1954)
‘Suwannee’ (White)	PD tolerance, Anthracnose tolerance, Powdery mildew tolerance (Mortensen, 1983b)
‘Conquistador’ (Red)	PD tolerance (Hu et al., 2012), Anthracnose resistance, Downy mildew resistance, Black rot resistance (Mortensen, 1983a)
‘Favorite’ (Red)	PD tolerance (Hu et al., 2012)
‘Lomanto’ (Red)	PD tolerance (Kamas et al.)

¹ Pierce’s Disease is caused by the bacterium *Xylella fastidiosa*.

² Downy Mildew is caused by the fungus *Plasmopara viticola*.

³ Bunch Rot is caused by the fungus *Botrytis cinerea*.

⁴ Black rot is caused by the fungus *Guignardia bidwellii* (Ellis) Viala and Ravaz.

⁵ Anthracnose is caused by the fungus *Elsinoe ampelina*.

In future years, the variety trial will be used to study basic plant characteristics for each variety including plant vigor, leafing date, flowering date, ripening dates, number of clusters, number of berries per cluster, cluster and berry weight, and berry color. A LI-COR system (LI-6400 EXT) (LI-COR Biosciences, Lincoln, NE) is available for use at the Griffin campus, and additional traits that can be measured include photosynthetic rate, CO₂ assimilation, and respiration rate, and others. Measuring these traits would allow us to examine the presence or absence of stress on the plant's productivity, and examine how these traits relate to end fruit quality. Plants can also be evaluated for tolerance to the major diseases in the southeastern US climate. Fruit traits that can be evaluated include soluble solids (brix); pH; total titratable acids; color stability; and total anthocyanin content. Variety trials can also be used in future years to examine the effect of new management practices, such as pruning, training and others, on overall plant performance.

Current Results:

Land has been selected, marked off, and rows have been subsoiled for the variety trial planting at the Dempsey Farm at the UGA Griffin Campus. Soil sampling for the variety plot has also been conducted. Due to a high level of deer pressure on the farm, the farm was enclosed with an 8ft wild game fence to prevent severe plant defoliation and successful plant establishment caused by deer pressure. The completion of the fence was delayed and was not completed until July 2015. This prompted the decision to delay planting and establishment of the variety trial until the spring 2016 season. At present, plant material and all supplies needed to establish the variety trial at that time are being ordered and assembled.

Current Conclusions:

There are no conclusions for this project at this time.

Impact Statement:

The establishment of a hybrid variety trial for evaluation in Georgia will provide growers within the state and region with information on individual variety performance in addition to variety performance relative to other varieties. This information is key for a region that suffers from high disease pressure that prevents the establishment and successful growth of well-known European wine grape varieties. The long-term benefit of the trial establishment will enable growers to make suitable variety selections to establish new vineyards or expand their current vineyards.

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